BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds

The 10-year BBS trend for Greenfinch (-59%) is the second steepest decline for this period.

Key findings

Species list

Using the BirdTrends pages

The BTO's BirdTrends report is a one-stop shop for information about the population status of the common breeding birds of the wider UK countryside. The report is based on data gathered by the many thousands of volunteers who contribute to BTO-led surveys.

For each of 121 species, users can quickly access the latest information on trends in population size, breeding performance and survival rates, as measured by our long-term monitoring schemes. For each species, you will find:

- The latest conservation listings and estimates of UK population size
- A summary of changes in the size of the population and the possible causes of these changes
- Graphs and tables showing changes in UK population size, breeding performance and survival since our monitoring began
- Wherever possible, graphs and tables separately for UK countries (England, Scotland, Wales and Northern Ireland)
- Alerts, drawing attention to population declines of greater than 25%, or greater than 50%, that have occurred over the the most recent five-, ten- and 25-year assessment periods and the maximum period available (usually 48 years).

Text, tables, graphs and presentation for each species are updated annually to include the latest results alongside interpretative material from the literature. Information on demographic trends and on the causes of change is gradually being expanded.

There is far more to this report besides the species pages! Supporting pages describe the field and analytical methods that were used to produce the results for each species and to identify alerts. We discuss overall patterns of trends in abundance and breeding success, and compare the latest trend information and alerts with the Birds of Conservation Concern list, last updated in 2015 (Eaton *et al*. 2015). Summary tables list alerts and population changes by scheme, and you can use our 'table generator' to select and display tables of population change to your own specification. A detailed References section lists more than 820 of the most relevant recent publications, with onward links to abstracts or to full text where freely available, and is a valuable key to recent scientific work by BTO and other researchers.The Key findings page provides a brief overview of our main findings this year.

We would value your comments on this report and particularly any suggestions on how it can be improved:

EMAIL YOUR COMMENTS

Authors

These web pages constitute an annual report that is part of the BTO Research Report series. Authors were Dario Massimino, Ian Woodward, Mark Hammond, Sarah Harris, Dave Leech, David Noble, Ruth Walker, Carl Barimore, Daria Dadam, Sarah Eglington, John Marchant, Martin Sullivan, Stephen Baillie and Rob Robinson. The recommended citation for the report is as follows, and is given in the page footer throughout the report:

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Key findings

This section summarises the key findings of the report, under six headings, based on the results presented and discussed in the Summary tables and Discussion sections. It concentrates on the alerts raised by this edition of the report and changes to alerts since previous reports in this series.

Declining species

Tree Sparrow is one of five species with a long-term decline of 90% or more..

In the current report, there are 28 species for which our best long-term trends show statistically significant population declines of greater than 50% over periods of 31–48 years (see Latest long-term alerts).

These are Grey Partridge, Little Grebe, Lapwing, Redshank, Woodcock, Snipe, Turtle Dove, Cuckoo, Little Owl, Willow Tit, Marsh Tit, Skylark, House Martin, Willow Warbler, Whitethroat, Starling, Song Thrush, Mistle Thrush, Spotted Flycatcher, Nightingale, House Sparrow, Tree Sparrow, Yellow Wagtail, Tree Pipit, Linnet, Lesser Redpoll, Yellowhammer and Corn Bunting (taxonomic order).

One further species shows a non-significant decline greater than 50% over a long timescale. Change for Lesser Spotted Woodpecker is non-significant over the longest period but only because data are sparse and monitoring ceased in 1999; a further strong decline has since been logged by Atlas data.

The steepest long-term populations declines we have measured are for Turtle Dove, Tree Sparrow, Willow Tit, Grey Partridge and Nightingale, which have all declined by 90% or more since 1967, as, almost certainly, has Lesser Spotted Woodpecker. Turtle Dove shows the biggest decline of any species in this report (98%) and its rate of decline suggests it may soon disappear as a British breeding bird.

These 28 species that have halved in population size outweigh the 22 species found to show an equivalent increase, i.e. a doubling of population size, over similar periods, although seven further species in this report have more than doubled over shorter periods (see Positive changes). The gap between the numbers of species halving and doubling has narrowed by one species in this year's report.

Except for Little Owl, which as an introduced species is not eligible, and two species that moved from amber to green in 2015, all these rapidly declining species already benefit from listing as either red or amber Birds of Conservation Concern (PSoB/BoCC4). The two species moved to green, despite strong decline over the longest term, are Little Grebe, for which monitoring results are conflicting, and Whitethroat, which has shown sustained, though limited, recovery following considerable losses in the late 1960s.

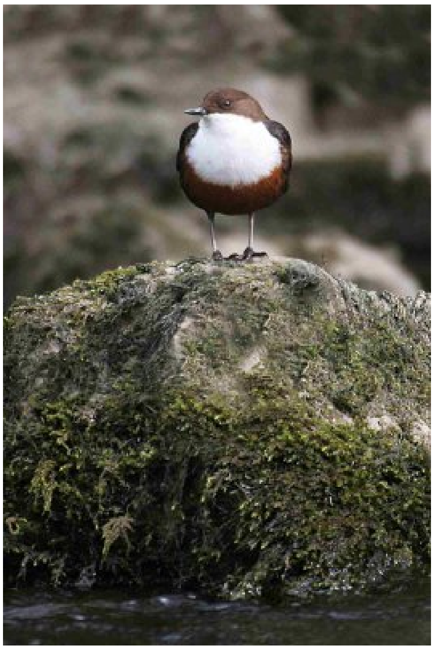
Four species still listed only as amber after the 2015 review (BoCC4) arguably meet red-list criteria for breeding population decline: these are Snipe, House Martin, Redshank and Willow Warbler.

A further seven species raise lower-level concern, as a result of statistically significant long-term declines of between 25% and 50%. These are Common Sandpiper, Sedge Warbler, Dunnock, Grey Wagtail, Meadow Pipit, Bullfinch and Greenfinch. All of these species are already on the amber list on account of their population declines, except for Grey Wagtail which is red listed, and Sedge Warbler and Greenfinch which for now remain on the green list. Populations of the first two of these species have fluctuated with little overall trend in recent decades, while recent declines in Greenfinch populations reverse a period of sustained increase. Dipper was listed in this section in the 2016 report, but the long-term decline has now dropped below 25% after a couple of years of increase and is also no longer statistically significant.

In addition, Curlew (now red listed) has declined by more than 25% (as also shown by atlas data), but raises no formal long-term alert because the confidence intervals around its change estimates are too wide.

Two scarcer species with much shorter monitoring histories have also decreased by more than half during just a 20-year period and are already red listed: Wood Warbler and Whinchat. Set against these two species are seven that have more than doubled over equivalent shorter periods (see Positive changes). Pied Flycatcher, also already red listed, declined by between 25% and 50% over a 20-year period.

Recent changes to alerts



A recent small upturn for Dipper means it no longer raises an alert in this report.

The *BirdTrends* report raises species alerts for population change to conservation bodies when the best available estimates of long-term decline are statistically significant and pass criteria set at -25% and -50%.

Species with declines close to these threshold values often change category between years. Discussion tables A1–A3, however, indicate just two changes to the long-term alerts since *BirdTrends 2016*, affecting two different species, plus one additional species listed in Table A3 that did not raise a formal alert.

- For Dipper the 40-year WBS/WBBS decline has fallen below the 25% threshold and is also no longer statistically significant, and therefore no longer raises an alert. This species is currently amber-listed.
- For Tawny Owl the 25-year CBC/BBS decrease now raises a lower level alert. The 48-year trend still does not raise any alerts.
- The green-listed Garden Warbler raised an alert for the first time in *BirdTrends 2015*, but the CBC/BBS decline dropped back below the 25% threshold in *BirdTrends 2016*. It reappears in Table A3 in the current report, as the decline has climbed back above 25%. However, it does not raise a formal alert due to the wide confidence intervals around the current estimate.

Amber and red listings use similar criteria and were reviewed in 2015. This report, using three further year's data not available to BoCC4, suggest potential updates to current conservation concern for House Martin, Little Grebe, Sedge Warbler and Greenfinch.

Alerts from WBS/WBBS (Table A4) are unchanged except for the change for Dipper which also occurred in Table A2 and hence is described above.

For CES (Table A5) the change for Robinson *et al.* 2010b) and raises a low level alert for both the 25-year and 48-year CBC/BBS trends.

Positive changes

The Goldfinch population in the UK has doubled since 1967.

Although much of this report focuses on declines and their conservation significance, there are many species that are increasing in number as UK breeding birds.

In the current report, there are 22 species for which our most representative long-term trends show a statistically significant doubling in population size over periods of 22–48 years.

These are Mute Swan, Greylag Goose, Canada Goose, Shelduck, Mallard, Goosander, Sparrowhawk, Buzzard, Coot, Stock Dove, Woodpigeon, Collared Dove, Green Woodpecker, Great Spotted Woodpecker, Magpie, Jackdaw, Carrion Crow, Chiffchaff, Blackcap, Nuthatch, Wren and Goldfinch (in taxonomic order). Chiffchaff and Wren have been added to this list in the current report, but Great Tit has been removed as the population increase has dropped just below the threshold for inclusion following five years of negative annual changes.

The steepest long-term increases we have measured have been for Buzzard, Greylag Goose, Great Spotted Woodpecker and Collared Dove, which have all increased by more than 300% since 1967, although Collared Dove numbers have started to decrease more recently.

The 22 species that have doubled over the long term are set against the 28 that have halved in number over similar periods (see Declining species). The gap between these two totals had widened over recent years up to and including the *BirdTrends 2015* report, but has since narrowed by four species.

Seven further species, monitored only over a shorter period, have also more than doubled (see Increasing species). These are Mandarin Duck, Gadwall, Little Egret, Red Kite, Barn Owl and Ring-necked Parakeet (all monitored by BBS over 20-years) and Cetti's Warbler (monitored by CES over the period 1990–2015). Two additional species have more than halved over this shorter period.

For thirteen species that are listed as red or amber for a population decline over the long term – Ten-year trends and evidence of species recovery).

Six further formerly declining species – Whitethroat, Dunnock, Tree Sparrow, Bullfinch, Lesser Redpoll and Reed Bunting – have reversed their population trend to show significant increases over the last ten years. Whitethroat has already been moved to the green list (BoCC4). For all these species, however, population levels remain severely depleted, despite the recent increases.

Reduced breeding success

There is increasing evidence to suggest that Willow Warbler population declines have been driven, at least in part, by a reduction in breeding success.

Our best measure of nest-level breeding success is Fledglings Per Breeding Attempt (FPBA), calculated from brood sizes and nest failure rates recorded by participants in the Nest Record Scheme, which indicates the mean number of young fledging from each nest in a given year.

Twelve species exhibit reduced FPBA over the past 48 years, indicating that their productivity has decreased over time: two red-listed species (Tree Pipit and Linnet), four amber-listed species (Nightjar, Willow Warbler, Meadow Pipit and Reed Bunting) and six green-listed species (Moorhen, Great Tit, Garden Warbler, Treecreeper, Chaffinch and Greenfinch). While productivity of Moorhen, Great Tit, Willow Warbler, Garden Warbler, Linnet and Reed Bunting has been falling consistently, trends for the other six species are curvilinear. For five species, FPBA increased between the mid 1960s and mid 1980s or mid 1990s and decreased thereafter; whereas in the case of Nightjar, productivity decreased from the mid 1960s until the mid 2000s but has increased slightly over the last ten years.

Productivity declines in migratory species: Nightjar, Willow Warbler, Garden Warbler and Tree Pipit, may be driven in part by birds returning in poorer condition as a result of changes in habitat or climate on their African wintering grounds. For Willow Warbler and Garden Warbler there is evidence that conditions on the breeding grounds and, in the case of the latter, grazing pressure from deer, may also be important.The majority of species exhibiting productivity declines, including residents such as Reed Bunting, are reliant on invertebrates to feed their young and there is increasing evidence that climatic change and/or anthropogenic factors, such as pesticides, are leading to a reduction in the size of prey populations. Additionally, climatic warming may have resulted in a developing asynchrony between laying dates and the availability of insect prey on the breeding grounds. Although this report shows that many species are advancing laying dates (see early breeding), for some species these advances may not be sufficient to match the advances in peak food availability. Long-distance migrants are thought to be particularly susceptible to such disjunction but residents may also be affected, particularly those reliant on seasonal peaks in caterpillars, such as Great Tit, Chaffinch and, to a lesser extent, Treecreeper; however, numbers of Great Tit and Chaffinch have increased over period covered by this report and we cannot exclude the possibility that the observed reduction in breeding success is due to density-dependent processes. Lack of food for nestling and parent Linnet due to a paucity of stubbles and weeds in more intensively farmed agricultural habitats may have contributed to the reduction in the species' breeding success, while Greenfinch productivity may have been impacted by the continued spread of trichomonosis, although research would be needed to establish this link. The driver for increased Moorhen nest failure is at present unclear, but increases in aquatic mammalian predators and Coot populations have been proposed as potential causes.

CES ringing data integrate productivity across the whole season, including juvenile survival in the first few weeks after fledging, the key breeding success parameter being the ratio of juveniles to adults captured. According to this measure, productivity has fallen significantly for 10 of the 23 species monitored. Blue Tit, Willow Tit, Sedge Warbler and Reed Bunting have exhibited declines of more than 50% over the last 31 years, while reductions of between 25% and 49% have been observed for Great Tit, Willow Warbler, Blackcap, Garden Warbler, Blackbird and Song Thrush. For species such as Blue Tit, Great Tit and Blackcap, where a concurrent population increase has occurred, reductions in productivity may be at least partly driven by density-dependent processes, whereby increased competition for resources in an expanding population will mean that some pairs occupy poorer quality habitat and reduces the mean breeding success per pair. Alternatively, climate induced mismatch with invertebrate food supplies may be impacting negatively on productivity and/or post-fledging survival, particularly in the case of the caterpillar-dependent tit species. Song Thrush and Sedge Warbler have experienced significant declines in abundance, either on CES sites or more widely (based on CBC/BBS figures), but previous analyses suggest that falling survival rates are likely to have been a more important contributor to population changes than reduced productivity. There is, however, increasing evidence that a reduction in the number of offspring produced may be an important driver of Willow Warbler declines (and possibly other migratory species) and may also be preventing recovery of the UK Reed Bunting population.

Increased breeding success

Nuthatch has exhibited the greatest increase in productivity of any species over
the past 47 years, due to a combination of falling failure rates
and increasing brood sizes

Our best overall measure of breeding success is Fledglings Per Breeding Attempt (FPBA), calculated from brood sizes and nest failure rates, which indicates the mean number of young leaving each nest in a given year.

FPBA has increased significantly for 28 species over the last 48 years, across a wide range of taxonomic groups. Population trends are also positive for 16 of these species, including raptors (Sparrowhawk, Buzzard, Barn Owl, Merlin, Peregrine), pigeons (Stock Dove, Woodpigeon, Collared Dove), corvids (Magpie, Jackdaw, Carrion Crow), and some small passerines (Nuthatch, Wren, Robin, Redstart and Pied Wagtail). It is therefore possible that increasing productivity has contributed to the population growth exhibited by these species over recent decades.

Conversely, 12 species (Little Owl, Tawny Owl, Kestrel, Skylark, Sedge Warbler, Starling, Dipper, Wheatear, House Sparrow, Tree Sparrow, Grey Wagtail and Yellowhammer) have declined in number as FPBA has increased, suggesting that a density-dependent reduction in intraspecific competition, or a retreat into better quality habitat, may have enabled breeding success to rise.

CES ringing data integrate productivity across the whole season, including juvenile survival in the first few weeks or months after fledging. According to this measure, productivity has not risen significantly for any of the 23 species monitored. Two species (BirdTrends 2016, but the trend for both species is no longer significant following lower productivity in 2016.

Early breeding

The advance in Redstart laying dates is the greatest exhibited by any migrant; the species now breeds a fortnight earlier on average than it did in the mid-1960s.

Data from the Nest Record Scheme provide strong evidence of shifts towards earlier laying in a range of species, linked to climatic change. We have now identified 39 species that, on average, are laying between three and 23 days earlier, on average, than in the mid 1960s.

The species now laying earlier in the year represent a wide range of taxonomic and ecological groups, including raptors (Kestrel – 9 days), waders (Oystercatcher – 3 days), migrant insectivores (Pied Flycatcher – 10 days, Swallow – 11 days), resident insectivores (Robin – 9 days, Blue Tit – 8 days), corvids (Magpie – 23 days) and resident seed-eaters (Greenfinch – 20 days).

For some species these shifts towards earlier laying may be insufficient to match seasonal advances in the peaks of food availability. Recent research has shown that significantly stronger phenological responses to climate change are displayed at lower trophic levels (such as the food birds eat) than at higher levels (such as the birds themselves), increasing the potential for disjunction and resulting productivity declines. However, the evidence for for a population-level effect of reduction in breeding success is mixed and more research is needed to determine the extent to which declines in abundance will result.

Only six species demonstrate a significant delay in average laying dates, of between two and 19 days: Woodpigeon, Turtle Dove, Barn Owl, Raven, Blackbird and Yellowhammer (taxonomic order). With the exception of Raven, all of these species initiate multiple breeding attempts per season and there is increasing evidence that species which are less reliant on seasonal peaks in resource availability may be able to extend their breeding seasons further into the summer, resulting in a later mean value for laying date. Raven typically initiates laying in February, long before most other species and prior to the early spring period in which climatic warming has been most pronounced.

Introduction

Gathering quantitative information on the bird populations of the UK has been a key function of the BTO ever since its formation in 1933. Its nationwide network of volunteer observers, many of whom are highly skilled and long-term contributors to survey schemes, provides the ideal way to monitor bird populations, particularly for the commoner species that are widely distributed across the countryside. BTO data, from such schemes as the Common Birds Census, Nest Record Scheme and BTO/JNCC/RSPB Breeding Bird Survey, have been increasingly influential in determining nature conservation policy in the UK. The partnership between JNCC and BTO has ensured that these schemes are operated and developed in ways that provide high-quality information for nature conservation.

The value of the monitoring work undertaken by the BTO is reflected in their use in government biodiversity and wildlife statistics. The BTO's schemes fulfil a considerable portion of the government's monitoring needs for UK birds, at species level and as multi-species *indicators* of bird population changes (Gregory *et al.* 2004). Indicators of trends in breeding birds (e.g. Defra 2015) help the government track the UK's progress towards international targets, such as those set by the Convention on Biological Diversity in October 2010. This approach has been extended more widely through a collaboration between EBCC, BirdLife and RSPB to produce pan-European bird indicators (PECBMS 2016b).

Our 2017 report is the latest in a series, begun in 1997, produced under the BTO's partnership with the Joint Nature Conservation Committee (on behalf of Natural England, Scottish Natural Heritage, Natural Resources Wales, and the Council for Nature Conservation and the Countryside) as part of its programme of research into nature conservation.

Only the first two reports were published on paper, with subsequent ones being produced solely as web documents. A complete list of all the previous reports and links to those published online can be found here. The first 12 reports were titled *Breeding Birds in the Wider Countryside: their conservation status* but this is now known as 'the *BirdTrends* report', with an informal title that matches its web link.

All the commonest and most widespread UK breeding bird species have a *BirdTrends* page, updated annually to incorporate the latest survey data and assessments of trends. Colonial seabirds, which are well covered by the results of Seabird 2000 (Mitchell *et al.* 2004) and by the JNCC's Seabird Monitoring Programme (Heubeck 2013), and species covered by the Rare Breeding Birds Panel (Holling & RBBP 2015), are in general not included here – though with a handful of exceptions.

The main emphasis of this report is on trends in the abundance and demography of individual breeding species. The system of alerts, derived from the BTO's census and nest record data, ensures that conservation bodies are quickly made aware of important demographic changes.

Trends in wintering populations of waterfowl are covered by the Wetland Bird Survey annual reports, also now fully available online (Frost *et al.* 2017), and by the *WeBS alerts* system (Cook *et al.* 2013).

Monitoring UK breeding birds

Long-running bird surveys operated by BTO contribute to an overall programme of Integrated Population Monitoring (IPM) that has been developed by the BTO, in partnership with JNCC, to monitor the numbers, breeding performance and survival rates of a wide range of bird species. IPM has the following specific aims (Baillie 1990, 1991):

1. to establish thresholds that will be used to notify conservation bodies of requirements for further research or conservation action;
2. to identify the stage of the life cycle at which demographic changes are taking place;
3. to provide data that will assist in identifying the causes of such changes; and
4. to distinguish changes in population sizes or demographic rates induced by human activities from those that are due to natural fluctuations.

Changes in numbers of breeding birds have been measured by:

- the BTO/JNCC/RSPB Breeding Bird Survey (BBS) – which began in 1994 and replaced the CBC (below) as the major monitoring scheme for landbirds, after a seven-year overlap. BBS is based on around 3,000 1-km squares, within each of which birdwatchers count and record birds in a standardised manner along a 2-km transect. Because the survey squares are chosen randomly, the results are representative of all habitats and regions. Combined CBC/BBS indices now provide long-running and ongoing population monitoring for many common birds.
- the *Common Birds Census* (CBC) – which ran from 1962 to 2000. This scheme mapped the breeding territories of common birds through intensive fieldwork on 200–300 mainly farmland and woodland plots each year, averaging about 70 and 20 ha respectively.
- the Waterways Breeding Bird Survey (WBBS) – which began in 1998 and replaced the WBS (below) as the major monitoring scheme for breeding birds along rivers and canals, after a ten-year overlap. It is a transect scheme akin to BBS but with the transects running alongside linear waterways. Transects comprise up to ten 500-m sections and cover typically 3–3.5 km of bird-rich habitat. Around 250–300 sites are covered each year, mostly randomly selected. Combined WBS/WBBS indices now provide long-running and ongoing population monitoring for many common waterside birds.
- the *Waterways Bird Survey* (WBS) – which ran from 1974 to 2007. WBS observers mapped the territories of birds along rivers, streams and canals on 80–130 plots each year, each on average 4.5 km in length. Around 70 of these sites are currently incorporated within WBBS.
- the Constant Effort Sites scheme (CES) – which began in 1983 and is based on breeding-season bird ringing at over 100 sites. The catching effort is kept constant at each site during each year, so that changes in numbers of birds caught will reflect population changes and not variation in catching effort.
- the Heronries Census – through which counts of 'apparently occupied nests' have been collected from a high proportion of the UK's heronries every year since 1928.

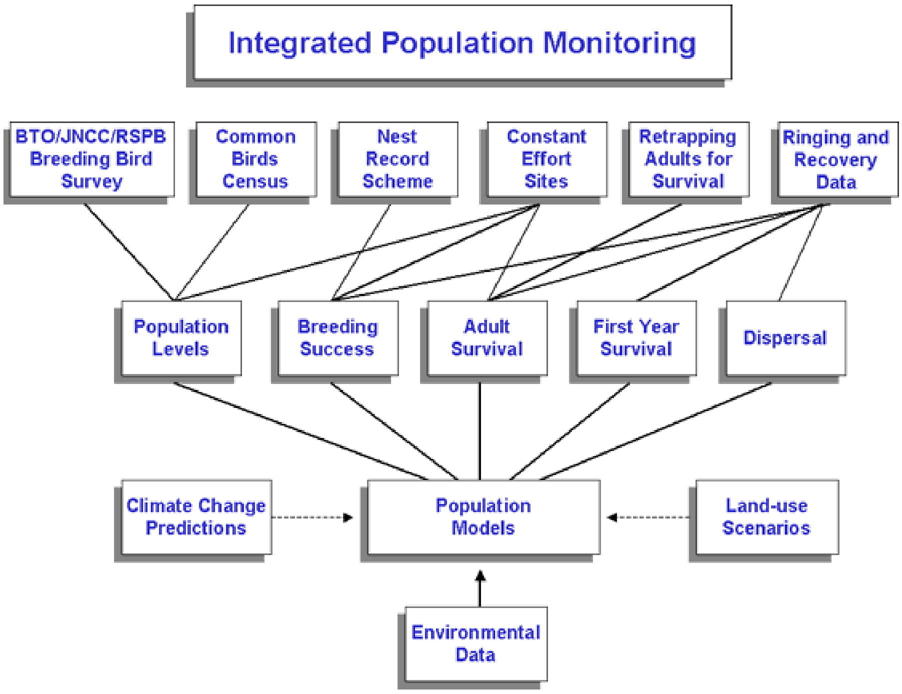
Changes in breeding performance are measured by:

- the Nest Record Scheme – which began in 1939 and collates standardised information on up to 35,000 individual nesting attempts per year. This allows the measurement of:
  - laying dates
  - clutch sizes
  - brood sizes
  - nesting success during egg and chick stages
  - fledglings per breeding attempt (integrating success across all nesting stages).
- CES (see above) – which provides information on overall productivity for a range of species by measuring the ratio of juveniles to adults caught each year.

Changes in survival are measured by:

- the British and Irish Ringing Scheme – which provides information on the finding circumstances and longevity of ringed birds found dead by members of the public.
- CES also provides information on survival rates, based on the recapture of ringed birds at constant-effort sites.
- Further information on survival rates is provided through the Retrapping Adults for Survival scheme (RAS).

The ways in which the schemes fit together are shown in the diagram below, which also demonstrates the way in which the BTO aims to combine all this information, using population models, to elucidate the mechanisms behind the changes we observe in population size.


Integrated Population Monitoring
BTO/JNCC/RSPB Breeding Bird Survey
Common Birds Census
Nest Record Scheme
Constant Effort Sites
Retrapping Adults for Survival
Ringing and Recovery Data
Population Levels
Breeding Success
Adult Survival
First Year Survival
Dispersal
Climate Change Predictions
Population Models
Land-use Scenarios
Environmental Data

Combining results from different schemes

Monitoring the changes in the size of a population does not in itself provide sufficient information on which to base an effective conservation strategy (Goss-Custard 1993, Furness & Greenwood 1993). Concurrent monitoring of breeding performance and survival rates is necessary to allow changes in population size to be properly interpreted (Temple & Wiens 1989, Crick *et al.* 2003) and, for long-lived species, can provide early warning of impending conservation problems (Pienkowski 1991).

