BTO Research Report No. 187

Breeding Birds in the Wider Countryside: their conservation status (1971-1995)

A report of the BTO's Integrated Population Monitoring programme

H.Q.P. Crick, S.R. Baillie, D.E. Balmer, R.I. Bashford, C. Dudley, D.E. Glue, R.D. Gregory, J.H. Marchant, W.J. Peach and A.M. Wilson

August 1997

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BREEDING BIRDS IN THE WIDER COUNTRYSIDE: THEIR CONSERVATION STATUS (1971-1995)

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EXECUTIVE SUMMARY

1. This report provides a species-by-species overview of the trends in breeding population size and reproductive success over the past 25 years of birds covered by BTO monitoring schemes. This time period is that used to identify species that need to be included on the *Conservation Importance List* (JNCC 1996).

2. The report covers the majority of breeding bird species, excluding colonial seabirds which are well covered by the JNCC's Seabird Monitoring Programme (Thompson *et al.* 1997), and excluding the majority of species already covered by the Rare Breeding Birds Panel (Ogilvie 1996). Most wintering populations of waterfowl are well covered by the Wetland Bird Survey annual reports (e.g. Waters & Cranswick 1996).

3) Population trends are described at the geographical scale of the UK as a whole.

4) The following BTO Alerts are made to JNCC and Country Agencies about worrying declines in population size, reproductive success or survival:

> **High BTO Alerts**: 17 species: Hen Harrier, Grey Partridge, Lapwing, Woodcock, Turtle Dove, Tawny Owl, Skylark, Tree Pipit, Yellow Wagtail, Song Thrush, Grasshopper Warbler, Spotted Flycatcher, Tree Sparrow, Redpoll, Bullfinch, Reed Bunting, Corn Bunting.
>
> **Medium BTO Alerts**: 23 species: Red-throated Diver, Kestrel, Moorhen, Curlew, Redshank, Little Owl, Kingfisher, Lesser Spotted Woodpecker, Meadow Pipit, Grey Wagtail, Pied Wagtail, Dunnock, Blackbird, Mistle Thrush, Willow Warbler, March Tit, Willow Tit, Raven, Starling, Greenfinch, Linnet, Twite, Yellowhammer.

5) Two species can be said to have recovered their population status since the *Conservation Importance List* was drawn up and would now no-longer warrant inclusion: Swallow and Goldfinch.

6) The number of species showing long-term trends of declining population size approximately equalled the number showing increases. However, declines were particularly prevalent among seed-eating species, among farmland species and among grassland or marshland species.

7) Among species showing significant long-term trends in breeding performance, the majority (75%) show an improvement over time. However, declines in breeding performance were again prevalent among seed-eating species, and among those associated with heathland, bog or upland habitats and those associated with waterbodies or coastal habitats.

8) The report will be produced regularly and it is meant to be a working document to be used by conservation practitioners as a ready reference guide to the current changes in status of breeding birds in the UK. (Breeding distributions are not included as these are already fully documented in the *New Breeding Atlas* (Gibbons *et al.* 1993) and breeding population sizes are not included because these are to be reported regularly by the Avian Population Estimates Panel (Stone *et al.* 1997)). We will initiate an active process to seek feedback on how to improve the value of future editions of this report.

1. INTRODUCTION

Survey and monitoring form the bedrock for conservation. Without knowledge of the distribution and size of populations and how they are changing, the actions of conservationists must necessarily be based upon hunches and intuition that have a high chance of failing the species or habitats they wish to conserve.

Fortunately, for bird conservationists in the UK, there is a long tradition of volunteer support for ornithological survey and monitoring, and the British Trust for Ornithology has been the medium for channelling much of these efforts towards well-structured programmes of increasing value. The statutory conservation bodies in the UK were farsighted enough to realise the superb cost-effectiveness of volunteer monitoring by contracting the BTO to provide monitoring data from the early 1960s. The Joint Nature Conservation Committee (JNCC) and its predecessor bodies have benefitted greatly from this work which provides it and the Country Agencies (English Nature, Scottish Natural Heritage and Countryside Council for Wales) with an unrivalled comprehensive overview of the long-term trends for a major component of the UK's wildlife. This overview covers changes in population size as well as changes in reproductive success and survival that might have caused the population changes. When a declining population is detected, the BTO can inform conservationists of which stage of the life-cycle appears to have been detrimentally affected. Conservationists are thereby able to target their action or further research effectively. This is the main function of the BTO's Integrated Population Monitoring programme for UK birds (Greenwood *et al.* 1993, 1994).

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 on declining farmland species, are highlighted as showing "how broadly based surveillance can identify important new trends". More generally, the report states that monitoring is "essential if broad aims, specific objectives and precise targets are to be achieved". It notes that baselines must be established; that regular and systematic recording must be made to detect change; and that 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 is being developed by the BTO under the 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 changes are taking place.
(c) To provide data that will assist in identifying the causes of change.
(d) To distinguish changes in populations induced by human activities from those that are natural population fluctuations.

The programme brings together data from several long-running BTO schemes. Changes in numbers of breeding birds are measured by the Common Birds Census, Waterways Bird Survey and Constant Effort Sites Scheme (based on bird ringing). The recently established BTO/JNCC/RSPB Breeding Bird Survey can only provide information on short-term population changes at the moment, but will gradually develop into a major component of this work. The Nest Record Scheme and Constant Effort Sites Scheme provide data on productivity, while the Ringing Scheme and Constant Effort Sites Scheme provide data on survival rates.

Increasingly it is being realised that monitoring population size or density is not enough for conservationists (Goss-Custard 1993); the monitoring of reproductive and survival rates are essential to allow efficient interpretation of changes in population size (Temple & Wiens 1989) and, in the case of long-lived species, to provide early warning of impending changes in population size (Pienkowski 1991).

There are good theoretical reasons why population density can be a misleading indicator of habitat quality and population productivity (e.g. van Horne 1983) and good empirical studies have shown that densities are not necessarily related to habitat quality in a linear manner (e.g. Ratcliffe 1976, Pienkowski & Evans 1982, Watson *et al.* 1987, Vickery *et al.* 1992, Lawton 1996). Conservation management decisions based solely on changes in population size will have a high chance of being inappropriate (Lawton 1993).

For both short and long-lived species, declines in population size may be due to loss of habitat or a decline in habitat quality leading to decreasing productivity or survival. Without access to good long-term datasets of productivity and survival, remedial conservation action has to be taken without a sound basis or has to wait until some detailed investigative research has been undertaken. The former scenario may provide misjudged action, which is both wasteful of resources and ineffective; the latter scenario defers action, allowing a situation to worsen, increasing the cost of subsequent action or even making restitution impossible.

Additionally for long-lived species, declines in population size may only occur after long periods of low survival or reproduction. The classic example is that of the Peregrine, which in the UK suffered from poor productivity during the 1940s and 1950s, due to DDT contamination, thereby decreasing the buffering capacity of the non-breeding population to withstand severe mortality of breeding adults due to cyclodiene poisoning from the middle 1950s onwards (Ratcliffe 1993). Monitoring of breeding numbers would not have revealed the problem as efficiently as an "early warning" provided by the monitoring of productivity (Pienkowski 1991). Another recent example where declines in productivity have preceded declines in population size is provided by the catastrophic breeding failures of seabirds, and particularly Arctic Terns, in Shetland (Monaghan *et al.* 1989, Walsh *et al.* 1995).

1.2 The value of combing results from different monitoring schemes.

A current and important example relates to severe declines in the population size of 10-20 species of birds on farmland measured by the Common Birds Census over the past 15-20 years. This has identified a major problem in the wider countryside that has to be tackled by conservationists (Fuller *et al.* 1996). While the problem has been identified, the proximate causes of these declines could be changes in productivity or in survival. Autecological studies

of these 10-20 species would be very costly. Such studies would not necessarily be representative of the wider countryside because intensive study plots would be small. They would not produce any reliable or consistent results for 3-5 years.

Results from the Nest Record Scheme have revealed which species have suffered declines in productivity that parallel declines in population size (e.g. Reed Bunting & Bullfinch in Crick *et al.* 1996). More detailed analyses can relatively quickly probe such preliminary results to show, for example, that every aspect of Corn Bunting productivity has increased markedly during its population decline (Crick 1997). In this way the Nest Record Scheme has been able to direct conservation research towards investigating survival rates outside the breeding season for species such as Corn Bunting, but towards the nesting season for Bullfinch and Reed Bunting (cf. RSPB Action Plans for these species). Analyses of Nest Record Cards have suggested that research on declining Golden Plover (Crick 1992a) and Twite (Brown *et al.* 1995) populations in England should be concentrated on productivity studies, providing useful information for English Nature.

Similarly, BTO-led studies of the Lapwing population have shown that productivity declines and not changes in survival appear to have driven the population decline (Peach *et al.* 1994). Detailed analysis of the decline of the Song Thrush population has shown that declines in first-year survival rates were sufficiently large to account for the observed changes in population size; other aspects of survival and productivity have not varied sufficiently to have had a major impact (Baillie 1990, Thomson *et al.* 1997). Analyses of declining Sedge Warbler populations using data from a variety of BTO monitoring schemes showed that changes in over-wintering survival associated with below average rainfall in the Sahel wintering quarters was the most important factor determining population changes (Peach *et al.* 1991). Analyses of the population dynamics of seven Palaearctic-African migrant passerines have shown that over-wintering survival was the most important factor in all cases (Baillie & Peach 1992).

The ability to distinguish quickly, the stage of the life-cycle most affected during population declines will be particularly important when the conservation agencies begin to consider the plight of species listed on their Conservation Importance List (JNCC 1996). This list was drawn up using data from the BTO's Common Birds Census (and other sources of information) to prioritise species of birds of conservation concern. The value of the BTO's historical databases in helping to diagnose the problems facing these species will be invaluable and more cost-effective than initiating between 50 and 100 individual autecological studies.

Of course, this is not the only function of the BTO's Integrated Population Monitoring programme, because, once conservation actions have been initiated, their successes will be monitored and be assessed against the background information provided by the BTO's long-term schemes. This is the only way that conservation bodies can measure the effectiveness of their actions at a national scale in a cost-effective manner.

1.3 The aims of this report

The aims of this report are as follows:

1) To provide a species-by-species overview of the trends in breeding population size and reproductive success over the past 25 years of birds covered by BTO monitoring schemes. This time period is that used to identify species that need to be included on the Conservation Importance List (JNCC 1996).

2) To cover the majority of breeding species, excluding colonial seabirds which are well covered by the JNCC's Seabird Monitoring Programme (Thompson *et al.* 1996), and excluding the majority of species already covered by the Rare Breeding Birds Panel (Ogilvie 1996). Most wintering populations of waterfowl are well covered by the Wetland Bird Survey annual reports (e.g. Waters *et al.* 1996).

3) To cover the UK as a whole.

4) To provide early warning alerts to JNCC and Country Agencies about worrying declines in population size or reproductive success, with special reference to species on the *Conservation Importance List*.

5) To provide a brief synthesis of the species trends, in terms of common trends within species grouped by habitat or foraging habits.

6) To indicate how the report will be developed over the coming years.

The report will be produced regularly and it is meant to be a working document to be used by conservation practitioners as a ready reference guide to the current changes in status of breeding birds in the UK. (Breeding distributions are not included as these are already fully documented in the *New Breeding Atlas* (Gibbons *et al.* 1993) and breeding population sizes are not included because these are to be reported regularly by the Avian Population Estimates Panel (Stone *et al.* 1997)).

The report is produced as part of the BTO's work carried out under contract to 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.

After a section which outlines the methodologies of the monitoring schemes that produce the information contained in the report, there is a species-by-species summary of trends from census, nest recording and ringing schemes. Species are listed in taxonomic (Voous) order.

2. METHODOLOGY

Six monitoring schemes have contributed data to this report. Five provide data on changes in population size: Common Birds Census; Waterways Bird Survey; Breeding Bird Survey; Heronries Census; and Constant Effort Sites ringing scheme. Two schemes provide data on changes in productivity: Nest Record Scheme and Constant Effort Sites Scheme. In addition, information from detailed analyses of the recoveries of birds from the Ringing Scheme is included when relevant.

The methodologies of the monitoring schemes are described below, including information on fieldwork, data preparation, sampling considerations and statistical methods used to analyse the data.

2.1 Common Birds Census

The results from the Common Birds Census (CBC) provide estimates of population trends of almost all of the commoner breeding species in Britain. Annual counts of birds during the breeding season on between 200 and 300 plots around the country allow comparisons of population levels on a year-to-year basis. Focusing on farmland and woodland habitats, the CBC provides reliable indices of population change for around 60 species.

The CBC has been running since 1962 and was instigated to provide sound numerical information on farmland bird populations in the face of rapid changes in agricultural practice. Fieldwork is carried out by a team of dedicated volunteers, currently around 250 strong. The same observers survey the same plots using the same methods year after year. On average, plots are censused for around seven consecutive years but some observers have now been surveying the same sites since the CBC's inception in the early 1960s.

Originally, emphasis was on farmland plots but other habitats including woodland were added shortly afterwards. The sample of farmland plots contains most of the main agricultural land-uses, with plots averaging around 80 hectares in extent. Woodland plots are generally smaller, averaging just over 20 hectares. A small number of plots of other habitats are surveyed annually, including heathlands and small wetlands.

A territory-mapping approach is used to estimate the number and positions of territories of each species present on the survey plot during the breeding season. Volunteers visit their survey plot ten times between late March and early July and all contacts with birds, either by sight or sound, are plotted on large-scale maps. Codes are used to identify the bird's species, sex and age where possible, and also to record activity such as song or nest-building. The registrations are then transferred to species maps, which are returned to the BTO for analysis.

The pattern of registrations reveals the numbers of territories for each species. By applying rigorous rules while analysing the species maps, we can be sure that there is consistency between our estimates from year to year. Comparison of territory totals with those for the same plots in the previous year gives an estimate of the change between those two years and updates the long-running population index for each species. 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 graphs showing CBC population indices for around two-thirds of these.

Observers also provide detailed habitat maps and information from their plots. This makes it possible to match the distribution of bird territories back to habitat features, with the potential for much more detailed studies of bird-habitat relationships.

The CBC was the first national breeding bird monitoring scheme of its kind anywhere in the world and has become the standard by which others schemes and surveys are compared. 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 CBC is often regarded as the benchmark by which other survey methods are compared, it is important that its validity and limitations are understood. There have been many validation studies of the CBC, mainly by the BTO itself. Snow (1965) compared CBC mapping and intensive nest-finding, concluding 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 individuals 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 will not have implications for the CBC's ability to identify population trends. It has also been found 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 similarly that the results of territory analysis are not affected by changes in analysts, once trained (O'Connor and Marchant 1981). Fuller *et al.* (1985) found that farmland CBC plots were representative of ITE land-classes and cropping patterns in lowland England. Work by Moss (1985) examined the extent to which spurious random fluctuations can develop within CBC indices. It was concluded that such changes were small in relation to levels of population change estimated by CBC data.

The CBC is recognised as having many strengths and has been a keystone of bird population monitoring within the United Kingdom for over three decades. However, all monitoring programmes are subject to compromises between the theoretical ideal and what is practicable and cost-effective. The weaknesses of the CBC are largely related to the fact that both fieldwork and analysis are very time-consuming. This inevitably limits the numbers of volunteer birdwatchers who are able to participate in the scheme with the result that areas of low human population density (and therefore density of birdwatchers) are under-represented (Figure 2.1). The constraints imposed by the relatively small sample size mean that it was felt necessary to concentrate on farmland and woodland habitats, with the results that bird population trends in built-up areas and the uplands are little known. As the plots are chosen by the observers, it may be that plots are not always representative of the surrounding countryside and there may be some bias towards bird-rich habitats. It is for these reasons that the Breeding Bird Survey (see 2.3 below) was introduced in 1994 and both surveys will continues for several years in order to allow calibration between the schemes.

Percentage population changes are calculated between successive pairs of years using territory totals from only those plots censused in each of the two years. Index values for individual years are determined, with reference to a datum year when the index is set at 100, by multiplying index values by percentage changes. Trends were analysed by regressing log(index) against Year and $Year^2$ combined, to reveal whether population abundances have

changed in a linear or curvilinear manner over the past 25 years. Percentage changes were calculated from the start and end points of the quadratic regression lines. The significance levels of these trend lines are not provided because the standard assumptions of regression analysis are violated because individual data points cannot be regarded as independent (the same plots were used in the calculation of index values for different years).

2.2 Waterways Bird Survey

The Waterways Bird Survey (WBS) has monitored 19 riparian bird species on canals and rivers throughout the United Kingdom since 1974. As with the Common Birds Census (CBC), the territory mapping method is used to estimate the breeding population of waterbirds on each plot and shows in detail each bird's habitat usage. 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 120 plots distributed throughout the United Kingdom. Geographical spread is slightly different to that of the CBC because there is a higher proportion of plots in the north and west of England. Wales and Scotland are again rather poorly covered.

As with the CBC, 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. Following the withdrawal of JNCC funding, observers were asked to complete their own territory analysis, based on issued guidelines, for the first time in 1994. This has successfully speeded up the processing of WBS data. The results are still checked by BTO staff, and observers' analyses have been found to be consistent with those of BTO analysts.

Population changes are reported annually in *BTO News* for 19 riparian species, five of which are not covered by the CBC and many of the others are found in higher numbers in the WBS sample than in the CBC sample. Long-term trends were summarised in *Population Trends in British Breeding Birds* (Marchant *et al.* 1990) and in the 1992-93 annual report (Marchant & Balmer 1994). For those species covered by both CBC and WBS, there is generally much agreement between the population indices from the two schemes. However, there are one or two exceptions, such as for Lapwing, the populations of which declined rapidly on arable farmland during the late 1980s while numbers on WBS plots, typically representing populations along river flood plains, showed greater stability.

As the WBS employs the same methods as the CBC, the validation studies carried-out for the latter generally hold true for the WBS (see 2.1 above). Marchant *et al.* 1990 found that there has been little change in the composition of the WBS sample in terms of plot habitat type or geographical spread.

Percentage population changes are calculated between successive pairs of years using territory totals from only those plots censused in each of the two years. Index values for individual years are determined, with reference to a datum year when the index is set at 100, by multiplying index values by percentage changes. Trends were analysed by regressing log(index) against Year and Year^2, to reveal whether investigate whether population abundances have changed in a linear or curvilinear manner over the duration of the scheme. Percentage changes were calculated from the start and end points of the regression lines. The

significance levels of these trend lines are not provided because the standard assumptions of regression analysis are violated because individual data points cannot be regarded as independent (the same plots were used in the calculation of index values for different years).

2.3 Breeding Bird Survey

In 1994 the BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched following two years of extensive pilot work and a number of earlier desk-based studies. The introduction of the BBS was a response to the limitations of the Common Birds Census (CBC), which has monitored bird populations since 1962. It was recognised that there was a need to improve the geographical representation of UK bird monitoring and, thereby, both species and habitat coverage. The BBS uses line transects rather than the time consuming territory mapping method used by the CBC. This makes the survey relatively quick and convenient to undertake, thereby encouraging a larger number of volunteers to take part.

Survey squares are 1 x 1 km in size. They are selected using a stratified random sample from within 83 sampling regions. In most cases, these are standard BTO regions based on membership distribution. BBS regions with larger numbers of potential volunteers are allocated a larger number of squares enabling more birdwatchers to become involved in these areas. Note that this does not introduce bias in the results because the analysis takes each region separately in drawing up national statistics. The BBS requires a relatively large sample of survey squares and the aim is to maintain coverage of between two and three thousand squares in the UK. Fieldwork is coordinated through a network of BBS Regional Organisers.

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 made up of two parallel lines, each 1 km in length, although for practical reasons routes typically deviate somewhat from the ideal. Each of these lines is divided into five sections, making a total of ten 200 m sections, and birds and habitats are recorded within these units. The two bird-count visits are made about four weeks apart (ideally early May and early June), ensuring late 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. The average time observers spend per visit is around 90 minutes.

1565 1-km squares were surveyed in the first year (1994) and 1748 in 1995. Numbers are expected to be near 2000 by the end of 1997. The geographical spread of survey squares and the habitats are indicated in Figure 2.3 and Table 2.3.1. More than 200 species have been recorded so far, 76 from more than 100 squares and a further 23 species from 50-100 squares. (For a small number of species, which are colonial or flocking in habit, it is unclear how well they are monitored by the BBS, and they are not currently monitored by other BTO schemes; these are listed in Appendix 1).

Change measures between years are assessed using a loglinear model with Poisson error terms. The mean species count from early and late counts for each square (or single count if a square was only visited once in the breeding season) is used in the model. 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/the number of squares counted in that region) to correct for the under- or over-sampling of BBS regions 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, i.e. a statistically significant change, has taken place.

2.4 Heronries Census

The aim of this census is to collect annual nest counts of Grey Herons *Ardea cinerea* from as many sites as possible in the United Kingdom. The Heronries Census began in 1928 and is the longest-running monitoring scheme for any European bird. Volunteer observers make counts of nests at heron colonies each year. Changes in the numbers of nests, especially over periods of several years, are a clear measure of the population's trend.

Coverage is coordinated by 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 counted each year, providing an accurate estimate of population changes in those two countries (Figure 2.4). Rather few counts are made of heronries in Scotland and Northern Ireland. Counts are submitted to the BTO on cards and the data is entered onto computer at BTO headquarters. As the number of heronries cards submitted is relatively small and the information is of a straightforward nature, staff time required to administrate the scheme is relatively small while the data gathered is much more comprehensive than many species of similar abundance.

As a predator at the top of the freshwater ecosystem food-chain, Grey Herons are excellent indicators of environmental health in the countryside. Population changes are estimated by comparing counts summed across all heronries counted in each of two consecutive years. The estimates of population change are published in *BTO News* annually. Complete heronries censuses were carried-out in England and Wales in 1954 and 1964 while a census covering the whole of Great Britain was made in 1985. The trend graph provided in section 3.4 is calculated by combining the annual estimates of population change with the results from these full censuses to estimate the breeding population (in terms of number of occupied nests) of Grey Herons in England and Wales annually. The trend was analysed by regressing log(number of nests) against Year and Year^2, to reveal whether population abundance had changed in a linear or curvilinear manner over the past 25 years. Percentage change was calculated from the start and end points of the regression line. The significance levels of this trend lines is not provided because the standard assumptions of regression analysis are violated because individual data points cannot be regarded as independent (the same nest counts were used in the calculation of index values for different years).

2.5 Constant Effort Sites Scheme

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 in Peach *et al.* (1996).

The CES Scheme began in 1983 with 46 sites and by 1992 had expanded to encompass 119 sites spread throughout the UK. The distribution of CES sites tends to reflect the distribution of ringers within the UK and Ireland. In 1995, 93 sites were operated in England, 9 in Scotland, 7 in Wales, 3 in Northern Ireland and 2 in the Republic of Ireland. In this report we summarise changes in catch sizes of adults and young, and in the percentage of young, between 1983 and 1995 for 28 species of passerines. Changes in the abundance of adults and young were assessed through application of loglinear Poisson regression models in which year effects (annual changes in abundance) were constrained to change in a linear manner (on a log scale) over time. This provides a simple overall measure of change in abundance over the study period and a test of the statistical significance of the change. At sites where annual catching effort fell below the required 12 visits, annual catch sizes were corrected according to experience during years with complete coverage (see Peach *et al.* in prep for full details). Over-dispersion in some of the juvenile catch data was incorporated into the Poisson regression models where appropriate. Long-term trends in productivity are assessed by regressing the annual percentage young in the total catch against year. In these linear regressions each annual observation was weighted by the reciprocal of the variance of the percentage of young, in order to allow for changing sample sizes over time.

2.6 Nest Record Scheme

The BTO's Nest Record Scheme is the largest, longest running and most highly computerised such scheme in the world and possesses the most advanced and efficient techniques of data gathering, data capture and analyses. There are currently more than 1,000,000 records held by the Trust, of which 35% are computerised.

The primary aim of the Nest Record Scheme is to monitor annually the breeding performance of a wide range of UK birds as a key part of the BTO's data collection. Annual reports are published (e.g. Crick *et al.* 1996b) 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. Brown *et al.* 1995, Crick *et al.* 1994, Crick 1997, Peach *et al.* 1996).

The Nest Record Scheme gathers data on the breeding performance of birds in Britain and Ireland 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. 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 receives a total of more than 30,000 records each year for around 180 species. Typically, the BTO receives 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 the 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 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 since 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.

Six 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 and from egg-laying through to fledging, calculated from the methods of Mayfield (1961, 1975) and Johnson (1979).

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 early losses of individual chicks may be missed by observers; 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 Mayfield's (1961,1975) method and standard errors were calculated after Johnson (1979) (these methods and their assumptions have been fully reviewed in Crick & Baillie 1996). Daily nest failure rates were calculated for egg and nestling periods separately, as well as together ("egg-to-fledge"), each calculation assuming 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. 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, brood sizes and nest failure rates were weighted by sample size. Quadratic regressions were used when the inclusion of a quadratic term provided a significant improvement over linear regression.

Results are only presented if the total sample size of records for a particular variable and species exceed 100, and are presented with a caveat for small sample sizes if the number of records contributing data was between 100 and 250.

2.7 The alert system

A major function of the BTO's monitoring programme is to alert the JNCC and Country Agencies to severe or developing declines in the status of any species of bird. These can include declines in population size or declines in breeding performance or survival. To provide ease of reference to lists of species of conservation importance that form the basis of current conservation policy we have used criteria that are similar to those used in these lists (see section 3).

Alerts will be issued at two levels:

1) High BTO Alert:

- for species which have shown a decline in abundance of at least 50% over the past 25 years, or over the duration of the shorter-running Waterways Bird Survey (22 years) or Constant Effort Sites Scheme (13 years) (whichever is the most appropriate scheme for monitoring the species).

- for species which have shown a sufficiently large fall in breeding performance or survival that population size is likely to be severely affected (when population size is not monitored adequately).

2) Medium BTO Alert:

- for species which have shown a decline in abundance of 25-49% over the past 25 years, or over the duration of the shorter-running Waterways Bird Survey (22 years) or Constant Effort Sites Scheme (13 years) (whichever is the most appropriate scheme for monitoring the species).

- for species which have shown a statistically significant decline in breeding performance or survival.

In addition, we note "Recovery" for those species currently on the *Conservation Importance List* (JNCC 1996), due to declines in abundance as measured by the Common Birds Census, which would no longer warrant inclusion if the list was drawn up using the monitoring data in this report.

It should be noted that the List of Birds of Conservation Importance was drawn up using very conservative criteria, and that the BTO Alerts are issued for some species that would not satisfy these criteria. For example, the CBC has measured severe population declines for species that are monitored only in areas which are not wholly representative of the majority of the species' ranges in the UK. However, we consider that such declines are potentially important and, following a precautionary principle, need to be raised with the conservation authorities. For example, the severe decline (55%) of Tree Pipits on CBC plots indicates an

important problem for the species in southern England. Although Tree Pipits occur at higher densities in upland areas of Wales, north England and Scotland, they have not been monitored there until the advent of the BBS. The declines in southern England may or may not be an indicator of declines elsewhere in the Tree pipit's range but unless conservation organisations are alerted to the fact, they will not be able to make informed decisions about the possibility.

In addition, we use declines measured by the WBS and CES as the basis for BTO Alerts when these schemes are the most appropriate for monitoring any particular species. Thus, for instance, Grey Wagtail is primarily a waterside bird and is better monitored by the WBS than CBC. Thus we issue an alert for this species given a 29% decline on WBS plots, even though it has only declined by 14% on CBC plots.

Finally, we issue some alerts on the basis of significant declines in productivity as measured by the Nest Record Scheme. This is done occasionally in the absence of information on population change when declines in productivity may be the only indication we have of the "health" of a particular species in the UK. Occasionally it is done for species that have declined in abundance by less than 25% but for which declines in productivity may presage a population decline.

3. SPECIES ACCOUNTS

Depending on the availability of data (all species are not covered by each scheme), each account usually consists of the following:

1) *Species Name & Alert Status*: next to species name we state whether the BTO issues either an **Alert**, on the basis of changes in population abundance or demography or whether the species has undergone some population **Recovery** since it was listed on the *Conservation Importance List*. (See section 2.7, above).

2) *Conservation importance*: the conservation status of the species is graded with reference to the JNCC/Country Agency *Conservation Importance List* (JNCC 1996) as follows:

- **Table 1**: IUCN globally threatened species. These species require monitoring of populations and the preparation of International Species Action Plans to ensure effective conservation.

- **Table 2**: Uncommon and, rapidly or historically, declining British breeding birds. These species require monitoring of populations and the preparation of Species Action Plans to ensure their effective conservation.

- **Table 3**: Rapidly declining, but common British breeding birds. For these species the JNCC and Country Agencies will, in collaboration with Non-Governmental Organisations, investigate causes of decline and consider their conservation requirements and, where appropriate, prepare Species Action Plans to ensure effective conservation.

- **Table 4**: Species listed as moderately declining, historically declining but common, internationally important, localised or 'threatened in Europe' British breeding birds. These species require monitoring of populations and, where appropriate, the preparation of Species Action Plans to ensure effective conservation.

- **Unlisted**: Other British breeding birds.

Species are also categorised with reference to the *Birds of Conservation Concern* listing (Gibbons *et al.* 1996) as follows:

- **Red**: generally equivalent to Tables 1, 2 & 3 of the JNCC list.

- **Amber**: generally equivalent to Table 4.

- **Green**: generally equivalent to unlisted.

The UK Biodiversity Steering Group has produced three lists of species of conservation concern (Anon. 1995). These are indicated as follows:

- **Biodiversity Steering Group Short List**: species which are globally threatened or rapidly declining in the UK (i.e. by at least 50% in the last 25 years); and for which costed Action Plans have been prepared.

- **Biodiversity Steering Group Middle List**: species which are globally threatened or rapidly declining in the UK (i.e. by at least 50% in the last 25 years); and for which the Biodiversity steering group aims to produce costed Action Plans by 1998.

- **Biodiversity Steering Group Long List**: this includes species on Short and Middle Lists but also species for which UK has >25% of world or appropriate biogeographical population; species for which numbers or range have declined between 25 and 49% over the last 25 years; species which are found in < 15 10-km squares in the UK; and species listed in international or national conservation legislation.

3) *Species summary*: this provides a brief summary of the trends detailed for the species and indicates why such changes might have occurred with reference to published information when available.

4) *Population trends graph*: this shows the changes in abundance for that species over the past 25 years, as measured by the Common Birds Census or Waterways Bird Survey.

5) *Population trends table*: this provides details of percentage changes in population size over the past 25 years (or a shorter period, depending on the availability of data). It lists the period of years concerned and any caveats that must be considered when interpreting the changes. Statistical significance is indicated by a "*" (at $P<0.05$) or non-significance by "n.s.". The caveats are:

- **Small sample**: for CBC & WBS data, a sample of less than 20 census plots was available for at least one of the years; for CES data, a sample of less than 20 plots was available for more than half the years; for BBS data, a sample of only 50-99 plots was available for at least one of the years.

- **Low densities**: the CBC or WBS data may not be representative of the population as a whole because the average abundance of a species in 10-km squares containing CBC or WBS plots was less than that in other 10-km squares of the species' distribution in the UK (as measured from *New Breeding Atlas* data (Gibbons *et al.* 1993)).

- **Unrepresentative?**: it is unknown whether the CBC or WBS data are representative of the UK population because the average abundance of a species in 10-km squares containing CBC or WBS plots and in other 10-km squares of the species' distribution could not be calculated (as measured from *New Breeding Atlas* data (Gibbons *et al.* 1993)).

6) *Productivity trends table*: this provides details of changes in productivity over the past 25 years (or a shorter period, depending on the availability of data). It lists the period of years

concerned and the existence of any caveats that must be considered when interpreting the data. Productivity changes are indicated as positive (+ve) or negative (-ve), or as a combination if changes have been curvilinear (e.g. "+ve to -ve" to indicate that productivity has increased then decreased). Changes are indicated as statistically significant (at $P<0.05$) by a "*" or non-significant by "n.s.". When significant trends in clutch size, brood size or laying date occur, the absolute values of the changes, as predicted by regression analysis, are also provided. The caveats that may apply are:

- **Small sample**: only 100-250 nest records were available for analysis over the years concerned; for CES, a sample of less than 20 plots was available for more than half the years.

- **Unreliable trend**: although statistically significant, such a trend is probably caused by the undue effect of a small number of outlying data points.

7) *Notable demographic graphs*: notable graphs of changes recorded by the Constant Effort Sites Scheme or Nest Record Scheme illustrate significant trends in population size or productivity.

3.1.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

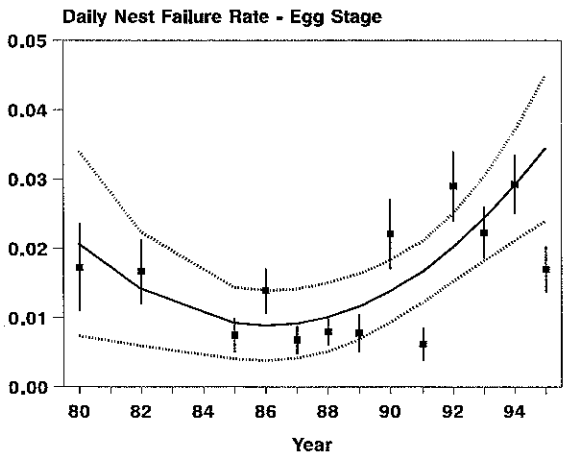
3.1.2 SPECIES SUMMARY

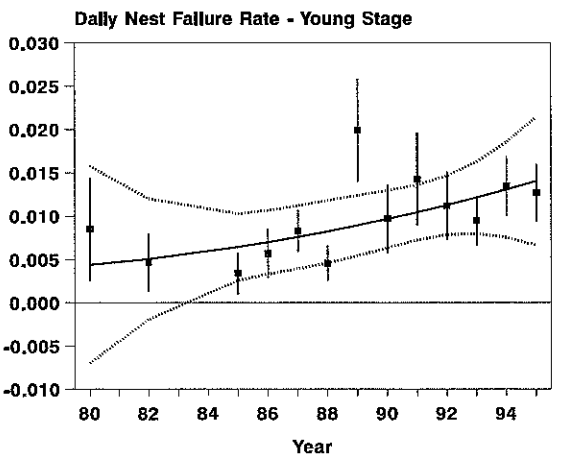
Increasing nest failure rates during egg and young stages is worrying for this species because of its unfavourable European conservation status. It should be noted that, although many of the nest records come from Orkney, there are reasonable numbers also from Shetland, mainland Scotland and Western Isles. Population Trends are not monitored by the BTO.

