BTO RESEARCH REPORT

Breeding Birds in the Wider Countryside: their conservation status 2003

H Q P Crick, J H Marchant, D G Noble, S R Baillie, D E Balmer, L P Beaven, R H Coombes, I S Downie, S N Freeman, A C Joys, D I Leech, M J Raven, R A Robinson & R M Thewlis

BTO Birds Science People

Breeding Birds in the Wider Countryside: their conservation status 2003

Trends in numbers and breeding performance for UK birds

H Q P Crick, J H Marchant, D G Noble, S R Baillie, D E Balmer, L P Beaven, R H Coombes, I S Downie, S N Freeman, A C Joys, D I Leech, M J Raven, R A Robinson and R M Thewlis

Contents Page Species Results

This website is a "one-stop-shop" for information about the population status of our common terrestrial birds. With one page per species, users can quickly find all the key information about trends in population size and breeding performance over the period 1967-2002 as measured by BTO monitoring schemes.

For each species, we provide:

- General information concerning species' conservation listings
- A brief summary of observed changes in the size of the population and information concerning the possible causes of these changes
- A series of graphs and tables showing the trends and changes in population size and breeding performance over the past 33 years
- Trends calculated from BTO/JNCC/RSPB Breeding Bird Survey (BBS) data, not only for the UK as a whole but also for each of its constituent countries (England, Scotland, Wales and Northern Ireland)
- A system of Alerts that highlight population declines in any census scheme of greater than 25% or greater than 50% that have occurred over the past 5 years, 10 years, 25 years and 33 years.

The website covers the majority of British breeding birds, over 100 species in total, but excludes colonial seabirds, which are well covered by the JNCC's Seabird Monitoring Programme (**Mavor *et al.* 2003**), and those species that are already covered by the Rare Breeding Birds Panel (**Ogilvie & RBBP 2003**). Most wintering populations of waterfowl are well covered by the Wetland Bird Survey annual reports (e.g. **Pollitt *et al.* 2003**).

The following species exhibit rapid declines (of over 50%) or moderate declines (between 25 and 49%) over the 33-year period 1967-2000 as measured by a combination of the Common Birds Census (CBC) and the BBS:

- **Rapid declines:**
  17 species: **Grey Partridge**, **Turtle Dove**, **Skylark**, **Tree Pipit**, **Song Thrush**, **Whitethroat**, **Spotted Flycatcher**, **Yellow Wagtail**, **Marsh Tit**, **Willow Tit**, **Starling**, **Tree Sparrow**, **Linnet**, **Lesser Redpoll**, **Yellowhammer**, **Corn Bunting** and **Bullfinch**
- **Moderate declines:**
  6 species: **Cuckoo**, **Dunnock**, **Mistle Thrush**, **Willow Warbler**, **Meadow Pipit** and **Reed Bunting**

The following species (not listed above) exhibit rapid declines (of over 50%) over shorter time periods.

Two species (**Lesser Spotted Woodpecker** and **Woodcock**) are no longer monitored in sufficient numbers by the BBS and are listed on the basis of declines >50% on the CBC between 1968 and 1999.

- **House Sparrow** has declined by 65% between 1977 and 2000.
- **Wood Warbler** has declined by 58% on the BBS since 1994.

It should be noted that CBC plots are concentrated in lowland areas, and as such may not cover a major proportion of the UK population of species associated with alternative habitats. Reported trends for these species may be restricted to England.

The following species show rapid declines (of over 50%) or moderate declines (between 25 and 49%) over the 25-year period 1975-2000, as measured by the Waterways Bird Survey (WBS):

- **Rapid declines:**
  3 species: **Little Grebe**, **Yellow Wagtail** and **Reed Bunting**
- **Moderate declines:**
  3 species: **Redshank**, **Grey Wagtail** and **Pied Wagtail**

In addition, **Lesser Whitethroat** has shown a decline of 52% on Constant Effort Sites (CES) since 1984, together with a 30% decline on CBC/BBS plots in England since 1975).

A number of species have undergone substantial population increases, more than doubling, over the same time period:

- **CBC/BBS trend:**
  Mute Swan, **Mallard**, **Coot**, **Buzzard**, **Stock Dove**, **Collared Dove**, **Woodpigeon**, **Green Woodpecker**, **Great Spotted Woodpecker**, **Nuthatch**, **Reed Warbler**, **Blackcap**, **Magpie**, **Carrion Crow**
- **WBS:**
  Mallard, **Oystercatcher**

There are a number of species for which declines in breeding performance are likely to be driving the population declines (**Linnet** and **Lapwing**) or helping to inhibit recovery (possibly **Reed Bunting**).�The importance of decreases in breeding performance for declining **Willow Warbler**, **Lesser Redpoll**, **Ringed Plover**, **Dunnock**, **Bullfinch**, **Yellowhammer**, **Grey Wagtail** and **Yellow Wagtail** populations and for farmland **Moorhen** populations is, as yet, undetermined.�

Increasing breeding performance may be helping to drive population expansion of a number of species:� the predatory **Grey Heron**, **Sparrowhawk** and **Buzzard**; the corvids **Jackdaw**, **Magpie**, **Jay**, **Carrion Crow** and **Rook**; the seed-eaters **Collared Dove**, **Stock Dove** and **Woodlark**; and the insectivores **Pied Wagtail**, **Robin**, **Redstart**, **Wren**, **Reed Warbler**, **Nuthatch**, **Great Tit**, **Blue Tit** and **Long-tailed Tit**.

For a few species for which long-term population data are not available, changes in breeding performance from the Nest Record Scheme may provide a potential warning of population declines, because they are the result of density-dependent changes (**Stonechat**, **Wheatear**, **Tawny Owl** and **Ring Ouzel**).� The importance of the substantial declines in productivity of **Greenfinch**, **Blue Tit**, **Sedge Warbler** and **Garden Warbler** is unclear at the moment, but warrants close attention.

Email your comments

Next page - Contents

Contents

1. INTRODUCTION

Since its formation in 1933, BTO has been deeply committed to gathering quantitative information on the bird populations of the UK. Its nationwide network of skilled volunteers, many of whom are long-term contributors to survey schemes, provides the ideal way to monitor the bird populations that are widely distributed across the countryside. BTO data, from such schemes as the **Common Birds Census** and **Nest Record Scheme**, have been increasingly influential in determining nature conservation policy in the UK.

The value of the monitoring work undertaken by the BTO is recognised in the Government's Biodiversity Steering Group report (**Anon. 1995**). The BTO's results, particularly those regarding declining farmland species, are highlighted as an example of the way in which broad-scale surveillance techniques can identify important new trends. More generally, the report states that monitoring is essential if the broad aims, specific objectives and precise targets of the Government's Biodiversity Action Plans are to be achieved. It notes that:

- baselines must be established;
- regular and systematic recording must be made, to detect change; and
- the reasons for change should be studied, to inform action.

The BTO's monitoring schemes fulfil a considerable portion of these needs for a wide range of bird species in the UK.

1.1 The BTO's monitoring of breeding birds in the UK

The Integrated Population Monitoring Programme has been developed by the BTO, under a BTO/JNCC contract, to monitor the numbers, breeding performance and survival rates of a wide range of bird species. It has the following specific aims (**Baillie 1990**, **1991**):

(a) to establish thresholds that will be used to notify conservation bodies of requirements for further research or conservation action;

(b) to identify the stage of the life cycle at which demographic changes are taking place;

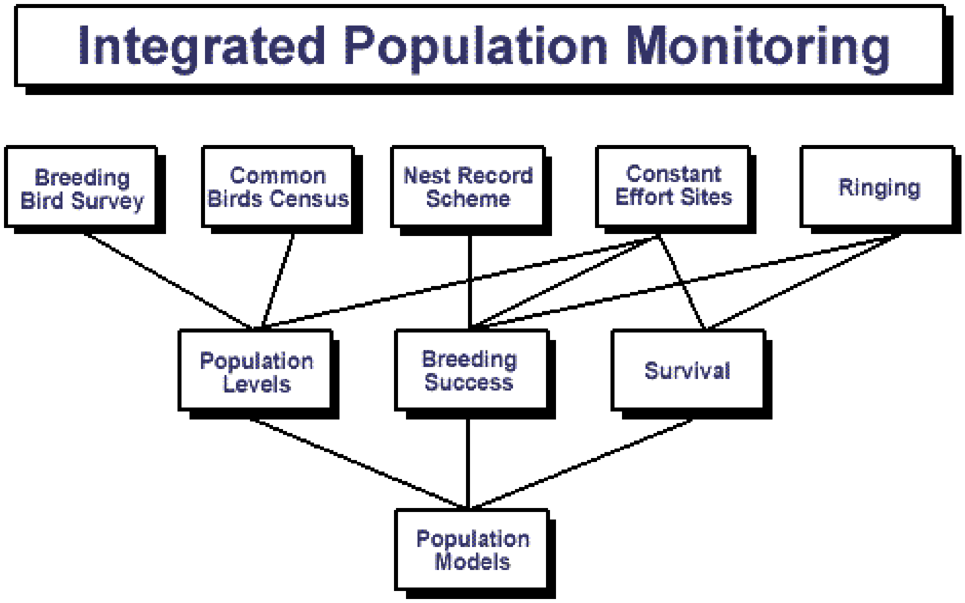
(c) to provide data that will assist in identifying the causes of such changes; and

(d) to distinguish changes in population sizes or demographic rates induced by human activities from those that are due to natural fluctuations in abundance.

The programme brings together data from several long-running BTO schemes.

- Changes in numbers of breeding birds are measured by:
  - the **Common Birds Census (CBC)** - which ran from 1962 and ended in 2000 (although BTO continues to use CBC-type surveys for other purposes). This scheme mapped the territories of common birds on 200-300 mainly farmland and woodland plots each year, averaging about 70 and 20 ha respectively.
  - the **Waterways Bird Survey (WBS)** - which began in 1974 and maps the territories of birds along rivers, streams and canals on 80-130 plots each year, each covering, on average, 4.5 km.
  - the **Constant Effort Sites Scheme (CES)** - which began in 1983 and is based on bird ringing at over 100 sites. The catching effort is kept constant at each site during each year, so that changes in numbers of birds caught are likely to reflect population changes and not variation in catching effort.
  - the **BTO/JNCC/RSPB Breeding Bird Survey (BBS)** - which began in 1994, has replaced the CBC as the major monitoring scheme for landbirds, after a seven-year overlap. BBS is based on around 2300 1-km squares, within each of which birdwatchers count and record birds in a standardised manner along a 2-km transect. Because the survey squares are chosen randomly, all habitats and regions are well covered. Combined CBC/BBS indices now provide long-running and ongoing population monitoring for many common birds.
- Changes in breeding performance are measured by:
  - the **Nest Record Scheme** - which began in 1939 and collates standardised information on up to 35,000 individual nesting attempts per year. This allows the measurement of
    - Laying dates
    - Clutch sizes
    - Brood sizes
    - Nesting success during egg and chick stages
  - the **CES** - which provides information on overall productivity for a range of species by measuring the ratio of juveniles to adults caught each year.
- Changes in survival are measured by:
  - the **British and Irish Ringing Scheme** - which provides information on the finding circumstances and longevity of ringed birds found dead by members of the public.
  - The **CES** can also provide information on survival rates, based on the recapture of ringed birds at CES sites.

The ways in which the schemes fit together are shown in the diagram below, which also demonstrates the way in which the BTO aims to combine all this information to understand the mechanisms behind changes in population sizes (using "population models").



Next Section - 1.2 The value of combining results from different monitoring schemes

Back to Introduction Index

1.2 The value of combining results from different monitoring schemes

Monitoring the changes in the size of a population does not in itself provide sufficient information on which to base an effective conservation strategy (**Goss-Custard 1993**). Concurrent monitoring of breeding performance and survival rates is essential to allow changes in population size to be properly interpreted (**Temple & Wiens 1989**) and, for long-lived species, can provide early warning of impending decline (**Pienkowski 1991**).

Where good long-term data sets for breeding performance and survival are lacking, conservation action may have to be taken without a sound basis or need to wait for detailed research to be undertaken. For many species, however, BTO already has the necessary data, collected by its volunteers over periods of several decades.

For a long-lived species, a decline in population size may only begin after a long period of low survival or reproductive output. The classic example is that of the Peregrine, which in the UK suffered from poor breeding performance during the 1940s and 1950s due to sub-lethal DDT contamination. This decreased the capacity of the non-breeding population to buffer the severe mortality of breeding adults that occurred due to cyclodiene poisoning from the mid 1950s onwards (**Ratcliffe 1993**). Monitoring of breeding performance gave an early warning of subsequent numerical decline (**Pienkowski 1991**). Another recent example of a decline in breeding performance that presaged population decline is the catastrophic breeding failures of seabirds, particularly Arctic Terns, in Shetland (**Monaghan *et al.* 1989**, **Walsh *et al*. 1995**).**Farmland birds**

During the mid 1980s, the BTO identified rapid declines in the population sizes of several farmland bird species (**O'Connor & Shrubb 1986**, **Fuller *et al.* 1995**). The BTO has since been able to investigate the causes of these declines, using its long-term historical databases (**Siriwardena *et al.* 1998a**, **2000**). The alternative approach of undertaking new intensive studies of all these species separately would have been very costly, taken several years to complete, and might not have been widely applicable within the UK.

This investigation, which was Government-funded and undertaken jointly with Oxford University, looked at changes in population size, breeding performance and survival rates of a variety of species in relation to changing farming practice. It showed that species responded to different aspects of the agricultural environment, but that typically these aspects were linked to intensification or regional specialisation. Declines in survival rates were found to be the main factor driving population decline in these species, with the exception of **Linnet**, for which the main factor appears to have been a decline in nesting success at the egg stage. The study was therefore able to eliminate some possible causes of change, and identify areas for future research, thus helping conservation bodies to use their scarce resources productively.

This report describes a number of other cases where the combined analysis of BTO data sets has helped to identify the causes of population declines, for example on the pages for **Lapwing** (**Peach *et al.* 1994**), **Song Thrush** (**Baillie 1990**, **Thomson *et al.* 1997**), **Sedge Warbler** (**Peach *et al.* 1991**), **Spotted Flycatcher** (**Freeman & Crick 2003**), **Starling** (**Freeman *et al.* 2002**), and **House Sparrow** (**Freeman & Crick 2002**). A fully integrated approach, estimating trends in numbers and demographic parameters through a single model containing data from various BTO surveys, is introduced by **Besbeas *et al.* (2002)**.

Biodiversity Action Plans The ability to quickly determine the stage of the life-cycle which is most affected during population declines is particularly important for the conservation agencies when considering the plight of species on the lists of conservation concern (**JNCC 1996**; **Anon. 1995**, **1998**). Analysis of BTO data sets, which has already helped to build these lists, is a key point in several of the UK Government's Biodiversity Action Plans for rapidly declining species. Once conservation actions have been initiated, the BTO's Integrated Population Monitoring programme has a further function, because the success of these actions will be measured and assessed by continued BTO monitoring.

Next Section - 1.3 The aims of this report

Back to Introduction Index

BBWC Home > **Contents** > **Introduction** > The aims of this report

1.3 The aims of this report

This report is the latest version of a working document that is used by conservation practitioners as a ready reference guide to recent changes in status of breeding birds in the UK. In posting it on the BTO web-site, we hope that it will be regularly used by a much wider audience, especially BTO members and the general birdwatching public. We also hope that it will become a useful resource for schools, colleges and universities, the media, ecological consultants, decision-makers, local government, and the more general world of industry and commerce. In summary, its aims are:

1) To provide to as wide as possible a readership a species-by-species overview of the trends in breeding population size and reproductive success of birds covered by BTO monitoring schemes since the 1960s, at the UK or UK-country scale.
2) To provide warning alerts to JNCC and Country Agencies concerning worrying declines in population size or reproductive success, with special reference to species on the UK Red and Amber lists.

This document is the result of the sustained fieldwork of many thousands of the BTO's volunteer supporters. Without their enthusiasm for collecting these hard-won facts, the cause of conservation in the UK would be very much the poorer.The data we present here are supplemented by information on breeding distributions in the 1988-91 Breeding Atlas (**Gibbons *et al.* 1993**), and on estimates of absolute size of breeding populations, which are reported on regularly by the Avian Population Estimates Panel (**Stone *et al.* 1997**). Colonial seabirds, which are well covered by the JNCC's Seabird Monitoring Programme (**Upton *et al.* 2000**), and the majority of species covered by the Rare Breeding Birds Panel (**Ogilvie 1998**), are not included here. Wintering populations of waterfowl are best covered by the Wetland Bird Survey annual reports (e.g. **Pollitt *et al.* 2000**).

The report is the fifth in a series produced under the BTO's partnership with the Joint Nature Conservation Committee (on the behalf of English Nature, Scottish Natural Heritage, the Countryside Council for Wales, and the Environment and Heritage Service in Northern Ireland), as part of its programme of research into nature conservation. The first report (**Crick *et al.* 1997**) investigated population trends exhibited by breeding species during 1971-95. A second report (**Crick *et al*. 1998**), produced the following year, covered 1972-96 The third report (**Baillie *et al.* 2001**), which was the first to be produced solely as a web document, documented trends during 1968-99. The current report directly supersedes **Baillie *et al.* (2002)**, which included data up to 2000. The two previous reports are still accessible via this report's **Contents** page.

Section 2 - Methodology

Back to Introduction Index

BBWC Home > Contents > Methodology

2. METHODOLOGY

Six monitoring schemes have contributed data to this report. Five provide data on changes in abundance: Breeding Bird Survey; Common Birds Census; Waterways Bird Survey; Heronries Census; and Constant Effort Sites ringing scheme. Two schemes provide data on changes in productivity: the Nest Record Scheme and the Constant Effort Sites Scheme. In addition, information from detailed analyses of the recoveries of birds from the Ringing Scheme is included where relevant. The methodologies of the monitoring schemes are described below, including information on fieldwork, data preparation, sampling considerations and the statistical methods used in analysis.

Next Page - Breeding Bird Survey

Back to Contents

2.1 Breeding Bird Survey

The BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched in 1994, following two years of extensive pilot work and earlier desk-based studies. The introduction of the BBS was a move designed to overcome the limitations of the **Common Birds Census** (CBC), which had monitored bird populations since 1962. In particular, it improves the geographical representativeness of UK bird monitoring, and thereby promotes both species and habitat coverage. The BBS uses line transects rather than the more intensive territory-mapping method used by the CBC. This makes the survey relatively quick to undertake, and has been successful in encouraging a large number of volunteers to take part. The average time observers spend per visit is only around 90 minutes.

The sampling units are 1x1-km squares of the National Grid. They are selected randomly by computer (see **Data Analysis** below). The BBS requires a relatively large sample of survey squares and the aim is to achieve coverage of about 2500 squares in the UK. An important aspect of BBS is its coordination through a network of volunteer BBS Regional Organisers. Information and survey forms are distributed first to these organisers, who contact volunteers willing to survey the squares every year. After the field season, forms are returned to BTO headquarters again via the Regional Organisers. On-line submission of BBS data is now also available and is recommended - see the **BBS pages** of the main BTO website for details.

Fieldwork involves three visits to each survey square each year. The first is to record details of habitat and to establish the survey route, the second and third to count birds. A survey route is composed of two roughly parallel lines, each 1 km in length, although for practical reasons routes typically deviate somewhat from the ideal. Each of these lines is divided into five sections, making a total of ten 200-m sections, and birds and habitats are recorded within these ten units. The two bird-count visits are made about four weeks apart (ideally early May and early June), ensuring that late-arriving migrants are recorded. Volunteers record all the birds they see or hear as they walk along their transect routes. Birds are noted in three distance categories (within 25 m, 25-100 m, or more than 100 m on either side of the line) measured at right angles to the transect line, or as in flight. Recording birds within distance bands is important because it provides a measure of bird detectability in different habitats and allows population densities to be estimated more accurately. The total numbers of each species, excluding juveniles, are recorded in each 200-m transect section and distance category, as well as the timing of the survey and UK weather conditions.

By 1998, more than 2300 BBS squares were being surveyed annually, close to the original target of 2500. Only around a quarter of these plots were covered in 2001, owing to Foot & Mouth Disease access restrictions, but (thanks to our keen observers) the sample recovered immediately to over 2100 in 2002. Squares are distributed throughout the UK and cover a broad range of habitats, including uplands and urban areas. Around 105 species are present on 40 or more BBS squares annually and can be monitored with good precision at the UK scale, although a few present special difficulties because of their colonial or flocking habit or their wide-ranging behaviour. For most of these, BBS can also assess annual population changes within England alone, and for about half the species also within Scotland and Wales as separate units. Sample sizes in Northern Ireland currently allow about 20 species to be indexed annually.

Data Analysis
Survey squares are chosen randomly using a stratified random sampling approach from within 83 sampling regions. These sampling regions, which in most cases are the standard BTO regions, are the "strata" (literally layers) of the sample. Survey squares are chosen at random within each region (stratum), to a density that varies with the number of BTO members resident there. Regions with larger numbers of potential volunteers are thereby allocated a larger number of squares, enabling more birdwatchers to become involved in these areas. This does not introduce bias into the results because the analysis takes the differences in regional sampling density into account.

Change measures between years are assessed using a log-linear model with Poisson error terms. For each species, the higher count from the total early or late counts for each square is used in the model (or the single count if the square was visited only once). Counts are modelled as a function of square and year effects. Each observation is weighted by the number of 1-km squares in each region divided by the number of squares counted in that region, to correct for the differences in sampling density within the UK. The upper and lower confidence limits of the changes indicate the certainty that can be attached to each change measure. When the limits are both positive or both negative, we can be 95% confident that a real change has taken place.

Trends are presented as graphs in which annual estimates are shown in blue and their 95% confidence limits in green. A caveat of "small sample" is provided where the mean sample size is in the range 30-39 plots per year for England, Northern Ireland, Wales and Scotland trends. A minimum sample size of 40 plots was required for the UK.

Next section - 2.2 Common Birds Census

Back to Methodology Index

CLICK HERE to go to the BBS section of the main BTO website

2.2 Common Birds Census

The Common Birds Census (CBC), which began in 1962, was the first of the BTO's monitoring schemes for widespread breeding birds, but has now been superseded for this purpose by **BBS**. The 2000 field season was the CBC's last year of full operation. Since 2001, a reduced set of CBC volunteers have continued to survey their plots, under the 'Core Mapping Census', with the aims of providing information on the relationships between territory locations and habitat features, and of monitoring birds in a small number of specific habitat types.

The weaknesses of the CBC as a monitor of UK bird populations were largely related to the time-consuming nature of both fieldwork and analysis. This inevitably limited the number of volunteers able to participate in the scheme, with the result that areas with few birdwatchers were under-represented. Constrained by the relatively small sample size, CBC concentrated on farmland and woodland habitats. Bird population trends in built-up areas and the uplands were therefore poorly represented. Moreover, as the plots were chosen by the observers, some may not have been representative of the surrounding countryside and there may be some bias towards bird-rich habitats. It is for these reasons that the BBS was introduced in 1994. Both surveys were run in parallel for several years to allow calibration between the schemes.

Although BBS now provides monitoring that is more representative of UK populations and covers more species, only CBC covers the mid 1960s to mid 1990s, a period of great change in bird populations. CBC results have been hugely influential in determining conservation priorities in the UK countryside. The store of detailed maps of almost a million birds' territories, collected through the CBC and maintained by BTO since the early 1960s, is a mine of information of unique value for investigating the relationships between breeding birds and their environment, over wide temporal and spatial scales, and is increasingly used for research. For many species, CBC and BBS trends can be linked to form joint CBC/BBS trends that provide ongoing monitoring, continuous since the 1960s.

Instructions for the CBC mapping method are still freely available by post from BTO headquarters and will shortly be available through the BTO website. The method is recommended where detailed information on territory numbers and locations is needed for a site and sufficient time is available for a thorough survey.

CBC, 1962-2000
The results from the Common Birds Census (CBC) provided reliable population trends for more than 60 of the commoner UK breeding species.

The CBC was instigated to provide sound information on farmland bird populations in the face of rapid changes in agricultural practice. Fieldwork was carried out by a team of 250-300 dedicated volunteers. The same observers surveyed the same plots using the same methods year after year. On average, plots were censused for around seven consecutive years but a few observers surveyed the same sites for more than 30 years. Although the original emphasis was on farmland plots, woodland plots were added by 1964. Farmland plots averaged around 70 hectares in extent. Woodland plots were generally smaller, averaging just over 20 hectares. A small number of plots of other habitats, including heathlands and small wetlands, were also surveyed annually, especially before 1985.

A territory-mapping approach was used to estimate the number and positions of territories of each species present on each survey plot during the breeding season. Volunteers visited their survey plots typically eight to ten times between late March and early July and all contacts with birds, either by sight or sound, were plotted on 1:2500 maps. Codes were used to note each bird's species, with sex and age where possible, and also to record activity such as song or nest-building. The registrations were then transferred to species maps and returned to BTO headquarters for analysis. Observers also provided maps and other details of the habitat on their plots. This makes it possible to match the distribution of bird territories with habitat features, providing the potential for detailed studies of bird-habitat relationships.

The pattern of registrations on the species maps reveals the numbers of territories for each species. All assessments of territory number were made by trained BTO staff, applying rigorous guidelines, to ensure consistency between estimates across sites and years.

In 1990, the results from the Common Birds Census were brought together in the book *Population Trends in British Breeding Birds* (**Marchant *et al.* 1990**). This landmark publication discussed long-term population trends for the years 1962 to 1988 for 164 species, with CBC or WBS population graphs for around two-thirds of these.

Validation studies

The CBC was the first national breeding bird monitoring scheme of its kind anywhere in the world and its value has been widely recognised internationally. The territory-mapping method adopted by the CBC is acknowledged as the most efficient way of estimating breeding bird numbers in small areas. As the benchmark to which other survey methods are compared, it is important that the validity and limitations of the CBC methods are understood. **Snow (1965)** compared CBC mapping and intensive nest-finding, and concluded that mapping censuses are good indicators of breeding population size for 70% of species. Experiments to test differences between observers' abilities to detect birds found that, although there was considerable variation between individual abilities, the observers were consistent from year to year (**O'Connor & Marchant 1981**). As the CBC relies on data from plots covered by the same observer in consecutive years, this source of bias has no implications for the CBC's ability to identify population trends. It has also been confirmed that the sample of plots from which CBC results are drawn has not changed in composition or character over the years (**Marchant *et al.* 1990**) and that the results of territory analysis are not affected by changes in analysts, once trained (**O'Connor & Marchant 1981**). **Fuller *et al.* (1985)** found that farmland CBC plots were representative of ITE lowland land-classes throughout England (excluding the extreme north and southwest), and closely reflected the agricultural statistics for southern and eastern Britain.

Data analysis

Few trend graphs in this report are drawn solely from CBC data. The following information will aid their interpretation.

Population changes are modelled using a generalised additive model (GAM), a type of log-linear regression model that incorporates a smoothing function (**Fewster *et al.* 2000**). This replaces the Mountford model that employed a 6-year moving window (**Mountford 1982**, **1985**; **Peach & Baillie 1994**) and was used until 1999, but the principles are similar. Counts are modelled as the product of site and year effects on the assumption that between-year changes are homogeneous across plots. "Smoothing" is used to remove short-term fluctuations (e.g. those caused by periods of severe weather or measurement error) and thus reveal the underlying pattern of population change. This is achieved by setting the degrees of freedom to one-third the number of years in the series. Confidence limits on the indices are estimated by bootstrapping (a resampling method; **Manley 1991**) and thus do not make any assumptions about the underlying distribution of counts.

Indices are plotted as the blue line on the graphs, and provide a relative measure of population size on an arithmetic scale with a 1998 value of 100. If an index value increases from 100 to 200, the population has doubled; if it declines from 100 to 50, it has halved. The two green lines on the graphs, above and below the index line, are the upper and lower 85% confidence limits. A narrow confidence interval indicates that the index series is estimated precisely, a wider interval indicates that it is less precise. The use of 85% confidence limits allows relatively straightforward comparison of points along the modelled line: non-overlap of the 85% confidence limits is equivalent to a significant difference at approximately the 5% level (**Anganuzzi 1993**). Caveats are provided to show where the data suffer from a "Small sample" if the mean number of plots was <20. Data are regarded as "Unrepresentative?" if the average abundance of a species in 10-km squares containing CBC plots was less than that in other 10-km squares of the species' distribution in the UK (as measured from *1988-91 Breeding Atlas* data (**Gibbons *et al.* 1993**)), or, where average abundances could not be calculated, expert opinion judged that CBC data may not be representative.

Next Page - 2.3 Joint CBC/BBS trends

Back to Methodology Index

CLICK HERE to go to the CBC section of the main BTO website

2.3 Combined Common Birds Census (CBC) and Breeding Bird Survey (BBS) trends

The field protocols for the two surveys are described in sections 2.1 and 2.2. As previously noted, the CBC has been an enormously influential project, providing the main source of information on national population levels in the UK since its inception. For all its importance and impact, however, certain biases in coverage have long been known. Coverage is predominantly in lowland south-eastern Britain, where the numbers of potential volunteers are greatest. Coverage in more sparsely populated upland regions has always been much more patchy. Even within the well-covered regions, sites are situated in a limited number of habitats, predominantly farmland and woodland. Within this region, the results are nevertheless believed to be broadly accurate (**Fuller *et al.* 1985**). However, several species such as Wood Warbler and Meadow Pipit have the greater part of their numbers in the north or west of the country, outside the area adequately covered. For these species, the CBC may not accurately reflect national trends.

The BBS, on account of its more rigorous, stratified random sampling design, and its simplicity in the field, produces data that better cover the previously under-represented areas. In previous editions of 'Breeding Birds in the Wider Countryside' (e.g. **Baillie *et al.* 2002**), indices have been published both from CBC and BBS data, for those species with sufficiently large sample sizes. The CBC was discontinued in 2000; from now on, BBS data will be used in the production of national population trends dating back to its year of establishment, 1994.

For many purposes, however, the presentation and analysis of longer time-series will be required, dating back to before the establishment of the BBS but coming right up to the present day. The calculation of 25-year alert designations, as in this report, provides just one example. This need has led to the BTO recently carrying out research into the compatibility of indices from BBS and CBC data in various years and regions, and the possibility of deriving trustworthy long-term indices from the two data sources in combination (**Freeman *et al.* 2003**). This research suggested that for the vast majority of species considered there was no significant difference between population trends, calculated from the two surveys, based on that part of the country where CBC data are sufficient to support a meaningful comparison. Where a statistically significant difference was found, this was sometimes for very abundant species for which the power to detect even a biologically insubstantial difference was considerable. Within this region, therefore, long-term trends based on CBC and BBS data can be produced for almost all species previously monitored by the CBC alone. In **Freeman *et al.* (2003)** this was the area covered by **Fuller *et al.* (1985)**, because CBC plots in that region were shown to be representative of lowland farmland there. As this region covers the bulk of England, and for consistency with the rest of this report we have produced joint indices for CBC/BBS for the whole of England (called CBC/BBS-England index), rather than just the Fuller rectangle. A similar UK index can be produced for only about 50% of species (CBC/BBS-UK index).

A second question then is whether one can obtain reliable trends over the same period for the entire UK. That is, since prior to 1994 only CBC data are available, are the population trends within the region well-covered by the CBC typical of those for the UK as a whole? The shortage of CBC data in the north and west means that the only way of investigating this is via the BBS data. Significant regional variation in trends was found for approximately half the species (see **Freeman *et al.* 2003** for full details). For such species, the regional bias in CBC data means that no reliable UK index can be produced prior to 1994. In summary, joint population indices dating back to the start of the CBC can continue to be produced for that part of the country well served by the CBC for almost all common species.

The present ‘Breeding Birds in the Wider Countryside’ is the first since the close of the CBC and the first to present joint CBC/BBS indices, in place of those derived solely from the CBC. The model fitted to these combined data is that historically employed for the BBS, a Generalized Linear Model with counts assumed to follow a Poisson distribution and a logarithmic link function. Standard errors were calculated via a bootstrapping procedure. For presentation in the figures, both the population trend and its confidence limits were also subsequently smoothed using a thin-plate smoothing spline with 11 degrees of freedom.

Indices are plotted as the blue line on the graphs, and provide a relative measure of population size on an arithmetic scale with a 2000 value of 100. If an index value increases from 100 to 200, the population has doubled; if it declines from 100 to 50, it has halved. The two green lines on the graphs, above and below the index line, are the upper and lower 85% confidence limits. A narrow confidence interval indicates that the index series is estimated precisely, a wider interval indicates that it is less precise. The use of 85% confidence limits allows relatively straightforward comparison of points along the modelled line: non-overlap of the 85% confidence limits is equivalent to a significant difference at approximately the 5% level (**Anganuzzi 1993**).

Next Page - 2.4 Waterways Bird Survey

Back to Methodology Index

BBWC Home > **Contents** > **Methodology** > Waterways Bird Survey

2.4 Waterways Bird Survey

The Waterways Bird Survey (WBS) has monitored the population sizes of up to 24 riparian bird species on canals and rivers throughout the UK since 1974. WBS uses a territory-mapping method like that of its parent scheme, the **Common Birds Census**, to estimate the breeding population of waterbirds on each plot. Detailed territory maps are prepared that can be compared with habitat data to show which features of linear waterways are important to breeding birds. The plots average 4.4 km in length; almost half are slow-flowing lowland rivers with the rest either fast-flowing rivers/streams or canals. There are currently around 90 plots distributed throughout the UK. The proportion of plots in the north and west of England is higher than existed in the CBC (**Marchant *et al.* 1990**). Wales, Scotland and especially Northern Ireland are relatively poorly covered.

All fieldwork is carried out by volunteers. Observers are asked to survey their plot on nine occasions between March and July, mapping all the birds seen or heard onto 1:10,000-scale maps. Registrations are then transferred to species maps, which are analysed to reveal the numbers and positions of territories for each species. Since 1994, observers have completed their own territory analysis, based on the scheme's written guidelines, with results checked by BTO staff. This has successfully speeded up the processing of WBS data at BTO headquarters. As WBS employs very similar methods to those of CBC, the validation studies carried out for the latter generally hold true for WBS (see **section 2.2**). **Marchant *et al.* (1990)** found that there has been little change in the composition of the WBS sample in terms of waterway type or geographical spread. Trend analysis and presentation follows the same pattern as CBC (**section 2.2**), except that the "unrepresentative?" caveat has not been used. A caveat of "small samples" is provided when the number of plots is between 10 and 19.

Population changes along waterways are reported annually in *BTO News* for around 20 riparian species, of which Goosander is not covered by BBS monitoring. For specialist waterbirds, including Little Grebe, Mute Swan, Common Sandpiper, Kingfisher, Sand Martin, Grey Wagtail, Dipper and Reed Warbler, targeted surveys along waterways can provide a better precision of monitoring than is possible through the more generalised BBS surveys. WBS indices can also add a new perspective on trends in waterbirds that are monitored, largely in other habitat types, by CBC/BBS. For **Lapwing**, populations declined rapidly on arable farmland during the late 1980s while numbers on WBS plots, typically representing populations along river floodplains, showed greater stability. **Yellow Wagtails** have apparently declined much more steeply in WBS habitats than elsewhere.

WBS has similar limitations as a monitoring scheme that led to the CBC's replacement by BBS. In particular, plot distribution is biased geographically and possibly also towards sites that are good for birds, and an intensive survey method is used that severely limits the sample size (**Marchant *et al.* 1990**). A drawback specific to WBS is that it covers only waterbirds. BTO has addressed these issues by setting up the **Waterways Breeding Bird Survey (WBBS)**, which has been running since 1998 in parallel with WBS. WBBS uses BBS-style transect methods along random waterways, and includes all species of birds. If, once its development is completed, WBBS becomes an ongoing scheme, it will provide useful monitoring data to supplement BBS.

Next section - 2.5 Heronries Census

Back to Methodology Index

CLICK HERE to go to the WBS section of the main BTO website

2.5 Heronries Census

The BTO Heronries Census began in 1928 and is the longest-running breeding-season bird monitoring scheme in the world. As predators at the top of the freshwater food chain, Grey Herons are excellent indicators of environmental health in the countryside. They build large stick nests, mostly in colonies at traditional sites. The aim of this census is to collect annual nest counts of Grey Herons from as many sites as possible in the United Kingdom. Volunteer observers make counts of 'apparently occupied nests' at heron colonies each year. Changes in the numbers of nests, especially over periods of several years, provide a clear measure of the population trend. In recent seasons, observers have also counted the nests of Little Egrets *Egretta garzetta*, which have been appearing in an increasing number of southern heronries since the first records in 1996.

Coverage is coordinated through a network of regional organisers. A core of birdwatchers and ringers monitor their local colonies annually, providing a backbone of regular counts. Around two-thirds of the heronries in England and Wales are currently counted each year, with more-complete censuses carried out in 1929, 1954, 1964, 1985 and 2003. Except during the special surveys, rather few counts are made of heronries in Scotland and Northern Ireland. Counts are submitted mostly on cards and the data are entered onto computer at BTO headquarters. The number of heronries cards submitted each year is around 450.

Data analysis

Population changes are estimated using a ratio-estimators approach derived from that of **Thomas (1993)**. Essentially, the ratios of the populations in any two (not necessarily consecutive) years of the survey are estimated from counts at sites visited in each of those years. These ratios can be used to estimate the counts at sites that were not visited, and hence build an estimate of the total population. Further modifications have been made to allow for the extinction of colonies and the establishment of new ones, resulting in the graph as shown (**Marchant *et al.* 2004**). A short report containing simple estimates of change for the latest year is published annually in *BTO News*.

On the **Grey Heron** page of this report, the trend is presented graphically with annual estimates in blue and their 85% confidence limits in green. A smooth trend line in red is based on a non-parametric regression model, using thin-plate smoothing splines with 24 degrees of freedom.

Next Section - 2.6 Constant Effort Sites Scheme

Back to Methodology Index

CLICK HERE to visit the Heronries Census page of the main BTO website

CLICK HERE to visit the Little Egrets page of the main BTO website (WeBS)

2.6 Constant Effort Sites

The Constant Effort Sites (CES) Scheme uses changes in catch sizes across a network of more than 100 standardised mist-netting sites to monitor changes in the abundance and breeding success of common passerines in scrub and wetland habitats. At each constant effort site, licensed ringers erect a series of mist-nets in the same positions, for the same amount of time, during 12 morning visits between May and August. Year-to-year changes in the number of adults caught provide a measure of changing population size, while the proportion of young birds in the total catch is used to monitor annual productivity (breeding success). By monitoring the abundance of young birds between May and August, the CES method should integrate contributions to annual productivity from the entire nesting season, including second and third broods for multi-brooded species. Between-year recaptures of ringed birds can also be used to calculate annual survival rates, although this requires specialised analytical techniques (e.g. **Peach 1993**) and is not considered further here. Further details of the CES Scheme and methods of analysis are presented by **Peach *et al.* (1996)**.

The CES Scheme began in 1983 with 46 sites and now has nearly 150. The distribution of CES sites tends to reflect the distribution of ringers within Britain and Ireland. The majority are operated in England, and there are small numbers in Scotland, Wales, Northern Ireland and the Republic of Ireland. The CES is able to monitor the populations of 28 species of passerines in scrub and wetland habitats.

Data Analysis
Annual estimates of the abundance of adults and young are separately assessed through application of log-linear Poisson regression models, from which fitted year-effects are taken as annual relative abundances, compared to an arbitrary value of unity in 2000. 85% confidence limits are based on the corresponding asymptotic standard errors. At sites where catching effort in a year falls below the required 12 visits, but a minimum of 8 are completed, annual catch sizes are corrected according to experience during years with complete coverage (see **Peach *et al.* 1998** for full details). Sites with fewer visits in a given year are omitted for the year in question.

Annual indices of productivity (young per pair) are estimated from logistic regression models applied to the proportions of juvenile birds in the catch, the year-effects then being transformed to measures of productivity relative to an arbitrary value of unity in 2000. As above, catch sizes are corrected for small numbers of visits missed where necessary. It should be noted that these indices are relative, and are not estimates of the actual numbers of young produced per pair. Full methodological details are provided by **Freeman *et al.* (in prep)**.

Data are presented graphically with annual estimates in blue and their 85% confidence limits in green. Methods and software for the optimal fitting of smoothed trends to CES data remain in development. Here, we also present a non-parametric regression model fitted to the calculated annual indices of abundance and productivity (via thin-plate smoothing splines with 5 degrees of freedom), to provide a simple smoothed picture. This is the red smoothed line on the CES graphs on the species pages. A caveat is provided for "small samples" when the average number of plots per year is between 10 and 19.

Next Section - 2.7 Nest Record Scheme

Back to Methodology Index

2.7 Nest Record Scheme

The BTO's Nest Record Scheme is the largest, longest-running and most highly computerised of such schemes in the world and possesses the most advanced and efficient techniques of data gathering, data capture and analysis (**Crick *et al.* 2003**). There are currently more than a million nest records held by the Trust, of which 35% are computerised.

The primary aim of the Nest Record Scheme is to monitor the breeding performance of a wide range of UK birds annually as a key part of the BTO's data collection. Annual reports are published (e.g. **Beaven *et al.* 2003**) and the significant results communicated immediately to JNCC. Another primary aim is to undertake detailed analyses of breeding performance of species of conservation interest (e.g. **Crick *et al.* 1994**, **Brown *et al.* 1995**, **Peach *et al.* 1995**, **Crick 1997**, **Browne *et al.* in press**).

The Nest Record Scheme gathers data on the breeding performance of birds in the UK through a network of volunteer ornithologists. Each observer is given a code of conduct that emphasises the responsibility of recorders towards the safety of the birds they record and explains their legal responsibilities. These observers complete standard nest record cards for each nest they find, giving details of nest site, habitat, contents of the nest at each visit and evidence for success or failure. When received by the BTO staff, the cards are checked, sorted and filed away ready for analysis. Those for Schedule 1 species are kept confidential. (These are species protected from disturbance at the nest by Schedule 1 of the Wildlife & Countryside Act 1981: they are generally rare species and the location of their nests may need to be protected from egg collecting (an illegal activity) or other potential disturbance. To visit the nests of these species a special licence is required.). Computer programs developed by BTO check the data for errors and calculate first-egg date, clutch size, nest loss rates at egg and chick stages. Data are computerised according to priorities for population monitoring and for specific research projects.

Currently the BTO collects a total of more than 30,000 records each year for around 180 species. Typically, there are more than 150 records for 55 species and more than 100 for a further 10-15 species. The quality of records improved substantially in 1990 with the introduction of a new recording card, which promotes greater standardisation and clarity in the information recorded by observers. The general distribution of Nest Record Cards is patchy at the county scale but is more even over larger regions of the UK. Overall, Northern Ireland and parts of Scotland (southeast, Western Isles) and parts of England (west Midlands, southwest) have relatively low coverage, often reflecting observer density. A major analysis of trends over time in various aspects of breeding performance found relatively few differences between major regions in the UK, when analysed using analysis of covariance (**Crick *et al.* 1993**). Habitat coverage is broad, as the scheme receives records from all the UK's major habitats. Most records come from woodland, farmland and freshwater sites, but the scheme also receives data from scrub, grassland, heathland and coastal areas.

Data Analysis

Five different variables were analysed for this report: laying date (where day 1 = January 1); clutch size; brood size; and daily nest failure rates during egg and nestling stages, calculated from the methods of **Mayfield (1961**, **1975**) and **Johnson (1979)** (see **Crick *et al.* 2003** for review).

In order to minimise the incidence of errors and inaccurately recorded nests, a set of rejection criteria was applied to the data: laying date only included cases where precision was within �5 days; clutch size was not estimated for nests which had been visited only once, for nests which were visited when laying could still have been in progress, or for nests which were only visited after hatching; and maximum brood size was calculated only for nests which were observed after hatching. The last variable is an underestimate of brood size at hatching because observers may miss early losses of individual chicks; it differs from clutch size because eggs may be lost during incubation and hatching success may be incomplete.

Daily failure rates of whole nests were calculated using a formulation of **Mayfield's (1961**, **1975**) method as a logit-linear model with a binomial error term, in which success or failure over a given number of days (as a binary variable) was modelled, with the number of days over which the nest was exposed during the egg and nestling periods as the binomial denominator (**Crawley 1993**, **Etheridge *et al.* 1997**, **Aebischer 1999**). Number of exposure days during the egg and nestling periods was calculated as the midpoint between the maximum and minimum possible, given the timing of nest visits recorded on each Nest Record Card (note that exposure days refer only to the time span for which data were recorded for each nest and do not represent the full length of the egg or nestling periods). Each calculation assumes that failure rates were constant during the period considered. Violations of this assumption of the Mayfield method can lead to biased estimates if sampling of nests is uneven over the course of each period. It is unlikely that any such bias would vary from year to year, so although absolute failure rates may be biased, annual comparisons should be unaffected (**Crick *et al.* 2003**). In this report, therefore, we present only temporal trends in daily nest failure rates.

Statistical analyses of nest record data were undertaken using SAS programs (**SAS 1990**). Regressions through annual mean laying dates, clutch sizes and brood sizes were weighted by sample size. Nest survival was analysed by logistic regression. Quadratic regressions were used when the inclusion of a quadratic term provided a significant improvement over linear regression. These are described as "curvilinear" in the tables on species pages. Significant linear trends are described as "linear". However, linear regressions are presented on the figures in this report, even when statistically non-significant, for illustrative purposes.

Results are presented only if the mean sample size of records for a particular variable and species exceeds 10 per year, and are presented with a caveat for small sample sizes if the mean number of records contributing data was between 10 and 30 per year.

Next Section - 2.8 The Alert System

Back to Methodology Index

CLICK HERE to go to the NRS section of the main BTO website

2.8 The Alert System

2.8.1 General approach

The alert system used within this report is designed to draw attention to developing population declines that may be of conservation concern. It also identifies situations where long-term declines have reversed, leading to an improvement in conservation status. It must be stressed that the changes reported here are advisory and do not supersede the agreed UK conservation listings (**Gregory *et al*. 2002**; see **PSoB** pages). They are based on similar criteria to *The Population Status of Birds in the UK*, however, and so provide an indication of likely changes at future revisions.

The system is based on statistical analyses of the population trend data for individual species. Alerts seek to identify rapid declines (>50%) and moderate declines (>25% but <50%). These declines are measured over a number of time-scales, depending on the availability of data - the full length of the available time series, and the most recent 25 years, 10 years and 5 years for which change can be estimated. The conservation emphasis is particularly on the longer periods, but short-term changes help to separate declines that are continuing - or accelerating - from those that have ceased or reversed.

The alerts are calculated annually using standard automated procedures. Where species are at the margin of two categories (e.g. a decline of about 25%) they may fire alerts in some years but not others, or different levels of alert in different years.

Data on some species might be biased, owing to unrepresentative monitoring, or imprecise, owing to small sample sizes. Because these data often provide the only information that is available, our general approach is to report all the alerts raised but to clearly flag up any deficiencies in the data.

2.8.2 Smoothing population trends

Bird populations show long-term changes that do not follow simple mathematical trajectories. In addition to the long-term trends, unsmoothed population indices also show short-term fluctuations resulting from a combination of natural population variability and statistical error. We use smoothing techniques that aim to extract the long-term pattern of population change, without forcing it to follow any particular shape (such as a straight line or a polynomial curve). These methods remove most of the effects of short-term fluctuations (including any natural year-to-year variability) so that the long-term trend is revealed more clearly.

Technical details available here

2.8.3 Years used for analysis

Once a smoothed population trend has been calculated, change measures are calculated from the ratio of the smoothed population indices for the two years of interest. Population indices for the first and last years of a smoothed time series are less reliable than the others, and so we always drop them before calculating alerts. Because the latest year is not included, the alerts are therefore less up-to-date than they could be, but fewer false alarms are generated. The latest year's data points do contribute to the smoothed curve and are dropped only after the smoothing has taken place.

The time taken to collate and analyse bird monitoring data is another factor affecting the years that can be included in these analyses. Full analyses of data sets are not usually all available until 12-15 months after the end of a particular breeding season. This report was prepared in 2003 when we had analyses of monitoring data up to 2002. As we drop the final year of the smoothed time series, we would normally have used change measures up to 2001. However, due to the Foot & Mouth Disease outbreak in the UK, BBS, WBS and Heronries data for 2001 were insufficient for inclusion and so population changes have been measured to 2000 (assuming missing data points for 2001).

Long-term changes for most of the species included in this report are calculated from joint Common Birds Census and Breeding Bird Survey data (CBC/BBS indices). The CBC started on farmland in 1962 and on woodland in 1964. However, the early years of the CBC population indices are strongly influenced by the effects of the unusually severe winters if 1961/62 and 1962/63, as well as by developments in methodology (**Marchant *et al.* 1990**). Therefore joint CBC/BBS indices have been calculated using the data from 1966 onwards and population changes are calculated back to 1967.

Data for other schemes generally start as soon as the scheme had reached a sufficient size to produce reliable results. The maximum periods available from the main schemes contributing to this report are set out in the table below.

Scheme	Years available		Maximum alert period		
	First year	Last year	First year	Last year	Number of years
CBC/BBS	1966	2002	1967	2000	33
Waterways Bird Survey	1974	2002	1975	2000	25
Constant Effort Sites	1983	2002	1984	2001	17
Heronries Census	1928	2002	1929	2000	71
Breeding Bird Survey	1994	2002	-	-	-

2.8.4 Confidence limits and statistical testing

We show 90% confidence limits for population change measures wherever possible. Any decline where the confidence limits do not overlap zero (no change) is regarded as statistically significant and will trigger an alert if it is of sufficient magnitude. Note that, because we are seeking to detect only declines, we are using a one-tailed test - with a P value of 0.05. These confidence limits therefore do not indicate whether increases are statistically significant.

The graphs of population trends show 85% confidence limits because these allow an approximate visual test of whether the difference between the indices for any two given years is statistically significant: if the indices for two given years are assumed independent and normally distributed with standard errors of comparable size (standard errors differing by a factor of up to about 2 are quite acceptable), then to a good approximation the difference between the indices is significant at the 5% level if there is no overlap in their 85% confidence intervals (**Buckland *et al.* 1992**). This test is fairly robust, and the independence assumption is reasonable if the years are some distance apart.

Technical details available here

2.8.5 Data-deficient species

There is uncertainty about the reliability of the results for some species, either because data may be unrepresentative or because they are based on a very small sample of plots. In these cases the cause of the uncertainty is recorded in the comment column of the population change table.

Unrepresentative data

This assessment is based on the criteria developed by **Gibbons *et al.* (1993)**. Data from the 1988-91 Breeding Atlas were used to compare the average abundance of a given species in 10-km squares with and without CBC plots. If average abundance is higher in squares without CBC plots, it is likely that much of the population is not well sampled by the CBC. In past reports, CBC data for such species were labelled as "unrepresentative". Where there are insufficient data to undertake such calculations, expert opinion was used. In this report, where it has been possible to produce joint UK or England CBC/BBS trends, then there was no substantial or statistical difference between the trends from the two schemes over the period when they ran in parallel. Thus the trends are always considered representative of the region concerned.

Sample size

Sample size is assessed from the average number of plots contributing to the population indices for a given species in each year. A plot with a zero count would be included provided that the species had been recorded there in at least one year and that records for that plot were available for at least two years. Plots where a species has never been recorded do not enter the index calculations. These average sample sizes are shown in column four (plots) of the population change tables. For CBC, WBS and CES, a mean of between 10 and 19 plots is flagged as a small sample. For regional BBS indices a mean in the range 30-39 plots is flagged as a small sample.

2.8.6 Application to individual schemes

Currently the full methodology outlined above is applied to the CBC/BBS and the WBS trends. For the CES scheme and the Heronries census we present annual indices with confidence limits and then fit a smoothed curve through the annual index values. We do not currently have confidence limits for this smoothed curve. Therefore all alert labels for CES are shown in square brackets. There are no alerts for Grey Heron.

BBS started in 1994 so only eight years' data (1994-2002) were available for this report. This is not a long enough time series to apply the smoothing methods and alerts framework outlined above. Therefore we have simply calculated change measures between the first and last years of the BBS time series based on the standard 'sites x years' model that is used to produce the BBS indices each year.

Technical details available here

Next - 2.9 Statistical methods used for alerts

Back to Methodology Index

2.9 Statistical methods used for alerts

The **Alert System** page contains a general overview of how the alert system works. More detailed information is given below about the statistical methods used to estimate population indices, population changes and their confidence intervals.

2.9.1 General structure of data

The data for all of the schemes reported here consist of annual counts made over a period of years at a series of sites. They can thus be summarised as a data matrix of sites x years, within which a proportion of the cells contain missing values because not all of the sites are covered every year. Such data can be represented as a simple model:

log (count) = site effect + year effect

Each site has a single site-effect parameter. These site parameters are not usually of biological interest but they are important because abundance is likely to differ between sites. The main parameters of interest are the year effects. These can be modelled either with as many parameters as years (an annual model), or with a smaller number of parameters, representing a smoothed curve.

A simple annual model would be fitted as a generalised linear model with Poisson errors and a log link function. This is the main model provided by the widely used program TRIM (**Pannekoek & van Strien 1996**).

2.9.2 Fitting smoothed models

Our preferred method for generating a smoothed population trend is to fit a smoothed curve to the data directly using a generalised additive model (GAM) (**Hastie & Tibshirani 1990**, **Fewster *et al.* 2000**). Thus the model from the previous section becomes:

log (count) = site effect + smooth (year)

where smooth (year) represents some smooth function of year. It was not straightforward to fit GAMs to the CES or Heronries Census data and we have therefore fitted smooth curves with a similar degree of smoothing to the annual indices.

The non-parametric smooth curve fitted in our models is based on a smoothing spline. The degree of smoothing is specified by the number of degrees of freedom (df). A simple linear trend has df = 1 while the full annual model has df = t-1, where t is the number of years in the time series. Here we set df to be approximately 0.3 times the number of years in the time series (**Fewster *et al.* 2000**). The degrees of freedom used for the main data sets presented on the web site are summarised below.

	Years	Length of time series	df for smoothed index
CBC/BBS	1966-2002	37	11
Waterways Bird Survey	1974-2002	29	9
Constant Effort Sites	1983-2002	20	6
Heronries Census	1928-2002	75	23

Note that the numbers of years shown here are different from those available for calculating change measures, because we use the whole time series available for analysis (i.e. prior to the truncation of end points), and because we count the number of years in the time series rather than the number of annual change measures.

2.9.3 CBC/BBS trends and Waterways Bird Survey

GAMs were fitted to the CBC/BBS and WBS data using the approach described above (**Fewster *et al.* 2000**). Confidence limits were fitted using a bootstrap technique to avoid restrictive assumptions about the distribution of the data. Bootstrap samples were drawn from the data by sampling plots with replacement. We generated 199 bootstrap samples from each data set and fitted a GAM to each of them. Confidence limits for the smoothed population indices (85% cl) and change measures (90% cl) were determined by taking the appropriate percentiles from the distributions of the bootstrap estimates The section on **confidence limits and statistical testing (2.8.4)** gives the reasons for choosing these particular confidence limits.

The GAMs were fitted using a modified version of the FORTRAN program GAIM (**Hastie & Tibshirani 1990**).

2.9.4 Constant Effort Sites

Annual indices were fitted to catches of adults and juveniles separately using the method described by **Peach *et al.* (1998)**. This is essentially the annual 'sites x years' model described above but with the addition of an offset to correct for missing visits.

Offsets could not easily be incorporated in the GAM software that we have available. Therefore we fitted a smooth curve to the annual indices. This was done using PROC TSPLINE of SAS with 6 degrees of freedom. This procedure should give very similar estimates to a GAM analysis, but it does not provide confidence intervals for the smoothed population trends, nor for the change measures derived from it. Therefore all alert flags relating to the CES are shown in square brackets.

2.9.5 Heronries Census

The Heronries Census data were analysed using a modified sites x years model which incorporates information about new colonies (sites) that have been established and other colonies from the sample that are known to have gone extinct. The method was developed by **Thomas (1993)** specifically in relation to the heronries data set. Since then the heronries database has been substantially upgraded and the method has been applied to the full data set (**Marchant *et al.* in press**).

The above method of analysis cannot be easily applied within a GAM framework. Therefore we fitted a smooth curve to the annual indices. This was done using PROC TSPLINE of SAS with 23 degrees of freedom. This procedure should give very similar estimates to a GAM analysis but it does not provide confidence intervals for the smoothed population trend or the change measures derived from it. This is not a serious limitations as there are no potential alerts for **Grey Heron**, whose populations have generally been increasing.

Section 3 - Species pages

Back to Methodology Index

SPECIES LIST

List of species (in Voous taxonomic order)

Barn Owl
Little Owl
Tawny Owl
Nightjar
Swift
Kingfisher
Green Woodpecker
Great Spotted Woodpecker
Lesser Spotted Woodpecker

LARKS

Woodlark
Skylark
Swallow
Sand Martin
House Martin
Tree Pipit
Meadow Pipit
Yellow Wagtail
Hooded Crow
Raven
Starling

SPARROWS

House Sparrow
Tree Sparrow

FINCHES

Chaffinch
Greenfinch
Goldfinch
Siskin
Linnet
Lesser Redpoll
Bullfinch

BUNTINGS

Yellowhammer
Reed Bunting
Corn Bunting

Information to aid interpretation of the pages for individual species can be found on the **Species Help Page**

RED-THROATED DIVER
Gavia stellata

Conservation listings

Europe: SPEC category 3, vulnerable
UK: Amber (25-50% population decline)

Long-term trend

Shetland: moderate decline

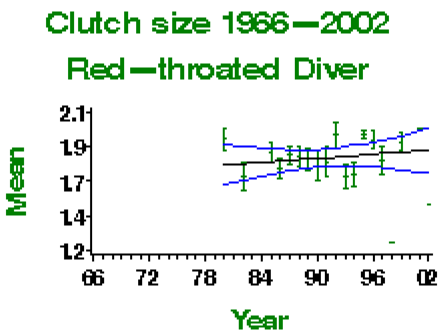
Status summary

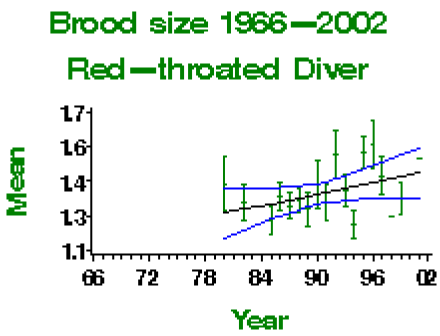
Population trends are not monitored by the BTO, but the UK Seabird Monitoring Programme shows that numbers in Shetland fluctuated around a stable level during 1980-99 (Upton *et al.* 2000). A previous survey (Gibbons *et al.* 1997) indicates a decrease of 36% there between 1983 and 1994, however, and this warrants Amber listing for Red-throated Diver, in addition to its original criterion of vulnerability in Europe as a whole. Increasing nest failure rates during the egg stage, although not a significant trend, may be a future cause of concern.

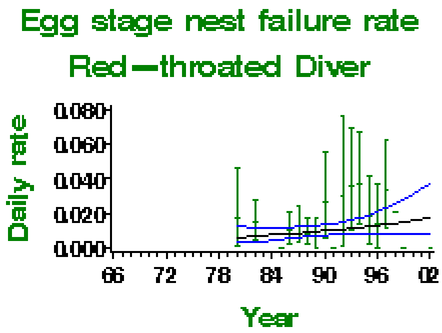
Annual breeding population changes are not currently monitored by BTO for this species

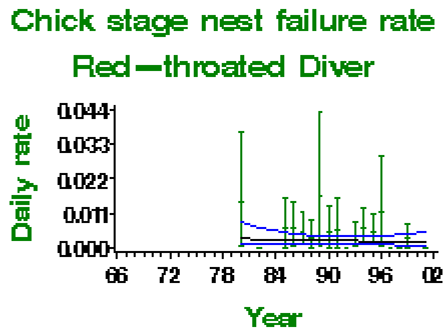
Table of productivity information for Red-throated Diver

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	21	1980-2001	28	None				Small sample
Brood size	21	1980-2001	42	None				
Daily failure rate (eggs)	21	1980-2001	16	None				Small sample
Daily failure rate (chicks)	21	1980-2001	23	None				Small sample









Insufficient data on laying date available for this species

Insufficient data on CES available for this species

LITTLE GREBE
Tachybaptus ruficollis

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: uncertain

Status summary

Both BBS and WBS have small samples for this species. Because of the shortage of data, and the conflict between WBS and BBS assessments, the rapid decline indicated by WBS has not triggered a conservation listing. The decline shown by the WBS may reveal problems among birds on linear waterways during the early 1980s and late 1990s, while increases shown by the CBC and by BBS may suggest that wider populations (including small still waters) are healthy. In an analysis of nest record cards, **Moss & Moss (1993)** found that nests on ponds and lakes were significantly more successful than those on rivers and streams and that nests on rivers, subject to fluctuating water levels, experienced significantly higher failure rates through flooding than those on canals, where water levels are artificially maintained.

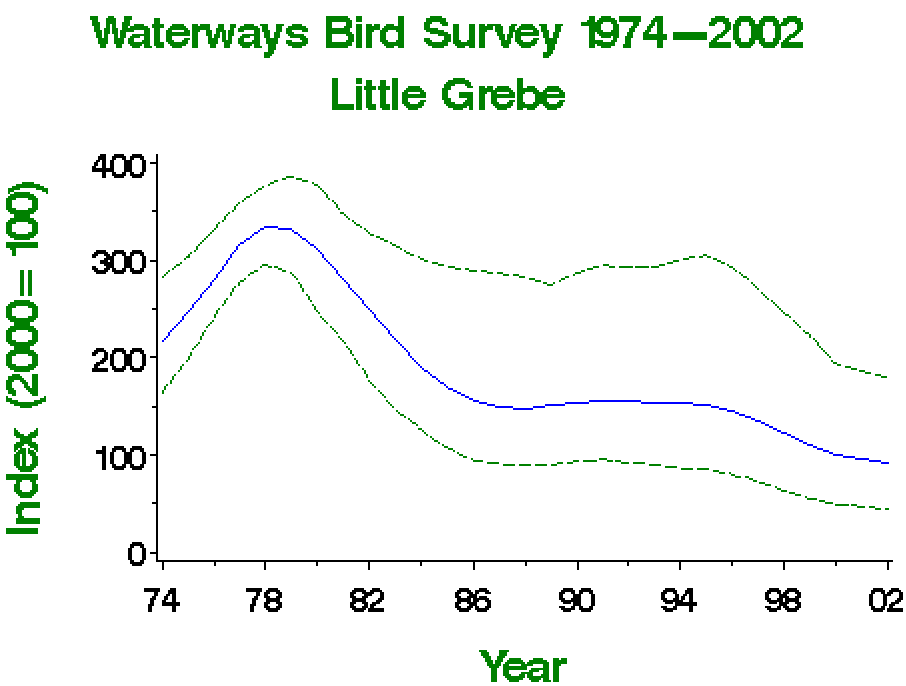
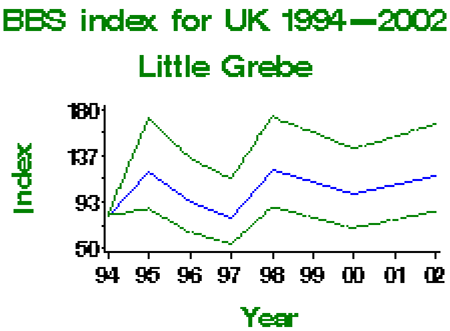


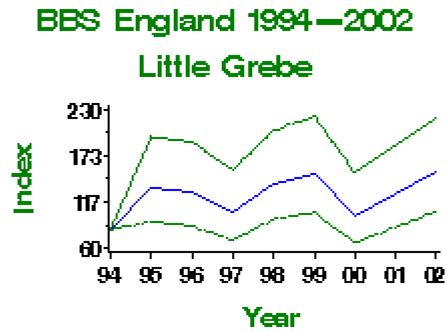
Table of population changes for Little Grebe

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	17	-60	-81	-16	>50	Small sample
	10	1990-2000	16	-35	-54	-17	>25	Small sample

	5	1995-2000	15	-34	-49	-21	>25	Small sample
BBS UK	8	1994-2002	47	47	5	106		
BBS England	8	1994-2002	39	83	26	165		

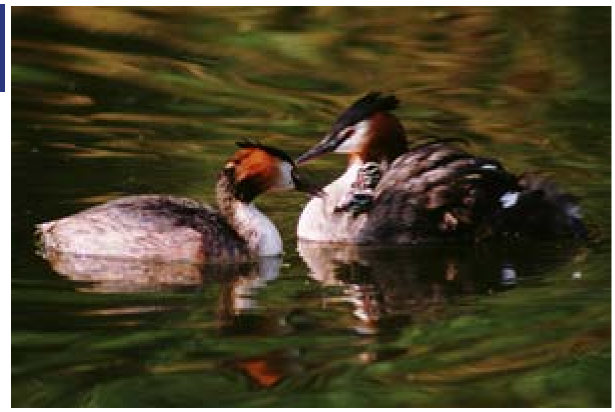
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

GREAT CRESTED GREBE
Podiceps cristatus



Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: probable increase

Status summary

This species was believed to be on the verge of extinction in Britain around 1860, when only 42 pairs were known in England. A subsequent increase followed reductions in persecution, aided by statutory protection, and the creation of habitat in the form of gravel pits (**Gibbons *et al.* 1993**). Increase was tracked by special surveys to around 7000 adult birds in Britain by 1975 (**Hughes *et al.* 1979**). The BBS provides the first annual, national monitoring of this species and indicates possible further population increase since 1994. Winter numbers, monitored by **WeBS**, increased during the 1980s and are now stable (**Musgrove *et al.* 2001**).

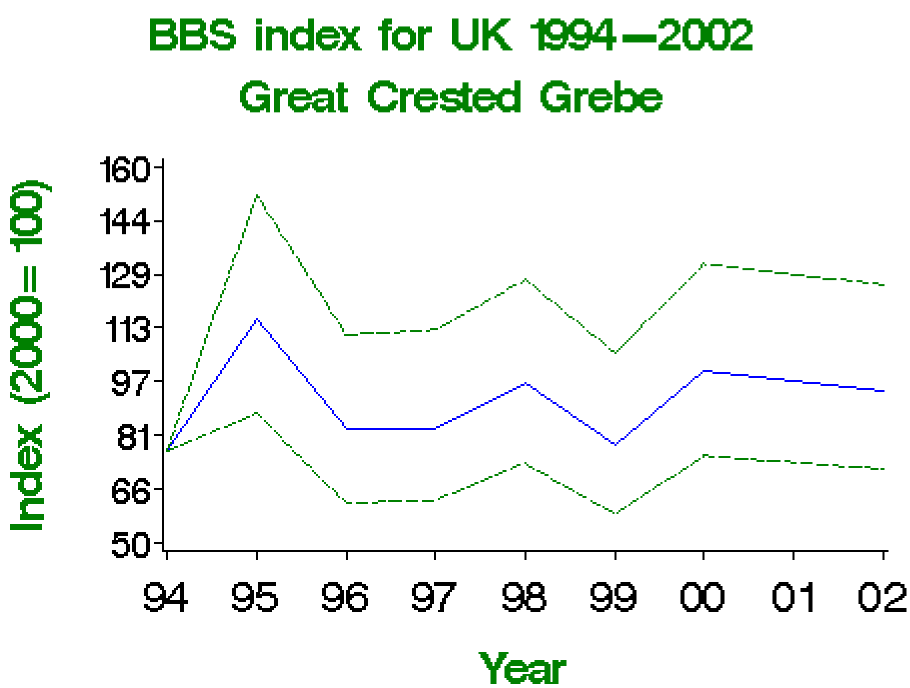
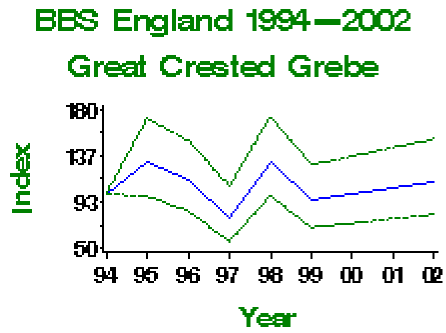


Table of population changes for Great Crested Grebe

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	55	23	-7	63		
BBS England	8	1994-2002	50	11	-19	51		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



Productivity information is not currently available for this species

CORMORANT
Phalacrocorax carbo

Conservation listings

Europe: no SPEC category, secure
UK: Amber (breeding localised, >20% of European population in winter)

Long-term trend

UK: moderate increase
Shetland: decline

Status summary

Cormorants, historically an almost exclusively coastal-breeding seabird in the UK, have established dozens of inland breeding colonies in eastern and central England since 1980 (**Rehfisch *et al.* 1999**). The UK Seabird Monitoring Programme shows substantial increases in numbers breeding inland in England and in Northern Ireland during 1986-99 (**Upton *et al.* 2000**). However, numbers have fallen in Shetland by 5% per annum over the same period. BBS indicates a moderate increase in Cormorant numbers, although numbers in England show only a shallow increase. The species has recently been moved from the Green to the Amber list, for reasons unconnected with its UK trend.

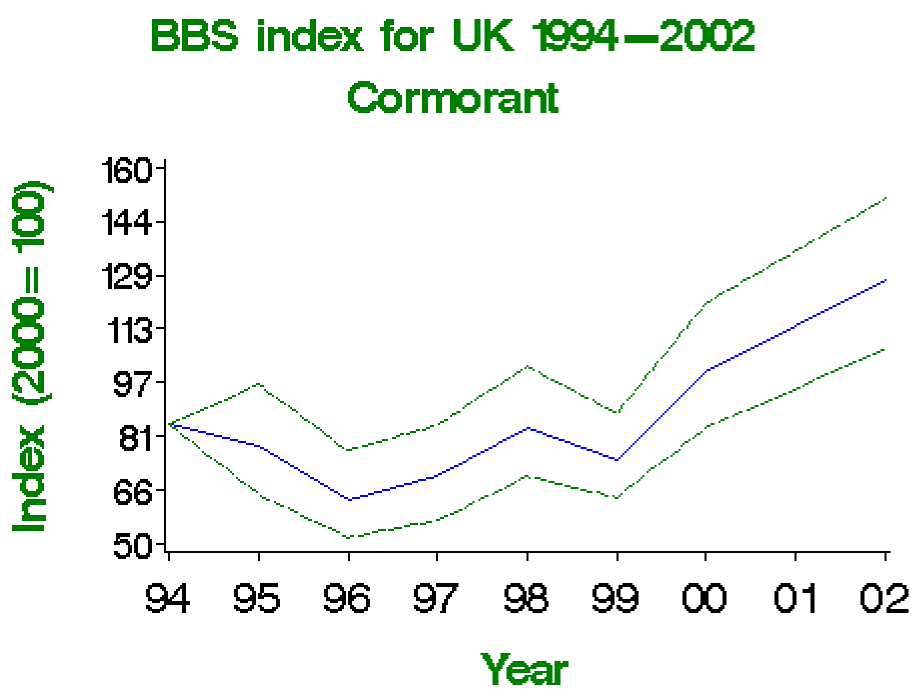
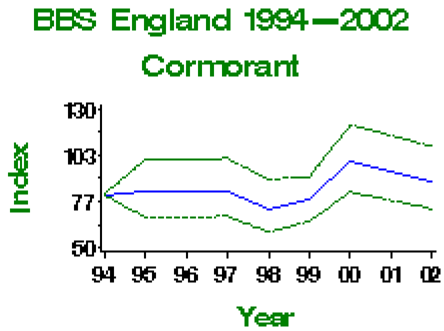


Table of population changes for Cormorant

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	147	50	26	78		
BBS England	8	1994-2002	120	10	-10	35		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



Productivity information is not currently available for this species

GREY HERON
Ardea cinerea

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England, Scotland: moderate increase
Wales: shallow increase

Status summary

The **BTO Heronries Census**, which has monitored Grey Herons since 1928, shows the species to be more abundant now than ever before. The effects of harsh winters, which induce severe mortality in this species, are clearly visible in the long-term trend. The general increase that underlies these fluctuations may stem from reduced persecution, improvements in water quality, the provision of new habitat as new lakes and gravel pits mature, and increased feeding opportunities at freshwater fisheries (**Gibbons *et al.* 1993**, **Marchant *et al.* 2004**).

The data for Scotland are likely to underestimate the populations there by a relatively small amount because certain parts of the country have never been surveyed for the scheme. Results of the **75th National Heronries Survey: 2003-3004** will help to assess this and will provide a new estimate for the total number of herons in the UK.

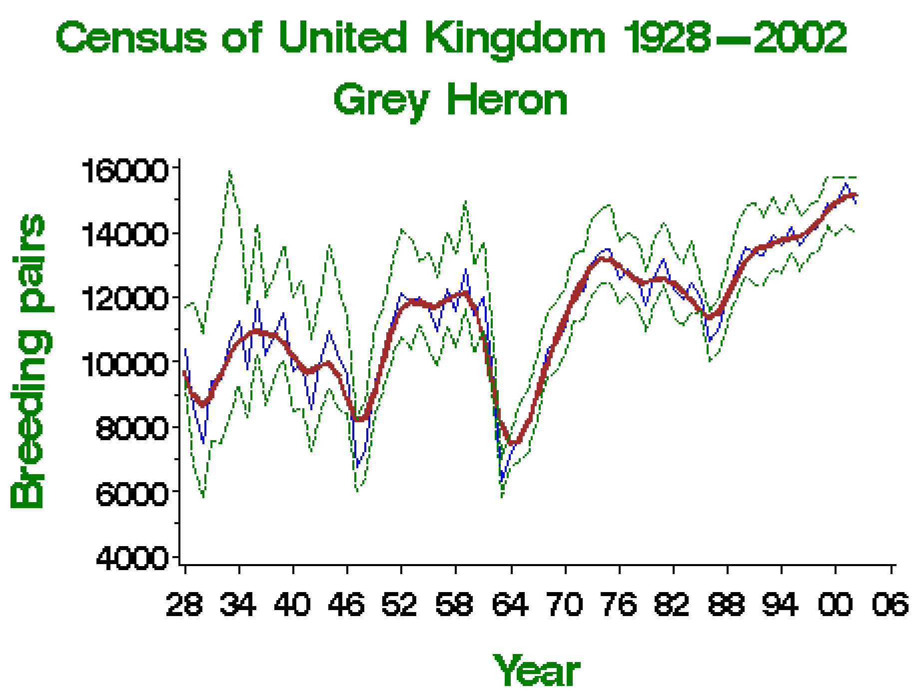
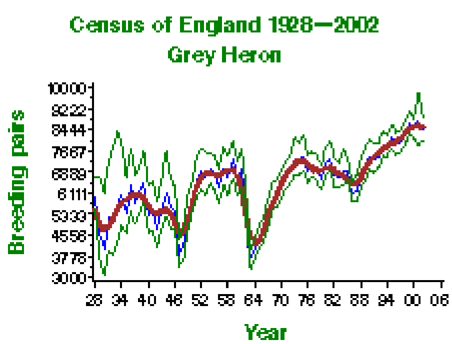


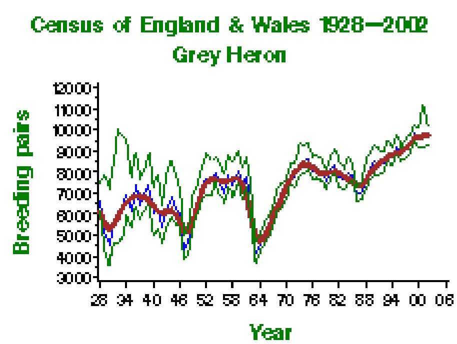
Table of population changes for Grey Heron

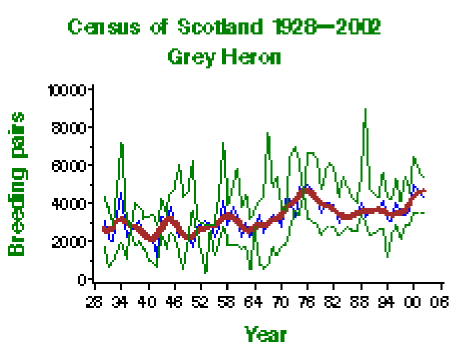
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Heronries UK	71	1929-2000	282	66	.	.		

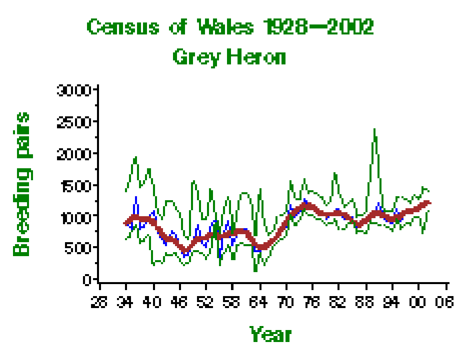
	25	1975-2000	422	13	.	.		
	10	1990-2000	465	14	.	.		
	5	1995-2000	514	8	.	.		
Heronries England and Wales	71	1929-2000	236	74	.	.		
	25	1975-2000	332	16	.	.		
	10	1990-2000	373	18	.	.		
	5	1995-2000	406	9	.	.		
Heronries England	71	1929-2000	201	72	.	.		
	25	1975-2000	268	18	.	.		
	10	1990-2000	310	18	.	.		
	5	1995-2000	341	8	.	.		
Heronries Scotland	69	1931-2000	35	71	.	.		
	25	1975-2000	53	-6	.	.		
	10	1990-2000	53	21	.	.		
	5	1995-2000	71	27	.	.		
Heronries Wales	65	1935-2000	38	20	.	.		
	25	1975-2000	64	-3	.	.		
	10	1990-2000	63	8	.	.		
	5	1995-2000	65	15	.	.		
BBS UK	8	1994-2002	477	32	18	46		
BBS England	8	1994-2002	387	8	-4	21		
BBS Scotland	8	1994-2002	41	113	37	229		
BBS Wales	8	1994-2002	35	23	-18	84		

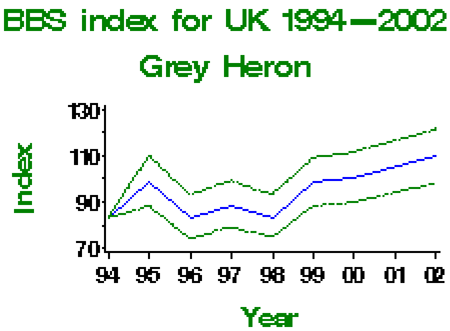
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

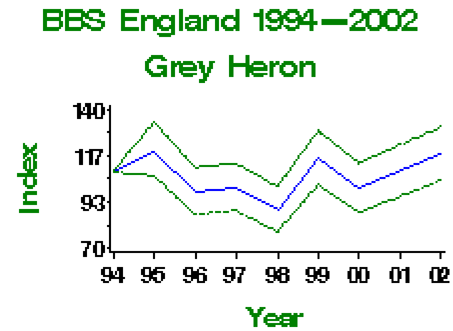


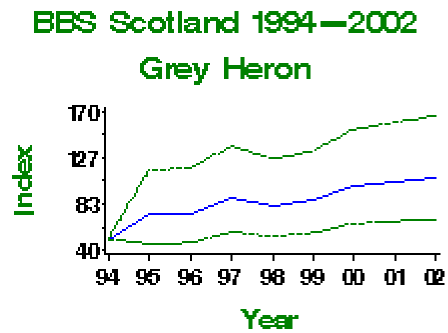












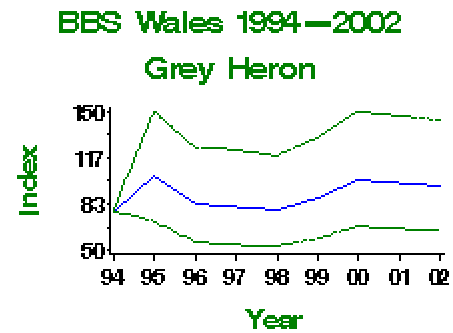
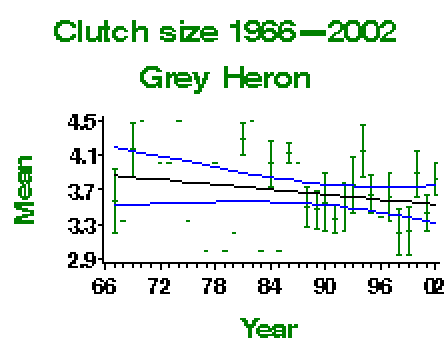
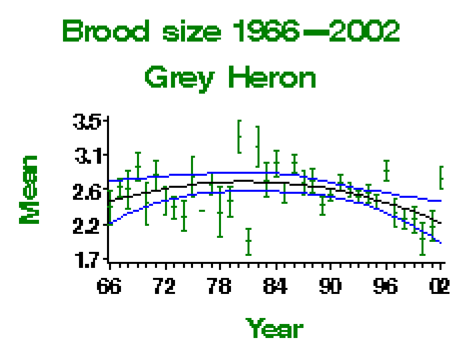
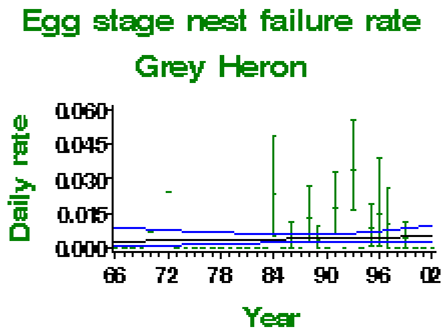


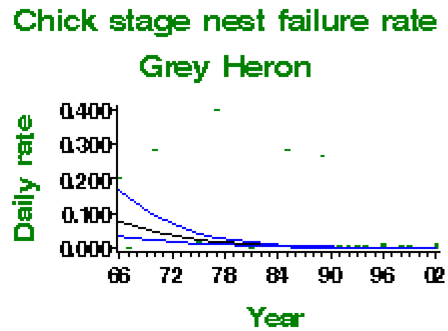
Table of productivity information for Grey Heron

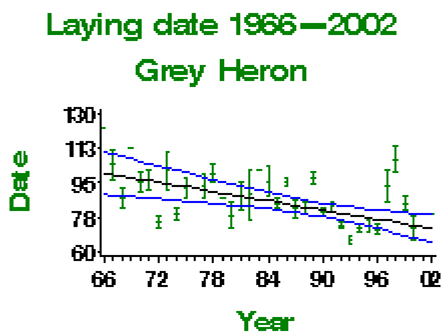
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	44	Curvilinear	2.52 chicks	2.23 chicks	-0.29 chicks	
Daily failure rate (eggs)	33	1968-2001	16	None				Small sample
Daily failure rate (chicks)	33	1968-2001	29	Linear decline	0.0599 nests/day	0.0007 nests/day	-0.0592 nests/day	Small sample
Laying date	33	1968-2001	31	Linear decline	day 98	day 73	-25 days	











Insufficient data on CES available for this species

MUTE SWAN
Cygnus olor

Conservation listings

Europe: no SPEC category, secure
UK: Amber (>20% of European breeding population)

Long-term trend

UK: moderate increase

Status summary

Mute Swan populations have increased progressively on both WBS and CBC plots since the mid-1980s, perhaps reflecting warmer winter weather and the replacement of anglers' lead weights with non-toxic alternatives (**Gibbons *et al.* 1993**). CBC/BBS data indicate that a rapid increase has occurred, but may be less representative of the whole population than WBS figures.The reductions in breeding performance, although statistically significant, may be to some extent artefacts of the relatively small and perhaps unrepresentative annual samples in the 1990s. The recent change of conservation listing from Green to Amber is unconnected with its UK trend.

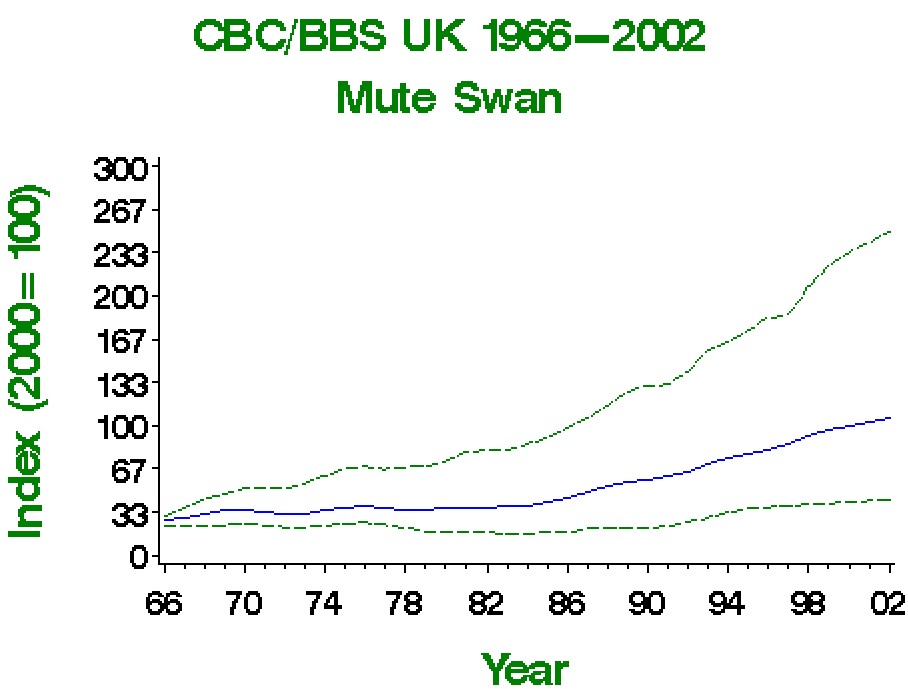
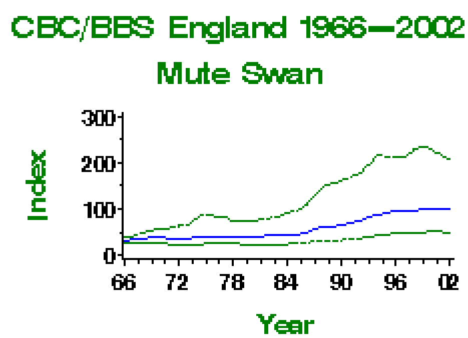


Table of population changes for Mute Swan

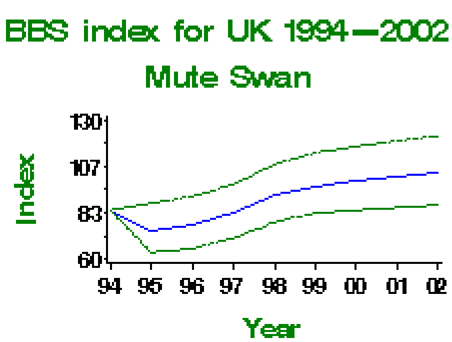
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	55	241	34	671		
	25	1975-2000	67	173	12	373		
	10	1990-2000	131	71	33	130		
	5	1995-2000	202	27	5	66		
CBC/BBS England	33	1967-2000	47	192	43	651		

	25	1975-2000	58	145	24	306		
	10	1990-2000	113	53	28	107		
	5	1995-2000	175	8	-2	26		
WBS waterways	25	1975-2000	44	73	18	165		
	10	1990-2000	56	49	31	80		
	5	1995-2000	61	22	11	37		
BBS UK	8	1994-2002	170	22	3	44		
BBS England	8	1994-2002	145	-12	-25	4		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



WBS UK graph



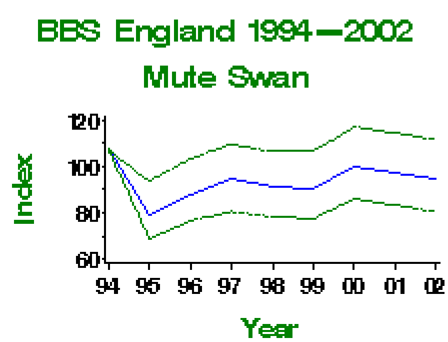
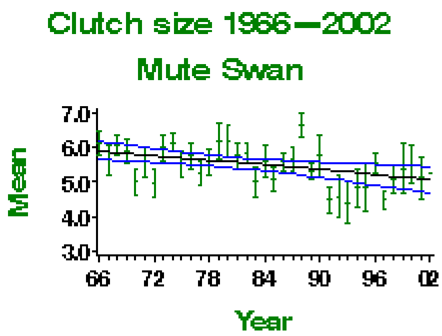
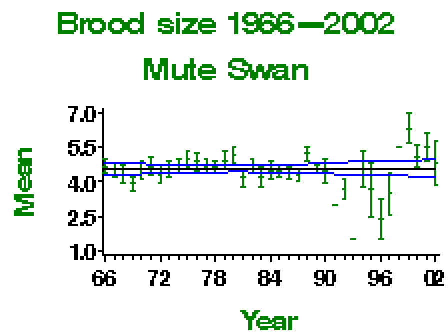


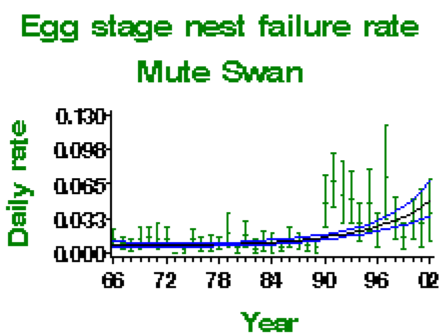
Table of productivity information for Mute Swan

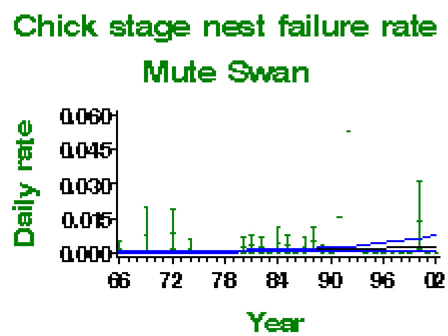
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	19	Linear decline	5.86 eggs	5.1 eggs	-0.76 eggs	Small sample
Brood size	33	1968-2001	33	None				
Daily failure rate		1968-			0.0078	0.0431	0.0353	Small

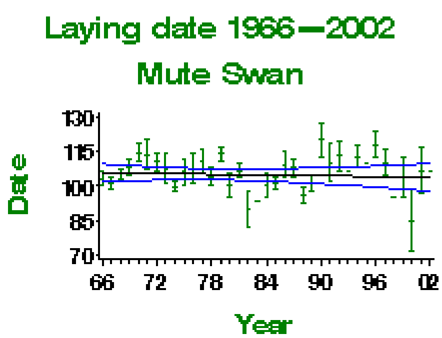
(eggs)	33	2001	26	Curvilinear	nests/day	nests/day	nests/day	sample
Daily failure rate (chicks)	33	1968-2001	20	Linear increase	0.0005 nests/day	0.003 nests/day	0.0025 nests/day	Small sample
Laying date	33	1968-2001	12	None				Small sample











Insufficient data on CES available for this species

GREYLAG GOOSE
Anser anser

Conservation listings

Europe: no SPEC category, secure
UK: not listed (introduced population)
Amber (localised Hebridean population)
Amber (in winter, localised and >20% of NW European Flyway population)

Long-term trend

UK: rapid increase

Status summary

Apart from an indigenous population in north-west Scotland and Western Isles, and winter visitors from Iceland and Scandinavia, the Greylag Goose is an introduced species throughout the UK. Introduced Greylags have increased very rapidly, at a rate estimated at 12% per annum in southern Britain between the 1988-91 atlas period and 1999 (**Rehfisch *et al.* 2002**). The WBS sample became large enough for annual monitoring in 1992, since when further increase on linear waterways has been recorded. Annual breeding-season monitoring in a wider range of habitats through BBS has shown similar strong increases. Winter monitoring by WeBS shows a continuing long-term increase (**Musgrove *et al.* 2001**).

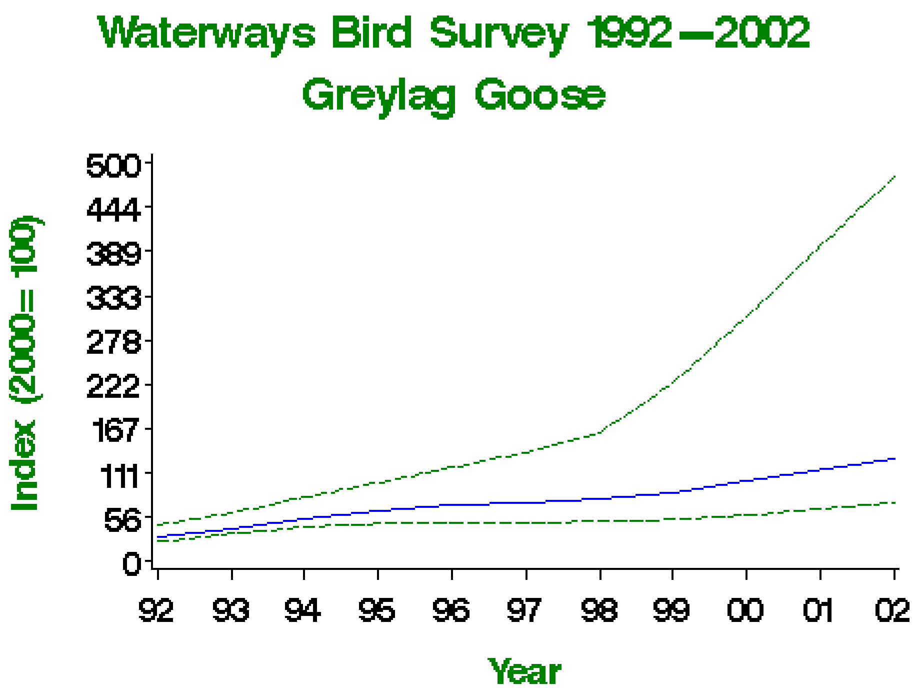
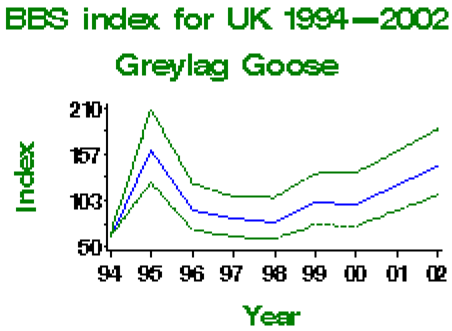
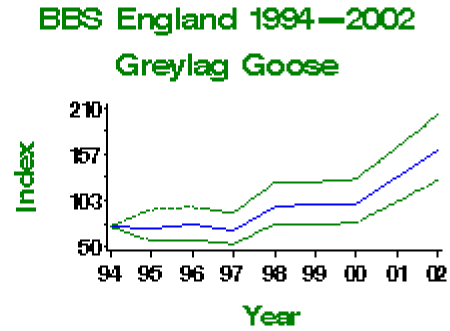


Table of population changes for Greylag Goose

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	7	1993-2000	12	145	40	499		Small sample
	5	1995-2000	12	58	19	239		Small sample
BBS UK	8	1994-2002	86	132	78	201		
BBS England	8	1994-2002	68	118	72	175		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

CANADA GOOSE
Branta canadensis

Conservation listings

Europe: no SPEC category
UK: not listed (introduced)

Long-term trend

UK: rapid increase

Status summary

Canada Geese have increased rapidly, at a rate estimated at 9.9% per annum in southern Britain between the 1988-91 Atlas period and 1999 (**Rehfisch *et al.* 2002**). The WBS sample became large enough for annual monitoring in 1980, since when further, apparently accelerating increase on linear waterways has been recorded. Annual breeding-season monitoring in a wider range of habitats through BBS has shown similar strong increases in England and in the UK as a whole. Results from periodic breeding surveys show the population is increasing at an accelerating rate (**Wernham *et al.* in press**). Winter monitoring by WeBS shows a continuing long-term increase (**Musgrove *et al*. 2001**).

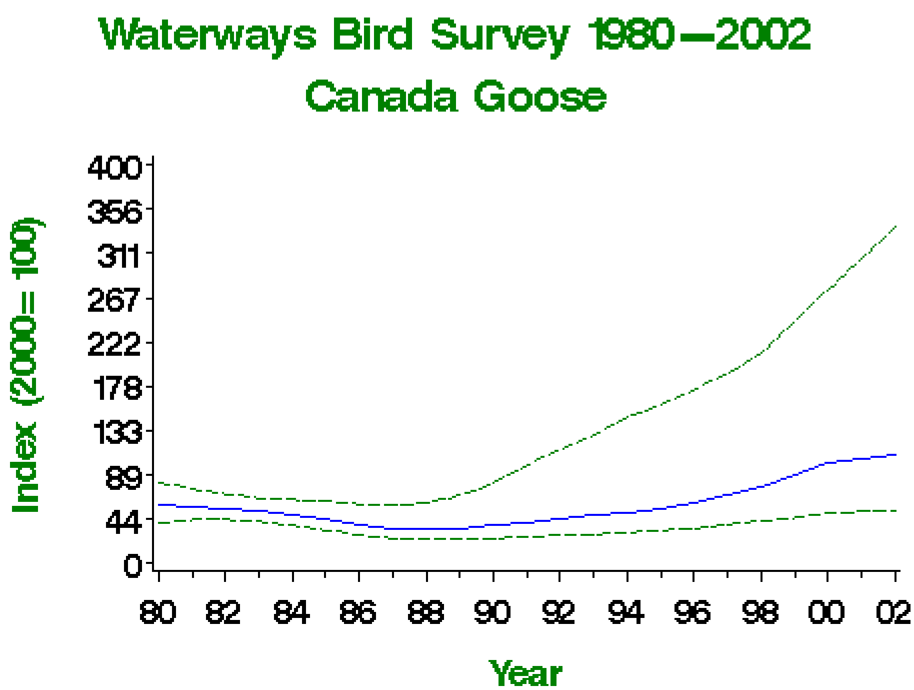
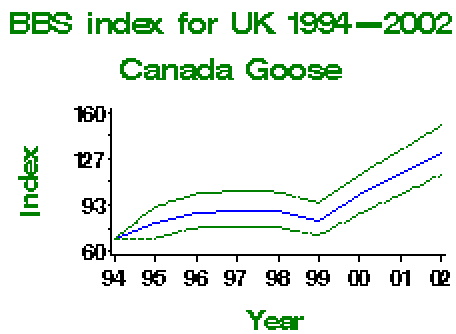


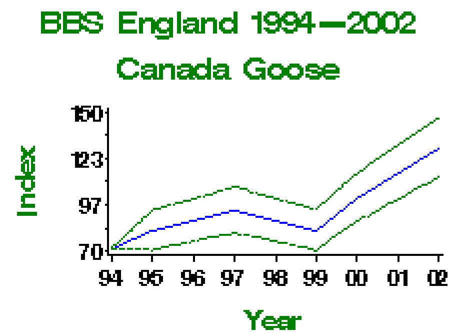
Table of population changes for Canada Goose

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	19	1981-2000	29	76	-6	518		
	10	1990-2000	37	165	72	343		
		1995-						

	5	2000	41	80	40	141		
BBS UK	8	1994-2002	300	92	68	120		
BBS England	8	1994-2002	284	80	58	106		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

SHELDUCK
Tadorna tadorna

Conservation listings

Europe: no SPEC category, secure
UK: Amber (localised in winter, >20% of NW European population in winter)

Long term-trend

UK: rapid increase

Status summary

Shelducks occurred on relatively few CBC plots, most of which were close to a coast or an estuary, and it is unclear how well the CBC trend represents that of the population as a whole. The CBC showed a substantial increase from the mid 1960s until the early 1980s, some decrease during the 1980s, and stability during the 1990s. Population increase was associated with expansion of range, measured at 20% in Britain between 1968-72 and 1988-91 (**Gibbons *et al.* 1993**). The UK winter Shelduck population has shown a general increase since 1965 (**Musgrove *et al.* 2001**). Recent declines shown by BBS and by WeBS (**Musgrove *et al.* 2001**) may reveal emerging problems for the species.

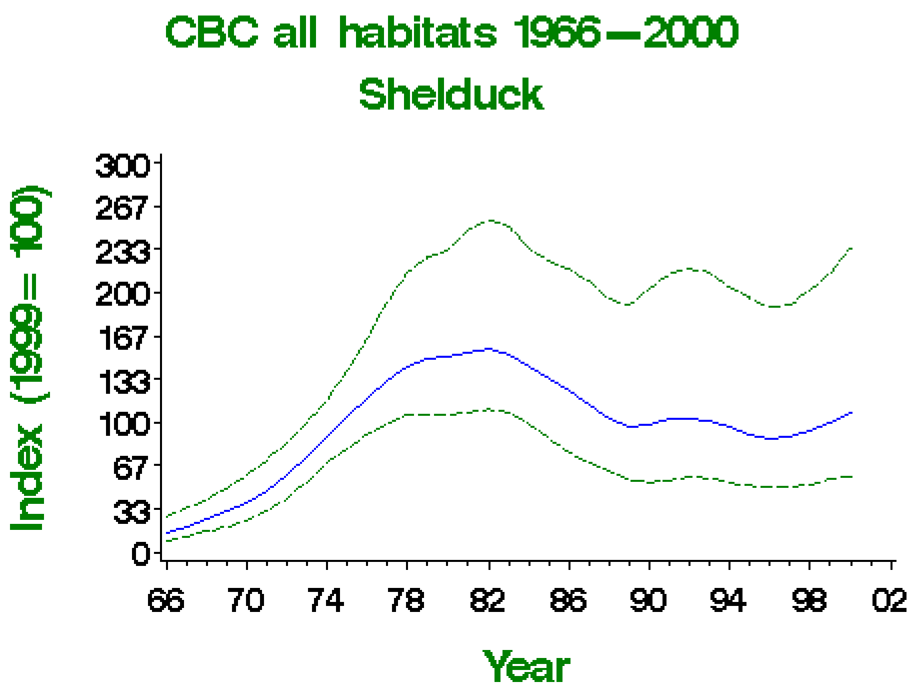
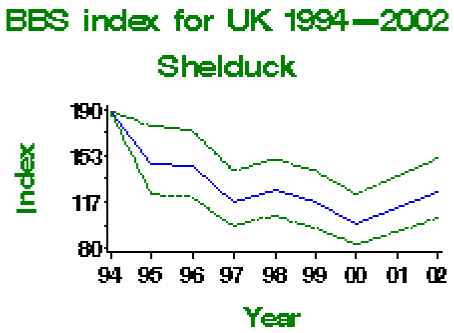
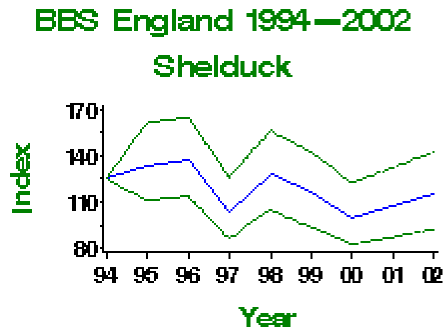


Table of population changes for Shelduck

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	114	-34	-45	-20	(>25)	
BBS England	8	1994-2002	95	-8	-26	14		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

MALLARD
Anas platyrhynchos

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

Mallards have increased steadily in the UK since the 1960s, an increase that may have been contributed to by large-scale releases for shooting (**Marchant *et al.* 1990**). Winter populations have declined since the late 1980s (**Musgrove *et al.* 2001**), linked apparently to a decrease in continental immigration (**Wernham *et al.* in press**). Substantial and increasing numbers of Mallards, especially on WBS plots, originate from domesticated birds and do not resemble wild-type birds in plumage or behaviour.

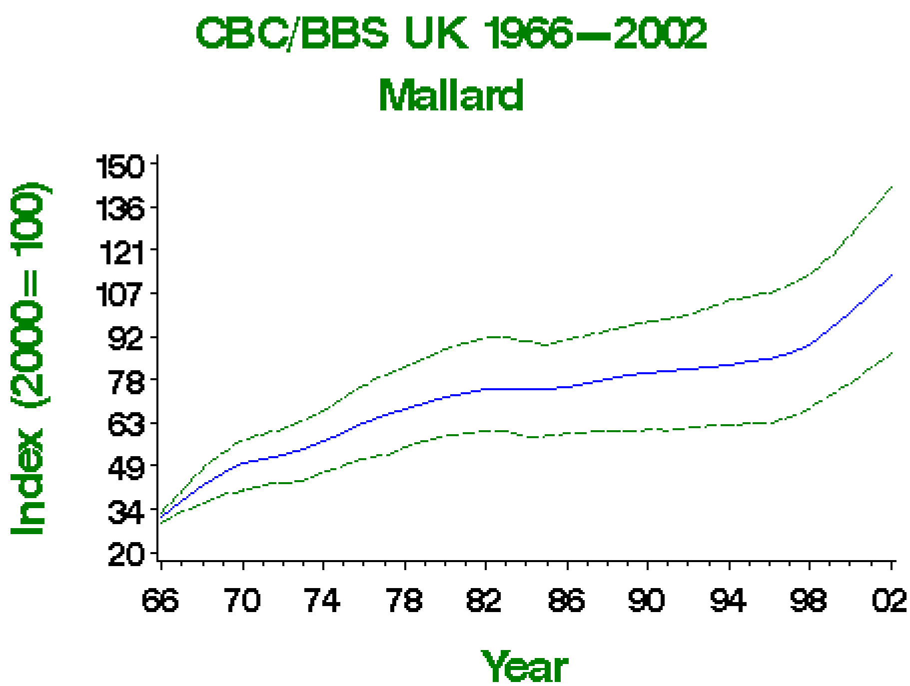
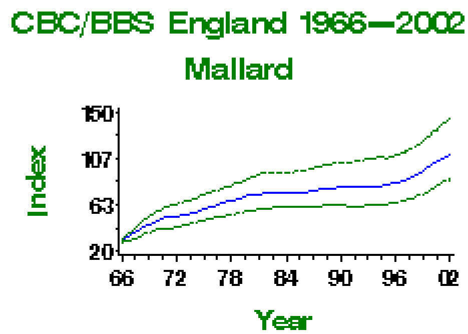


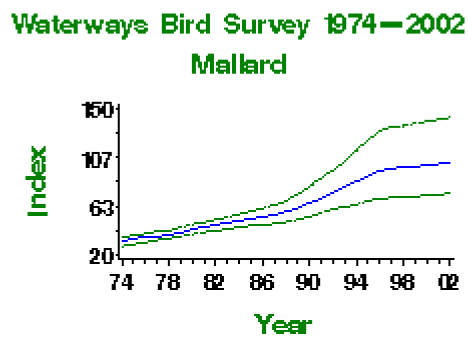
Table of population changes for Mallard

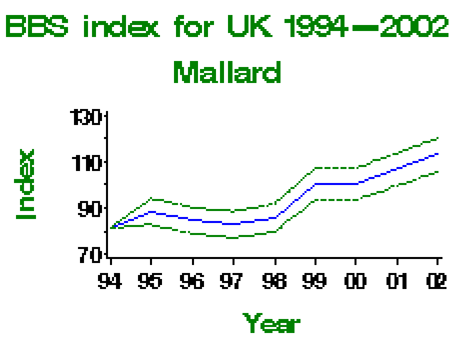
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	299	171	113	243		
	25	1975-2000	365	67	45	99		
	10	1990-2000	693	25	14	40		
	5	1995-2000	1073	19	13	27		
CBC/BBS England	33	1967-2000	253	188	128	269		
	25	1975-2000	307	69	44	100		
	10	1990-2000	582	25	10	39		

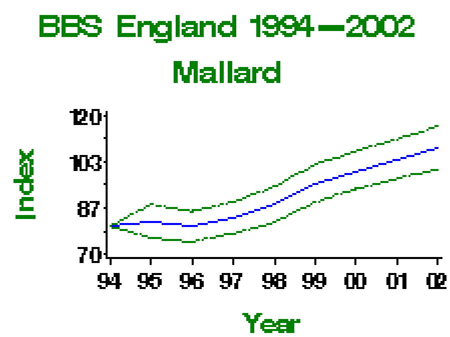
	5	1995-2000	897	22	14	30		
WBS waterways	25	1975-2000	58	196	125	296		
	10	1990-2000	25	51	28	78		
	5	1995-2000	25	11	4	19		
BBS UK	8	1994-2002	926	39	30	48		
BBS England	8	1994-2002	773	35	26	45		
BBS Scotland	8	1994-2002	82	50	17	93		
BBS Wales	8	1994-2002	52	-8	-32	25		

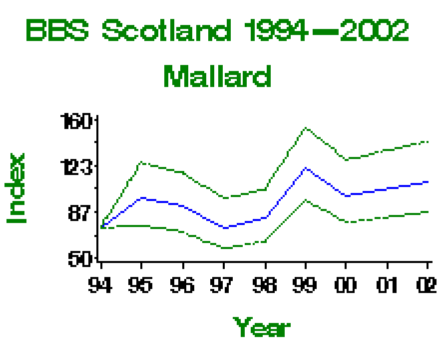
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

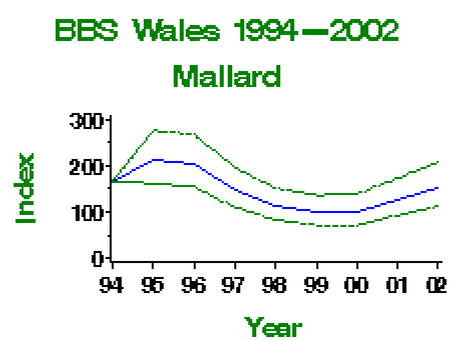






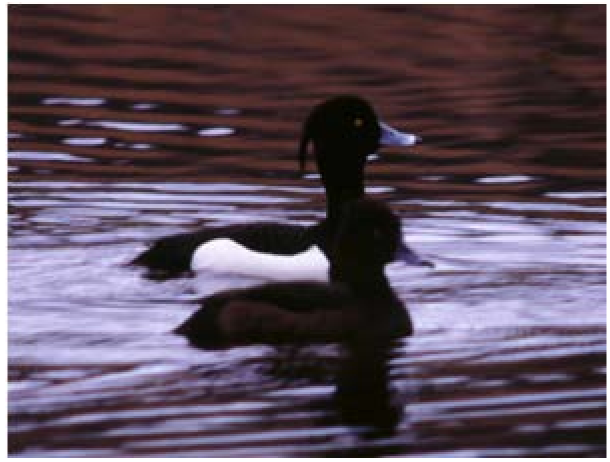






Productivity information is not currently available for this species

TUFTED DUCK
Aythya fuligula



Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: shallow increase

Status summary

The colonisation of the UK by Tufted Ducks in 1849, and the subsequent spread, was aided by the spread of the zebra mussel, which had been introduced accidentally to Britain a few decades earlier. The long-term shallow increases shown by WBS and CBC, and the 15% increase in range in Britain between the two atlas periods (**Gibbons *et al.* 1993**) may indicate that population expansion and in-filling of range are still occurring. BBS data suggest substantial increase since 1994, in England and in the UK as a whole. The species' winter trend in the UK is also upward (**Musgrove *et al.* 2001**).

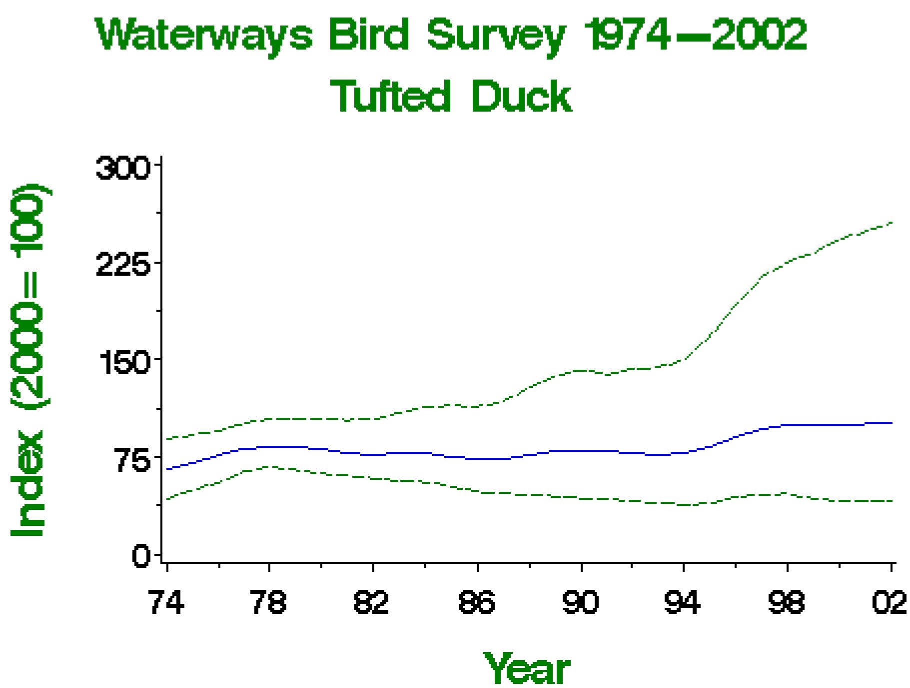
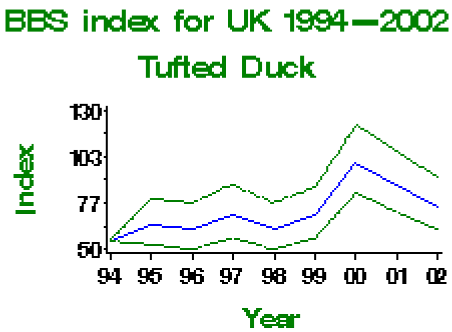
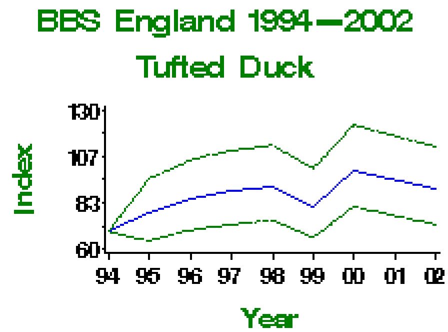


Table of population changes for Tufted Duck

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	24	41	-36	228		
	10	1990-2000	28	25	-16	101		
	5	1995-2000	31	20	-12	68		
BBS UK	8	1994-2002	122	36	11	67		
BBS England	8	1994-2002	105	31	5	62		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

GOOSANDER
Mergus merganser

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: moderate increase

Status summary

Goosanders were first discovered to have colonised the UK in Perthshire in 1871, and spread from Scotland into northern England in the 1940s (**Holloway 1996**). Between the two breeding atlases it expanded its range in northern England, and colonised Wales and southwest England. WBS samples became large enough for annual monitoring in 1980, and have shown continued population increase to at least the mid 1990s, since when some decrease may possibly have occurred. The BTO's two national surveys demonstrated an average increase in population size of 3% per annum between 1987 and 1997 (**Rehfisch *et al.* 1999**). Reasons for the colonisation and the subsequent range expansion and population increase are unknown.

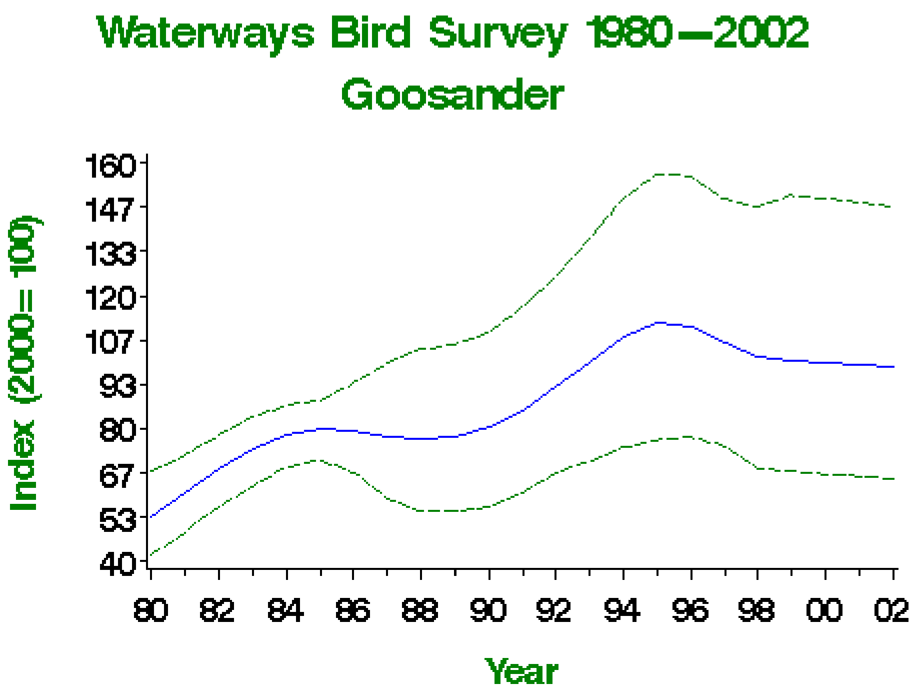


Table of population changes for Goosander

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	19	1981-2000	23	65	-4	187		
	10	1990-2000	28	24	-4	63		
	5	1995-2000	28	-10	-27	13		

Productivity information is not currently available for this species

HEN HARRIER
Circus cyaneus

Conservation listings

Europe: SPEC category 3, vulnerable
UK: Red (historical decline)

Long-term trend

UK: stable (between 1988-89 and 1998)

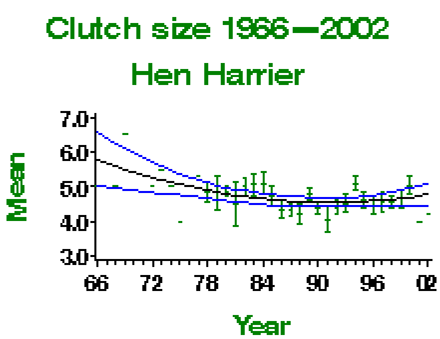
Status summary

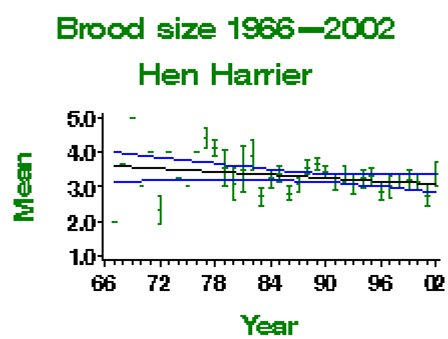
Listed because of substantial declines over the last two centuries, this species has suffered from persecution on grouse moors (**Etheridge *et al.* 1997**) and recently also from loss of habitat as forestry plantations have matured (**Bibby & Etheridge 1993**). The UK population was unchanged between surveys in 1988-89 and 1998, although there were declines in Orkney and England but increases in Northern Ireland and Isle of Man (**DETR 2000**). Although average clutch size has declined substantially since the mid 1980s, further investigation has shown that this trend is due to increased proportions in recent years of records from Orkney, where clutch sizes tend to be smaller than on the mainland (**Summers 1998**, **Crick 1998**).

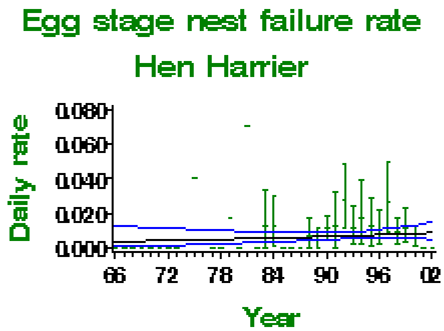
Annual breeding population changes for this species
are not currently monitored by BTO

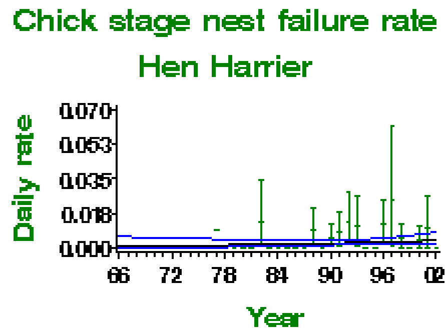
Table of productivity information for Hen Harrier

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	Curvilinear	5.61 eggs	4.74 eggs	-0.87 eggs	Small sample
Brood size	33	1968-2001	19	None				Small sample
Daily failure rate (eggs)	33	1968-2001	11	None				Small sample
Daily failure rate (chicks)	33	1968-2001	13	None				Small sample









Insufficient data on laying date available for this species

Insufficient data on CES available for this species

SPARROWHAWK
Accipiter nisus

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: rapid increase

Status summary

Sparrowhawks increased strongly in the UK as the population recovered from the crash caused by organochlorine pesticides in the 1950s and 1960s (**Newton 1986**). Improving breeding performance is likely to have contributed to this increase. Failure rates at the egg stage (c.44 days from laying the first egg) have fallen markedly. The population seems to have stabilised since the mid 1990s.