Where good long-term data sets for breeding performance and survival are lacking, conservation action might have to be taken without an adequate understanding of the mechanisms involved or might need to wait years for detailed research to be undertaken. As this report demonstrates, however, there are many species for which BTO already holds the necessary data, collected by volunteer observers over periods of several decades (Greenwood 2000).

For a long-lived species, a decline in population may not begin until a long period of low survival or reduced reproductive output has already passed. The classic example is that of the Peregrine, which in the UK suffered from poor breeding performance during the 1940s and 1950s due to sub-lethal DDT contamination. This drop in productivity decreased the capacity of the non-breeding section of the population to buffer the severe mortality of breeding adults that occurred due to cyclodiene poisoning from the mid 1950s onward (Ratcliffe 1993). Monitoring of breeding performance gave an early warning of impending numerical decline (Pienkowski 1991). Another example of a decline in breeding performance that presaged population decline is the catastrophic breeding failures of seabirds, particularly Arctic Terns, in Shetland (Monaghan *et al.* 1989, 1992, Walsh *et al.* 1995, Mavor *et al.* 2003, 2004, Wanless *et al.* 2005).

Farmland birds

During the mid 1980s, the BTO identified rapid declines in the population sizes of several farmland bird species (O'Connor & Shrubb 1986, Fuller *et al.* 1995). The BTO has since been able to investigate the demographic mechanisms underlying these declines, using its long-term historical data sets (Siriwardena *et al.* 1998a, 2000a).

This investigation, which was funded by Government and undertaken jointly with Oxford University, looked at changes in population size, breeding performance and survival rates of a variety of species in relation to changing farming practice. It showed that species responded to different aspects of agricultural change, but that typically these aspects were linked to intensification or regional specialisation. Declines in survival rates were found to be the main factor driving population decline in these species, with the exception of Linnet, for which the main factor appears to have been a decline in nesting success at the egg stage (Siriwardena *et al.* 2000b). The study was therefore able to eliminate some possible causes of change, and identify areas for future research, thus helping conservation bodies to use their scarce resources productively. This work made an important contribution to the wider programme of work on farmland birds undertaken by many research and conservation organisations (Aebischer *et al.* 2000, Vickery *et al.* 2004).

This report describes a number of other cases where the combined analysis of BTO data sets has helped to identify the causes of population declines, for example on the pages for Integrated population analysis'.

Biodiversity Action Plans

The ability to quickly determine the stage of the life cycle exerting the greatest influence on population declines is particularly important for the conservation agencies when considering remedial action for species on the lists of conservation concern. Analysis of BTO data sets, which has already helped to build these lists, is a key point in several of the UK Government's biodiversity action plans for rapidly declining species. Once conservation actions have been initiated, the BTO's Integrated Population Monitoring programme has a further function, because the success of these actions will be measured and assessed by continued BTO monitoring.

The aims of this report

The BirdTrends report is used by conservation practitioners as a ready reference to changes in status among breeding birds in the UK. Here on the BTO website, it is available to a much wider audience including BTO supporters, who may have contributed data, and the general birdwatching public. We hope that it also provides a useful resource for schools, colleges and universities, the media, ecological consultants, Wildlife Trusts, decision-makers, local government, and the more general world of industry and commerce. In summary, its aims are:

1. To provide, to as wide a readership as possible, a species-by-species overview of the trends in breeding population, reproductive performance and survival rate for birds covered by BTO monitoring schemes since the 1960s, at the UK and UK-country scales.
2. To provide warning alerts to JNCC and country agencies and to other conservation bodies about worrying declines in population size or reproductive success, with special reference to species on the UK red and amber lists of Birds of Conservation Concern.

Acknowledgements

Volunteer fieldwork

The volunteers who collected the data on which this website is based deserve full credit for their achievement. The population trends and other results that we present rely on the sustained, long-term fieldwork effort of many thousands of BTO volunteers. Our knowledge of the conservation status of the UK's bird populations is possible only as a result of their dedication. The conservation community owes them all an enormous debt of gratitude for their work. Without their enthusiasm, the cause of conservation in the UK would be very much the poorer.

We are also very grateful to the many land managers and landowners who permitted census work, nest recording and ringing to take place on their land.

Report production and analysis

This website presents the latest in a series of reports, prepared within the partnership between the British Trust for Ornithology (BTO) and the Joint Nature Conservation Committee (JNCC) (on behalf of the Department of Agriculture, Environment and Rural Affairs - Northern Ireland, Natural England, Natural Resources Wales and Scottish Natural Heritage), as part of its programme of research into nature conservation.

Mr and Mrs J A Pye's Charitable Settlement provided additional support towards the development of the website.

Our report includes results from the Breeding Bird Survey, which is funded jointly by BTO, JNCC and RSPB. The BBS partners are very grateful to the Department of Agriculture, Environment and Rural Affiars in Northern Ireland and to the Royal Society for the Protection of Birds in Scotland for supporting professional surveys in areas that would otherwise be difficult to cover. The report also includes results from the Ringing Scheme, which is funded by the JNCC, BTO and the ringers themselves.

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We are very grateful to all of the organisations and individuals listed above for their contributions to this report.

Methods

Eight monitoring schemes have contributed data to this report. Six provide data on changes in abundance: these are the Breeding Bird Survey, Common Birds Census, Waterways Breeding Bird Survey, Waterways Bird Survey, Heronries Census and the Constant Effort Sites ringing scheme. Two schemes, the Nest Record Scheme and Constant Effort Sites, provide data on changes in breeding productivity. Data on survival rates come from detailed analyses of the retrappings and recoveries of ringed birds, from Retrapping Adults for Survival, Constant Effort Sites and the general Ringing Scheme. In addition, information on waterbirds from the Wetland Bird Survey is included where relevant.

The methodologies of the monitoring schemes are described in turn, including information on fieldwork, data preparation, sampling considerations and the statistical methods used in analysis. Most of the analyses and the preparation of tables and graphs were undertaken using SAS software (SAS 2011).

The two final parts of the methods section concern the alert system. These deal, first in descriptive terms and second in statistical detail, with the system by which the results of monitoring surveys raise alerts and thereby are brought to the attention of conservation bodies.

Breeding Bird Survey

The BTO/JNCC/RSPB Breeding Bird Survey (BBS) was launched in 1994, following two years of extensive pilot work and earlier desk-based studies. The introduction of the BBS was a move designed to overcome the limitations of the Common Birds Census (CBC), which had monitored bird populations since 1962. In particular, it improves the geographical spread of UK bird monitoring, thus boosting coverage of species and of habitats.

The BBS uses line transects rather than the more intensive territory-mapping method that had been used by the CBC. The average time observers spend per visit on counting birds is only around 90 minutes and, even with travel and data-input time, this survey is relatively quick to undertake and is therefore accessible to a large number of volunteers. Sampling units are the 1x1-km squares of the Ordnance Survey national grid, of which there are some 254,000 in the UK. From these we make random selections for inclusion in the scheme (see Square selection, below). The BBS requires a relatively large sample of survey squares, and the initial aim was to achieve coverage of about 2,500 squares (1%). This total is now well exceeded.

An important aspect of BBS is its coordination through a network of volunteer BBS Regional Organisers. The Regional Organisers find and encourage willing volunteers for their squares and provide paper forms as required. Since 2003, when online submission of BBS data was introduced, most data have been returned online – see the BBS pages of the main BTO website for details.

Fieldwork involves up to three visits to each survey square each year. The first is to record details of habitat and to establish or re-check the survey route, while the second and third (termed 'early' and 'late') are to count birds. A survey route is composed of two roughly parallel lines, each 1 km in length, although for practical reasons routes typically deviate somewhat from the ideal. Each of these lines is divided into five sections, making a total of ten 200-m sections, and birds and habitats are recorded within these ten units. The two bird-count visits are made about four weeks apart (ideally in early May and early June), ensuring that late-arriving migrants are recorded. Volunteers record all the birds they see or hear as they walk along their transect routes. Birds are noted in three distance categories (within 25 m, 25–100 m, or more than 100 m on either side of the line, measured at right angles to the transect line), or as in flight. Recording birds within distance bands provides a measure of bird detectability in different habitats and thus allows population densities to be estimated more accurately. The total numbers of each species, excluding juveniles, are recorded in each 200-m transect section and distance category, as well as the timing of the survey and weather conditions. In 2014, the optional recording of the method of detection was included in BBS for the first time, and observers can now record whether they detect each individual bird by sight, by song or by call. This information is not currently used to calculate trends, but it is anticipated that it will help further refine the calculation of population densities for some species.

By 1998, more than 2,300 BBS squares were being surveyed annually, close to the original target of 2,500. Only around a quarter of these plots were covered in 2001, owing to Foot & Mouth Disease access restrictions, but (thanks to our keen observers) the sample recovered immediately to over 2,205 in 2002 and had increased further to 2,328 squares in 2003, 2,533 in 2004, 2,893 in 2005 and 3,313 in 2006. The sample soared to 3,759 in 2007 and ran marginally below that level over the next few years during and just after the 2007–11 Bird Atlas, before reaching a new high of 3,837 squares in 2016 (Harris *et al*. 2017). Squares are distributed throughout the UK and cover a broad range of habitats, including uplands and urban areas. There are now 111 species that are present on 40 or more BBS squares annually and so can be monitored with good precision at the UK scale (Joys *et al.* 2003, Harris *et al.* 2017), although a few present special difficulties because of their colonial or flocking habit or their wide-ranging behaviour. For most of these species, BBS can also assess annual population changes within England alone, using data from 30 or more squares, and for about half the species also within Scotland and Wales as separate units. Sample sizes in Northern Ireland already allow more than 30 species to be indexed annually.

Square selection

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

Data analysis

Change measures between years are assessed using a log–linear model with Poisson error terms. For each species and square, counts are summed across all sections and distance bands for each visit ('early' and 'late') and the higher value is used in the model (or the single count if the square was visited only once). Counts are modelled as a function of square and year effects. Each observation is weighted by the number of 1-km squares in each region divided by the number of squares counted there, to correct for the differences in sampling density between regions. 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 85% confident that a real change has taken place (see here for details).

Trends are presented as graphs in which annual population indices are shown alongside a smoothed trend and its 85% confidence limits. A caveat, 'small sample', is provided against the trends for England, Northern Ireland, Wales and Scotland where the mean sample size is between 30 and 40 plots per year.

Go to the BBS section of the main BTO website.

Common Birds Census

The Common Birds Census (CBC) ran from 1962 to 2000 and was the first of the BTO's schemes for monitoring population trends among widespread breeding birds. It has now been superseded for this purpose by BBS.

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

A territory-mapping approach was used to estimate the number and positions of territories of each species present on each survey plot during the breeding season (

CBC instructions (PDF, 1.90 MB)
: Marchant 1983). Volunteers visited their survey plots typically eight to ten times between late March and early July and all contacts with birds, either by sight or sound, were plotted on outline maps at a standard scale of 1:2,500 (25 inches to the mile). Codes were used to note each bird's species, with sex and age where possible, and also to record activity such as song or nest-building. The registrations were then transferred to species maps and returned to BTO headquarters for analysis. The pattern of registrations on the species maps reveals the numbers of territories for each species. All assessments of territory number were made by a small team of trained BTO staff, applying rigorous guidelines, for maximum consistency between estimates across sites and years. Observers also provided maps and other details of the habitat on their plots. This makes it possible to match the distribution of bird territories with contemporaneous habitat features, providing the potential for detailed studies of bird–habitat relationships.
In 1990, the results from the CBC were brought together in the book*Population Trends in British Breeding Birds*(Marchant *et al.* 1990). This landmark publication discussed long-term population trends for the years 1962 to 1988 for 164 species, with CBC or Waterways Bird Survey population graphs for around two-thirds of these.

The weaknesses of the CBC as a monitor of UK-wide bird populations were largely related to the time-consuming nature of both fieldwork and analysis. This inevitably limited the number of volunteers able to participate in the scheme, with the result that areas with few birdwatchers were under-represented. Constrained by its relatively small sample size, CBC concentrated on farmland and woodland habitats. Bird population trends in built-up areas and the uplands were therefore poorly represented. Furthermore, as the plots were chosen by the observers, they might not have been representative of the surrounding countryside and some bias towards bird-rich habitats might be suspected. It is for these reasons that the BBS was introduced in 1994. The two surveys were run in parallel for seven years to allow calibration between the results: for many species, CBC and BBS trends can be linked to form joint CBC/BBS trends that provide ongoing monitoring, continuous since the 1960s (Freeman *et al.* 2003, 2007a).

The results from the CBC provided reliable population trends for more than 60 of the UK's commoner breeding species and, through the linking of CBC with BBS to form this report's long-term trends, continue to be hugely influential in determining conservation priorities in the UK countryside. The archive of detailed maps of almost a million birds' territories, collected through the CBC and maintained at BTO HQ since the early 1960s, is a uniquely valuable resource for investigating the relationships between breeding birds and their environment, over wide temporal and spatial scales.

Validation studies

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

Data analysis

Population changes are modelled using a generalised additive model (GAM), a type of log–linear regression model that incorporates a smoothing function (Fewster*et al.* 2000). This has replaced the Mountford model that employed a six-year moving window (Mountford 1982, 1985, Peach & Baillie 1994) and was used to produce annual population indices until 1999, but the principles are similar. These models are also very similar to log–linear Poisson regression as implemented by program TRIM (Pannekoek & van Strien 1996). Counts are modelled as the product of site and year effects on the assumption that between-year changes are homogeneous across plots. Smoothing is used to remove short-term fluctuations (e.g. those caused by periods of severe weather or by measurement error) and thus reveal the underlying pattern of population change. This is achieved by setting the degrees of freedom to about a third of the number of years in the series. Confidence limits on the indices are estimated by bootstrapping (a resampling method; Manly 1991), to avoid making any assumptions about the underlying distribution of counts.

CBC-only graphs and tabulated trends are presented in this report for a small number of species whose numbers have become too depleted for annual monitoring to continue. Smoothed indices are plotted as the blue line on these graphs. The two green lines on the graphs, above and below the index line, are the upper and lower 85% confidence limits. Caveats are provided to show where the data suffer from a 'Small sample' if the mean number of plots was less than 20. Data are flagged as 'Unrepresentative?' if the average abundance of a species in 10-km squares containing CBC plots was less than that in other 10-km squares of the species' distribution in the UK (as measured from 1988–91 Breeding Atlas data (Gibbons *et al*. 1993)) or, where average abundances could not be calculated, if expert opinion judged that CBC data might not be representative.

In practice nearly all CBC data included in this report have been combined with BBS data to provide joint CBC/BBS trends, using the methods described in the next section. These methods for producing joint trends represent an extension of those described above.

More information on the

Common Birds Census (PDF, 87.11 KB)
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CBC/BBS trends

CBC and BBS have been described separately in earlier sections. This page describes how the results have been combined to derive joint CBC/BBS trends, extending from the 1960s to the present.

As previously noted, the CBC has been an enormously influential project, providing the main source of information on national population levels in the UK since its inception in 1962. Coverage was predominantly in lowland England, where the numbers of potential volunteers are greatest, while coverage was more patchy in more sparsely populated regions and especially the uplands (Marchant *et al.* 1990). CBC plots were situated in a limited number of habitats, predominantly farmland and woodland. Within a large rectangle of southeastern Britain (covering England and Wales south and east from Seascale, Scarborough and Exeter), the plots are nevertheless believed to be broadly representative, at least of lowland land-classes (Fuller *et al.* 1985). For species such as Wood Warbler and Meadow Pipit that have the greater part of their numbers in the far west or north of Britain, however, the CBC may not have accurately reflected UK trends.

The BBS, on account of its more rigorous, stratified random sampling design, and its simplicity in the field, produces better coverage of the previously under-represented regions and habitats. In some early editions of 'Breeding Birds in the Wider Countryside' (e.g. Baillie *et al.* 2002), separate indices were published from CBC and BBS data, for those species with sufficiently large sample sizes. There being no new CBC data since 2000, however, it is unnecessary to present a CBC-only trend – except for those few species that are now so rare that BBS has been unable to contribute.

For most purposes, the presentation and analysis of longer time-series is required, dating back to before the establishment of the BBS but coming right up to the present day. The calculation of 25-year alert designations, as in this report, provides just one example. This need led the BTO to research the compatibility of indices from BBS and CBC data in various years and regions, and the possibility of deriving trustworthy long-term indices from the two data sources in combination (Freeman *et al.* 2003, 2007a). This research suggested that for the vast majority of species considered there was no significant difference between population trends, calculated from the two surveys, based on that part of the country where CBC data are sufficient to support a meaningful comparison. Where a statistically significant difference was found, this was sometimes for very abundant species for which the power to detect even a biologically insubstantial difference was considerable. Within this region, therefore, long-term trends based on CBC and BBS data can be produced for almost all species previously monitored by the CBC alone. For (Freeman *et al.* 2003, 2007a) this was the area covered by Fuller *et al.* (1985), because CBC plots in that region were shown to be representative of lowland farmland there. As this region covers the bulk of England, and for consistency with the rest of this report, we have produced joint indices for CBC/BBS for the whole of England (the CBC/BBS England index), rather than just the English part of the 'Fuller rectangle'.

A second question then is whether one can obtain reliable trends over the same period for the entire UK. That is, since prior to 1994 only CBC data are available, are the population trends within the region well covered by the CBC typical of those for the UK as a whole? The shortage of CBC data in the north and west means that the only way of investigating this is via the BBS data. Significant differences in trends between the area well covered by the CBC and the rest of the UK were found for approximately half the species (see Freeman *et al.* 2003, 2007a, for full details). For such species, a regional bias in CBC data means that no reliable UK index can be produced prior to 1994. In summary, joint population indices dating back to the start of the CBC can continue to be produced for that part of the country well served by the CBC (essentially England) for almost all common species. However, a similar UK index can be produced for only about 50% of species (CBC/BBS UK index).

Data analysis

This report presents joint CBC/BBS trends for the UK and/or England, as appropriate. Ideally the trends would have been estimated using generalised additive models (Fewster *et al.* 2000) but these were too computationally intensive, given the large number of sites involved. Therefore we fitted a generalised linear model, with counts assumed to follow a Poisson distribution, and a logarithmic link function, to the combined CBC/BBS data. Standard errors were calculated via a bootstrapping procedure and there is therefore no need to model overdispersion, as it does not affect the parameter estimates. BBS squares were weighted as in standard BBS trend analyses. CBC plots were assigned the average weight of all BBS squares as this allows them to be incorporated within the analysis while retaining the convention of not applying weights within the BBS sample. The population trend was smoothed using a thin-plate smoothing spline with degrees of freedom about one third the total number of years. Confidence intervals were calculated via a bootstrap procedure. Bootstrap samples were generated by resampling sites from the original data set, with replacement. A generalised linear model was then fitted to each bootstrap replicate and a smoothing spline fitted to the annual population indices as described above. Confidence limits were then calculated as the appropriate percentiles from the sets of smoothed estimates. The overall result is a smoothed trend that is mathematically equivalent to that produced from a generalised additive model. The method of estimation is less statistically efficient because the smoothing is not incorporated within the estimation procedure, and is likely to have resulted in more conservative statistical tests and wider confidence intervals. However this compromise was necessary to make it possible to fit the trends within a reasonable amount of computer time (still several weeks).

Data presentation

Indices are plotted on the graphs as annual estimates, with a smoothed trend and its 85% confidence interval.The CBC started on farmland in 1962 and on woodland in 1964. However, the early years of the CBC population indices are strongly influenced by the effects of the unusually severe winters of 1961/62 and 1962/63, as well as by developments in methodology (Marchant *et al.* 1990). Joint CBC/BBS indices have been calculated using only the data from 1966 onward, therefore, and population changes are calculated back to 1967.

Waterways Bird Survey & Waterways Breeding Bird Survey

Waterways Bird Survey 1974–2007

The Waterways Bird Survey (WBS) monitored the population trends of riparian bird species on canals and rivers throughout the UK during the breeding seasons of 1974–2007. WBS used a territory-mapping method like that of its parent scheme, the Common Birds Census, to estimate the breeding population of waterbirds on each of a number of observer-selected survey plots. Detailed territory maps were prepared alongside habitat data that show which features of linear waterways are important to breeding birds. The plots averaged 4.4 km in length. Almost half were slow-flowing lowland rivers with the rest either fast-flowing rivers/streams or canals. In the scheme's closing years there were around 90 plots distributed throughout the UK. The north and west of Britain were better represented by WBS than by the CBC although, as with CBC, coverage outside England was relatively poor (Marchant *et al*. 1990).

All fieldwork was carried out by BTO volunteers. Observers were asked to survey their plots on nine occasions between March and July, mapping all the birds seen or heard onto 1:10,000 maps (six inches to the mile). Registrations were then transferred to species maps, which were analysed to reveal the numbers and positions of territories for each species. For the first 20 years all territory analysis was performed by trained headquarters staff but, during 1994–2007, observers mostly completed their own territory analysis, based on the scheme's written guidelines, with results checked and corrected by BTO staff. As WBS employed very similar methods to those of CBC, the validation studies carried out for the latter generally held true for WBS (see CBC section). Marchant *et al*. (1990) found that there had been little change by 1988 in the composition of the WBS sample, in terms of waterway type or geographical spread.

Population changes along waterways have been reported historically for up to 25 riparian species. For specialist waterbirds, includingMute Swan, Goosander, Little Grebe, Common Sandpiper, Kingfisher, Sand Martin, Reed Warbler, Dipper and Grey Wagtail, targeted surveys along waterways can provide a better precision of monitoring than is possible through the more generalised BBS surveys. Waterways indices can also add a new perspective on trends in waterbirds that are monitored, largely in different habitats, by CBC/BBS. For Lapwing, for example, populations declined rapidly on arable farmland during the late 1980s while numbers on WBS plots, typically representing populations along river floodplains, were more stable. Yellow Wagtails have declined much more steeply alongside rivers and canals than elsewhere.

Waterways Breeding Bird Survey and joint indices

WBS had limitations as a monitoring scheme similar to those that led to the CBC's replacement by BBS. In particular, plot distribution was biased geographically and possibly also towards sites that were good for birds, and an intensive survey method was used that severely limited the sample size (Marchant *et al*. 1990). A drawback specific to WBS was that it only covered waterbirds.

BTO addressed these issues by setting up the Waterways Breeding Bird Survey (WBBS), which ran in parallel with WBS from 1998 to 2007 and now continues as a permanent annual survey, supplementing BBS. WBBS uses BBS-style transect methods along random waterways, and includes all species of birds (and mammals, too). WBBS has received some of its funding from the Environment Agency. In 2014, it began collecting most of its data online via the BBS web pages.

Trends are available from WBBS alone for more than 80 species. These include the waterbirds previously covered by WBS and a further range of common species for which waterways are not the primary habitat. WBBS-only trends are of relatively short duration (since 1998) and are not presented in this report.

In a similar development to joint CBC/BBS indices, it has proved possible to link the two waterways schemes to provide joint WBS/WBBS indices, some dating back to 1974, for the species previously covered by WBS (see below).

Data analysis and presentation

Population trends are generated from the combined WBS and WBBS data using a generalised linear model with counts assumed to follow a Poisson distribution and a logarithmic link function. Standard errors were calculated via a bootstrapping procedure involving 199 replications. For presentation in the figures, both the population trend and its confidence limits were also subsequently smoothed using a thin-plate smoothing spline. The overall result is a smoothed trend that is mathematically equivalent to that produced from a generalised additive model, as previously used for the WBS data alone.

More information on

WBS (PDF, 77.53 KB)
and WBBS.

Heronries Census

As predators at the top of the freshwater food chain, herons may be excellent indicators of environmental health in the countryside. They build large stick nests, mostly in colonies at traditional sites, thus lending themselves to direct counts of active nests.

The BTO Heronries Census began in 1928 and is the longest-running breeding-season bird monitoring scheme in the world. The aim of this census is to collect annual nest counts of Grey Herons from as many sites as possible in the United Kingdom. Volunteer observers make counts of 'apparently occupied nests' at heron colonies each year. Changes in the numbers of nests, especially over periods of several years, provide a clear measure of the population trend.

In recent seasons, observers have also counted the nests of Little Egrets *Egretta garzetta*, which have been appearing in an increasing number of southern heronries since the first UK breeding records in 1996, and even of Cattle Egrets *Bubulcus ibis,* Night-herons *Nycticorax nycticorax* and Spoonbills *Platalea leucorodia.* Since egrets are fully included in the Heronries Census, data are requested from all breeding sites, whether or not Grey Herons are also present. Data submitted for the Heronries Census for Little Egrets and other rare species are shared with the Rare Breeding Birds Panel, who hold the more complete data sets. Counts of Cormorant colonies, which often occur alongside heronries, are also recorded and contribute to broader monitoring of that species (Newson *et al*. 2007, 2013).

Coverage is coordinated through a network of regional organisers. A core of birdwatchers and ringers monitor their local colonies annually, providing a backbone of regular counts. The number of heronries counted each year has grown in recent years to more than 600. Around two-thirds of the heronries in England and Wales are currently counted each year, with more-complete censuses carried out in 1929, 1954, 1964, 1985 and 2003. Historically rather few counts have been made of heronries in Scotland and Northern Ireland, except during the special surveys, but support there for the Heronries Census has been growing fast in recent years. Up to 90 heronries have been counted in Northern Ireland annually in recent years.

Online data submission was made available for Heronries Census observers for the first time in 2015.