Table 3.1.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1980-95	-ve to+ve	*	
NRS - young stage nest losses d^{-1}	1980-95	+ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1980-95	-ve to+ve	*	
NRS - clutch size	1980-95	-ve	n.s.	
NRS - brood size	1980-95	+ve	n.s.	

Figure 3.1.2: Long-term trends from the Nest Record Scheme





3.2 LITTLE GREBE *Tachybaptus ruficollis*

3.2.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.2.2 SPECIES SUMMARY

There is little evidence of any population change or distributional change for this widespread species (Gibbons *et al.* 1993).

Figure 3.2.1:
Population trend from the Waterways Bird Survey

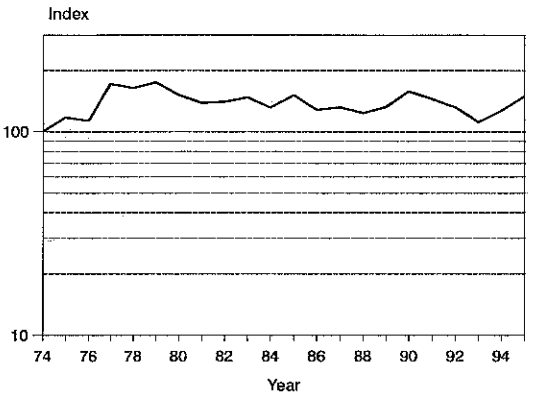


Table 3.2.1: Population trends

	Years	Change %	Caveat
WBS	1974-95	0	Small Sample

3.3 GREAT CRESTED GREBE *Podiceps cristatus*

3.3.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.3.2 SPECIES SUMMARY

Currently poorly monitored except by periodic national surveys. Over the long term this population has increased substantially with a decline in persecution (for their plumes) and the creation of new habitat such as flooded gravel pits (Gibbons *et al.* 1993).

Table 3.3.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	+18 n.s.	Small Sample

3.4 GREY HERON *Ardea cinerea*

3.4.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.4.2 SPECIES SUMMARY

The continuing population size of this species in England and Wales in now at an all-time high since the Heronries Census began in 1928. The species has spread into new parts of the UK and may have benefitted from a combination of warmer winters, decreased persecution and less pollution (Gibbons *et al.* 1993).

Figure 3.4.1:
Population trend from the Heronries Census

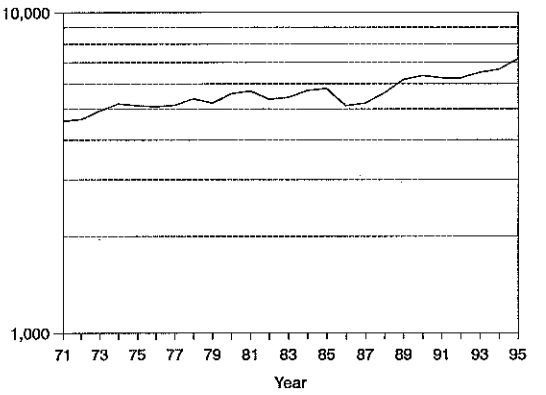


Table 3.4.1: Population trends

	Years	Change %	Caveat
Heronries Census	1971-95	+40	
BBS	1994-95	+21 *	

Table 3.4.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	-ve	n.s.	Small Sample
NRS - brood size	1971-95	+ve	n.s.	

3.5 MUTE SWAN *Cygnus olor*

3.5.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.5.2 SPECIES SUMMARY

The population of Mute Swans has shown encouraging increases since the introduction of alternatives to lead weights for angling and a recent run of mild winters (Gibbons *et al.* 1993).

Figure 3.5.1:
Population trend from the Waterways Bird Survey

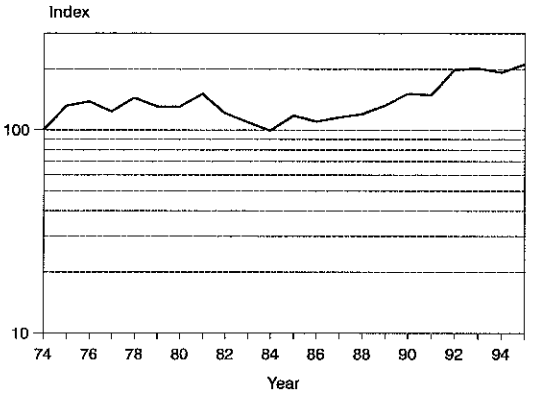


Table 3.5.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+75	Unrepresentative? & Small Sample
WBS	1974-95	+55	Unrepresentative?
BBS	1994-95	-22 *	

Table 3.5.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

3.6 MALLARD *Anas platyrhynchos*

3.6.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Longlist

3.6.2 SPECIES SUMMARY

The population of Mallard has increased considerably over the last 20-25 years, which may be due to large-scale release programmes by wildfowlers (Marchant *et al.* 1990).

Figure 3.6.1:
Population trends from the Common Birds Census and the Waterways Bird Survey

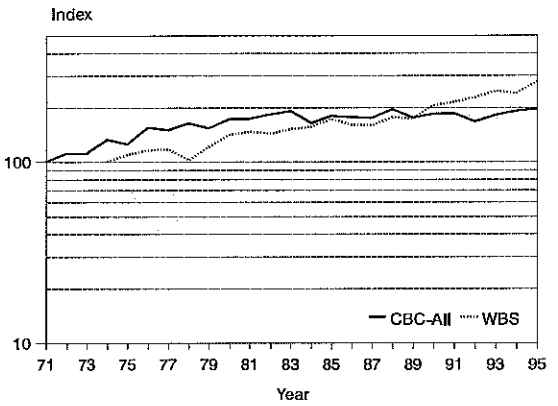


Table 3.6.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+67	
CBC - Farmland	1971-95	+34	
WBS	1974-95	+153	
BBS	1994-95	+6 n.s.	

3.7 TUFTED DUCK *Aythya fuligula*

3.7.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.7.2 SPECIES SUMMARY

Tufted Duck is widespread and has shown some population increase on CBC plots, most of which are in farmland, but not waterways. It is thought that the spread of the zebra mussel has helped this species (Gibbons *et al.* 1993).

Figure 3.7.1:
Population trend from the Waterways Bird Survey

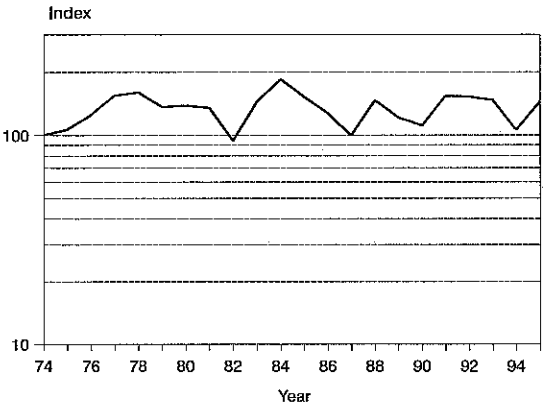


Table 3.7.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+54	Unrepresentative? & Small Sample
WBS	1974-95	+8	Unrepresentative?
BBS	1994-95	+9 n.s.	

3.8.1 CONSERVATION IMPORTANCE

Table 2/Red (Historial decline)
Biodiversity Steering Group Long List

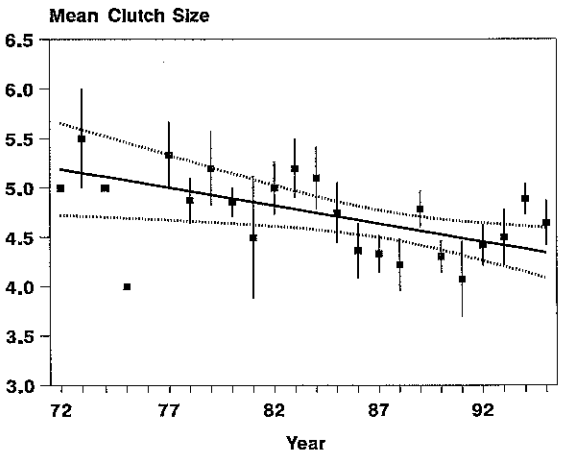
3.8.2 SPECIES SUMMARY

Listed because of substantial declines over the last 200 years, this species has suffered from persecution on grouse moors (Etheridge *et al.* (in press)) and more recently from loss of habitat as forestry plantations have matured (Bibby & Etheridge 1993). A High BTO Alert is issued because average clutch size has declined substantially since the mid 1980s, associated with the non-significant increases in nest losses.

Table 3.8.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1978-95	(−ve to +ve*)		Unreliable Trend
NRS - young stage nest losses d^{-1}	1978-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1978-95	+ve	n.s.	
NRS - clutch size	1971-95	5.18 - 4.34	*	
NRS - brood size	1971-95	−ve	n.s.	

Figure 3.8.2: Long-term trend from the Nest Record Scheme



3.9 SPARROWHAWK *Accipiter nisus*

3.9.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.9.2 SPECIES SUMMARY

The population has shown a steady recovery since the declines caused by organochlorine pesticides in the 1950s and 1960s (Newton 1986). The significant improvements in reproductive performance over the last 25 years are likely to have been a contributory factor.

Figure 3 9.1
Population trend from the Common Birds Census

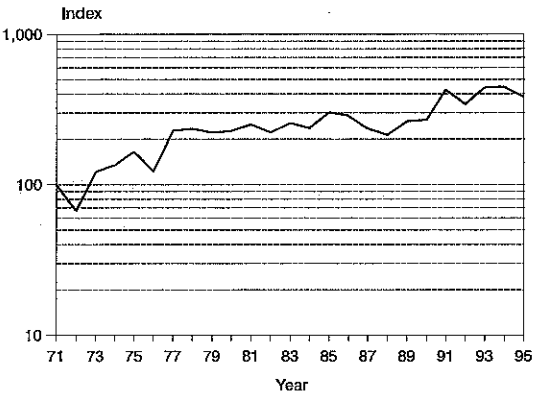


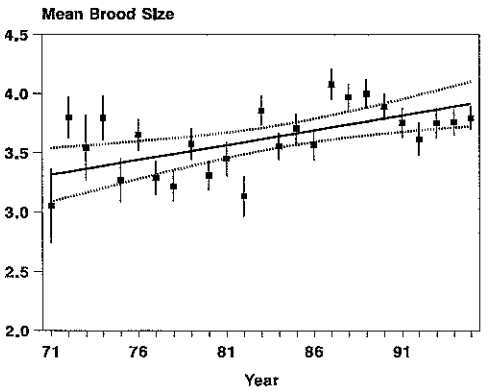
Table 3.9.1: Population trends

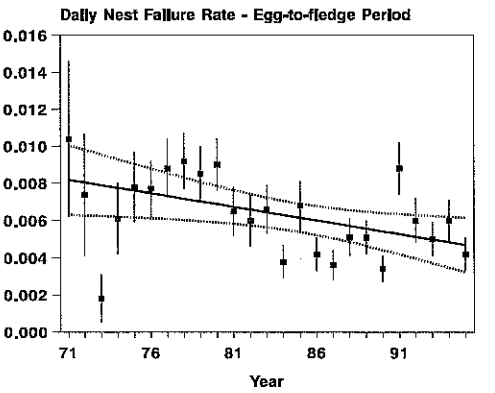
	Years	Change %	Caveat
CBC - all	1971-95	+286	Unrepresentative? & Small Sample
BBS	1994-95	-10 n.s.	

Table 3.9.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	3.31 - 3.91	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.9.2: Long-term trends from the Nest Record Scheme





3.10 BUZZARD *Buteo buteo*

3.10.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.10.2 SPECIES SUMMARY

The Buzzard population has been spreading eastwards gradually from its former restricted western distribution, (a consequence of earlier persecution) which explains why the population increase has only recently been apparent in the eastern-biassed CBC dataset. The population spread is linked to decreased persecution, recovering rabbit populations after their suppression by myxomatosis, and the restriction in use of organochlorine pesticides, all of which may have helped to improve nesting success.

Figure 3.10.1:
Population trend from the Common Birds Census

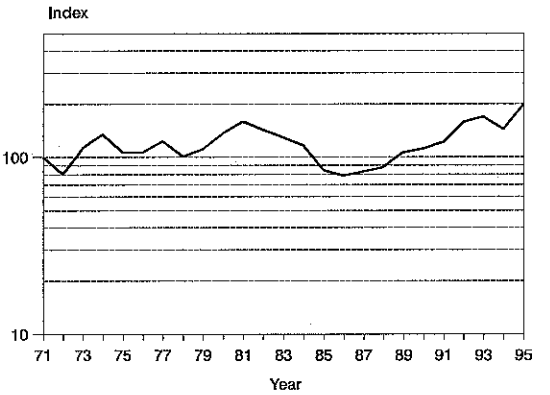


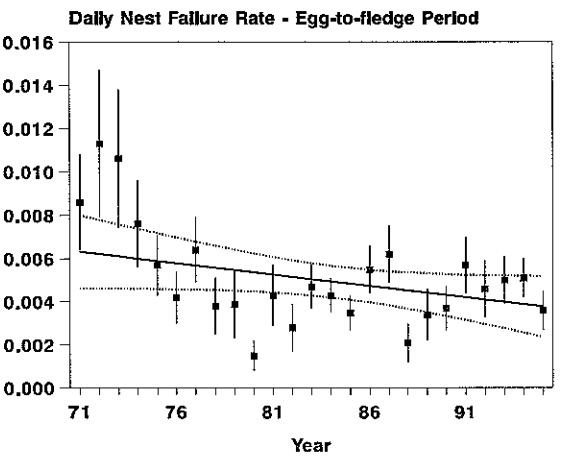
Table 3.10.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+33	Unrepresentative? & Small Sample
BBS	1994-95	+ 11 *	

Table 3.10.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	+ve	n.s.	Small Sample

Figure 3.10.2: Long-term trend from the Nest Record Scheme



3.11.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.11.2 SPECIES SUMMARY

The reasons for the Kestrel's population decline, which requires a Medium BTO Alert, are unknown but may be linked to farmland habitat degradation and declines in its small mammal prey populations as a result of agricultural intensification (Gibbons *et al.* 1993). Improvements in breeding performance are likely to be the result of the declining impact of organochlorine pesticides.

Figure 3.11.1:
Population trend from the Common Birds Census

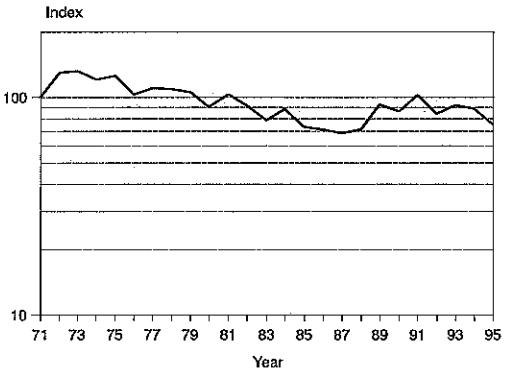


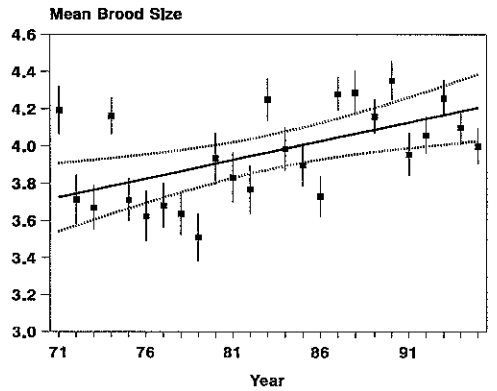
Table 3.11.1: Population trends

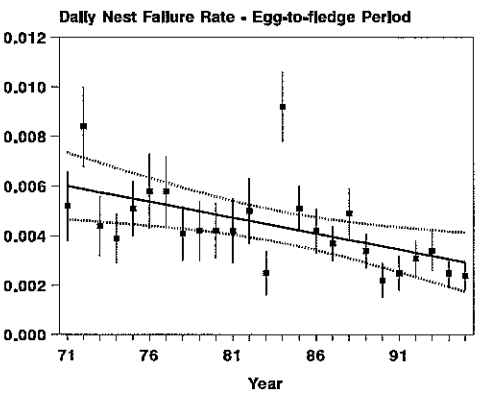
	Years	Change %	Caveat
CBC - all	1971-95	-35	
BBS	1994-95	-16 *	

Table 3.11.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d $^{-1}$	1971-95	-ve	n.s.	
NRS - young stage nest losses d $^{-1}$	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d $^{-1}$	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	3.72 - 4.21	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.11.2: Long-term trends from the Nest Record Scheme





3.12 MERLIN *Faclo columbarius*

3.12.1 CONSERVATION IMPORTANCE

Table 2/Red (Historial decline)
Biodiversity Steering Group Long List

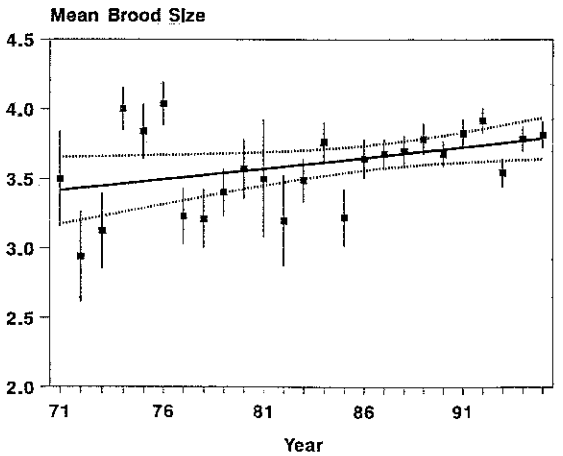
3.12.2 SPECIES SUMMARY

Having declined substantially over the past two centuries, there are indications that it has increased recently, perhaps associated with an increased use of forest edge as a nesting habitat (Parr 1994). Breeding performance has improved since the 1960s, probably linked to the declining influence of organochlorine pesticides (Crick 1993). Population trends are not monitored by the BTO.

Table 3.12.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	3.41 - 3.79	*	
NRS - laying date	1971-95	-ve	n.s.	Small Sample

Figure 3.12.2: Long-term trend from the Nest Record Scheme



3.13 HOBBY *Falco subbuteo*

3.13.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.13.2 SPECIES SUMMARY

This species is poorly monitored by standard BTO monitoring schemes due to its low population density and unobtrusive habits. Its distribution has increased markedly northwards in England since the 1970s (Gibbons *et al.* 1993), perhaps linked to increases in its dragonfly prey supplies (Prince & Clarke 1995) and a decreasing dependency on its traditional heathland habitat. Productivity appears not to have changed substantially over the last 25 years.

Table 3.13.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	Small Sample
NRS - brood size	1971-95	+ve	n.s.	

3.14 PEREGRINE FALCON *Falco peregrinus*

3.14.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

3.14.2 SPECIES SUMMARY

Although Peregrine has an unfavourable conservation status in Europe, its population size and distribution in the UK have largely recovered from the detrimental effects of organochlorine pesticides in the 1950s and 1960s; however, populations have declined recently in north-west Scotland and the Northern Isles (Crick & Ratcliffe 1995). The breeding performance of this species appears to have fully recovered but declined in the latter areas. Populations size of breeding pairs has been censused every 10 years by BTO/JNCC/RSPB/Raptor Study Groups since 1961. Surveys: 1961:385 pairs; 1971:489 pairs; 1981:728 pairs; 1991: 1283 pairs (Ratcliffe 1996).

Table 3.14.2: Productivity trends

	Years	Change %		Caveat
NRS - egg stage nest losses d^{-1}	1978-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1978-95	−ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1978-95	−ve	n.s.	
NRS - clutch size	1971-95	−ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	+ve	n.s.	Small Sample

3.15 RED GROUSE *Lagopus lagopus*

3.15.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.15.2 SPECIES SUMMARY

This species has been poorly covered by BTO surveys in the past, but surveys by the Game Conservancy Trust have shown long-term declines that appear to be due to degradation and loss of moorland habitat and increased predation by corvids and foxes (Hudson 1992).

Table 3.15.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	+13 n.s.	Small Sample

3.16 RED-LEGGED PARTRIDGE *Alectoris rufa*

3.16.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.16.2 SPECIES SUMMARY

This species was introduced in the 18th century and has a distribution restricted mainly to England, although there has been some spread northwards and westwards (Gibbons *et al.* 1993). The population is maintained by releases for game shooting and the decline in the CBC index may be linked to declining farmland habitat quality but is more likely to be due to the cessation of releasing Chukars *A. chukar*, a similar-looking "confusion species" that resulted in Red-legged x Chukar hybrids. This is why no BTO Alert is issued for the species.

Figure 3.16.1:
Population trend from the Common Birds Census

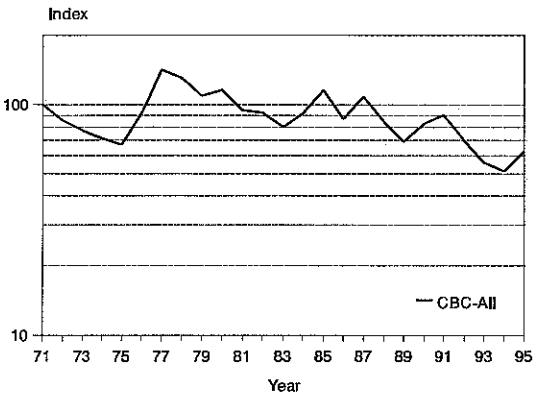


Table 3.16.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-31	
CBC - Farmland	1971-95	-20	Small Sample
BBS	1994-95	+12 n.s.	

3.17 GREY PARTRIDGE *Perdix perdix* HIGH BTO ALERT

3.17.1 CONSERVATION IMPORTANCE

Table 3/Red (50% Population decline)
Biodiversity Steering Group Short List

3.17.2 SPECIES SUMMARY

This is a species of considerable conservation importance because of its massive population decline, requiring a High BTO Alert, which shows no sign of recovery. The cause of the decline is linked strongly to low chick survival rates as a result of herbicidal destruction of the food plants of the insect prey of chicks (Potts 1986, Campbell *et al.* 1997).

Figure 3.17.1:
Population trend from the Common Birds Census

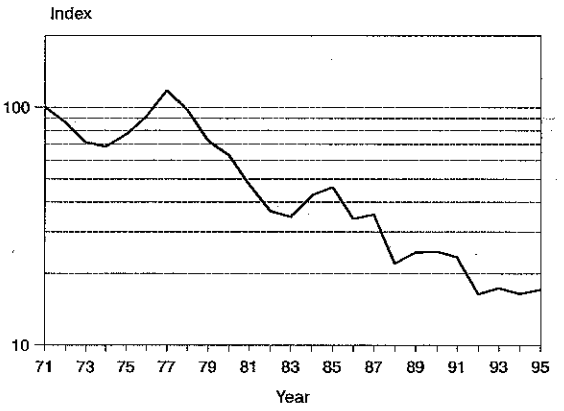


Table 3.17.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-86	
BBS	1994-95	-13 n.s.	

3.18 PHEASANT *Phasianus colchicus*

3.18.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.18.2 SPECIES SUMMARY

The populations of this gamebird have increased, but population levels are mainly related to the release of captive-bred stock by game-shooting interests (Marchant *et al.* 1990).

Figure 3.18.1:
Population trends from the Common Birds Census

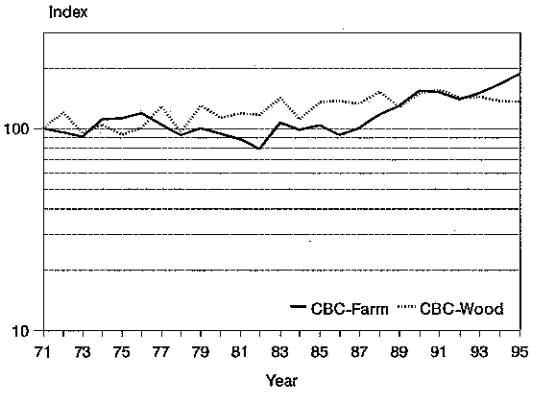


Table 3.18.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+76	
CBC - Farmland	1971-95	+67	
CBC - Woodland	1971-95	+51	
BBS	1994-95	0 n.s.	

3.19.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.19.2 SPECIES SUMMARY

While populations on WBS plots have remained relatively stable, declines on CBC plots may indicate a decline in habitat suitability away from waterways (Marchant *et al.* 1990). Distributional contractions have occurred in Scotland, Wales and the south-west England. Significant declines in productivity have warranted the inclusion of this species of Medium BTO Alerts.

Figure 3.19.1:
Population trends from the Common Birds Census and the Waterways Bird Survey

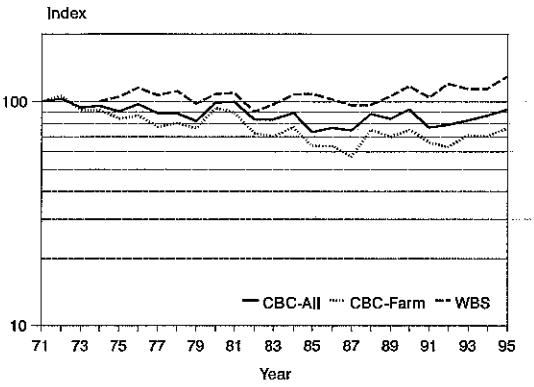


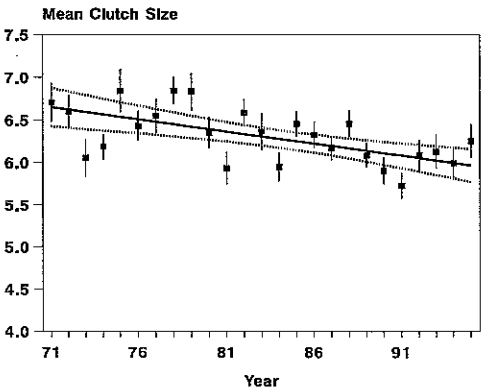
Table 3.19.1: Population trends

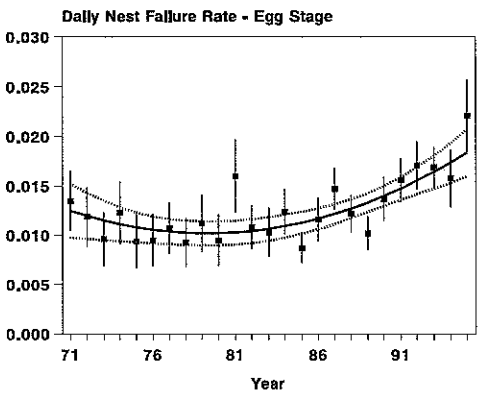
	Years	Change %	Caveat
CBC - all	1971-95	-16	
CBC - Farmland	1971-95	-32	
WBS	1974-95	+11	
BBS	1994-95	+11 n.s.	

Table 3.19.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	6.65 - 5.96	*	
NRS - brood size	1971-95	3.23 - 3.93	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.19.2: Long-term trends from the Nest Record Scheme





3.20 COOT *Fulicia atra*

3.20.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.20.2 SPECIES SUMMARY

It is uncertain why Coot number have increased on WBS plots, although it could reflect a population overflow from standing water bodies (Marchant *et al.* 1990).

Figure 3.20.1:
Population trends from the Common Birds Census and the Waterways Bird Survey

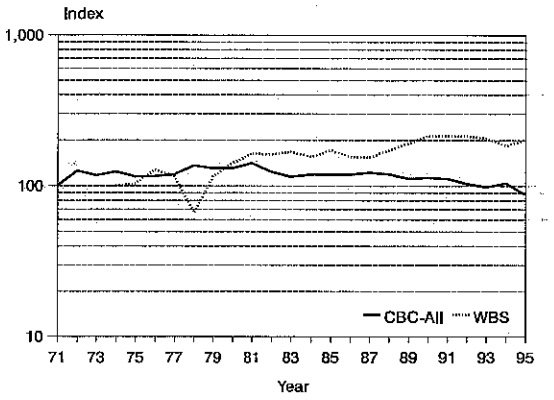


Table 3.20.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-16	Unrepresentative?
WBS	1974-95	+124	Unrepresentative? & Small Sample
BBS	1994-95	+21 *	

3.21 OYSTERCATCHER *Haematopus ostralegus*

3.21.1 CONSERVATION IMPORTANCE

Table 4/Amber (Wintering population)
Biodiversity Steering Group: Unlisted

3.21.2 SPECIES SUMMARY

The waterways population increased up to the mid 1980s, probably associated with the colonisation of inland areas in England and Wales (Gibbons *et al.* 1993). The trend towards earlier average laying dates may be linked to this habitat shift or to climate change (Crick *et al.* 1997).

Figure 3.21.1:
Population trend from theWaterways Bird Survey

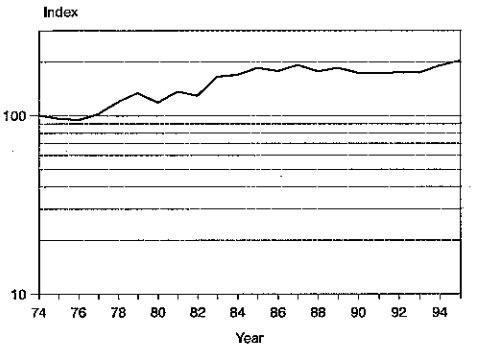


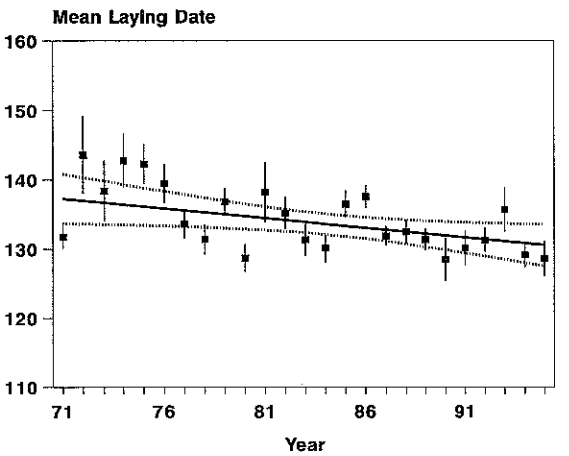
Table 3.21.1: Population trends

	Years	Change %	Caveat
WBS	1974-95	+109	Small Sample
BBS	1994-95	-26 *	

Table 3.21.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	137 - 130	*	

Figure 3.21.2: Long-term trend from the Nest Record Scheme



3.22 RINGED PLOVER *Charadrius hiaticula*

3.22.1 CONSERVATION IMPORTANCE

Table 4/Amber (Wintering population)
Biodiversity Steering Group Long List

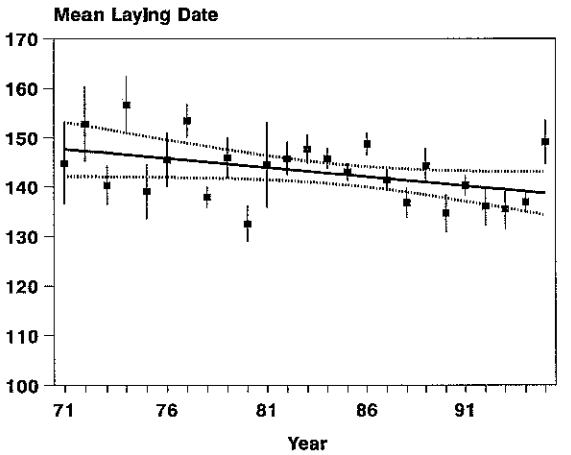
3.22.2 SPECIES SUMMARY

Although the breeding population is not monitored annually by the BTO; its distribution has spread inland, especially in England, probably associated with the increase in number of gravel pits and reservoirs (Gibbons *et al.* 1993). The trend towards earlier average laying dates may be linked to this distributional change or to climate change (Crick *et al.* 1997).

Table 3.22.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	148 - 139	*	

Figure 3.22.2: Long-term trend from the Nest Record Scheme



3.23 GOLDEN PLOVER *Pluvialis apricaria*

3.23.1 CONSERVATION IMPORTANCE

Table 4/Amber (Wintering population)
Biodiversity Steering Group Long List

3.23.2 SPECIES SUMMARY

Generally thought to be declining (Gibbons *et al.* 1993), this species has been relatively poorly monitored, although BBS should provide better coverage in the future. The large decline between 1994 and 1995 may have been influenced by the recording of non-breeding flocks close to the breeding grounds (Gregory *et al.* 1996). Detailed analysis of nest record cards suggests the occurrence of a decline in nest survival on grass moors compared to heather moors, which might be linked to increased sheep stocking rates (Crick 1992a, Fuller 1996).

Table 3.23.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	-63 *	Small Sample

Table 3.23.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	Small Sample

3.24.1 CONSERVATION IMPORTANCE

Table 4/Amber (Wintering population)
Biodiversity Steering Group Long List

3.24.2 SPECIES SUMMARY

The population declined substantially on CBC plots through the 1980s, requiring a High BTO Alert although the highest densities occur in the north of England and Scotland, in the area less well covered by CBC. The declines are strongly linked to changes in agricultural practice (Hudson *et al.* 1994) and may be due to declines in productivity (nestling survival rates) because adult and first year survival rates show no trend through time (Peach *et al.* 1994).