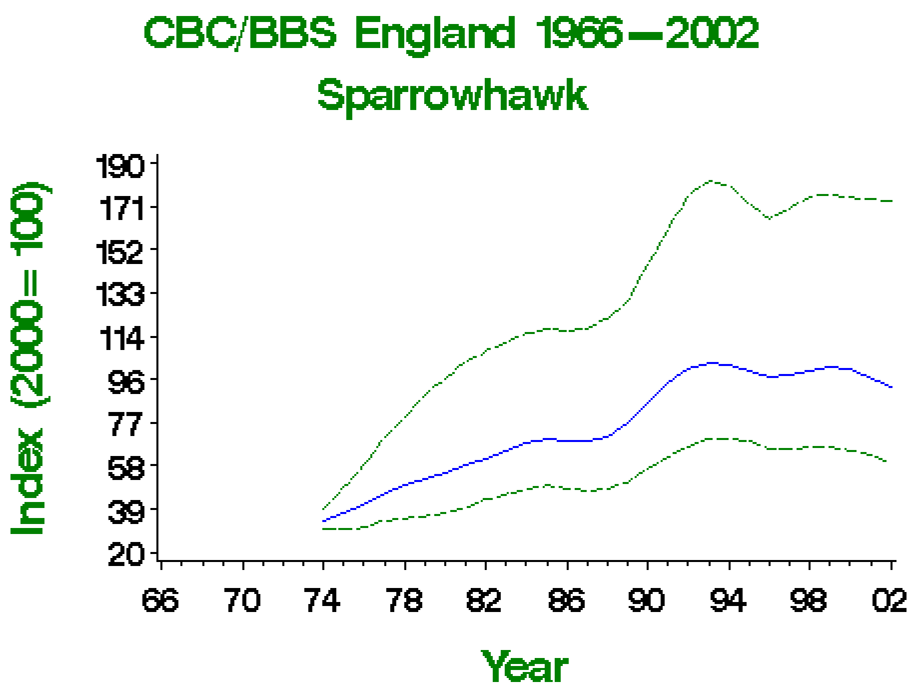
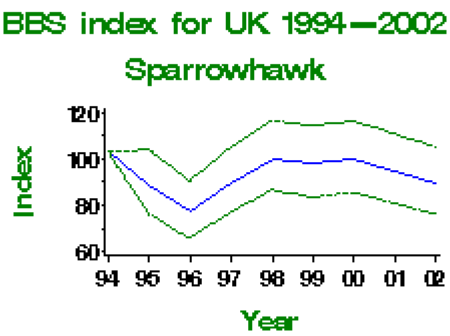


Table of population changes for Sparrowhawk

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	25	1975-2000	98	172	69	376		
	10	1990-2000	189	17	3	49		
	5	1995-2000	274	1	-7	13		
BBS UK	8	1994-2002	264	-13	-26	2		
BBS England	8	1994-2002	221	-20	-32	-5		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



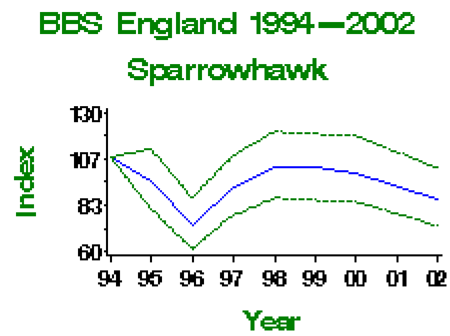
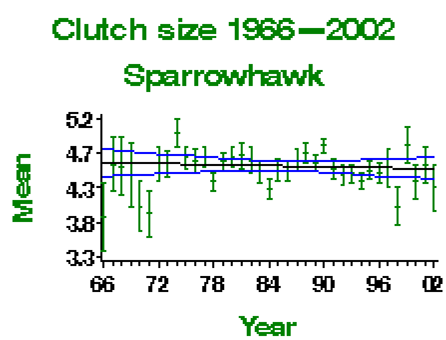
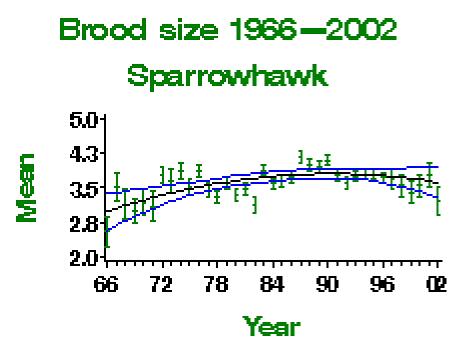
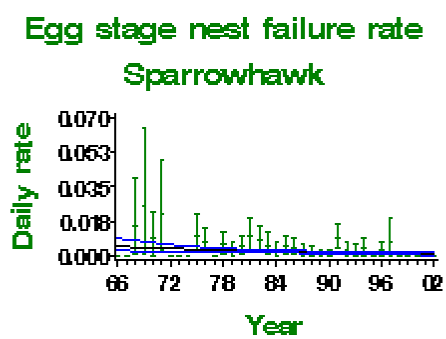


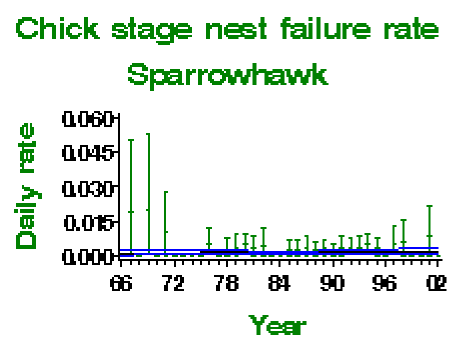
Table of productivity information for Sparrowhawk

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	42	None				
Brood size	33	1968-2001	82	Curvilinear	3.12 chicks	3.66 chicks	0.54 chicks	
Daily failure rate (eggs)	33	1968-2001	39	Linear decline	0.0046 nests/day	0.0012 nests/day	-0.0034 nests/day	
Daily failure rate (chicks)	33	1968-2001	54	None				
Laying date	33	1968-2001	17	None				Small sample

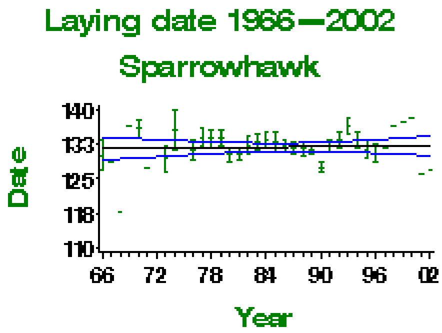








Insufficient data on CES



available for this species

BUZZARD
Buteo buteo

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

The Common Buzzard has shown a substantial eastward range expansion since the 1988-91 Atlas, and is arguably now the most abundant diurnal raptor in Britain (**Clements 2002**). The increasing trend identified by the CBC relates especially to the spread of range into central and eastern Britain, where CBC was more strongly representated. It has, however, if anything, been ampified by the addition of the more geographically representative BBS data since 1994. The increase has been associated with improving nesting success, perhaps through reduced persecution, the recovery of rabbit populations from the effects of myxomatosis and release from the deleterious effects of organochlorine pesticides (**Elliott & Avery 1991**, **Clements 2002**).

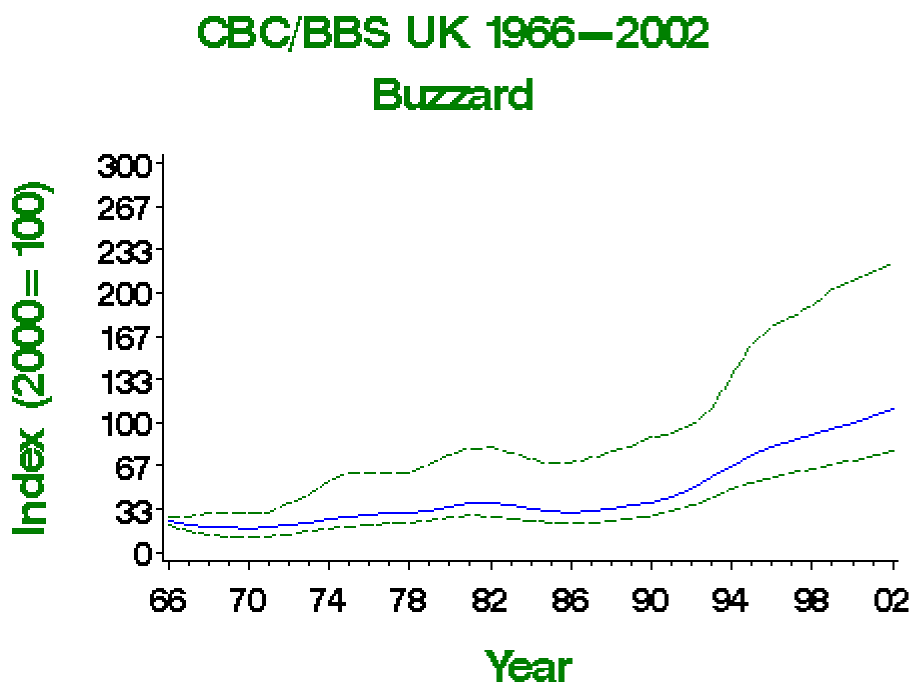
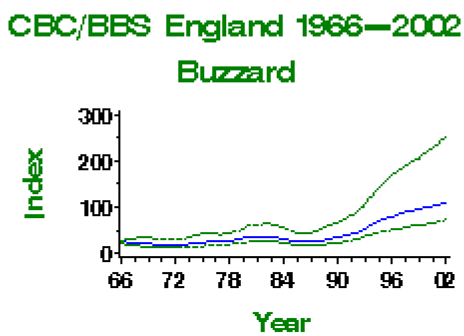


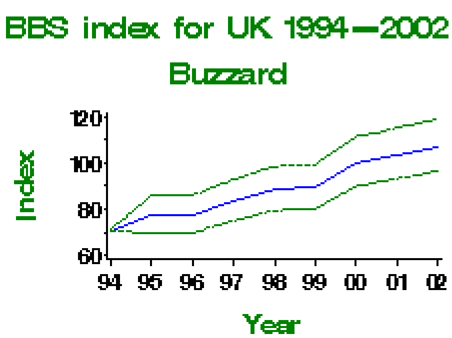
Table of population changes for Buzzard

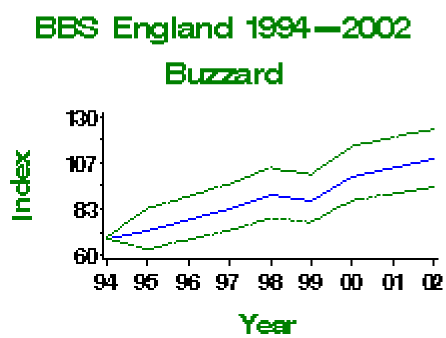
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	116	366	211	1296		
	25	1975-2000	148	262	174	576		
	10	1990-2000	323	159	102	270		

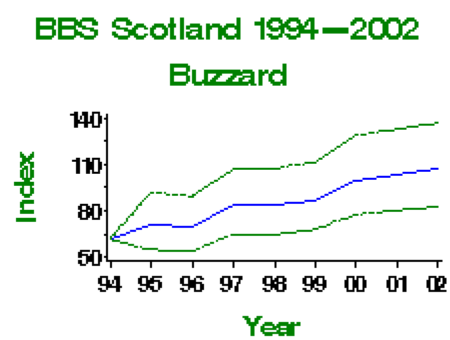
	5	1995-2000	523	34	26	46		
CBC/BBS England	33	1967-2000	66	317	180	895		
	25	1975-2000	85	316	202	798		
	10	1990-2000	183	195	124	357		
	5	1995-2000	297	38	26	52		
BBS UK	8	1994-2002	475	51	36	68		
BBS England	8	1994-2002	261	58	38	81		
BBS Scotland	8	1994-2002	95	73	34	122		
BBS Wales	8	1994-2002	109	11	-9	36		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









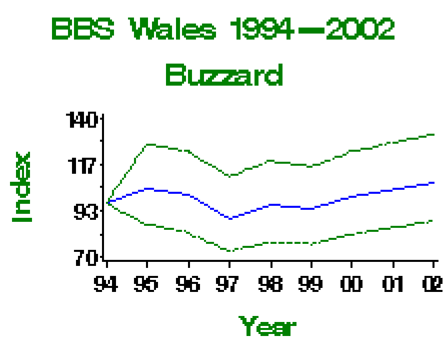
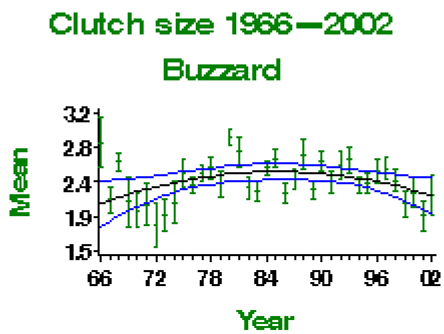
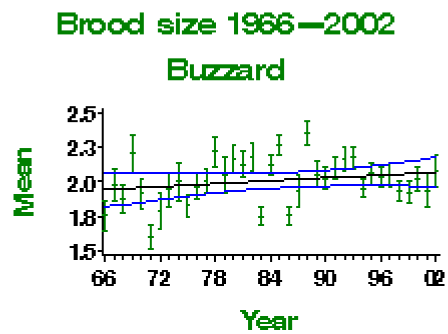
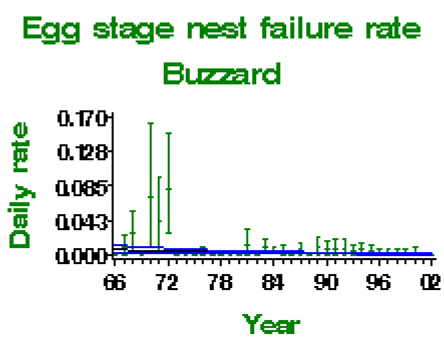


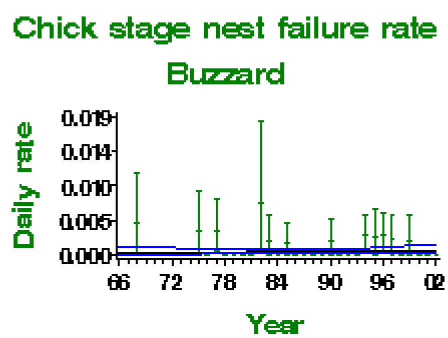
Table of productivity information for Buzzard

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	31	Curvilinear	2.16 eggs	2.21 eggs	0.05 eggs	
Brood size	33	1968-2001	86	None				
Daily failure rate (eggs)	33	1968-2001	24	Linear decline	0.0065 nests/day	0.0018 nests/day	-0.0047 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	43	None				









Insufficient data on laying dates available for this species

Insufficient data on CES available for this species

KESTREL
Falco tinnunculus

Conservation listings

Europe: SPEC category 3, declining
UK: Amber (25-50% population decline)

Long-term trend

England: moderate decline (since mid 1970s)

Status summary

Kestrels had recovered from the lethal and sublethal effects of organochlorine pesticides by the mid 1970s, the recovery probably driven by improving nesting success, but subsequently entered a decline. The failure rate at the egg stage (c.28 days from laying the first egg) has declined substantially, and brood sizes have continued to increase. The population decline has been linked to the effects of agricultural intensification on farmland habitats and small mammal populations (Gibbons *et al.* 1993).

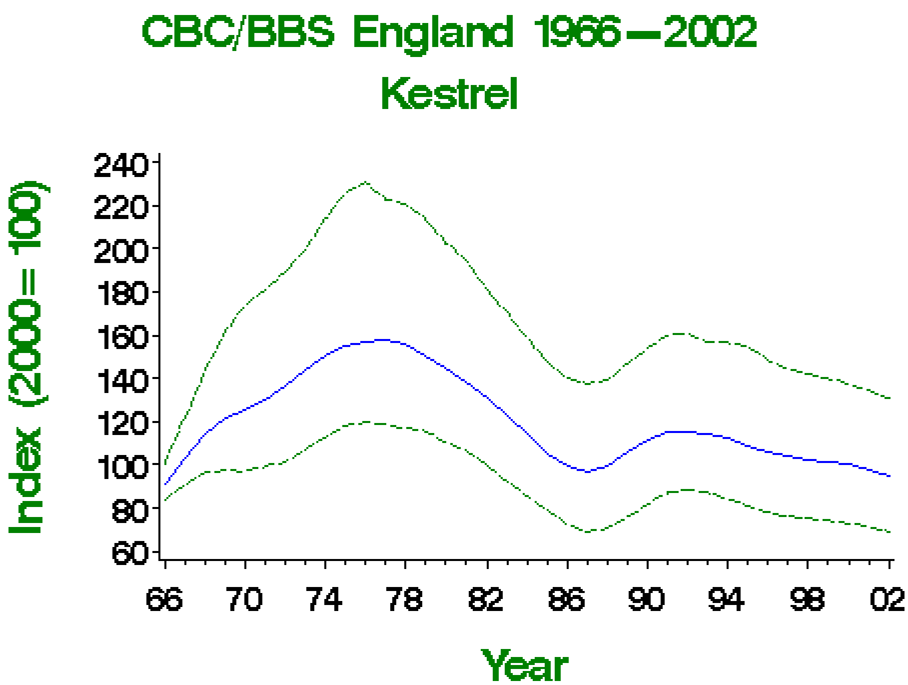
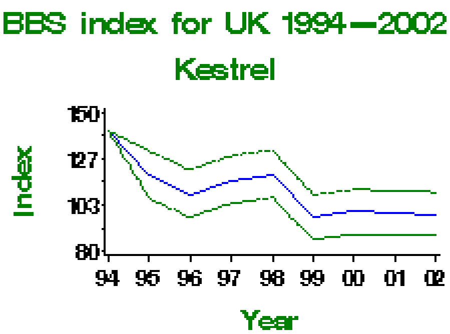
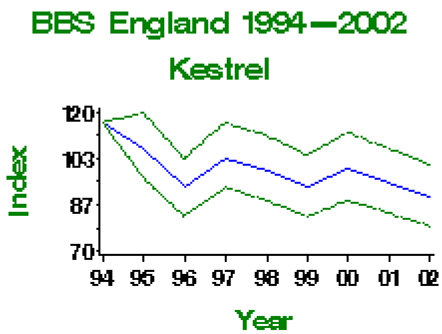


Table of population changes for Kestrel

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	163	-3	-30	27		
	25	1975-2000	196	-36	-49	-19	>25	
	10	1990-2000	347	-11	-22	4		
	5	1995-2000	512	-8	-16	0		
BBS UK	8	1994-2002	505	-30	-37	-22	(>25)	
BBS England	8	1994-2002	435	-23	-32	-13		
BBS Scotland	8	1994-2002	39	-42	-61	-15	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





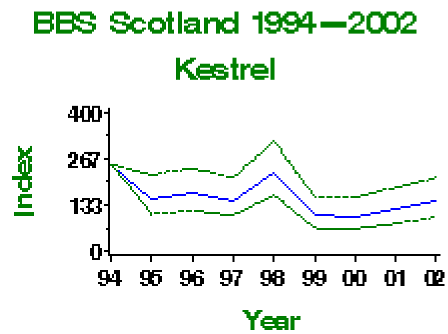
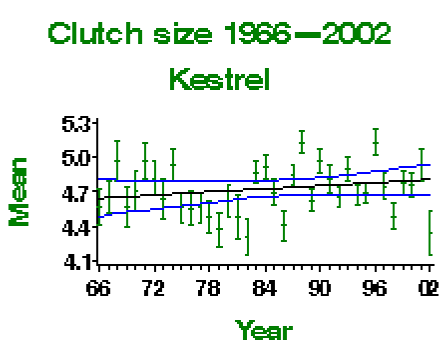
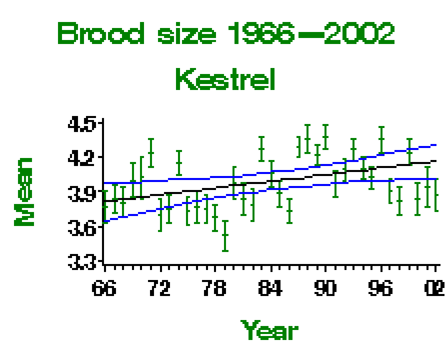
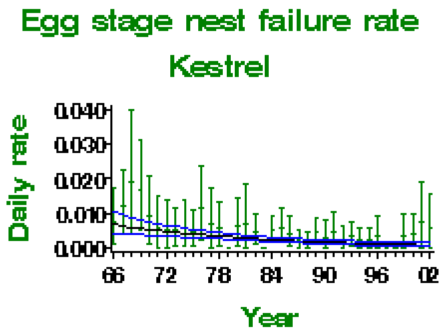


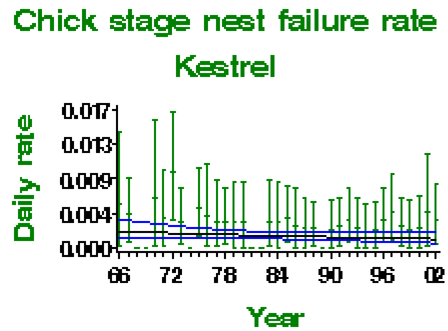
Table of productivity information for Kestrel

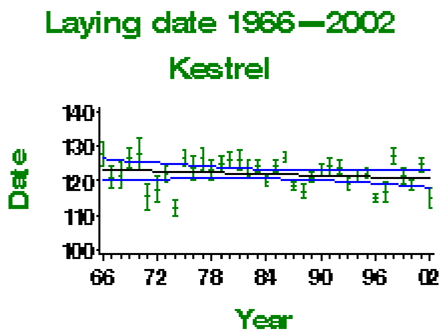
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	53	None				
Brood size	33	1968-2001	113	Linear increase	3.84 chicks	4.16 chicks	0.32 chicks	
Daily failure rate (eggs)	33	1968-2001	40	Linear decline	0.0061 nests/day	0.001 nests/day	-0.0051 nests/day	
Daily failure rate (chicks)	33	1968-2001	62	None				
Laying date	33	1968-2001	21	None				Small sample











Insufficient data on CES available for this species

MERLIN
Falco columbarius

Conservation listings

Europe: no SPEC category, secure
UK: Amber (historical decline)

Long-term trend

UK: probable increase

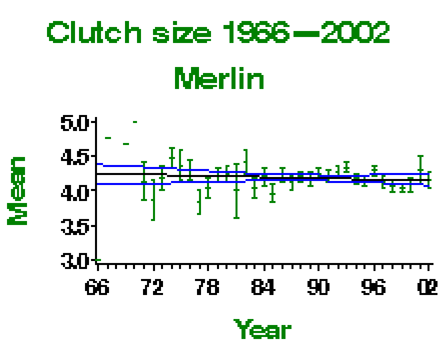
Status summary

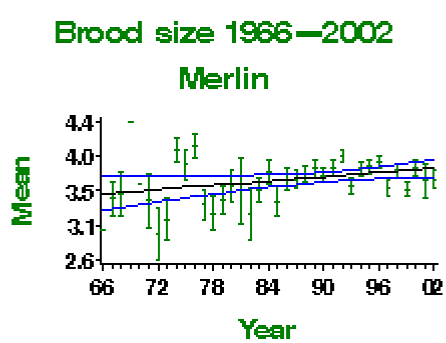
Having declined substantially over the past two centuries, Merlin shows indications of a recent doubling of population (**Rebecca & Bainbridge 1998**, **DETR 2000**). This increase may be associated with an increased use of forest edge as a nesting habitat (**Parr 1994**). Because of its recent population upturn, the species has been moved from the Red to the Amber list. Breeding performance has tended to improve since the 1960s, probably linked to the declining influence of organochlorine pesticides (**Crick 1993**).

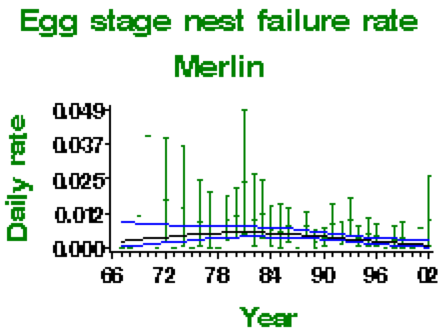
Annual breeding population changes for this species
are not currently monitored by BTO

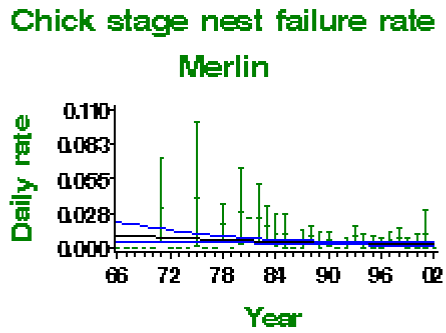
Table of productivity information for Merlin

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	41	None				
Brood size	33	1968-2001	58	Linear increase	3.49 chicks	3.78 chicks	0.29 chicks	
Daily failure rate (eggs)	33	1968-2001	29	Curvilinear	0.0028 nests/day	0.0012 nests/day	-0.0016 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	30	Linear decline	0.0097 nests/day	0.0028 nests/day	-0.0069 nests/day	









Insufficient data on laying date
available for this species

Insufficient data on CES
available for this species

HOBBY
Falco subbuteo

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: increase

Status summary

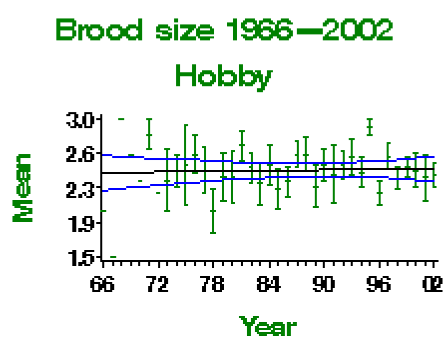
This species cannot be monitored by any of the standard monitoring schemes, due to its low population density and unobtrusive habits. Many sightings must refer to migrants, first-summer non-breeders, or to breeding birds from distant nests, and do not help to establish whether nesting occurs in that locality. The Rare Breeding Birds Panel collects annual data, which under-represent the true population to unknown degrees, but adequately establish the long-term trend. Its distribution has spread markedly northwards in England since the 1970s (**Gibbons *et al.* 1993**), perhaps linked to increases in its dragonfly prey supplies (**Prince & Clarke 1993**) and a decreasing dependency on its traditional heathland habitat, but the reasons underlying the Hobby's increase are still only speculative (**Clements 2001**). Small annual samples of nest record cards permit analysis only of brood size, which appears not to have changed substantially.

Annual breeding population changes for this species
are not currently monitored by BTO

Table of productivity information for Hobby

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	16	None				Small sample

Insufficient data on clutch size
available for this species



Insufficient data on nest failure
available for this species

Insufficient data on nestling failure
available for this species

Insufficient data on laying date
available for this species

Insufficient data on CES
available for this species

PEREGRINE FALCON
Falco peregrinus

Conservation listings

Europe: SPEC category 3, rare
UK: Amber (European status)

Long-term trend

UK, England: increase
Northwest Scotland: decline

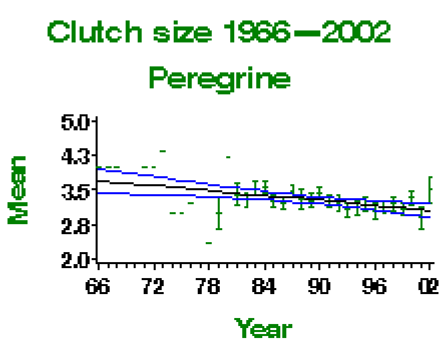
Status summary

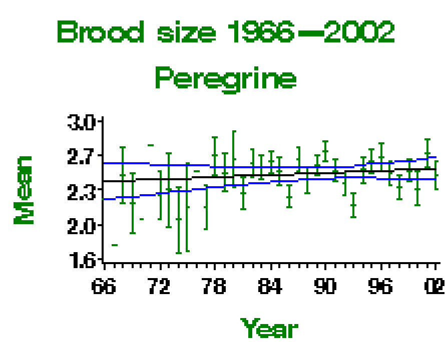
Although Peregrine has an unfavourable conservation status in Europe, its population size, distribution in the UK, and breeding performance have all largely recovered from the detrimental effects of organochlorine pesticides in the 1950s and 1960s. Populations and breeding performance have declined recently, however, in northwest Scotland and the Northern Isles (Crick & Ratcliffe 1995), and nest record information for the UK as a whole shows a significant decline in clutch size, although samples for the first ten years are small. The number of UK breeding pairs has been censused every ten years since 1961 by BTO/JNCC/RSPB/Raptor Study Groups, and has been estimated as follows: 1961, 385 pairs; 1971, 489 pairs; 1981, 728 pairs; 1991, 1283 pairs (Ratcliffe 1993).

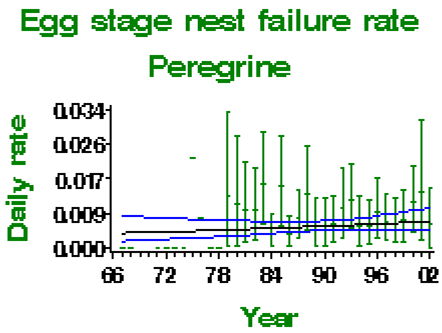
Annual population changes are not monitored for this species

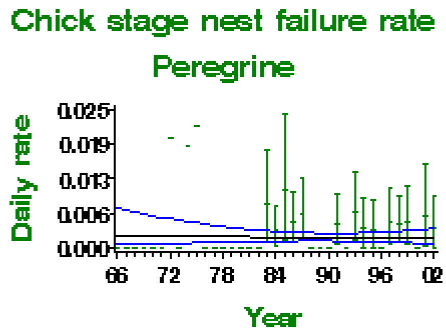
Table of productivity information for Peregrine Falcon

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	16	Linear decline	3.68 eggs	3.08 eggs	-0.6 eggs	Small sample
Brood size	33	1968-2001	40	None				
Daily failure rate (eggs)	33	1968-2001	21	None				Small sample
Daily failure rate (chicks)	33	1968-2001	21	None				Small sample









Insufficient data on laying date available for this species

Insufficient data on CES available for this species

RED GROUSE
Lagopus lagopus

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% population decline)

Long-term trend

UK: decline

Status summary

The distinctive dark-winged race *scotica* is endemic to Britain and Ireland and has the vast bulk of its population within the UK. BBS shows no overall trend in the size of the Red Grouse population since 1994. However, Game Conservancy Trust surveys have revealed long-term declines, apparently driven by moorland loss and degradation and increased predation from corvids and foxes (**Hudson 1992**, N.J. Aebischer pers. comm.), which have prompted the move of the species from the Green to the Amber list. Raptor predation is believed not to affect breeding populations significantly, although it can reduce post-breeding abundance (**Redpath & Thirgood 1997**). Red Grouse abundance varies in cycles, with periods that vary regionally, that are linked to the dynamics of infection by a nematode parasite (**Dobson & Hudson 1992**, **Gibbons *et al.* 1993**). All population data should therefore be interpreted in this context.

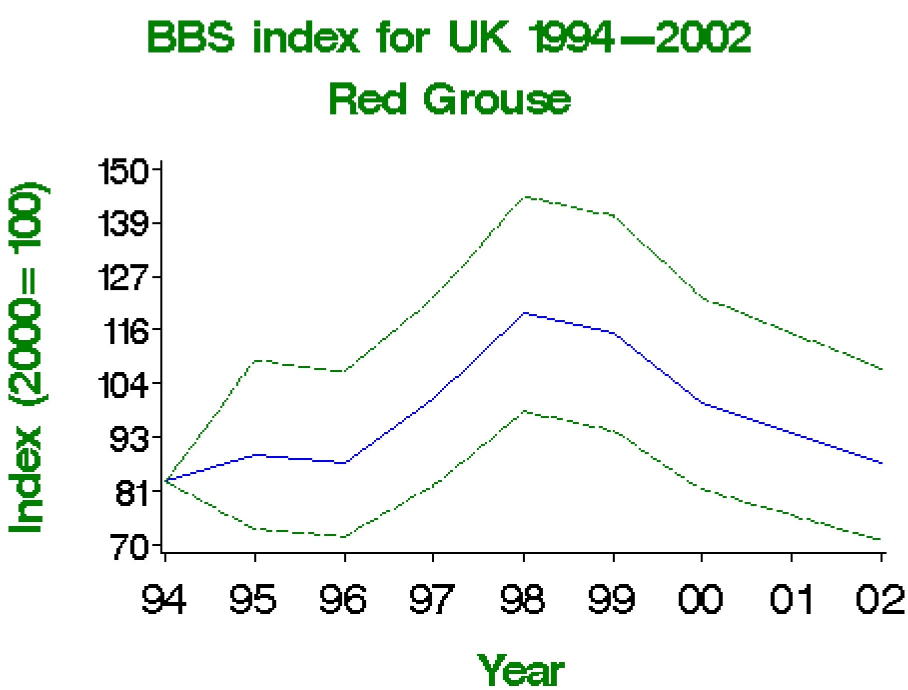
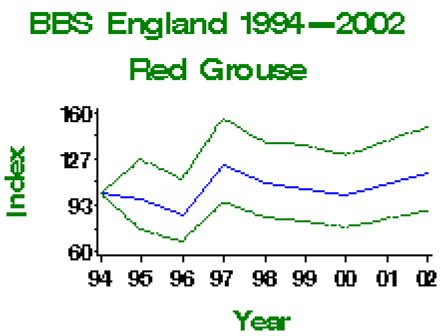
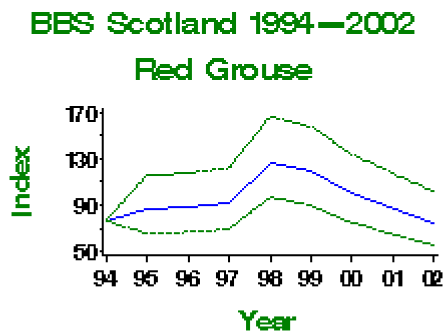


Table of population changes for Red Grouse

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	101	5	-15	29		
BBS England	8	1994-2002	39	14	-12	47		
BBS Scotland	8	1994-2002	57	-3	-28	32		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

RED-LEGGED PARTRIDGE
Alectoris rufa

Conservation listings

Europe: SPEC category 2, vulnerable
UK: not listed (introduced)

Long-term trend

UK: moderate decline

Status summary

Red-legged Partridge is an introduced species whose abundance is probably very closely related to the numbers released for shooting. No BTO Alert or UK conservation listing is issued, therefore, for the decline in the CBC index, which was estimated at 34% between 1968 and 1999. BBS data since 1994 indicate shallow increase in England and in the UK as a whole over this period.

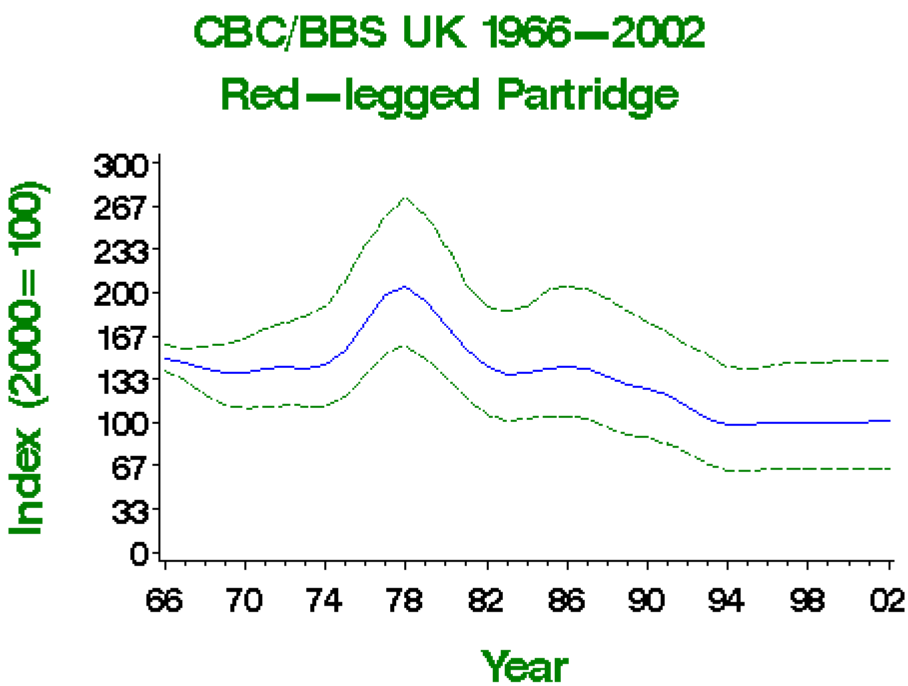
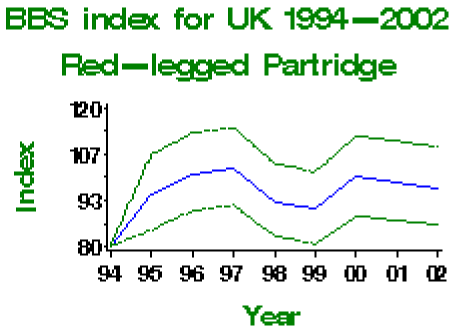
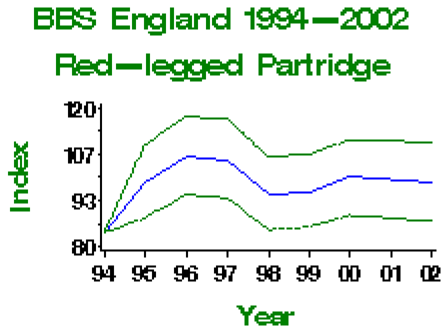


Table of population changes for Red-legged Partridge

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	110	-32	-57	2		
	25	1975-2000	136	-36	-56	-12	>25	
	10	1990-2000	269	-20	-35	-3		
	5	1995-2000	423	3	-5	11		
BBS UK	8	1994-2002	372	21	8	36		
BBS England	8	1994-2002	368	17	4	31		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

GREY PARTRIDGE
Perdix perdix

Conservation listings

Europe: SPEC category 3, vulnerable
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

This species has declined enormously, probably because of the effects of agricultural intensification (specifically herbicides) on the food plants of young chicks' insect prey (Potts 1986). Despite years of research and the application of a Government Biodiversity Action Plan, the continuing decline shown by CBC/BBS suggests that efforts to boost the population have not yet been successful.

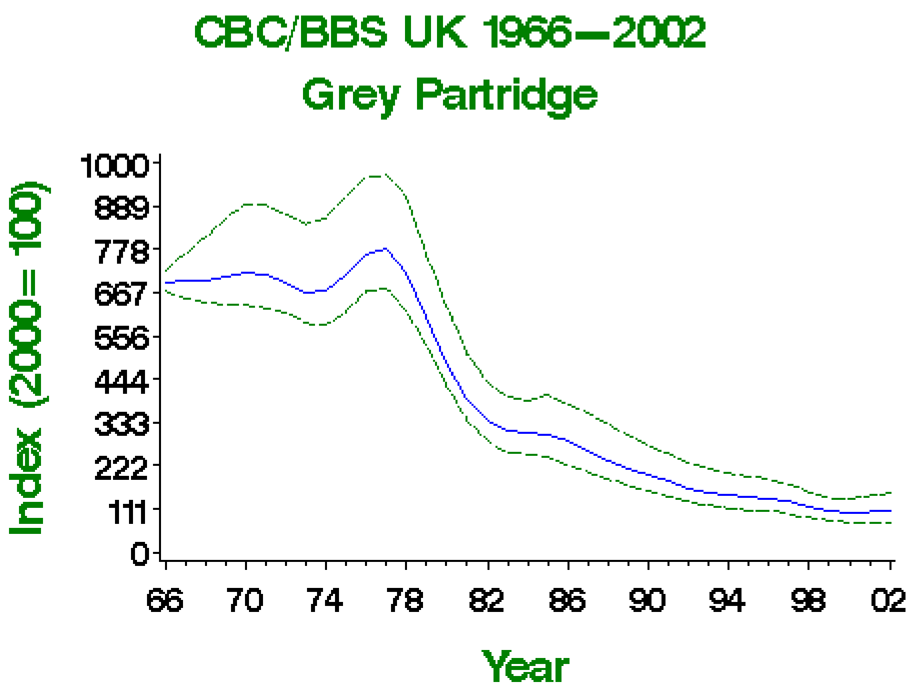
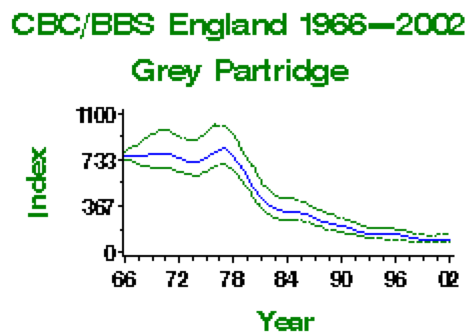


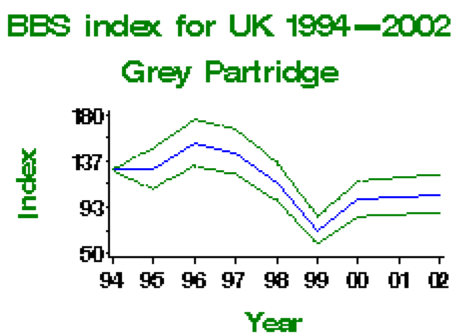
Table of population changes for Grey Partridge

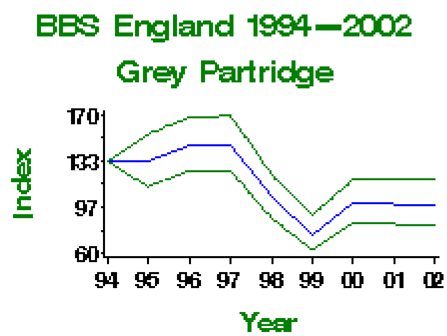
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	103	-86	-90	-81	>50	
	25	1975-2000	113	-86	-90	-81	>50	
	10	1990-2000	177	-50	-60	-40	>25	
	5	1995-2000	261	-30	-37	-23	>25	
CBC/BBS England	33	1967-2000	92	-87	-91	-82	>50	
	25	1975-2000	100	-87	-90	-81	>50	
	10	1990-2000	157	-52	-62	-38	>50	
	5	1995-2000	231	-30	-37	-23	>25	

BBS UK	8	1994-2002	216	-18	-31	-3		
BBS England	8	1994-2002	189	-26	-38	-11	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







Productivity information is not currently available for this species

PHEASANT
Phasianus colchicus

Conservation listings

Europe: no SPEC category, secure
UK: not listed (introduced)

Long-term trend

England: moderate increase

Status summary

Pheasants have increased in abundance from the 1960s to the mid 1990s, although the CBC index indicates a drop to late-1980s levels in the late 1990s. The BBS shows a continuing increase in Pheasant abundance in England, but decreases in Scotland and Wales. During 1968-88, a period when the total biomass of birds in Britain fell by an estimated 10%, CBC data indicate that Pheasant biomass rose by about 2500 tonnes - more than ten times more than any other species (**Dolton & Brooke 1999**). Numbers of this introduced gamebird are determined principally by releases for shooting (**Marchant *et al.* 1990**). The Game Conservancy Trust estimates that about 20-22 million birds are released in Britain each autumn, with more than two million of these surviving until spring.

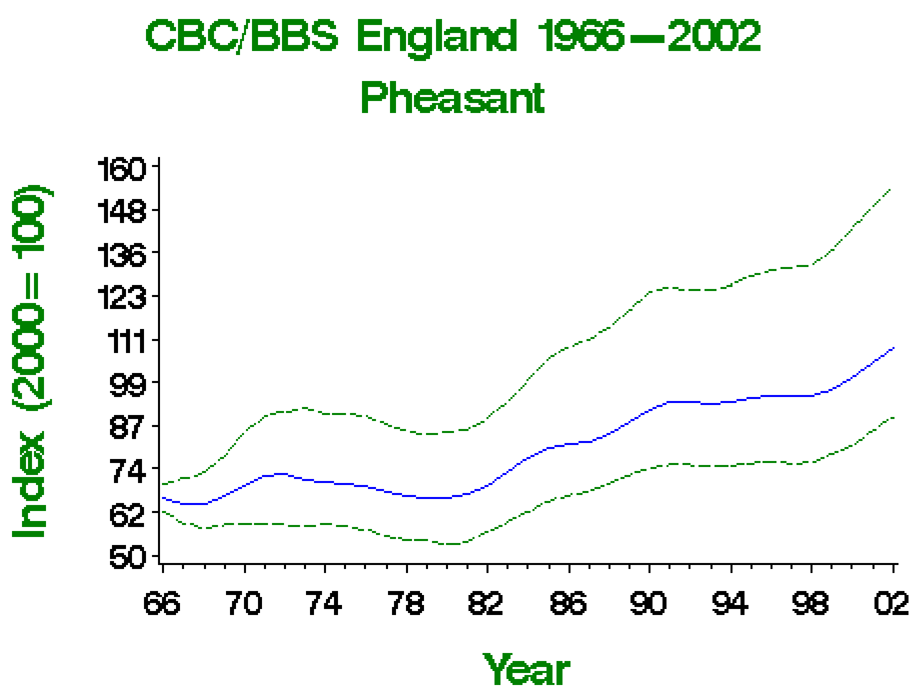
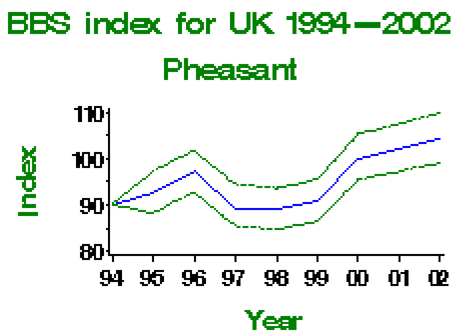


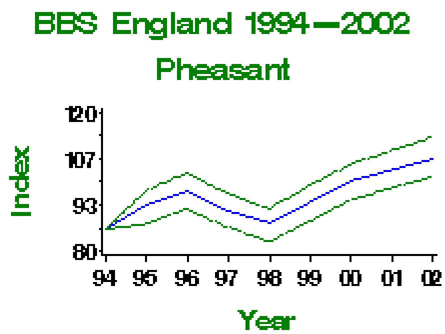
Table of population changes for Pheasant

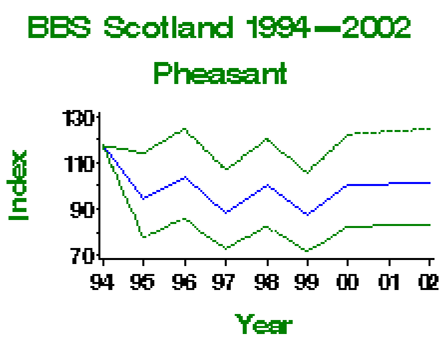
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	324	55	26	120		
	25	1975-2000	397	43	21	81		
	10	1990-2000	790	10	0	21		

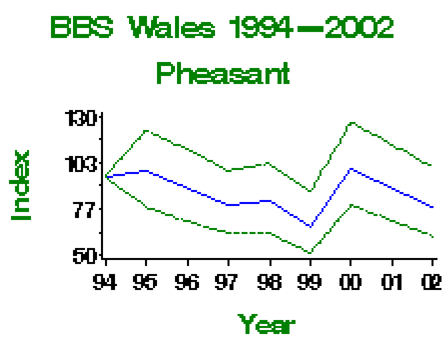
	5	1995-2000	1216	6	1	12		
BBS UK	8	1994-2002	1236	16	10	22		
BBS England	8	1994-2002	1049	24	18	31		
BBS Scotland	8	1994-2002	98	-14	-29	6		
BBS Wales	8	1994-2002	63	-18	-36	6		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









Productivity information is not currently available for this species

MOORHEN
Gallinula chloropus

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

While the long-term trend is of shallow increase, much of the population increase took place before 1974, when WBS monitoring began, and may have been a recovery from heavy mortality during the cold winters of the early 1960s. On both CBC/BBS and WBS evidence, there was decrease during the 1970s and 1980s, but this has been followed by a partial recovery. A decline in the number and quality of farmland ponds, and the spread of American mink *Mustela vison*, which is an important predator especially along watercourses, have been suggested as possible causes of decline. The decline has been associated with significant reductions in breeding performance. Average clutch size has declined and the failure rate of nests over the full 25-day egg period (20 days for incubation and 5 days for laying) has increased, but average brood sizes have improved.

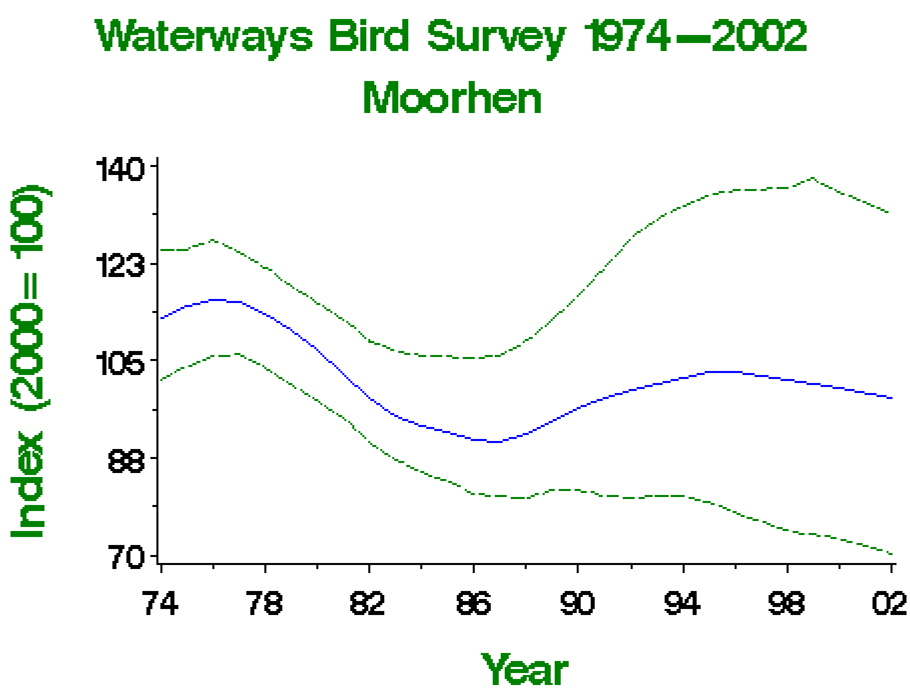
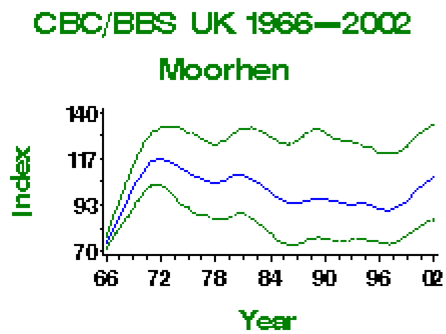


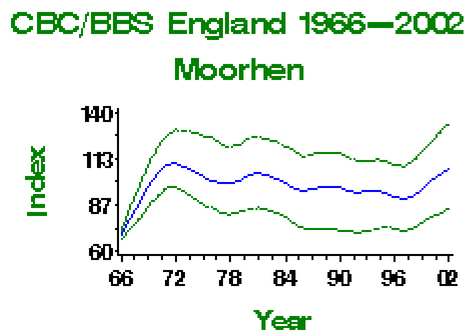
Table of population changes for Moorhen

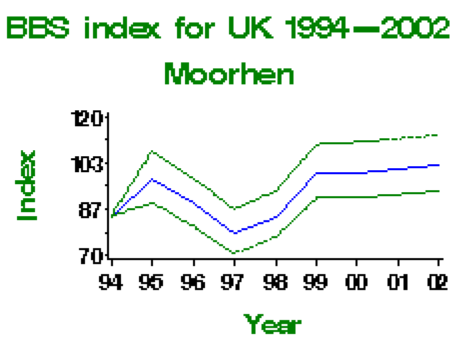
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	201	20	-7	58		
	25	1975-2000	234	-9	-26	11		
	10	1990-2000	406	4	-10	15		
	5	1995-2000	607	7	0	14		
CBC/BBS England	33	1967-2000	182	27	0	61		
	25	1975-2000	213	-3	-22	18		

	10	1990-2000	374	3	-6	20		
	5	1995-2000	557	7	3	14		
WBS waterways	25	1975-2000	76	-13	-33	15		
	10	1990-2000	83	4	-14	22		
	5	1995-2000	78	-3	-12	6		
BBS UK	8	1994-2002	503	22	11	35		
BBS England	8	1994-2002	461	18	6	30		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







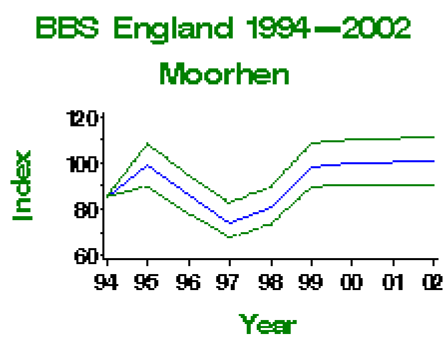
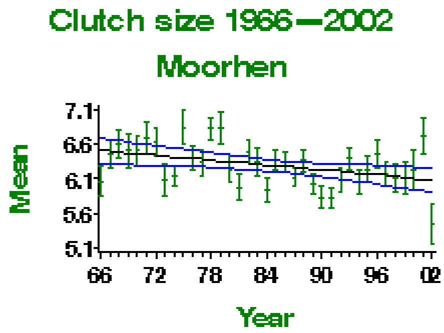
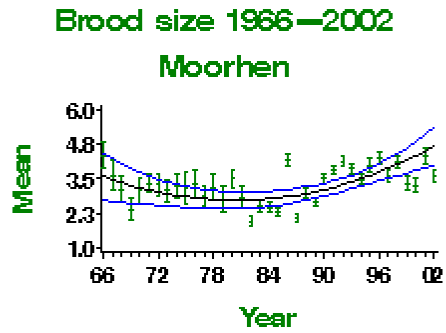
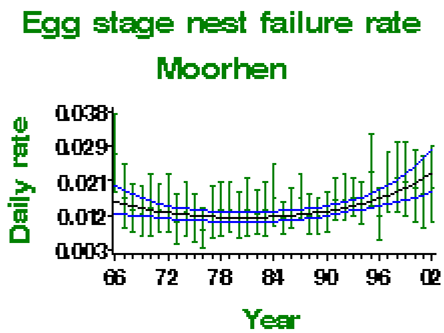


Table of productivity information for Moorhen

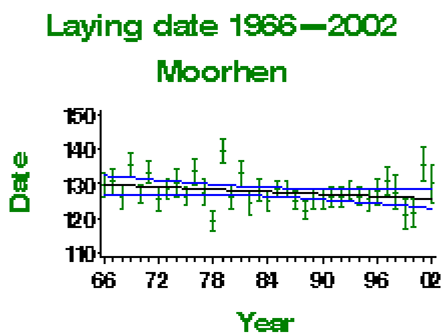
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	95	Linear decline	6.48 eggs	6.1 eggs	-0.38 eggs	
Brood size	33	1968-2001	78	Curvilinear	3.36 chicks	4.49 chicks	1.13 chicks	
Daily failure rate (eggs)	33	1968-2001	111	Curvilinear	0.0143 nests/day	0.021 nests/day	0.0067 nests/day	
Daily failure rate (chicks)	33	1968-2001	32	None				
Laying date	33	1968-2001	72	None				







Insufficient data on nestling failure
available for this species



Insufficient data on CES
available for this species

COOT
Fulica atra

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Coot territories recorded by WBS may be on linear waterways or on adjacent lakes, making WBS arguably more representative of Coot populations as a whole than CBC, which was less likely to record Coots in their main habitats. Both WBS and CBC/BBS trends for Coot indicate a shallow increase, although small CBC samples suggested a rapid rise in the late 1960s. Winter abundance on large still waters, as monitored by WeBS, has also shown consistent moderate increases since the early 1970s (**Musgrove *et al.* 2001**).

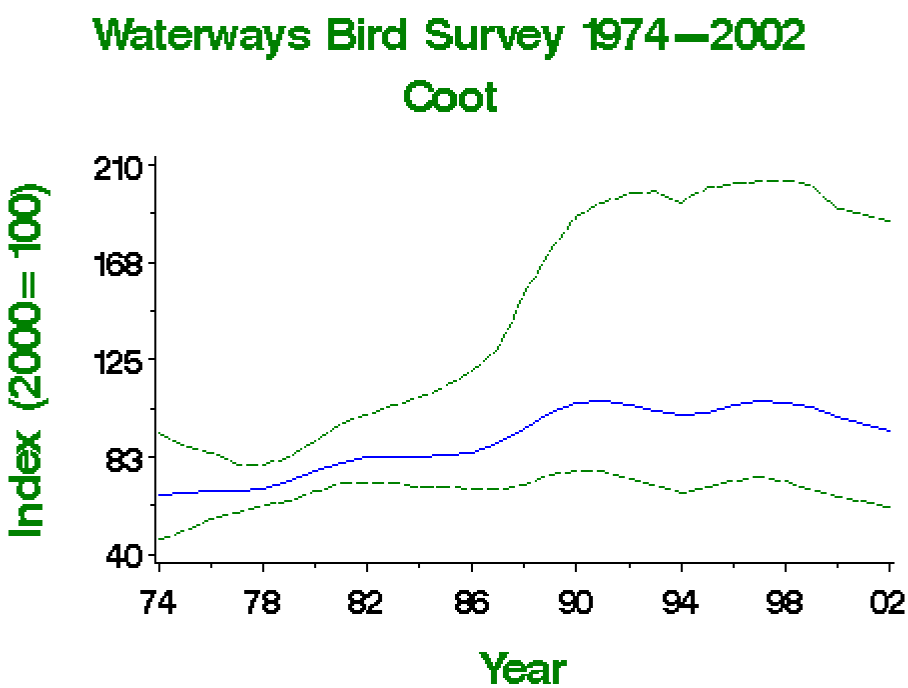
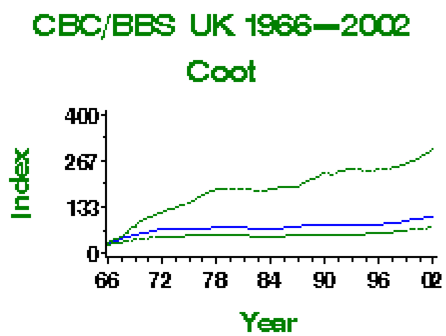


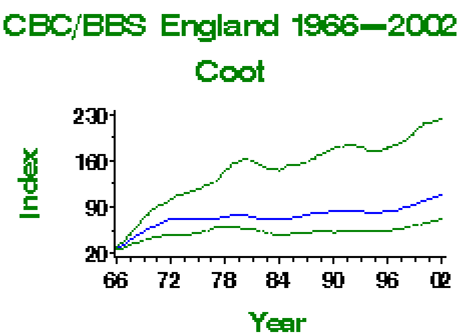
Table of population changes for Coot

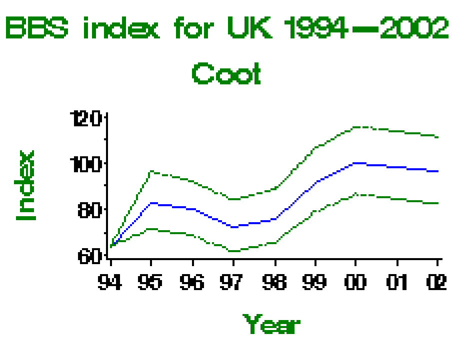
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	69	180	99	857		
	25	1975-2000	84	43	2	146		
	10	1990-2000	152	20	4	60		
	5	1995-2000	233	21	7	38		
CBC/BBS England	33	1967-2000	62	174	91	506		
	25	1975-2000	76	41	-3	130		
	10	1990-2000	138	19	1	51		

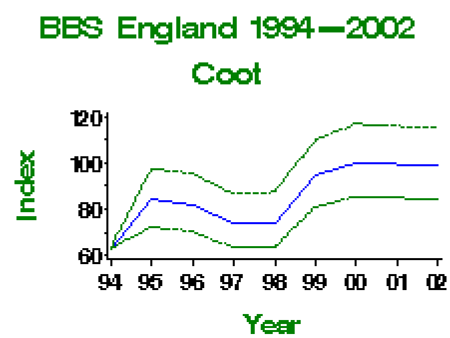
	5	1995-2000	211	21	10	35		
WBS waterways	25	1975-2000	39	49	-10	219		
	10	1990-2000	51	-6	-27	24		
	5	1995-2000	54	-2	-22	24		
BBS UK	8	1994-2002	191	51	29	75		
BBS England	8	1994-2002	171	57	34	83		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









Productivity information is not currently available for this species

OYSTERCATCHER
Haematopus ostralegus

Conservation listings

Europe: no SPEC category, secure
UK: Amber (>20% of European breeding population, >20% of East Atlantic Flyway population in winter, localised wintering population)

Long-term trend

UK: rapid increase

Status summary

Oystercatchers increased along linear waterways between 1974 and 1986, as the species colonised inland sites across England and Wales (**Gibbons *et al*. 1993**). Thereafter, the WBS index stabilised, so showing a pattern parallel to that in winter abundance revealed by WeBS (**Musgrove *et al.* 2001**). BBS data since 1994, which include birds in a broader range of locations and habitats, suggest increase in England but decline in Scotland. The increase in nest failure rates for the 27-day egg stage (25 days for incubation and 2 days for laying) probably results from the spread of the species into less favourable areas. The trend towards earlier laying can be partially explained by recent climate change (**Crick & Sparks 1999**).

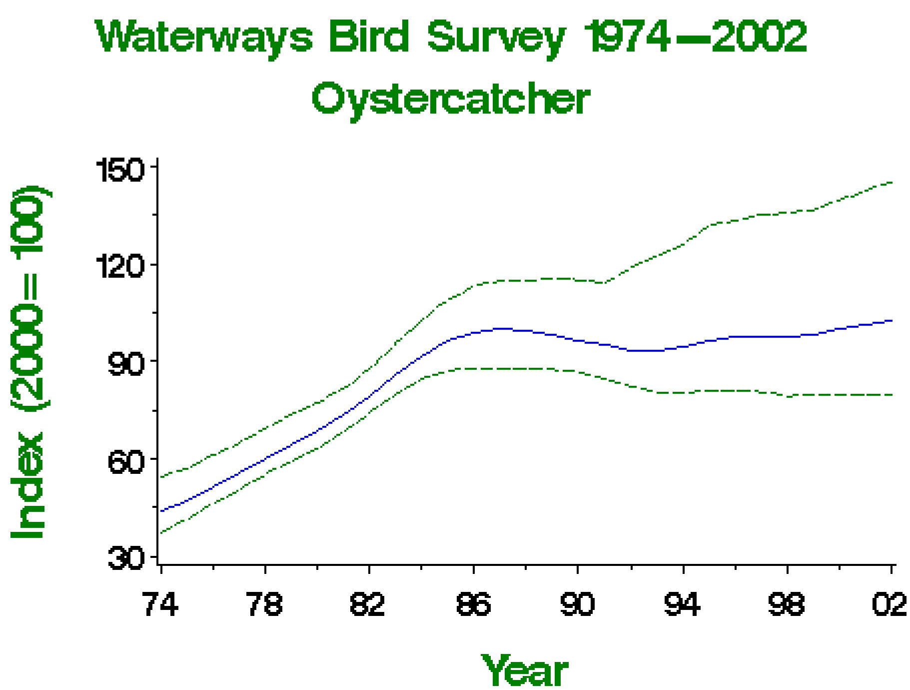
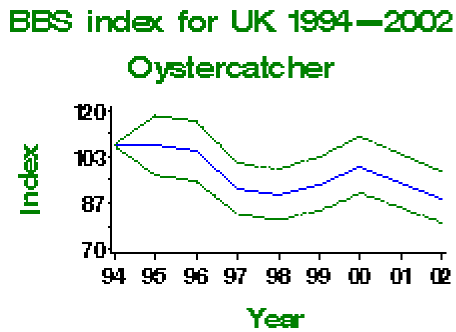


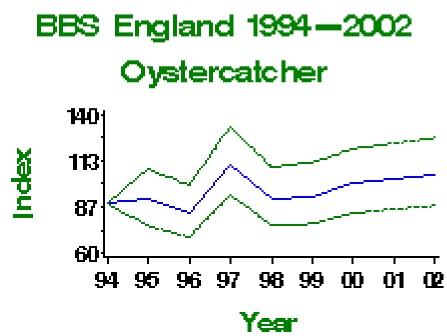
Table of population changes for Oystercatcher

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	23	112	68	165		
	10	1990-2000	29	3	-13	30		
	5	1995-2000	31	4	-8	19		
BBS UK	8	1994-2002	231	-18	-26	-9		
BBS England	8	1994-2002	106	19	-1	43		

BBS Scotland	8	1994-2002	116	-24	-35	-12		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





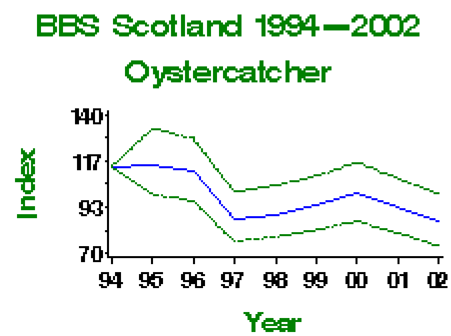
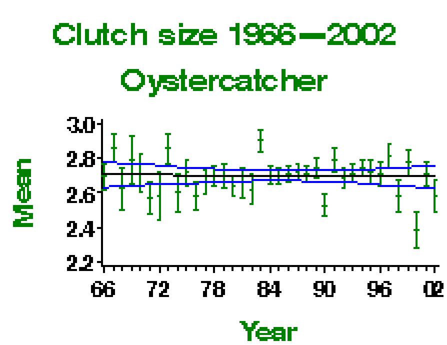


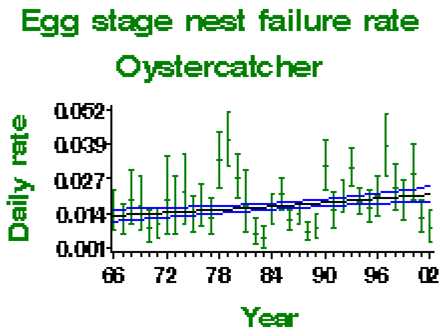
Table of productivity information for Oystercatcher

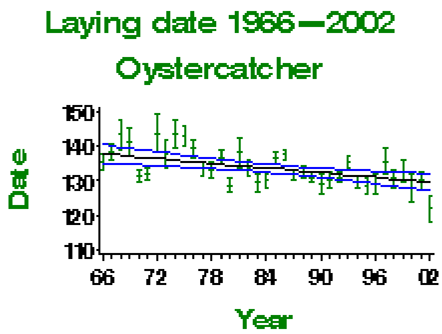
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	104	None				
Daily failure rate (eggs)	33	1968-2001	111	Linear increase	0.0133 nests/day	0.0205 nests/day	0.0072 nests/day	
Laying date	33	1968-2001	46	Linear decline	day 137	day 130	-7 days	



Insufficient data on brood size available for this species

Insufficient data on nestling failure available for this species





Insufficient data on CES available for this species

RINGED PLOVER
Charadrius hiaticula

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% decline in winter population, >20% East Atlantic Flyway population in winter)

Long-term trend

UK: uncertain

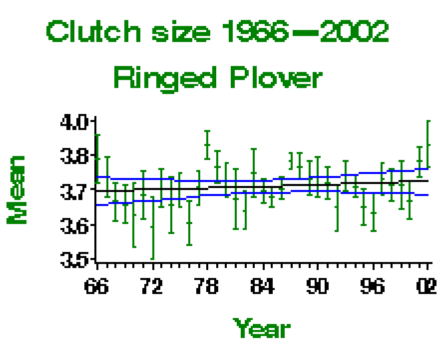
Status summary

At the previous review, this species was Amber listed on the strength of its European status alone, but a recent winter decline now also meets the Amber criterion. The breeding population is not monitored annually by the BTO, but a BTO survey in 1984 showed increases throughout the UK since the previous survey in 1973/74 (**Prater 1989**). The breeding distribution spread inland between the two atlas periods, especially in England, probably associated with the increase in number of gravel pits and reservoirs (**Gibbons *et al.* 1993**). The 1984 survey revealed that over 25% of the UK population nested on the Western Isles, especially on the machair, where breeding waders have subsequentlly suffered greatly from predation by introduced hedgehogs. Beach-nesting birds are very vulnerable to disturbance and in some regions in 1984 were largely confined to wardened reserves. The recent marked trend towards increasing nest failures at the egg stage is worrying and warrants further investigation.

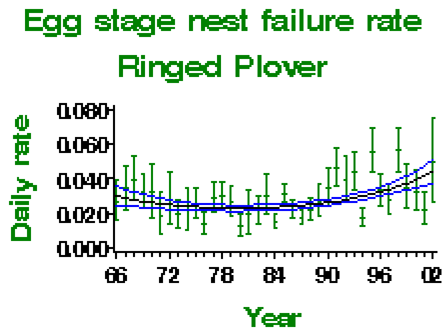
Annual breeding population changes for this species
are not currently monitored by BTO

Table of productivity information for Ringed Plover

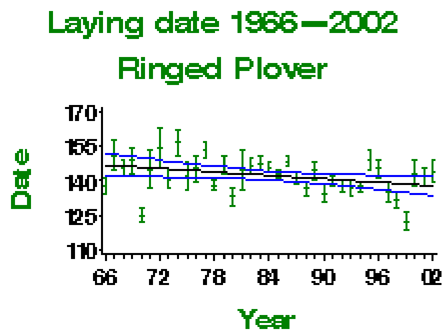
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	88	None				
Daily failure rate (eggs)	33	1968-2001	127	Curvilinear	0.0278 nests/day	0.0413 nests/day	0.0135 nests/day	
Laying date	33	1968-2001	41	Linear decline	day 146	day 138	-8 days	



Insufficient data on brood size
available for this species



Insufficient data on nestling failure available for this species



Insufficient data on CES available for this species

GOLDEN PLOVER
Pluvialis apricaria

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: possible decline

Status summary

The species has recently been moved from the Amber to the Green list because new data suggest it does not qualify as internationally important during the breeding season. There were no annual monitoring data before the inception of BBS. BBS has shown declines in Scotland and the UK since 1994, but this is generally thought to be a continuation of an earlier trend (**Gibbons *et al.* 1993**). Nest survival on grass moors, unlike that on heather moors, may have declined over time (**Crick 1992a**), perhaps linked to increased stocking densities of sheep (**Fuller 1996**). There is no clear trend in clutch size; a large number of late-season records, that provide higher proportions of two-and three-egg clutches, were submitted from an intensive study during 1996-98 (Pearce-Higgins, pers. comm.).

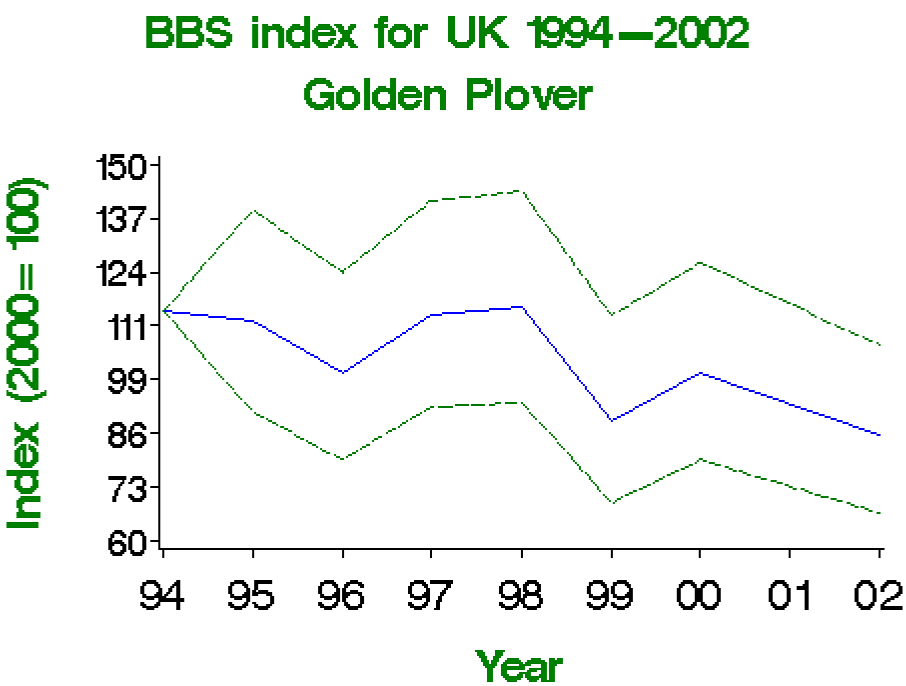
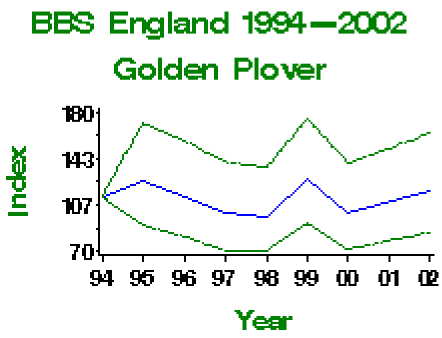


Table of population changes for Golden Plover

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	75	-26	-42	-7	(>25)	
BBS England	8	1994-2002	30	4	-25	44		
BBS Scotland	8	1994-2002	44	-33	-52	-7	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



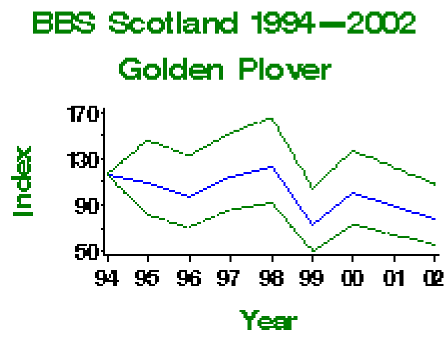
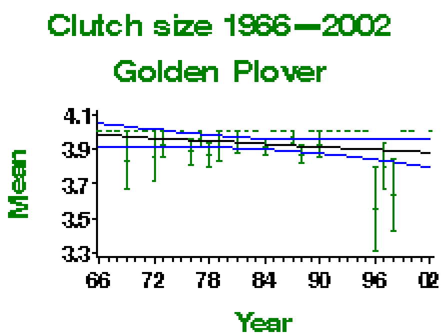


Table of productivity information for Golden Plover

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	16	None				Small sample



Insufficient data on brood size available for this species

Insufficient data on nest failure available for this species

Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

LAPWING
Vanellus vanellus

Conservation listings

Europe: no SPEC category, (secure)
UK: Amber (25-50% population decline, >20% European wintering population)

Long-term trend

UK: moderate decline

Status summary

The Amber listing of this species is now based on UK decline, as well as the original criterion of international importance. CBC recorded some increase in its early years, and on WBS plots increase continued until the mid 1980s. Lapwings declined rapidly on lowland farmland through the 1980s, probably because changes in agricultural practice led to reduced productivity (**Hudson *et al.* 1994**, **Siriwardena *et al.* 2000**). Adult and first-year survival rates show no trend through time (**Peach *et al.* 1994**, **Catchpole *et al.* 1999**), but the nest record data show an increase in failure rates at the egg stage (29 days, comprising 26 days incubation and 3 days laying). National surveys in England and Wales showed a 49% population decline between 1987 and 1998 (**Wilson *et al.* 2001**). Population declines in excess of 50% over 15 years in Northern Ireland (**Henderson *et al.* 2002**) mirror similar declines throughout grassland areas of Wales and southeast England (**Wilson *et al.* 2001**). BBS data indicate little change in England since 1994, but steep decline in Scotland.

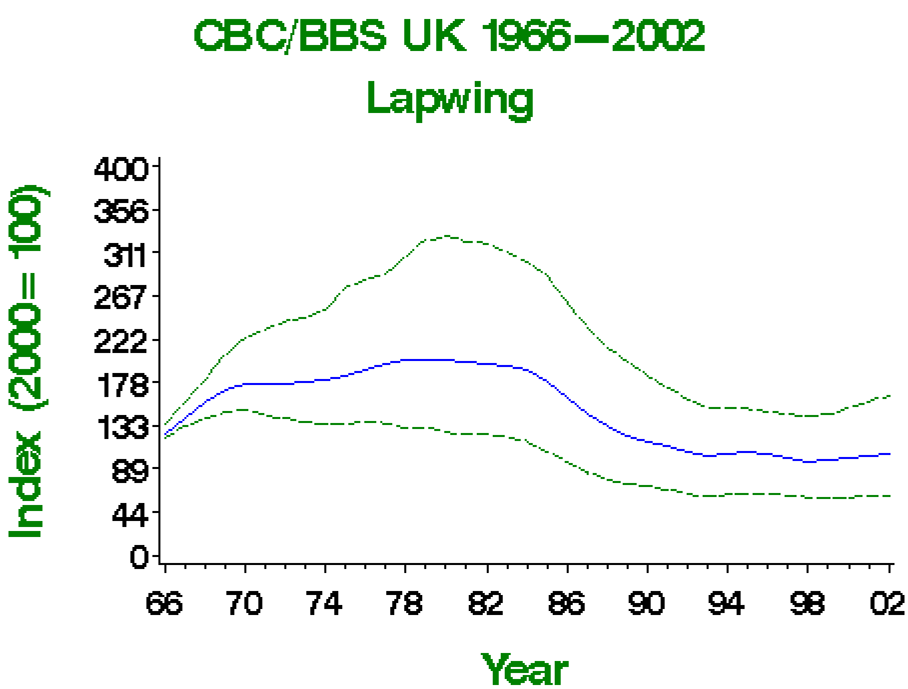
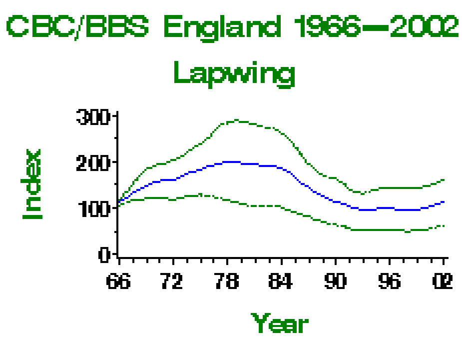


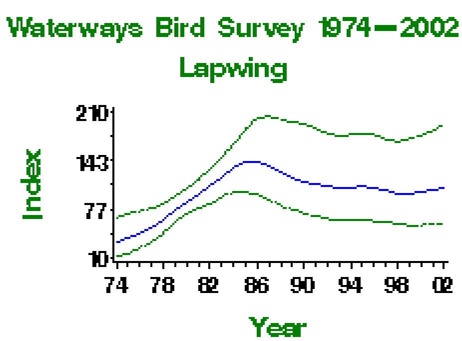
Table of population changes for Lapwing

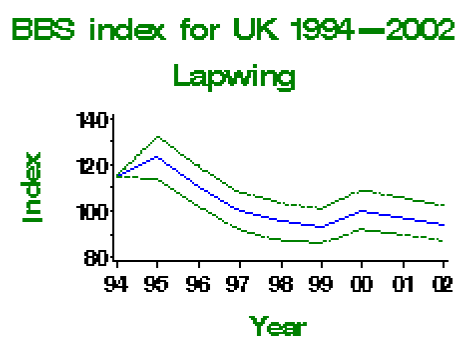
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	164	-29	-62	13		
	25	1975-2000	197	-46	-65	-27	>25	
	10	1990-2000	381	-15	-32	6		

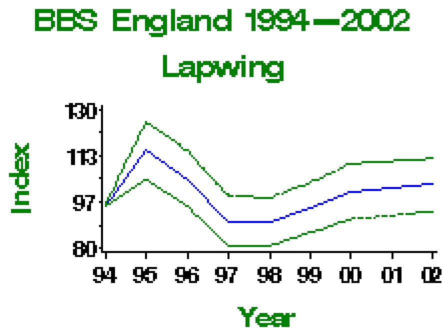
	5	1995-2000	589	-5	-12	5		
CBC/BBS England	33	1967-2000	134	-19	-59	14		
	25	1975-2000	161	-46	-63	-28	>25	
	10	1990-2000	308	-13	-27	15		
	5	1995-2000	477	0	-10	13		
WBS waterways	25	1975-2000	39	170	-12	819		
	10	1990-2000	40	-12	-27	9		
	5	1995-2000	40	-7	-20	8		
BBS UK	8	1994-2002	533	-18	-24	-11		
BBS England	8	1994-2002	426	8	-2	18		
BBS Scotland	8	1994-2002	84	-39	-50	-26	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









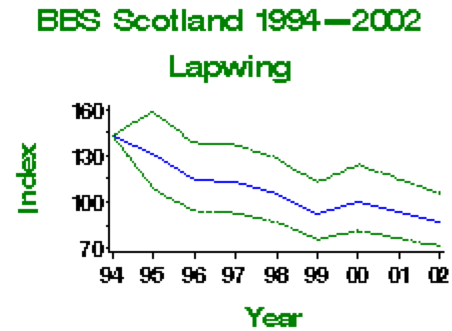
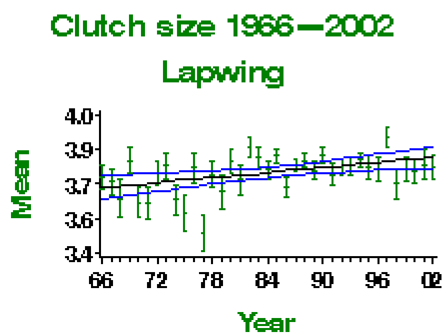
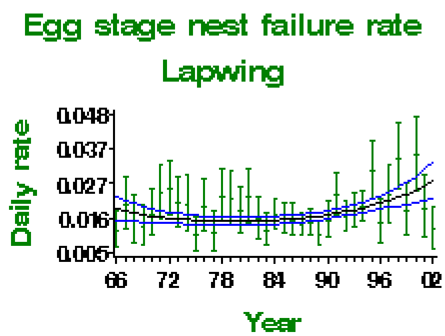


Table of productivity information for Lapwing

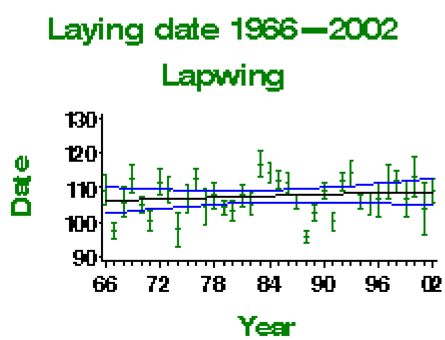
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	129	Linear increase	3.69 eggs	3.82 eggs	0.13 eggs	
Daily failure rate (eggs)	33	1968-2001	140	Curvilinear	0.0174 nests/day	0.0258 nests/day	0.0084 nests/day	
Laying date	33	1968-2001	32	None				



Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species



Insufficient data on CES available for this species

SNIPE
Gallinago gallinago

Conservation listings

Europe: no SPEC category, (secure)
UK: Amber (>50% population decline but data possibly unrepresentative)

Long-term trend

UK: probable decline

Status summary

Snipe were monitored by the CBC mainly in lowland England, where numbers have fallen rapidly since the 1970s as farmland has been drained (**Gibbons *et al.* 1993**, **Siriwardena *et al.* 2000**). The trend more generally is not fully known, but the 1988-91 atlas documented range loss widely in Wales, Northern Ireland and Scotland, as well as lowland England, and a general decrease is probable. The BBS shows no clear population trend in England since 1994, but a rapid rise in Scotland. Daily nest failure rates at the egg stage appear to have halved.

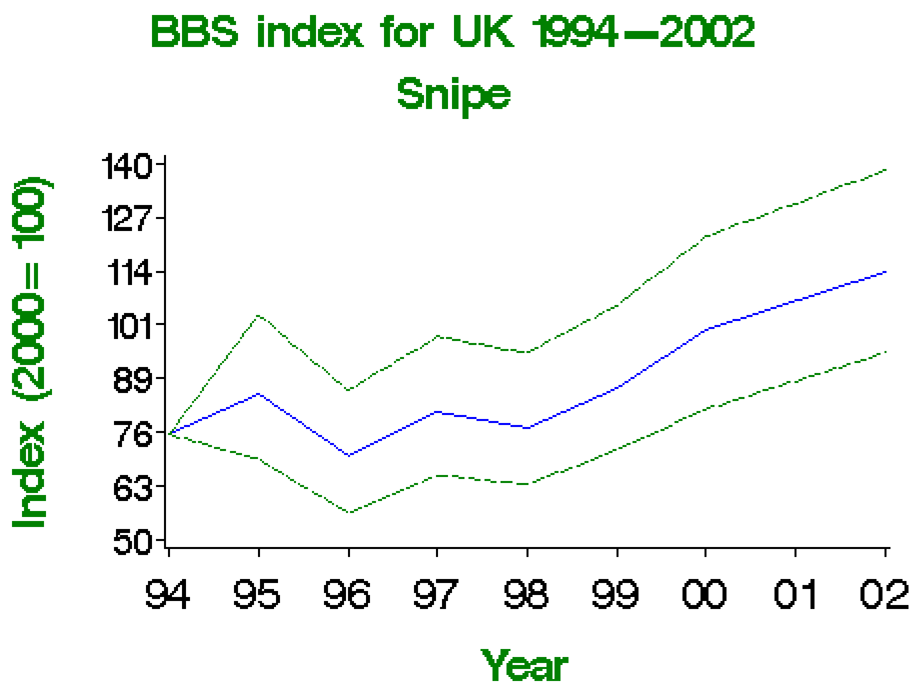
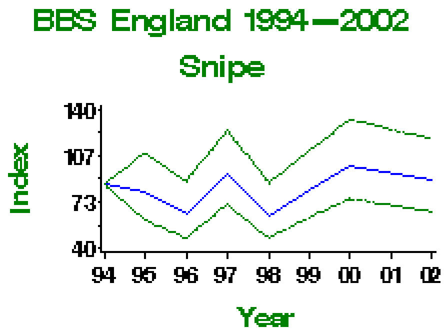


Table of population changes for Snipe

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	117	52	26	84		
BBS England	8	1994-2002	52	3	-23	38		
BBS Scotland	8	1994-2002	52	71	27	130		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



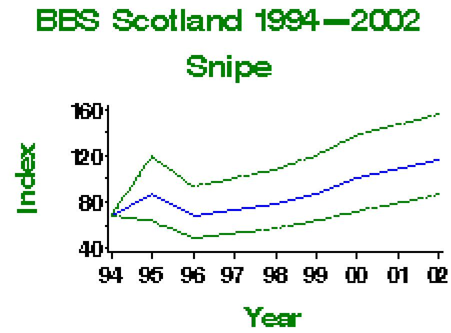
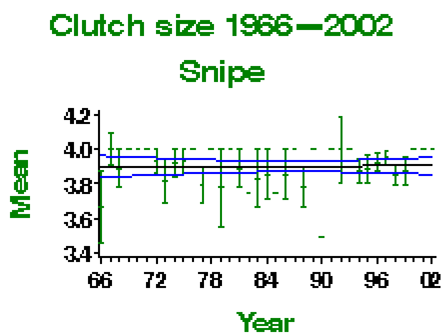
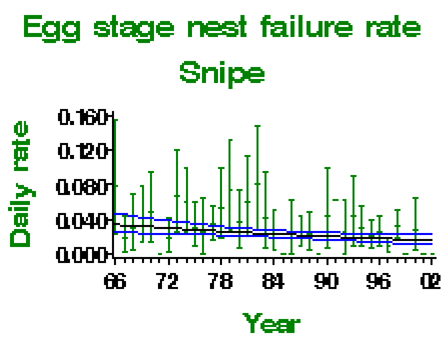


Table of productivity information for Snipe

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	None				Small sample
Daily failure rate (eggs)	33	1968-2001	18	Linear decline	0.033 nests/day	0.0163 nests/day	-0.0167 nests/day	Small sample



Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

CURLEW
Numenius arquata

Conservation listings

Europe: SPEC category 3, declining (winter)
UK: Amber (>20% of European breeding and winter populations)

Long-term trend

UK, England: probable decline

Status summary

Curlews monitored by CBC were mostly in lowland habitats and may have been affected by drainage of farmland (**Gibbons *et al.* 1993**). BBS data, more representative of the overall population, also show a decline, particularly in Scotland. WBS data, in contrast, indicate a moderate increase in Curlews nesting alongside waterways. Wintering Curlew abundance has shown a shallow long-term increase (**Musgrove *et al.* 2001**). In Northern Ireland, a rapid breeding decline occurred between the mid 1980s and 1999 (**Henderson *et al.* 2002**). Although samples are small, failure rate of nests at the egg stage have fallen.

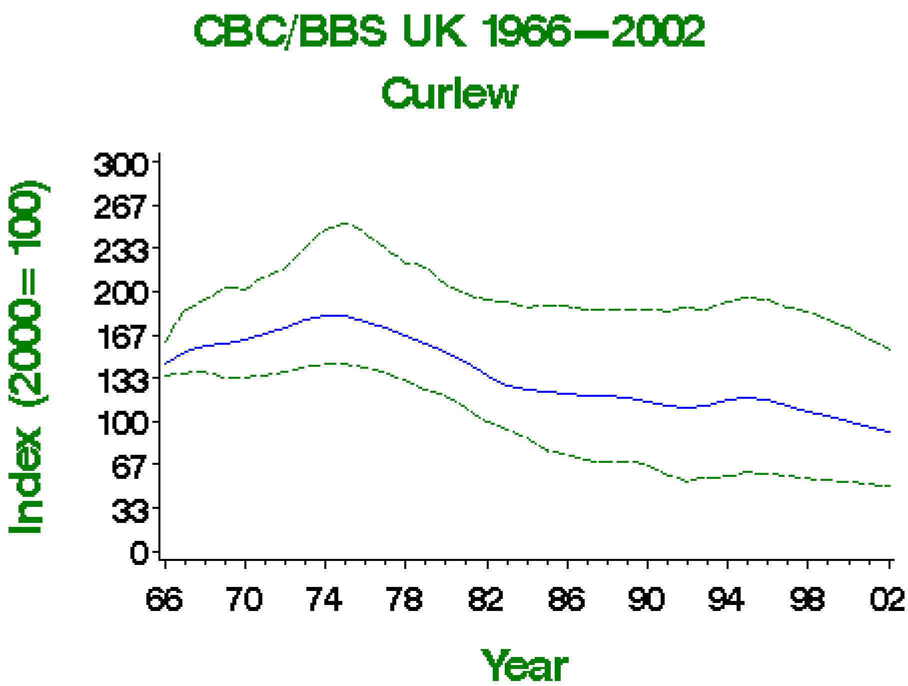
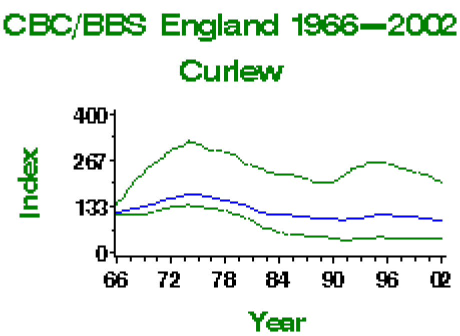


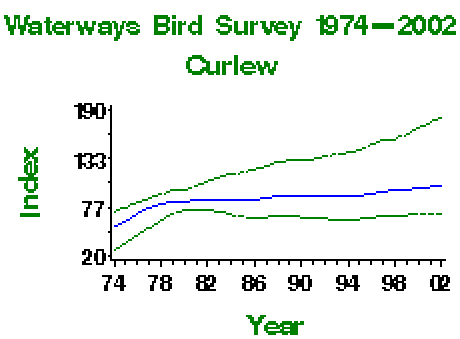
Table of population changes for Curlew

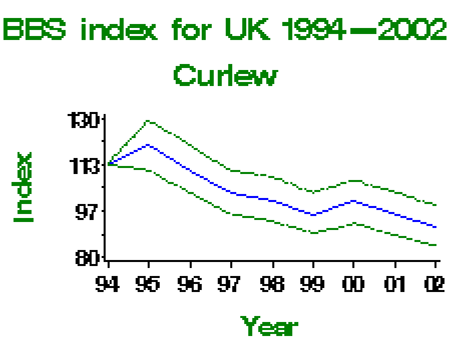
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	112	-35	-68	13		
	25	1975-2000	141	-45	-70	2		
	10	1990-2000	299	-13	-32	10		
	5	1995-2000	473	-15	-23	-7		
CBC/BBS England	33	1967-2000	67	-20	-70	54		
	25	1975-2000	84	-40	-80	4		
	10	1990-2000	175	3	-17	26		

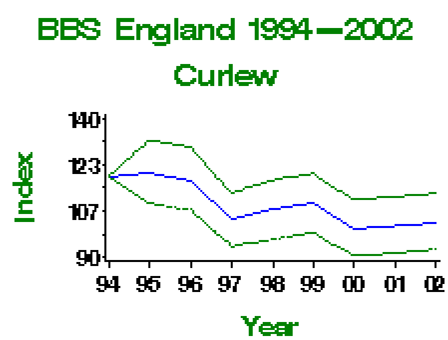
	5	1995-2000	275	-8	-15	1		
WBS waterways	25	1975-2000	22	64	1	316		
	10	1990-2000	25	11	-13	45		
	5	1995-2000	26	10	-5	35		
BBS UK	8	1994-2002	429	-20	-26	-13		
BBS England	8	1994-2002	245	-14	-22	-5		
BBS Scotland	8	1994-2002	122	-24	-35	-11		
BBS Wales	8	1994-2002	38	-18	-43	19		

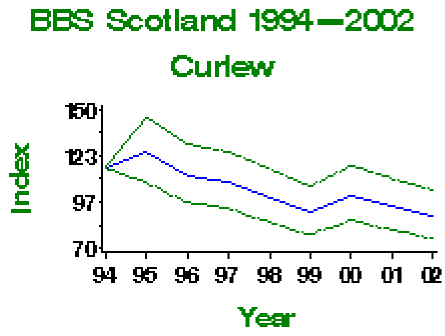
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











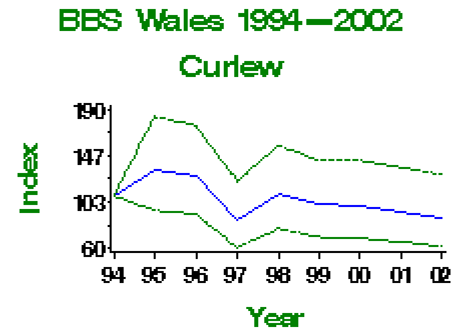
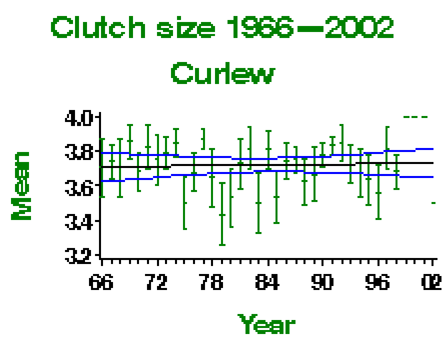
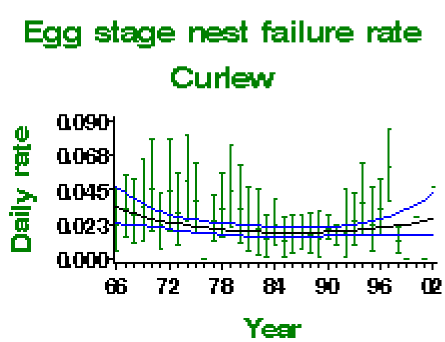


Table of productivity information for Curlew

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	24	None				Small sample
Daily failure rate (eggs)	33	1968-2001	27	Curvilinear	0.0295 nests/day	0.0248 nests/day	-0.0047 nests/day	Small sample



Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

WOODCOCK
Scolopax rusticola

Conservation listings

Europe: SPEC category 3, declining (winter)
UK: Amber (>50% population decline but data possibly unrepresentative)

Long-term trend

UK: rapid decline

Status summary

The Woodcock has declined rapidly and significantly on CBC plots. Because CBC did not cover coniferous forests and was concentrated in lowland Britain, however, it is not certain how well this trend represents the whole population and, provisionally, the results warrant only an Amber listing. Range contractions, that may have the same cause as the decline in abundance, were recorded concurrently with part of the CBC decline (**Gibbons *et al.* 1993**). The drying out of natural woodlands, overgrazing by deer, and the maturation of new plantations are possible causes of the Woodcock's decline. BBS is inefficient at recording this species, and cannot continue the index series. The first special BTO survey aimed at monitoring breeding Woodcock took place in 2003.

Table of population changes for Woodcock

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC all habitats	31	1968-1999	20	-74	-88	-49	>50	Unrepresentative? small sample
	25	1974-1999	20	-76	-88	-51	>50	Unrepresentative? small sample
	10	1989-1999	13	-40	-62	-11	>25	Unrepresentative? small sample

	5	1994-1999	13	-24	-44	-3		Unrepresentative? small sample

Productivity information is not currently available for this species

REDSHANK
Tringa totanus

Conservation listings
Europe: SPEC category 2, declining
UK: Amber (>50% population decline but data possibly unrepresentative, >20% of East Atlantic Flyway population in winter)

Long-term trend
UK: moderate decline

Status summary
UK population decline has now been added to the criteria by which Redshank qualifies for Amber listing. Considerable range contraction had occurred by 1988-91 from many areas of the UK, probably as a result of the drainage of farmland (**Gibbons *et al.* 1993**). WBS results show a decline along waterways that has apparently accelerated during the 1990s. BBS shows a moderate UK decline, but this is not evident in the data for England alone. Wintering populations (augmented by many Icelandic and some other northern European breeders) are stable (**Musgrove *et al.* 2001**). The substantial section of the British population that nests on saltmarshes decreased by 23% between 1985 and 1996 (**Brindley *et al.* 1998**). The failure rate of nests at the egg stage has fallen since the 1960s.

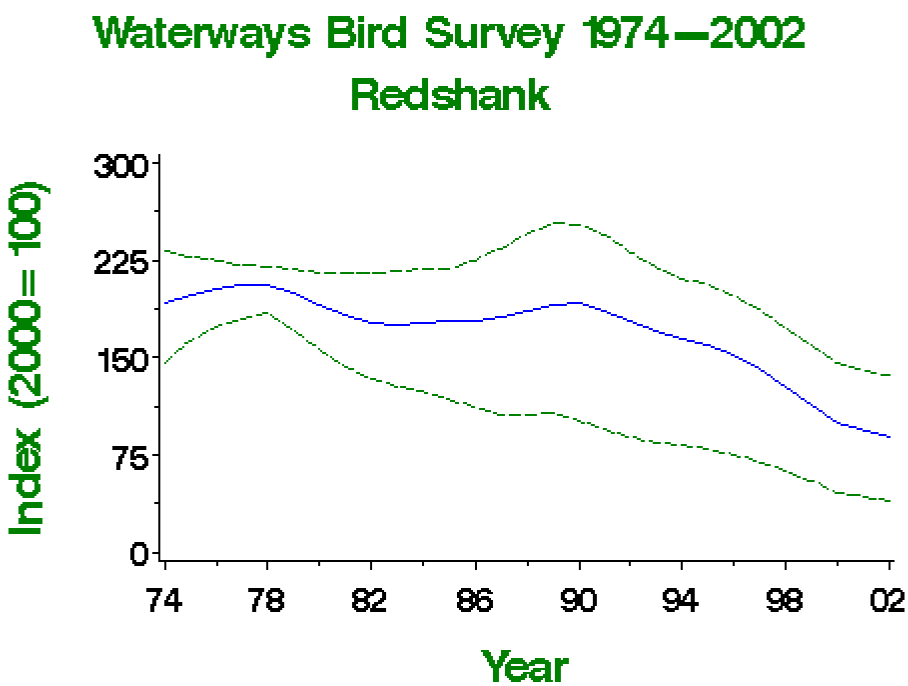
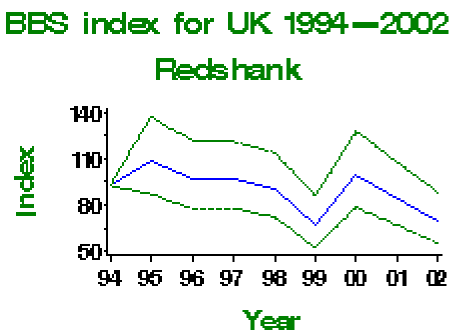


Table of population changes for Redshank

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	19	-49	-82	-9	>25	Small sample
	10	1990-2000	18	-48	-61	-27	>25	Small sample
	5	1995-2000	17	-37	-49	-16	>25	Small sample
BBS UK	8	1994-2002	68	-25	-40	-5	(>25)	
BBS England	8	1994-2002	44	14	-16	57		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



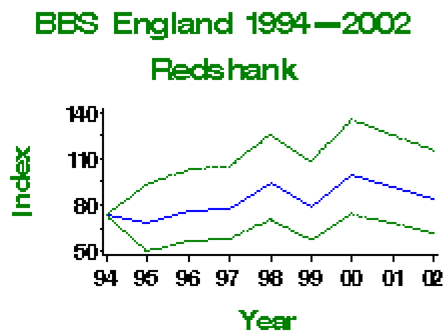
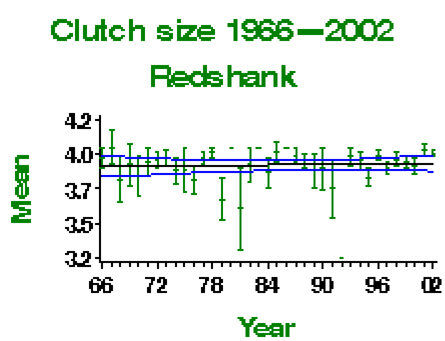
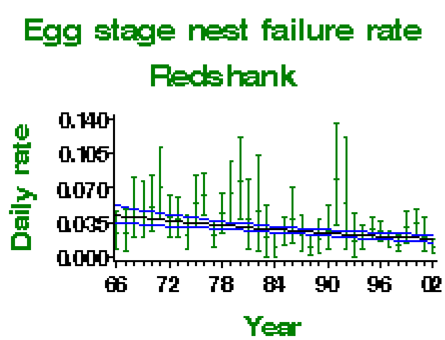


Table of productivity information for Redshank

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	27	None				Small sample
Daily failure rate (eggs)	33	1968-2001	32	Linear decline	0.0407 nests/day	0.0191 nests/day	-0.0216 nests/day	



Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

COMMON SANDPIPER
Actitis hypoleucos

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: shallow decline

Status summary

WBS provides the best census sample for monitoring the UK's breeding Common Sandpiper population. Its results show a decline from 1985 onwards (after a more gradual increase) that has yet to be explained. The recent decrease is echoed by BBS data from Scotland and from the UK as a whole. No BTO Alert is triggered by WBS data because no year used in an inter-annual comparison falls near the population peak, but UK BBS data show a 25% decline in just eight years.

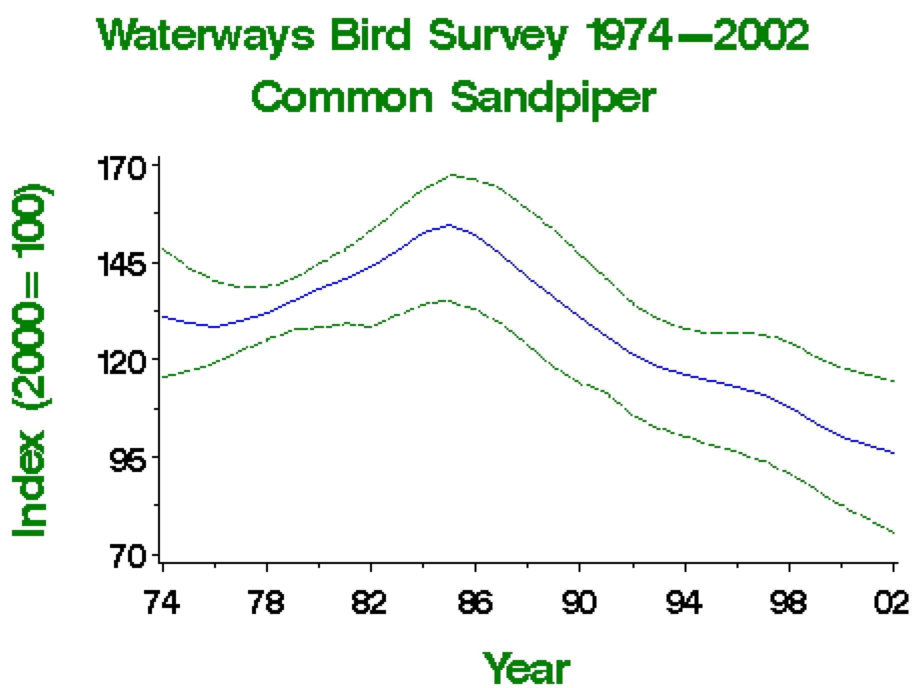
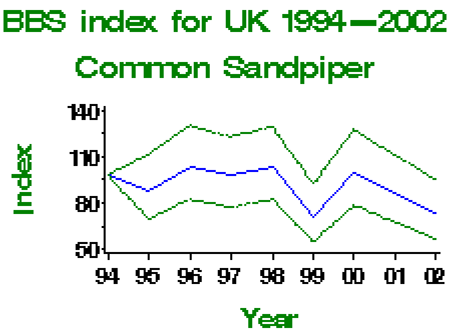


Table of population changes for Common Sandpiper

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	27	-23	-43	-7		
	10	1990-2000	29	-24	-36	-13		
	5	1995-2000	27	-13	-24	-3		
BBS UK	8	1994-	61	-25	-42	-3	(>25)	

		2002						
BBS Scotland	8	1994-2002	36	-23	-46	9		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



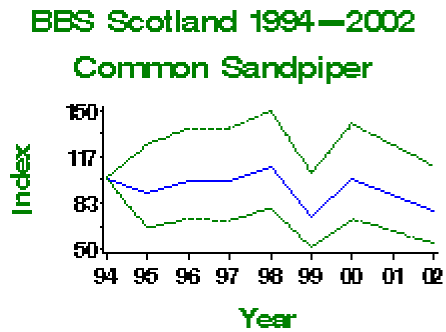
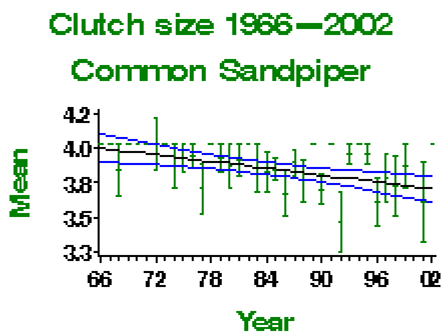
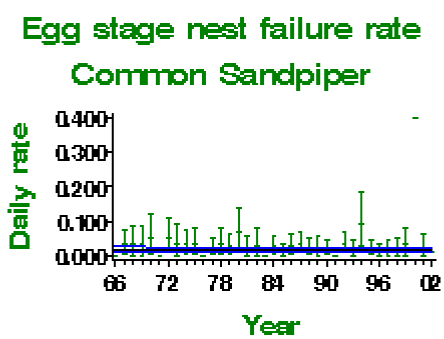


Table of productivity information for Common Sandpiper

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	12	Linear decline	3.96 eggs	3.72 eggs	-0.24 eggs	Small sample
Daily failure rate (eggs)	33	1968-2001	14	None				Small sample



Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

STOCK DOVE
Columba oenas

Conservation listings

Europe: SPEC category 4, secure
UK: Amber (>20% of European breeding population)

Long-term trend

England: rapid increase

Status summary

Populations have increased substantially, probably showing a recovery from the deleterious effects of organochlorine seed-dressings in the 1950s and early 1960s (O'Connor & Mead 1984). The increase in nest failure rates at the egg stage (17 days in length) is slight, and was not detectable in farmland habitats alone (Siriwardena *et al.* 2000b). BBS indices suggest that abundance is still increasing, in the UK and in England alone.

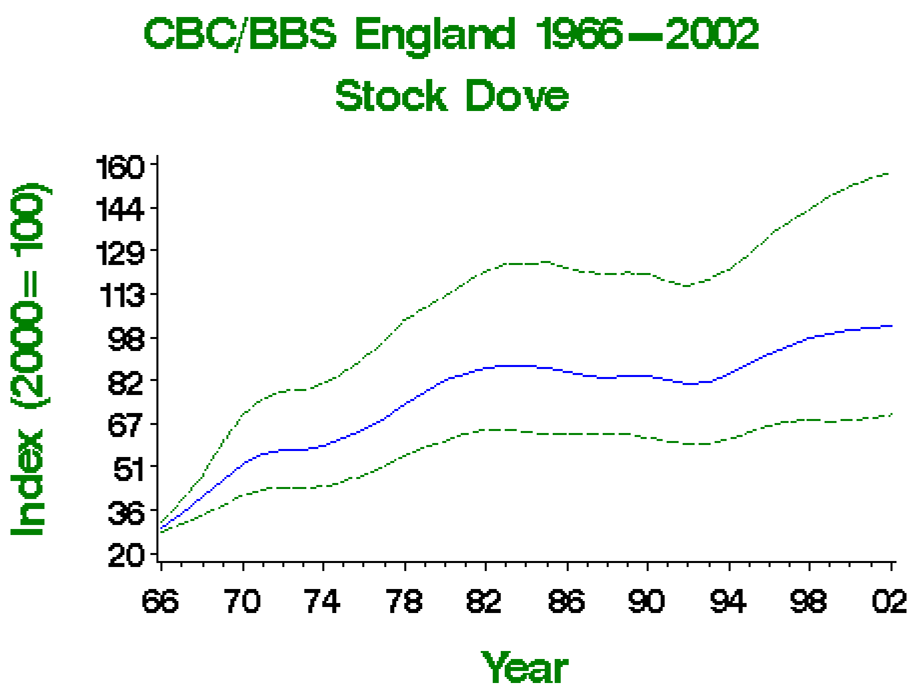
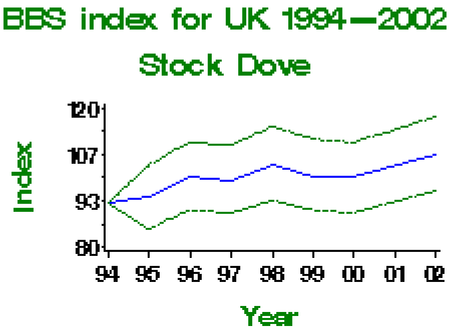


Table of population changes for Stock Dove

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	180	191	100	325		
	25	1975-2000	221	63	26	132		
	10	1990-2000	412	19	4	44		
	5	1995-2000	626	14	3	26		
BBS UK	8	1994-2002	585	15	4	27		
BBS England	8	1994-2002	541	14	2	26		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



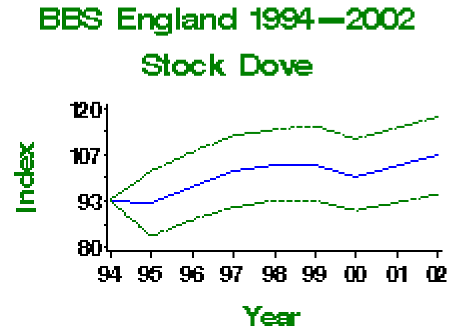
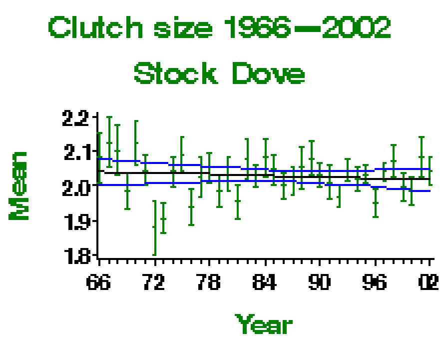
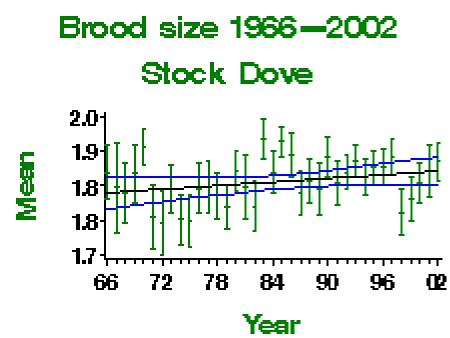
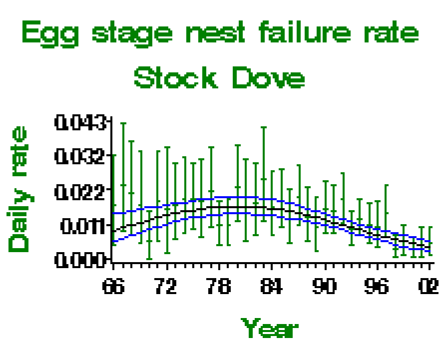


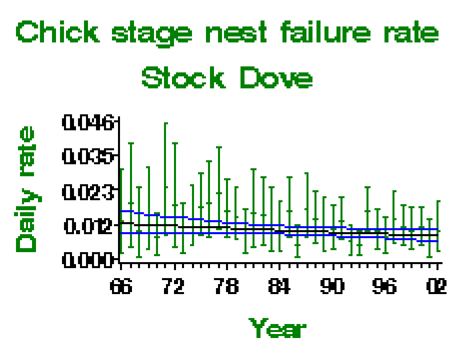
Table of productivity information for Stock Dove

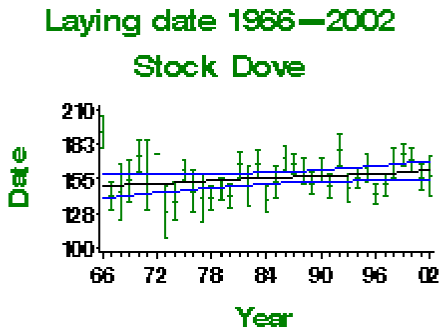
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	65	None				
Brood size	33	1968-2001	88	None				
Daily failure rate (eggs)	33	1968-2001	64	Curvilinear	0.0106 nests/day	0.0043 nests/day	-0.0063 nests/day	
Daily failure rate (chicks)	33	1968-2001	48	None				
Laying date	33	1968-2001	14	None				Small sample











Insufficient data on CES available for this species

WOODPIGEON
Columba palumbus

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

The CBC/BBS trend for this species is of a steady, steep increase since at least the mid 1970s. Woodpigeons are difficult to survey precisely, however, and this is reflected in the relatively wide confidence intervals. The spread of intensive arable cultivation, especially of oilseed rape, which has been shown to promote overwinter survival, may explain the rise in numbers (**Gibbons *et al.* 1993**). In contrast to increase or stability elsewhere in the UK, the BBS trend for Scotland appears to indicate minor decline since 1994.

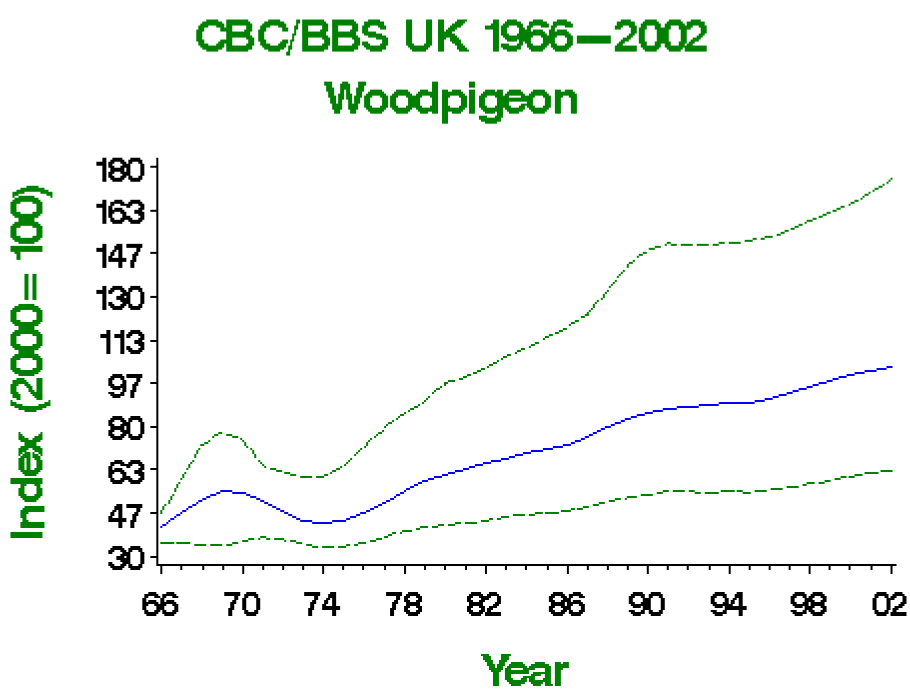
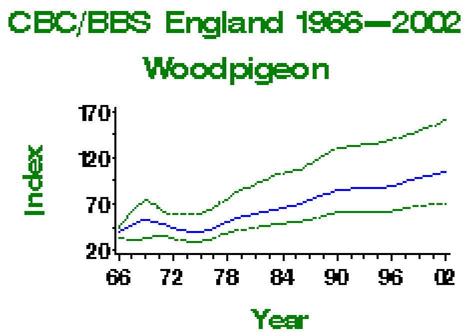


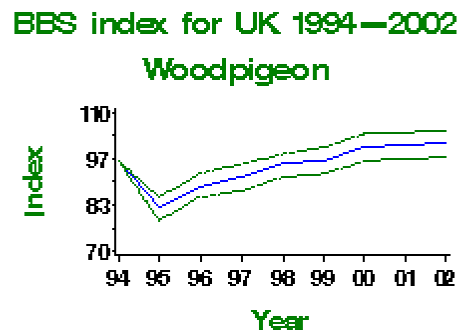
Table of population changes for Woodpigeon

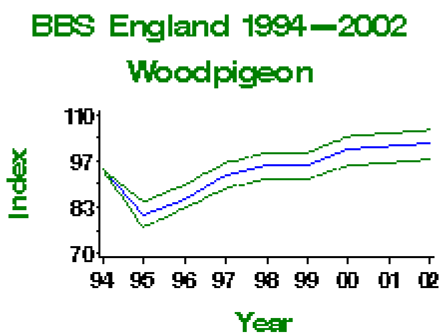
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	472	114	15	358		
	25	1975-2000	612	130	64	204		
	10	1990-2000	1312	17	9	27		
	5	1995-2000	2059	12	8	16		
CBC/BBS England	33	1967-2000	382	125	36	383		
	25	1975-2000	495	147	61	257		
	10	1990-2000	1062	19	10	28		

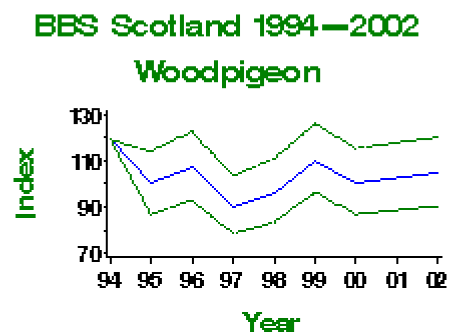
	5	1995-2000	1659	13	8	18		
BBS UK	8	1994-2002	1826	5	1	9		
BBS England	8	1994-2002	1465	8	3	12		
BBS Scotland	8	1994-2002	156	-12	-24	1		
BBS Wales	8	1994-2002	145	10	-3	25		
BBS N.Ireland	8	1994-2002	52	24	-8	67		

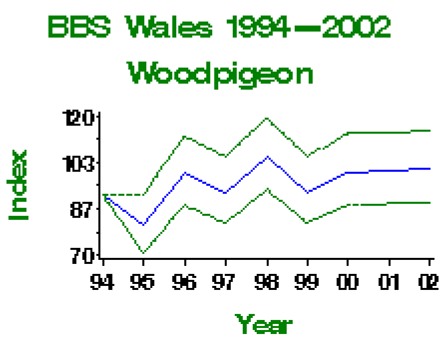
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

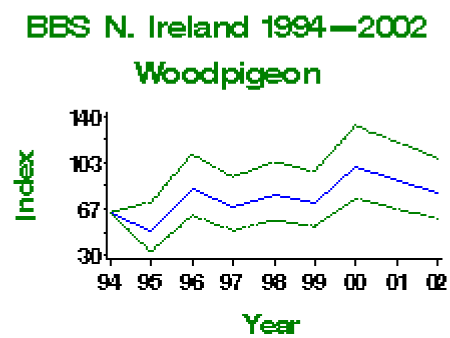












Productivity information is not currently available for this species

TURTLE DOVE
Streptopelia turtur

Conservation listings

Europe: SPEC category 3, declining
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

The CBC/BBS trend is of severe declines in Turtle Dove abundance, beginning in the late 1970s and continuing to the present. Analysis of nest record cards and ringing data for farmland Turtle Doves suggests, although without statistical significance, that productivity has increased while annual survival has fallen (**Siriwardena *et al.* 2000**, **2000b**). Hunting during migration is a possible cause of the decline, to add to those related to agricultural intensification that have been postulated for other farmland seed-eaters (**O'Connor & Shrubb 1986**, **Krebs *et al.* 1999**).