Data analysis

Population changes are estimated using a ratio-estimators approach derived from that described by Thomas (1993). Essentially, the ratios of the populations in any two (not necessarily consecutive) years of the survey are estimated from counts at sites visited in each of those years. These ratios can be used to estimate the counts at sites that were not visited, and hence build an estimate of the total population. The population model also allows for cases where the extinction of colonies and the establishment of new ones had not been observed directly (Marchant *et al*. 2004).

Data presentation

On the Grey Heron page of this report, the UK trend is presented graphically as annual estimates of apparently occupied nests, with a smoothed trend and its 85% confidence limits. The smooth trend line is based on a non-parametric regression model, using thin-plate smoothing splines with degrees of freedom approximately 0.3 times the number of years in the model. Trends are also shown for England and Wales together, and for England, Wales and Scotland alone.

Visit the Heronries Census page of the BTO website.

Constant Effort Sites scheme

The Constant Effort Sites (CES) scheme uses changes in catch sizes across a network of 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 visits evenly spaced between 1 May and 31 August (Peach *et al.* 1996). Year-to-year changes in the number of adults caught provide a measure of changing population size, while the ratio of young birds to adults in the total catch is used to monitor annual productivity (breeding success). By summing 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, but will also include a small component of mortality during the immediate post-fledging period. More detailed information about analytical methods is given below and were also provided by Peach *et al.* (1998) (abundance) and Robinson *et al.* (2007) (productivity). Between-year recaptures of ringed birds are also used to calculate annual survival rates of adult birds using specialised analytical techniques (Peach 1993).

The CES scheme began in 1983 with 46 sites and now has over 140. The distribution of CES sites tends to reflect the distribution of ringers within Britain and Ireland. The majority are operated in England, and there are small numbers in Scotland, Wales, Northern Ireland and the Republic of Ireland. The CES routinely monitors the populations of 24 species of passerines in scrub and wetland habitats.

Data analysis

Smoothed trends in the abundance of adults and young are separately assessed using a generalised additive model (GAM), with 85% confidence intervals calculated by bootstrapping (Fewster *et al.* 2000). At sites where catching effort in a year falls below the standard 12 visits, but no more than four visits have been missed, annual catch sizes are corrected according to experience during years with complete coverage, by incorporating an offset into the model (see Peach *et al.* 1998 for full details). Sites with fewer than eight visits in a given year are omitted for the year in question.

Annual indices of productivity (young per adult) are estimated from logistic regression models applied to the proportions of juvenile birds in the catch, the year-effects then being transformed to measures of productivity relative to an arbitrary value of 100 in the most recent year. As above, catch sizes are corrected where small numbers of visits have been missed. It should be noted that these indices are only relative figures, and are not estimates of the actual numbers of young produced per adult (Robinson *et al.* 2007).

Annual estimates of adult survival are derived from a form of the standard Cormack–Jolly–Seber capture–mark–recapture model (Lebreton*et al.* 1992), modified to account for the presence of transient birds. Transients are birds passing through the site, or perhaps living on its periphery, and which therefore have a much lower probability of capture than resident birds living in the vicinity of the net rides. The presence of transients thus tends to decrease the estimated survival rates. We allow for this by introducing an additional 'survival period' in the year of first capture (Hines *et al.* 2003). As with our other schemes, we assume survival probabilities vary annually in a similar fashion across all sites, though mean survival probabilities may differ between sites. Because of the standardised capture protocol, we assume that recapture probabilities are site-specific, but constant through time. For each bird we also insert an additional period after the first capture, indicating whether the bird was caught subsequently in the same season. The probability of surviving this period can be regarded as the probability that the bird is resident on the site (that is the probability that it is available for recapture). The survival and recapture probabilities for this initial period are assumed constant across years and sites. Note that the annual estimates of annual survival presented are in fact the probability that adult birds return to the same CE site the following year; this will be lower (to a small but unknown extent) than the true survival rate. We do not estimate survival rates for juvenile birds, because of their much greater propensity to disperse.

Data presentation

Abundance and productivity data are presented graphically with a smoothed trend and its 85% confidence limits. No trend is currently fitted to the survival data, but the individual estimates are presented with 95% confidence limits. A caveat is provided for 'Small samples' when the average number of plots per year is between 10 and 20.

Visit the CES section of the BTO website.

Retrapping Adults for Survival scheme

RAS aims to provide information on adult survival for a range of species in a variety of habitats, particularly those not caught in sufficient numbers on CES sessions or during more general mist-netting. As with CES, between-year recaptures of ringed birds are used to calculate annual survival rates of adults (Peach 1993).

Each RAS project targets an individual species and operates within a defined study area, aiming to catch or resight the majority of the adults breeding within the site each year. RAS ringers often employ colour rings to increase the probability of detecting returning individuals. The minimum annual sample size should ideally be sufficient to include 30 individuals retrapped or resighted from previous years, whilst maintaining a constant trapping/resighting effort. Each RAS study must run for a minimum of five years, but preferably much longer, to allow calculation of long-term trends in survival rate. Examples of analyses of RAS data have been published by Robinson *et al.* (2008, 2010).

The RAS scheme was launched in 1998 and about 200 projects are currently active, covering about 60 species in total. Data for several of these are presented in this report. Study sites are well distributed throughout the UK.

Data analysis and presentation

Annual estimates of adult survival are derived from a form of the standard Cormack–Jolly–Seber capture–mark–recapture model (Lebreton et al. 1992). As with our other schemes, we assume survival probabilities vary annually in a similar fashion across all sites, though mean survival probabilities may differ between sites. Where individuals can be sexed we include a sex-specific intercept, but assume survival varies similarly across years for both sexes; where few individuals of one sex are caught, we exclude these from the models. We model the annual recapture probabilities as a function of either the number days on which the RAS project operated in that year or the amount of effort recorded, choosing the one that best fits the data. Note that the annual estimates of annual survival presented are in fact the probability that adult birds are found to have returned to the same RAS site the following year; this will be lower (to a small but unknown extent) than the true survival rate. We do not estimate survival rates for juvenile birds, because of their much greater propensity to disperse.

Visit the RAS section of the BTO website.

Nest Record Scheme

The BTO's Nest Record Scheme is the largest, longest-running and most highly computerised of such schemes in the world and employs the most advanced and efficient techniques of data gathering, data capture and analysis (Crick *et al.* 2003). BTO now holds more than 1.3 million nest records, of which over 70% are already computerised.

The primary aim of the Nest Record Scheme is to monitor the breeding performance of a wide range of UK birds annually as a key part of the BTO's data collection. Periodic reports are published in *BTO News* (e.g. Leech & Barimore 2008) or *Life Cycle* magazine and the significant results communicated immediately to JNCC. Another primary aim is to undertake detailed analyses of breeding performance of species of conservation interest (e.g. Crick *et al.* 1994, 2002, Brown *et al.* 1995, Peach *et al.* 1995a, Crick 1997, Chamberlain & Crick 1999, 2003, Siriwardena*et al.* 2001, Freeman & Crick 2003, Browne *et al.* 2005, Tryjanowski *et al.* 2006, Douglas et al. 2010b).

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

Currently the BTO collects a total of more than 40,000 records each year for around 180 species. Typically, there are more than 150 records for 50 species and more than 100 for a further 20 species. The quality of records improved substantially in 1990 with the introduction of a new recording card, which promotes greater standardisation and clarity in the information recorded by observers. Nest recording has subsequently become a module within IPMR, the program through which ringing data are currently collected. The general distribution of completed nest records is patchy at the county scale but is more even over larger regions of the UK. Overall, Northern Ireland and parts of Scotland (southeast, Western Isles) and parts of England (West Midlands, southwest) have relatively low coverage, often reflecting observer density. A major analysis of trends over time in various aspects of breeding performance found relatively few differences between major regions, when analysed using analysis of covariance (Crick *et al.* 1993). The scheme receives records from all the UK's major habitats. Most records come from woodland, farmland and freshwater sites, but the scheme also receives data from scrub, grassland, heathland and coastal areas.

Data analysis

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

To minimise the incidence of errors and inaccurately recorded nests, a set of rejection criteria was applied to the data: laying date included only 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 visited only after hatching; and maximum brood size was calculated only for nests which were observed after hatching. The last variable is an underestimate of brood size at hatching, because observers may miss early losses of individual chicks; it differs from clutch size because some eggs may be lost during incubation or fail to hatch.

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

As the combined influence of concurrent trends in these individual breeding parameters on overall productivity is difficult to assess, the estimates produced are used to derive an annual mean estimate of the number of 'fledglings produced per breeding attempt' (FPBA) according to the equation below (Crick *et al.* 2003):

FPBA = CS × HS × (1 – EF)EP × (1 – YF)YP

where CS represents clutch size, HS represents hatching success, EF and YF represent egg- and chick-stage daily failure rates and EP and YP represent the length of the egg and nestling periods. Standard errors were derived using the formula given by Siriwardena *et al.* (2000b).

Statistical analyses of nest record data were undertaken using SAS programs (SAS 2011). Regressions through annual mean laying dates, clutch sizes and brood sizes were weighted by sample size. Nest survival was analysed by logistic regression. Quadratic regressions were used when the inclusion of a quadratic term provided a significant improvement over linear regression. These are described as 'curvilinear' in the tables on species pages. Significant linear trends are described as 'linear'. The better-fitting regressions (i.e. quadratic or linear) are presented on the figures in this report. Where neither regression is significant, the linear regression line is shown for illustration.

Data presentation

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

Note that the data presented are modelled figures. As a result, the presented figures may appear anomalous under certain unusual circumstances, as is the case for Buzzard in this report, which shows a figure for the number of fledglings per breeding attempt that is higher than the brood size in the same year. As each variable is modelled separately using the best fitting regression line for that variable, this anomaly can occur if the best fitting model is different for each variable.

Visit the Nest Record Scheme section of the BTO website.

Integrated population analysis

The BTO operates, in partnership with others, several schemes aimed at monitoring the numbers and demography of a range of widespread UK birds. A key aim of this monitoring is to investigate how and why bird populations change, and thus to make species conservation more effective and to contribute evidence that supports the conservation of wider biodiversity and the environment. All population changes are a consequence of underlying demographic factors, which are themselves determined largely by environmental conditions. Thus analyses of trends in numbers (from BBS, CES and other schemes) are complemented by the Ringing and Nest Record schemes which aim to monitor demographic patterns underlying population changes.

Populations may change because the number of individuals either entering the population (productivity) or leaving it (survival) changes. For an island such as Britain, immigration and emigration, which may also cause changes at more local scales, can be safely ignored (e.g. Robinson *et al.* 2012). To gain a full picture of how these processes operate, it is best to consider them simultaneously (along with the changes in numbers) in an integrated fashion and, ideally, incorporate them into a single statistical model (Besbeas *et al.* 2002, Buckland *et al.* 2004, Brooks *et al.* 2004). This is for a number of reasons. Firstly, it makes most efficient use of all the collected data and can help quantify processes for which the available data are sparse. Secondly, such factors might interact, through processes like density dependence, so to understand the consequences fully, they cannot be viewed in isolation. Thirdly, and perhaps most importantly, we do not have data on all the processes – for instance, the proportion of adults breeding or the number of nesting attempts made by individuals of multi-brooded species can be really hard to measure. By constructing an integrated model we can acknowledge this uncertainty and assess to what extent it affects our conclusions about the causes of population change.

Robinson *et al.* (2014) constructed integrated population models (IPMs) for 17 species of common birds. They did this using newly developed statistical techniques which, although they require a lot of computing power, enable one to combine data from different sources, by specifying a common underlying model – in our case of population change. Information on changes in numbers came from the CBC and BBS schemes, information on brood sizes (for some species) and nest success from the Nest Record Scheme and information on brood size (for some species) and survival of young and adult birds from the Ringing Scheme, with the number of individuals ringed and subsequently found dead (mostly by members of the public) enumerated for each year.

The population size in any given year (N_{t+1}) depends on the population size in the previous year (N_t) as follows:

$$N_{t+1} = 0.5N_t\, \rho_t\, (B_t\, \varphi_{egg,t}\, \varphi_{yng,t}\, \varphi_{fy,t}) + N_t\, \varphi_{ad,t}$$

where B represents the mean brood size, φ_{egg} and φ_{yng} survival of the nest at the egg and chick stages, φ_{fy} survival during the first year following hatching (which for some species we can separate into the post-fledging and first-winter periods) and φ_{ad} adult survival, all in year *t* (Robinson *et al.* 2014). The final parameter, ρ, represents the unmeasured demographic rates, i.e. the number of adults actually breeding, the number of nesting attempts made (particularly in multi-brooded species) and (for some species) survival during the post-fledging period. We employed a Bayesian state-space approach (Brooks *et al.* 2004), generating five sets of 200,000 samples (of which we discarded the first 100,000 as ‘burn-in’ and kept every 50th to minimise autocorrelation) using uninformative priors and the MCMC sampling algorithm in JAGS (Plummer 2003). For further details see Robinson *et al.* (2014).

Alert system

General approach
Smoothing population trends
Years used for analysis
Confidence limits and statistical testing
Data-deficient species

General approach

The alert system used within this report is designed to draw attention to developing population declines that may be of conservation concern, and has been described in detail by Baillie & Rehfisch (2006). It also identifies cases where long-term declines have reversed, leading to an improvement in conservation status. It must be stressed that the alerts and reversals reported here are advisory and do not supersede the agreed, longer-term UK conservation listings (Eaton *et al*. 2015; see PSoB pages). They are based on similar criteria to *Birds of Conservation Concern*, however, and so provide an indication of likely changes at future revisions.

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

The alerts are calculated annually using standard automated procedures. Where species are at the margin of two categories (e.g. a decline of about 25%) they may raise alerts in some years but not others or, if around 50%, different levels of alert in different years.

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

Smoothing population trends

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

Technical details available here

Years used for analysis

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

The time it takes BTO to collate and analyse each year's intake of bird monitoring data is another factor affecting the years that can be included in these analyses. Full analyses of data sets are not usually all available until 12–15 months after the end of a particular breeding season. Thus for a report prepared in year *x* (e.g. 2017) we have analyses of monitoring data up to year *x*-1 (e.g. 2016). As we drop the final year of the smoothed time series, we report here on change measures up to year *x*-2 (e.g. 2015).

Long-term changes for most of the species included in this report are calculated from joint Common Birds Census and Breeding Bird Survey data (CBC/BBS indices), with population changes calculated back to 1967.

Confidence limits and statistical testing

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

The graphs of population trends show 85% confidence limits because these allow an approximate visual test of whether the difference between the index values for any two given years is statistically significant: if the index values for two given years are assumed to be independent, and normally distributed with standard errors of comparable size (standard errors differing by a factor of up to about 2 are quite acceptable), then to a good approximation the difference between them is significant at the 5% level if there is no overlap in their 85% confidence intervals (Buckland *et al.* 1992, Anganuzzi 1993). This test is fairly robust, and the independence assumption is reasonable if the years are well separated.

Data-deficient species

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

Unrepresentative data

In this report we present joint UK or England CBC/BBS trends only if there was no substantial or statistical difference between the trends from the two schemes over the period when they ran in parallel (Freeman *et al.* 2007a). Thus, since BBS results are drawn from a random sample, the trends are always considered to be representative of the region concerned.

For CBC data representativeness was assessed using the criteria developed by Gibbons *et al.* (1993). Data from the 1988–91 Breeding Atlas were used to compare the average abundance of a given species in 10-km squares with and without CBC plots. If average abundance is higher in squares without CBC plots, it is likely that much of the population is not well sampled by the CBC. In past reports, CBC data for such species were labelled as "unrepresentative". Where there are insufficient data to undertake such calculations, expert opinion was used instead.

Sample size

Sample size is assessed from the average number of plots contributing to the population indices for a given species in each year. A plot with a zero count would be included provided that the species had been recorded there in at least one year and that records for that plot were available for at least two years. Plots where a species has never been recorded do not enter the index calculations. These average sample sizes are shown in column four ('plots') of the population change tables. For CBC, WBS and CES, a mean of between 10 and 20 plots (when rounded to a whole number) is flagged as a small sample. For BBS indices for individual countries a mean in the range 30–40 plots is flagged as a small sample. UK BBS indices are presented only where samples reach at least 40 plots.

Statistical methods for alerts

The alert system page presents an overview of how the alert system works. More detail is given below about the statistical methods used to estimate population changes and their confidence intervals.

General structure of the data

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

log (count) = site effect + year effect

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

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

Fitting smoothed trends

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

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

where smooth (year) represents some smoothing function of the year effect. It was not straightforward to fit GAMs to the bird census data and we have therefore fitted smoothed curves with a similar degree of smoothing to the annual indices (details below).

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

	Years	Length of time series	df for smoothed index
CBC/BBS	1966–2016	51	15
WBS/WBBS	1974–2016	43	13
Breeding Bird Survey	1994–2016	23	7
Heronries Census	1928–2016	89	27
Constant Effort Sites	1983–2016	34	10

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

CBC/BBS, WBS/WBBS and BBS trends

The model fitted to the combined CBC/BBS and WBS/WBBS data is that historically employed for the BBS – a generalised linear model with counts assumed to follow a Poisson distribution and a logarithmic link function. Standard errors were calculated via a bootstrapping procedure involving 199 replications. For presentation in the figures, both the population trend and its confidence limits were also subsequently smoothed using a thin-plate smoothing spline. The overall result is a smoothed trend that is mathematically equivalent to that produced from a generalised additive model.

Heronries Census trends

The Heronries Census data were analysed using a modified sites x years model based on ratio estimation which incorporates information about new colonies (sites) that have been established and other colonies from the sample that are known to have become extinct. The method was developed by Thomas (1993) specifically in relation to the heronries data set. Since then the heronries database has been substantially upgraded and the method has been applied to the full data set (Marchant *et al.* 2004).

Such a method of analysis cannot be easily applied within a GAM framework. Therefore we fitted a smooth curve to the annual population estimates. This was done using PROC TSPLINE of SAS (SAS 2011). This procedure should give very similar estimates to a GAM analysis but it does not provide confidence intervals for the smoothed population trend or the change measures derived from it. Bootstrapped confidence intervals, where available, are thus presented instead for the Grey Heron trend.

Constant Effort Sites trends

GAMs were fitted to the CES data for catches of adults and juveniles separately with the addition of an offset to correct for missing visits. Confidence limits were fitted using a bootstrap technique to avoid restrictive assumptions about the distribution of the data. Bootstrap samples were drawn from the data by sampling plots with replacement. We generated 199 bootstrap samples from each data set and fitted a GAM to each of them. Confidence limits for the smoothed population indices (85% cl) and change measures (90% cl) were determined by taking the appropriate percentiles from the distributions of the bootstrap estimates, in a similar manner to that employed for the WBS/WBBS trends.

Species

Access the page for a species by clicking its link on the list below. Each species page has alphabetical and taxonomic listings giving access to all the others.

Jump to

Wildfowl
Gamebirds
Seabirds
Waterbirds
Hawks
Waders
Pigeons
Owls
Crows
Tits
Larks
Warblers
Thrushes
Sparrows
Finches
Buntings

List of species (in BOU taxonomic order)

WILDFOWL

Mute Swan
Greylag Goose
Canada Goose
Shelduck
Gadwall
Mallard
Mandarin Duck
Tufted Duck
Goosander

GAMEBIRDS

Red-legged Partridge
Red Grouse
Grey Partridge
Pheasant

WATERBIRDS

Red-throated Diver
Cormorant
Little Egret
Grey Heron
Little Grebe
Great Crested Grebe

HAWKS, etc.

Red Kite
Hen Harrier
Sparrowhawk
Buzzard
Moorhen
Coot

WADERS

Oystercatcher
Golden Plover
Lapwing
Ringed Plover
Curlew
Common Sandpiper
Redshank
Woodcock
Snipe
Common Tern

PIGEONS, etc.

Feral Pigeon
Stock Dove
Woodpigeon
Collared Dove
Turtle Dove
Cuckoo

OWLS, etc

Barn Owl
Little Owl
Tawny Owl
Nightjar
Swift
Kingfisher
Green Woodpecker
Great Spotted Woodpecker
Lesser Spotted Woodpecker
Kestrel
Merlin
Hobby
Peregrine
Ring-necked Parakeet

CROWS, etc.

Magpie
Jay
Jackdaw
Rook
Carrion Crow
Hooded Crow
Raven

TITS, etc.

Goldcrest
Blue Tit
Great Tit
Coal Tit
Willow Tit
Marsh Tit

LARKS, etc.

Woodlark
Skylark
Sand Martin
Swallow
House Martin

WARBLERS, etc.

Cetti's Warbler
Long-tailed Tit
Wood Warbler
Chiffchaff
Willow Warbler
Blackcap
Garden Warbler
Lesser Whitethroat
Whitethroat Grasshopper Warbler
Sedge Warbler
Reed Warbler
Nuthatch
Treecreeper
Wren
Starling
Dipper

THRUSHES, etc.

Ring Ouzel
Blackbird
Song Thrush
Mistle Thrush
Spotted Flycatcher
Robin
Nightingale
Pied Flycatcher
Redstart
Whinchat
Stonechat
Wheatear

SPARROWS, etc.

Dunnock
House Sparrow
Tree Sparrow
Yellow Wagtail
Grey Wagtail
Pied Wagtail
Tree Pipit
Meadow Pipit

FINCHES, etc.

Chaffinch
Bullfinch
Greenfinch
Linnet
Lesser Redpoll
Common Crossbill
Goldfinch

BUNTINGS

Yellowhammer
Reed Bunting
Corn Bunting

Information to aid interpretation of the pages for individual species can be found on the Key to species texts page.

The following seabird species are not covered by *BirdTrends* but full trend information is available from the*JNCC 2015), a separate web site produced by a partnership of which both BTO and JNCC are part.*

SEABIRDS

Fulmar
Manx Shearwater
Storm Petrel
Leach's Petrel
Gannet
Shag
Arctic Skua
Great Skua
Kittiwake
Black-headed Gull
Mediterranean Gull
Common Gull
Lesser Black-backed Gull
Herring Gull
Great Black-backed Gull
Sandwich Tern
Roseate Tern
Arctic Tern
Little Tern
Guillemot
Razorbill
Black Guillemot
Puffin

Key to species texts

The 121 species in this report can be accessed in any order, via the alphabetic and taxonomic 'Species links'. The taxonomic sequence is that maintained by the British Ornithologists' Union and updated in in its current British List. The vernacular and scientific names we use are also drawn from that list. Given this report's limited geographical scope, we use British rather than the international English names. Depending on the availability of data, the following will be found beneath each species heading:

1. Conservation listings: Global, European and UK conservation categories are given, in that order.

Global listings

BirdLife International is responsible for maintaining the global red list for birds that is part of the cross-taxa listings being compiled by IUCN (International Union for Conservation of Nature). On the BirdLife International web site, there is a page of information for every species in which justification for its conservation listing is given (BirdLife International 2015a). We show the global conservation category for each species, with a link to its BirdLife species page.

The IUCN categories relevant to this report are:

- VULNERABLE (VU) - A species is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see IUCN Red List Criteria), and it is therefore considered to be facing a high risk of extinction in the wild.
- NEAR THREATENED (NT) - A species is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
- LEAST CONCERN (LC) - A species is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant species are included in this category.

European listings

Conservation listings for Europe that use the same categories as the global assessment have been recently provided by BirdLife International for the first time (BirdLife International 2015b). A broad geographical definition is used for Europe as well as a political one (EU27) that covers the very much smaller area represented by the countries of the European Union. We show the whole-European red list category, with a link to the relevant species page on the BirdLife International web site, along with the EU27 listing if it is different.

These listings supersede the 'species of European concern' (SPEC) categories formerly used (BirdLife International 2004).

UK conservation listing

The UK conservation listing is taken from *The Population Status of Birds in the UK* (Eaton *et al.* 2015 (BoCC4); see PSoB pages). These assessments supersede three earlier Birds of Conservation Concern listings (Gibbons *et al.* 1996, Gregory *et al.* 2002, Eaton *et al.* 2009). There are three categories, as follows:

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

The main reason or reasons for listing as red or amber, which are tabulated in the full paper (Eaton *et al.* 2015) are summarised here.

Like its predecessor, BoCC4 also classifies races, for polytypic species, where two or more races occur regularly in the UK. On occasion the listing for a race may differ from that for the species as a whole. These race-level assessments are given alongside those for species level in our species pages.

A note appears in this section if the species is one for which the Rare Breeding Birds Panel currently requires all UK breeding records to be submitted, or on which it has reported in the past.

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

- Rapid decline: >50% population decline according to CBC/BBS, WBS/WBBS or CES
- Moderate decline: 25–50% population decline according to CBC/BBS, WBS/WBBS or CES
- Shallow decline: 10–25% population decline according to CBC/BBS, WBS/WBBS or CES
- Decline/Increase: information has been derived from sources other than CBC/BBS, WBS/WBBS or CES
- Probable/Possible increase/decline: information has been derived from sources other than CBC/BBS, WBS/WBBS or CES, and the information is uncertain – see the status summary for details
- Stable/Fluctuating, with no long-term trend: no overall change, or change <10%
- Uncertain: the information from two monitoring schemes conflicts, or the data are unrepresentative of the species' total UK population – see the status summary for details
- Unknown: no information on the UK population trend is available
- Shallow increase: 10–50% population increase according to CBC/BBS, WBS/WBBS or CES
- Moderate increase: 50–100% population increase according to CBC/BBS, WBS/WBBS or CES
- Rapid increase: >100% population increase according to CBC/BBS, WBS/WBBS or CES

3. UK population size: Estimates of population sizes of birds in Britain and in the UK, for the breeding season and for winter, are agreed periodically by the Avian Population Estimates Panel (APEP), on which BTO, GWCT, JNCC, RSPB and WWT are represented (Stone *et al.* 1997, Baker *et al.* 2006, Musgrove *et al.* 2013). UK population estimates from APEP's third report (Musgrove *et al.* 2013) are given for each of our species, with a shortened reference (APEP13) and a summary of how each estimate was derived. Any new information potentially superseding APEP13 is also presented.