Figure 3.24.1:
Population trend from the Common Birds Census

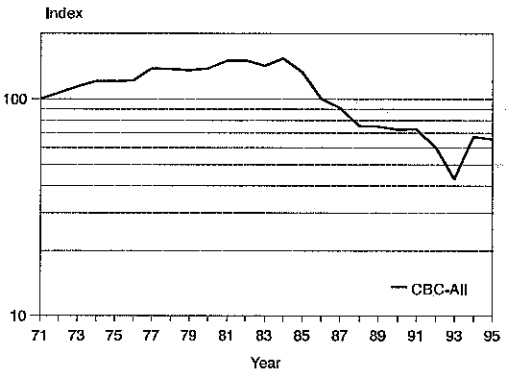


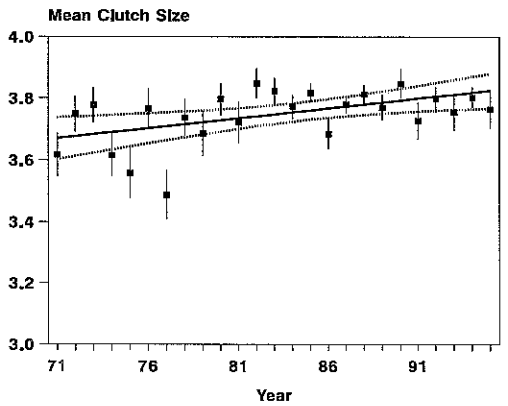
Table 3.24.1: Population trends

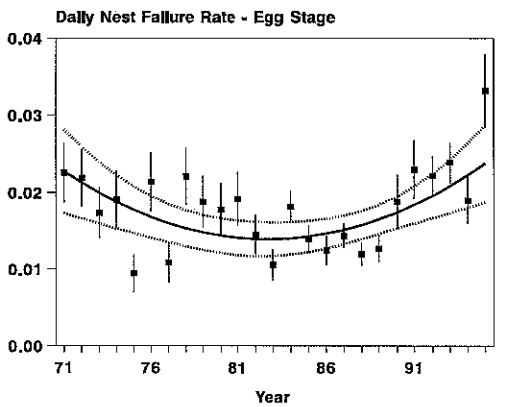
	Years	Change %	Caveat
CBC - all	1971-95	−55	Low Densities
CBC - Farmland	1971-95	−63	Low Densities
BBS	1994-95	+21 *	

Table 3.24.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	−ve to +ve	*	
NRS - clutch size	1971-95	3.67 - 3.82	*	
NRS - laying date	1971-95	−ve	n.s.	

Figure 3.24.2: Long-term trends from the Nest Record Scheme





3.25 SNIPE *Gallinago gallinago*

3.25.1 CONSERVATION IMPORTANCE

Unlisted/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.25.2 SPECIES SUMMARY

Due to its secretive and cryptic nature this species is relatively poorly monitored, although its distribution has contracted substantially with the drainage and intensification of grassland management (Gibbons *et al.* 1993).

Table 3.25.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	+3 n.s.	

Table 3.25.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	-ve n.s.	Small Sample

3.26.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group

3.26.2 SPECIES SUMMARY

This crepuscular and natural species has undergone a substantial range contraction which is reflected in the population decline in the CBC index, requiring a High BTO Alert. Reasons for this decline are uncertain but may include loss of habitat from forest maturation and lower spring rainfall (Gibbons *et al.* 1993).

Figure 3.26.1:
Population trend from the Common Birds Census

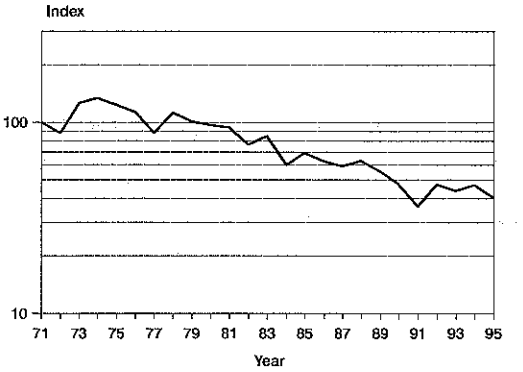


Table 3.26.1: Population trends

	Years	Change	Caveat
CBC - all	1971-95	-69	Unrepresentative? & Small Sample

3.27.1 CONSERVATION IMPORTANCE

Table 4/Amber (>20% of European population)
Biodiversity Steering Group Long List

3.27.2 SPECIES SUMMARY

The Curlew's population range has contracted in the Midlands and south-west England, which contains many of the CBC plots, probably due to land drainage and agricultural intensification (Gibbons *et al.* 1993). The population decline on CBC plots requires a Medium BTO Alert. The trend towards earlier average laying dates may be linked to climate change (Crick *et al.* 1997).

Figure 3.27.1:
Population trends from the Common Birds Census & the Waterways Bird Survey

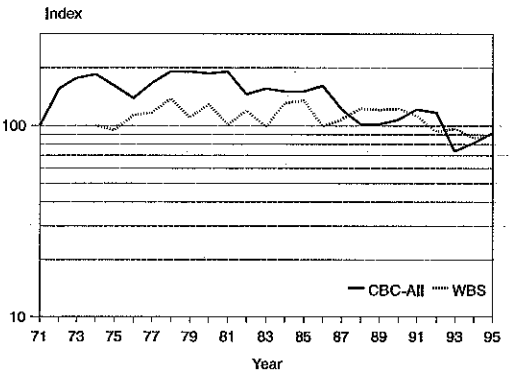


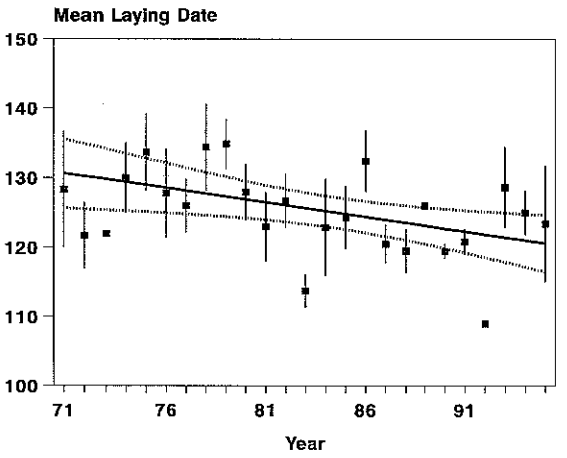
Table 3.27.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-25	Unrepresentative? & Small Sample
BBS	1994-95	+4 n.s.	

Table 3.27.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	131-121	*	

Figure 3.27.2: Long-term trend from the Nest Record Scheme



3.28.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

3.28.2 SPECIES SUMMARY

Redshank has suffered a substantial range contraction in all parts of the UK, probably due to loss of wetlands to drainage and agricultural intensification (Gibbons *et al.* 1993). The decline in CBC index warrants a Medium BTO Alert. The reasons for declining egg stage losses are unclear, but the trend towards earlier average laying dates may be linked to climate change (Crick *et al.* 1997).

Figure 3.28.1:
Population trends from the Common Birds Census & the Waterways Bird Survey

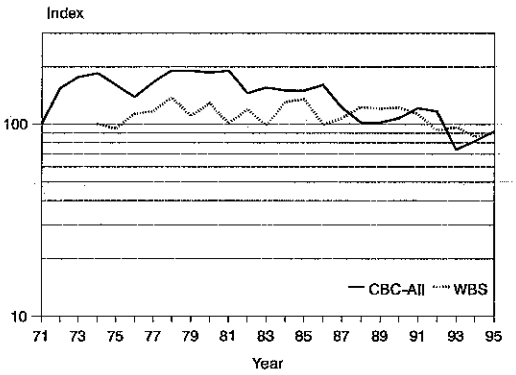


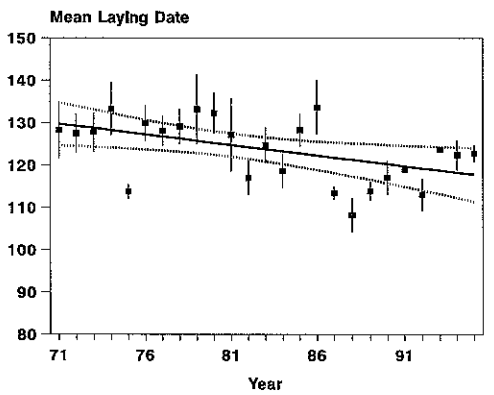
Table 3.28.1: Population trends

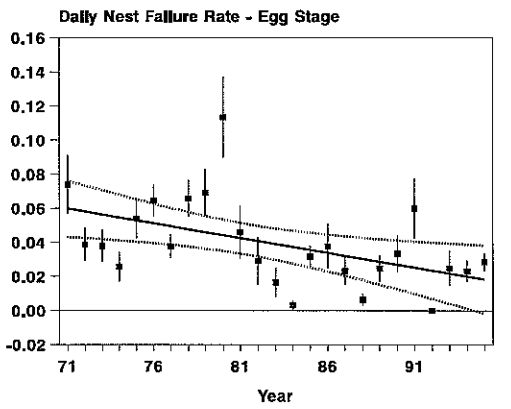
	Years	Change %	Caveat
CBC - all	1971-95	-47	Unrepresentative & Small Sample
WBS	1974-95	-13	Unrepresentative? & Small Sample
BBS	1994-95	+4 n.s.	Small Sample

Table 3.28.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	130 - 118	*	Small Sample

Figure 3.28.2: Long-term trends from the Nest Record Schemes





3.29 COMMON SANDPIPER *Actitis hypoleucos*

3.29.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.29.2 SPECIES SUMMARY

Although there is some evidence for a slight range contraction at the southern edges of its distribution in England and Wales (Gibbons *et al.* 1993), its population trend has remained fairly stable.

Figure 3.29.1:
Population trend from the Waterways Bird Survey

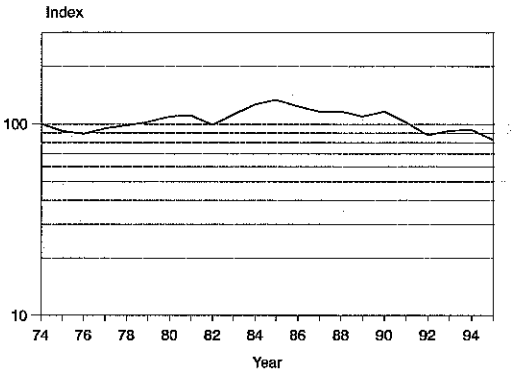


Table 3.29.1: Population trends

	Years	Change %	Caveat
WBS	1974-95	+1	Small Sample
BBS	1994-95	-27 n.s.	Small Sample

3.30 FERAL PIGEON/ROCK DOVE *Columba livia*

3.30.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.30.2 SPECIES SUMMARY

The BBS will provide the first monitoring of this economically important species. It may be useful in future to try and separate survey squares which cover mainly wild Rock Doves from those that cover feral and domestic pigeons.

Table 3.30.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	-6 n.s.	

3.31 STOCK DOVE *Columba oenas*

3.31.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.31.2 SPECIES SUMMARY

Populations have increased substantially, mainly during the 1970s, probably as a result of recovery from the effects of organochlorine seed-dressings in the 1950s and 1960s (Gibbons *et al.* 1993). The improvements in nest success may also be linked to this. This is one of the few species which has a trend towards later average laying dates (Crick *et al.* 1997).

Figure 3.31.1:
Population trends from the Common Birds Census

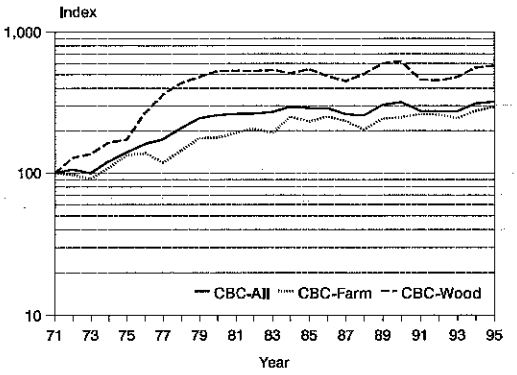


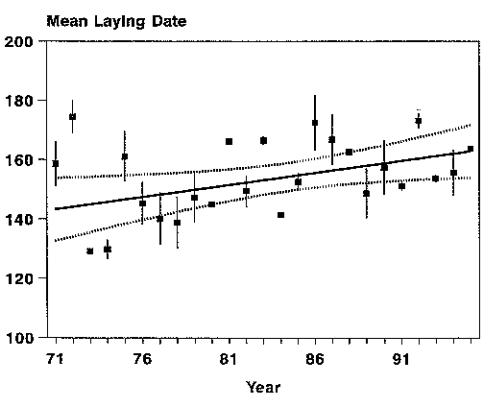
Table 3.31.1: Population trends

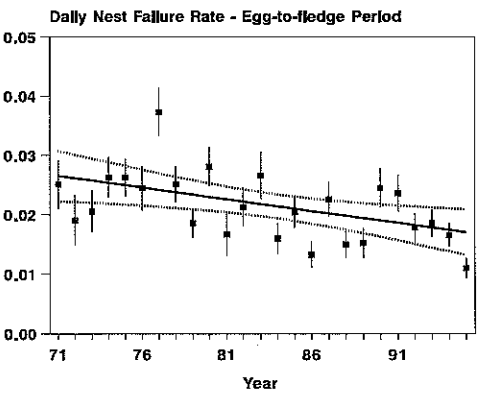
	Years	Change %	Caveat
CBC - all	1971-95	+196	
CBC - Farmland	1971-95	+205	
CBC - Woodland	1971-95	+306	Small Sample
BBS	1994-95	+9 n.s.	

Table 3.31.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	1.81 - 1.89	*	
NRS - laying date	1971-95	143 - 163	*	

Figure 3.31.2: Long-term trends from the Nest Record Scheme





3.32 WOODPIGEON *Columba palumbus*

3.32.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.32.2 SPECIES SUMMARY

This species has shown a massive population increase and appears to have benefitted from the spread of oilseed rape cultivation (Gibbons *et al.* 1993).

Figure 3.32.1:
Population trend from the Common Birds Census

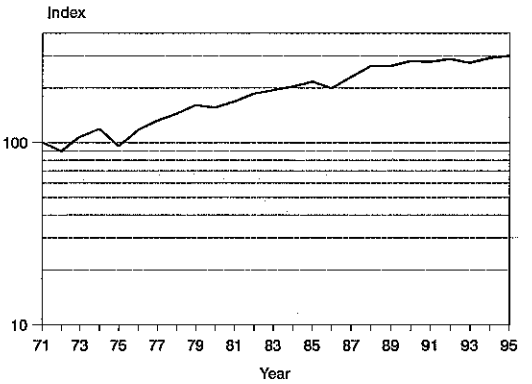


Table 3.32.1: Population trends

	Years	Change %	Caveat
CBC-all	1971-95	+253	Small Sample
BBS	1994-95	−11 *	

3.33 COLLARED DOVE *Streptopelia decaocto*

3.33.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group

3.33.2 SPECIES SUMMARY

The population increase after colonisation in the 1950s only started to level out in the late 1970s (Marchant *et al.* 1990). Nesting success has tended to increase over the past 25 years.

Figure 3.33.1:
Population trend from the Common Birds Census

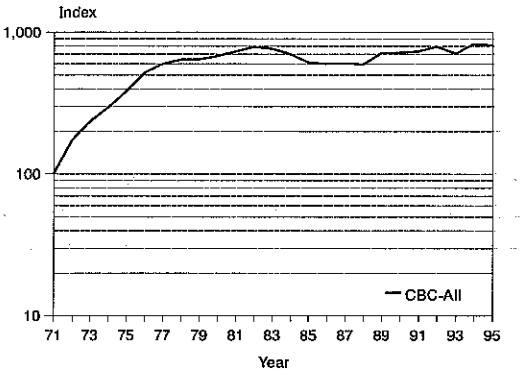


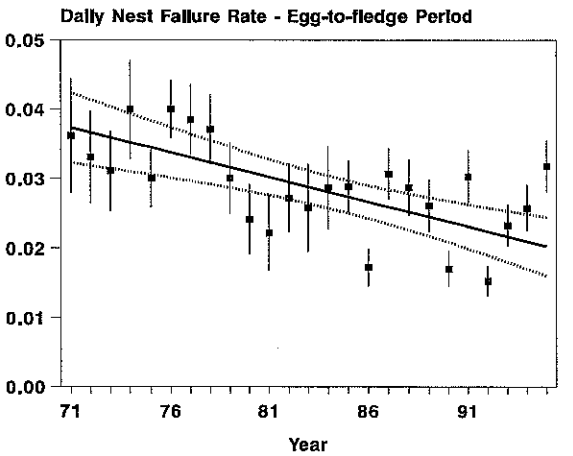
Table 3.33.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+259	
CBC - Farmland	1971-95	+378	
BBS	1994-95	+2 n.s.	

Table 3.33.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve *	
NRS - clutch size	1971-95	-ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	+ve n.s.	

Figure 3.33.2: Long-term trend from the Nest Record Scheme



3.34.1 CONSERVATION IMPORTANCE

Table 2/Red (>50% Population decline)
Biodiversity Steering Group Middle List

3.34.2 SPECIES SUMMARY

Severe population declines, requiring a High BTO Alert, and range contraction to the north and west is the subject of current research (Calladine *et al.* 1997) but may be linked to hunting during migration, reductions in seed availability due to herbicide use and grassland fertilization (Gibbons *et al.* 1993). Non-significant improvements in nest success suggest that productivity per nest may not be a problem.

Figure 3.34.1:
Population trends from the Common Birds Census

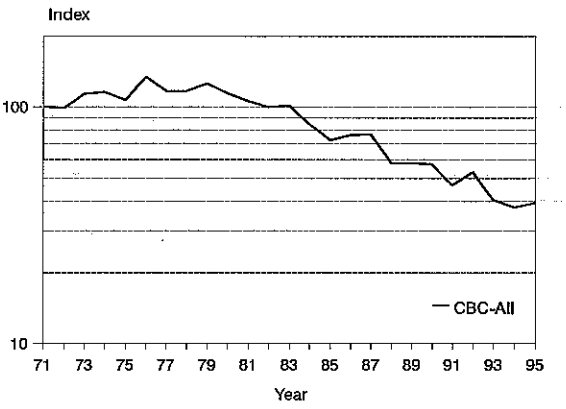


Table 3.34.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-69	Small Sample
CBC - Farmland	1971-95	-79	Small Sample
CBC - Woodland	1971-95	-79	
BBS	1994-95	+5 n.s.	

Table 3.34.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	-ve n.s.	
NRS - brood size	1971-95	-ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

3.35 CUCKOO *Cuculus canorus*

3.35.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group

3.35.2 SPECIES SUMMARY

Populations of Cuckoo appear to have been fairly stable over the past 25 years, although there is some doubt as to whether the CBC adequately monitors the species because of its large territory size and its utilisation of woodland and wetland habitats not covered by the CBC (Marchant *et al.* 1990). Although there is little evidence for distributional change (Gibbons *et al.* 1993), calculations based on host parasitism changes in rates suggest that there has been a substantial population decline (Brooke & Davies 1987).

Figure 3.35.1:
Population trends from the Common Birds Census

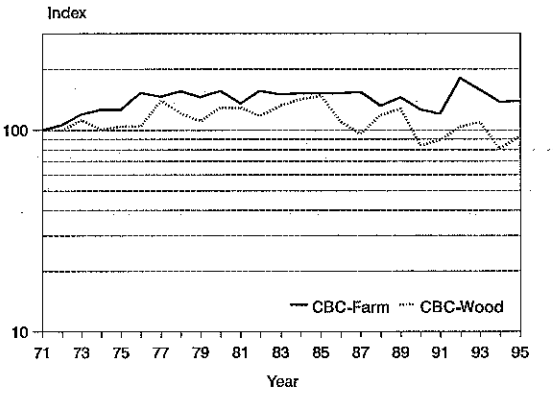


Table 3.35.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+28	
CBC - Farmland	1971-95	+21	
CBC - Woodland	1971-95	-13	
BBS	1994-95	+2 n.s.	

3.36 BARN OWL *Tyto alba*

3.36.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Distribution decline)
Biodiversity Steering Group Long List

3.36.2 SPECIES SUMMARY

Productivity has tended to improve since the 1950s and 1960s when Barn Owls appear to have been affected by organochlorine pesticides (Percival 1991). However, this improvement appears now to have ceased. A national census, organised jointly by Hawk & Owl Trust and BTO 1995-97 will provide a replicable baseline estimate of population size (Crick *et al.* 1996), but population trends are not monitored annually.

Table 3.36.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	Small Sample

3.37.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity SteeringGroup: Unlisted

3.37.2 SPECIES SUMMARY

This mainly crepuscular and nocturnal species is probably not reliably censused by current monitoring schemes, but there is sufficient evidence for population declines on CBC plots to require a Medium BTO Alert and some evidence for some contraction from the edges of its range (Gibbons *et al.* 1993). Brood sizes have shown a tendency to increase.

Figure 3.37.1:
Population trend from the Common Birds Census

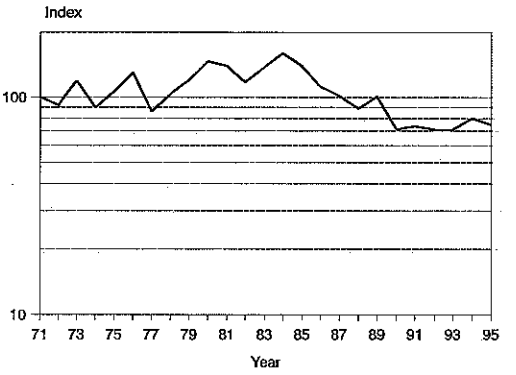


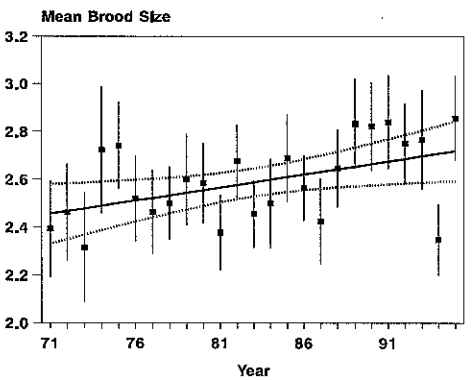
Table 3.37.1: Population trends

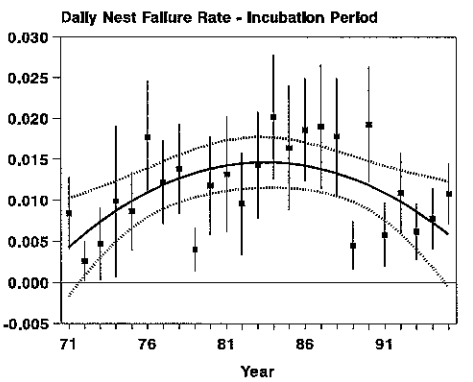
	Years	Change %	Caveat
CBC - all	1971-95	-32	Unrepresentative?
BBS	1994-95	-17 n.s.	

Table 3.37.2: Productivity trends

	Years	Change	
NRS - egg stage nest losses d^{-1}	1971-95	+ve to -ve	*
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.
NRS - clutch size	1971-95	+ve	n.s.
NRS - brood size	1971-95	2.46 - 2.72	*

Figure 3.37.2: Long-term trends from the Nest Record Scheme





3.38.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.38.2 SPECIES SUMMARY

Although Tawny Owls are probably poorly covered by CBC because of their nocturnal habits, the worrying long-term decline is supported by evidence of a range contraction (Gibbons *et al.* 1993). The cyclicity apparent in the population trend may be due to cycles in the abundance of their small mammal prey. Improvements in nesting success are likely to be linked to the declining impact of organochlorine pesticides.

Figure 3.38.1:
Population trend from the Common Birds Census

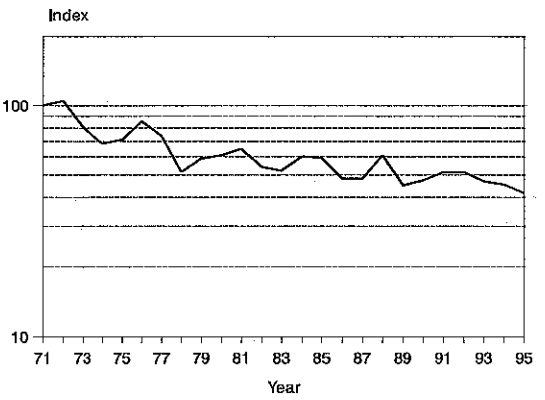


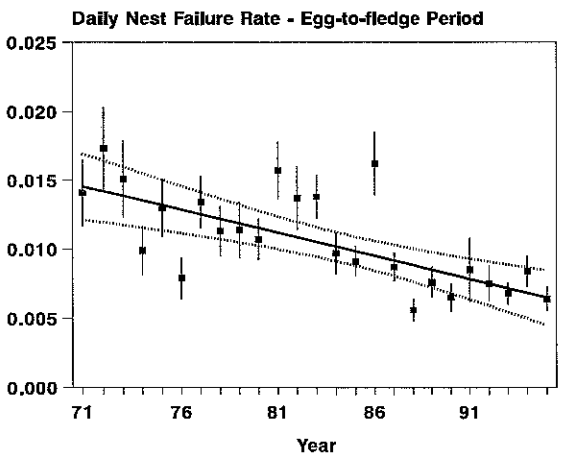
Table 3.38.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-50	Unrepresentative?
BBS	1994-95	-16 n.s.	Small Sample

Table 3.38.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.38.2: Long-term trend from the Nest Record Scheme



3.39 LONG-EARED OWL *Asio otus*

3.39.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

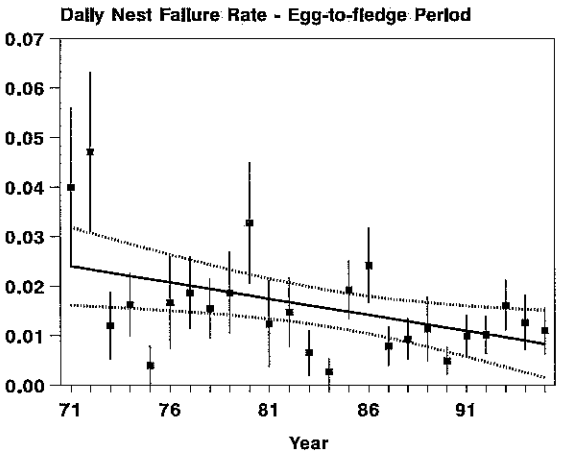
3.39.2 SPECIES SUMMARY

This is one of the most poorly monitored UK species, being very secretive and nocturnal. Its distribution appears to have decreased markedly, but for unknown reasons (Gibbons *et al.* 1993). There is some evidence that nesting success has improved, which, as with most raptors, may be linked to the decreasing effects of organochlorine pesticides.

Table 3.39.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	-ve	n.s.	Small Sample
NRS - brood size	1971-95	+ve	n.s.	

Figure 3.39.2: Long-term trend from the Nest Record Scheme



3.40 NIGHTJAR *Caprimulgus europaeus*

3.40.1 CONSERVATION IMPORTANCE

Table 2/Red (>50% Distribution decline)
Biodiversity Middle List

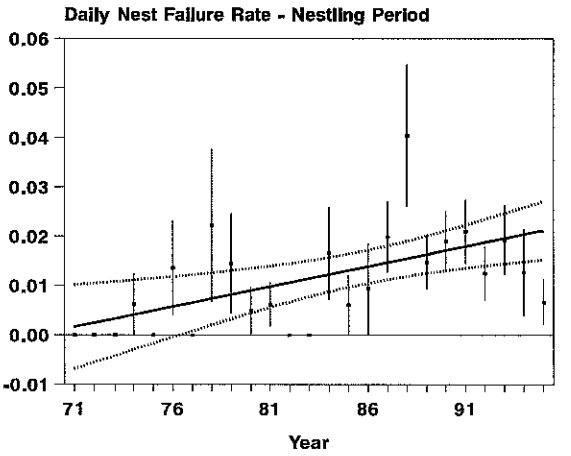
3.40.2 SPECIES SUMMARY

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 have been felled and replanted (Morris *et al.* 1994). Increased nest failure rates may be due to occupation of a wider range of habitats. Population trends are not monitored annually.

Table 3.40.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	−ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	−ve	n.s.	
NRS - brood size	1971-95	−ve	n.s.	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.40.2: Long-term trend from the Nest Record Scheme.



3.41 COMMON SWIFT *Apus apus*

3.41.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.41.2 SPECIES SUMMARY

Unmonitored to date, but the BBS will help to fill this gap.

Table 3.41.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	-9 *	

3.42.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

3.42.2 SPECIES SUMMARY

The Kingfisher has undergone a severe decline on WBS plots warranting a Medium BTO Alert, and has decreased in range throughout much of England and Northern Ireland, spreading only in lowland Scotland (Gibbons *et al.* 1993). There are also worrying indications of declining breeding performance. All indicators suggest declining habitat quality of UK waterways, possibly due to water pollution, human disturbance and water abstraction (Marchant *et al.* 1990).

Figure 3.42.1:
Population trend from the Waterways Bird Survey

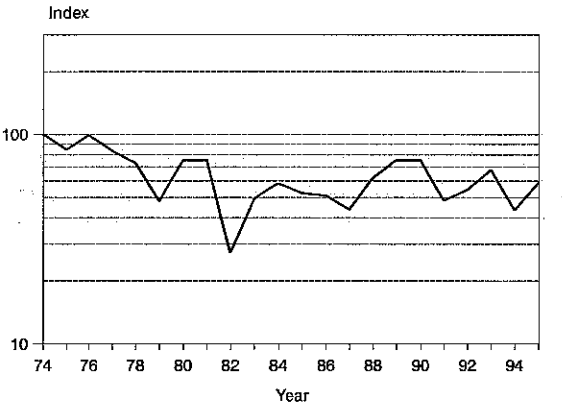


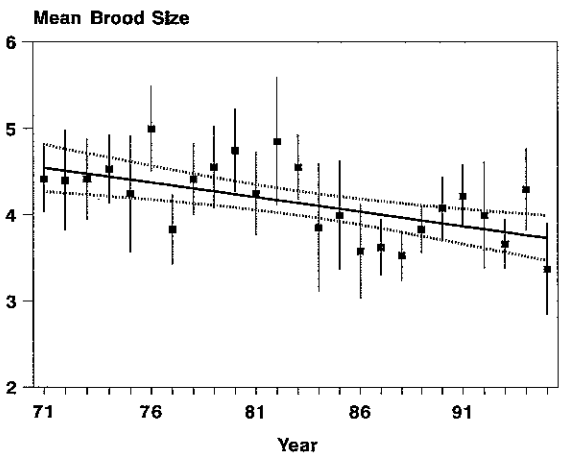
Table 3.42.1: Population trends

	Years	Change %	Caveat
WBS	1974-95	-35	Small Sample

Table 3.42.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	(-ve to +ve	*)	Unreliable trend
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - brood size	1971-95	4.54 - 3.73	*	

Figure 3.42.2: Long-term trend from the Nest Record Scheme



3.43 GREEN WOODPECKER *Picus viridis*

3.43.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

3.43.2 SPECIES SUMMARY

Populations of this species have tended to fluctuate about a farily constant level, but reasons for these changes are unknown.

Figure 3.43.1:
Population trends from the Common Birds Census

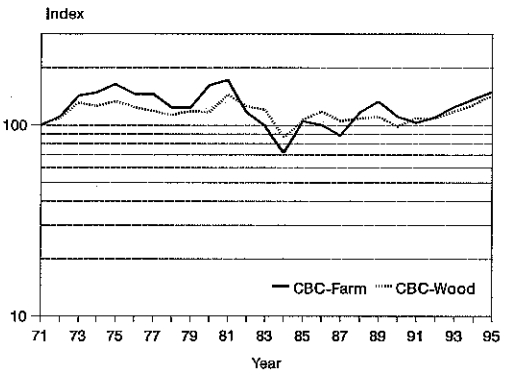


Table 3.43.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+14	Small Sample
CBC - Farmland	1971-95	-13	
CBC - Woodland	1971-95	-3	
BBS	1994-95	-13 *	

3.44 GREAT SPOTTED WOODPECKER *Dendrocopos major*

3.44.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.44.2 SPECIES SUMMARY

Reasons for the substantial increase in this population during the 1970s are unclear. The very low nest failure rates in recent years do not appear to be an artefact of small samples.

Figure 3.44.1:
Population trends from the Common Birds Census

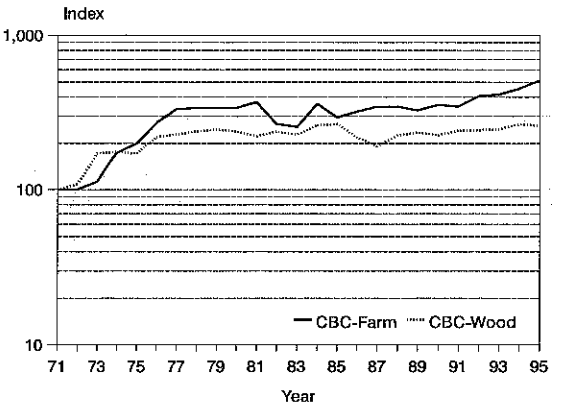


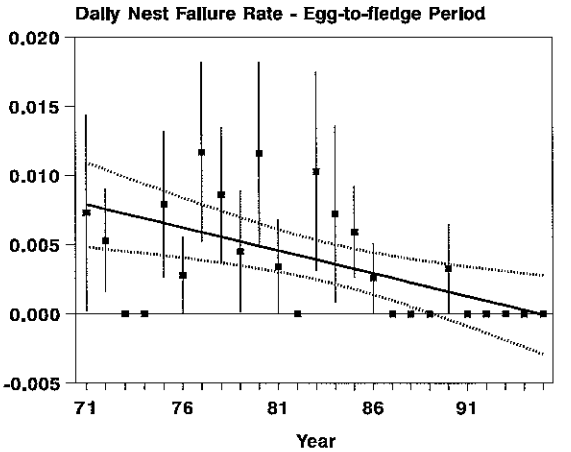
Table 3.44.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+124	
CBC - Farmland	1971-95	+218	
CBC - Woodland	1971-95	+73	
BB	1994-95	+ 11 n.s.	

Table 3.44.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - brood size	1971-95	-ve	n.s.	

Figure 3.44.2: Long-term trend from the Nest Record Scheme



3.45 LESSER SPOTTED WOODPECKER *Dendrocopos minor* MEDIUM BTO ALERT

3.45.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.45.2 SPECIES SUMMARY

It is thought that the population rose in the 1970s due to the spread of Dutch Elm Disease, and the subsequent decline may be linked to the clearance of dead elms (Gibbons *et al.* 1993). The decline is sufficient to warrant a Medium BTO Alert.

