The Breeding Bird Survey 2006

BTO

JOINT NATURE CONSERVATION COMMITTEE

RSPB

The Breeding Bird Survey partnership comprises:

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For further BBS information, visit our web site (www.bto.org/bbs), or visit BirdWeb for information about other bird surveys (www.bto.org/birdweb).

This report is provided free to all BBS fieldworkers and Regional Organisers. Further copies are available from BTO HQ at a cost of £5 (postage and packing included). The report can be downloaded free of charge from www.bto.org/bbs/results/bbsreport.htm.

ACKNOWLEDGEMENTS

The twelfth annual report for the Breeding Bird Survey (BBS) allows us to look at the progress of the scheme over the past thirteen years, 1994–2006. We also present the survey coverage and bird population changes between the two most recent years, 2005–06. Data were collected from 3,295 1-km squares in 2006, representing a massive effort from our volunteer fieldworkers and Regional Organisers (ROs). We would like to take this opportunity to thank everyone who has contributed to the success of the BBS.

The BBS is organised by the British Trust for Ornithology (BTO), and jointly funded by BTO, the Joint Nature Conservation Committee (JNCC is the statutory adviser to Government on UK and international nature conservation, on behalf of the Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage) and the Royal Society for the Protection of Birds (RSPB). The BBS Steering Group comprises Dr Helen Baker (JNCC), Dr Richard Gregory (RSPB), Dr Stephen Baillie (chair, BTO) and Dr David Noble (BTO). We are grateful to the following people who have provided assistance to the scheme since its inception: Dr Nicholas Aebischer, Dr Mark Avery, Dr Ian Bainbridge, Richard Bashford, George Boobyer, Prof. Steve Buckland, Dr Nick Carter, the late Dr Steve Carter, Dr Humphrey Crick, Anita Donaghy, Dr Iain Downie, Dr Steve Freeman, Dr Colin Galbraith, Dr David Gibbons, Dr John Goss-Custard, Dr Rhys Green, Prof. Jeremy Greenwood, Dr Richard Gregory, James Hall, Dr Andrew Joys, John Marchant, Dr Ian McLean, James Mackinnon, Mike Meharg, Dr Dorian Moss, Dr Stuart Newson, Dr Will Peach, Dr Ken Perry, Angela Rickard, Dr Ken Smith, David Stroud, Dr Derek Thomas, Richard Weyl and Karen Wright. We also acknowledge the support of the Environment and Heritage Service in Northern Ireland who generously funded two professional fieldworkers to cover 51 squares in the Province, and the help of staff from the RSPB office in Belfast who organised the fieldwork. Maps of coverage were produced using DMAP, which was written by Dr Alan Morton. The cover photograph of a Turtle Dove is by Mike Weston and the BBS logo is by Andy Wilson. Other photographs in this report are by John Harding and Chris Bradley. Report production and design are by Mandy T Andrews.

PROFILES

Mike Raven is the National Organiser for 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. Mike was previously responsible for the running of the BTO's Nest Record Scheme.

Dr David Noble is the Head of the Census Unit and oversees the running of bird surveys such as the 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.

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The Breeding Bird Survey 2006

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by

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The Breeding Bird Survey 2006

Summary

• This is the twelfth annual report of the BTO/JNCC/RSPB Breeding Bird Survey (BBS), covering the years 1994 to 2006. The primary aim of the survey is to provide population trends for a range of common and widespread bird species in the UK.

• Survey plots are based on '1-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 aim is to survey the same squares each 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 visits are early-morning counts to survey breeding birds. A line-transect method is used, with birds recorded in distance bands. Each survey requires only 5–6 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, who in most cases are BTO Regional Representatives, with help from the BTO's Welsh and Irish Officers and BTO Scotland. Regional Organisers play a vital role in coordinating and fostering local fieldwork effort.

• A total of 223 species and subspecies was recorded on 3,295 BBS squares in 2006. Population indices are calculated using methods that take regional differences in sampling effort into account. We were able to measure population changes with a medium to high degree of precision for 103 species across the UK.

• Trends for Cormorant, Grey Heron and Common Tern are reported with the caveat that counts may contain a high proportion of birds away from breeding sites, and the trend for Tawny Owl with the caveat that the BBS method monitors nocturnal species poorly.

• In the UK, 29 species declined and 45 species increased significantly between 1994 and 2006, with Crossbill, Turtle Dove, Wood Warbler and Willow Tit all decreasing by more than 50%. Grey Partridge, Kestrel, Curlew, Cuckoo, Tawny Owl, Swift, Yellow Wagtail, Spotted Flycatcher, Pied Flycatcher, Hooded Crow, Starling, Bullfinch and Corn Bunting all showed moderate declines (25–50%). Greylag Goose, Canada Goose, Tufted Duck, Little Grebe, Great Crested Grebe, Coot, Great Spotted Woodpecker, Sand Martin, Stonechat, Blackcap, Great Tit, Nuthatch, Raven and Tree Sparrow all showed increases in excess of 50% (Table 4).

• Sixteen widespread species monitored by the BBS have been red-listed on the basis of long-term population trends (see Gregory et al 2002) and, of these, eleven species declined significantly on BBS squares between 1994 and 2006 (Grey Partridge, Turtle Dove, Skylark, Spotted Flycatcher, Willow Tit, Starling, House Sparrow, Linnet, Bullfinch, Yellowhammer and Corn Bunting) and four species increased significantly (Song Thrush, Grasshopper Warbler, Tree Sparrow and Reed Bunting).

• Population changes are provided for all four constituent UK countries – England, Scotland, Wales and Northern Ireland – and for each of the nine English Government Office Regions.

• In England, 24 species declined and 47 species increased significantly between 1994 and 2006. Cuckoo, Turtle Dove and Willow Tit all declined by more than 50%, and Red Grouse, Grey Partridge, Tawny Owl, Swift, Tree Pipit, Yellow Wagtail, Mistle Thrush, Willow Warbler, Spotted Flycatcher, Starling, Linnet, Bullfinch and Corn Bunting all showed moderate declines (25–50%). Increases greater than 50% were recorded for Greylag Goose, Canada Goose, Shelduck, Little Grebe, Buzzard, Coot, Oystercatcher, Common Tern, Ring-necked Parakeet, Green Woodpecker, Great Spotted Woodpecker, Sand Martin, Redstart, Stonechat, Blackcap, Great Tit, Nuthatch, Raven and Greenfinch (Table 5).

• In Scotland, 10 species declined and 17 species increased significantly between 1994 and 2006. Curlew and Kestrel declined by more than 50%, and Lapwing, Swift, Rook, Hooded Crow and Lesser Redpoll all showed moderate declines (25–50%). Increases greater than 50% were recorded for Grey Heron, House Martin, Wren, Mistle Thrush, Blackcap, Whitethroat, Goldcrest, Great Tit and Reed Bunting (Table 6).

• In Wales, 9 species declined and 18 species increased significantly between 1994 and 2006. Starling declined by more than 50% and Curlew, Cuckoo, Swift, Goldcrest, Coal Tit, Bullfinch and Yellowhammer all showed moderate declines (25–50%). Increases greater than 50% were recorded for Great Spotted Woodpecker, Swallow, House Martin, Stonechat, Blackcap, Great Tit, Nuthatch and House Sparrow (Table 7).

• In Northern Ireland, no species were recorded as declining significantly between 1994 and 2006, whereas 17 species increased. Increases greater than 50% were recorded for Wood Pigeon, Swallow, House Martin, Meadow Pipit, Wren, Dunnock, Blackbird, Willow Warbler, Goldcrest, Coal Tit, Blue Tit, Great Tit, Hooded Crow, Greenfinch and Goldfinch (Table 8).

• In England, a number of species showed declines in most of the regions for which population trends could be calculated, including Curlew, Cuckoo, Swift, Skylark, Mistle Thrush, Willow Warbler, Starling and Yellowhammer. Species that showed marked regional differences in population trends included Stock Dove, House Martin, Song Thrush, Chiffchaff, Long-tailed Tit, Magpie and Rook.

• The BBS-online application allows BBS observers to submit their bird, habitat and mammal counts electronically via the web, and view historical data for their squares. 2006 was the third year in which this system was available and data for 50% of squares was submitted using BBS-online. The BBS web pages (available to everyone) provide the visitor with the latest results from the scheme (see www.bto.org/bbs).

Background

The status of wild bird populations is an important indicator of the health of the countryside. The BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched in 1994, with the aim of improving the geographical scope of UK bird monitoring by including all habitats and, therefore, more species of breeding birds than had the previous Common Birds Census (CBC). Since the final year of the CBC in 2000, the BBS has become the primary scheme for monitoring the population changes of our common and widespread bird species in the UK. By surveying more than 2,000 sites each year, we are routinely able to generate UK population trends from BBS data for more than 100 species. BBS results are being used increasingly to set conservation priorities by the Government and by non-governmental organisations.

The BBS and CBC ran alongside each other during 1994–2000 and this overlap period allowed us to develop methods to calculate long-term trends using data from both schemes. Joint CBC/BBS trends for England and the UK have been produced annually for a wide range of species. The most recent update included joint CBC/BBS trends for 1966–2005, published in Breeding Birds in the Wider Countryside: their conservation status 2006 and available on the BTO website (www.bto.org/birdtrends).

Methods and organisation

The BBS uses a line-transect method of surveying birds in randomly selected 1-km squares. Each BBS observer makes two visits each breeding season to count all the birds seen and heard along two 1-km transects across their square. Birds are recorded in one of three distance bands, or in flight, the former to enable detectability to be assessed and species density calculated. 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. Data from the BBS can also be summarised for individual countries, counties and habitats.

Population changes are 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, first summed over all distance categories and transect sections. Counts are modelled as a function of year and site effects, weighted to account for differences in sampling intensity among regions of the UK, with standard errors adjusted for over-dispersion. Only squares that were counted in at least two years are included in the analyses. Counts for six species of wader (Oystercatcher, Lapwing, Golden Plover, Curlew, Redshank and Snipe) have been corrected to exclude counts of non-breeding flocks and, for Golden Plover, observations in unsuitable breeding habitat have also been excluded.

Work has been undertaken to assess the precision and reliability of BBS trends for all species, with the aim of developing a protocol to ensure that reported trends are based on reliable data and sufficient sample sizes. This has resulted in the population trends of five species of gull (Black-headed, Common, Herring, Lesser Black-backed and Great Black-backed) being dropped from the report as a large proportion of the counts are of non-breeding, wintering or migratory birds. Trends for other species with substantial wintering populations (e.g. Fieldfare) are excluded for the same reason. Trends for Cormorant, Grey Heron and Common Tern are reported with the caveat that counts may contain a high proportion of birds away from breeding sites, and the trend for Tawny Owl is reported with the caveat that the BBS method monitors nocturnal species poorly.

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 assigned to them from the sampling strategy to observers in their particular region, and for finding new volunteers. They also manage incoming online submissions, and ensure that survey forms are collected and sent to BTO HQ as soon after the field season as possible. Since the success of the survey depends on volunteer surveyors, we are keen to provide them with up-to-date feedback. All BBS observers receive a copy of the annual report and those returning completed sets of forms are acknowledged by BTO HQ. Those with Internet access can also view BBS data and summaries of trends (see www.bto.org/bbs).