4. Key facts table: For 43 species only, there follows a table giving a summary of key facts for migration, habitat and diet.

5. Status summary: This section provides a brief summary of the trends detailed for the species. Unless there is a separate Causes of change section for the species (see 11, below), it also indicates why population changes might have occurred, if this is known, with reference to any information published in the scientific literature.

6. Population trend graphs: The first, headline graph shows the most representative long-term trend in abundance for the species, and is followed under the 'Population changes in detail' header by further graphs from other schemes, including BBS graphs for separate UK countries, as available. Generally for these graphs there are annual estimates (dots), with a smoothed trend line and its 85% confidence interval. The Methods section provides details about how the trend data are calculated for each scheme. Index values provide a relative measure of population size on an arithmetic scale relative to an arbitrary value of 100 in one of the years of the sequence. If an index value increases from 100 to 200, the population has doubled; if it declines from 100 to 50, it has halved. A narrow confidence interval indicates that the index series is estimated precisely, and a wider one that it is less precise, though the scale of the *y*-axis varies throughout and must always be taken into account. The use of 85% confidence limits allows relatively straightforward comparison of points along the modelled line: non-overlap of the 85% confidence limits is equivalent to a statistically significant difference at approximately the 5% level (Anganuzzi 1993).

CBC/BBS joint trends are produced only where there was no significant difference between CBC and BBS trends during the period of overlap between the two schemes (1994–2000). Where a joint CBC/BBS UK trend cannot be justified it is sometimes possible to present a CBC/BBS England one, provided that CBC and BBS trends were not significantly different across the 'Fuller rectangle' during the overlap period (see CBC/BBS trends, Alert system). CBC/BBS England trends use all data from England and become the headline trend if no long-term UK index is available.

7. Population trends table: This table provides details of summarised percentage changes in population size, over the maximum period from each source, and from the past 25 years, 10 years and 5 years, where these figures are available. Further columns indicate the years included, the average number of census plots included in the analysis for each year, the percentage change (an increase if presented with no sign) and the upper and lower 90% confidence limits of that change. Note that positive and negative percentage changes are not directly equivalent: for example, a decrease of 20% would require an increase of 25% to restore the population to its former level. Where the confidence interval does not include zero, population declines are regarded as statistically significant. The 'Alert' column indicates where a statistically significant population decline is estimated to be of greater than 50% (>50) or between 25% and 50% (>25) (see the Alerts section for further details). The 'Comment' column lists any caveats that must be considered when interpreting the estimates. The caveats include:

- Small sample: For CBC/BBS, WBS/WBBS and CES data, a mean sample size of less than 20 (but more than 10) census plots was available; for BBS data from individual countries, a mean sample of less than 40 (but more than 30) plots was available.
- Unrepresentative?: Some trends may be marked as possibly unrepresentative of the stated region, owing to the original CBC plots being self-selected by observers and thus potentially a biased sample. This judgment was made either because the species' average abundance in 10-km squares containing CBC plots was less than that in other occupied 10-km squares, as measured by 1988–91 Breeding Atlas timed counts or frequency indices (Gibbons *et al.* 1993) or, where these figures could not be calculated, on expert opinion.

8. Population trends by habitat: This section appears for a subset of the most abundant and widespread species. It refers to BBS data for the 16-year period 1995–2011 and has not been updated to the current year. A chart shows the species' BBS trends for each of 12 broad, mutually exclusive habitat types. The data presented vary by species according to their sample sizes. The vertical axis shows the estimated percentage change over the period, with its 95% confidence interval, in relation to the overall change, indicated by a dashed line. Under 'More on habitat trends', the data for each habitat trend are presented as a table and as a graph. The graphs allow the patterns of change to be compared between habitat categories over time. There is more information on these trends here on the BBS pages.

9. Demography graphs: Graphs from Constant Effort Sites or Nest Record Scheme data illustrate trends in productivity and survival. NRS graphs show annual means, with error bars to denote ±1 standard error; and quadratic or linear regression lines with their 95% confidence interval. For CES data, the smoothed trends are plotted with their 85% confidence limits (see CES section for details). CES survival graphs show annual estimates, ±1 standard error, but trends for these data have not been assessed.

10. Demography table: This provides details of changes in demographic variables since 1968 (or a more recent year, depending on the availability of data). It lists the period of years concerned, the mean annual sample, the type of trend ('curvilinear' is for a significant quadratic trend, 'linear' is for a significant linear trend, 'none' is where the linear trend is not significantly different from horizontal), the modelled values (from the appropriate regression) for the first and last years and their difference (provided only where the trend is significant), and any caveats that must be considered when interpreting the data. Changes are presented either in the units given or as percentages, and are increases unless a minus sign is shown. The caveat 'Small sample'; is given when the mean number of nest record cards contributing annually was in the range 10–30, or when the mean annual number of CES plots recording the species was less than 20 (but more than 10). Note that where the trend is curvilinear, although inclusion in the table indicates that a significant quadratic trend has occurred, the overall change between 1968 and the current year may be small.

11. Causes of change: For a selection of species (currently 55), information on the causes of the demographic changes we have observed has been removed from the Status summary paragraph and expanded under this heading.

12. Additional information: Links to atlas maps and tables from previous atlas surveys, and the relevant pages of BirdFacts, BirdTrack and Garden BirdWatch, as available from the BTO web site, are provided on the side bar of each species page.

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WBS/WBBS alerts & population increases

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5. WBS/WBBS population increases of >50% – long term

1. Table of alerts for WBS/WBBS waterways 1975-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	40	23	-97	-99	-95	>50	
Snipe	40	14	-89	-98	-65	>50	Small sample
Redshank	40	24	-65	-89	-36	>50	
Reed Bunting	40	89	-63	-74	-48	>50	
Pied Wagtail	40	118	-61	-71	-54	>50	
Little Grebe	40	20	-58	-82	-11	>50	
Sedge Warbler	40	73	-54	-68	-36	>50	
Common Sandpiper	40	50	-46	-57	-34	>25	
Grey Wagtail	40	100	-39	-53	-22	>25	
Moorhen	40	126	-32	-50	-13	>25	

2. Table of alerts for WBS/WBBS waterways 1990-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	25	21	-94	-98	-88	>50	
Snipe	25	17	-81	-96	-56	>50	Small sample
Redshank	25	26	-65	-80	-43	>50	
Lapwing	25	82	-60	-72	-43	>50	
Sedge Warbler	25	95	-49	-60	-36	>25	
Common Sandpiper	25	64	-44	-53	-32	>25	
Little Grebe	25	21	-42	-65	-6	>25	
Pied Wagtail	25	149	-31	-46	-21	>25	

3. Table of alerts for WBS/WBBS waterways 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	10	19	-60	-77	-30	>50	Small sample
Lapwing	10	96	-42	-57	-28	>25	
Redshank	10	26	-35	-57	-8	>25	
Tufted Duck	10	52	-32	-49	-11	>25	
Coot	10	86	-29	-46	-9	>25	
Sedge Warbler	10	105	-29	-39	-18	>25	
Oystercatcher	10	91	-26	-33	-17	>25	

4. Table of alerts for WBS/WBBS waterways 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	5	15	-53	-72	-5	>50	Small sample
Sedge Warbler	5	97	-30	-38	-18	>25	
Coot	5	72	-28	-39	-15	>25	
Tufted Duck	5	47	-27	-45	-7	>25	

5. Table of population increases for WBS/WBBS waterways 1975-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Mute Swan	40	84	62	13	126		
Whitethroat	40	87	145	7	354		
Mallard	40	174	181	110	254		

CBC/BBS alerts & population increases

1a. CBC/BBS UK alerts – long term
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5a. CBC/BBS UK population increases of >50% – long term
5b. CBC/BBS England population increases of >50% – long term

1a. Table of population alerts for CBC/BBS UK 1967-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	48	101	-98	-99	-97	>50	
Grey Partridge	48	139	-92	-94	-88	>50	
Willow Tit	48	43	-91	-96	-82	>50	
Spotted Flycatcher	48	132	-87	-91	-81	>50	
Corn Bunting	48	80	-87	-94	-76	>50	
Marsh Tit	48	104	-79	-85	-70	>50	
Yellow Wagtail	48	89	-72	-86	-38	>50	
Little Owl	48	61	-71	-82	-53	>50	
Whitethroat	48	704	-59	-70	-43	>50	
Yellowhammer	48	622	-56	-66	-46	>50	
Mistle Thrush	48	614	-55	-62	-45	>50	
Lapwing	48	339	-54	-74	-32	>50	
Song Thrush	48	1045	-50	-57	-40	>50	
Greenfinch	48	892	-48	-58	-33	>25	
Bullfinch	48	373	-37	-50	-23	>25	
Sedge Warbler	48	165	-35	-64	-5	>25	
Dunnock	48	1080	-33	-43	-23	>25	

1b. Table of population alerts for CBC/BBS England 1967-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	48	100	-98	-99	-96	>50	
Tree Sparrow	48	103	-96	-98	-91	>50	
Grey Partridge	48	125	-92	-95	-88	>50	
Nightingale	48	24	-92	-97	-62	>50	
Spotted Flycatcher	48	98	-92	-95	-89	>50	
Willow Tit	48	39	-91	-96	-84	>50	
Starling	48	708	-89	-92	-85	>50	
Tree Pipit	48	52	-86	-93	-73	>50	
Lesser Redpoll	48	51	-85	-95	-68	>50	
Corn Bunting	48	76	-85	-93	-73	>50	
Marsh Tit	48	95	-78	-85	-68	>50	
Cuckoo	48	307	-76	-82	-66	>50	
Linnet	48	515	-71	-79	-63	>50	
Yellow Wagtail	48	87	-70	-86	-42	>50	

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
House Martin	48	338	-69	-92	-2	>50	
Little Owl	48	59	-68	-79	-44	>50	
Willow Warbler	48	525	-66	-75	-54	>50	
Skylark	48	698	-63	-69	-55	>50	
Mistle Thrush	48	495	-61	-68	-53	>50	
Yellowhammer	48	541	-61	-70	-47	>50	
Whitethroat	48	607	-59	-72	-49	>50	
Song Thrush	48	828	-52	-60	-42	>50	
Meadow Pipit	48	219	-45	-75	-23	>25	
Sedge Warbler	48	109	-44	-72	-22	>25	
Greenfinch	48	755	-41	-54	-28	>25	
Bullfinch	48	298	-41	-56	-27	>25	
Lapwing	48	285	-37	-70	-2	>25	
Dunnock	48	887	-37	-46	-28	>25	
Red-legged Partridge	48	266	-34	-59	-2	>25	

2a. Table of population alerts for CBC/BBS UK 1990-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	25	131	-95	-97	-94	>50	
Willow Tit	25	48	-88	-93	-82	>50	
Grey Partridge	25	205	-71	-77	-63	>50	
Spotted Flycatcher	25	178	-63	-74	-54	>50	
Little Owl	25	91	-61	-70	-50	>50	
Yellow Wagtail	25	142	-59	-71	-44	>50	
Corn Bunting	25	127	-51	-69	-28	>50	
Marsh Tit	25	148	-49	-57	-36	>25	
Lapwing	25	595	-45	-56	-30	>25	
Greenfinch	25	1578	-41	-47	-33	>25	
Yellowhammer	25	1063	-39	-46	-34	>25	
Mistle Thrush	25	1043	-37	-43	-28	>25	
Tawny Owl	25	103	-30	-46	-12	>25	

2b. Table of population alerts for CBC/BBS England 1990-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	25	129	-95	-97	-94	>50	
Willow Tit	25	43	-89	-93	-82	>50	
Spotted Flycatcher	25	127	-78	-85	-73	>50	
Lesser Redpoll	25	60	-77	-92	-57	>50	
Tree Pipit	25	69	-76	-86	-62	>50	
Starling	25	1254	-74	-78	-70	>50	
Cuckoo	25	498	-70	-74	-66	>50	
Grey Partridge	25	184	-69	-77	-63	>50	
Nightingale	25	33	-62	-75	-38	>50	
Little Owl	25	88	-58	-67	-41	>50	

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	25	139	-58	-71	-45	>50	
Willow Warbler	25	856	-54	-62	-48	>50	
Corn Bunting	25	122	-50	-68	-26	>25	
Mistle Thrush	25	831	-48	-53	-41	>25	
Yellowhammer	25	924	-48	-54	-42	>25	
Marsh Tit	25	135	-47	-58	-37	>25	
House Martin	25	630	-41	-68	-12	>25	
Greenfinch	25	1333	-38	-46	-29	>25	
House Sparrow	25	1163	-35	-51	-22	>25	
Meadow Pipit	25	388	-34	-51	-16	>25	
Tawny Owl	25	89	-33	-46	-15	>25	
Lapwing	25	500	-32	-43	-14	>25	
Garden Warbler	25	347	-31	-41	-21	>25	
Skylark	25	1238	-28	-36	-21	>25	

3a. Table of population alerts for CBC/BBS UK 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	10	93	-88	-91	-84	>50	
Greenfinch	10	2181	-59	-61	-57	>50	
Willow Tit	10	43	-50	-62	-36	>50	
Little Owl	10	96	-45	-53	-36	>25	
Grey Partridge	10	234	-37	-44	-26	>25	
Marsh Tit	10	169	-36	-45	-26	>25	
Lapwing	10	803	-35	-42	-28	>25	
Moorhen	10	768	-26	-30	-22	>25	

3b. Table of population alerts for CBC/BBS England 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	10	92	-87	-91	-83	>50	
Greenfinch	10	1843	-58	-59	-56	>50	
Willow Tit	10	38	-51	-65	-33	>50	
Little Owl	10	94	-47	-56	-36	>25	
Spotted Flycatcher	10	127	-41	-50	-28	>25	
Cuckoo	10	525	-40	-44	-34	>25	
Starling	10	1635	-38	-41	-33	>25	
Grey Partridge	10	212	-36	-43	-27	>25	
House Martin	10	856	-33	-38	-28	>25	
Lapwing	10	688	-31	-37	-25	>25	
Marsh Tit	10	154	-31	-42	-19	>25	
Mistle Thrush	10	1048	-29	-33	-26	>25	
Kestrel	10	717	-27	-31	-21	>25	

4a. Table of population alerts for CBC/BBS UK 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	5	56	-70	-78	-60	>50	
Greenfinch	5	2059	-40	-43	-38	>25	

4b. Table of population alerts for CBC/BBS England 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	5	54	-69	-79	-61	>50	
Greenfinch	5	1752	-38	-40	-36	>25	

5a. Table of population increases of >50% for UK CBC/BBS 1967-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Pied Wagtail	48	626	73	26	136		
Reed Warbler	48	74	87	21	272		
Great Tit	48	1145	99	76	127		
Magpie	48	968	101	61	147		
Chiffchaff	48	792	105	68	162		
Wren	48	1265	114	87	142		
Jackdaw	48	843	131	51	269		
Coot	48	143	159	67	544		
Woodpigeon	48	1202	160	36	462		
Mallard	48	673	169	105	246		
Mute Swan	48	128	246	55	679		
Nuthatch	48	277	254	162	393		
Blackcap	48	847	291	215	387		
Great Spotted Woodpecker	48	561	387	235	708		

5b. Table of population increases of >50% for England CBC/BBS 1967-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Robin	48	982	62	44	79		
Reed Warbler	48	70	66	11	210		
Pied Wagtail	48	478	69	25	141		
Great Tit	48	936	83	63	116		
Pheasant	48	776	85	49	161		
Long-tailed Tit	48	467	97	40	186		
Goldfinch	48	683	109	58	158		
Magpie	48	817	110	70	160		
Wren	48	1002	111	86	139		
Chiffchaff	48	670	112	70	176		

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Jackdaw	48	679	124	47	270		
Carrion Crow	48	985	134	94	193		Includes Hooded Crow
Coot	48	129	158	63	407		
Woodpigeon	48	963	175	41	468		
Green Woodpecker	48	397	182	110	296		
Mallard	48	566	204	132	275		
Stock Dove	48	383	212	111	347		
Mute Swan	48	110	213	52	667		
Blackcap	48	728	248	188	341		
Nuthatch	48	238	258	151	417		
Great Spotted Woodpecker	48	493	330	215	554		
Buzzard	48	327	792	477	1892		

CES alerts & population increases

1. CES adults alerts – long term
2. CES adults alerts – 25 years
3. CES adults alerts – 10 years
4. CES adults alerts – 5 years
5. CES adults population increases of >50% – long term

1. Table of alerts for CES adults 1984-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Warbler	31	89	-74	-80	-68	>50	
Lesser Whitethroat	31	37	-67	-84	-47	>50	
Willow Tit	31	16	-61	-87	-22	>50	Small sample
Reed Bunting	31	60	-60	-71	-48	>50	
Whitethroat	31	64	-48	-65	-31	>25	
Sedge Warbler	31	67	-47	-64	-28	>25	

2. Table of alerts for CES adults 1990-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Lesser Whitethroat	25	39	-73	-83	-62	>50	
Willow Warbler	25	95	-70	-75	-65	>50	
Willow Tit	25	16	-60	-87	-19	>50	Small sample
Sedge Warbler	25	74	-57	-66	-48	>50	
Greenfinch	25	44	-50	-69	-12	>50	
Reed Bunting	25	65	-50	-65	-34	>25	
Whitethroat	25	71	-45	-61	-28	>25	
Chaffinch	25	84	-31	-53	-4	>25	

3. Table of alerts for CES adults 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	10	43	-59	-70	-46	>50	
Chaffinch	10	79	-40	-50	-33	>25	
Lesser Whitethroat	10	32	-31	-50	-12	>25	
Sedge Warbler	10	72	-28	-36	-21	>25	
Willow Warbler	10	88	-27	-35	-21	>25	

4. Table of alerts for CES adults 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	5	37	-38	-52	-19	>25	

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Whitethroat	5	80	-30	-40	-21	>25	

5. Table of population increases for CES adults 1984-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Robin	31	95	54	30	82		
Goldfinch	31	34	62	13	212		
Wren	31	101	77	50	105		
Blackcap	31	93	124	83	177		
Chiffchaff	31	77	308	191	620		

BBS population declines & increases

1. BBS – UK alerts – 20 years
2. BBS – England alerts – 20 years
3. BBS – Scotland alerts – 20 years
4. BBS – Wales alerts – 20 years
5. BBS – Northern Ireland alerts – 20 years
6. BBS – UK alerts – 10 years
7. BBS – England alerts – 10 years
8. BBS – Scotland alerts – 10 years
9. BBS – Wales alerts – 10 years
10. BBS – Northern Ireland alerts – 10 years
11. BBS – UK alert – 5 years
12. BBS – England alerts – 5 years
13. BBS – Scotland alerts – 5 years
14. BBS – Wales alerts – 5 years
15. BBS – Northern Ireland alerts – 5 years
16. BBS – UK population increases of >50%– 20 years
17. BBS – England population increases of >50%– 20 years
18. BBS – Scotland population increases of >50%– 20 years
19. BBS – Wales population increases of >50% – 20 years
20. BBS – Northern Ireland population increases of >50%– 20 years

1. Table of declines >25% for BBS UK 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	20	136	-94	-96	-93	>50	
Willow Tit	20	48	-80	-85	-73	>50	
Grey Partridge	20	227	-60	-66	-54	>50	
Little Owl	20	96	-57	-66	-46	>50	
Wood Warbler	20	53	-57	-75	-30	>50	
Swift	20	1061	-51	-56	-45	>50	
Whinchat	20	78	-51	-63	-37	>50	
Starling	20	1810	-51	-54	-48	>50	
Curlew	20	537	-48	-53	-44	>25	
Greenfinch	20	1856	-46	-48	-42	>25	
Lapwing	20	700	-43	-49	-36	>25	
Cuckoo	20	711	-43	-48	-36	>25	
Yellow Wagtail	20	162	-42	-50	-31	>25	
Pied Flycatcher	20	40	-41	-72	-7	>25	
Marsh Tit	20	152	-41	-51	-30	>25	
Kestrel	20	686	-38	-44	-31	>25	
Redshank	20	89	-38	-59	-6	>25	
Spotted Flycatcher	20	192	-38	-51	-23	>25	
Corn Bunting	20	144	-34	-48	-20	>25	
Tawny Owl	20	95	-28	-42	-12	>25	Nocturnal species

2. Table of declines >25% for BBS England 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	20	134	-94	-96	-92	>50	
Willow Tit	20	42	-82	-87	-73	>50	
Cuckoo	20	551	-69	-72	-66	>50	
Spotted Flycatcher	20	134	-61	-68	-54	>50	
Starling	20	1474	-60	-63	-57	>50	

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Grey Partridge	20	203	-57	-63	-49	>50	
Little Owl	20	93	-57	-65	-47	>50	
Swift	20	914	-50	-56	-43	>25	
Nightingale	20	33	-48	-64	-15	>25	
Tree Pipit	20	76	-46	-64	-24	>25	
Common Sandpiper	20	31	-43	-61	-19	>25	
Willow Warbler	20	958	-43	-49	-37	>25	
Greenfinch	20	1565	-43	-46	-40	>25	
Yellow Wagtail	20	158	-41	-50	-30	>25	
Marsh Tit	20	137	-41	-51	-31	>25	
Dipper	20	31	-39	-59	0	>25	
Mistle Thrush	20	949	-38	-42	-33	>25	
Whinchat	20	34	-37	-60	-19	>25	
Redshank	20	64	-35	-51	-19	>25	
Corn Bunting	20	137	-33	-45	-17	>25	
Curlew	20	351	-31	-39	-21	>25	
Grasshopper Warbler	20	40	-31	-53	-11	>25	
Garden Warbler	20	378	-31	-38	-23	>25	
Feral Pigeon/Rock Dove	20	588	-29	-38	-19	>25	
Tawny Owl	20	82	-29	-41	-10	>25	Nocturnal species
House Martin	20	756	-28	-34	-20	>25	
Yellowhammer	20	1068	-26	-30	-22	>25	
Lapwing	20	589	-25	-33	-18	>25	

3. Table of declines >25% for BBS Scotland 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Kestrel	20	42	-69	-78	-52	>50	
Curlew	20	129	-59	-66	-52	>50	
Lapwing	20	89	-58	-68	-48	>50	
Swift	20	55	-57	-68	-38	>50	
Greenfinch	20	111	-55	-68	-40	>50	
Oystercatcher	20	140	-37	-47	-30	>25	
Rook	20	121	-33	-50	-15	>25	
Golden Plover	20	38	-31	-47	-11	>25	
Starling	20	161	-26	-42	-10	>25	

4. Table of declines >25% for BBS Wales 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Starling	20	82	-70	-79	-59	>50	
Curlew	20	35	-68	-76	-55	>50	
Swift	20	68	-59	-70	-41	>50	
Yellowhammer	20	34	-57	-70	-41	>50	
Greenfinch	20	117	-52	-64	-40	>50	
Rook	20	82	-42	-59	-18	>25	

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

5. Table of declines >25% for BBS Northern Ireland 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	20	49	-52	-72	-19	>50	
Skylark	20	32	-48	-58	-39	>25	

6. Table of declines >25% for BBS UK 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	10	93	-87	-91	-85	>50	
Greenfinch	10	2181	-59	-61	-57	>50	
Willow Tit	10	43	-50	-62	-32	>50	
Stonechat	10	207	-47	-53	-37	>25	
Little Owl	10	96	-45	-55	-35	>25	
Swift	10	1192	-38	-42	-33	>25	
Grey Partridge	10	234	-37	-45	-28	>25	
Marsh Tit	10	169	-36	-45	-26	>25	
Kestrel	10	802	-35	-39	-29	>25	
Lapwing	10	803	-35	-41	-27	>25	
Grey Wagtail	10	269	-33	-40	-25	>25	
Starling	10	2015	-32	-36	-27	>25	
Grey Heron	10	810	-28	-35	-21	>25	Non-breeders included
Moorhen	10	768	-26	-30	-20	>25	

7. Table of declines >25% for BBS England 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	10	92	-87	-91	-84	>50	
Greenfinch	10	1843	-58	-59	-55	>50	
Willow Tit	10	38	-51	-64	-34	>50	
Little Owl	10	94	-47	-56	-38	>25	
Stonechat	10	97	-41	-53	-25	>25	
Spotted Flycatcher	10	127	-41	-49	-29	>25	
Cuckoo	10	525	-40	-44	-34	>25	
Starling	10	1635	-38	-42	-34	>25	
Grey Partridge	10	212	-36	-44	-26	>25	
Swift	10	1028	-36	-41	-31	>25	
Redshank	10	76	-33	-48	-17	>25	
House Martin	10	856	-33	-37	-27	>25	
Lapwing	10	688	-31	-36	-25	>25	
Marsh Tit	10	154	-31	-40	-20	>25	
Mistle Thrush	10	1048	-29	-33	-26	>25	

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Grey Heron	10	671	-28	-34	-22	>25	Non-breeders included
Feral Pigeon/Rock Dove	10	668	-28	-36	-19	>25	
Kestrel	10	717	-27	-30	-21	>25	
Moorhen	10	714	-25	-29	-20	>25	

8. Table of declines >25% for BBS Scotland 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Kestrel	10	42	-59	-69	-40	>50	
Greenfinch	10	130	-59	-67	-50	>50	
Stonechat	10	49	-58	-69	-46	>50	
Grey Wagtail	10	37	-47	-60	-31	>25	
Goldcrest	10	119	-43	-52	-25	>25	
Lapwing	10	92	-40	-53	-24	>25	
Swift	10	65	-37	-55	-14	>25	
Grey Heron	10	64	-33	-48	-12	>25	Non-breeders included
Rook	10	138	-28	-46	-6	>25	
Linnet	10	108	-25	-38	-10	>25	

9. Table of declines >25% for BBS Wales 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	10	133	-66	-71	-60	>50	
Swift	10	71	-45	-59	-28	>25	
Starling	10	82	-41	-52	-28	>25	
Curlew	10	32	-40	-52	-25	>25	
Yellowhammer	10	31	-36	-52	-15	>25	
Rook	10	90	-30	-43	-10	>25	

10. Table of declines >25% for BBS Northern Ireland 2005-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	10	57	-75	-80	-68	>50	
Linnet	10	43	-37	-56	-18	>25	
Skylark	10	31	-35	-47	-24	>25	
Lesser Redpoll	10	38	-32	.	.	>25	
Goldcrest	10	56	-31	-48	-10	>25	
Swallow	10	100	-29	-38	-20	>25	
Mistle Thrush	10	68	-27	-39	-13	>25	

11. Table of declines >25% for BBS UK 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	5	56	-70	-79	-64	>50	
Greenfinch	5	2059	-40	-42	-39	>25	
Crossbill	5	80	-37	-61	-31	>25	
Grasshopper Warbler	5	110	-35	-50	-29	>25	
Barn Owl	5	65	-30	-44	-20	>25	

12. Table of declines >25% for BBS England 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	5	54	-69	-79	-62	>50	
Greenfinch	5	1752	-38	-41	-36	>25	
Wheatear	5	294	-27	-37	-18	>25	

13. Table of declines >25% for BBS Scotland 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	5	117	-47	-57	-39	>25	
Kestrel	5	36	-32	-50	-4	>25	

14. Table of declines >25% for BBS Wales 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	5	124	-50	-59	-42	>50	
Curlew	5	31	-30	-44	-8	>25	
Rook	5	94	-30	-42	-13	>25	
Swift	5	68	-26	-46	-2	>25	

15. Table of declines >25% for BBS Northern Ireland 2010-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Greenfinch	5	46	-50	-60	-38	>25	
Lesser Redpoll	5	36	-42	.	.	>25	
Linnet	5	40	-40	-61	-25	>25	
Pheasant	5	55	-29	-41	-12	>25	

16. Table of population increases for BBS UK 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Stonechat	20	159	53	15	97		
Jackdaw	20	1855	54	44	66		
Siskin	20	197	61	25	93		
Canada Goose	20	524	75	46	123		
Buzzard	20	1096	84	70	100		
Nuthatch	20	545	90	71	109		
Chiffchaff	20	1646	109	98	121		
Tree Sparrow	20	195	119	71	167		
Goldfinch	20	1779	122	109	136		
Great Spotted Woodpecker	20	1166	130	116	146		
Gadwall	20	42	131	42	286		
Blackcap	20	1736	145	132	159		
Barn Owl	20	50	217	128	350		
Greylag Goose	20	237	232	28	586		
Mandarin	20	33	405	.	.		
Red Kite	20	137	1231	780	2106		
Ring-necked Parakeet	20	77	1455	579	4457		
Little Egret	20	44	2894	.	.		