Figure 3.45.1:
Population trend from the Common Birds Census

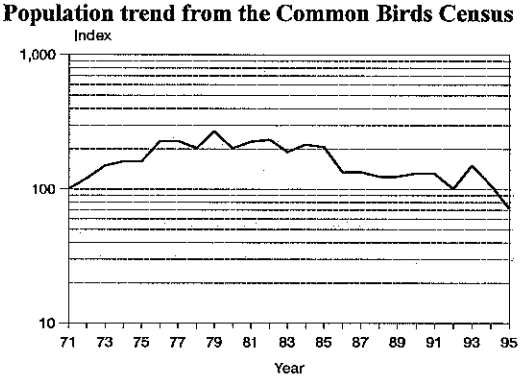


Table 3.45.1: Population trends

	Years	Change %	Caveat
CBC-all	1971-95	-38	Unrepresentative? & Small Sample

3.46 WOODLARK *Lullula arborea*

3.46.1 CONSERVATION IMPORTANCE

Table 2/Red (>50% Distribution decline)
Biodiversity Steering Group Middle List

3.46.2 SPECIES SUMMARY

Sitters *et al.* (1996) report that the population of this rare breeding bird has 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 forest storm damage, forest restocking, and heathland management. No strong trends are evident in breeding performance.

Table 3.46.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	−ve	n.s.	
NRS - laying date	1971-95	−ve	n.s.	

3.47.1 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group Short List

3.47.2 SPECIES SUMMARY

After a severe population decline between the mid 1970s and mid 1980s, requring a High BTO Alert, the population has remained relatively stable. Recent in depth analysis at the BTO suggests that most aspects of breeding performance per nest have improved and that decreases in adult survival or in the population of birds attempting to breed may have influenced the population decline (Chamberlain & Crick in prep.).

Figure 3.47.1:
Population trend from the Common Birds Census

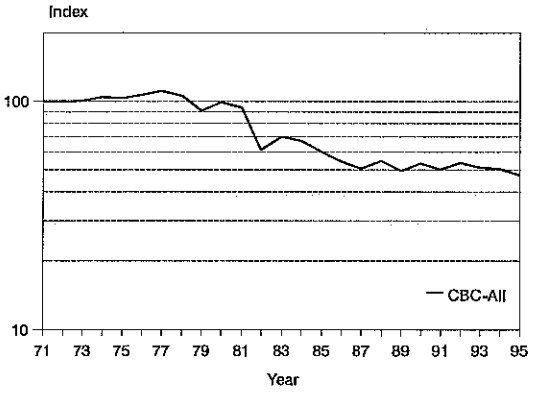


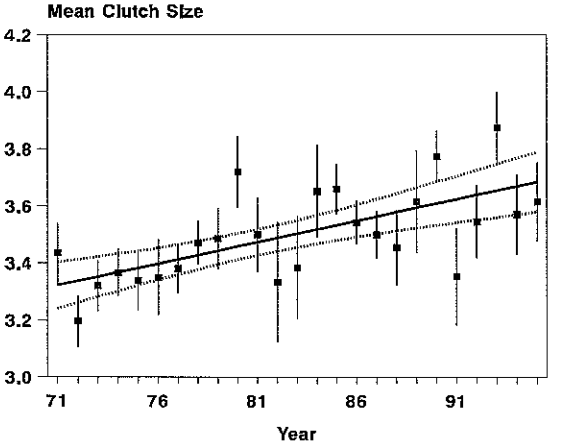
Table 3.47.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-62	
CBC - Farmland	1971-95	-61	
BBS	1994-95	+1 n.s.	

Table 3.47.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	3.32 - 3.68	*	
NRS - brood size	1971-95	3.15 - 3.41	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.47.2: Long-term trend from the Nest Record Scheme



3.48.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.48.2 SPECIES SUMMARY

Recent reanalysis using superior techniques haave shown that the apparent population decline shown here is spurious (see section 4.13). Detailed analysis has shown that population fluctuations are most strongly related to losses on their wintering grounds (Baillie & Peach 1992). Nest failure rates during the egg stage increased during the 1970s and 1980s, but now show signs of decreasing.

Figure 3.48.1:
Population trend from the Common Birds Census

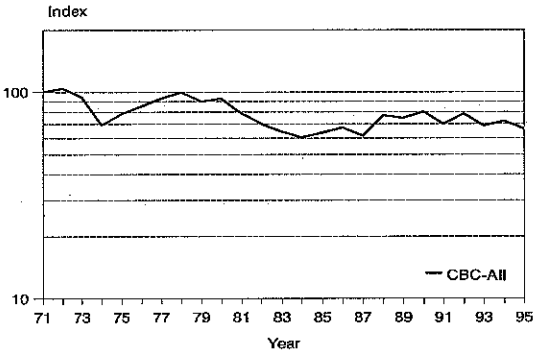


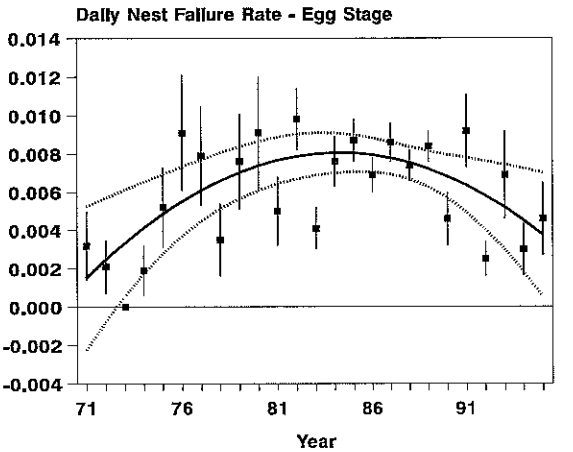
Table 3.48.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-28	Unreliable Trend
CBC - Farmland	1971-95	-37	Unreliable Trend
BBS	1994-95	-17 *	

Table 3.48.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve to -ve	*	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.48.2: Long-term trend from the Nest Record Scheme



3.49 HOUSE MARTIN *Delichon urbica*

3.49.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Long List

3.49.2 SPECIES SUMMARY

The CBC index for this species is variable and may be unreliable because it is based on a small sample of nest counts, but the overall pattern appears to suggest a slight population increase (Marchant *et al.* 1990).

Figure 3.49.1:
Population trend from the Common Birds Census

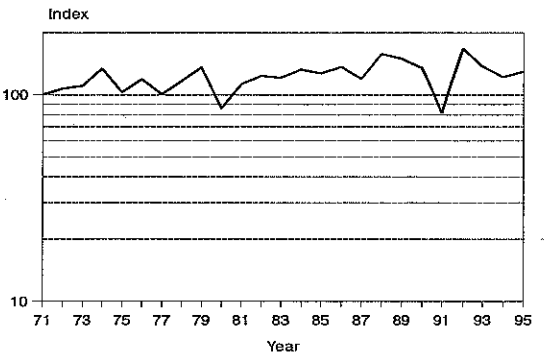


Table 3.49.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+27	Small Sample
BBS	1994-95	+12 *	

3.50.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group

3.50.2 SPECIES SUMMARY

Tree Pipits occur in greatest abundance in Wales, north England and Scotland and the marked CBC decline, which required a High BTO Alert, may reflect the range contraction that has occurred in central and south-east England (Gibbons *et al.* 1993). Improvements have occurred in breeding performance and the causes of the population decline is unknown.

Figure 3.50.1:
Population trend from the Common Birds Census

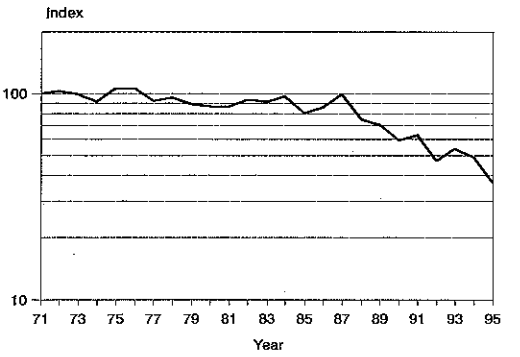


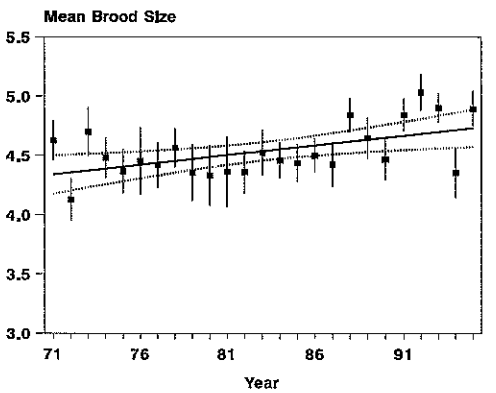
Table 3.50.1: Population trends

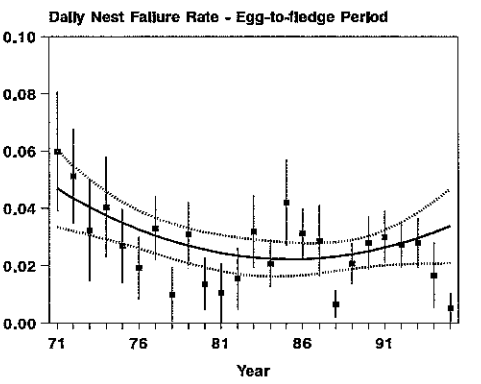
	Years	Change %	Caveat
CBC - All	1971-95	-55	Low Densities
BBS	1994-95	-17 n.s.	

Table 3.50.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - young nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	5.06 - 4.67 - 5.40	*	Small Sample
NRS - brood size	1971-95	4.34 - 4.73	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.50.2: Long-term trends from the Nest Record Scheme





3.51.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.51.2 SPECIES SUMMARY

The population decline on CBC plots requires a Medium BTO Alert. It is probably a reflection of the range contraction that has occurred in lowland areas of central and southern England, which has been linked to loss of marginal land to cultivation; the large fall in the mid 1980s may have been the result of severe weather on their Iberian wintering grounds (Gibbons *et al.* 1993). Breeding performance has generally improved but nest failures appear to have increased in the 1990s.

Figure 3.51.1:
Population trend from the Common Birds Census

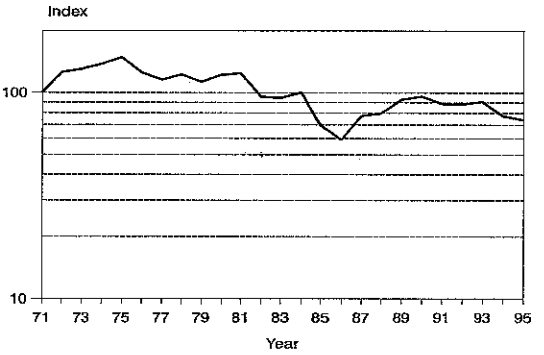


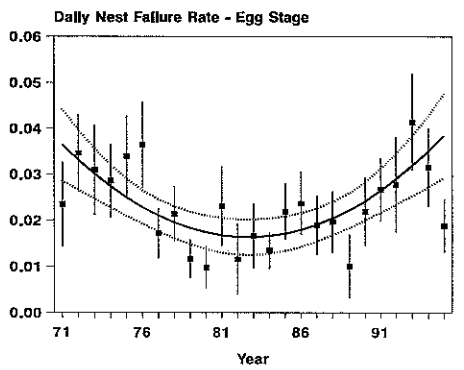
Table 3.51.1: Population trends

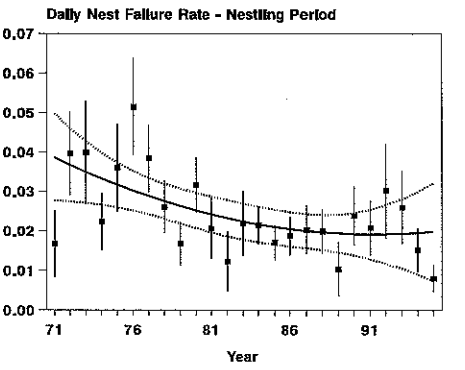
	Years	Change %	Caveat
CBC - all	1971-95	-44	Low Densities
BBS	1994-95	+7 *	

Table 3.51.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.51.2: Long-term trends from the Nest Record Scheme





3.52 ROCK PIPIT *Anthus petrosus*

3.52.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.52.2 SPECIES SUMMARY

This coastal species is poorly covered by BTO census schemes, but there is some evidence of range contraction decline from the breeding atlases (Gibbons *et al.* 1993). Small samples of nest records indicate no major trends in productivity.

Table 3.52.1: Population trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	Small Sample
NRS - clutch size	1971-95	-ve	n.s.	Small Sample
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

3.53.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.53.2 SPECIES SUMMARY

Yellow Wagtail appears to have contracted its range on all sides, to become more concentrated in the Midlands of England; severe declines in WBS (requiring a High BTO Alert) and CBC indices would support the view that loss of habitat through land drainage and grass conversion to arable has been influential (Gibbons *et al.* 1993). Changes in breeding performance appear too slight to be a factor, although sample sizes of nest record cards are small.

Figure 3.53.1:
Population trends from the Common Birds Census & the Waterways Bird Survey

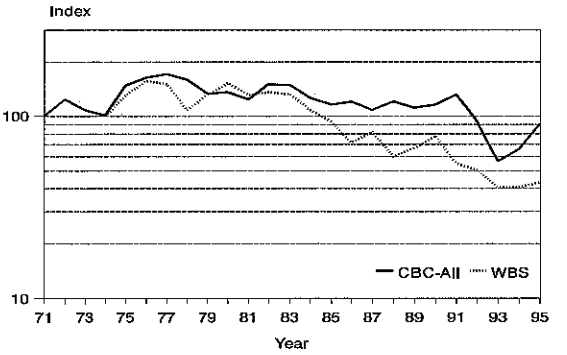


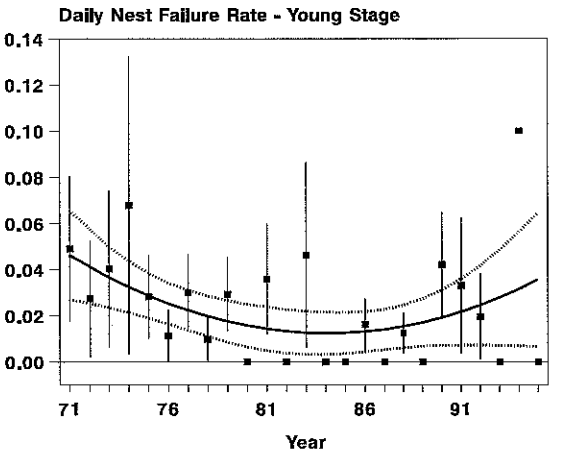
Table 3.53.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	−36	Small Sample
WBS	1974-95	−74	Small Sample
BBS	1994-95	+24 *	

Table 3.53.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	−ve to +ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve	n.s.	
NRS - clutch size	1971-95	−ve	n.s.	Small Sample
NRS - brood size	1971-95	−ve	n.s.	
NRS - laying date	1971-95	−ve	n.s.	Small Sample

Figure 3.53.2: Long-term trend from the Nest Record Scheme



3.54.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.54.2 SPECIES SUMMARY

This species occurs in mainly upland areas not well covered by CBC and WBS (Marchant *et al.* 1990) but, the decline on WBS plots warrants a Medium BTO Alert. Reproductive performance has improved markedly over the past 25 years.

Figure 3.54.1:
Population trends from the Common Birds Census and the Waterways Bird Survey

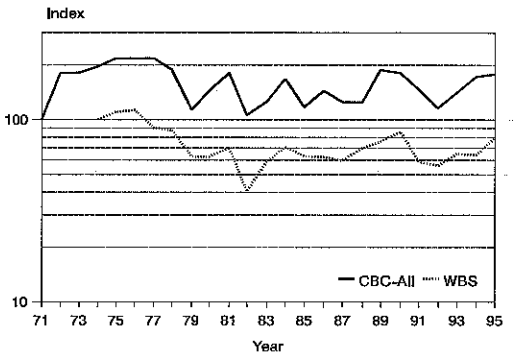


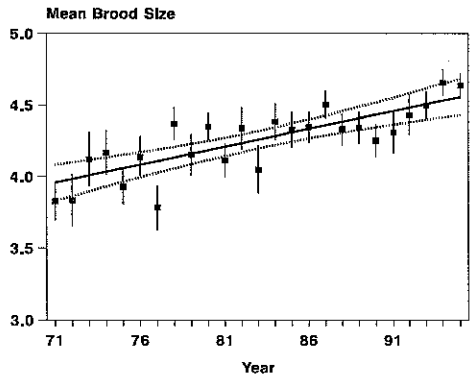
Table 3.54.1: Population trends

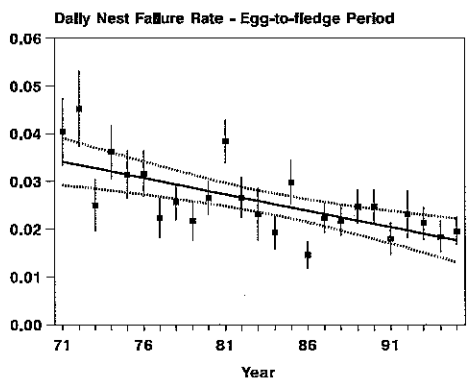
	Years	Change %	Caveat
CBC - all	1971-95	-14	Low Densities & Small Sample
WBS	1974-95	-29	Low Densities
BBS	1994-95	+23 n.s.	

Table 3.54.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	4.79 - 5.05	*	
NRS - brood size	1971-95	3.96 - 4.56	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.54.2: Long-term trends from the Nest Record Scheme





3.55.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.55.2 SPECIES SUMMARY

The centres of abundance of this species occur in upland and northerly areas not well covered by CBC and WBS (Gibbons *et al.* 1993), but the severe decline on WBS plots may be an indication of habitat degradation on English water courses during the 1970s and warrants a Medium BTO Alert. There are no major changes in breeding performance over the past 25 years.

Figure 3.55.1:
Population trends from the Common Birds Census & the Waterways Bird Survey

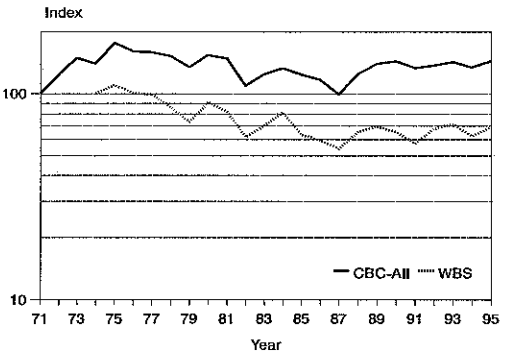


Table 3.55.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-4	Low Densities
CBC - Farmland	1971-95	-1	Low Densities
WBS	1974-95	-39	Low Densities
BBS	1994-95	+ 21*	

Table 3.55.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	+ve	n.s.	

3.56 DIPPER *Cinclus cinclus*

3.56.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Long List

3.56.2 SPECIES SUMMARY

A good indicator locally of acidity and other water pollution (Ormerod & Tyler 1989, 1990), the population of this species appears fairly stable and breeding performance has shown strong improvements over time.

Figure 3.56.1:
Population trend from the Common Birds Census

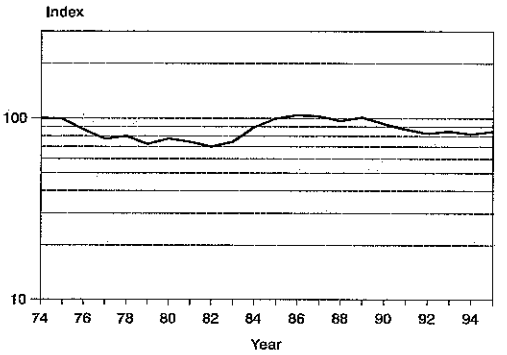


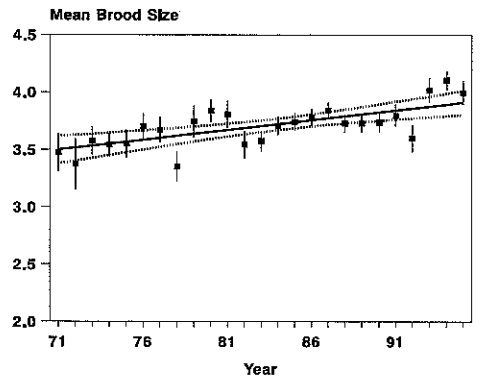
Table 3.56.1: Population trends

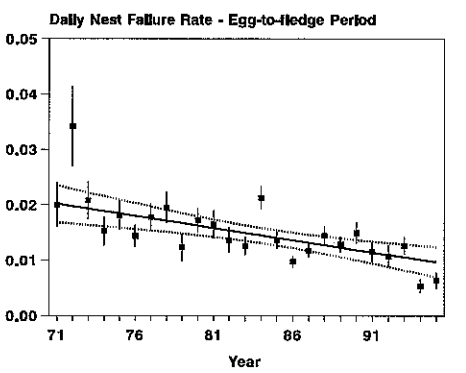
	Years	Change %	Caveat
WBS	1974-95	+6	

Table 3.56.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	4.35 - 4.52	*	
NRS - brood size	1971-95	3.50 - 3.91	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.56.2: Long-term trends from the Nest Record Scheme





3.57 WREN *Troglodytes troglodytes*

3.57.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.57.2 SPECIES SUMMARY

Wren is a species that is strongly affected by severe winter weather (Peach *et al.* 1995) which is reflected in the highly variable population trends.

Figure 3.57.1:
Population trends from the Common Birds Census

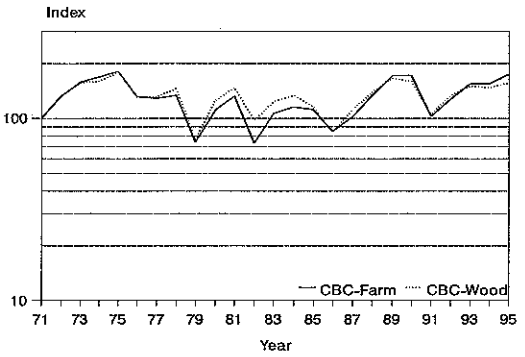


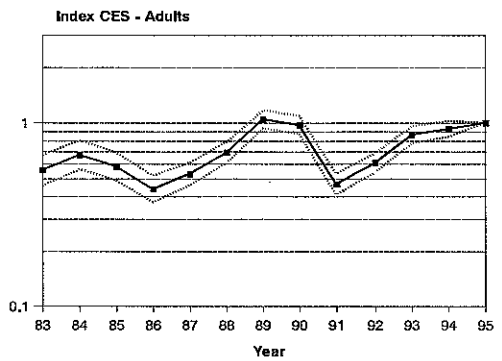
Table 3.57.1: Population trends

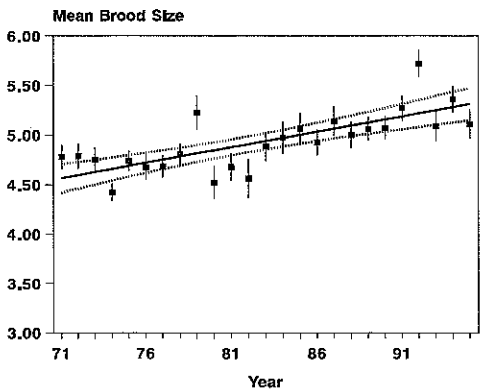
	Years	Change %	Caveat
CBC - all	1971-95	+21	
CBC - Farmland	1971-95	+10	
CBC - Woodland	1971-95	+5	
BBS	1994-95	+14 *	
CES - Adults	1983-95	+82 *	
CES - Juveniles	1983-95	+62 *	

Table 3.57.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS- egg stage nest losses d^{-1}	1971-95	−ve	n.s.	
NRS- young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve	n.s.	
NRS - clutch size	1971-95	5.51 - 5.91	*	
NRS - brood size	1971-95	4.56 - 5.31	*	
NRS - laying date	1971-95	131 - 136 - 124	*	

Figure 3.57.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.58.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.58.2 SPECIES SUMMARY

Severe declines in this common resident, warranting a Medium BTO Alert, appear to have continued in woodland, but levelled off on farmland. Both CES and NRS suggest that breeding performance has improved during the population decline.

Figure 3.58.1:
Population trends from the Common Birds Census

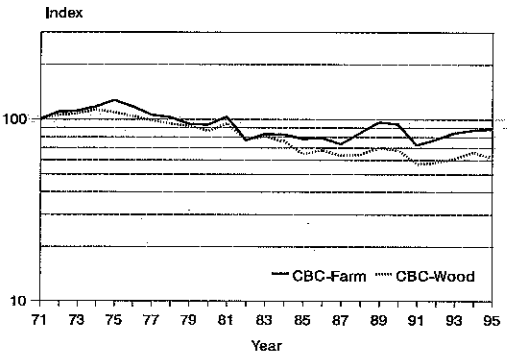


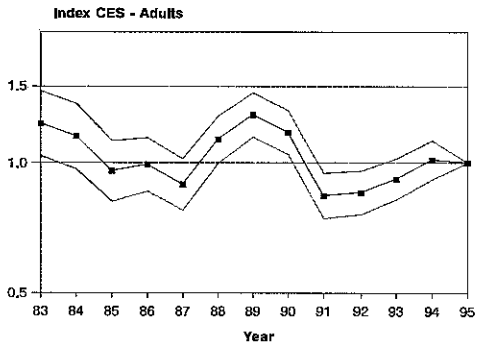
Table 3.58.1: Population trends

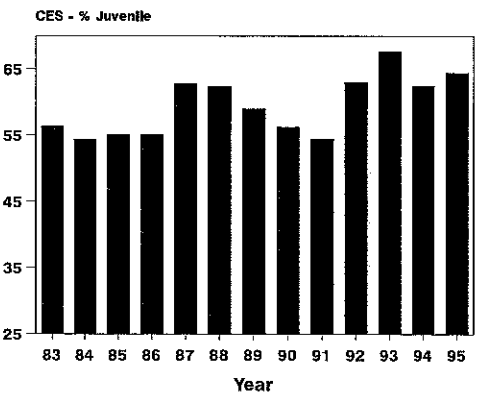
	Years	Change %	Caveat
CBC - all	1971-95	-32	
CBC - Farmland	1971-95	-31	
CBC - Woodland	1971-95	-50	
BBS	1994-95	+4 n.s.	
CES - Adults	1983-95	-17 *	
CES - Juveniles	1983-95	+8 n.s.	

Table 3.58.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve *	
NRS - egg stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	3.87 - 4.20 *	
NRS - brood size	1971-95	3.37 - 3.65 *	
NRS - laying date	1971-95	125 - 119 *	

Figure 3.58.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.59 ROBIN *Erithacus rubecula*

3.59.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.59.2 SPECIES SUMMARY

Robin populations are affected by cold-weather fluctuations but show trends of increase in recent years, particularly on CES plots. Breeding performance has shown marked and steady improvements.

Figure 3.59.1:
Population trends from the Common Birds Census

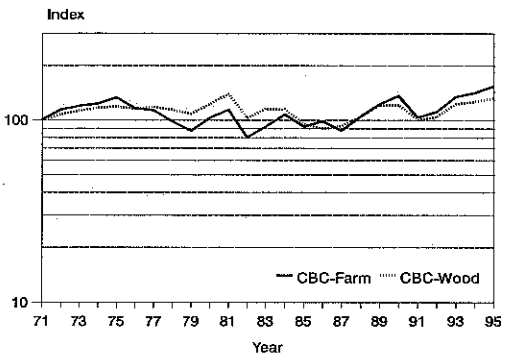


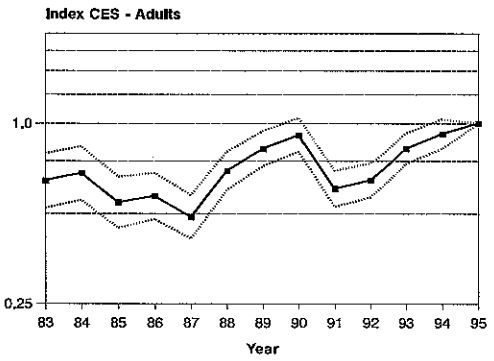
Table 3.59.1: Population trends

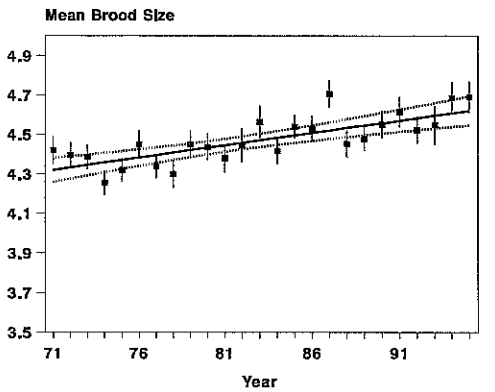
	Years	Change %	Caveat
CBC - all	1971-95	+17	
CBC - Farmland	1971-95	+15	
CBC - Woodland	1971-95	+ 3	
BBS	1994-95	+11 *	
CES - Adults	1983-95	+82 *	
CES - Juveniles	1983-95	+53 *	

Table 3.59.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS- egg stage nest losses d^{-1}	1971-95	-ve *	
NRS- young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	4.81 - 5.00 *	
NRS - brood size	1971-95	4.32 - 4.62 *	
NRS - laying date	1971-95	+ve n.s.	

Figure 3.59.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.60 NIGHTINGALE *Luscinia megarhynchos*

3.60.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Distribution decline)
Biodiversity Steering Group Long List

3.60.2 SPECIES SUMMARY

Sample sizes for CES and NRS are small but the former provide support for declining populations and the latter indicates the possibility that nesting success has declined while average brood size has increased. Population declines have been linked to loss of coppiced woodland and to climate change (Gibbons *et al.* 1993).

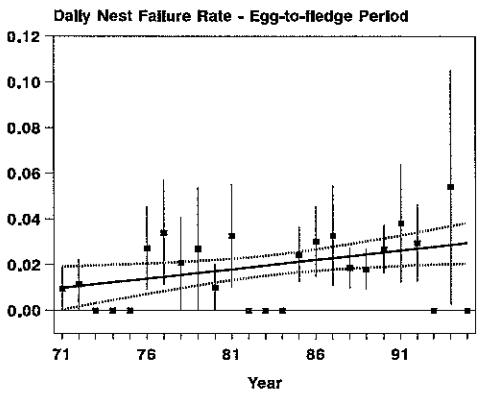
Table 3.60.1: Population trends

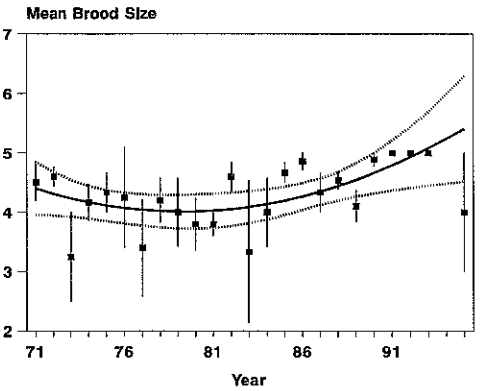
	Years	Change %	Caveat
CES - Adults	1983-95	-40 n.s.	Small Sample
CES - Juveniles	1983-95	-78 *	Small Sample

Table 3.60.2: Productivity trends

	Years	Change		Caveat
NRS- egg stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS- young stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	*	Small Sample
NRS - brood size	1971-95	4.40 - 4.01 - 5.40	*	Small Sample
NRS - laying date	1971-95	-ve	n.s.	Small Sample

Figure 3.60.2: Long-term trends from the Nest Record Scheme





3.61 REDSTART *Phoenicurus phoenicurus*

3.61.1 CONSERVATION IMPORTANCE

Table 4/Amber (European Status)
Biodiversity Steering Group Long List

3.61.2 SPECIES SUMMARY

Although the New Breeding Atlas shows large losses of range in east and south England (Gibbons *et al.* 1993), the CBC shows populations have increased substantially elsewhere. During this period nesting success has improved, clutch and brood sizes have increased and average laying dates have become substantially earlier.

Figure 3.61.1:
Population trend from the Common Birds Census

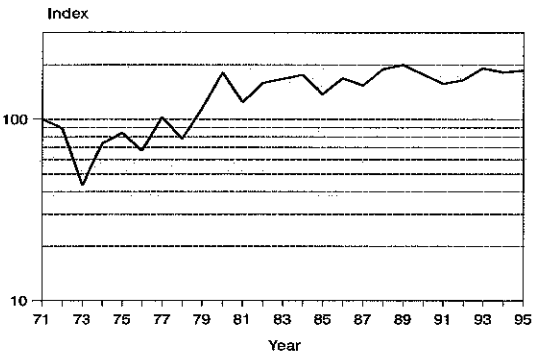


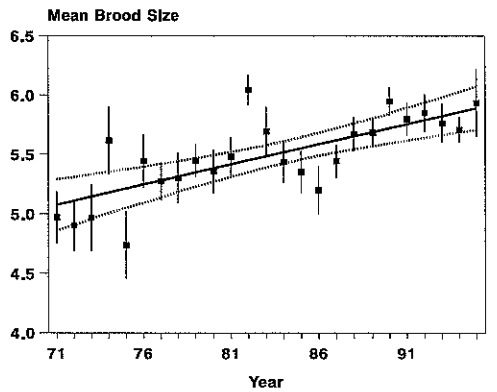
Table 3.61.1: Population trends

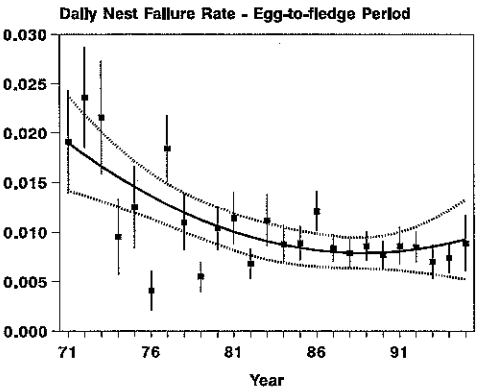
	Years	Change %	Caveat
CBC - all	1971-95	+196	Small Sample & Low Densities
BBS	1994-95	+31 *	

Table 3.61.2: Productivity trends

	Years	Change		Caveat
NRS- egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS- young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	6.10 - 6.40	*	
NRS - brood size	1971-95	5.08 - 5.89	*	
NRS - laying date	1971-95	146 - 135	*	

Figure 3.61.2: Long-term trends from the Nest Record Scheme





3.62 WHINCHAT *Saxicola rubetra*

3.62.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.62.2 SPECIES SUMMARY

Mainly an upland species, the New Breeding Atlas showed that its range had contracted considerably in lowland England, probably due to loss of marginal uncultivated land (Gibbons *et al.* 1993). There is little evidence for long-term trends in breeding performance.