Survey coverage

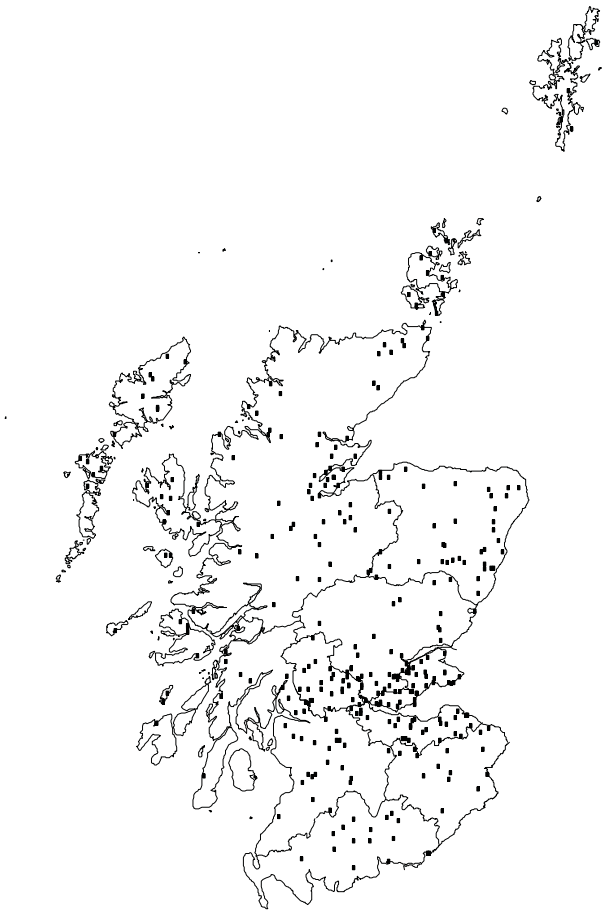
To date, we have received 3,295 sets of completed BBS forms for 2006, the greatest number of squares surveyed since the survey was launched in 1994, and an encouraging increase on the total of 2,889 received for 2005 (Table 1). Only those squares that have been surveyed in two or more years between 1994 and 2006 are included in the calculation of trends, leading to bird counts from 3,671 sites being used in this analysis. BBS squares are randomly selected by computer, and can therefore turn up on any area of land in the UK. A few squares can never be surveyed and truly 'uncoverable' sites are removed from the system. However, squares that are temporarily inaccessible, or which are not taken up because of their remote location, are retained in order to maintain the integrity of the sampling design, although we recognise that some will seldom be surveyed

Table 1. BBS coverage during 2004–06. The number of squares surveyed in each country and English Government Office Region (GOR).

Country/GOR	2004 covered	2005 covered	2006 covered
England	1,883	2,180	2,560
Scotland	272	303	333
Wales	252	270	271
Northern Ireland	103	120	107
Isle of Man	6	3	5
Channel Islands	11	13	19
North West England	220	254	288
North East England	75	84	117
Yorkshire & the Humber	158	183	201
East Midlands	170	201	233
East of England	262	321	371
West Midlands	160	194	214
South East England	446	517	593
South West England	300	333	437
London	92	93	106
Total:	**2,527**	**2,889**	**3,295**

England

A record total of 2,560 squares were surveyed in England in 2006. Record coverage was also achieved in all nine English Government Office Regions and in 47 of the 75 BTO regions, including substantial increases in Buckinghamshire, Devon, Dorset, Durham, Hampshire, Hertfordshire, Leicestershire, Northumberland and the Yorkshire regions of Bradford, North West and Richmond.

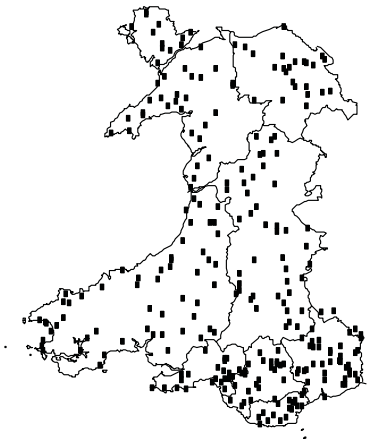


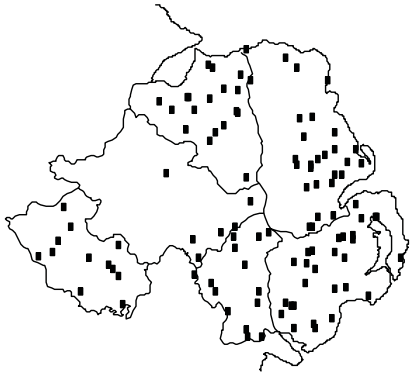
Scotland

The BBS had another very successful year in Scotland in 2006, with a total of 333 squares surveyed by volunteers. This surpassed the previous record of 312 squares set in 1997, a total that included at least 50 squares surveyed by professional fieldworkers. Record coverage was achieved in the BTO regions of Argyll (North), Central, Fife, Lanarkshire and Shetland, and substantial increases were achieved in Caithness and Inverness-shire.

Wales

The total of 271 squares surveyed in Wales in 2006 just exceeded the previous record of 270 squares set in 2005. Record coverage was achieved in the BTO regions of Brecknock, Ceredigion and Glamorgan (South and Mid).





Northern Ireland

A total of 107 squares was surveyed in Northern Ireland in 2006, a decrease on the 120 squares surveyed in 2005, but still the second-best total since the survey started in 1994. A total of 51 squares was surveyed by two professional fieldworkers, funded by the Environment & Heritage Service in Northern Ireland.

Survey results

Species recorded

A total of 223 species, including a number of escapees, subspecies and domestic breeds was recorded on BBS visits in the UK in 2006. Of these, 115 species were recorded in 40 or more squares (Table 2) and a further 108 species in fewer than 40 squares (Table 3).

Gadwall, Goosander, Little Egret, Red Kite, Peregrine and Barn Owl were all recorded on 40 or more squares in 2006, although their mean sample size over the entire survey period (1994–2006) remained under 40 squares, and thus, we were unable to produce reliable trends for these species. However, if present levels of coverage are maintained, we will be able to calculate trends for some of these in the near future, in particular Red Kite, which was recorded on 123 squares. Mandarin, Teal, Fulmar, Ringed Plover, Lesser Spotted Woodpecker, Nightingale, Twite and Indian Peafowl (Peacock) were all recorded on 30–39 squares in 2006, and an increase in population size or increase in BBS coverage may enable us to produce reliable trends for these species in years to come.

The number of squares on which Mandarin, Red Kite, Mediterranean Gull, Barn Owl, Cetti's Warbler and Dartford Warbler were recorded, all increased substantially between 2005 and 2006, a reflection of increased BBS coverage or expanding populations. Fan-tailed Warbler (a new colonist to the Channel Islands), Puffin and Spotted Crake were all recorded for the first time on BBS squares in 2006. At the other end of the spectrum, the Wood Pigeon was by far the most numerous species on BBS squares in the UK, with 76,383 birds counted and distantly followed by Starling (44,580), Rook (40,815) and Blackbird (37,123). Chaffinch was the most widely recorded species in the UK, being noted on 3,051 or 93% of squares surveyed but followed very closely by Wood Pigeon (3,048), Blackbird (3,039), Wren (2,977) and Robin (2,903).

An average of 31 species were recorded on squares across the UK. The most 'species rich' square, where an impressive total of 71 species was recorded in 2006 was located in Oxfordshire, followed by 67 species recorded on a square in the West Midlands. Species richness by county also varied widely, with Norfolk squares recording an average of 36 species, compared to 28 species in County Antrim and only 11 species in the Western Isles of Scotland. However, due credit must be given to observers who survey remote

Table 2. Species recorded in 40 or more squares across the UK during the 2006 BBS survey. 'Number of squares' is the number of squares a species was recorded in, and '%' the percentage of squares the species was recorded in. Non-native species with self-sustaining populations in the UK are followed by (i).

Species	Number of squares	%	Species	Number of squares	%	Species	Number of squares	%
Mute Swan	318	10%	Wood Pigeon	3048	93%	Lesser Whitethroat	355	11%
Greylag Goose	249	8%	Feral Pigeon	819	25%	Whitethroat	1670	51%
Canada Goose (i)	635	19%	Collared Dove	1718	52%	Wood Warbler	62	2%
Shelduck	191	6%	Turtle Dove	141	4%	Chiffchaff	1630	50%
Gadwall	44	1%	Ring-necked Parakeet (i)	87	3%	Willow Warbler	1506	46%
Mallard	1631	50%	Cuckoo	801	24%	Goldcrest	984	30%
Tufted Duck	185	6%	Barn Owl	81	2%	Spotted Flycatcher	241	7%
Goosander	53	2%	Little Owl (i)	130	4%	Pied Flycatcher	40	1%
Red Grouse	117	4%	Tawny Owl	82	2%	Long-tailed Tit	1155	35%
Red-legged Partridge (i)	700	21%	Swift	1329	40%	Blue Tit	2854	87%
Grey Partridge	291	9%	Kingfisher	88	3%	Great Tit	2753	84%
Pheasant (i)	2293	70%	Green Woodpecker	1078	33%	Coal Tit	957	29%
Little Grebe	96	3%	Great Spotted Woodpecker	1428	43%	Willow Tit	60	2%
Great Crested Grebe	79	2%	Skylark	2091	64%	Marsh Tit	182	6%
Cormorant	332	10%	Sand Martin	166	5%	Nuthatch	599	18%
Little Egret	43	1%	Swallow	2467	75%	Treecreeper	434	13%
Grey Heron	868	26%	House Martin	1214	37%	Jay	969	29%
Red Kite	123	4%	Tree Pipit	146	4%	Magpie	2314	70%
Sparrowhawk	476	14%	Meadow Pipit	931	28%	Jackdaw	2105	64%
Buzzard	1174	36%	Yellow Wagtail	178	5%	Rook	1559	47%
Kestrel	847	26%	Grey Wagtail	257	8%	Carrion Crow	2894	88%
Hobby	49	1%	Pied Wagtail	1543	47%	Hooded Crow	152	5%
Peregrine	51	2%	Dipper	68	2%	Raven	338	10%
Moorhen	831	25%	Wren	2977	91%	Starling	2084	63%
Coot	351	11%	Dunnock	2558	78%	House Sparrow	1940	59%
Oystercatcher	379	12%	Robin	2903	88%	Tree Sparrow	210	6%
Golden Plover	111	3%	Redstart	181	6%	Chaffinch	3051	93%
Lapwing	844	26%	Whinchat	73	2%	Greenfinch	2429	74%
Snipe	166	5%	Stonechat	224	7%	Goldfinch	1876	57%
Curlew	520	16%	Wheatear	354	11%	Siskin	179	5%
Redshank	97	3%	Blackbird	3039	92%	Linnet	1324	40%
Common Sandpiper	74	2%	Fieldfare	43	1%	Lesser Redpoll	168	5%
Black-headed Gull	652	20%	Song Thrush	2518	77%	Crossbill	58	2%
Common Gull	170	5%	Mistle Thrush	1386	42%	Bullfinch	639	19%
Lesser Black-backed Gull	676	21%	Grasshopper Warbler	79	2%	Yellowhammer	1399	43%
Herring Gull	844	26%	Sedge Warbler	344	10%	Reed Bunting	649	20%
Great Black-backed Gull	144	4%	Reed Warbler	170	5%	Corn Bunting	160	5%
Common Tern	95	3%	Blackcap	1956	59%			
Stock Dove	919	28%	Garden Warbler	498	15%			

Table 3. Species recorded on fewer than 40 squares in the UK during the 2006 survey. Non-native species with self-sustaining populations in the UK are followed by (i). Species in parenthesis are feral or non-native species in Category E of the British Ornithologists' Union British List. Species marked with an asterisk are usually recognised as races or forms rather than full species.