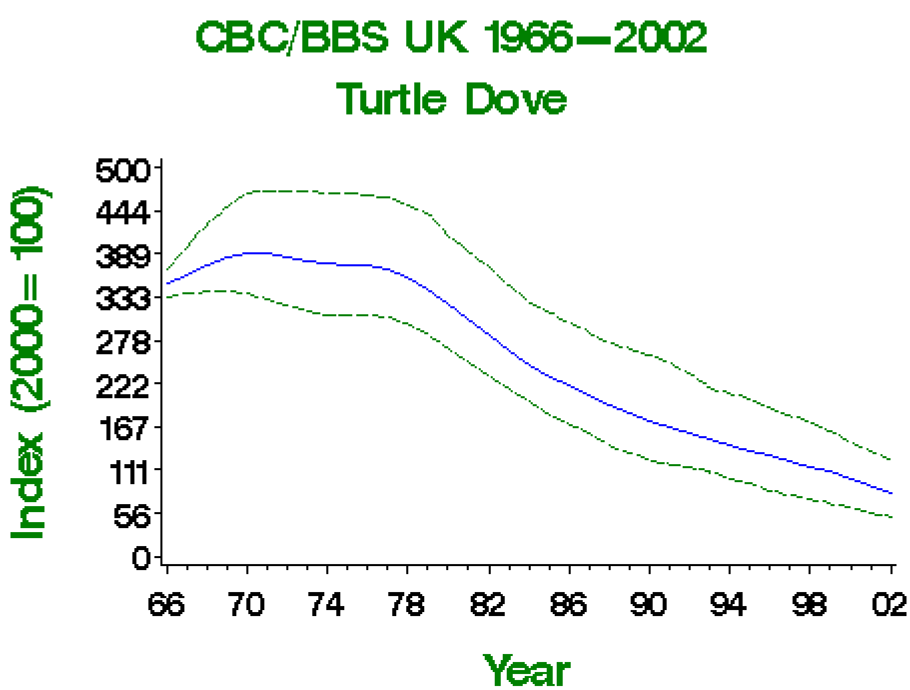
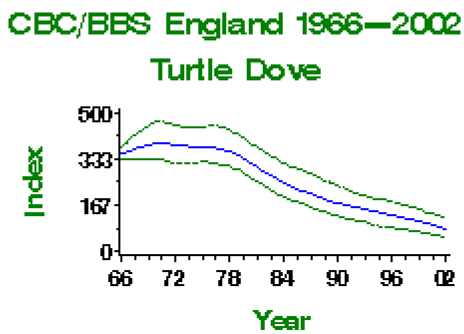


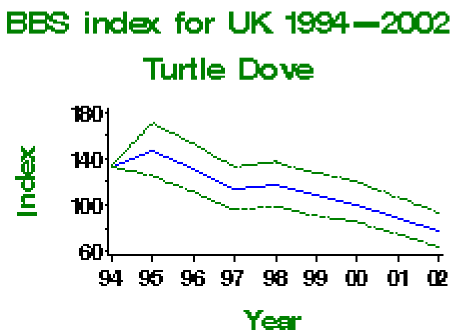
Table of population changes for Turtle Dove

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	98	-72	-83	-58	>50	
	25	1975-2000	108	-73	-84	-60	>50	
	10	1990-2000	160	-42	-56	-31	>25	
	5	1995-2000	233	-27	-36	-17	>25	
CBC/BBS England	33	1967-2000	97	-72	-82	-60	>50	
	25	1975-2000	107	-73	-84	-62	>50	

	10	1990-2000	158	-43	-57	-32	>25	
	5	1995-2000	229	-27	-36	-18	>25	
BBS UK	8	1994-2002	187	-42	-52	-30	(>25)	
BBS England	8	1994-2002	185	-43	-52	-31	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





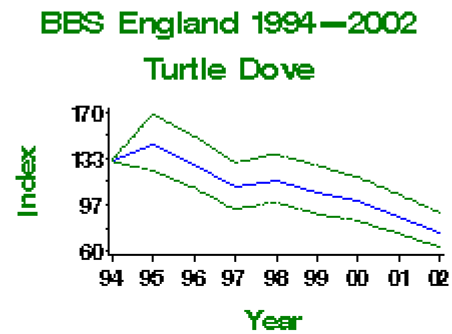
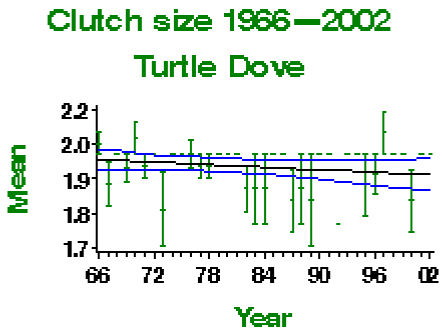
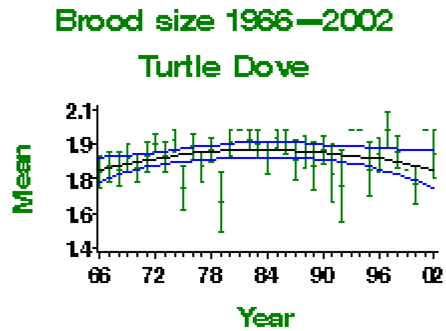
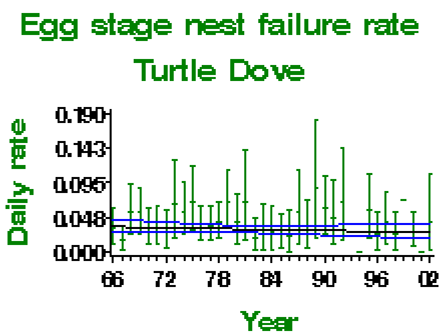


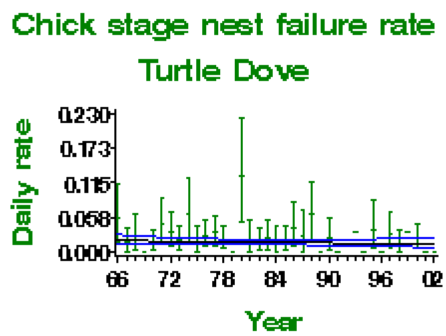
Table of productivity information for Turtle Dove

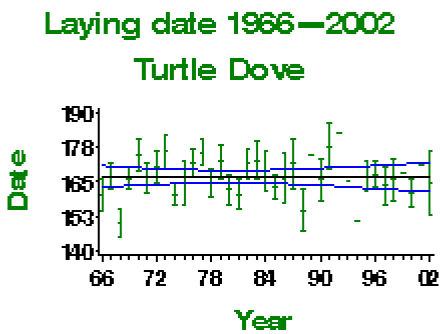
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	None				Small sample
Brood size	33	1968-2001	18	Curvilinear	1.82 chicks	1.8 chicks	-0.02 chicks	Small sample
Daily failure rate (eggs)	33	1968-2001	17	None				Small sample
Daily failure rate (chicks)	33	1968-2001	13	None				Small sample
Laying date	33	1968-2001	14	None				Small sample











Insufficient data on CES available for this species

COLLARED DOVE
Streptopelia decaocto

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

UK: rapid increase

Status summary

Collared Dove abundance has increased rapidly since the species first colonised Britain in 1955. From just four birds in 1955, the population was put conservatively at 15,000-25,000 pairs by 1970 (**Hudson 1972**). The CBC index showed an almost exponential rise as colonisation continued during the early 1970s, but had levelled off by about 1980. BBS shows continuing increases (except in Scotland). The changes in breeding performance per nesting attempt have been very slight improvements.

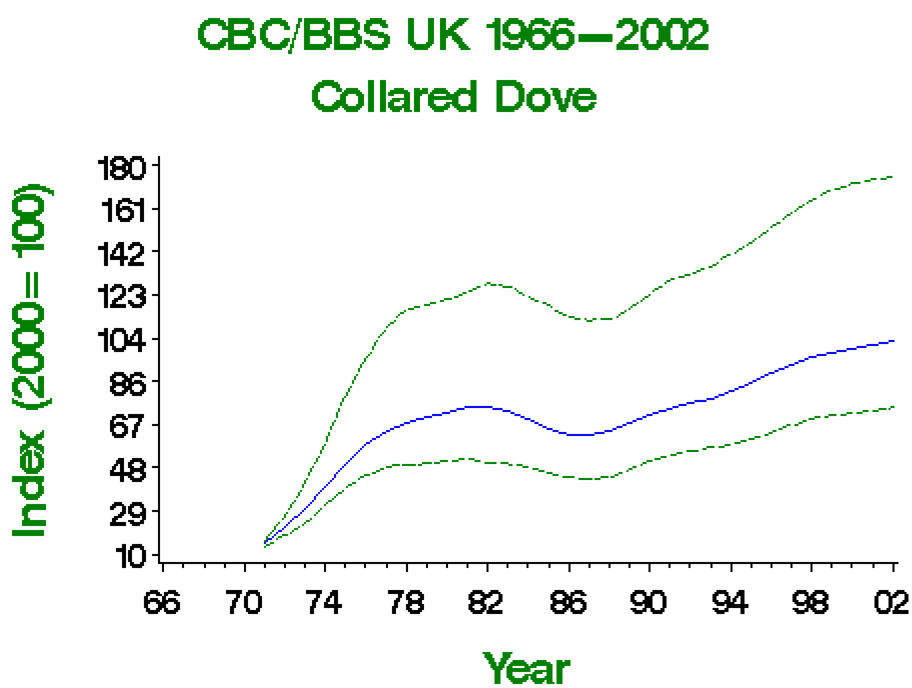
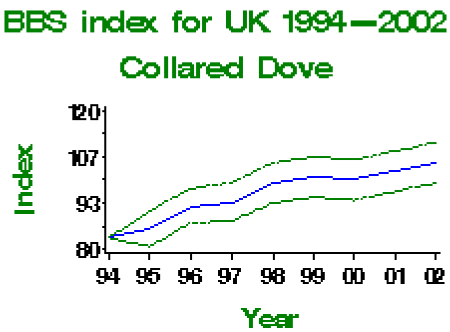
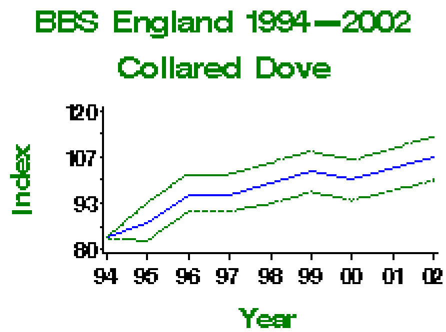


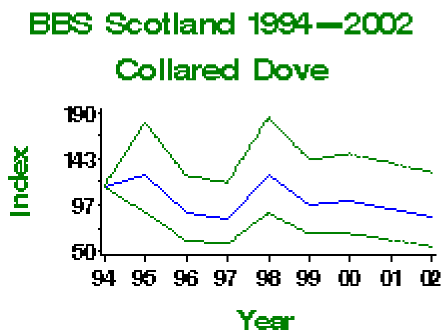
Table of population changes for Collared Dove

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	25	1975-2000	346	104	65	165		
	10	1990-2000	699	42	23	67		
	5	1995-2000	1097	18	13	24		
BBS UK	8	1994-2002	988	26	19	33		
BBS England	8	1994-2002	883	28	20	35		
BBS Scotland	8	1994-2002	34	-27	-52	13		
BBS Wales	8	1994-2002	51	9	-19	47		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







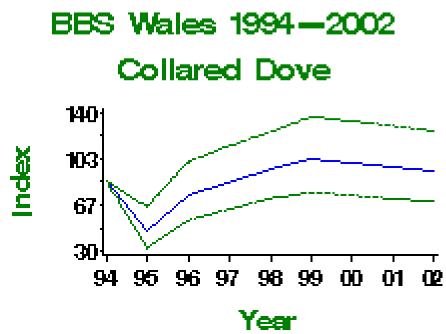
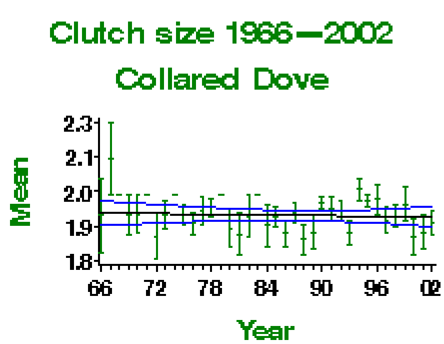
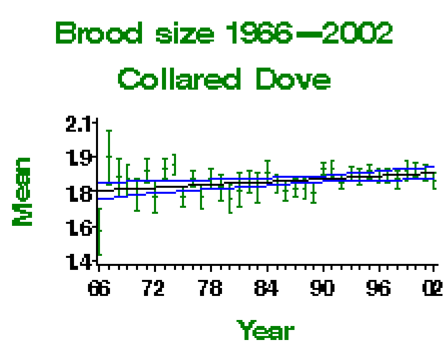
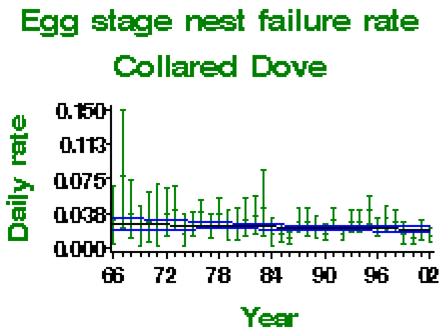


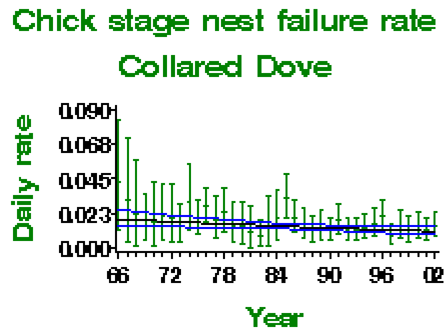
Table of productivity information for Collared Dove

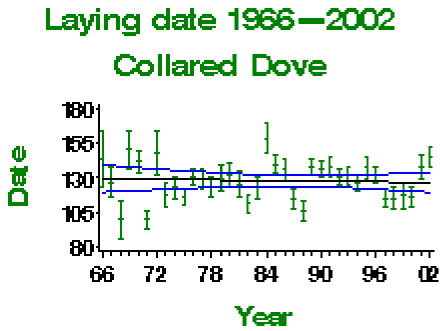
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	42	None				
Brood size	33	1968-2001	67	Linear increase	1.76 chicks	1.84 chicks	0.08 chicks	
Daily failure rate (eggs)	33	1968-2001	57	None				
Daily failure rate (chicks)	33	1968-2001	51	Linear decline	0.0184 nests/day	0.0112 nests/day	-0.0072 nests/day	
Laying date	33	1968-2001	41	None				











Insufficient data on CES
available for this species

CUCKOO
Cuculus canorus

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% population decline)

Long-term trend

UK, England: moderate decline

Status summary

The CBC/BBS trend shows Cuckoo abundance to have been in decline since the early 1980s. The species has now been moved from the Green to the Amber list. The sensitivity of CBC to change in this species may have been relatively low, mainly because Cuckoo territories were typically larger than census plots (**Marchant *et al.* 1990**). BBS shows a continuing decline, however, especially in England; Scottish data indicate some increase. Cuckoo numbers may have fallen because the populations of key host species, such as Dunnock and Meadow Pipit, have declined (**Brooke & Davies 1987**).

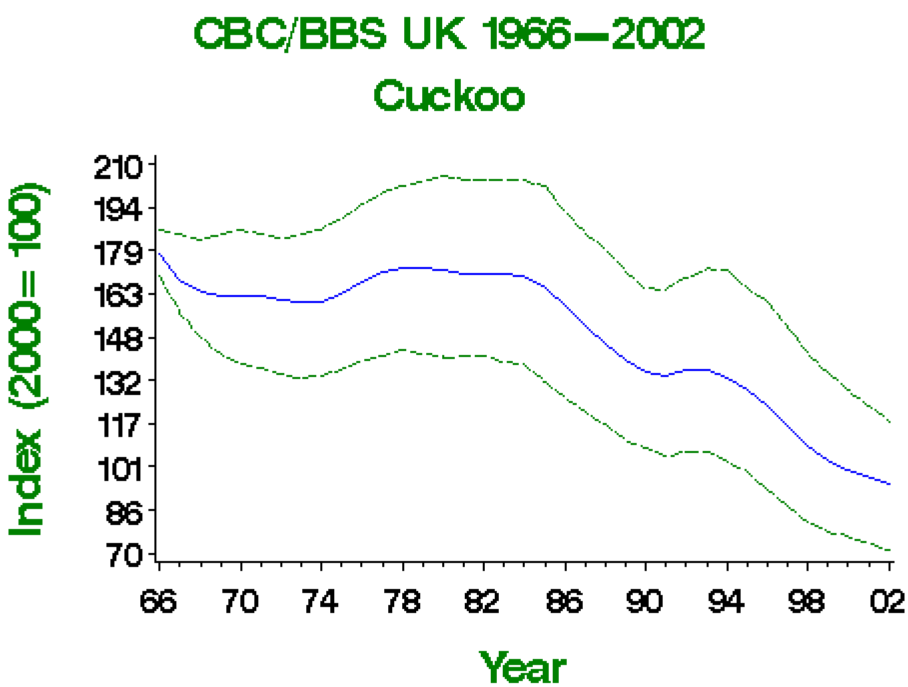
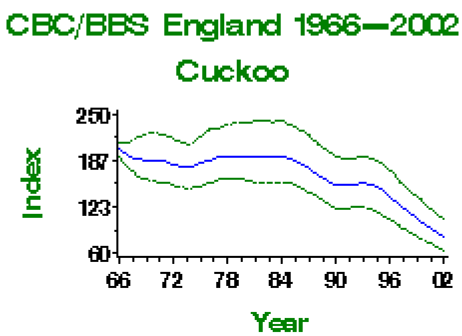


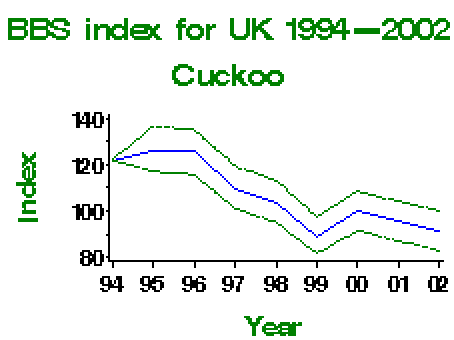
Table of population changes for Cuckoo

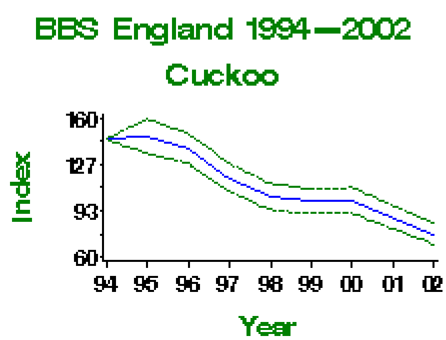
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	256	-41	-56	-23	>25	
	25	1975-2000	309	-39	-51	-25	>25	
	10	1990-2000	564	-26	-36	-16	>25	
	5	1995-2000	846	-22	-27	-18		
CBC/BBS England	33	1967-2000	219	-48	-60	-30	>25	

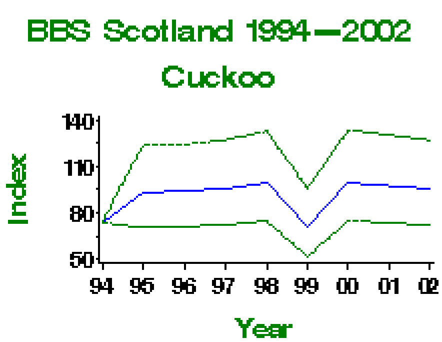
	25	1975-2000	263	-45	-57	-33	>25	
	10	1990-2000	470	-35	-43	-27	>25	
	5	1995-2000	697	-32	-36	-28	>25	
BBS UK	8	1994-2002	727	-25	-32	-18	(>25)	
BBS England	8	1994-2002	591	-47	-52	-42	(>25)	
BBS Scotland	8	1994-2002	64	30	-2	73		
BBS Wales	8	1994-2002	55	-33	-51	-6	(>25)	

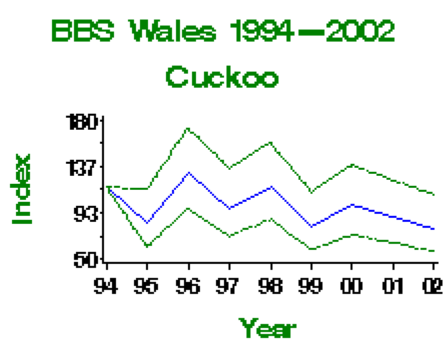
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











Productivity information is not currently available for this species

BARN OWL
Tyto alba

Conservation listings

Europe: SPEC category 3, declining
UK: Amber (25-50% distribution decline)

Long-term trend

UK: decline

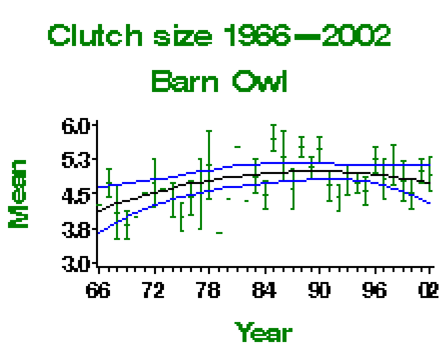
Status summary

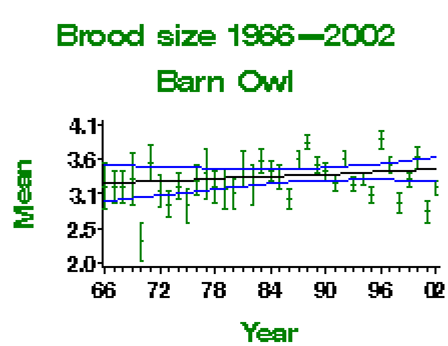
There is good evidence for a decline in this species that lasted throughout the 20th century, although there has been no annual monitoring until very recently. Productivity has tended to improve since the 1950s and 1960s when Barn Owls appear to have been affected by organochlorine pesticides (**Percival 1990**). Clutch sizes have risen, and nest failure rates have fallen at both the egg and nestling stages. A national census during 1995-97, organised jointly by Hawk & Owl Trust and BTO, has provided a replicable baseline estimate of c.4000 breeding pairs in the UK (**Toms *et al.* 2001**). The lack of annual population change data for this species is now being addressed by the BTO's **Barn Owl Monitoring Programme**, which began in 2000; additional nest record, ringing and biometric information is also being collected through this scheme (**Leech *et al.* 2003**).

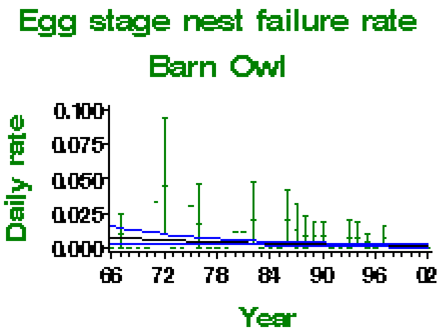
Annual breeding population changes for this species
are not currently monitored by BTO

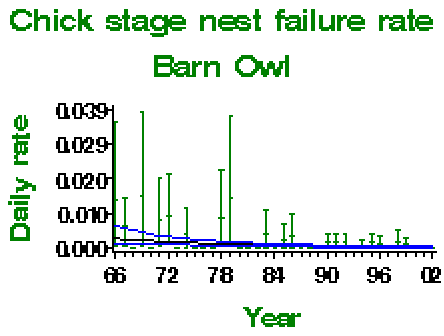
Table of productivity information for Barn Owl

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	Curvilinear	4.28 eggs	4.77 eggs	0.49 eggs	Small sample
Brood size	33	1968-2001	66	None				
Daily failure rate (eggs)	33	1968-2001	12	Linear decline	0.0072 nests/day	0.0015 nests/day	-0.0057 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	40	Linear decline	0.0025 nests/day	0.0003 nests/day	-0.0022 nests/day	









Insufficient date on laying date
available for this species

Insufficient data on CES
available for this species

LITTLE OWL
Athene noctua

Conservation listings

Europe: SPEC category 3, declining
UK: not listed (introduced)

Long-term trend

UK: uncertain

Status summary

The CBC trend for Little Owl shows fluctuations but no clear trend over the long term, but the more recent BBS trend suggests a shallow increase, especially in England. These assessments may both be unreliable, however, because the species has large territories and is difficult to detect. A population estimate of c. 7000 pairs from the BTO/Hawk & Owl Trust's Project Barn Owl (**Toms *et al.* 2000**) is the first replicable estimate for the UK. Although annual sample sizes are small, there are no trends evident in rates of nest success, but brood size has increased.

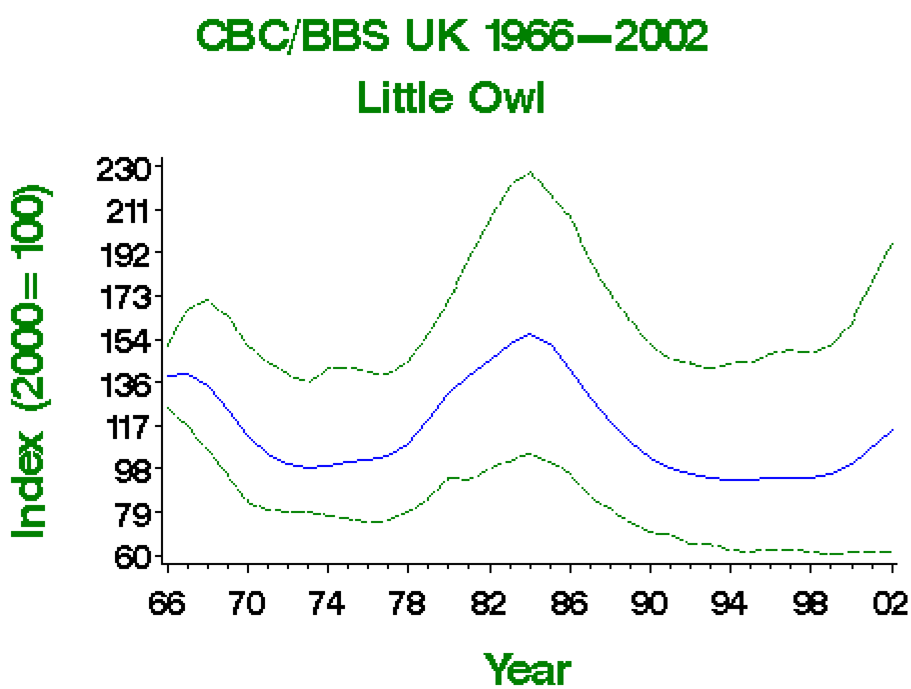
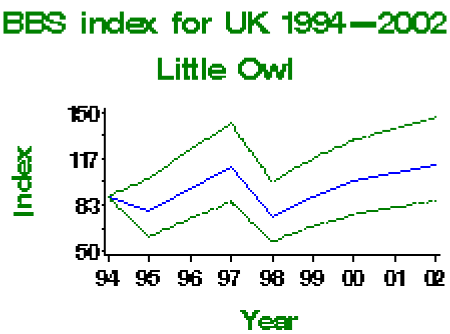


Table of population changes for Little Owl

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	47	-28	-56	12		
	25	1975-2000	54	-1	-36	48		
	10	1990-2000	84	-3	-24	24		

	5	1995-2000	119	8	-11	34		
BBS UK	8	1994-2002	89	26	-3	64		
BBS England	8	1994-2002	86	32	0	73		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



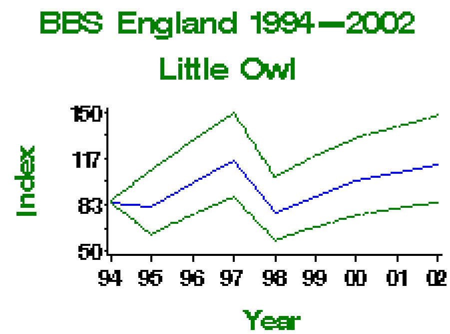
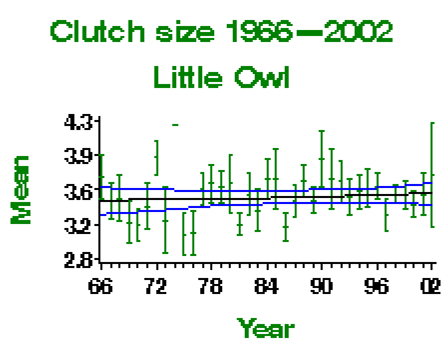
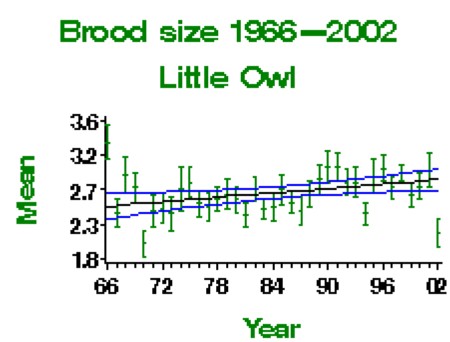
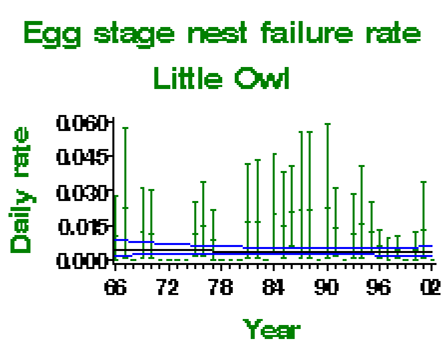


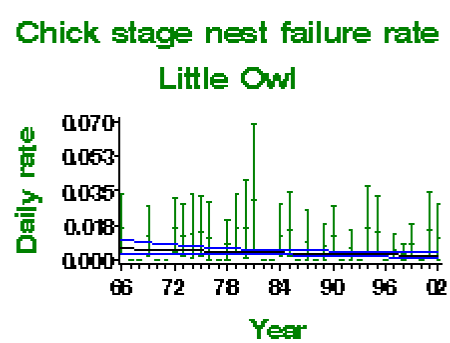
Table of productivity information for Little Owl

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	17	None				Small sample
Brood size	33	1968-2001	36	Linear increase	2.51 chicks	2.82 chicks	0.31 chicks	
Daily failure rate (eggs)	33	1968-2001	15	None				Small sample
Daily failure rate (chicks)	33	1968-2001	19	None				Small sample









Insufficient data on laying dates available for this species

Insufficient data on CES available for this species

TAWNY OWL
Strix aluco

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: stable

Status summary

As a nocturnal species, Tawny Owl is relatively poorly covered by the BTO's monitoring schemes. The pattern shown by CBC/BBS is a remarkably stable one, however, in keeping with the longevity, sedentary behaviour, and slow breeding rate of this species. There is a slight indication of very shallow downward trend since the early 1970s, which recent BBS data, for England and for the UK as a whole, suggest has accelerated since 1999. It may be relevant to this possible long-term change that **Gibbons *et al.* (1993)** found evidence for a contraction of the species' UK range between the two atlas periods. The substantial improvements in nest success during the c.29-day egg stage could be linked to the declining impact of organochlorine pesticides.

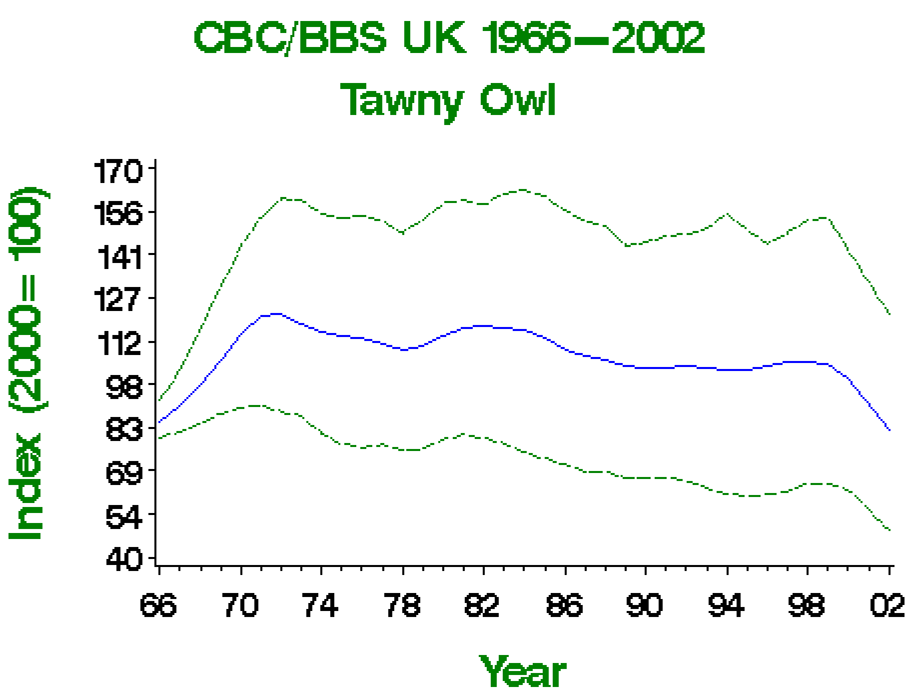
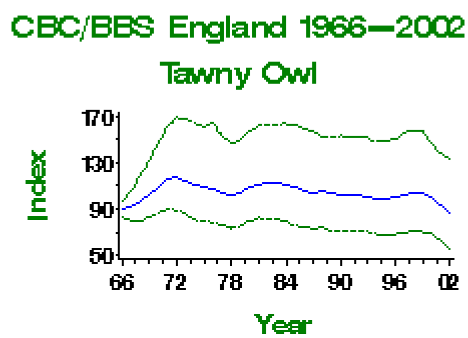


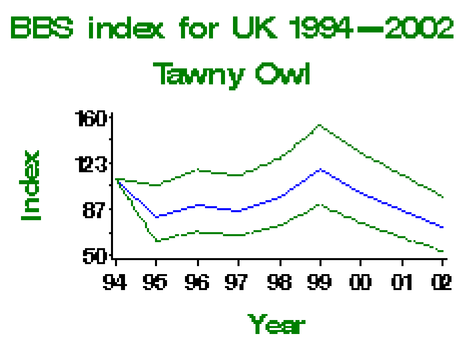
Table of population changes for Tawny Owl

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	74	10	-32	59		
	25	1975-2000	84	-12	-33	9		
	10	1990-2000	106	-3	-18	18		
	5	1995-2000	134	-2	-16	11		

CBC/BBS England	33	1967-2000	62	8	-26	62		
	25	1975-2000	70	-9	-26	12		
	10	1990-2000	90	-2	-17	21		
	5	1995-2000	112	1	-12	17		
BBS UK	8	1994-2002	77	-35	-52	-13	(>25)	
BBS England	8	1994-2002	63	-20	-42	10		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





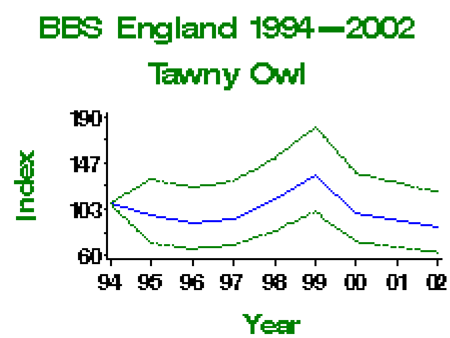
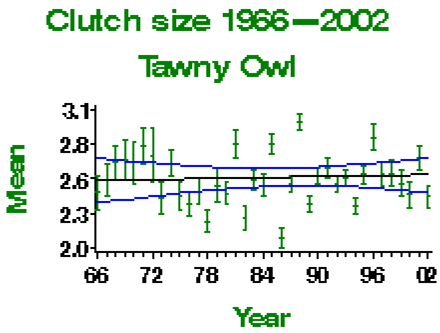
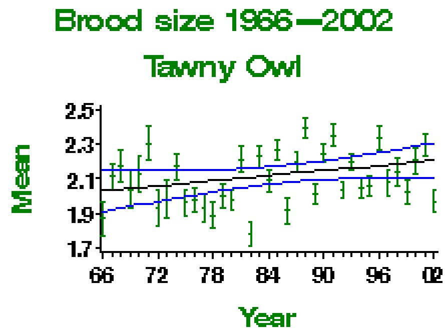
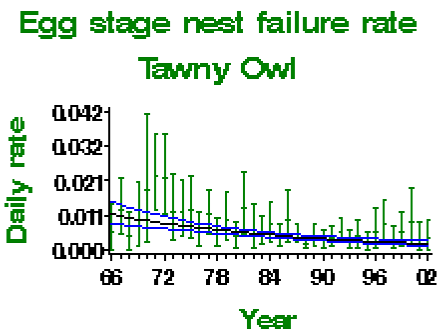


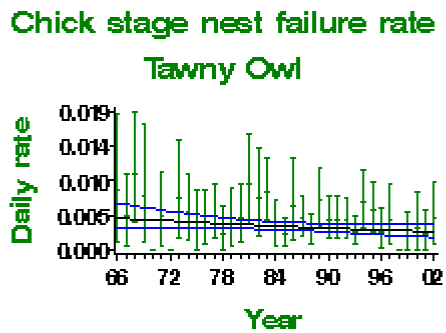
Table of productivity information for Tawny Owl

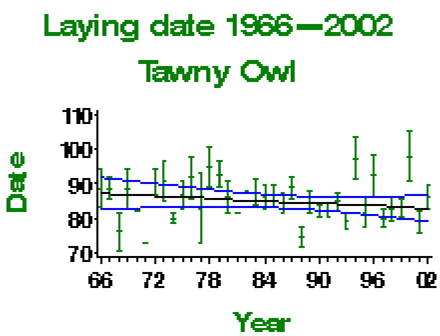
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	77	None				
Brood size	33	1968-2001	132	None				
Daily failure rate (eggs)	33	1968-2001	53	Linear decline	0.0099 nests/day	0.0021 nests/day	-0.0078 nests/day	
Daily failure rate (chicks)	33	1968-2001	79	None				
Laying date	33	1968-2001	13	None				Small sample











Insufficient data on CES available for this species

NIGHTJAR
Caprimulgus europaeus

Conservation listings

Europe: SPEC category 2, (declining)
UK: Red (>50% distribution decline)

Long-term trend

UK: uncertain

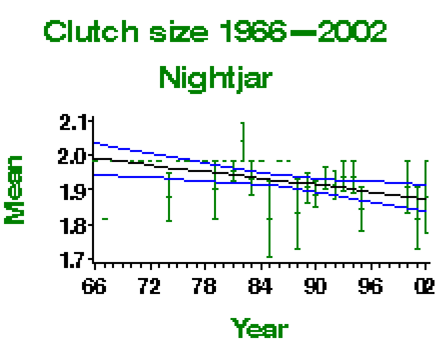
Status summary

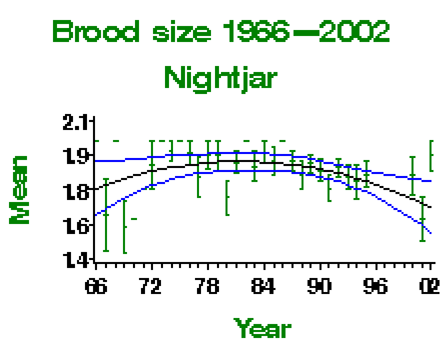
Having suffered a decline in range of more than 50% between breeding atlases, the 1992 national survey revealed a welcome increase of 50% in population size since 1981, probably due to increased availability of young forest habitat as plantations were felled and replanted (Morris *et al.* 1994). The apparent increase in nest failure rates at the chick stage, up to 1995, are probably an artefact of very small sample sizes in the early years. Nest Record Scheme data for 1996-99 will soon be added to this dataset.

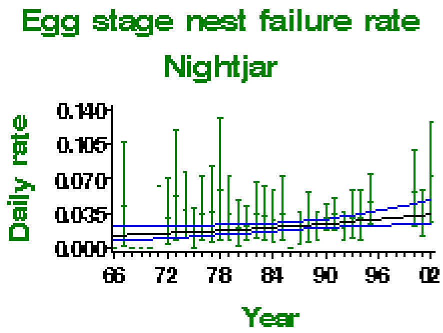
Annual population changes are not monitored for this species

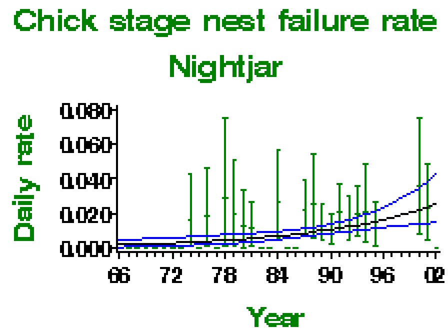
Table of productivity information for Nightjar

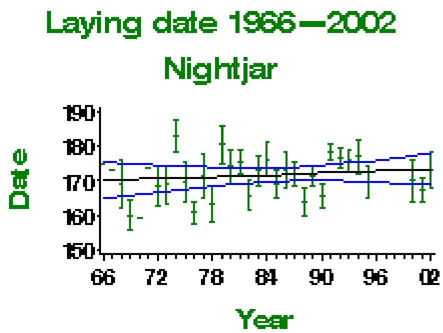
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	27	1968-1995	16	Linear decline	2 eggs	1.9 eggs	-0.1 eggs	Small sample
Brood size	27	1968-1995	24	Curvilinear	1.79 chicks	1.79 chicks	0 chicks	Small sample
Daily failure rate (eggs)	27	1968-1995	20	Linear increase	0.0136 nests/day	0.0285 nests/day	0.0149 nests/day	Small sample
Daily failure rate (chicks)	27	1968-1995	20	Linear increase	0.0022 nests/day	0.0155 nests/day	0.0133 nests/day	Small sample
Laying date	27	1968-1995	18	None				Small sample











Insufficient data on CES
available for this species

COMMON SWIFT
Apus apus

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: unknown

Status summary

Swifts were not monitored before the inception of the BBS and, because its results since 1994 show large fluctuations, a long time-series may be needed before population trends can be estimated with confidence. Initial results suggest decline in England, Scotland and Wales. Monitoring is complicated by the difficulty of finding occupied nests, by the weather-dependent and sometimes long distances travelled by foraging adults, and by the variable midsummer influx of non-breeding immatures. Concern for Swifts, a small organisation of private individuals, is trying to promote the provision of nesting sites for this species, as so many are being lost to re-development. It is also gathering information on populations to assess whether the species should be listed as of conservation concern. (For more information on Concern for Swifts contact **Jake Allsop**.)

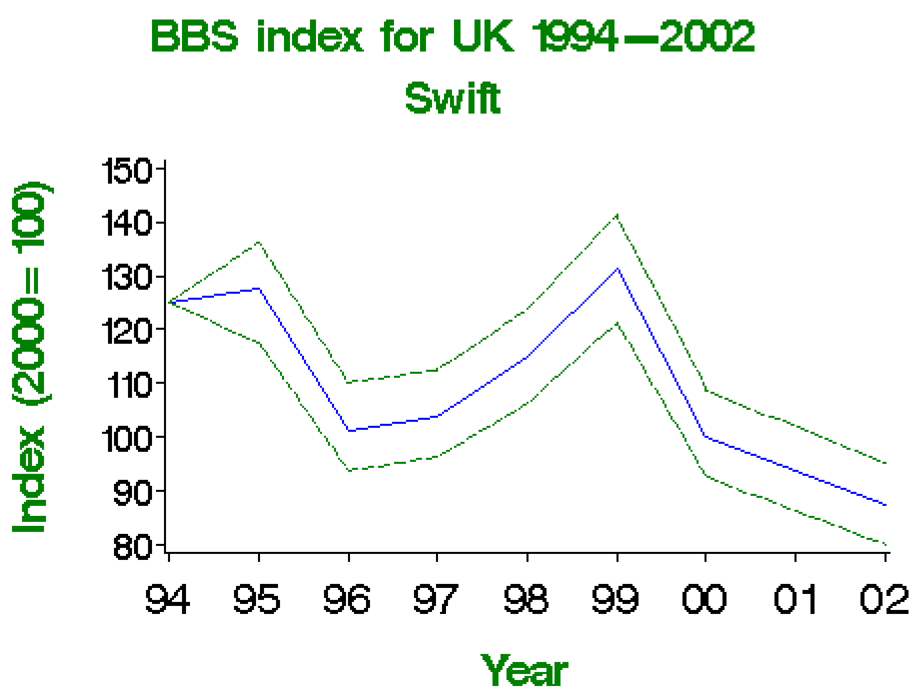
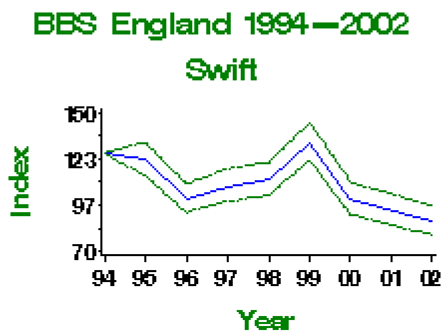


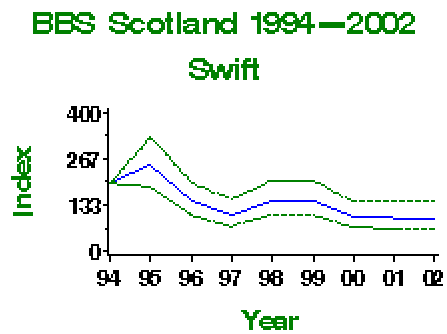
Table of population changes for Swift

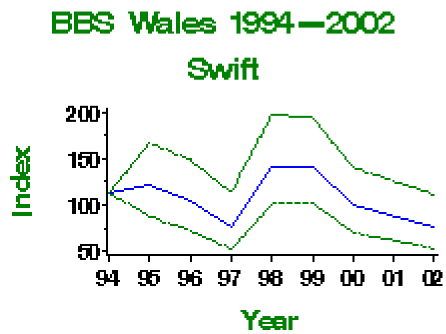
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment

BBS UK	8	1994-2002	847	-30	-36	-24	(>25)	
BBS England	8	1994-2002	736	-31	-37	-24	(>25)	
BBS Scotland	8	1994-2002	39	-51	-68	-25	(>50)	
BBS Wales	8	1994-2002	56	-32	-53	-2	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







Productivity information is not currently available for this species

KINGFISHER
Alcedo atthis

Conservation listings

Europe: SPEC category 3, declining
UK: Amber (European status)

Long-term trend

UK: fluctuating, with no long-term trend

Status summary

The Kingfisher declined along linear waterways (its principal habitat) until the mid 1980s, since when it seems to have recovered completely. The decline was associated with a contraction of range in England (**Gibbons *et al.* 1993**). Kingfishers suffer severe mortality during harsh winters but, with up to three broods in a season, and up to six chicks in a brood, their potential for rapid recovery is unusually high.

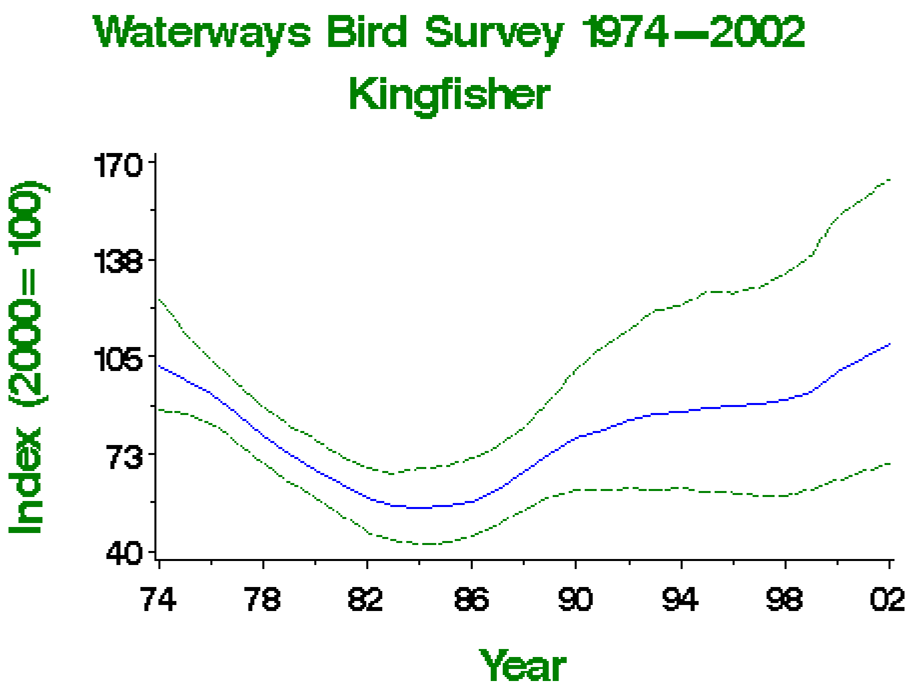
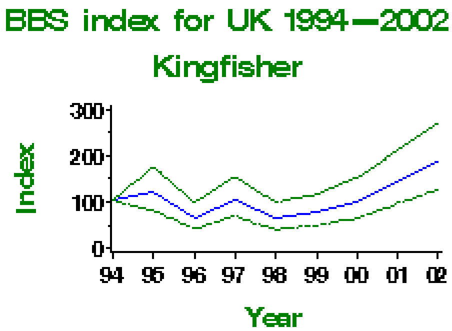
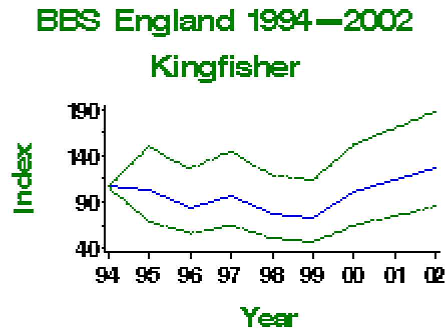


Table of population changes for Kingfisher

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	32	3	-34	55		
	10	1990-2000	38	29	-2	72		
	5	1995-2000	38	14	-5	35		
BBS UK	8	1994-2002	41	76	21	157		
BBS England	8	1994-2002	35	19	-20	77		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

GREEN WOODPECKER
Picus viridis

Conservation listings

Europe: SPEC category 2, declining
UK: Amber (European status)

Long-term trend

England: rapid increase

Status summary

Green Woodpecker populations have increased steadily since 1966, except for a period of stability or shallow decline centred on the late 1970s. Recent results indicate that the current phase of increase is continuing across most of the UK range, although the Welsh population appears to be stable. The ecological factors underlying the increase are not yet known.

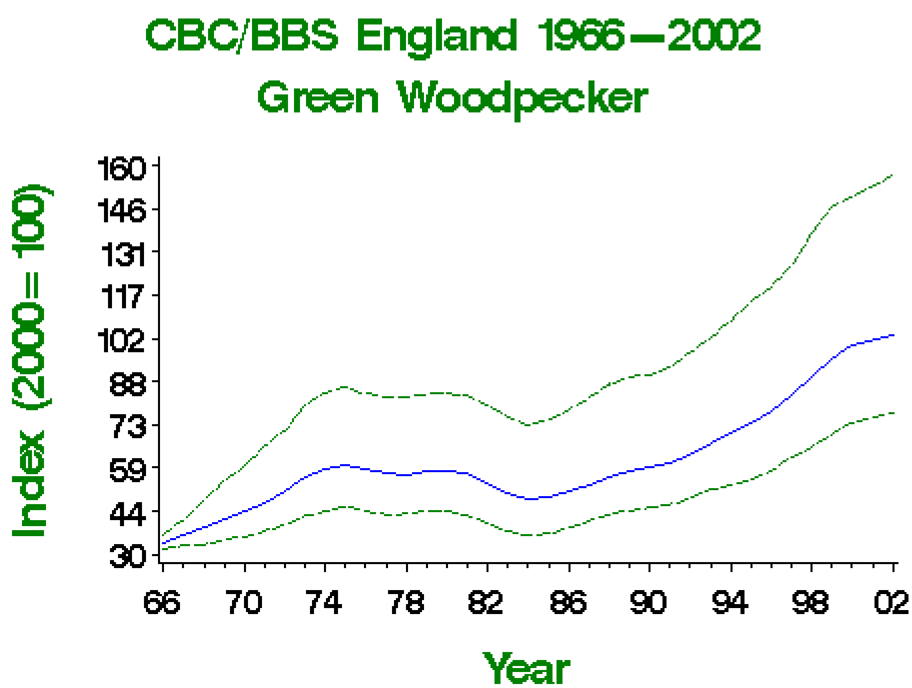
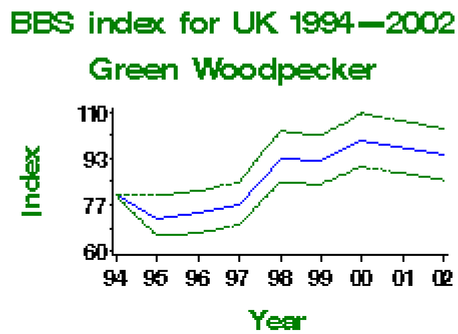


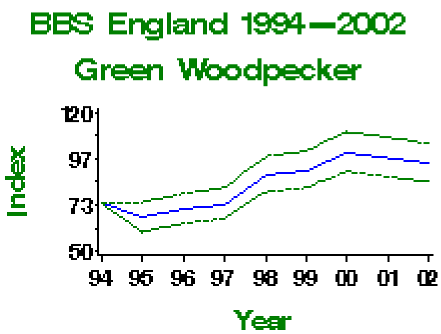
Table of population changes for Green Woodpecker

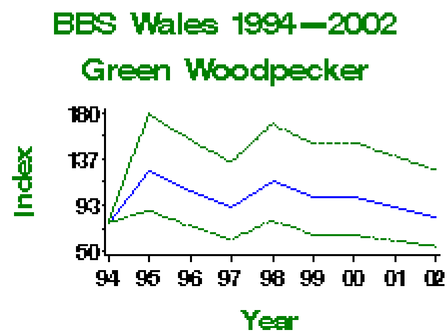
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	176	174	117	308		
	25	1975-2000	217	68	37	127		
	10	1990-2000	408	69	47	95		
	5	1995-2000	621	35	27	44		

BBS UK	8	1994-2002	549	18	7	30		
BBS England	8	1994-2002	505	27	14	40		
BBS Wales	8	1994-2002	38	8	-29	64		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







Productivity information is not currently available for this species

GREAT SPOTTED WOODPECKER
Dendrocopos major

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

This species increased rapidly in the 1970s and began a further increase in the early 1990s. Dutch Elm Disease, which greatly increased the amount of standing dead timber and its associated insects, has been linked to the 1970s increase (**Marchant *et al.* 1990**). The ecological factors underlying the current increase are not yet known, but the species may be benefiting from the maturation of new forests and from the increasing provision of winter food in gardens. Brood size appears to be decreasing, but NRS data are sparse for this species.

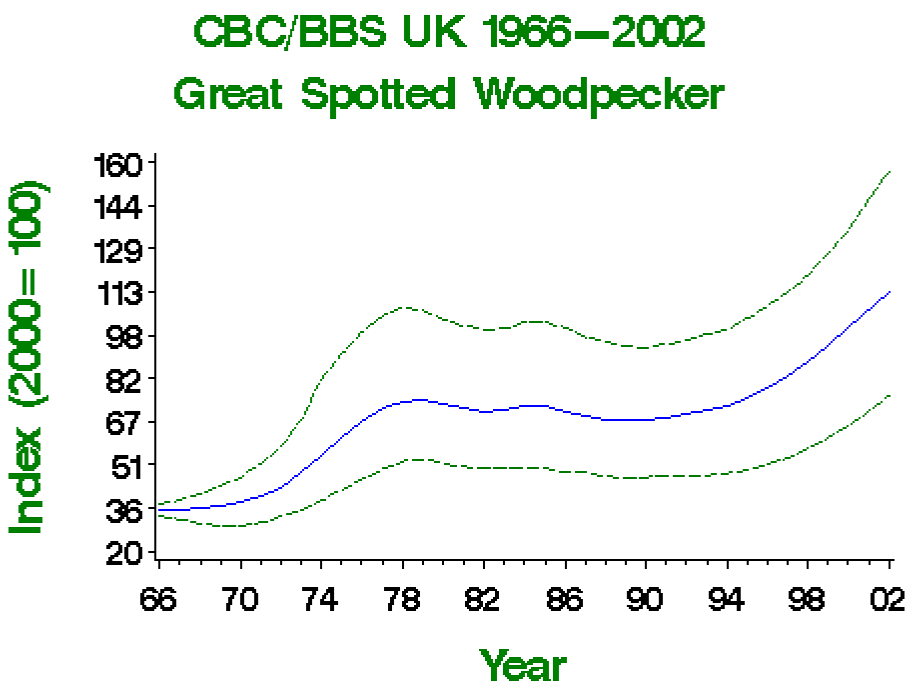
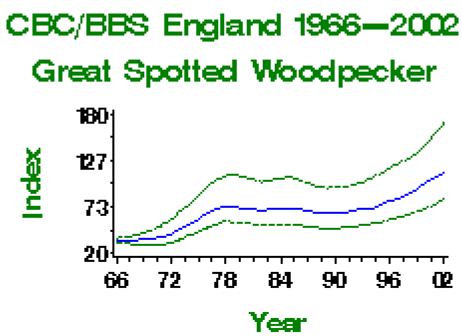


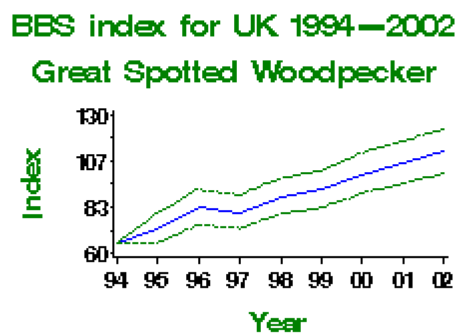
Table of population changes for Great Spotted Woodpecker

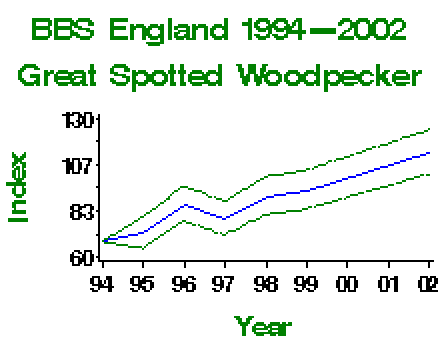
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	215	188	95	300		
	25	1975-2000	267	65	37	93		
	10	1990-2000	484	48	34	62		
	5	1995-2000	734	33	25	38		

CBC/BBS England	33	1967-2000	195	187	100	353		
	25	1975-2000	242	66	38	103		
	10	1990-2000	437	51	35	71		
	5	1995-2000	660	33	26	41		
BBS UK	8	1994-2002	594	72	55	89		
BBS England	8	1994-2002	531	65	50	83		
BBS Wales	8	1994-2002	45	68	16	141		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







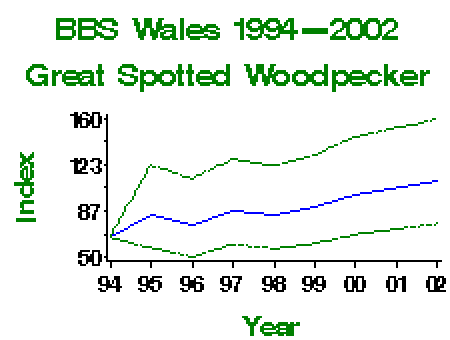
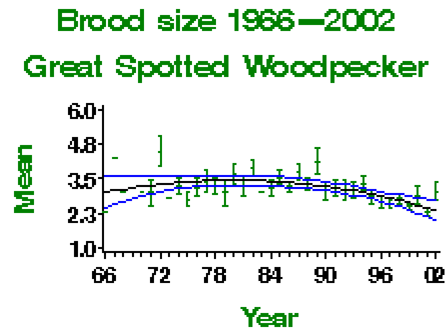


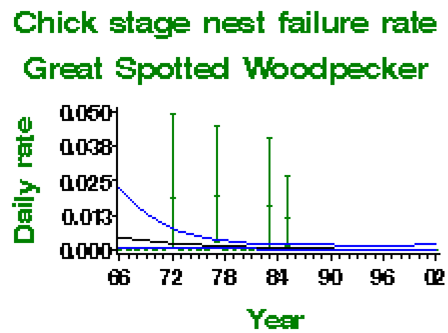
Table of productivity information for Great Spotted Woodpecker

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	15	Curvilinear	3.13 chicks	2.45 chicks	-0.68 chicks	Small sample
Daily failure rate (chicks)	33	1968-2001	16	None				Small sample

Insufficient data on clutch size available for this species



Insufficient data on egg nest failure available for this species



Insufficient data on laying date available for this species

Insufficient data on CES available for this species

LESSER SPOTTED WOODPECKER
Dendrocopos minor

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK: rapid decline

Status summary

The Lesser Spotted Woodpecker has declined significantly and very rapidly since around 1980, following a shallower increase, and has also contracted in range (Gibbons *et al.* 1993). It now qualifies for Red listing, but has become so rare in recent years that BBS has been unable to collect enough data for annual monitoring. Reductions in the area of mature broadleaved woodland, losses of non-woodland trees such as elms, increases in woodland isolation and reductions in the volume of dead wood in woodland are candidate causes for the decline (Vanhinsbergh *et al.* 2001).

Table of population changes for Lesser Spotted Woodpecker

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC all habitats	31	1968-1999	17	-60	-81	40		Small sample
	25	1974-1999	18	-73	-86	-31	>50	Small sample
	10	1989-1999	11	-51	-75	-22	>50	Small sample
	5	1994-	9	-33	-56	0		Small

		1999						sample

Productivity information is not currently available for this species

WOODLARK
Lullula arborea

Conservation listings

Europe: SPEC category 2, vulnerable
UK: Red (>50% distribution decline)

Long-term trend

UK: increase

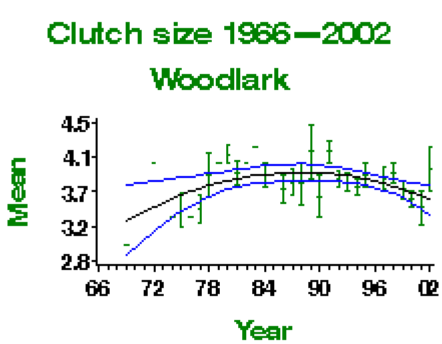
Status summary

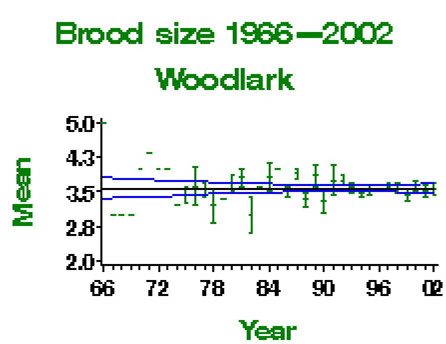
This species is too rare and restricted for annual population changes to be monitored by BTO observers. **Sitters *et al.* (1996)** report that the population increased from c.250 pairs in 1986 to c.600 pairs in 1993, probably helped by recent mild winters and increased habitat availability due to storm damage in plantations, forest restocking, and heathland management. A new national survey in 1997 showed that the population had increased further to c.1550 pairs (**Wotton & Gillings 2000**; see **http://www.bto.org/research/archive/arch3.htm**). Nest failure rates at the egg stage (17 days, comprising 14 days incubation and 3 days laying) have declined, at least between 1975 and 1999, and clutch sizes have increased.

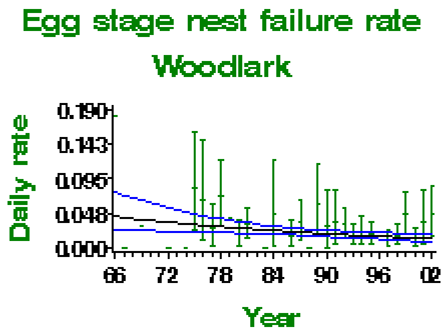
Annual breeding population changes for this species
are not currently monitored by BTO

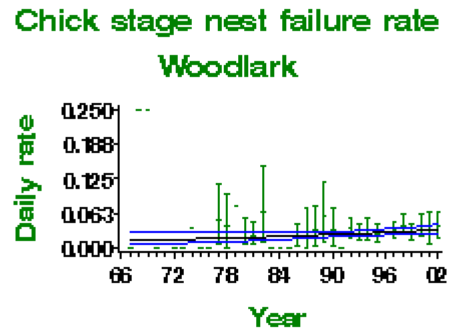
Table of productivity information for Woodlark

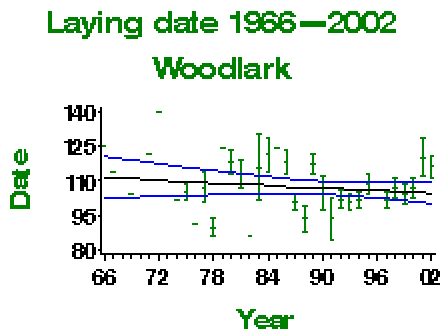
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	15	Curvilinear	3.24 eggs	3.6 eggs	0.36 eggs	Small sample
Brood size	33	1968-2001	24	None				Small sample
Daily failure rate (eggs)	33	1968-2001	18	Linear decline	0.0409 nests/day	0.0137 nests/day	-0.0272 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	25	None				Small sample
Laying date	33	1968-2001	17	None				Small sample











Insufficient data on CES available for this species

SKYLARK
Alauda arvensis

Conservation listings

Europe: SPEC category 3, vulnerable
UK: Red (>50% population decline)

Long-term trend

England: rapid decline

Status summary

The Skylark declined rapidly from the mid 1970s until the mid 1980s, when the rate of decline slowed; BBS shows, however, that the decline is continuing in England, and probably in Wales. Considerable research effort at the BTO and elsewhere in recent years has indicated that the most likely cause of the decline is the increase in the winter-sowing of cereals, which restricts opportunities for late-season nesting attempts because of vegetation height, and may reduce overwinter survival by reducing the area of stubbles (**Wilson *et al*. 1997**, **Donald & Vickery 2000**). Breeding success per attempt has increased during the decline (**Chamberlain & Crick 1999**, **Siriwardena *et al.* 2000b**). For a general review of the effects of agricultural practice on Skylark population trends see **Chamberlain & Siriwardena (2000)**.

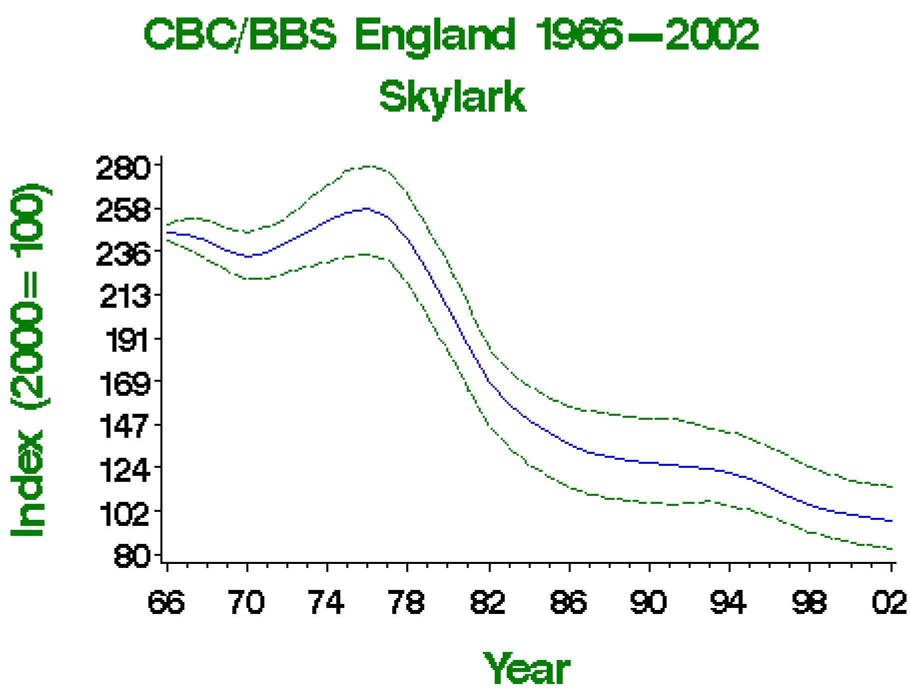
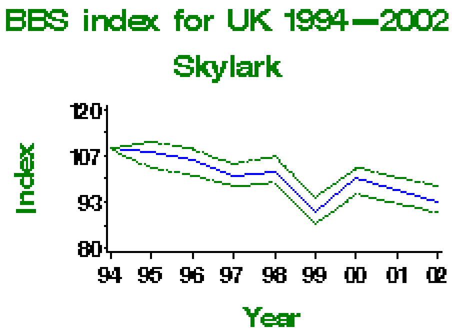


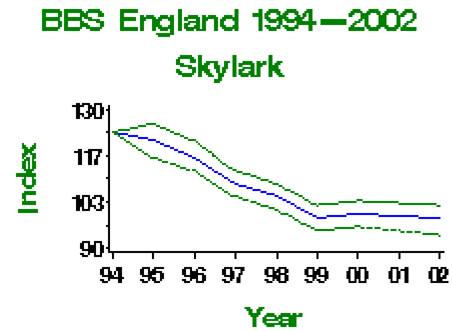
Table of population changes for Skylark

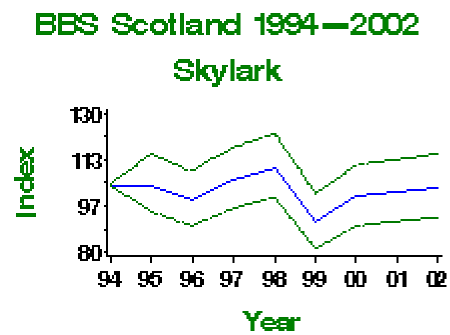
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	327	-59	-67	-49	>50	
	25	1975-2000	396	-61	-67	-54	>50	
	10	1990-2000	779	-21	-28	-14		
	5	1995-2000	1206	-16	-18	-12		

BBS UK	8	1994-2002	1375	-14	-17	-10		
BBS England	8	1994-2002	1072	-20	-24	-17		
BBS Scotland	8	1994-2002	186	-1	-11	11		
BBS Wales	8	1994-2002	87	-11	-23	4		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







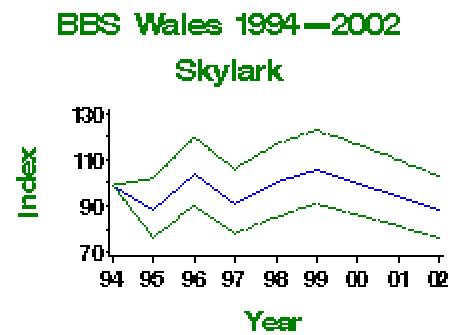
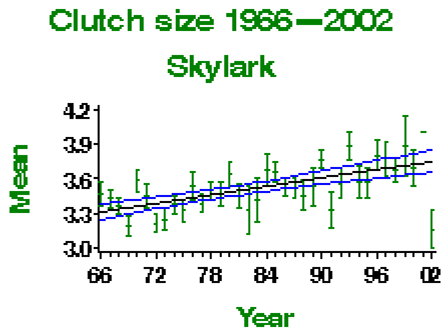
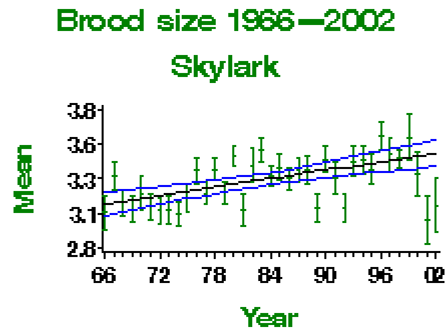
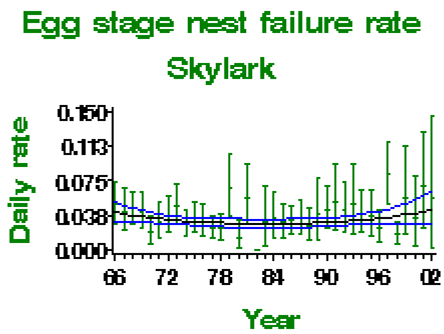


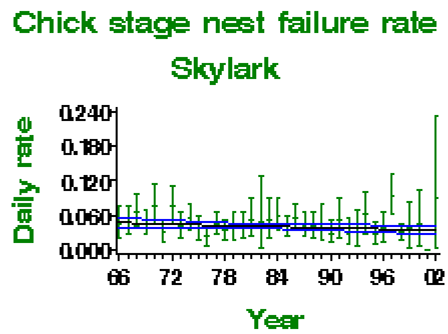
Table of productivity information for Skylark

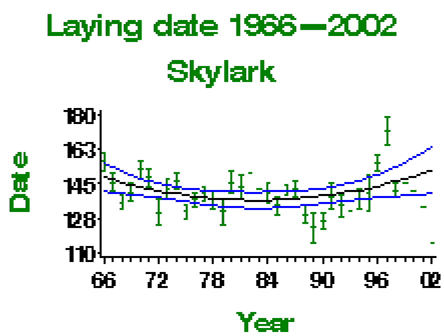
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	41	Linear increase	3.34 eggs	3.74 eggs	0.4 eggs	
Brood size	33	1968-2001	71	Linear increase	3.14 chicks	3.48 chicks	0.34 chicks	
Daily failure rate (eggs)	33	1968-2001	50	Curvilinear	0.0375 nests/day	0.0415 nests/day	0.004 nests/day	
Daily failure rate (chicks)	33	1968-2001	59	None				
Laying date	33	1968-2001	22	Curvilinear	day 146	day 150	4 days	Small sample











Insufficient data on CES available for this species

SWALLOW
Hirundo rustica

Conservation listings

Europe: SPEC category 3, declining
UK: Amber (European status)

Long-term trend

UK, England: fluctuating, with no long-term trend

Status summary

Swallow was originally Amber listed partly on the strength of a perceived CBC decline, but continues to qualify through its unfavourable European status. Modern methods of estimating population change from CBC give no evidence for long-term decline in the UK, although numbers may have decreased on farmland in eastern England and in non-farmed habitats (**Robinson *et al.* 2003**). Recent BBS data suggest an upturn. Nevertheless, the species is difficult to monitor, and some conservationists remain concerned about it. Detailed analysis has shown that the population fluctuations are most strongly related to losses on their wintering grounds (**Baillie & Peach 1992**). More recently, population change has been shown to be correlated with rainfall in the western Sahel on spring passage, but not with cattle numbers or with nest-site availability in the UK (**Robinson *et al.* 2003**). Aspects of breeding performance have shown small contrasting changes, with slight increases in the daily nest failure rate at the egg stage in the 1980s and at the nestling stage in the 1990s. The trend towards earlier laying can be partially explained by recent climate change (**Crick & Sparks 1999**).

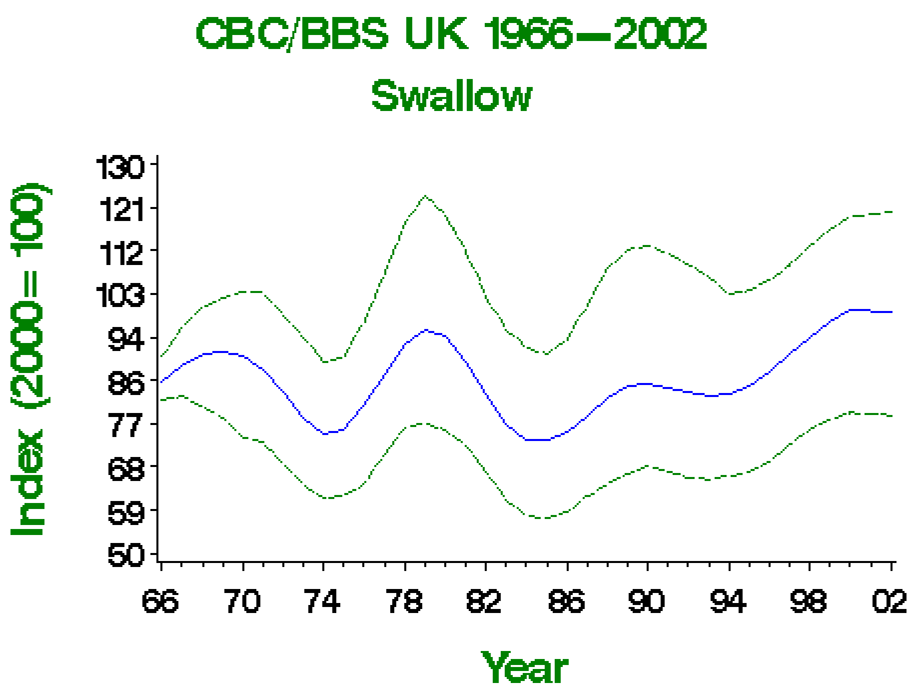
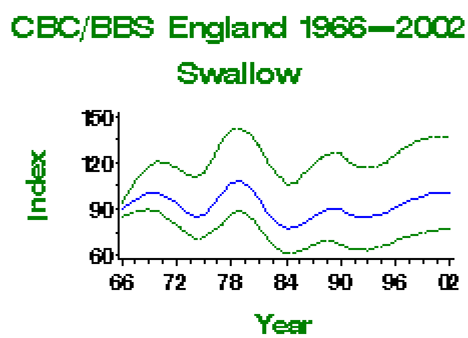


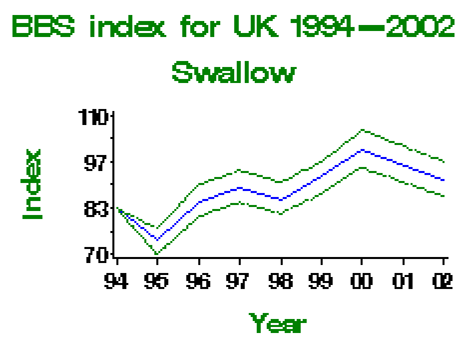
Table of population changes for Swallow

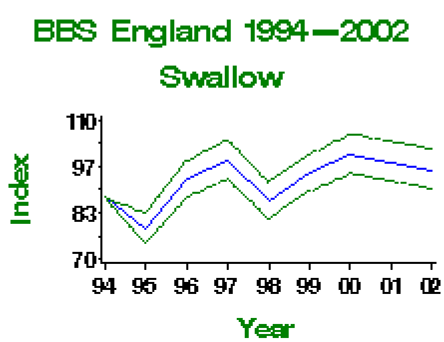
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	369	13	-12	46		
	25	1975-2000	461	33	13	59		
	10	1990-2000	977	18	4	34		

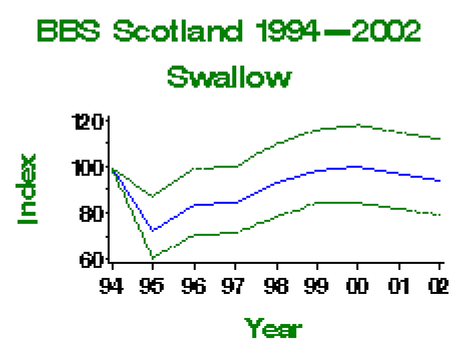
	5	1995-2000	1552	19	12	25		
CBC/BBS England	33	1967-2000	288	6	-17	51		
	25	1975-2000	360	16	-8	48		
	10	1990-2000	759	12	-2	29		
	5	1995-2000	1199	14	8	19		
BBS UK	8	1994-2002	1419	10	4	16		
BBS England	8	1994-2002	1094	9	3	16		
BBS Scotland	8	1994-2002	131	-5	-20	13		
BBS Wales	8	1994-2002	132	39	16	66		
BBS N.Ireland	8	1994-2002	54	13	-18	55		

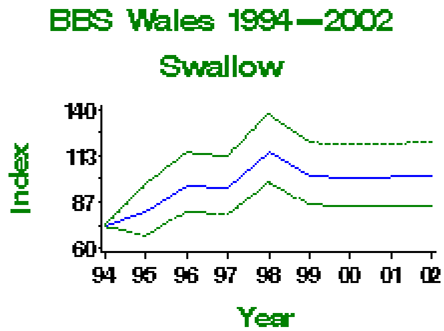
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











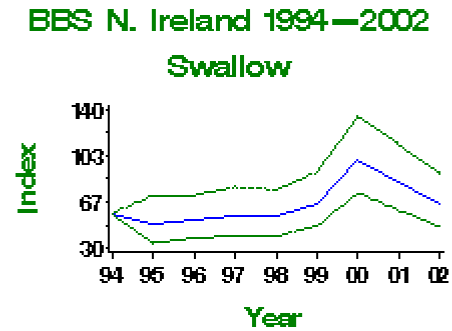
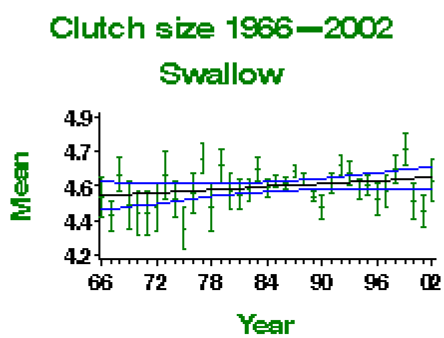
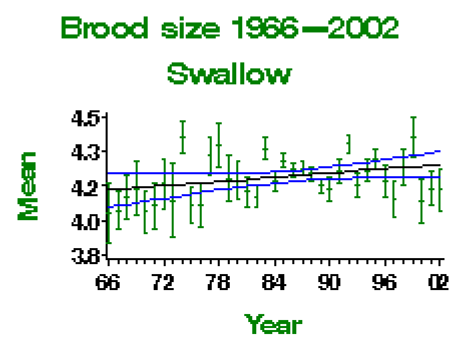
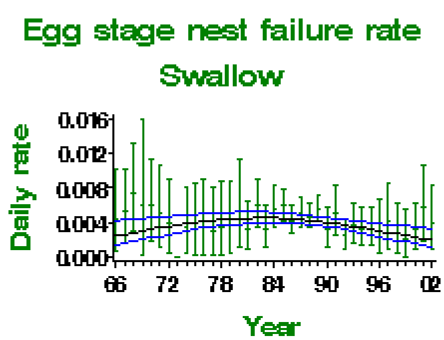


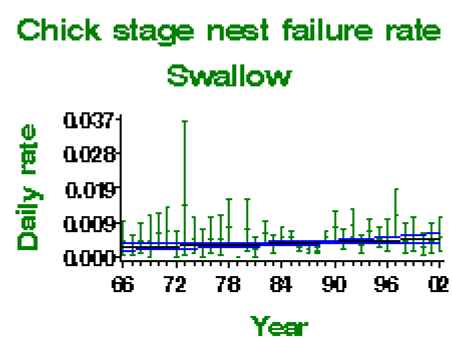
Table of productivity information for Swallow

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	180	None				
Brood size	33	1968-2001	292	None				
Daily failure rate (eggs)	33	1968-2001	224	Curvilinear	0.0029 nests/day	0.0022 nests/day	-0.0007 nests/day	
Daily failure rate (chicks)	33	1968-2001	198	Linear increase	0.0028 nests/day	0.0049 nests/day	0.0021 nests/day	
Laying date	33	1968-2001	90	Curvilinear	day 170	day 161	-9 days	

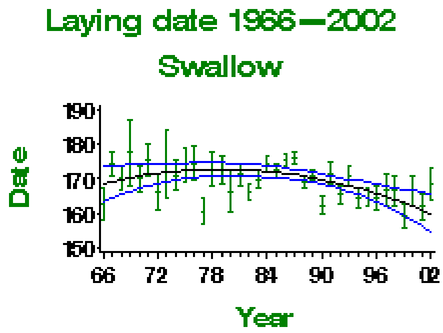








Insufficient data on CES available for this species


Laying date 1966—2002
Swallow
Date
190
180
170
160
150
66
72
78
84
90
96
02
Year

SAND MARTIN
Riparia riparia

Conservation listings
Europe: SPEC category 3, declining
UK: Amber (European status)

Long-term trend
UK: fluctuating, with no long-term trend

Status summary
This species is notoriously difficult to monitor, because active and inactive nest holes are difficult to distinguish, and because whole colonies may shift to new locations as suitable sand cliffs are created and destroyed. WBS nest counts suggest a stable or shallowly increasing population, with some fluctuations, and a steep decrease in the last five years. BBS counts of birds show wide fluctuations, with no indication yet of any trend. Winter rainfall in the species' trans-Saharan wintering grounds affect annual survival and thus abundance in the following breeding season (D.M. Norman, pers. comm.).

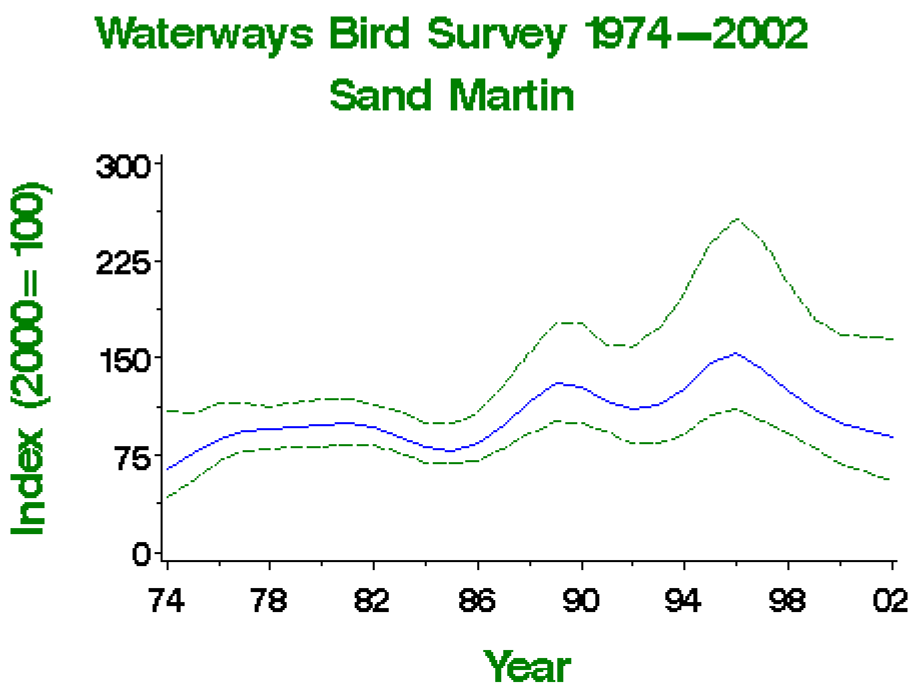
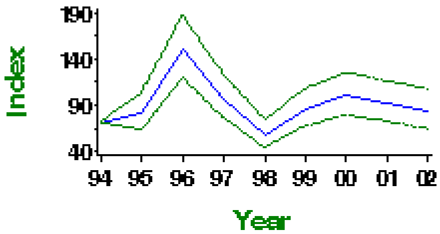


Table of population changes for Sand Martin

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	19	32	-21	146		Small sample
	10	1990-2000	25	-22	-43	17		
	5	1995-2000	27	-32	-48	-8	>25	
BBS UK	8	1994-2002	96	17	-9	51		
BBS England	8	1994-2002	64	7	-19	41		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

BBS index for UK 1994–2002
Sand Martin



BBS England 1994–2002
Sand Martin

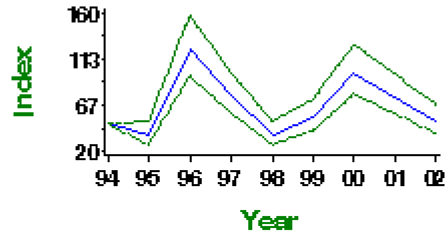
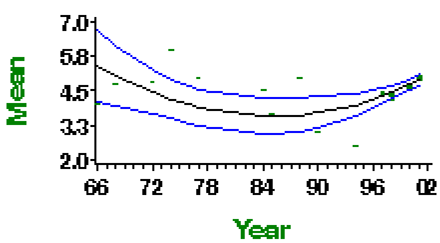


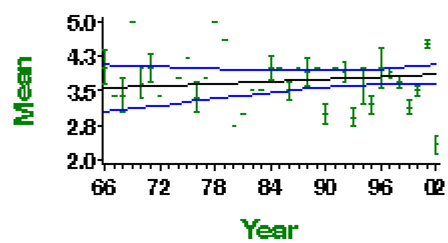
Table of productivity information for Sand Martin

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	16	Curvilinear	5.06 eggs	4.88 eggs	-0.18 eggs	Small sample
Brood size	33	1968-2001	16	None				Small sample
Daily failure rate (chicks)	33	1968-2001	13	Linear decline	0.0195 nests/day	0.001 nests/day	-0.0185 nests/day	Small sample
Laying date	33	1968-2001	15	Curvilinear	day 114	day 146	32 days	Small sample

Clutch size 1966–2002
Sand Martin

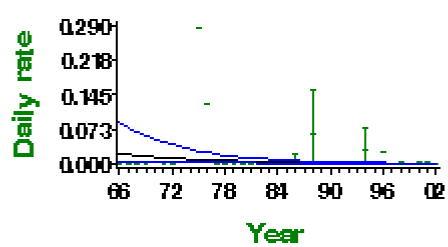


Brood size 1966–2002
Sand Martin

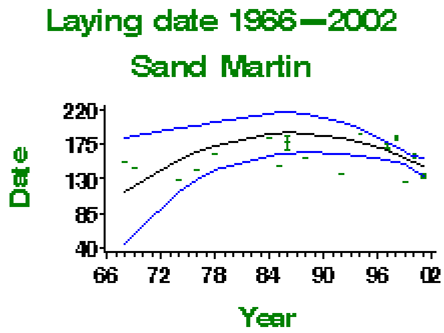


Insufficient data on nest failure available for this species

Chick stage nest failure rate
Sand Martin



Insufficient data on CES available for this species


Laying date 1966—2002
Sand Martin
Date
220
175
130
85
40
66
72
78
84
90
96
02
Year

HOUSE MARTIN
Delichon urbicum

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% population decline)

Long-term trend

UK: uncertain

Status summary

The House Martin's colonial habits and tendency to nest in human settlements mean that it is extraordinarily difficult to monitor. In some cases, demise of a colony may be balanced by single nests or small groups becoming established elsewhere. For these reasons, study areas should be large, covered thoroughly, and ideally randomly selected. The available data predominantly suggest decline, although BBS shows fluctuations or a shallow increase in recent years. The species has recently been moved from the Green to the Amber list because of moderate decline in the CBC trend for 1974-99.

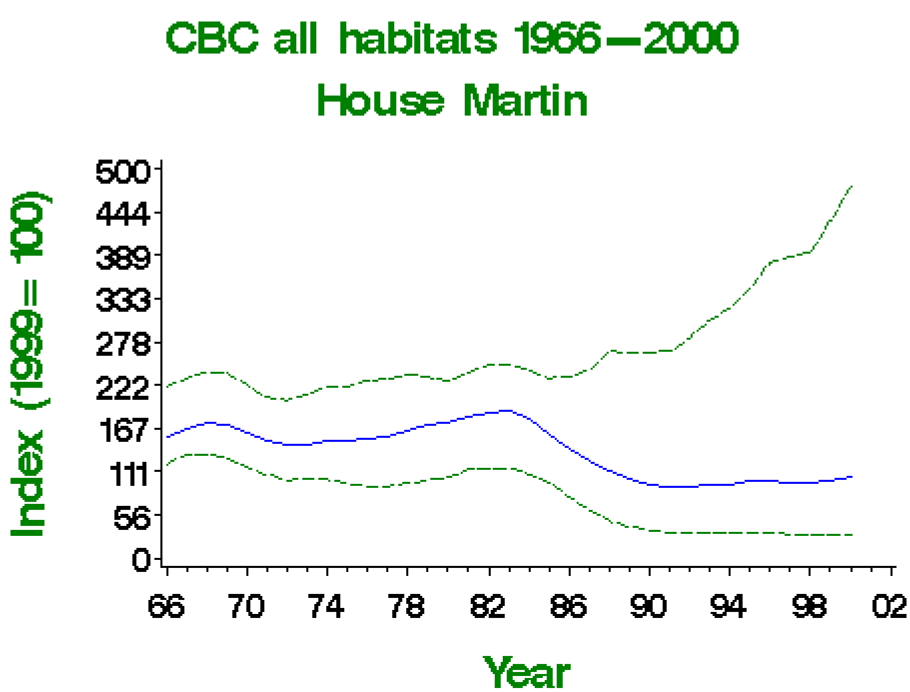
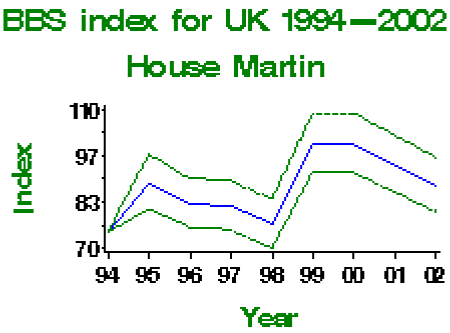
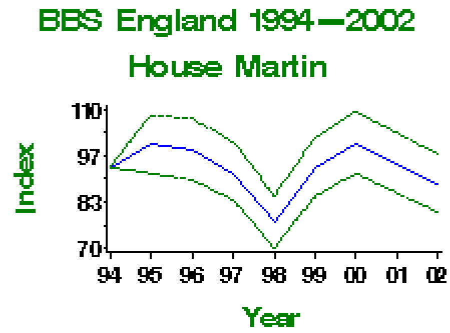


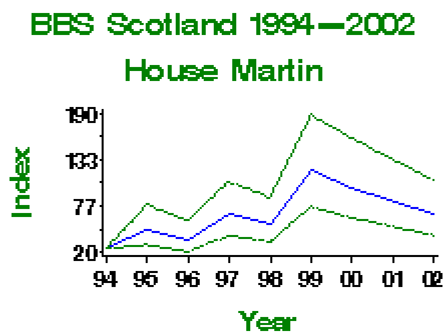
Table of population changes for House Martin

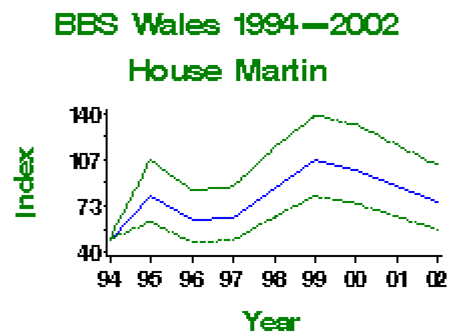
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	723	18	8	29		
BBS England	8	1994-2002	577	-5	-14	4		
BBS Scotland	8	1994-2002	43	174	68	346		
BBS Wales	8	1994-2002	74	54	14	107		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









Productivity information is not currently available for this species

TREE PIPIT
Anthus trivialis

Conservation listings

Europe: no SPEC category, secure
UK: Amber (>50% population decline but data possibly unrepresentative)

Long-term trend

England: rapid decline

Status summary

The species has recently been moved from the Green to the Amber list, on the strength of its population decline.Tree Pipits occur in greatest abundance in Wales, northern England and Scotland, and thus the marked CBC decline between the two atlas periods may reflect the range contraction that has occurred in central and southeast England (**Gibbons *et al.* 1993**). Subsequently, CBC/BBS data for England have shown further decrease, levelling off in the late 1990s. Since 1994, the UK index has been stable: substantial decrease in England has been balanced by increases in Scotland, although no separate trend is available from there. The causes of the population decline are unclear, but may be linked to changing forest structure, as new plantations mature, and increased grazing pressure in woodland (**Vanhinsbergh *et al.* 2001**). Improvements have occurred in breeding performance, with a substantial increase in brood size and a decline in failure rates over the 17-day egg stage (13 days incubation and 4 days laying).

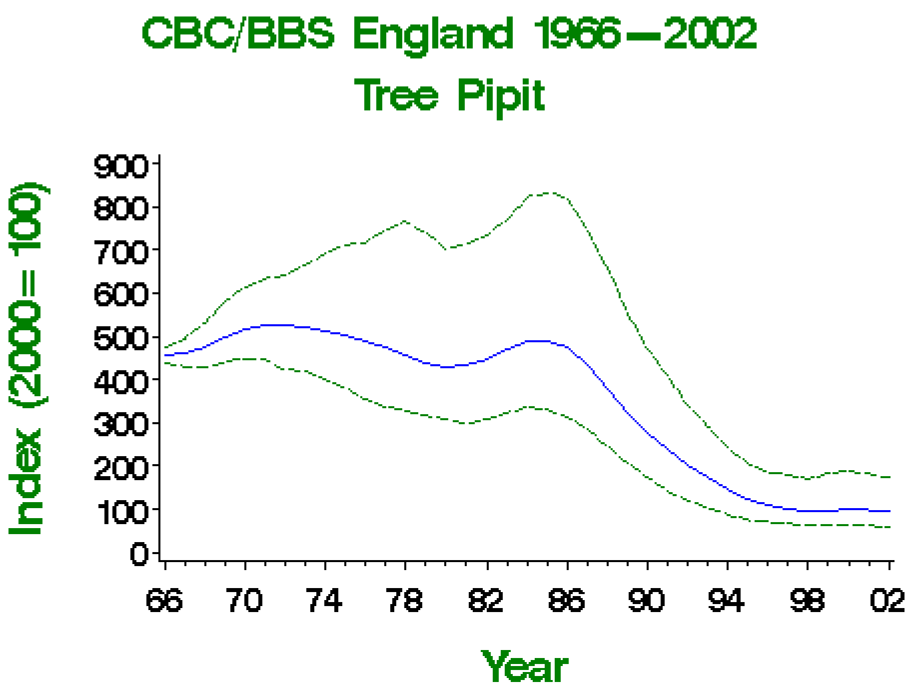
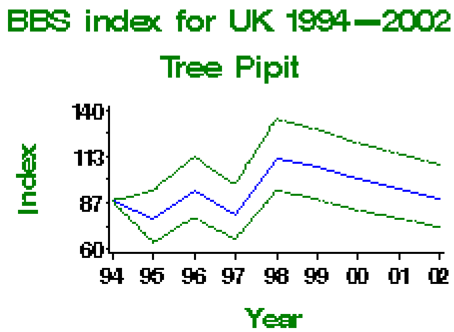


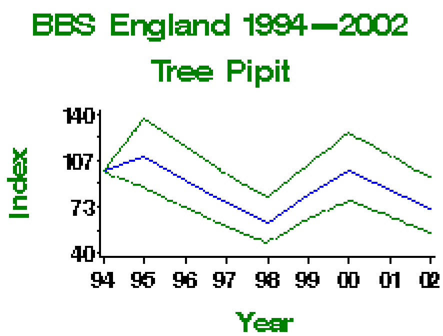
Table of population changes for Tree Pipit

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	41	-78	-89	-59	>50	
	25	1975-2000	43	-80	-89	-65	>50	
	10	1990-2000	57	-64	-78	-45	>50	

	5	1995-2000	82	-20	-37	3		
BBS UK	8	1994-2002	122	1	-17	24		
BBS England	8	1994-2002	64	-27	-45	-5	(>25)	
BBS Wales	8	1994-2002	30	-8	-38	37		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





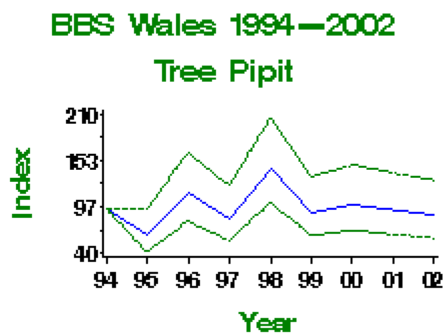
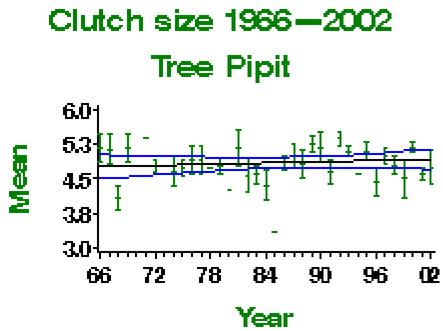
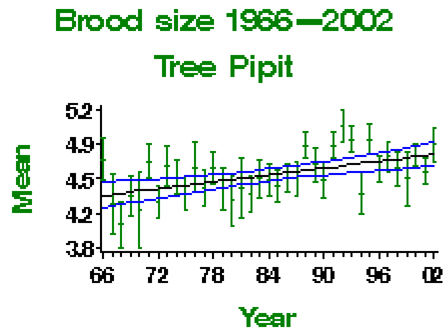
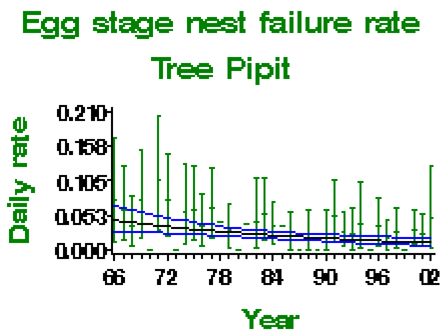


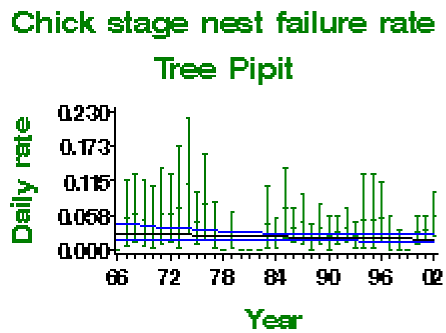
Table of productivity information for Tree Pipit

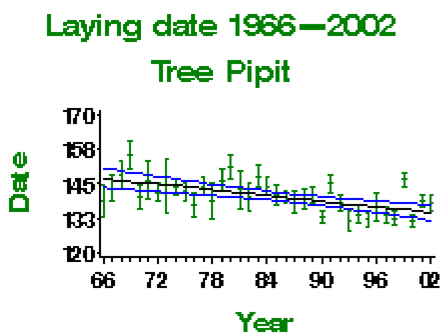
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	10	None				Small sample
Brood size	33	1968-2001	28	Linear increase	4.36 chicks	4.73 chicks	0.37 chicks	Small sample
Daily failure rate (eggs)	33	1968-2001	12	Linear decline	0.0417 nests/day	0.0118 nests/day	-0.0299 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	18	None				Small sample
Laying date	33	1968-2001	18	Linear decline	day 146	day 135	-11 days	Small sample











Insufficient data on CES available for this species

MEADOW PIPIT
Anthus pratensis

Conservation listings

Europe: SPEC category 4, secure
UK: Amber (25-50% population decline)

Long-term trend

UK, England: moderate decline

Status summary

Moorland, the key Meadow Pipit habitat, was not covered well by the CBC, but BBS now provides more representative monitoring for this species. The decline in CBC/BBS trend since the mid 1970s, accompanied by a range contraction from lowland England (**Gibbons *et al.* 1993**), has now been recognised as worthy of conservation concern with the species' move from the Green to the Amber list. Meadow Pipits are partial migrants and conditions on the Iberian wintering grounds have been linked to the decline, as have losses of marginal land from parts of the breeding range (**Gibbons *et al.* 1993**). Nest failure rates at the 12-day nestling stage have declined markedly, which may reflect the loss of birds from suboptimal habitat. Changes in laying date are related to climate change (**Crick & Sparks 1999**).

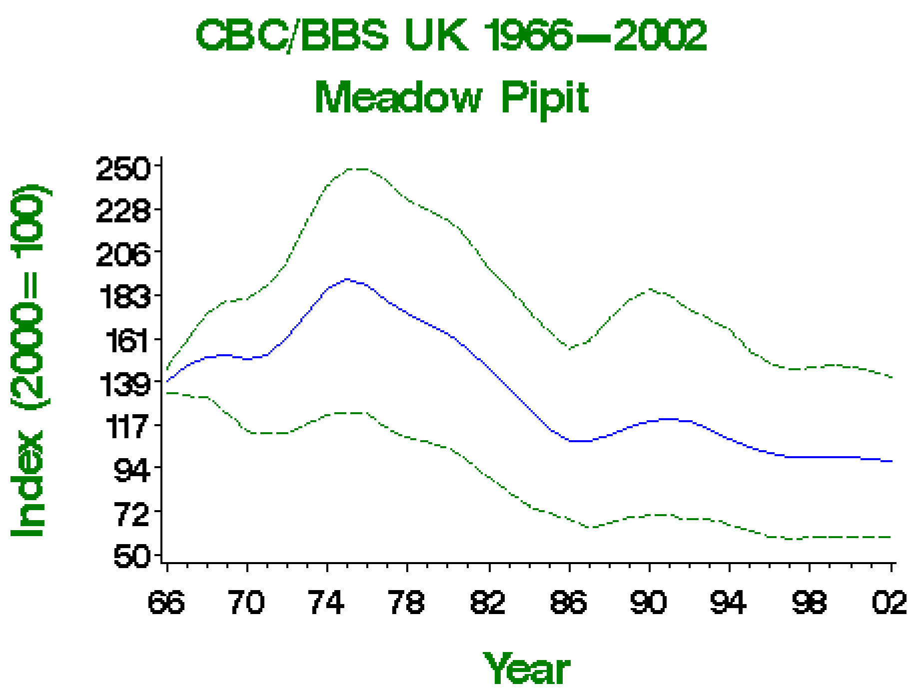
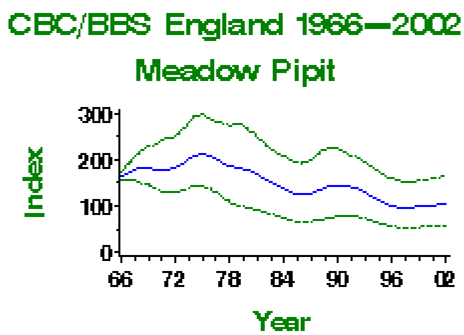


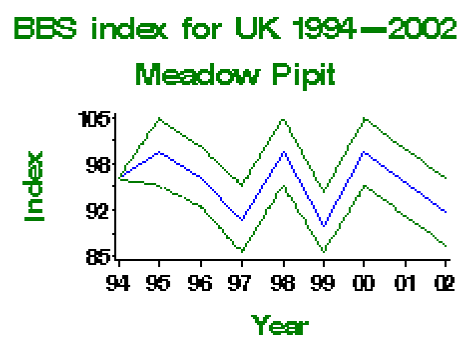
Table of population changes for Meadow Pipit

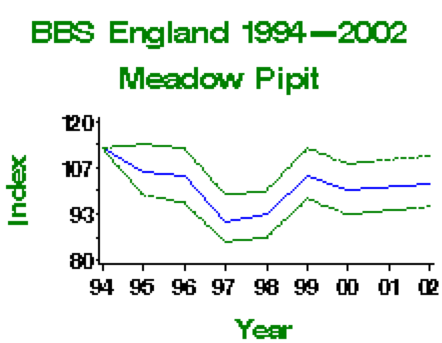
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	172	-32	-63	3		
	25	1975-2000	212	-48	-64	-32	>25	
	10	1990-2000	433	-16	-31	-2		
	5	1995-2000	677	-5	-12	4		
CBC/BBS England	33	1967-2000	95	-43	-73	-12	>25	

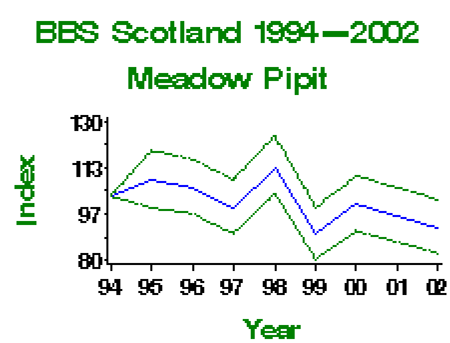
	25	1975-2000	115	-53	-70	-38	>50	
	10	1990-2000	221	-31	-45	-16	>25	
	5	1995-2000	340	-8	-16	-2		
BBS UK	8	1994-2002	619	-5	-10	0		
BBS England	8	1994-2002	304	-9	-15	-2		
BBS Scotland	8	1994-2002	195	-11	-20	-1		
BBS Wales	8	1994-2002	72	23	7	43		
BBS N.Ireland	8	1994-2002	45	28	-3	70		

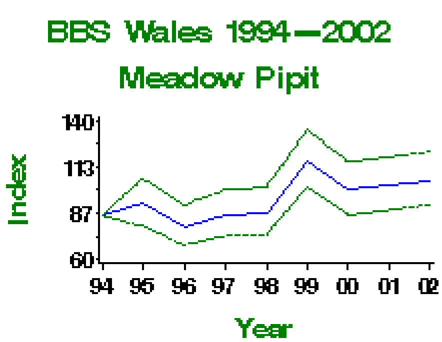
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











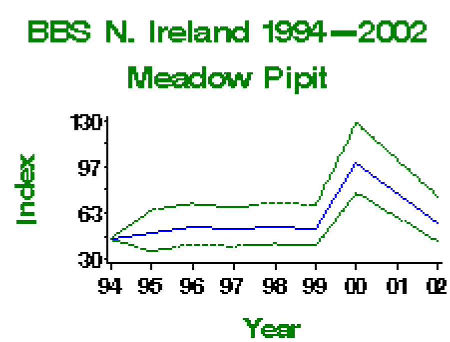
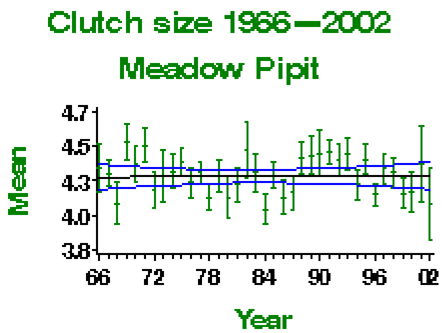
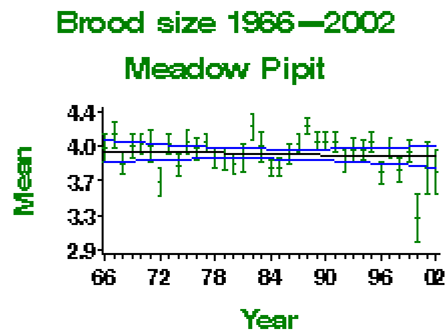
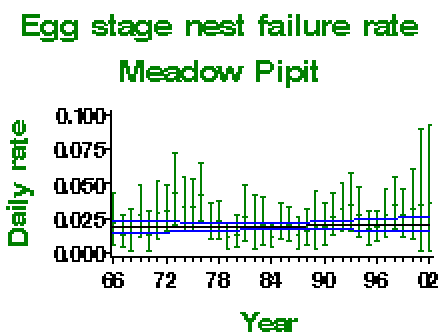


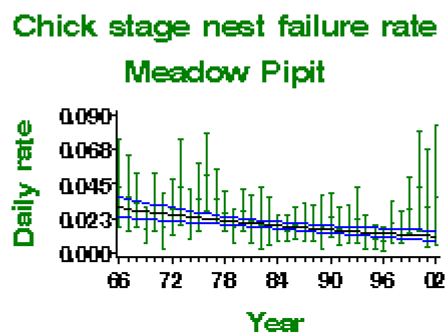
Table of productivity information for Meadow Pipit

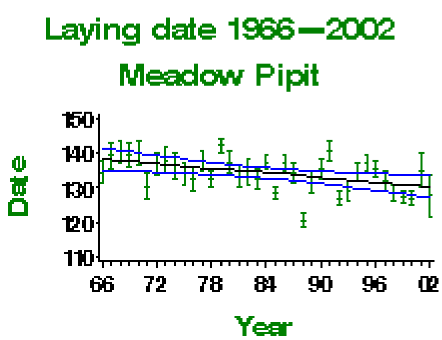
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	40	None				
Brood size	33	1968-2001	75	None				
Daily failure rate (eggs)	33	1968-2001	50	None				
Daily failure rate (chicks)	33	1968-2001	68	Linear decline	0.0279 nests/day	0.0114 nests/day	-0.0165 nests/day	
Laying date	33	1968-2001	43	Linear decline	day 138	day 131	-7 days	











Insufficient data on CES available for this species

YELLOW WAGTAIL
Motacilla flava

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

Britain holds almost the entire population of the distinctive race *flavissima*, and so population changes in the UK are of special signficance. Yellow Wagtails have been in decline since the early 1980s, according to CBC/BBS and especially WBS, and have now been moved from the Green to the Amber list. Continuation of the decline since 1999 already suggests that Red listing is appropriate. **Gibbons *et al.* (1993)** identified a range contraction towards a core area in central England, concurrent with the early years of decline. Farmland drainage, the conversion of pasture to arable land, the change from spring to winter cereals, and the loss of insects associated with cattle have been cited as potential causes (**Gibbons *et al.* 1993**, **Nelson *et al.* 2003**). Although sample sizes are small, there has been a significant reduction in brood size over the past 30 years.

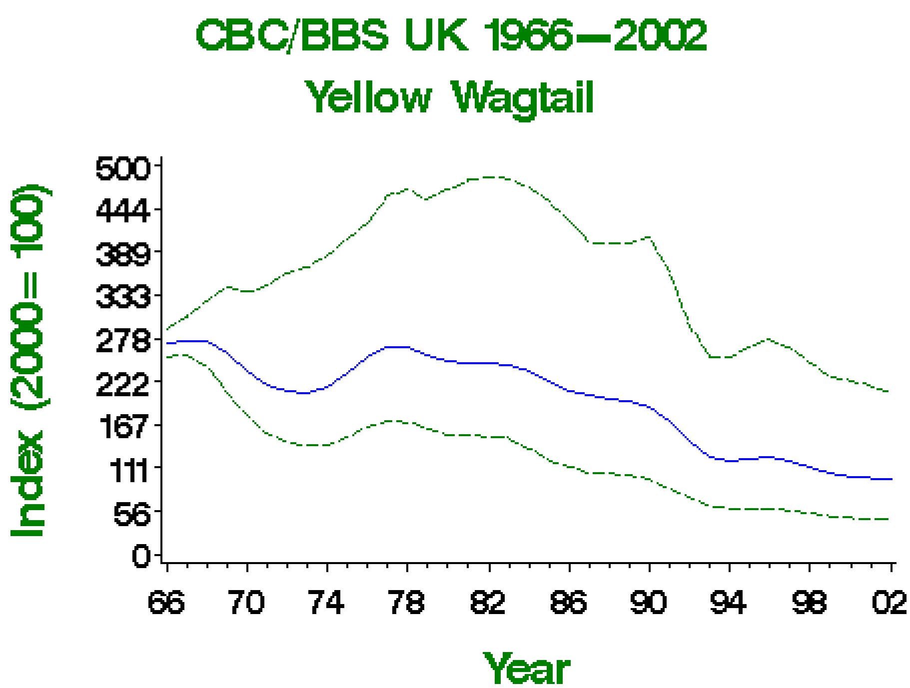
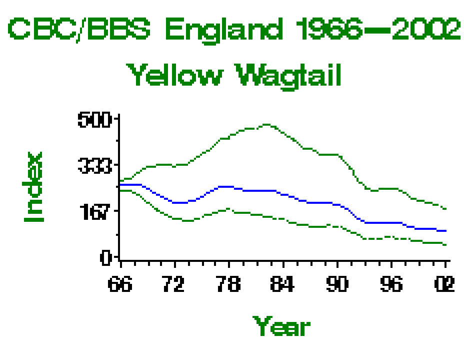


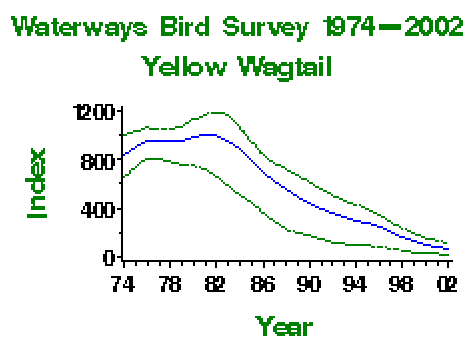
Table of population changes for Yellow Wagtail

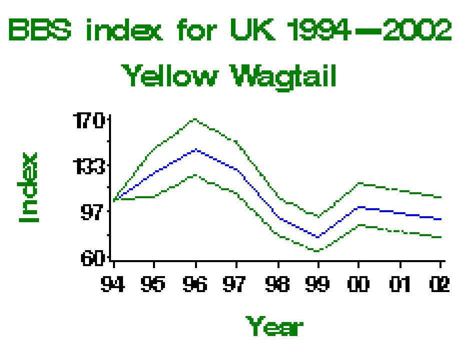
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	59	-64	-84	-16	>50	
	25	1975-2000	68	-57	-78	-26	>50	
	10	1990-2000	117	-47	-60	-30	>25	
	5	1995-2000	179	-18	-31	-6		
CBC/BBS England	33	1967-2000	58	-62	-85	-24	>50	

	25	1975-2000	66	-54	-77	-17	>50	
	10	1990-2000	115	-47	-63	-31	>25	
	5	1995-2000	175	-19	-32	-7		
WBS waterways	25	1975-2000	21	-89	-96	-82	>50	
	10	1990-2000	17	-77	-88	-69	>50	Small sample
	5	1995-2000	15	-64	-76	-53	>50	Small sample
BBS UK	8	1994-2002	155	-14	-28	2		
BBS England	8	1994-2002	152	-15	-28	2		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







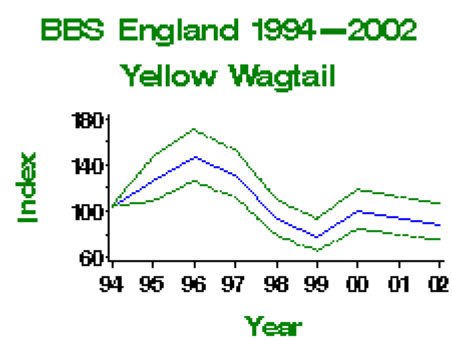
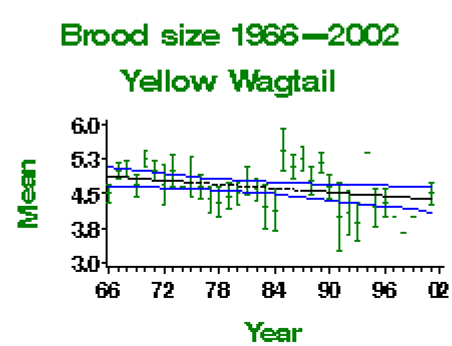


Table of productivity information for Yellow Wagtail

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	13	Linear decline	4.84 chicks	4.38 chicks	-0.46 chicks	Small sample

Insufficient data on clutch size available for this species



Insufficient data on nest failure available for this species

Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species

Insufficient data on CES available for this species

GREY WAGTAIL
Motacilla cinerea

Conservation listings

Europe: no SPEC category, (secure)
UK: Amber (25-50% population decline)

Long-term trend

UK: moderate decline

Status summary

Grey Wagtail populations are most dense in northern and western Britain. WBS shows a fluctuating population size, with a fall during the late 1970s and early 1980s from an initial high point in 1974. The species has recently been moved from the Green to the Amber list, because of a 41% 'moderate decline' recorded between 1975 and 1999, but the current figures already show a reduction in this figure. The trends for Grey Wagtail are very similar to those for **Pied Wagtail**, suggesting that similar factors may be affecting these two species. Both clutch and brood size of Grey Wagtails have declined over the past 15-20 years and may indicate a reduction in the quality of their riverine habitats.

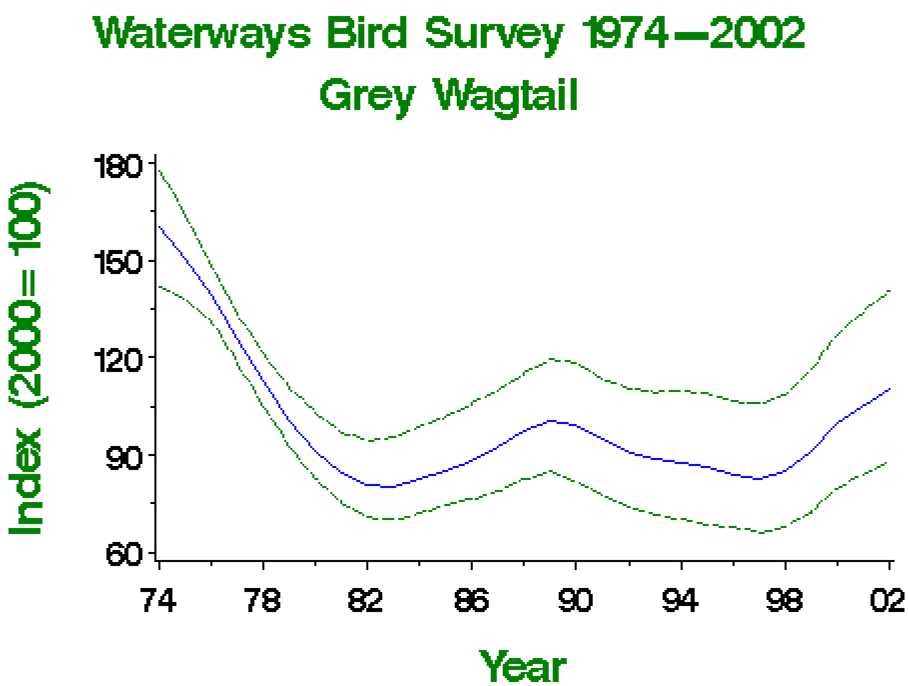
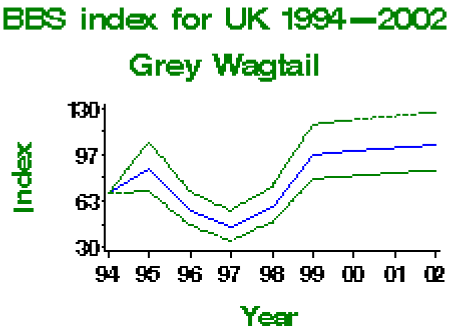


Table of population changes for Grey Wagtail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	57	-34	-49	-10	>25	
	10	1990-2000	64	1	-12	14		
	5	1995-2000	62	16	8	26		
BBS UK	8	1994-2002	154	52	25	86		
BBS England	8	1994-2002	98	71	35	117		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



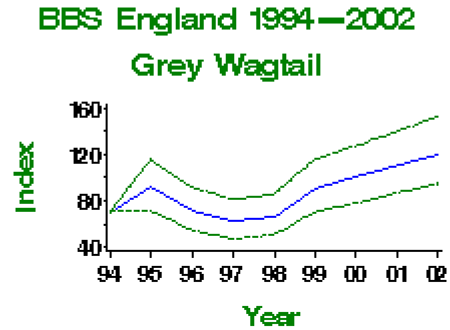
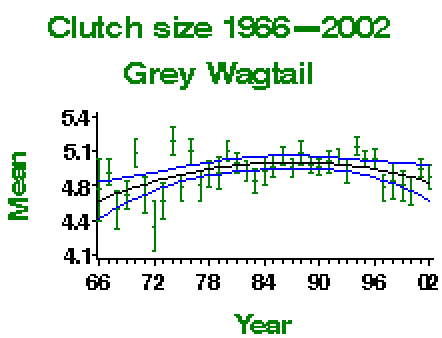
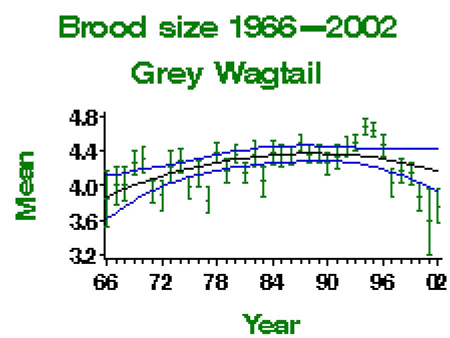
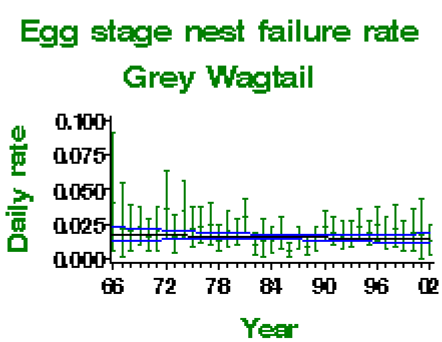


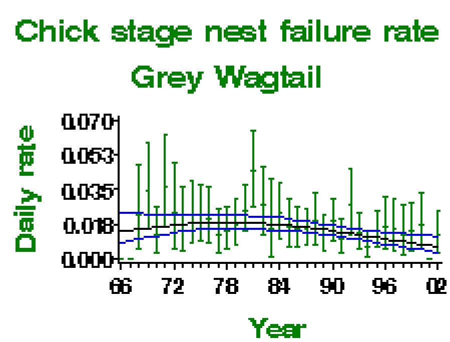
Table of productivity information for Grey Wagtail

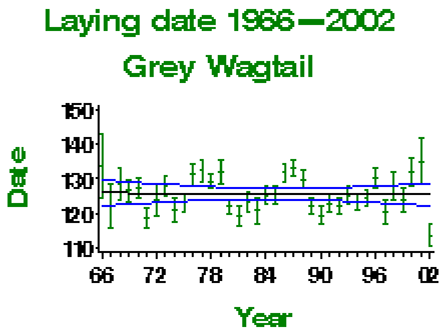
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	42	Curvilinear	4.68 eggs	4.8 eggs	0.12 eggs	
Brood size	33	1968-2001	87	Curvilinear	3.96 chicks	4.2 chicks	0.24 chicks	
Daily failure rate (eggs)	33	1968-2001	64	None				
Daily failure rate (chicks)	33	1968-2001	62	Curvilinear	0.0152 nests/day	0.007 nests/day	-0.0082 nests/day	
Laying date	33	1968-2001	66	None				











Insufficient data on CES available for this species

PIED WAGTAIL
Motacilla alba

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: uncertain

Status summary

Britain and Ireland together hold almost the entire population of the distinctive dark-backed race *yarrellii*, and so population changes in the UK are of special significance. Results of monitoring conflict somewhat since 1974: CBC/BBS and WBS trends fluctuate in parallel but, whereas little change is evident in the CBC/BBS index over this period, WBS has shown a moderate decline, perhaps suggesting the influence of factors specific to linear waterways. The CBC shows that a strong increase preceded 1974, such that populations have increased overall since 1966. The long-term trend in abundance is similar to those shown by **Wren** and **Long-tailed Tit**, two other resident insectivores (**Siriwardena *et al*. 1998a**). Changes in breeding performance measures have been conflicting and do not help explain the population trends. Although average clutch and brood sizes have declined a little, failure rates at the egg stage (17 days, comprising 13 days incubation and 4 days laying) have also fallen.