Table 3.62.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	+16 n.s.	Small Sample

Table 3.62.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	+ve n.s.	

3.63 STONECHAT *Saxicola torquata*

3.63.1 CONSERVATION IMPORTANCE

Table 4/Amber (European status)
Biodiversity Steering Group Long List

3.63.2 SPECIES SUMMARY

The New Breeding Atlas records a substantial decline in distribution, with losses from south-west England, south-west and east Scotland, probably due to changes in agriculture (Gibbons *et al.* 1993). Changes in productivity show improving brood sizes but there is a suggestion that nest failures may be increasing.

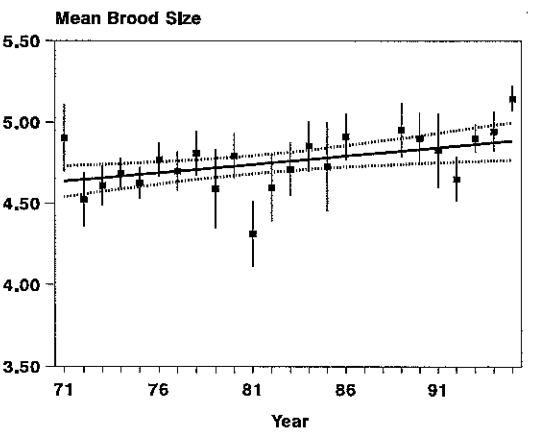
Table 3.63.1: Population trends

	Years	Change %	Caveat
BBS	1994-95	+57 *	Small Sample

Table 3.63.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	(-ve to +ve	*)	Unreliable trend
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	4.63 - 4.88	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.63.2: Long-term trend from the Nest Record Scheme



3.64 WHEATEAR *Oenanthe oenanthe*

3.64.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.64.2 SPECIES SUMMARY

This species has suffered a decline in range in lowland England and eastern Scotland which is linked to ploughing of grassland and reductions in rabbit populations due to myxomatosis, although the latter are now recovering (Gibbons *et al.* 1993). Breeding performance has generally improved over the 25-year period.

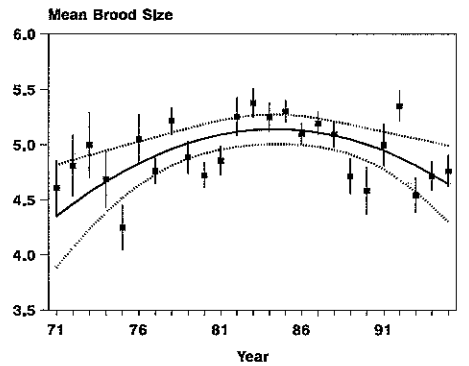
Table 3.64.1: Population trends

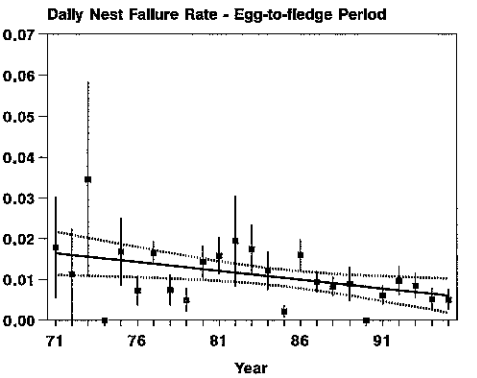
	Years	Change %	Caveat
BBS	1994-95	+32 *	

Table 3.64.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve to -ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	4.35 - 5.14 - 4.65	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.64.2: Long-term trends from the Nest Record Scheme





3.65.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group: Unlisted

3.65.2 SPECIES SUMMARY

Blackbird populations have declined since the 1970s, requiring a Medium BTO Alert. The CBC farmland index and CES index suggest that this decline has continued. These declines are likely to be linked to agricultural changes (Fuller *et al.* 1996).

Figure 3.65.1:
Population trends from the Common Birds Census

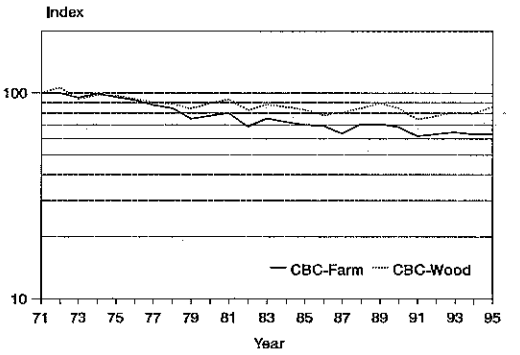


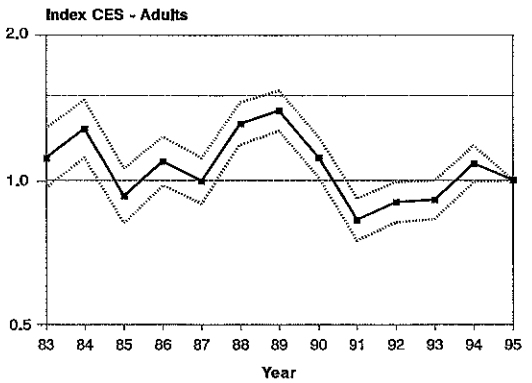
Table 3.65.1: Population trends

	Years	Change %		Caveat
CBC - all	1971-95	-31		
CBC - Farmland	1971-95	-40		
CBC - Woodland	1971-95	-21		
BBS	1994-95	-1	n.s.	
CES - Adults	1983-95	-20	*	
CES - Juveniles	1983-95	-15	n.s.	

Table 3.65.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	

Figure 3.65.2: Long-term trend from the Constant Effort Sites



3.66 SONG THRUSH *Turdus philomelos* HIGH BTO ALERT

3.66.1 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group Short List

3.66.2 SPECIES SUMMARY

Detailed analysis has shown that the severe population decline of this species is, which requires a High BTO Alert, due to declines in survival of juveniles in their first year of life: reasons for these declines are unknown (Thomson *et al.* 1997). Over the same period breeding performance has improved.

Figure 3.66.1:
Population trends from the Common Birds Census

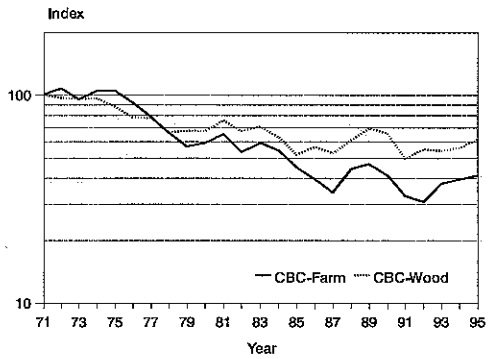


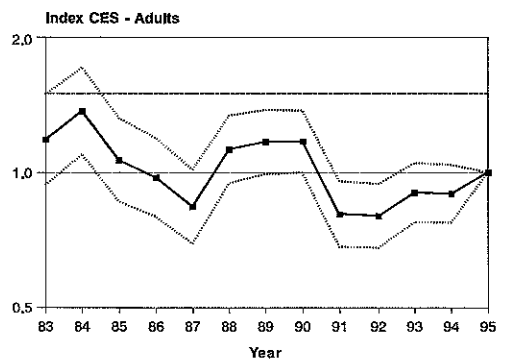
Table 3.66.1: Population trends

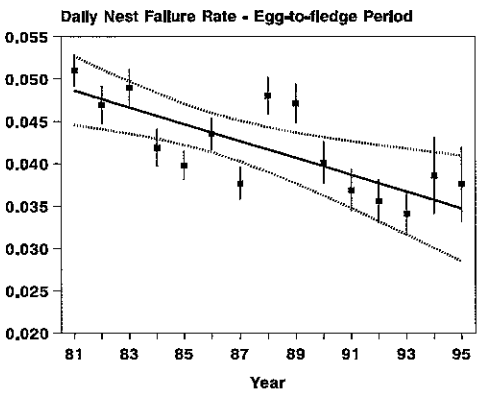
	Years	Change %		Caveat
CBC - all	1971-95	-56		
CBC - Farmland	1971-95	-70		
CBC - Woodland	1971-95	-45		
BBS	1994-95	-1	n.s.	
CES - Adults	1983-95	-24	*	
CES - Juveniles	1983-95	-46	*	

Table 3.66.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1981-95	-ve to +ve	*	
NRS - young stage nest losses d^{-1}	1981-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1981-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	3.57 - 3.78		
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.66.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.67 MISTLE THRUSH *Turdus viscivorus* MEDIUM BTO ALERT

3.67.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.67.2 SPECIES SUMMARY

Requiring a Medium BTO Alert, the decline in population size of this species in farmland but not wodland suggests that changes in agricultural practice have affected this species. The lack of strong trends in breeding performance imply that survival rates may have decreased.

Figure 3.67.1:
Population trends from the Common Birds Census

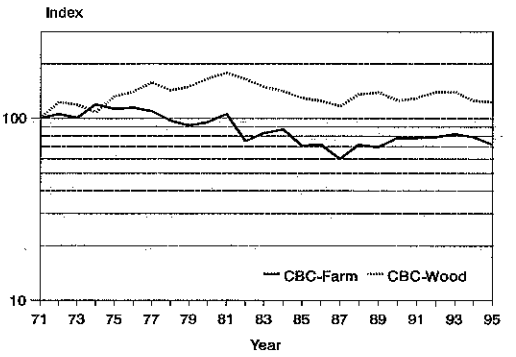


Table 3.67.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-25	
CBC - Farmland	1971-95	-38	
CBC - Woodland	1971-95	+ 4	
BBS	1994-95	-6 n.s.	

Table 3.67.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	-ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

3.68 GRASSHOPPER WARBLER *Locustella naevia* HIGH BTO ALERT

3.68.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Distribution decline)
Biodiversity Steering Group Long List

3.68.2 SPECIES SUMMARY

Although generally under-recorded, the species' conservation importance was based on range contraction but the CBC index suggests too a very severe decline and warrants a High BTO Alert. NRS analysis shows that the species has a high reproductive potential (Glue 1990) so it has been suggested that habitat loss through land drainage and clearance has ben a major factor in its decline (Gibbons *et al.* 1993).

Figure 3.68.1:
Population trend from the Common Birds Census

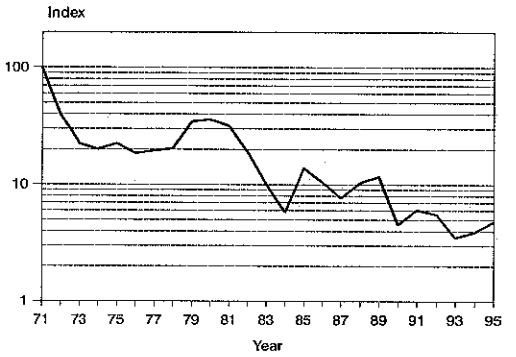


Table 3.68.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-91	Unrepresentative? & Small Sample

3.69 SEDGE WARBLER *Acrocephalus schoenobaenus*

3.69.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.69.2 SPECIES SUMMARY

Detailed analysis has shown that much of the variation in population size is related to changes in adult survival rates which, in turn, are related to changes in rainfall on their West African wintering grounds (Peach *et al.* 1991). The WBS is a more appropriate monitoring scheme than CBC for this wetland species, so no BTO Alert is issued.

Figure 3.69.1:
Population trends from the Common Birds Census and The Waterways Bird Survey

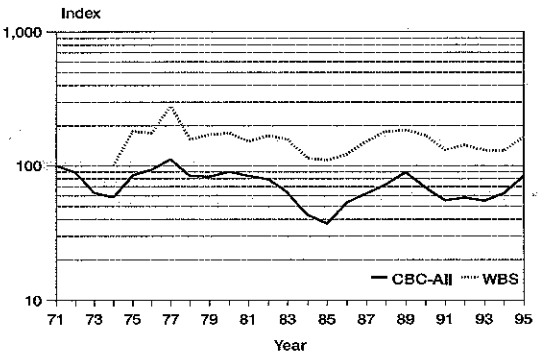


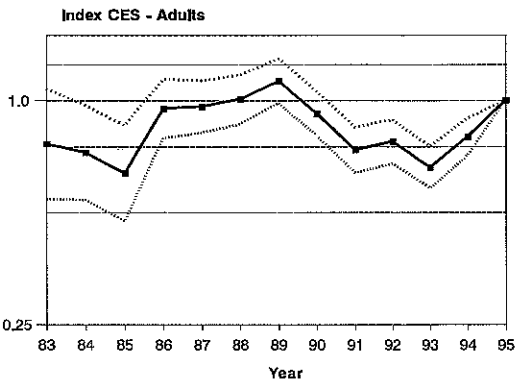
Table 3.69.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	−31	Low Densities
CBC - Farmland	1971-95	−18	Low Densities & Small Sample
WBS	1974-95	+14	L ow Densities & Small Sample
BBS	1994-95	14 n.s.	
CES - Adults	1983-95	−10 n.s.	
CES - Juveniles	1983-95	−16 n.s.	

Table 3.69.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	−ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	−ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve n.s.	
NRS - clutch size	1971-95	−ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	+ve n.s.	

Figure 3.69.2: Long-term trend from the Constant Effort Sites Scheme



3.70 REED WARBLER *Acrocephalus scirpaceus*

3.70.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.70.2 SPECIES SUMMARY

The large increase in CBC index may be unrepresentative because it is based on a relatively small sample of mainly coastal plots (Marchant *et al.* 1990). Distributionally there has been little change (Gibbons *et al.* 1993). The CES reports a substantial decline up to 1991, but this has been followed by recovery. Productivity has tended to increase over the period.

Figure 3.70.1:
Population trend from the Common Birds Census

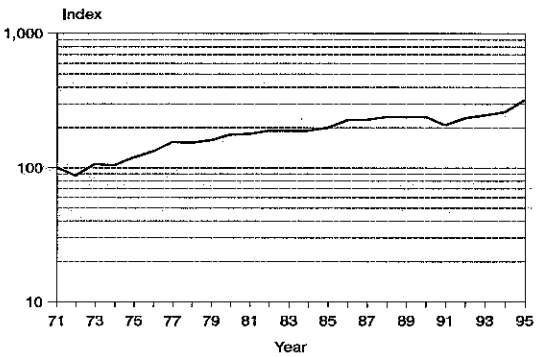


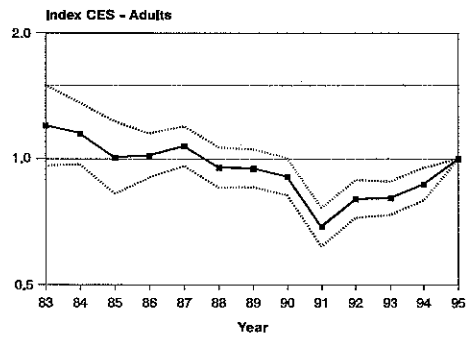
Table 3.70.1: Population trends

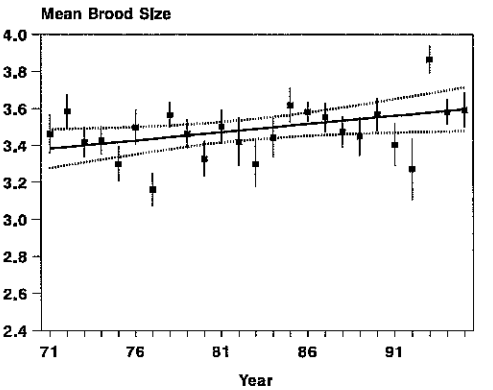
	Years	Change %	Caveat
CBC - all	1971-95	+189	Small Sample
BBS	1994-95	0 n.s.	Small Sample
CES - Adults	1983-95	−23 *	
CES - Juveniles	1983-95	−3 n.s.	

Table 3.70.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	−ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	3.38 - 3.60 *	
NRS - laying date	1971-95	−ve n.s.	

Figure 3.70.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.71 LESSER WHITETHROAT *Sylvia curruca*

3.71.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.71.2 SPECIES SUMMARY

This species has expanded its range to the north and west (Gibbons *et al.* 1993) but has shown little long-term trend in population size. Productivity has tended to improve, resulting in increased captures of juveniles on CES plots.

Figure 3.71.1:
Population trend from the Common Birds Census

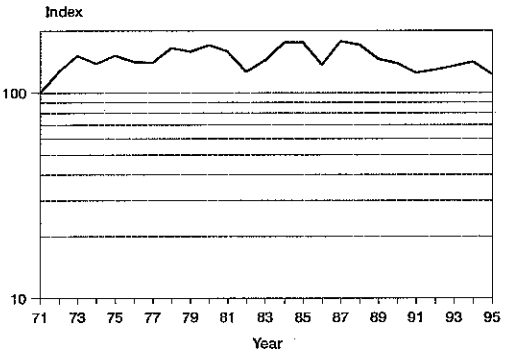


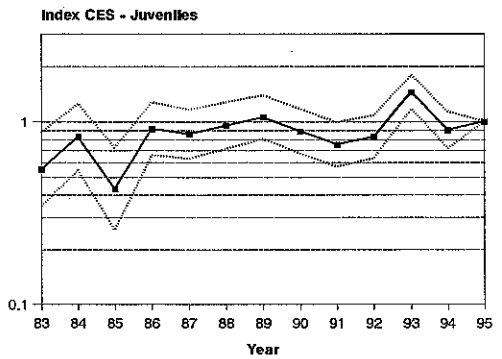
Table 3.71.1: Population trends

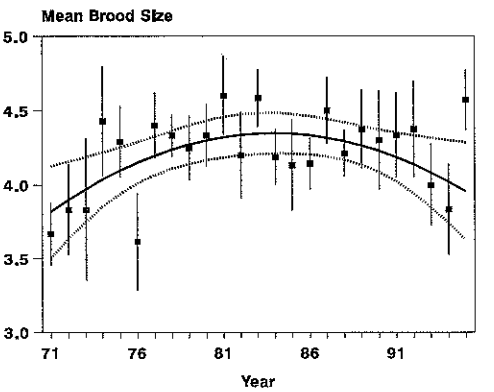
	Years	Change %		Caveat
CBC - all	1971-95	+2		
CBC - Farmland	1971-95	-14		
BBS	1994-95	-12	n.s.	
CES - Adults	1983-95	-11	n.s.	
CES - Juveniles	1983-95	+43	*	

Table 3.71.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	Small Sample
NRS - clutch size	1971-95	+ve	n.s.	Small Sample
NRS - brood size	1971-95	3.82 - 4.35 - 3.95	*	
NRS - laying date	1971-95	-ve	n.s.	Small Sample

Figure 3.71.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.72 WHITETHROAT *Sylvia communis*

3.72.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Long List

3.72.2 SPECIES SUMMARY

Whitethroat populations crashed by 75% between 1968 and 1969 due to drought in West Africa (Winstanley *et al.* 1974) and population fluctuations are related to over-wintering survival (Baillie & Peach 1992). After 1969, populations remained low until the late 1980s, since when they have increased to make a partial recovery. On woodland the populations have remained low for unknown reasons. There has been little change in productivity over the period, but average laying dates have become earlier (Crick *et al.* 1997).

Figure 3.72.1:
Population trends from the Common Birds Census and the Waterways Bird Survey

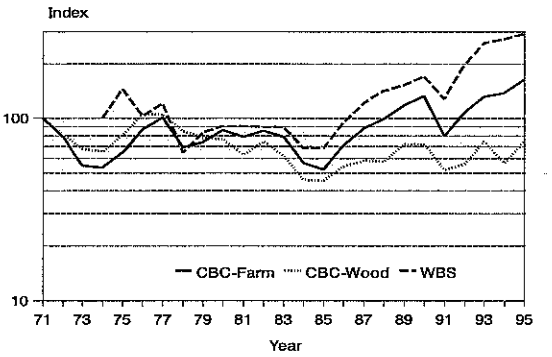


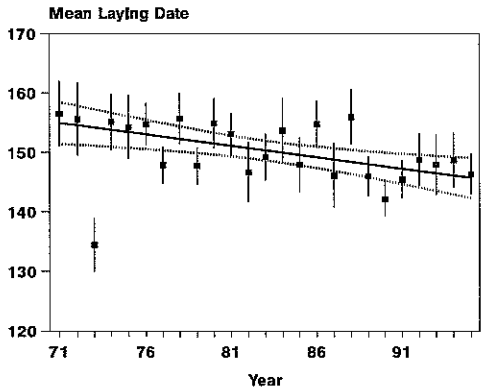
Table 3.72.1: Population trends

	Years	Change		Caveat
CBC - all	1971-95	+54		
CBC - Farmland	1971-95	+85		
CBC - Woodland	1971-95	-33		Small Sample
WBS	1974-95	+170		Small Sample
BBS	1994-95	+3	*	
CES - Adults	1983-95	-13	n.s.	
CES - Juveniles	1983-95	+14	n.s.	

Table 3.72.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	155 - 146 *		

Figure 3.72.2: Long-term trend from the Nest Record Scheme



3.73 GARDEN WARBLER *Sylvia borin*

3.73.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Long List

3.73.2 SPECIES SUMMARY

Garden Warbler populations dropped gradually during the 1960s (Marchant *et al.* 1990), recovered during the 1970s and levelled off from the mid 1980s. The CES indicates that productivity has become generally higher in the 1990s than the 1980s.

Figure 3.73.1:
Population trend from the Common Birds Census

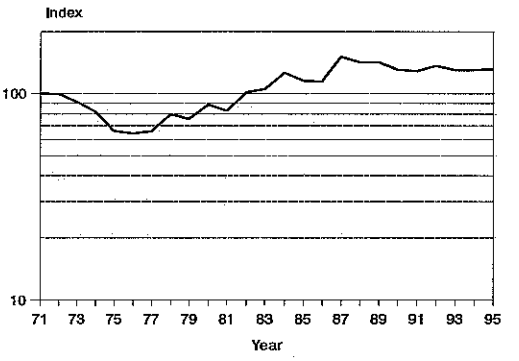


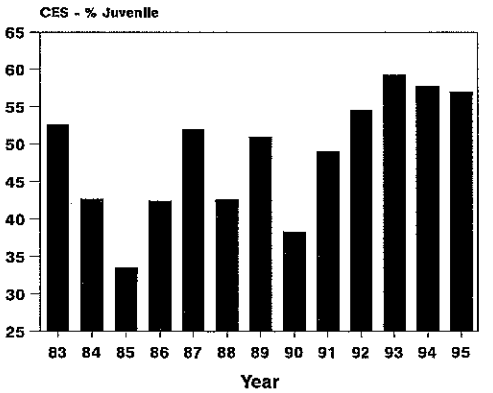
Table 3.73.1: Population trends

	Years	Change %		Caveat
CBC - all	1971-95	+97		
CBC - Farmland	1971-95	+43		Small Sample
CBC - Woodland	1971-95	+91		
BBS	1994-95	+7	n.s.	
CES - Adults	1983-95	−10	n.s.	
CES - Juveniles	1983-95	+15	n.s.	

Table 3.73.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	*	
NRS - egg stage nest losses d^{-1}	1971-95	−ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve	n.s.	
NRS - clutch size	1971-95	−ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	−ve	n.s.	

Figure 3.73.2: Long-term trend from the Constant Effort Sites Schemes



3.74 BLACKCAP *Sylvia atricapilla*

3.74.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.74.2 SPECIES SUMMARY

Blackcap populations have been increasing steadily from the 1960s, involving some northward spread in Scotland, but for unknown reasons (Gibbons *et al.* 1993). Breeding performance appears not to have changed substantially.

Figure 3.74.1:
Population trends from the Common Birds Census

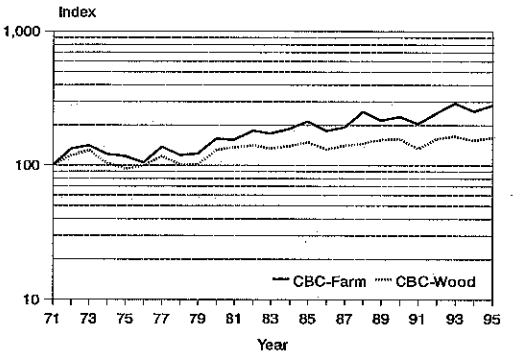


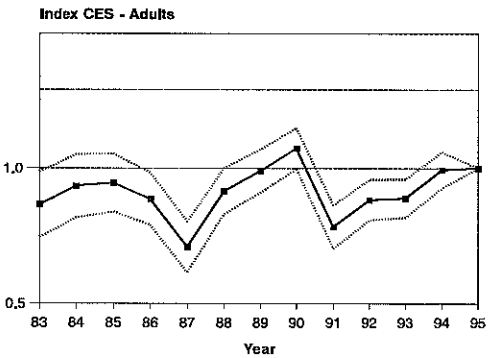
Table 3.74.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+114	
CBC - Farmland	1971-95	+164	
CBC - Woodland	1971-95	+62	
BBS	1994-95	+6 n.s.	
CES - Adults	1983-95	+18 *	
CES - Juveniles	1983-95	+34 *	

Table 3.74.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	-ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.74.2: Long-term trend from the Nest Record Schemes



3.75 WOOD WARBLER *Phylloscopus sibilatrix*

3.75.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.75.2 SPECIES SUMMARY

Wood Warblers occur predominantly in western Britain and appear to have shown little long-term population change or trend in breeding performance.

Figure 3.75.1:
Population trend from the Common Birds Census

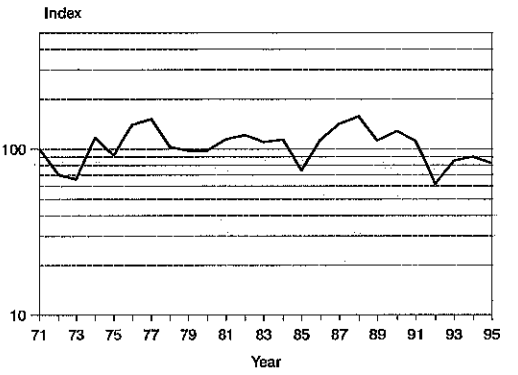


Table 3.75.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-1	Low Densities & Small Sample
BBS	1994-95	-19 n.s.	Small Sample

Table 3.75.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	-ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

3.76 CHIFFCHAFF *Phylloscopus collybita*

3.76.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.76.2 SPECIES SUMMARY

Overall, the population has shown little long-term trend, but the fluctuations are similar to those of the Sedge Warbler, suggesting that over-wintering losses are important. The strong trend towards earlier average laying dates may be linked to global climate change (Crick *et al.* 1997).

Figure 3.76.1:
Population trends from the Common Birds Census

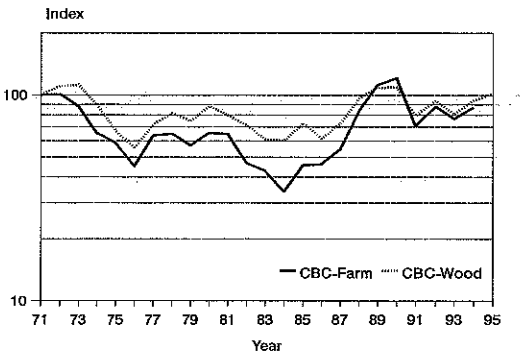


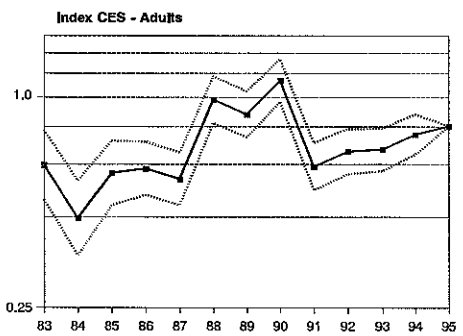
Table 3.76.1: Population trends

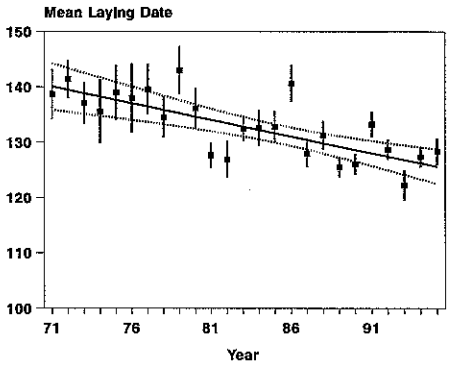
	Years	Change %	Caveat
CBC - all	1971-95	+26	
CBC - Farmland	1971-95	+22	
CBC - Woodland	1971-95	+6	
BBS	1994-95	+7 *	
CES - Adults	1983-95	+34 *	
CES - Juveniles	1983-95	+34 *	

Table 3.76.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	−ve *	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	−ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	140 - 125 *	

Figure 3.76.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.77 WILLOW WARBLER *Phylloscopus trochilus* MEDIUM BTO ALERT

3.77.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group

3.77.2 SPECIES SUMMARY

Detailed analysis has shown that the severe population decline in the late 1980s was restricted to the southern part of the UK and was strongly linked to changes in adult survival, and that increases in daily nest failure rates had only a small effect (Peach *et al.* 1996). The decline on CES plots requires a Medium BTO Alert.

Figure 3.77.1:
Population trends from the Common Birds Census

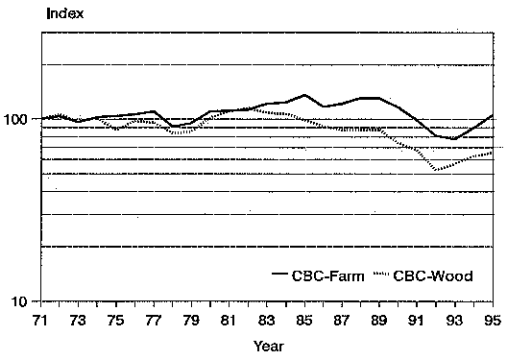


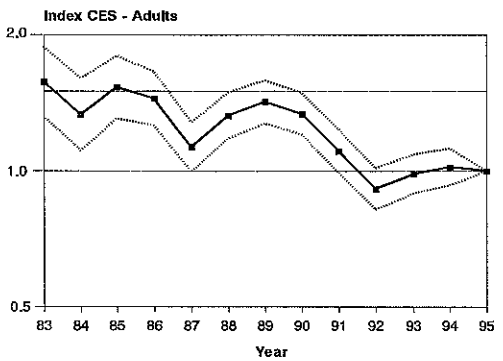
Table 3.77.1: Population trends

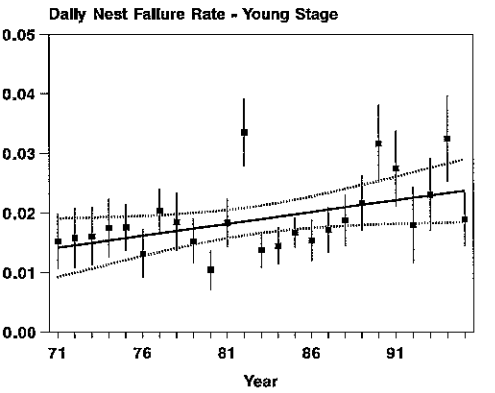
	Years	Change %	Caveat
CBC - all	1971-95	-14	
CBC - Farmland	1971-95	-1	
CBC - Woodland	1971-95	-39	
BBS	1994-95	+16 *	
CES - Adults	1983-95	-42 *	
CES - Juveniles	1983-95	-49 *	

Table 3.77.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve *	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	4.94 - 5.28	
NRS - laying date	1971-95	141 - 134 *	

Figure 3.77.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.78 GOLDCREST *Regulus regulus*

3.78.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.78.2 SPECIES SUMMARY

Goldcrest populations fluctuate strongly as a result of winter weather. Thus it is unclear whether the overall trend of population decline reflects a real decline or simply that the two most severe winters occured in the latter half of the study period. It seems prudent not to issue a BTO Alert for this species.

Figure 3.78.1:
Population trends from the Common Birds Census

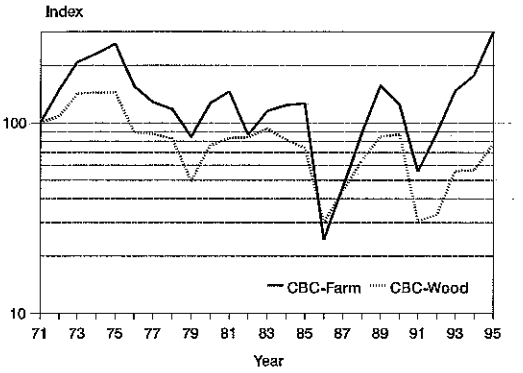


Table 3.78.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-48	
CBC - Farmland	1971-95	-29	Small Sample
CBC - Woodland	1971-95	-61	
BBS	1994-95	+30 *	

Table 3.78.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	Small Sample
NRS - clutch size	1971-95	-ve	n.s.	Small Sample
NRS - brood size	1971-95	-ve	n.s.	Small Sample
NRS - laying date	1971-95	-ve	n.s.	Small Sample

3.79 SPOTTED FLYCATCHER *Muscicapa striata* HIGH BTO ALERT

3.79.1 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group Middle List

3.79.2 SPECIES SUMMARY

Since breeding performance has generally improved, the severe population declines of this long-distance migrant, which warrant a High BTO Alert, are likely to be linked to changes in over-wintering survival.