17. Table of population increases for BBS England 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Stonechat	20	71	55	5	139		
Canada Goose	20	484	60	37	108		
Jackdaw	20	1490	65	54	76		
Tree Sparrow	20	152	69	39	119		
Nuthatch	20	464	91	72	112		
Great Spotted Woodpecker	20	1016	105	92	118		
Chiffchaff	20	1381	111	101	123		
Blackcap	20	1476	117	107	131		
Goldfinch	20	1465	118	106	130		
Gadwall	20	40	121	29	304		
Raven	20	155	130	7	280		
Buzzard	20	751	194	161	239		
Barn Owl	20	48	238	159	400		
Greylag Goose	20	197	284	176	526		
Ring-necked Parakeet	20	77	1455	526	4650		
Little Egret	20	40	2779	.	.		
Red Kite	20	101	19918	9007	19277		

18. Table of population increases for BBS Scotland 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Dunnock	20	155	57	35	85		

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Siskin	20	81	61	19	94		
Long-tailed Tit	20	33	63	3	146		
Great Tit	20	171	64	41	89		
Wren	20	243	67	47	82		
Tree Pipit	20	36	100	40	158		
Whitethroat	20	92	117	31	226		
House Martin	20	76	121	60	203		
Goldfinch	20	110	180	111	264		
Great Spotted Woodpecker	20	59	413	284	592		
Blackcap	20	73	460	298	736		
Chiffchaff	20	64	648	426	1147		

19. Table of population increases for BBS Wales 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Chiffchaff	20	153	67	42	94		
Goldfinch	20	141	76	47	109		
House Sparrow	20	135	79	50	115		
Stock Dove	20	33	88	23	197		
Stonechat	20	39	139	71	272		
Blackcap	20	137	151	109	197		
Great Spotted Woodpecker	20	89	180	134	262		

20. Table of population increases for BBS Northern Ireland 1995-2015

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Song Thrush	20	79	52	18	96		
Pied Wagtail	20	47	66	.	.		
Wren	20	94	69	28	102		
Willow Warbler	20	82	72	32	90		
Dunnock	20	72	86	20	137		
Woodpigeon	20	87	87	44	124		
Pheasant	20	43	89	10	157		
Collared Dove	20	34	97	16	143		
Jackdaw	20	78	98	40	140		
House Martin	20	45	108	22	207		
Great Tit	20	76	172	107	214		
Hooded Crow	20	84	179	111	252		
Goldfinch	20	52	722	.	.		
Buzzard	20	34	1015175	.	.		
Blackcap	20	42	2382660	.	.		

Breeding performance

1. Clutch size
2. Brood size
3. Egg-stage nest failure rate
4. Chick-stage nest failure rate

1. Table of significant trends in Clutch size measured between 1967-2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Great Tit	48	416	Linear decline	8.25 eggs	7.25 eggs	-1 eggs	
Magpie	48	41	Linear decline	5.67 eggs	4.97 eggs	-0.7 eggs	
Blue Tit	48	572	Linear decline	9.38 eggs	8.72 eggs	-0.66 eggs	
Long-tailed Tit	48	46	Curvilinear	7.85 eggs	7.22 eggs	-0.63 eggs	
Grey Heron	48	14	Curvilinear	4.15 eggs	3.66 eggs	-0.49 eggs	Small sample
Hen Harrier	48	11	Curvilinear	5.58 eggs	5.2 eggs	-0.38 eggs	Small sample
Great Crested Grebe	48	15	Linear decline	3.52 eggs	3.19 eggs	-0.33 eggs	Small sample
Peregrine	48	19	Linear decline	3.46 eggs	3.14 eggs	-0.32 eggs	Small sample
Buzzard	48	36	Curvilinear	2.1 eggs	1.84 eggs	-0.26 eggs	
Meadow Pipit	48	42	Curvilinear	4.26 eggs	4 eggs	-0.26 eggs	
Woodpigeon	48	97	Linear decline	2.02 eggs	1.79 eggs	-0.23 eggs	
Pied Wagtail	48	67	Linear decline	5.1 eggs	4.91 eggs	-0.19 eggs	
Greenfinch	48	84	Linear decline	4.76 eggs	4.58 eggs	-0.18 eggs	
Linnet	48	127	Linear decline	4.75 eggs	4.6 eggs	-0.15 eggs	
Ring Ouzel	48	11	Linear decline	4.05 eggs	3.9 eggs	-0.15 eggs	Small sample
Reed Bunting	48	44	Linear decline	4.51 eggs	4.37 eggs	-0.14 eggs	
Chaffinch	48	99	Linear decline	4.29 eggs	4.16 eggs	-0.13 eggs	
Moorhen	48	113	Curvilinear	6.58 eggs	6.46 eggs	-0.12 eggs	
Common Sandpiper	48	12	Curvilinear	3.99 eggs	3.88 eggs	-0.11 eggs	Small sample
Nightjar	48	21	Linear decline	1.97 eggs	1.88 eggs	-0.09 eggs	Small sample
Swift	48	14	Curvilinear	2.44 eggs	2.35 eggs	-0.09 eggs	Small sample
Collared Dove	48	44	Linear decline	1.96 eggs	1.88 eggs	-0.08 eggs	
Wren	48	99	Curvilinear	5.57 eggs	5.55 eggs	-0.02 eggs	
Grey Wagtail	48	39	Curvilinear	4.78 eggs	4.77 eggs	-0.01 eggs	
Oystercatcher	48	158	Curvilinear	2.76 eggs	2.79 eggs	0.03 eggs	
Stock Dove	48	133	Curvilinear	2.07 eggs	2.11 eggs	0.04 eggs	
Carrion Crow	48	31	Curvilinear	4.03 eggs	4.08 eggs	0.05 eggs	Includes Hooded Crow
Lapwing	48	189	Linear increase	3.71 eggs	3.8 eggs	0.09 eggs	
Redshank	48	28	Curvilinear	3.89 eggs	4.02 eggs	0.13 eggs	Small sample
Stonechat	48	40	Curvilinear	4.96 eggs	5.11 eggs	0.15 eggs	
Mistle Thrush	48	32	Linear increase	3.89 eggs	4.07 eggs	0.18 eggs	
Dunnock	48	115	Curvilinear	3.9 eggs	4.1 eggs	0.2 eggs	
Skylark	48	35	Curvilinear	3.33 eggs	3.56 eggs	0.23 eggs	
Redstart	48	55	Curvilinear	5.87 eggs	6.13 eggs	0.26 eggs	
Little Owl	48	25	Linear increase	3.35 eggs	3.7 eggs	0.35 eggs	Small sample
Pied Flycatcher	48	395	Curvilinear	6.39 eggs	6.74 eggs	0.35 eggs	
Tree Sparrow	48	357	Curvilinear	4.75 eggs	5.16 eggs	0.41 eggs	
Starling	48	77	Linear increase	4.46 eggs	4.94 eggs	0.48 eggs	

2. Table of significant trends in Brood size measured between 1967-2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Great Tit	48	877	Linear decline	7.41 chicks	6.14 chicks	-1.27 chicks	
Blue Tit	48	1058	Linear decline	8.3 chicks	7.35 chicks	-0.95 chicks	
Long-tailed Tit	48	37	Linear decline	6.42 chicks	5.78 chicks	-0.64 chicks	
Carrion Crow	48	78	Curvilinear	2.91 chicks	2.39 chicks	-0.52 chicks	Includes Hooded Crow
Grey Heron	48	90	Linear decline	2.85 chicks	2.39 chicks	-0.46 chicks	
Chiffchaff	48	50	Linear decline	5.08 chicks	4.69 chicks	-0.39 chicks	

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Yellow Wagtail	48	12	Linear decline	4.78 chicks	4.44 chicks	-0.34 chicks	Small sample
Magpie	48	79	Curvilinear	3.34 chicks	3 chicks	-0.34 chicks	
Greenfinch	48	104	Linear decline	4.1 chicks	3.76 chicks	-0.34 chicks	
House Sparrow	48	164	Linear decline	3.48 chicks	3.18 chicks	-0.3 chicks	
Coal Tit	48	73	Curvilinear	7.39 chicks	7.11 chicks	-0.28 chicks	
Great Crested Grebe	48	13	Curvilinear	2.24 chicks	1.97 chicks	-0.27 chicks	Small sample
Wood Warbler	48	41	Linear decline	5.55 chicks	5.28 chicks	-0.27 chicks	
Rook	48	74	Curvilinear	2.18 chicks	1.93 chicks	-0.25 chicks	
Meadow Pipit	48	86	Linear decline	4.01 chicks	3.79 chicks	-0.22 chicks	
Raven	48	73	Curvilinear	3.27 chicks	3.08 chicks	-0.19 chicks	
Hobby	48	28	Curvilinear	2.33 chicks	2.15 chicks	-0.18 chicks	Small sample
Pied Wagtail	48	138	Linear decline	4.49 chicks	4.35 chicks	-0.14 chicks	
Reed Bunting	48	62	Curvilinear	4.01 chicks	3.89 chicks	-0.12 chicks	
Great Spotted Woodpecker	48	24	Curvilinear	3.78 chicks	3.68 chicks	-0.1 chicks	Small sample
Woodpigeon	48	136	Curvilinear	1.8 chicks	1.74 chicks	-0.06 chicks	
Linnet	48	145	Curvilinear	4.09 chicks	4.06 chicks	-0.03 chicks	
Buzzard	48	115	Curvilinear	1.86 chicks	1.89 chicks	0.03 chicks	
Mute Swan	48	68	Curvilinear	4.39 chicks	4.42 chicks	0.03 chicks	
Dunnock	48	128	Curvilinear	3.4 chicks	3.43 chicks	0.03 chicks	
Yellowhammer	48	65	Curvilinear	2.97 chicks	3.01 chicks	0.04 chicks	
Collared Dove	48	74	Curvilinear	1.74 chicks	1.79 chicks	0.05 chicks	
Spotted Flycatcher	48	126	Curvilinear	3.63 chicks	3.68 chicks	0.05 chicks	
Stonechat	48	79	Curvilinear	4.62 chicks	4.68 chicks	0.06 chicks	
Grey Wagtail	48	82	Curvilinear	4.03 chicks	4.13 chicks	0.1 chicks	
Tree Pipit	48	31	Curvilinear	4.28 chicks	4.42 chicks	0.14 chicks	
Peregrine	48	56	Linear increase	2.4 chicks	2.56 chicks	0.16 chicks	
Skylark	48	65	Curvilinear	3.1 chicks	3.31 chicks	0.21 chicks	
Sparrowhawk	48	66	Curvilinear	3.17 chicks	3.4 chicks	0.23 chicks	
Corn Bunting	48	14	Curvilinear	3.3 chicks	3.55 chicks	0.25 chicks	Small sample
Willow Warbler	48	151	Linear increase	5.12 chicks	5.38 chicks	0.26 chicks	
Merlin	48	58	Linear increase	3.55 chicks	3.81 chicks	0.26 chicks	
Dipper	48	160	Curvilinear	3.43 chicks	3.74 chicks	0.31 chicks	
Tree Sparrow	48	468	Curvilinear	3.79 chicks	4.13 chicks	0.34 chicks	
Little Owl	48	53	Linear increase	2.52 chicks	2.89 chicks	0.37 chicks	
Redstart	48	98	Curvilinear	5.1 chicks	5.55 chicks	0.45 chicks	
Starling	48	238	Linear increase	3.25 chicks	3.71 chicks	0.46 chicks	
Jay	48	11	Linear increase	3.4 chicks	3.99 chicks	0.59 chicks	Small sample
Wren	48	130	Linear increase	3.75 chicks	4.52 chicks	0.77 chicks	
Nuthatch	48	86	Linear increase	4.92 chicks	5.8 chicks	0.88 chicks	

3. Table of significant trends in Daily failure rate (eggs) measured between 1967-2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Cuckoo	48	14	Linear decline	0.0694 nests/day	0.0263 nests/day	-0.0431 nests/day	Small sample
Woodlark	48	26	Curvilinear	0.0687 nests/day	0.0344 nests/day	-0.0343 nests/day	Small sample
Cirl Bunting	48	15	Curvilinear	0.0416 nests/day	0.0138 nests/day	-0.0278 nests/day	Small sample
Long-tailed Tit	48	64	Curvilinear	0.0391 nests/day	0.0121 nests/day	-0.027 nests/day	
Dipper	48	121	Curvilinear	0.0312 nests/day	0.0047 nests/day	-0.0265 nests/day	
Redshank	48	29	Curvilinear	0.0459 nests/day	0.0202 nests/day	-0.0257 nests/day	Small sample
Magpie	48	48	Linear decline	0.0272 nests/day	0.002 nests/day	-0.0252 nests/day	
Sand Martin	48	68	Curvilinear	0.0284 nests/day	0.0077 nests/day	-0.0207 nests/day	
Yellowhammer	48	62	Curvilinear	0.0513 nests/day	0.0313 nests/day	-0.02 nests/day	
Snipe	48	13	Linear decline	0.0319 nests/day	0.0127 nests/day	-0.0192 nests/day	Small sample
Wheatear	48	16	Linear decline	0.0215 nests/day	0.0044 nests/day	-0.0171 nests/day	Small sample
Carrion Crow	48	47	Curvilinear	0.0209 nests/day	0.0046 nests/day	-0.0163 nests/day	Includes Hooded Crow
Woodpigeon	48	110	Curvilinear	0.0461 nests/day	0.0299 nests/day	-0.0162 nests/day	
Stock Dove	48	125	Curvilinear	0.0189 nests/day	0.0065 nests/day	-0.0124 nests/day	
Pied Wagtail	48	91	Linear decline	0.018 nests/day	0.0067 nests/day	-0.0113 nests/day	
Robin	48	233	Curvilinear	0.0249 nests/day	0.0143 nests/day	-0.0106 nests/day	
Wood Warbler	48	26	Curvilinear	0.0239 nests/day	0.0143 nests/day	-0.0096 nests/day	Small sample

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Tawny Owl	48	68	Curvilinear	0.0121 nests/day	0.0025 nests/day	-0.0096 nests/day	Nocturnal species
Starling	48	123	Linear decline	0.0111 nests/day	0.0024 nests/day	-0.0087 nests/day	
Buzzard	48	30	Linear decline	0.0088 nests/day	0.0004 nests/day	-0.0084 nests/day	Small sample
Grey Wagtail	48	59	Linear decline	0.0176 nests/day	0.0095 nests/day	-0.0081 nests/day	
Barn Owl	48	35	Linear decline	0.0081 nests/day	0.0004 nests/day	-0.0077 nests/day	
Great Crested Grebe	48	23	Curvilinear	0.0272 nests/day	0.0195 nests/day	-0.0077 nests/day	Small sample
House Sparrow	48	121	Linear decline	0.011 nests/day	0.0036 nests/day	-0.0074 nests/day	
Redstart	48	84	Curvilinear	0.0157 nests/day	0.0086 nests/day	-0.0071 nests/day	
Nuthatch	48	65	Linear decline	0.009 nests/day	0.002 nests/day	-0.007 nests/day	
Kestrel	48	44	Curvilinear	0.008 nests/day	0.0011 nests/day	-0.0069 nests/day	
Tree Pipit	48	15	Curvilinear	0.0464 nests/day	0.0396 nests/day	-0.0068 nests/day	Small sample
Marsh Tit	48	21	Linear decline	0.0075 nests/day	0.001 nests/day	-0.0065 nests/day	Small sample
Jackdaw	48	77	Curvilinear	0.0088 nests/day	0.0029 nests/day	-0.0059 nests/day	
Merlin	48	23	Linear decline	0.0073 nests/day	0.0015 nests/day	-0.0058 nests/day	Small sample
Wren	48	143	Linear decline	0.0181 nests/day	0.0126 nests/day	-0.0055 nests/day	
Tree Sparrow	48	466	Linear decline	0.0082 nests/day	0.0032 nests/day	-0.005 nests/day	
Peregrine	48	26	Linear decline	0.0073 nests/day	0.0026 nests/day	-0.0047 nests/day	Small sample
Sparrowhawk	48	30	Linear decline	0.0044 nests/day	0.0006 nests/day	-0.0038 nests/day	
Treecreeper	48	23	Curvilinear	0.0244 nests/day	0.0208 nests/day	-0.0036 nests/day	Small sample
Great Tit	48	801	Curvilinear	0.006 nests/day	0.0026 nests/day	-0.0034 nests/day	
Pied Flycatcher	48	485	Curvilinear	0.0063 nests/day	0.0031 nests/day	-0.0032 nests/day	
Spotted Flycatcher	48	113	Curvilinear	0.0178 nests/day	0.0151 nests/day	-0.0027 nests/day	
Coal Tit	48	56	Linear decline	0.0043 nests/day	0.0018 nests/day	-0.0025 nests/day	
Raven	48	23	Curvilinear	0.0025 nests/day	0.0002 nests/day	-0.0023 nests/day	Small sample
Blue Tit	48	1006	Curvilinear	0.0045 nests/day	0.0025 nests/day	-0.002 nests/day	
Greenfinch	48	117	Curvilinear	0.0274 nests/day	0.026 nests/day	-0.0014 nests/day	
Chiffchaff	48	55	Curvilinear	0.022 nests/day	0.0212 nests/day	-0.0008 nests/day	
Collared Dove	48	62	Curvilinear	0.0323 nests/day	0.0319 nests/day	-0.0004 nests/day	
Dunnock	48	162	Curvilinear	0.0259 nests/day	0.0264 nests/day	0.0005 nests/day	
Grey Heron	48	17	Curvilinear	0.0001 nests/day	0.0008 nests/day	0.0007 nests/day	Small sample
Curlew	48	21	Curvilinear	0.0284 nests/day	0.0302 nests/day	0.0018 nests/day	Small sample
Reed Warbler	48	214	Curvilinear	0.0186 nests/day	0.0204 nests/day	0.0018 nests/day	
Sedge Warbler	48	40	Curvilinear	0.0154 nests/day	0.0203 nests/day	0.0049 nests/day	
Linnet	48	176	Linear increase	0.0184 nests/day	0.0238 nests/day	0.0054 nests/day	
Meadow Pipit	48	53	Curvilinear	0.0218 nests/day	0.0287 nests/day	0.0069 nests/day	
Little Grebe	48	14	Curvilinear	0.0355 nests/day	0.0428 nests/day	0.0073 nests/day	Small sample
Whitethroat	48	45	Curvilinear	0.0103 nests/day	0.0178 nests/day	0.0075 nests/day	
Garden Warbler	48	24	Curvilinear	0.018 nests/day	0.0272 nests/day	0.0092 nests/day	Small sample
Goldfinch	48	40	Linear increase	0.0191 nests/day	0.0283 nests/day	0.0092 nests/day	
Willow Warbler	48	69	Linear increase	0.009 nests/day	0.0192 nests/day	0.0102 nests/day	
Ringed Plover	48	128	Linear increase	0.022 nests/day	0.034 nests/day	0.012 nests/day	
Moorhen	48	139	Linear increase	0.0107 nests/day	0.0235 nests/day	0.0128 nests/day	
Lapwing	48	208	Curvilinear	0.0163 nests/day	0.0291 nests/day	0.0128 nests/day	
Skylark	48	44	Curvilinear	0.0377 nests/day	0.0506 nests/day	0.0129 nests/day	
Chaffinch	48	187	Curvilinear	0.0298 nests/day	0.0437 nests/day	0.0139 nests/day	
Nightjar	48	26	Linear increase	0.0162 nests/day	0.0308 nests/day	0.0146 nests/day	Small sample
Blackbird	48	334	Curvilinear	0.0252 nests/day	0.0398 nests/day	0.0146 nests/day	
Reed Bunting	48	52	Linear increase	0.0076 nests/day	0.0258 nests/day	0.0182 nests/day	
Oystercatcher	48	174	Linear increase	0.0122 nests/day	0.0329 nests/day	0.0207 nests/day	
Whinchat	48	20	Linear increase	0.0058 nests/day	0.0315 nests/day	0.0257 nests/day	Small sample

4. Table of significant trends in Daily failure rate (chicks) measured between 1967-2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Sand Martin	48	96	Curvilinear	0.0271 nests/day	0.0011 nests/day	-0.026 nests/day	
Magpie	48	46	Curvilinear	0.0221 nests/day	0.0029 nests/day	-0.0192 nests/day	
Skylark	48	53	Linear decline	0.0477 nests/day	0.0303 nests/day	-0.0174 nests/day	
Grey Wagtail	48	58	Linear decline	0.0217 nests/day	0.0073 nests/day	-0.0144 nests/day	
Reed Warbler	48	165	Curvilinear	0.0217 nests/day	0.0084 nests/day	-0.0133 nests/day	
Jackdaw	48	69	Curvilinear	0.014 nests/day	0.0035 nests/day	-0.0105 nests/day	
Yellowhammer	48	50	Linear decline	0.0382 nests/day	0.028 nests/day	-0.0102 nests/day	

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Blackbird	48	271	Linear decline	0.0281 nests/day	0.0195 nests/day	-0.0086 nests/day	
Meadow Pipit	48	75	Curvilinear	0.0343 nests/day	0.0259 nests/day	-0.0084 nests/day	
Tree Sparrow	48	324	Linear decline	0.0141 nests/day	0.0058 nests/day	-0.0083 nests/day	
Merlin	48	29	Linear decline	0.0099 nests/day	0.0018 nests/day	-0.0081 nests/day	Small sample
Corn Bunting	48	15	Curvilinear	0.0513 nests/day	0.0432 nests/day	-0.0081 nests/day	Small sample
Redstart	48	61	Linear decline	0.0115 nests/day	0.0036 nests/day	-0.0079 nests/day	
House Sparrow	48	121	Curvilinear	0.0161 nests/day	0.0085 nests/day	-0.0076 nests/day	
Carrion Crow	48	40	Linear decline	0.007 nests/day	0.0011 nests/day	-0.0059 nests/day	Includes Hooded Crow
Collared Dove	48	55	Curvilinear	0.0222 nests/day	0.018 nests/day	-0.0042 nests/day	
Barn Owl	48	164	Curvilinear	0.0034 nests/day	0.0003 nests/day	-0.0031 nests/day	
Starling	48	138	Curvilinear	0.0069 nests/day	0.0039 nests/day	-0.003 nests/day	
Tawny Owl	48	106	Curvilinear	0.0035 nests/day	0.0008 nests/day	-0.0027 nests/day	Nocturnal species
Nuthatch	48	71	Linear decline	0.0043 nests/day	0.0021 nests/day	-0.0022 nests/day	
Woodpigeon	48	88	Curvilinear	0.0219 nests/day	0.0223 nests/day	0.0004 nests/day	
Stonechat	48	73	Curvilinear	0.0175 nests/day	0.0186 nests/day	0.0011 nests/day	
Swallow	48	557	Linear increase	0.0032 nests/day	0.0043 nests/day	0.0011 nests/day	
Cuckoo	48	16	Curvilinear	0.0263 nests/day	0.0275 nests/day	0.0012 nests/day	Small sample
Spotted Flycatcher	48	102	Curvilinear	0.0086 nests/day	0.01 nests/day	0.0014 nests/day	
Whinchat	48	32	Curvilinear	0.0253 nests/day	0.027 nests/day	0.0017 nests/day	
Treecreeper	48	22	Curvilinear	0.015 nests/day	0.0168 nests/day	0.0018 nests/day	Small sample
Moorhen	48	51	Linear increase	0.0003 nests/day	0.0026 nests/day	0.0023 nests/day	
Pied Flycatcher	48	404	Curvilinear	0.0029 nests/day	0.0058 nests/day	0.0029 nests/day	
Chaffinch	48	127	Curvilinear	0.0299 nests/day	0.0328 nests/day	0.0029 nests/day	
Wren	48	98	Linear increase	0.0074 nests/day	0.0106 nests/day	0.0032 nests/day	
Nightjar	48	24	Curvilinear	0.0018 nests/day	0.0085 nests/day	0.0067 nests/day	Small sample
Linnet	48	126	Linear increase	0.0153 nests/day	0.0231 nests/day	0.0078 nests/day	
Long-tailed Tit	48	43	Linear increase	0.0076 nests/day	0.0208 nests/day	0.0132 nests/day	
Turtle Dove	48	11	Curvilinear	0.0215 nests/day	0.0349 nests/day	0.0134 nests/day	Small sample
Garden Warbler	48	20	Linear increase	0.0113 nests/day	0.0264 nests/day	0.0151 nests/day	Small sample
Wood Warbler	48	33	Curvilinear	0.0236 nests/day	0.0452 nests/day	0.0216 nests/day	
Cirl Bunting	48	21	Curvilinear	0.0607 nests/day	0.1101 nests/day	0.0494 nests/day	Small sample

Discussion

In this discussion we:

1. Review the latest population change measures and alerts for species that are on the Birds of Conservation Concern (BoCC4) red or amber lists for the UK for reasons of population decline (Eaton *et al.* 2015) (*here*).
2. Identify species not on the BoCC4 lists but which raise alerts on account of long-term declines and, conversely, currently listed species where recovery may be sufficient to downgrade their listing status in the future (*here*).
3. Briefly review declines along waterways and in scrub and wetland habitats as shown by the WBS/WBBS and CES schemes (*here*).
4. Review trends over the last 10 years in species that have shown long-term declines, to identify the extent of ongoing declines and check for any evidence of recovery (*here*).
5. Identify those species that have shown rapid long-term population increases (*here*).
6. Discuss patterns of changes in breeding performance and relationships between trends in abundance and breeding performance (*here*).
7. Summarise the overall patterns found (*here*).