Species	Number of squares	Species	Number of squares	Species	Number of squares	Species	Number of squares
Whooper Swan	4	Fulmar	32	Whimbrel	31	Fan-tailed Warbler	1
Pink-footed Goose	6	Gannet	19	Greenshank	9	Marsh Warbler	1
White-fronted Goose	1	Shag	18	Green Sandpiper	3	Dartford Warbler	18
Barnacle Goose	9	Bittern	3	Turnstone	12	Firecrest	5
Brent Goose	7	Marsh Harrier	27	Red-necked Phalarope	1	Bearded Tit	3
Egyptian Goose (i)	19	Hen Harrier	19	Arctic Skua	7	Crested Tit	4
Mandarin (i)	39	Montagu's Harrier	1	Great Skua	9	Short-toed Treecreeper	3
Wigeon	8	Goshawk	12	Mediterranean Gull	9	Golden Oriole	1
Teal	38	Golden Eagle	2	Kittiwake	2	Chough	8
Pintail	2	Osprey	5	Sandwich Tern	17	Brambling	7
Garganey	3	Merlin	19	Arctic Tern	10	Twite	33
Shoveler	19	Water Rail	7	Little Tern	4	Scottish Crossbill	5
Pochard	19	Spotted Crake	1	Guillemot	5	Hawfinch	3
Scaup	1	Corncrake	2	Razorbill	4	Snow Bunting	1
Eider	17	Crane	2	Black Guillemot	4	Cirl Bunting	4
Goldeneye	7	Avocet	6	Rock Dove	13		
Red-breasted Merganser	16	Little Ringed Plover	11	Long-eared Owl	1	[Black Swan]	3
Ruddy Duck (i)	13	Ringed Plover	33	Short-eared Owl	25	[Bar-headed Goose]	1
Ptarmigan	1	Dotterel	1	Nightjar	5	Feral/hybrid Goose*	20
Black Grouse	16	Grey Plover	6	Lesser Spotted Woodpecker	30	[Ruddy Shelduck]	2
Capercaillie	1	Knot	1	Woodlark	27	Feral/hybrid mallard type*	29
Quail	9	Sanderling	1	Rock Pipit	23	[Marbled Duck]	1
Golden Pheasant (i)	3	Purple Sandpiper	1	Waxwing	1	[Reeve's Pheasant]	1
Red-throated Diver	14	Dunlin	23	Nightingale	35	[Peacock]	36
Black-throated Diver	3	Jack Snipe	1	Black Redstart	3	[Helmetted Guineafowl]	11
Great Northern Diver	4	Woodcock	15	Ring Ouzel	28		
Puffin	2	Black-tailed Godwit	15	Redwing	11		
Black-necked Grebe	1	Bar-tailed Godwit	5	Cetti's Warbler	28		

areas, which may hold important populations of a small number of specialist species. It is just as important to know where there are few birds as to where there are many.

Conventions for the population trends tables (Tables 4-9)

The figures presented in the trends tables are the percentage changes in population levels for the respective periods, marked with an asterisk where significant. For the 1994–2006 period, the lower and upper 95% confidence limits are given. The sample is the mean number of squares occupied each year over the survey period 1994–2006 (excluding squares that were surveyed in only one year). Species in bold are red-listed and those in italics amber-listed in Population Status of Birds in the UK. Trends for species in parenthesis must be treated with caution, because it is considered either that the species is poorly covered by the BBS method, or that a high proportion of the counts were likely to have been made away from breeding sites. Trends tables and graphs are available on the BTO website (www.bto.org/bbs/trends).

United Kingdom

The trends discussed in this section are for the period 1994–2006 unless otherwise stated. Of the 101 species recorded on an average of 40 or more squares in the UK between 1994 and 2006 (Table 4), 29 declined significantly and 45 increased significantly.

Of the sixteen species that were red-listed in Population Status of Birds in the UK (Gregory et al 2002), because their UK breeding populations had declined by at least 50% during 1974–99, and for which we are able to calculate population trends, eleven declined significantly and four increased significantly between 1994 and 2006. Those showing a decline during this period include farmland specialists such as Grey Partridge (down 37%), Skylark (down 15%), Yellowhammer (down 16%) and Corn Bunting (down 39%). On a more positive note, none of these species showed a significant decline in numbers between 2005 and 2006. However, Turtle Dove numbers fell by 29% between the two most recent survey years, resulting in a significant decline of 61% since 1994.

The recent upward trend in Tree Sparrow seems to have revived after last year's temporary glitch, with numbers increasing by an impressive 66% on BBS squares between 2005 and 2006, and by 97% since 1994. Sand Martin also had a good year in 2006, with numbers up by 63% on the previous year. In general, of the 26 long-distance migrant species monitored by BBS, 14 increased in numbers and 12 declined in numbers between 2005 and 2006, although the vast majority of these changes were not significant. A number of our long-distance migrants are prone to large annual variations, driven by a number of factors including breeding productivity and conditions on their wintering grounds and migration routes. Significant declines were noted between 2005 and 2006 for some of our small-bodied residents, such as Goldcrest, Wren and Coal Tit. It is possible that colder-than-average winter temperatures in 2005/06 (at least by modern standards) probably contributed towards these falls in numbers.

A total of 30 species for which we are able to generate population trends are amber-listed in Population Status of Birds in the UK. These species are amber-listed on the basis of one or more criteria, including declines in breeding numbers, declines in breeding range, the UK breeding population forms a large proportion of the European total, or the species has an unfavourable status in Europe.

Of twelve species amber-listed on the basis of moderate (25–50%) declines in the UK during 1974–99, two increased significantly (House Martin and Dunnock) and eight decreased significantly (Kestrel, Lapwing, Cuckoo, Meadow Pipit, Yellow Wagtail, Mistle Thrush, Wood Warbler and Willow Warbler) during 1994–2006. Five species for which BBS trends are calculated are amber-listed on the basis that their UK breeding population forms at least 20% of the European population and, of these, only Curlew showed any significant change in numbers, with a 37% decline since 1994. Seven species are amber-listed partly because of their unfavourable status in Europe (i.e. 'Species of European Concern' (SPEC) 2 and 3), and of these, Green Woodpecker, Sand Martin, Swallow, Redstart and Stonechat have all increased significantly since 1994. Note that these criteria were based on the SPEC classifications in the first version of Birds in Europe. The revised and original SPECs are listed in a new Birds in Europe (Birdlife International 2004).

Please note that the UK trends for Hobby and Ring-necked Parakeet, which were both recorded on an average of fewer than 40 squares each year during 1994–2006 have been included in Table 4 because these species meet the criteria for reporting trends in England where most of the populations reside.

Table 4. UK population changes for species recorded on a mean of 40 or more squares per year for 2005–06 and 1994–2006.

Species	Sample	Change 05-06	Change 94-06	lcl	ucl	Species	Sample	Change 05-06	Change 94-06	lcl	ucl
Mute Swan	201	-14	8	-6	25	*Dunnock*	1686	2	25 *	19	31
Greylag Goose	118	-9	235 *	169	318	Robin	1942	1	18 *	14	22
Canada Goose	368	5	161 *	130	195	*Redstart*	136	9	30 *	10	53
Shelduck	125	49 *	0	-15	16	Whinchat	72	13	-22 *	-38	-3
Mallard	1059	-2	20 *	12	28	*Stonechat*	113	-17	177 *	116	256
Tufted Duck	131	47 *	94 *	63	132	Wheatear	258	18	13	0	27
Red Grouse	103	-2	-18	-34	3	Blackbird	2030	-3	18 *	15	21
Red-legged Partridge	441	-12	36 *	23	52	**Song Thrush**	1609	-2	17 *	11	23
Grey Partridge	220	2	-37 *	-46	-26	*Mistle Thrush*	1043	-7	-13 *	-20	-6
Pheasant	1435	5	38 *	31	45	**Grasshopper Warbler**	63	6	49 *	9	102
Little Grebe	58	7	72 *	28	133	Sedge Warbler	257	-7	0	-12	14
Great Crested Grebe	61	154 *	157 *	103	225	Reed Warbler	100	-4	37 *	15	64
(Cormorant)	188	-9	14	-3	33	Blackcap	1226	4	67 *	57	77
(Grey Heron)	559	-9	18 *	7	31	Garden Warbler	389	-1	-11	-21	0
Sparrowhawk	302	0	-1	-14	13	Lesser Whitethroat	224	25	-16 *	-28	-3
Buzzard	623	-7	49 *	36	63	Whitethroat	1101	9	37 *	29	45
Kestrel	565	-10	-25 *	-33	-17	*Wood Warbler*	53	-6	-66 *	-74	-55
Hobby	32	21	-9	-37	33	Chiffchaff	1120	-18 *	8 *	2	15
Moorhen	559	2	21 *	10	34	*Willow Warbler*	1233	-6	-7 *	-12	-3
Coot	221	-7	66 *	44	91	*Goldcrest*	640	-20 *	37 *	26	50
Oystercatcher	261	3	-10	-18	0	**Spotted Flycatcher**	197	-4	-29 *	-40	-17
Golden Plover	53	34	27	-2	64	Pied Flycatcher	40	-19	-44 *	-60	-23
Lapwing	593	2	-17 *	-23	-10	Long-tailed Tit	734	1	1	-9	12
Snipe	128	-13	14	-5	36	Blue Tit	1900	-3	20 *	16	25
Curlew	438	0	-37 *	-42	-32	Great Tit	1767	6	54 *	48	61
Redshank	73	-8	-21	-38	0	Coal Tit	632	-18 *	8	-1	17
Common Sandpiper	60	2	-11	-29	11	**Willow Tit**	53	0	-69 *	-77	-56
(Common Tern)	53	57	21	-9	59	**Marsh Tit**	132	-31	-10	-28	13
Feral Pigeon	587	-18 *	-12 *	-20	-3	Nuthatch	360	-6	64 *	45	85
Stock Dove	655	-3	5	-5	16	Treecreeper	293	6	30 *	13	50
Wood Pigeon	2045	1	20 *	16	25	Jay	601	4	1	-9	11
Collared Dove	1125	1	39 *	32	47	Magpie	1570	-4	-1	-5	4
Turtle Dove	178	-29	-61 *	-68	-52	Jackdaw	1355	-10	27 *	20	35
Ring-necked Parakeet	30	19	302 *	140	572	Rook	1092	-3	-7	-14	1
Cuckoo	716	-1	-30 *	-35	-24	Carrion Crow	1922	6	21 *	15	27
Little Owl	94	25	0	-22	28	Hooded Crow	119	-12	-28 *	-42	-11
(Tawny Owl)	79	-41	-43 *	-57	-24	Raven	203	-31 *	57 *	31	87
Swift	927	-8	-26 *	-31	-20	**Starling**	1568	-5	-27 *	-31	-22
Kingfisher	47	28	24	-12	76	**House Sparrow**	1356	-6	-6 *	-10	-2
Green Woodpecker	650	9	44 *	32	57	**Tree Sparrow**	142	66 *	97 *	66	135
Great Spotted Woodpecker	759	3	130 *	110	152	Chaffinch	2032	1	17 *	13	20
Skylark	1480	-3	-15 *	-18	-11	Greenfinch	1513	4	49 *	41	57
Sand Martin	107	63 *	115 *	75	163	Goldfinch	1206	-12	21 *	13	30
Swallow	1600	1	36 *	30	43	Siskin	116	-11	-15	-31	5
House Martin	817	-14	19 *	9	29	**Linnet**	1081	-16 *	-24 *	-29	-18
Tree Pipit	121	4	-21 *	-35	-4	*Lesser Redpoll*	128	-24	4	-15	28
Meadow Pipit	676	-11 *	-16 *	-20	-11	Crossbill	40	-11	-52 *	-67	-30
Yellow Wagtail	152	6	-29 *	-40	-16	**Bullfinch**	496	-27 *	-28 *	-35	-19
Grey Wagtail	182	-30	20	0	45	**Yellowhammer**	1046	1	-16 *	-20	-11
Pied Wagtail	1083	-3	17 *	9	25	**Reed Bunting**	387	9	39 *	26	53
Dipper	49	-5	8	-22	50	**Corn Bunting**	138	-12	-39 *	-49	-27
Wren	2012	-10 *	11 *	8	15						

England

A total of 192 species was recorded on BBS visits in England in 2006 and, of these, Wood Pigeon was again the most widespread, being recorded on 97% of squares, closely followed by Blackbird (96%), Chaffinch (95%) and Carrion Crow (94%). Of the 94 species that were recorded on an average of 30 or more squares in England (Table 5), 24 declined significantly and 47 increased significantly between 1994 and 2006.