Figure 3.79.1:
Population trends from the Common Birds Census

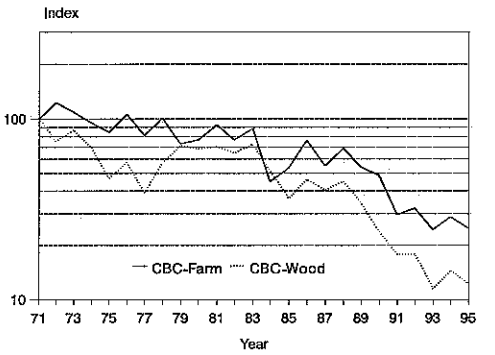


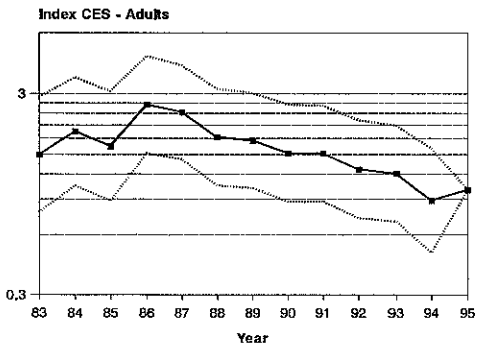
Table 3.79.1: Population trends

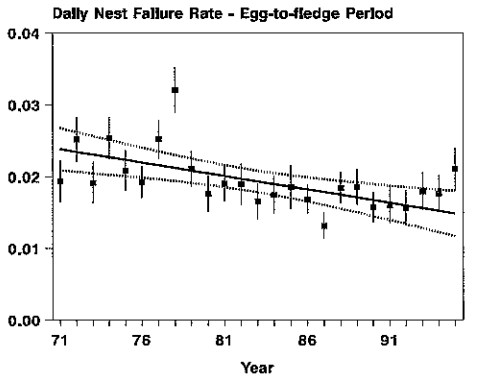
	Years	Change %	Caveat
CBC - all	1971-95	-79	
CBC - Farmland	1971-95	-76	
CBC - Woodland	1971-95	-83	Small Sample
BBS	1994-95	-17 n.s.	
CES - Adults	1983-95	-58 *	Small Sample
CES - Juveniles	1983-95	-46 *	Small Sample

Table 3.79.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve *	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	3.58 - 3.77 - 3.68 *	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.79.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.80 LONG-TAILED TIT *Aegithalos caudatus*

3.80.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.80.2 SPECIES SUMMARY

Large population fluctuations in this species are likely to be mainly due to winter weather. In recent years the population has tended to increase associated with increases in productivity. The recent trend towards earlier laying may be linked to global climate change (Crick *et al.* 1997).

Figure 3.80.1:
Population trends from the Common Birds Census

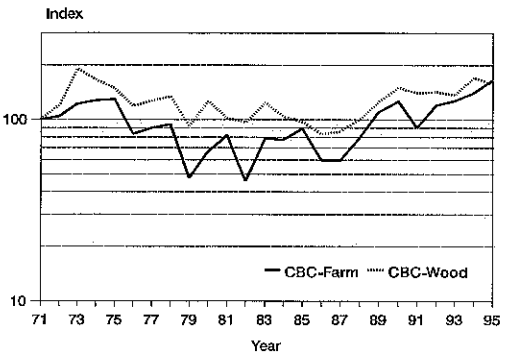


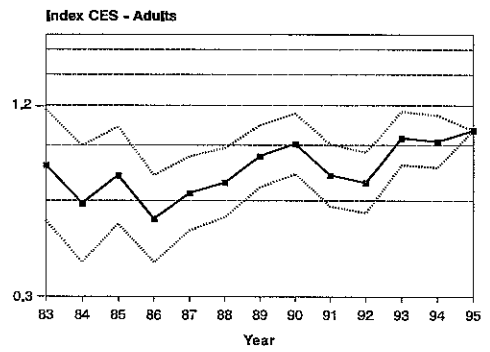
Table 3.80.1: Population trends

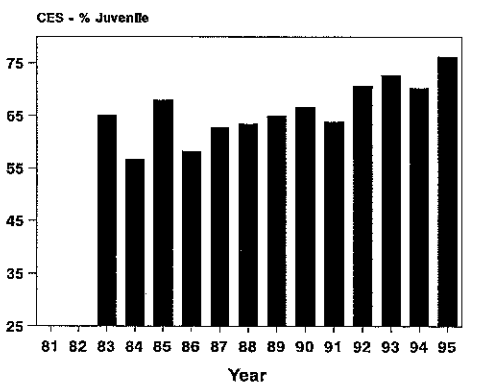
	Years	Change %	Caveat
CBC - all	1971-95	+22	
CBC - Farmland	1971-95	+22	
CBC - Woodland	1971-95	+5	
BBS	1994-95	+11 n.s.	
CES - Adults	1983-95	+71 *	
CES - Juveniles	1983-95	+132 *	

Table 3.80.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve *	
NRS - egg stage nest losses d^{-1}	1971-95	-ve *	
NRS - young stage nest losses d^{-1}	1971-95	+ve *	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve *	
NRS - clutch size	1971-95	-ve n.s.	
NRS - brood size	1971-95	- ve n.s.	
NRS - laying date	1971-95	105 - 109 - 96 *	

Figure 3.80.2: Long-term trends from the Constant Effort Sites





3.80.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.80.2 SPECIES SUMMARY

Marsh Tit population size and distribution has declined for unknown reasons (Gibbons *et al.* 1993), but this is unlikely to be due to changes in breeding performance, which has improved. The population declines on CBC plots warrants a Medium BTO Alert.

Figure 3.80.1:
Population trend from the Common Birds Census

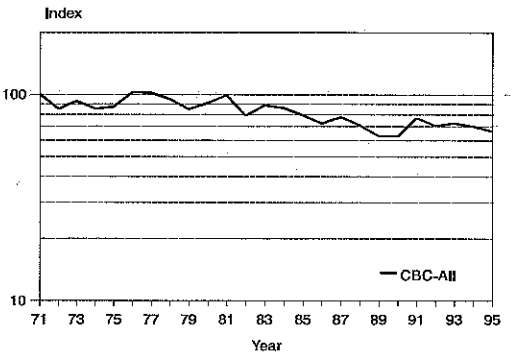


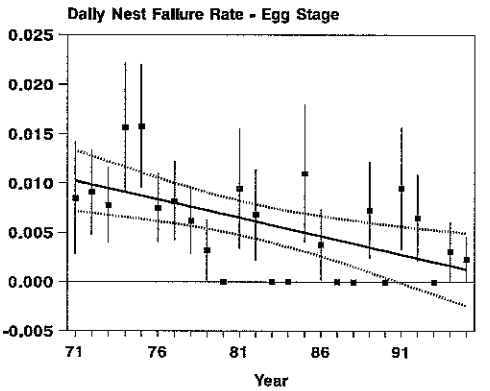
Table 3.80.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-33	
CBC - Woodland	1971-95	-32	
BBS	1994-95	+36 *	

Table 3.80.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.80.2: Long-term trend from the Nest Record Scheme



3.82.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.82.2 SPECIES SUMMARY

Willow Tit populations have declined in size and distribution, which may be linked to drainage of their preferred damp woodland habitats and to drier summers (Gibbons *et al.* 1993). The decline on CBC plots requires a Medium BTO Alert.

Figure 3.82.1:
Population trend from the Common Birds Census

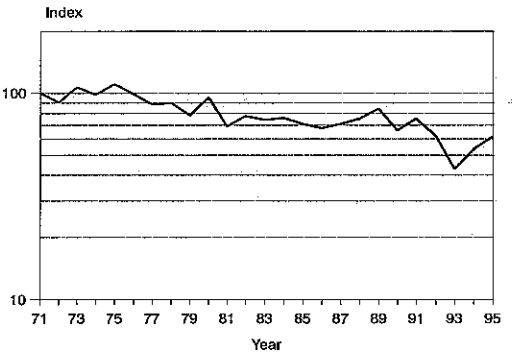


Table 3.82.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-46	Small Sample
BBS	1994-95	-24 n.s.	Small Sample
CES-Adults	1983-95	-31 n.s.	
CES-Juveniles	1983-95	-15 n.s.	

3.83 COAL TIT *Parus ater*

3.83.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.83.2 SPECIES SUMMARY

Coal Tits appear less affected by cold winter weather than other small resident passerines and have increased in population size on farmland.

Figure 3.83.1:
Population trends from the Common Birds Census

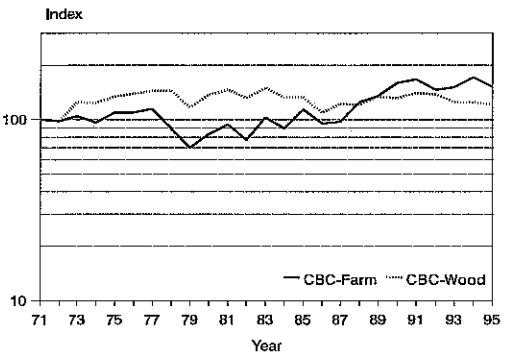


Table 3.83.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+11	
CBC - Farmland	1971-95	+72	
CBC - Woodland	1971-95	+7	
BBS	1994-95	+4 n.s.	

3.84 BLUE TIT *Parus caeruleus*

3.84.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.84.2 SPECIES SUMMARY

This very abundant species has shown a slight increase in population size. Its ability to utilize aritificial food in gardens probably enables it to survive well in winter weather.

Figure 3.84.1:
Population trends from the Common Birds Census

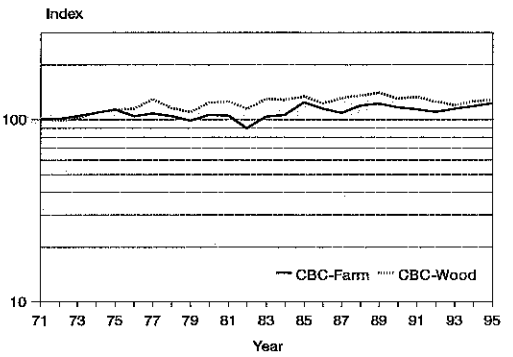


Table 3.84.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+28	
CBC - Farmland	1971-95	+17	
CBC - Woodland	1971-95	+27	
BBS	1994-95	+ 8 *	
CES - Adults	1983-95	−5 n.s.	
CES - Juveniles	1983-95	−1 n.s.	

3.85 GREAT TIT *Parus major*

3.85.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group

3.85.2 SPECIES SUMMARY

After increasing in population size in the late 1970s, populations have fluctuated about a steady level.

Figure 3.85.1:
Population trends from the Common Birds Census

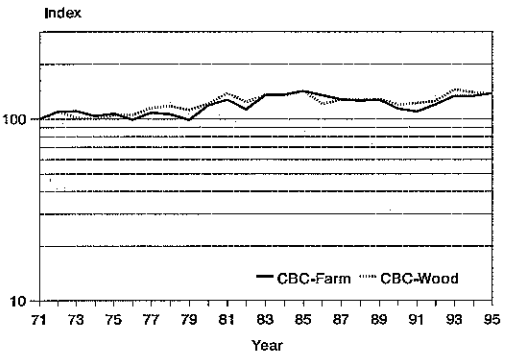


Table 3.85.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+38	
CBC - Farmland	1971-95	+30	
CBC - Woodland	1971-95	+34	
BBS	1994-95	+5 *	
CES - Adults	1983-95	−9 n.s.	
CES - Juveniles	1983-95	+18 n.s.	

Table 3.85.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve n.s.	

3.86 NUTHATCH *Sitta europaea*

3.86.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.86.2 SPECIES SUMMARY

Nuthatch populations have increased substantially and have spread into north England over the past 25 years (Gibbons *et al.* 1993). Nest failure rates fell and have started to increase, but average brood sizes have increased by nearly 2 young. Average laying dates have become earlier and are perhaps being affected by climate change (Crick *et al.* 1997)

Figure 3.86.1:
Population trend from the Common Birds Census

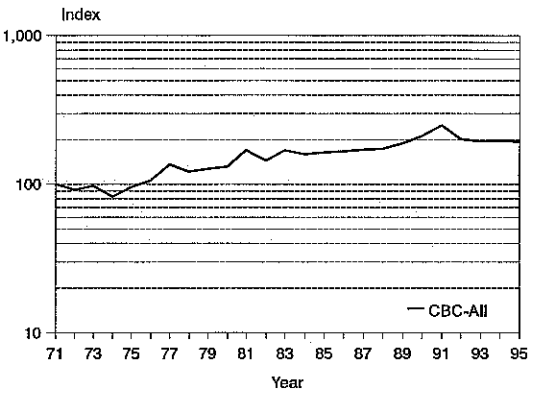


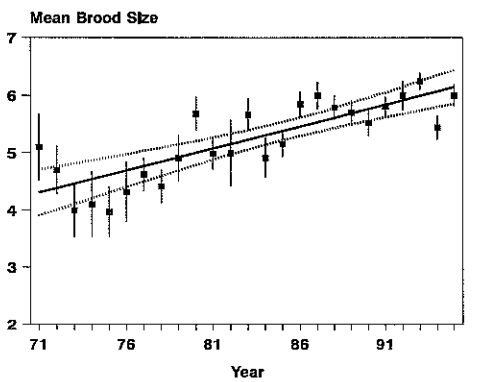
Table 3.86.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+149	
CBC - Woodland	1971-95	+152	
BBS	1994-95	+ 6 n.s.	

Table 3.86.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	4.31 - 6.14	*	
NRS - laying date	1971-95	122 - 115	*	

Figure 3.86.2: Long-term trend from the Nest Record Scheme



3.87 TREECREEPER *Certhia familiaris*

3.87.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.87.2 SPECIES SUMMARY

Treecreeper numbers and survival rates are reduced by wet winters (Peach *et al.* 1995). Both CES and NRS indicate that breeding performance has generally increased.

Figure 3.87.1:
Population trends from the Common Birds Census

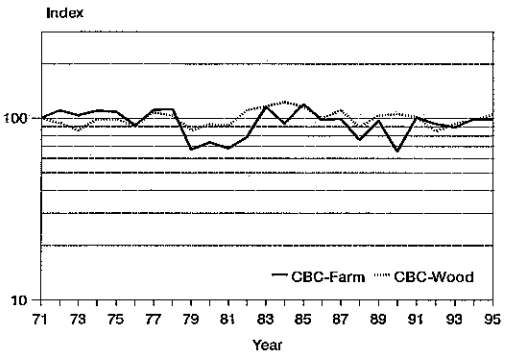


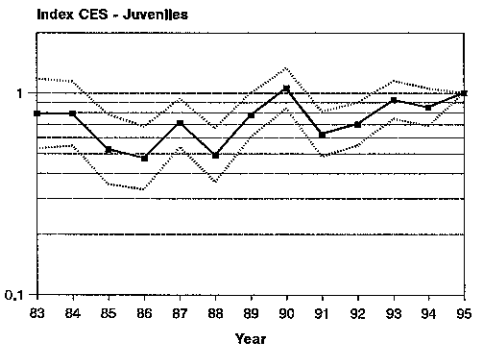
Table 3.87.1: Population trends

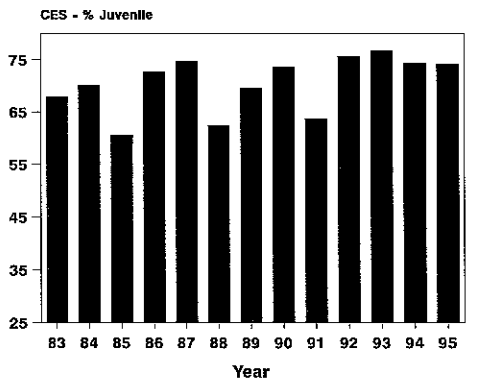
	Years	Change %	Caveat
CBC - all	1971-95	0	
CBC - Farmland	1971-95	-11	
CBC - Woodland	1971-95	+5	
BBS	1994-95	+17 n.s.	
CES - Adults	1983-95	+15 n.s.	
CES - Juveniles	1983-95	+69 *	

Table 3.87.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve *	
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve *	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve *	
NRS - clutch size	1971-95	- ve n.s.	
NRS - brood size	1971-95	4.18 - 4.63 - 4.30 *	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.87.2: Long-term trends from the Constant Effort Sites





3.88 JAY *Garrulus glandarius*

3.88.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.88.2 SPECIES SUMMARY

Jay population trends show an interesting divergence, with increases in their preferred woodland habitat but decreases on farmland which is likely to be a sub-optimal habitat. The latter decreases may be linked to agricultural changes that have affected other bird populations.

Figure 3.88.1:
Population trends from the Common Birds Census

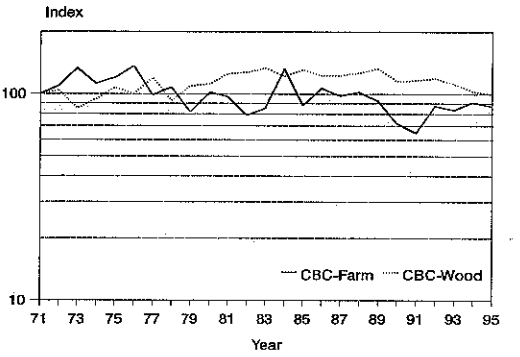


Table 3.88.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	+3	
CBC - Farmland	1971-95	−30	
CBC - Woodland	1971-95	+18	
BBS	1994-95	−26 *	

3.89 MAGPIE *Pica pica*

3.89.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.89.2 SPECIES SUMMARY

Magpie populations increased until the late 1980s and have since been relatively stable. The increases have been linked to their spread into urban/suburban habitats and a decline in game-keeping (Marchant *et al.* 1990). There have been large increases in productivity over the period and average laying date has advanced by nearly three weeks, which may be linked to climate change or the shift in habitat use (Crick *et al.* 1997).

Figure 3.89.1:
Population trends from the Common Birds Census

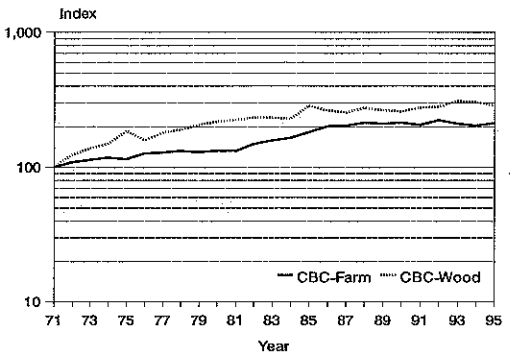


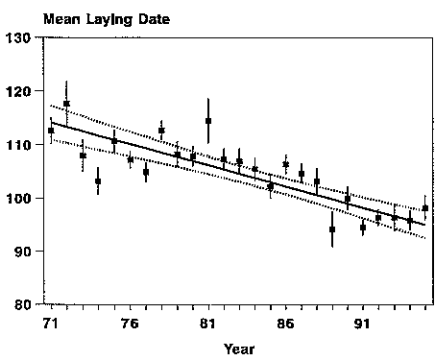
Table 3.89.1: Population trends

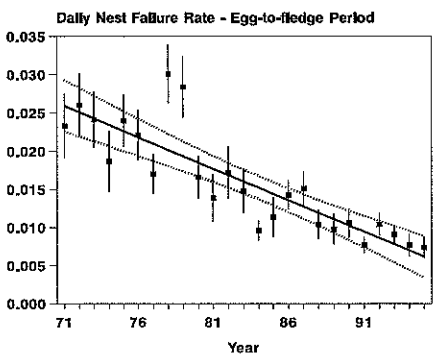
	Years	Change %	Caveat
CBC - all	1971-95	+156	
CBC - Farmland	1971-95	+130	
CBC - Woodland	1971-95	+146	
BBS	1994-95	-5 *	

Table 3.89.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	3.36 - 4.07	*	
NRS - laying date	1971-95	114 - 95	*	

Figure 3.89.2: Long-term trends from the Nest Record Scheme





3.90 JACKDAW *Corvus monedula*

3.90.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.90.2 SPECIES SUMMARY

Populations in farmland have tended to remain steady after increases in the 1970s but those in woodland have continued to increase. Reasons for these increases are obscure but breeding performance has increased substantially over the period.

Figure 3.90.1:
Population trends from the Common Birds Census

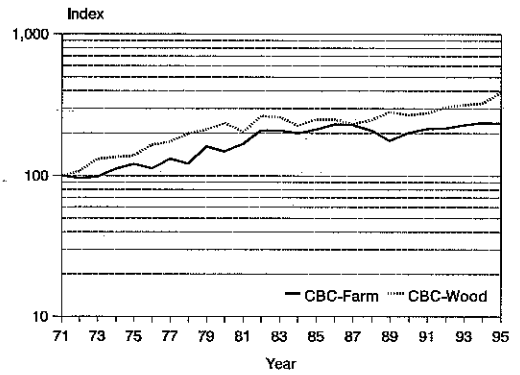


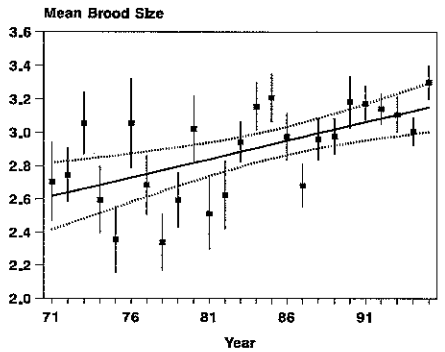
Table 3.90.1: Population trends

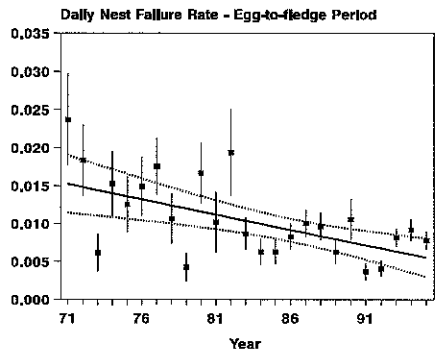
	Years	Change %	Caveat
CBC - all	1971-95	+142	
CBC - Farmland	1971-95	+156	
CBC - Woodland	1971-95	+193	Small Sample
BBS	1994-95	5 n.s.	

Table 3.90.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	2.61 - 3.15	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.90.2: Long-term trends from the Nest Record Schemes





3.91 ROOK *Corvus frugilegus*

3.91.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.91.2 SPECIES SUMMARY

Rooks are monitored relatively poorly by CBC and have been subject to periodic survey. Initial analyses of the latest survey in 1996 suggest that there has been an approximate increase in UK population of 40% since 1975 (Marchant *et al.* 1997). Over the past 25 years nesting success has tended to improve.

Figure 3.91.1:
Population trend from the Common Birds Census

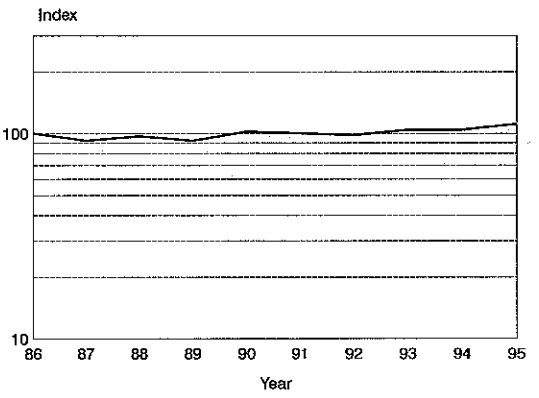


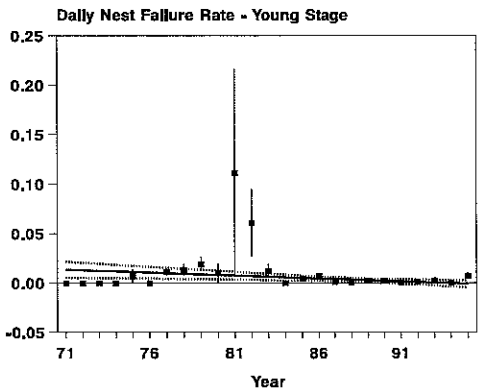
Table 3.91.1: Population trends

	Years	Change %	Caveat
CBC - All	1986-95	+14	Small Sample
BBS	1994-95	+ 2 n.s.	Low Densities

Table 3.91.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	to n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	3.48 - 3.81 - 3.03	*	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	-ve	n.s.	Small Sample

Figure 3.91.2: Long-term trend from the Nest Record Scheme



3.92 CARRION CROW *Corvus corone*

3.92.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.92.2 SPECIES SUMMARY

Carrion Crow populations have shown steady increases which are thought to be linked to declining game-keeping interests (Marchant *et al.* 1990). Nesting success has improved and there is a trend towards earlier average laying dates which may be linked to climate change (Crick *et al.* 1997).

Figure 3.92.1:
Population trends from the Common Birds Census

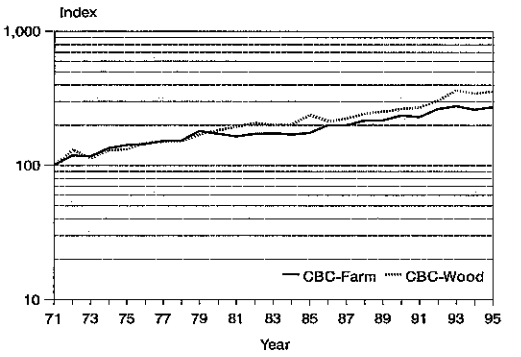


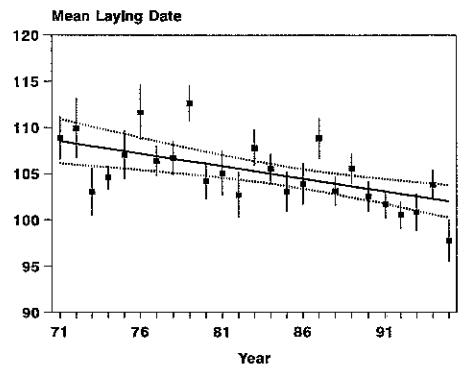
Table 3.92.1: Population trends

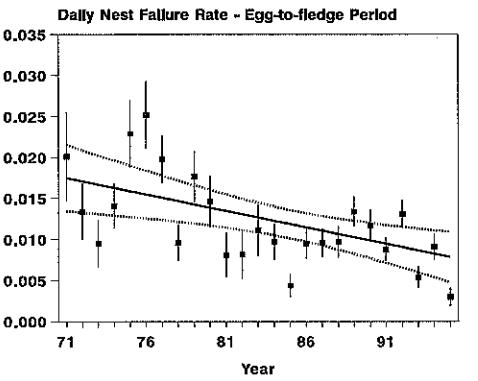
	Years	Change %	Caveat
CBC - all	1971-95	+180	
CBC - Farmland	1971-95	+141	
CBC - Woodland	1971-95	+218	
BBS	1994-95	0 n.s.	

Table 3.92.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve *	
NRS - clutch size	1971-95	-ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	108 - 102 *	

Figure 3.92.2: Long-term trends from the Nest Record Schemes





3.93.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.93.2 SPECIES SUMMARY

Raven populations have decreased in Scotland and northern England (Gibbons *et al.* 1993) and distributional gaps are linked to grouse moor gamekeeping interests (Gibbons *et al.* 1995). Brood sizes have declined significantly and nest failures are higher than there were in the 1970s. The declines in breeding performance warrant a Medium BTO Alert.

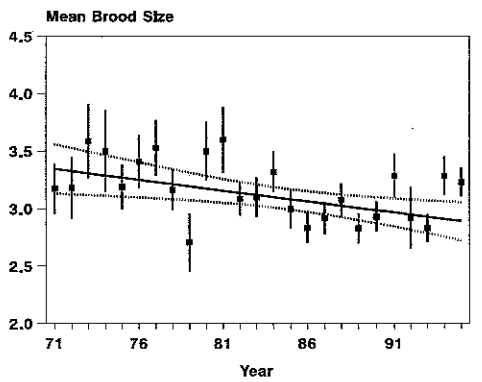
Table 3.93.1: Population trends

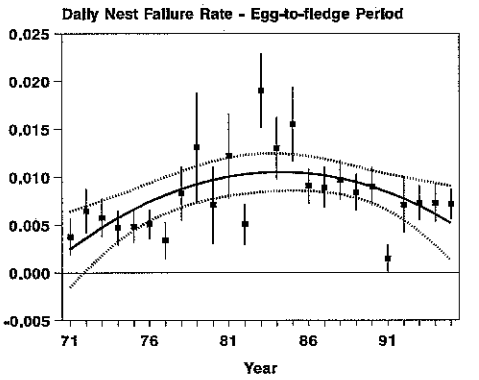
	Years	Change %	Caveat
BBS	1994-95	+35 *	

Table 3.93.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve to -ve	*	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	3.35 - 2.89	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.93.2: Long-term trends from the Nest Record Scheme





3.94.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group: Unlisted

3.94.2 SPECIES SUMMARY

Population of Starling have declined substantially, especially in woodland, since the early 1980s warranting a Medium BTO Alert. Their preferred feeding habitat is permanent pasture, much of which has been lost, particularly in south and east England (Gibbons *et al.* 1993). The Nest Record Scheme shows improvements in breeding success, so it is possible that changes in survival have affected the population declines.

Figure 3.94.1:
Population trends from the Common Birds Census

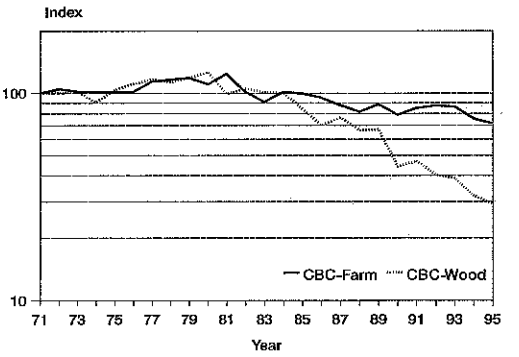


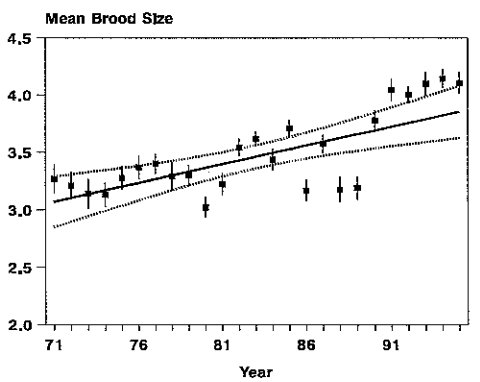
Table 3.94.1: Population trends

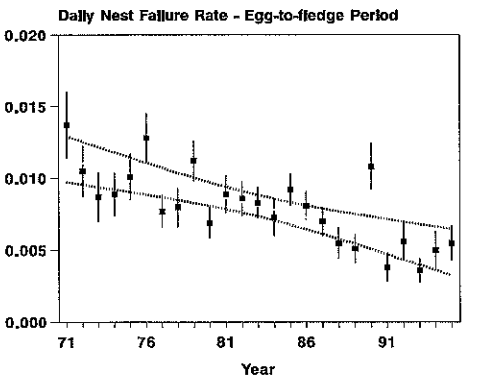
	Years	Change %	Caveat
CBC - all	1971-95	-45	
CBC - Farmland	1971-95	-30	
CBC - Woodland	1971-95	-71	
BBS	1994-95	+8 *	

Table 3.94.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	4.43 - 4.81	*	
NRS - brood size	1971-95	3.07 - 3.85	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.94.2: Long-term trends from the Nest Record Scheme





3.95 HOUSE SPARROW *Passer domesticus*

3.95.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.95.2 SPECIES SUMMARY

This colonial and flocking species is monitored poorly by CBC but its indication of decline have been echoed by other studies. Possible reasons for decline include loss of food supplies through other biocide usage, loss of winter stubbles and increased cat predation (Gibbons *et al.* 1993).

Figure 3.95.1:
Population trend from the Common Birds Census

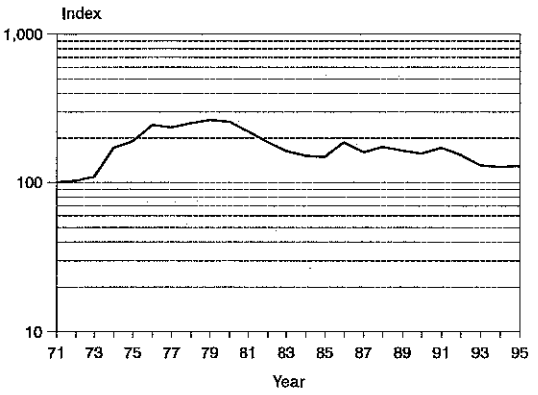


Table 3.95.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-10	Small Sample
BBS	1994-95	+3 n.s.	

3.96.1 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group

3.96.2 SPECIES SUMMARY

Tree Sparrow populations have crashed since the late 1970s, requiring a High BTO Alert with range contractions in south-west England, west Wales, northern England and Scotland (Gibbons *et al.* 1993). The reasons for the decline are unknown but may be a feature of a medium-term rise and fall in Tree Sparrow numbers (Summers-Smith 1995). The changes are unlikely to be linked to breeding performance as this has tended to improve.

Figure 3.96.1:
Population trends from the Common Birds Census

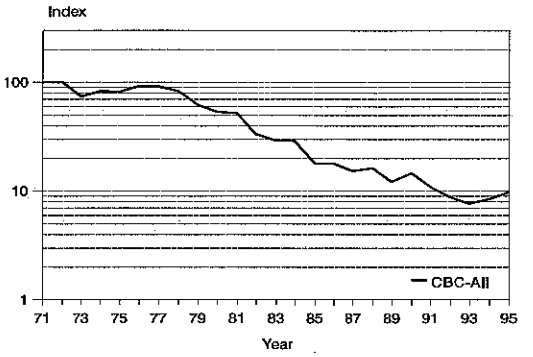


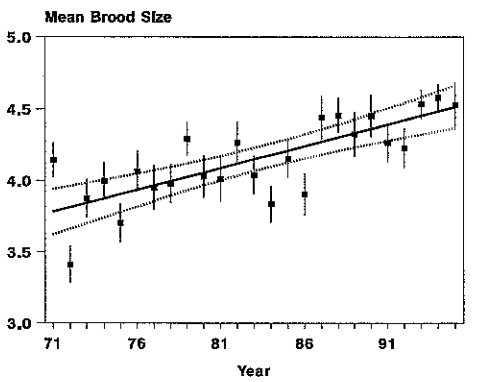
Table 3.96.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-95	Small Sample
CBC - Farmland	1971-95	-89	Small Sample
BBS	1994-95	-3 n.s.	

Table 3.96.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	- ve	n.s.	
NRS - clutch size	1971-95	4.78 - 5.41	*	
NRS - brood size	1971-95	3.78 - 4.50	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.96.2: Long-term trends from the Nest Record Schemes



3.97 CHAFFINCH *Fringilla coelebs*

3.97.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group: Unlisted

3.97.2 SPECIES SUMMARY

Chaffinch populations have gradually increased over the past 25 years, as shown by both CBC and CES, contrasting with many of the other seed-eating finches. Breeding performance has tended to improve over the period and recent trends toward earlier laying may be linked to global climate change (Crick *et al.* 1997).