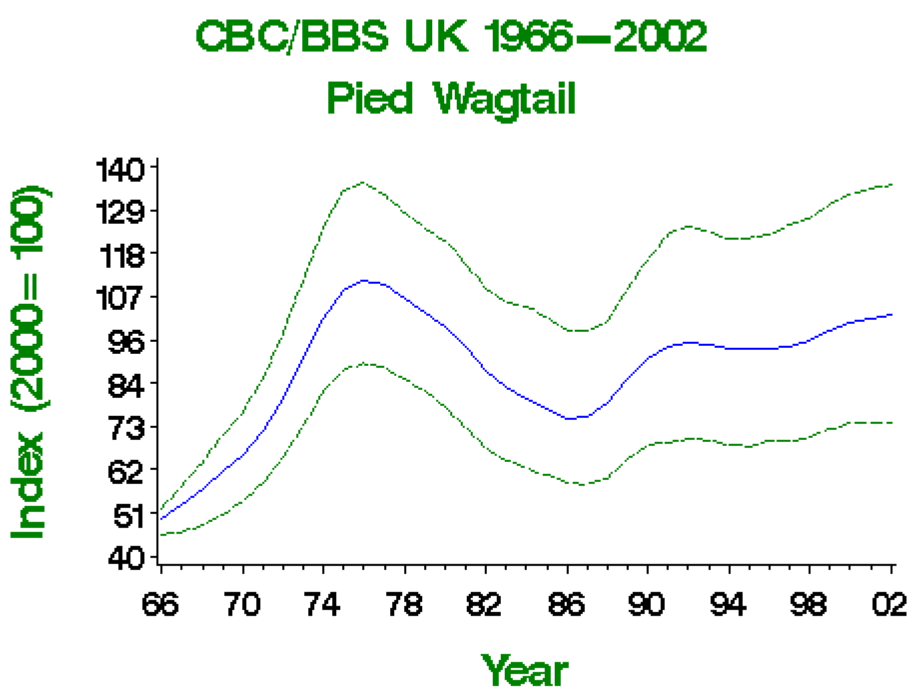
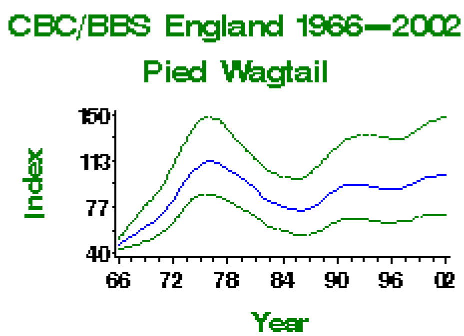


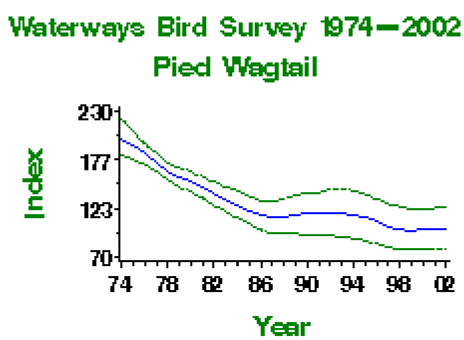
Table of population changes for Pied Wagtail

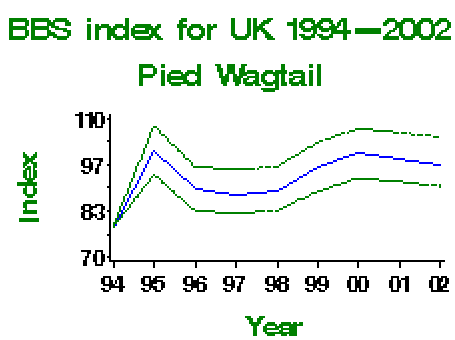
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	278	89	34	155		
	25	1975-2000	342	-8	-32	21		
	10	1990-2000	681	10	1	25		
	5	1995-2000	1077	7	1	13		

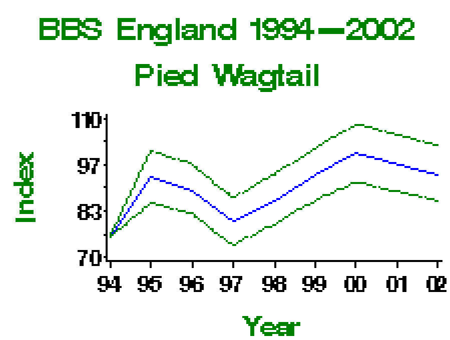
CBC/BBS England	33	1967-2000	216	95	41	179		
	25	1975-2000	265	-10	-31	24		
	10	1990-2000	521	10	-3	28		
	5	1995-2000	822	9	4	16		
WBS waterways	25	1975-2000	66	-48	-59	-35	>25	
	10	1990-2000	69	-15	-26	-2		
	5	1995-2000	69	-12	-20	-3		
BBS UK	8	1994-2002	959	23	15	33		
BBS England	8	1994-2002	728	24	14	35		
BBS Scotland	8	1994-2002	114	30	5	61		
BBS Wales	8	1994-2002	91	0	-21	26		

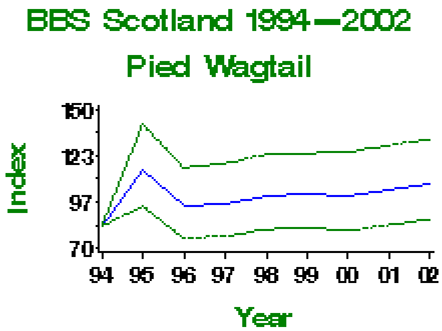
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











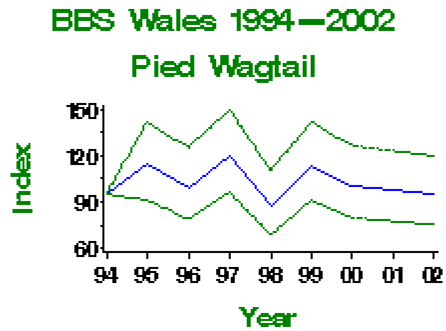
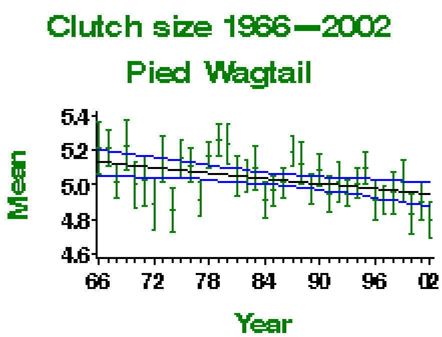
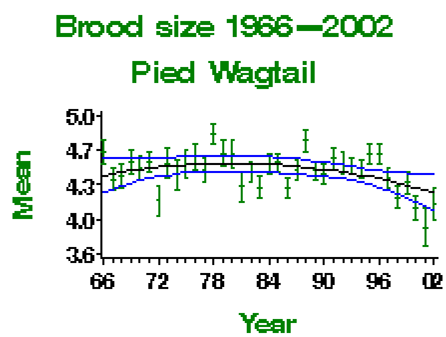
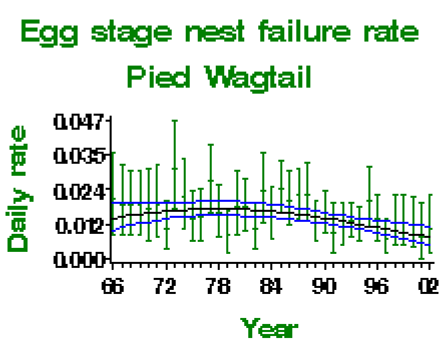


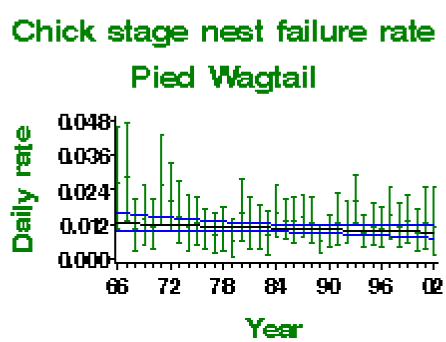
Table of productivity information for Pied Wagtail

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	60	Linear decline	5.12 eggs	4.96 eggs	-0.16 eggs	
Brood size	33	1968-2001	113	Curvilinear	4.43 chicks	4.24 chicks	-0.19 chicks	
Daily failure rate (eggs)	33	1968-2001	83	Curvilinear	0.0148 nests/day	0.008 nests/day	-0.0068 nests/day	
Daily failure rate (chicks)	33	1968-2001	91	None				
Laying date	33	1968-2001	80	None				

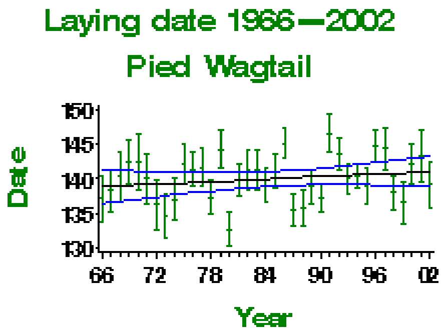








Insufficient data on CES available for this species


Laying date 1966—2002
Pied Wagtail
Date
150
145
140
135
130
66
72
78
84
90
96
02
Year

DIPPER
Cinclus cinclus

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

UK: fluctuating, with no long-term trend

Status summary

The WBS trend shows that Dipper populations have fluctuated somewhat over the last thirty years. The species is a good indicator of acidity and other water pollution (Ormerod & Tyler 1989, 1990), so the trend warrants careful monitoring. Breeding performance has improved strongly over time, and laying dates have become earlier, perhaps because of climate change (Crick & Sparks 1999). Broods now average larger, and there has been substantial reduction in failure rates of nests at the egg stage.

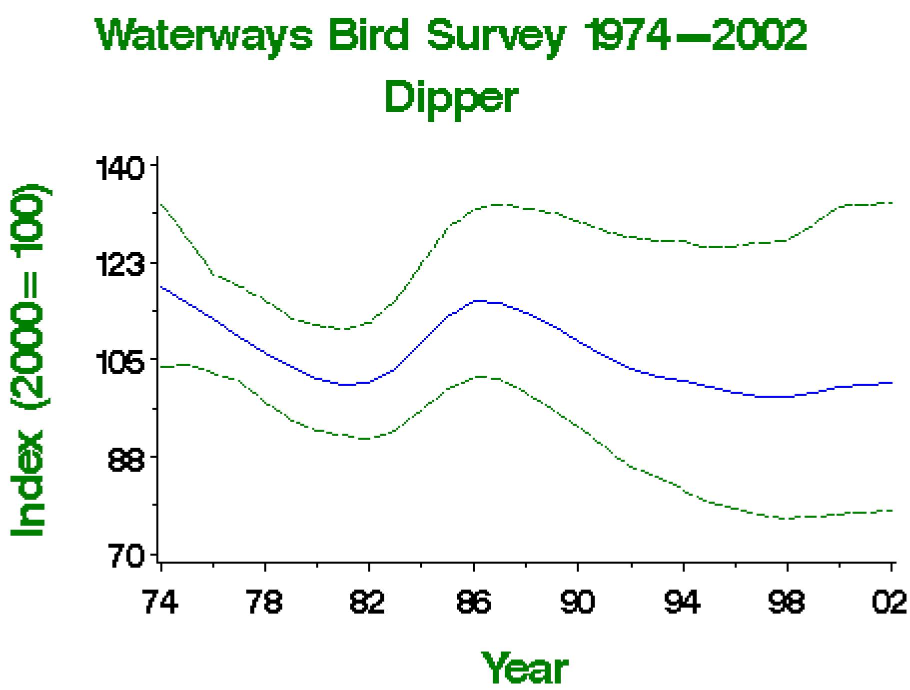


Table of population changes for Dipper

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS waterways	25	1975-2000	36	-13	-32	20		
	10	1990-2000	37	-8	-21	8		
	5	1995-2000	35	0	-9	11		
BBS UK	8	1994-2002	44	-25	-51	15		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

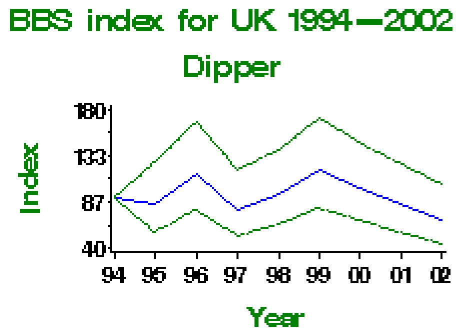
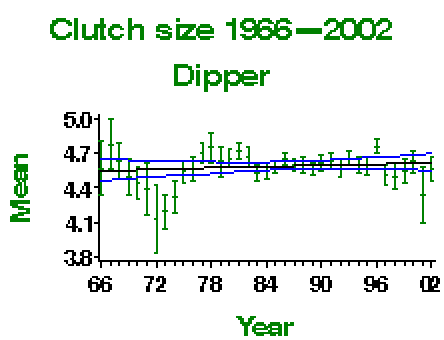
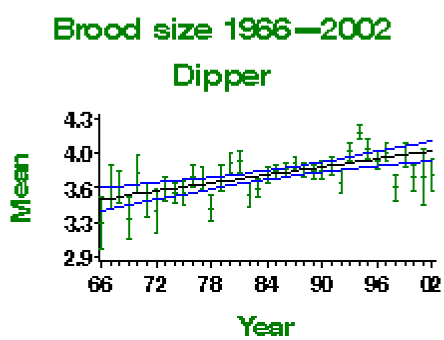
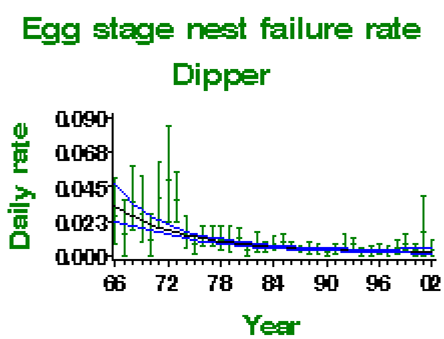


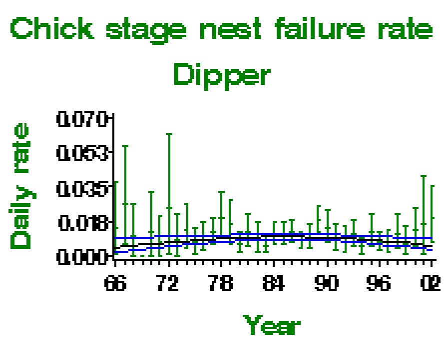
Table of productivity information for Dipper

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	77	None				
Brood size	33	1968-2001	148	Linear increase	3.51 chicks	3.96 chicks	0.45 chicks	
Daily failure rate (eggs)	33	1968-2001	108	Curvilinear	0.0259 nests/day	0.0032 nests/day	-0.0227 nests/day	
Daily failure rate (chicks)	33	1968-2001	84	Curvilinear	0.0054 nests/day	0.006 nests/day	0.0006 nests/day	
Laying date	33	1968-2001	64	Linear decline	day 108	day 100	-8 days	

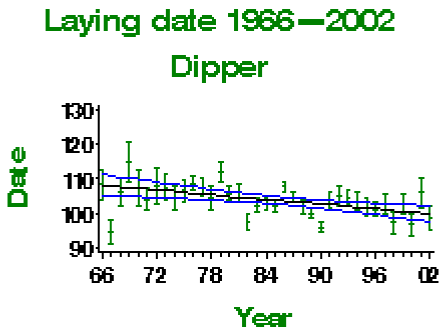








Insufficient data on CES available for this species


Laying date 1966–2002
Dipper
Date
130
120
110
100
90
66
72
78
84
90
96
02
Year

DUNNOCK
Prunella modularis

Conservation listings

Europe: SPEC category 4, secure
UK: Amber (25-50% population decline)

Long-term trend

England: moderate decline

Status summary

Dunnock abundance fell substantially between the mid 1970s and mid 1980s, after a period of population stability. Some recovery has occurred throughout the UK since the late 1990s, but the species is still subject to Amber listing. The cause of the decline remains unknown. There has been little variation in survival rates over time (**Siriwardena *et al.* 1998a**) and although clutch and brood size has increased, so have failure rates at the egg stage, which may affect the ability of the species to recover.

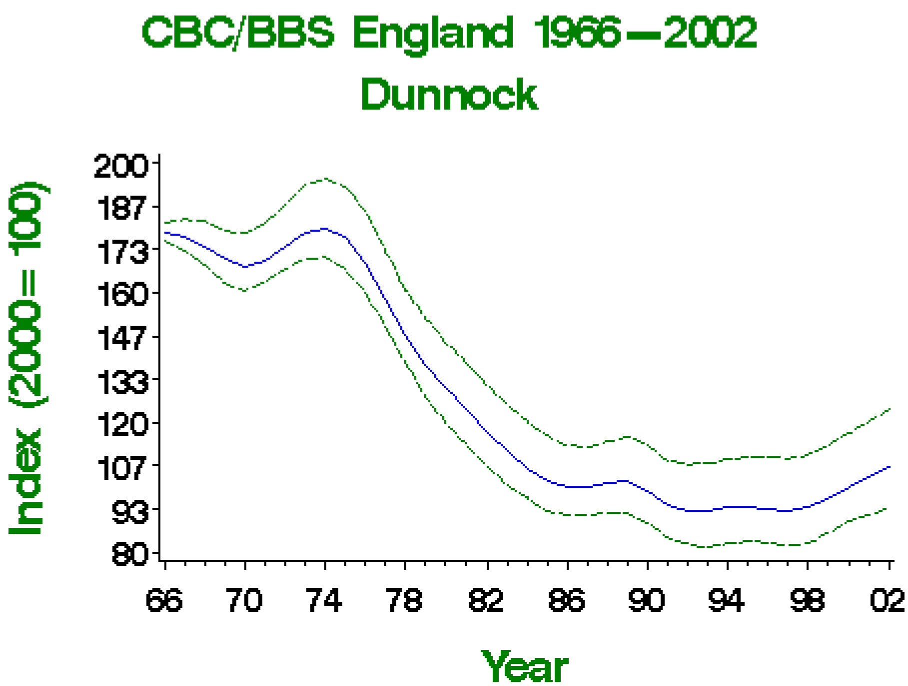
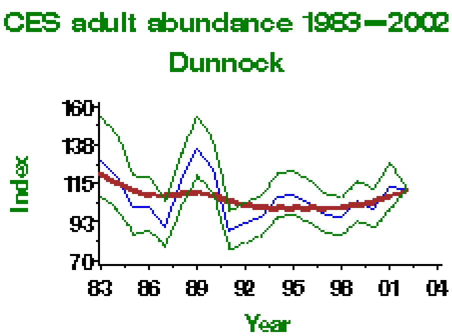


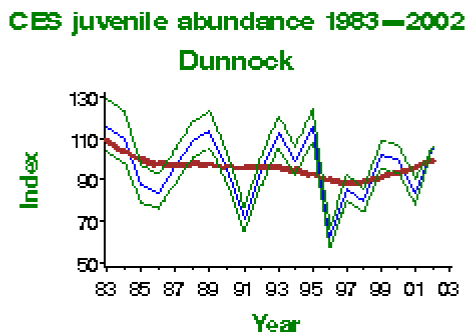
Table of population changes for Dunnock

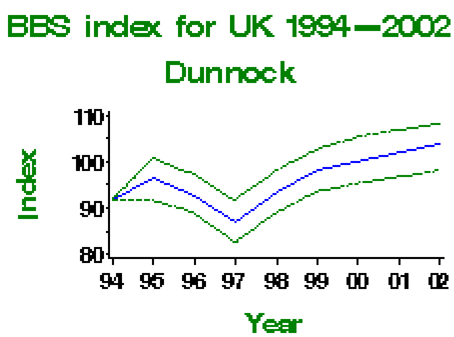
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	425	-44	-51	-33	>25	
	25	1975-2000	507	-44	-51	-34	>25	
	10	1990-2000	935	1	-7	10		
	5	1995-2000	1425	6	3	10		
CES adults	17	1984-2001	92	-7	.	.		
	10	1991-2001	108	3	.	.		

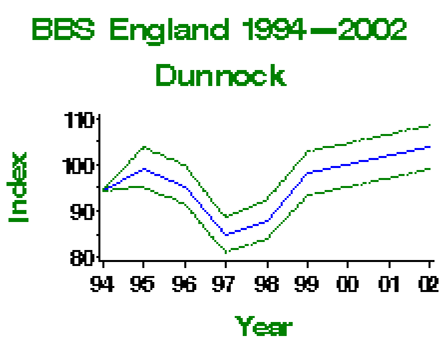
	5	1996-2001	110	7	.	.		
CES juveniles	17	1984-2001	89	-8	.	.		
	10	1991-2001	105	0	.	.		
	5	1996-2001	108	7	.	.		
BBS UK	8	1994-2002	1483	13	7	18		
BBS England	8	1994-2002	1220	10	5	15		
BBS Scotland	8	1994-2002	99	15	-9	47		
BBS Wales	8	1994-2002	114	15	-3	37		
BBS N.Ireland	8	1994-2002	42	187	76	368		

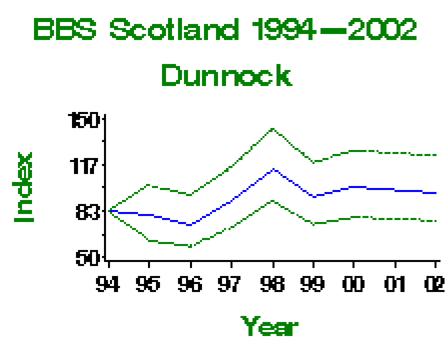
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

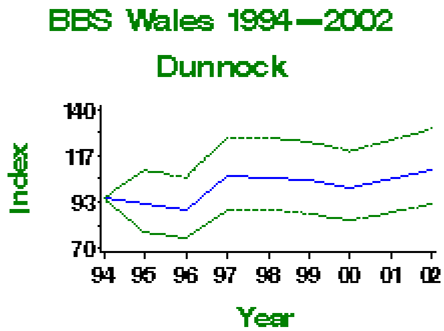












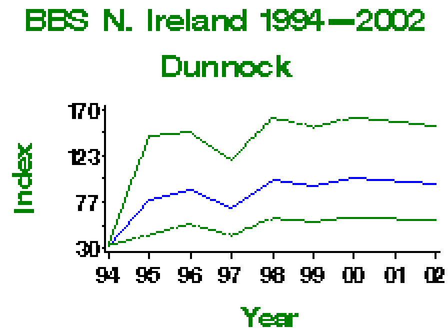
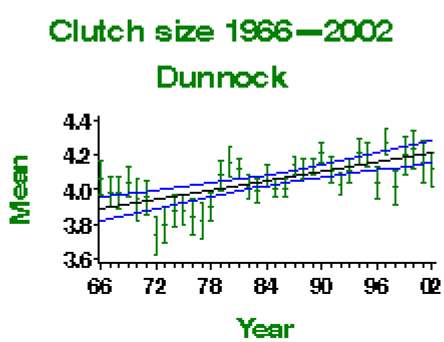
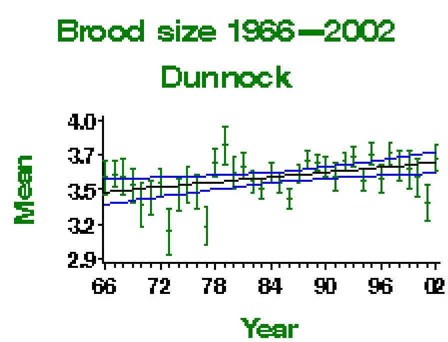
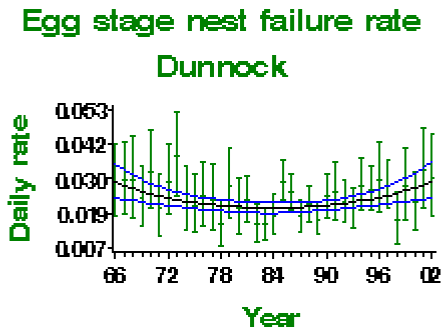


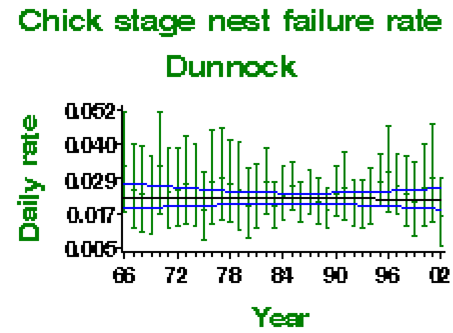
Table of productivity information for Dunnock

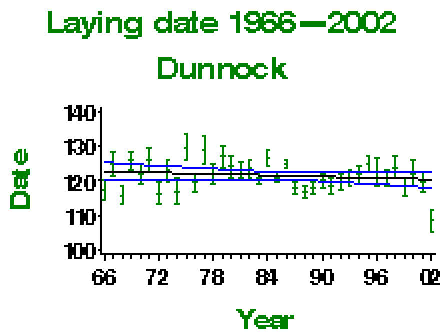
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	102	Linear increase	3.91 eggs	4.2 eggs	0.29 eggs	
Brood size	33	1968-2001	107	Linear increase	3.45 chicks	3.66 chicks	0.21 chicks	
Daily failure rate (eggs)	33	1968-2001	143	Curvilinear	0.0268 nests/day	0.0279 nests/day	0.0011 nests/day	
Daily failure rate (chicks)	33	1968-2001	113	None				
Laying date	33	1968-2001	81	None				
Percentage juveniles (CES)	17	1984-2001	97	Smoothed trend	101 productivity index	101 productivity index	-1%	
Percentage juveniles (CES)	10	1991-2001	113	Smoothed trend	103 productivity index	101 productivity index	-3%	
Percentage juveniles (CES)	5	1996-2001	114	Smoothed trend	101 productivity index	101 productivity index	-1%	

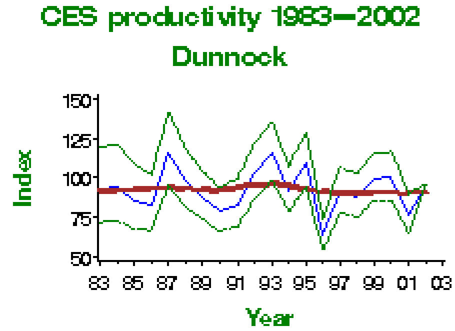





Egg stage nest failure rate
Dunnock
Daily rate
0.053
0.042
0.030
0.019
0.007
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Dunnock
Daily rate
0.052
0.040
0.029
0.017
0.005
66 72 78 84 90 96 02
Year


Laying date 1966-2002
Dunnock
Date
140
130
120
110
100
66 72 78 84 90 96 02
Year


CES productivity 1983-2002
Dunnock
Index
150
125
100
75
50
83 85 87 89 91 93 95 97 99 01 03
Year

WREN
Troglodytes troglodytes

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

England: moderate increase

Status summary

Following a rapid increase into the mid 1970s, Wren abundance has fluctuated; BBS results suggest further recent rise in all parts of the UK. Abundance can vary sharply from year to year in this species, influenced by mortality rates that may be very high in severe winters and by the species' high breeding potential (Peach *et al.* 1995b), although this is largely concealed by smoothing in the CBC/BBS trends. Breeding performance has shown some small improvements in the long term.

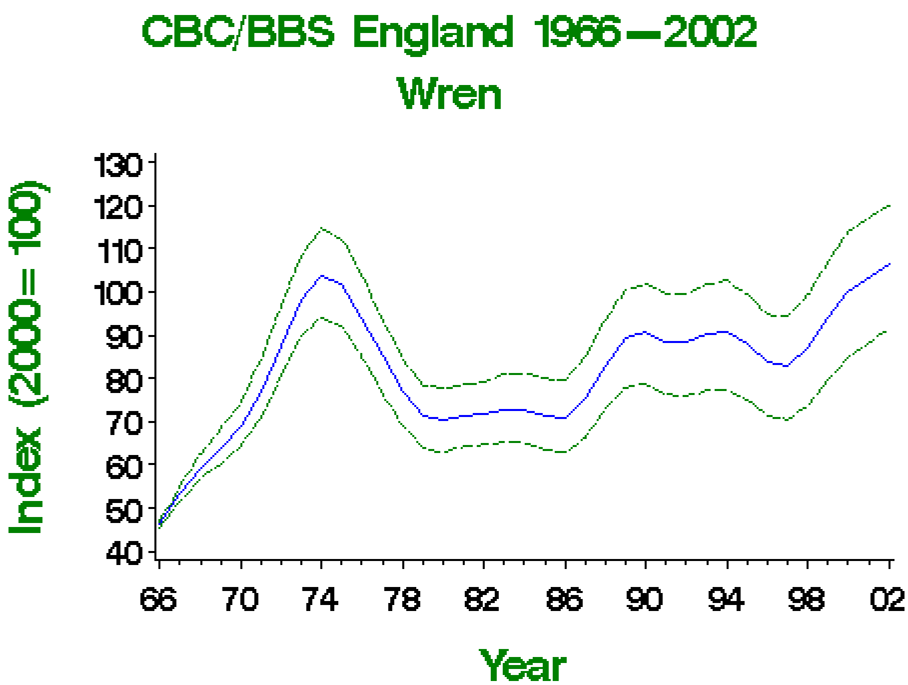
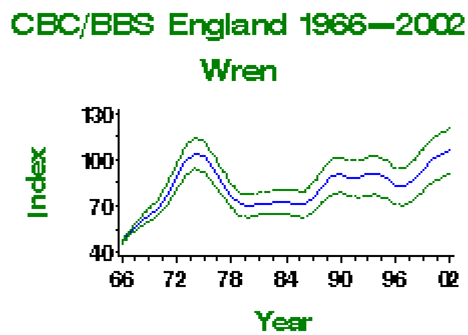


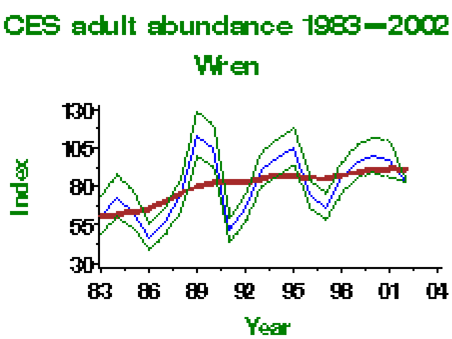
Table of population changes for Wren

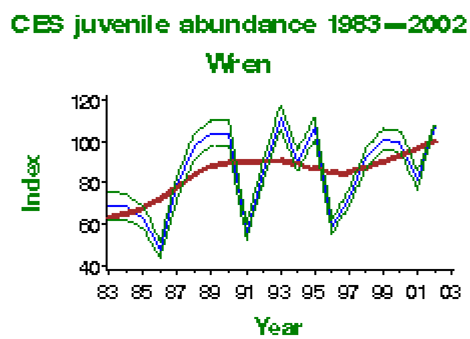
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	472	88	61	115		
	25	1975-2000	567	-2	-13	10		
	10	1990-2000	1064	10	5	15		
	5	1995-2000	1621	14	11	17		
CES adults	17	1984-2001	93	48	.	.		
	10	1991-2001	109	11	.	.		
	5	1996-2001	112	7	.	.		

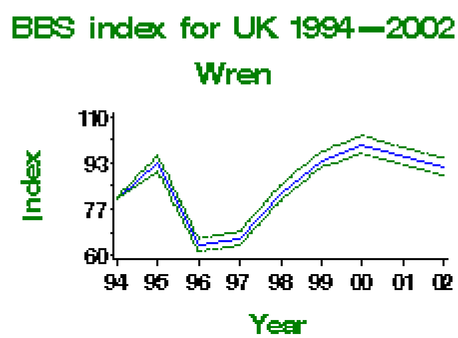
CES juveniles	17	1984-2001	92	49	.	.		
	10	1991-2001	107	7	.	.		
	5	1996-2001	110	13	.	.		
BBS UK	8	1994-2002	1784	14	10	18		
BBS England	8	1994-2002	1389	7	3	10		
BBS Scotland	8	1994-2002	174	38	19	59		
BBS Wales	8	1994-2002	152	19	8	32		
BBS N.Ireland	8	1994-2002	59	64	27	112		

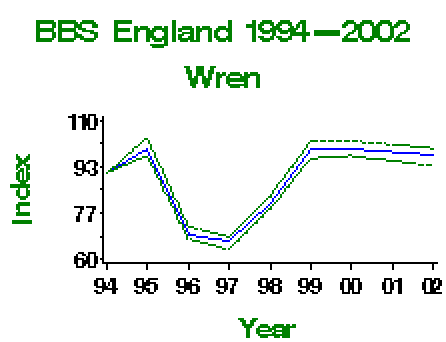
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

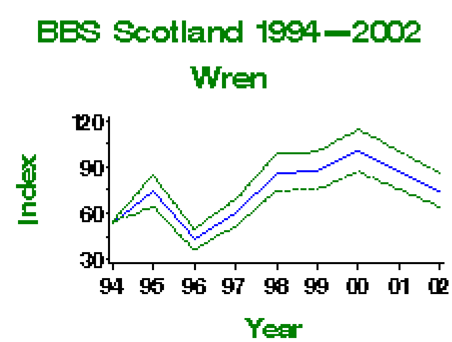


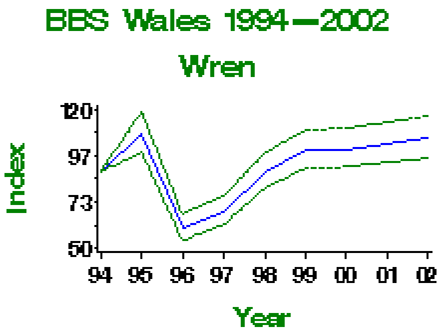












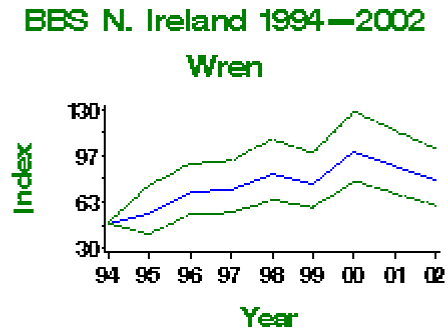
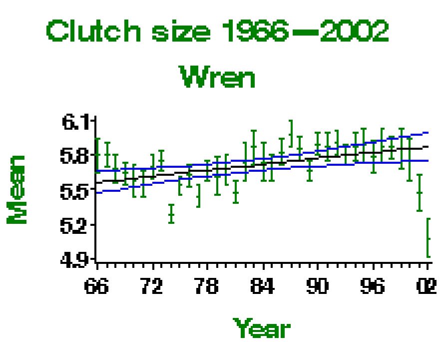
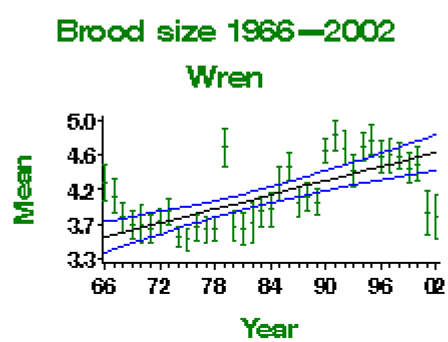
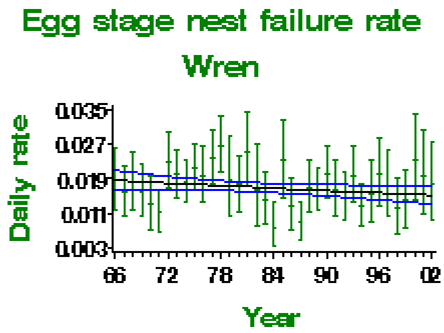


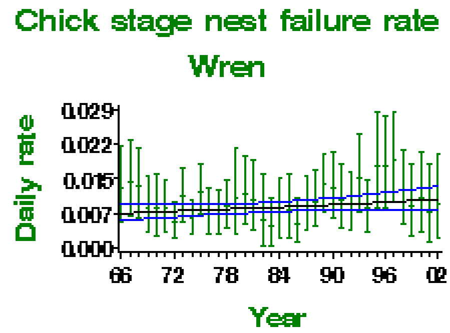
Table of productivity information for Wren

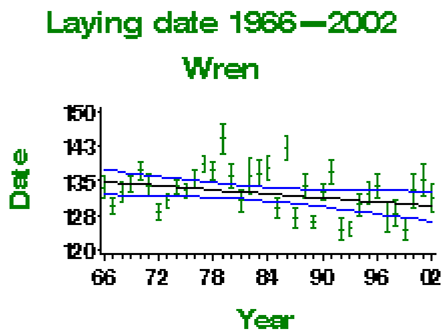
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	99	Linear increase	5.58 eggs	5.86 eggs	0.28 eggs	
Brood size	33	1968-2001	128	Linear increase	3.63 chicks	4.58 chicks	0.95 chicks	
Daily failure rate (eggs)	33	1968-2001	147	None				
Daily failure rate (chicks)	33	1968-2001	102	None				
Laying date	33	1968-2001	90	None				
Percentage juveniles (CES)	17	1984-2001	97	Smoothed trend	99 productivity index	101 productivity index	1%	
Percentage juveniles (CES)	10	1991-2001	113	Smoothed trend	110 productivity index	101 productivity index	-9%	
Percentage juveniles (CES)	5	1996-2001	115	Smoothed trend	98 productivity index	101 productivity index	2%	

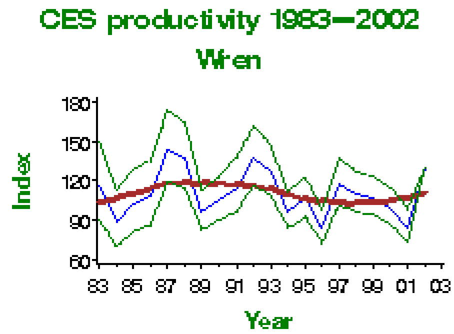





Egg stage nest failure rate
Wren
Daily rate
0.035
0.027
0.019
0.011
0.003
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Wren
Daily rate
0.029
0.022
0.015
0.007
0.000
66 72 78 84 90 96 02
Year


Laying date 1966–2002
Wren
Date
150
143
135
128
120
66 72 78 84 90 96 02
Year


CES productivity 1983–2002
Wren
Index
180
150
120
90
60
83 85 87 89 91 93 95 97 99 01 03
Year

ROBIN
Erithacus rubecula

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Robins have increased markedly since the mid 1980s, according to both CBC/BBS and CES results. Significant improvements have occurred concurrently in breeding performance, according to NRS data, due to reductions in nest failure rates at both egg and chick stages, although CES productivity measures have declined. The CES and BBS graphs show that marked and significant fluctuations occur, perhaps in response to winter weather (these are not evident in the CBC/BBS graphs, where smoothed trends are presented). The reasons for these changes remain to be investigated.

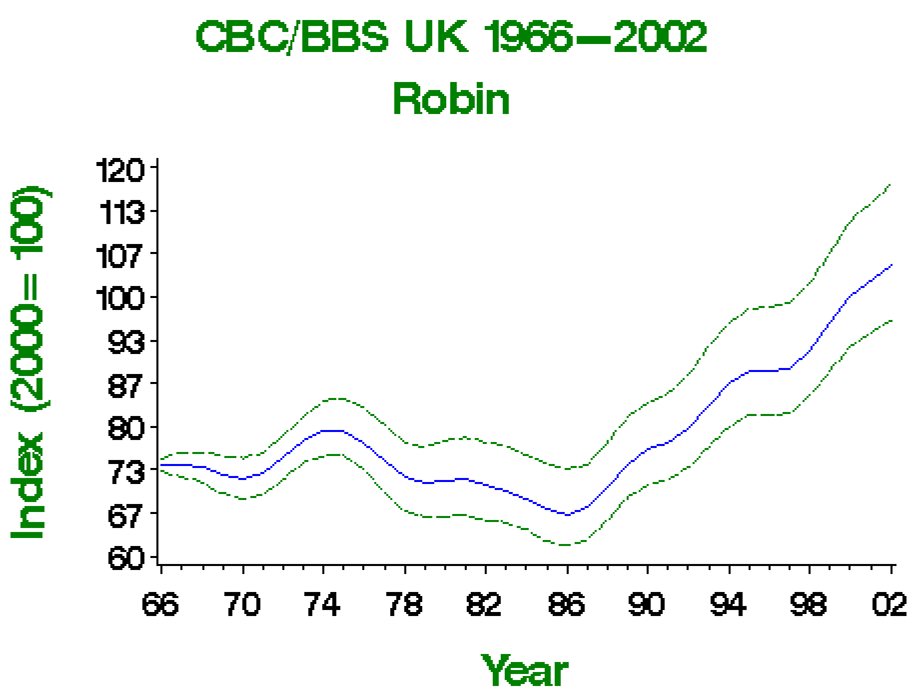
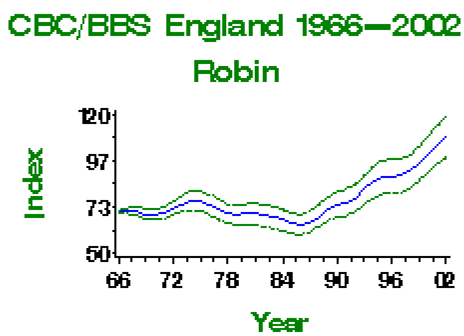


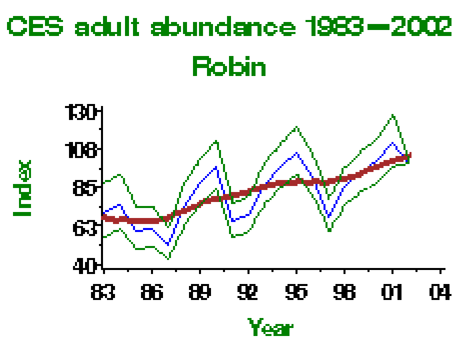
Table of population changes for Robin

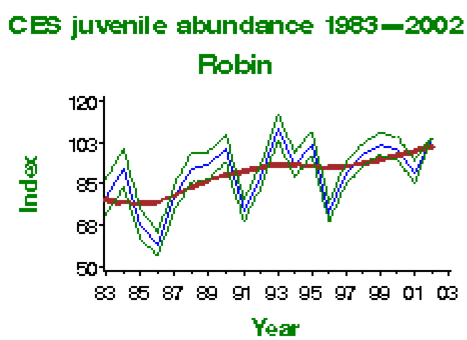
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	567	35	24	50		
	25	1975-2000	685	26	17	38		
	10	1990-2000	1299	31	26	36		
	5	1995-2000	1995	13	11	16		
CBC/BBS England	33	1967-2000	462	40	25	53		
	25	1975-2000	556	31	21	41		

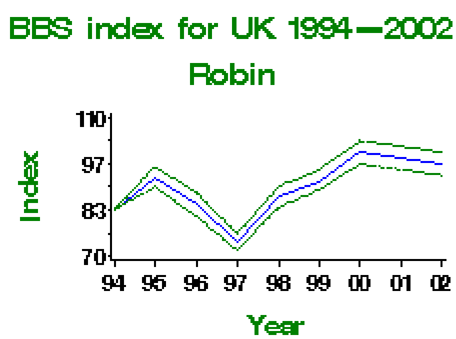
	10	1990-2000	1042	35	29	40		
	5	1995-2000	1590	13	11	16		
CES adults	17	1984-2001	87	52	.	.		
	10	1991-2001	103	26	.	.		
	5	1996-2001	104	14	.	.		
CES juveniles	17	1984-2001	92	28	.	.		
	10	1991-2001	108	9	.	.		
	5	1996-2001	112	7	.	.		
BBS UK	8	1994-2002	1721	16	12	20		
BBS England	8	1994-2002	1358	24	19	28		
BBS Scotland	8	1994-2002	150	-8	-21	7		
BBS Wales	8	1994-2002	149	17	6	29		
BBS N.Ireland	8	1994-2002	56	28	1	62		

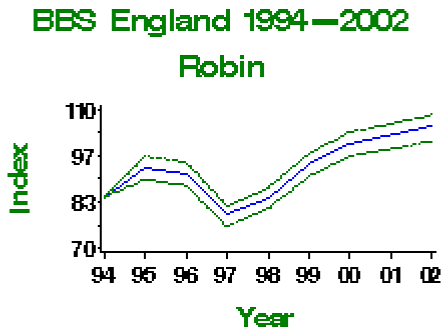
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

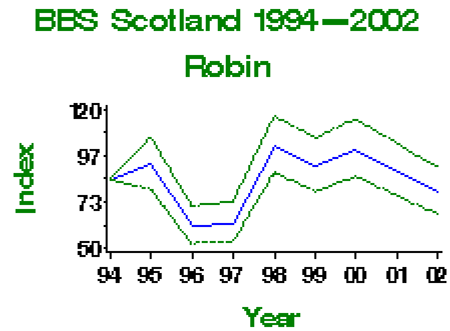


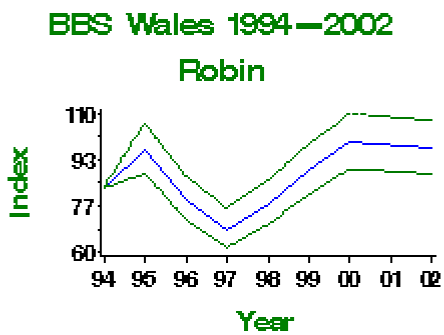












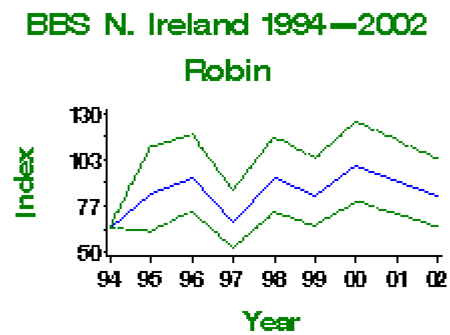
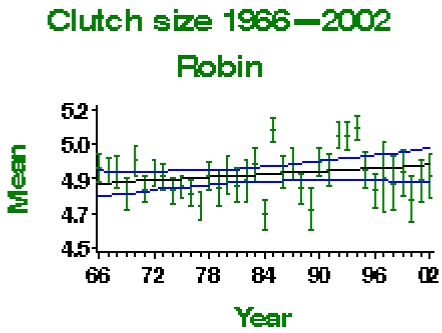
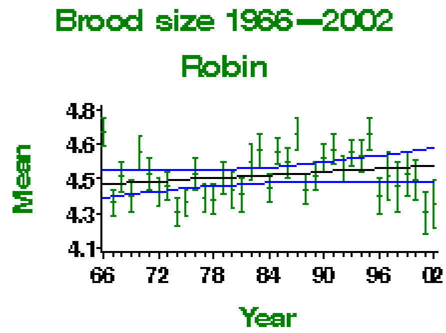
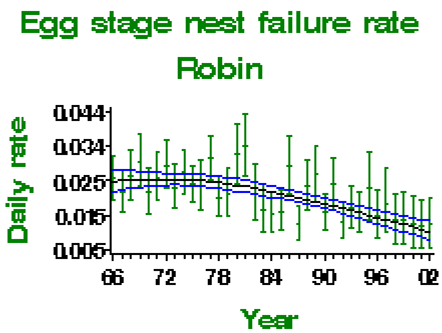


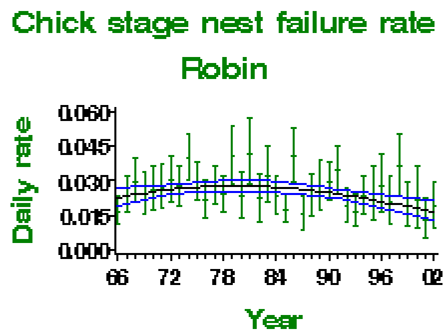
Table of productivity information for Robin

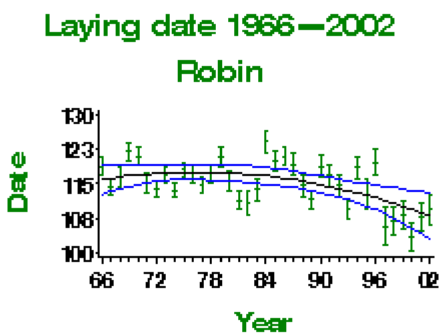
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	122	None				
Brood size	33	1968-2001	162	None				
Daily failure rate (eggs)	33	1968-2001	181	Curvilinear	0.0247 nests/day	0.011 nests/day	-0.0137 nests/day	
Daily failure rate (chicks)	33	1968-2001	151	Curvilinear	0.0242 nests/day	0.0174 nests/day	-0.0068 nests/day	
Laying date	33	1968-2001	119	Curvilinear	day 117	day 109	-8 days	
Percentage juveniles (CES)	17	1984-2001	96	Smoothed trend	128 productivity index	101 productivity index	-22%	
Percentage juveniles (CES)	10	1991-2001	113	Smoothed trend	121 productivity index	101 productivity index	-18%	
Percentage juveniles (CES)	5	1996-2001	115	Smoothed trend	112 productivity index	101 productivity index	-11%	

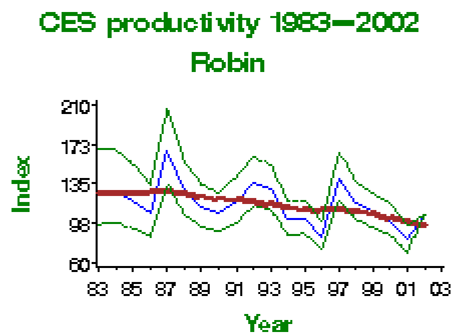

Clutch size 1966–2002
Robin
Mean
Year


Brood size 1966–2002
Robin
Mean
Year


Egg stage nest failure rate
Robin
Daily rate
Year


Chick stage nest failure rate
Robin
Daily rate
Year


Laying date 1966–2002
Robin
Date
Year


CES productivity 1983–2002
Robin
Index
Year

NIGHTINGALE
Luscinia megarhynchos

Conservation listings

Europe: SPEC category 4, (secure)
UK: Amber (25-50% distribution decline)

Long-term trend

UK: probable decline

Status summary

In 1999, the BTO organised a national survey of Nightingales, which showed a marked range contraction since the previous survey in 1980, but only a small overall population decline (8%) (**Wilson *et al.* 2002**). Nightingales are scarce birds, and CBC and BBS data are correspondingly sparse. Nevertheless, analysis of the available CBC data shows continuous decline (G.M. Siriwardena, unpubl.) and CES suggests a similar pattern, at least until 1997. CES indicates a sharp decline in productivity during the 1980s, perhaps because Nightingale nesting success may be adversely affected by cold and wet springs.

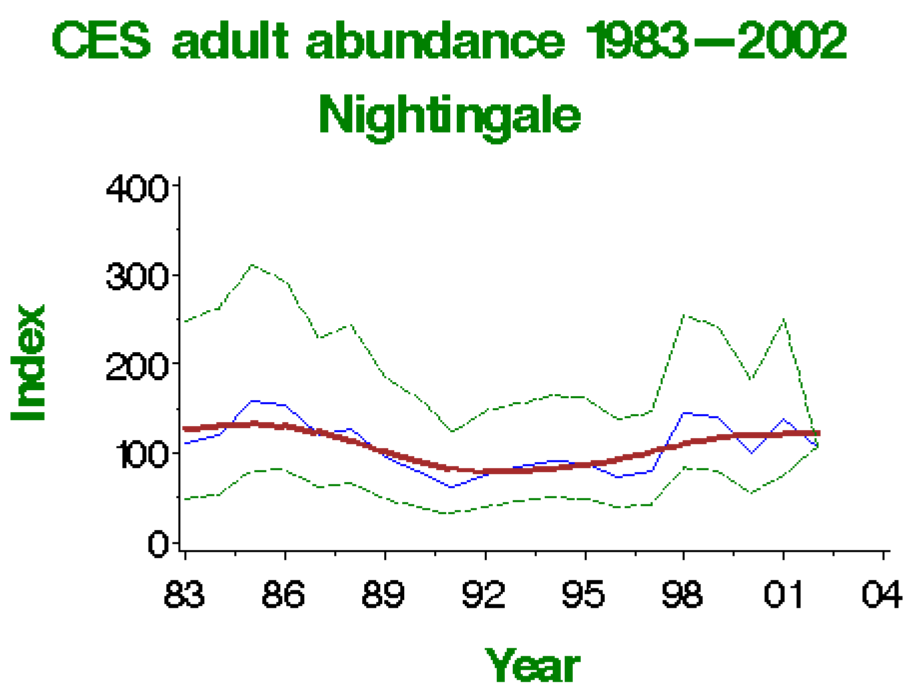


Table of population changes for Nightingale

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CES adults	17	1984-2001	10	-7	.	.		Small sample
	10	1991-2001	11	47	.	.		Small sample
	5	1996-2001	11	31	.	.		Small sample

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

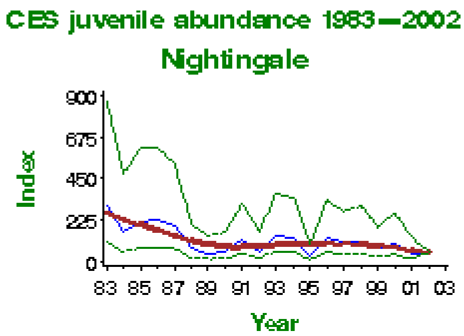


Table of productivity information for Nightingale

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	3	None				Small sample
Brood size	33	1968-2001	6	None				Small sample
Daily failure rate (eggs)	33	1968-2001	3	None				Small sample
Daily failure rate (chicks)	33	1968-2001	5	None				Small sample
Laying date	33	1968-2001	5	None				Small sample
Percentage juveniles (CES)	17	1984-2001	12	Smoothed trend	606 productivity index	101 productivity index	-84%[>50]	Small sample
Percentage juveniles (CES)	10	1991-2001	13	Smoothed trend	257 productivity index	101 productivity index	-61%[>50]	Small sample
Percentage juveniles (CES)	5	1996-2001	13	Smoothed trend	278 productivity index	101 productivity index	-64%[>50]	Small sample

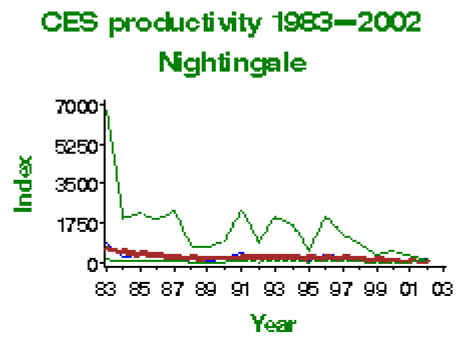
Insufficient data on clutch size available for this species

Insufficient data on brood size available for this species

Insufficient data on nest failure available for this species

Insufficient data on nestling failure available for this species

Insufficient data on laying date
available for this species



REDSTART
Phoenicurus phoenicurus

Conservation listings

Europe: SPEC category 2, vulnerable
UK: Amber (European status)

Long-term trend

UK, England: fluctuating, with no long-term trend

Status summary

The decline in the late 1960s and early 1970s was thought to be due to severe drought conditions in the Sahel wintering area in Africa (**Marchant *et al.* 1990**). There was a loss of range of 20% in Britain between 1968-72 and 1988-91, in terms of the numbers of occupied 10-km squares (**Gibbons *et al.* 1993**). A recovery in population size began in the mid 1970s and appears to have continued, at least in England, into the late 1990s. This increase has been associated with improving breeding performance and progressively earlier laying dates. The trend towards earlier laying can be partially explained as a result of recent climate change (**Crick & Sparks 1999**).

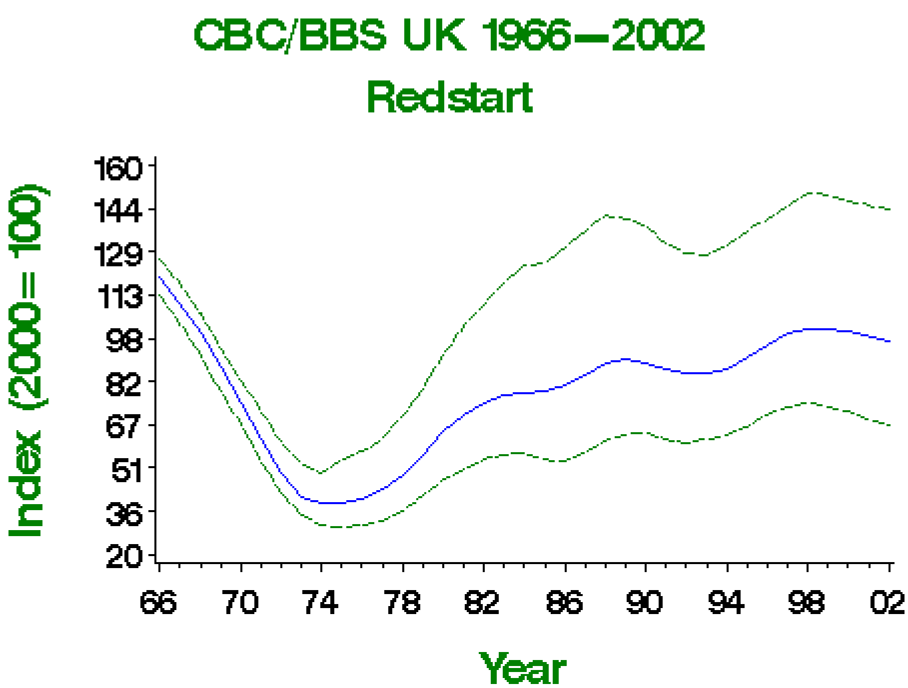
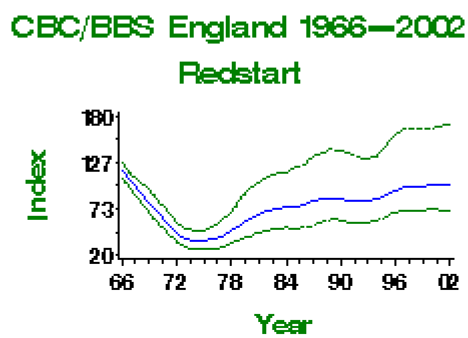


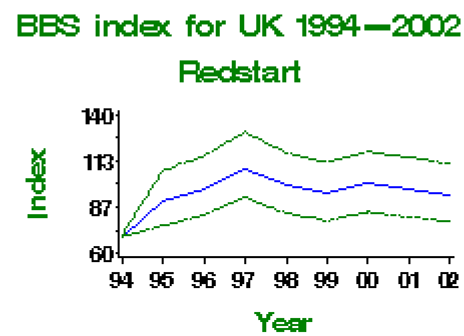
Table of population changes for Redstart

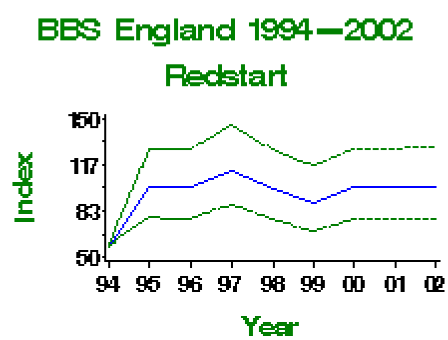
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	50	-10	-39	42		
	25	1975-2000	59	160	73	271		
	10	1990-2000	109	12	-2	26		
	5	1995-2000	164	10	0	20		
CBC/BBS England	33	1967-2000	32	-5	-33	75		

	25	1975-2000	37	174	113	336		
	10	1990-2000	66	18	2	33		
	5	1995-2000	95	12	1	25		
BBS UK	8	1994-2002	133	34	12	60		
BBS England	8	1994-2002	70	72	33	122		
BBS Wales	8	1994-2002	52	2	-20	30		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







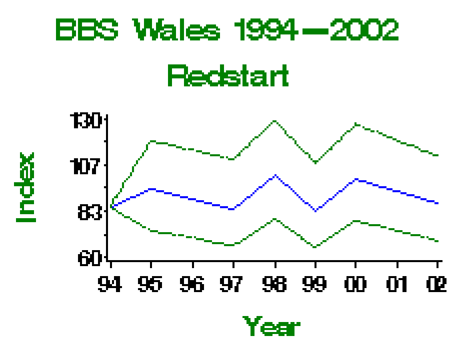
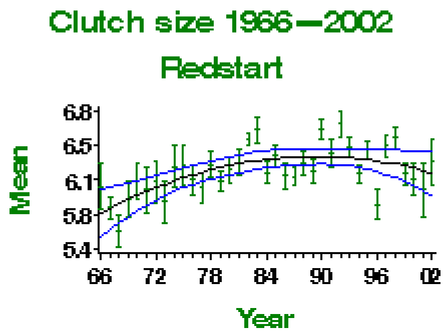
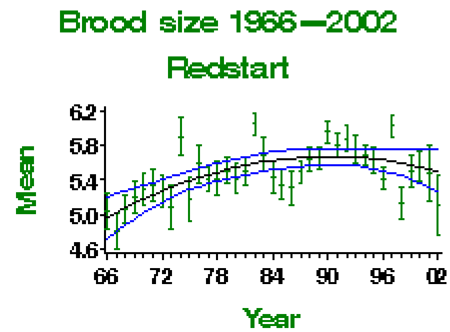


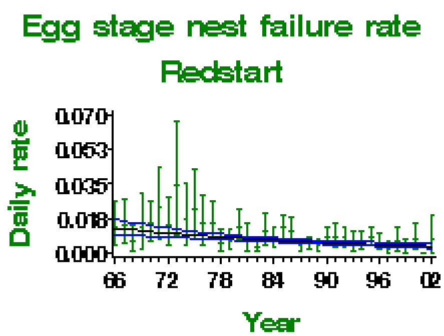
Table of productivity information for Redstart

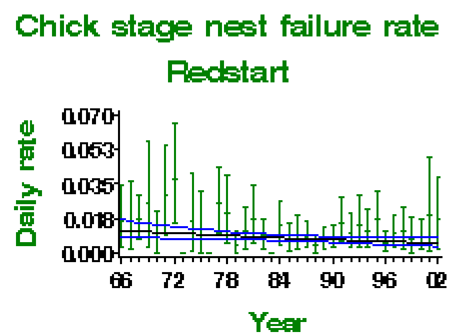
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	52	Curvilinear	5.86 eggs	6.2 eggs	0.34 eggs	
Brood size	33	1968-2001	91	Curvilinear	5.08 chicks	5.53 chicks	0.45 chicks	
Daily failure rate (eggs)	33	1968-2001	78	Linear decline	0.0118 nests/day	0.0038 nests/day	-0.008 nests/day	
Daily failure rate	33	1968-	55	Linear	0.0112	0.0054	-0.0058	

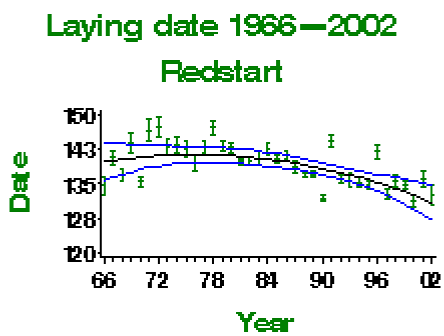
(chicks)		2001		decline	nests/day	nests/day	nests/day	
Laying date	33	1968-2001	66	Curvilinear	day 140	day 132	-8 days	











Insufficient data on CES available for this species

WHINCHAT
Saxicola rubetra

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: possible decline

Status summary

Whinchats were not monitored until the BBS began in 1994. By then, however, **Gibbons *et al.* (1993)** had identified a range contraction from lowland England that was probably due to the loss of marginal farmland habitats. BBS data suggest that some recent decline may have taken place, especially in England. There has been no clear trend in breeding performance in the period since 1966.

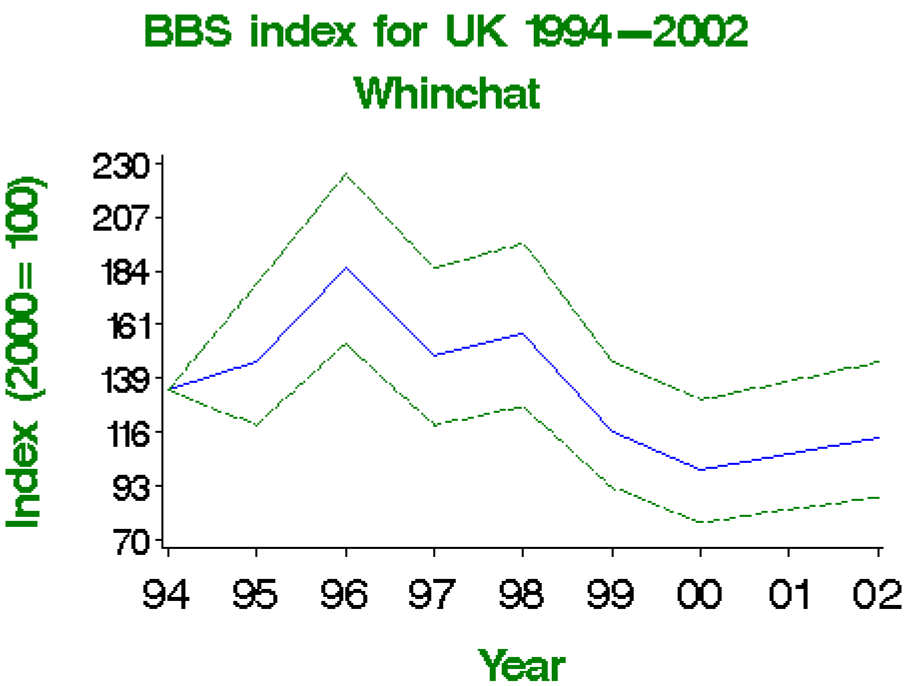


Table of population changes for Whinchat

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	78	-15	-34	9		
BBS England	8	1994-2002	32	-24	-46	8		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

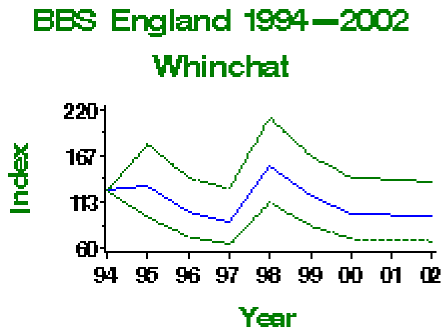
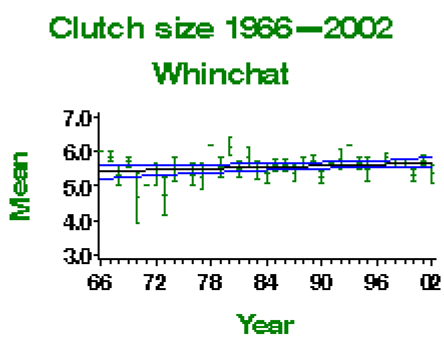
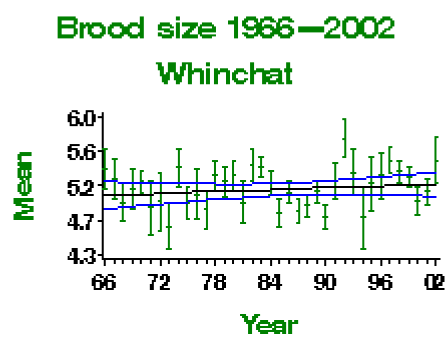
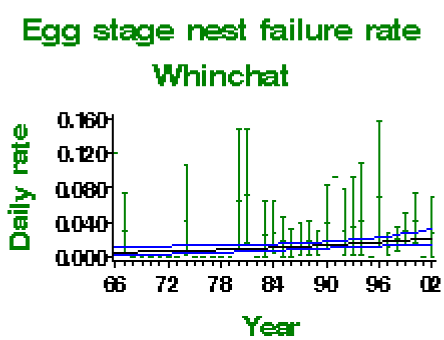


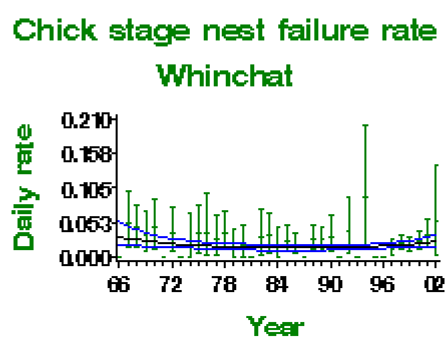
Table of productivity information for Whinchat

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	None				Small sample
Brood size	33	1968-2001	43	None				
Daily failure rate (eggs)	33	1968-2001	16	Linear increase	0.006 nests/day	0.0209 nests/day	0.0149 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	29	Curvilinear	0.027 nests/day	0.0221 nests/day	-0.0049 nests/day	Small sample
Laying date	33	1968-2001	31	Curvilinear	day 148	day 144	-4 days	

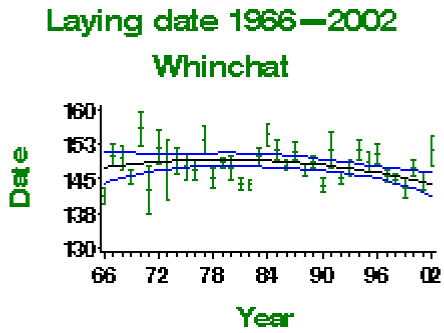








Insufficient data on CES available for this species


Laying date 1966—2002
Whinchat
Date
160
153
145
138
130
66
72
78
84
90
96
02
Year

STONECHAT
Saxicola torquatus

Conservation listings

Europe: SPEC category 3, (declining)
UK: Amber (European status)

Long-term trend

UK: uncertain, possible decline

Status summary

Breeding atlas data showed a substantial contraction in the Stonechat's range between the early 1970s and late 1980s (**Gibbons *et al.* 1993**), but the species was not monitored sufficiently well before the start of the BBS for long-term numerical trends to be investigated. Abundance appears to be linked to severe winter weather, and suitable breeding habitat has become scarce and fragmented in many inland regions (**Marchant *et al.* 1990**). Numbers have fluctuated since 1994, but with a substantial net increase. Clutch and brood sizes have improved over the long term.

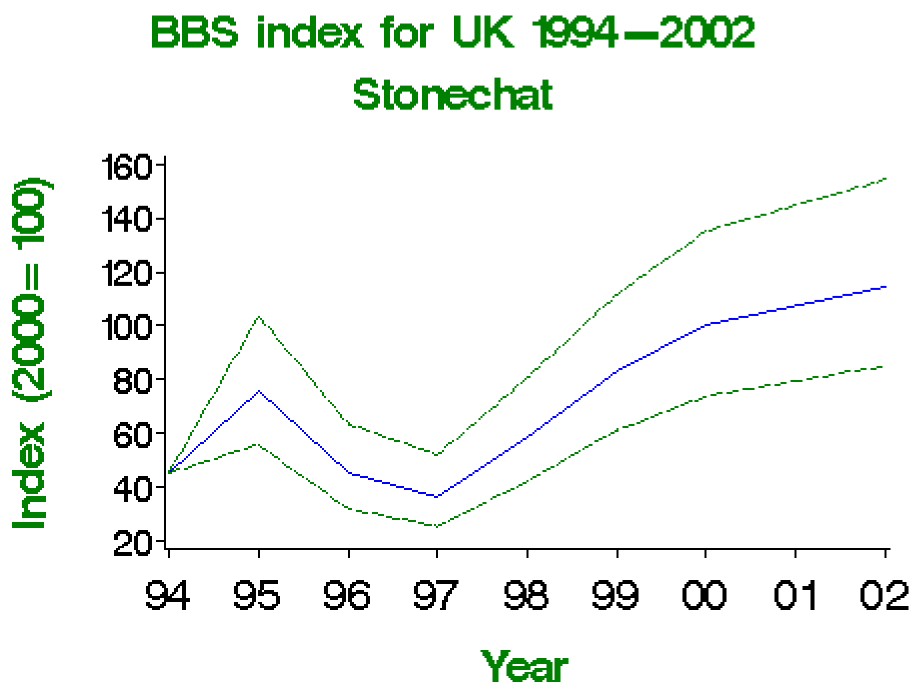


Table of population changes for Stonechat

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	80	153	88	241		
BBS England	8	1994-2002	30	115	35	243		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

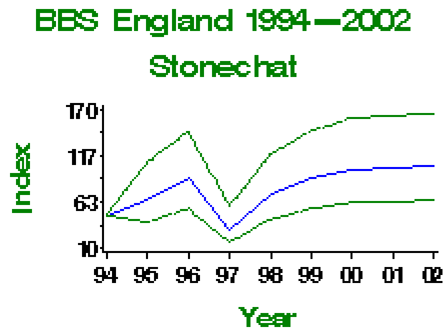
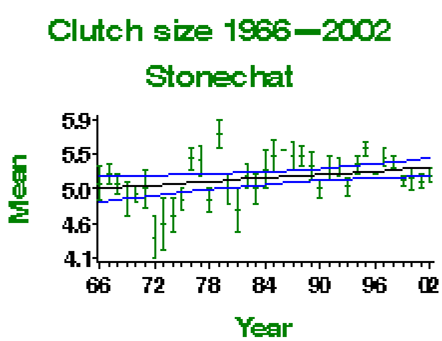
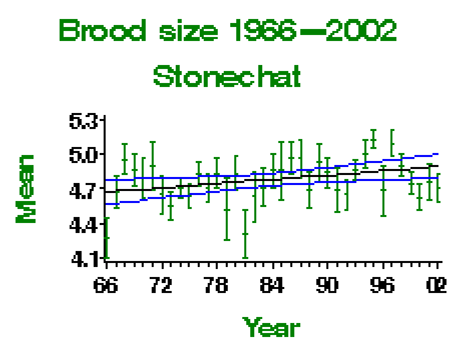
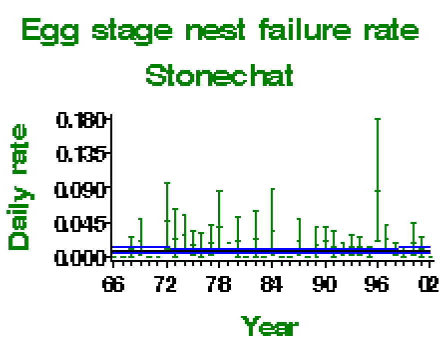


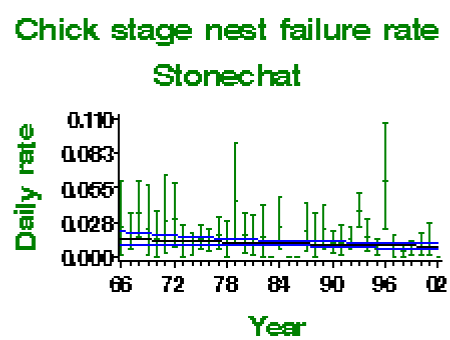
Table of productivity information for Stonechat

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	23	Linear increase	5.02 eggs	5.28 eggs	0.26 eggs	Small sample
Brood size	33	1968-2001	53	Linear increase	4.68 chicks	4.89 chicks	0.21 chicks	
Daily failure rate (eggs)	33	1968-2001	27	None				Small sample
Daily failure rate (chicks)	33	1968-2001	48	None				
Laying date	33	1968-2001	31	None				

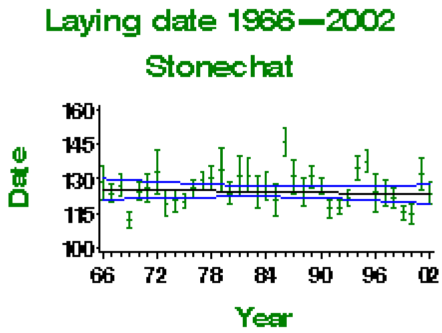








Insufficient data on CES available for this species


Laying date 1966—2002
Stonechat
Date
160
145
130
115
100
66
72
78
84
90
96
02
Year

WHEATEAR
Oenanthe oenanthe

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: possible decline

Status summary

Although common in many upland areas, the Wheatear was not monitored until the inception of the BBS in 1994. **Gibbons *et al.* (1993)** had by then identified range contractions from lowland Britain, perhaps due to losses of grassland and declines in rabbit abundance. The BBS shows wide fluctuations but no clear trend in abundance since 1994 in either England, Scotland or Wales. Failure rates at the egg stage (18 days, comprising 14 days incubation and 4 days laying) have fallen, but so has brood size.

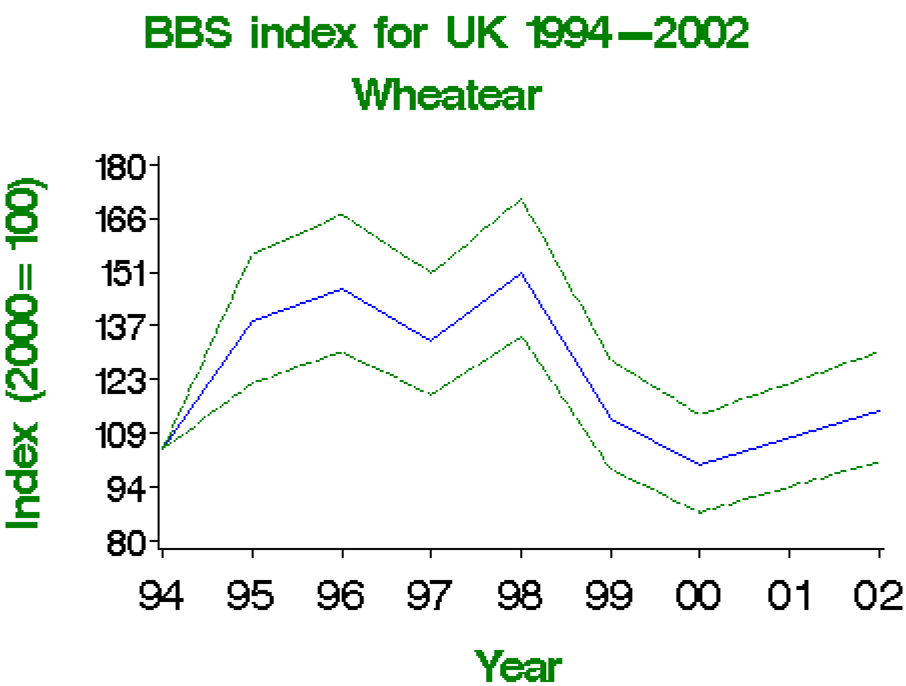
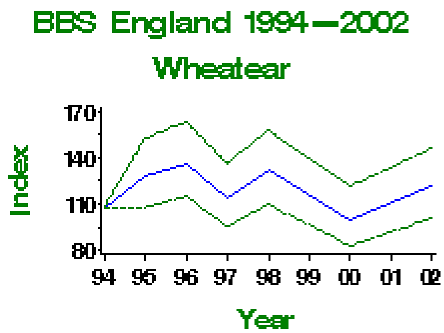
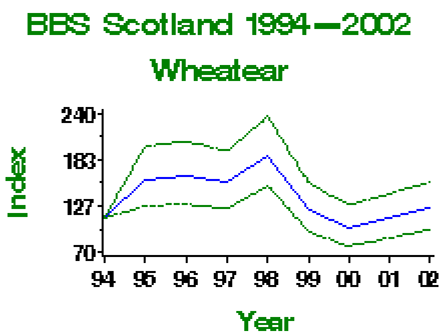


Table of population changes for Wheatear

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	237	10	-3	25		
BBS England	8	1994-2002	113	13	-6	36		
BBS Scotland	8	1994-2002	73	10	-13	39		
BBS Wales	8	1994-2002	42	-5	-33	33		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





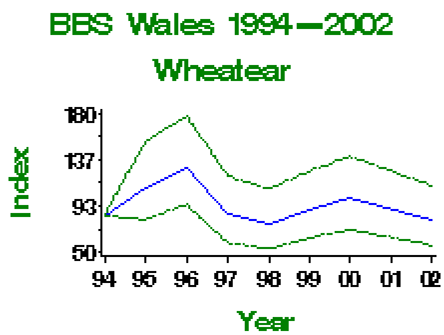
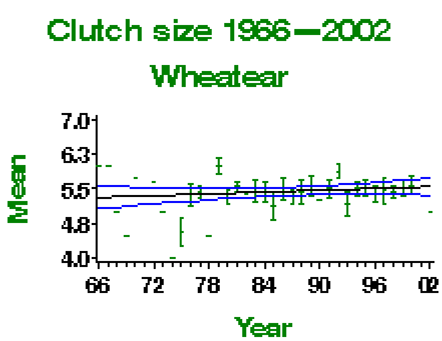
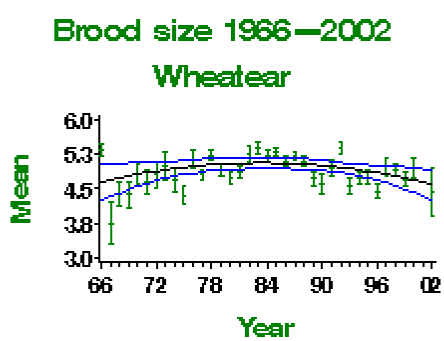
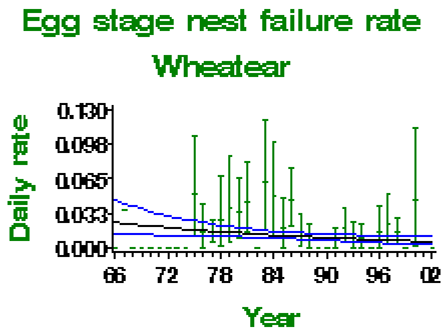


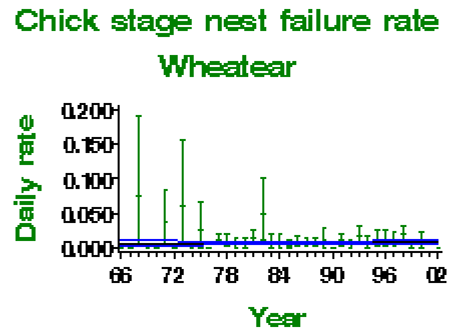
Table of productivity information for Wheatear

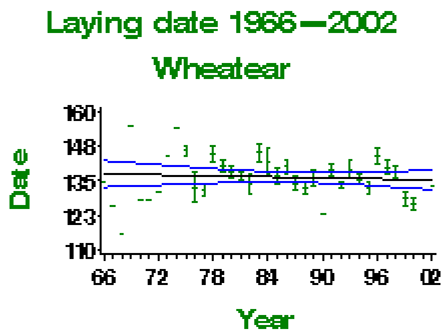
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	14	None				Small sample
Brood size	33	1968-2001	66	Curvilinear	4.73 chicks	4.64 chicks	-0.09 chicks	
Daily failure rate (eggs)	33	1968-2001	21	Linear decline	0.0226 nests/day	0.0066 nests/day	-0.016 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	46	None				
Laying date	33	1968-2001	15	None				Small sample











Insufficient data on CES available for this species

RING OUZEL
Turdus torquatus

Conservation listings

Europe: SPEC category 4, secure
UK: Red (>50% population decline)

Long-term trend

UK: probable decline

Status summary

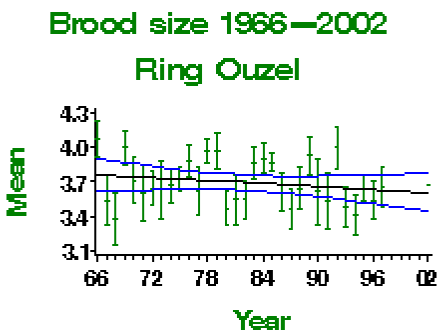
The 1988-91 Breeding Atlas showed a decline of 27% in the number of 10-km squares occupied between 1968-72 and 1988-91 (**Gibbons *et al*. 1993**), and the extent of population decline has now been established by a special survey. A 58% decline was estimated for the period between 1988-91 and 1999, warranting Red listing for this species (**Wotton *et al.* 2002**). Reasons for the decline are unknown but afforestation, disturbance, climatic warming, and competition with Blackbirds have all been suggested. Declines in chick-stage nest failure rates may be linked to the retreat of the species to its most favoured areas.

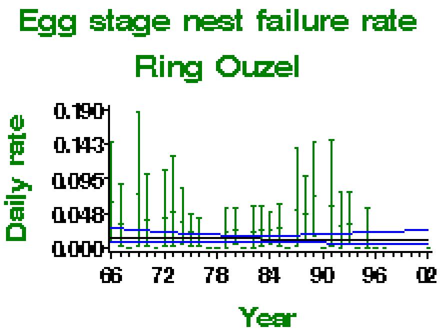
Annual breeding population changes for this species
are not currently monitored by BTO

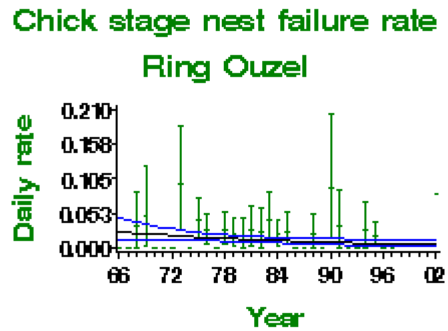
Table of productivity information for Ring Ouzel

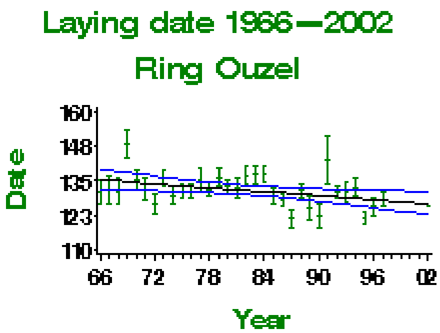
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	25	None				Small sample
Daily failure rate (eggs)	33	1968-2001	12	None				Small sample
Daily failure rate (chicks)	33	1968-2001	16	Linear decline	0.0229 nests/day	0.0057 nests/day	-0.0172 nests/day	Small sample
Laying date	33	1968-2001	27	Linear decline	day 135	day 127	-8 days	Small sample

Insufficient data on clutch size
available for this species









Insufficient data on CES available for this species

BLACKBIRD
Turdus merula

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: shallow decline

Status summary

Both CBC/BBS and CES data show long-term declines in Blackbird abundance, but recent increases suggest that the population may be starting to recover. The moderate-decline criteria for Amber listing and for BTO alerts are no longer met, and the species is now listed as Green. CBC results indicate that the decline began in the mid 1970s. Productivity shows no clear temporal trend, and it is likely that changes in survival drove the decline (**Siriwardena *et al.* 1998a**). Agricultural intensification is likely to have contributed (**Fuller *et al.* 1995**), but, since numbers fell in woodland as well as farmland, additional factors probably operated.

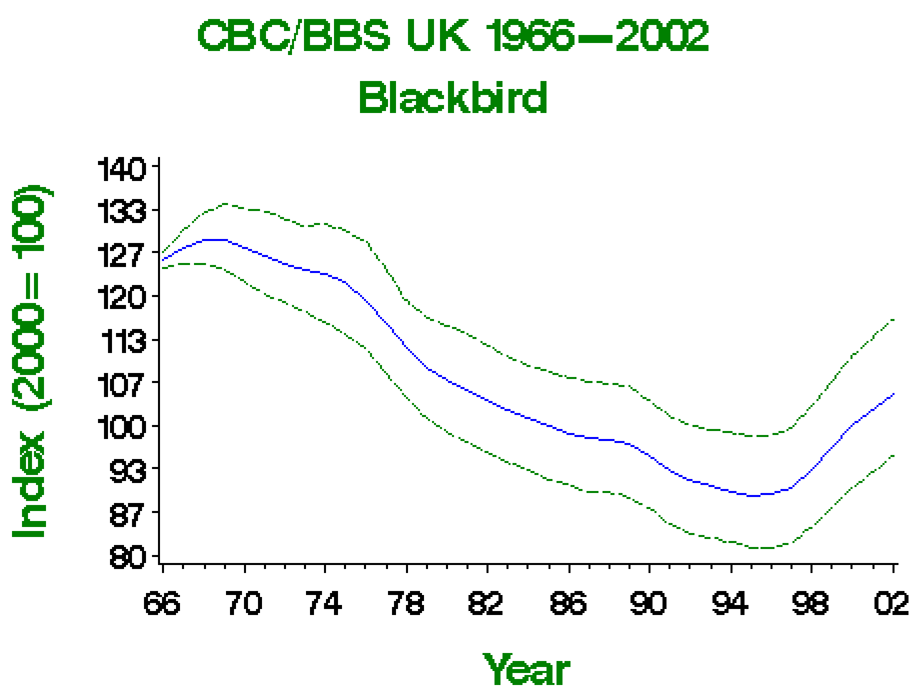
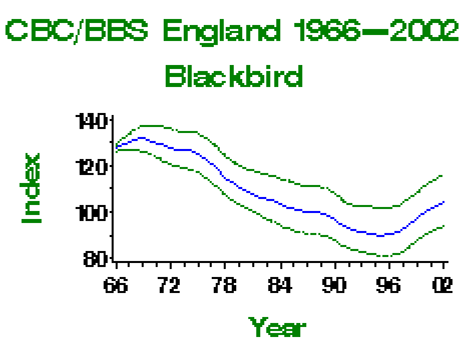


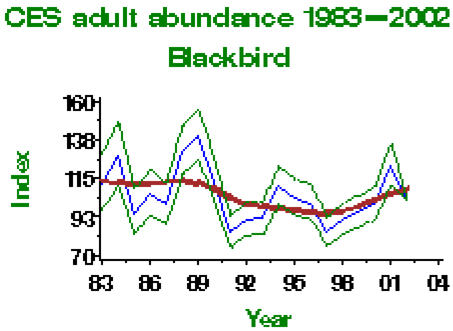
Table of population changes for Blackbird

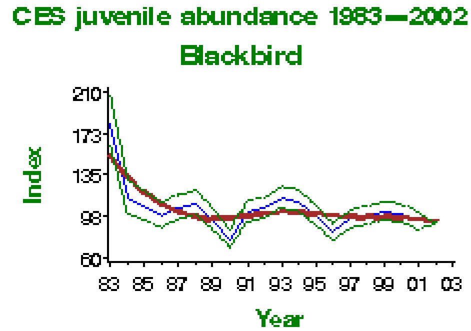
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	592	-22	-29	-13		
	25	1975-2000	715	-18	-25	-10		
	10	1990-2000	1357	5	1	9		
	5	1995-2000	2085	12	10	14		

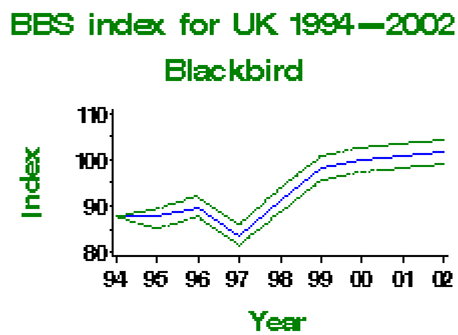
CBC/BBS England	33	1967-2000	488	-23	-31	-14		
	25	1975-2000	587	-20	-28	-13		
	10	1990-2000	1104	4	0	8		
	5	1995-2000	1687	11	9	13		
CES adults	17	1984-2001	95	-6	.	.		
	10	1991-2001	110	2	.	.		
	5	1996-2001	112	11	.	.		
CES juveniles	17	1984-2001	84	-29	.	.	[>25]	
	10	1991-2001	99	-3	.	.		
	5	1996-2001	100	-3	.	.		
BBS UK	8	1994-2002	1803	16	13	19		
BBS England	8	1994-2002	1446	14	11	18		
BBS Scotland	8	1994-2002	144	10	-3	24		
BBS Wales	8	1994-2002	149	24	12	36		
BBS N.Ireland	8	1994-2002	56	92	49	147		

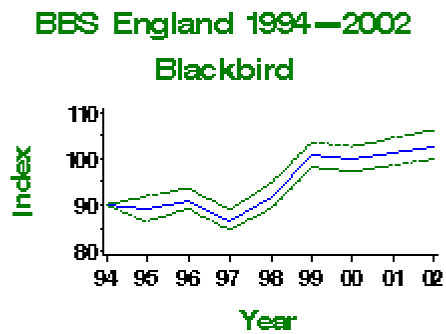
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

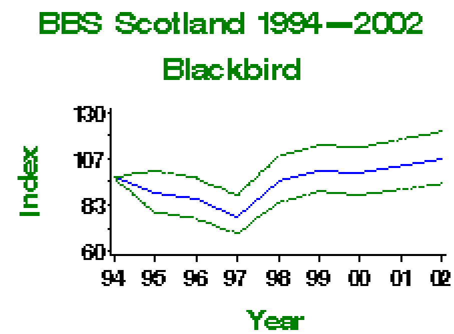


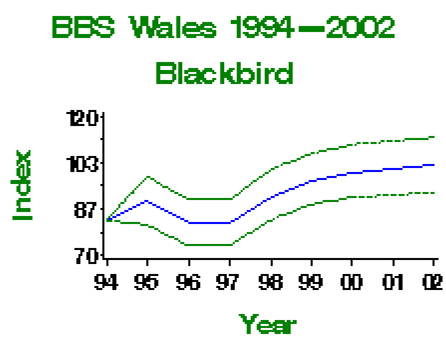












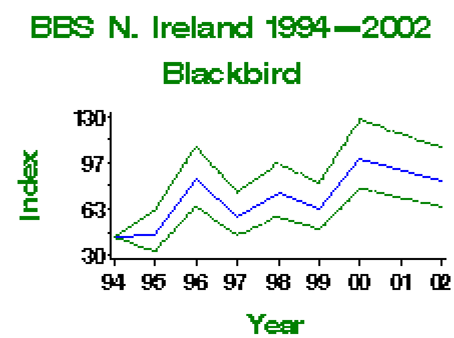
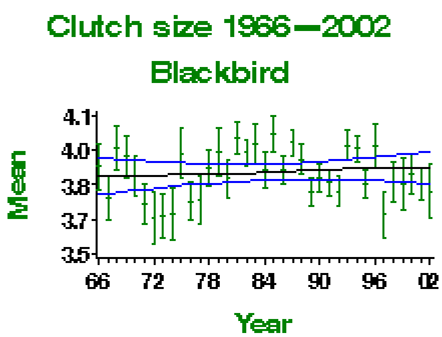
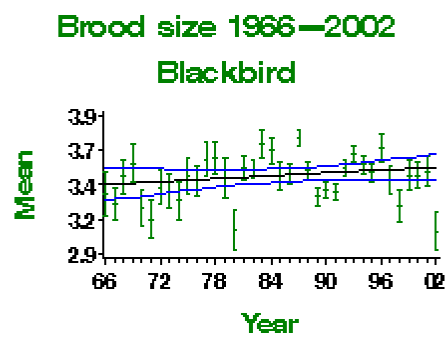


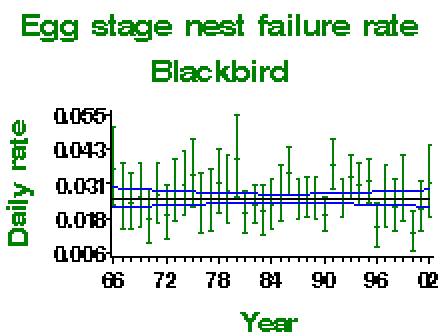
Table of productivity information for Blackbird

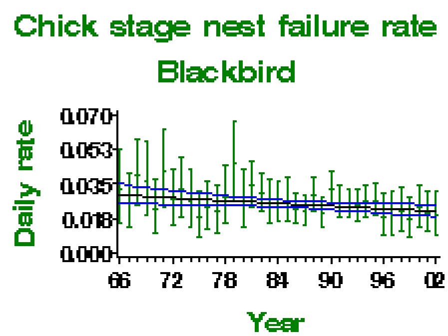
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	94	None				
Brood size	33	1968-2001	118	None				
Daily failure rate (eggs)	33	1968-2001	135	None				
Daily failure rate	33	1968-2001	114	Linear decline	0.0292 nests/day	0.0216 nests/day	-0.0076 nests/day	

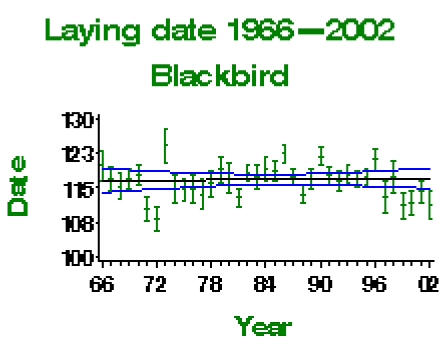
(chicks)								
Laying date	33	1968-2001	115	None				
Percentage juveniles (CES)	17	1984-2001	97	Smoothed trend	127 productivity index	101 productivity index	-21%	
Percentage juveniles (CES)	10	1991-2001	112	Smoothed trend	106 productivity index	101 productivity index	-5%	
Percentage juveniles (CES)	5	1996-2001	114	Smoothed trend	114 productivity index	101 productivity index	-12%	

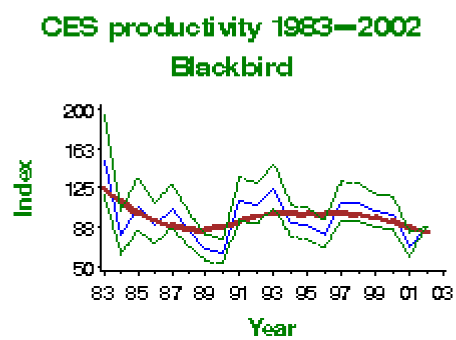












SONG THRUSH
Turdus philomelos

Conservation listings

Europe: SPEC category 4, secure
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

The CBC shows a rapid decline in Song Thrush abundance that began in the mid 1970s. The second half of this decline can also be seen in the CES index. CES productivity showed an initial decrease, followed by stability, and NRS data indicate that breeding performance has improved during this period. Changes in survival of juveniles in their first year of life probably drove the decline (**Thomson *et al.* 1997**, **Siriwardena *et al.* 1998a**). Recent CBC/BBS data suggest that the decline has at least levelled off, and may now be reversing. Decreasing Song Thrush abundance has been linked to agricultural intensification (**Fuller *et al.* 1995**), but woodland-specific factors such as drainage and the depletion of the shrub layer may also be implicated (**Vanhinsbergh *et al.* 2003**).

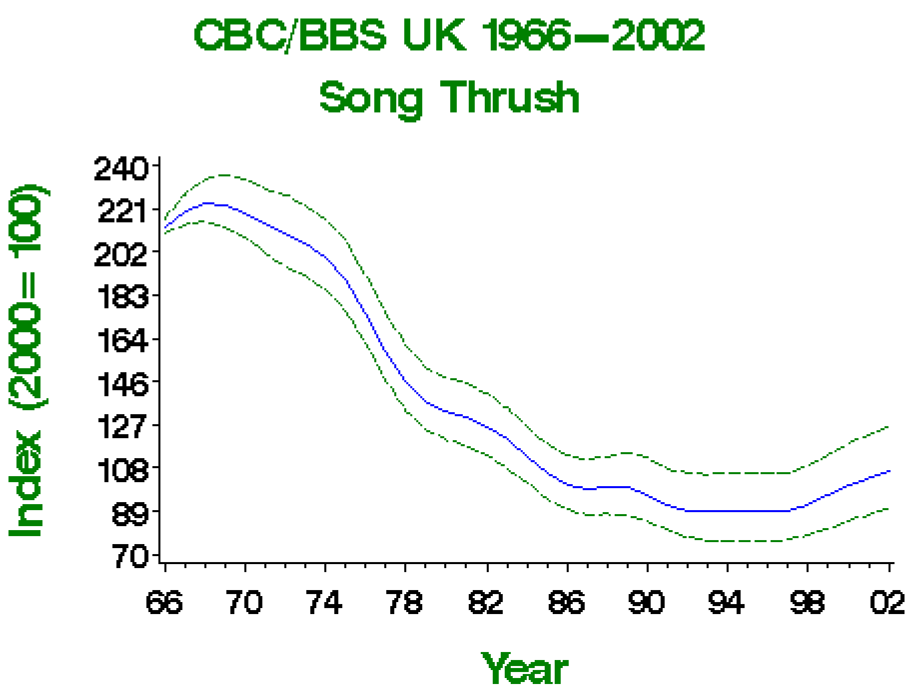


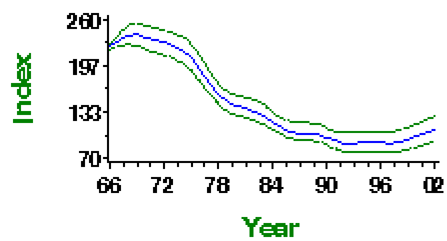
Table of population changes for Song Thrush

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	485	-55	-62	-45	>50	
	25	1975-2000	578	-47	-54	-41	>25	
	10	1990-2000	1062	4	-5	13		

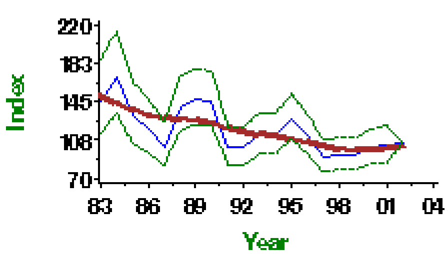
	5	1995-2000	1619	12	8	16		
CBC/BBS England	33	1967-2000	393	-57	-64	-50	>50	
	25	1975-2000	465	-52	-59	-43	>50	
	10	1990-2000	840	1	-7	9		
	5	1995-2000	1271	8	5	12		
CES adults	17	1984-2001	79	-31	.	.	[>25*]	
	10	1991-2001	91	-17	.	.		
	5	1996-2001	90	-6	.	.		
CES juveniles	17	1984-2001	63	-52	.	.	[>50*]	
	10	1991-2001	73	-8	.	.		
	5	1996-2001	74	2	.	.		
BBS UK	8	1994-2002	1394	13	8	19		
BBS England	8	1994-2002	1082	14	8	20		
BBS Scotland	8	1994-2002	131	8	-10	31		
BBS Wales	8	1994-2002	126	25	7	45		
BBS N.Ireland	8	1994-2002	47	28	-11	84		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

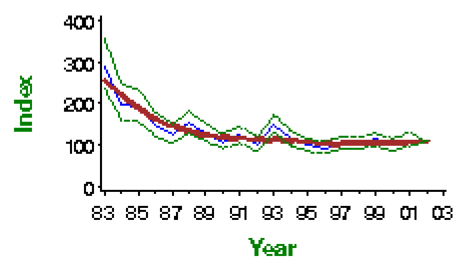
CBC/BBS England 1966–2002
Song Thrush



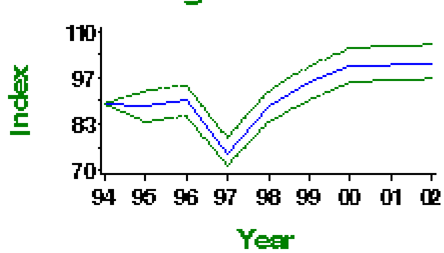
CES adult abundance 1983–2002
Song Thrush

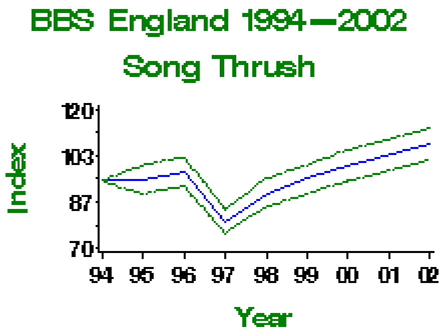


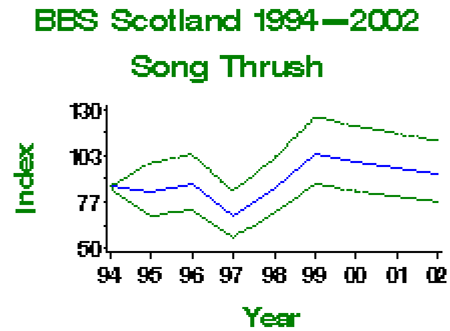
CES juvenile abundance 1983–2002
Song Thrush

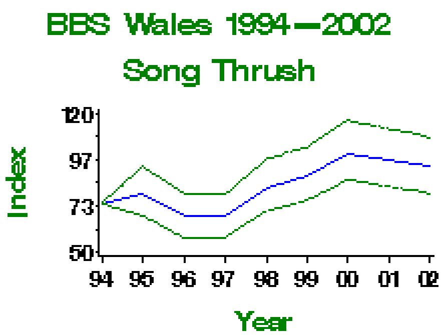


BBS index for UK 1994–2002
Song Thrush









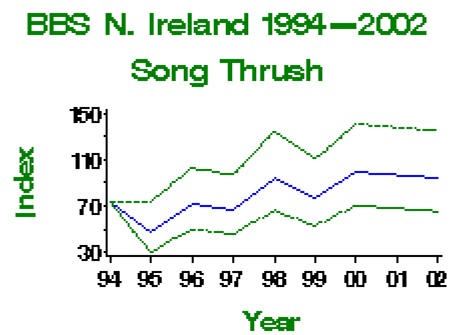
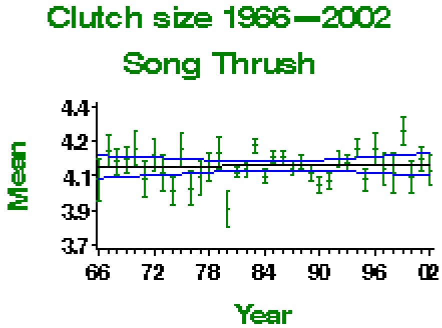
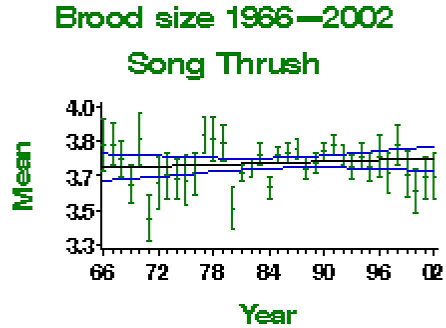
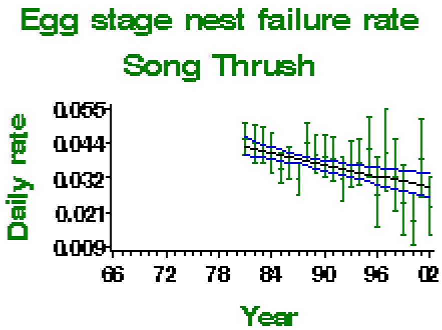


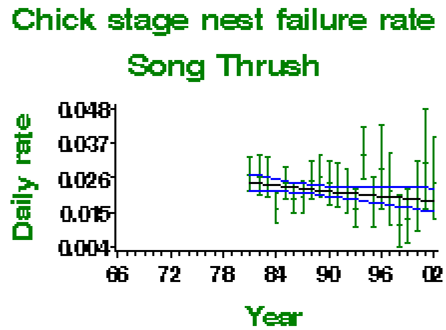
Table of productivity information for Song Thrush

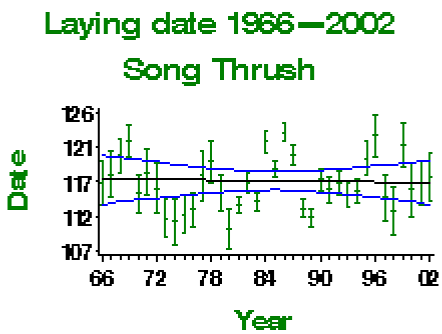
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	175	None				
Brood size	33	1968-2001	194	None				
Daily failure rate (eggs)	20	1981-2001	347	Linear decline	0.0424 nests/day	0.0298 nests/day	-0.0126 nests/day	
Daily failure rate (chicks)	20	1981-2001	258	None				
Laying date	33	1968-2001	202	None				
Percentage juveniles (CES)	17	1984-2001	86	Smoothed trend	147 productivity index	101 productivity index	-32%[>25]	
Percentage juveniles (CES)	10	1991-2001	100	Smoothed trend	90 productivity index	101 productivity index	11%	
Percentage juveniles (CES)	5	1996-2001	100	Smoothed trend	96 productivity index	101 productivity index	5%	

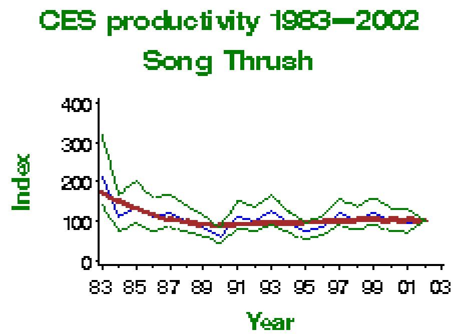

Clutch size 1966—2002
Song Thrush
Mean
Year


Brood size 1966—2002
Song Thrush
Mean
Year


Egg stage nest failure rate
Song Thrush
Daily rate
Year


Chick stage nest failure rate
Song Thrush
Daily rate
Year


Laying date 1966—2002
Song Thrush
Date
Year


CES productivity 1983—2002
Song Thrush
Index
Year

MISTLE THRUSH
Turdus viscivorus

Conservation listings

Europe: SPEC category 4, secure
UK: Amber (25-50% population decline)

Long-term trend

UK, England: moderate decline

Status summary

Like those of **Song Thrush** and **Blackbird**, Mistle Thrush populations have declined significantly since the mid 1970s, especially on farmland. The species has recently been moved from the Green to the Amber list because of population decline, but recent BBS data suggest that this decline may now have ceased. There have been no strong trends in breeding performance, and the decline is likely to have been driven by reduced annual survival (**Siriwardena *et al.* 1998**).

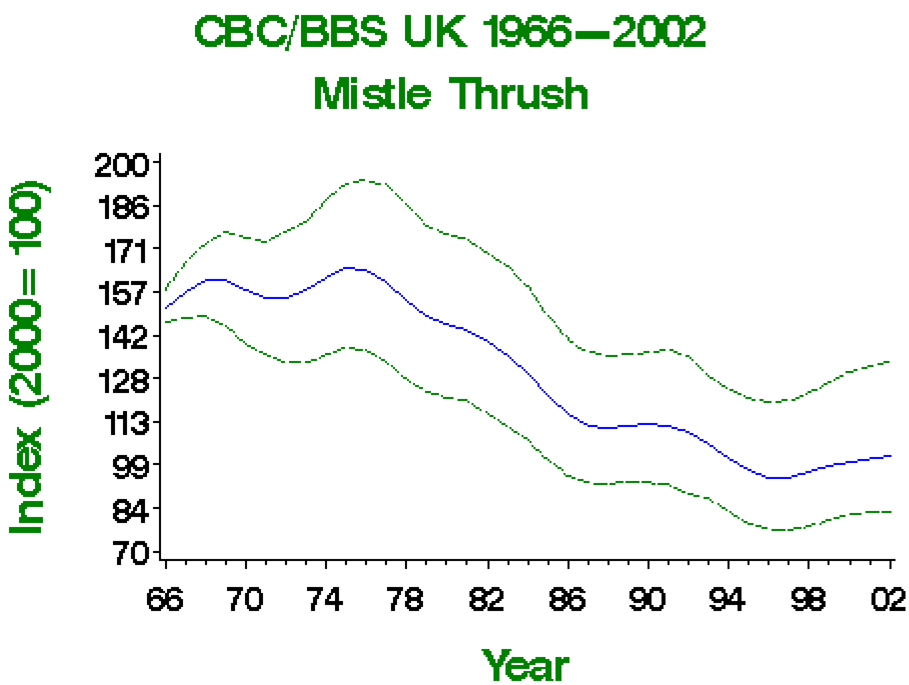
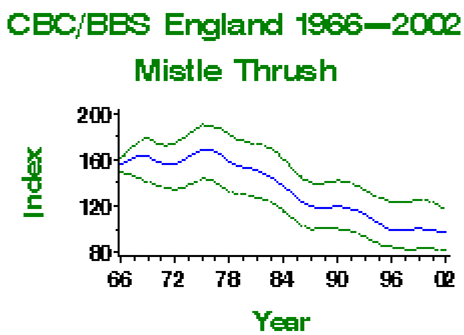


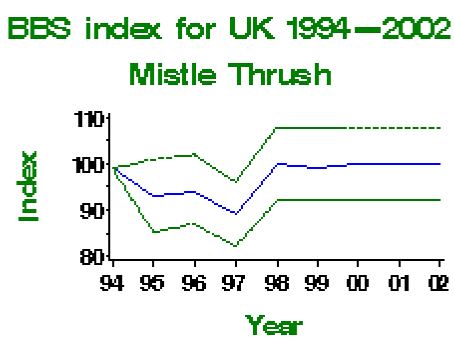
Table of population changes for Mistle Thrush

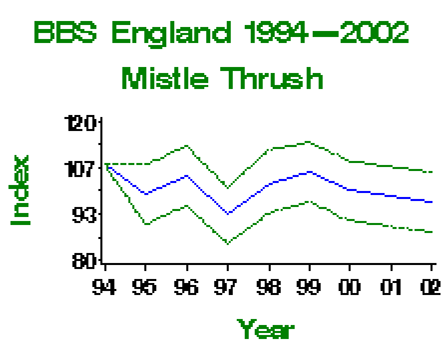
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	334	-36	-49	-18	>25	
	25	1975-2000	400	-39	-48	-29	>25	
	10	1990-2000	724	-11	-19	-2		
	5	1995-2000	1100	3	-3	10		
CBC/BBS England	33	1967-2000	280	-38	-47	-25	>25	

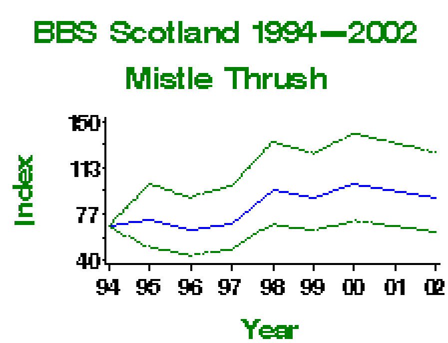
	25	1975-2000	334	-41	-49	-29	>25	
	10	1990-2000	598	-16	-25	-8		
	5	1995-2000	901	-3	-9	3		
BBS UK	8	1994-2002	946	1	-7	9		
BBS England	8	1994-2002	767	-10	-18	-2		
BBS Scotland	8	1994-2002	57	33	-6	88		
BBS Wales	8	1994-2002	81	5	-20	38		
BBS N.Ireland	8	1994-2002	37	42	-11	127		

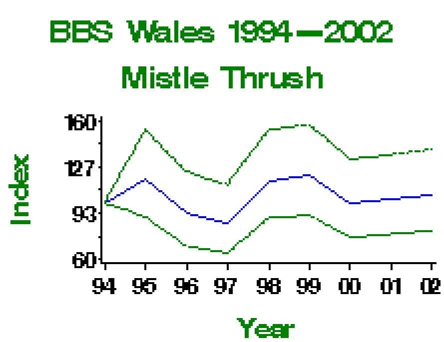
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











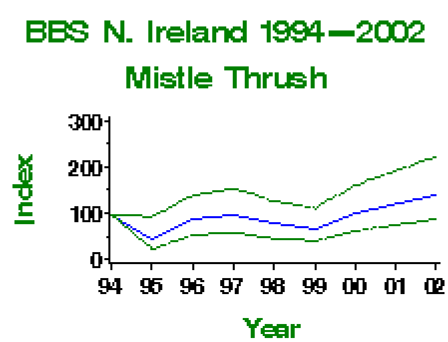
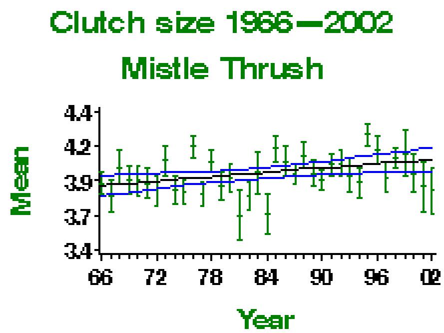
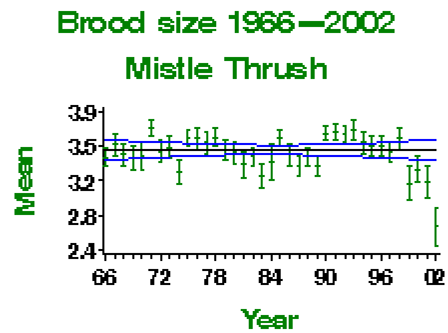
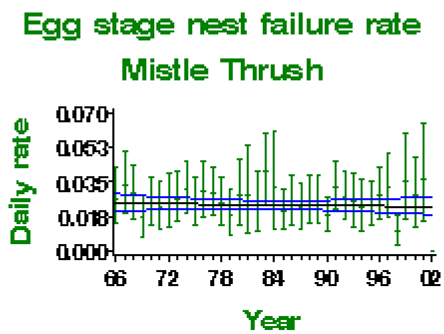


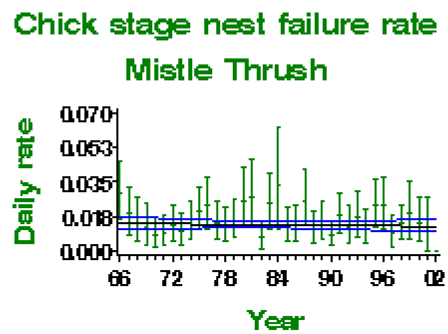
Table of productivity information for Mistle Thrush

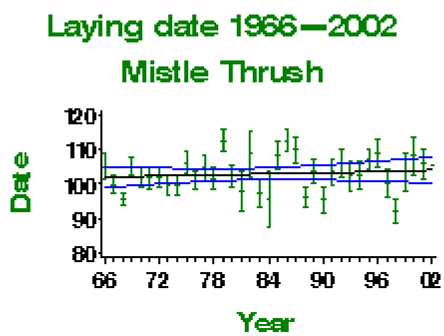
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	39	Linear increase	3.88 eggs	4.05 eggs	0.17 eggs	
Brood size	33	1968-2001	73	None				
Daily failure rate (eggs)	33	1968-2001	63	None				
Daily failure rate (chicks)	33	1968-2001	65	None				
Laying date	33	1968-2001	32	None				











Insufficient data on CES available for this species

GRASSHOPPER WARBLER
Locustella naevia

Conservation listings

Europe: SPEC category 4, secure
UK: Red (>50% population decline)

Long-term trend

UK: rapid decline

Status summary

Grasshopper Warbler was previously Amber listed because of a contraction in range during the period preceding the 1988-91 Atlas, reportedly due to habitat loss (**Gibbons *et al.* 1993**). CBC data suffer from small and severely dwindling sample sizes, but the available data indicate a rapid population decline between the mid 1960s and mid 1980s, when numbers became too small for annual monitoring (**Marchant *et al.* 1990**). On this basis, the species is now Red listed. The BBS shows fluctuations in abundance since 1994, but little net change. Given suitable habitat and conditions, the species has high reproductive potential, as demonstrated by analysis of the NRS data (**Glue 1990**).