Except where otherwise indicated, our discussion is based on the best long-term trend that is available for each species. This is usually a joint CBC/BBS UK trend or, if this trend could not be constructed because CBC and BBS trends were different during the period of overlap of the two schemes, a CBC/BBS England trend (see Key to species texts). A WBS/WBBS trend replaces these for certain waterway species.

Details of estimating and comparing trends are given in the Methods section. Full details of all trends available for each species are given on the Species pages. Summary tables of all alerts raised by each scheme are presented in the Summary tables.

Of course, a number of species included in the BoCC4 red and amber lists are not covered by this report, and not every species listed red or amber is in UK population decline. Thus our tables relating to birds listed red or amber do not include every species on these lists.

Latest long-term alerts

A standardised system for setting 'alerts' in this report has been agreed between the providers and users of population monitoring information in the UK. Alerts are raised by population declines of 25–50% and of >50% over short, medium and longer terms (five years, ten years and 25+ years respectively) and noted in the 'Alert' column in the population change and demography tables. These help to highlight the scale and timing of declines, and act as an aid to interpreting the trend graphs presented.

These alerts are important for conservation practitioners who need to set priorities for conservation action, but we hope that they will also interest readers of the report more generally. Similar Alerts for wetland birds are provided by the Wetland Bird Survey (Cook *et al.* 2013).

Our main emphasis in this section is on long-term declines measured over the longest period available (usually 48 years) and over 25 years, which is one of the periods used to determine 'Birds of Conservation Concern' red and amber listing for the UK (Eaton *et al.* 2015).

Alerts triggered over the short term should be considered as early warnings, indicating that conservation issues may be developing for the species concerned. Some short-term declines might stem, however, from normal fluctuations in abundance, from which the population is able to recover without assistance. The steep decline of a suite of species of similar ecology should be considered as a stronger indication that potential problems may be developing. Details of the methodology used to raise alerts are given in the Methods section.

Where this section discusses red-listed or amber-listed species, it uses the current version of these lists, introduced in December 2015 and abbreviated as BoCC4. The full paper (Eaton *et al.* 2015) details the criteria by which each listed species qualifies for its red or amber status and these criteria are also summarised on our species pages under 'Conservation listings' (see Key to species texts). Our tables here of red and amber species include only those that met the criteria (red or amber, respectively) for UK breeding population decline.

Long-term trends of 'Birds of Conservation Concern' red-listed species

The species considered in this section are red listed under BoCC4 wholly or partly because of severe UK population declines revealed by annual census data, amounting to more than 50% over the 25-year period 1987–2012, the 45-year period 1967–2012, or both. The latest long-term population changes and alerts for these severely declining species are shown in Table A1, over the maximum period available (usually the 48 years 1967–2015) and over 25 years (1990–2015). This table thus updates the figures that were used to produce the new BoCC4 red list, by three years.

The 24 species in Table A1 are listed in descending order of their longest-term percentage change.Turtle Dove remains the species with the strongest long-term UK decline (-98%). Tree Sparrow, which headed this table recently, has shown significant increases in numbers since 1995 and is now in second place, albeit still with a decline of 96% since 1967. The figures for Lesser Spotted Woodpecker are likely to be a very large underestimate of the current population change, because the species had by 1999 become too rare for further annual monitoring. Were recent data available, this species might easily surpass Turtle Dove and Tree Sparrow in the strength of its decline. Similarly, there is strong evidence that the decline for Woodcock has continued since it was last included in CBC/BBS monitoring.

Table A1 Latest trends for red-listed species

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	48	CBC/BBS UK	-98	-99	-97	>50	
Turtle Dove	25	CBC/BBS UK	-95	-97	-94	>50	
Tree Sparrow	48	CBC/BBS England	-96	-98	-91	>50	
Tree Sparrow	25	CBC/BBS England	-33	-67	4		
Grey Partridge	48	CBC/BBS UK	-92	-94	-88	>50	
Grey Partridge	25	CBC/BBS UK	-71	-77	-63	>50	
Nightingale	48	CBC/BBS England	-92	-97	-62	>50	
Nightingale	25	CBC/BBS England	-62	-75	-38	>50	
Willow Tit	48	CBC/BBS UK	-91	-96	-82	>50	
Willow Tit	25	CBC/BBS UK	-88	-93	-82	>50	
Starling	48	CBC/BBS England	-89	-92	-85	>50	
Starling	25	CBC/BBS England	-74	-78	-70	>50	
Spotted Flycatcher	48	CBC/BBS UK	-87	-91	-81	>50	
Spotted Flycatcher	25	CBC/BBS UK	-63	-74	-54	>50	
Corn Bunting	48	CBC/BBS UK	-87	-94	-76	>50	
Corn Bunting	25	CBC/BBS UK	-51	-69	-28	>50	
Tree Pipit	48	CBC/BBS England	-86	-93	-73	>50	
Tree Pipit	25	CBC/BBS England	-76	-86	-62	>50	
Lesser Redpoll	48	CBC/BBS England	-85	-95	-68	>50	
Lesser Redpoll	25	CBC/BBS England	-77	-92	-57	>50	
Marsh Tit	48	CBC/BBS UK	-79	-85	-70	>50	
Marsh Tit	25	CBC/BBS UK	-49	-57	-36	>25	

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Cuckoo	48	CBC/BBS England	-76	-82	-66	>50	
Cuckoo	25	CBC/BBS England	-70	-74	-66	>50	
Woodcock	31	CBC to 1999	-74	-88	-49	>50	Small sample
Woodcock	25	CBC to 1999	-76	-88	-51	>50	Small sample
Yellow Wagtail	48	CBC/BBS UK	-72	-86	-38	>50	
Yellow Wagtail	25	CBC/BBS UK	-59	-71	-44	>50	
House Sparrow	38	CBC/BBS England	-71	-80	-62	>50	
House Sparrow	25	CBC/BBS England	-35	-51	-22	>25	
Linnet	48	CBC/BBS England	-71	-79	-63	>50	
Linnet	25	CBC/BBS England	-9	-24	8		
Skylark	48	CBC/BBS England	-63	-69	-55	>50	
Skylark	25	CBC/BBS England	-28	-36	-21	>25	
Lesser Spotted Woodpecker	31	CBC to 1999	-60	-81	40		Small sample
Lesser Spotted Woodpecker	25	CBC to 1999	-73	-86	-31	>50	Small sample
Yellowhammer	48	CBC/BBS UK	-56	-66	-46	>50	
Yellowhammer	25	CBC/BBS UK	-39	-46	-34	>25	
Mistle Thrush	48	CBC/BBS UK	-55	-62	-45	>50	
Mistle Thrush	25	CBC/BBS UK	-37	-43	-28	>25	
Lapwing	48	CBC/BBS UK	-54	-74	-32	>50	
Lapwing	25	CBC/BBS UK	-45	-56	-30	>25	
Song Thrush	48	CBC/BBS UK	-50	-57	-40	>50	
Song Thrush	25	CBC/BBS UK	13	5	23		
Grey Wagtail	40	WBS/WBBS waterways	-39	-53	-22	>25	
Grey Wagtail	25	WBS/WBBS waterways	-7	-24	11		
Curlew	48	CBC/BBS England	-38	-78	21		
Curlew	25	CBC/BBS England	-21	-42	0		

For Grey Wagtail, the population has increased in each of the last five years, so the 40-year decline is now less than 50%, prompting a lower level alert; and the 25-year decline is now less than 25% so no longer triggers an alert. This species was moved from the amber to the red list under BoCC4. Based on current figures it could potentially be changed back to amber when the list is next reviewed as the population continues to fluctuate following a large decline in the 1970s.

For nine other species – Tree Sparrow, Marsh Tit, House Sparrow, Linnet, Skylark, Yellowhammer, Mistle Thrush, Lapwing and Song Thrush – the 25-year change is now less than 50%, indicating that, while these species meet red-list criteria for long-term change, their rate of decline in more recent years has been slower than for most other red-listed birds, although their populations are still at a much lower level than in the 1960s. For Linnet and Grey Wagtail, the 25-year trend is effectively stable, and Song Thrush numbers have increased slightly. Though Curlew is red listed for its UK breeding population decline, its long-term CBC/BBS trends do not currently meet the >50% criterion (due to wide uncertainty in the trend estimate as a result of a small sample size); the key information for red listing comes from other surveys.

Long-term trends of declining amber-listed species

There are 25 amber-listed species under BoCC4 that are included in this report, of which about half (13 species) are listed because of UK population declines over the periods 1990–2015 or 1967–2015. Long-term trends are available from annual census data for 12 of these species (all except Swift); their trends are listed in Table A2 in descending order of longest-term percentage change (normally over the 48 years 1967–2015). A 25-year change (1990–2015) is also shown.

Table A2 Latest trends for declining amber-listed species

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
House Martin	48	CBC/BBS England	-69	-92	-2	>50	
House Martin	25	CBC/BBS England	-41	-68	-12	>25	
Willow Warbler	48	CBC/BBS England	-66	-75	-54	>50	
Willow Warbler	25	CBC/BBS England	-54	-62	-48	>50	
Redshank	40	WBS/WBBS waterways	-65	-89	-36	>50	
Redshank	25	WBS/WBBS waterways	-65	-80	-43	>50	
Common Sandpiper	40	WBS/WBBS waterways	-46	-57	-34	>25	

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Common Sandpiper	25	WBS/WBBS waterways	-44	-53	-32	>25	
Meadow Pipit	48	CBC/BBS England	-45	-75	-23	>25	
Meadow Pipit	25	CBC/BBS England	-34	-51	-16	>25	
Bullfinch	48	CBC/BBS UK	-37	-50	-23	>25	
Bullfinch	25	CBC/BBS UK	15	2	28		
Dunnock	48	CBC/BBS UK	-33	-43	-23	>25	
Dunnock	25	CBC/BBS UK	18	9	28		
Dipper	40	WBS/WBBS waterways	-22	-41	7		
Dipper	25	WBS/WBBS waterways	-10	-25	10		
Tawny Owl	48	CBC/BBS UK	-21	-49	16		
Tawny Owl	25	CBC/BBS UK	-30	-46	-12	>25	
Kestrel	48	CBC/BBS England	-18	-43	17		
Kestrel	25	CBC/BBS England	-25	-33	-13		
Reed Bunting	48	CBC/BBS UK	-17	-39	9		
Reed Bunting	25	CBC/BBS UK	8	-6	36		
Shelduck	31	CBC to 1999	300	94	787		Small sample
Shelduck	25	CBC to 1999	12	-40	118		

Three amber-listed species raise high alerts, having shown significant declines of greater than 50%, and so potentially are red-list candidates:

- The English House Martin population shows a statistically significant long-term decline of more than 50%. The species is still therefore a potential candidate for red listing, although BBS data indicate little change since 1995 in the UK as a whole as a result of increases in Scotland and Northern Ireland.
- English Willow Warblers clearly meet the red-list criterion for population decline, but there has been little change in Wales and the overall change in Scotland and Northern Ireland since 1995 has been upward.
- Redshank has declined steeply in lowland Britain, according to waterways surveys, raising high alerts; a major decline is also documented for its breeding sites on saltmarsh, and BBS data show that declines have occurred recently across a wide range of habitats. BBS declines do not yet meet the red-list criterion, however.

Five other species raise only the lower level of alert. Common Sandpiper and Meadow Pipit meet the 25% criterion (equivalent to amber listing) in both periods. Populations of Bullfinch and Dunnock have been recovering and show stable or increasing trends over the shorter, 25-year period. Tawny Owl raises a new alert in this report over the 25-year period but does not do so over the longer 48-year period. Though amber listed for population decline, Dipper, Reed Bunting, Kestrel and Shelduck do not formally raise alerts on the present data (in the case of Dipper this is a change from last year's report which raised a lower level alert).

Long-term declines of species that are not currently red or amber listed (for declines)

This section of the report draws attention to declines which currently surpass red or amber criteria but which were not recognised in the BoCC4 listings (Table A3). These species may be candidates for conservation listing (for declines) at the next review.

Table A3 Long-term trends for declining species not on the red or amber list (for declines)

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Snipe	40	WBS/WBBS waterways	-89	-98	-65	>50	Small sample
Snipe	25	WBS/WBBS waterways	-81	-96	-56	>50	Small sample
Little Owl	48	CBC/BBS UK	-71	-82	-53	>50	
Little Owl	25	CBC/BBS UK	-61	-70	-50	>50	
Whitethroat	48	CBC/BBS UK	-59	-70	-43	>50	
Little Grebe	40	WBS/WBBS waterways	-58	-82	-11	>50	
Little Grebe	25	WBS/WBBS waterways	-42	-65	-6	>25	
Greenfinch	48	CBC/BBS UK	-48	-58	-33	>25	
Greenfinch	25	CBC/BBS UK	-41	-47	-33	>25	
Sedge Warbler	48	CBC/BBS UK	-35	-64	-5	>25	
Sand Martin	25	WBS/WBBS waterways	-34	-58	12		
Red-legged Partridge	48	CBC/BBS UK	-30	-56	11		
Garden Warbler	48	CBC/BBS UK	-26	-51	12		
Oystercatcher	25	WBS/WBBS waterways	-25	-44	15		

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment

The WBS/WBBS trend for Snipe is based now on a very small sample of plots, the species having deserted so many of its former riverside haunts. It is currently amber-listed solely because its UK breeding range has contracted sharply, especially in lowland England, and not for UK population decline. BBS data indeed do not show any decline at the UK scale over the longest period covered by this survey (20 years); however, numbers have dropped in the UK during the most recent 10-year period.

Little Owl meets red-list criteria for population decline but, as a species introduced to the UK, is not eligible for any conservation listing. Whereas WBS/WBBS indicates a strong decline for Little Grebe over both long-term timescales, small waterbodies are not well-covered by BBS and relative stability on BBS squares casts doubt upon the true nature of this species' population trend. Whitethroat also raises a high alert over the long term, but the species is currently in recovery from its sudden losses in the late 1960s and therefore does not warrant a conservation listing.

Stanbury *et al.* 2017) Potential WBS/WBBS declines of >25% have occurred for Garden Warbler over 48-years, and for Sand Martin and Oystercatcher over the 25-year period, but these estimates have wide confidence intervals and are not statistically significant, so do not formally raise an alert, although declines have been seen in many migratory birds. The apparent decline of Red-legged Partridge is also not statistically significant, and is of no conservation concern because the species is not native to the UK.

Declines along linear waterways

The Waterways Bird Survey and Waterways Breeding Bird Survey supplement the results from CBC and BBS, which include all habitat types, by measuring trends in bird populations alongside rivers and canals. Joint WBS/WBBS trends allow trend assessments to be continuous since 1974 for up to 25 species that were covered by WBS. WBBS, ongoing since 1998, includes all bird species but trends are presented here only for waterway-specialist species, for which joint WBS/WBBS trends are available.

For 13 species that are abundant in waterway habitats, WBS/WBBS provides the headline population trend for this report, generally because sample sizes exceed those from CBC/BBS. These species include one that is red-listed (Grey Wagtail), seven amber-listed species (Greylag Goose, Oystercatcher, Common Sandpiper, Redshank, Snipe, Kingfisher and Dipper) and four green-listed species Tufted Duck, Goosander, Little Grebe and Sand Martin), along with Canada Goose, which, as a non-native species in the UK, is excluded from the BoCC4 listings.

For five of the WBS/WBBS headline species that are in decline, latest trends appear also in Tables A1, A2 or A3, as appropriate Dipper also appears in Table A2 as it is amber-listed as a result of declines, but does not currently raise an alert. Two other species appear in Table A3 as a result of potential declines (of >25%, but not statistically significant). Even where WBS/WBBS is not the headline trend for a species, however, the waterways data provide valuable supplementary information from this sensitive habitat.

Table A4 lists all statistically significant declines of greater than 25% recorded from the full period of waterway monitoring (nominally 40 years, 1975–2015).

Table A4 Population declines of greater than 25% recorded by the joint Waterways Bird Survey/Waterways Breeding Bird Survey (WBS/WBBS) between 1975 and 2015

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	40	WBS/WBBS waterways	-97	-99	-95	>50	
Snipe	40	WBS/WBBS waterways	-89	-98	-65	>50	Small sample
Redshank	40	WBS/WBBS waterways	-65	-89	-36	>50	
Reed Bunting	40	WBS/WBBS waterways	-63	-74	-48	>50	
Pied Wagtail	40	WBS/WBBS waterways	-61	-71	-54	>50	
Little Grebe	40	WBS/WBBS waterways	-58	-82	-11	>50	
Sedge Warbler	40	WBS/WBBS waterways	-54	-68	-36	>50	
Lapwing	35	WBS/WBBS waterways	-52	-75	-20	>50	
Common Sandpiper	40	WBS/WBBS waterways	-46	-57	-34	>25	
Grey Wagtail	40	WBS/WBBS waterways	-39	-53	-22	>25	
Moorhen	40	WBS/WBBS waterways	-32	-50	-13	>25	

Six species are included here for which the WBS/WBBS trend is not the headline one and so is not listed in Tables A1–A3. These species are discussed briefly below. The trends for Yellow Wagtail and Sedge Warbler are consistent in direction with the 48-year trends reported from CBC/BBS, but the declines on waterways have been more severe. The CBC/BBS trend for Reed Bunting is not statistically significant, but shows a substantial increase in the first eight years until the mid-1970s followed by a substantial decline in the late 1970s and early 1980s, and therefore would be consistent with WBS/WBBS if both trends had started in 1975. The Pied Wagtail declines along waterways are particularly intriguing because they contrast markedly with the fluctuating but generally upward trend, in more terrestrial habitats, as measured by CBC/BBS.

In the early 1980s, population increases for Lapwing reported by WBS/WBBS contrasted sharply with decline on CBC/BBS sites but long-term trends from both schemes show there has been a steep decline. It is possible that the initial WBS/WBBS increases may have been caused by redistribution of breeding birds into wetland areas during the early stages of the decline. Moorhen numbers have dipped sharply by all measures over the last ten years, perhaps through extra mortality in cold winters, and its long-term WBS/WBBS change has tipped over the alert threshold.

Alerts raised by WBS/WBBS, and long-term increases detected by that index, are tabulated in WBS/WBBS alerts and population increases. A full set of this year's WBS/WBBS trends can be obtained from the Table generator.

Declines on CES plots

The Constant Effort Sites Scheme provides trends from standardised ringing in scrub and wetland habitats. It is possibly our best scheme for monitoring some bird populations inhabiting reed beds, but its main objective is to collect integrated data on relative abundance, productivity and survival for a suite of species. The longest trends currently available from the CES cover a period of 31 years (Table A5).

Table A5 Population declines of greater than 25% recorded by the Constant Effort Sites scheme between 1984 and 2015

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Willow Warbler	31	CES adults	-74	-80	-68	>50	
Willow Warbler	25	CES adults	-70	-75	-65	>50	
Lesser Whitethroat	31	CES adults	-67	-84	-47	>50	
Lesser Whitethroat	25	CES adults	-73	-83	-62	>50	
Willow Tit	31	CES adults	-61	-87	-22	>50	Small sample
Willow Tit	25	CES adults	-60	-87	-19	>50	Small sample
Reed Bunting	31	CES adults	-60	-71	-48	>50	
Reed Bunting	25	CES adults	-50	-65	-34	>25	
Greenfinch	25	CES adults	-50	-69	-12	>50	
Whitethroat	31	CES adults	-48	-65	-31	>25	
Whitethroat	25	CES adults	-45	-61	-28	>25	
Sedge Warbler	31	CES adults	-47	-64	-28	>25	
Sedge Warbler	25	CES adults	-57	-66	-48	>50	
Chaffinch	25	CES adults	-31	-53	-4	>25	

Most of the species that are declining on CES sites show broadly similar trends to those from CBC/BBS or WBS/WBBS data.Willow Tit is red listed on the strength of its long-term CBC/BBS declines (Table A1). Willow Warbler and Reed Bunting are similarly amber listed (Table A2).Greenfinch and Sedge Warbler are currently green listed but the long-term population trends now show a decline of >25% (Table A3).

For reasons unknown, CES trends for Whitethroat, Reed Bunting and especially Lesser Whitethroat are considerably more negative than those from census data over similar periods.

Chaffinch also raises a CES alert following several years of population decline. Recent BBS data also show a sharp decline but as this followed longer-term increases it has not yet triggered any BBS alerts.

A full set of alerts raised by CES and long-term increases are tabulated in CES alerts and population increases.

Ten-year trends and evidence of species recovery

If the status of species that have shown long-term declines were now improving, we would expect to find trends to be more positive in recent years than in the earlier part of the time series. To examine this, we list in Table B1 the best change estimates over the most recent ten-year period for which we have data (2005–15 in all but three cases), for all of the declining species listed in Tables A1–A3 (previous section). For Lesser Spotted Woodpecker, Woodcock and Shelduck, the ten-year period for which data are tabulated is 1989–99.

Table B1 also includes four further species that are listed red or amber in BoCC4 because of recent breeding decline, and for which we can report ten-year trends, but which lacked annual monitoring data before 1994. These are Whinchat, Grasshopper Warbler and Wood Warbler (all red listed), and Swift (amber listed).

Table B1 Ten-year trends for species that have shown long-term declines

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Turtle Dove	10	CBC/BBS UK	-88	-91	-84	>50	
Greenfinch	10	CBC/BBS UK	-59	-61	-57	>50	
Lesser Spotted Woodpecker	10	CBC to 1999	-51	-75	-22	>50	Small sample
Willow Tit	10	CBC/BBS UK	-50	-62	-36	>50	
Little Owl	10	CBC/BBS UK	-45	-53	-36	>25	
Cuckoo	10	CBC/BBS England	-40	-44	-34	>25	
Woodcock	10	CBC to 1999	-40	-62	-11	>25	Small sample
Starling	10	CBC/BBS England	-38	-41	-33	>25	
Swift	10	BBS UK	-38	-42	-33	>25	
Grey Partridge	10	CBC/BBS UK	-37	-44	-26	>25	
Marsh Tit	10	CBC/BBS UK	-36	-45	-26	>25	
Lapwing	10	CBC/BBS UK	-35	-42	-28	>25	
Redshank	10	WBS/WBBS waterways	-35	-57	-8	>25	
House Martin	10	CBC/BBS England	-33	-38	-28	>25	
Little Grebe	10	WBS/WBBS waterways	-28	-46	2		
Kestrel	10	CBC/BBS England	-27	-31	-21	>25	
Oystercatcher	10	WBS/WBBS waterways	-26	-33	-17	>25	
Mistle Thrush	10	CBC/BBS UK	-24	-28	-20		
Whinchat	10	BBS UK	-22	-39	-5		
Common Sandpiper	10	WBS/WBBS waterways	-21	-30	-10		
Tree Pipit	10	CBC/BBS England	-19	-36	2		
Grey Wagtail	10	WBS/WBBS waterways	-18	-29	-7		
Grasshopper Warbler	10	BBS UK	-16	-37	6		
Red-legged Partridge	10	CBC/BBS UK	-16	-21	-10		
Willow Warbler	10	CBC/BBS England	-15	-21	-8		
Curlew	10	CBC/BBS England	-14	-20	-7		
Sedge Warbler	10	CBC/BBS UK	-13	-23	-2		
Snipe	10	WBS/WBBS waterways	-13	-47	22		
Tawny Owl	10	CBC/BBS UK	-13	-29	10		
Nightingale	10	CBC/BBS England	-12	-37	25		
Skylark	10	CBC/BBS England	-11	-15	-8		
Spotted Flycatcher	10	CBC/BBS UK	-9	-25	9		
Wood Warbler	10	BBS UK	-8	-40	36		
Corn Bunting	10	CBC/BBS UK	-7	-21	13		
Garden Warbler	10	CBC/BBS UK	-5	-14	5		
House Sparrow	10	CBC/BBS England	-4	-8	0		
Yellowhammer	10	CBC/BBS UK	-4	-8	0		
Song Thrush	10	CBC/BBS UK	-1	-4	3		
Meadow Pipit	10	CBC/BBS England	0	-8	7		

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Yellow Wagtail	10	CBC/BBS UK	0	-15	18		
Dipper	10	WBS/WBBS waterways	1	-10	13		
Dunnock	10	CBC/BBS UK	3	0	6		
Shelduck	10	CBC to 1999	3	-21	40		
Linnet	10	CBC/BBS England	5	-1	11		
Reed Bunting	10	CBC/BBS UK	8	0	17		
Sand Martin	10	WBS/WBBS waterways	12	-17	42		
Whitethroat	10	CBC/BBS UK	14	10	22		
Bullfinch	10	CBC/BBS UK	21	13	30		
Tree Sparrow	10	CBC/BBS England	41	15	68		
Lesser Redpoll	10	CBC/BBS England	47	5	89		

Species are listed in ascending order of population change. Thus the species with the steepest recent decline appear first. Towards the foot of the table are species that remain in long-term decline but have shown partial recovery of those losses during the recent ten-year period.