Figure 3.97.1:
Population trends from the Common Birds Census

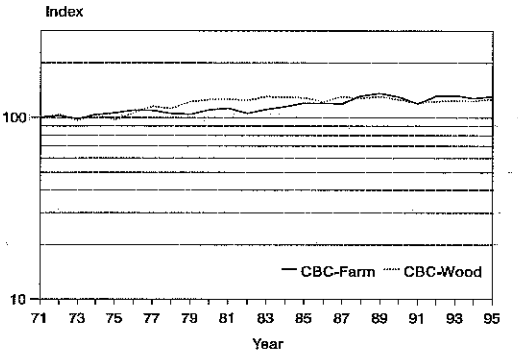


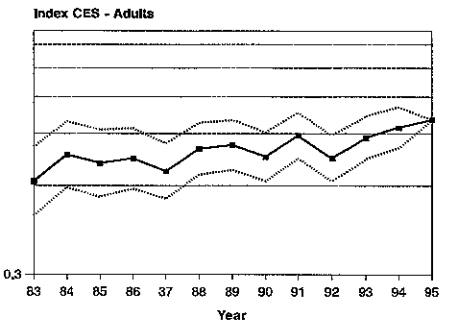
Table 3.97.1: Population trends

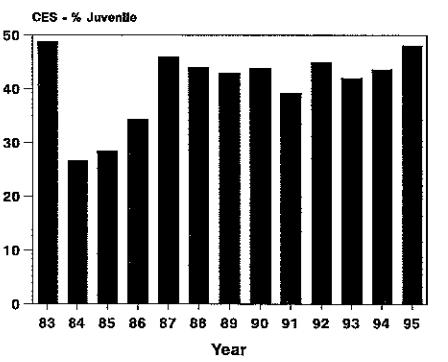
	Years	Change %	Caveat
CBC - all	1971-95	+32	
CBC - Farmland	1971-95	+35	
CBC - Woodland	1971-95	+28	
BBS	1994-95	-1 n.s.	
CES - Adults	1983-95	+51 *	
CES - Juveniles	1983-95	+96 *	

Table 3.97.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	*	
NRS - egg stage nest losses d^{-1}	1971-95	-ve to + ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve to -ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	128 - 131 - 122	*	

Figure 3.97.2: Long-term trends from the Constant Effort Sites Scheme





3.98 GREENFINCH *Carduelis chloris* MEDIUM BTO ALERT

3.98.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.98.2 SPECIES SUMMARY

Greenfinch populations have been relatively stable over the past 25 years. However, the Nest Record Scheme provides evidence for increasing nest failures in the 1990s which may foreshadow a future population decline (Crick *et al.* 1996b), hence the Medium BTO Alert.

Figure 3.98.1:
Population trends from the Common Birds Census

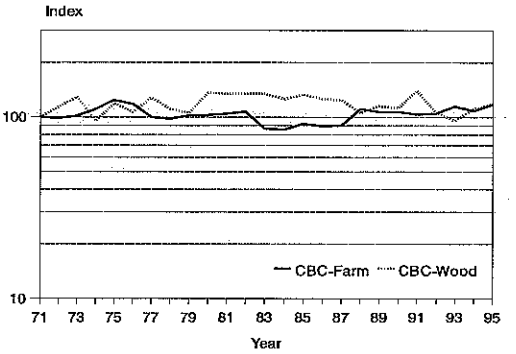


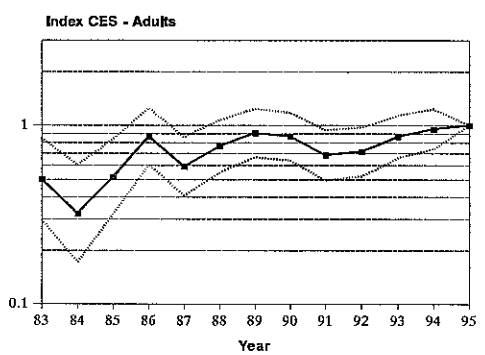
Table 3.98.1: Population trends

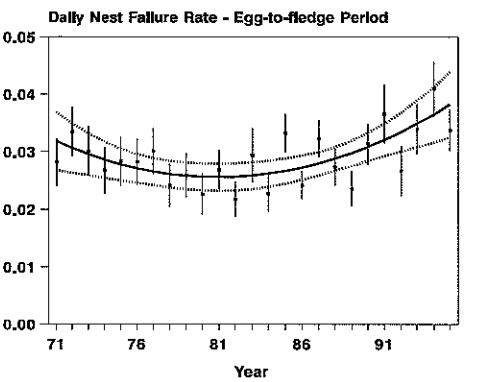
	Years	Change %	Caveat
CBC - all	1971-95	-7	
CBC - Farmland	1971-95	+2	
CBC - Woodland	1971-95	+2	
BBS	1994-95	+6 *	
CES - Adults	1983-95	+79 *	
CES - Juveniles	1983-95	-3 *	

Table 3.98.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	-ve n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve *	
NRS - young stage nest losses d^{-1}	1971-95	-ve to +ve *	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve *	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	-ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.98.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.99.1 CONSERVATION IMPORTANCE

Table 4/Amber (25-50% Population decline)
Biodiversity Steering Group Long List

3.99.2 SPECIES SUMMARY

The majority of Goldfinches move to France, Belgium and Spain in winter and population fluctuations are likely to be dependent on conditions there (Gibbons *et al.* 1993). Although it suffered after the cold winter of 1985/86, the population appears now to have recovered (see Section 4.3).

Figure 3.99.1:
Population trend from the Common Birds Census

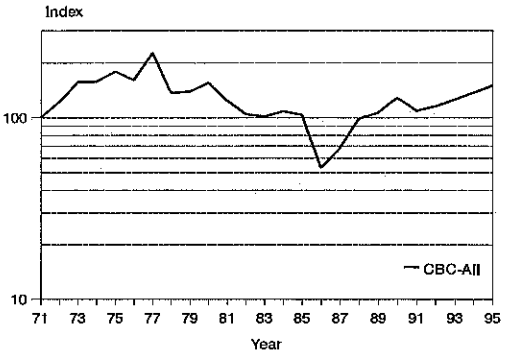


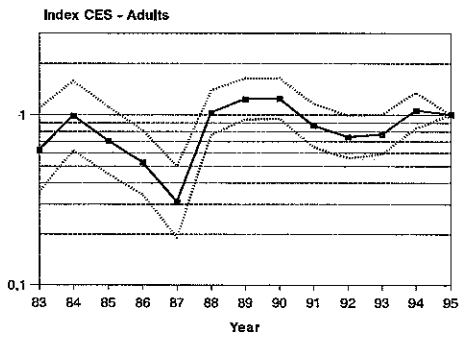
Table 3.99.1: Population trends

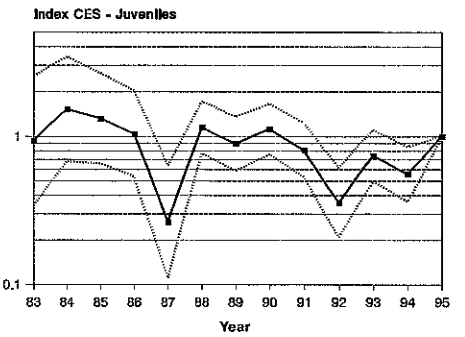
	Years	Change %	Caveat
CBC - all	1971-95	-27	Unreliable Trend
CBC - Farmland	1971-95	+20	
BBS	1994-95	-4 n.s.	
CES - Adults	1983-95	+40 n.s.	
CES - Juveniles	1983-95	-45 *	

Table 3.99.2: Productivity trends

	Years	Change	Caveat
NRS - egg stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve n.s.	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.99.2: Long-term trends from the Constant Effort Sites Scheme





3.100 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group Middle List

3.100.2 SPECIES SUMMARY

Linnet populations underwent a large decline from the mid 1970s to mid 1980s and have since begun to recover (Medium BTO Alert), however declines in scrub habitats (CES) appear to be continuing Declines have been linked to loss of weed seed food supplies due to herbicides and it is possible that recovery might be a beneficial effect of set-aside. Trends in nest failure rates mirror the CBC population trends, suggesting a causal link between the two.

Figure 3.100:
Population trends from the Common Birds Census

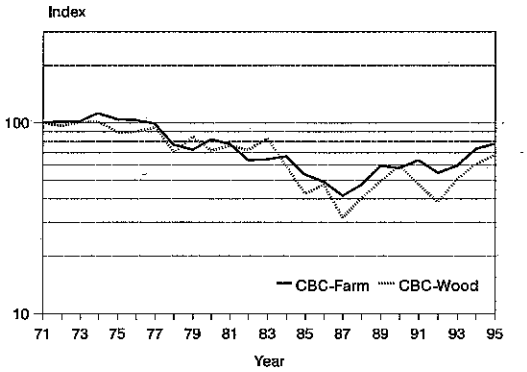


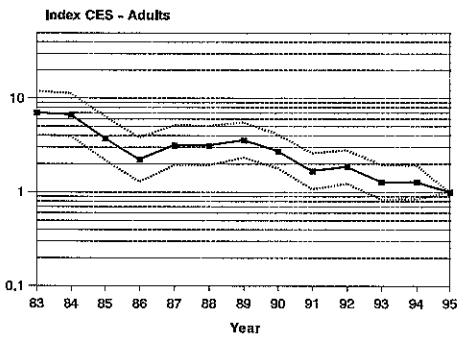
Table 3.100: Population trends

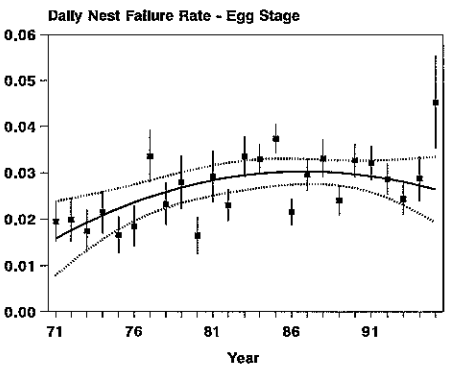
	Years	Change %		Caveat
CBC - all	1971-95	-46		
CBC - Farmland	1971-95	-49		
CBC - Woodland	1971-95	-58		Small Sample
BBS	1994-95	+15	*	
CES - Adults	1983-95	-85	*	
CES - Juveniles	1983-95	-91	*	

Table 3.100.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	+ve to - ve	*	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve to -ve	*	
NRS - clutch size	1971-95	-ve	n.s.	
NRS - brood size	1971-95	+ve	n.s.	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.100: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.101.1 CONSERVATION IMPORTANCE

Table 4/Red (Historial decline)
Biodiversity Steering Group Long List

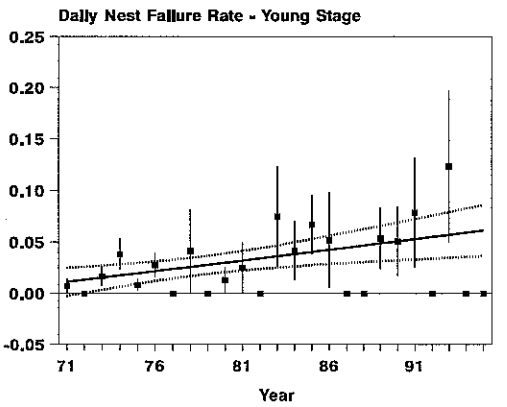
3.101.2 SPECIES SUMMARY

Twite populations are not monitored annually but have undergone a long-term historical decline, probably due to habitat loss through moorland degradation and agricultural reclamation (Gibbons *et al.* 1993). Breeding performance has tended to decline (Medium BTO Alert) and this has been linked to the increased use of less productive grassland for nesting as heather moorland has been degraded (Brown *et al.* 1995).

Table 3.101.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - clutch size	1971-95	-ve	n.s.	Small Sample
NRS - brood size	1971-95	-ve	n.s.	Small Sample
NRS - laying date	1971-95	-ve	n.s.	Small Sample

Figure 3.101.2: Long-term trend from the Nest Record Scheme



3.102.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.102.2 SPECIES SUMMARY

Redpoll underwent a substantial range contraction between the breeding atlases (Gibbons *et al.* 1993) and, although not representative of the centres of Redpoll populations, the CBC and CES have recorded large population declines (High BTO Alert). Breeding performance has not changed substantially, so the declines are likely to be due to habitat loss or declines in survival.

Figure 3.102.1:
Population trend from the Common Birds Census

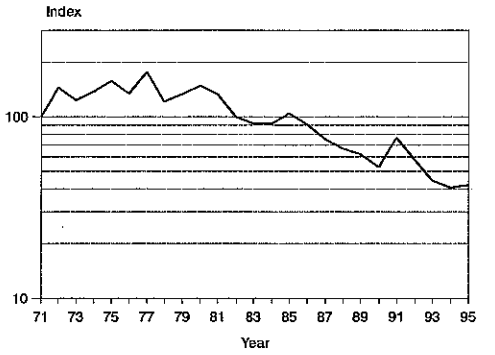


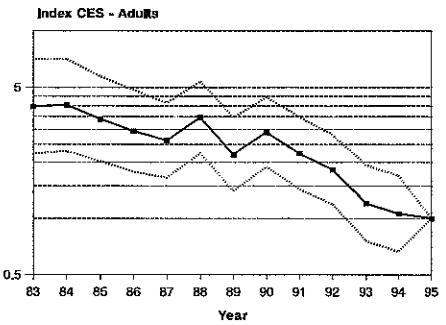
Table 3.102.1: Population trends

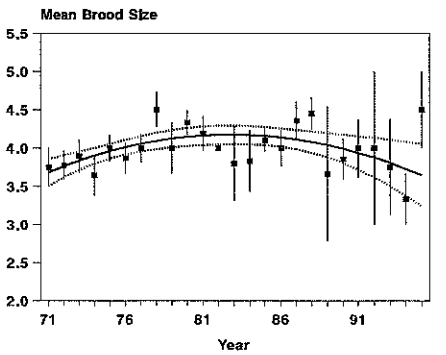
	Years	Change %	Caveat
CBC - all	1971-95	-72	Low Densities & Small Sample
BBS	1994-95	0 n.s.	
CES - Adults	1983-95	-77 *	
CES - Juveniles	1983-95	-75 *	

Table 3.102.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	3.68 - 4.17 - 3.64	*	
NRS - laying date	1971-95	+ve	n.s.	

Figure 3.102.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.103.1 CONSERVATION IMPORTANCE

Table 3/Red (50% Population decline)
Biodiversity Steering Group Middle List

3.103.2 SPECIES SUMMARY

Bullfinch populations declined strongly in the late 1970s requiring a High BTO Alert and have been relatively stable since then, although CES provides evidence for recent decline. Although brood sizes tended to decline in the 1990s, nest failure rates have improved. It is unclear why populations have declined, but agricultural intensification may provide a cause (Marchant *et al.* 1990).

Figure 3.103.1:
Population trends from the Common Birds Census

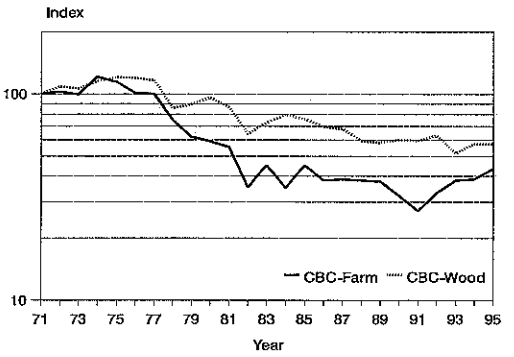


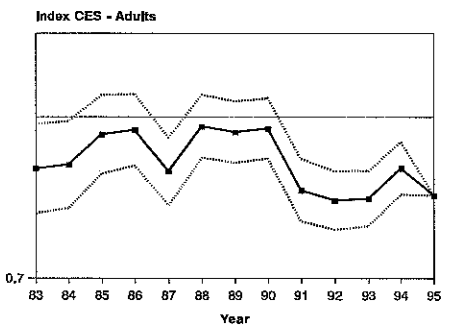
Table 3.103.1: Population trends

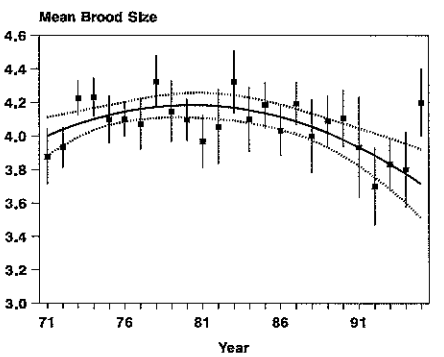
	Years	Change %	Caveat
CBC - all	1971-95	-57	
CBC - Farmland	1971-95	-75	
CBC - Woodland	1971-95	-56	
BBS	1994-95	-17 *	
CES - Adults	1983-95	-24 *	
CES - Juveniles	1983-95	+1 n.s.	

Table 3.103.2: Productivity trends

	Years	Change		Caveat
CES % - Juveniles	1983-95	+ve	n.s.	
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	*	
NRS - clutch size	1971-95	+ve	n.s.	
NRS - brood size	1971-95	4.00 - 4.18 - 3.72	*	
NRS - laying date	1971-95	142 - 150 - 137	*	

Figure 3.103.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.104 YELLOWHAMMER *Emberiza citrinella* MEDIUM BTO ALERT

3.104.1 CONSERVATION IMPORTANCE

Unlisted/Green
Biodiversity Steering Group Long List

3.104.2 SPECIES SUMMARY

Yellowhammer populations have declined more recently than other seed-eating passerines and now require a Medium BTO Alert. This may be linked to loss of food supplies due to loss of stubbles and increased biocide use. Breeding performance has tended to improve, so changes in survival rates may have caused the population decline.

Figure 3.104.1:
Population trends from the Common Birds Census

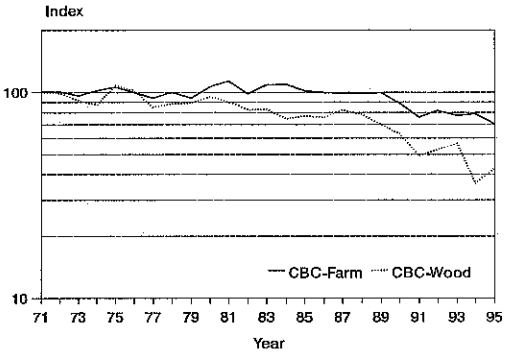


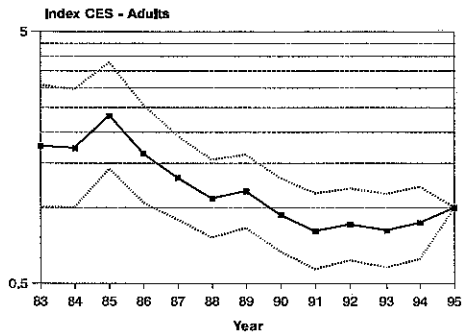
Table 3.104.1: Population trends

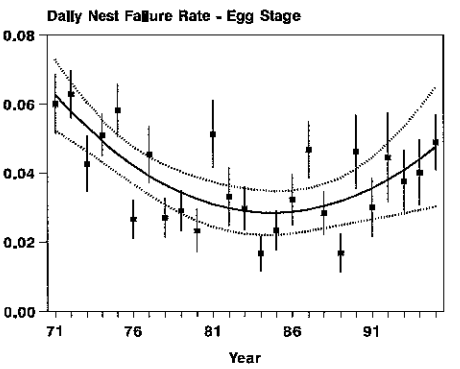
	Years	Change %	Caveat
CBC - all	1971-95	-31	
CBC - Farmland	1971-95	-24	
CBC - Woodland	1971-95	-55	
BBS	1994-95	-8	
CES - Adults	1983-95	-52 *	
CES - Juveniles	1983-95	-76 *	

Table 3.104.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - young stage nest losses d^{-1}	1971-95	-ve	*	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve to +ve	*	
NRS - clutch size	1971-95	3.33 - 3.67	*	
NRS - brood size	1971-95	2.95 - 3.41	*	
NRS - laying date	1971-95	-ve	n.s.	

Figure 3.104.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.105 REED BUNTING *Emberiza schoeniclus* HIGH BTO ALERT

3.105.1 CONSERVATION IMPORTANCE

Table 3/Red (>50% Population decline)
Biodiversity Steering Group Middle List

3.105.2 SPECIES SUMMARY

Reed Bunting populations declined in both their dry and wet habitats in the late 1970s, and the CES suggests this has continued. Population declines have been linked to increased herbicide use (Gibbons *et al.* 1993) and require a High BTO Alert.

Figure 3.105.1:
Population trends from the Common Birds Census and Waterways Bird Survey

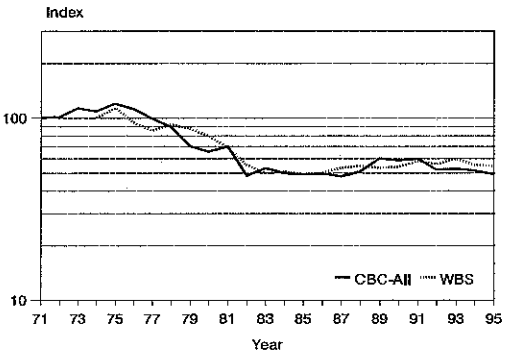


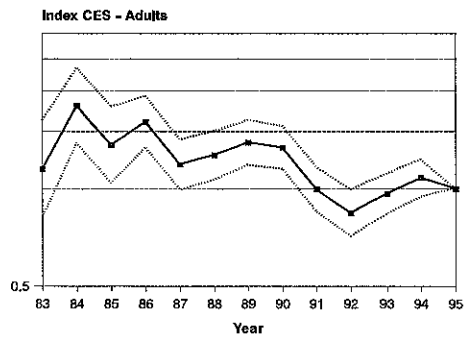
Table 3.105.1: Population trends

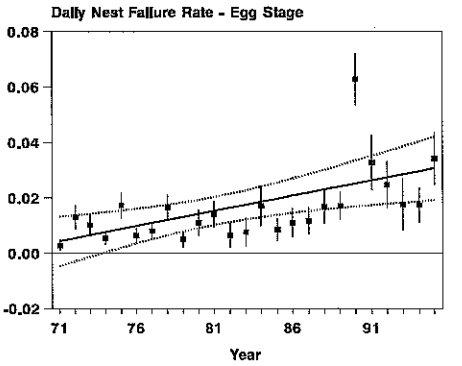
	Years	Change %	Caveat
CBC - all	1971-95	-60	
CBC - Farmland	1971-95	-61	
WBS	1974-95	-49	
BBS	1994-95	+5 n.s.	
CES - Adults	1983-95	-44 *	
CES - Juveniles	1983-95	-61 *	

Table 3.105.2: Productivity trends

	Years	Change	Caveat
CES % - Juveniles	1983-95	+ve *	
NRS - egg stage nest losses d^{-1}	1971-95	+ve *	
NRS - young stage nest losses d^{-1}	1971-95	+ve n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	+ve *	
NRS - clutch size	1971-95	+ve n.s.	
NRS - brood size	1971-95	+ve n.s.	
NRS - laying date	1971-95	-ve n.s.	

Figure 3.105.2: Long-term trends from the Constant Effort Sites and Nest Record Schemes





3.106.1 CONSERVATION IMPORTANCE

Table 2/Red (>50% Population decline)
Biodiversity Steering Group Middle List

3.106.2 SPECIES SUMMARY

Populations of Corn Bunting crashed during the 1980s, requiring a High BTO Alert. This has been blamed on loss of weedy stubbles as a winter feeding habitat (Donald 1997). Over this time, breeding performance has improved, and so the causes of decline are likely to be poor survival and/or habitat loss (Crick 1997).

Figure 3.106.1:
Population trend from the Common Birds Census

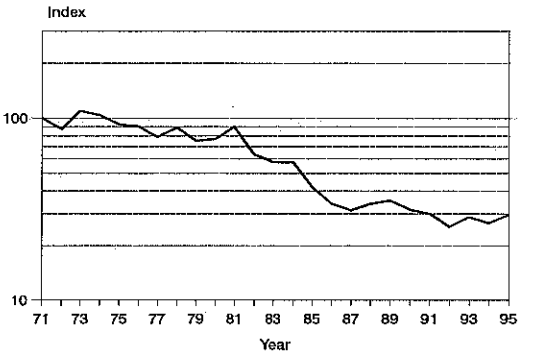


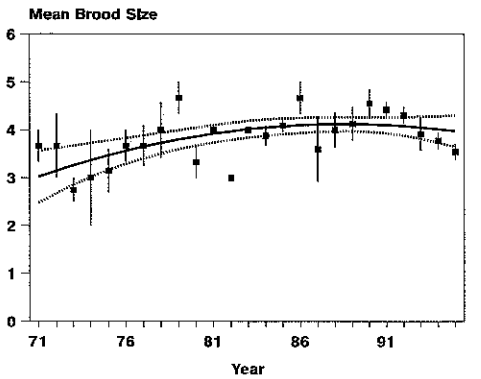
Table 3.106.1: Population trends

	Years	Change %	Caveat
CBC - all	1971-95	-80	Small Sample
BBS	1994-95	-5 n.s.	

Table 3.106.2: Productivity trends

	Years	Change		Caveat
NRS - egg stage nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - young stage nest losses d^{-1}	1971-95	+ve	n.s.	
NRS - egg-to-fledge nest losses d^{-1}	1971-95	-ve	n.s.	
NRS - clutch size	1971-95	+ve	n.s.	Small Sample
NRS - brood size	1971-95	3.01 - 4.12 - 3.96	*	
NRS - laying date	1971-95	185 - 164	*	

Figure 3.106.2: Long-term trend from the Nest Record Scheme



4. DISCUSSION

4.1 BTO Alerts

One of the main aims of this report is to provide early warning alerts to JNCC and Country Agencies about worrying declines in population size or reproductive success, with special reference to species on the *Conservation Importance List*. We have used similar criteria to those used in the drawing up of the *Conservation Importance List*, the *Biodiversity Steering Group Lists* and the *List of Birds of Conservation Concern*, but have been less conservative in some respects.

Although the data for some species may be unrepresentative of the UK as a whole due to factors such as relatively small sample sizes or because monitoring only takes place on plots containing relatively low or high densities of a species, the results presented here are often the only information available for a species and they at least show what is happening in the monitored areas. If conservationists are not alerted to the fact that, say, Tawny Owls have declined by 50% over the last 25 years on CBC plots, the BTO would be failing in its duty and the conservationists would not be able to use this piece of information in their planning. It alerts the conservationists that there is the distinct possibility that Tawny Owls, a top predator and potential indicator species, is being affected detrimentally by some environmental change.

Similarly, we are able to include demographic factors within our alerts, mainly concerning breeding performance but also, when available, survival rates. These can be used to enhance our understanding about why a particular change in population status has occurred. They can also provide early warning of impending changes in population size, in the absence of certain information on population size or before such changes have occurred (see section 1.1).

4.1.1 High BTO Alerts

High BTO Alerts are given for species which have shown a population decline of at least 50% over the past 25 years (or over the duration of the WBS or CES) or for species with large declines in breeding performance or survival. 17 High BTO Alerts are given in this report (Table 4.1.1).

Grey Partridge, Turtle Dove, Skylark, Song Thrush, Spotted Flycatcher, Tree Sparrow, Bullfinch, Reed Bunting and Corn Bunting: for these nine species, the High BTO Alerts represent no change in status for species currently listed on Tables 2 & 3 of the *Conservation Importance List* or the *Red List* of *Birds of Conservation Concern*. These species are the subject of active research programmes by a wide range of conservation and research organisations. For Bullfinch and Reed Bunting there have been significant declines in breeding performance associated with their population declines. For Song Thrush, detailed analysis of BTO datasets has shown that a decline in first-year survival rates is sufficient to explain most of the population decline (Thomson *et al.* 1997), this information will be important in guiding future conservation work on this species.

Hen Harrier: This species is currently of high conservation importance because of a historical population decline, but requires a High BTO Alert because of a large decline in average clutch size, associated with non-significant declines in nesting success. This is particularly important

given the current climate of calls for its control by grouse moor managers and indicates that the species is not necessarily secure in terms of breeding performance. The data for this trend need to be analysed in more depth to investigate the possible environmental factors that might be behind the decline.

For the other seven species, CBC plots may not be representative for the bulk of their populations but the declines are severe and deserve consideration:

Lapwing is currently of medium conservation importance because of the size of its wintering population, but it has experienced large changes in its breeding distribution and is thought to be suffering from changes in the farmland environment, such as the decline in mixed farming regimes and the switch to autumn-sown cereals (Hudson *et al.* 1994). Peach *et al.* (1994) suggest that the declines may be due to declines in productivity (nestling survival rates) because adult and first year survival rates show no long-term trends.

Woodcock and **Tawny Owl** are probably poorly monitored by the CBC because of their crepuscular and nocturnal habits, but the declines of the former give cause for concern to game shooting interests (Hoodless 1994) and the latter has importance as a species at the top of the food-chain.

Lowland populations of **Tree Pipit** may be peripheral to the main part of the species' distribution, but the recent severe decline is both important in itself and as a potential indicator of changes in the largely unmonitored parts of its range.

Like the Tree Pipit, the **Yellow Wagtail** is a long-distance summer migrant and its severe decline may be due to factors operating on the breeding grounds, wintering grounds or on migration. The WBS is probably the most appropriate scheme for monitoring Yellow Wagtails, given the species' preference for wet habitats, especially those that might be found along river corridors.

Grasshopper Warbler has declined enormously, although it may be under-recorded by the CBC due to its unpredictable and often crepuscular or nocturnal singing habits. Analysis of Nest Record Cards has shown that it has the potential to reproduce rapidly (Glue 1990) but very little is known about this species' requirements and about its migratory habits.

Finally, **Redpoll** is unusual in being a declining seed-eater that is more of a woodland species than a farmland species. It declined substantially on CBC and CES plots, although both schemes are unrepresentative of the centres of its distribution in the UK. The reasons for its decline are unclear but it has undergone a substantial range contraction over the past 25 years and its ecology needs to be investigated in detail.

4.1.2 Medium BTO Alerts

Medium BTO Alerts are given for species which have shown a population decline of between 25 and 49% over the past 25 years (or over the duration of the WBS or CES) or for species with significant declines in breeding performance or survival. 23 Medium BTO Alerts are given in this report (Table 4.1.2).

Kestrel, Dunnock, Blackbird, Marsh Tit, Willow Tit and Starling: for these six species, the Medium BTO Alerts represent no change in status for species currently listed on Table 4 of the Conservation Importance List or the Amber List of Birds of Conservation Concern.

Twite is currently listed as having high conservation importance because of a historical decline in population size. Nest Record Scheme data suggests that breeding performance has declined, which collaborative work with English Nature suggests may be due to declines in the quality of habitat available on moorland. English Nature has made this the subject of various research projects that will investigate this species in more detail.

Red-throated Diver is currently listed as having medium conservation importance because of its European population status, but requires a Medium BTO Alert because of declining nesting success in recent years.

Curlew, Redshank and Kingfisher are all listed as having medium conservation importance because of their European population status. For the waders, the CBC suggests that a large population decline has occurred over the last 25 years, although it must be noted that the CBC plots may not be representative for the species in the UK. However there is considerable concern about the status of breeding waders on lowland wetlands and in more upland areas (Brown & Grice 1993, Robson *et al.* 1995, Shrubb *et al.* 1997). Although Kingfisher is susceptible to the effects of cold winters, the severe decline measured by the WBS is more likely to reflect changes in riverine habitat quality and management because recent winters have been relatively mild and should have encouraged population resurgence. Furthermore, the Nest Record Scheme provides some evidence for declining breeding performance which merits further research.

Linnet was given high conservation importance due to a population decline of more than 50% but it now shows some signs of recovery such that its long-term decline is now just less than 50%, only requiring a Medium BTO Alert. Long-term changes in breeding performance appear to be related to its population changes and this is currently part of an active research project at the BTO.

All the other 11 species were originally listed as not having conservation importance.

Mistle Thrush and Yellowhammer would now warrant being included on the lists of conservation importance because they have declined in population size by >25%. Mistle Thrush is the third *Turdus* to show such declines and research on its congeners may throw light on its population decline. Yellowhammer is the third bunting to decline and joins the list of declining farmland seed-eaters for which there is cause for concern. Considerable research is being directed at the problem of declining seed-eaters, but it appears that multiple factors may be playing a part in their declines but particularly loss of winter and spring food supplies.

Little Owl, Lesser Spotted Woodpecker and Meadow Pipit all show severe declines on CBC plots but they either occur on a relatively small number of plots (the former two) or have a distribution for which CBC coverage is not representative (the latter species). However, the declines are the only long-term information available on changes in population size and warrant being noted by conservationists.

Grey Wagtail and Pied Wagtail both show important population declines on WBS plots over the past 22 years, which may be linked to detrimental changes to the quality of riverine habitats as suggested for Kingfisher (above).

Willow Warbler has declined by 42% on CES plots over the past 13 years. While the CBC index shows some signs of recovery, the CES trend does not. Detailed analysis of population data, survival rates and breeding performance have shown that the decline is largely explained by a fall in the survival rates of adult Willow Warblers in the southern part of its range in the UK (Peach *et al.* 1995). Whether these declines in survival were due to factors operating within or outwith the UK remains to be determined.

Moorhen, Raven and Greenfinch are all species that show long-term declines in breeding performance with only minor declines in population size (or unknown changes in population size for Raven). These Medium BTO Alerts are therefore pre-emptive alerts of possible future declines in population size: they are species which need to be monitored with care.

4.1.3 Other species of Conservation Importance

Ten other species are covered by this report, that are listed as having conservation importance but are not subject to the BTO Alerts discussed above (4.1.1 or 4.1.2).

There are three species of high conservation importance with steadily increasing populations. Merlin population size has increased (BTO *et al.* 1997), although it is not monitored by the BTO, and Nest Record Scheme data show trends of improving breeding performance. Nightjar populations have increased substantially since 1981 (Morris *et al.* 1994) and slight increases in nest failure rates are likely to be associated with movements into new habitats. Woodlark populations have also increased substantially since 1986 (Sitters *et al.* 1996) but for this species there have been no trends evident in breeding performance.