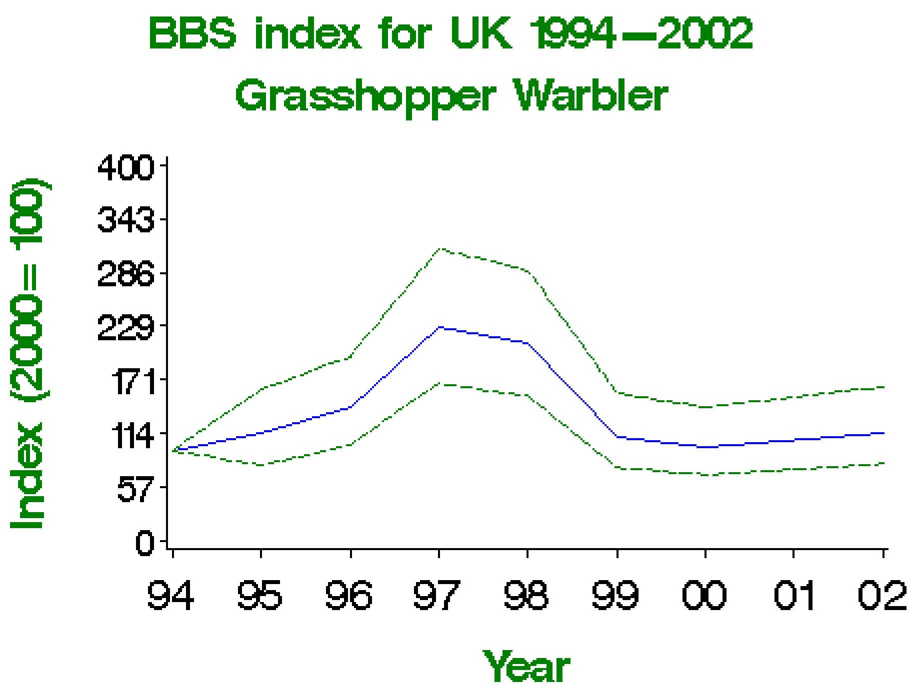


Table of population changes for Grasshopper Warbler

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	59	20	-15	70		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

No productivity information available for this species

SEDGE WARBLER
Acrocephalus schoenobaenus

Conservation listings

Europe: SPEC category 4, (secure)
UK: Green

Long-term trend

UK: fluctuating, with no long-term trend

Status summary

Detailed analysis of BTO data sets has shown that much of the year-to-year variation in population size is driven by changes in adult survival rates which, in turn, are related to changes in rainfall on their Sahel (trans-Saharan) wintering grounds (**Peach *et al.* 1991**). The smoothed CBC/BBS and WBS trends show four troughs in population, related to years of poor West African rainfall, with a low point in 1984-85. The CES, which provides the biggest Sedge Warbler sample, shows the last three of the same troughs and also illustrates the large year-to-year fluctuations that occur in this species. No strong trends are apparent in breeding performance, but CES productivity has shown a steady decline since 1983.

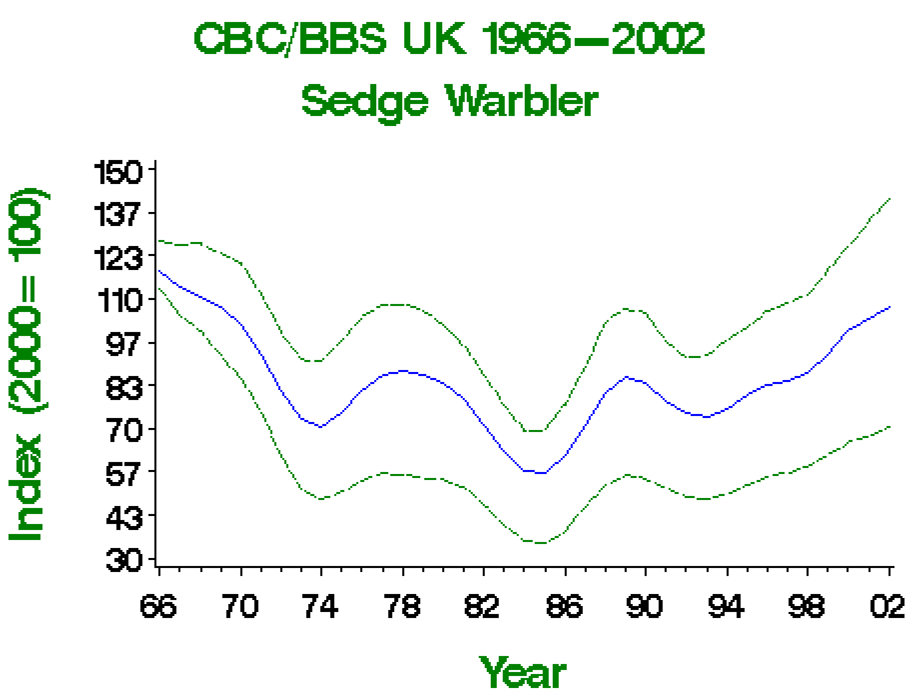
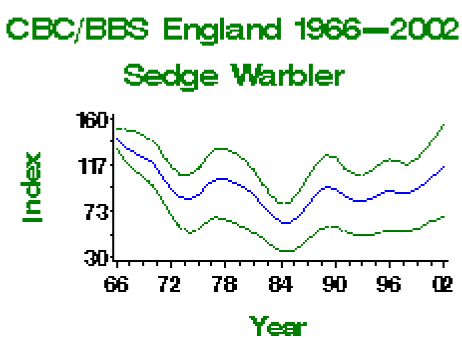


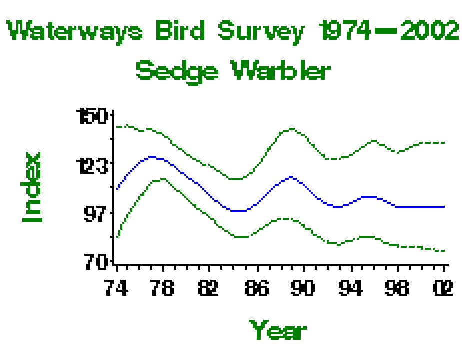
Table of population changes for Sedge Warbler

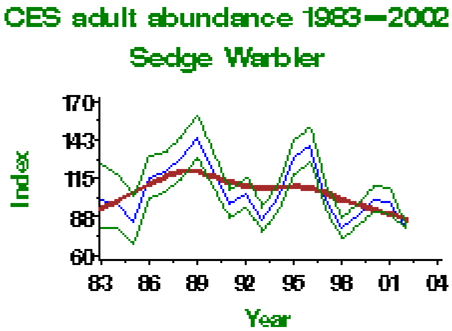
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	94	-12	-46	17		
	25	1975-2000	109	34	4	73		

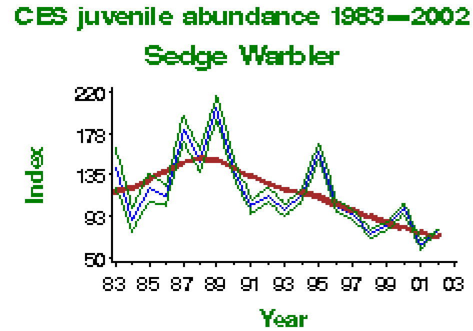
	10	1990-2000	192	19	5	44		
	5	1995-2000	295	25	12	40		
CBC/BBS England	33	1967-2000	66	-25	-60	6		
	25	1975-2000	75	12	-16	36		
	10	1990-2000	126	6	-7	31		
	5	1995-2000	190	12	1	28		
WBS waterways	25	1975-2000	44	-15	-41	33		
	10	1990-2000	55	-10	-23	5		
	5	1995-2000	58	-4	-15	9		
CES adults	17	1984-2001	63	-9	.	.		
	10	1991-2001	77	-20	.	.		
	5	1996-2001	82	-18	.	.		
CES juveniles	17	1984-2001	60	-37	.	.	[>25*]	
	10	1991-2001	73	-43	.	.	[>25*]	
	5	1996-2001	77	-28	.	.	[>25*]	
BBS UK	8	1994-2002	242	30	14	48		
BBS England	8	1994-2002	153	32	12	55		
BBS Scotland	8	1994-2002	47	53	11	110		

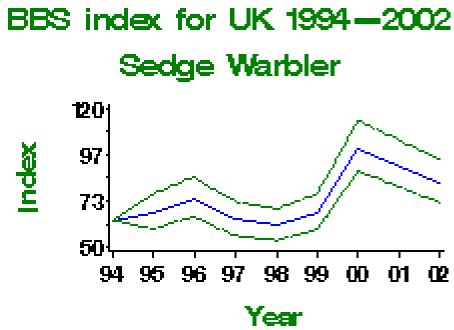
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

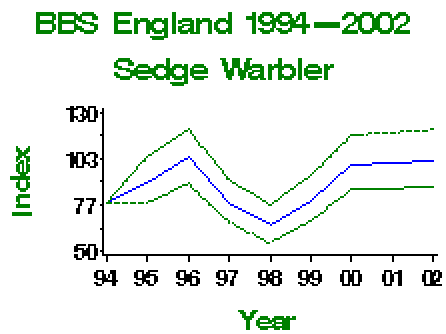












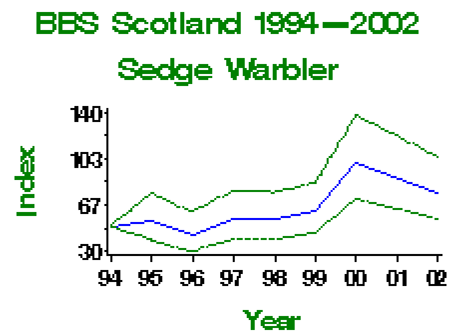
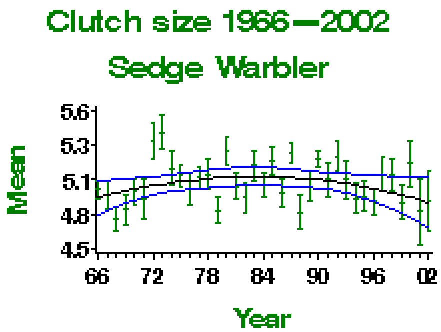
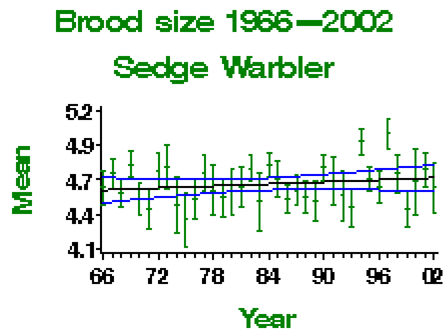


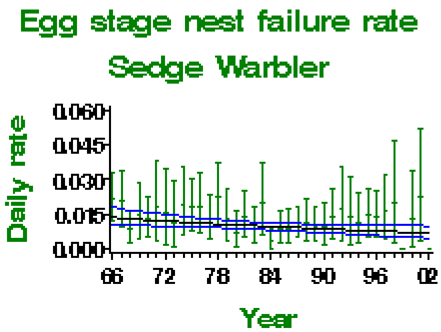
Table of productivity information

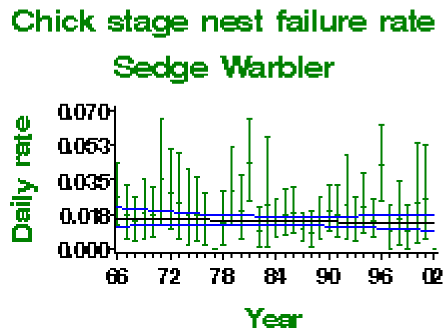
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	40	Curvilinear	4.94 eggs	4.89 eggs	-0.05 eggs	
Brood size	33	1968-2001	63	None				
Daily failure rate (eggs)	33	1968-2001	47	Linear decline	0.0132 nests/day	0.0071 nests/day	-0.0061 nests/day	
Daily failure rate (chicks)	33	1968-2001	54	None				
Laying date	33	1968-2001	54	None				
Percentage juveniles (CES)	17	1984-2001	68	Smoothed trend	171 productivity index	101 productivity index	-41% [>25]	
Percentage juveniles (CES)	10	1991-2001	83	Smoothed trend	148 productivity index	101 productivity index	-32% [>25*]	
Percentage juveniles	5	1996-	87	Smoothed	122 productivity	101 productivity	-18%	

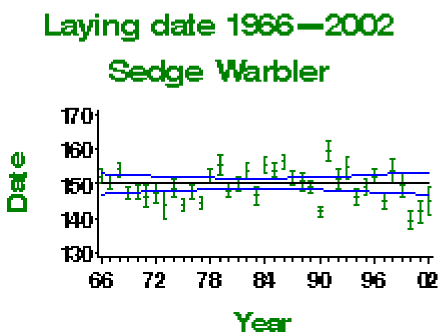
(CES)		2001		trend	index	index		

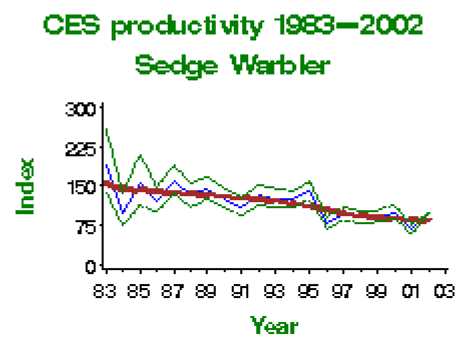












REED WARBLER
Acrocephalus scirpaceus

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: Shallow decline over past 15 years
Linear waterways: Moderate increase

Status summary

This species has an unusually patchy distribution, with very high densities in *Phragmites* reedbeds, where numbers are very hard to census. Because of this, CES, which has many sites in reedbeds, may be a better measure of population change than either CBC/BBS or WBS, where the species is encountered mainly at low density or in linear habitats. CES shows a decline from 1983 until the early 1990s, followed by a partial recovery. Both CBC/BBS and WBS show progressive moderate increases, perhaps linked to increasingly sensitive management of small and linear wetland sites. NRS breeding performance has improved slightly, and a small improvement is apparent in CES productivity. The trend towards earlier laying can be partially explained by recent climate change (Crick & Sparks 1999).

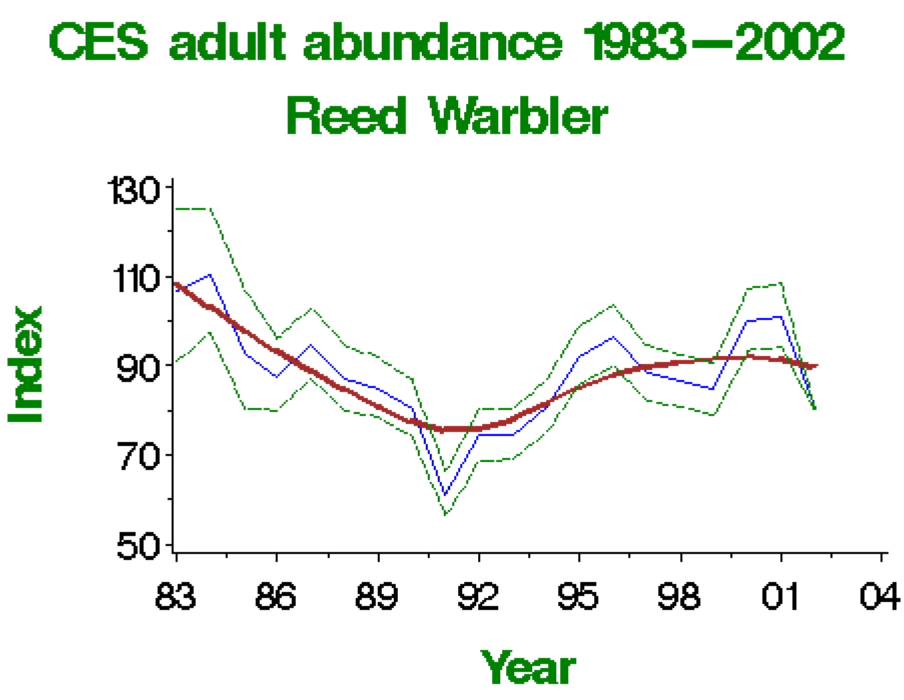
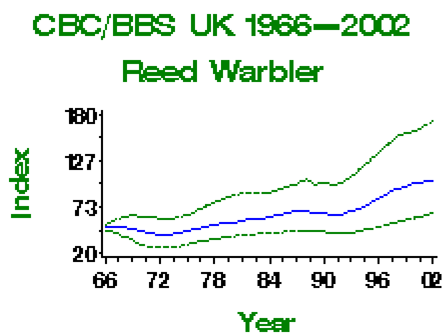


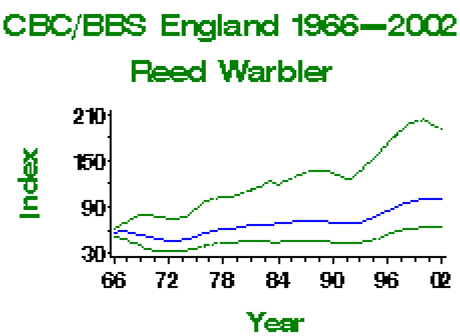
Table of population changes for Reed Warbler

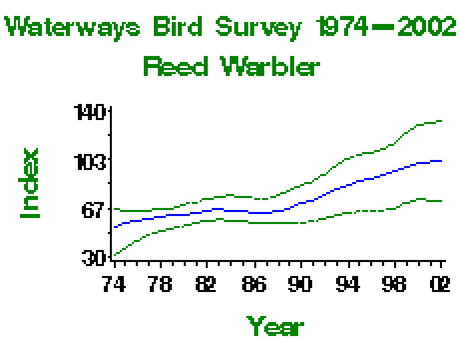
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	41	95	31	227		
	25	1975-2000	49	120	60	237		
	10	1990-2000	81	52	25	92		
	5	1995-2000	119	29	18	40		

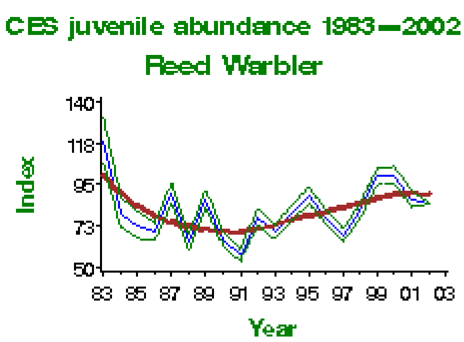
CBC/BBS England	33	1967-2000	39	72	12	252		
	25	1975-2000	46	93	37	179		
	10	1990-2000	78	42	21	69		
	5	1995-2000	115	26	16	37		
WBS waterways	25	1975-2000	20	81	24	220		
	10	1990-2000	27	43	18	66		
	5	1995-2000	30	15	-7	32		
CES adults	17	1984-2001	52	-11	.	.		
	10	1991-2001	62	21	.	.		
	5	1996-2001	64	4	.	.		
CES juveniles	17	1984-2001	54	-1	.	.		
	10	1991-2001	65	30	.	.		
	5	1996-2001	67	13	.	.		
BBS UK	8	1994-2002	87	29	6	57		
BBS England	8	1994-2002	83	20	-2	46		

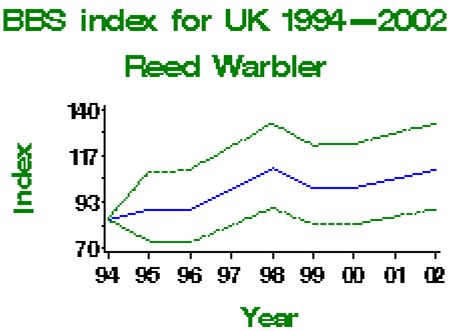
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











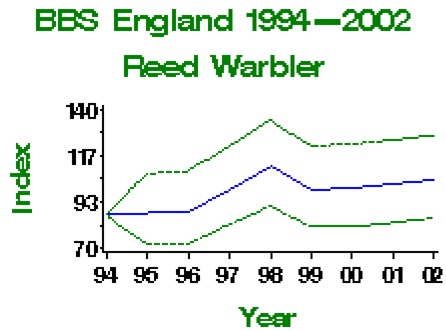
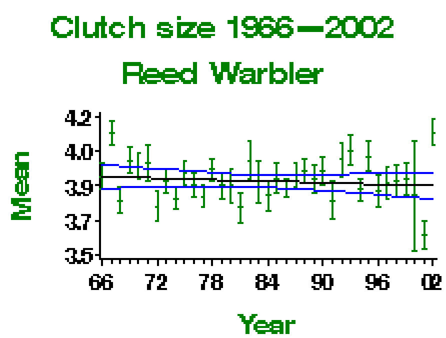
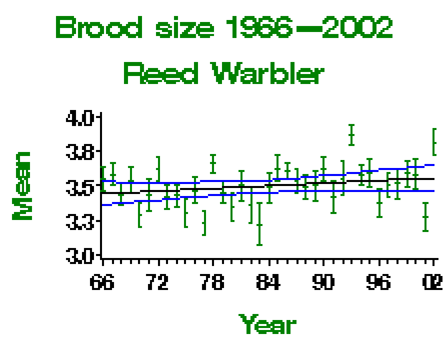
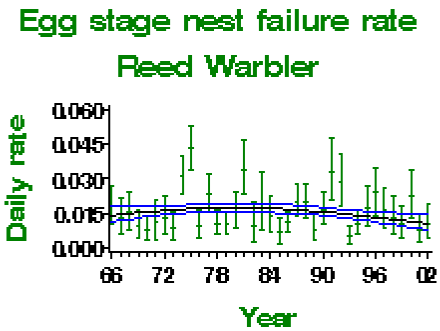


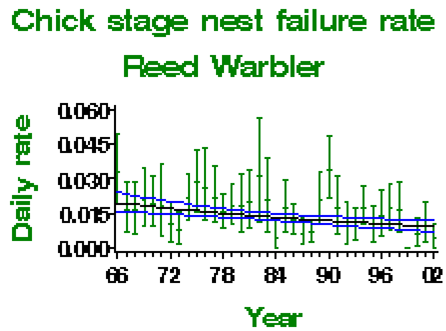
Table of productivity information for Reed Warbler

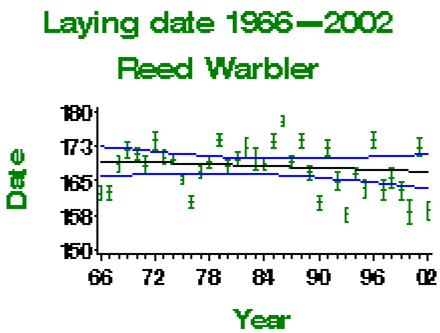
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	99	None				
Brood size	33	1968-2001	112	None				
Daily failure rate (eggs)	33	1968-2001	126	Curvilinear	0.0151 nests/day	0.0112 nests/day	-0.0039 nests/day	
Daily failure rate (chicks)	33	1968-2001	90	Linear decline	0.0188 nests/day	0.0095 nests/day	-0.0093 nests/day	
Laying date	33	1968-2001	143	None				
Percentage juveniles (CES)	17	1984-2001	59	Smoothed trend	86 productivity index	101 productivity index	17%	
Percentage juveniles (CES)	10	1991-2001	70	Smoothed trend	97 productivity index	101 productivity index	3%	
Percentage juveniles (CES)	5	1996-2001	72	Smoothed trend	94 productivity index	101 productivity index	6%	

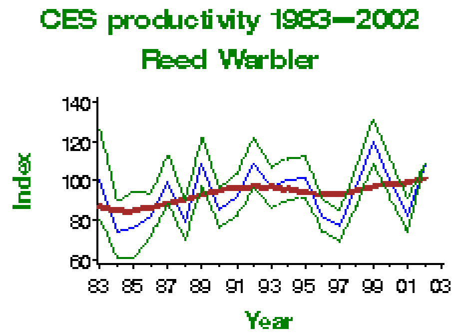





Egg stage nest failure rate
Reed Warbler
Daily rate
0.060
0.045
0.030
0.015
0.000
66
72
78
84
90
96
02
Year


Chick stage nest failure rate
Reed Warbler
Daily rate
0.060
0.045
0.030
0.015
0.000
66
72
78
84
90
96
02
Year


Laying date 1966–2002
Reed Warbler
Date
180
173
165
158
150
66
72
78
84
90
96
02
Year


CES productivity 1983–2002
Reed Warbler
Index
140
120
100
80
60
83
85
87
89
91
93
95
97
99
01
03
Year

BLACKCAP
Sylvia atricapilla

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

Blackcap abundance has increased consistently since the late 1970s, a trend common to all habitats and evident from both the CBC/BBS and the CES indices, although the causes remain unknown. There have been no clear accompanying trends in productivity. The trend towards earlier laying may be a response to recent climate change (**Crick & Sparks 1999**).

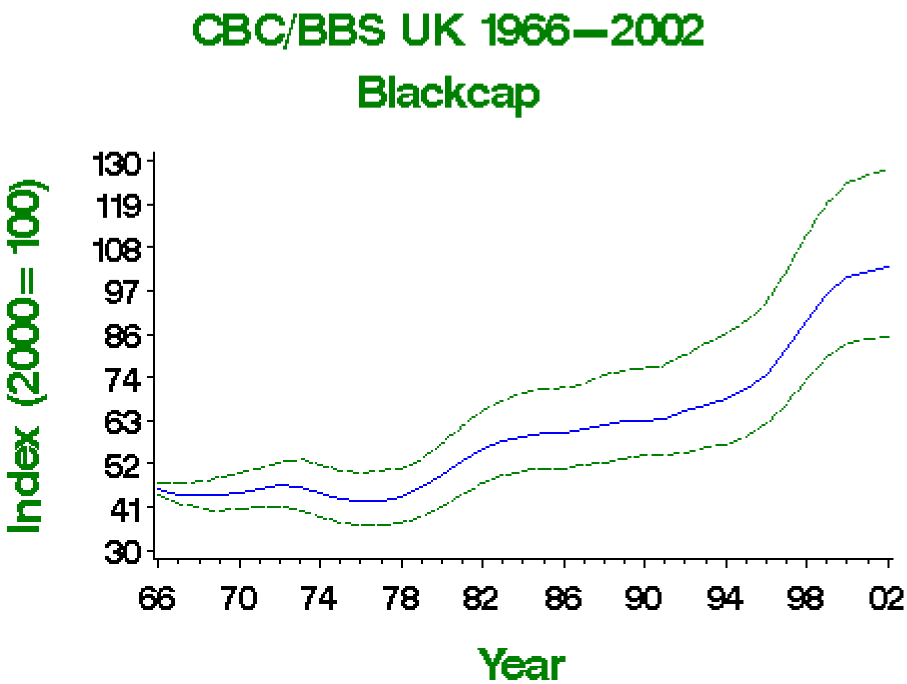
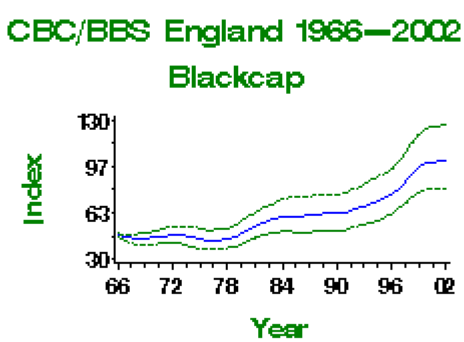


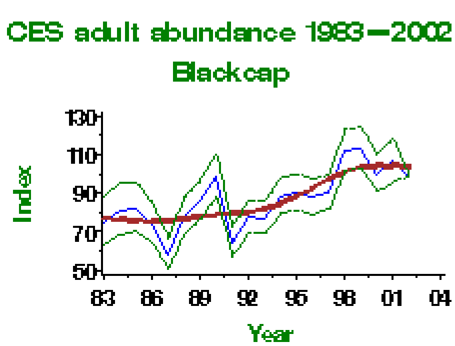
Table of population changes for Blackcap

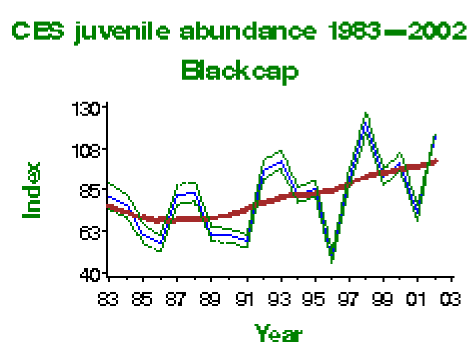
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	366	125	88	185		
	25	1975-2000	445	131	105	173		
	10	1990-2000	831	58	49	65		
	5	1995-2000	1262	40	36	45		

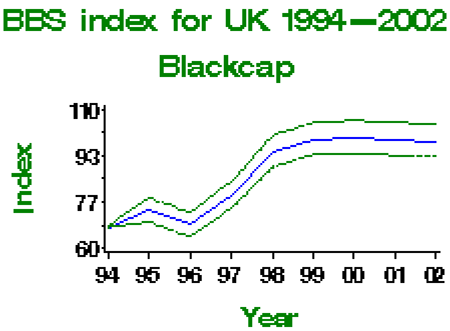
CBC/BBS England	33	1967-2000	327	119	78	173		
	25	1975-2000	396	127	94	168		
	10	1990-2000	734	58	50	67		
	5	1995-2000	1109	37	33	42		
CES adults	17	1984-2001	84	37	.	.		
	10	1991-2001	99	32	.	.		
	5	1996-2001	102	13	.	.		
CES juveniles	17	1984-2001	85	34	.	.		
	10	1991-2001	101	32	.	.		
	5	1996-2001	104	15	.	.		
BBS UK	8	1994-2002	1046	46	38	55		
BBS England	8	1994-2002	917	37	29	46		
BBS Wales	8	1994-2002	87	64	31	105		

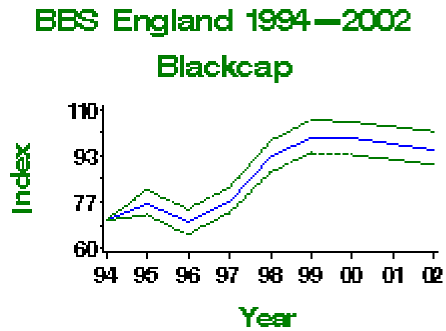
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











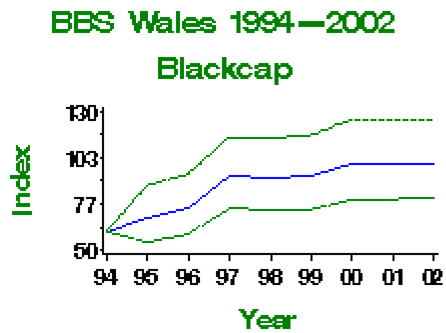
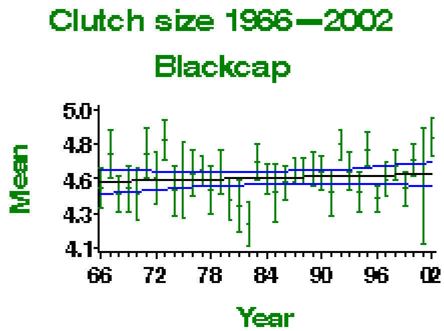
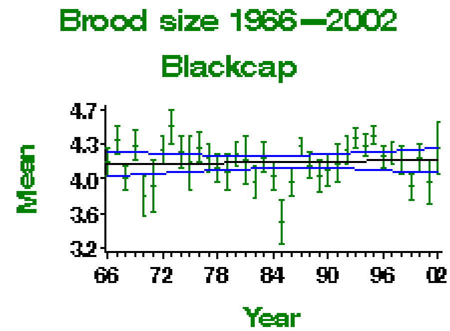
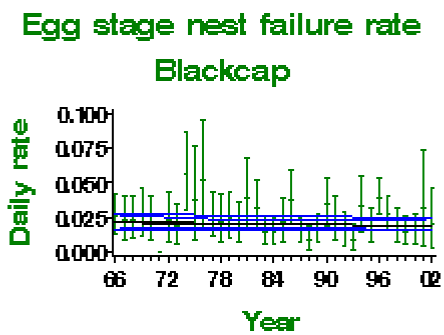


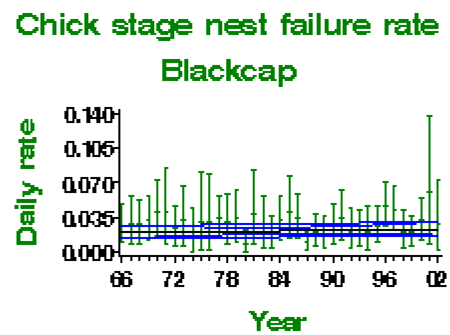
Table of productivity information

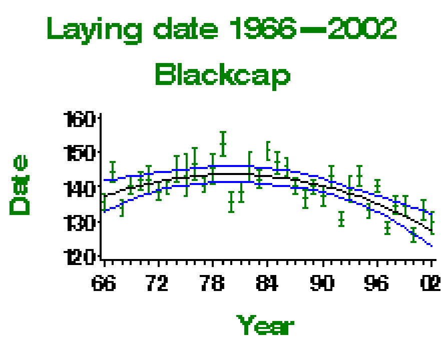
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	36	None				
Brood size	33	1968-2001	42	None				
Daily failure rate (eggs)	33	1968-2001	46	None				
Daily failure rate (eggs)	33	1968-2001	46	None				
Daily failure rate (chicks)	33	1968-2001	36	None				
Daily failure rate (chicks)	33	1968-2001	36	None				
Laying date	33	1968-2001	37	Curvilinear	day 139	day 129	-10 days	
Percentage juveniles (CES)	17	1984-2001	92	Smoothed trend	107 productivity index	101 productivity index	-6%	
Percentage juveniles (CES)	10	1991-2001	108	Smoothed trend	106 productivity index	101 productivity index	-6%	
Percentage juveniles (CES)	5	1996-2001	111	Smoothed trend	101 productivity index	101 productivity index	-1%	

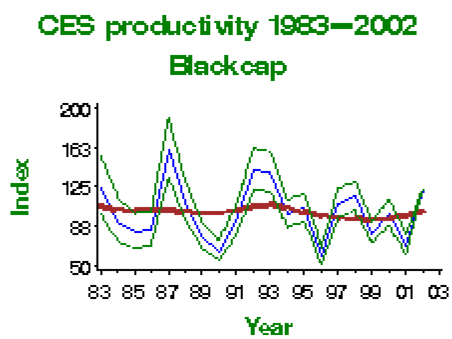

Clutch size 1966—2002
Blackcap
Mean
5.0
4.8
4.6
4.3
4.1
66 72 78 84 90 96 02
Year


Brood size 1966—2002
Blackcap
Mean
4.7
4.3
4.0
3.6
3.2
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Blackcap
Daily rate
0.100
0.075
0.050
0.025
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Blackcap
Daily rate
0.140
0.105
0.070
0.035
0.000
66 72 78 84 90 96 02
Year


Laying date 1966—2002
Blackcap
Date
160
150
140
130
120
66 72 78 84 90 96 02
Year


CES productivity 1983—2002
Blackcap
Index
200
163
125
88
50
83 85 87 89 91 93 95 97 99 01 03
Year

GARDEN WARBLER
Sylvia borin

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: fluctuating, with no long-term trend

Status summary

Garden Warbler abundance has varied alongside that of other trans-Saharan migrant warblers (**Siriwardena *et al.* 1998b**), probably reflecting the influence of the environment on the wintering grounds. Despite large short-term fluctuations in abundance, the CBC/BBS and CES both suggest long-term population stability. Productivity, as measured by the CES, has declined since 1983.

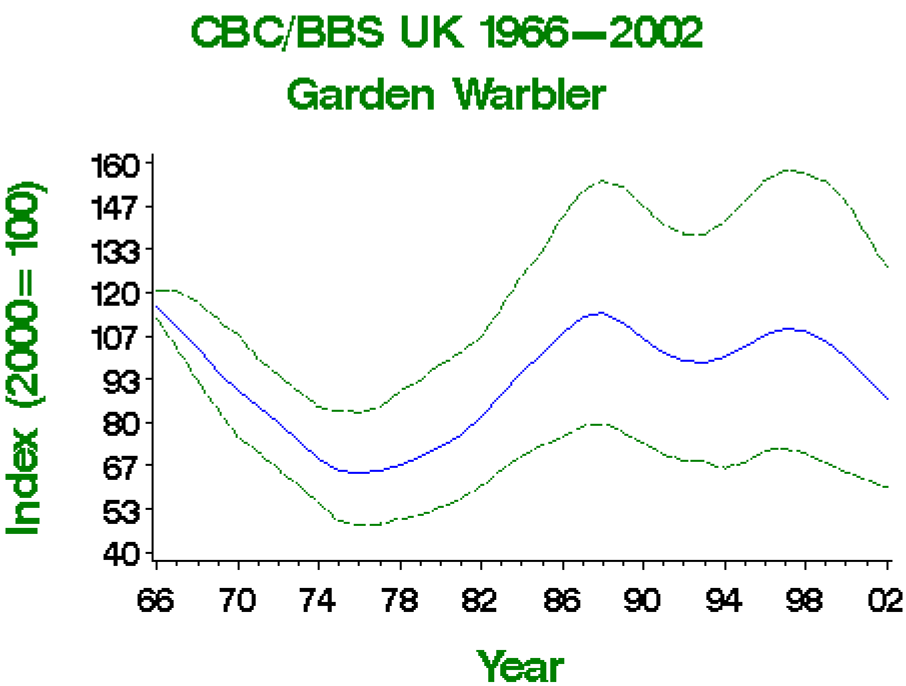
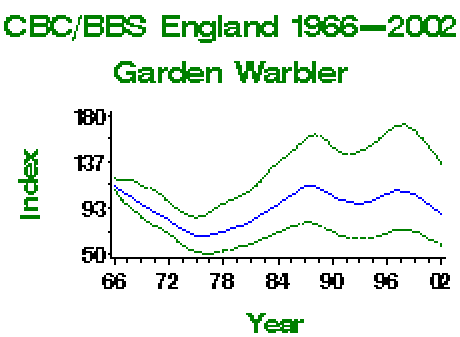


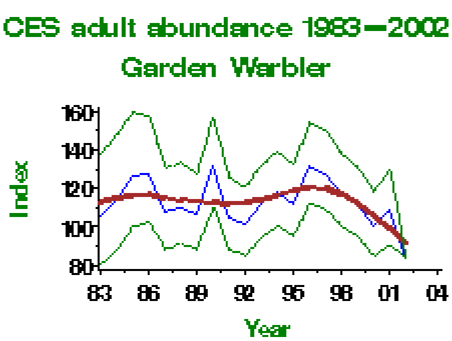
Table of population changes for Garden Warbler

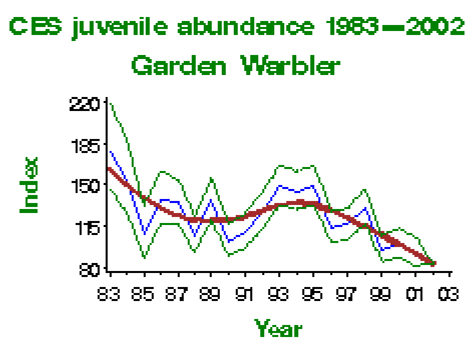
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	162	-9	-41	40		
	25	1975-2000	191	54	11	122		
	10	1990-2000	331	-5	-16	6		
	5	1995-2000	489	-3	-11	6		
CBC/BBS England	33	1967-2000	139	-8	-41	42		
	25	1975-2000	164	48	7	109		

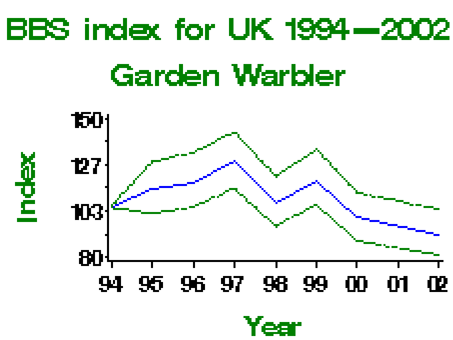
	10	1990-2000	278	-5	-17	8		
	5	1995-2000	408	-3	-11	4		
CES adults	17	1984-2001	65	-14	.	.		
	10	1991-2001	76	-11	.	.		
	5	1996-2001	76	-18	.	.		
CES juveniles	17	1984-2001	63	-39	.	.	[>25*]	
	10	1991-2001	73	-26	.	.	[>25]	
	5	1996-2001	71	-29	.	.	[>25]	
BBS UK	8	1994-2002	369	-13	-23	-1		
BBS England	8	1994-2002	302	-11	-22	2		
BBS Wales	8	1994-2002	52	-29	-48	-2	(>25)	

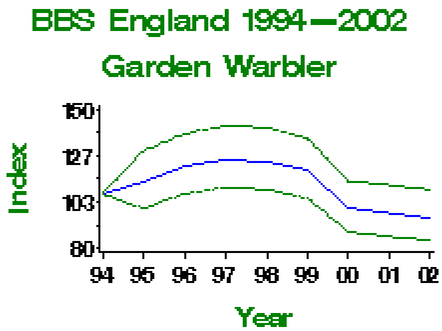
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











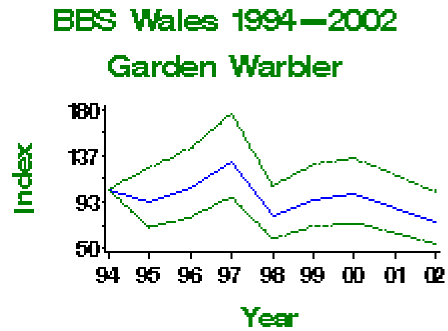
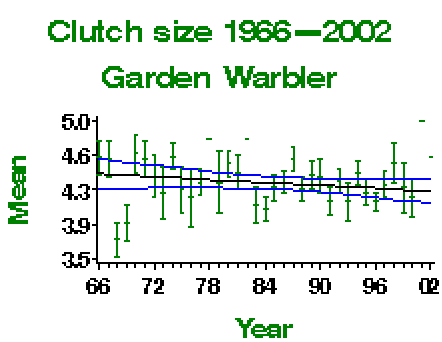
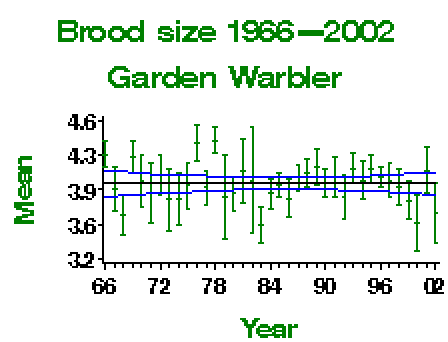
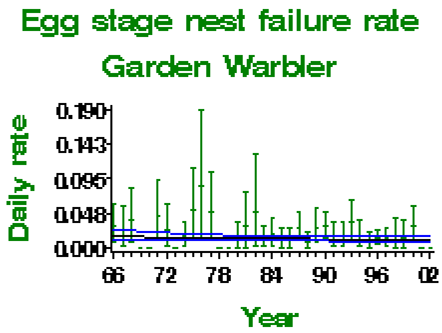


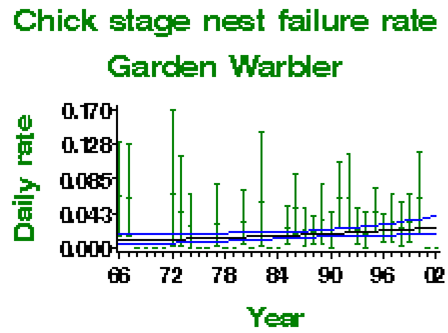
Table of productivity information

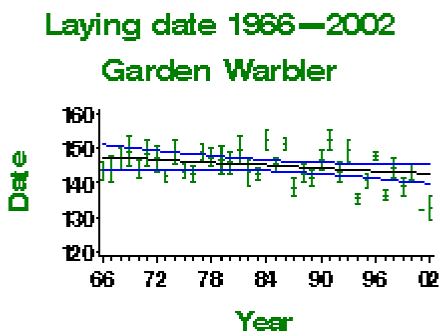
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	17	None				Small sample
Brood size	33	1968-2001	26	None				Small sample
Daily failure rate (eggs)	33	1968-2001	23	None				Small sample
Daily failure rate (chicks)	33	1968-2001	20	Linear increase	0.0097 nests/day	0.025 nests/day	0.0153 nests/day	Small sample
Laying date	33	1968-2001	22	None				Small sample
Percentage juveniles (CES)	17	1984-2001	77	Smoothed trend	180 productivity index	101 productivity index	-44%[>25]	
Percentage juveniles (CES)	10	1991-2001	89	Smoothed trend	140 productivity index	101 productivity index	-28%[>25]	
Percentage juveniles (CES)	5	1996-2001	87	Smoothed trend	131 productivity index	101 productivity index	-23%	

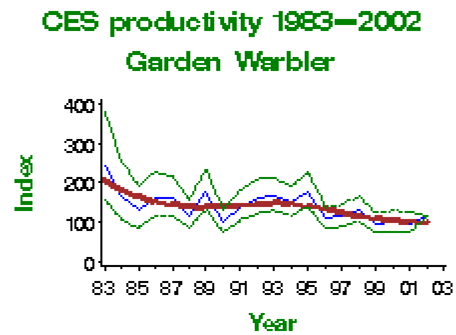





Egg stage nest failure rate
Garden Warbler
Daily rate
0.190
0.143
0.095
0.048
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Garden Warbler
Daily rate
0.170
0.128
0.085
0.043
0.000
66 72 78 84 90 96 02
Year


Laying date 1966–2002
Garden Warbler
Date
160
150
140
130
120
66 72 78 84 90 96 02
Year


CES productivity 1983–2002
Garden Warbler
Index
400
300
200
100
0
83 85 87 89 91 93 95 97 99 01 03
Year

LESSER WHITETHROAT
Sylvia curruca

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: shallow decline

Status summary

Lesser Whitethroat abundance tended to be stable (albeit with short-term fluctuations) from the 1960s until the late 1980s, but there is evidence for a subsequent moderate decline in the CBC/BBS and CES trends. These changes were significant and large enough over the relevant periods to trigger BTO Alerts. Their possible causes should be investigated. A reduction in productivity, recently observed from CES plots, suggests the cause may be linked to productivity rather than to survival.

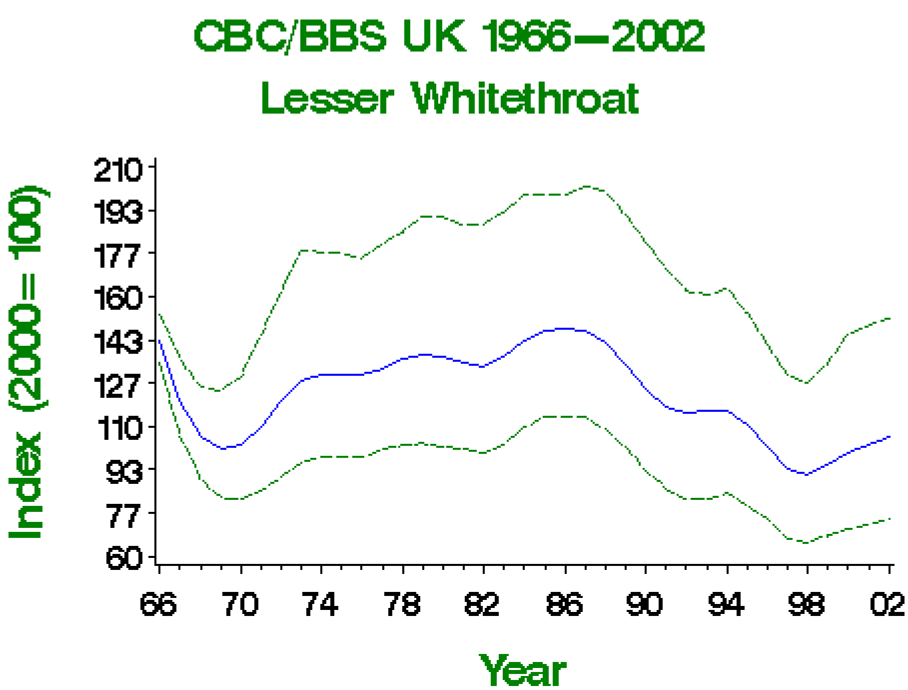
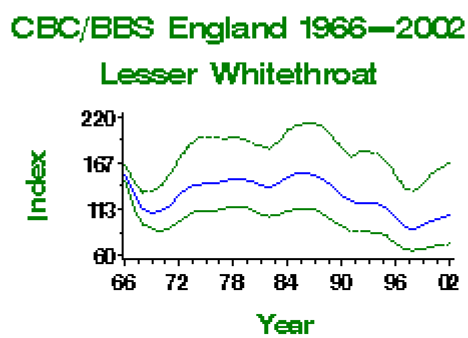


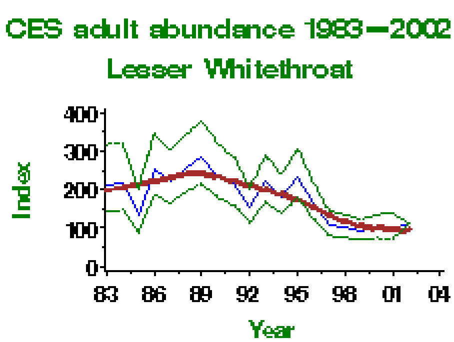
Table of population change for Lesser Whitethroat

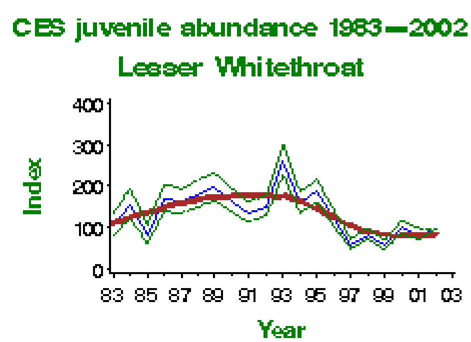
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	96	-17	-42	16		
	25	1975-2000	114	-23	-45	3		
	10	1990-2000	180	-20	-33	-7		
	5	1995-2000	250	-10	-19	1		
CBC/BBS England	33	1967-2000	92	-23	-47	22		
	25	1975-2000	109	-30	-49	-7	>25	

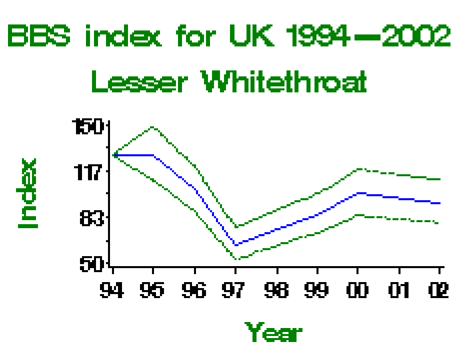
	10	1990-2000	172	-23	-36	-7		
	5	1995-2000	238	-12	-21	-2		
CES adults	17	1984-2001	41	-52	.	.	[>50*]	
	10	1991-2001	45	-57	.	.	[>50*]	
	5	1996-2001	39	-37	.	.	[>25]	
CES juveniles	17	1984-2001	44	-33	.	.	[>25*]	
	10	1991-2001	50	-54	.	.	[>50*]	
	5	1996-2001	42	-35	.	.	[>25*]	
BBS UK	8	1994-2002	204	-27	-38	-14	(>25)	
BBS England	8	1994-2002	194	-29	-40	-16	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









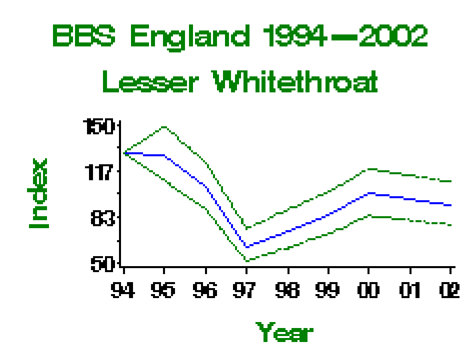


Table of productivity information for Lesser Whitethroat

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	6	None				Small sample

Brood size	33	1968-2001	9	None				Small sample
Daily failure rate (eggs)	33	1968-2001	8	None				Small sample
Daily failure rate (chicks)	33	1968-2001	8	None				Small sample
Laying date	33	1968-2001	9	None				Small sample
Percentage juveniles (CES)	17	1984-2001	55	Smoothed trend	85 productivity index	101 productivity index	17%	
Percentage juveniles (CES)	10	1991-2001	62	Smoothed trend	117 productivity index	101 productivity index	-14%	
Percentage juveniles (CES)	5	1996-2001	54	Smoothed trend	108 productivity index	101 productivity index	-7%	

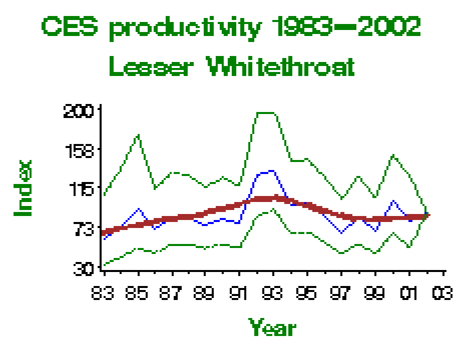
Insufficient data on clutch size available for this species

Insufficient data on brood size available for this species

Insufficient data on nest failure available for this species

Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species



WHITETHROAT
Sylvia communis

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: rapid decline (followed by shallow increase)

Status summary

Whitethroat populations, which had been stable up to 1968 and departed as normal that autumn, crashed by around 70% between the 1968 and 1969 breeding seasons. They fluctuated around their lower level until the mid 1980s, since when a shallow recovery has occurred. Recovery has been most apparent along linear waterways. In a pioneering study, **Winstanley *et al.* (1974)** linked the 1969 crash to droughts in the Whitethroat's wintering grounds in the western Sahel. Annual fluctuations in abundance (not shown in the smoothed trend) correlate to those in overwinter survival rate (**Baillie & Peach 1992**). Other trans-Saharan migrant warblers have shared similarly timed population changes (**Siriwardena *et al.* 1998b**). Productivity, as measured by CES, shows a moderate decline during the period of population recovery, which may be associated with a minor reduction in average brood size.

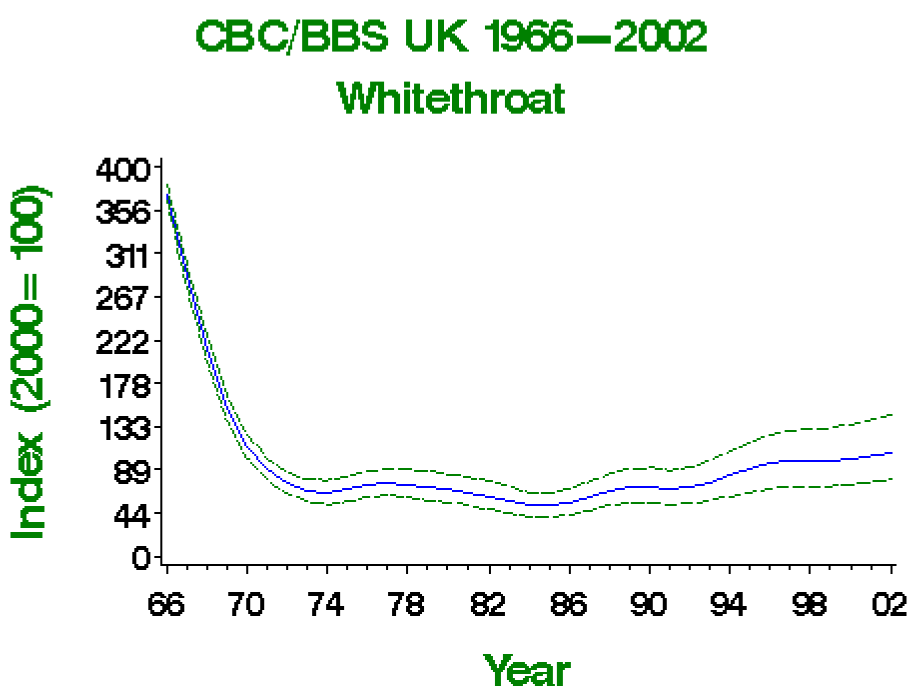
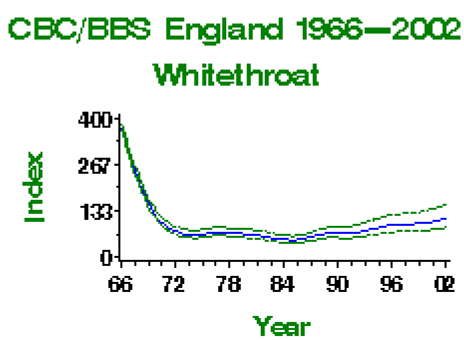


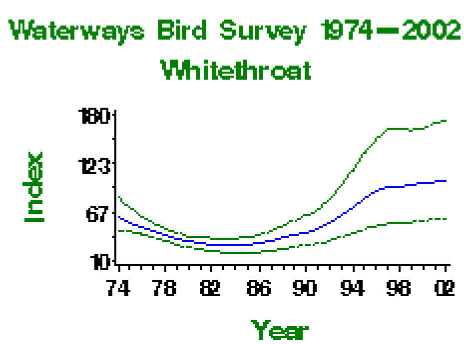
Table of population changes for Whitethroat

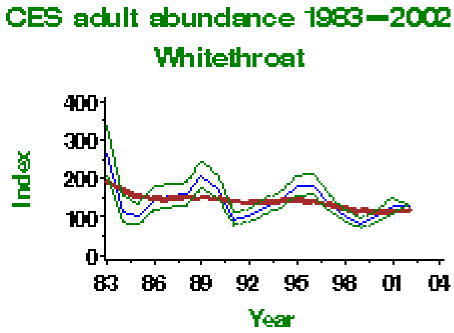
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	319	-65	-75	-50	>50	
	25	1975-2000	380	45	16	80		
	10	1990-2000	735	41	29	56		
	5	1995-2000	1143	12	7	16		

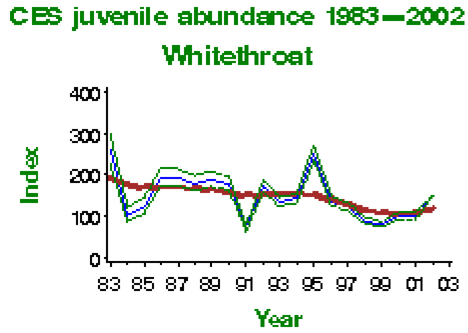
CBC/BBS England	33	1967-2000	279	-65	-73	-51	>50	
	25	1975-2000	332	49	14	90		
	10	1990-2000	641	44	29	66		
	5	1995-2000	995	12	8	17		
WBS waterways	25	1975-2000	40	81	-8	219		
	10	1990-2000	57	128	69	198		
	5	1995-2000	63	21	8	34		
CES adults	17	1984-2001	57	-32	.	.	[>25]	
	10	1991-2001	70	-18	.	.		
	5	1996-2001	71	-19	.	.		
CES juveniles	17	1984-2001	62	-38	.	.	[>25]	
	10	1991-2001	75	-28	.	.	[>25]	
	5	1996-2001	77	-22	.	.		
BBS UK	8	1994-2002	978	30	22	38		
BBS England	8	1994-2002	851	36	27	45		
BBS Scotland	8	1994-2002	53	12	-20	57		
BBS Wales	8	1994-2002	61	-7	-27	20		

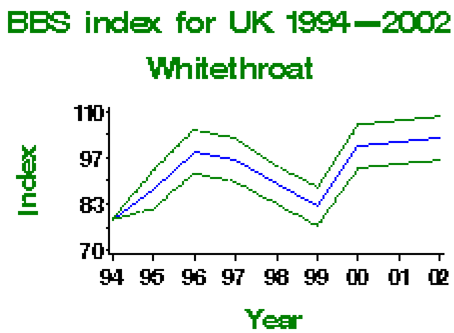
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

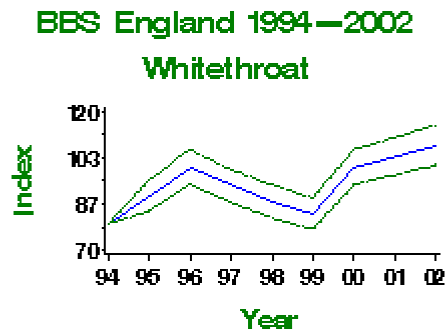


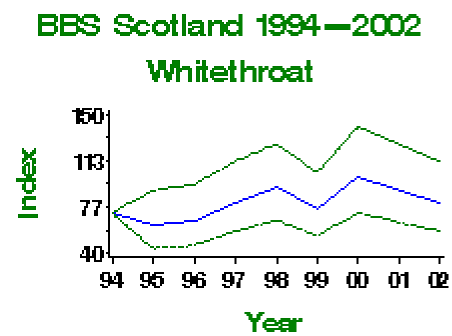












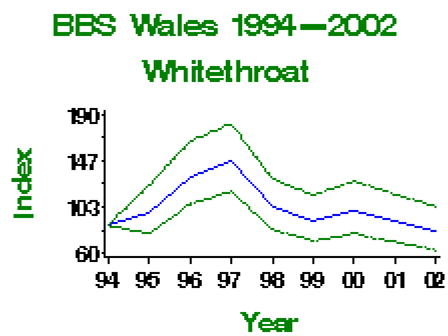
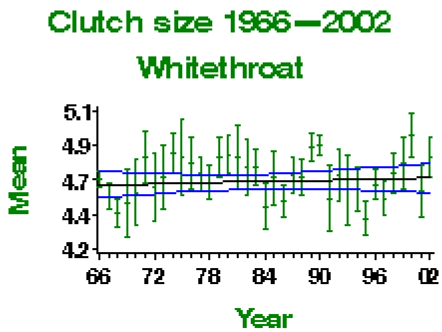
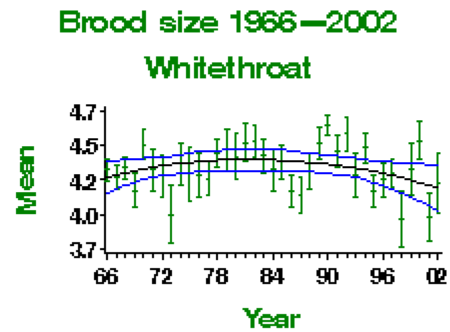
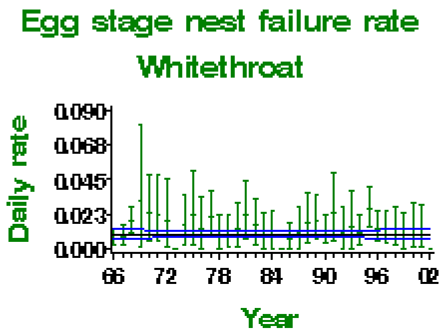


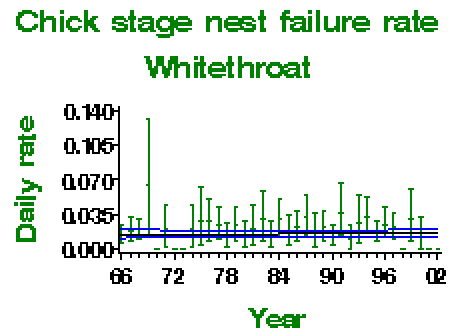
Table of productivity information for Whitethroat

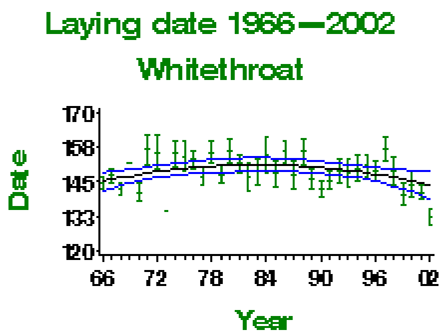
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	26	None				Small sample
Brood size	33	1968-2001	60	Curvilinear	4.25 chicks	4.16 chicks	-0.09 chicks	
Daily failure rate (eggs)	33	1968-2001	36	None				
Daily failure rate (chicks)	33	1968-2001	45	None				
Laying date	33	1968-2001	17	Curvilinear	day 146	day 145	-1 days	Small sample
Percentage juveniles (CES)	17	1984-2001	73	Smoothed trend	137 productivity index	101 productivity index	-27% [>25]	
Percentage juveniles (CES)	10	1991-2001	87	Smoothed trend	136 productivity index	101 productivity index	-26% [>25]	
Percentage juveniles (CES)	5	1996-2001	90	Smoothed trend	119 productivity index	101 productivity index	-16%	

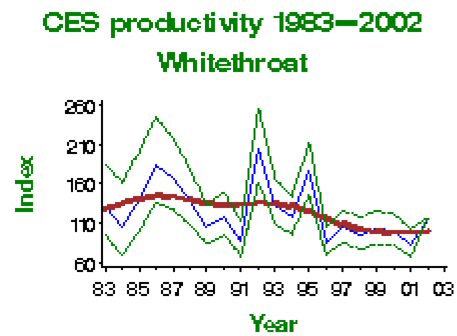

Clutch size 1966–2002
Whitethroat
Mean
5.1
4.9
4.7
4.4
4.2
66 72 78 84 90 96 02
Year


Brood size 1966–2002
Whitethroat
Mean
4.7
4.5
4.2
4.0
3.7
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Whitethroat
Daily rate
0.090
0.068
0.045
0.023
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Whitethroat
Daily rate
0.140
0.105
0.070
0.035
0.000
66 72 78 84 90 96 02
Year


Laying date 1966–2002
Whitethroat
Date
170
158
145
133
120
66 72 78 84 90 96 02
Year


CES productivity 1983–2002
Whitethroat
Index
260
210
160
110
60
83 85 87 89 91 93 95 97 99 01 03
Year

WOOD WARBLER
Phylloscopus sibilatrix

Conservation listings

Europe: SPEC category 4, (secure)
UK: Amber (25-50% population decline)

Long-term trend

UK: probable decline

Status summary

Wood Warblers, which have a westerly distribution in Britain, were not monitored well before the inception of the BBS. Llittle change was apparent at the few CBC plots on which the species occurred (**Crick *et al.* 1998**). The species' range varied little between the two breeding atlas periods (**Gibbons *et al.* 1993**), but has subsequently shown further retreat from southeast England. BBS shows a rapid and significant decline since 1994, and accordingly the species has now been moved from the Green to the Amber list. A decrease has been observed in nest failure rates at the egg stage.

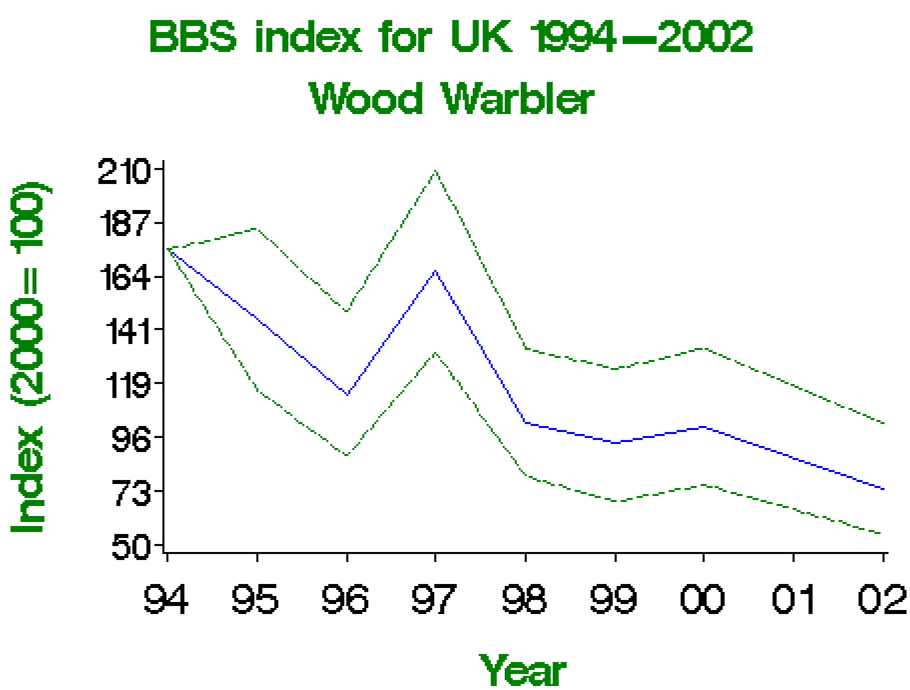


Table of population changes for Wood Warbler

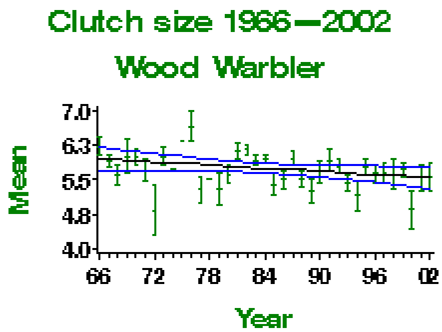
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	56	-58	-69	-42	(>50)	

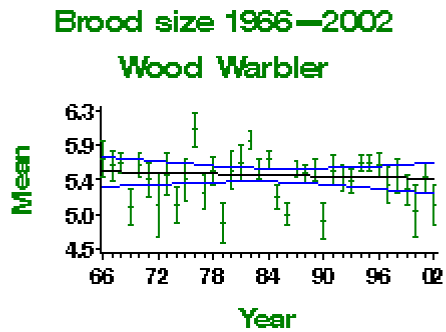
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

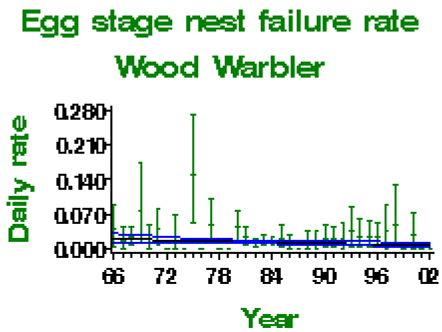
Table of productivity information

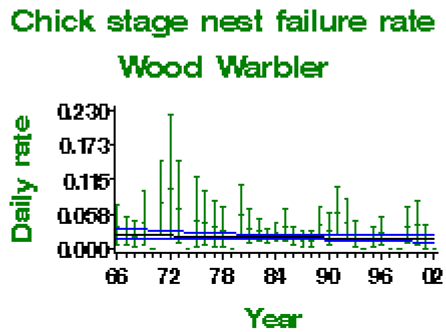
Variable	Period	Years	Mean annual	Trend	Predicted in first	Predicted in last	Change	Comment

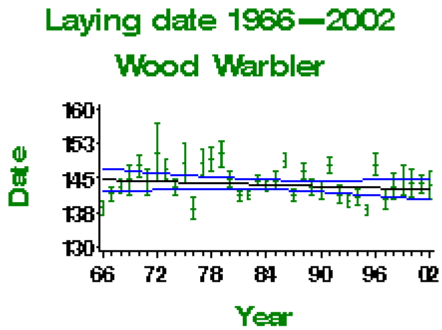
	(yrs)		sample		year	year		
Clutch size	33	1968-2001	17	None				Small sample
Brood size	33	1968-2001	38	None				
Daily failure rate (eggs)	33	1968-2001	22	Linear decline	0.0199 nests/day	0.0088 nests/day	-0.0111 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	28	None				Small sample
Laying date	33	1968-2001	33	None				











Insufficient data on CES available for this species

CHIFFCHAFF
Phylloscopus collybita

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

UK, England: fluctuating with no long-term trend

Status summary

Chiffchaff abundance crashed in the late 1960s/early 1970s in common with that of other trans-Saharan warblers (**Siriwardena *et al.* 1998a**). After remaining stable for a decade, the population recovered strongly, and has continued to increase. This recovery is evident from both CBC/BBS and CES data. Climate change may partially explain the trend towards earlier laying (**Crick & Sparks 1999**). However, overwinter survival may be the critical factor responsible for changes in abundance, as it is for **Whitethroat** and **Sedge Warbler**.

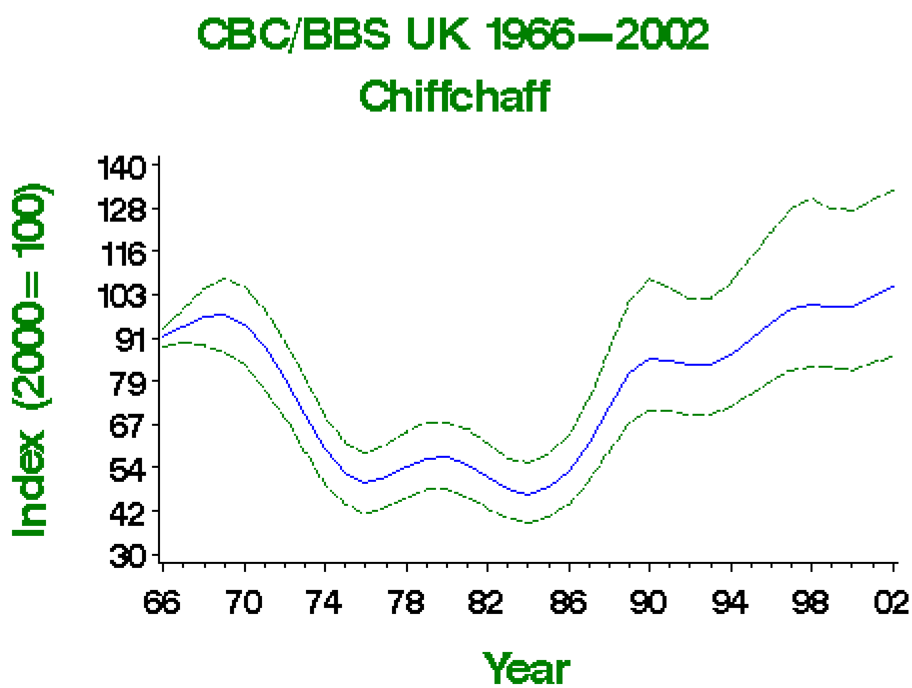
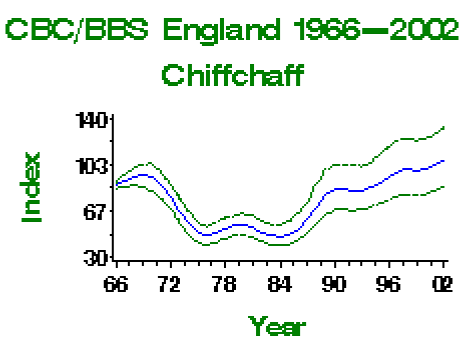


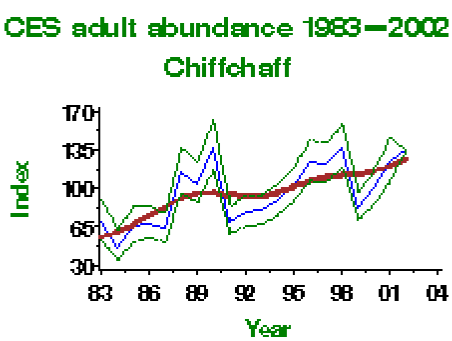
Table of population changes in Chiffchaff

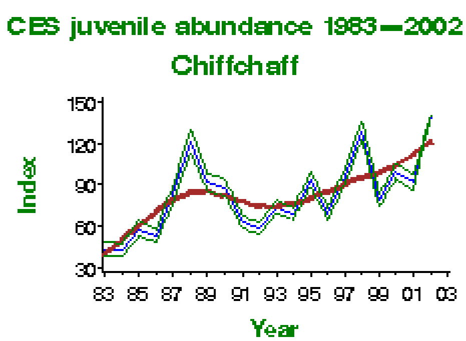
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	321	6	-13	41		
	25	1975-2000	387	89	62	141		
	10	1990-2000	742	17	6	26		
	5	1995-2000	1130	10	4	14		
CBC/BBS		1967-						

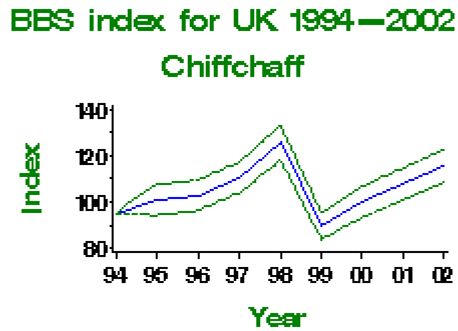
England	33	2000	279	10	-10	37		
	25	1975-2000	334	100	64	150		
	10	1990-2000	639	19	8	31		
	5	1995-2000	969	12	7	15		
CES adults	17	1984-2001	63	98	.	.		
	10	1991-2001	74	27	.	.		
	5	1996-2001	77	12	.	.		
CES juveniles	17	1984-2001	74	124	.	.		
	10	1991-2001	89	43	.	.		
	5	1996-2001	94	32	.	.		
BBS UK	8	1994-2002	938	21	14	29		
BBS England	8	1994-2002	799	22	14	30		
BBS Wales	8	1994-2002	95	6	-12	27		

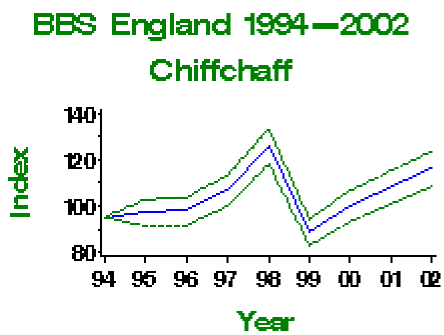
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











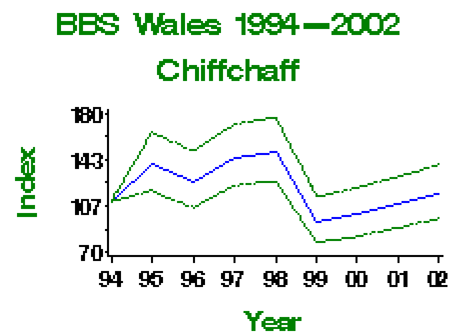
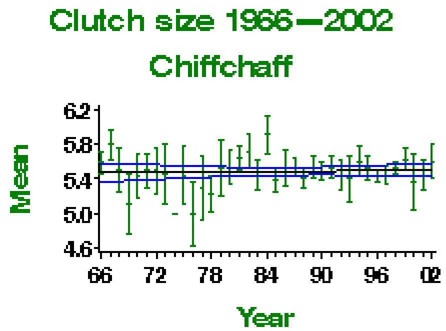
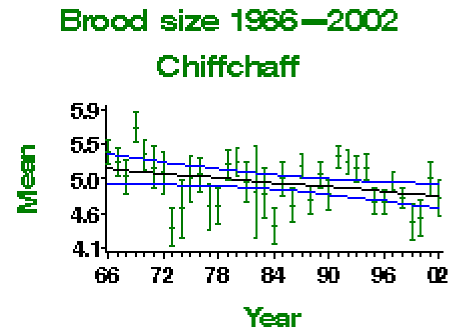
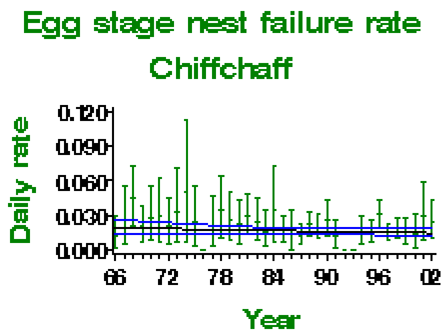


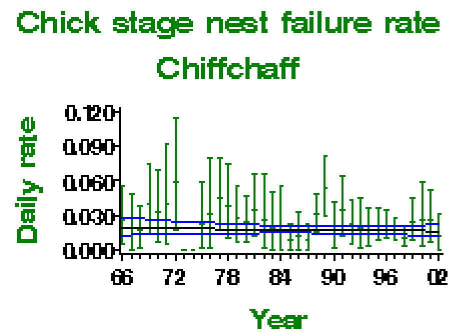
Table of productivity information for Chiffchaff

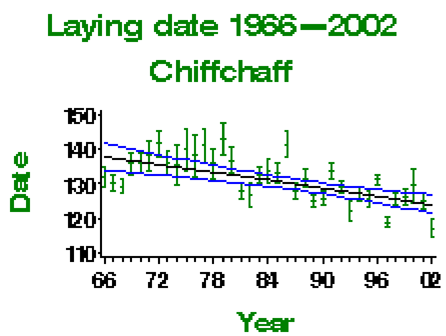
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	26	None				Small sample
Brood size	33	1968-2001	29	Linear decline	5.12 chicks	4.79 chicks	-0.33 chicks	Small sample
Daily failure rate (eggs)	33	1968-2001	34	None				
Daily failure rate (chicks)	33	1968-2001	30	None				Small sample
Laying date	33	1968-2001	39	Linear decline	day 137	day 125	-12 days	
Percentage juveniles (CES)	17	1984-2001	83	Smoothed trend	98 productivity index	101 productivity index	2%	
Percentage juveniles (CES)	10	1991-2001	98	Smoothed trend	101 productivity index	101 productivity index	-1%	
Percentage juveniles (CES)	5	1996-2001	102	Smoothed trend	92 productivity index	101 productivity index	8%	

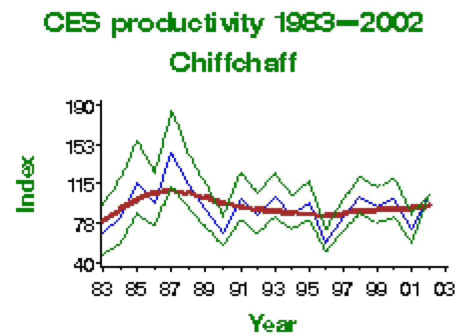

Clutch size 1966—2002
Chiffchaff
Mean
6.2
5.8
5.4
5.0
4.6
66 72 78 84 90 96 02
Year


Brood size 1966—2002
Chiffchaff
Mean
5.9
5.5
5.0
4.6
4.1
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Chiffchaff
Daily rate
0.120
0.090
0.060
0.030
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Chiffchaff
Daily rate
0.120
0.090
0.060
0.030
0.000
66 72 78 84 90 96 02
Year


Laying date 1966—2002
Chiffchaff
Date
150
140
130
120
110
66 72 78 84 90 96 02
Year


CES productivity 1983—2002
Chiffchaff
Index
190
153
115
78
40
83 85 87 89 91 93 95 97 99 01 03
Year

WILLOW WARBLER
Phylloscopus trochilus

Conservation listings

Europe: no SPEC category, secure
UK: Amber (25-50% population decline)

Long-term trend

England: moderate decline

Status summary

Willow Warbler abundance has apparently shown different trends at different UK latitudes. The overall CBC/BBS trend shows a rapid decline during the 1980s and early 1990s, after 20 years of relative stability, and, on the strength of a 31% decline on CBC plots between 1974 and 1999, the species has now been moved from the Green to the Amber list. This decline occurred mainly in the south of the UK, however, due to a fall in survival rates there (**Peach *et al*. 1995**), with Scottish populations remaining unaffected. BBS figures since 1994 indicate a stark contrast between strong increase in Scotland and Northern Ireland, and further decreases in England and in Wales. The recent population decline is associated with a moderate decline in productivity as measured by CES and increases in failure rates at both egg and clutch stages. Laying dates have become earlier, perhaps in response to recent climatic warming (**Crick & Sparks 1999**).

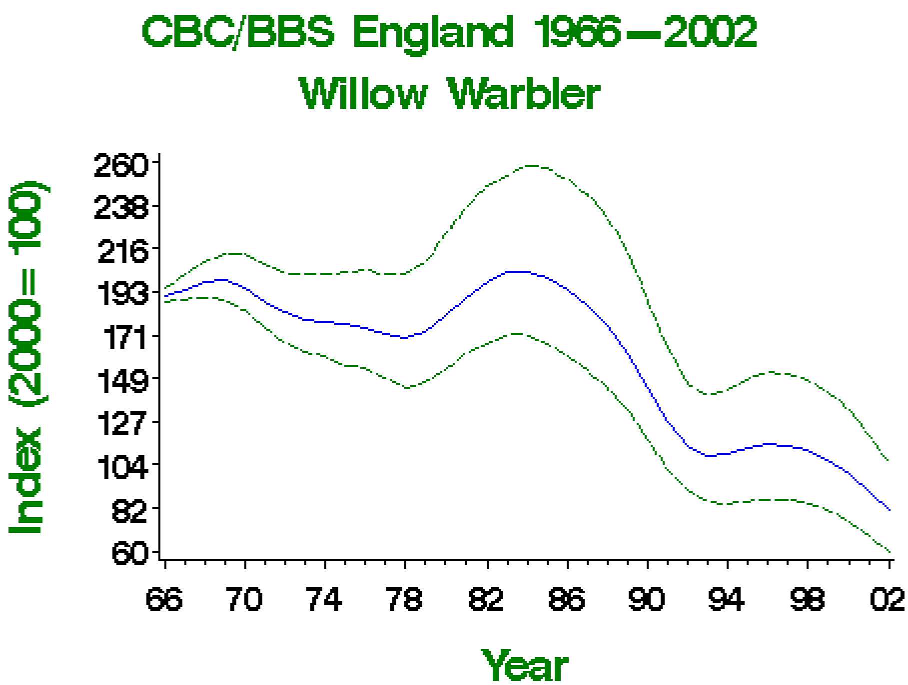
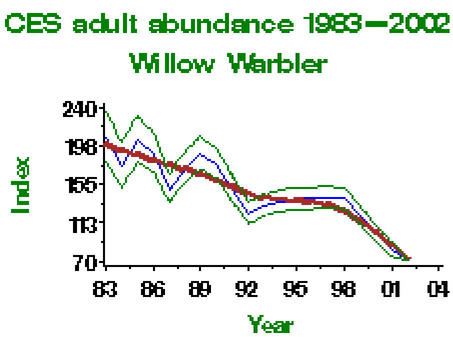


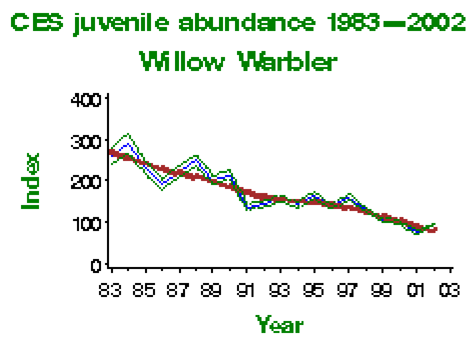
Table of population changes for Willow Warbler

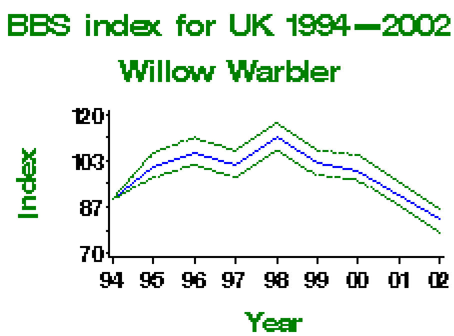
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	336	-49	-63	-32	>25	
	25	1975-2000	396	-44	-55	-32	>25	
	10	1990-2000	693	-30	-39	-24	>25	
	5	1995-2000	1030	-12	-15	-8		
CES adults	17	1984-2001	90	-54	.	.	[>50*]	

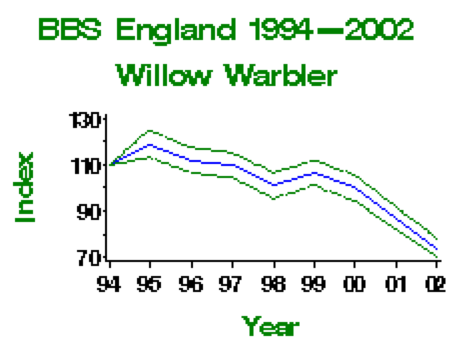
	10	1991-2001	104	-42	.	.	[>25*]	
	5	1996-2001	103	-35	.	.	[>25*]	
CES juveniles	17	1984-2001	89	-64	.	.	[>50*]	
	10	1991-2001	104	-47	.	.	[>25*]	
	5	1996-2001	106	-36	.	.	[>25*]	
BBS UK	8	1994-2002	1202	-8	-13	-4		
BBS England	8	1994-2002	840	-33	-36	-29	(>25)	
BBS Scotland	8	1994-2002	172	25	9	43		
BBS Wales	8	1994-2002	134	-28	-36	-18	(>25)	
BBS N.Ireland	8	1994-2002	51	47	7	101		

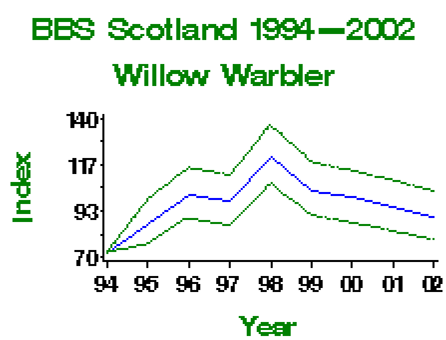
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

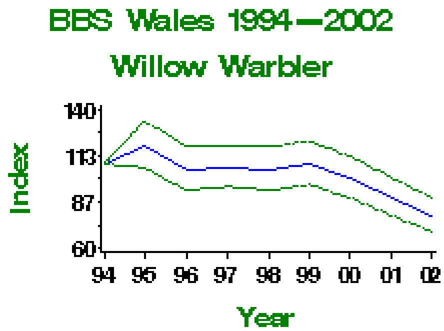












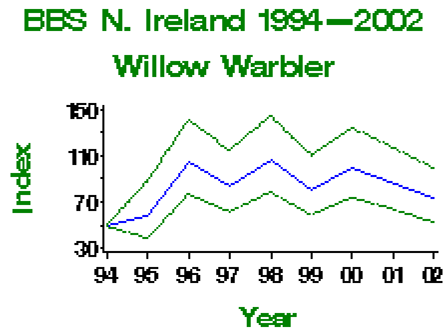
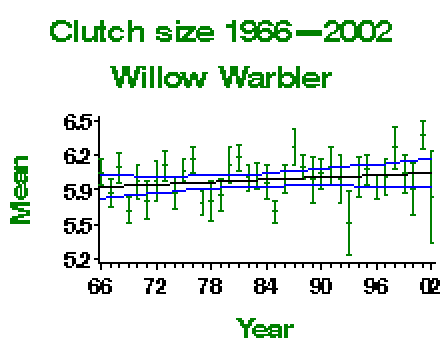
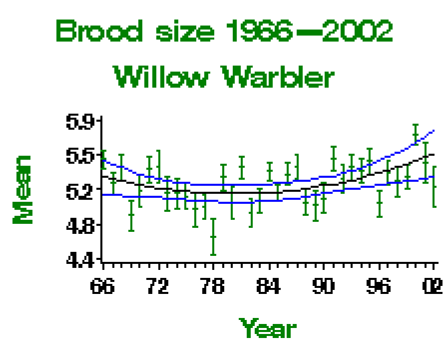
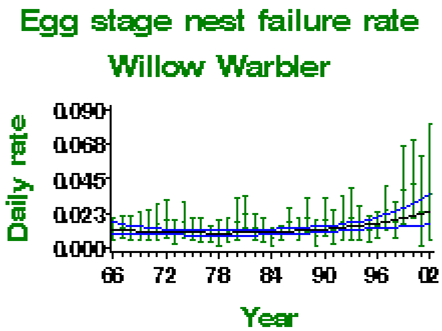


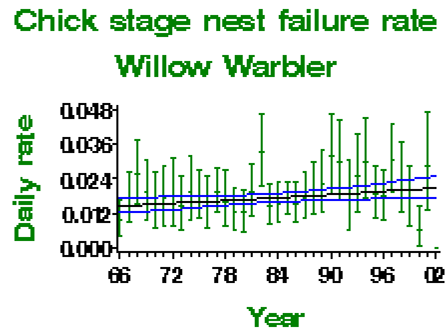
Table of productivity information for Willow Warbler

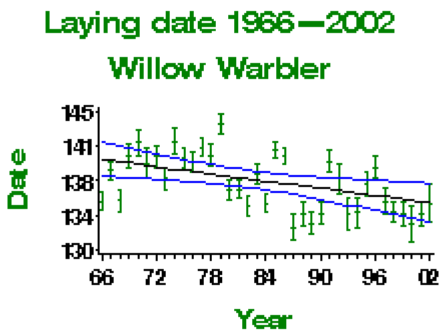
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	52	None				
Brood size	33	1968-2001	139	Curvilinear	5.24 chicks	5.49 chicks	0.25 chicks	
Daily failure rate (eggs)	33	1968-2001	72	Curvilinear	0.0114 nests/day	0.0219 nests/day	0.0105 nests/day	
Daily failure rate (chicks)	33	1968-2001	128	Linear increase	0.015 nests/day	0.0207 nests/day	0.0057 nests/day	
Laying date	33	1968-2001	89	Linear decline	day 140	day 135	-5 days	
Percentage juveniles (CES)	17	1984-2001	96	Smoothed trend	147 productivity index	101 productivity index	-32% [>25*]	
Percentage juveniles (CES)	10	1991-2001	112	Smoothed trend	112 productivity index	101 productivity index	-10%	
Percentage juveniles (CES)	5	1996-2001	113	Smoothed trend	102 productivity index	101 productivity index	-2%	

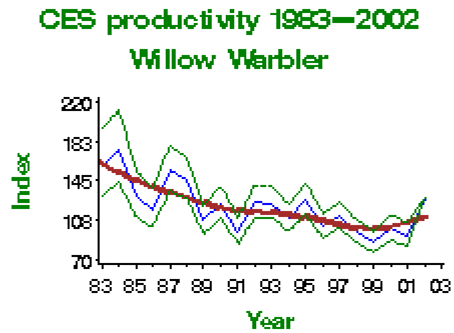





Egg stage nest failure rate
Willow Warbler
Daily rate
0.090
0.068
0.045
0.023
0.000
66
72
78
84
90
96
02
Year


Chick stage nest failure rate
Willow Warbler
Daily rate
0.048
0.036
0.024
0.012
0.000
66
72
78
84
90
96
02
Year


Laying date 1966–2002
Willow Warbler
Date
145
141
138
134
130
66
72
78
84
90
96
02
Year


CES productivity 1983–2002
Willow Warbler
Index
220
183
145
108
70
83
85
87
89
91
93
95
97
99
01
03
Year

GOLDCREST
Regulus regulus

Conservation listings

Europe: SPEC category 4, (secure)
UK: Amber (>50% population decline but data possibly unrepresentative)

Long-term trend

UK, England: fluctuating, with no long-term trend

Status summary

Goldcrest abundance is affected strongly by winter weather and the strong increase in the species' CBC/BBS index up to the mid 1970s probably reflects recovery from the cold winters of the early 1960s. The subsequent decline has resulted in the recent addition of the species to the Amber list, although it only meets the criterion because 1975, the start of the relevant period, was the peak year of the population index. Trends over longer and shorter periods all suggest population increase, and the long-term trend looks very much like what would be obtained had a series of damped oscillations led to population stability after an earlier perturbation. CBC had relatively poor coverage of coniferous plantations, in which Goldcrest occurs at increasing densities as the trees mature. The increase in area of such prime habitat was not reflected in the trend prior to the inception of BBS.

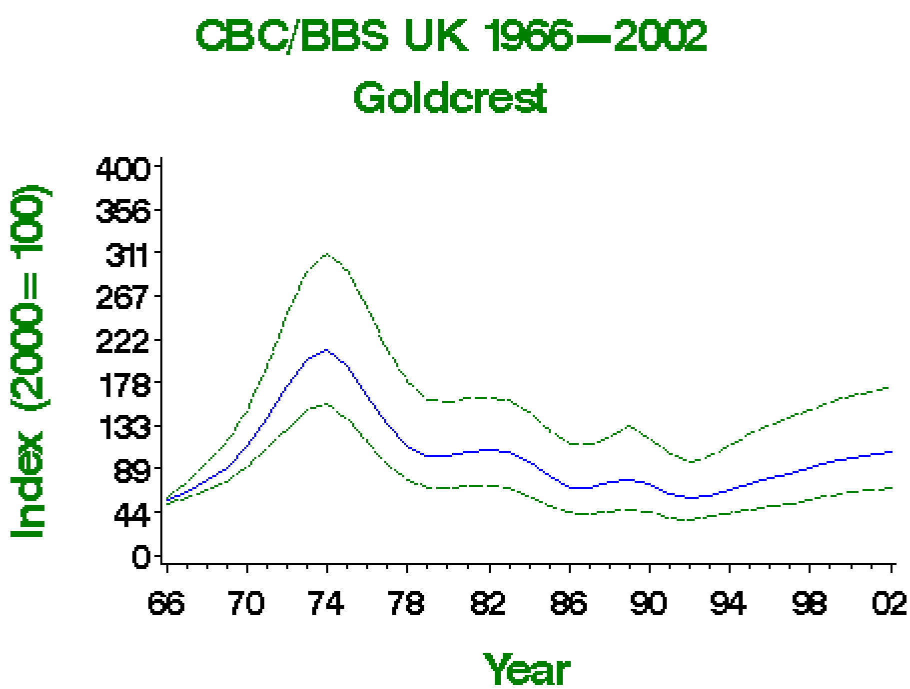
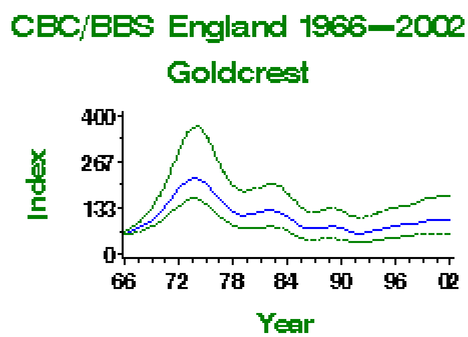


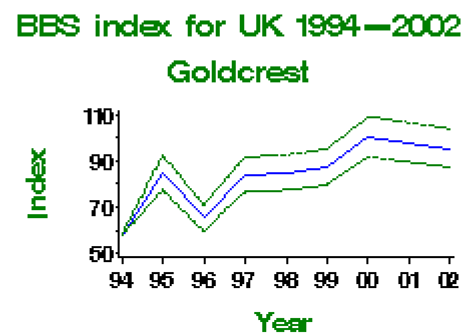
Table of population changes for Goldcrest

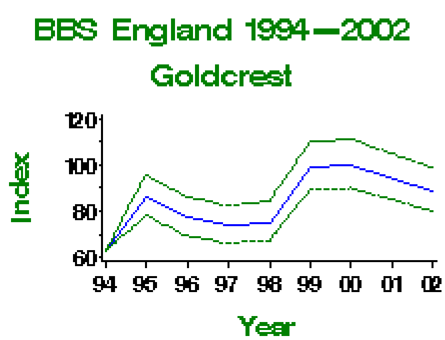
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	202	53	-13	166		
	25	1975-2000	240	-49	-61	-36	>25	
	10	1990-2000	422	38	12	66		

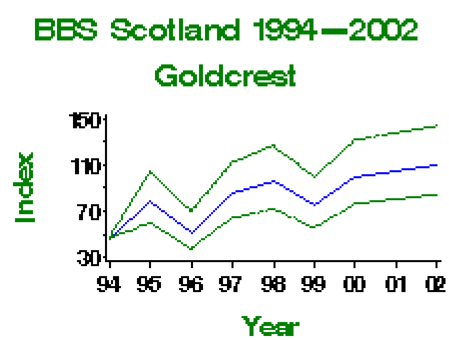
	5	1995-2000	650	37	24	49		
CBC/BBS England	33	1967-2000	149	42	-21	130		
	25	1975-2000	175	-51	-65	-34	>50	
	10	1990-2000	297	32	6	66		
	5	1995-2000	452	30	22	39		
BBS UK	8	1994-2002	534	65	51	80		
BBS England	8	1994-2002	365	42	28	58		
BBS Scotland	8	1994-2002	69	137	82	210		
BBS Wales	8	1994-2002	68	-1	-20	23		

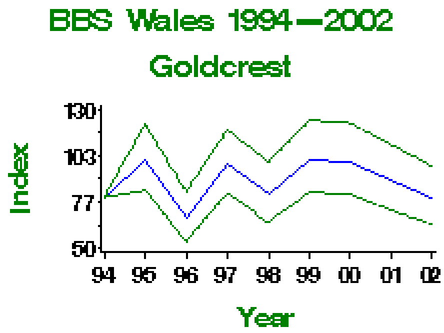
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











Productivity information is not currently available for this species

SPOTTED FLYCATCHER
Muscicapa striata

Conservation listings

Europe: SPEC category 3, declining
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

Spotted Flycatchers have declined rapidly and consistently since the 1960s and the CBC/BBS decline is also reflected in the trend revealed by CES. Breeding performance as measured by NRS and CES has tended to improve over this period. Demographic modelling shows that decreases in the annual survival rates of birds in their first year of life are most likely to have driven the decline (**Freeman & Crick 2003**). Decreasing survival rates may have been caused by deteriorating woodland habitats, or by conditions either on the wintering grounds or along migration routes (**Vanhinsbergh *et al.* 2001**). Since trends have been similar across UK regions and habitats, it is more likely that the decline has been driven by factors operating outside the UK.

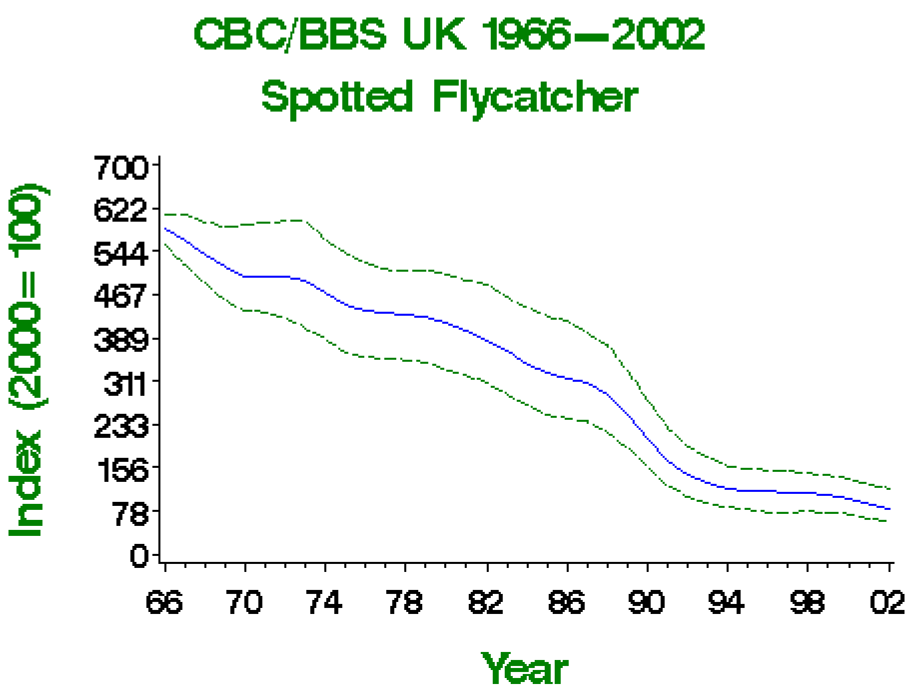
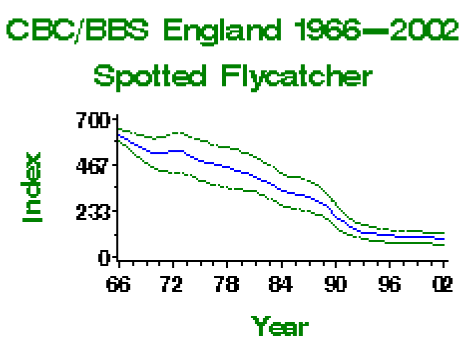


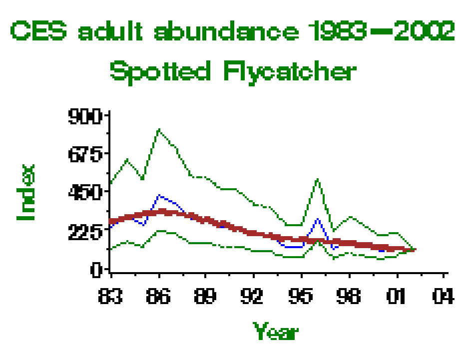
Table of population changes for Spotted Flycatcher

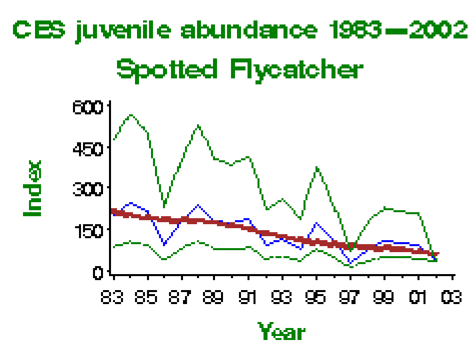
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	110	-82	-88	-75	>50	
	25	1975-2000	120	-78	-84	-68	>50	

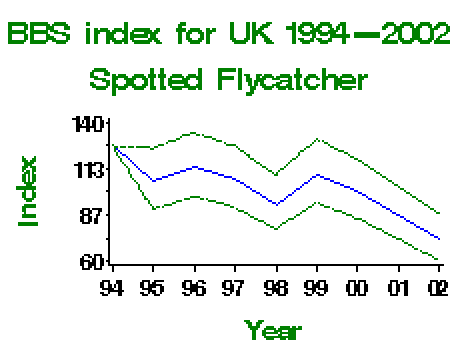
	10	1990-2000	168	-51	-61	-39	>50	
	5	1995-2000	240	-13	-25	3		
CBC/BBS England	33	1967-2000	86	-83	-88	-78	>50	
	25	1975-2000	93	-80	-85	-72	>50	
	10	1990-2000	125	-52	-62	-39	>50	
	5	1995-2000	176	-11	-25	2		
CES adults	17	1984-2001	16	-61	.	.	[>50]	Small sample
	10	1991-2001	15	-50	.	.	[>50]	Small sample
	5	1996-2001	14	-28	.	.	[>25]	Small sample
CES juveniles	17	1984-2001	12	-65	.	.	[>50]	Small sample
	10	1991-2001	12	-53	.	.	[>50]	Small sample
	5	1996-2001	11	-26	.	.	[>25]	Small sample
BBS UK	8	1994-2002	194	-42	-52	-31	(>25)	
BBS England	8	1994-2002	142	-35	-47	-20	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









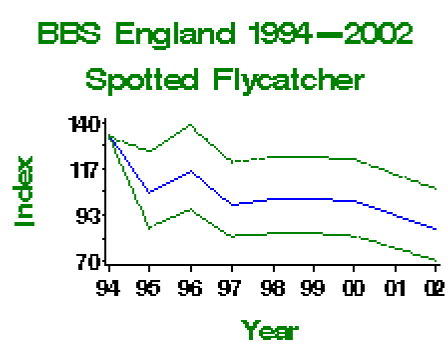
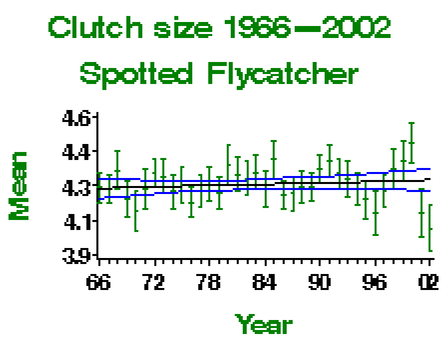
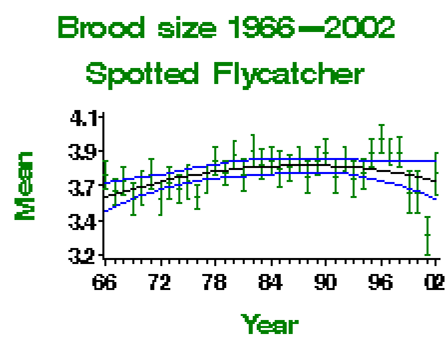
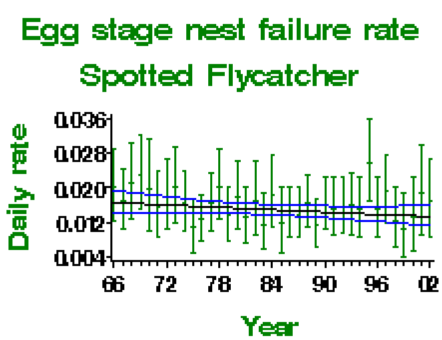


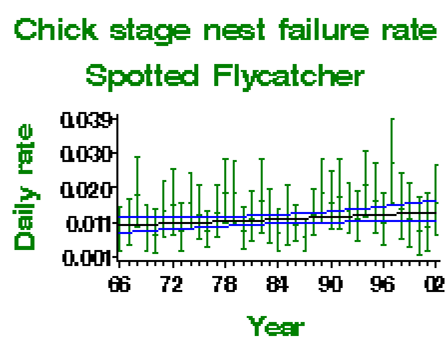
Table of productivity information for Spotted Flycatcher

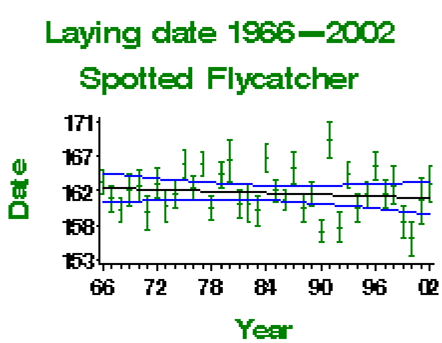
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	83	None				
Brood size	33	1968-2001	134	Curvilinear	3.61 chicks	3.7 chicks	0.09 chicks	
Daily failure rate (eggs)	33	1968-2001	123	None				
Daily failure rate (chicks)	33	1968-2001	110	None				
Laying date	33	1968-2001	74	None				
Percentage juveniles (CES)	17	1984-2001	23	Smoothed trend	75 productivity index	101 productivity index	33%	
Percentage juveniles (CES)	10	1991-2001	22	Smoothed trend	60 productivity index	101 productivity index	66%	
Percentage juveniles (CES)	5	1996-2001	20	Smoothed trend	72 productivity index	101 productivity index	40%	

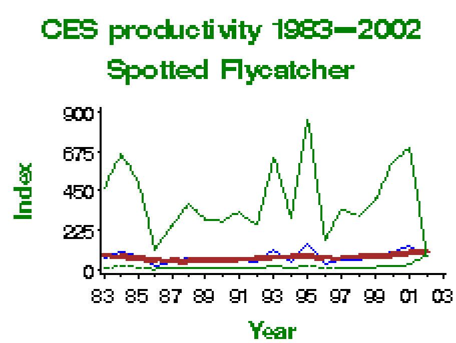












PIED FLYCATCHER
Ficedula hypoleuca

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: uncertain

Status summary

Pied Flycatchers are common birds of upland deciduous woods in parts of western and northern Britain. The 1988-91 breeding atlas revealed a small expansion in range, aided by the provision of nest boxes (**Gibbons *et al.* 1993**). BBS suggests that abundance has been stable since 1994. A substantial rise in nest failure rates at the chick stage may follow from the provision of nest boxes in suboptimal habitat.

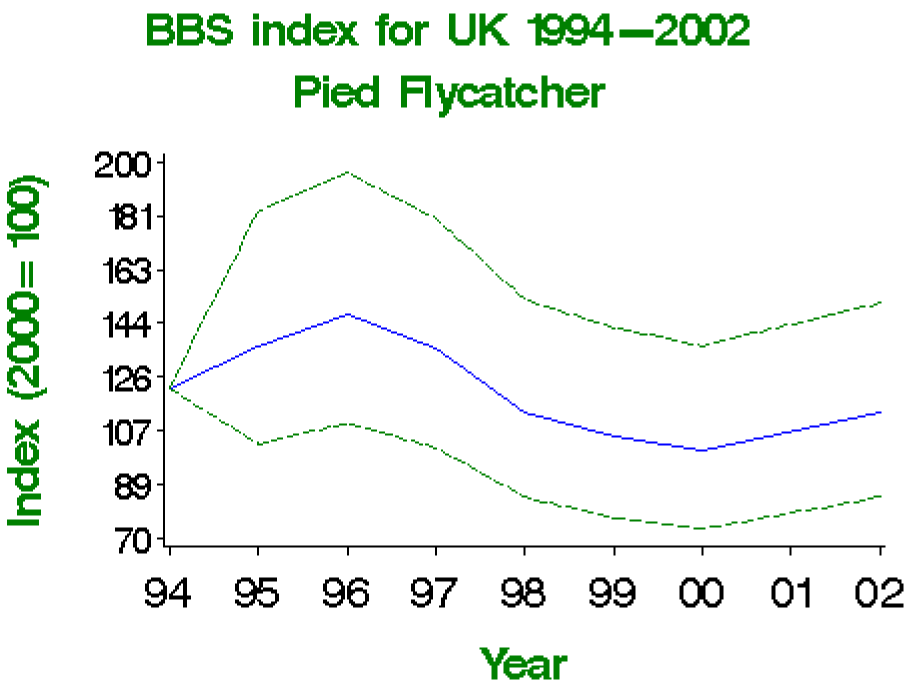


Table of population changes for Pied Flycatcher

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	43	-7	-31	24		

Information on productivity not currently available for this species

LONG-TAILED TIT
Aegithalos caudatus

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: moderate increase

Status summary

This species tends to undergo large-scale fluctuations in numbers, suffering heavy mortality when winters are severe, but able to recover quickly by virtue of its high breeding potential. Much of the increase in the CBC/BBS trend took place prior to 1975, perhaps as a recovery from the cold winters of the early 1960s. It is therefore not reflected in the 25-year trend, which is perhaps best described as 'fluctuating, with no long-term trend'. Both CBC/BBS and CES index trends show increases in Long-tailed Tit abundance since the mid 1980s, but BBS data suggest little change since 1994. Improvements in nesting success at the egg stage - 19 days, comprising 13 days incubation and 6 days laying - have accompanied the recent increase, but clutch and brood sizes have been smaller. The trend towards earlier laying may be explained by recent climatic changes (**Crick & Sparks 1999**).

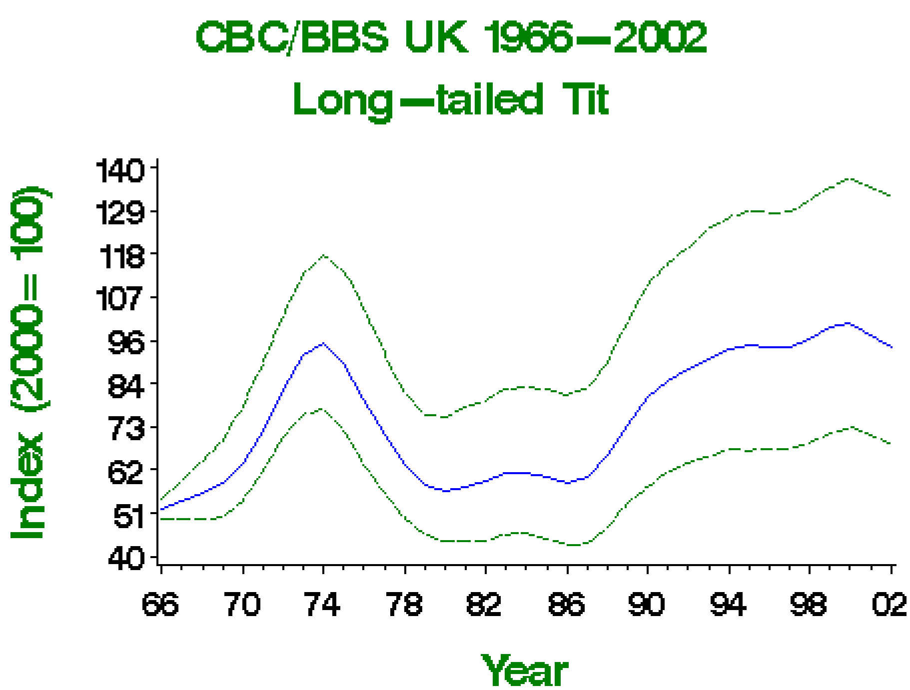
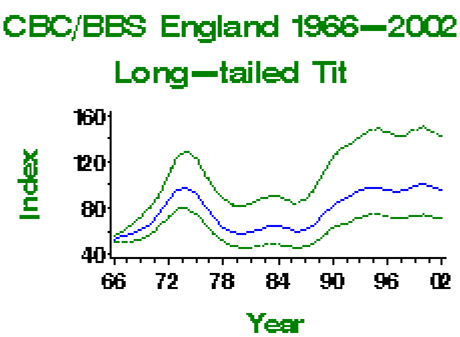


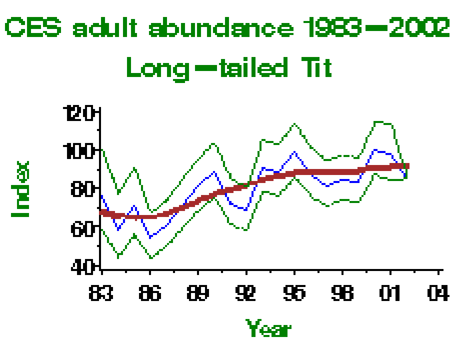
Table of population changes for Long-tailed Tit

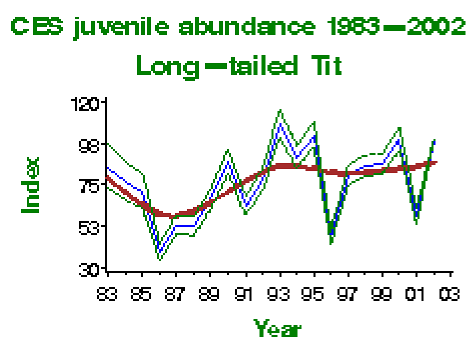
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	257	84	27	160		
	25	1975-2000	308	11	-10	37		
	10	1990-2000	550	24	14	35		
	5	1995-2000	803	6	0	14		
CBC/BBS England	33	1967-2000	228	81	29	168		

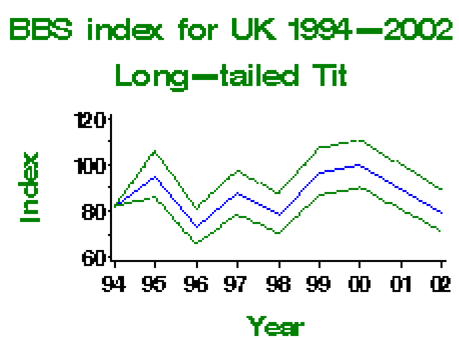
	25	1975-2000	272	9	-9	39		
	10	1990-2000	486	22	10	33		
	5	1995-2000	707	2	-5	10		
CES adults	17	1984-2001	74	39	.	.		
	10	1991-2001	91	16	.	.		
	5	1996-2001	93	3	.	.		
CES juveniles	17	1984-2001	66	20	.	.		
	10	1991-2001	84	11	.	.		
	5	1996-2001	87	3	.	.		
BBS UK	8	1994-2002	630	-3	-13	9		
BBS England	8	1994-2002	554	-12	-21	-1		
BBS Wales	8	1994-2002	47	29	-17	102		

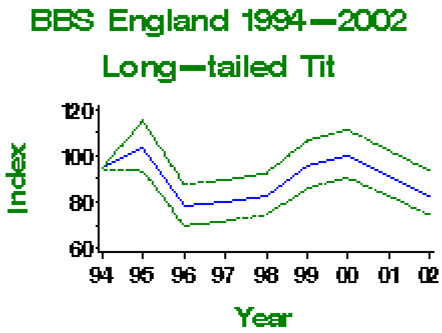
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











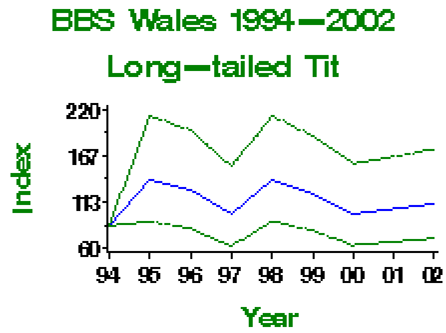
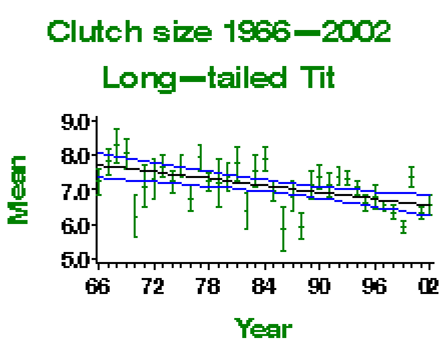
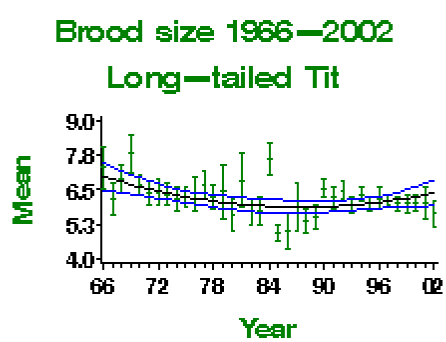
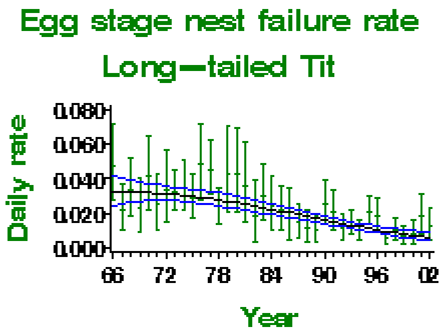


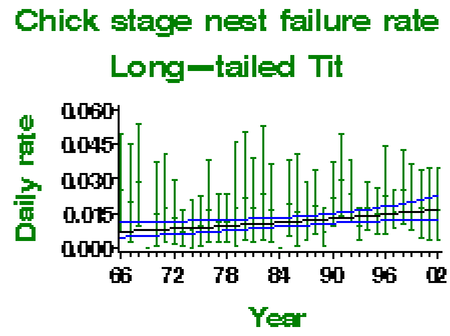
Table of productivity information for Long-tailed Tit

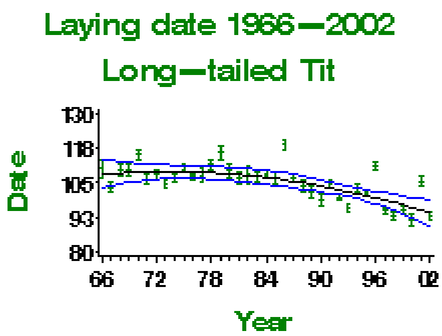
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	32	Linear decline	7.65 eggs	6.57 eggs	-1.08 eggs	
Brood size	33	1968-2001	27	Curvilinear	6.79 chicks	6.32 chicks	-0.47 chicks	Small sample
Daily failure rate (eggs)	33	1968-2001	51	Curvilinear	0.0322 nests/day	0.007 nests/day	-0.0252 nests/day	
Daily failure rate (chicks)	33	1968-2001	36	Linear increase	0.0077 nests/day	0.0164 nests/day	0.0087 nests/day	
Laying date	33	1968-2001	42	Curvilinear	day 109	day 95	-14 days	
Percentage juveniles (CES)	17	1984-2001	80	Smoothed trend	102 productivity index	101 productivity index	-2%	
Percentage juveniles (CES)	10	1991-2001	98	Smoothed trend	103 productivity index	101 productivity index	-3%	
Percentage juveniles (CES)	5	1996-2001	100	Smoothed trend	98 productivity index	101 productivity index	2%	

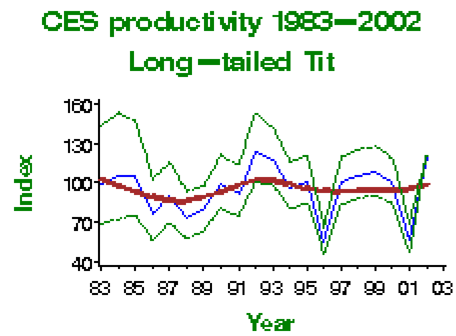





Egg stage nest failure rate
Long-tailed Tit
Daily rate
0.080
0.060
0.040
0.020
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Long-tailed Tit
Daily rate
0.060
0.045
0.030
0.015
0.000
66 72 78 84 90 96 02
Year


Laying date 1966-2002
Long-tailed Tit
Date
130
118
105
93
80
66 72 78 84 90 96 02
Year


CES productivity 1983-2002
Long-tailed Tit
Index
160
130
100
70
40
83 85 87 89 91 93 95 97 99 01 03
Year

MARSH TIT
Parus palustris

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

Marsh Tit abundance has declined rapidly, despite improvements in breeding performance. The species' UK conservation listing has recently been upgraded from Amber to Red. Detailed demographic work suggests that the decline may have been driven by low annual survival and that neither increased nest predation nor interspecific competition is responsible (G.M. Siriwardena, unpubl.). Marsh Tits nest in woods as small as half a hectare (**Hinsley *et al.* 1995**), but there is evidence from CBC that declines are steeper on smaller plots (G.M. Siriwardena, unpubl.). Increased woodland isolation, loss of woodland understorey due to grazing, and reductions in the availability of dead wood may all have contributed to the decline (**Vanhinsbergh *et al.* 2001**, **Perrins 2003**).