For several species that have a mainly English distribution in the UK, the trends for England and the UK are generally similar. However, the population trends for several species in England differed from those for the UK, such as the Lapwing, which increased significantly in England, but declined in the UK overall since 1994. In contrast, Wheatear and Long-tailed Tit have declined significantly in England, while showing no significant change in numbers in the UK. Numbers of Great Crested Grebe, Grey Heron, House Martin, Wren and Treecreeper all increased significantly in the UK, but showed no significant change in England.

Due to the increase in survey coverage in England over the past five years, we are now able to calculate trends for Ring-necked Parakeet for the first time. This non-native species was added to the UK list only in 1983, after which numbers have continued to increase and have more than trebled on BBS squares since 1994. Likewise, its range has also increased, with birds being recorded on only 0.3% of squares in 1994, but 3.4% in 2006.

Eleven species were recorded on an average of 20–29 squares in England over the entire survey period and hence too few squares for English trends to be calculated (Gadwall, Red Kite, Common Sandpiper, Barn Owl, Lesser Spotted Woodpecker, Dipper, Nightingale, Whinchat, Fieldfare, Grasshopper Warbler and Wood Warbler).

Table 5. ENGLAND. Population changes for species recorded on a mean of 30 or more squares per year for 2005–06 and 1994–2006.

Species	Sample	Change 05–06	Change 94–06	lcl	ucl	Species	Sample	Change 05–06	Change 94–06	lcl	ucl
Mute Swan	172	-14	-10	-22	4	Pied Wagtail	821	-6	17*	8	27
Greylag Goose	96	69*	166*	119	224	Wren	1560	-7*	1	-3	4
Canada Goose	344	-3	128*	101	159	*Dunnock*	1375	3	18*	13	24
Shelduck	103	70*	68*	42	99	Robin	1526	3	23*	18	27
Mallard	885	0	26*	18	35	*Redstart*	73	35	59*	26	100
Tufted Duck	113	1	41*	17	70	*Stonechat*	44	-10	164*	78	290
Red Grouse	46	-17	-27*	-44	-6	Wheatear	126	-13	-22*	-35	-7
Red-legged Partridge	432	-11	31*	18	45	Blackbird	1614	-3	15*	12	18
Grey Partridge	196	10	-32*	-42	-21	**Song Thrush**	1247	3	19*	12	25
Pheasant	1211	7	48*	41	56	*Mistle Thrush*	835	-13	-28*	-34	-21
Little Grebe	48	8	84*	30	160	Sedge Warbler	164	13	5	-9	23
Great Crested Grebe	55	7	-6	-28	23	Reed Warbler	96	6	34*	12	61
(Cormorant)	154	-3	35*	14	60	Blackcap	1062	5	58*	49	67
(Grey Heron)	454	-3	8	-3	20	Garden Warbler	318	7	-8	-19	4
Sparrowhawk	251	-7	-8	-20	7	Lesser Whitethroat	214	32	-14	-26	0
Buzzard	369	10	111*	88	136	Whitethroat	951	10	37*	29	46
Kestrel	488	-6	-9	-18	2	Chiffchaff	945	-16*	9*	3	16
Hobby	31	21	-7	-37	36	*Willow Warbler*	841	-1	-29*	-33	-25
Moorhen	513	2	18*	7	29	*Goldcrest*	447	-13	32*	19	46
Coot	200	-9	70*	46	97	**Spotted Flycatcher**	141	5	-40*	-50	-27
Oystercatcher	129	3	57*	34	83	Long-tailed Tit	645	-3	-12*	-20	-2
Lapwing	484	1	15*	5	26	Blue Tit	1539	1	17*	13	22
Snipe	60	9	6	-18	37	Great Tit	1433	10	51*	44	58
Curlew	260	-4	-22*	-29	-15	Coal Tit	415	1	19*	8	32
Redshank	49	-22	-17	-39	11	**Willow Tit**	46	7	-69*	-78	-56
(Common Tern)	48	95	116*	58	194	**Marsh Tit**	118	-25	-21	-37	0
Feral Pigeon	492	-14	-14*	-22	-5	Nuthatch	298	-1	62*	42	85
Stock Dove	603	-4	2	-8	13	Treecreeper	217	7	9	-6	28
Wood Pigeon	1631	6	28*	23	34	Jay	520	3	-10	-18	0
Collared Dove	994	3	41*	34	49	Magpie	1307	-4	-4	-9	1
Turtle Dove	175	-27	-60*	-68	-52	Jackdaw	1070	2	40*	32	49
Ring-necked Parakeet	30	19	302*	140	572	Rook	857	15	7	-2	16
Cuckoo	574	-8	-51*	-55	-46	Carrion Crow	1572	7	29*	22	36
Little Owl	90	33	14	-11	47	Raven	66	-36	175*	103	273
(Tawny Owl)	67	-41	-36*	-53	-13	**Starling**	1286	-5	-38*	-42	-34
Swift	798	-18*	-35*	-40	-29	**House Sparrow**	1121	-5	-14*	-18	-10
Kingfisher	41	7	19	-16	69	**Tree Sparrow**	117	18	26*	3	53
Green Woodpecker	601	13	58*	44	73	Chaffinch	1572	3	22*	18	25
Great Spotted Woodpecker	674	10	125*	106	147	Greenfinch	1272	3	51*	43	59
Skylark	1163	-2	-19*	-22	-15	Goldfinch	989	-4	16*	8	25
Sand Martin	72	119*	119*	75	174	Siskin	36	4	18	-17	67
Swallow	1226	8	36*	29	44	**Linnet**	877	-14	-30*	-36	-25
House Martin	647	-16*	2	-7	11	*Lesser Redpoll*	52	26	-8	-32	26
Tree Pipit	65	15	-38*	-52	-21	**Bullfinch**	384	-22*	-30*	-38	-21
Meadow Pipit	344	-13	-23*	-29	-18	**Yellowhammer**	913	-2	-21*	-25	-16
Yellow Wagtail	149	6	-27*	-38	-13	**Reed Bunting**	290	3	16*	4	29
Grey Wagtail	117	-23	36*	8	70	**Corn Bunting**	132	-10	-34*	-45	-22

Scotland

A total of 165 species was recorded on BBS visits in Scotland in 2006 and, of these, Wren was the most widespread, being noted on 77% of squares surveyed, followed by Chaffinch (76%), Skylark (70%) and Meadow Pipit (68%). Two species were recorded for the first time on BBS squares in Scotland: Puffin and Helmeted Guineafowl. Two species that are on the edge of their natural range in Scotland (albeit expanding northwards) were also noted (Marsh Harrier and Nuthatch), plus a selection of late winter visitors and passage migrants (Whooper Swan, Pink-footed Goose, White-fronted Goose, Barnacle Goose, Great Northern Diver, Sanderling, Purple Sandpiper, Bar-tailed Godwit, Green Sandpiper, Turnstone, Fieldfare and Brambling) some of which occasionally breed in Scotland.

A total of 54 species was recorded on an average of 30 or more squares in Scotland (Table 6), and of these, ten had declined significantly and seventeen had increased significantly between 1994 and 2006. For many species, the trends in Scotland were broadly similar to those in England, including significant increases in Dunnock, Blackbird, Blackcap, Whitethroat, Goldcrest, Blue Tit, Great Tit, Chaffinch and Reed Bunting. In contrast, numbers of Curlew, Swift and Meadow Pipit all declined significantly in both countries.

A number of species continue to fare better in Scotland than in England (Cuckoo, Mistle Thrush, Willow Warbler and House Sparrow), whilst others are declining significantly in Scotland whilst increasing south of the border in England (Wood Pigeon, Lapwing and Oystercatcher). Grey Heron, House Martin, Wren and Magpie have increased significantly in Scotland since 1994, but have shown no significant change in England. Conversely, populations of Kestrel, Rook and Lesser Redpoll have declined in Scotland but appear to be stable further south.

Fourteen species were recorded on an average of 20–29 squares in Scotland over the entire survey period, and hence too few squares for Scottish population trends to be calculated (Grey Partridge, Redshank, Stock Dove, Great Spotted Woodpecker, Sand Martin, Tree Pipit, Grey Wagtail, Dipper, Whinchat, Stonechat, Chiffchaff, Spotted Flycatcher, Long-tailed Tit and Treecreeper). Several of these species were recorded on more than 30 squares in 2006, and therefore, if current levels of coverage are maintained, we should be able to produce Scottish trends for them in the future.

Wales

A total of 143 species was recorded on BBS visits in Wales in 2006, including five which had never been seen on Welsh BBS squares before (Brent Goose, Spotted Crake, Grey Plover, Knot and Twite). Chaffinch was the most widely recorded species in Wales, being noted on 93% of surveyed squares, closely followed by Wren, Blackbird and Carrion Crow (all 92%) and Robin (88%).

Of the 52 species that were recorded on an average of 30 or more squares in Wales (Table 7), nine had declined significantly and 18 had increased significantly between 1994 and 2006. Starling underwent the greatest decline of any species monitored by the BBS in Wales, with numbers falling by 51% since 1994. Similar downward trends were also recorded for typical woodland species (Willow Warbler, Coal Tit and Goldcrest), long-distance migrants (Cuckoo and Swift) and farmland specialists such as Yellowhammer.

For most species, the Welsh trends matched the pattern further east in England. However, there were a few notable exceptions, including Goldcrest and Coal Tit, which have both undergone significant declines in Wales since 1994, while increasing in England. The opposite applies to House Sparrow, where the Welsh population appears to be faring well, and has increased by more than 100% since 1994, compared to an overall decline in England. Likewise, House Martin numbers have increased significantly in Wales, but have shown little change in England over the survey period.

Table 6. SCOTLAND. Population changes for species recorded on a mean of 30 or more squares per year for 2005–06 and 1994–2006.