Four species of medium conservation importance are so listed because of their European status. Peregrine populations in the UK have increased steadily since the 1970s to reach high levels in 1991 (Crick & Ratcliffe 1995) and breeding performance appears to have fully recovered from the effects of organochlorine pesticide contaminants. Population size of Green Woodpecker has fluctuated on CBC plots but there has been little overall change. Redstart populations have increased considerably on CBC plots and the Nest Record Scheme has found substantial improvements in breeding performance over the past 25 years, but for unknown reasons. Stonechat population size was not monitored by the BTO prior to the BBS but its breeding performance shows no substantial trends.

Barn Owl population size has declined substantially during the latter half of the century (Shawyer 1987) but it is not monitored annually by the BTO. The Nest Record Scheme shows that its breeding performance has recovered since the 1960s (Percival 1992) and is now relatively steady, with no long-term trends. Swallow and Goldfinch populations were both originally recorded as having declined by more than 25%, but recent reanalysis using more advanced techniques suggest that populations no longer fall into this category (Siriwardena *et al.* in press). For Swallow, a semi-colonial species, the CBC has to rely on changes in nest counts, which appear to cause the standard CBC chain index to be subject to random drift. When analysed using techniques that are not liable to this problem (and which will be used in

subsequent editions of this report) the population decline is no longer apparent. For Goldfinch, the current CBC index has recovered to 1970s levels, but due to a large population decline in the late 1980s, the statistical technique of quadratic regression suggests a population decline erroneously.

4.2 Interspecies comparisons

Full-scale interspecific comparisons are beyond the scope of this project but have been the subject of detailed analysis in many recent studies (e.g. Fuller *et al.* 1996) and ongoing research projects (e.g. Siriwardena *et al.* in press). Here, we briefly review the direction of trends shown by species roughly grouped according to ecological types and habitat-use (Appendix 2).

Long-term trends in population size could be estimated by at least one monitoring scheme (see 2.7) for 79 species. For 11 species, the trends increased or decreased by less than 10%. Of the others, there was approximately the same number showing an increase in population size (n=32) as those showing a decrease (n=36).

When the species were divided according to ecological types (Table 4.2.1) approximately equal numbers of waterbirds, migrant insectivores and resident insectivores showed trends of population increase and decrease. Seed-eaters showed some disparity, with 10 species showing decreases and only four showing increases (three pigeons and Chaffinch). Among raptors and corvids there were more increases than decreases, probably due to the declining effects of organochlorine pesticides and declines in game-keeping interests.

Much the same sort of result occurred when the species were divided according to their characteristic habitat (Table 4.2.2). Such a division has to be necessarily crude, given that most bird species are relatively wide-ranging and occur in a number of different habitats. Equal numbers of woodland species have increased and decreased. There is a preponderance of decreases among grassland and marsh birds and among farmland birds, but waterbirds tend to be increasing.

Long-term trends in breeding performance could be estimated for 82 species from either NRS or CES. For 29 species, there were no significant trends over time. For the others there was a substantial majority (n=40) that showed an improvement in breeding performance compared with those that showed a significant decline (n=13).

When the species were divided according to ecological types (Table 4.2.3), raptors and corvids and the resident insectivores had relatively high numbers of species with improving trends in breeding performance. Seed-eaters had a relatively high proportion of species with declining trends in breeding performance.

After being divided according to broad habitat categories (Table 4.2.4), species most associated with heathland/bog/upland habitat and those associated with waterbodies or coastal habitats were relatively more likely to have declining breeding performance than birds in other habitats. Surprisingly, birds in farmland were more likely to have improving breeding performance than

would be expected from the overall proportion of species across all habitats. Perhaps their breeding performance has tended to increase as a density dependant response to their declines in abundance.

4.3 Future plans

This report is very much a first version of a report that we hope will develop over the coming years to be a regular, important and useful document for conservation practitioners in the UK. We will seek feedback from users of this report to show how it can be made more user-friendly and on the sorts of extra information that would be useful and if currently it contains information that could be dispensed with.

A second report, for the years 1972-1996, will be produced within the 1997/98 financial year as part of the BTO's contract to the JNCC. In future, subject to discussions currently under way, it is possible that the report may not need to be produced annually, but could perhaps be produced every two years, with a supplement in the intervening years to provide an update on any significant changes that might have occurred in the interim.

4.3.1 Timing of the report

Data from each scheme contributing to this report becomes available at different times of the year following the breeding season being recorded. For example, data from the 1997 breeding season become available as follows:

BBS	August 1998
CBC	March 1998
WBS	May 1998
Heronries Census	May 1998
NRS	August 1998
CES	February 1998.

Thus a report providing the integrated results from these schemes could be produced in the October or November of the year following the season being reported.

4.3.2 Data analysis

In future, various developments in data analysis are envisaged that will be incorporated into these reports as the methodology becomes established. There are additional datasets that may become available, there are different ways in which the data could be subdivided, there are better analytical techniques for currently analysed datasets and there are developments that could be made in the BTO Alert system.

The major additional BTO dataset comprises the Age Specific Totals Lists derived from the Ringing Scheme. These were introduced in 1985 to collect cohort sizes (the numbers of adults, juveniles, pulli and unaged) of birds ringed during the summer (April to September) of each year (Baillie & Green 1987). Twenty-two species of passerine are included, covering a range of common migrant and resident birds. This information, when combined with information on the numbers of ringed birds recovered each year, allows the calculation of age-specific

survival rates, while accounting for age- and year-specific variation in recovery reporting rates. Without information from the Age Specific Total Lists, recovery reporting rates must be assumed to be constant, which could lead to biases in the estimates of survival (Baillie & McCulloch 1993). In future, subject to the development of relatively automated means of data handling and analysis, it should be possible to provide trends in annual survival rates for adults and juveniles for these 22 species.

The current report concentrates solely on trends in the UK. The only subdivision in a dataset is within the CBC, which is divided into farmland and woodland plots when data are sufficient for a particular species. There are many different ways in which data in the report could be divided, according to geography or habitat, but this will have to undertaken carefully because the power of the analyses will be reduced as the data are subdivided.

A possible requirement for the Country Agencies might be to have information provided at the country level (England, Scotland, Wales and Northern Ireland) although this may mean little biologically. A recent report for the Department of Environment, written by a consortium that included the BTO, on wildlife information and indicators recommended the use of "Landscapes" for wildlife reporting (Parr *et al.* 1996). These are defined with the use of the ITE Land Classification (Bunce *et al.* 1996) which classifies each 1-km square in Britain according to its geographical and ecological characteristics. The Landscapes are linked to dominant type of agriculture, and reflects the natural environment, they are: Arable, Pastural, Marginal Upland (e.g. much of Wales) and True Upland (e.g. much of Scotland). Habitat-based divisional splits will need to be relatively broad to ensure that there are sufficient data for each category. The BTO has developed a habitat coding scheme that is used throughout the various monitoring schemes and is compatible with other widely used habitat classifications (Crick 1992b). The top level of this system would provide the most convenient basis for investigating the data (viz: Woodland, Scrubland, Grassland, Heathland, Farmland, Human, Freshwater, Coastal, Rock).

There have been considerable advances recently in the analysis of between-year changes in population size of the sort measured by CBC, WBS, CES and BBS. These are superior to traditional methods that involve simple chain-indexing in that they make more efficient use of the available data and are not subject to random drift. Methods, such as Loglinear Poisson regression, model a matrix of site counts by years, with site and year effects (McCullagh & Nelder 1989, ter Braak *et al.* 1994). This will allow the estimation of confidence intervals (and therefore statistical tests) on the long-term changes in abundance.

In unmodified series of data points, long-term trends are often obscured by both short-term fluctuations and measurement error. Smoothing algorithms provide a way to reduce the influence of these factors, thereby revealing underlying long-term trends (Buckland *et al.* 1992). Use of these techniques has been found very useful in the analysis of CBC data (Siriwardena *et al.* in press; Marchant *et al.* 1997) and could also be used in the analysis of breeding performance and survival rates. Another way to tackle this problem would be to analyse the data using Generalized Additive Models (GAMs: Hastie & Tibshirani 1990). GAMs could incorporate both Loglinear Poisson regression and smoothing into a single flexible framework that, due to its statistical efficiency, would allow the estimation of narrower confidence intervals.

The system of BTO Alerts used in this report is simple and straightforward, which has benefits in terms of understandability. A more sophisticated system of alerts has been developed by Marchant *et al.* (1997) to analyse long-term trends in population size and could be used in future editions of this report. Between-year changes in population size are smoothed and then trends are measured as the differences in population size measured over 5,10 and 25 year periods. (They also suggest measuring 1-year differences using unsmoothed data). Four levels of alert were suggested:

Alert 1: >50% decline
Alert 2: 25-49% decline
Alert 3: >50% decline predicted to occur over 25 years if current rate continues
Alert 4: 25-49% decline predicted to occur over 25 years if current rate continues.

An alert system should ideally include some aspect of the ability of species to recover from population declines. Greenwood *et al.* (1994) suggested separate measures of "resilience", "consistency" and "deviance", but it might be possible to design a system of alerts for population changes that incorporates information on net reproductive rate and density dependence within a single system in the future.

The system above is only appropriate for census data because relatively small declines in breeding performance or survival rates can have significant long-term effects on population size. Changes of >25% are likely to have relatively massive effects on population size. The ideal would be a system that reflected the possible impact of any decline on population size by making reasonable assumptions about a species' life history, but this is unlikely to be realisable for some time.

4.4 Conclusion

We hope that this report will be both useful as a ready source of information for the day-to-day use of conservationists 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 and pointers about how populations are changing and where further research and conservation action needs to be taken.

The report raises BTO Alerts for 40 species due to declines in population size, breeding performance or survival. This list of species will help inform conservation organisations when they are drawing up their plans for priority work, especially as the current lists, such as the Conservation Importance List quickly become dated.

The information in this report on demographic factors will also help conservation organisations to target their resources more effectively. For declining species of conservation importance, the lack of a decline in breeding performance suggests that lack of habitat or factors affecting survival are more likely to be playing a role rather than factors such as nesting success.

Finally, we hope that users of this report will provide feedback on how the report can be improved in the future. We will welcome comments on any aspect of this report if they help us to produce a better and more useful product in the next edition.

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Table 2.3.1 Frequency of habitat types recorded by the BBS in 1995

Major Habitat	Percentage of transect sections
Farmland	54.2
Human Sites	15.7
Woodland	12.1
Heathland & Bogs	8.0
Grassland	5.0
Scrubland	2.3
Water Bodies	1.7
Inland Rock	0.6
Coastal	0.4
Miscellaneous	0.1
TOTAL	100.0

Table 4.1.1 List of species assigned High BTO Alert Status

Species	Population Change (Scheme)	Significant Demographic Decline[1]	Current Conservation Importance[2]
Hen Harrier	--[3]	Yes	High
Grey Partridge	-86%(CBC)	--	High
Lapwing	-55%(CBC)	No	Medium
Woodcock	-69%(CBC)	--	Medium
Turtle Dove	-69%(CBC)	No	High
Tawny Owl	-50%(CBC)	No	Unlisted
Skylark	-62%(CBC)	No	High
Tree Pipit	-55% (CBC)	No	Unlisted
Yellow Wagtail	-74% (WBS)	No	Unlisted
Song Thrush	-56% (CBC)	Yes[1]	High
Grasshopper Warbler	-91% (CBC)	--	Medium
Spotted Flycatcher	-79% (CBC)	No	High
Tree Sparrow	-95% (CBC)	No	High
Redpoll	-72% (CBC)	No	Unlisted
Bullfinch	-57% (CBC)	Yes	High
Reed Bunting	-60% (CBC)	Yes	High
Corn Bunting	-80% (CBC)	No	High

[1] In all cases but one, significant demographic decline refers to a decline in breeding performance; for the Song Thrush it refers to a decline in survival rates.

[2] Species are ranked as High if on Tables 2 or 3 of the Conservation Importance List or on the Red List of Birds of Conservation Concern; or as Medium if on Table 4, or on the Amber List respectively.

[3] Insufficient data indicated by --

Table 4.1.2 List of species assigned Medium BTO Alert Status

Species	Population Change (Scheme)	Significant Demographic Decline[1]	Current Conservation Importance[2]
Red-throated Diver	--[3]	Yes	Medium
Kestrel	-35% (CBC)	No	Medium
Moorhen	+11% (WBS)	Yes	Unlisted
Curlew	-25% (CBC)	No	Medium
Redshank	-47% (CBC)	No	Medium
Little Owl	-32% (CBC)	No	Unlisted
Kingfisher	-35% (WBS)	Yes	Medium
Lesser Spotted Woodpecker	-38% (CBC)	--	Unlisted
Meadow Pipit	-44% (CBC)	No	Unlisted
Grey Wagtail	-29% (WBS)	No	Unlisted
Pied Wagtail	-39% (WBS)	No	Unlisted
Dunnock	-32% (CBC)	No	Medium
Blackbird	-31% (CBC)	No	Medium
Mistle Thrush	-25% (CBC)	No	Unlisted
Willow Warbler	-42% (CES)	Yes[1]	Unlisted
Marsh Tit	-33% (CBC)	No	Medium
Willow Tit	-46% (CBC)	--	Medium
Raven	--	Yes	Unlisted
Starling	-45% (CBC)	No	Medium
Greenfinch	-7% (CBC)	Yes	Unlisted
Linnet	-46% (CBC)	Yes	High
Twite	--	Yes	High
Yellowhammer	-31% (CBC)	No	Unlisted

[1] In all cases but one, significant demographic decline refers to a decline in breeding performance;for the Willow Warbler it refers to a decline in survival rates.

[2] Species are ranked as High if on Lists 2 or 3 of the Conservation Importance List or on the Red List of Birds of Conservation Concern; or as Medium if on Table 4, or on the Amber List respectively

[3] Insufficient data indicated by --

Table 4.2.1 Number of species (and proportions in parentheses) showing population increases, decreases or no trend, when divided according to ecological type (see Appendix 2 for details)

	Population Increase (>10%)	Population Decrease (>10%)	No Trend (<10% change)
Waterbirds	6 (43%)	5 (36%)	3 (21%)
Raptors and Corvids	6 (60%)	3 (30%)	1 (10%)
Resident Insectivores	9 (41%)	10 (45%)	3 (14%)
Migrant Insectivores	7 (41%)	8 (47%)	2 (12%)
Seed-eaters	4 (25%)	10 (62%)	2 (12%)
All Species	32 (41%)	36 (46%)	11 (14%)

Table 4.2.2 Numbers of species (and populations in parentheses) showing population increases, decreases or no trend, when divided according to broad habitat categories (see Appendix 2 for details)

	Population Increase (>10%)	Population Decrease (>10%)	No Trend (<10% change)
Woodland/Scrub	18 (49%)	14 (38%)	5 (14%)
Grassland/Marsh	1 (11%)	8 (89%)	0 (0%)
Heathland/Bogs/Upland	0	2	1
Farmland	5 (31%)	10 (62%)	1 (6%)
Human Sites	2	0	1
Waterbodies/Coastal	6 (55%)	2 (18%)	3 (27%)
All Species	32 (41%)	36 (46%)	11 (14%)

Table 4.2.3 **Number of species (and proportions in parentheses) showing different types of trend in breeding performance when divided according to ecological type (see Appendix 2 for details)**

	Significant Breeding Performance Improvement	Significant Breeding Performance Decline	Non-significant Trend in Breeding Performance
Waterbirds	2 (17%)	3 (25%)	7 (58%)
Raptors and Corvids	11 (69%)	2 (12%)	3 (19%)
Resident Insectivores	13 (65%)	0 (0%)	7 (35%)
Migrant Insectivores	8 (44%)	3 (17%)	7 (39%)
Seed-eaters	6 (38%)	5 (31%)	5 (31%)
All species	40 (39%)	13 (16%)	29 (39%)

Table 4.2.4 **Numbers of species (and proportions in parentheses) showing different types of trend in breeding performance when divided according to broad habitat categories(see Appendix 2 for details)**

	Significant Breeding Performance Improvement	Significant Breeding Performance Decline	Non-significant Trend in Breeding Performance
Woodland/Scrub	19 (58%)	4 (12%)	10 (30%)
Grassland/Marsh	5 (56%)	1 (11%)	3 (33%)
Heathland/Bogs/Upland	2 (17%)	4 (33%)	6 (50%)
Farmland	11 (69%)	1 (6%)	5 (29%)
Human Sites	1 (100%)	0 (0%)	0 (0%)
Waterbodies/Coastal	2 (20%)	3 (30%)	5 (50%)
All Species	40 (49%)	13 (16%)	29 (35%)

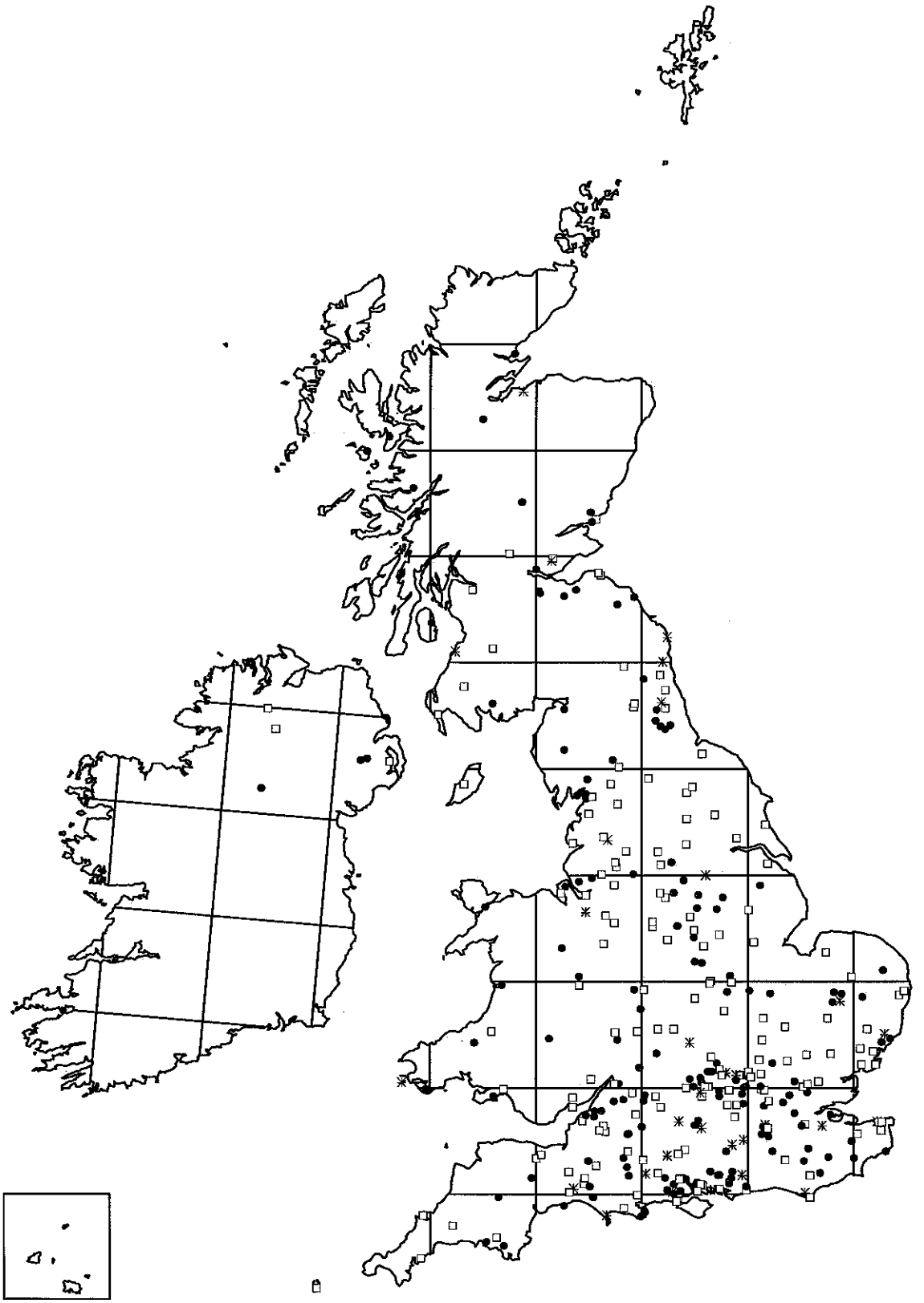

Figure 2.1 The distribution of Common Birds Census plots contributing data to estimates of percentage change between 1987 and 1996. Habitat categories are shown separately: open squares - farmland; filled circles - woodland; asterisks - special habitats.

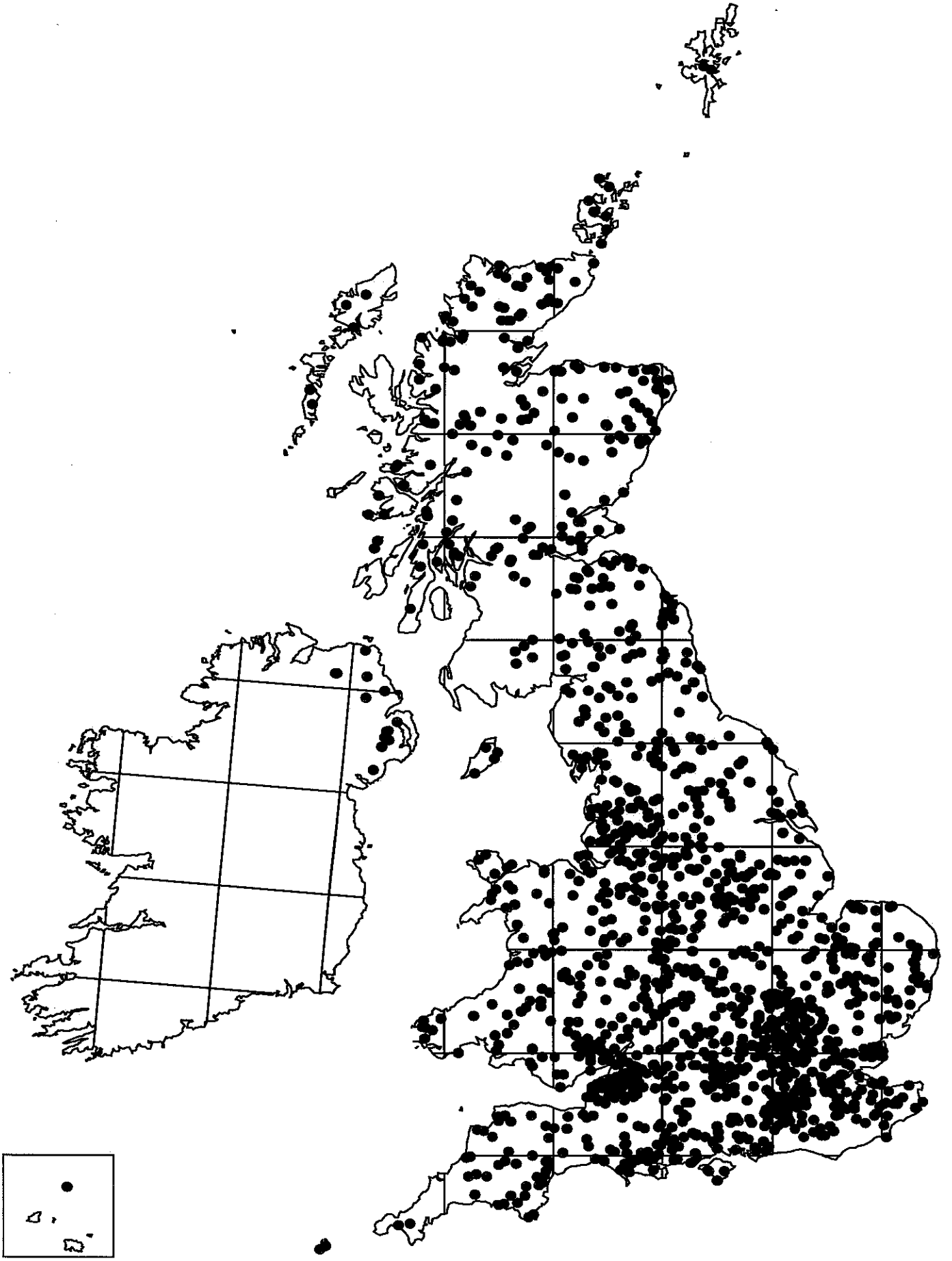

Figure 2.3 The distribution of Breeding Bird Survey plots contributing to estimates of percentage change between 1994 and 1995.

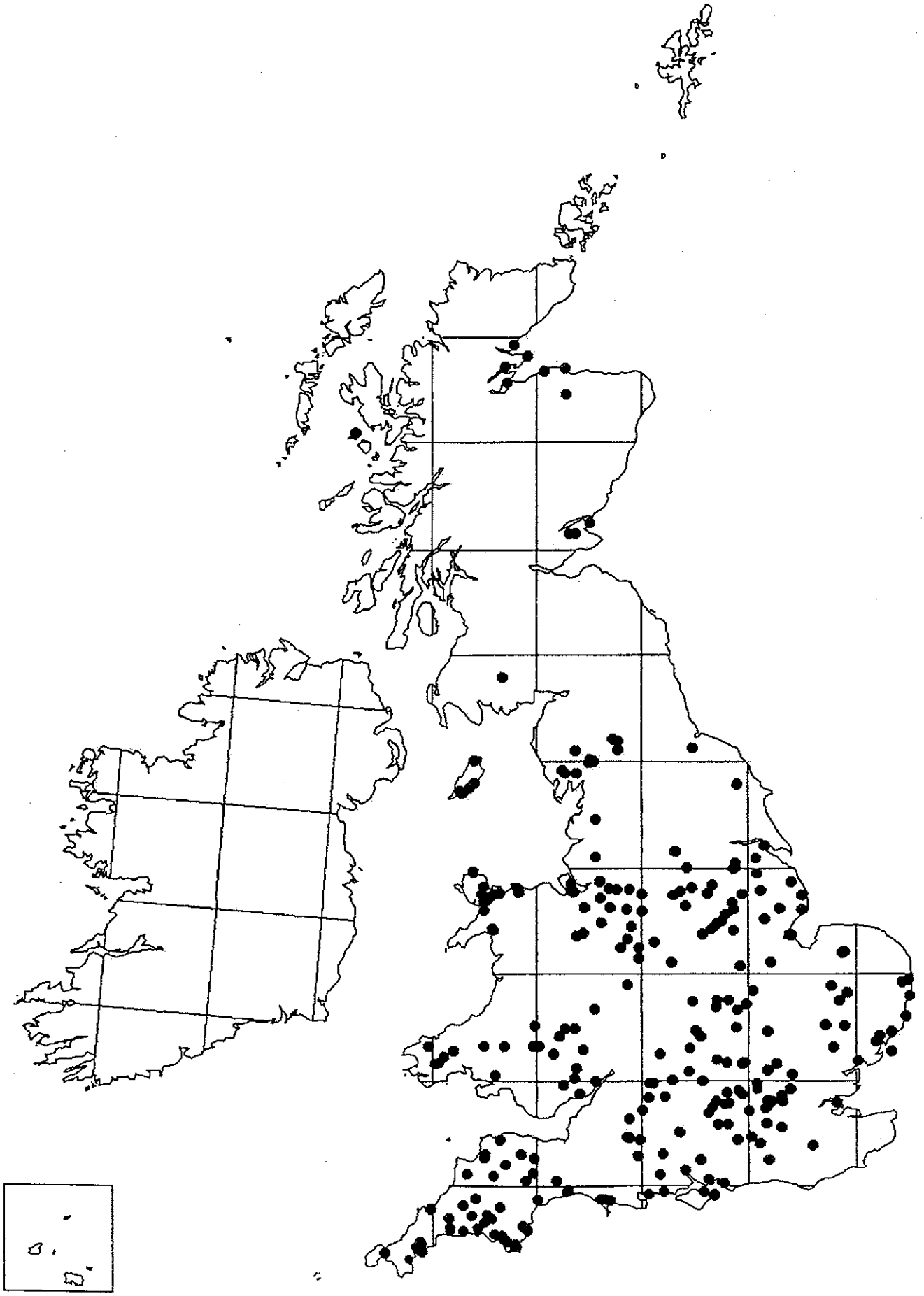

Figure 2.4 Heronries counted for the BTO's Heronries Census in 1994.

Appendix 1 Population changes of extra species monitored by Breeding Bird Survey between 1994 and 1995

Species	Change %		Caveat
Cormorant *Phalacrocorax carbo*	+15	n.s.	
Greylag Goose *Anser anser*	+169	*	Small Sample
Canada Goose *Branta canadensis*	+24	*	
Shelduck *Tadorna tadorna*	+8	n.s.	
Black-headed Gull *Larus ridibundus*	+11	n.s.	
Common Gull *Larus canus*	+7	n.s.	
Lesser Black-backed Gull *Larus fuscus*	+3	n.s.	
Herring Gull *Larus argentatus*	-2	n.s.	
Great Black-backed Gull *Larus marinus*	-16	n.s.	Small Sample
Sand Martin *Riparia riparia*	+52	*	Small Sample
Siskin *Carduelis spinus*	-25	n.s.	

* Sufficient information is currently unavailable for the species from other BTO monitoring schemes

Appendix 2 **List of species categorised by broad ecological type and habitat, with a summary of changes in population size and breeding performance (Key is given at end of table)**

Species	Ecological Type	Habitat	Population Change	Breeding Performance Change
Red-throated Diver	W	W		-
Little Grebe	W	W	0	
Grey Heron	W	W	+	0
Mute Swan	W	W	+	0
Mallard	W	W	+	
Tufted Duck	W	W	0	
Hen Harrier	R	H/B		-
Sparrowhawk	R	W/S	+	+
Buzzard	R	W/S	+	+
Kestrel	R	F	-	+
Merlin	R	H/B		+
Hobby	R	F		0
Peregrine Falcon	R	H/B		0
Grey Partridge	S	F	-	
Moorhen	W	W	+	-
Coot	W	W	+	
Oystercatcher	W	W	+	0
Ringed Plover	W	W		0
Golden Plover	W	H/B		0
Lapwing	W	F	-	+
Snipe	W	G		0
Woodcock	W	W/S	-	
Curlew	W	H/B	-	0
Redshank	W	G	-	+
Common Sandpiper	W	H/B	0	
Stockdove	S	F	+	+
Woodpigeon	S	F	+	
Collared Dove	S	H	+	+
Turtle Dove	S	F	-	0
Cuckoo	I	G	+	

Species	Ecological Type	Habitat	Population Change	Breeding Performance Change
Barn Owl	R	F		0
Little Owl	R	G	-	+
Tawny Owl	R	W/S	-	+
Long-eared Owl	R	W/S		+
Nightjar	M	H/B		-
Kingfisher	W	W	-	-
Green Woodpecker	I	W/S	+	
Great Spotted Woodpecker	I	W/S	+	+
Lesser Spotted Woodpecker	I	W/S	-	
Woodlark	S	H/B		0
Skylark	S	F	-	+
Swallow	M	F		+
House Martin	M	H	+	
Tree Pipit	M	W/S	-	+
Meadow Pipit	I	H/B	-	0
Rock Pipit	I	W		0
Yellow Wagtail	M	G	-	0
Grey Wagtail	I	W	-	+
Pied Wagtail	I	F	0	0
Dipper	I	W	0	+
Wren	I	W/S	+	+
Dunnock	I	W/S	-	+
Robin	I	W/S	+	+
Nightingale	M	W/S	-	-
Redstart	M	W/S	+	+
Whinchat	M	H/B		0
Stonechat	I	H/B		+
Wheatear	M	G		+
Blackbird	I	W/S	-	0
Song Thrush	I	W/S	-	+
Mistle Thrush	I	W/S	-	0
Grasshopper Warbler	M	G	-	
Sedge Warbler	M	G	-	0

Species	Ecological Type	Habitat	Population Change	Breeding Performance Change
Reed Warbler	M	G	-	+
Lesser Whitethroat	M	W/S	0	0
Whitethroat	M	W/S	+	0
Garden Warbler	M	W/S	+	+
Blackcap	M	W/S	+	0
Wood Warbler	M	W/S	0	0
Chiffchaff	M	W/S	+	+
Willow Warbler	M	W/S	-	-
Goldcrest	I	W/S		0
Spotted Flycatcher	M	F	-	+
Long-tailed Tit	I	W/S	+	+
Marsh Tit	I	W/S	-	+
Willow Tit	I	W/S	-	
Coal Tit	I	W/S	+	
Blue Tit	I	W/S	+	
Great Tit	I	W/S	+	0
Nuthatch	I	W/S	+	+
Treecreeper	I	W/S	0	+
Jay	R	W/S	0	
Magpie	R	F	+	+
Jackdaw	R	W/S	+	+
Rook	R	F	+	+
Common Crow	R	F	+	+
Raven	R	H/B		-
Starling	I	G	-	+
House Sparrow	I	H	0	
Tree Sparrow	S	F	-	+
Chaffinch	S	W/S	+	+
Greenfinch	S	W/S	0	-
Goldfinch	S	W/S		0
Linnet	S	F	-	-
Twite	S	H/B		-
Redpoll	S	W/S	-	0

Species	Ecological Type	Habitat	Population Change	Breeding Performance Change
Bullfinch	S	W/S	-	-
Yellowhammer	S	F	-	+
Reed Bunting	S	G	-	-
Corn Bunting	S	F	-	0

KEY:

Ecological Type:	**Waterbirds**	=	**W**
	Raptors & Corvids	=	**R**
	Resident Insectivores	=	**I**
	Migrant Insectivores	=	**M**
	Seed-eaters	=	**S**
Habitat:	**Wood/Scrub**	=	**W/S**
	Grass/Marsh	=	**G**
	Heath/Bog/Upland	=	**H/B**
	Farmland	=	**F**
	Human habitats	=	**H**
	Waterbodies/Coast	=	**W**
Population Change:	**>10% increase**	=	**+**
	>10% decrease	=	**-**
	<10% change	=	**0**
Breeding Performance Change:	**Significant increase**	=	**+**
	Significant decrease	=	**-**
	Trend not significant	=	**0**