As indicated by their position at the top of Table B1, there is high confidence that the populations of Turtle Dove, Greenfinch and Willow Tit have halved within just the last ten years, or even a shorter period. These are the only species in long-term decline that suffered a 50% fall during 2005–15 (but Lesser Spotted Woodpecker also met these criteria during the most recent ten-year period for which data are available). A further 12 species also raise alerts, having declined significantly by more than 25% (but less than 50%) in their most recent ten-year period. All these declines compound earlier losses for these species.

The ongoing declines of so many of the species listed in Table B1 raises serious conservation concern. A special case is Turtle Dove, for which the current rate of decline is not only very steep but also accelerating (88%, from 86% in last year's report, 84% in the 2015 report and 80% in the 2014 report).

The 25% threshold, which is used to define decreases over the 25-year period that are worthy of amber listing, is equivalent to a change of 10.9% over ten years, assuming a constant rate of change. Thus a decrease of 11% or greater listed in Table B1 indicates that these species (31 in all, including non-significant declines for Little Grebe, Tree Pipit, Grasshopper Warbler, Snipe, Tawny Owl and Nightingale) are on course for new or renewed red or amber listing for breeding population decline.

A smaller decrease, or an increase, indicates that the population decline may be easing off. Species that have declined in the longer term but with losses smaller than 11%, or with no significant population change, over the ten-year period are Spotted Flycatcher, Wood Warbler, Corn Bunting, Garden Warbler, House Sparrow, Yellowhammer, Song Thrush, Meadow Pipit, Yellow Wagtail, Dipper, Shelduck, Linnet, and Sand Martin.

Six species at the foot of the table show significant gains in population over the last ten years. The strong increase in Lesser Redpoll and Tree Sparrow numbers is very welcome but the upturns are coming from such a low level that numbers remain far below those of the mid 1970s, with the population trend graphs still showing little sign of clear recovery. Whitethroat numbers have increased steadily since the mid 1980s but again are still far below the level prior to their population crash in 1968/69. Bullfinch, Reed Bunting and Dunnock remain on the amber list, because their recent increases also represent only a small recovery from earlier losses.

Increasing species

Population changes of species for which our best long-term trend estimate from CBC/BBS (usually over 48 years) or from WBS/WBBS (a maximum of 40 years) shows an increase of more than 50% are shown in Table C1. There are 29 species listed, one more than in *BirdTrends 2016*; the increase for Coal Tit is now below the 50% cut-off, but the increases for Goldcrest and Robin are now both just above the cut-off. Twenty-two of the species have more than doubled their population size over the periods in which they have been monitored (22–48 years).

Table C1 Long-term population increases of greater than 50% from CBC/BBS (1967-2015) or WBS/WBBS (1975-2015), using the best survey for each species

Species	Period (yrs)	Source	Change (%)	Lower limit	Upper limit	Alert	Comment
Buzzard	48	CBC/BBS England	792	477	1892		
Greylag Goose	22	WBS/WBBS waterways	512	166	1297		
Great Spotted Woodpecker	48	CBC/BBS UK	387	235	708		
Collared Dove	43	CBC/BBS UK	311	168	500		
Shelduck	31	CBC to 1999	300	94	787		Small sample
Blackcap	48	CBC/BBS UK	291	215	387		
Nuthatch	48	CBC/BBS UK	254	162	393		
Mute Swan	48	CBC/BBS UK	246	55	679		
Stock Dove	48	CBC/BBS England	212	111	347		
Green Woodpecker	48	CBC/BBS England	182	110	296		
Mallard	48	CBC/BBS UK	169	105	246		
Woodpigeon	48	CBC/BBS UK	160	36	462		
Canada Goose	34	WBS/WBBS waterways	159	42	560		
Coot	48	CBC/BBS UK	159	67	544		
Carrion Crow	48	CBC/BBS England	134	94	193		
Jackdaw	48	CBC/BBS UK	131	51	269		
Goosander	34	WBS/WBBS waterways	122	41	272		
Wren	48	CBC/BBS UK	114	87	142		
Goldfinch	48	CBC/BBS England	109	58	158		
Sparrowhawk	40	CBC/BBS England	108	37	281		
Chiffchaff	48	CBC/BBS UK	105	68	162		
Magpie	48	CBC/BBS UK	101	61	147		
Great Tit	48	CBC/BBS UK	99	76	127		
Long-tailed Tit	48	CBC/BBS England	97	40	186		
Reed Warbler	48	CBC/BBS UK	87	21	272		
Pheasant	48	CBC/BBS England	85	49	161		
Pied Wagtail	48	CBC/BBS UK	73	26	136		
Goldcrest	48	CBC/BBS England	56	-21	233		
Robin	48	CBC/BBS UK	50	35	64		

Table C1 is led by Buzzard, by a wide margin, but it should be noted that seven of the fastest-increasing species in this report are actually not included here, because their monitoring data cover too short a period. The UK's non-native population of Ring-necked Parakeets is estimated to have risen by 1455% (more than a 15-fold increase) over the 20 years 1995–2015. Arguably, however, this is more a conservation problem than a success! Mandarin Duck (+405%) is another fast-increasing non-native species. Unmitigated successes are the growth during 1995–2015, estimated through BBS, of Barn Owl (+217%), Gadwall (+131%) and the reintroduced Red Kite (+1231%). Little Egret has increased by almost 30-fold during 1995–2015. Though the trajectory has been moderated by recent cold-weather-related setbacks, attention should also be drawn to the rapid rise of Cetti's Warbler, a recently established native species, which CES now estimates to have increased by 1115% during 1990–2015.

Four groups stand out among the increasing species: corvids – especially Carrion Crow, Magpie and Jackdaw; doves – Collared Dove, Stock Dove and Woodpigeon; woodpeckers and other smaller species of woodland and gardens; and some waterbirds. Corvids appear to have benefited from changed gamebird management practices in recent years, and the larger doves from the increased acreage of brassica crops (particularly oilseed rape).

The majority of the third group are species primarily of woodland that are also common in gardens in some areas Great Spotted Woodpecker, Green Woodpecker, Nuthatch, Blackcap, Wren, Great Tit, Long-tailed Tit and Robin. The reasons for these increases are presently unclear but may, in many cases, relate to improved feeding opportunities in gardens. Pied Wagtail has increased in numbers by 73% on CBC/BBS plots over 48 years, but declined by 61% on WBS/WBBS plots over the past 40 years, although the CBC/BBS index is likely to be most representative of the UK population as a whole. Reed Warbler, also an insectivore, has been expanding its range northwards and westwards and might be benefiting from climate change. Declines on CES plots suggest the benefits might not be universal, with the habitat quality in 'core' sites possibly decreasing, while warming climates facilitate the colonisation of new sites.

A number of species associated with freshwater habitats are becoming more abundant, although differences between their ecological requirements make it unlikely that the major causal factors are common to all. For Mallard, the CBC/BBS increase was matched by a WBS/WBBS increase of 181% over 40 years. The long-term increases recorded for Mute Swan on both CBC/BBS and WBS/WBBS plots are likely to be the result, at least in part, of banning the use of lead weights by anglers, which took effect in 1986. Greylag Goose, Shelduck, Canada Goose, Coot and Goosander are other wildfowl among this report's increasing species.

Two widespread raptors have shown remarkable recoveries from low population levels after the banning of certain poisonous farmland pesticides in the early 1960s, assisted by lower levels of illegal predator control. Buzzards increased in England by a remarkable 792% between 1967 and 2015, with a rapid increase of 59% over the last ten years alone. Sparrowhawks, too scarce for CBC to monitor until the mid 1970s, showed a 108% increase over the 40-year period from 1975 to 2015. However, their recovery appears to have been completed earlier than Buzzard's, with the population currently in shallow decline.

While Pheasant holds a place in this table, its increase in census data has been driven largely by the hugely increasing scale of releases of artificially reared poults for shooting, from which the corvids may also have benefited.

Changes in breeding performance

Changes in a range of aspects of breeding performance can be measured under the Nest Record Scheme (NRS) and the Constant Effort Sites (CES) scheme. The NRS provides information on components of breeding performance (clutch size, brood size and failure rates at the egg and nestling stages) that can be combined to give an overall estimate of productivity per nesting attempt (FPBA) – see NRS page for further information. The CES scheme provides an index of breeding performance accrued over all nesting attempts in a particular year. CES results also take into account any changes in the survival rates of fledglings in the first few weeks after leaving the nest, a period when losses of young can be high.

Breeding performance may be influenced by a variety of factors, including food availability, predation pressure and weather conditions. Variation in breeding performance maycontribute to fluctuations in abundance and may even be the main demographic factor responsible for determining the size of the population. Conversely, the breeding performance of a population may be inversely related to its size, with productivity decreasing as the number of individuals increases, and vice versa. This relationship may be due to the action of density-dependent factors, such as competition for resources: as numbers increase, competition for resources is likely to increase, possibly resulting in poorer productivity. Alternatively, increases in abundance may be accompanied by range expansion into less suitable habitats or areas where breeding performance is poorer, thus reducing the average productivity of the population. The converse is also true, and where declines result from the loss of individuals from these suboptimal habitats, there may be a subsequent increase in average productivity recorded.

Changes in Fledglings Per Breeding Attempt from Nest Record Scheme data

The NRS started collating nest histories of individual breeding attempts in 1939 and sufficient data are available for trends to be produced from the mid 1960s onward. The data collected allow annual variation in clutch size, brood size and stage-specific nest failure rates to be assessed, and these breeding parameters are included in the Summary tables. While detailed exploration of annual variation in productivity is essential if the impacts of environmental factors on breeding success are to be fully understood, the combined effects of concurrent changes in the number of offspring and failure rates can be difficult to interpret. These measures are therefore integrated into a single annual figure representing the mean number of young leaving each nest, termed Fledglings Per Breeding Attempt (FPBA; Siriwardena *et al.* 2000b, Crick *et al.* 2003).

All species displaying significant temporal trends in mean FPBA are included in Table D1. In total, 42 species exhibited significant trends in FPBA over the past 48 years, of which 12 were negative, indicating that reproductive output has decreased over time. Birds exhibiting declines in productivity include two BoCC red-listed species (Tree Pipit and Linnet), four amber-listed species (Nightjar, Willow Warbler, Meadow Pipit and Reed Bunting) and six green-listed species (Moorhen, Great Tit, Garden Warbler, Treecreeper, Chaffinch and Greenfinch). While productivity of Moorhen, Great Tit, Willow Warbler, Garden Warbler, Linnet and Reed Bunting has been falling consistently, trends for the other six species are curvilinear. For five species, FPBA increased between the mid 1960s and mid 1980s or mid 1990s and decreased thereafter; whereas in the case of Nightjar, productivity decreased from the mid 1960s until the mid 2000s but has increased slightly over the last ten years. Corn Bunting did exhibit a significant FPBA decline in *BirdTrends 2016;* however following recent productive seasons the trend is no longer significant and breeding success is now at a similar level to that displayed in the mid 1960s.

Table D1 Significant trends in fledglings per breeding attempt measured between 1967 and 2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Garden Warbler	48	20	Linear decline	3.08 fledglings	2.33 fledglings	-0.75 fledglings	Small sample
Moorhen	48	51	Linear decline	2.58 fledglings	1.96 fledglings	-0.62 fledglings	
Great Tit	48	541	Linear decline	5.95 fledglings	5.36 fledglings	-0.59 fledglings	
Reed Bunting	48	48	Linear decline	2.74 fledglings	2.16 fledglings	-0.58 fledglings	
Nightjar	48	23	Curvilinear	1.55 fledglings	0.98 fledglings	-0.57 fledglings	Small sample
Willow Warbler	48	69	Linear decline	3.6 fledglings	3.13 fledglings	-0.47 fledglings	
Linnet	48	126	Linear decline	2.72 fledglings	2.31 fledglings	-0.41 fledglings	
Chaffinch	48	127	Curvilinear	1.6 fledglings	1.31 fledglings	-0.29 fledglings	
Greenfinch	48	86	Curvilinear	2.14 fledglings	1.93 fledglings	-0.21 fledglings	
Treecreeper	48	21	Curvilinear	2.68 fledglings	2.49 fledglings	-0.19 fledglings	Small sample
Meadow Pipit	48	52	Curvilinear	2 fledglings	1.93 fledglings	-0.07 fledglings	
Tree Pipit	48	15	Curvilinear	1.65 fledglings	1.62 fledglings	-0.03 fledglings	Small sample
Dunnock	48	125	Curvilinear	1.66 fledglings	1.66 fledglings	0 fledglings	
Blackbird	48	270	Curvilinear	1.48 fledglings	1.48 fledglings	0 fledglings	
Collared Dove	48	55	Curvilinear	0.78 fledglings	0.79 fledglings	0.01 fledglings	
Sedge Warbler	48	38	Curvilinear	2.97 fledglings	3.05 fledglings	0.08 fledglings	
Woodpigeon	48	88	Curvilinear	0.51 fledglings	0.62 fledglings	0.11 fledglings	
House Sparrow	48	107	Curvilinear	2.31 fledglings	2.59 fledglings	0.28 fledglings	
Skylark	48	42	Curvilinear	0.89 fledglings	1.18 fledglings	0.29 fledglings	
Robin	48	212	Curvilinear	2.3 fledglings	2.62 fledglings	0.32 fledglings	
Stock Dove	48	80	Linear increase	1 fledglings	1.36 fledglings	0.36 fledglings	
Yellowhammer	48	48	Curvilinear	0.83 fledglings	1.26 fledglings	0.43 fledglings	
Carrion Crow	48	39	Curvilinear	1.65 fledglings	2.09 fledglings	0.44 fledglings	Includes Hooded Crow
Little Owl	48	19	Linear increase	1.9 fledglings	2.37 fledglings	0.47 fledglings	Small sample
Buzzard	48	30	Linear increase	1.54 fledglings	2.03 fledglings	0.49 fledglings	Small sample
Peregrine	48	25	Linear increase	1.78 fledglings	2.28 fledglings	0.5 fledglings	Small sample
Wren	48	98	Curvilinear	2.37 fledglings	2.92 fledglings	0.55 fledglings	
Pied Wagtail	48	90	Linear increase	3.01 fledglings	3.56 fledglings	0.55 fledglings	
Sparrowhawk	48	30	Curvilinear	2.62 fledglings	3.19 fledglings	0.57 fledglings	
Kestrel	48	44	Curvilinear	2.89 fledglings	3.5 fledglings	0.61 fledglings	
Tawny Owl	48	68	Linear increase	1.38 fledglings	1.99 fledglings	0.61 fledglings	Nocturnal species

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Grey Wagtail	48	55	Linear increase	2.6 fledglings	3.4 fledglings	0.8 fledglings	
Jackdaw	48	66	Curvilinear	1.52 fledglings	2.32 fledglings	0.8 fledglings	
Starling	48	115	Linear increase	2.57 fledglings	3.42 fledglings	0.85 fledglings	
Wheatear	48	15	Linear increase	3.53 fledglings	4.4 fledglings	0.87 fledglings	Small sample
Barn Owl	48	35	Linear increase	2.34 fledglings	3.25 fledglings	0.91 fledglings	
Dipper	48	89	Curvilinear	2.01 fledglings	2.96 fledglings	0.95 fledglings	
Merlin	48	21	Linear increase	2.44 fledglings	3.44 fledglings	1 fledglings	Small sample
Tree Sparrow	48	324	Linear increase	2.77 fledglings	3.84 fledglings	1.07 fledglings	
Redstart	48	61	Curvilinear	3.39 fledglings	4.75 fledglings	1.36 fledglings	
Magpie	48	41	Curvilinear	1.1 fledglings	2.49 fledglings	1.39 fledglings	
Nuthatch	48	64	Linear increase	3.69 fledglings	5.44 fledglings	1.75 fledglings	

See Key to species texts for help with interpretation

A recent review paper focusing on long-distance migrant declines (Vickery *et al.* 2014) highlighted the important role demographic data play in the identification of mechanisms. Work by Morrison *et al.* (2013b) using BBS data reported a consistent positive relationship between latitude and the trajectory of long-distance migrant population trends within the UK, suggesting that abundance is, at least in part, determined by breeding success. This conclusion was supported by a study focusing specifically on contrasting regional trends in Willow Warbler numbers (Morrison *et al.* 2016c), which identified reduced productivity at lower latitudes as the underlying driver. There is increasing evidence that organisms at lower trophic levels are responding to climatic change more rapidly than those towards the top of the food chain (Visser & Both 2005, Thackeray *et al.* 2010, 2016). Resulting mismatches in the timing of food availability and of offspring food demand, referred to as phenological disjunction, can have severe impacts on breeding success and ultimately on population trends of bird species (Both *et al.* 2009), although there is evidence that the magnitude of these impacts may vary with diet and breeding habitat (Dunn & Møller 2014).

Long-distance migrants are thought to be particularly susceptible to disjunction between birds and their prey due to their later arrival on the breeding grounds and the energetic demands of their journey northwards, which may constrain their ability to advance their laying dates (Rubolini *et al.* 2010, Ockendon *et al.* 2012, Gilroy et al. 2016 but see Goodenough *et al.* 2011, Winkler *et al.* 2014); the resultant negative impacts on breeding success may be exacerbated by increased competition with less disadvantaged residents (Wittwer *et al.* 2015). Recent studies have detected negative correlations between May temperatures and both the population trajectories (Pearce-Higgins *et al.* 2015) and the extincton risk (Mustin *et al.* 2014) in a range of migrant species, lending weight to this hypothesis and potentially explaining the productivity declines reported here for Nightjar, Tree Pipit, Willow Warbler and Garden Warbler. Alteration to some habitats by humans may increase competition further by causing a reduction in nest site availability (Higginson 2017).

Trans-Saharan migrants may also be experiencing negative impacts of climate change in their African wintering grounds or on passage, with reduced rainfall leading to a fall in insect abundance and a subsequent loss of condition, resulting in a lower reproductive output during the following spring (Saino *et al.* 2004, 2011, Schaub *et al.* 2011, Ockendon *et al.* 2013, Finch *et al.* 2014). A similar effect has been found for Dobson *et al.* 2016). The importance of conditions outside the breeding grounds was emphasised by Gilroy et al. (2016), who found that species inhabiting larger wintering ranges relative to the size of their breeding range were less likely to exhibit population declines, this increased migratory diversity potentially buffers the impacts of reduced quality within individual wintering regions or habitats.

Disjunction risk is predicted to vary spatially in relation to the duration of resource peaks and previous research has reported more marked migrant population declines in highly seasonal habitats (Both *et al.* 2010), of which woodlands are a prime example. Invertebrate food availability in the canopy increases rapidly during the brief period when larval Lepidoptera emerge to take advantage of the spring leaf burst, prior to the foliage toughening and developing chemical defences. As springs have become warmer, oak leafing dates have advanced, a shift matched by caterpillars (Buse *et al.* 1999), but apparently not by tits (Visser *et al.* 1998) or flycatchers (Both *et al.* 2009), despite the apparent plasticity of passerine laying dates in response to environmental drivers (Phillimore *et al.* 2016). The figures presented in this report indicate that Greenwood & Baillie 2008). The population level impacts of disjunction-related productivity declines are still unclear and there is some evidence that reduced productivity under warmer temperatures may be buffered by density-dependent increases in survival in some species, including Reed *et al.* 2012, 2013, 2015), and possibly also in clutch size (Saether *et al.* 2016).

Recent declines in the number of aerial insects (Shortall *et al.* 2009), particularly moths (Conrad *et al.* 2006, Fox 2013) and butterflies (Fox et al. 2015), have been reported across the UK. These invertebrate groups form a significant element of the diet of all the long-distance migrants identified as displaying productivity declines and a reduction in food availability may increase the incidence of whole brood failure due to starvation or desertion by under-nourished parents. The latitudinal variation in population trends identified by Morrison *et al.* (2013b) may reflect a more pronounced drop in invertebrate numbers in the south of the UK where conditions are generally drier. An alternative explanation may be a lower usage of neonicotinoid pesticides in the north, as it is becoming apparent that detrimental impacts on invertebrate numbers may not be limited to the agricultural areas to which they are applied (Hallmann *et al.* 2014).

Clearly, declining food availability due to changes in farming practices, including agrochemical usage, may also be an issue for farmland bird species displaying negative trends in FPBA. Brickle *et al.* 2000 observed that Siriwardena *et al.* 1998b, Peach *et al.* 1999, Siriwardena *et al.* 2000b). If adults of stubble-feeding species are in poorer condition at the start of the breeding season, their investment in reproduction may also be reduced, and the granivorous diet of Siriwardena *et al.* 1999, 2000b).

Egg-stage failure rates are implicated in the reduced productivity of eight of the 12 species exhibiting significant declines in FPBA (Groom 1993, Stoate & Szczur 2001, 2006, White *et al.* 2014), previous studies have failed to find any evidence of a significant impact at a national scale (Gooch *et al.* 1991, Thomson *et al.* 1998, Chamberlain *et al.* 2009, Newson *et al.* 2009, Vögeli *et al.* 2011, reviewed by Madden *et al.* 2015). Ground nesting birds, in particular waders, may also be vulnerable to predation from mammals such as red fox and hedgehogs, and several studies have identified predation as a factor or partial factor causing low productivity and hence population declines (e.g. Teunissen *et al.* 2008, MacDonald & Bolton 2008b, Mason *et al.* 2017, Calladine *et al.* 2017). Several recent studies have also suggested that predation pressure may increase in response to climatic warming. For example, Cox *et al.* (2013) found that the incidence of nest predation by birds and snakes, but not mammals, increased with temperature in the USA, although the mechanism is unknown, while Auer & Martin (2013) demonstrated an increase in the proportion of predated nests across a range of species due to climate-induced shifts in plant–herbivore interactions. Development of land can also alter predator type and number, with negative consequences for nest survival, as demonstrated by Hethcoat & Chalfoun (2015). Predation rates may therefore be increasing and further research into the impacts of nest predators on population trajectories, at a variety of spatial scales, is urgently required.

Increased grazing pressure by deer, numbers of which are rising rapidly in many areas of the UK (Newson *et al.* 2012), has been identified as a possible driver of population declines in the UK (Fuller *et al.* 2005) and the USA (Martin *et al.* 2011), the removal of the herb and shrub layers potentially reducing the availability of both food and well-concealed nesting sites. Mustin *et al.* (2014) demonstrated that Garden Warbler were less likely to colonise woodland sites with poorly developed undergrowth and experimental exclusion of deer has been shown to impact positively on this species. Similarly, Holt *et al.* 2010, 2011 showed that Nightingale territory density was much higher within deer exclosures, and Newson *et al.* 2012 identified a negative correlation between deer and Willow Warbler population trends, which may also have been driven by reduced productivity.

Increasing human activity in the countryside, resulting from a growing population, could increase disturbance levels, in turn influencing the rates of predation and desertion. An investigation of Langston *et al.* 2007) and a review of recreational disturbance impacts found breeding success to be adversely affected by human activity levels in 28 out of 33 papers cited (Steven *et al.* 2011). However, Lowe *et al.* (2014) observed that, while Nightjar territory selection was influenced by disturbance, there appeared to be no concurrent impact on breeding success.

The colonisation of urban habitats by Greenfinch may also have increased the proportion of data originating from gardens, which may represent a relatively resource-poor breeding environment when compared with their more traditional farmland habitats, resulting in the smaller brood and clutch sizes observed. Similar reductions in reproductive output across an urban gradient have been observed for tit species, although results from localised studies are conflicting (see Chamberlain *et al.* 2009 for review) and more research is needed to see whether these are representative at a national scale. The recent outbreak of trichomonosis, which has significantly and rapidly reduced the abundance of Robinson *et al.* 2010b), could have impacted on breeding success and may also provide a good test of the hypothesis that productivity declines over the last 50 years represent a density-dependent response. Lehikoinen *et al.* 2013).

FPBA has increased significantly over the last 48 years for 28 species, across a wide range of taxonomic groups (Table D1). Population trends are also upward for 16 of these species, including raptors (Sparrowhawk, Buzzard, Barn Owl, Merlin, Peregrine), pigeons (Stock Dove, Woodpigeon, Collared Dove), corvids (Magpie, Jackdaw, Carrion Crow), and some small passerines (Nuthatch, Wren, Robin, Redstart and Pied Wagtail). It is therefore possible that increasing productivity has contributed to the population growth exhibited by these species over recent decades. Conversely, 12 species (Little Owl, Tawny Owl, Kestrel, Skylark, Sedge Warbler, Starling, Dipper, Wheatear, House Sparrow, Tree Sparrow, Grey Wagtail and Yellowhammer), have declined in number as FPBA has increased, suggesting that a density-dependent reduction in intraspecific competition or change in habitat use may have enabled breeding success to rise.