Species	Sample	Change 05–06	Change 94–06	lcl	ucl	Species	Sample	Change 05–06	Change 94–06	lcl	ucl
Mallard	89	-17	-4	-25	24	**Song Thrush**	143	-13	10	-9	32
Red Grouse	52	13	-12	-38	23	*Mistle Thrush*	64	-6	62 *	17	125
Pheasant	109	-3	-13	-28	6	Sedge Warbler	47	-9	7	-22	47
(Grey Heron)	45	-5	78 *	17	173	Blackcap	35	-10	112 *	35	232
Buzzard	109	-19	20	-6	55	Whitethroat	63	3	92 *	40	164
Kestrel	41	-35	-65 *	-77	-46	*Willow Warbler*	177	-12	20 *	5	37
Oystercatcher	119	5	-20 *	-31	-8	*Goldcrest*	76	-25	95 *	49	155
Golden Plover	41	36	21	-10	62	Blue Tit	131	-11	24 *	5	47
Lapwing	85	2	-47 *	-57	-34	Great Tit	118	6	68 *	37	106
Snipe	52	-23	17	-13	59	Coal Tit	102	-27	2	-17	25
Curlew	118	-4	-52 *	-60	-42	Magpie	37	9	40 *	1	94
Common Sandpiper	33	2	-11	-37	24	Jackdaw	96	-9	2	-19	29
Feral Pigeon	53	-36	-19	-43	16	Rook	98	-25	-29 *	-48	-4
Wood Pigeon	168	-20	-21 *	-31	-10	Carrion Crow	158	-1	-5	-21	14
Collared Dove	40	-1	6	-24	48	Hooded Crow	50	-16	-48 *	-61	-30
Cuckoo	65	14	48 *	13	95	Raven	39	-16	49	-3	127
Swift	45	-7	-35 *	-53	-12	**Starling**	129	1	23	-2	55
Skylark	188	-6	-8	-18	3	**House Sparrow**	77	-7	31 *	5	63
Swallow	143	-9	13	-4	33	Chaffinch	199	6	13 *	2	24
House Martin	49	-12	126 *	43	256	Greenfinch	89	15	22	-5	58
Meadow Pipit	194	-6	-22 *	-30	-13	Goldfinch	69	-15	39	-4	99
Pied Wagtail	118	2	12	-9	38	Siskin	54	-18	-25	-47	8
Wren	188	-17	59 *	38	82	**Linnet**	82	-23	-5	-27	25
Dunnock	111	-7	32 *	5	66	*Lesser Redpoll*	36	-55*	-37 *	-59	-3
Robin	161	-10	4	-10	19	**Bullfinch**	31	-18	26	-27	115
Wheatear	73	31	23	-3	57	**Yellowhammer**	90	9	11	-7	34
Blackbird	158	5	16 *	3	31	**Reed Bunting**	46	36	93 *	41	165

Table 7. WALES. Population changes for species recorded on a mean of 30 or more squares per year for 2005–06 and 1994–2006.

Species	Sample	Change 05–06	Change 94–06	lcl	ucl	Species	Sample	Change 05–06	Change 94–06	lcl	ucl
Mallard	60	38	23	-7	63	Blackcap	104	0	77 *	44	117
Pheasant	78	4	45 *	18	78	Garden Warbler	53	21	-24	-43	2
(Grey Heron)	41	-39	-18	-45	23	Whitethroat	71	14	-9	-27	14
Buzzard	127	-17	-5	-22	16	Chiffchaff	117	-20	1	-16	20
Curlew	38	15	-40 *	-58	-13	*Willow Warbler*	147	7	-22 *	-32	-12
Wood Pigeon	169	2	31 *	16	48	*Goldcrest*	77	-21	-40 *	-52	-24
Collared Dove	61	4	33 *	2	73	Long-tailed Tit	52	-17	33	-12	99
Cuckoo	56	-6	-36 *	-52	-14	Blue Tit	159	-12	32 *	16	50
Swift	63	-4	-31 *	-50	-4	Great Tit	151	1	55 *	33	80
Green Woodpecker	43	-11	11	-24	64	Coal Tit	65	-8	-28 *	-44	-6
Great Spotted Woodpecker	57	-17	82 *	30	155	Nuthatch	62	-26	51 *	9	107
Skylark	96	-2	-2	-15	13	Treecreeper	38	-16	40	-9	117
Swallow	152	-5	73 *	46	105	Jay	62	13	33	-2	81
House Martin	82	11	95 *	48	157	Magpie	148	-4	-8	-21	9
Tree Pipit	31	6	-28	-51	6	Jackdaw	125	-50 *	19	-5	49
Meadow Pipit	81	-15	3	-11	19	Rook	73	-7	-24	-45	7
Pied Wagtail	106	-18	13	-10	40	Carrion Crow	182	13	30 *	12	50
Wren	177	-10	3	-7	13	Raven	78	-46 *	13	-16	51
Dunnock	134	1	38 *	18	62	**Starling**	81	-14	-51 *	-62	-36
Robin	174	5	13 *	3	24	**House Sparrow**	108	0	107 *	72	148
Redstart	53	-8	-2	-23	25	Chaffinch	178	-12	-6	-15	4
Stonechat	31	-22	287 *	129	555	Greenfinch	100	-11	26 *	1	58
Wheatear	48	22	10	-18	48	Goldfinch	110	-39 *	25	-2	61
Blackbird	176	0	39 *	27	52	**Linnet**	87	-24	-7	-30	22
Song Thrush	149	-3	31 *	13	51	**Bullfinch**	58	-49 *	-42 *	-57	-20
Mistle Thrush	91	1	2	-22	33	**Yellowhammer**	37	2	-44 *	-58	-24

Ten species were recorded on an average of 20–29 squares in Wales over the entire survey period, and hence too few squares for Welsh trends to be calculated (Kestrel, Stock Dove, Feral Pigeon, Grey Wagtail, Sedge Warbler, Wood Warbler, Spotted Flycatcher, Pied Flycatcher, Siskin and Reed Bunting). The considerable increase in BBS coverage in Wales over the last three years has enabled us to calculate Welsh trends for Stonechat for the first time, the numbers of which, have increased nearly threefold since 1994.

Northern Ireland

A total of 113 species was recorded on BBS visits in Northern Ireland in 2006, including three that have never been recorded on BBS squares in the Province before (Little Egret, Kittiwake and Waxwing). Wren was the most widespread species, being recorded on 98% of squares, followed by Chaffinch (93%), Robin and Swallow (both 92%) and Wood Pigeon (90%). Of the 26 species that were recorded on an average of 30 or more squares in Northern Ireland (Table 8), no species had declined significantly and 17 species had increased significantly between 1994 and 2006. However, the numbers of several species are now less than they were in 1994, in particular those for Skylark, Mistle Thrush and House Sparrow, although none of these declines are statistically significant. On the list of increasing species are several typical garden birds (Wren, Dunnock, Robin, Blackbird, Blue Tit, Great Tit, Chaffinch, Greenfinch and Goldfinch), woodland species (Willow Warbler, Goldcrest and Coal Tit), long-distance migrants (Swallow and House Martin) and the ubiquitous Wood Pigeon and Hooded Crow.

Because of the relatively small number of squares surveyed in Northern Ireland, we are able to produce population indices for only the most widespread and numerous species in the Province. Most of the birds that are declining in other parts of the UK cannot be monitored by the BBS in Northern Ireland. Eleven species were

Table 8. NORTHERN IRELAND. Population changes for species recorded on a mean of 30 or more squares per year for 2005–06 and 1994–2006.

Species	Sample	Change 05–06	Change 94–06	lcl	ucl	Species	Sample	Change 05–06	Change 94–06	lcl	ucl
Wood Pigeon	67	-19	53 *	16	102	*Goldcrest*	35	-23	100 *	15	249
Skylark	32	-6	-17	-43	20	Blue Tit	61	-26	78 *	31	141
Swallow	68	5	51 *	14	101	Great Tit	55	-21	158 *	80	269
House Martin	33	-32	96 *	17	229	Coal Tit	49	-37	73 *	3	190
Meadow Pipit	55	-16	65 *	27	116	Magpie	67	-7	24	-3	59
Pied Wagtail	34	37	62	-5	177	Jackdaw	60	2	-3	-29	31
Wren	75	-3	86 *	48	135	Rook	61	-34	-7	-36	35
Dunnock	56	28	286 *	154	488	Hooded Crow	65	-6	70 *	17	146
Robin	71	13	36 *	9	70	**Starling**	63	-18	41	-7	113
Blackbird	70	-13	70 *	37	111	**House Sparrow**	41	-20	-19	-42	14
Song Thrush	61	0	30	-6	79	Chaffinch	73	-13	49 *	16	91
Mistle Thrush	49	22	-11	-41	35	Greenfinch	41	9	236 *	97	474
Willow Warbler	64	-6	71 *	27	130	Goldfinch	31	-28	101 *	25	224

recorded on an average of 20–29 squares in Northern Ireland over the entire survey period, and hence too few squares for trends to be calculated (Pheasant, Curlew, Collared Dove, Cuckoo, Sedge Warbler, Blackcap, Chiffchaff, Linnet, Lesser Redpoll, Bullfinch and Reed Bunting). However, as a result of increased coverage, the BBS is now able to monitor the numbers of Goldfinch in Northern Ireland for the first time.

Isle of Man and the Channel Islands

A total of 61 species was recorded on five squares on the Isle of Man in 2006, including two that were new to the BBS on the island (Tufted Duck and Black Guillemot) and two island specialities (Hen Harrier and Chough). Seventy-five species were recorded on a record total of 19 squares on the Channel Islands in 2006, including 13 squares on Jersey, 4 on Alderney and 2 on Guernsey. Of these, only Wren, Blackbird and Carrion Crow were noted on all squares. A wide range of species was recorded, including an island speciality, Short-toed Treecreeper, on three squares and five species that had not been recorded on BBS squares on the islands before: Puffin, Dartford Warbler, Pied Flycatcher, Reeves's Pheasant and the recent colonist: Fan-tailed Warbler.

Government Office Regions within England

The record number of squares surveyed in England in 2006 meant that we were able to calculate population trends for many species in the nine English Government Office Regions (Table 9). The nine regions are made up of the groups of counties listed in the shaded box. Because climate, agriculture and habitats vary throughout England, major regional differences in population trends may point us towards possible reasons for population changes. Coverage varies considerably from one region to another, with the number of squares surveyed being largely dependent upon the number of BBS observers available in that area. As a result of the work done to determine how many occupied squares are needed to generate reliable population trends, we report trends only for species recorded on 30 or more squares.

The distribution of each species within the UK and the number of squares surveyed within each region largely determines how many species we can monitor, from only 19 species in London to 63 species in both the East of England and South East regions. However, because record coverage was achieved in all nine regions in 2006, we are able to calculate trends for several species within their regions for the first time, including: Goldcrest in North West England; Lapwing, Mistle Thrush and Goldfinch in North East England; Grey Partridge in the East Midlands; Red-legged Partridge in the West Midlands; Cormorant in South East England and Jay in London. For 72 species, there were records from enough squares for trends to be generated in at least one region, while for 47 species we could produce trends for five or more regions.

For some species for which we are able to produce trends in five or more English regions, the 1994–2006 trends were broadly similar. Canada Goose, Mallard, Red-legged Partridge, Wood Pigeon, Collared Dove, Swallow, Dunnock, Robin, Blackbird, Whitethroat, Goldcrest, Blue Tit, Jackdaw, Carrion Crow, Chaffinch and Greenfinch all increased significantly in the majority of regions for which trends can be calculated. Pheasant, Great Spotted Woodpecker, Blackcap and Great Tit increased in all of the regions for which trends can be calculated. Conversely, only the Cuckoo declined significantly in all of its regions, and numbers of Swift, Skylark, Mistle Thrush, Willow Warbler, Starling, Linnet and Yellowhammer declined in the majority of regions.

For a number of species, however, distinctly different patterns of population change were seen in the English regions. Blackbird numbers have declined in London since 1994 but have generally increased elsewhere, while Song Thrush has declined in the South East and East of England regions, but generally increased in other parts of the country. Long-tailed Tit and Wren numbers also show a decline in the South East, but also in the South West, and have increased or remained relatively stable elsewhere. BBS results indicate that the long-term increase in Magpie may be coming to a halt in some parts of the country, with numbers having fallen in Yorkshire, the West Midlands and South West since 1994, although they have increased in the East of England and London regions.