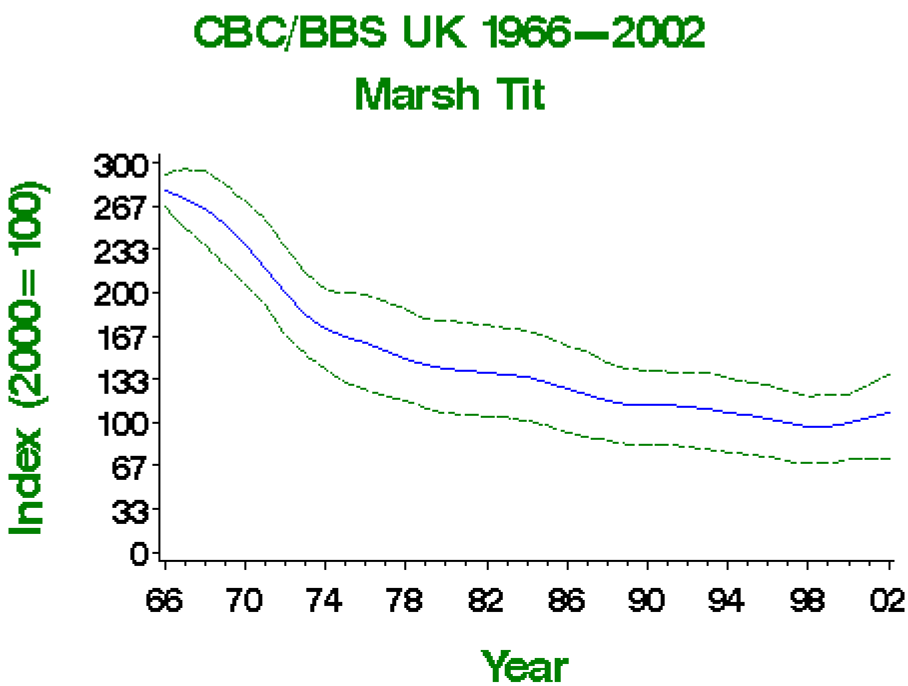
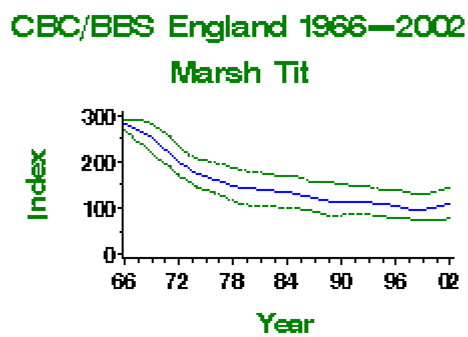


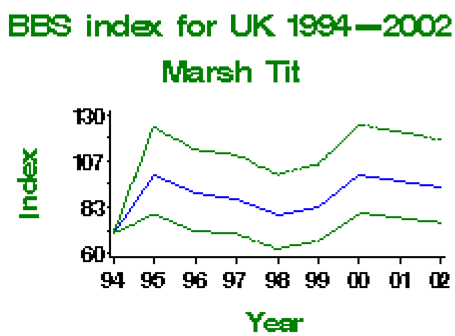
Table of population changes for Marsh Tit

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	79	-63	-74	-54	>50	
	25	1975-2000	87	-40	-54	-23	>25	
	10	1990-2000	128	-12	-29	3		
	5	1995-2000	172	-5	-17	4		
CBC/BBS England	33	1967-2000	74	-63	-73	-48	>50	
	25	1975-2000	80	-40	-55	-22	>25	

	10	1990-2000	118	-13	-26	6		
	5	1995-2000	156	-7	-18	5		
BBS UK	8	1994-2002	122	34	8	68		
BBS England	8	1994-2002	108	24	-1	55		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





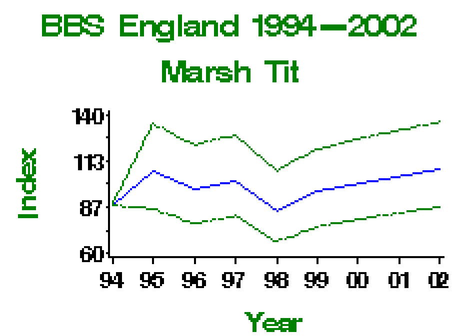
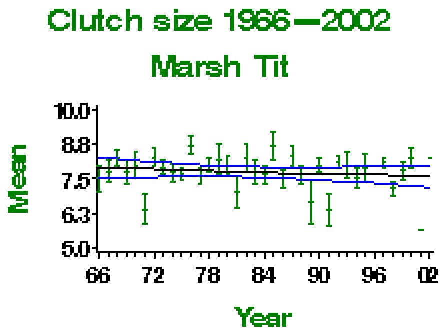
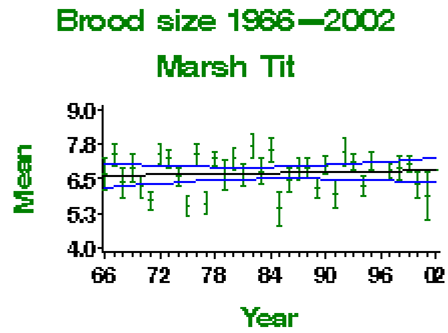
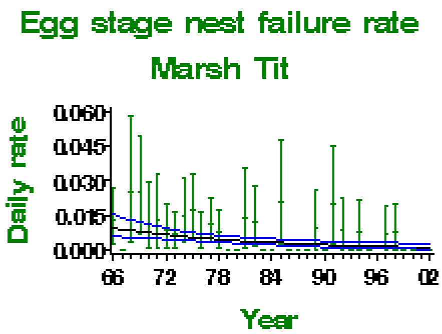


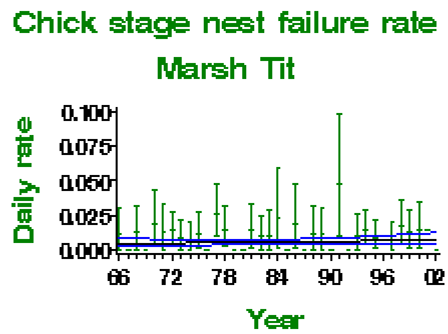
Table of productivity information for Marsh Tit

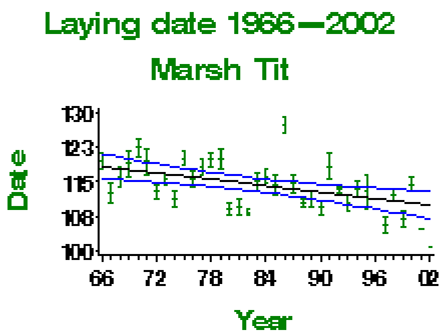
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	13	None				Small sample
Brood size	33	1968-2001	22	None				Small sample
Daily failure rate (eggs)	33	1968-2001	19	Linear decline	0.0085 nests/day	0.0013 nests/day	-0.0072 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	19	None				Small sample
Laying date	33	1968-2001	14	Linear decline	day 118	day 110	-8 days	Small sample











Insufficient data on CES available for this species

WILLOW TIT
Parus montanus

Conservation listings

Europe: no SPEC category, (secure)
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

Willow Tits have been in decline since the mid 1970s. The continuing decline in the CBC/BBS index through the 1990s, following a brief period of stability during the 1980s, is replicated in the CES abundance trend. The UK conservation listing has recently been upgraded from Amber to Red. The species is extinct in an increasing number of former haunts, and appears to have withdrawn to certain preferred wet woodland habitats. The decline is unlikely to be due to nest predation (G.M. Siriwardena, unpubl.). Candidate causes include reductions in the availability of dead wood, woodland drainage, and reductions in the woodland shrub layer due to overgrazing by deer (**Vanhinsbergh *et al.* 2001**, **Perrins 2003**).

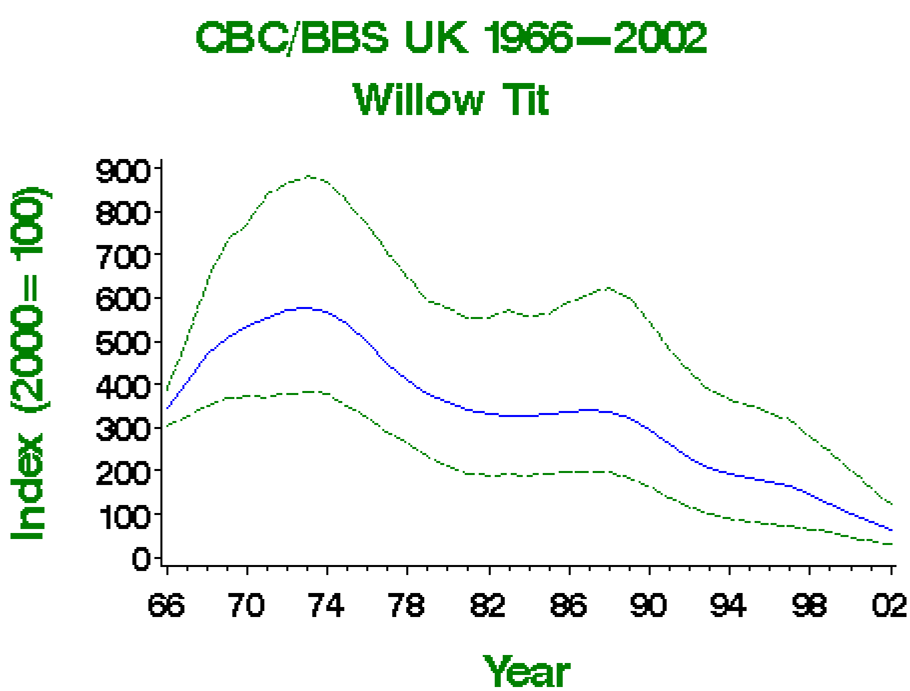
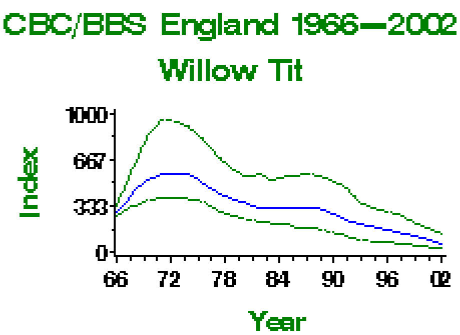


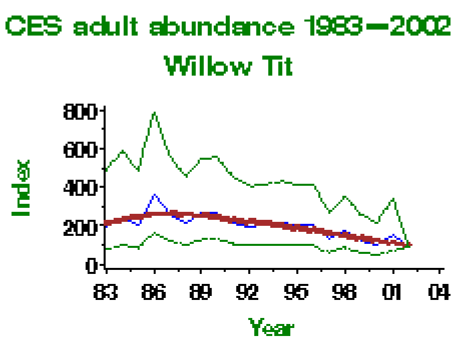
Table of population changes for Willow Tit

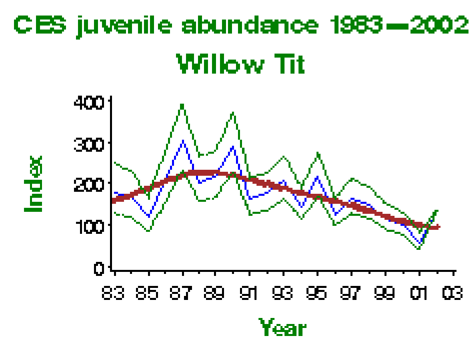
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	42	-75	-89	-55	>50	
	25	1975-2000	44	-81	-90	-71	>50	
	10	1990-2000	54	-66	-78	-51	>50	
	5	1995-2000	74	-45	-59	-32	>25	
CBC/BBS England	33	1967-2000	40	-73	-90	-53	>50	

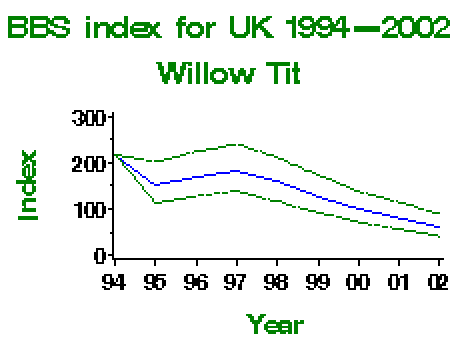
	25	1975-2000	41	-81	-93	-70	>50	
	10	1990-2000	49	-64	-78	-53	>50	
	5	1995-2000	66	-42	-57	-31	>25	
CES adults	17	1984-2001	23	-51	.	.	[>50]	
	10	1991-2001	23	-51	.	.	[>50]	
	5	1996-2001	20	-36	.	.	[>25]	
CES juveniles	17	1984-2001	32	-41	.	.	[>25*]	
	10	1991-2001	33	-52	.	.	[>50*]	
	5	1996-2001	27	-36	.	.	[>25*]	
BBS UK	8	1994-2002	55	-72	-81	-59	(>50)	
BBS England	8	1994-2002	48	-71	-81	-56	(>50)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









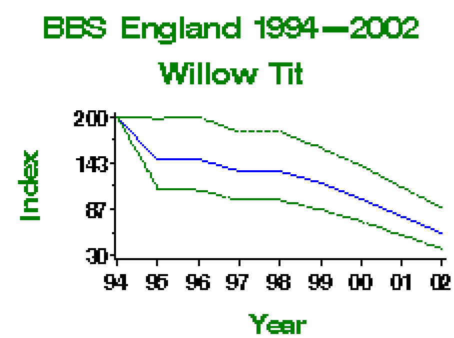


Table of productivity information for Willow Tit

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-	2	None				Small

		2001						sample
Brood size	33	1968-2001	6	None				Small sample
Daily failure rate (eggs)	33	1968-2001	4	None				Small sample
Daily failure rate (chicks)	33	1968-2001	5	None				Small sample
Laying date	33	1968-2001	2	None				Small sample
Percentage juveniles (CES)	17	1984-2001	36	Smoothed trend	109 productivity index	101 productivity index	-8%	
Percentage juveniles (CES)	10	1991-2001	37	Smoothed trend	104 productivity index	101 productivity index	-4%	
Percentage juveniles (CES)	5	1996-2001	31	Smoothed trend	100 productivity index	101 productivity index	0%	

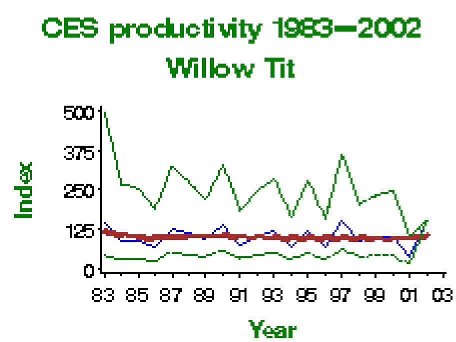
Insufficient data on clutch size available for this species

Insufficient data on brood size available for this species

Insufficient data on nest failure available for this species

Insufficient data on nestling failure available for this species

Insufficient data on laying date available for this species



COAL TIT
Parus ater

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Coal Tit abundance has been rather stable since the mid 1970s, following an earlier rapid increase. The ratios of Coal Tit to **Blue** and **Great Tits** caught for ringing have both shown a sustained increase since 1960 (**Perrins 2003**), although in these figures population change may be confounded to some degree with changes in behaviour among birds and bird ringers. Confidence intervals are wide, but BBS shows large changes in population sizes that have varied geographically across the UK. This pattern suggests that Coal Tit abundance in the UK may be controlled by a complex range of factors.

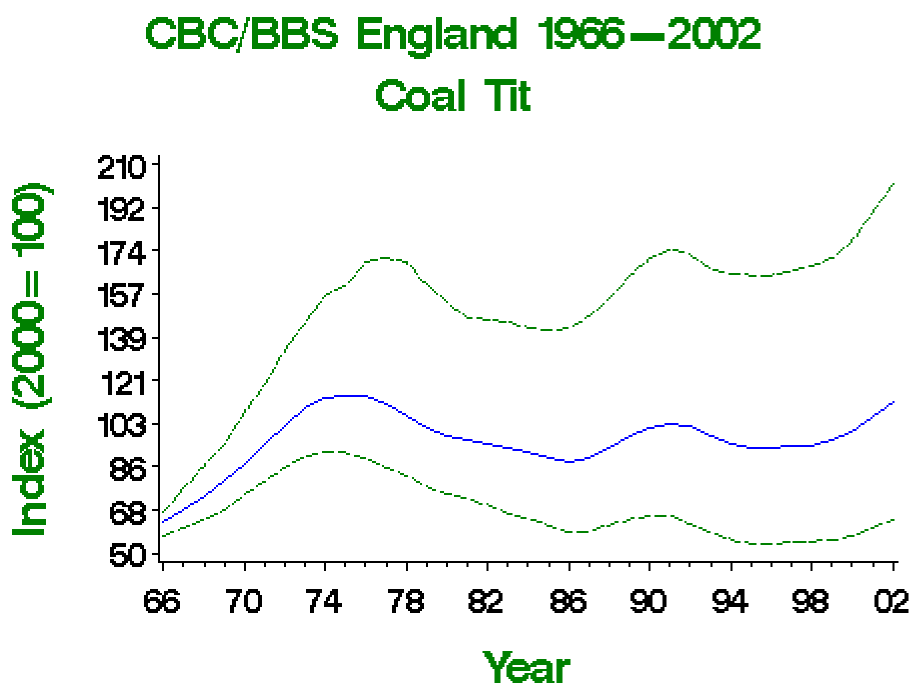
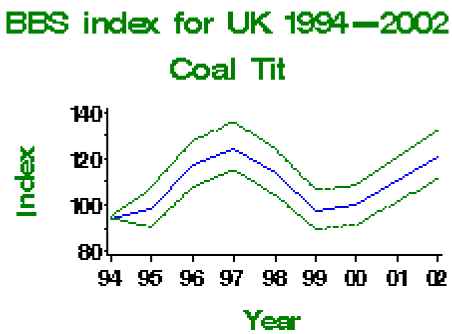


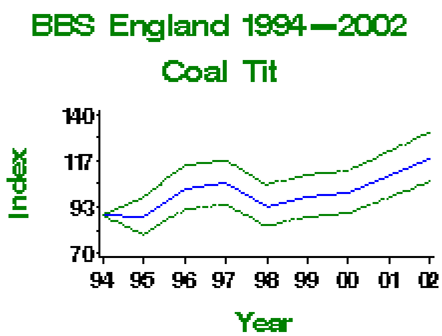
Table of population changes for Coal Tit

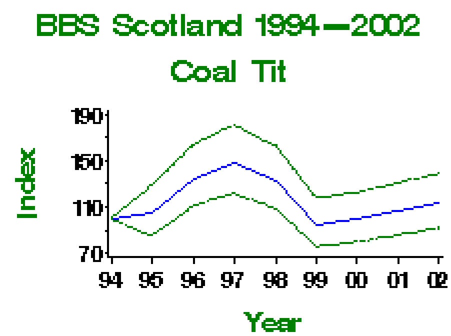
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	159	47	-18	194		
	25	1975-2000	187	-13	-39	26		

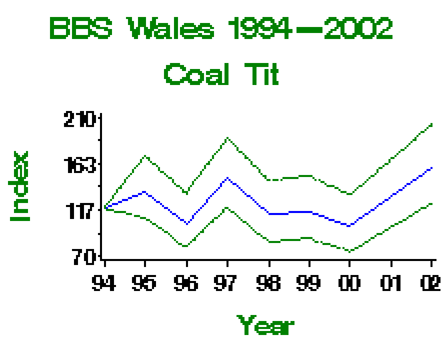
	10	1990-2000	309	-2	-15	11		
	5	1995-2000	439	7	-2	14		
BBS UK	8	1994-2002	543	28	18	40		
BBS England	8	1994-2002	352	32	19	47		
BBS Scotland	8	1994-2002	95	13	-8	39		
BBS Wales	8	1994-2002	59	33	4	71		
BBS N.Ireland	8	1994-2002	37	142	37	328		

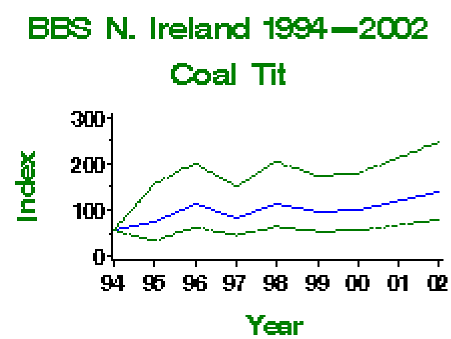
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











Productivity information is not currently available for this species

BLUE TIT
Parus caeruleus

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Blue Tit populations have increased in abundance, in parallel with those of **Great Tits**, with brief pauses in the long-term upward trend. The recent years of the CBC/BBS index show fluctuations but no clear trend. Food provision by humans during winter and availability of nest boxes, which may reduce egg and nestling predation, have both increased and may have contributed to the rise in population. A substantial decline in productivity, revealed by the CES, has accompanied the population increase.

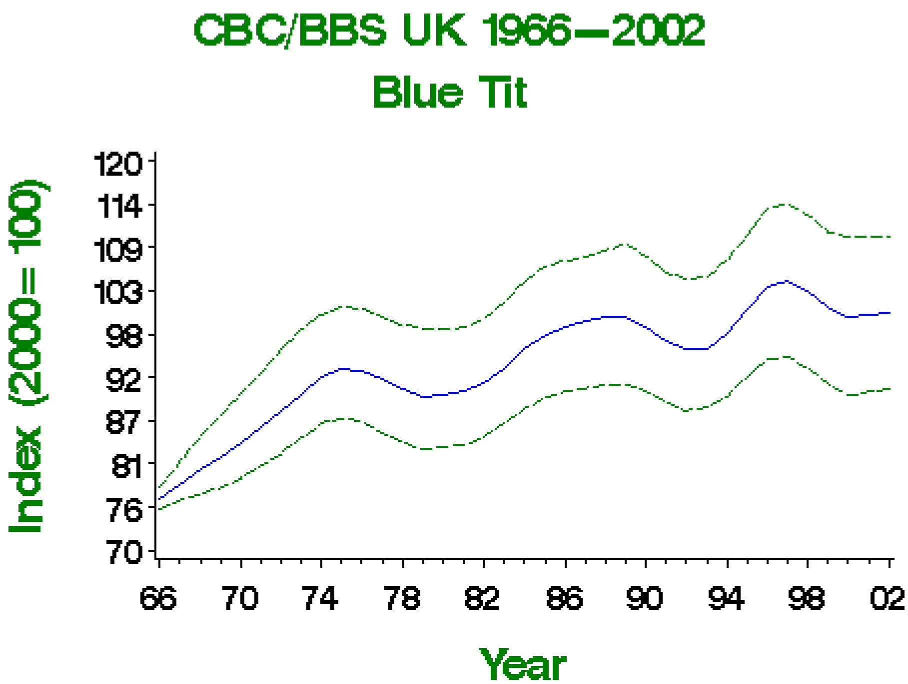
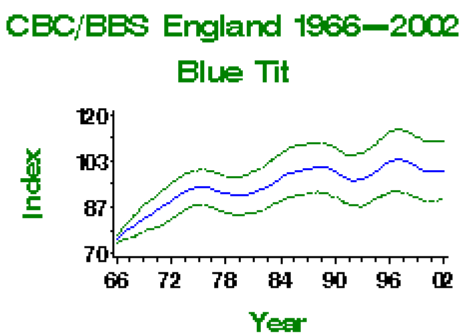


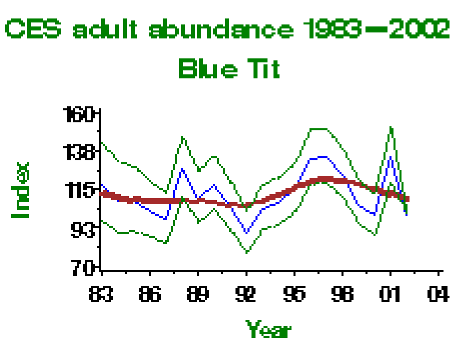
Table of population changes for Blue Tit

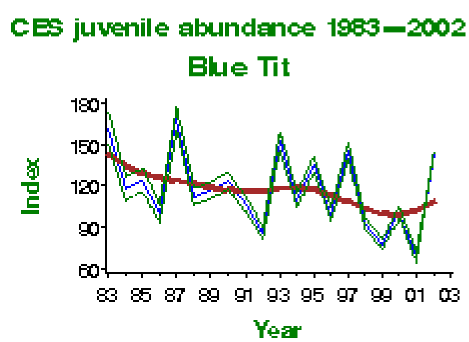
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	558	27	16	40		
	25	1975-2000	673	7	-2	16		
	10	1990-2000	1276	1	-2	5		
	5	1995-2000	1958	-1	-3	2		

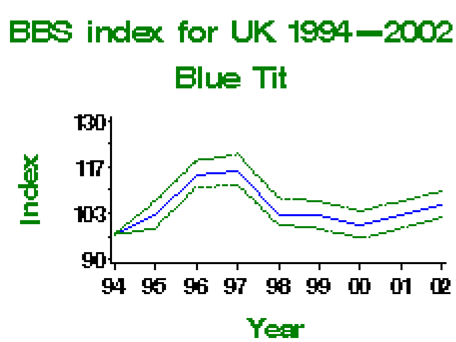
CBC/BBS England	33	1967-2000	466	28	14	45		
	25	1975-2000	561	6	-1	19		
	10	1990-2000	1056	0	-3	5		
	5	1995-2000	1611	-1	-3	2		
CES adults	17	1984-2001	94	2	.	.		
	10	1991-2001	109	6	.	.		
	5	1996-2001	111	-6	.	.		
CES juveniles	17	1984-2001	93	-24	.	.		
	10	1991-2001	108	-12	.	.		
	5	1996-2001	111	-10	.	.		
BBS UK	8	1994-2002	1681	9	5	13		
BBS England	8	1994-2002	1374	5	1	9		
BBS Scotland	8	1994-2002	117	11	-7	33		
BBS Wales	8	1994-2002	135	28	13	46		
BBS N.Ireland	8	1994-2002	47	49	8	104		

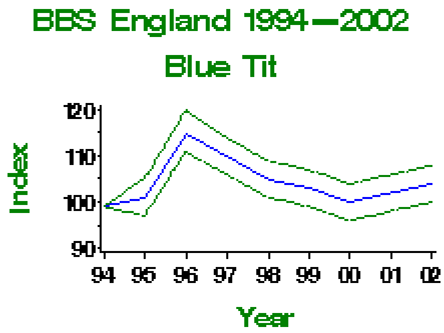
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

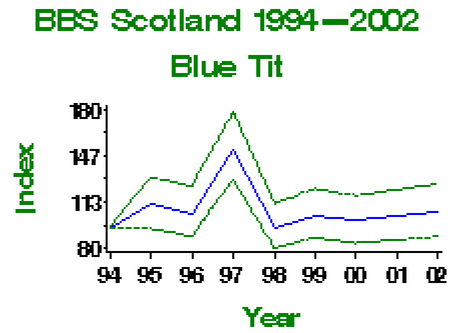


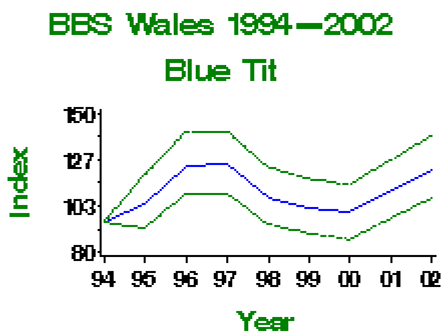












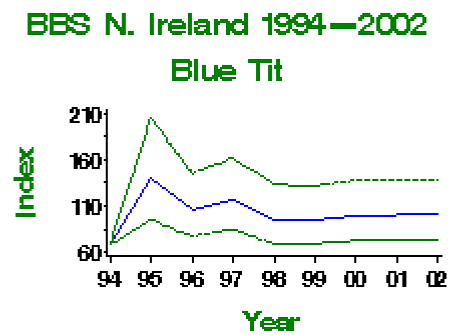
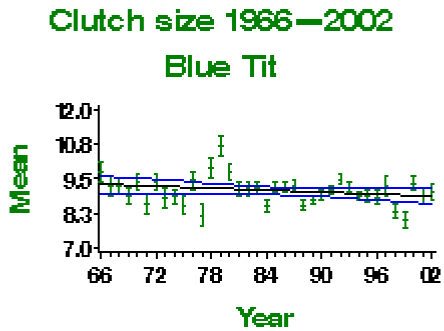
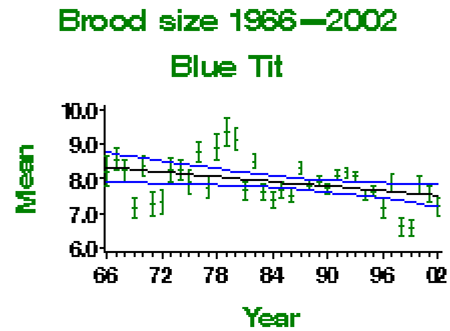
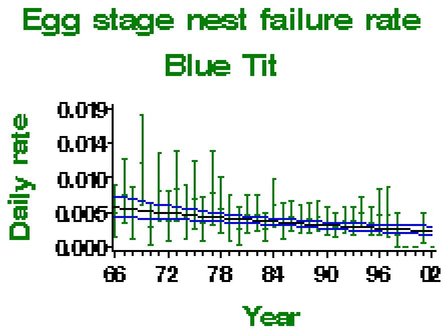


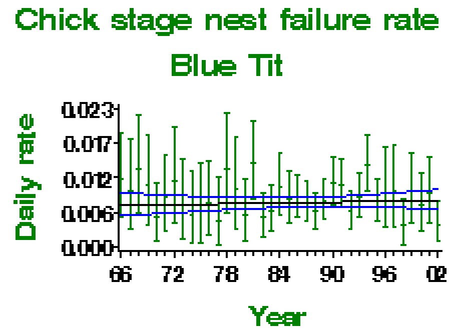
Table of productivity information for Blue Tit

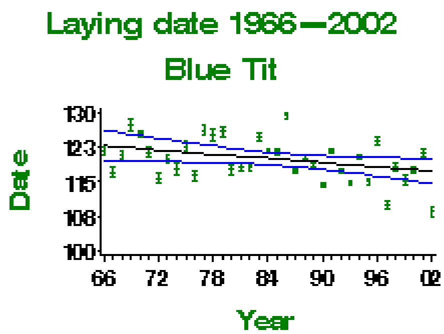
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	84	None				
Brood size	33	1968-2001	135	Linear decline	8.29 chicks	7.55 chicks	-0.74 chicks	
Daily failure rate (eggs)	33	1968-2001	136	Linear decline	0.0052 nests/day	0.0023 nests/day	-0.0029 nests/day	
Daily failure rate (chicks)	33	1968-2001	116	None				
Laying date	33	1968-2001	118	Linear decline	day 123	day 118	-5 days	
Percentage juveniles (CES)	17	1984-2001	98	Smoothed trend	140 productivity index	101 productivity index	-29% [>25*]	
Percentage juveniles (CES)	10	1991-2001	114	Smoothed trend	117 productivity index	101 productivity index	-15%	
Percentage juveniles (CES)	5	1996-2001	116	Smoothed trend	101 productivity index	101 productivity index	-1%	

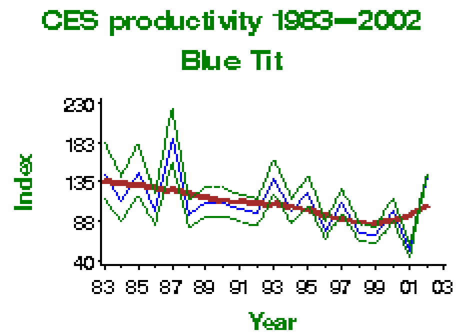

Clutch size 1966–2002
Blue Tit
Mean
12.0
10.8
9.5
8.3
7.0
66 72 78 84 90 96 02
Year


Brood size 1966–2002
Blue Tit
Mean
10.0
9.0
8.0
7.0
6.0
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Blue Tit
Daily rate
0.019
0.014
0.010
0.005
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Blue Tit
Daily rate
0.023
0.017
0.012
0.006
0.000
66 72 78 84 90 96 02
Year


Laying date 1966–2002
Blue Tit
Date
130
123
115
108
100
66 72 78 84 90 96 02
Year


CES productivity 1983–2002
Blue Tit
Index
230
183
135
88
40
83 85 87 89 91 93 95 97 99 01 03
Year

GREAT TIT
Parus major

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: moderate increase

Status summary

Great Tits have increased steadily since the 1960s, with the exception of two brief periods of stability or shallow decline during the mid 1970s and late 1980s. Recent CBC/BBS and BBS results suggest that this increase is continuing, in all UK countries. A positive effect of more food provision by humans during winter is one possible explanation for the increase. Changes in different aspects of breeding performance are contradictory, but the recent upturn in CES productivity suggests that density-dependent competition is not yet affecting juvenile:adult ratios in the post-fledging period.

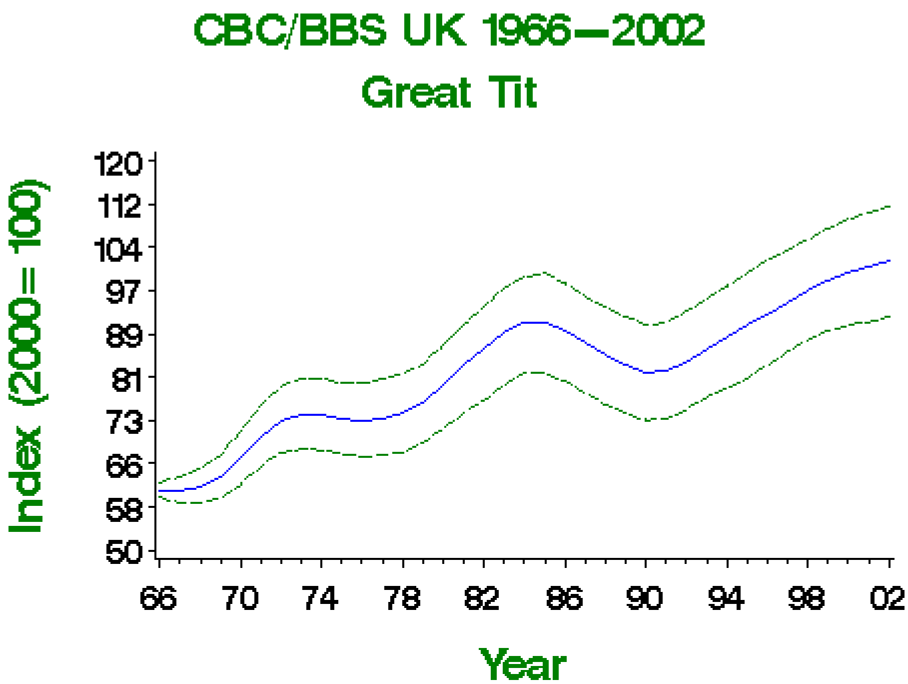
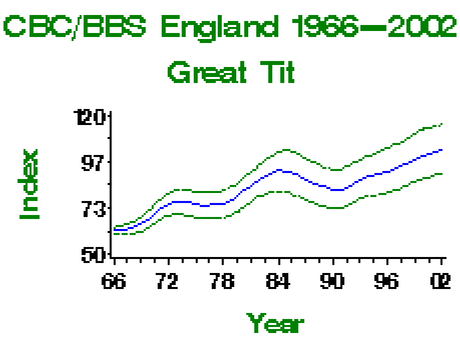


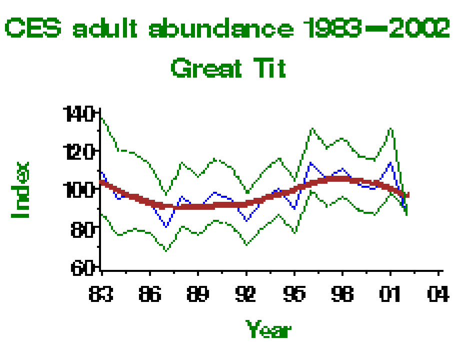
Table of population changes for Great Tit

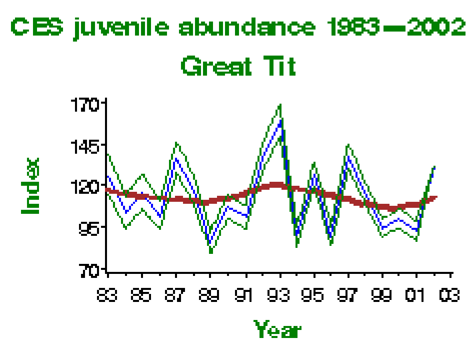
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	522	65	46	82		
	25	1975-2000	630	36	24	48		
	10	1990-2000	1179	22	16	27		
	5	1995-2000	1802	11	8	14		
CBC/BBS England	33	1967-2000	437	61	38	86		
	25	1975-2000	526	33	17	53		
	10	1990-2000	976	21	16	28		
	5	1995-2000	1484	10	7	13		

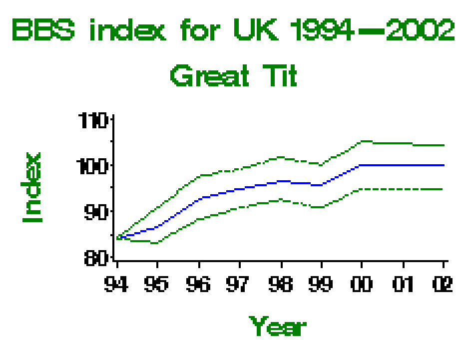
CES adults	17	1984-2001	87	1	.	.		
	10	1991-2001	102	9	.	.		
	5	1996-2001	104	-2	.	.		
CES juveniles	17	1984-2001	89	-6	.	.		
	10	1991-2001	105	-6	.	.		
	5	1996-2001	107	-5	.	.		
BBS UK	8	1994-2002	1537	19	13	24		
BBS England	8	1994-2002	1257	14	9	20		
BBS Scotland	8	1994-2002	104	25	0	57		
BBS Wales	8	1994-2002	128	31	12	53		
BBS N.Ireland	8	1994-2002	41	99	32	202		

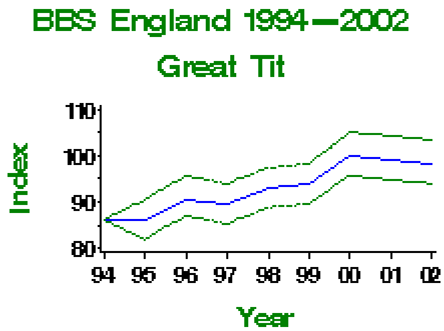
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

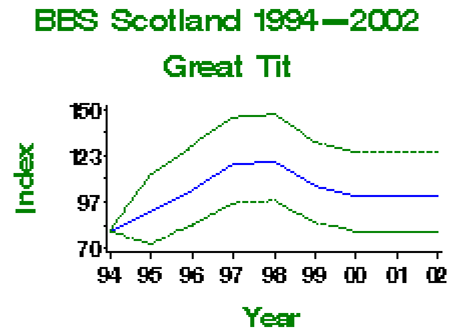


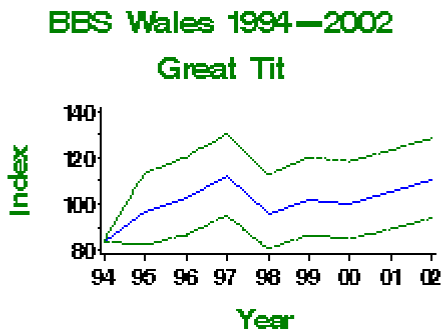












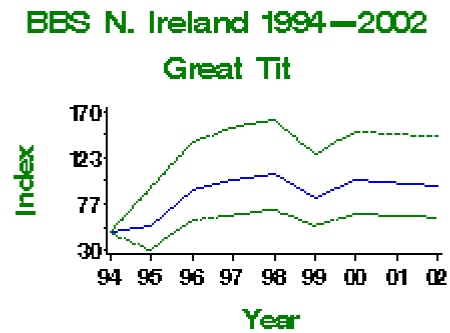
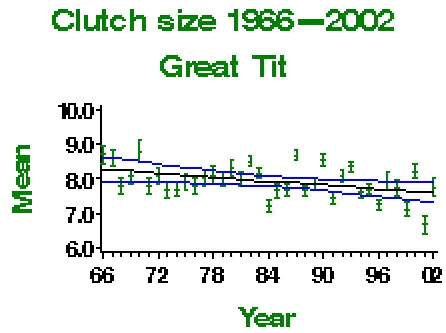
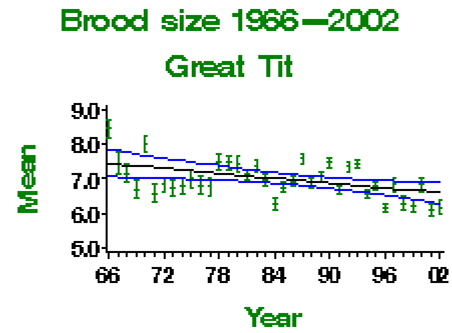
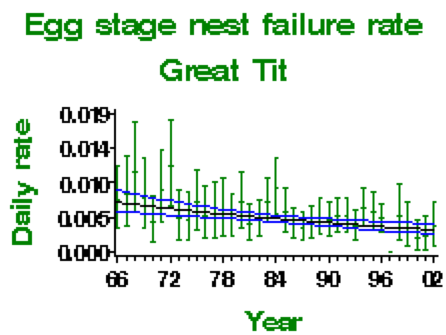


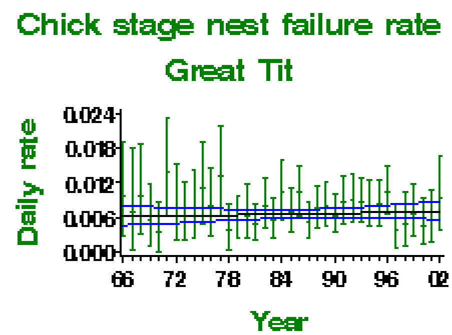
Table of productivity information for Great Tit

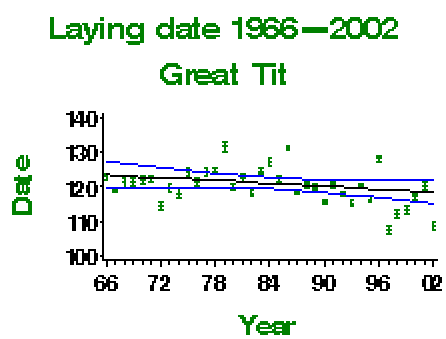
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	94	Linear decline	8.24 eggs	7.62 eggs	-0.62 eggs	
Brood size	33	1968-2001	160	Linear decline	7.41 chicks	6.63 chicks	-0.78 chicks	
Daily failure rate (eggs)	33	1968-2001	154	Linear decline	0.0066 nests/day	0.0032 nests/day	-0.0034 nests/day	
Daily failure rate (chicks)	33	1968-2001	127	None				
Laying date	33	1968-2001	116	None				
Percentage juveniles (CES)	17	1984-2001	95	Smoothed trend	115 productivity index	101 productivity index	-13%	
Percentage juveniles (CES)	10	1991-2001	111	Smoothed trend	111 productivity index	101 productivity index	-10%	
Percentage juveniles (CES)	5	1996-2001	113	Smoothed trend	99 productivity index	101 productivity index	1%	

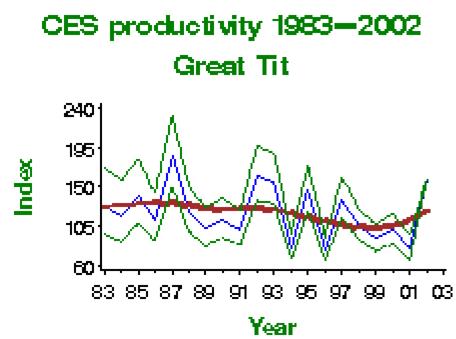

Clutch size 1966—2002
Great Tit
Mean
10.0
9.0
8.0
7.0
6.0
66 72 78 84 90 96 02
Year


Brood size 1966—2002
Great Tit
Mean
9.0
8.0
7.0
6.0
5.0
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Great Tit
Daily rate
0.019
0.014
0.010
0.005
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Great Tit
Daily rate
0.024
0.018
0.012
0.006
0.000
66 72 78 84 90 96 02
Year


Laying date 1966—2002
Great Tit
Date
140
130
120
110
100
66 72 78 84 90 96 02
Year


CES productivity 1983—2002
Great Tit
Index
240
195
150
105
60
83 85 87 89 91 93 95 97 99 01 03
Year

NUTHATCH
Sitta europaea

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

Nuthatch abundance has increased rapidly since the mid 1970s. Despite minor setbacks during the 1990s, there is no indication yet of a halt to the upward trend. This increase has been accompanied by a range expansion into northern England (**Gibbons *et al.* 1993**) and has been associated with a large increase in brood size. The reasons for these changes are unknown. A trend towards earlier laying, perhaps as a result of climate change (**Crick *et al.* 1997**), has also been identified.

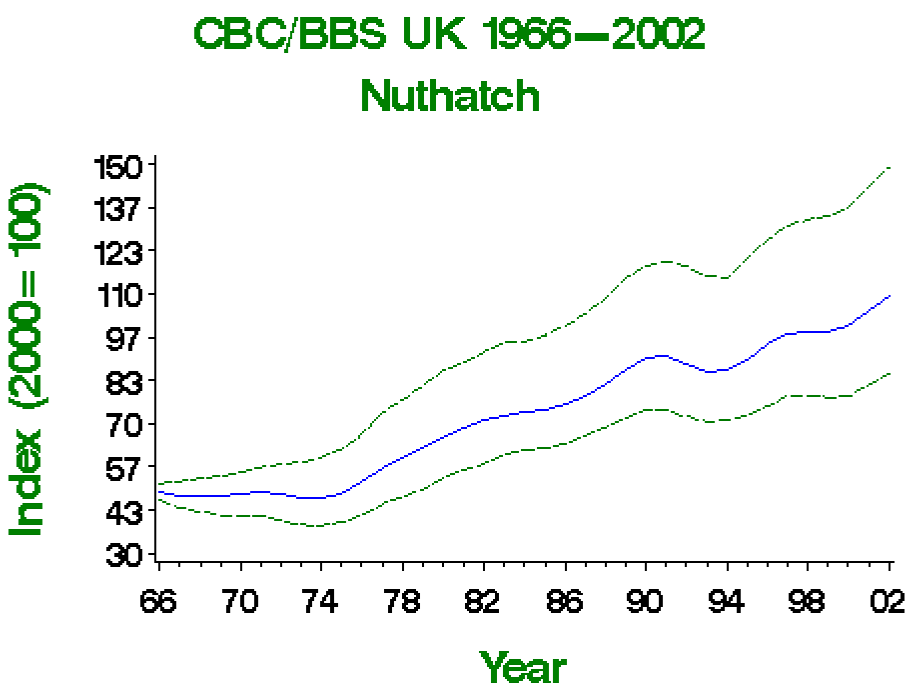
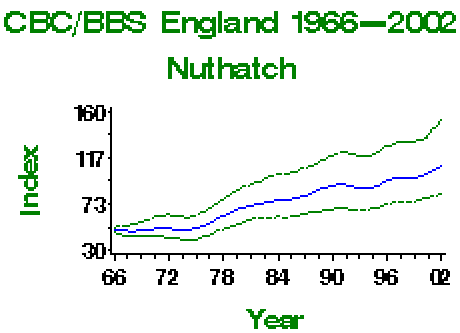


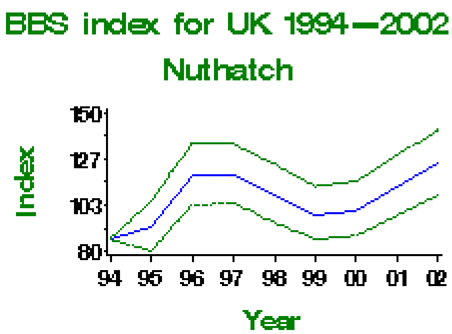
Table of population changes for Nuthatch

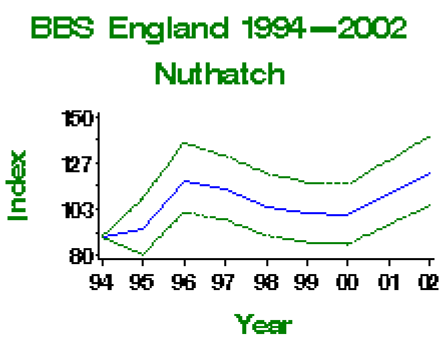
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	122	109	64	191		
	25	1975-2000	147	106	67	160		
	10	1990-2000	257	11	1	24		
	5	1995-2000	372	12	4	20		
CBC/BBS England	33	1967-2000	107	107	47	201		
	25	1975-2000	128	99	55	153		
	10	1990-2000	219	10	-3	24		
	5	1995-2000	313	10	1	19		

BBS UK	8	1994-2002	294	44	26	64		
BBS England	8	1994-2002	240	36	18	57		
BBS Wales	8	1994-2002	53	68	22	131		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







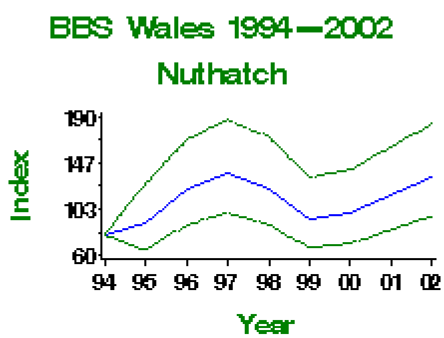
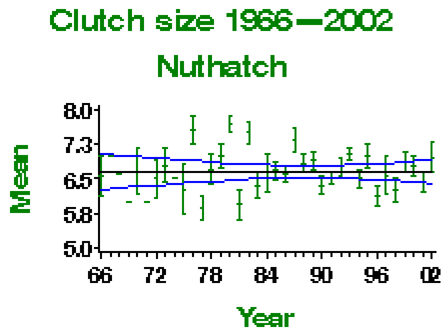
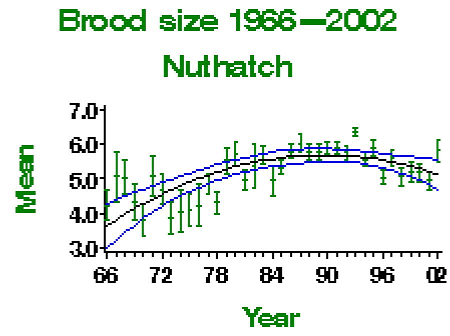
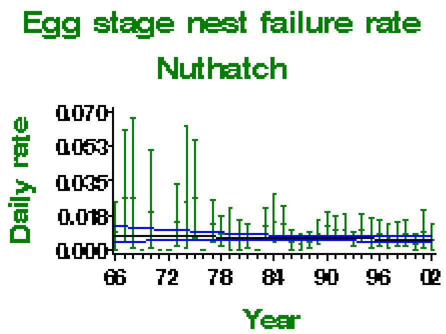


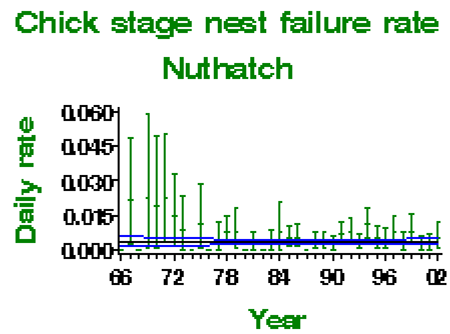
Table of productivity information for Nuthatch

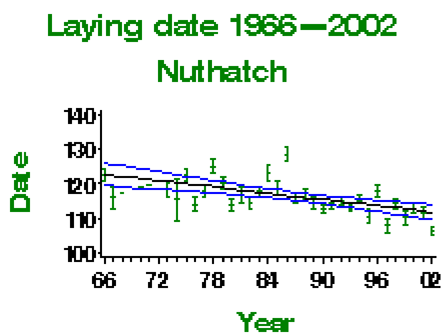
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	25	None				Small sample
Brood size	33	1968-2001	57	Curvilinear	3.98 chicks	5.21 chicks	1.23 chicks	
Daily failure rate (eggs)	33	1968-2001	44	None				
Daily failure rate (chicks)	33	1968-2001	47	None				
Laying date	33	1968-2001	26	Linear decline	day 122	day 112	-10 days	Small sample











Insufficient data on CES available for this species

TREECREEPER
Certhia familiaris

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

England: fluctuating, with no long-term trend

Status summary

The UK Treecreeper population peaked in the mid 1970s but, since the late 1970s, has been roughly stable. BBS data suggest an increase recently in Wales, and in the UK as a whole, but continued stability in England. Detailed study has shown that Treecreeper numbers and survival rates are reduced by wet winters (**Peach *et al*. 1995b**). Productivity, calculated using CES data, shows a long-term shallow decrease. An apparent decrease in clutch size has been countered by a significant fall in nest failure rates at the egg stage (18 days, comprising 14 days incubation and 4 days laying).

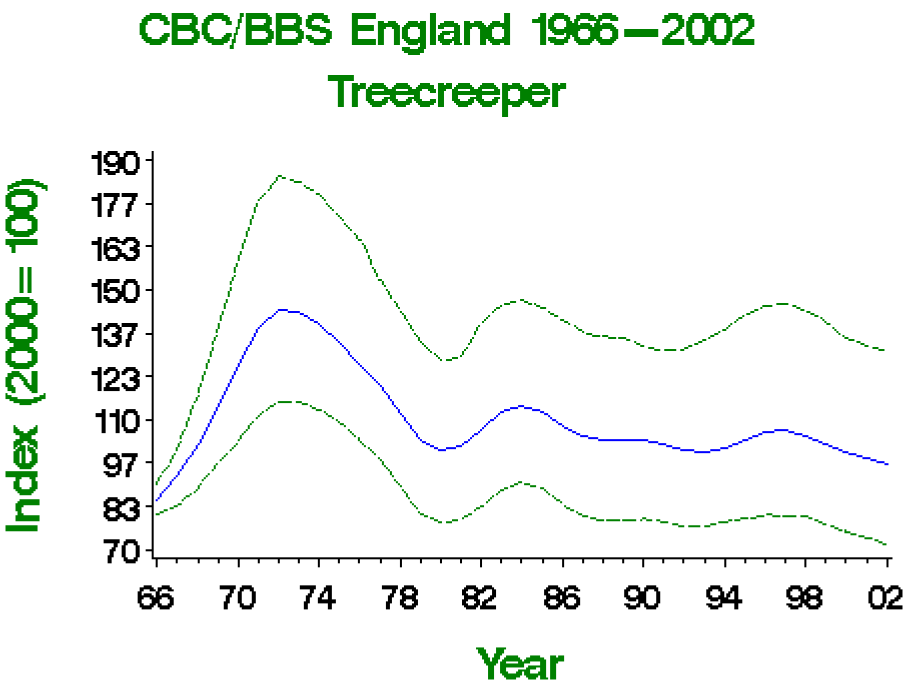
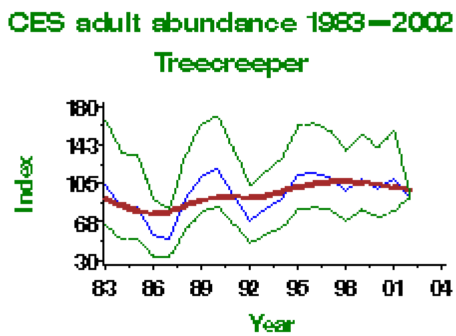


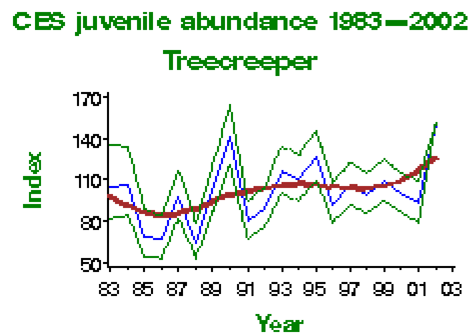
Table of population changes for Treecreeper

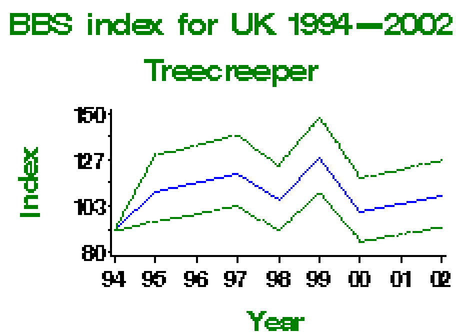
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	124	8	-18	44		
	25	1975-2000	141	-25	-40	-11	>25	
	10	1990-2000	211	-4	-16	12		

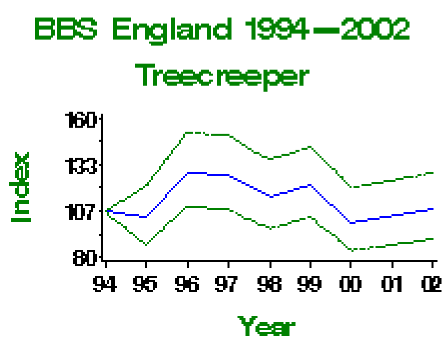
	5	1995-2000	286	-4	-12	6		
CES adults	17	1984-2001	37	22	.	.		
	10	1991-2001	44	10	.	.		
	5	1996-2001	45	-3	.	.		
CES juveniles	17	1984-2001	56	27	.	.		
	10	1991-2001	67	14	.	.		
	5	1996-2001	66	10	.	.		
BBS UK	8	1994-2002	264	19	2	39		
BBS England	8	1994-2002	195	1	-15	21		
BBS Wales	8	1994-2002	36	70	9	164		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









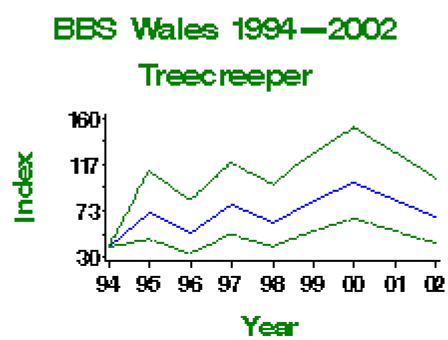
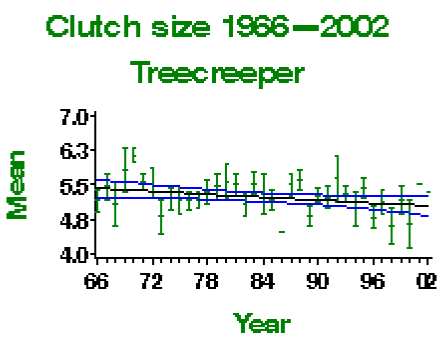
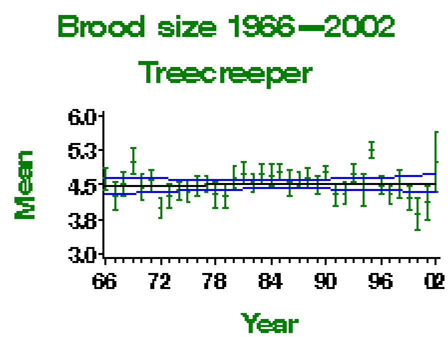


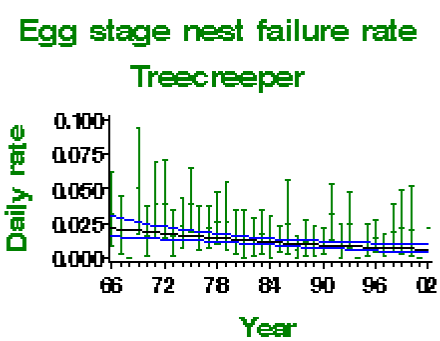
Table of productivity information for Treecreeper

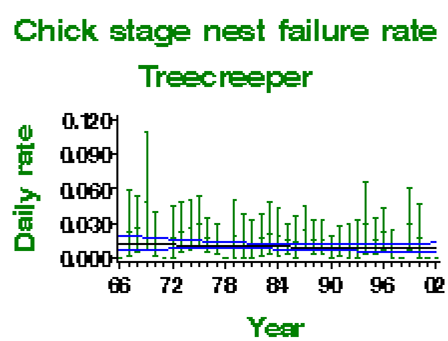
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	14	Linear decline	5.41 eggs	5.06 eggs	-0.35 eggs	Small sample
		1968-						

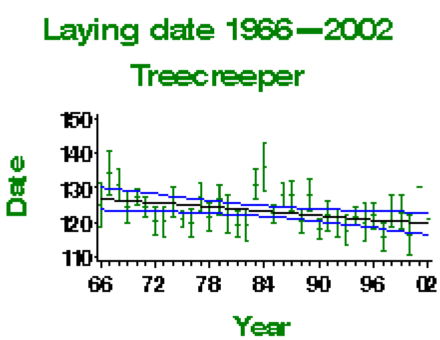
Brood size	33	2001	31	None				
Daily failure rate (eggs)	33	1968-2001	25	Linear decline	0.0204 nests/day	0.0065 nests/day	-0.0139 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	25	None				Small sample
Laying date	33	1968-2001	15	Linear decline	day 127	day 120	-7 days	Small sample
Percentage juveniles (CES)	17	1984-2001	64	Smoothed trend	107 productivity index	101 productivity index	-7%	
Percentage juveniles (CES)	10	1991-2001	75	Smoothed trend	115 productivity index	101 productivity index	-13%	
Percentage juveniles (CES)	5	1996-2001	76	Smoothed trend	100 productivity index	101 productivity index	0%	

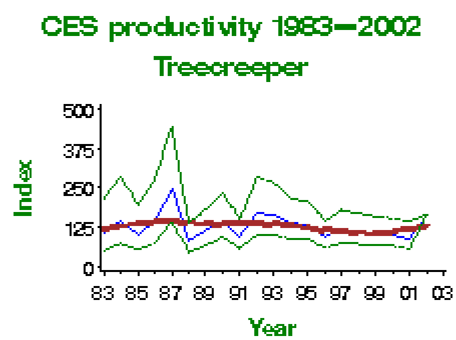












JAY
Garrulus glandarius

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

England: fluctuating, with no long-term trend

Status summary

The UK Jay population remained stable in the species' preferred woodland habitat until the late 1980s, after which the population began to decline. This decrease followed an earlier decline on farmland CBC plots (**Gregory & Marchant 1996**). Long-term trends are shallowly downward overall, but BBS has recorded substantial increase since 1999. Although sample sizes are small, nest failure rates at the egg stage (21 days, comprising 16 days incubation and 5 days laying) have fallen considerably.

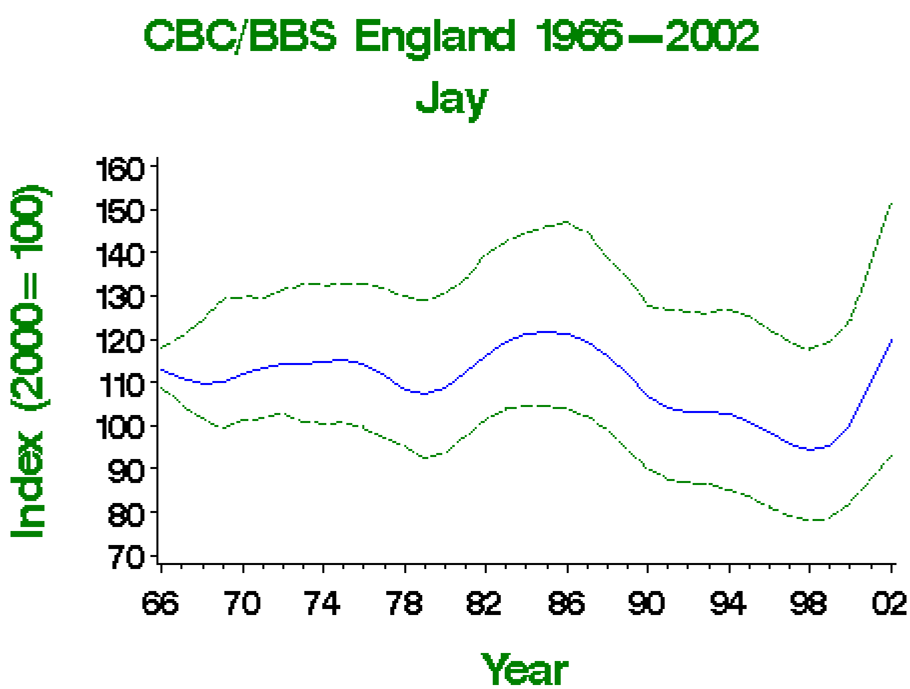
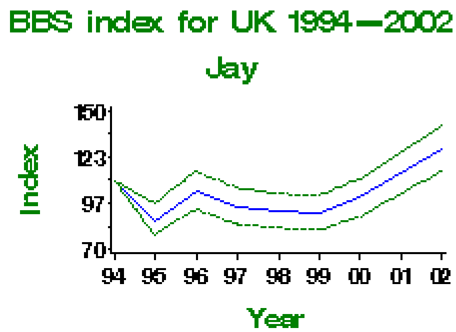


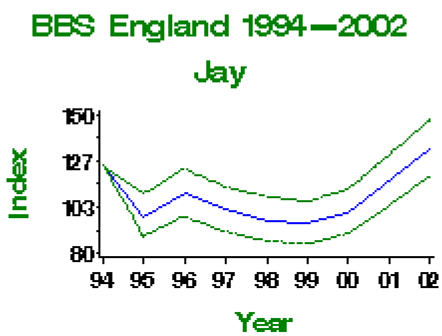
Table of population changes for Jay

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	192	-10	-27	14		
	25	1975-2000	228	-13	-28	5		
	10	1990-2000	384	-7	-16	0		
	5	1995-2000	550	-1	-7	6		
BBS UK	8	1994-2002	513	16	5	29		

BBS England	8	1994-2002	447	6	-5	18		
BBS Wales	8	1994-2002	53	1	-29	42		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





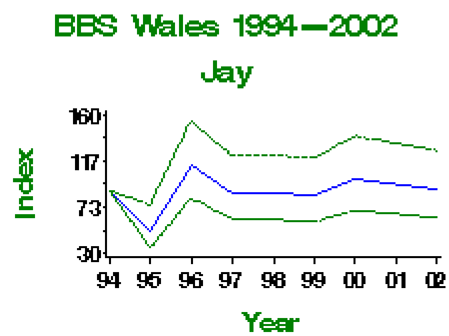
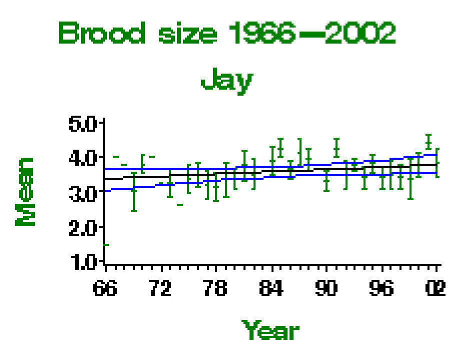


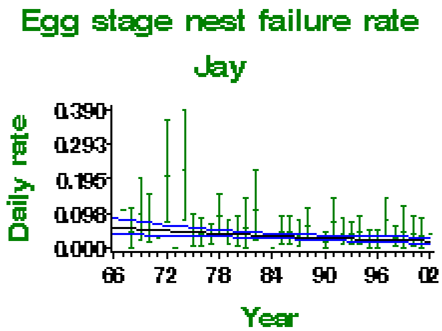
Table of productivity information for Jay

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	11	None				Small sample
Daily failure rate (eggs)	33	1968-2001	10	Linear decline	0.0548 nests/day	0.0209 nests/day	-0.0339 nests/day	Small sample

Insufficient data on clutch size available for this species



Insufficient data on nestling failure available for this species



Insufficient data on laying date available for this species

Insufficient data on CES available for this species

MAGPIE
Pica pica

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK, England: rapid increase

Status summary

The high level of adaptability displayed by Magpies has allowed them to colonise many new urban and suburban localities since the 1960s. Magpies increased steadily until the late 1980s, when abundance stabilised (**Gregory & Marchant 1996**). The trend has been associated with improvements in breeding performance, as has been observed for other corvids, and probably reflects the benefits of a generalist strategy under changing environmental conditions. The declines in nest failure rates, during both the egg stage (21 days, comprising 17 days incubation and 4 days laying) and the chick stage (25 days), have been substantial, and are likely to be the result of reductions in gamekeeping activity (**Marchant *et al.* 1990**). A strong trend towards earlier laying has also been identified and may be partially explained by recent climate change (**Crick & Sparks 1999**).

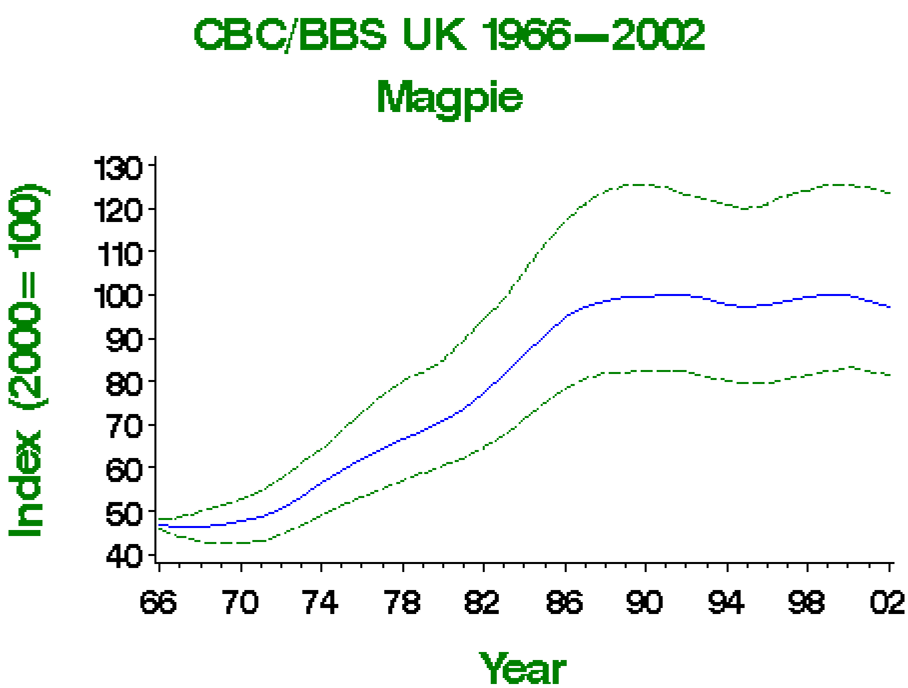
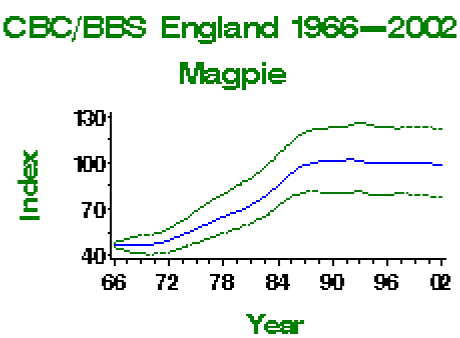


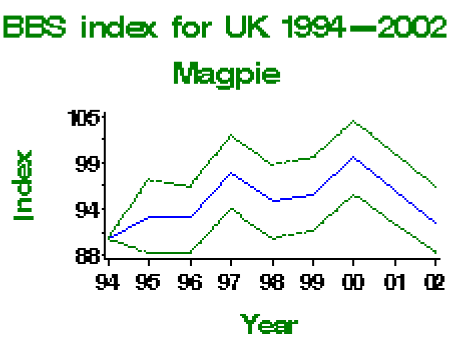
Table of population changes for Magpie

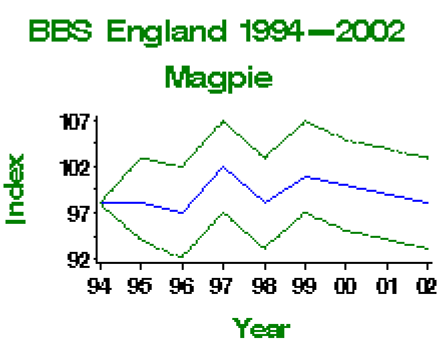
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	441	115	73	166		

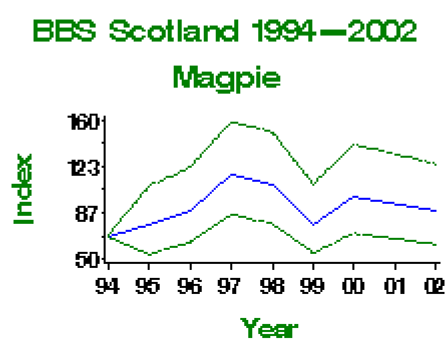
	25	1975-2000	545	68	47	95		
	10	1990-2000	1046	0	-7	7		
	5	1995-2000	1616	3	-1	7		
CBC/BBS England	33	1967-2000	381	114	74	168		
	25	1975-2000	469	75	52	100		
	10	1990-2000	894	-1	-8	5		
	5	1995-2000	1370	0	-3	4		
BBS UK	8	1994-2002	1401	2	-2	7		
BBS England	8	1994-2002	1178	0	-5	5		
BBS Scotland	8	1994-2002	33	29	-10	83		
BBS Wales	8	1994-2002	131	-10	-24	7		
BBS N.Ireland	8	1994-2002	53	34	2	76		

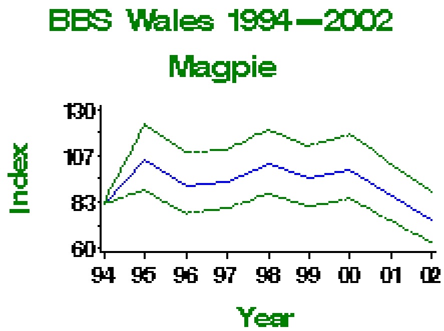
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











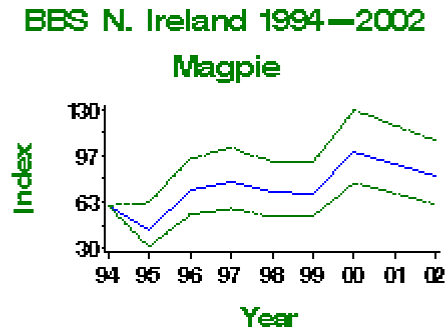
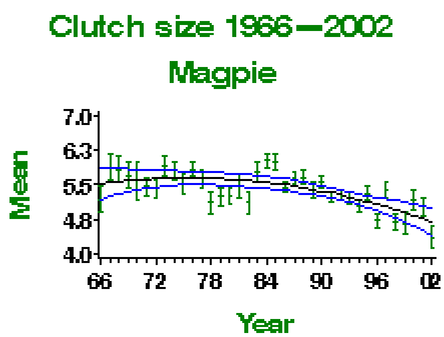
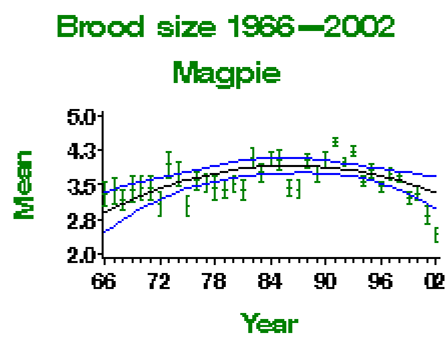
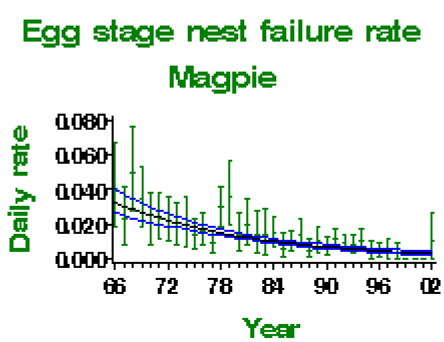


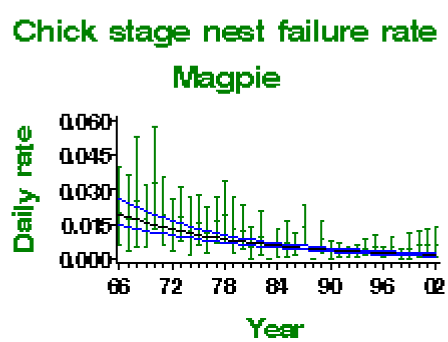
Table of productivity information for Magpie

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	51	Curvilinear	5.58 eggs	4.79 eggs	-0.79 eggs	
Brood size	33	1968-2001	87	Curvilinear	3.11 chicks	3.4 chicks	0.29 chicks	
Daily failure rate (eggs)	33	1968-2001	58	Linear decline	0.0288 nests/day	0.0035 nests/day	-0.0253 nests/day	
Daily failure rate (chicks)	33	1968-2001	56	Linear decline	0.0172 nests/day	0.0019 nests/day	-0.0153 nests/day	
Laying date	33	1968-2001	39	Curvilinear	day 110	day 84	-26 days	

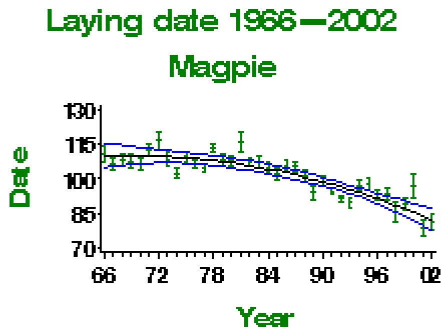








Insufficient data on CES available for this species


Laying date 1966–2002
Magpie
Date
130
115
100
85
70
66
72
78
84
90
96
02
Year

JACKDAW
Corvus monedula

Conservation listings

Europe: SPEC category 4, (secure)
UK: Green

Long-term trend

UK, England: moderate increase

Status summary

Jackdaws have increased in abundance since the 1960s (**Gregory & Marchant 1996**), and more recent BBS data suggest the increase is continuing. As with **Magpie**, **Rook** and **Carrion Crow**, the increase has been associated with improvements in breeding performance and probably reflects the species' generalist feeding habits, which allow it to exploit diverse and ephemeral food resources. A minor increase long-term in average brood size has been compounded by substantial declines in nest failure rates during the egg stage (21 days, comprising 17 days incubation + 4 days laying) and chick stage (30 days). Overall, from egg-laying to fledging, the proportion of nests that fail has fallen by about two-thirds. Typically in this species, the younger chicks of a brood perish quickly if food becomes limited. Larger brood sizes and increases in fledging success are therefore likely to be due to improved parental provisioning success (**Henderson & Hart 1993**). Brood sizes were unusually small in 2001 and 2002, however.

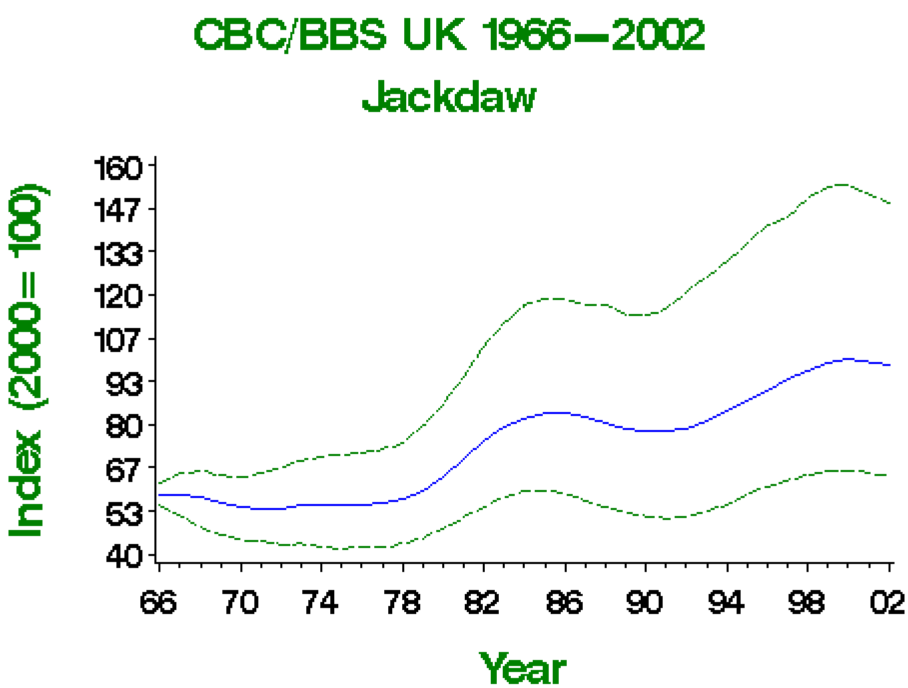
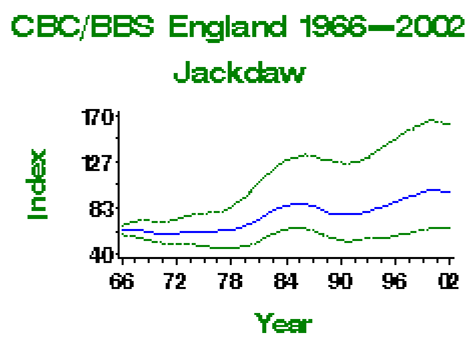


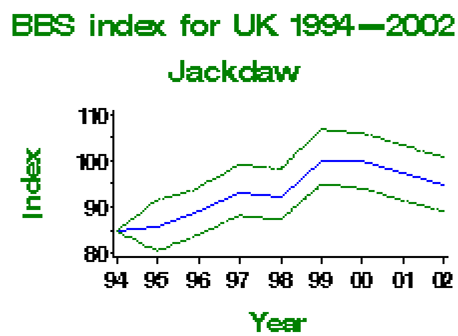
Table of population changes for Jackdaw

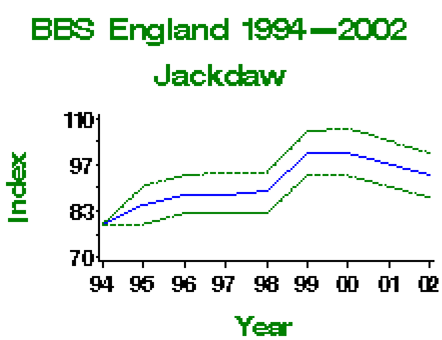
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	316	71	11	167		
	25	1975-2000	397	80	23	153		

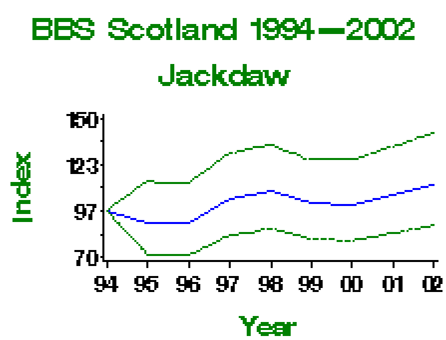
	10	1990-2000	829	29	16	46		
	5	1995-2000	1308	15	7	22		
CBC/BBS England	33	1967-2000	253	58	1	163		
	25	1975-2000	316	63	12	147		
	10	1990-2000	660	29	13	49		
	5	1995-2000	1039	17	10	25		
BBS UK	8	1994-2002	1178	12	5	19		
BBS England	8	1994-2002	932	18	10	26		
BBS Scotland	8	1994-2002	88	15	-9	46		
BBS Wales	8	1994-2002	107	3	-16	26		
BBS N.Ireland	8	1994-2002	46	-11	-36	26		

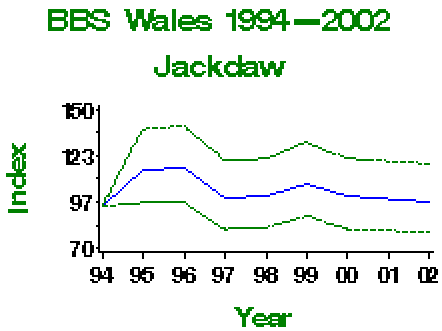
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











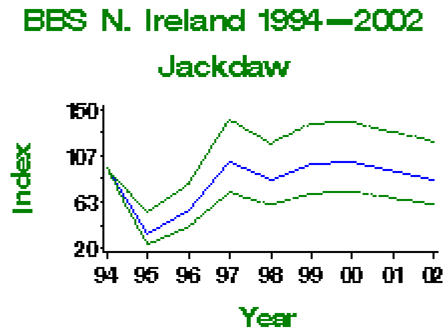
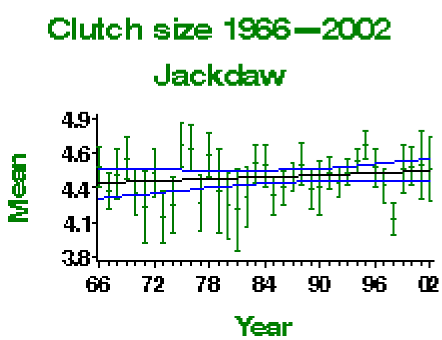
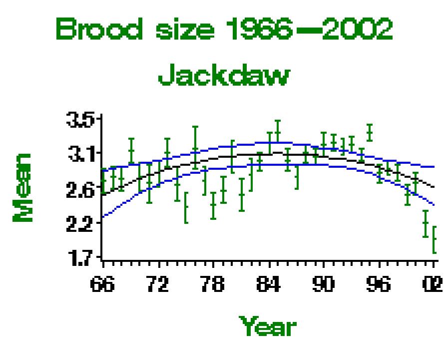
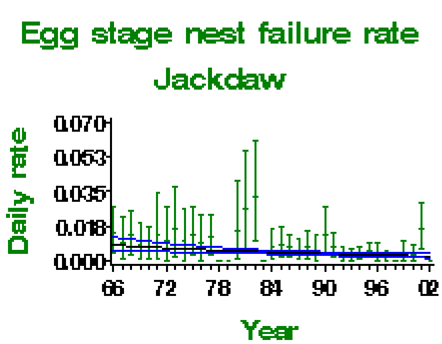


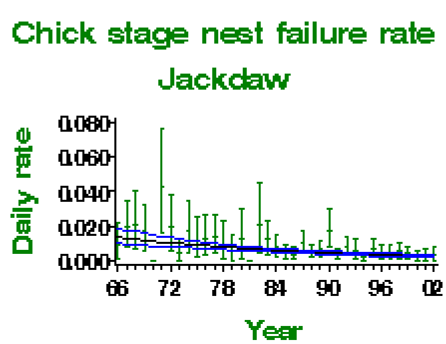
Table of productivity information for Jackdaw

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	40	None				
Brood size	33	1968-2001	78	Curvilinear	2.62 chicks	2.66 chicks	0.04 chicks	
Daily failure rate (eggs)	33	1968-2001	49	Linear decline	0.0075 nests/day	0.0026 nests/day	-0.0049 nests/day	
Daily failure rate (chicks)	33	1968-2001	47	Linear decline	0.0126 nests/day	0.0029 nests/day	-0.0097 nests/day	
Laying date	33	1968-2001	20	Curvilinear	day 113	day 110	-3 days	Small sample

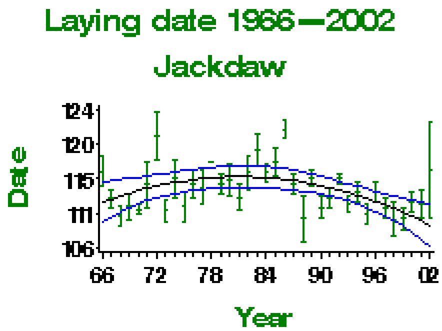








Insufficient data for CES available for this species


Laying date 1966—2002
Jackdaw
Date
124
120
115
111
106
66
72
78
84
90
96
02
Year

ROOK
Corvus frugilegus

Conservation listings

Europe: no SPEC category, secure
UK: Green

Long-term trend

UK: moderate increase

Status summary

Relatively few rookeries fell within CBC plots, but an index calculated from the available nest counts shows a shallow, long-term increase (**Wilson *et al.* 1998**). The trend is confirmed by the results of the latest BTO rookeries survey, which identified a 40% increase in abundance between 1975 and 1996 (**Marchant & Gregory 1999**). This increase has been associated with an increase in brood size and probably reflects the species' adaptability in the face of agricultural change. BBS sightings suggest decrease in England but increase in Northern Ireland since 1994; BBS nest counts have not yet been investigated.

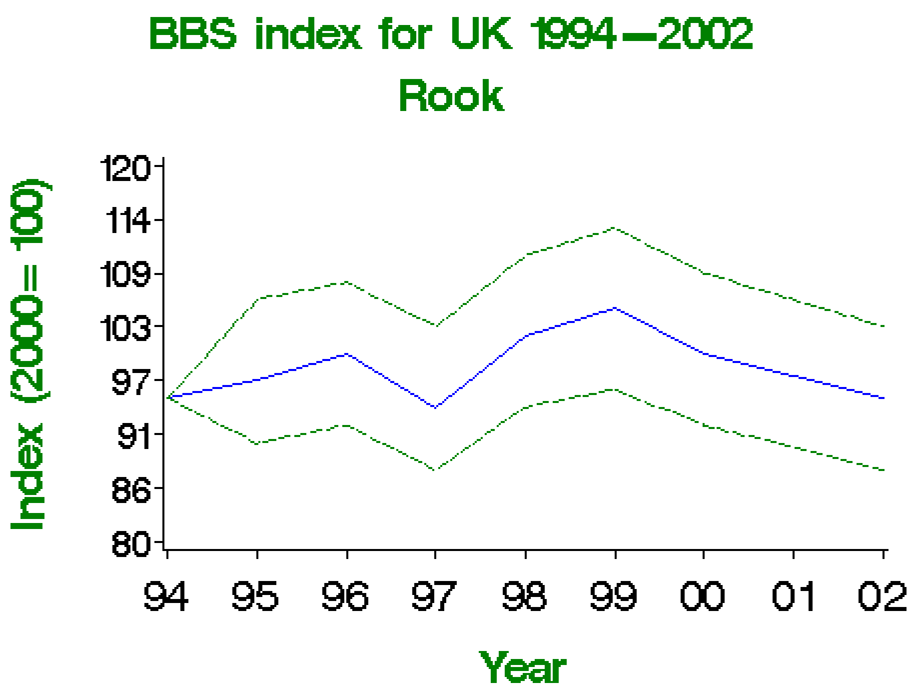
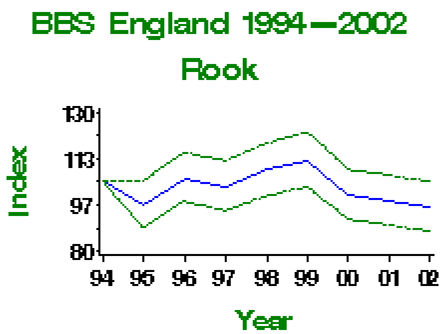


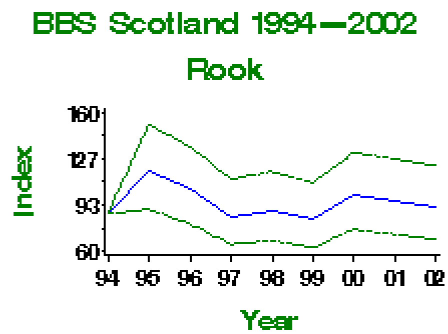
Table of population changes for Rook

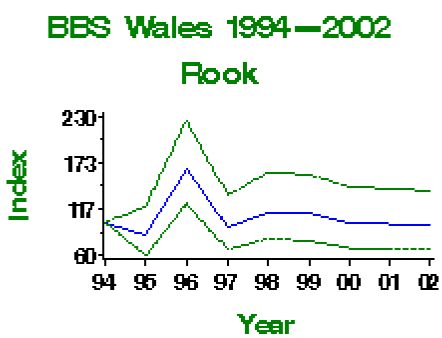
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	1002	0	-8	8		
BBS England	8	1994-2002	791	-9	-17	0		
BBS Scotland	8	1994-2002	97	5	-21	40		
BBS Wales	8	1994-2002	66	-4	-33	39		

BBS N.Ireland	8	1994-2002	46	58	7	132		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB







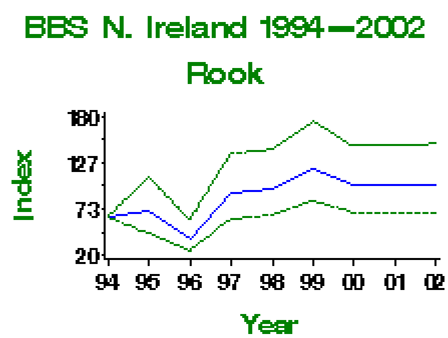
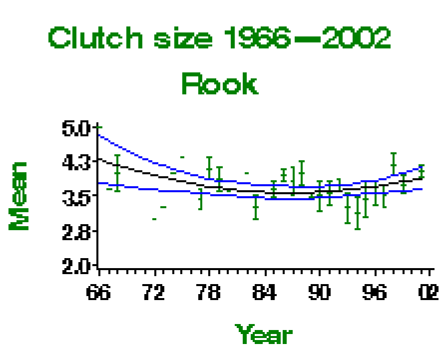
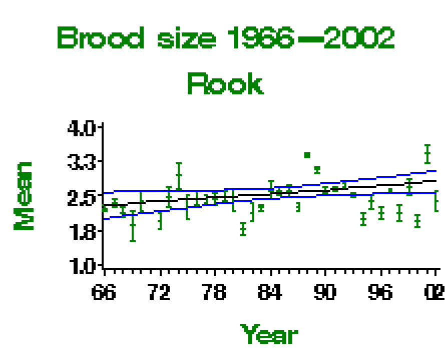
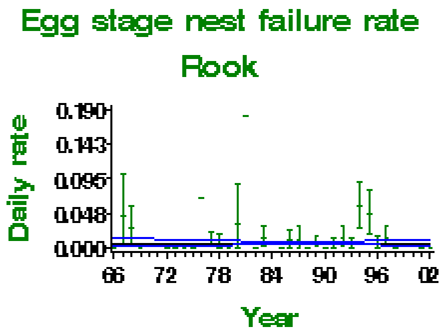


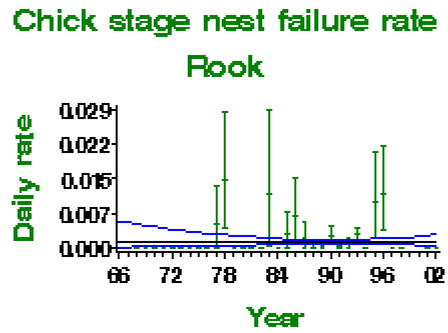
Table of productivity information for Rook

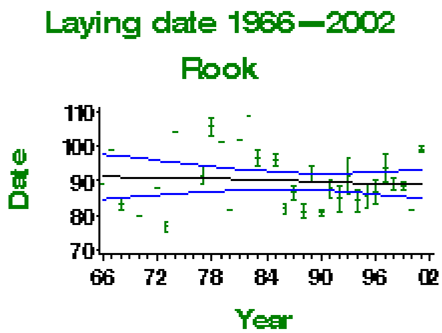
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	14	Curvilinear	4.15 eggs	3.88 eggs	-0.27 eggs	Small sample
Brood size	33	1968-2001	94	Linear increase	2.32 chicks	2.8 chicks	0.48 chicks	
Daily failure rate (eggs)	33	1968-2001	39	None				
Daily failure rate (chicks)	33	1968-2001	61	None				
Laying date	33	1968-2001	13	None				Small sample











Insufficient data on CES available for this species

CARRION CROW
Corvus corone

Conservation listings

Europe (*C. corone/cornix*): no SPEC category, secure
UK (*C. corone/cornix*): Green

Long-term trend

UK, England: rapid increase

Status summary

Carrion Crows have increased steadily since the 1960s (**Gregory & Marchant 1996**) and both the CBC and the BBS indicate that the increase is continuing. This trend has been associated with increases in nesting success and earlier laying (perhaps an effect of climate change: **Crick *et al.* 1997**) and probably reflects the species' adaptability to changing habitats and the exploitation of ephemeral food resources in intensive agriculture. Reduced control activities by gamekeepers may also have contributed (**Marchant *et al.* 1990**), as may the increase in roadside carrion.

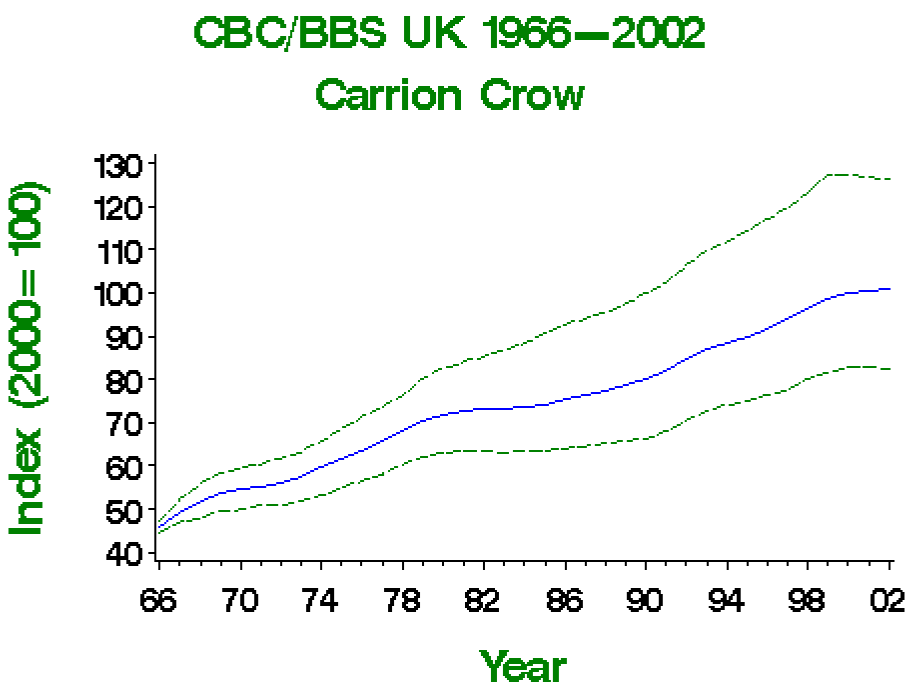
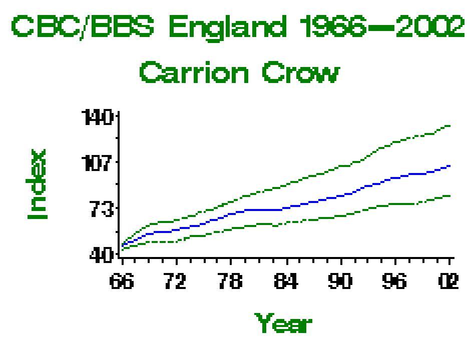


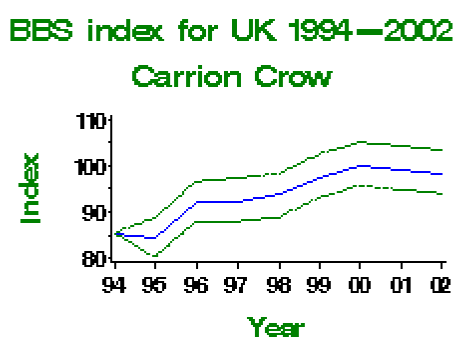
Table of population changes for Carrion Crow

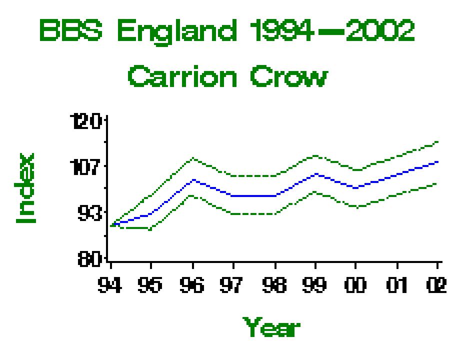
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	516	104	67	170		
	25	1975-2000	636	62	40	103		
	10	1990-2000	1252	25	16	32		
	5	1995-2000	1945	12	6	17		
CBC/BBS England	33	1967-2000	428	104	67	160		
	25	1975-2000	527	60	33	94		

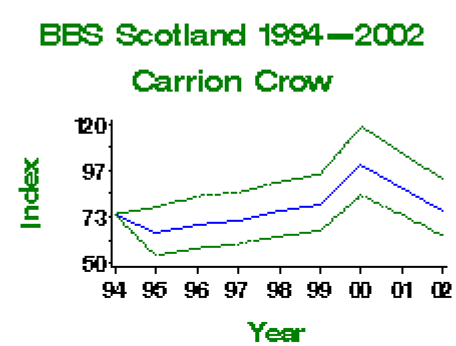
	10	1990-2000	1034	22	14	31		
	5	1995-2000	1602	8	2	14		
BBS UK	8	1994-2002	1712	15	10	21		
	8	1994-2002	104	-31	-47	-9	(>25)	
BBS England	8	1994-2002	1400	21	14	27		
BBS Scotland	8	1994-2002	147	3	-14	24		
	8	1994-2002	50	-59	-73	-39	(>50)	
BBS Wales	8	1994-2002	156	7	-7	24		
BBS N.Ireland	8	1994-2002	48	90	28	182		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









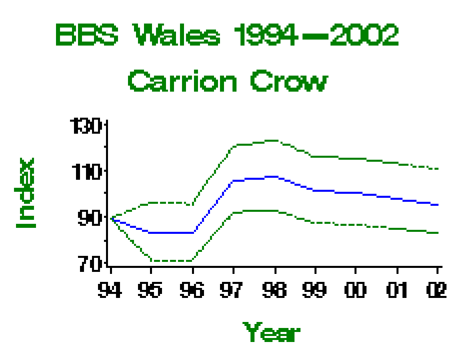
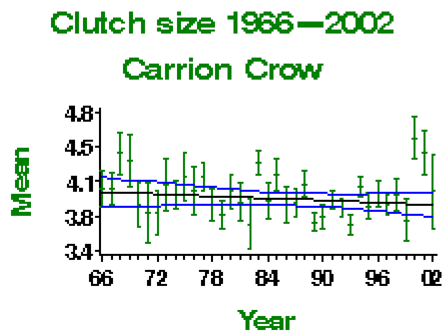
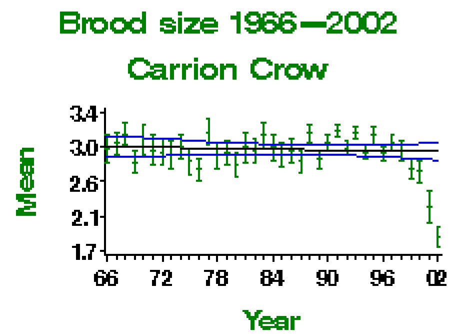


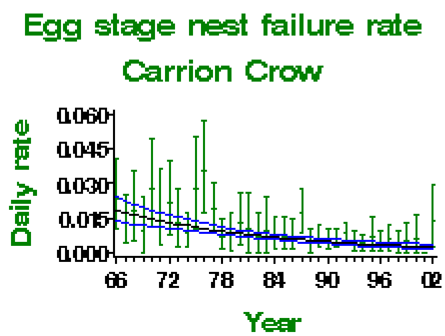
Table of productivity changes for Carrion Crow

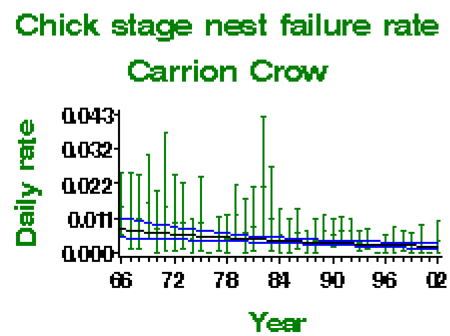
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	38	None				
Brood size	33	1968-	83	None				

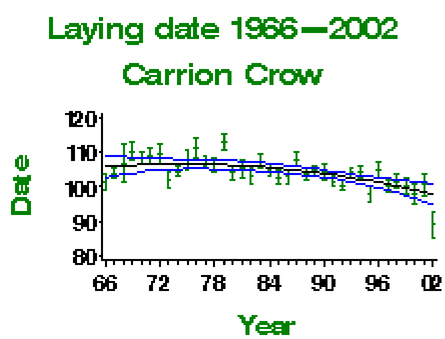
		2001						
Daily failure rate (eggs)	**33**	**1968-2001**	**56**	**Linear decline**	**0.0163 nests/day**	**0.0028 nests/day**	**-0.0135 nests/day**	
Daily failure rate (chicks)	**33**	**1968-2001**	**46**	**Linear decline**	**0.0068 nests/day**	**0.0022 nests/day**	**-0.0046 nests/day**	
Laying date	**33**	**1968-2001**	**36**	**Curvilinear**	**day 106**	**day 99**	**-7 days**	











Insufficient data on CES available for this species

HOODED CROW
Corvus cornix

Conservation listings

Europe (*C. corone/cornix*): no SPEC category, secure
UK (*C. corone/cornix*): Green

Long-term trend

UK: uncertain

Status summary

The BOU Records Committee took the decision in 2002 to treat Hooded Crow and **Carrion Crow** as separate species. This split is not yet recognised in conservation listings. In the UK, Hooded Crows occur in Northern Ireland, the Isle of Man, and Scotland, mainly west and north of the Great Glen. Retrospective analysis of BBS trends is simple because observers record Hooded Crows (coded HC) separately from Carrion Crows and from intermediates (coded HB). Intermediate forms between Carrion and Hooded, which predominate in a band across western Scotland and occur less frequently elsewhere in the UK, are not included in either BBS index. Initial results from BBS suggest that some decrease in Hooded Crows may have occurred in Scotland, countered by increase in Northern Ireland, but raising Scottish and UK alerts. Hooded Crows have increased markedly in Ireland since 1924 (**Hutchinson 1989**).

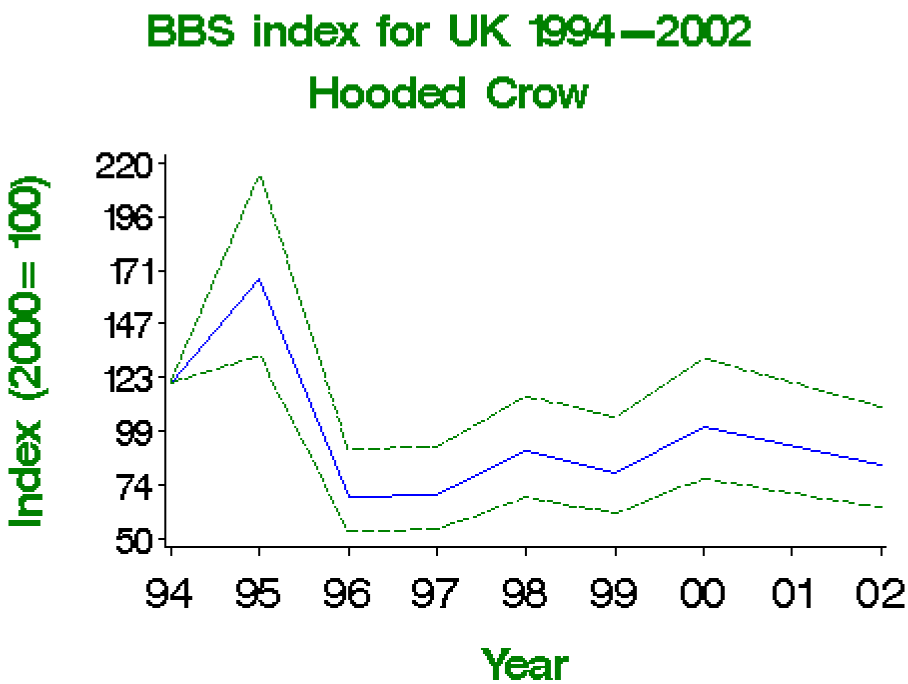
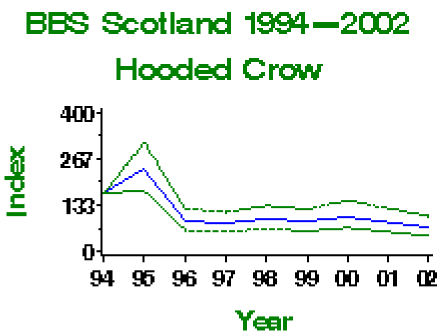
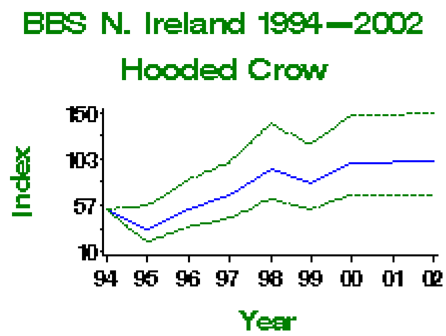


Table of population changes for Hooded Crow

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	104	-31	-47	-9	(>25)	
BBS Scotland	8	1994-2002	50	-59	-73	-39	(>50)	Small sample
BBS N.Ireland	8	1994-2002	48	90	28	182		Small sample

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

RAVEN
Corvus corax

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

UK: uncertain

Status summary

The Raven's range has contracted from some areas of northern Britain and gaps in the distribution have been linked to persecution associated with grouse moors (Gibbons *et al.* 1993, 1995). Declines in southern Scotland and northern England were associated with increases in afforestation (Marquiss *et al.* 1978). More recently, Ravens have increased along the English-Welsh border and in parts of lowland England, helping to balance local declines in northern Britain (Cross 2002). BBS indicates increase in England and Scotland since 1994, and stability in Wales. Breeding performance, in terms of brood size and egg-stage nest losses, has reduced.

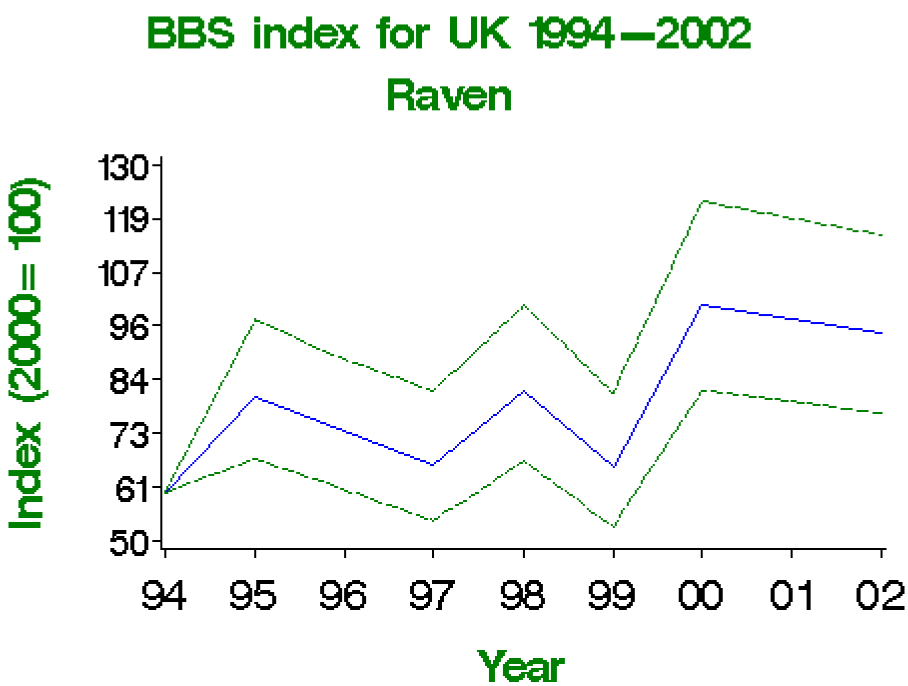
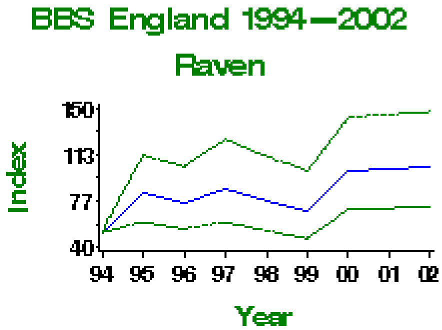
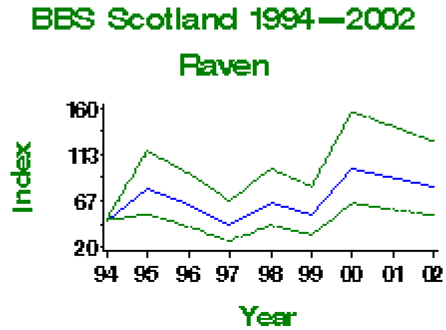


Table of population changes for Raven

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	165	56	28	91		
BBS England	8	1994-2002	46	100	40	186		
BBS Scotland	8	1994-2002	37	71	10	167		
BBS Wales	8	1994-2002	65	7	-21	44		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





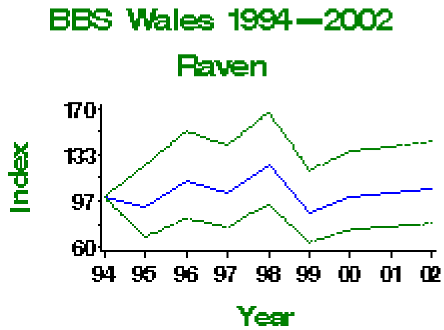
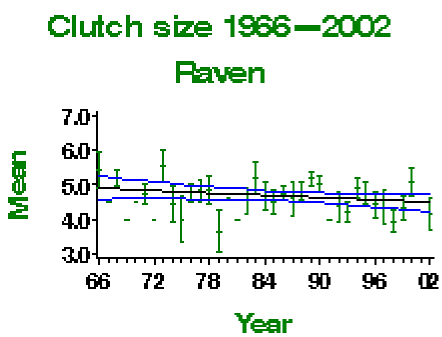
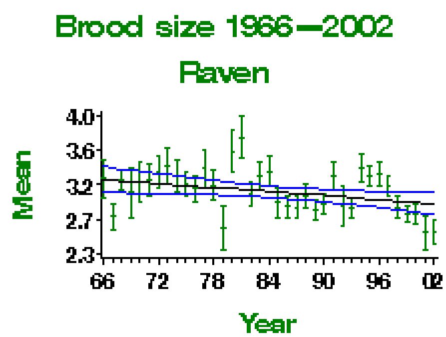
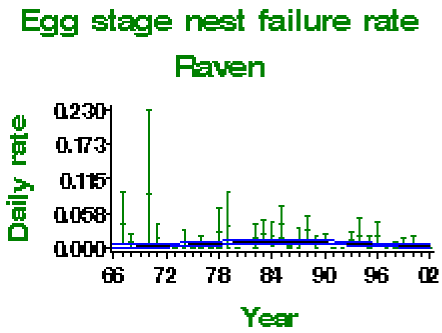


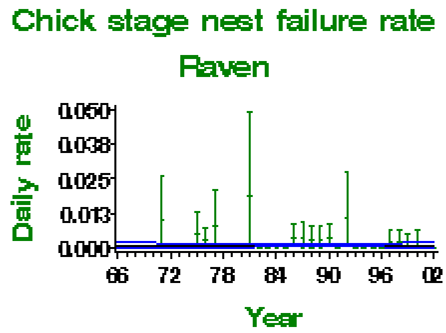
Table of productivity information for Raven

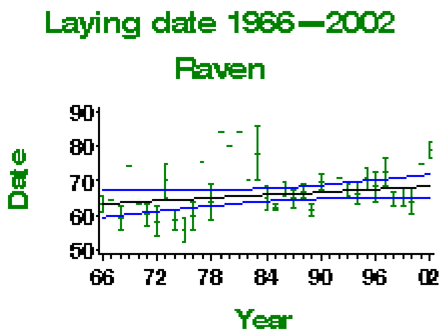
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	12	None				Small sample
Brood size	33	1968-2001	57	Linear decline	3.2 chicks	2.93 chicks	-0.27 chicks	
Daily failure rate (eggs)	33	1968-2001	20	Curvilinear	0.0022 nests/day	0.0028 nests/day	0.0006 nests/day	Small sample
Daily failure rate (chicks)	33	1968-2001	25	None				Small sample
Laying date	33	1968-2001	11	None				Small sample











Insufficient data on CES
available for this species

STARLING
Sturnus vulgaris

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

England: rapid decline

Status summary

Breeding Starling abundance has fallen rapidly, particularly since the early 1980s, and especially in woodland (**Robinson *et al.* 2002**). The declines have been greatest in the south and west of Britain; recent BBS data suggest that populations are currently more stable in Scotland and may even be increasing in Northern Ireland. The species' UK conservation listing has recently been upgraded from Amber to Red. Strong improvements in breeding performance have occurred, suggesting that decreasing survival rates, particularly of young birds, may be responsible for the observed decline (**Freeman *et al.* 2002**). Loss of the species' preferred feeding habitat, permanent pasture, and general intensification of livestock rearing are likely to be having adverse effects on farmland populations (**Crick *et al.* 2002**).