The nine English Government Office Regions are as follows:

GOR1 (North West): Cheshire, Cumbria, Lancashire, Greater Manchester, Merseyside.
GOR2 (North East): Cleveland, Co. Durham, Northumberland.
GOR3 (Yorkshire): East Yorkshire, North Lincolnshire, North Yorkshire, South Yorkshire, West Yorkshire.
GOR4 (East Midlands): Derbyshire, Leicestershire & Rutland, Lincolnshire, Northamptonshire, Nottinghamshire.
GOR5 (East of England): Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk, Suffolk.
GOR6 (West Midlands): Birmingham, Herefordshire, Shropshire, Staffordshire, Warwickshire, Worcestershire.
GOR7 (South East): Berkshire, Buckinghamshire, Hampshire, Isle of Wight, Kent, Oxfordshire, Surrey, Sussex.
GOR8 (South West): Avon, Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire.
GOR9 London.

BBS mammal monitoring in 2006

In 2006, mammal records were received for 83% of surveyed BBS squares (2,740 squares). Table 10 shows the fifteen most frequently recorded mammal species in 2006. For easily detectable diurnal species such as Rabbit, Grey Squirrel, Brown Hare and some of the deer, the vast majority of records were for individuals seen and counted during the two counting visits. However, for other mammals, a large proportion of the records were based on field signs, dead animals and local knowledge of the species' presence on that site. These include nocturnal or crepuscular species such as Mole, Red Fox, Badger, Hedgehog, Stoat and Weasel.

In addition to those listed in Table 10, a further 32 mammal species were recorded during the survey, including (number of squares in brackets): Mountain or Irish Hare (52), Red Squirrel (44), American Mink (38), Otter (37), Common Shrew (29), Sika Deer (26), Wood Mouse (18), Pipistrelle sp. (13), Field Vole (11), Water Vole (11), Bank Vole (7), Chinese Water Deer (7), Common Seal (5), Feral Goat (5), Pygmy Shrew (5), Grey Seal (4), House Mouse (4), Harvest Mouse (2), Orkney Vole (2), Water Shrew (2), Wild Boar (2) and Barbastelle, Brown Long-eared Bat, Dormouse, Ferret, Harbour Porpoise, Lesser White-toothed Shrew, Natterer's Bat, Noctule, Pine Marten, Polecat and Serotine on single squares.

Single squares in Suffolk and Norfolk proved to be the most diverse in 2006, with nine species of mammal being seen on each square during the two counts. One or more species was seen during the two bird count visits on 2,396 squares (87.3% of squares surveyed for mammals). In addition, field signs were noted, or mammals were seen on additional visits on another 146 squares (5.3%), leaving 198 surveyed squares (7.2%) where no mammals were recorded. It is very important that we continue to receive completed mammal forms or online submissions for those squares where no mammals were recorded, as these contribute just as much as mammal-rich squares to the analyses of population trends.

Table 9. ENGLISH GOVERNMENT OFFICE REGIONS. Population changes for species recorded on a mean of 30 or more squares per year for 1994–2006. For each region the percentage change is given (marked with an asterisk if significant), and the sample size (in italics).

Species	N.West		N.East		Yorks		E.Mids		East		W.Mids		S.East		S.West		London	
Mute Swan									68*	*36*			-40*	*44*				
Canada Goose	341*	*49*					34	*31*	101*	*46*	31	*52*	101*	*90*	218*	*35*		
Shelduck									52*	*33*								
Mallard	30*	*129*			46*	*67*	-4	*81*	17*	*161*	56*	*91*	43*	*180*	67*	*123*	-7	*33*
Red-legged Partridge					41	*35*	-18	*64*	19*	*158*	74*	*30*	110*	*92*	121*	*39*		
Grey Partridge							-14	*30*	-23	*42*			-59*	*36*				
Pheasant	134*	*102*	93*	*42*	89*	*90*	19*	*112*	30*	*233*	27*	*112*	34*	*302*	68*	*212*		
(Cormorant)									84*	*40*			61*	*32*				
(Grey Heron)	26	*69*					11	*42*	-7	*71*	20	*49*	-5	*97*	8	*67*		
Sparrowhawk									-19	*40*			-6	*59*	-29	*43*		
Buzzard	134*	*36*									167*	*64*	711*	*65*	29*	*166*		
Kestrel	19	*59*			-25	*40*	24	*48*	-15	*92*	-3	*37*	-19	*112*	-27*	*69*		
Moorhen	-9	*62*			72*	*32*	-2	*50*	33*	*110*	-4	*54*	1	*120*	27	*56*		
Coot									25	*33*			19	*49*				
Oystercatcher	13	*44*																
Lapwing	7	*99*	29	*31*	57*	*74*	53*	53	23	*66*	-25	*35*	-13	*99*				
Curlew	-24*	*77*	-29*	*31*	-28*	*70*					-57*	*30*						
Feral Pigeon	-34*	*65*			-13	*48*	-6	*44*	-7	*69*	-35*	*39*	-17	*95*	24	*62*	-18	*56*
Stock Dove	61*	*40*			116*	*36*	-24	*60*	-23*	*119*	24	*70*	0	*157*	1	*100*		
Wood Pigeon	31*	*173*	49*	*54*	44*	*114*	-4	*148*	40*	*272*	27*	*151*	25*	*380*	30*	*278*	87*	*62*
Collared Dove	55*	*105*			4	*59*	54*	*89*	106*	*180*	4	*104*	40*	*240*	26*	*157*	67*	*40*
Turtle Dove									-65*	*84*			-59*	*57*				
Cuckoo	-41*	*36*			-47*	*38*	-31*	*56*	-51*	*118*	-53*	*61*	-44*	*165*	-71*	*82*		
Swift	-25*	*98*			-12	*64*	-35*	*74*	-32*	*138*	-12	*70*	-53*	*152*	-42*	*128*	-17	*49*
Green Woodpecker									174*	*126*	23	*50*	39*	*237*	34*	*108*		
Great Spotted Woodpecker	128*	*60*					97*	*37*	148*	*113*	124*	*75*	123*	*216*	123*	*106*		
Skylark	-14	*106*	-35*	*46*	23*	*98*	-10	*124*	-22*	*236*	-27*	*102*	-19*	*261*	-15*	*181*		
Swallow	41*	*158*	62*	*48*	64*	*106*	24*	*113*	0	*188*	32*	*120*	22*	*249*	65*	*231*		
House Martin	36*	*86*			44*	*51*	-2	*46*	-13	*93*	-19	*72*	-28*	*136*	5	*125*		
Meadow Pipit	-39*	*69*	-9	*35*	-44*	*66*	-23	*36*	-2	*40*			-25	*44*	12	*39*		
Yellow Wagtail							-51*	*34*	-31*	*48*								
Pied Wagtail	23*	*107*	-12	*33*	-19	*74*	12	*79*	42*	*134*	66*	*76*	4	*172*	13	*128*		
Wren	60*	*170*	9	*50*	57*	*116*	18*	*140*	-6	*250*	3	*145*	-25*	*362*	-12*	*272*	25*	*56*
Dunnock	37*	*141*	43*	*37*	2	*89*	2	*128*	20*	*221*	58*	*136*	1	*333*	20*	*246*	26	*45*
Robin	54*	*162*	37*	*47*	69*	*100*	8	*134*	31*	*245*	42*	*149*	6	*364*	11*	*267*	73*	*57*
Wheatear	-45*	37																
Blackbird	38*	*172*	35*	*46*	48*	*114*	12*	*146*	6	*265*	31*	*151*	-4	*379*	16*	*279*	-20*	*62*
Song Thrush	119*	*127*	2	*40*	42*	*74*	22	*97*	-22*	*192*	64*	*121*	-10*	*330*	26*	*227*	-7	*39*
Mistle Thrush	38*	*105*	-11	*30*	-52*	*61*	-5	*73*	-43*	*135*	-25*	*77*	-45*	*213*	-39*	*114*		
Sedge Warbler									10	*44*								
Reed Warbler									15	*37*								
Blackcap	181*	*85*			109*	*53*	61*	*80*	41*	*189*	66*	*105*	45*	*290*	44*	*205*		
Garden Warbler									-15	*55*	18	*41*	-20	*84*	45*	*55*		
Lesser Whitethroat									9	*60*			-36*	*47*	-30	*32*		
Whitethroat	36*	*69*			10	*56*	48*	*103*	30*	*205*	15	*85*	77*	*230*	36*	*160*		
Chiffchaff	106*	*64*			32	*38*	90*	*54*	17	*150*	44*	*106*	-16*	*267*	-4	*224*		
Willow Warbler	27*	*122*	-21*	*46*	-18*	*85*	-21*	*79*	-51*	*123*	-42*	*86*	-65*	*149*	-48*	*142*		
Goldcrest	188*	*31*							47*	*58*	108*	*34*	22*	*150*	10	*108*		
Spotted Flycatcher													-71*	*32*				
Long-tailed Tit	39	*62*			118*	*31*	47*	*55*	-21	*112*	-10	*70*	-39*	*181*	-26*	*103*		
Blue Tit	21*	*165*	11	*41*	47*	*104*	26*	*134*	38*	*249*	13*	*149*	17*	*370*	1	*266*	57*	*61*
Great Tit	66*	*149*	46*	*36*	99*	*87*	90*	*120*	34*	*233*	49*	*143*	29*	*358*	55*	*252*	149*	*55*
Coal Tit	29	*47*							11	*49*	52*	*37*	-15	*114*	8	*80*		
Marsh Tit													-35*	*43*				
Nuthatch											142*	*36*	26*	*125*	59*	*63*		
Treecreeper													-15	*71*	4	*43*		
Jay	8	*53*							20	*86*	-30*	*49*	-22*	*174*	-10	*84*	-7	*30*
Magpie	-6	*152*			-30*	*73*	5	*108*	47*	*198*	-23*	*135*	2	*325*	-12*	*235*	36*	*60*
Jackdaw	38*	*103*	21	*40*	94*	*78*	44*	*78*	124*	*171*	20	*111*	34*	*268*	26*	*211*		
Rook	-43*	*73*	15	*36*	-49*	*78*	-4	*72*	70*	*154*	-34*	*74*	35*	*190*	21	*178*		
Carrion Crow	46*	*179*	16	*53*	132*	*118*	46*	*134*	87*	*244*	22*	*149*	10	*362*	14	*271*	79*	*61*
Raven															163*	*33*		
Starling	-36*	*153*	-45*	*42*	-45*	*96*	-2	*114*	-30*	*217*	-40*	*122*	-48*	*296*	-53*	*186*	-30*	*61*
House Sparrow	-9	*130*			-19*	*73*	16*	*96*	-27*	*184*	5	*122*	-35*	*249*	9	*185*	-65*	*57*
Chaffinch	36*	*170*	30*	*53*	49*	*114*	33*	*143*	43*	*262*	8	*149*	14*	*370*	1	*277*	149*	*34*
Greenfinch	78*	*127*	35	*32*	82*	*79*	108*	*112*	52*	*217*	59*	*121*	4	*310*	59*	*230*	141*	*45*
Goldfinch	77*	*116*	52	*31*	26	*71*	32*	*82*	-18*	*155*	34*	*88*	-8	*228*	14	*191*		
Linnet	-1	*83*	-13	*33*	-19	*72*	-58*	*97*	-37*	*157*	-29*	*69*	-45*	*202*	-16	*153*		
Bullfinch									-19	*54*	-27	*43*	-36*	*118*	-36*	*85*		
Yellowhammer	-19	*55*	-32*	*31*	-14	*62*	-22*	*111*	-16*	*192*	-25*	*101*	-30*	*216*	-16*	*142*		
Reed Bunting	8	*48*					13	*41*	32*	*67*			-15	*50*				
Corn Bunting									-40*	*40*								

Table 10. Occurrence of common mammal species on BBS squares in 2006. The figures under the 'Present' heading indicate the number of squares each species was recorded in (both present and counted); those in the 'Seen' column, the number of squares in which the species was seen and counted; and 'individuals', the total number of individuals counted.

Mammal species	*No. squares*		*Individuals*
	Present	**Seen**	
Rabbit	1,873	1,702	15,617
Grey Squirrel	1,044	896	1,904
Brown Hare	917	848	3,019
Red Fox	816	338	427
Mole	742	4	7
Roe Deer	610	495	1,187
Feral Cat/Domestic Cat	478	360	676
Badger	453	10	10
Brown Rat	212	39	54
Muntjac Deer	200	128	205
Hedgehog	194	13	15
Stoat	138	44	46
Fallow Deer	129	77	748
Weasel	100	19	20
Red Deer	97	69	620

Producing mammal population trends from BBS data

The BTO is a member of the Tracking Mammals Partnership (TMP), a collaborative initiative involving 25 organisations with varied interests in mammals. TMP aims to provide good quality trend data to guide conservation and wildlife management policy for mammals. The BBS is an important component of the TMP surveillance programme and BBS count data are now being used to routinely calculate population trends for seven mammal species (Table 11). The 2007 update of UK Mammals, which describes recent surveys organised by the partnership, is included with this report.

Table 11. UK Mammal Trends. Population changes for species recorded on a mean of 40 or more BBS squares per year for 1995–2005. For each species the sample size is given, together with the percentage change (marked with an asterisk if significant) and lower and upper 95% confidence limits. The sample is the mean number of squares occupied each year over the survey period 1995–2005 (excluding squares that were surveyed in only one year).

Species	*Sample*	*% change*	*lcl*	*ucl*
Rabbit	1077	-15 *	-21	-9
Brown Hare	525	-9	-17	1
Mountain/Irish Hare	39	-8	-37	34
Grey Squirrel	478	42 *	27	59
Red Fox	218	-33 *	-42	-22
Roe Deer	237	25 *	7	46
Muntjac Deer	45	-9	-32	22

BBS-online update (www.bto.org/bbs)

The BBS-online application was first launched in November 2003 and provides the BBS observer with a quick and easy method to submit their bird, habitat and mammal data electronically via the web. The system also allows the user to view and manage data from previous years for their squares. A suite of BBS web pages provides all visitors to the site with a wide range of outputs, including tables and graphs showing the latest trends, species distribution maps and species lists down to a county level. Information is also provided about BBS methods, research projects and how to participate.

Data for 1,633 squares (50% of the total number surveyed) were submitted online in 2006, representing a considerable increase on the 1,146 squares (40% of the total) in 2005. Electronic submission continues to reduce the costs of data entry and checking and allows us to provide BBS observers and general visitors to the BTO website with more comprehensive and up-to-date results.

The BTO's Information Systems Unit will continue to deal with comments and any problems raised by BBS-online users. A complete review of the system is undertaken at the end of each year, with a view to identifying possible improvements. Many thanks to the RSPB for generously funding the initial development of BBS-online, and to members of the BTO's Information Systems Unit (Iain Downie, Karen Wright, Stuart McHugh and Luke Delve) who have continued to develop the system and have provided technical support over the past year.

BBS research and development

Supplemental BBS-Style Surveys

By David Noble

In recent years, there have been several large-scale BBS-style surveys carried out largely by professional fieldworkers in parallel to the core BBS. The funding for these projects comes from government or statutory organisations responsible for particular issues – such as the Countryside Rights of Way Act (CRoW). Examples include the farmland bird surveys carried out in lowland England in 2005 (due to be repeated in 2008), the continuing upland bird surveys, and new surveys of birds in Scottish woodlands. The reason for these special surveys is to supplement the core surveys carried out by BBS volunteers, in areas where it is sometimes difficult to achieve the necessary coverage, or where additional information is needed to assess the effects of a particular policy on bird numbers. A good example of the latter is the question of whether the government's new Environmental Stewardship Entry Level Scheme is successful in improving conditions for farmland birds. Details of two current initiatives follow. Note that advertisements for experienced bird surveyors are posted early each season on the BTO website.

Upland Breeding Bird Surveys in England

This ongoing survey, a collaboration between BTO, RSPB and Natural England has a number of goals. One is to assess the possible effects on birds of increased access to the countryside under England's CRoW Act. Another aim is to increase survey coverage to a level sufficient to calculate population trends for a suite of relatively scarce upland birds (e.g. Ring Ouzel) and produce a better, more representative upland bird indicator. A third ambition is to assess population trends of key upland species in designated Special Protection Areas (SPAs). In order to accomplish all of this, a team of fieldworkers were hired to survey more than 300 1-km squares across upland areas of England in 2007. Results will be combined with BBS results and compared to those from previous years to assess trends in upland areas with different types of land management (e.g.

within and outside designated sites) and to contribute to analyses of long-term population trends in upland birds.

Woodland Bird Surveys in Scotland

Thanks to funding from Forestry Commission Scotland and SNH, we are also coordinating surveys of woodland birds in Scotland in 2007, targeting 1-km squares with at least 15% woodland. This minimum amount is low in order to capture forest fragments as well as continuous forest stands and hence be as representative as possible of all woodland types. Increased coverage of woodland will, we hope, enable us to calculate population trends for the scarcer woodland birds in Scotland, such as Chiffchaff, Redstart and Long-tailed Tit, and develop a more robust woodland bird indicator for the country. We hired a small team of surveyors to cover at least 80 1-km squares in 2007 and the plan is to phase in uptake of these new 'woodland squares' by volunteers over the next four years.

Increased coverage of woodland squares in Scotland may enable us to calculate a population trend for Redstart in Scotland. Photograph by John Harding.

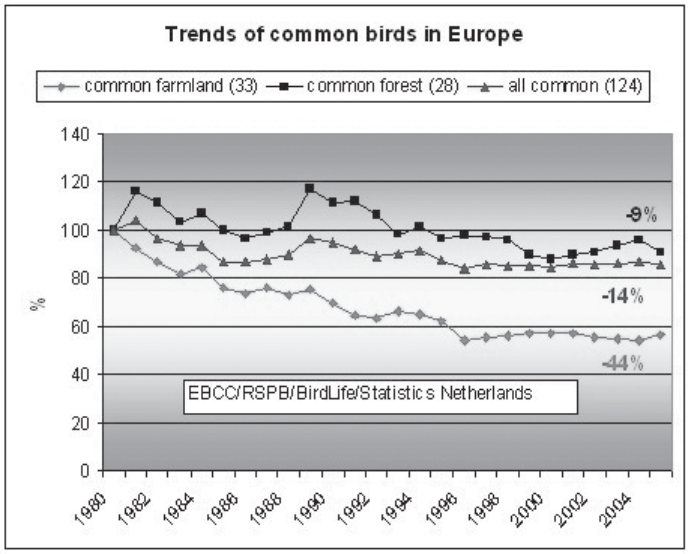
Wild Bird Indicators

By David Noble

BBS results continue to be used to annually update a suite of wild bird indicators, from the regional level (bird indicators for each of England's Government Office Regions) to the international. These multi-species indicators, composed of the average population trends of birds associated with particular habitats, are used as a proxy for wider biodiversity by regional, national and international bodies to assess progress towards sustainable development. The latest wild bird indicators for the UK and for England, which can be found on the Defra website (www.jncc.gov.uk/pdf/2010-BIYP2007.pdf) show that the farmland bird index has been roughly stable since the early 1990s although is still down 40% since the 1970s. Over the past two decades, the woodland bird index has fluctuated and is currently down 10% from its value in the 1970s. The Defra publication includes the Biodiversity Action Plan (BAP) indicator, where the population status of a number of bird species is assessed using BBS data. Further information, including the species composition of each of these indicators, can be found at www.bto.org/research/indicators/index.htm.

BBS results were used, along with older data from the CBC, to contribute to the 2007 update of the European wild bird indicators in a project called Pan-European Common Bird Monitoring. For this initiative, country-specific trends for 124 species from 20 different countries across Europe were first combined to produce pan-European species trends. The European trends were then combined to produce multi-species indicators of common farmland birds, common forest birds and all common birds, for the period 1980 to 2005. As in the UK, farmland birds show the steepest decline (-44% since 1980) whereas common woodland species have declined by a more modest 9%. The farmland bird declines are worst in Western Europe (-50%) compared to a shallower decline of 16% in Southern Europe. Based on these findings, there is growing concern about worsening declines in the new EU states that hold large populations of farmland birds. The forest bird indicator shows a different pattern, being relatively stable in West and Central/East Europe but with steep declines in North Europe and South Europe. This highlights the worrying state of Europe's boreal forests in places such as Finland and Sweden, as well as declines in birds, characteristic of Mediterranean scrub and dry woodland. Further information on these indicators and the Pan-European Common Bird Monitoring Scheme can be found on the website of the European Bird Census Council www.ebcc.info/pecbm.html.

Figure 1. European Wild Bird Indicators



The collection of additional habitat and land use information in 2007

By Mike Raven

As BBS participants are well aware, existing observers were asked to collect additional habitat and land use information from their squares during the 2007 field season. There were several components to this, including the recording of additional habitat features along the route (hedgerows, ditches) as well as potentially important features of agricultural landscapes (field margins, fallow land, more details on crops). Recording the presence of these features will be extremely valuable in assessing the success of the government's agri-environment schemes such as the Environmental Stewardship in England, Tir Gofal in Wales, the Rural Stewardship Scheme in Scotland and the Countryside Management Scheme in Northern Ireland. Better information on linear features along the BBS routes will help refine calculations of density and population size in different habitats, and hence estimates of national population sizes. We also took this opportunity to collect more information in other key habitats (woodland, uplands and urban areas) by increasing the number of level 3 and level 4 habitat codes

that it was possible to record from two to four. This additional information will be assessed and its collection could be repeated in the future (probably in five years) to provide a measure of the impact of changing land management (e.g. changes in crops or increased farming of biofuels) on bird populations as well as the effects of the various agri-environment schemes. We would like to thank everybody who collected these data, which will provide us with valuable additional information about their BBS survey sites.

As in the early years of the BBS, all observers were asked in 2007 to record habitat details along the ideal route. The 'ideal route' consists of two parallel lines running either north to south or east to west, 500m apart and 250m in from the border of the square. We know that most observers tend to follow features such as paths and edges of fields rather than straight lines, so this information is vital to periodically assess possible bias in habitat coverage, and how this might affect estimates of population trends or size.

For the first time, observers were supplied with a printed colour O.S. map of their square on which to mark their actual transect route and 200m sections. This information will help to ensure that new volunteers are able to accurately follow routes used by previous volunteers, and importantly, provides the potential for transect routes to be digitised and more easily related to other spatially-referenced information (e.g. data from satellite images).

Estimating population sizes for common and widespread breeding birds

By Stuart Newson

National population estimates for common and widespread terrestrial breeding birds, as published periodically in key scientific journals, have until now been largely based on territory estimates from the Common Birds Census (CBC). Because the BBS is now our major source of monitoring data for these species, it is increasingly important to be able to produce national population estimates from it, and that is one of the reasons for collecting BBS records in distance bands. We have recently developed our methods of distance analyses using BBS data to generate measures of abundance for surveyed squares and by extension, national population sizes. Preliminary findings revealed a strong relationship between BBS-based and existing (mainly CBC-based) estimates, implying that both are getting the picture broadly right. However, estimates for particular species did differ between methods. Examining these differences more closely, we found that BBS-based estimates tended to be higher than existing ones for the less abundant species, whose preferred habitat types were not covered well by the CBC – i.e. habitat types other than farmland and woodland. This highlights the value of a random sample covering all habitat types, and the success of the BBS in providing it.