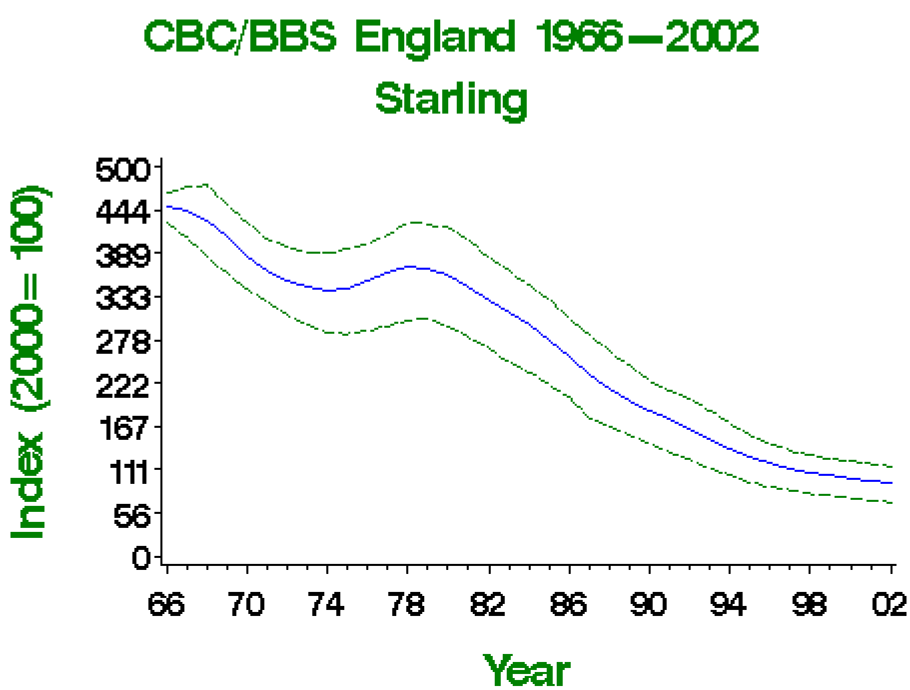
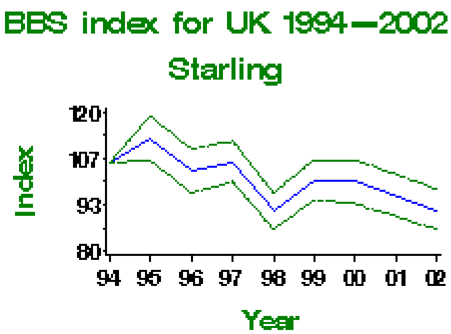


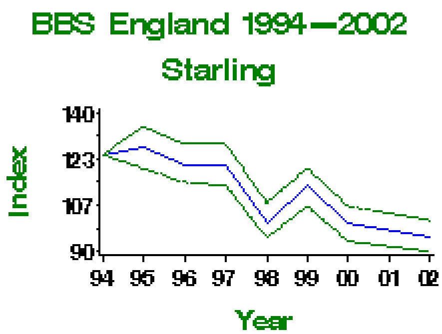
Table of population changes for Starling

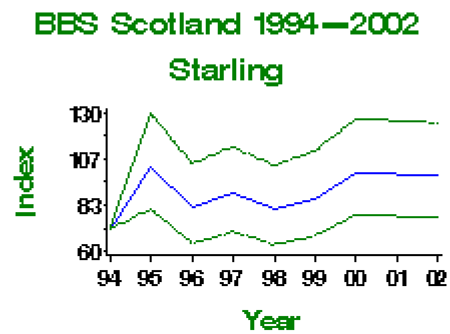
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	356	-77	-84	-71	>50	
	25	1975-2000	436	-71	-78	-63	>50	

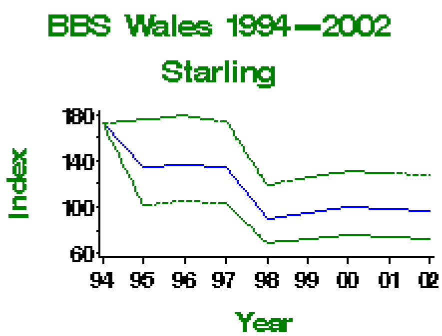
	10	1990-2000	859	-46	-54	-39	>25	
	5	1995-2000	1339	-21	-25	-17		
BBS UK	8	1994-2002	1465	-13	-18	-7		
BBS England	8	1994-2002	1213	-24	-28	-19		
BBS Scotland	8	1994-2002	119	38	8	75		
BBS Wales	8	1994-2002	77	-44	-58	-26	(>25)	
BBS N.Ireland	8	1994-2002	48	53	0	133		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









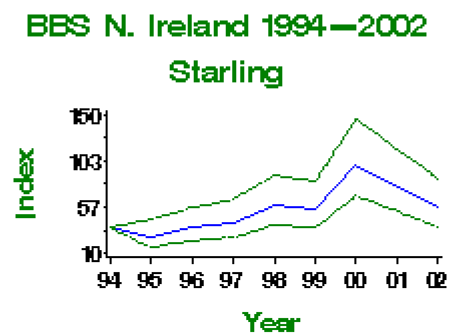
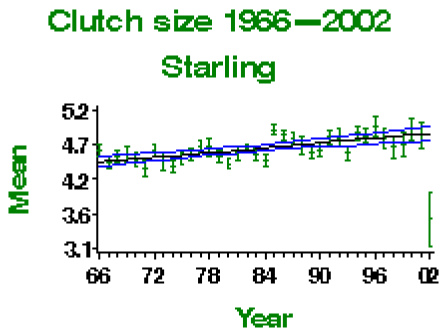
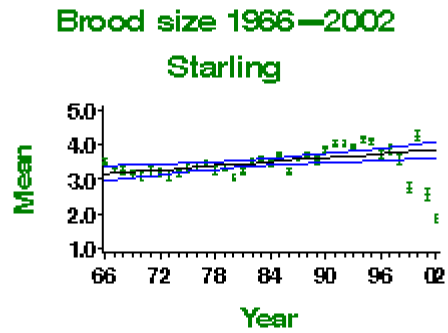


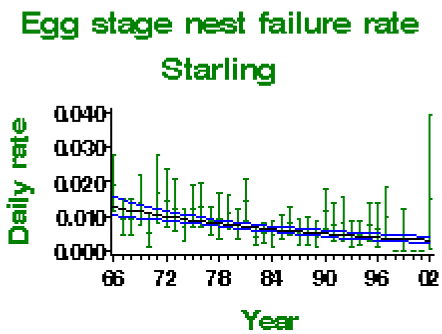
Table of productivity information for Starling

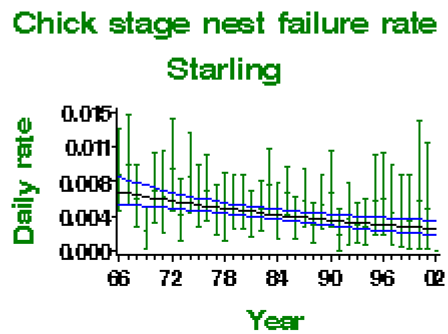
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	82	Linear increase	4.44 eggs	4.83 eggs	0.39 eggs	
Brood size	33	1968-2001	215	Linear increase	3.21 chicks	3.83 chicks	0.62 chicks	
Daily failure rate (eggs)	33	1968-2001	127	Linear decline	0.0118 nests/day	0.0033 nests/day	-0.0085 nests/day	

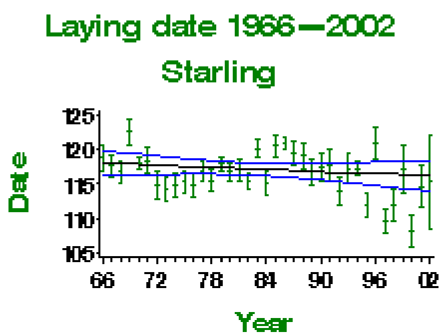
Daily failure rate (chicks)	33	1968-2001	150	Linear decline	0.006 nests/day	0.0025 nests/day	-0.0035 nests/day	
Laying date	33	1968-2001	91	None				











Insufficient data on CES available for this species

HOUSE SPARROW
Passer domesticus

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

The UK House Sparrow population was not monitored adequately by the CBC until 1976, partly because that scheme did not target urban areas and gardens. Data collected by CBC/BBS indicate a rapid decline in abundance over the last 25 years, as does the BTO's Garden Bird Feeding Survey though this commenced later (**Siriwardena *et al.* 2002**). These results are supported by many other data and anecdotal reports that have generated great conservation concern (see **Summers-Smith 2003**). A change in the listing criteria has resulted in the admission of the species, previously Green-listed, to the Red list. The decline is likely to have been driven by reductions in overwinter survival (**Siriwardena *et al.* 1999**) and has been linked to a range of changes in rural and urban habitats; the causes are likely to be different in the two areas. Possible explanations for the decrease in House Sparrow abundance include general reductions in food supply, reductions in the amount of grain spilt during agricultural operations, tighter hygiene regulations, increases in predation, and the use of toxic additives in unleaded petrol (**Crick *et al.* 2002**). BBS data suggest that the species has shown increases recently in Scotland and Wales.

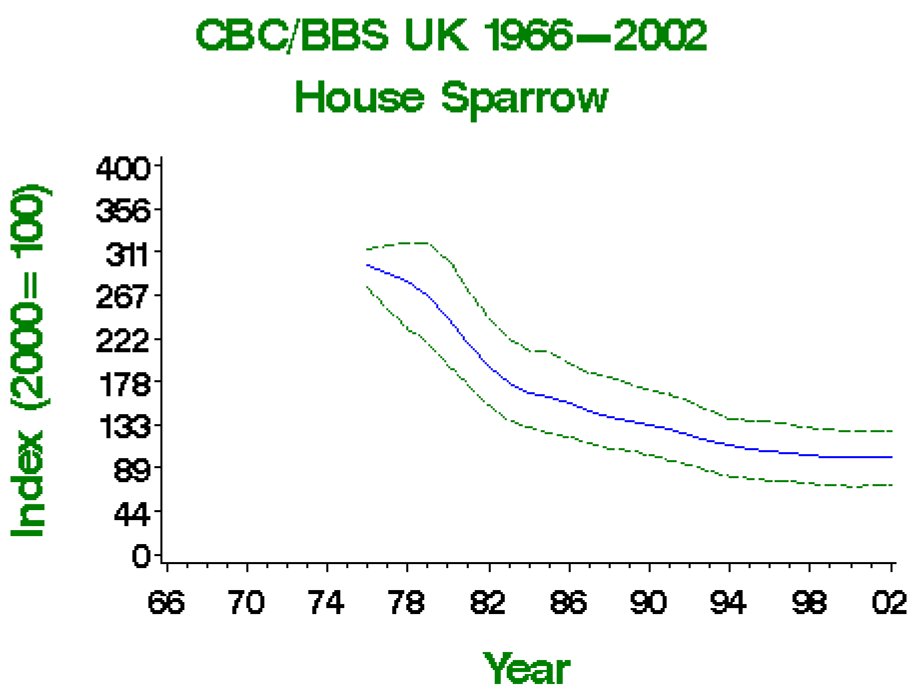
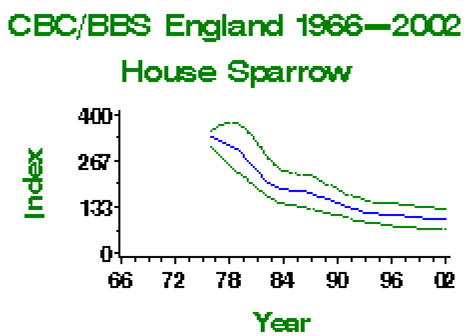


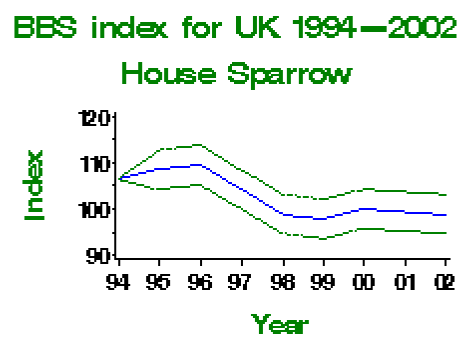
Table of population changes for House Sparrow

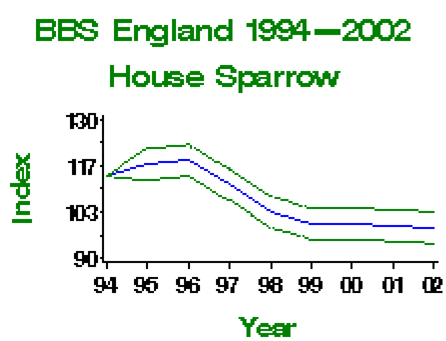
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	23	1977-2000	413	-65	-76	-55	>50	
	10	1990-2000	845	-25	-37	-8	>25	

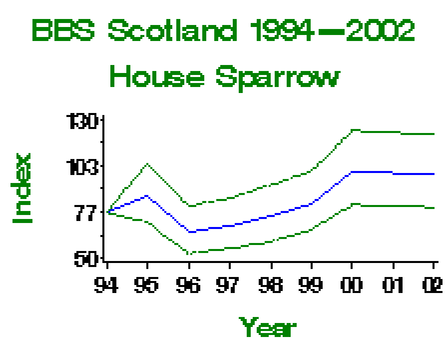
	5	1995-2000	1341	-8	-12	-3		
CBC/BBS England	23	1977-2000	349	-69	-78	-60	>50	
	10	1990-2000	714	-31	-47	-18	>25	
	5	1995-2000	1128	-12	-18	-6		
BBS UK	8	1994-2002	1227	-7	-11	-3		
BBS England	8	1994-2002	1028	-13	-17	-9		
BBS Scotland	8	1994-2002	72	29	4	59		
BBS Wales	8	1994-2002	90	63	35	98		
BBS N.Ireland	8	1994-2002	32	-34	-58	3		

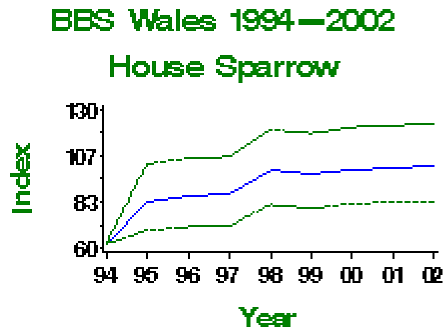
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











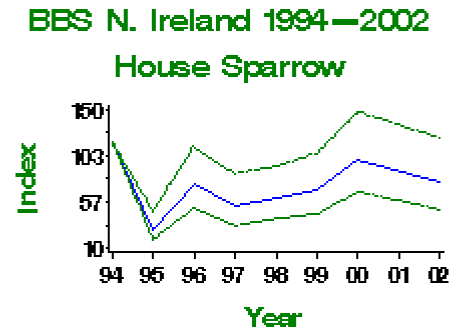
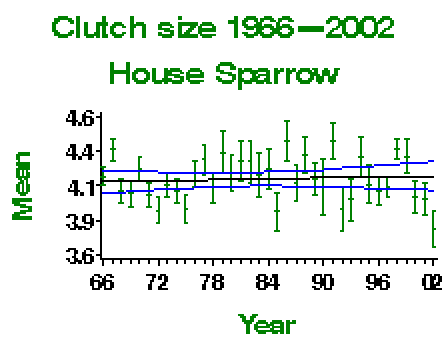
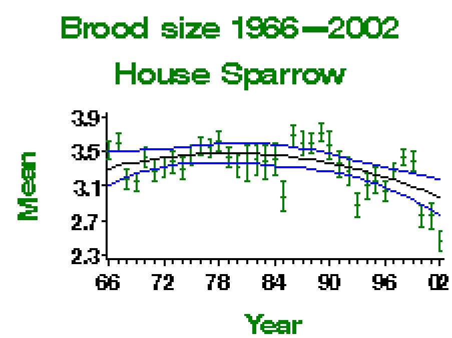
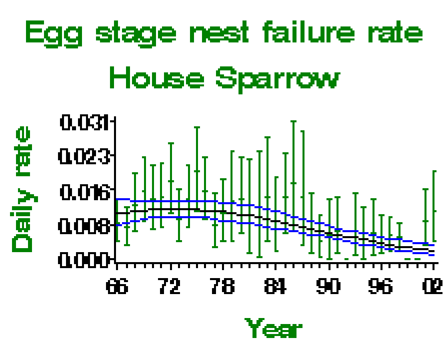


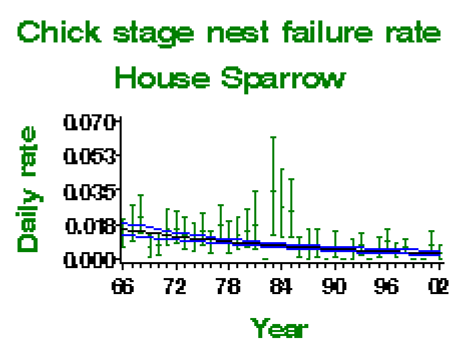
Table of productivity changes for House Sparrow

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	57	None				
Brood size	33	1968-2001	95	Curvilinear	3.36 chicks	3.02 chicks	-0.34 chicks	
Daily failure rate (eggs)	33	1968-2001	76	Curvilinear	0.0107 nests/day	0.0021 nests/day	-0.0086 nests/day	
Daily failure rate (chicks)	33	1968-2001	75	Linear decline	0.014 nests/day	0.0032 nests/day	-0.0108 nests/day	
Laying date	33	1968-2001	45	Linear decline	day 145	day 137	-8 days	

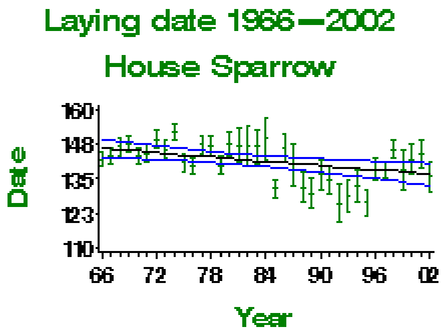








Insufficient data for CES available for this species


Laying date 1966—2002
House Sparrow
Date
160
148
135
123
110
66
72
78
84
90
96
02
Year

TREE SPARROW
Passer montanus

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK: rapid decline

Status summary

Tree Sparrow abundance crashed between the late 1970s and the early 1990s. BBS data indicate increase since 1994, in England and in the UK as a whole, but it should be remembered that the current population level is only about 3% of the numbers just two decades earlier. Clear range contractions occurred between the two breeding atlas periods (**Gibbons *et al.* 1993**), and have continued subsequently, with many local extinctions during the 1990s. Features of agricultural intensification, such as reductions in winter stubble availability, are likely to be implicated in the decline. Breeding performance has improved substantially as population sizes have decreased, suggesting that decreases in productivity were not responsible for the decline. It is likely that survival was the more critical demographic rate, although ring-recovery analyses have produced equivocal results because of small sample sizes (**Siriwardena *et al.* 1998b**, **2000b**).

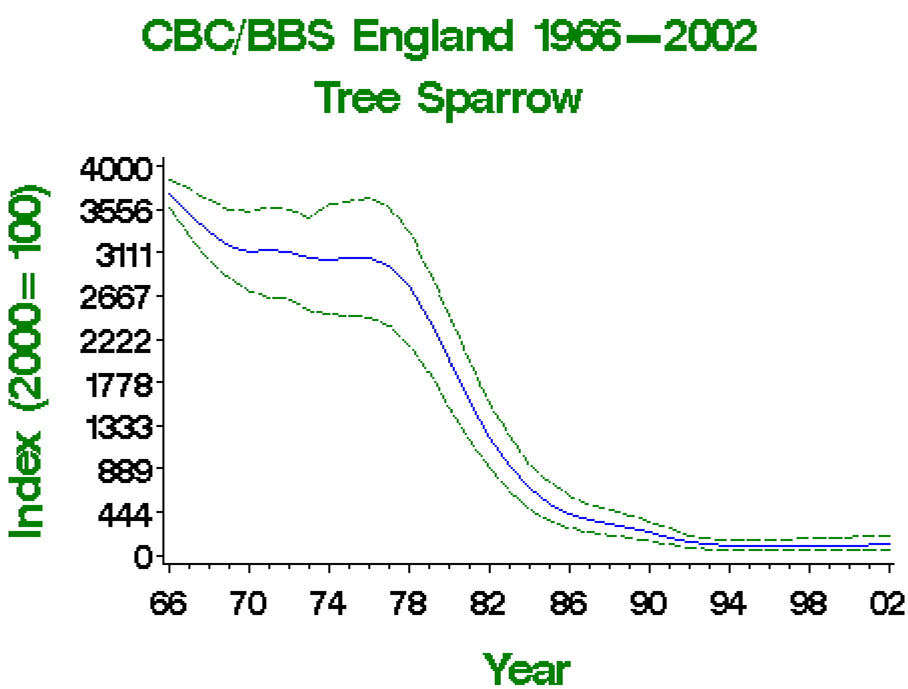
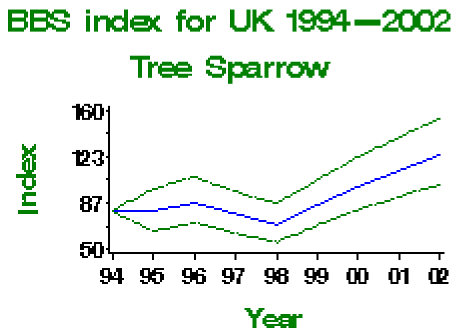


Table of population changes for Tree Sparrow

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	77	-97	-99	-95	>50	
	25	1975-2000	75	-97	-99	-94	>50	
	10	1990-2000	88	-57	-81	-29	>50	
	5	1995-2000	127	14	-9	38		

BBS UK	8	1994-2002	133	55	26	91		
BBS England	8	1994-2002	111	16	-8	45		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



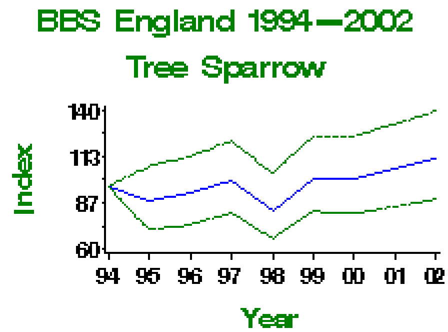
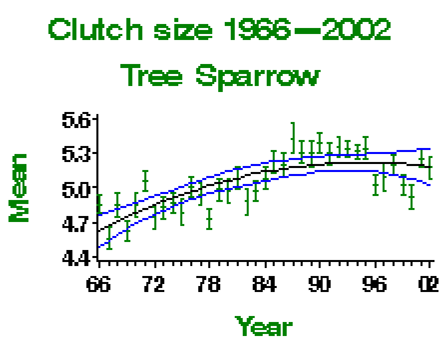
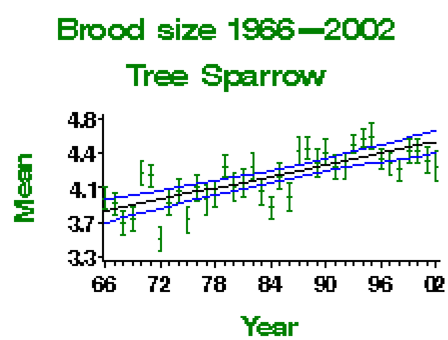
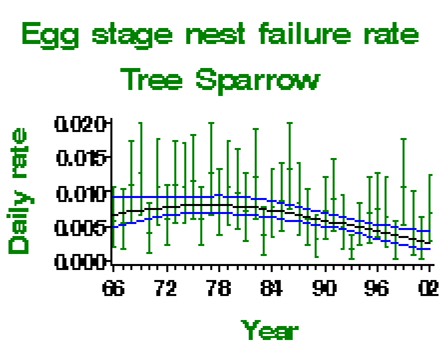


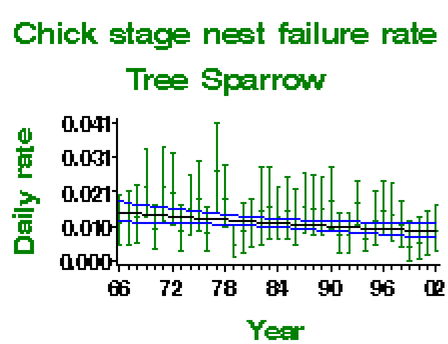
Table of productivity information for Tree Sparrow

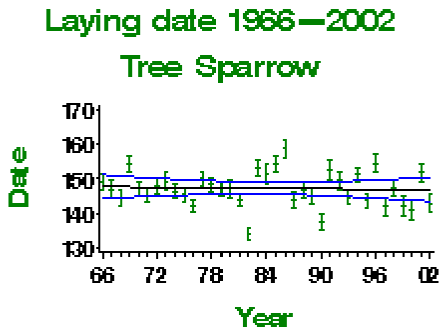
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	92	Curvilinear	4.71 eggs	5.19 eggs	0.48 eggs	
Brood size	33	1968-2001	104	Linear increase	3.84 chicks	4.52 chicks	0.68 chicks	
Daily failure rate (eggs)	33	1968-2001	121	Curvilinear	0.0071 nests/day	0.0029 nests/day	-0.0042 nests/day	
Daily failure rate (chicks)	33	1968-2001	87	Linear decline	0.014 nests/day	0.0089 nests/day	-0.0051 nests/day	
Laying date	33	1968-2001	106	None				











Insufficient data on CES available for this species

CHAFFINCH
Fringilla coelebs

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Chaffinch abundance increased rapidly during the 1970s and 1980s, according to CBC/BBS and CES, but numbers seem to have stabilised during the1990s. The recent relative stability has been associated with a reduction in annual survival, which could be density-dependent (**Siriwardena *et al.* 1999**). There is also some evidence of improved breeding performance during the population increase, with larger brood sizes and fewer egg-stage nest failures. The trend towards earlier laying dates may be partially explained by recent climate change (**Crick & Sparks 1999**). Chaffinches are well adapted to suburban and garden habitats, as well as to highly fragmented woodland and hedgerows, occurring less in the open-field, arable habitats that have been affected most by agricultural intensification, so may have benefited by environmental changes from which other seed-eating passerines have suffered.

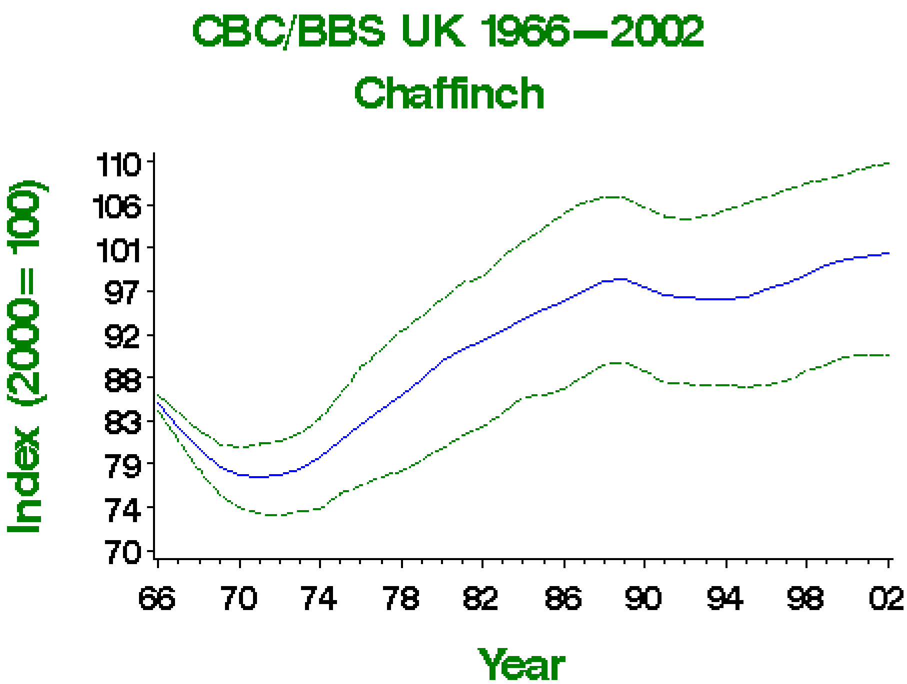
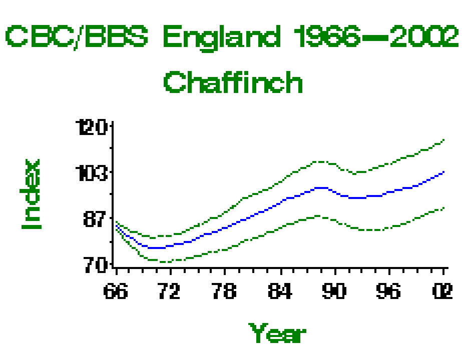


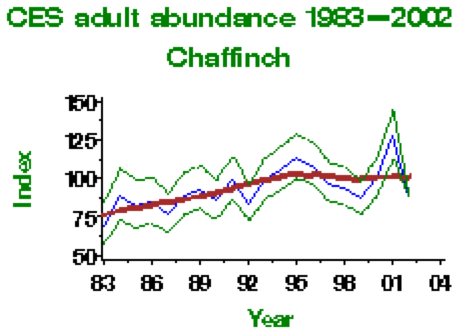
Table of population changes for Chaffinch

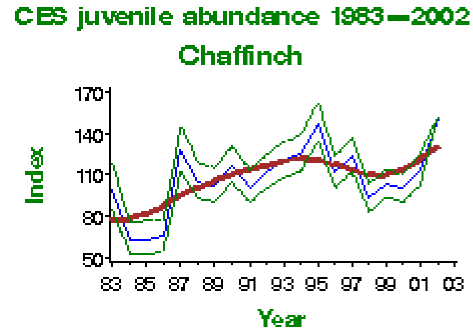
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	584	21	8	34		
	25	1975-2000	709	23	13	33		
		1990-						

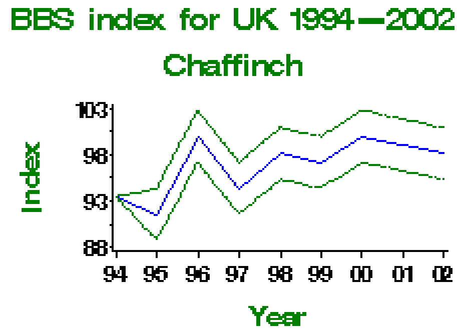
	10	2000	1357	3	-2	7		
	5	1995-2000	2085	4	2	7		
CBC/BBS England	33	1967-2000	470	24	6	38		
	25	1975-2000	567	26	15	38		
	10	1990-2000	1071	4	0	9		
	5	1995-2000	1636	5	3	8		
CES adults	17	1984-2001	77	29	.	.		
	10	1991-2001	90	9	.	.		
	5	1996-2001	91	-1	.	.		
CES juveniles	17	1984-2001	56	54	.	.		
	10	1991-2001	67	6	.	.		
	5	1996-2001	68	2	.	.		
BBS UK	8	1994-2002	1806	5	2	8		
BBS England	8	1994-2002	1398	9	6	13		
BBS Scotland	8	1994-2002	189	1	-8	12		
BBS Wales	8	1994-2002	152	-16	-25	-7		
BBS N.Ireland	8	1994-2002	57	55	16	107		

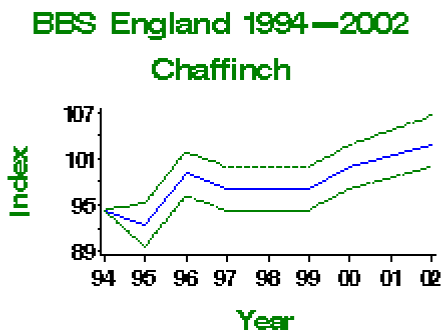
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

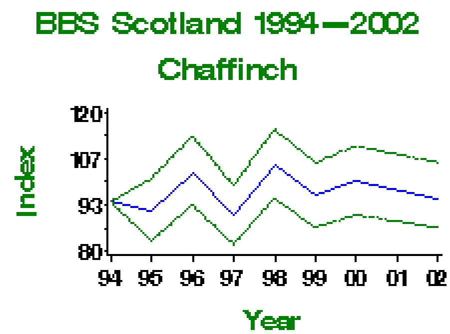


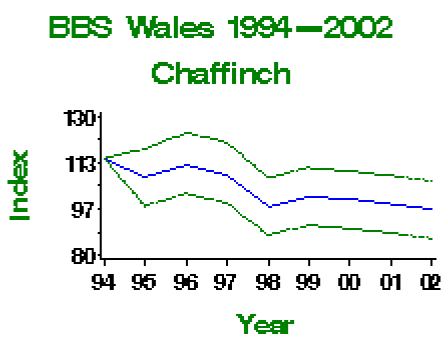












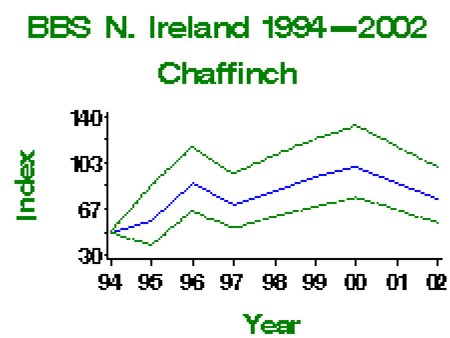
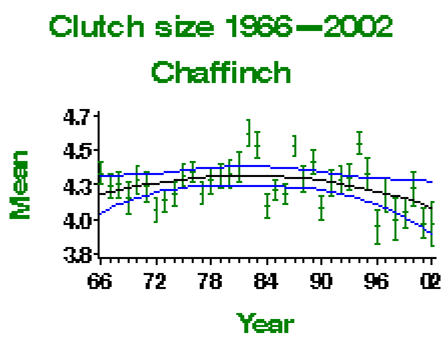
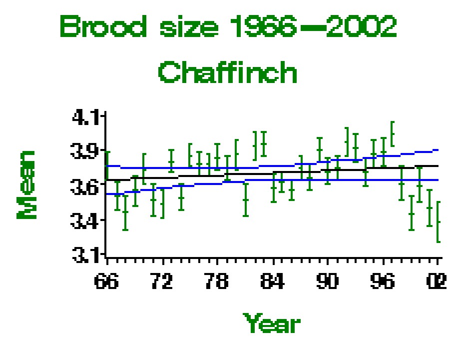


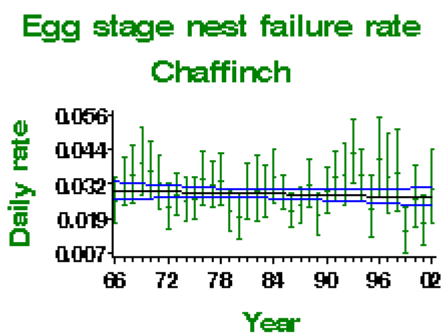
Table of productivity information for Chaffinch

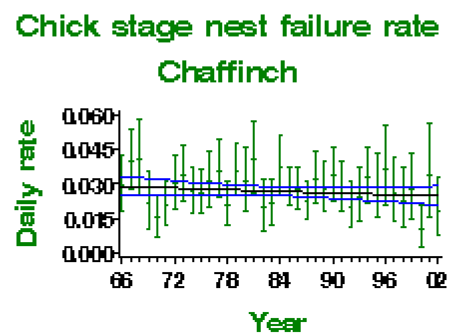
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	87	Curvilinear	4.21 eggs	4.12 eggs	-0.09 eggs	
Brood size	33	1968-2001	140	None				
Daily failure rate (eggs)	33	1968-2001	165	None				
Daily failure rate	33	1968-2001	115	None				

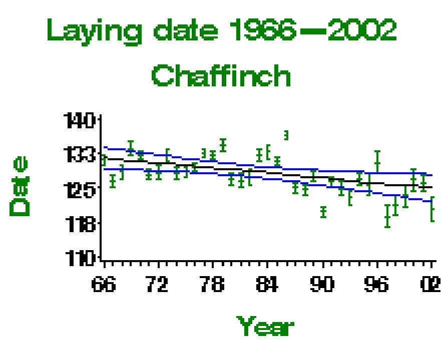
(chicks)								
Laying date	33	1968-2001	111	Linear decline	day 131	day 125	-6 days	
Percentage juveniles (CES)	17	1984-2001	81	Smoothed trend	112 productivity index	101 productivity index	-11%	
Percentage juveniles (CES)	10	1991-2001	96	Smoothed trend	113 productivity index	101 productivity index	-12%	
Percentage juveniles (CES)	5	1996-2001	97	Smoothed trend	94 productivity index	101 productivity index	6%	

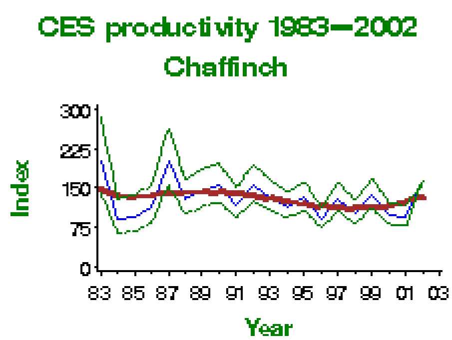












GREENFINCH
Carduelis chloris

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK, England: shallow increase

Status summary

Greenfinch abundance varied little up to the mid 1990s, and there was little change in either survival or breeding performance during this period (**Siriwardena *et al.* 1998b**, **2000b**). More recent CBC/BBS data indicate population increases widely across the UK during the 1990s, which have occurred despite a decrease in productivity indicated by CES data. A continuing decline in productivity could presage a future population downturn, but the CES trend could perhaps be an artefact of changing feeding opportunities for young Greenfinches in summer. The trend towards earlier laying may be explained by recent climate change (**Crick & Sparks 1999**).

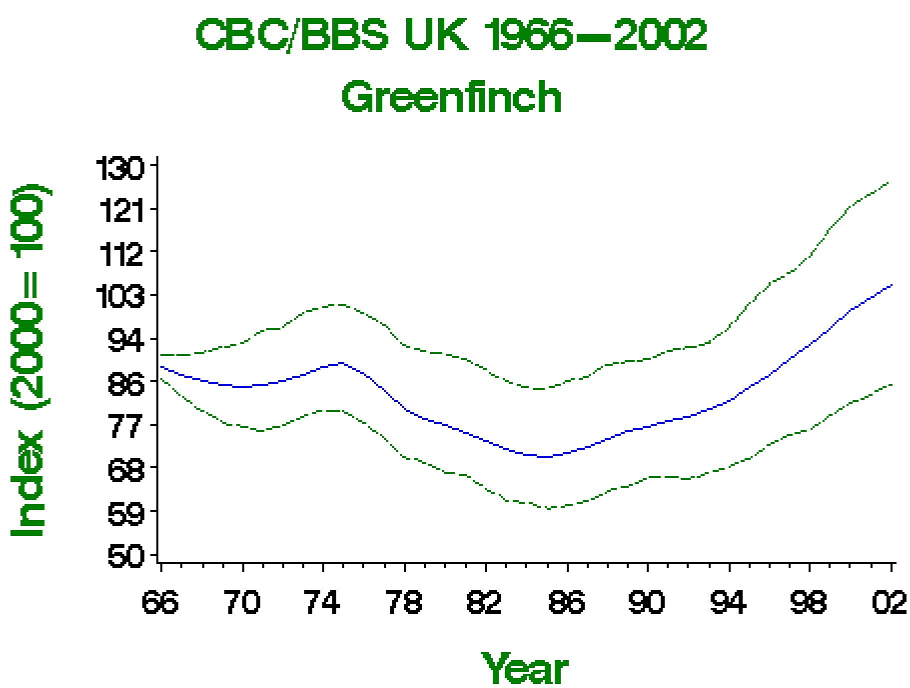
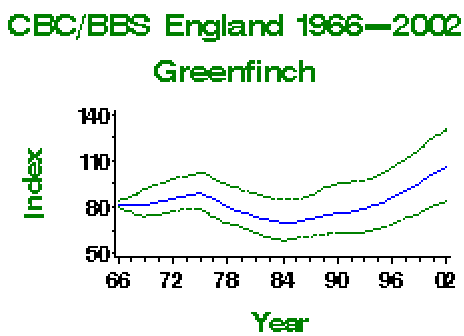


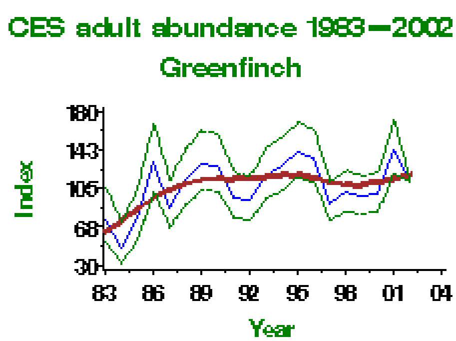
Table of population changes for Greenfinch

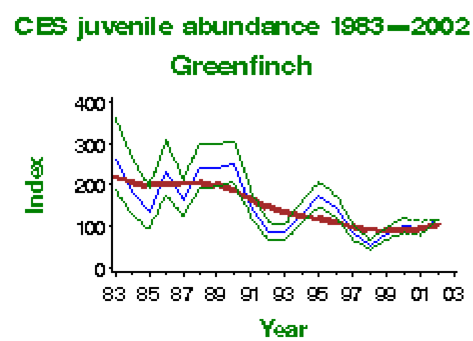
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	406	15	-8	44		
	25	1975-2000	491	12	-9	32		

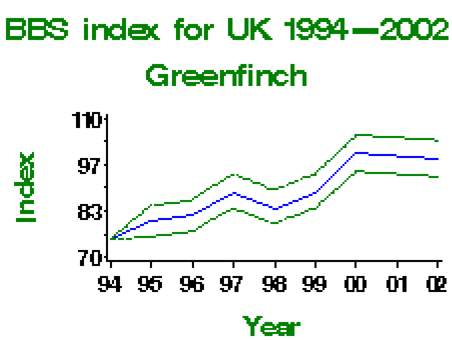
	10	1990-2000	947	31	13	45		
	5	1995-2000	1478	19	13	24		
CBC/BBS England	33	1967-2000	348	24	-3	50		
	25	1975-2000	419	13	-12	33		
	10	1990-2000	808	31	15	42		
	5	1995-2000	1256	20	14	24		
CES adults	17	1984-2001	41	56	.	.		
	10	1991-2001	47	0	.	.		
	5	1996-2001	47	-1	.	.		
CES juveniles	17	1984-2001	24	-54	.	.	[>50*]	
	10	1991-2001	29	-42	.	.	[>25*]	
	5	1996-2001	31	-13	.	.		
BBS UK	8	1994-2002	1301	31	24	38		
BBS England	8	1994-2002	1101	31	24	38		
BBS Scotland	8	1994-2002	80	18	-10	55		
BBS Wales	8	1994-2002	82	19	-5	51		

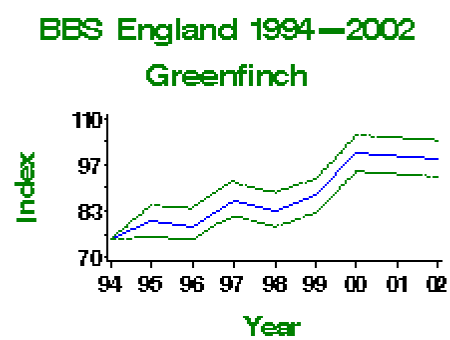
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

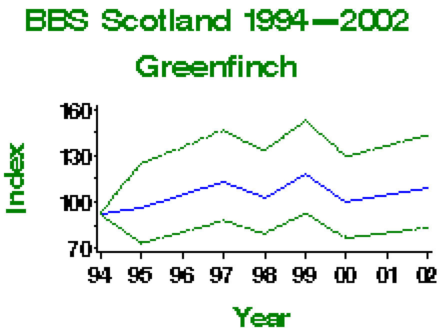












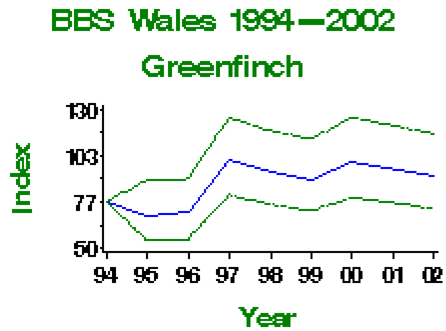
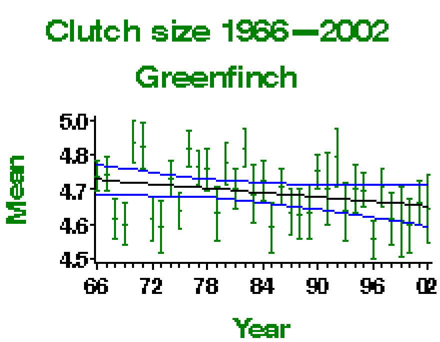
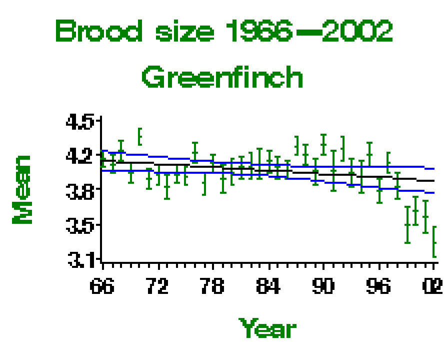
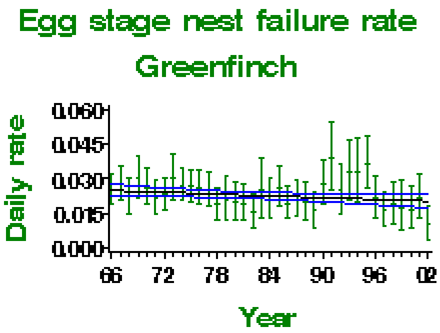


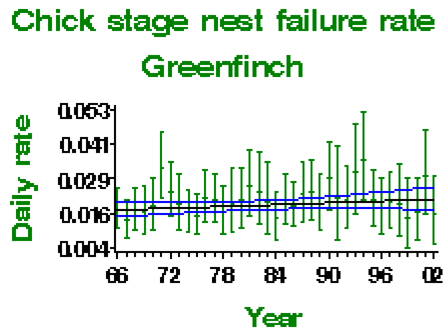
Table of productivity information for Greenfinch

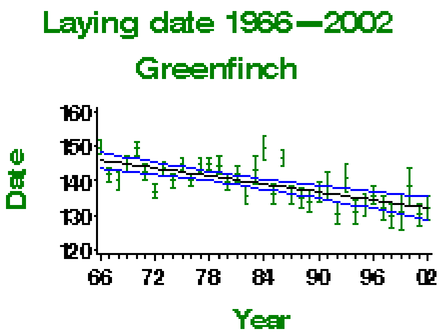
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	94	None				
Brood size	33	1968-2001	114	Linear decline	4.08 chicks	3.9 chicks	-0.18 chicks	
Daily failure rate (eggs)	33	1968-2001	130	None				
Daily failure rate (chicks)	33	1968-2001	97	None				
Laying date	33	1968-2001	95	Linear decline	day 145	day 133	-12 days	
Percentage juveniles (CES)	17	1984-2001	45	Smoothed trend	321 productivity index	101 productivity index	-69% [>50*]	
Percentage juveniles (CES)	10	1991-2001	53	Smoothed trend	210 productivity index	101 productivity index	-52% [>50*]	
Percentage juveniles (CES)	5	1996-2001	53	Smoothed trend	121 productivity index	101 productivity index	-18%	

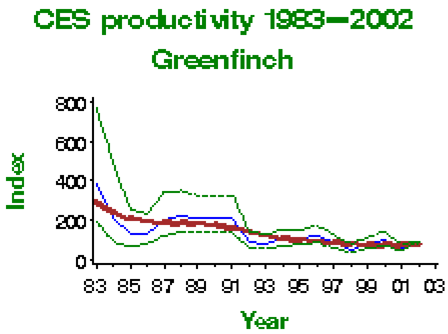





Egg stage nest failure rate
Greenfinch
Daily rate
0.060
0.045
0.030
0.015
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Greenfinch
Daily rate
0.053
0.041
0.029
0.016
0.004
66 72 78 84 90 96 02
Year


Laying date 1966–2002
Greenfinch
Date
160
150
140
130
120
66 72 78 84 90 96 02
Year


CES productivity 1983–2002
Greenfinch
Index
800
600
400
200
0
83 85 87 89 91 93 95 97 99 01 03
Year

GOLDFINCH
Carduelis carduelis

Conservation listings

Europe: no SPEC category, (secure)
UK: Green

Long-term trend

England: fluctuating, with no long-term trend

Status summary

Goldfinch abundance fell sharply from the mid 1970s until the mid 1980s, but the decline was both preceded and followed by significant population increases. The recent upturn has lifted the species from the Amber list into the Green category. These population changes can be explained almost entirely by changes in annual survival rates, which may have resulted from a reduction in the availability of weed seeds, due to agricultural intensification, and subsequent increased use of other food sources such as garden bird tables. Alternatively, the effects of environmental change or increased hunting pressure in the Franco-Iberian wintering grounds of the migrant majority of the population may have temporarily reduced survival rates (**Siriwardena *et al.* 1999**). There has been an increase during the 1990s in productivity as measured by CES.

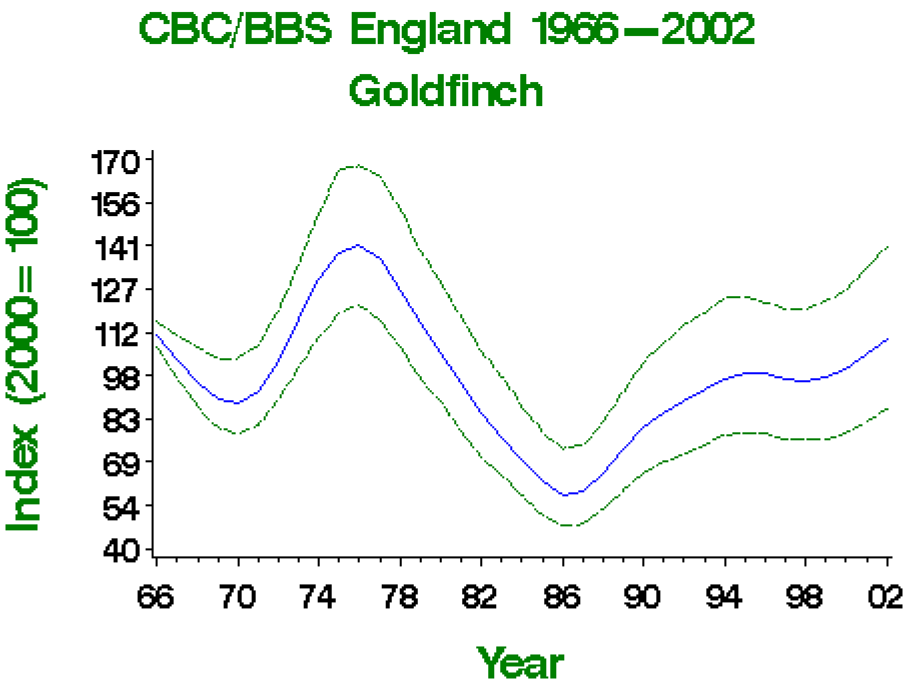
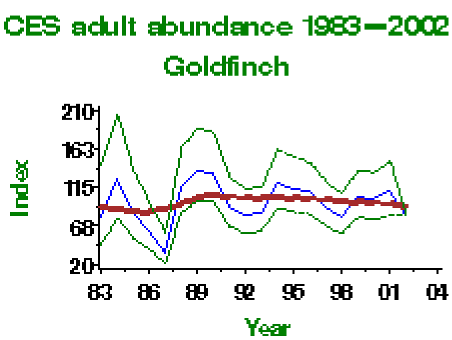


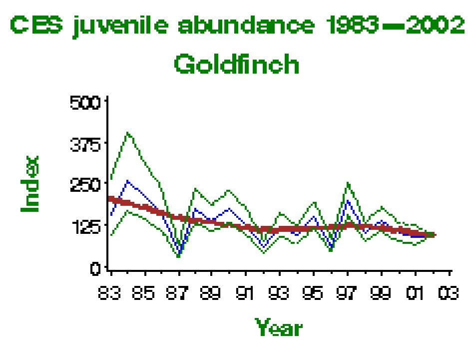
Table of population changes for Goldfinch

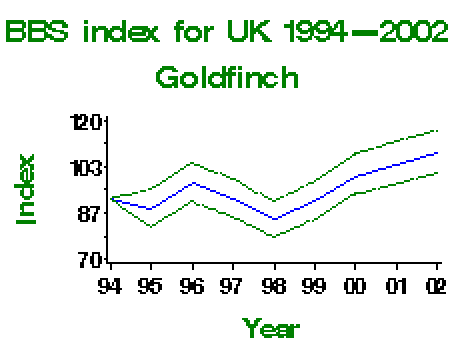
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	258	-3	-27	23		
	25	1975-2000	314	-28	-44	-10	>25	

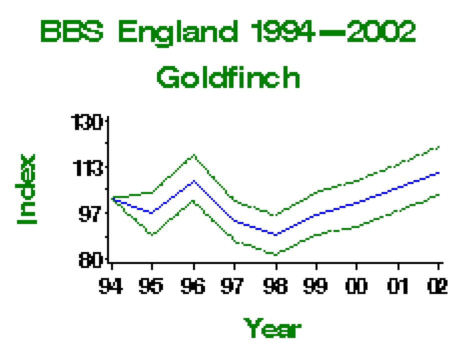
	10	1990-2000	618	24	11	42		
	5	1995-2000	956	2	-4	7		
CES adults	17	1984-2001	31	8	.	.		
	10	1991-2001	37	-9	.	.		
	5	1996-2001	40	-7	.	.		
CES juveniles	17	1984-2001	18	-47	.	.	[>25*]	Small sample
	10	1991-2001	21	-14	.	.		
	5	1996-2001	23	-14	.	.		
BBS UK	8	1994-2002	1031	18	10	27		
BBS England	8	1994-2002	855	9	1	18		
BBS Scotland	8	1994-2002	59	56	9	123		
BBS Wales	8	1994-2002	92	64	28	110		

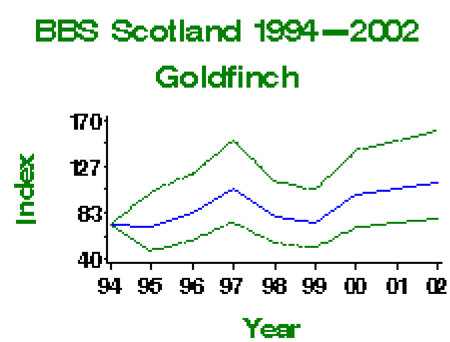
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











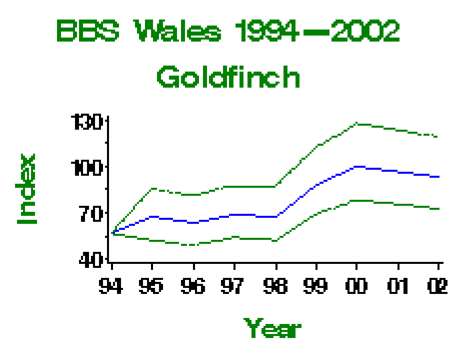
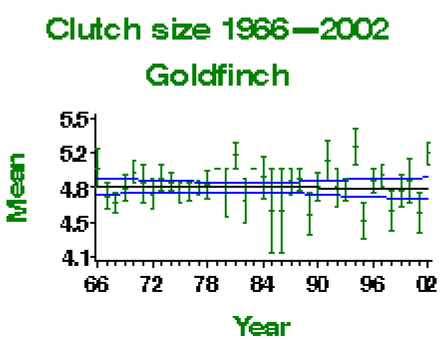
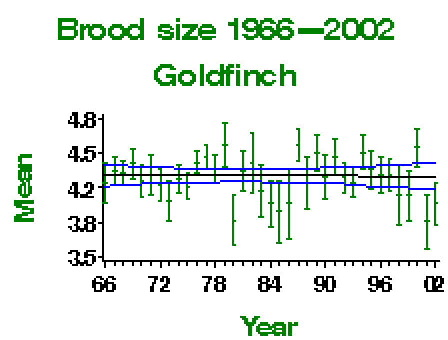


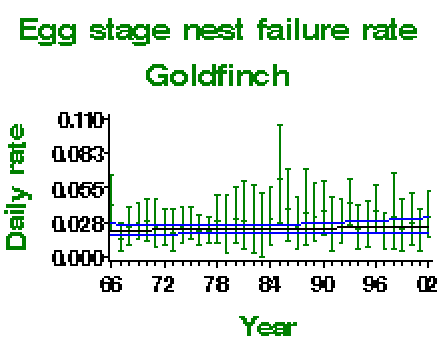
Table of productivity information for Goldfinch

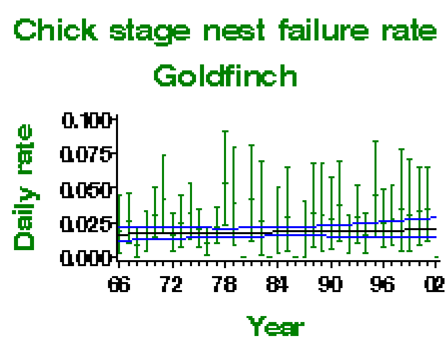
Variable	Period (yrs)	Years	Mean annual	Trend	Predicted in first year	Predicted in last year	Change	Comment

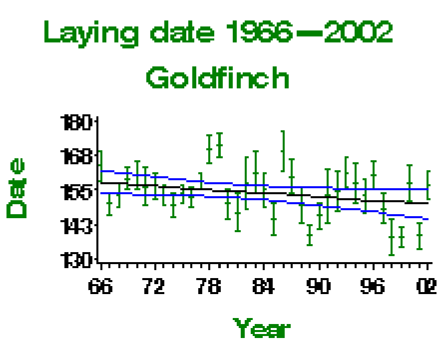
			sample					
Clutch size	33	1968-2001	18	None				Small sample
Brood size	33	1968-2001	32	None				
Daily failure rate (eggs)	33	1968-2001	33	None				
Daily failure rate (chicks)	33	1968-2001	27	None				Small sample
Laying date	33	1968-2001	21	None				Small sample
Percentage juveniles (CES)	17	1984-2001	36	Smoothed trend	115 productivity index	101 productivity index	-13%	
Percentage juveniles (CES)	10	1991-2001	43	Smoothed trend	78 productivity index	101 productivity index	28%	
Percentage juveniles (CES)	5	1996-2001	46	Smoothed trend	86 productivity index	101 productivity index	16%	

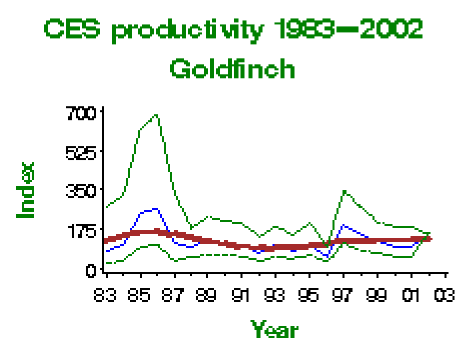












SISKIN
Carduelis spinus

Conservation listings

Europe: SPEC category 4, secure
UK: Green

Long-term trend

UK: probable increase

Status summary

The UK Siskin population breeds mainly in coniferous forest habitats that were poorly monitored before the inception of the BBS. The 1988-91 Breeding Atlas identified a considerable expansion of the breeding range into southern Britain (Gibbons *et al.* 1993), but the factors responsible for this range expansion are unclear. The maturation of new forests in northern Britain may also have boosted numbers within the traditional range. The BBS indicates that the size of the population has fluctuated in recent years, but that there has been no significant net change in numbers.

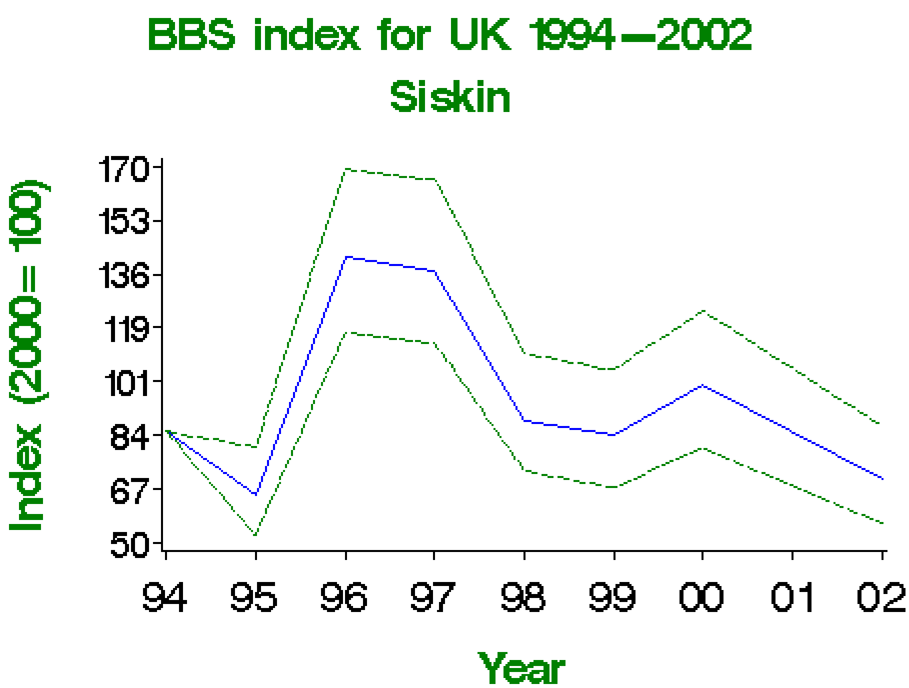
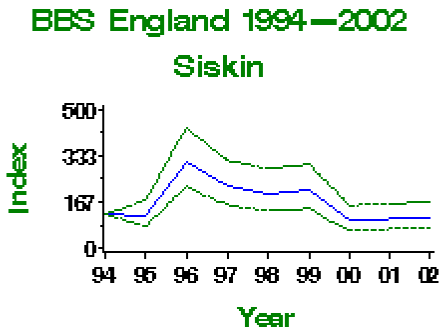
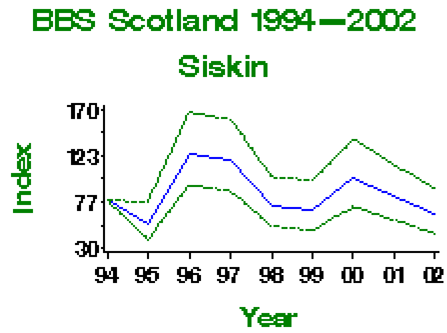


Table of population changes for Siskin

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	8	1994-2002	113	-18	-34	2		
BBS England	8	1994-2002	33	-8	-38	37		
BBS Scotland	8	1994-2002	56	-18	-42	15		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





Productivity information is not currently available for this species

LINNET
Carduelis cannabina

Conservation listings

Europe: SPEC category 4, secure
UK: Red (>50% population decline)

Long-term trend

England: rapid decline

Status summary

Linnet abundance declined rapidly in the UK between the mid 1970s and mid 1980s. Numbers have subsequently remained stable, although with some recovery in Scotland. CES has shown declines continuing through the 1990s. Nest failure rates rose during the principal period of population decline, and this represents the most likely demographic mechanism driving the observed decreases in abundance (**Siriwardena *et al.* 1999**, **2000b**). CES results suggest that low productivity is still a problem for the species, possibly due to reductions in hedgerow quality leaving nests more exposed and therefore at greater risk of predation.

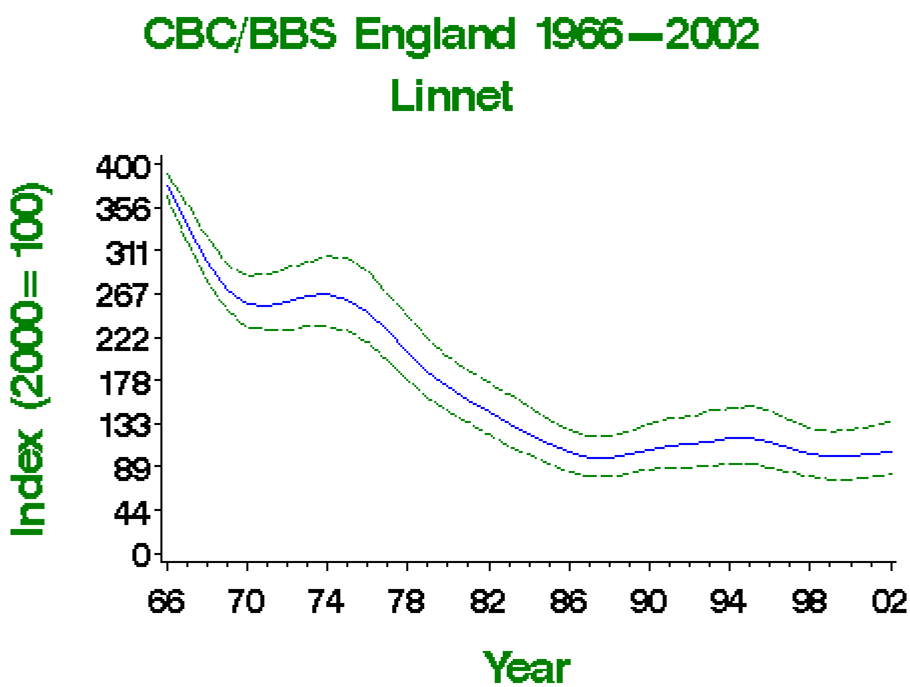
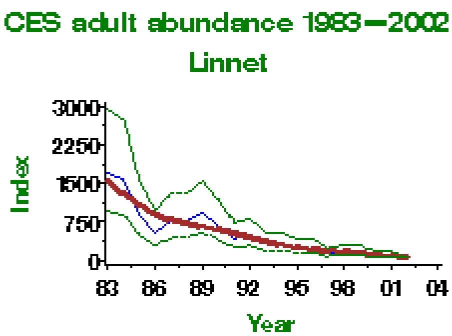


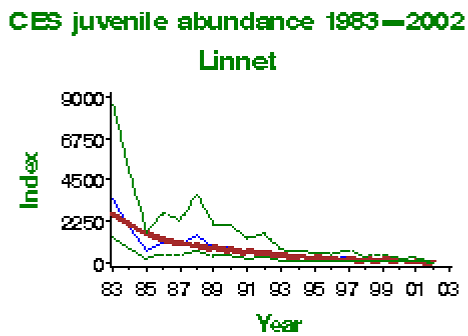
Table of population changes for Linnet

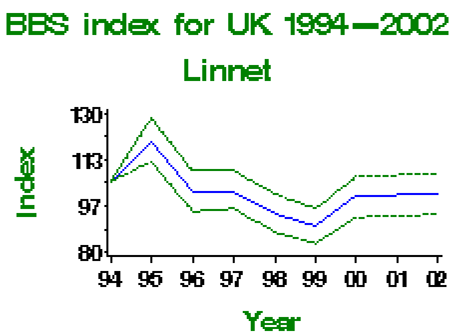
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	33	1967-2000	279	-70	-78	-61	>50	
	25	1975-2000	331	-62	-70	-52	>50	
	10	1990-2000	622	-6	-21	12		
	5	1995-2000	953	-16	-21	-11		
CES adults	17	1984-2001	21	-93	.	.	[>50*]	

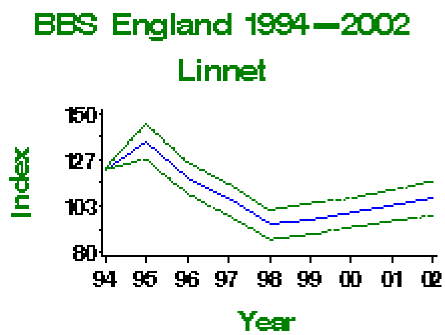
	10	1991-2001	24	-83	.	.	[>50*]	
	5	1996-2001	20	-61	.	.	[>50]	
CES juveniles	17	1984-2001	15	-96	.	.	[>50*]	Small sample
	10	1991-2001	16	-88	.	.	[>50]	Small sample
	5	1996-2001	16	-67	.	.	[>50]	Small sample
BBS UK	8	1994-2002	1009	-4	-11	3		
BBS England	8	1994-2002	826	-12	-19	-5		
BBS Scotland	8	1994-2002	78	34	3	75		
BBS Wales	8	1994-2002	77	13	-15	50		

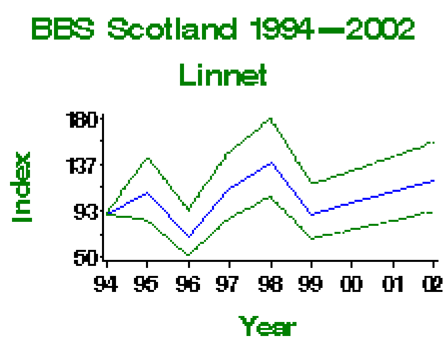
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











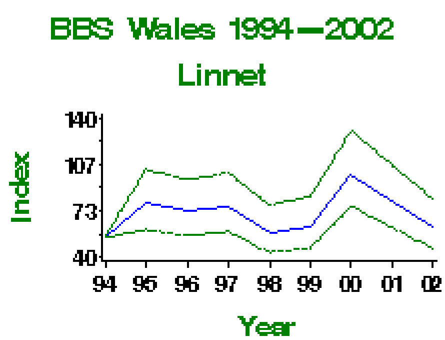
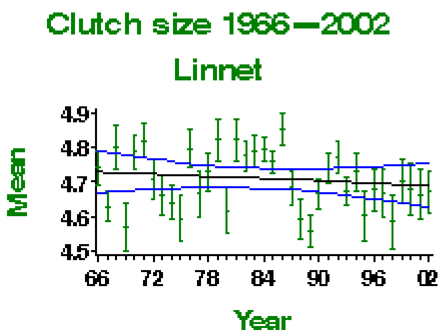
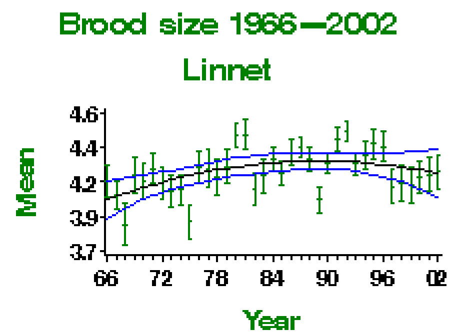


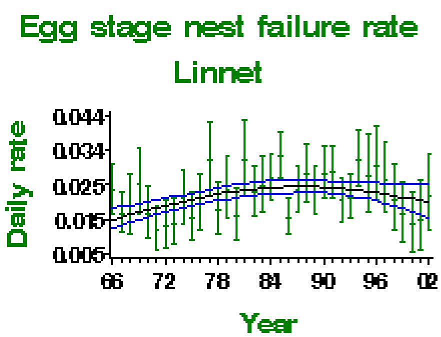
Table of productivity information for Linnet

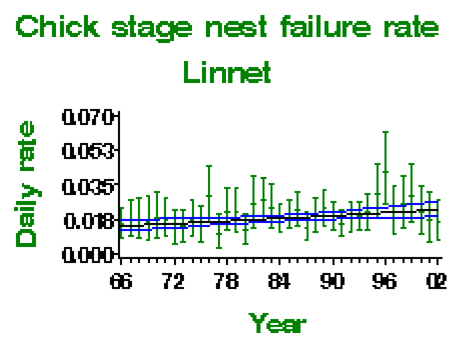
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	110	None				
Brood size	33	1968-2001	124	Curvilinear	4.07 chicks	4.21 chicks	0.14 chicks	

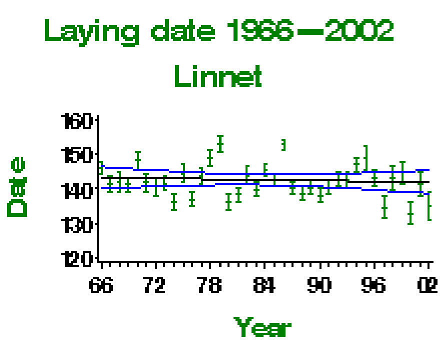
Daily failure rate (eggs)	33	1968-2001	156	Curvilinear	0.0161 nests/day	0.0201 nests/day	0.004 nests/day	
Daily failure rate (chicks)	33	1968-2001	110	Linear increase	0.0148 nests/day	0.0223 nests/day	0.0075 nests/day	
Laying date	33	1968-2001	114	None				
Percentage juveniles (CES)	17	1984-2001	24	Smoothed trend	373 productivity index	101 productivity index	-73%[>50]	
Percentage juveniles (CES)	10	1991-2001	27	Smoothed trend	205 productivity index	101 productivity index	-51%[>50]	
Percentage juveniles (CES)	5	1996-2001	24	Smoothed trend	168 productivity index	101 productivity index	-40%[>25]	

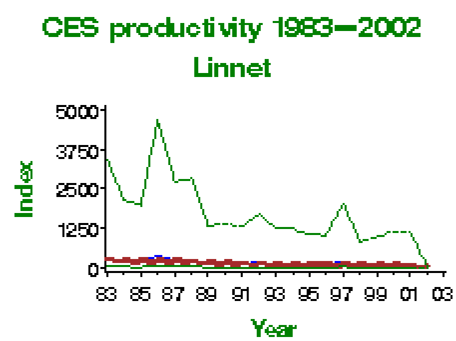












LESSER REDPOLL
Carduelis cabaret

Conservation listings

Europe (*C. cabaret/flammea*): no SPEC category, (secure)
UK: Amber (>50% population decline but data possibly unrepresentative, >20% of European breeding population)

Long-term trend

England: rapid decline

Status summary

Lesser Redpolls were once abundant and widespread on CBC and CES plots in lowland Britain, but are largely absent now as breeding birds. The 1988-91 Atlas showed a range contraction of 11% since 1968-72, including complete loss in much of eastern Grampian (**Gibbons *et al.* 1993**). It is nevertheless possible that they may have withdrawn from the lowlands to northern and western UK regions, where monitoring prior to 1994 was less effective. The species has been moved from the Green to the Amber list, although the apparent extent of its decline clearly warrants Red-listing. It is unclear from BBS results whether the decline has ceased, and some recent increase is indicated in Scotland. CES data indicates a rapid long-term decline in productivity, and there is evidence that survival rates also fell during the population decline (**Siriwardena *et al.* 1998a**). Since *C. cabaret* is now treated as a separate species from *C. flammea*, and has a restricted range that lies wholly within western Europe, it is likely to gain a European conservation listing at the next review.

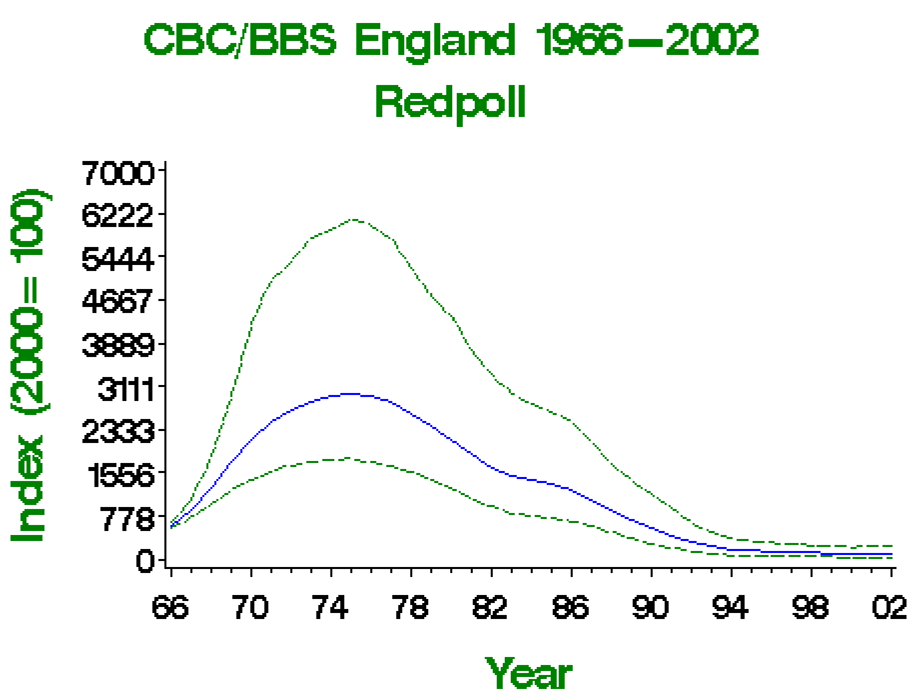
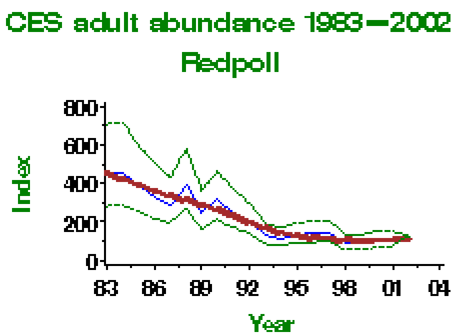


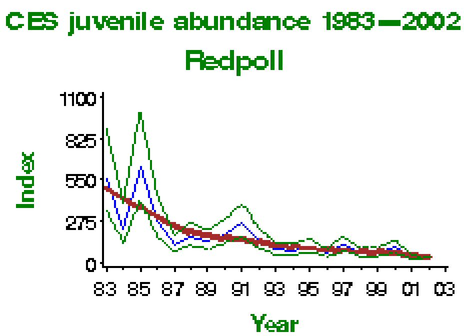
Table of population changes for Lesser Redpoll

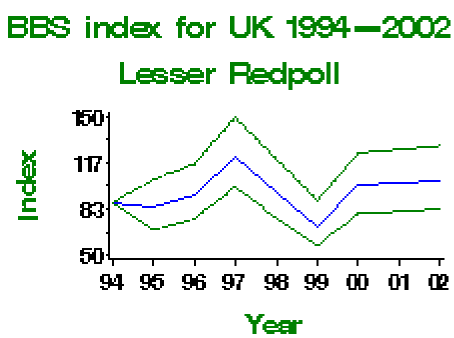
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	**33**	**1967-2000**	**41**	**-89**	**-96**	**-74**	**>50**	
	25	**1975-2000**	**41**	**-97**	**-98**	**-94**	**>50**	
	10	**1990-2000**	**37**	**-82**	**-92**	**-70**	**>50**	

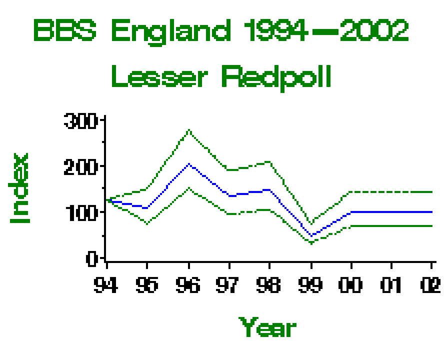
	5	1995-2000	51	-35	-55	-6	>25	
CES adults	17	1984-2001	19	-75	.	.	[>50*]	Small sample
	10	1991-2001	18	-54	.	.	[>50*]	Small sample
	5	1996-2001	16	-12	.	.		Small sample
CES juveniles	17	1984-2001	11	-88	.	.	[>50*]	Small sample
	10	1991-2001	10	-67	.	.	[>50*]	Small sample
BBS UK	8	1994-2002	118	18	-5	47		
BBS England	8	1994-2002	47	-22	-45	13		
BBS Scotland	8	1994-2002	36	26	-16	88		

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB









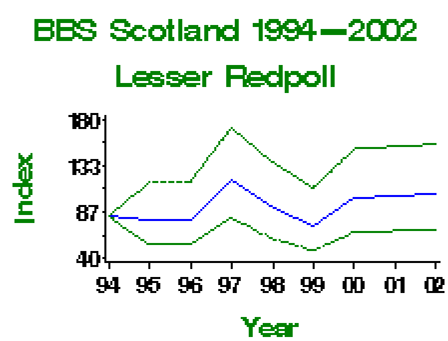


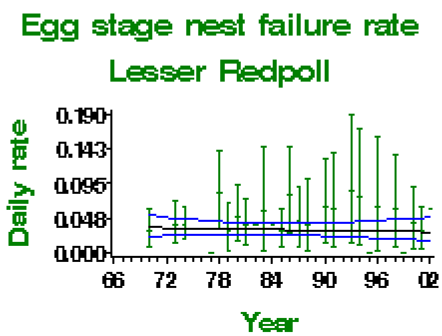
Table of productivity information for Lesser Redpoll

Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	8	None				Small sample
Brood size	33	1968-2001	9	None				Small sample

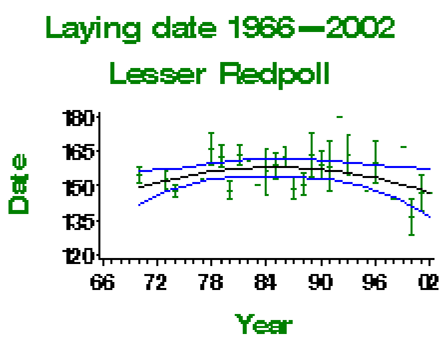
Daily failure rate (eggs)	33	1968-2001	11	None				Small sample
Daily failure rate (chicks)	33	1968-2001	7	None				Small sample
Laying date	33	1968-2001	12	Curvilinear	day 147	day 148	1 days	Small sample
Percentage juveniles (CES)	17	1984-2001	21	Smoothed trend	398 productivity index	101 productivity index	-75% [>50]	
Percentage juveniles (CES)	10	1991-2001	20	Smoothed trend	245 productivity index	101 productivity index	-59% [>50*]	Small sample
Percentage juveniles (CES)	5	1996-2001	17	Smoothed trend	228 productivity index	101 productivity index	-56% [>50]	Small sample

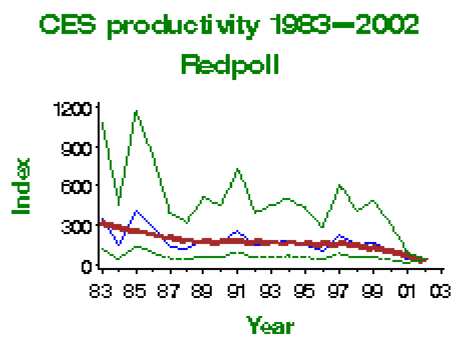
Insufficient data on clutch size available for this species

Insufficient data on brood size available for this species



Insufficient data on nestling failure available for this species





BULLFINCH
Pyrrhula pyrrhula

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

The UK Bullfinch population has been in decline since the mid 1970s, following a period of relative stability. The decline was initially very steep, but has been shallower since the early 1980s. Nevertheless, the CES and CBC/BBS both suggest that the decline is continuing, at least in southern Britain. The demographic mechanism remains unclear (**Siriwardena *et al.* 1999**, **2000b**), although agricultural intensification is suspected to have played a part. CES data indicate that productivity has increased over the last decade. However, nest failure rates at the egg stage have risen through the 1990s.

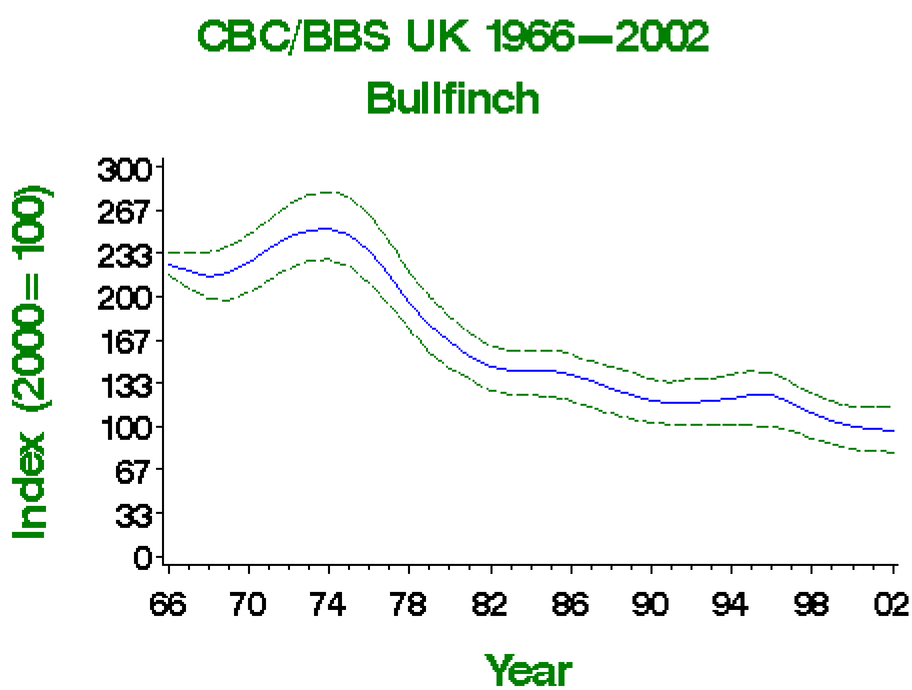
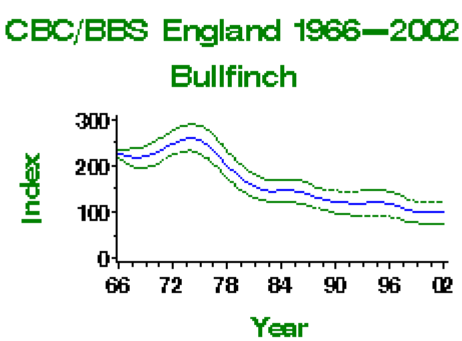


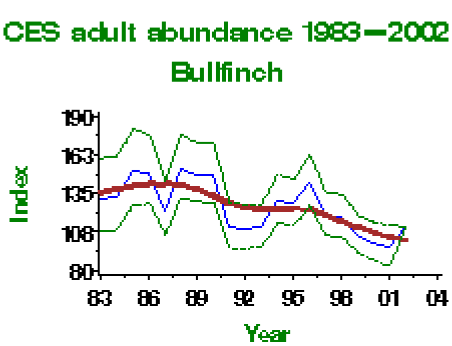
Table of population changes for Bullfinch

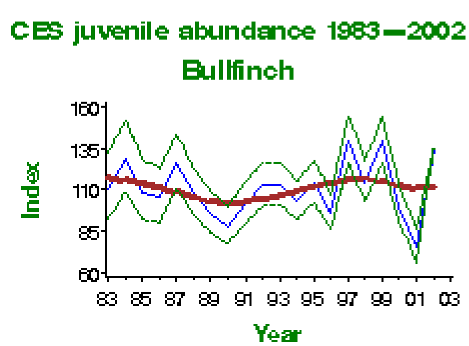
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	224	-54	-64	-47	>50	
	25	1975-2000	256	-60	-67	-52	>50	
	10	1990-2000	394	-17	-24	-9		

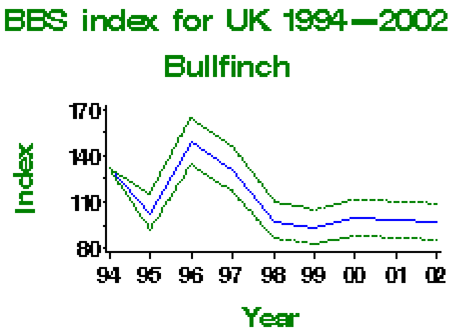
	5	1995-2000	562	-19	-25	-13		
CBC/BBS England	33	1967-2000	188	-55	-66	-42	>50	
	25	1975-2000	212	-61	-70	-52	>50	
	10	1990-2000	317	-18	-29	-11		
	5	1995-2000	444	-16	-24	-11		
CES adults	17	1984-2001	80	-25	.	.	[>25]	
	10	1991-2001	91	-19	.	.		
	5	1996-2001	89	-16	.	.		
CES juveniles	17	1984-2001	62	-4	.	.		
	10	1991-2001	71	8	.	.		
	5	1996-2001	70	-3	.	.		
BBS UK	8	1994-2002	437	-26	-35	-17	(>25)	
BBS England	8	1994-2002	341	-27	-36	-17	(>25)	
BBS Wales	8	1994-2002	47	-37	-56	-12	(>25)	

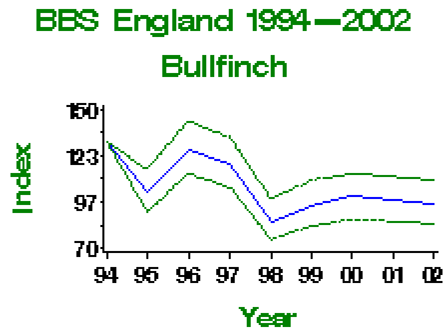
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB











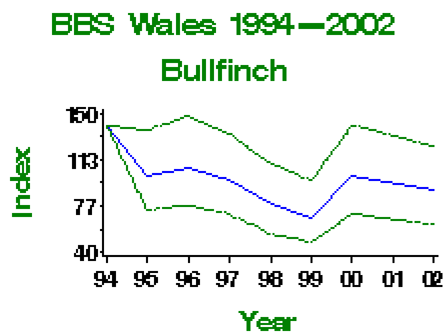
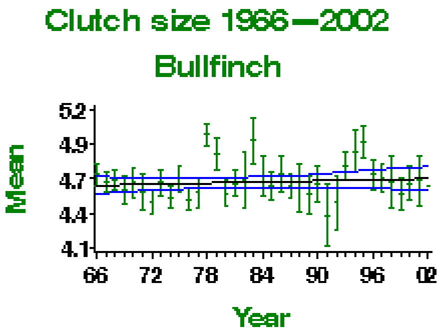
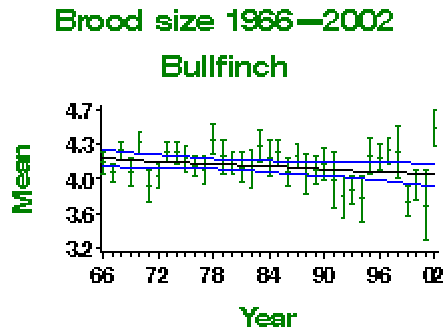
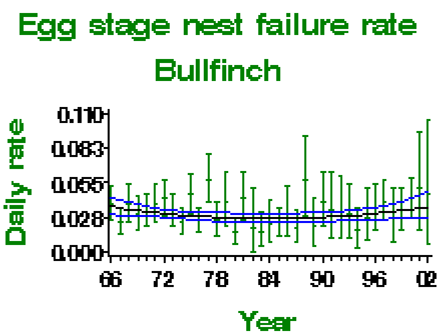


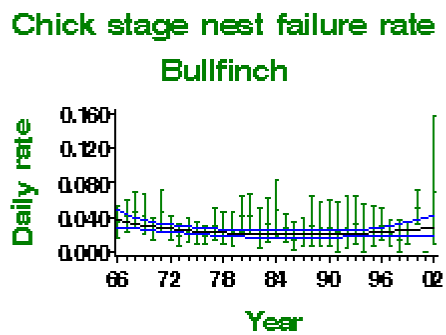
Table of productivity information for Bullfinch

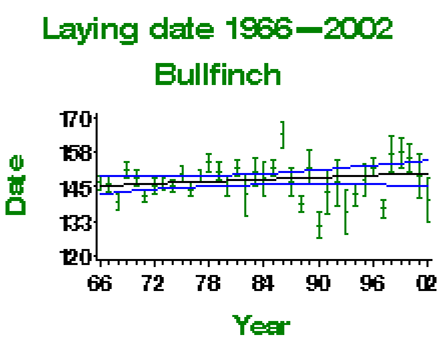
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	37	None				
Brood size	33	1968-2001	39	None				
Daily failure rate (eggs)	33	1968-2001	53	Curvilinear	0.034 nests/day	0.0348 nests/day	0.0008 nests/day	
Daily failure rate (chicks)	33	1968-2001	36	Curvilinear	0.0332 nests/day	0.0279 nests/day	-0.0053 nests/day	
Laying date	33	1968-2001	34	None				
Percentage juveniles (CES)	17	1984-2001	84	Smoothed trend	93 productivity index	101 productivity index	8%	
Percentage juveniles (CES)	10	1991-2001	95	Smoothed trend	78 productivity index	101 productivity index	28%	
Percentage juveniles (CES)	5	1996-2001	93	Smoothed trend	90 productivity index	101 productivity index	11%	

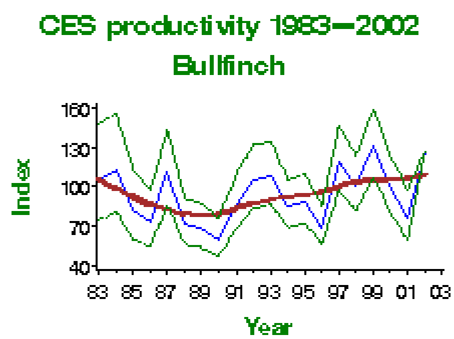

Clutch size 1966—2002
Bullfinch
Mean
5.2
4.9
4.7
4.4
4.1
66 72 78 84 90 96 02
Year


Brood size 1966—2002
Bullfinch
Mean
4.7
4.3
4.0
3.6
3.2
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Bullfinch
Daily rate
0.110
0.083
0.055
0.028
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Bullfinch
Daily rate
0.160
0.120
0.080
0.040
0.000
66 72 78 84 90 96 02
Year


Laying date 1966—2002
Bullfinch
Date
170
158
145
133
120
66 72 78 84 90 96 02
Year


CES productivity 1983—2002
Bullfinch
Index
160
130
100
70
40
83 85 87 89 91 93 95 97 99 01 03
Year

YELLOWHAMMER
Emberiza citrinella

Conservation listings

Europe: SPEC category 4, (secure)
UK: Red (>50% population decline)

Long-term trend

UK, England: rapid decline

Status summary

Yellowhammer abundance began to decline on farmland in the mid 1980s and the decline has continued ever since. The species, listed as Green in 1996, now qualifies for the Red list. While there is some evidence that survival rates have decreased during the period of decline, Yellowhammer breeding performance has tended to increase (**Siriwardena *et al.* 1998b**, **2000b**). However, recent declines in brood size and egg-stage failure rates are potentially of concern. Overall nest failure rates are relatively high, probably because later nests, which tend to be more successful (**Kyrkos 1997**), are under-represented in the NRS data set, but this is unlikely to affect overall trends. Reductions in winter seed food availability as a result of agricultural intensification (for example, the loss of winter stubbles and a reduction in weed densities) are widely believed to have contributed to the population decline.

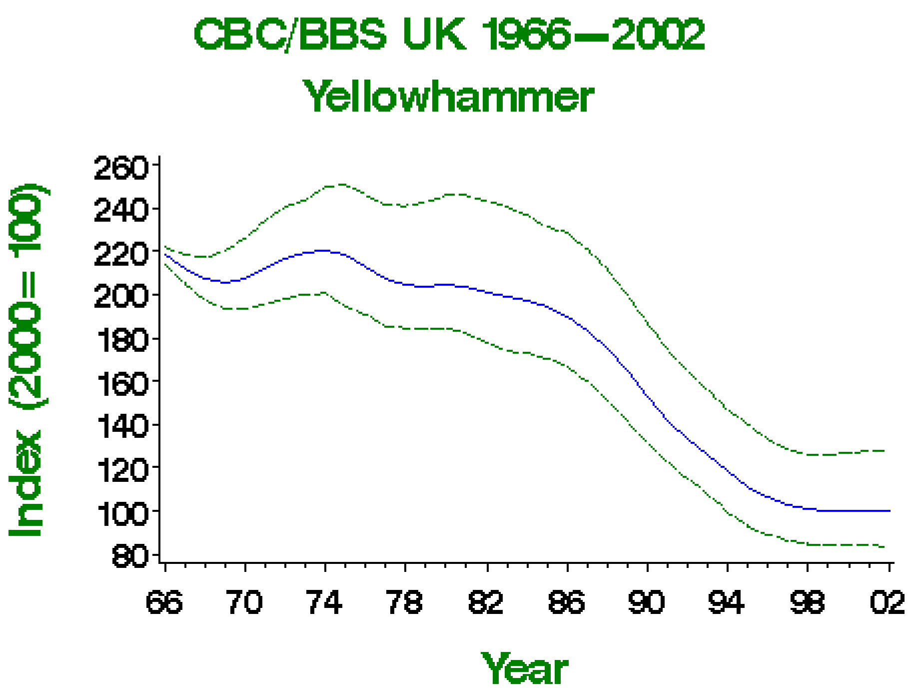
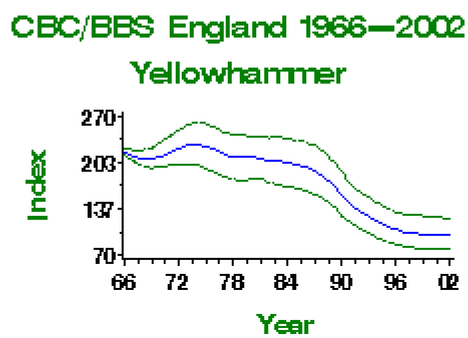


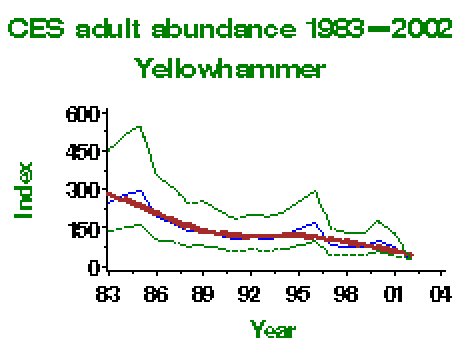
Table of population changes for Yellowhammer

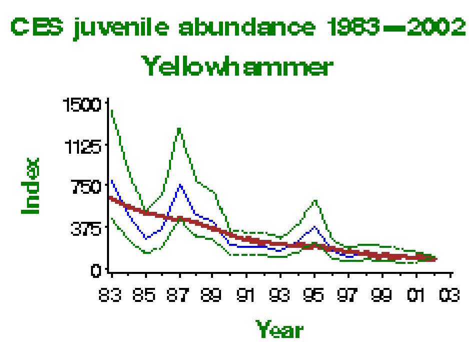
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	338	-53	-62	-40	>50	
	25	1975-2000	401	-54	-61	-47	>50	
	10	1990-2000	745	-34	-41	-29	>25	
	5	1995-2000	1137	-10	-13	-7		

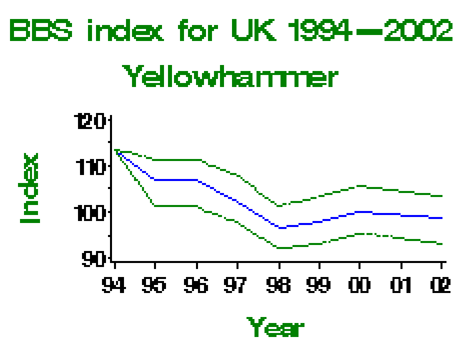
CBC/BBS England	33	1967-2000	295	-53	-63	-41	>50	
	25	1975-2000	351	-56	-63	-48	>50	
	10	1990-2000	650	-36	-42	-29	>25	
	5	1995-2000	989	-11	-14	-7		
BBS UK	8	1994-2002	995	-13	-18	-9		
BBS England	8	1994-2002	864	-17	-22	-13		
BBS Scotland	8	1994-2002	86	8	-11	32		
BBS Wales	8	1994-2002	37	-31	-50	-4	(>25)	

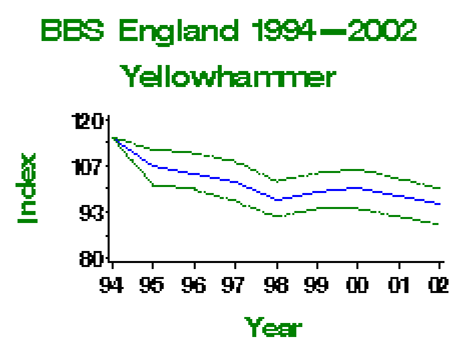
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

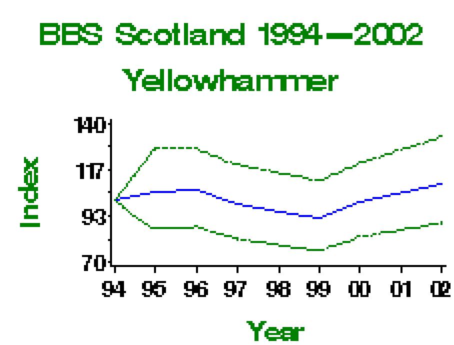












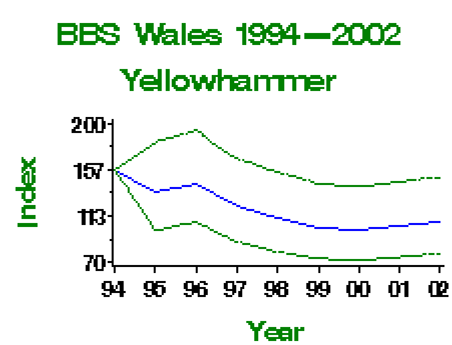
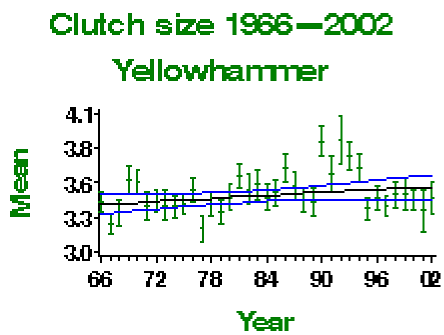
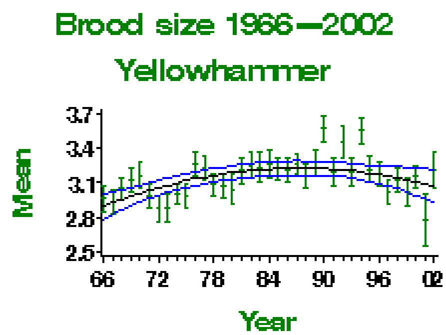
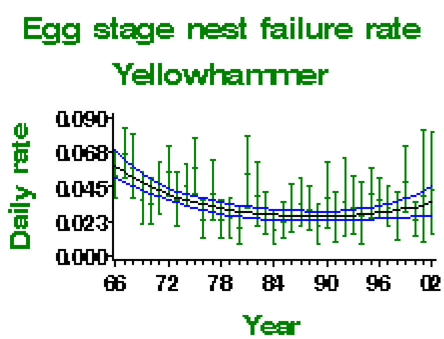


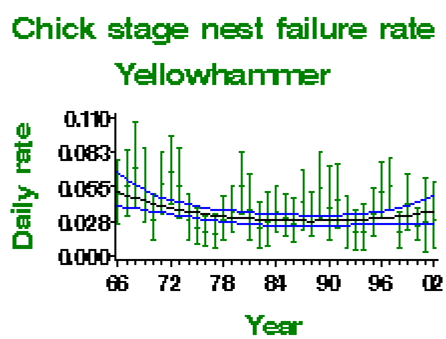
Table of productivity information for Yellowhammer

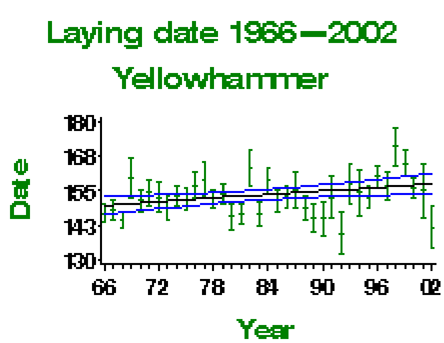
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	44	None				
Brood size	33	1968-2001	69	Curvilinear	2.96 chicks	3.09 chicks	0.13 chicks	
Daily failure rate (eggs)	33	1968-2001	66	Curvilinear	0.0514 nests/day	0.0332 nests/day	-0.0182 nests/day	
Daily failure rate (chicks)	33	1968-2001	53	Curvilinear	0.0462 nests/day	0.0344 nests/day	-0.0118 nests/day	
Laying date	33	1968-2001	27	Linear increase	day 150	day 157	7 days	Small sample

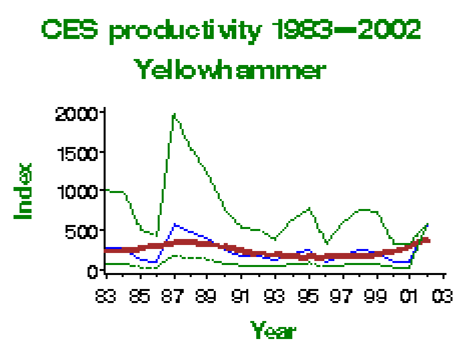












REED BUNTING
Emberiza schoeniclus

Conservation listings

Europe: no SPEC category, secure
UK: Red (>50% population decline)

Long-term trend

UK, England: moderate decline

Status summary

Red-listing for this species is based on a 62% decline on CBC plots between 1974 and 1999. Both CBC/BBS and WBS indices declined rapidly during the 1970s, but Reed Bunting abundance has since remained remarkably stable. The early increase in the CBC index has been associated with a gradual spread into drier habitats and it is likely that the subsequent decline was related to agricultural intensification. CES data indicate that the decline has continued and that it is associated with falling productivity. Detailed demographic analyses suggest that the decline was driven by decreasing survival rates and that a subsequent population recovery may have been prevented by increased nest losses (**Peach *et al.* 1999**). This is supported by a moderate decline in CES productivity and an increase in failure rates at the egg stage.

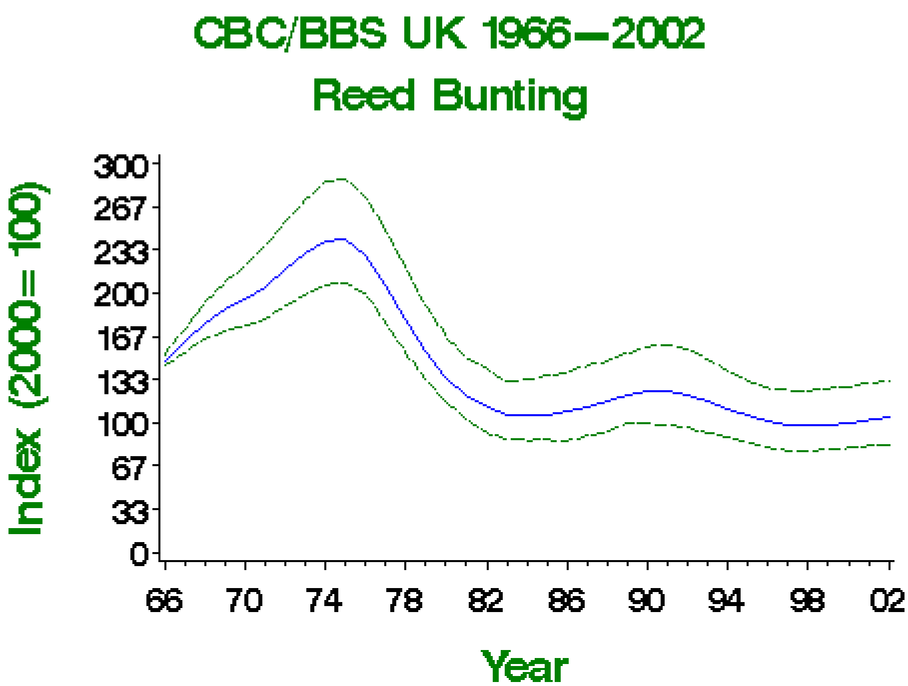
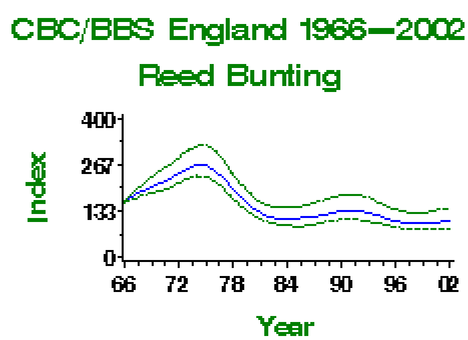


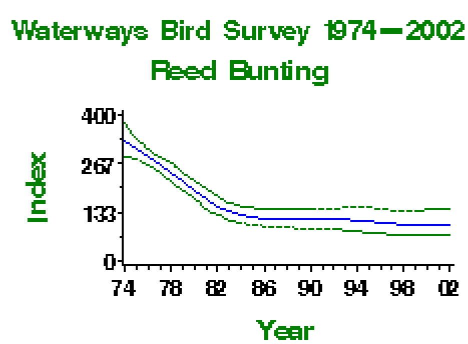
Table of population changes for Reed Bunting

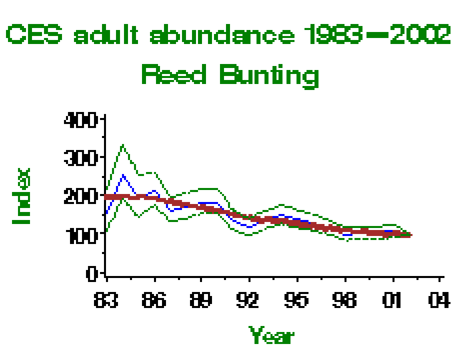
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	151	-39	-52	-20	>25	
	25	1975-2000	169	-59	-67	-52	>50	
	10	1990-2000	267	-20	-29	-11		
	5	1995-2000	395	-6	-12	-1		

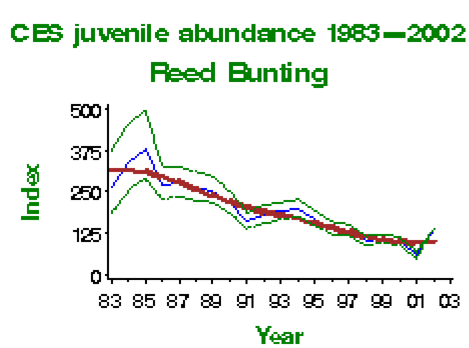
CBC/BBS England	33	1967-2000	123	-43	-56	-25	>25	
	25	1975-2000	136	-62	-70	-55	>50	
	10	1990-2000	210	-25	-34	-14		
	5	1995-2000	306	-12	-17	-5		
WBS waterways	25	1975-2000	53	-68	-77	-55	>50	
	10	1990-2000	60	-12	-29	9		
	5	1995-2000	62	-8	-19	6		
CES adults	17	1984-2001	59	-50	.	.	[>25*]	
	10	1991-2001	70	-34	.	.	[>25]	
	5	1996-2001	74	-18	.	.		
CES juveniles	17	1984-2001	41	-69	.	.	[>50*]	
	10	1991-2001	48	-52	.	.	[>50*]	
	5	1996-2001	49	-32	.	.	[>25*]	
BBS UK	8	1994-2002	329	3	-8	15		
BBS England	8	1994-2002	249	-13	-24	-2		
BBS Scotland	8	1994-2002	39	28	-11	83		

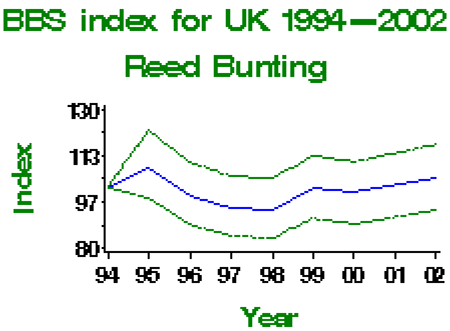
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB

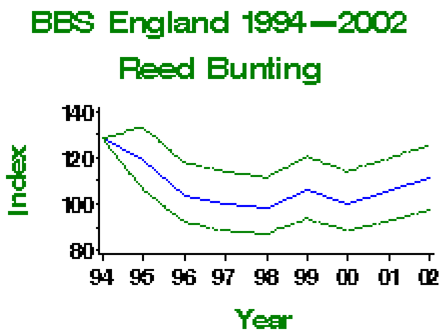












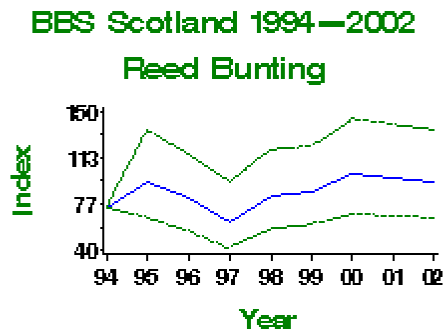
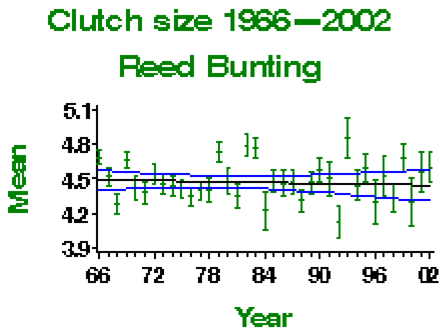
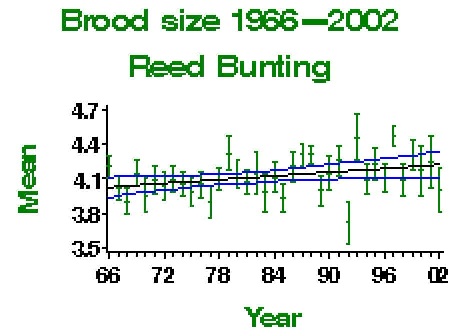
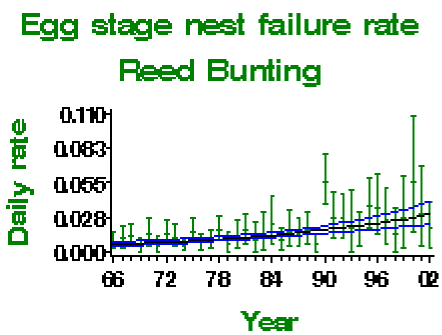


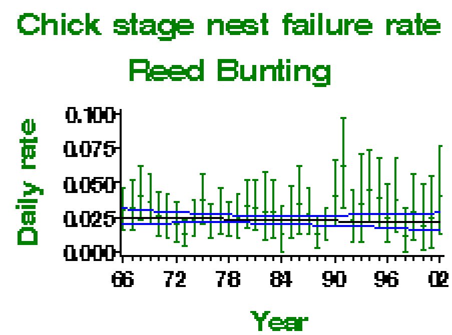
Table of productivity information for Reed Bunting

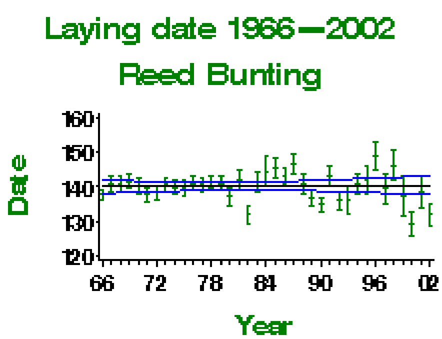
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Clutch size	33	1968-2001	47	None				
Brood size	33	1968-2001	64	Linear increase	4.04 chicks	4.22 chicks	0.18 chicks	
Daily failure rate (eggs)	33	1968-2001	55	Linear increase	0.0068 nests/day	0.0286 nests/day	0.0218 nests/day	
Daily failure rate (chicks)	33	1968-2001	54	None				
Laying date	33	1968-2001	53	None				
Percentage juveniles (CES)	17	1984-2001	62	Smoothed trend	147 productivity index	101 productivity index	-32% [>25]	
Percentage juveniles (CES)	10	1991-2001	73	Smoothed trend	149 productivity index	101 productivity index	-33% [>25*]	
Percentage juveniles (CES)	5	1996-2001	78	Smoothed trend	118 productivity index	101 productivity index	-16%	

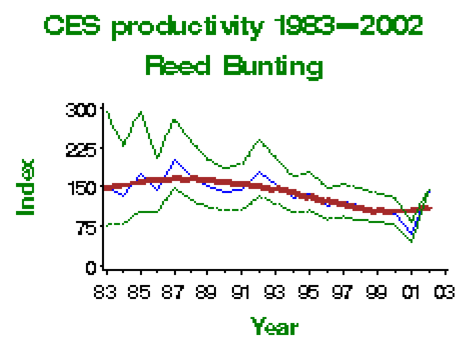

Clutch size 1966—2002
Reed Bunting
Mean
5.1
4.8
4.5
4.2
3.9
66 72 78 84 90 96 02
Year


Brood size 1966—2002
Reed Bunting
Mean
4.7
4.4
4.1
3.8
3.5
66 72 78 84 90 96 02
Year


Egg stage nest failure rate
Reed Bunting
Daily rate
0.110
0.083
0.055
0.028
0.000
66 72 78 84 90 96 02
Year


Chick stage nest failure rate
Reed Bunting
Daily rate
0.100
0.075
0.050
0.025
0.000
66 72 78 84 90 96 02
Year


Laying date 1966—2002
Reed Bunting
Date
160
150
140
130
120
66 72 78 84 90 96 02
Year


CES productivity 1983—2002
Reed Bunting
Index
300
225
150
75
0
83 85 87 89 91 93 95 97 99 01 03
Year

CORN BUNTING
Emberiza calandra

Conservation listings

Europe: SPEC category 4, (secure)
UK: Red (>50% population decline, historical decline)

Long-term trend

UK, England: rapid decline

Status summary

Following an earlier, historical decrease, Corn Buntings declined very steeply between the mid 1970s and mid 1980s, withdrawing then from large areas of their former range. Subsequently the decline has continued at a much-reduced rate. Corn Bunting breeding performance has increased considerably over this period (**Crick 1997**), and the demographic mechanism behind the decline is probably that survival rates have fallen. However, ring-recovery sample sizes do not permit this hypothesis to be tested (**Siriwardena *et al.* 1998b**, **2000b**). Any decrease in survival rates is probably a result of the deleterious effects of agricultural intensification on seed availability in winter (**Donald 1997**).

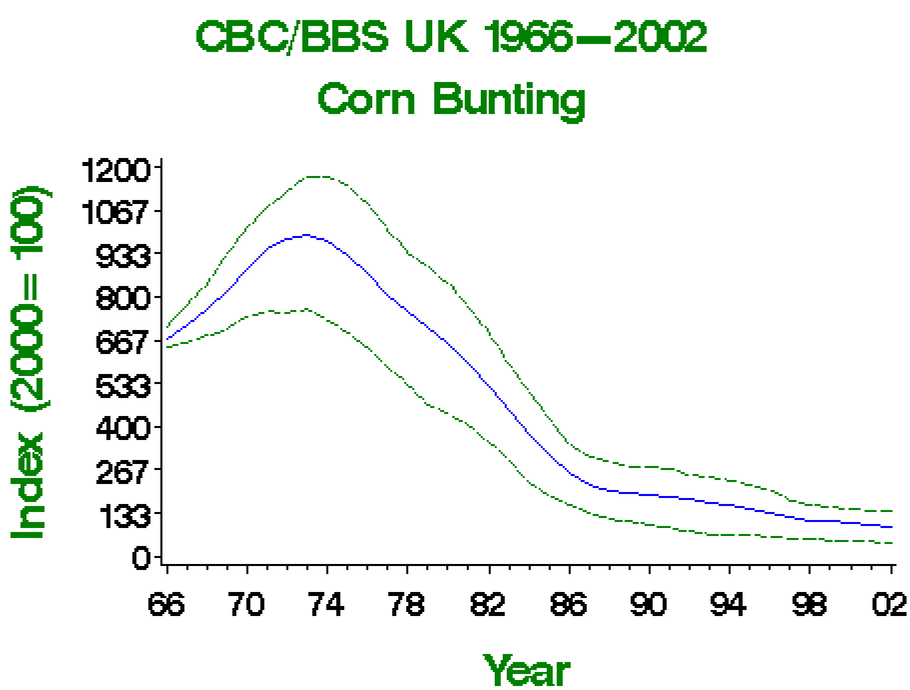
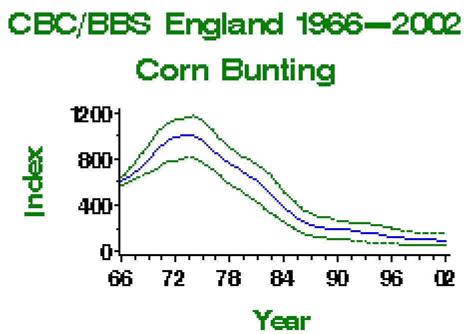


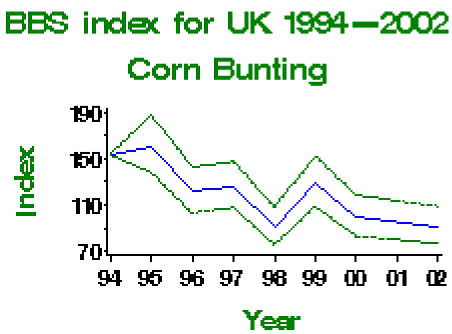
Table of population changes for Corn Bunting

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	33	1967-2000	53	-86	-94	-78	>50	
	25	1975-2000	59	-89	-95	-84	>50	
	10	1990-2000	107	-47	-63	-23	>25	
	5	1995-2000	160	-30	-38	-20	>25	
CBC/BBS England	33	1967-2000	51	-85	-93	-75	>50	
	25	1975-2000	57	-90	-94	-84	>50	

	10	1990-2000	102	-48	-67	-24	>25	
	5	1995-2000	153	-31	-40	-16	>25	
BBS UK	8	1994-2002	142	-41	-50	-29	(>25)	
BBS England	8	1994-2002	135	-35	-46	-23	(>25)	

The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB





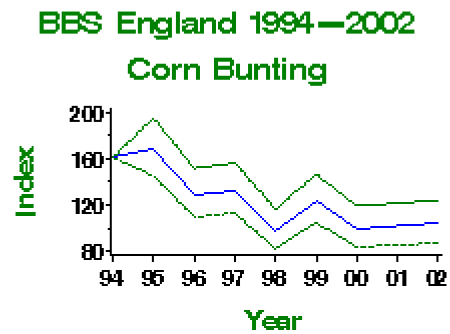
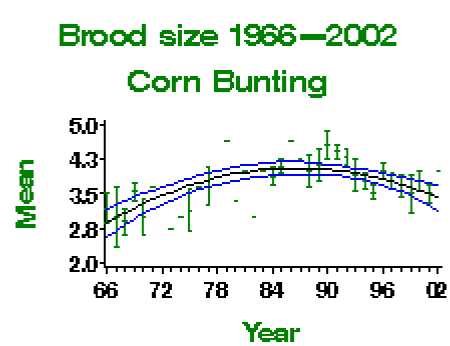
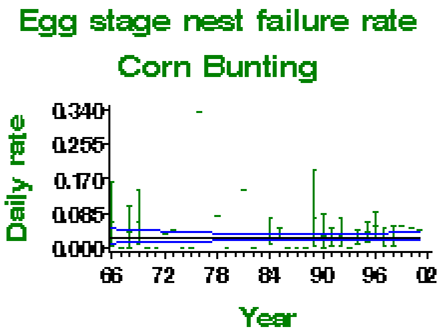


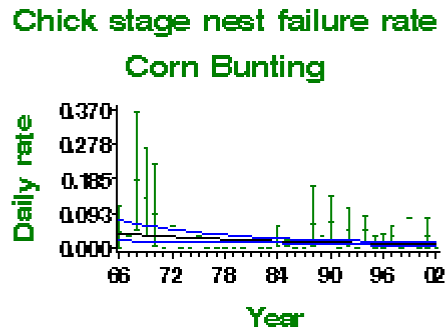
Table of productivity information for Corn Bunting

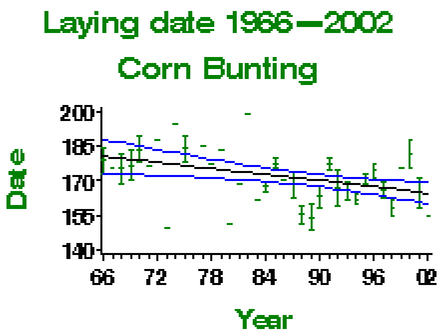
Variable	Period (yrs)	Years	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Brood size	33	1968-2001	12	Curvilinear	3.09 chicks	3.5 chicks	0.41 chicks	Small sample
Daily failure rate (eggs)	33	1968-2001	12	None				Small sample
Daily failure rate (chicks)	33	1968-2001	11	Linear decline	0.0361 nests/day	0.0101 nests/day	-0.026 nests/day	Small sample
Laying date	33	1968-2001	15	Linear decline	day 180	day 165	-15 days	Small sample

Insufficient data on clutch size available for this species









Insufficient data on CES available for this species

3. Help on species accounts

Depending on the availability of data (not every species is covered by each scheme), each account consists of the following:

1) ***Conservation listings:*** First, the European conservation category is given, according to current listings by BirdLife International (**Tucker & Heath 1994**). The criteria and their application have recently been subject to thorough review, and new listings are to be published shortly. The current SPEC (Species of European Conservation Concern) categories are as follows:

SPEC 1	Species of global conservation concern, having been classified as Globally Threatened, Conservation Dependent or Data Deficient in **Collar *et al.* (1994)**
SPEC 2	Species whose global populations are concentrated in Europe (i.e. more than 50% of their global population or range is in Europe) and which have an Unfavourable Conservation Status in Europe (i.e. European Threat Status is Endangered, Vulnerable, Rare, Declining, Localised or Insufficiently Known)
SPEC 3	Species whose global populations are not concentrated in Europe, but which have an Unfavourable Conservation Status in Europe
SPEC 4	Species whose global populations are concentrated in Europe but which have a Favourable Conservation Status in Europe (i.e. European Threat Status is Secure)

Other species, not considered to be of European conservation concern, are not categorised. The SPEC category, if any, and the European Threat Status (in brackets if provisional) are given for each species.