A second point is that, whilst the CBC methodology produces an estimate of breeding territories, BBS counts are of all adult birds and do not distinguish breeding from non-breeding individuals (except for juveniles in family parties). This means that BBS-based population estimates for species such as Buzzard, which has a significant non-breeding component, will reflect an estimate of total adult population size and not just the breeding population. Both approaches are valid, but when comparing population estimates from different sources, attention needs to be paid to how they are calculated. Another finding was that for species where detectability varies markedly between males and females (e.g. Garden Warbler), the BBS may underestimate population size if gender differences in detectability are not taken into account. Further work to examine the importance of sex-specific detectability is currently underway.

BBS data have been used to produce a UK population estimate for Wren of 5 million pairs.
Photograph by Chris Bradley.

The influence of life history and ecological variables on long-term trends in abundance

By Andrew Joys

BBS data are currently analysed annually alongside CBC data to generate long-term population trends of common breeding birds in the UK and England (see www.bto.org/birdtrends for the latest updates and graphs). In recent work, we looked at 59 widespread terrestrial species in England to see if those undergoing particular patterns of population change showed similarities in terms of breeding habitat, diet, breeding range and size of the population, body measurements, migratory status or life history variables. Over half of the 59 species for which reliable trends were available declined over the period covered by both surveys (1960s to present). Nine of these species declined by more than 50%. In species associated with the two major habitats covered by these surveys – farmland and woodland, the greatest period of decline was generally during the 1970s and 1980s. Although many long-distance migrants have declined, migrants and residents were generally synchronous in the direction and timing of their population changes.

We then carried out multivariate analyses to determine which traits seemed to have the most influence on the population trends. Diet was found to have a significant effect on population change, with seedeaters showing the largest declines. This agrees with previous studies showing the effects of reduced winter food supplies on numbers of buntings and sparrows. Less easily explained is the finding that species with shorter incubation and fledging periods were also more likely to have experienced declines. This work is continuing and it is hoped that by identifying common patterns of population changes we can pinpoint the likely causes, on the breeding or wintering grounds, and help reverse the declines seen in a number of species across a broad range of habitats.

Influence of weather on short-term fluctuations in abundance

By Andrew Joys

The long-term population trends reported on the BTO website provide the best description of overall change in abundance, but

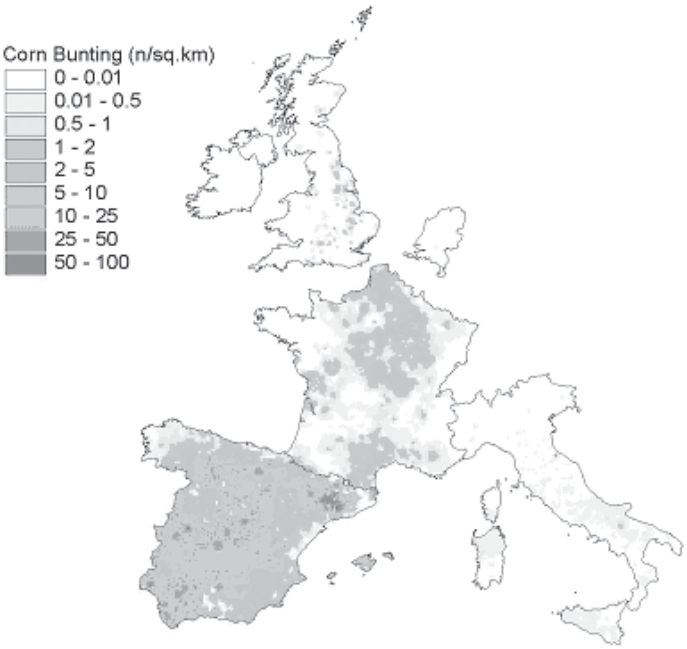
the smoothing of these trends, as it is designed to, masks year-to-year fluctuations. Such variations may be related to weather patterns and the effects of climate change. Work is currently underway to analyse the joint CBC/BBS trends in relation to other long-term UK data on climatic variables such as rainfall, average monthly temperatures and winter severity. This will be integrated with more detailed studies of migrant bird species and the implications of changes in conditions in wintering areas on numbers returning to breed in the UK.

From monitoring data to maps: the first steps

By Stuart Newson

Bird survey programmes to monitor trends over time also provide us with a great deal of data that have the potential to be used spatially to create maps showing changes in species distribution and abundance. This potential appears to have been simultaneously recognised by researchers in a number of different organisations across Europe all interested in large-scale mapping of bird abundance. Aided by the European Bird Census Council (EBCC), ways to exchange information on this subject and move forward using common methods have been discussed. The BTO organised a recent workshop aimed at setting the stage on spatial modelling of bird monitoring data by attracting participants working on this topic. Given the role of EBCC in coordinating and integrating bird monitoring at a European scale, the idea arose of using the existing pan-European bird monitoring network as a means of integrating data for different countries and to explore the potential of these data for mapping purposes. A new initiative, the "EBCC Spatial Modelling Workgroup" of which BTO is a member, was established to coordinate progress and deal with issues relating to the production of maps from monitoring data. Figure 2 shows the provisional pan-European map of abundance for Corn Bunting and provides a glimpse of what can be achieved.

Figure 2. Provisional pan-European abundance maps for Corn Bunting. Countries where data were not available at the time of writing are excluded from the map.



The future

It is vitally important that we continue to monitor populations of our commoner birds across a wide variety of habitats and it is only by continuing to survey our BBS squares year after year that we can do this. With the continued support of our volunteers, BBS will be able to play an important role in assessing the effectiveness of wide-scale farmland management changes that have recently been put in place. It may also provide us with new insights into the effects on birds of broader management approaches in other habitats and also those of climate change.

The 2006 fieldwork season was the most successful in the history of the BBS, with more squares being surveyed than in any other year since 1994. Record volunteer coverage was achieved in England, Scotland and Wales and in all nine English Government Office Regions. The increase in coverage is enabling us to monitor the numbers of more species in more regions of the UK, now including Crossbill and Ring-necked Parakeet for the first time. If this level of coverage is maintained we will continue to report on an increasing number of trends for an increasing number of species.

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BBS Regional Organisers for 2006:

ENGLAND: Avon – John Tully; Bedfordshire – Judith Knight; Berkshire – Chris Robinson; Birmingham & West Midlands – vacant (now Steve Davies); Buckinghamshire – vacant (now David Lee); Cambridgeshire – John Le Gassick (now Tony Fulford); Cheshire (mid) – Paul Miller; Cheshire (north & east) – Charles Hull; Cheshire (south) – Charles Hull; Cleveland – Vic Fairbrother; Cornwall – Stephen Jackson; Cumbria – Clive Hartley, Colin Gay, Stephen Westerberg and Dave Piercy; Derbyshire (north & south) – Dave Budworth; Devon – John Woodland; Dorset – Mike Pleasants; Durham – David Sowerbutts; **Essex (north-east) – vacant;** Essex (north-west) – vacant (now Graham Smith); Essex (south) – vacant (now Lynn Parr); Gloucestershire – Mike Smart; Hampshire – Glynne Evans; Herefordshire – Steve Coney; Hertfordshire – Chris Dee; Huntingdon & Peterborough – **Philip Todd (now vacant);** Kent – Sally Hunter; Lancashire (east) – Tony Cooper; Lancashire (north-west) – Jean Roberts; Lancashire (south) – vacant (now Graham Coxall); Leicestershire & Rutland – Tim Grove; **Lincolnshire (east) – vacant; Lincolnshire (north) – vacant;** Lincolnshire (south) – Richard and Kay Heath; Lincolnshire (west) – Peter Overton; London (north) – Ian Woodward; London (south) – Richard Arnold; Manchester – Judith Smith; Merseyside – Bob Harris; Norfolk (north-east) – Chris Hudson; Norfolk (north-west) – Mike Barrett (now Allan Hale); Norfolk (south-east) – Rachel Warren; Norfolk (south-west) – Vincent Matthews; **Northamptonshire – vacant;** Northumberland – Tom and Muriel Cadwallender; Nottinghamshire – Lynda Milner; Oxfordshire (north) – Frances Buckel; Oxfordshire (south) – John Melling; Isles of Scilly – Will Wagstaff; Shropshire – Allan Dawes; Somerset – Penny Allwright ; Staffordshire (north, south & west) – Gerald Gittens; Suffolk – Mick Wright; **Surrey – Hugh Evans (now vacant);** Sussex – Helen Crabtree; Warwickshire – Mark Smith; Isle of Wight – James Gloyn; Wiltshire (north & south) – Bill Quantrill; Wirral – Paul Miller; Worcestershire – Harry Green; Yorkshire (north-west) – Gerald Light; Yorkshire (Richmond) – John Edwards; Yorkshire (Harrogate) – Mike Brown; **Yorkshire (east) – vacant; Yorkshire (Hull) - vacant;** Yorkshire (north-east) – Michael Carroll; Yorkshire (Bradford) – Mike Denton; Yorkshire (York) – Rob Chapman; **Yorkshire (Leeds & Wakefield) – Claire Callaghan (now vacant);** Yorkshire (south-east & south-west) – Peter Brown (now David Gains).

SCOTLAND: Aberdeen – John Littlejohn (now vacant); Angus – Ken Slater; Argyll (south, Bute & Gigha) – Richard Allan; Argyll (north, Mull, Coll, Tiree & Morvern) – Sue Dewar; Ayrshire – Brian Broadley; Benbecula & the Uists – Brian Rabbitts; Borders – Steve Hunt (now Graham Pyatt); Caithness – Donald Omand; Central – Neil Bielby; Dumfries – Edmund Fellowes; Fife & Kinross – Norman Elkins; Inverness (east and west) – Hugh Insley; Islay, Jura & Colonsay – Malcolm Ogilvie (now John Armitage); Kincardine & Deeside – Graham Cooper; Kirkcudbright – Andrew Bielinski; Lanark, Renfrew & Dunbarton – John Knowler; Lewis & Harris – Chris Reynolds (now Martin Scott); Lothian – Alan Heavisides; Moray & Nairn – Bob Proctor; Orkney – Colin Corse; Perthshire – Richard Paul; Ross-shire – Simon Cohen; Shetland – Dave Okill; Skye – Robert McMillan; Small Isles (Rum, Eigg, Muck, Canna) – Bob Swann; **Sutherland - vacant;** Wigtown – Geoff Sheppard.

WALES: Anglesey – Tony White; Brecon – John Lloyd; Caernarfon – Geoff Gibbs; Cardigan – Moira Convery; Carmarthen – Colin Jones; Clwyd (east) – Anne Brenchley; Clwyd (west) – Mel Ab Owain; Glamorgan (west) – Rhian Evans; Glamorgan (mid & south) – Rob Nottage; Gwent – Jerry Lewis; Merioneth – Geoff Gibbs (now Dave Anning); Montgomery – Jane Kelsall; Pembrokeshire – Annie Haycock (formerly Poole); Radnorshire – Brian Jones.

NORTHERN IRELAND: Antrim – Ruth Wilson; Armagh – David Knight; Down – Alistair McIlwain; Fermanagh – Phil Grosse; Londonderry – Charles Stewart; **Tyrone – vacant.**

CHANNEL ISLANDS: Guernsey & Alderney – Jamie Hooper; Jersey – Tony Paintin. **ISLE OF MAN:** Pat Cullen.

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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 would also like to thank the farmers and landowners for their support and co-operation in allowing BBS volunteers onto their land. 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.

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