The UK conservation listing, given next, is taken from *The Population Status of Birds in the UK* (**Gregory *et al.* 2002**; see **PSoB** pages). These supersede the previous *Birds of Conservation Concern* listings (**Gibbons *et al.* 1996**), and cover the period 2002-07. There are three categories, as follows:

Red	high conservation concern
Amber	medium conservation concern
Green	all other species (except introduced species, which are not classified)

The main reason or reasons for listing as Red or Amber are also given. NB:

- SPEC 1 (globally threatened) species are Red-listed, and SPEC 2 or 3 species are Amber-listed (unless they are introduced or a Red-list criterion applies)
- Red- or Amber-listing may stem from decline, localisation or importance of non-breeding as well as breeding populations in the UK
- Rates of population decline are generally derived from CBC results for the 25-year period 1974-99
- Range declines are generally calculated from the numbers of 10-km squares occupied in the two breeding atlases (**Gibbons *et al.* 1993**)
- Historical decline (in UK between 1800-1995) is assessed by literature review

2) ***Long-term trend:*** This summarises the trend in population size since 1975 from WBS data, 1984 from CES data, or 1967 from CBC/BBS, with reference to any CBC/BBS, WBS or CES data that may be tabulated. If there are no data available from these schemes, any assessment of trends covers the period since about the mid 1960s, but may also take historical data into account. Increases and declines that are qualified as 'shallow', 'moderate' or 'rapid' are generally statistically significant. The following terms are used (with percentages rounded to the nearest whole number):

- **Rapid decline:** >50% population decline from CBC/BBS, WBS or CES

Moderate decline: 25-49% population decline from CBC/BBS, WBS or CES
- **Shallow decline:** 10-24% population decline from CBC/BBS, WBS or CES
- **Decline/Increase:** information has been derived from other sources
- **Probable/Possible increase/decline:** as above, but the information is not as certain - see the status summary for reasons
- **Stable/Fluctuating, with no long-term trend:** no overall change, or change <10%
- **Uncertain:** where the information from two monitoring schemes indicate conflicting trends or if the schemes are unrepresentative of the species' total UK population
- **Unknown:** no information on the UK population trend is available
- **Shallow increase:** 10-49% population increase from CBC/BBS, WBS or CES
- **Moderate increase:** 50-99% population increase from CBC/BBS, WBS or CES
- **Rapid increase:** >100% population increase from CBC/BBS, WBS or CES

3) ***Status summary:*** This section provides a brief summary of the trends detailed for the species and indicates why such changes might have occurred, with reference to any published information, if this is known.

4) ***Population trend graphs:*** The first shows the most representative or longest-running trend in abundance for the species, and is followed after the table by further graphs from other schemes, including BBS graphs for separate UK countries, as available. **Methods (Section 2)** provides details about how the graphs are calculated for each scheme. For CBC/BBS, CBC and WBS, the graphs show a smoothed line (blue) and its 85% confidence limits (green); for CES, Heronries Census and BBS, annual estimates are shown (blue) together with their 85% or 95% (BBS) confidence limits (green), and for the first two schemes a smoothed line (red).

5) ***Population trends table:*** This table provides details of summarised percentage changes in population size, over the maximum period from each source, and from the past 25 years, 10 years and 5 years, where these figures are available. Further columns indicate the years included, the average number of census plots that held the species in each year, the percentage change (an increase if presented with no sign) and the upper and lower confidence limits of that change. Where the confidence interval does not include zero change, the direction of change is regarded as statistically significant. The '**Alert**' column indicates where a statistically significant population decline is estimated to be of 50% or more (>50) or between 25 and 49% (>25) (see **Alerts, Section 2.8** for further details). The '**Comment**' column lists any caveats that must be considered when interpreting the estimates. The caveats are:

- **Small sample:** For CBC, WBS and CES data, a mean sample size of less than 20 (but more than 10) census plots was available; for regional BBS data, a mean sample of less than 40 (but more than 30) plots was available.

- **Unrepresentative?:** The CBC data may inadequately represent the population as a whole. This judgment was made either because the species' average abundance in 10-km squares containing CBC plots was less than that in other occupied 10-km squares, as measured by Breeding Atlas timed counts or frequency indices (**Gibbons *et al.* 1993**), or, where these figures could not be calculated, on expert opinion. Where joint CBC/BBS trends can be produced, the trends are always considered to be representative for the region concerned.

6) ***Productivity trends table:*** This provides details of changes in productivity since 1968 (or a more recent year, depending on the availability of data). It lists the period of years concerned, the mean annual sample, the type of trend ("curvilinear" is for a significant quadradic trend, "linear" is for a significant linear trend, "none" is where the linear trend is not significantly different from horizontal), the predicted values (from the smoothed trend) for the first and last years and their difference (where the trend is significant), and any caveats that must be considered when interpreting the data. Changes are presented either in the units given or as percentages, and are increases unless a minus sign is shown. The caveat '**Small sample**' is given when the mean number of nest record cards contributing annually was in the range 10-30, or when the mean annual number of CES plots recording the species was less than 20 (but more than 10).

7) ***Productivity graphs:*** Graphs from Constant Effort Sites Scheme or Nest Record Scheme data illustrate any significant trends in population size or productivity. For NRS data, annual means (averages) are shown in green, with error bars to denote �1 standard error; regression lines (in black) and the upper and lower 95% confidence limits of these lines (in blue) are also shown. For CES data, the annual values are plotted (in blue) with their 85% confidence intervals (in green) and a smoothed line (red) is put through these points (see **Section 2.6** for details).

Use 'Species quick links' box at top of page to move around species pages

Section 4 - Discussion

Back to Contents

4. Discussion

Return to Contents

4.1 The alert system

This report uses a system of alerts agreed after a series of extensive discussions between the providers and users of population monitoring information in the UK.�The system provides alerts to population declines of 25-49% and of >50% over short, medium and longer terms (5 years, 10 years and 25+ years respectively). These help to highlight the scale and timing of declines as an aid to interpreting the trend graphs presented.�For example, a species that triggers an alert over 25 years but not over the past 10 or 5 years, declined at some point in the past, but has not yet recovered. A species that triggers alerts over 25, 10 and 5 years, however, is still undergoing a potentially serious population decline.�For the former species, identification of actions that will aid population recovery is of greatest importance, whereas for the latter species it is urgent that means of halting declines are established before consideration is given to actions aimed at increasing the population size. Alerts triggered over the short term for individual species should be considered as early warnings, indicating that conservation issues may be developing for these species. However, it is possible that such declines may be due to chance fluctuations in abundance from which the population is able to recover without assistance. The rapid, short-term decline of a suite of similar species should be considered as a stronger indication that potential problems may be developing.

These alerts are therefore important for the conservation practitioners who need to prioritise the needs for conservation action, but we also hope that they will prove of more general use to other readers of the report.�

In this discussion:

1) We first describe the key alerts that are raised for population declines over the last 33 years from the combined CBC/BBS results for UK or England.�This is the longest time period covered by reliable monitoring data, given the need to allow populations to recover following the severe winter of 1962/63, and the lack of data from 2001 due to Foot-and-Mouth disease and access restrictions.

2) We aim to:
   a) highlight those species that are potentially new candidates for conservation listing due to rapid or moderate declines in their abundance, and
   b) to discuss those species that are candidates to change their conservation status.

   It should be stressed that these are current candidates only, and that they may not remain as such by the time the next 5-yearly review of the lists of birds of conservation concern is undertaken.

3) We then discuss the other main alerts covered in the report:
   a) WBS alerts over 25 years,
   b) CES alerts over 17 years, and
   c) BBS changes over 8 years.

4) Finally we discuss:
   a) rapidly increasing species,
   b) changes in breeding performance, and
   c) summarise the overall patterns found.

Return to previous page

Go to next page - 4.2 The 33-year alerts

4.2 The 33-year alerts

The population sizes of 23 species have shown statistically significant declines of more than 25% over the 33-year period 1967-2000, and 17 of these declines by more than 50% (see tables 4.2.1.1 and 4.2.1.2).� The majority of these species are listed Red or Amber in *The Population Status of Birds in the UK* (**Gregory *et al.* 2002**; see **PSoB** pages).

4.2.1 Recent 50% alerts

Here we highlight those species which are not on the current UK Red list, although they now have a >50% decline (see Tables 4.2.1.1 & 4.2.1.2). Please note that their current alert level may not persist until the next time that the Red and Amber Lists are revised (in c.5 years), so they can be considered as potential candidates for changed conservation status.

- **Yellow Wagtail**: The joint CBC/BBS index indicates that Yellow Wagtail numbers have decreased steadily since the early 1980s. The trend suggested by WBS data is of even greater concern, indicating an 89% decline in the size of the population between 1975 and 2000, although this sample may be less representative of the population as a whole.
- **Whitethroat**: The population crashed heavily between the 1968 and 1969 breeding seasons, and has subsequently shown an upward trend. This species is Green-listed, based on its 25-year trend.

Two other species trigger a 50% alert, but it should be noted that the CBC did not necessarily provide monitoring coverage of a representative sample of their populations.

- **Tree Pipit**: This species is currently Amber-listed but the CBC did not cover its strongholds in Scotland and Wales well. However, its decline indicates potential problems in at least a part of its range (lowland England, as measured by the joint CBC/BBS-England index). The cause of this decline is unknown and certainly warrants further investigation.
- **Lesser Redpoll**: This species is currently Amber-listed even though the population declines in England greatly exceed 50%. Its listing was downgraded because the CBC does not cover its distributional range.

Species that do not show a potential change in status are: **Grey Partridge**, **Turtle Dove**, **Skylark, Song Thrush**, **Spotted Flycatcher**, **Marsh** and **Willow Tits, Starling, Tree Sparrow, Linnet**, **Bullfinch, Yellowhammer** and **Corn Bunting**.

Two species (**Woodcock** and **Lesser Spotted Woodpecker**) do not appear in these tables because they are not monitored reliably by the BBS and it is not possible to calculate 33-year trends. Both have declined by >50% on the CBC between 1968 and 1999. The Woodcock is currently on the Amber list, despite a >50% decline, because the CBC did not cover the distributional range of this species well. Its sizeable decline in lowland England necessitates further investigation and the BTO and the Game Conservancy Trust carried out a survey of this species in 2003.

Table 4.2.1.1� Population alerts (>50%) for CBC/BBS UK 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Grey Partridge	33	103	-86	-90	-81	>50	
Corn Bunting	33	53	-86	-94	-78	>50	
Spotted Flycatcher	33	110	-82	-88	-75	>50	
Willow Tit	33	42	-75	-89	-55	>50	
Turtle Dove	33	98	-72	-83	-58	>50	

Whitethroat	33	319	-65	-75	-50	>50	
Yellow Wagtail	33	59	-64	-84	-16	>50	
Marsh Tit	33	79	-63	-74	-54	>50	
Song Thrush	33	485	-55	-62	-45	>50	
Bullfinch	33	224	-54	-64	-47	>50	
Yellowhammer	33	338	-53	-62	-40	>50	

Table 4.2.1.2� Population alerts (>50%) for CBC/BBS England 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Tree Sparrow	33	77	-97	-99	-95	>50	
Lesser Redpoll	33	41	-89	-96	-74	>50	
Grey Partridge	33	92	-87	-91	-82	>50	
Corn Bunting	33	51	-85	-93	-75	>50	
Spotted Flycatcher	33	86	-83	-88	-78	>50	
Tree Pipit	33	41	-78	-89	-59	>50	
Starling	33	356	-77	-84	-71	>50	
Willow Tit	33	40	-73	-90	-53	>50	
Turtle Dove	33	97	-72	-82	-60	>50	
Linnet	33	279	-70	-78	-61	>50	
Whitethroat	33	279	-65	-73	-51	>50	
Marsh Tit	33	74	-63	-73	-48	>50	
Yellow Wagtail	33	58	-62	-85	-24	>50	
Skylark	33	327	-59	-67	-49	>50	
Song Thrush	33	393	-57	-64	-50	>50	
Bullfinch	33	188	-55	-66	-42	>50	
Yellowhammer	33	295	-53	-63	-41	>50	

See Help for information on category definitions.

4.2.2 Recent 25% Alerts

Here we highlight those species that are not listed as having a 25-49% decline (see **section 2.8**) on the current Amber list of UK birds (Tables 4.2.2.1 and 4.2.2.2). Please note that their current alert level may not persist until the next time that the Red and Amber Lists are revised (in c.5 years), so they can be considered as potential candidates for changed conservation status.

- **Reed Bunting**: This species is on the Red conservation listing, but over the 33-year period the magnitude of the population decline falls short of the 50% mark.� The decline of Reed Buntings has been greater on WBS plots (68%).

Species that do not show a potential change in status are: **Dunnock**, **Cuckoo**, **Meadow Pipit**, **Mistle Thrush** and **Willow Warbler**. Two other species (**Lapwing** and **Curlew**) showed declines of between 25% and 50% over this 33-year period, but these were not statistically significant. Two introduced species (Little Owl and Red-legged Partridge) also showed evidence of moderate (25-49%) declines over the past 33 years, but these are not statistically significant.

�

Table 4.2.2.1 Population alerts (>25%) for CBC/BBS UK 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Cuckoo	33	256	-41	-56	-23	>25	
Reed Bunting	33	151	-39	-52	-20	>25	
Mistle Thrush	33	334	-36	-49	-18	>25	

Table 4.2.2.2� Population alerts (>25%) for CBC/BBS England 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Warbler	33	336	-49	-63	-32	>25	
Cuckoo	33	219	-48	-60	-30	>25	
Dunnock	33	425	-44	-51	-33	>25	
Meadow Pipit	33	95	-43	-73	-12	>25	
Reed Bunting	33	123	-43	-56	-25	>25	
Mistle Thrush	33	280	-38	-47	-25	>25	

See **Help** for information on category definitions.

Return to previous page

Go to next page - 4.3 Alerts over shorter periods

4.3 Alerts over 25, 10 and 5 years

The population trends discussed in **Section 4.2** were calculated using joint CBC/BBS data collected over the 33-year period between 1967 and 2000. Population trends are also calculated, and alerts raised, over shorter periods. Alerts are calculated 25 years retrospectively in order to allow direct comparison with those used in the Red and Amber conservation listing process. The additional calculation of trends during the periods 10 and 5 years prior to the current year allows rapid declines in population sizes to be identified quickly, before numbers of individuals fall to such a level that reversal of the trend becomes very difficult.

4.3.1 Joint CBC/BBS Alerts

There are relatively few major differences between the alerts raised over 25 years and those raised over 33 years which have already been discussed.

- **Kestrel**: Although the Kestrel does not trigger an alert over the 33-year period, it does show a 36% decline over the past 25 years. During the first few years of the CBC, the data indicate that the size of the population was increasing from a relatively low point, possibly reflecting a recovery from the detrimental effects of organochlorine pesticide poisoning. The subsequent population decline over 25 years is still a concern, given the species' position at the top of one of the open-farmland food chains.
- **Lesser Whitethroat**: The joint CBC/BBS trend for England indicates a 30% decline over the last 25 years. It has suffered a larger decline on CES sites (see 4.3.3), but it is currently not on the Red or Amber lists.
- **Goldcrest**: Although this might be viewed with some scepticism because its population is subject to large annual fluctuations due to the weather, the smoothed population trend for this species demonstrates a decrease, after a transient population peak in the mid 1970s. However, it should be noted that the CBC monitored relatively few pure conifer woods and that Goldcrests on the more representative BBS plots have shown big increases in recent years.
- **Marsh Tit**: Shows only a 40% decline over the past 25 years but a 63% decline over 33 years, as a result of the decline being steepest early on in the time series.
- **Treecreeper:** Although this species shows a 25% decline over the past 25 years, this appears to be the result of a transient population peak in the mid 1970s. The trend is similar to that of Goldcrest.
- **Goldfinch:** Although this shows a decline of 28% over the past 25 years, the species shows large population fluctuations with no clear overall trend.
- **Red-legged Partridge:** Shows a statistically significant population decline of 36% over the past 25 years, but no alert is generated for this introduced species.

Complete tables of those species triggering alerts at 25, 10 and 5 years are given in **Appendix 7.1**.

4.3.2 Waterways Bird Survey Alerts

The WBS provides information concerning population changes over a maximum period of 25 years. Six species trigger alerts over this time period (Table 4.3.2).

- **Yellow Wagtail**: The decline of this species by 89% over 25 years is extremely serious and probably reflects a deterioration in the suitability of any adjacent farmland for foraging, perhaps combined with a deterioration in riverine habitat quality and management. This supports evidence of a more widespread decline in this species, which has been linked to the loss of wet meadows. The BTO, in conjunction with Anglia Water, began an investigation into the ecology of this species in 2002.
- **Reed Bunting**: The 68% decline of this species along linear waterways is greater than that measured by the CBC/BBS trends in other habitats over a similar period. Although declining survival rates are mainly responsible for the decrease in abundance, it is possible that declines in breeding success might be preventing recovery (**Peach *et al.* 1999**).
- **Little Grebe**: Although the WBS does not monitor Little Grebes on still water bodies and the sample sizes monitored are relatively small, the decline on linear waterways is considerable

(-60%) and suggests that an investigation of the potential cause of the decline and of the species' ecology is required.

In addition to these rapid declines, three species show declines of 25-49%:

- **Redshank**: Although WBS data suggest that numbers of Redshank have declined along inland waterways since the mid 1970s, data collected under the BBS, which provides a more complete coverage of the species' range, also shows that there has been a decline (25%) between 1994 and 2002. The size of the wintering population appears to be stable (**Pollitt *et al.* 2003**), although many of these wintering birds are from Iceland and do not belong to the British population.
- **Pied Wagtail**: Although not generally considered to be associated closely with linear water bodies, this species is relatively common on WBS plots where the population has declined by 48% over the past 25 years. This decline has not affected the majority of the population, which occurs in drier habitats, but it may reflect a potentially important decline in the condition of riparian habitats.
- **Grey Wagtail**: This is the third wagtail species to exhibit substantial declines along linear waterways (34%). Grey Wagtail is the species most closely associated with rivers and streams, feeding alongside and over them, and is perhaps the strongest indicator that a serious decline in the quality of riparian habitat has occurred over the past 25 years.

Table 4.3.2 Alerts for WBS waterways 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	25	21	-89	-96	-82	>50	
Reed Bunting	25	53	-68	-77	-55	>50	
Little Grebe	25	17	-60	-81	-16	>50	Small sample
Redshank	25	19	-49	-82	-9	>25	Small sample
Pied Wagtail	25	66	-48	-59	-35	>25	
Grey Wagtail	25	57	-34	-49	-10	>25	

See **Help** for information on category definitions.

4.3.3 Constant Effort Sites Alerts

The majority of species that trigger alerts from the CES over the last 17 years are also the subject of alerts from CBC/BBS. However, these alerts are useful because they cover a very different set of habitats, including wet and dry scrub and reedbeds, which are not represented by CBC/BBS. Thus >50% alerts are raised for **Linnet**, **Spotted Flycatcher, Lesser Redpoll, Willow Warbler** and **Willow Tit**, and >25% alerts are raised for **Reed Bunting**, **Whitethroat, Song Thrush** and **Bullfinch**, although it should be noted that the CES does not necessarily monitor a representative sample of these populations.

Interestingly, the CES indicates a substantial decline (33%) in **Whitethroat** abundance that is not shown by CBC/BBS over a similar period (41-45% increase), perhaps confirming that this species has not properly recovered from the population crash in 1969 that was induced by drought in the West African Sahel.

CES data trigger a high (>50%) alert for one additional species compared to the CBC/BBS: **Lesser Whitethroat**. This species has declined by 52% over the past 17 years. Lesser Whitethroat are rather enigmatic birds which winter in eastern Africa, in contrast to most of the UK's other long-distance migrants that winter in western or southern Africa. Population declines may be due to the influence of factors acting on the population on their wintering grounds.

Comparison between CES and CBC over the past 10 years indicates that some species have declined much faster on CES than on CBC plots: This is especially true for **Linnet**, which declined by 88% on CES plots but decreased by 6% on CBC/BBS plots. Indeed, much of this decline on CES plots has occurred over the past 5 years, with a 61% decline over that period. **Reed Bunting** populations declined more rapidly on CES plots (-34%) than on CBC plots (-20%) or WBS plots (-12%), which is worrying as the CES reedbed and wet scrub habitats are likely to be the preferred habitat for this species. **Song Thrush** populations have declined faster on CES plots (-17%) than on CBC/BBS plots (+4%), as have **Lesser Whitethroat** populations (CES -57%; CBC/BBS -20%) and **Willow Warbler** (CES -42%; CBC/BBS -30%). Trends for **Spotted Flycatcher** and **Bullfinch** have been similar on CES and CBC/BBS plots over the past 10 years. A more rapid decrease on CBC/BBS plots has only been indicated for **Willow Tit** (CES -51%, CBC/BBS -66%).

Table 4.3.3 Alerts for CES adults 1984-2001

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Linnet	17	21	-93	.	.	[>50*]	
Lesser Redpoll	17	19	-75	.	.	[>50*]	Small sample
Spotted Flycatcher	17	16	-61	.	.	[>50]	Small sample
Willow Warbler	17	90	-54	.	.	[>50*]	
Lesser Whitethroat	17	41	-52	.	.	[>50*]	
Willow Tit	17	23	-51	.	.	[>50]	
Reed Bunting	17	59	-50	.	.	[>25*]	
Whitethroat	17	57	-32	.	.	[>25]	
Song Thrush	17	79	-31	.	.	[>25*]	
Bullfinch	17	80	-25	.	.	[>25]	

See **Help** for information on category definitions.

4.3.4 Breeding Bird Survey Population Changes

The BBS has been designed to provide a properly representative coverage of the whole of the UK. However, it has only been in operation since 1994, so population changes reported here (eg Table 4.3.4) are all calculated over an eight-year period. These measures of change have been derived from simple annual indices and have not been subject to the same analytical approaches and smoothing as the longer-running schemes. The results should therefore be interpreted with this limitation in mind.

Several of the species with population changes of greater than 25% on BBS sites in the UK (as well as in individual countries) have been in long-term decline, as indicated by CBC/BBS and WBS data:

- BBS - UK: **Redshank**
- BBS - UK, England and Wales: **Bullfinch** and **Cuckoo**
- BBS - UK and England: **Willow Tit, Turtle Dove, Spotted Flycatcher, Corn Bunting** and **Lesser Whitethroat**
- BBS - UK and Scotland: **Kestrel**

Several other species that have exhibited long-term declines on CBC/BBS plots have decreased by more than 25% in a particular country, e.g. England, but not in the UK as a whole:

- BBS - England: **Willow Warbler**, **Tree Pipit** and **Grey Partridge**
- BBS - Scotland: **Lapwing**
- BBS - Wales: **Starling** and **Yellowhammer**

Species declines that have not been identified by the more long-term schemes include:

- BBS - UK: **Shelduck, Tawny Owl, Common Sandpiper** and **Wood Warbler**
- BBS - UK, England, Scotland and Wales: **Swift**
- BBS - UK and Scotland: **Carrion Crow** and **Golden Plover**
- BBS - Wales: **Garden Warbler**

For many of these species, long-established BTO monitoring schemes may not have provided wide-enough coverage of their distributional ranges. The rapid declines reported from BBS may therefore be important indicators of new conservation problems, although some declines may simply reflect temporary natural fluctuations in population size caused by factors such as weather conditions.

Details of BBS population changes are given in **Appendix 7.4**.

Table 4.3.4 Alerts for BBS UK 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	8	55	-72	-81	-59	(>50)	
Wood Warbler	8	56	-58	-69	-42	(>50)	
Turtle Dove	8	187	-42	-52	-30	(>25)	
Spotted Flycatcher	8	194	-42	-52	-31	(>25)	
Corn Bunting	8	142	-41	-50	-29	(>25)	
Tawny Owl	8	77	-35	-52	-13	(>25)	
Shelduck	8	114	-34	-45	-20	(>25)	
Carrion Crow	8	104	-31	-47	-9	(>25)	
Kestrel	8	505	-30	-37	-22	(>25)	
Swift	8	847	-30	-36	-24	(>25)	
Lesser Whitethroat	8	204	-27	-38	-14	(>25)	
Golden Plover	8	75	-26	-42	-7	(>25)	
Bullfinch	8	437	-26	-35	-17	(>25)	
Redshank	8	68	-25	-40	-5	(>25)	
Common Sandpiper	8	61	-25	-42	-3	(>25)	
Cuckoo	8	727	-25	-32	-18	(>25)	

See **Help** for information on what the categories mean.

Return to previous page

Go to next page - 4.4 Increasing species

4.4��� Increasing species

Those species that have increased by more than 50% over the past 33 years on CBC/BBS plots and 25 years on WBS plots are shown in Tables 4.4.1 & 4.4.2 respectively. Four identifiable groups stand out: corvids **- Jackdaw**, **Carrion Crow** and **Magpie**; doves **- Woodpigeon**, **Stock Dove** and **Collared Dove**; insectivores; and waterbirds. Corvids appear to have benefited from relaxation and decrease of gamekeeping activities in the countryside in recent years and the increased use of Brassica crops (particularly oilseed rape) has probably been beneficial to the doves.

The majority of increasing resident insectivores are species that are associated with woodland but also common in gardens: **Green Woodpecker**, **Great Spotted Woodpecker**, **Nuthatch**, **Long-tailed Tit**, **Great Tit** and **Wren**. The reasons for these increases are presently unclear. **Pied Wagtail** has increased in number by 89% on CBC/BBS plots over 33 years, but declined by 48% on WBS plots over the past 25 years – although neither survey may be entirely representative of the UK population as a whole.

Two migrant insectivorous species have also exhibited large increases in abundance: **Reed Warbler** and **Blackcap**. CBC/BBS data indicate that both species have approximately doubled in number over the last 33 years. Reed Warblers have also increased by 81% on WBS plots over the last 25 years, although their numbers have fallen by 11% at CES sites over the last 17 years. Again, the reasons for these population increases are currently unclear.

Table 4.4.1 Population increases of >50% for CBC/BBS 1967-2000. The figures refer to UK indices unless otherwise stated.

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Buzzard	33	116	366	211	1296		
Mute Swan	33	55	241	34	671		
Stock Dove	33	180	191	100	325		England
Great Spotted Woodpecker	33	215	188	95	300		
Coot	33	69	180	99	857		
Green Woodpecker	33	176	174	117	308		England
Mallard	33	299	171	113	243		
Blackcap	33	366	125	88	185		
Magpie	33	441	115	73	166		
Woodpigeon	33	472	114	15	358		
Nuthatch	33	122	109	64	191		
Collared Dove	25*	346	104	65	165		Only monitored since 1971
Carrion Crow	33	516	104	67	170		
Reed Warbler	33	41	95	31	227		
Pied Wagtail	33	278	89	34	155		
Wren	33	472	88	61	115		England
Long-tailed Tit	33	257	84	27	160		
Jackdaw	33	316	71	11	167		
Great Tit	33	522	65	46	82		

See **Help** for information on category definitions.

Many species associated with freshwater habitats are also becoming more abundant.� The CBC and WBS cannot be said to provide monitoring of a representative portion of the population for most of these species but these results are interesting indicators of changes that may nevertheless be affecting the whole population.� We can be confident that **Grey Heron** populations have increased in England and Wales over the past 70 years and that **Mallard** populations have increased on both CBC/BBS and WBS plots over the last 33 and 25 years respectively. The increases recorded for **Mute Swan** on both CBC/BBS and WBS plots are likely to be the result of banning the use of lead weights by anglers. The factors responsible for the population increases displayed by **Coot** are currently unclear. Two waders have increased on WBS plots over the past 14 years: **Curlew** and **Oystercatcher**. The **Survey of Breeding Waders of Lowland Wet Meadows** provided more information on the size of the lowland breeding populations of these species in England and Wales in 2002. Although this survey also suggested that **Oystercatchers** have increased (by 51% between 1982 and 2002), particularly in south and east England, the survey found that **Curlew** numbers had declined by 40%.

Table 4.4.2 Population increases of >50% for WBS waterways 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Mallard	25	58	196	125	296		
Oystercatcher	25	23	112	68	165		
Reed Warbler	25	20	81	24	220		Small sample
Mute Swan	25	44	73	18	165		
Curlew	25	22	64	1	316		

See **Help** for information on category definitions.

Return to previous page

Go to next page - 4.5 Changes in breeding performance

4.5������ Changes in breeding performance

Changes in a range of aspects of breeding performance can be measured under the Nest Record Scheme and the Constant Effort Sites scheme.� The former provides information on components of breeding performance *per nesting attempt*. The latter provides an index of breeding performance accrued over *all* nesting attempts in a particular year, combined with the effect of changes in the survival of fledglings once they have left the nest but before they are caught as juveniles � a period when losses of young can be high.

Breeding performance may be influenced by a variety of factors, including food availability, predation pressure and weather conditions. Variation in breeding performance may help to influence, and may even be the main factor responsible for controlling the size of a population. Conversely, the breeding performance of a population may be negatively related to its size, with productivity decreasing as the number of individuals increases, and vice versa. This relationship may be due to the action of density-dependent factors, such as competition for resources: as numbers increase, competition for resources is likely to increase, possibly resulting in a reduction in productivity. Alternatively, increases in abundance may result from range expansion into new, sub-optimal habitats where breeding performance is poorer and the average productivity of the population is thus lowered, whilst declines may result from the loss of individuals from these sub-optimal habitats, leading to a subsequent increase in average productivity.

4.5.1 Changes in clutch and brood size

Those species exhibiting statistically significant trends in clutch and brood size over the past 33 years are shown in Tables 4.5.1.1 and 4.5.1.2. Although the numbers of species showing increases and decreases in clutch size were approximately equal (13 and 14 species respectively) there were many more species showing increases in brood size (27) than decreases (14) over the same period.

Table 4.5.1.1 Significant trends in clutch size

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Long-tailed Tit	33	32	Linear decline	7.65 eggs	6.57 eggs	-1.08 eggs	
Hen Harrier	33	13	Curvilinear	5.61 eggs	4.74 eggs	-0.87 eggs	Small sample
Magpie	33	51	Curvilinear	5.58 eggs	4.79 eggs	-0.79 eggs	
Mute Swan	33	19	Linear decline	5.86 eggs	5.1 eggs	-0.76 eggs	Small sample
Great Tit	33	94	Linear decline	8.24 eggs	7.62 eggs	-0.62 eggs	
Peregrine	33	16	Linear decline	3.68 eggs	3.08 eggs	-0.6 eggs	Small sample
Moorhen	33	95	Linear decline	6.48 eggs	6.1 eggs	-0.38 eggs	
Treecreeper	33	14	Linear decline	5.41 eggs	5.06 eggs	-0.35 eggs	Small sample
Rook	33	14	Curvilinear	4.15 eggs	3.88 eggs	-0.27 eggs	Small sample
Common Sandpiper	33	12	Linear decline	3.96 eggs	3.72 eggs	-0.24 eggs	Small sample
Pied Wagtail	33	60	Linear decline	5.12 eggs	4.96 eggs	-0.16 eggs	
Nightjar	27	16	Linear decline	2 eggs	1.9 eggs	-0.1 eggs	Small sample
Chaffinch	33	87	Curvilinear	4.21 eggs	4.12 eggs	-0.09 eggs	
Sedge Warbler	33	40	Curvilinear	4.94 eggs	4.89 eggs	-0.05 eggs	
Buzzard	33	31	Curvilinear	2.16 eggs	2.21 eggs	0.05 eggs	
Grey Wagtail	33	42	Curvilinear	4.68 eggs	4.8 eggs	0.12 eggs	
Lapwing	33	129	Linear increase	3.69 eggs	3.82 eggs	0.13 eggs	
Mistle Thrush	33	39	Linear increase	3.88 eggs	4.05 eggs	0.17 eggs	
Stonechat	33	23	Linear increase	5.02 eggs	5.28 eggs	0.26 eggs	Small sample
Wren	33	99	Linear increase	5.58 eggs	5.86 eggs	0.28 eggs	
Dunnock	33	102	Linear increase	3.91 eggs	4.2 eggs	0.29 eggs	
Redstart	33	52	Curvilinear	5.86 eggs	6.2 eggs	0.34 eggs	
Woodlark	33	15	Curvilinear	3.24 eggs	3.6 eggs	0.36 eggs	Small sample
Starling	33	82	Linear increase	4.44 eggs	4.83 eggs	0.39 eggs	
Skylark	33	41	Linear increase	3.34 eggs	3.74 eggs	0.4 eggs	
Tree Sparrow	33	92	Curvilinear	4.71 eggs	5.19 eggs	0.48 eggs	

Barn Owl	33	13	Curvilinear	4.28 eggs	4.77 eggs	0.49 eggs	Small sample

See **Help** for information on category meanings.

Three species (**Pied Wagtail**, **Great Tit** and **Long-tailed Tit**) exhibited decreases in both clutch size and brood size over the period, whilst another eight species (**Dunnock**, **Stonechat**, **Skylark**, **Grey Wagtail**, **Redstart**, **Tree Sparrow**, **Starling** and **Wren**) exhibited increases in both clutch size and brood size. For two species, declines in clutch size were partially (**Magpie**) or fully (**Moorhen**) compensated for by increases in average brood size, suggesting that conditions for young had improved for these species whilst conditions for parent birds during egg formation may have deteriorated.

Table 4.5.1.2 Significant trends in brood size

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Great Tit	33	160	Linear decline	7.41 chicks	6.63 chicks	-0.78 chicks	
Blue Tit	33	135	Linear decline	8.29 chicks	7.55 chicks	-0.74 chicks	
Great Spotted Woodpecker	33	15	Curvilinear	3.13 chicks	2.45 chicks	-0.68 chicks	Small sample
Long-tailed Tit	33	27	Curvilinear	6.79 chicks	6.32 chicks	-0.47 chicks	Small sample
Yellow Wagtail	33	13	Linear decline	4.84 chicks	4.38 chicks	-0.46 chicks	Small sample
House Sparrow	33	95	Curvilinear	3.36 chicks	3.02 chicks	-0.34 chicks	
Chiffchaff	33	29	Linear decline	5.12 chicks	4.79 chicks	-0.33 chicks	Small sample
Grey Heron	33	44	Curvilinear	2.52 chicks	2.23 chicks	-0.29 chicks	
Raven	33	57	Linear decline	3.2 chicks	2.93 chicks	-0.27 chicks	
Pied Wagtail	33	113	Curvilinear	4.43 chicks	4.24 chicks	-0.19 chicks	
Greenfinch	33	114	Linear decline	4.08 chicks	3.9 chicks	-0.18 chicks	
Wheatear	33	66	Curvilinear	4.73 chicks	4.64 chicks	-0.09 chicks	
Whitethroat	33	60	Curvilinear	4.25 chicks	4.16 chicks	-0.09 chicks	
Turtle Dove	33	18	Curvilinear	1.82 chicks	1.8 chicks	-0.02 chicks	Small sample
Nightjar	27	24	Curvilinear	1.79 chicks	1.79 chicks	0 chicks	Small sample
Jackdaw	33	78	Curvilinear	2.62 chicks	2.66 chicks	0.04 chicks	
Collared Dove	33	67	Linear increase	1.76 chicks	1.84 chicks	0.08 chicks	
Spotted Flycatcher	33	134	Curvilinear	3.61 chicks	3.7 chicks	0.09 chicks	
Yellowhammer	33	69	Curvilinear	2.96 chicks	3.09 chicks	0.13 chicks	
Linnet	33	124	Curvilinear	4.07 chicks	4.21 chicks	0.14 chicks	
Reed Bunting	33	64	Linear increase	4.04 chicks	4.22 chicks	0.18 chicks	
Dunnock	33	107	Linear increase	3.45 chicks	3.66 chicks	0.21 chicks	
Stonechat	33	53	Linear increase	4.68 chicks	4.89 chicks	0.21 chicks	
Grey Wagtail	33	87	Curvilinear	3.96 chicks	4.2 chicks	0.24 chicks	
Willow Warbler	33	139	Curvilinear	5.24 chicks	5.49 chicks	0.25 chicks	
Merlin	33	58	Linear increase	3.49 chicks	3.78 chicks	0.29 chicks	
Magpie	33	87	Curvilinear	3.11 chicks	3.4 chicks	0.29 chicks	
Little Owl	33	36	Linear increase	2.51 chicks	2.82 chicks	0.31 chicks	
Kestrel	33	113	Linear increase	3.84 chicks	4.16 chicks	0.32 chicks	
Skylark	33	71	Linear increase	3.14 chicks	3.48 chicks	0.34 chicks	
Tree Pipit	33	28	Linear increase	4.36 chicks	4.73 chicks	0.37 chicks	Small sample
Corn Bunting	33	12	Curvilinear	3.09 chicks	3.5 chicks	0.41 chicks	Small sample
Dipper	33	148	Linear increase	3.51 chicks	3.96 chicks	0.45 chicks	
Redstart	33	91	Curvilinear	5.08 chicks	5.53 chicks	0.45 chicks	
Rook	33	94	Linear increase	2.32 chicks	2.8 chicks	0.48 chicks	
Sparrowhawk	33	82	Curvilinear	3.12 chicks	3.66 chicks	0.54 chicks	
Starling	33	215	Linear increase	3.21 chicks	3.83 chicks	0.62 chicks	
Tree Sparrow	33	104	Linear increase	3.84 chicks	4.52 chicks	0.68 chicks	
Wren	33	128	Linear increase	3.63 chicks	4.58 chicks	0.95 chicks	
Moorhen	33	78	Curvilinear	3.36 chicks	4.49 chicks	1.13 chicks	
Nuthatch	33	57	Curvilinear	3.98 chicks	5.21 chicks	1.23 chicks	

See **Help** for information on category meanings.

Variation in clutch or brood size may influence population sizes of the following species:

- Decreased brood and population size: **Yellow Wagtail** � the decline in average brood size of nearly half a chick per nesting attempt may be potentially important in determining the population trend.�The BTO project on Yellow Wagtails, initiated in 2002, aims to investigate the influence of decreased brood sizes on the abundance of this species. Recent declines in the clutch and brood sizes of **Grey Wagtail** may be important for this species, considering its decline on WBS plots and declines in brood size of **Moorhen** and **Yellowhammer** are also of concern.

- Increased clutch and population size: **Wren -** the increase in brood size is also likely to be important.
- Increased brood and population size: two corvid species are prominent here **-** **Rook** and **Magpie** have both exhibited increased average brood sizes, as has **Sparrowhawk**. For the hawk, the return of the species into eastern areas of the UK, where populations of songbird prey are greater, may be a factor in this increase. The UK **Nuthatch** population, which has been expanding northwards and has increased considerably in size, has exhibited an increase in average brood size of more than one extra young per nesting attempt. It would seem likely that this has helped to drive the population increase of this species.

Changes in average clutch or brood sizes that are dependent on population densities have been suggested for between 10 and 20 species, i.e. sizes have increased as populations decreased or *vice versa*.�For a few species, long-term population data are not available and changes in clutch or brood size may be density-dependent responses that are suggestive of population declines.�This situation applies particularly to **Stonechat**, a species for which atlas data support the suggestion of population declines.

4.5.2 Changes in nest failure rates

Statistically significant trends in the daily nest failure rates at the egg and chick stages over the past 33 years are shown in Tables 4.5.2.1 and 4.5.2.2. The number of species exhibiting declines in failure rates at the chick stage (21) was more than double the number exhibiting increases (8), as was the number of species exhibiting declines in failure rates at the egg stage (35 vs. 14).� Thus the general picture is one of improving nesting success.

Table 4.5.2.1 Significant trends in egg-stage daily failure rate of nests

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Jay	33	10	Linear decline	0.0548 nests/day	0.0209 nests/day	-0.0339 nests/day	Small sample
Tree Pipit	33	12	Linear decline	0.0417 nests/day	0.0118 nests/day	-0.0299 nests/day	Small sample
Woodlark	33	18	Linear decline	0.0409 nests/day	0.0137 nests/day	-0.0272 nests/day	Small sample
Magpie	33	58	Linear decline	0.0288 nests/day	0.0035 nests/day	-0.0253 nests/day	
Long-tailed Tit	33	51	Curvilinear	0.0322 nests/day	0.007 nests/day	-0.0252 nests/day	
Dipper	33	108	Curvilinear	0.0259 nests/day	0.0032 nests/day	-0.0227 nests/day	
Redshank	33	32	Linear decline	0.0407 nests/day	0.0191 nests/day	-0.0216 nests/day	
Yellowhammer	33	66	Curvilinear	0.0514 nests/day	0.0332 nests/day	-0.0182 nests/day	
Snipe	33	18	Linear decline	0.033 nests/day	0.0163 nests/day	-0.0167 nests/day	Small sample
Wheatear	33	21	Linear decline	0.0226 nests/day	0.0066 nests/day	-0.016 nests/day	Small sample
Treecreeper	33	25	Linear decline	0.0204 nests/day	0.0065 nests/day	-0.0139 nests/day	Small sample
Robin	33	181	Curvilinear	0.0247 nests/day	0.011 nests/day	-0.0137 nests/day	
Carrion Crow	33	56	Linear decline	0.0163 nests/day	0.0028 nests/day	-0.0135 nests/day	
Song Thrush	20	347	Linear decline	0.0424 nests/day	0.0298 nests/day	-0.0126 nests/day	
Wood Warbler	33	22	Linear decline	0.0199 nests/day	0.0088 nests/day	-0.0111 nests/day	Small sample
House Sparrow	33	76	Curvilinear	0.0107 nests/day	0.0021 nests/day	-0.0086 nests/day	
Starling	33	127	Linear decline	0.0118 nests/day	0.0033 nests/day	-0.0085 nests/day	
Redstart	33	78	Linear decline	0.0118 nests/day	0.0038 nests/day	-0.008 nests/day	
Tawny Owl	33	53	Linear decline	0.0099 nests/day	0.0021 nests/day	-0.0078 nests/day	
Marsh Tit	33	19	Linear decline	0.0085 nests/day	0.0013 nests/day	-0.0072 nests/day	Small sample
Pied Wagtail	33	83	Curvilinear	0.0148 nests/day	0.008 nests/day	-0.0068 nests/day	
Stock Dove	33	64	Curvilinear	0.0106 nests/day	0.0043 nests/day	-0.0063 nests/day	
Sedge Warbler	33	47	Linear decline	0.0132 nests/day	0.0071 nests/day	-0.0061 nests/day	
Barn Owl	33	12	Linear decline	0.0072 nests/day	0.0015 nests/day	-0.0057 nests/day	Small sample
Kestrel	33	40	Linear decline	0.0061 nests/day	0.001 nests/day	-0.0051 nests/day	
Jackdaw	33	49	Linear decline	0.0075 nests/day	0.0026 nests/day	-0.0049 nests/day	
Buzzard	33	24	Linear decline	0.0065 nests/day	0.0018 nests/day	-0.0047 nests/day	Small sample
Curlew	33	27	Curvilinear	0.0295 nests/day	0.0248 nests/day	-0.0047 nests/day	Small sample
Tree Sparrow	33	121	Curvilinear	0.0071 nests/day	0.0029 nests/day	-0.0042 nests/day	
Reed Warbler	33	126	Curvilinear	0.0151 nests/day	0.0112 nests/day	-0.0039 nests/day	
Sparrowhawk	33	39	Linear decline	0.0046 nests/day	0.0012 nests/day	-0.0034 nests/day	
Great Tit	33	154	Linear decline	0.0066 nests/day	0.0032 nests/day	-0.0034 nests/day	
Blue Tit	33	136	Linear decline	0.0052 nests/day	0.0023 nests/day	-0.0029 nests/day	
Merlin	33	29	Curvilinear	0.0028 nests/day	0.0012 nests/day	-0.0016 nests/day	Small sample
Swallow	33	224	Curvilinear	0.0029 nests/day	0.0022 nests/day	-0.0007 nests/day	
Raven	33	20	Curvilinear	0.0022 nests/day	0.0028 nests/day	0.0006 nests/day	Small sample
Bullfinch	33	53	Curvilinear	0.034 nests/day	0.0348 nests/day	0.0008 nests/day	

Dunnock	33	143	Curvilinear	0.0268 nests/day	0.0279 nests/day	0.0011 nests/day	
Linnet	33	156	Curvilinear	0.0161 nests/day	0.0201 nests/day	0.004 nests/day	
Skylark	33	50	Curvilinear	0.0375 nests/day	0.0415 nests/day	0.004 nests/day	
Moorhen	33	111	Curvilinear	0.0143 nests/day	0.021 nests/day	0.0067 nests/day	
Oystercatcher	33	111	Linear increase	0.0133 nests/day	0.0205 nests/day	0.0072 nests/day	
Lapwing	33	140	Curvilinear	0.0174 nests/day	0.0258 nests/day	0.0084 nests/day	
Willow Warbler	33	72	Curvilinear	0.0114 nests/day	0.0219 nests/day	0.0105 nests/day	
Ringed Plover	33	127	Curvilinear	0.0278 nests/day	0.0413 nests/day	0.0135 nests/day	
Whinchat	33	16	Linear increase	0.006 nests/day	0.0209 nests/day	0.0149 nests/day	Small sample
Nightjar	27	20	Linear increase	0.0136 nests/day	0.0285 nests/day	0.0149 nests/day	Small sample
Reed Bunting	33	55	Linear increase	0.0068 nests/day	0.0286 nests/day	0.0218 nests/day	
Mute Swan	33	26	Curvilinear	0.0078 nests/day	0.0431 nests/day	0.0353 nests/day	Small sample

See **Help** for information on category meanings.

The changes in egg-stage and chick-stage failure rates were both positive for **Linnet, Nightjar, Willow Warbler** and **Mute Swan**. For a further 12 species (**Barn Owl**, **Starling**, **Carrion Crow**, **Robin**, **Redstart**, **Merlin**, **Reed Warbler**, **Yellowhammer**, **Jackdaw**, **Magpie**, **Tree Sparrow, House Sparrow**), egg-stage and chick-stage failure rates both decreased. For a further five species (**Swallow, Whinchat, Bullfinch, Dipper** and **Long-tailed Tit**), declines in the failure rate at one stage were partially cancelled out by increases in failure rates at the other, suggesting that different factors may influence productivity at egg and chick stages.

Table 4.5.2.2 Significant trends in chick-stage daily failure rate of nests

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Grey Heron	33	29	Linear decline	0.0599 nests/day	0.0007 nests/day	-0.0592 nests/day	Small sample
Corn Bunting	33	11	Linear decline	0.0361 nests/day	0.0101 nests/day	-0.026 nests/day	Small sample
Ring Ouzel	33	16	Linear decline	0.0229 nests/day	0.0057 nests/day	-0.0172 nests/day	Small sample
Meadow Pipit	33	68	Linear decline	0.0279 nests/day	0.0114 nests/day	-0.0165 nests/day	
Magpie	33	56	Linear decline	0.0172 nests/day	0.0019 nests/day	-0.0153 nests/day	
Yellowhammer	33	53	Curvilinear	0.0462 nests/day	0.0344 nests/day	-0.0118 nests/day	
House Sparrow	33	75	Linear decline	0.014 nests/day	0.0032 nests/day	-0.0108 nests/day	
Jackdaw	33	47	Linear decline	0.0126 nests/day	0.0029 nests/day	-0.0097 nests/day	
Reed Warbler	33	90	Linear decline	0.0188 nests/day	0.0095 nests/day	-0.0093 nests/day	
Grey Wagtail	33	62	Curvilinear	0.0152 nests/day	0.007 nests/day	-0.0082 nests/day	
Blackbird	33	114	Linear decline	0.0292 nests/day	0.0216 nests/day	-0.0076 nests/day	
Collared Dove	33	51	Linear decline	0.0184 nests/day	0.0112 nests/day	-0.0072 nests/day	
Merlin	33	30	Linear decline	0.0097 nests/day	0.0028 nests/day	-0.0069 nests/day	
Robin	33	151	Curvilinear	0.0242 nests/day	0.0174 nests/day	-0.0068 nests/day	
Redstart	33	55	Linear decline	0.0112 nests/day	0.0054 nests/day	-0.0058 nests/day	
Bullfinch	33	36	Curvilinear	0.0332 nests/day	0.0279 nests/day	-0.0053 nests/day	
Tree Sparrow	33	87	Linear decline	0.014 nests/day	0.0089 nests/day	-0.0051 nests/day	
Whinchat	33	29	Curvilinear	0.027 nests/day	0.0221 nests/day	-0.0049 nests/day	Small sample
Carrion Crow	33	46	Linear decline	0.0068 nests/day	0.0022 nests/day	-0.0046 nests/day	
Starling	33	150	Linear decline	0.006 nests/day	0.0025 nests/day	-0.0035 nests/day	
Barn Owl	33	40	Linear decline	0.0025 nests/day	0.0003 nests/day	-0.0022 nests/day	
Dipper	33	84	Curvilinear	0.0054 nests/day	0.006 nests/day	0.0006 nests/day	
Swallow	33	198	Linear increase	0.0028 nests/day	0.0049 nests/day	0.0021 nests/day	
Mute Swan	33	20	Linear increase	0.0005 nests/day	0.003 nests/day	0.0025 nests/day	Small sample
Willow Warbler	33	128	Linear increase	0.015 nests/day	0.0207 nests/day	0.0057 nests/day	
Linnet	33	110	Linear increase	0.0148 nests/day	0.0223 nests/day	0.0075 nests/day	
Long-tailed Tit	33	36	Linear increase	0.0077 nests/day	0.0164 nests/day	0.0087 nests/day	
Nightjar	27	20	Linear increase	0.0022 nests/day	0.0155 nests/day	0.0133 nests/day	Small sample
Garden Warbler	33	20	Linear increase	0.0097 nests/day	0.025 nests/day	0.0153 nests/day	Small sample

See **Help** for information on categoriy meanings.

Density-dependent changes in egg- or chick-stage failure rates are suggested for more than 10 species (i.e. failure rates have increased as populations have increased, or both decreased).

Variation in nest failure rates may be an important factor governing the population size of the following species:

- Increased egg-stage failure rates and decreased population size.�Reductions in breeding performance at the egg stage have been implicated in the population declines of both **Lapwing** and **Linnet** (**Peach *et al.* 1994**; **Siriwardena *et al.* 2000b**). It has also been suggested that poor breeding performance may be preventing the recovery of **Reed Bunting** populations (Peach *et al.* 1999). It is also of concern that failure rates have increased for declining **Dunnock** and **Willow Warbler** (as well as chick-stage failure rates). Increased failure rates of **Ringed Plover** and **Moorhen** nests are also of concern.

- Decreased egg-stage failure rates and increased population size. Corvids, such as **Magpie, Jay, Carrion Crow** and **Jackdaw**, appear to have benefited from improvements in nesting success at the egg stage, as have raptors such as **Sparrowhawk** and **Buzzard**.�Decreased persecution and reduction in the use of pesticides are likely to have been important factors in the recovery of these species. **Woodlark** populations have increased in recent years and it may be that sympathetic habitat management has helped to improve nesting success for this species.�**Long-tailed Tit** populations have been expanding considerably in recent years and, improvements in breeding performance may have helped this.�This species is a relatively early nester that has taken advantage of recent climatic warming (Crick *et al.* 1997, Crick & Sparks 1999). Six other insectivores, **Great Tit**, **Blue Tit**, **Robin**, **Redstart**, **Reed Warbler** and **Pied Wagtail**, have exhibited population increases as breeding success has improved. The improvements in the nesting success of **Stock Dove** could have a major impact on the size of the population, given the high number of breeding attempts made by this species each year.
- Decreased chick-stage failure rates and increased population size. Several corvids (**Jackdaw**, **Carrion Crow**, **Magpie**) and insectivores (**Redstart**, **Robin**) have also exhibited decreases in chick-stage failure rates as the size of their populations have increased. **Grey Heron** populations have increased over the last 70 years, and improvements in chick-stage nest survival may have played a part in this increase, perhaps aided by the declining impact of organochlorine pesticides and improvements in water quality of riverine and standing water bodies. **Reed Warbler** has expanded its range in the UK over the years, and the small improvement in nest success at the chick stage may have contributed to this expansion. Decreased chick-stage failure rates of **Collared Doves** may have aided the rapid growth of the UK population over the last 33 years, particularly as this species makes a relatively large number of breeding attempts per year.

Two species exhibit both increased chick-stage failure rates and population declines: **Linnet** and **Willow Warbler**. However, the results of BTO studies suggest that increased failure rates at the chick stage are not responsible for the decreasing abundance of these species.

For a few species, long-term population data are not available. In this situation, changes in nest failure rates could be used as indicators of potential population declines, because they might signify the action of density-dependent processes on productivity, and by doing so provide information concerning species numbers (**Wheatear**, **Tawny Owl**, **Ring Ouzel**).

4.5.3 Changes in productivity from CES

The CES results start in 1984, so the changes in productivity shown in table 4.5.3 cover roughly half the time period of the Nest Record Scheme results.� Statistical significance is not available for these trends at present, although a good indication can be obtained by inspecting the confidence intervals for the annual indices that are presented on the individual species graphs.� Overall, 11 species exhibit declines of >25% in productivity while only one species shows an improvement of >25%.�

Seven of the declines in productivity are greater than 25% and a further four are greater than 50%.� Two of these species, **Lesser Redpoll** and **Willow Warbler**, have declined substantially in number.� Decreased nesting success is unlikely to have been a major factor driving the population decline of Willow Warblers, but the changes in productivity may represent declines in post-fledging survival, which could be a factor of some importance.� Little is known about Lesser Redpoll populations, as it is not well covered by BTO population monitoring schemes. However, the large decline (-75%) in CES productivity should be of major concern.� Decreased productivity may be a factor preventing the recovery of **Song Thrush, Linnet**, **Reed Bunting** and **Whitethroat** populations, which all declined before the CES was initiated. In addition, the large decline in **Nightingale** productivity is of concern given the complex changes in its distribution shown by the 1999 survey, which identified decreases in abundance over large parts of the species' range.�The importance of the substantial declines in productivity of **Greenfinch**, **Blue Tit**, **Sedge Warbler** and **Garden Warbler** is currently unclear, but these decreases warrant close attention.

Only **Spotted Flycatcher** exhibits a productivity increase of greater than 25%, which agrees with the trend towards larger brood sizes identified for this species using Nest Records Scheme data. These trends may be the result of a density-dependent response to the decline of the population.

Table 4.5.3 Changes in productivity indices (percentage juveniles) for CES 1984-2001 (17 years)

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Nightingale	17	12	Smoothed trend	606 productivity index	101 productivity index	-84%[>50]	Small sample
Lesser Redpoll	17	21	Smoothed trend	398 productivity index	101 productivity index	-75%[>50]	
Linnet	17	24	Smoothed trend	373 productivity index	101 productivity index	-73%[>50]	
Greenfinch	17	45	Smoothed trend	321 productivity index	101 productivity index	-69%[>50*]	
Garden Warbler	17	77	Smoothed trend	180 productivity index	101 productivity index	-44%[>25]	
Sedge Warbler	17	68	Smoothed trend	171 productivity index	101 productivity index	-41%[>25]	
Song Thrush	17	86	Smoothed trend	147 productivity index	101 productivity index	-32%[>25]	
Reed Bunting	17	62	Smoothed trend	147 productivity index	101 productivity index	-32%[>25]	
Willow Warbler	17	96	Smoothed trend	147 productivity index	101 productivity index	-32%[>25*]	
Blue Tit	17	98	Smoothed trend	140 productivity index	101 productivity index	-29%[>25*]	
Whitethroat	17	73	Smoothed trend	137 productivity index	101 productivity index	-27%[>25]	
Robin	17	96	Smoothed trend	128 productivity index	101 productivity index	-22%	
Blackbird	17	97	Smoothed trend	127 productivity index	101 productivity index	-21%	
Goldfinch	17	36	Smoothed trend	115 productivity index	101 productivity index	-13%	
Great Tit	17	95	Smoothed trend	115 productivity index	101 productivity index	-13%	
Chaffinch	17	81	Smoothed trend	112 productivity index	101 productivity index	-11%	
Willow Tit	17	36	Smoothed trend	109 productivity index	101 productivity index	-8%	
Treecreeper	17	64	Smoothed trend	107 productivity index	101 productivity index	-7%	
Blackcap	17	92	Smoothed trend	107 productivity index	101 productivity index	-6%	
Long-tailed Tit	17	80	Smoothed trend	102 productivity index	101 productivity index	-2%	
Dunnock	17	97	Smoothed trend	101 productivity index	101 productivity index	-1%	
Wren	17	97	Smoothed trend	99 productivity index	101 productivity index	1%	
Chiffchaff	17	83	Smoothed trend	98 productivity index	101 productivity index	2%	
Bullfinch	17	84	Smoothed trend	93 productivity index	101 productivity index	8%	
Reed Warbler	17	59	Smoothed trend	86 productivity index	101 productivity index	17%	
Lesser Whitethroat	17	55	Smoothed trend	85 productivity index	101 productivity index	17%	
Spotted Flycatcher	17	23	Smoothed trend	75 productivity index	101 productivity index	33%	

See **Help** for information on category meanings.

4.5.4 Changes in average laying dates

Over the past 25 years many species have exhibited a trend towards progressively earlier clutch initiation (**Crick *et al.*1997**) with laying dates showing curvilinear responses over the past 50 years as spring temperatures have cooled and then warmed (**Crick & Sparks 1999**).� Table 4.5.4 confirms that over the past 33 years the majority of species exhibiting significant trends show an advancement of laying dates rather than a delay.� Thus 27 species are laying between 26 days and 1 day earlier, on average, than they were 33 years ago.� There are no taxonomic or ecological associations between the species showing such changes, and they seem to occur across a wide range of species (**Crick *et al.* 1997**). Only three species show significant changes towards later laying, all of which suffer from small sample sizes and appear to be driven by a small number of outlying late years toward the end of the time series.� It is likely that the laying dates of the majority of those species that do not show a significant trend in timing of laying are related to some aspect of weather, but that those aspects do not show any trend over time (**Crick & Sparks 1999**).

The significance of the changes in phenology for breeding performance and productivity is currently unknown and needs to be investigated. Earlier average laying may be beneficial for birds because earlier fledging is often related to improved survival to the following year.� However, several studies are beginning to show that birds are unable to advance their phenology sufficiently to match phenological changes in their food supply, such that later nesting birds are suffering from poorer productivity.� Early nesting parents have an increased chance of having their offspring recruited into the next generation (**Visser *et al.* 1998**).� The conservation significance of factors such as these needs to be assessed urgently.

Table 4.5.4 Significant trends in laying date (Day 1 = 1 Jan) for 1968-2001

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Magpie	33	39	Curvilinear	day 110	day 84	-26 days	
Grey Heron	33	31	Linear decline	day 98	day 73	-25 days	

Corn Bunting	33	15	Linear decline	day 180	day 165	-15 days	Small sample
Long-tailed Tit	33	42	Curvilinear	day 109	day 95	-14 days	
Chiffchaff	33	39	Linear decline	day 137	day 125	-12 days	
Greenfinch	33	95	Linear decline	day 145	day 133	-12 days	
Tree Pipit	33	18	Linear decline	day 146	day 135	-11 days	Small sample
Blackcap	33	37	Curvilinear	day 139	day 129	-10 days	
Nuthatch	33	26	Linear decline	day 122	day 112	-10 days	Small sample
Swallow	33	90	Curvilinear	day 170	day 161	-9 days	
Ringed Plover	33	41	Linear decline	day 146	day 138	-8 days	
Dipper	33	64	Linear decline	day 108	day 100	-8 days	
Robin	33	119	Curvilinear	day 117	day 109	-8 days	
Redstart	33	66	Curvilinear	day 140	day 132	-8 days	
Ring Ouzel	33	27	Linear decline	day 135	day 127	-8 days	Small sample
Marsh Tit	33	14	Linear decline	day 118	day 110	-8 days	Small sample
House Sparrow	33	45	Linear decline	day 145	day 137	-8 days	
Oystercatcher	33	46	Linear decline	day 137	day 130	-7 days	
Meadow Pipit	33	43	Linear decline	day 138	day 131	-7 days	
Treecreeper	33	15	Linear decline	day 127	day 120	-7 days	Small sample
Carrion Crow	33	36	Curvilinear	day 106	day 99	-7 days	
Chaffinch	33	111	Linear decline	day 131	day 125	-6 days	
Willow Warbler	33	89	Linear decline	day 140	day 135	-5 days	
Blue Tit	33	118	Linear decline	day 123	day 118	-5 days	
Whinchat	33	31	Curvilinear	day 148	day 144	-4 days	
Jackdaw	33	20	Curvilinear	day 113	day 110	-3 days	Small sample
Whitethroat	33	17	Curvilinear	day 146	day 145	-1 days	Small sample
Lesser Redpoll	33	12	Curvilinear	day 147	day 148	1 days	Small sample
Skylark	33	22	Curvilinear	day 146	day 150	4 days	Small sample
Yellowhammer	33	27	Linear increase	day 150	day 157	7 days	Small sample

See **Help** for information on category meanings.

Return to previous page

Go to next page - 4.6 Discussion of trends

BBWC Home > Contents > Discussion > Discussion of trends

4.6����Discussion of trends

4.6.1 Candidates for conservation listing

The new analyses presented in this report suggest that several species should be considered as potential candidates for addition to the Red and Amber lists of species of conservation concern that have been developed by the conservation agencies and conservation non-governmental organisations (Gregory *et al.* 2002). The joint CBC/BBS trend for Lesser Whitethroat in England now shows a decline over 25 years by 30%, which would place it on the Amber list. This confirms the serious declines reported for the species over 17 years on CES sites (-52%). There are two other species that also raise alerts of declines of >25% over 25 years on CBC/BBS plots in England: Goldfinch and Treecreeper. However, it is likely that these are the accidental result of how the time period falls with respect to population trajectories that fluctuate considerably, with no real overall trend. Both species happened to reach peak population levels at around 1975.

The WBS achieves a 25-year time span in this report, and two species are potential candidates for conservation listing as a result. Little Grebe has declined by 60%, although WBS is not necessarily representative of the bulk of the population, which occurs on still water bodies. Also, Pied Wagtail has declined by 48% on WBS plots, suggesting problems in its riparian habitat although the CBC/BBS trend suggests no long-term trend.

4.6.2 Candidates for changed conservation listing

One species - Yellow Wagtail - previously listed as exhibiting moderate declines (>25%) now appears to be declining rapidly, having decreased in number by more than 50% over the last 25 years on CBC/BBS (-57%) plots and on WBS plots (-89%). This makes it a candidate species for the Red list.

4.6.3 The role of breeding performance

In general, breeding performance appears to show a density-dependent response to population changes.� As populations decline, breeding performance tends to improve, but as populations increase, breeding performance tends to decline.

However, there are a number of species for which declines in breeding performance are likely to be driving the population declines (**Linnet** and **Lapwing**) or helping to inhibit recovery (possibly **Reed Bunting**).� The importance of decreases in breeding performance for declining **Willow Warbler, Lesser Redpoll, Ringed Plover, Dunnock, Bullfinch, Yellowhammer, Grey Wagtail** and **Yellow Wagtail** populations and for farmland **Moorhen** populations is, as yet, undetermined.

Increasing breeding performance may be helping to drive population expansion of a number of species:� the predatory **Grey Heron**, **Sparrowhawk** and **Buzzard**; the corvids **Jackdaw**, **Magpie**, **Jay, Carrion Crow** and **Rook**; the seed-eaters **Collared Dove**, **Stock Dove** and **Woodlark**; and the insectivores **Pied Wagtail**, **Robin**, **Redstart**, **Wren, Reed Warbler, Nuthatch**, **Great Tit**, **Blue Tit** and **Long-tailed Tit**.

For a few species for which long-term population data are not available, changes in breeding performance from the Nest Record Scheme may provide a potential warning of population declines, because they are the result of density-dependent changes (**Stonechat**, **Wheatear**, **Tawny Owl** and **Ring Ouzel**).� The importance of the substantial declines in productivity of **Greenfinch**, **Blue Tit**, **Sedge Warbler** and **Garden Warbler** is unclear at the moment, but warrants close attention.

Return to previous page

Go to next page - 4.7 Conclusion

4.7������Conclusion

We hope that this report will be useful both as a ready source of information for conservation practitioners and as a source of information for those involved in more strategic conservation policy making. The information presented here is very much the tip of the data iceberg held by the BTO, providing a concise overview of the way in which populations are changing and suggesting areas where further research and conservation action needs to be taken.

Alerts are raised by declines in population sizes or breeding performance for a considerable number of species. These declines will help conservation organisations to prioritise future conservation action, alongside the recently published *Birds of Conservation Concern* (**Gregory *et al.* 2002**) and other information.

The information concerning demographic factors contained in this report will also help conservation organisations to target their resources more effectively. For declining species of conservation importance, declines in breeding performance may indicate that conservation action should be targeted at the breeding season; the lack of a decline in breeding performance may suggest that factors other than nesting success, such as loss of habitat or changes in survival rates are more likely to be influencing observed population declines.

Finally, we hope that users of this report will provide feedback on how the report can be improved in the future. We welcome comments on more general aspects of this report if they will help us to produce a better and more useful product in the next edition.

Email your comments

Section 5 - Acknowledgements

Return to Discussion index

BBWC Home > **Contents** > Acknowledgements

5. Acknowledgements

Volunteer fieldwork

Our biggest thankyou is to the volunteers who collected the data on which this website is based. The population trends and other results that we present rely on the sustained, long-term fieldwork of many thousands of BTO volunteers. Our knowledge of the conservation status of the UK's bird populations is only possible as a result of their dedication and enthusiasm. The conservation community owes them an enormous debt of gratitude for their work.

Report production and analysis

This website presents the latest in a series of reports, prepared within the partnership between the British Trust for Ornithology (BTO) and the Joint Nature Conservation Committee (JNCC) (on behalf of English Nature, Scottish Natural Heritage, the Countryside Council for Wales and the Environment & Heritage Service of Northern Ireland), as part of its programme of research into nature conservation.

Mr and Mrs J A Pye's Charitable Settlement provided additional support towards the development of the website.

This report includes results from the Breeding Bird Survey, which is funded jointly by BTO, JNCC and RSPB. The BBS partners are very grateful to the Environment and Heritage Service in Northern Ireland and to the Royal Society for the Protection of Birds in Scotland for supporting professional surveys in areas that would otherwise be difficult to cover.

Iain Downie and Susan Waghorn put in a huge amount of skill and effort in designing and building the website, and in creating the programs that produce the figures and tables.

Helen Baker and Ian McLean of JNCC provided helpful discussions, comments and support during the production of the report. David Stroud, Rowena Langston, David Gibbons, Jacquie Clark, Nigel Clark, Jeremy Greenwood and Malcolm Vincent provided helpful comments on earlier editions of this publication.

The analyses would not have been possible without the hard work of many BTO staff who organise schemes and collate data sets: Sue Adams, Jeremy Blackburn, Jacquie Clark, Mark Collier, Mark Grantham, Bridget Griffin, Angela Rickard, Brenda Read, Anne Trewhitt and Jane Waters. The work is also heavily dependent on the BTO's computer and database systems operated by Peter Lack and Karen Wright.

We are very grateful to all of the above organisations and individuals for their contributions to this report.

Section 6 - References

Back to Contents

REFERENCES

Aebischer, N.J. (1999) Multi-way comparisons and generalised linear models of nest success: extensions of the Mayfield method. *Bird Study* 46: S22-S31.

Anganuzzi, A.A. (1993) A comparison of tests for detecting trends in abundance indices of dophins. *Fishery Bull. US* 91: 183-194.

Anonymous (1995) *Biodiversity: the UK Steering Group report. Vol. 1: Meeting the Rio Challenge*. *Vol. 2: Action Plans.* HMSO, London.

Anonymous (1998) *UK Biodiversity Group Tranche 2 Action Plans. Vol. 1: Vertebrates & Vascular Plants*. English Nature, Peterborough.

Baillie, S.R. (1990) Integrated population monitoring of breeding birds in Britain and Ireland. *Ibis* 132: 151-166.

Baillie, S.R., Crick, H.Q.P., Balmer, D.E., Beaven, L.P., Downie, I.S., Freeman, S.N., Leech, D.I., Marchant, J.H., Noble, D.G., Raven, M.J., Simpkin, A.P., Thewlis, R.M. & Wernham, C.V. (2002) *Breeding Birds in the Wider Countryside: their conservation status 2001*. BTO Research Report 278. BTO, Thetford. (http://www.bto.org/birdtrends)

Baillie, S.R. (1991) Monitoring terrestrial breeding bird populations*. In* Goldsmith, F.B. (ed.) *Monitoring for Conservation and Ecology*: 112-132. Chapman & Hall, London.

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

Baillie, S.R. & McCulloch, N. (1993) Modelling the survival rates of passerines ringed during the breeding season from national ringing and recovery data. *In* Lebreton, J.-D. & North, P.M. (eds) *Marked Individuals in the Study of Bird Populations*: 123-139. Birkhauser, Basel.

Baillie, S.R. & Peach, W.J. (1992) Population limitation in Palaearctic-African migrant passerines. *Ibis* 134 Suppl. 1: 120-132.

Baillie, S.R., Crick, H.Q.P., Balmer, D.E., Bashford, R.I., Beaven, L.P., Freeman, S.N., Marchant, J.H., Noble, D.G., Raven, M.J., Siriwardena, G.M., Thewlis, R. and Wernham, C.V. (2001) *Breeding Birds in the Wider Countryside: their conservation status 2000.* BTO Research Report No. 252. BTO, Thetford.

Beaven, L.P., Leech, D.I. & Crick, H.Q.P. (2003) The Nest Record Scheme 2002 - has Linnet turned the corner? *BTO News* 249: 4.5.

Besbeas, P., Freeman, S.N., Morgan, B.J.T & Catchpole, E.A. (2002) Integrating mark-recapture-recovery and census data to estimate animal abundance and demographic parameters. *Biometrics* 58, 3, 540-547.

Bibby, C.J. & Etheridge, B. (1993) Status of the Hen Harrier *Circus cyaneus* in Scotland in 1988-89. *Bird Study* 40: 1-11.

Brindley, E., Norris, K., Cook, T., Babbs, S., Forster-Browne, C. & Yaxley, R. (1998) The abundance and conservation status of redshank (*Tringa totanus*) nesting on saltmarshes in Great Britain. *Biol. Cons.* 86: 289-297.

Brooke, M. de L. & Davies, N.B. (1987) Recent changes in host usage by cuckoos *Cuculus canorus* in Britain. *J. Anim. Ecol.* 56: 873-883.

Brown, A.F., Crick, H.Q.P. & Stillman, R.A. (1995) The distribution , numbers and breeding ecology of Twite *Acanthis flavirostris* in the south Pennines of England. *Bird Study* 42: 107-121.

Browne, S.J., Aebischer, N.J. & Crick, H.Q.P. (in press) The breeding ecology of Turtle Doves

Streptopelia turtur in Britain during the period 1941 to 2000: an analysis of BTO Nest Record Cards. *Bird Study*.

Buckland, S.T., Cattanach, K.L. & Anganuzzi, A.A. (1992) Estimating trends in abundance of dolphins associated with tuna in the eastern tropical Pacific Ocean, using sightings data collected on commercial tuna vessels. *Fishery Bulletin* 90, 1-20.

Catchpole, E.A., Morgan, B.J.T., Freeman, S.N. & Peach, W.J. (1999) Modelling the survival of British Lapwings *Vanellus vanellus* using ring-recovery data and weather covariates. *Bird Study* 46 (suppl.): 5-13.

Chamberlain, D.E. & Crick, H.Q.P. (1999) Population declines and reproductive performance of skylarks *Alauda arvensis* in different regions and habitats of Great Britain. *Ibis* 141: 38-51.

Chamberlain, D.E. & Siriwardena, G.S. (2000) The effects of agricultural intensification on Skylarks *Alauda arvensis*: evidence from monitoring studies in Great Britain. *Environmental Reviews* 8: 95-113.

Clements, R. (2001) The Hobby in Britain: a new population estimate. *British Birds* 94: 402-408.

Clements, R. (2002) The Common Buzzard in Britain: a new population estimate. *British Birds* 95: 377-383.

Collar, N.J., Crosby, M.J. & Stattersfield, A.J. (1994) *Birds to watch 2: the world list of threatened birds.* Cambridge, UK: BirdLife International (BirdLife Conservation Series no. 4).

Crawley, M.J. (1993) *GLIM for Ecologists*. Blackwell Science, Oxford, UK.

Crick, H.Q.P. (1992a) *Trends in the Breeding Performance of Golden Plover in Britain.* BTO Research Report 76. BTO, Thetford.

Crick, H.Q.P. (1992b) A bird-habitat coding system for use in Britain and Ireland incorporating aspects of land-management and human activity. *Bird Study* 39:1-12.

Crick, H.Q.P. (1993) Trends in breeding success of Merlins (*Falco columbarius*) in Britain from 1937-1989. In Nicholls, M.K. & Clarke, R. (Eds.) *Biology and Conservation of Small Falcons*: 30-38. Hawk & Owl Trust, London.

Crick, H.Q.P. (1997) Long-term trends in Corn Bunting *Miliaria calandra* productivity in Britain. In Donald, P.F. & Aebischer, N.J. (Eds.) *The Ecology and Conservation of Corn Buntings* Miliaria calandra: 52-64. UK Nature Conservation No. 13. JNCC, Peterborough.

Crick, H.Q.P. (1998) Decline in clutch size of Hen Harriers: reply. *BTO News* 218: 23.

Crick, H.Q.P. & Baillie, S.R. (1996) *A review of the BTO's Nest Record Scheme: Its value to the Joint Nature Conservation Committee and Country Agencies, and its methodology.* BTO Research Report No. 159. BTO, Thetford.

Crick, H.Q.P., Baillie, S.R., Balmer, D.E., Bashford, R.I., Dudley, C., Glue, D.E., Gregory, R.D., Marchant, J.H., Peach, W.J. & Wilson, A.M. (1997) *Breeding birds in the Wider Countryside: their conservation status (1971-1995)*. BTO Research Report No. 187. BTO, Thetford.

Crick, H.Q.P., Baillie, S.R., Balmer, D.E., Bashford, R.I., Beaven, L.P., Dudley, C., Glue, D.E., Gregory, R.D., Marchant, J.H., Peach, W.J. & Wilson, A.M. (1998) *Breeding Birds in the Wider Countryside: their conservation status (1972-1996)*. BTO Research Report No. 198. BTO, Thetford.

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

Crick, H.Q.P., Dudley, C., Evans, A.D. & Smith, K.W. (1994) Causes of nest failure among buntings in the UK. *Bird Study* 41: 88-94.

Crick, H.Q.P., Dudley, C. & Glue, D.E. (1993) Breeding Birds in 1991. *BTO News* 185: 15-18.

Crick, H.Q.P., Dudley, C., Glue, D.E. & Thomson, D.L. (1997) UK birds are laying eggs earlier. *Nature*

388: 526.

Crick, H.Q.P., Raven, M., Beaven, L.P., Dudley, C. & Glue, D.E. (2000) Breeding trends from Nest Records leads to new alerts for declining species. *BTO News* 228: 8-9.

Crick, H.Q.P., Robinson, R.A., Appleton, G.F., Clark, N.A. & Rickard, A.D. (2002) (eds) *Investigation into the causes of the decline of starlings and house sparrows in Great Britain*. Research Report 290. BTO, Thetford.

Crick, H.Q.P. & Ratcliffe, D.A. (1995) The Peregrine *Falco peregrinus* population of the United Kingdom in 1991. *Bird Study* 42: 1-19.

Crick, H.Q.P. & Sparks, T.H. (1999) Climate change related to egg-laying trends. *Nature* 399: 423-424.

Cross, T. (2002) Common Raven (Raven) *Corvus corax*. In *The Migration Atlas: movements of the birds of Britain and Ireland* (eds C.V. Wernham, M.P. Toms, J.H. Marchant, J.A. Clark, G.M. Siriwardena & S.R. Baillie), pp 626-628. T. & A.D. Poyser, London.

DETR (2000) *Report of the UK Raptor Working Group*. DETR, London.

Dobson, A.P. & Hudson, P.J. (1992) Regulation and stability of a free-living host-parasite system *Trichostrongylus tenuis* in Red Grouse. II Population models. *J. Anim. Ecol*. 61, 487-500.

Dolton, C.S. & Brooke M. de L. (1999) Changes in the biomass of birds breeding in Great Britain, 1968-88. *Bird Study* 46: 274-278.

Donald, P.F. (1997) The Corn Bunting *Miliaria calandra* in Britain: a review of current status, patterns of decline and possible causes. *In* Donald, P.F. & Aebischer, N.J. (eds.) *The Ecology and Conservation of Corn Buntings* Miliaria calandra: 11-26. UK Nature Conservation No. 13. Joint Nature Conservation Committee, Peterborough.

Donald, P.F. & Vickery, J.A. (2000) The importance of cereal fields to breeding and wintering skylarks *Alauda arvensis* in the UK. In *Proceedings of the 1999 BOU Spring Conference: Ecology and Conservation of Lowland Farmland Birds* (Eds N.J. Aebischer, A.D. Evans, P.V. Grice & J.A. Vickery).

Elliott, G.R. & Avery, M.I. (1991) A review of reports of buzzard persecution 1975-1989. *Bird Study* 38: 52-56.

Etheridge, B., Summers, R.W. & Green, R.E. (1997) The effects of illegal killing and destruction of nests by humans on the population dynamics of the hen harrier *Circus cyaneus* in Scotland. *J. Appl. Ecol.* 34:1081-1105.

Fewster, R.M., Buckland, S.T., Siriwardena, G.M., Baillie, S.R. & Wilson, J.D. (2000) Analysis of population trends for farmland birds using generalized additive models. *Ecology* 81: 1970-1984.

Freeman, S.N., Noble, D.G., Newson, S.E. & Baillie, S.R. (2003) *Modelling bird population changes using data from the Common Birds Census and the Breeding Bird Survey.* BTO Research Report No. 303. BTO, Thetford.

Freeman, S.N., Robinson, R.A., Clark, J.A., Griffin, B.M. & Adams, S.Y. (2002) Population dynamics of Starling *Sturnus vulgaris* breeding in Britain: an integrated analysis. pp 121-139 in Crick, H.Q.P., Robinson, R.A., Appleton, G.F., Clark, N.A. & Rickard, A.D. (eds) *Investigation into the causes of the decline of starlings and house sparrows in Great Britain*. Research Report 290. BTO, Thetford.

Freeman, S.N., Wernham, C.V. & Balmer, D.E. (In prep.) Long-term changes in the productivity of common songbirds in Britain and Ireland from constant effort ringing.

Freeman, S.N. & Crick, H.Q.P. (2002) Population dynamics of House Sparrows *Passer domesticus* breeding in Britain: an integrated analysis. pp 193-211 in Crick, H.Q.P., Robinson, R.A., Appleton, G.F., Clark, N.A. & Rickard, A.D. (eds) *Investigation into the causes of the decline of starlings and house sparrows in Great Britain*. Research Report 290. BTO, Thetford.

Freeman, S.N. & Crick, H.Q.P. (2003) The decline of the Spotted Flycatcher *Muscicapa striata* in the UK: an integrated population model. *Ibis* 145: 400-412.

Fuller, R.J. (1996) *Relationships between grazing and birds with particular reference to sheep in the British uplands.* BTO Research Report No. 164. BTO, Thetford.

Fuller, R.J., Gregory, R.D., Gibbons, D.W., Marchant, J.H., Wilson, J.D., Baillie, S.R. & Carter, N. (1995) Population declines and range contractions among lowland farmland birds in Britain. *Conserv. Biol*. 9: 1425-1441.

Fuller, R.J., Marchant, J.H. & Morgan, R.A. (1985) How representative of agricultural practice in Britain are Common Birds Census farmland plots? *Bird Study* 32: 56-70.

Gibbons, D.W., Bainbridge, I.P., Mudge, G.P., Tharme, A.P. & Ellis, P.M. (1997) The status and distribution of the Red-throated Diver *Gavia stellata* in Britain in 1994. *Bird Study* 44: 194-205.

Gibbons, D.W., Avery, M.I., Baillie, S.R., Gregory, R.D., Kirby, J., Porter, R.F., Tucker, G.M. & Williams, G. (1996) Bird species of conservation concern in the United Kingdom, Channel Islands and Isle of Man: revising the Red Data List. *RSPB Conserv. Rev.* 10: 7-18.

Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) *The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991.* London: Poyser.

Glue, D.E. (1990) Breeding biology of the Grasshopper Warbler in Britain. *Brit. Birds* 83: 131-145.

Glue, D.E. (1994) Siskins arrive early on orange peanut bags as House Sparrow numbers decline. *BTO News* 194: 14-15.

Goss-Custard, J.C. (1993) The effect of migration and scale on the study of bird populations: 1991 Witherby Lecture. *Bird Study* 40: 81-96.

Gregory, R.D., Wilkinson, N.I., Noble, D.G., Robinson, J.A., Brown, A.F., Hughes, J., Procter, D., Gibbons, D.W. & Galbraith, C.A. (2002) The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* 95: 410-448.

Gregory, R.D. & Marchant, J.H. (1996) Population trends of Jays, Magpies, Jackdaws and Carrion Crows in the United Kingdom. *Bird Study* 43: 28-37.

Hastie, T.J. & Tibshirani, R.J. (1990) *Generalized additive models*. Chapman & Hall, London, UK.

Henderson, I.G. & Hart, P.J.B. (1993) Provisioning, parental investment and reproductive success in Jackdaws *Corvus monedula*. *Ornis Scandinavica* 24: 142-148.

Henderson, I.G., Wilson, A.M., Steele, D. & Vickery, J.A. (2002) Population estimates, trends and habitat associations of breeding Lapwing *Vanellus vanellus*, Curlew *Numenius arquata* and Snipe *Gallinago gallinago* in Northern Ireland in 1999. *Bird Study* 49: 17-15.

Hinsley, S.A., Bellamy, P.E., Newton, I. & Sparks, T.H. (1995) Habitat and landscape factors influencing the presence of individual breeding bird species in woodland fragments. *J. Avian Biol.* 26: 94-104.

Holloway, S. (1996) *The Historical Atlas of Breeding Birds in Britain and Ireland 1875-1900.* T. & A.D. Poyser, London.

Hudson, P.J. (1992) *Grouse in space and time.* Game Conservancy Trust, Fordingbridge.

Hudson, R. (1972) Collared Doves in Britain and Ireland during 1965-70. *British Birds* 65: 139-155.

Hudson, R., Tucker, G.M. & Fuller, R.J. (1994) Lapwing *Vanellus vanellus* populations in relation to agricultural changes: a review. *In* Tucker, G.M., Davies, S.M. & Fuller, R.J. (eds) *The Ecology and Conservation of Lapwings Vanellus vanellus:* 1-33. UK Nature Conservation No 9. JNCC, Peterborough.

Hughes, S.W.M., Bacon, P., & Flegg, J.J.M. (1979) The 1975 census of the Great Crested Grebe in Britain. *Bird Study* 26: 213-226.

Hutchinson, C.D. (1989) *Birds in Ireland*. T. & A.D. Poyser, Calton.

JNCC (1996) *Birds of Conservation Importance.* Press release (31 May 1996). Joint Nature Conservation Committee, Peterborough.

Johnson, D.H. (1979) Estimating nest success: The Mayfield method and an alternative. *Auk* 96: 651-661.

Krebs, J.R., Wilson, J.D., Bradbury R.B. & Siriwardena, G.M. (1999) The second silent spring? *Nature* 400: 611-612.

Kyrkos, A. (1997) *Behavioural and demographic responses of yellowhammers to variation in agricultural practices.* D.Phil. Thesis, University of Oxford.

Lawton, J.H. (1993) Range, population abundance and conservation. *TREE* 8: 409-413.

Lawton, J.H. (1996) Population abundances, geographic ranges and conservation: 1994 Witherby Lecture. *Bird Study* 43: 3-19.

Leech, D.I., Marchant, J.H., Beaven, L.P. & Crick, H.Q.P. (2003) *The BTO Barn Owl Monitoring Programme: third year 2002.* BTO Research Report No. 341. BTO, Thetford.

Manley, B.F.J. (1991) *Randomisation and Monte Carlo Methods in Biology*. Chapman & Hall, London.

Marchant, J.H., Freeman, S.N., Crick, H.Q.P. & Beaven, L.P. (2004) The BTO Heronries Census of England and Wales 1928-2000: new indices and a comparison of analytical methods. *Ibis* 146: 323-334.

Marchant, J.H., Hudson, R., Carter, S.P. & Whittington, P.A. (1990) *Population Trends in British Breeding Birds*. BTO, Tring.

Marchant, J.H., Wilson, A.M., Chamberlain, D.E., Gregory, R.D. & Baillie, S.R. (1997) *Opportunistic Bird Species - Enhancements for the Monitoring of Populations.* BTO Research Report No. 176. BTO, Thetford.

Marchant, J.H. & Gregory, R.D. (1999) Numbers of nesting Rooks *Corvus frugilegus* in the United Kingdom in 1996. *Bird Study* 46: 258-273.

Marquiss, M., Newton, I. & Ratcliffe, D.A. (1978) The decline of the Raven *Corvus corax* in relation to afforestation in southern Scotland and northern England. *Journal of Applied Ecology* 15:129-144.

Mavor, R.A., Parsons, M., Heubeck, M., Pickerell, G. & Schmitt, S. (2003) *Seabirds numbers and breeding success in Britain and Ireland, 2002* (UK Nature Conservation, No 27). JNCC, Peterborough.

Mayfield, H. (1961) Nesting success calculated from exposure. *Wilson Bulletin* 73: 255-261.

Mayfield, H. (1975) Suggestions for calculating nest success. *Wilson Bulletin* 87: 456-466.

Monaghan, P., Uttley, J.D., Burns, M.D., Thaine, C., & Blackwood, J. (1989) The relationship between food supply, reproductive effort and breeding success in Arctic Terns *Sterna paradisaea. J. Anim. Ecol.* 58: 261-274.

Morris, A., Burges, D., Fuller, R.J., Evans, A.D. & Smith, K.W. (1994) The status and distribution of Nightjars *Caprimulgus europaeus* in Britain in 1992. *Bird Study* 41: 181-191.

Moss, D. & Moss, G.M. (1993) Breeding biology of the Little Grebe *Tachybaptus ruficollis* in Britain and Ireland. *Bird Study* 40: 107-114.

Mountford, M.D. (1982) Estimation of population fluctuations with application to the Common Birds Census. *Appl. Stat.* 31: 135-143.

Mountford, M.D. (1985) An index of population change with an application to the Common Birds Census. *In* Morgan, B.J.T. & North, P.M. (*Eds) Statistics in Ornithology:* 121-132. Springer-Verlag, Berlin.

Musgrove, A.J., Pollitt, M.S., Hall, C., Hearn, R.D., Holloway, S.J., Marshall, P.E., Robinson, J.A. & Cranswick, P.A. (2001) *The Wetland Bird Survey 1999-2000: WIldfowl and Wader Counts.* BTO/WWT/RSPB/JNCC, Slimbridge.

Nelson, S.H., Court, I., Vickery, J.A., Watts, P.N. & Bradbury, R.B. (2003) The status and ecology of the Yellow Wagtail in Britain. *British Wildlife* 14: 270-274.

Newton, I. (1986) *The Sparrowhawk*. Poyser, Calton.

O'Connor, R.J. & Marchant, J.H. (1981) *A field validation of some Common Birds Census techniques.* BTO Research Report 4. BTO, Tring.

O'Connor, R.J. & Mead, C.J. (1984) The Stock Dove in Britain, 1930-1980. *Brit. Birds* 77: 181-201.

O'Connor, R.J. & Shrubb, M. (1986) *Farming and Birds*. Cambridge, UK: Cambridge University Press.

Ogilvie, M.A. & Rare Breeding Birds Panel (1998) Rare breeding birds in the United Kingdom in 1998. *Brit. Birds* 93: 358-393.

Ogilvie, M.A. & Rare Breeding Birds Panel (2003) Rare breeding birds in the United Kingdom in 2001. *Brit. Birds* 96: 476-519.

Ormerod, S.J. & Tyler, S.J. (1989) Long-term change in the suitability of Welsh streams for Dippers *Cinclus cinclus* as a result of acidification and recovery: a modelling study. *Env. Poll*. 62: 171-182.

Ormerod, S.J. & Tyler, S.J. (1990) Environmental pollutants in the eggs of Welsh Dippers *Cinclus cinclus*: a potential monitor of organochlorine and mercury contamination in upland rivers. *Bird Study* 37: 171-176.

Pannekoek, J. & van Strien, A. (1996) *TRIM (TRends and Indices for Monitoring data)*. Research paper 9634. Statistics Netherlands, Voorburg, The Netherlands.

Parr, S.J. (1994) Changes in the population size and nest sites of Merlins *Falco columbarius* in Wales between 1970 and 1991. *Bird Study* 41: 42-47.

Peach, W.J. (1993) Combining mark recapture data sets for small passerines. In *Marked Individuals in the Study of Bird Populations* (eds J.-D. Lebreton & P.M. North), pp. 107-122. Birkhauser Verlag, Basel, Switzerland.

Peach, W.J. & Baillie, S.R. (1994) Implementation of the Mountford indexing method for the Common Birds Census. *In* Hagemeijer, W. and Verstrael, T. (eds.) *Bird Numbers 1992.* Distribution, Monitoring and Ecological Aspects: 653-662. Proc. 12th Int. Conf. International Bird Census Council and European Ornithological Atlas Committee. Beek-Ubbergen: Sovon.

Peach, W.J., Baillie, S.R & Balmer, D.E. (1998) Long-term changes in the abundance of passerines in Britain and Ireland as measured by constant effort mist-netting. *Bird Study* 45: 257-275.

Peach, W.J., Baillie, S.R. & Underhill, L. (1991) Survival of British Sedge Warblers *Acrocephalus schoenobaenus* in relation to west African rainfall. *Ibis* 133: 300-305.

Peach, W.J., Buckland, S.T. & Baillie, S.R. (1996) The use of constant effort mist-netting to measure between-year changes in the abundance and productivity of common passerines. *Bird Study* 43: 142-156.

Peach, W.J., Crick, H.Q.P. & Marchant, J.H. (1995) The demography of the decline in the British Willow Warbler population. *J. Appl. Stat.* 22: 905-922.

Peach, W.J., du Feu, C. & McMeeking, J. (1995b) Site tenacity and survival rates of Wrens *Troglodytes troglodytes* and Treecreepers *Certhia familiaris* in a Nottinghamshire wood. *Ibis* 137: 497-507.

Peach, W.J., Siriwardena, G.M. & Gregory, R.D. (1999) Long-term changes in the abundance and demography of British reed buntings *Emberiza schoeniclus*. *J. Appl. Ecol.* 36: 798-811.

Peach, W.J., Thompson, P.S. & Coulson, J.C. (1994) Annual and long-term variation in the survival rates of British lapwings *Vanellus vanellus*. *J. Anim. Ecol*. 63: 60-70.

Percival, S.M. (1990) *Population trends in British Barn Owls,* Tyto alba*, and Tawny Owls,* Strix aluco*, in relation to environmental change.* BTO Research Report No. 57, Tring.

Perrins, C. (2003) The status of Marsh and Willow Tits in the UK. *British Birds* 96: 418-426.

Pienkowski, M.W. (1991) Using long-term ornithological studies in setting targets for conservation in Britain. *Ibis*, 133 (Suppl 1): 62-75 (Peregrine, Lapwing).

Pienkowski, M.W. & Evans, P.R. (1982) Breeding behaviour, productivity and survival of colonial and non-colonial Shelducks *Tadorna tadorna*. Ornis Scand. 13: 101-116.

Pollitt, M.S., Hall, C., Holloway, S.J., Hearn, R.D., Marshall, P.E., Musgrove, A.J., Robinson, J.A. & Cranswick, P.A. (2003) The Wetland Bird Survey 2000-01: Wildfowl and Wader Counts. BTO/WWT/RSPB/JNCC, Slimbridge.

Pollitt, M.S., Cranswick, P.A., Musgrove, A.J., Hall, C., Hearn, R.D., Robinson, J.A. & Holloway, S.J. (2000) *The Wetland Bird Survey 1998-99: Wildfowl and Wader Counts.* BTO/WWT/RSPB/JNCC, Slimbridge, Glos.

Potts, G.R. (1986) *The Partridge: Pesticides, Predation and Conservation.* Collins, London.

Prater, A.J. (1989) Ringed Plover *Charadrius hiaticula* breeding population of the United Kingdom in 1984. *Bird Study* 36: 154-159.

Prince, P. & Clarke, R. (1993) The hobby's breeding range in Britain. *Brit. Wildl*. 4: 341-346.

Ratcliffe, D.A. (1976) Observations on the breeding of the Golden Plover in Great Britain. *Bird Study* 23: 62-116.

Ratcliffe, D.A. (1993) *The Peregrine Falcon*. Second Edition. Poyser, London.

Rebecca, G.W. & Bainbridge, I.P. (1998) The breeding status of the Merlin *Falco columbarius* in Britain in 1993-94. *Bird Study* 45: 172-187.

Redpath, S. & Thirgood, S. (1997) *Birds of Prey and Red Grouse*. HMSO, London.

Rehfisch, M.M, Austin, G.E., Holloway, S.J., Allan, J.R. & O'Connell, M. (2002) An approach to the assessment of change in the numbers of Canada Geese *Branta canadensis* and Greylag Geese *Anser anser* in southern Britain. *Bird Study* 49, 50-59.

Rehfisch, M.M., Wernham, C.V. & Marchant, J.H. (Eds) (1999) *Population, distribution, movements and survival of fish-eating birds in Great Britain.* DETR, London.

Robinson, R.A., Crick, H.Q.P. & Peach, W.J. (2003) Population trends of Swallows *Hirundo rustica* breeding in Britain. *Bird Study* 50, 1-7.

Robinson, R.A., Siriwardena, G.M. & Crick, H.Q.P. (2002) Status and population trends of the Starling *Sturnus vulgaris* in Great Britain. Pp 11-32. in Crick, H.Q.P., Robinson, R.A., Appleton, G.F. Clark, N.A. & Rickard, A.D. 2002. (eds) *Investigation into the causes of the decline of starlings and house sparrows in Great Britain.* BTO, Thetford.

SAS Institute Inc. (1990) *SAS Language: Reference, Version 6, First Edition*. SAS Inst. Inc., Cary, NC.

Siriwardena, G.M., Baillie, S.R., Buckland, S.T., Fewster, R.M., Marchant, J.H. & Wilson, J.D. (1998b) Trends in the abundance of farmland birds: a quantitative comparison of smoothed Common Birds Census indices. *J. Appl. Ecol.* 35: 24-43.

Siriwardena, G.M., Baillie, S.R., Crick, H.Q.P. & Wilson, J.D. (2000b) The importance of variation in the breeding performance of seed-eating birds for their population trends on farmland. *J. Appl. Ecol*. 37: 1-22.

Siriwardena, G.M., Baillie, S.R., Crick, H.Q.P., Wilson, J.D. & Gates S. (2000) The demography of lowland farmland birds. In *Proceedings of the 1999 BOU Spring Conference: Ecology and Conservation of Lowland Farmland Birds* (Eds. N.J. Aebischer, A.D. Evans, P.V. Grice & J.A. Vickery).

Siriwardena, G.M., Baillie, S.R. & Wilson, J.D. (1998a). Variation in the survival rates of British farmland passerines with respect to their population trends. *Bird Study* 45: 276-292.

Siriwardena, G.M., Baillie, S.R. & Wilson, J.D. (1999) Temporal variation in the annual survival rates of six granivorous birds with contrasting population trends. *Ibis* 141: 621-636.

Siriwardena, G.M., Freeman, S.N. & Crick, H.Q.P. (2001) The decline of the Bullfinch *Pyrrhula pyrrhula* in Britain: is the mechanism known? *Acta Orn.* 36(2):143-152.

Siriwardena, G.M., Robinson, R.A. & Crick, H.Q.P. (2002) Status and population trends of the house sparrow *Passer domesticus* in Great Britain. Pp 33-52 in Crick, H.Q.P., Robinson, R.A., Appleton, G.F. Clark, N.A. & Rickard, A.D. 2002. (eds) *Investigation into the causes of the decline of starlings and house sparrows in Great Britain.* BTO, Thetford.

Sitters, H.P., Fuller, R.J., Hoblyn, R.A., Wright, M.T., Cowie, N. & Bowden, C.G.R. (1996) The Woodlark *Lullula arborea* in Britain: population trends, distribution and habitat occupancy. *Bird Study* 43: 172-187.

Snow, D.W. (1965) The relationship between census results and the breeding population of birds on farmland. *Bird Study* 12: 287-304.

Stone, B.H., Sears, J., Cranswick, P.A., Gregory, R.D., Gibbons, D.W., Rehfisch, M.M., Aebischer, N.J. & Reid, J.B. (1997) Population estimates of birds in Britain and in the United Kingdom. *Brit. Birds* 90: 1-22.

Summers, R. (1998) The decline in clutch size of Hen Harriers. *BTO News* 218: 23.

Summers-Smith, J.D. (2003) The decline of the House Sparrow: a review. *British Birds* 96: 439-446.

Temple, S.A. & Wiens, J.A. (1989) Bird populations and environmental changes: can birds be bio-indicators? *Amer. Birds* 43: 260-270.

Thomas, G.E. (1993) Estimating annual total heron population counts. *Appl. Statistics* 42: 473-486.

Thompson, R., Brindley, E. & Heubeck, M. (1997) *Seabird numbers and breeding success in Britain and Ireland, 1996.* JNCC UK Nature Conservation Report 21.

Thomson, D.L., Baillie, S.R. & Peach, W.J. (1997) The demography and age-specific annual survival of British song thrushes *Turdus philomelos* during periods of population stability and decline. *J. Anim. Ecol.* 66: 414-424.

Toms, M.P., Crick, H.Q.P. & Shawyer, C.R. (2000) *Project Barn Owl Final Report.* BTO Research Report No. 197/ HOT Research Report 98/1. British Trust for Ornithology/Hawk & Owl Trust, Thetford, Norfolk.

Toms, M.P., Crick, H.Q.P. & Shawyer, C.R. (2001) The status of breeding Barn Owls *Tyto alba* in the United Kingdom 1995-97. *Bird Study* 48: 23-37.

Tucker, G.M. & Heath, M.F. (1994) *Birds in Europe: their conservation status.* Conservation Series no. 3. BirdLife International, Cambridge.

Upton, A.J., Pickerell, G. & Heubeck, M. (2000) *Seabird numbers and breeding success in Britain and Ireland, 1999*. U.K. Nature Conservation No. 24. JNCC, Peterborough.

Vanhinsbergh, D., Fuller, R.J. & Noble, D.G. (2003). *An analysis of changes in the populations of British woodland birds and a review of possible causes.* BTO Research Report 245, British Trust for Ornithology, Thetford, Norfolk.

van Horne, B. (1983) Density as a misleading indicator of habitat quality. *J. Wildl. Manage.* 47: 893-901.

Vickery, P.D., Hunter, M.L. & Wells, J.V. (1992) Is density an indicator of breeding success? *Auk* 109: 706-710.

Visser, M.E., van Noordwijk, A.J., Tinbergen, J.M. & Lessels, C.M. (1998) Warmer springs lead to mistimed reproduction in Great Tits (*Parus major*). *Proc. R. Soc. Lond. B* 265: 1867-1870.

Watson, J., Langslow, D.R. & Rae, S.R. (1987) *The impact of land-use change on Golden Eagles* Aquila chrysaetos *in the Scottish Highlands.* NCC Report No. 720, NCC, Peterborough.

Wilson, A.M., Henderson, A.C.B. & Fuller, R.J. (2002) Status of the Common Nightingale *Luscinia megarhynchos)* in England at the end of the 20th century with particular reference to climate change. *Bird Study* 49: 193-204.

Wilson, A.M., Vickery, J.A. & Browne, S.J. (2001) Numbers and distribution of Northern Lapwings *Vanellus vanellus* breeding in England and Wales in 1998. *Bird Study* 48: 2-17.

Wilson, J.D., Evans, J., Browne, S.J., & King, J.R. (1997) Territory distribution and breeding success of skylarks *Alauda arvensis* on organic and intensive farmland in Southern England. *J. Appl. Ecol*. 34: 1462-1478.

Winstanley, D., Spencer, R. & Williamson, K. (1974) Where have all the Whitethroats gone? *Bird Study* 21: 1-14.

Wotton, S.R. & Gillings, S. (2000) The status of breeding Woodlarks *Lullula arborea* in Britain in 1997. *Bird Study* 47: 212-224.

Wotton, S.R., Langston, R.H.W. & Gregory, R.D. (2002) The breeding status of the Ring Ouzel *Turdus torquatus* in the UK in 1999. *Bird Study* 49: 26-34.

Section 7 - Appendix

Back to Contents

BBWC Home > Contents > Appendix

7. Appendix - Summary tables of changes in population size and breeding performance

7.1 Tables of alerts and population increases from CBC

7.2 Tables of alerts and population increases from WBS

7.3 Tables of alerts and population increases from CES

7.4 Tables of population declines or increases from BBS

Back to top

Section 8 - Select your own table

Return to Contents

BBWC Home > Contents > Appendix > Tables of alerts and population increases from CBC/BBS

7.1 Tables of alerts and population increases from CBC/BBS

1a. Table of population alerts for CBC/BBS UK 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Grey Partridge	33	103	-86	-90	-81	>50	
Corn Bunting	33	53	-86	-94	-78	>50	
Spotted Flycatcher	33	110	-82	-88	-75	>50	
Willow Tit	33	42	-75	-89	-55	>50	
Turtle Dove	33	98	-72	-83	-58	>50	
Whitethroat	33	319	-65	-75	-50	>50	
Yellow Wagtail	33	59	-64	-84	-16	>50	
Marsh Tit	33	79	-63	-74	-54	>50	
Song Thrush	33	485	-55	-62	-45	>50	
Bullfinch	33	224	-54	-64	-47	>50	
Yellowhammer	33	338	-53	-62	-40	>50	
Cuckoo	33	256	-41	-56	-23	>25	
Reed Bunting	33	151	-39	-52	-20	>25	
Mistle Thrush	33	334	-36	-49	-18	>25	

1b. Table of population alerts for CBC/BBS England 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Tree Sparrow	33	77	-97	-99	-95	>50	
Lesser Redpoll	33	41	-89	-96	-74	>50	
Grey Partridge	33	92	-87	-91	-82	>50	
Corn Bunting	33	51	-85	-93	-75	>50	
Spotted Flycatcher	33	86	-83	-88	-78	>50	
Tree Pipit	33	41	-78	-89	-59	>50	
Starling	33	356	-77	-84	-71	>50	
Willow Tit	33	40	-73	-90	-53	>50	

Turtle Dove	33	97	-72	-82	-60	>50	
Linnet	33	279	-70	-78	-61	>50	
Whitethroat	33	279	-65	-73	-51	>50	
Marsh Tit	33	74	-63	-73	-48	>50	
Yellow Wagtail	33	58	-62	-85	-24	>50	
Skylark	33	327	-59	-67	-49	>50	
Song Thrush	33	393	-57	-64	-50	>50	
Bullfinch	33	188	-55	-66	-42	>50	
Yellowhammer	33	295	-53	-63	-41	>50	
Willow Warbler	33	336	-49	-63	-32	>25	
Cuckoo	33	219	-48	-60	-30	>25	
Dunnock	33	425	-44	-51	-33	>25	
Meadow Pipit	33	95	-43	-73	-12	>25	
Reed Bunting	33	123	-43	-56	-25	>25	
Mistle Thrush	33	280	-38	-47	-25	>25	

2a. Table of population alerts for CBC/BBS UK 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Corn Bunting	25	59	-89	-95	-84	>50	
Grey Partridge	25	113	-86	-90	-81	>50	
Willow Tit	25	44	-81	-90	-71	>50	
Spotted Flycatcher	25	120	-78	-84	-68	>50	
Turtle Dove	25	108	-73	-84	-60	>50	
Bullfinch	25	256	-60	-67	-52	>50	
Reed Bunting	25	169	-59	-67	-52	>50	
Yellow Wagtail	25	68	-57	-78	-26	>50	
Yellowhammer	25	401	-54	-61	-47	>50	
Goldcrest	25	240	-49	-61	-36	>25	
Meadow Pipit	25	212	-48	-64	-32	>25	
Song Thrush	25	578	-47	-54	-41	>25	
Lapwing	25	197	-46	-65	-27	>25	
Marsh Tit	25	87	-40	-54	-23	>25	
Cuckoo	25	309	-39	-51	-25	>25	
Mistle Thrush	25	400	-39	-48	-29	>25	

2b. Table of population alerts for CBC/BBS England 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment

Tree Sparrow	25	75	-97	-99	-94	>50	
Lesser Redpoll	25	41	-97	-98	-94	>50	
Corn Bunting	25	57	-90	-94	-84	>50	
Grey Partridge	25	100	-87	-90	-81	>50	
Willow Tit	25	41	-81	-93	-70	>50	
Tree Pipit	25	43	-80	-89	-65	>50	
Spotted Flycatcher	25	93	-80	-85	-72	>50	
Turtle Dove	25	107	-73	-84	-62	>50	
Starling	25	436	-71	-78	-63	>50	
Linnet	25	331	-62	-70	-52	>50	
Reed Bunting	25	136	-62	-70	-55	>50	
Skylark	25	396	-61	-67	-54	>50	
Bullfinch	25	212	-61	-70	-52	>50	
Yellowhammer	25	351	-56	-63	-48	>50	
Yellow Wagtail	25	66	-54	-77	-17	>50	
Meadow Pipit	25	115	-53	-70	-38	>50	
Song Thrush	25	465	-52	-59	-43	>50	
Goldcrest	25	175	-51	-65	-34	>50	
Lapwing	25	161	-46	-63	-28	>25	
Cuckoo	25	263	-45	-57	-33	>25	
Dunnock	25	507	-44	-51	-34	>25	
Willow Warbler	25	396	-44	-55	-32	>25	
Mistle Thrush	25	334	-41	-49	-29	>25	
Marsh Tit	25	80	-40	-55	-22	>25	
Kestrel	25	196	-36	-49	-19	>25	
Lesser Whitethroat	25	109	-30	-49	-7	>25	
Goldfinch	25	314	-28	-44	-10	>25	
Treecreeper	25	141	-25	-40	-11	>25	

3a. Table of population alerts for CBC/BBS UK 1990-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	10	54	-66	-78	-51	>50	
Spotted Flycatcher	10	168	-51	-61	-39	>50	
Grey Partridge	10	177	-50	-60	-40	>25	
Yellow Wagtail	10	117	-47	-60	-30	>25	
Corn Bunting	10	107	-47	-63	-23	>25	
Turtle Dove	10	160	-42	-56	-31	>25	
Yellowhammer	10	745	-34	-41	-29	>25	
Cuckoo	10	564	-26	-36	-16	>25	

House Sparrow	10	845	-25	-37	-8	>25	

3b. Table of population alerts for CBC/BBS England 1990-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Lesser Redpoll	10	37	-82	-92	-70	>50	
Tree Pipit	10	57	-64	-78	-45	>50	
Willow Tit	10	49	-64	-78	-53	>50	
Tree Sparrow	10	88	-57	-81	-29	>50	
Grey Partridge	10	157	-52	-62	-38	>50	
Spotted Flycatcher	10	125	-52	-62	-39	>50	
Corn Bunting	10	102	-48	-67	-24	>25	
Yellow Wagtail	10	115	-47	-63	-31	>25	
Starling	10	859	-46	-54	-39	>25	
Turtle Dove	10	158	-43	-57	-32	>25	
Yellowhammer	10	650	-36	-42	-29	>25	
Cuckoo	10	470	-35	-43	-27	>25	
Meadow Pipit	10	221	-31	-45	-16	>25	
House Sparrow	10	714	-31	-47	-18	>25	
Willow Warbler	10	693	-30	-39	-24	>25	

4a. Table of population alerts for CBC/BBS UK 1995-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	5	74	-45	-59	-32	>25	
Grey Partridge	5	261	-30	-37	-23	>25	
Corn Bunting	5	160	-30	-38	-20	>25	
Turtle Dove	5	233	-27	-36	-17	>25	

4b. Table of population alerts for CBC/BBS England 1995-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	5	66	-42	-57	-31	>25	
Lesser Redpoll	5	51	-35	-55	-6	>25	
Cuckoo	5	697	-32	-36	-28	>25	
Corn Bunting	5	153	-31	-40	-16	>25	
Grey Partridge	5	231	-30	-37	-23	>25	
Turtle Dove	5	229	-27	-36	-18	>25	

Back to Top

Appendix 7.1 Tables 5a and 5b

7.1 Tables of alerts and population increases from CBC/BBS

5a. Table of population increases of >50% for UK CBC/BBS 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Great Tit	33	522	65	46	82		
Jackdaw	33	316	71	11	167		
Long-tailed Tit	33	257	84	27	160		
Pied Wagtail	33	278	89	34	155		
Reed Warbler	33	41	95	31	227		
Carrion Crow	33	516	104	67	170		
Nuthatch	33	122	109	64	191		
Woodpigeon	33	472	114	15	358		
Magpie	33	441	115	73	166		
Blackcap	33	366	125	88	185		
Mallard	33	299	171	113	243		
Coot	33	69	180	99	857		
Great Spotted Woodpecker	33	215	188	95	300		
Mute Swan	33	55	241	34	671		
Buzzard	33	116	366	211	1296		

5b. Table of population increases of >50% for England CBC/BBS 1967-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Pheasant	33	324	55	26	120		
Jackdaw	33	253	58	1	163		
Great Tit	33	437	61	38	86		
Reed Warbler	33	39	72	12	252		
Long-tailed Tit	33	228	81	29	168		
Wren	33	472	88	61	115		
Pied Wagtail	33	216	95	41	179		
Carrion Crow	33	428	104	67	160		

Nuthatch	33	107	107	47	201		
Magpie	33	381	114	74	168		
Blackcap	33	327	119	78	173		
Woodpigeon	33	382	125	36	383		
Coot	33	62	174	91	506		
Green Woodpecker	33	176	174	117	308		
Great Spotted Woodpecker	33	195	187	100	353		
Mallard	33	253	188	128	269		
Stock Dove	33	180	191	100	325		
Mute Swan	33	47	192	43	651		
Buzzard	33	66	317	180	895		

Back to top

Appendix 7.2

7.1 Tables of alerts and population increases from WBS

1. Table of alerts for WBS waterways 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	25	21	-89	-96	-82	>50	
Reed Bunting	25	53	-68	-77	-55	>50	
Little Grebe	25	17	-60	-81	-16	>50	Small sample
Redshank	25	19	-49	-82	-9	>25	Small sample
Pied Wagtail	25	66	-48	-59	-35	>25	
Grey Wagtail	25	57	-34	-49	-10	>25	

2. Table of alerts for WBS waterways 1990-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	10	17	-77	-88	-69	>50	Small sample
Redshank	10	18	-48	-61	-27	>25	Small sample
Little Grebe	10	16	-35	-54	-17	>25	Small sample

3. Table of alerts for WBS waterways 1995-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	5	15	-64	-76	-53	>50	Small sample
Redshank	5	17	-37	-49	-16	>25	Small sample
Little Grebe	5	15	-34	-49	-21	>25	Small sample
Sand Martin	5	27	-32	-48	-8	>25	

4. Table of population increases for WBS waterways 1975-2000

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Curlew	25	22	64	1	316		
Mute Swan	25	44	73	18	165		
Reed Warbler	25	20	81	24	220		
Oystercatcher	25	23	112	68	165		
Mallard	25	58	196	125	296		

Back to top

Appendix 7.3

7.1 Tables of alerts and population increases from CES

Table of alerts for CES adults 1984-2001

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Linnet	17	21	-93	.	.	[>50*]	
Lesser Redpoll	17	19	-75	.	.	[>50*]	Small sample
Spotted Flycatcher	17	16	-61	.	.	[>50]	Small sample
Willow Warbler	17	90	-54	.	.	[>50*]	
Lesser Whitethroat	17	41	-52	.	.	[>50*]	
Willow Tit	17	23	-51	.	.	[>50]	
Reed Bunting	17	59	-50	.	.	[>25*]	
Whitethroat	17	57	-32	.	.	[>25]	
Song Thrush	17	79	-31	.	.	[>25*]	
Bullfinch	17	80	-25	.	.	[>25]	

Table of alerts for CES adults 1991-2001

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Linnet	10	24	-83	.	.	[>50*]	
Lesser Whitethroat	10	45	-57	.	.	[>50*]	
Lesser Redpoll	10	18	-54	.	.	[>50*]	Small sample
Willow Tit	10	23	-51	.	.	[>50]	
Spotted Flycatcher	10	15	-50	.	.	[>50]	Small sample
Willow Warbler	10	104	-42	.	.	[>25*]	
Reed Bunting	10	70	-34	.	.	[>25]	

Table of alerts for CES adults 1996-2001

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Linnet	5	20	-61	.	.	[>50]	
Lesser Whitethroat	5	39	-37	.	.	[>25]	
Willow Tit	5	20	-36	.	.	[>25]	
Willow Warbler	5	103	-35	.	.	[>25*]	
Spotted Flycatcher	5	14	-28	.	.	[>25]	Small sample

Table of population increases for CES adults 1984-2001

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Robin	17	87	52	.	.		
Greenfinch	17	41	56	.	.		
Chiffchaff	17	63	98	.	.		

Back to top

Appendix 7.4

7.1 Tables of population declines or increases from BBS

Table of declines >25% for BBS UK 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	8	55	-72	-81	-59	(>50)	
Wood Warbler	8	56	-58	-69	-42	(>50)	
Turtle Dove	8	187	-42	-52	-30	(>25)	
Spotted Flycatcher	8	194	-42	-52	-31	(>25)	
Corn Bunting	8	142	-41	-50	-29	(>25)	
Tawny Owl	8	77	-35	-52	-13	(>25)	
Shelduck	8	114	-34	-45	-20	(>25)	
Black-headed Gull	8	428	-33	-40	-25	(>25)	
Carrion Crow	8	104	-31	-47	-9	(>25)	
Kestrel	8	505	-30	-37	-22	(>25)	
Swift	8	847	-30	-36	-24	(>25)	
Lesser Whitethroat	8	204	-27	-38	-14	(>25)	
Golden Plover	8	75	-26	-42	-7	(>25)	
Bullfinch	8	437	-26	-35	-17	(>25)	
Redshank	8	68	-25	-40	-5	(>25)	
Common Sandpiper	8	61	-25	-42	-3	(>25)	
Cuckoo	8	727	-25	-32	-18	(>25)	

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of declines >25% for BBS England 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Tit	8	48	-71	-81	-56	(>50)	
Great Black-backed Gull	8	36	-60	-72	-44	(>50)	
Cuckoo	8	591	-47	-52	-42	(>25)	
Turtle Dove	8	185	-43	-52	-31	(>25)	
Spotted Flycatcher	8	142	-35	-47	-20	(>25)	
Corn Bunting	8	135	-35	-46	-23	(>25)	

Willow Warbler	8	840	-33	-36	-29	(>25)	
Swift	8	736	-31	-37	-24	(>25)	
Lesser Whitethroat	8	194	-29	-40	-16	(>25)	
Tree Pipit	8	64	-27	-45	-5	(>25)	
Bullfinch	8	341	-27	-36	-17	(>25)	
Grey Partridge	8	189	-26	-38	-11	(>25)	

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of declines >25% for BBS Scotland 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Black-headed Gull	8	72	-68	-76	-56	(>50)	
Carrion Crow	8	50	-59	-73	-39	(>50)	
Swift	8	39	-51	-68	-25	(>50)	
Kestrel	8	39	-42	-61	-15	(>25)	
Lapwing	8	84	-39	-50	-26	(>25)	
Golden Plover	8	44	-33	-52	-7	(>25)	
Common Gull	8	66	-31	-46	-11	(>25)	

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of declines >25% for BBS Wales 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Starling	8	77	-44	-58	-26	(>25)	
Bullfinch	8	47	-37	-56	-12	(>25)	
Cuckoo	8	55	-33	-51	-6	(>25)	
Swift	8	56	-32	-53	-2	(>25)	
Yellowhammer	8	37	-31	-50	-4	(>25)	
Garden Warbler	8	52	-29	-48	-2	(>25)	
Willow Warbler	8	134	-28	-36	-18	(>25)	

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Back to top

Appendix 7.4 continued

7.4 Tables of population declines or increases from BBS

Table of population increases for BBS UK 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Buzzard	8	475	51	36	68		
Coot	8	191	51	29	75		
Snipe	8	117	52	26	84		
Grey Wagtail	8	154	52	25	86		
Tree Sparrow	8	133	55	26	91		
Raven	8	165	56	28	91		
Goldcrest	8	534	65	51	80		
Great Spotted Woodpecker	8	594	72	55	89		
Kingfisher	8	41	76	21	157		
Canada Goose	8	300	92	68	120		
Greylag Goose	8	86	132	78	201		
Stonechat	8	80	153	88	241		

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of population increases for BBS England 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Coot	8	171	57	34	83		
Buzzard	8	261	58	38	81		
Great Spotted Woodpecker	8	531	65	50	83		
Common Tern	8	41	70	16	147		
Grey Wagtail	8	98	71	35	117		
Redstart	8	70	72	33	122		
Canada Goose	8	284	80	58	106		
Little Grebe	8	39	83	26	165		
Raven	8	46	100	40	186		
Stonechat	8	30	115	35	243		
Greylag Goose	8	68	118	72	175		

Common Gull	8	50	125	53	230		

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of population increases for BBS Scotland 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Sedge Warbler	8	47	53	11	110		
Goldfinch	8	59	56	9	123		
Great Black-backed Gull	8	34	67	10	155		
Snipe	8	52	71	27	130		
Raven	8	37	71	10	167		
Buzzard	8	95	73	34	122		
Grey Heron	8	41	113	37	229		
Goldcrest	8	69	137	82	210		
House Martin	8	43	174	68	346		

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of population increases for BBS Wales 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
House Martin	8	74	54	14	107		
Herring Gull	8	56	58	15	116		
House Sparrow	8	90	63	35	98		
Blackcap	8	87	64	31	105		
Goldfinch	8	92	64	28	110		
Great Spotted Woodpecker	8	45	68	16	141		
Nuthatch	8	53	68	22	131		
Treecreeper	8	36	70	9	164		

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Table of population increases for BBS N.Ireland 1994-2002

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Chaffinch	8	57	55	16	107		
Rook	8	46	58	7	132		
Wren	8	59	64	27	112		
Carrion Crow	8	48	90	28	182		
Blackbird	8	56	92	49	147		
Great Tit	8	41	99	32	202		
Coal Tit	8	37	142	37	328		
Dunnock	8	42	187	76	368		

This table does not use formal alerts methods due to the small number of years of data.
Population changes are based on an annual population index with no smoothing or truncation of end points.

Back to top

Back to Contents

Breeding Birds in the Wider Countryside

8. Select your own table of population changes (2003)

This page allows you to display a table of population changes according to a range of different criteria. The population change data that will be displayed are the same as those that are contained in the individual species accounts. You can choose which schemes and time periods will be included in your table. You can also select all species or a particular species. Just complete the form below and then click on the compile table button to display your chosen table

Select periods to be included (at least one)

- [ ] 5 years
- [ ] 10 years
- [ ] 25 years
- [x] Maximum

Select scheme categories to be included (at least one)

- [x] CBC\BBS United Kingdom
- [ ] CBC\BBS England
- [ ] Waterways
- [ ] Heronries United Kingdom
- [ ] Heronries England and Wales
- [ ] Heronries England
- [ ] Heronries Scotland
- [ ] Heronries Wales
- [ ] CES adults
- [ ] CES juveniles
- [ ] BBS United Kingdom
- [ ] BBS England
- [ ] BBS Wales
- [ ] BBS Scotland
- [ ] BBS Northern Ireland

Select species to be included. You may select either one individual species or all species.

All species
Little Grebe
Great Crested Grebe
Cormorant
Grey Heron
Grey Heron
Mute Swan
Greylag Goose
Canada Goose
Shelduck

All species
Little Grebe
Great Crested Grebe
Cormorant
Grey Heron
Grey Heron
Mute Swan
Greylag Goose
Canada Goose
Mallard

Sort table by:

- (•) Species; scheme; period (descending)
- ( ) Scheme; species; period (descending)
- ( ) Change (ascending)
- ( ) Scheme; change (ascending)

Compile table

Reset to default values

Return to Contents

This report should be cited as:
Crick, H.Q.P., Marchant, J.H., Noble, D.G., Baillie, S.R., Balmer, D.E., Beaven, L.P., Coombes, R.H., Downie, I.S., Freeman, S.N., Joys, A.C., Leech, D.I., Raven, M.J., Robinson, R.A. and Thewlis, R.M. (2004) Breeding Birds in the Wider Countryside: their conservation status 2003. BTO Research Report No. 353. BTO, Thetford. (**http://www.bto.org/birdtrends2003**)

Pages maintained by Susan Waghorn and Iain Downie

Images: Nuthatch, by Adrian Dancy / BTO; Lapwing, by Sarah Kelman / BTO

Breeding Birds in the Wider Countryside: their conservation status 2003

This report is a "one-stop-shop" for information about the population status of our common terrestrial birds. With one page per species, readers can quickly find all the key information about trends in population size and breeding performance as measured by BTO monitoring schemes. It provides an overview of trends for the period 1966–2002.

This report is the third in a series, prepared within the Partnership between the British Trust for Ornithology (BTO) and the Joint Nature Conservation Committee (JNCC) (on behalf of Natural England, Scottish Natural Heritage, Countryside Council for Wales and the Environment & Heritage Service of Northern Ireland) as part of its programme of research into nature conservation.

It is the result of the sustained long-term fieldwork efforts of many thousands of the BTO's volunteer supporters. Without their enthusiasm for collecting these hard-won facts, the cause of conservation in the UK would be very much the poorer.

H Q P Crick, J H Marchant, D G Noble, S R Baillie, D E Balmer, L P Beaven, R H Coombes, I S Downie, S N Freeman, A C Joys, D I Leech, M J Raven, R A Robinson and R M Thewlis 2003. Breeding Birds in the Wider Countryside: their conservation status 2003. *BTO Research Report*, BTO, Thetford, UK.

Birds Science People