Two species (Blackbird and Dunnock) showed significant productivity increases until the early 1990s, which have been reversed by subsequent declines so that FPBA is now the same as it was in the mid 1960s. For both species, recent population increases have followed previous declines, so density-dependent processes could be responsible for the observed changes in FPBA.

Changes in productivity from Constant Effort Sites ringing data

The CES started monitoring populations in 1983, so the changes in productivity (Table D2) cover roughly half the period of the Nest Record Scheme results. The CES data set is unique in providing relative measures of adult abundance and productivity from the same set of sites in mostly wetland and scrub habitats. While the NRS data set monitors the productivity of individual nesting attempts, the proportion of juveniles in the CES catch provides a relative measure of annual variation in productivity that integrates the effects of the number of fledglings produced per attempt, number of nesting attempts and immediate post-fledging survival. Use of these two techniques in combination provides a powerful method of determining which factors are responsible for observed declines in recruitment of young birds into the breeding population.

Table D2 Changes in productivity indices (percentage juveniles) for CES, 1984-2015, calculated from smoothed trend

Species	Period (yrs)	Plots (n)	Change (%)	Lower limit	Upper limit	Comment
Willow Tit	31	27	-79	-94	-22	
Sedge Warbler	31	73	-62	-76	-39	
Blue Tit	31	105	-61	-71	-48	
Reed Bunting	31	63	-55	-74	-6	
Great Tit	31	103	-44	-59	-23	
Song Thrush	31	92	-43	-61	-21	
Garden Warbler	31	78	-43	-62	-14	
Blackcap	31	100	-40	-56	-19	
Willow Warbler	31	100	-33	-48	-11	
Blackbird	31	103	-31	-47	-10	

See Key to species texts for help with interpretation

Overall, 10 species exhibit significant declines in the proportion of juveniles captured (Table D2). The apparent productivity of Blue Tit, Willow Tit, Sedge Warbler and Reed Bunting has fallen by more than 50% over the last 25 years, while Great Tit, Willow Warbler, Blackcap, Garden Warbler, Song Thrush and Blackbird show reductions in relative productivity of between 25% and 50%.

Although two of these species, Peach *et al.* 1991, 1995a, 1999, Robinson *et al.* 2004, 2010, 2014, Baillie *et al.* 2009). The potential susceptibility of long-distance migrants to climate-induced phenological disjunction is discussed above and it is interesting to note that the productivity declines of Willow Warbler and Garden Warbler detected by CES are now mirrored in the NRS trends; a recent study using BTO data sets suggests that reduced productivity may be responsible for the negative population trends for Willow Warbler detected in the south of England (Morrison *et al.* 2016c).

Peach *et al.* 1999). For species such as Blue Tit, Great Tit and Blackcap, where a concurrent population increase has occurred, reductions in productivity may be driven by density-dependent processes, where increased competition for resources in an expanding population reduces the mean breeding success per pair. While NRS trends in per-attempt productivity for the two tit species are in the same direction as the CES per-season productivity trend, they indicate a slight increase in FPBA for Blackcap, suggesting that for this species, density dependence might be influencing the number of nesting attempts initiated per pair rather than the number of chicks reared per brood.

None of the 23 species monitored show significant positive trends in CES productivity in *BirdTrends 2017*. Two species (BirdTrends 2016, but the trend for both species is no longer significant following lower productivity in 2016. A positive trend might be predicted if climatic warming enabled multi-brooded species, such as Reed Warbler, to extend their breeding season, increasing the number of broods reared per adult (Dunn & Møller 2014). Eglington *et al.* (2015) found that, using CES data from across Europe, Reed Warbler was the one species experiencing temperature dependent increases in productivity, particularly in the north of its range. NRS results are also suggestive of an increase in per-attempt productivity for this species and results of a recent food supplementation study suggest that this is as predicted if climatic change has increased food availability (Vafidis et al. 2016).

Changes in average laying dates from Nest Record Scheme data

Since the mid 1970s, many species have exhibited a trend towards progressively earlier clutch initiation (Crick *et al.* 1997) with laying dates showing curvilinear responses over the past 50 years as spring temperatures have cooled and then warmed (Crick & Sparks 1999). Table D3 confirms that the majority of species exhibiting significant trends since the late 1960s have advanced laying. Thus 39 species are laying between three and 23 days earlier, on average, than they were 48 years ago.

The results of previous studies predict laying-date advancement to be more constrained in long-distance migrants (Both *et al.* 2009, Rubolini *et al.* 2010, Kluen *et al.* 2016), although the extent to which populations are able to adjust migratory strategies in response to environmental pressures and the predicted impact on population size is currently the focus of much discussion (James & Abbott 2014, Winkler *et al.* 2014, Kristensen *et al.* 2016). It is interesting to note that the magnitude of the laying-date shift in both Pied Flycatcher and Redstart (10 days and 14 days respectively) is greater than that displayed by many resident species, although their mean laying date is still approximately a fortnight later than non-migratory species with similar nestling diets, such as Blue Tit and Great Tit. No taxonomic or ecological associations are apparent within the group of species displaying laying-date advancements and a wide range of taxa demonstrate trends of a similar magnitude (Crick *et al.* 1997).

Table D3 Significant trends in laying date measured between 1967 and 2015

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Magpie	48	32	Curvilinear	Apr 27	Apr 4	-23 days	
Greenfinch	48	86	Linear decline	May 26	May 6	-20 days	
Long-tailed Tit	48	57	Linear decline	Apr 21	Apr 4	-17 days	
Goldfinch	48	26	Curvilinear	Jun 5	May 19	-17 days	Small sample
Redstart	48	70	Linear decline	May 24	May 10	-14 days	
Blackcap	48	45	Linear decline	May 24	May 11	-13 days	
Coal Tit	48	44	Linear decline	May 3	Apr 20	-13 days	
Nuthatch	48	38	Linear decline	May 2	Apr 19	-13 days	
Chiffchaff	48	64	Linear decline	May 15	May 3	-12 days	
Swallow	48	238	Linear decline	Jun 24	Jun 13	-11 days	
Dipper	48	75	Linear decline	Apr 18	Apr 7	-11 days	
Chaffinch	48	119	Linear decline	May 12	May 1	-11 days	
Stonechat	48	51	Linear decline	May 7	Apr 27	-10 days	
Reed Warbler	48	240	Linear decline	Jun 20	Jun 10	-10 days	
Whitethroat	48	21	Curvilinear	May 27	May 17	-10 days	Small sample
Pied Flycatcher	48	489	Linear decline	May 20	May 10	-10 days	
Marsh Tit	48	14	Linear decline	Apr 28	Apr 18	-10 days	Small sample
Great Tit	48	490	Linear decline	May 4	Apr 24	-10 days	
Treecreeper	48	13	Linear decline	May 6	Apr 26	-10 days	Small sample
Corn Bunting	48	17	Linear decline	Jun 25	Jun 15	-10 days	Small sample
Kestrel	48	26	Linear decline	May 5	Apr 26	-9 days	Small sample
Robin	48	151	Linear decline	Apr 28	Apr 19	-9 days	
House Sparrow	48	67	Linear decline	May 25	May 16	-9 days	
Grey Wagtail	48	62	Linear decline	May 8	Apr 30	-8 days	
Ring Ouzel	48	24	Linear decline	May 14	May 6	-8 days	Small sample
Sedge Warbler	48	45	Curvilinear	May 29	May 21	-8 days	
Garden Warbler	48	23	Linear decline	May 28	May 20	-8 days	Small sample
Blue Tit	48	741	Linear decline	May 2	Apr 24	-8 days	
Carrion Crow	48	29	Linear decline	Apr 17	Apr 9	-8 days	Includes Hooded Crow
Cuckoo	48	18	Linear decline	Jun 10	Jun 3	-7 days	Small sample
Willow Warbler	48	89	Linear decline	May 20	May 13	-7 days	
Jackdaw	48	33	Linear decline	Apr 26	Apr 19	-7 days	
Tree Pipit	48	22	Curvilinear	May 28	May 22	-6 days	Small sample
Wren	48	90	Linear decline	May 14	May 8	-6 days	
Starling	48	86	Linear decline	Apr 28	Apr 23	-5 days	
Moorhen	48	82	Linear decline	May 9	May 5	-4 days	
Wood Warbler	48	38	Linear decline	May 25	May 21	-4 days	
Oystercatcher	48	72	Curvilinear	May 19	May 16	-3 days	
Tree Sparrow	48	357	Linear decline	May 27	May 24	-3 days	
Swift	48	13	Curvilinear	May 26	May 26	0 days	Small sample
Blackbird	48	268	Curvilinear	Apr 23	Apr 25	2 days	
Raven	48	12	Curvilinear	Mar 3	Mar 5	2 days	Small sample
Barn Owl	48	22	Curvilinear	May 16	May 22	6 days	Small sample
Yellowhammer	48	25	Linear increase	May 31	Jun 7	7 days	Small sample
Turtle Dove	48	12	Linear increase	Jun 14	Jun 24	10 days	Small sample

Species	Period (yrs)	Mean annual sample	Trend	Predicted in first year	Predicted in last year	Change	Comment
Woodpigeon	48	100	Linear increase	Jun 3	Jun 22	19 days	

See Key to species texts for help with interpretation

The population-level consequences of phenological change are the subject of many current scientific studies, including several ongoing projects at BTO. Advanced laying is typically beneficial as early-nesting parents have an increased chance of recruiting offspring into the next generation (Visser *et al.* 1998). Climate-induced advances in phenology have been observed across a wide range of taxa and are occuring most rapidly at lower trophic levels, so that the annual cycles of predators are increasingly mis-timed with those of their prey (Thackeray *et al.* 2016). A frequently used model system is that of woodland passerines, where the timing of leaf emergence is advanced and the speed of caterpillar development is increased at higher temperatures (Buse *et al.* 1999, Visser & Holleman 2001), resulting in a food peak advancement that nesting birds are unable to match and a subsequent reduction in breeding success (though see Phillimore *et al.* 2016).

Both *et al.* (2006) demonstrated that mismatches between periods of food availability and chick demand can affect abundance in Dutch Pied Flycatcher populations, with those exhibiting the largest disjunction between arrival in spring and peak caterpillar abundance experiencing the greatest declines. Another study by Both and his colleagues, also in the Netherlands, suggested that the magnitude of disjunction may be mediated by habitat type, with species in more seasonal habitats at greatest risk of negative impacts on productivity (Both *et al.* 2010). However, while Dutch Reed *et al.* 2012, 2013, 2015). The ability to switch to different food sources to provide for chicks, as demonstrated for Wood Warbler (Mallord *et al.* 2017), may provide another buffer for some species. Whether such compensations will persist as the climate warms further remains to be seen and the population-level significance of trophic mismatches remains an active research area with potentially important policy implications for conservation. Projections of climatic suitability in Great Britain under future climate scenarios suggest that climatic suitability could increase for 44% of species and reduce for 9% of species by 2080, with the largest gains in abundance expected to occur in northern and western areas; however many of the species which are expected to reduce are those that are already red listed following long-term population declines (Massimino *et al.* 2017).

Only six species exhibit significant trends towards later laying, of which five (Cornulier *et al.* 2009) which, as mean laying dates are calculated across all broods, would result in the observed shift. Increased production of repeat broods could be stimulated by climatic amelioration, with later nests being more productive in warmer conditions, or by movement of birds away from farmland and into habitats where they are released from constraints on multiple brooding. A recent study using data from North America and Europe identified a positive temporal trend in the length of the breeding season of multi-brooded, but not single-brooded, bird species, consistent with the hypothesis that climate change is extending the window of opportunity for nesting for species less reliant on peaks in seasonal resources (Dunn & Møller 2014).

The only single-brooded bird displaying a significant trend towards later laying is Raven, a species that initiates laying in February, prior to the the early spring period that has witnessed the most significant rates of warming. It is likely that the laying dates of the majority of those species that do not show a significant trend in timing of breeding are similarly related to weather, but that their weather-mediated cues do not show any trend over time (Crick & Sparks 1999).

Conclusion

This report is designed to be useful as a ready source of information for conservation practitioners, and as a source of information for those involved in more strategic conservation policy-making, as well as to the general student of bird populations. It provides a relatively simple and concise overview of the way in which populations are changing, suggesting areas where further research is required or where conservation action needs to be taken. The information presented here is a summary of a very extensive and much more detailed data set held by the BTO.

Alerts are raised as a result of declines in the population sizes of a considerable number of species. These alerts will help conservation organisations to prioritise future conservation action, alongside the Birds of Conservation Concern list (Eaton *et al.* 2015) and other information.

The demographic information contained in this report should also help conservation organisations to target their resources more effectively. For declining species of conservation importance, declines in breeding performance may indicate that conservation action should be targeted towards the breeding season; such responses may sometimes be masked, however, by density-dependent improvements in breeding success as the population declines (Green 1999). The lack of a decline in breeding performance may suggest that factors other than nesting success, such as loss of habitat or changes in survival rates are more likely to be influencing the observed population declines. An analysis looking across species (Robinson et al. 2014) suggested that temporal variation in declining species was associated more with productivity and recruitment of young, while for increasing species, adult survival was relatively more important in determining population change. However, as evidenced by Lapwing, the effect of demographic rates may interact, so they need to be considered in the context of the life-cycle as a whole. A report of this kind can provide only an initial summary of such information, and a full assessment of the population dynamics of a declining species will generally require more detailed investigations (e.g. Peach *et al.* 1999, Freeman & Crick 2003, Robinson *et al.* 2004, 2014).

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

EMAIL YOUR COMMENTS

Utilities

With the exception of the trends by habitat, the tables of population change that appear on the species pages are species-based selections from a single unified table, with data newly calculated for this edition of the report. A number of additional selections from this table, by scheme and time period, are presented in the Summary tables and Discussion sections. Using the Table generator, you can interrogate the master table by data source or time period, for all species or for your own selection of species, and choose how your extract will be sorted.

This edition of the BirdTrends report is the latest in an annual series that began in 1997. Citations for previous editions are listed under Previous reports. Links are given to the full text of previous reports, which are mostly still available online.

The Utilities section also holds a unified list of the References that have been cited throughout the report.

Previous reports

Previous reports in this series are listed, from the most recent to the earliest. The first two (Crick *et al.* 1997, 1998) were produced as paper reports, but all subsequent editions are purely web-based and url addresses must be included in their citations.

Note that www.bto.org/about-birds/birdtrends will always link to the home page of the most recent version of this report. Web addresses including a year (e.g. .../birdtrends/2014/...) may lead you to earlier reports in the series, now superseded.

BirdTrends 2016: trends in numbers, breeding success and survival for UK breeding birds

Robinson, R.A., Leech, D.I., Massimino, D., Woodward, I., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Barimore, C., Dadam, D., Hammond, M.J., Harris, S.J., Noble, D.G., Walker, R.H. & Baillie, S.R. (2016) *BirdTrends 2016: trends in numbers, breeding success and survival for UK breeding birds.* Research Report 691. BTO, Thetford. www.bto.org/about-birds/birdtrends/2016

BirdTrends 2015: trends in numbers, breeding success and survival for UK breeding birds

Robinson, R.A., Marchant, J.H., Leech, D.I., Massimino, D., Sullivan, M.J.P., Eglington, S.M., Barimore, C., Dadam, D., Downie, I.S., Hammond, M.J., Harris, S.J., Noble, D.G., Walker, R.H. & Baillie, S.R. (2015) *BirdTrends 2015: trends in numbers, breeding success and survival for UK breeding birds.* Research Report 678. BTO, Thetford. www.bto.org/about-birds/birdtrends/2015

BirdTrends 2014: trends in numbers, breeding success and survival for UK breeding birds

Baillie, S.R., Marchant, J.H., Leech, D.I., Massimino, D., Sullivan, M.J.P., Eglington, S.M., Barimore, C., Dadam, D., Downie, I.S., Harris, S.J., Kew, A.J., Newson, S.E., Noble, D.G., Risely, K. & Robinson, R.A. (2014) *BirdTrends 2014: trends in numbers, breeding success and survival for UK breeding birds.* Research Report 662. BTO, Thetford. www.bto.org/about-birds/birdtrends/2014

BirdTrends 2013: trends in numbers, breeding success and survival for UK breeding birds

Baillie, S.R., Marchant, J.H., Leech, D.I., Massimino, D., Eglington, S.M., Johnston, A., Noble, D.G., Barimore, C., Kew, A.J., Downie, I.S., Risely, K. & Robinson, R.A. (2014) *BirdTrends 2013: trends in numbers, breeding success and survival for UK breeding birds* Research Report 652. BTO, Thetford. www.bto.org/about-birds/birdtrends/2013

BirdTrends 2012: trends in numbers, breeding success and survival for UK breeding birds

Baillie, S.R., Marchant, J.H., Leech, D.I., Massimino, D., Eglington, S.M., Johnston, A., Noble, D.G., Barimore, C., Kew, A.J., Downie, I.S., Risely, K. & Robinson, R.A. (2013) *BirdTrends 2012: trends in numbers, breeding success and survival for UK breeding birds* Research Report 644. BTO, Thetford. www.bto.org/about-birds/birdtrends/2012

BirdTrends 2011: trends in numbers and demography for UK breeding birds

Baillie, S.R., Marchant, J.H., Leech, D.I., Renwick, A.R., Eglington, S.M., Joys, A.C., Noble, D.G., Barimore, C., Conway, G.J., Downie, I.S., Risely, K. & Robinson, R.A. (2012) *BirdTrends 2011: trends in numbers and demography for UK breeding birds* Research Report 609. BTO, Thetford. (www.bto.org/about-birds/birdtrends/2011)

Breeding Birds in the Wider Countryside: their conservation status 2010

Baillie, S.R., Marchant, J.H., Leech, D.I., Renwick, A.R., Joys, A.C., Noble, D.G., Barimore, C., Conway, G.J., Downie, I.S., Risely, K. & Robinson, R.A. (2010) *Breeding Birds in the Wider Countryside: their conservation status 2010.* Research Report 565. BTO, Thetford. (www.bto.org/birdtrends2010/index.htm)

Breeding Birds in the Wider Countryside: their conservation status 2009

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Breeding Birds in the Wider Countryside: their conservation status 2008

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Mute Swan

Cygnus olor

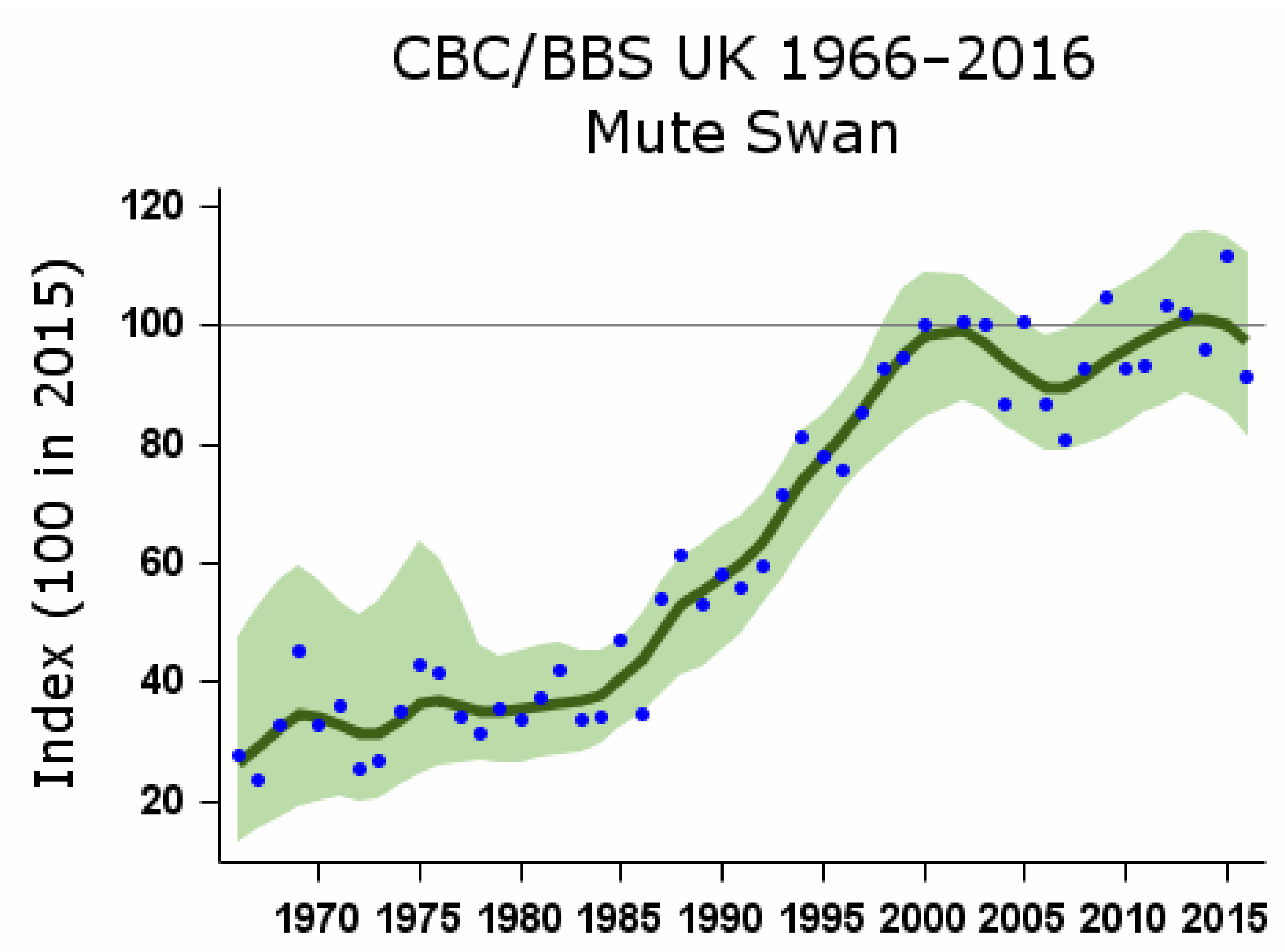
Key facts

Conservation listings:	Global: amber (non-breeding international importance)
Long-term trend:	UK, England: rapid increase
Population size:	6,400 (5,800-7,000) pairs in 2009 (APEP13: 2002 estimate (Ward et al. 2007) updated using BBS trend); 79,000 individuals in winter in 2004-09 (Musgrove et al. 2011)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

Mute Swan populations, which had been fairly stable since the 1960s, increased progressively from the mid 1980s to around 2000, when a new plateau was reached. Waterways, likely to be a preferred habitat for breeding swans, show a more moderate rate of increase than CBC/BBS. Winter trends have shown a parallel upturn, with little change in Britain after 2000 (Frost et al. 2017). After a spell on the green list during 2009-15 the species is now amber listed once more, through the international importance of its UK wintering population (Eaton et al. 2015). There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



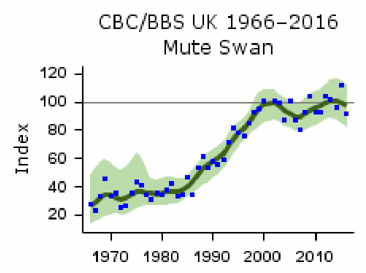
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

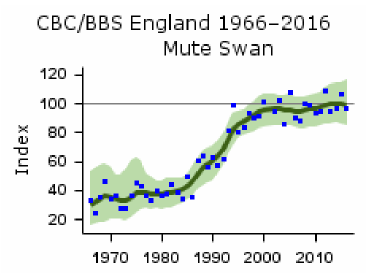
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	128	246	55	679		
	25	1990-2015	230	74	36	135		
	10	2005-2015	328	9	-3	23		
	5	2010-2015	335	4	-8	22		
CBC/BBS England	48	1967-2015	110	213	52	667		Small CBC sample
	25	1990-2015	197	64	29	127		
	10	2005-2015	280	5	-5	17		
	5	2010-2015	287	3	-7	18		
WBS/WBBS waterways	40	1975-2015	84	62	13	126		
	25	1990-2015	112	20	-3	49		
	10	2005-2015	136	-18	-29	-3		
	5	2010-2015	124	-12	-25	0		
BBS UK	20	1995-2015	268	26	5	72		
	10	2005-2015	328	9	-4	26		
	5	2010-2015	335	4	-5	21		
BBS England	20	1995-2015	229	12	-7	45		
	10	2005-2015	280	5	-10	21		
	5	2010-2015	287	3	-7	20		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

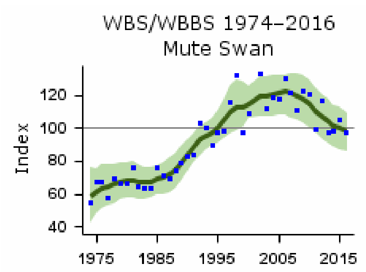
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



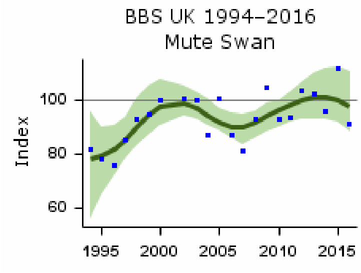
CBC/BBS UK graph



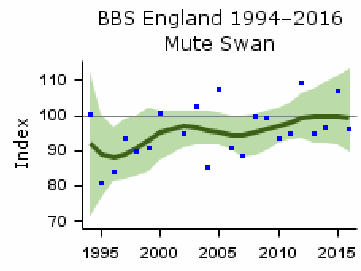
CBC/BBS England graph



WBS/WBBS waterways graph

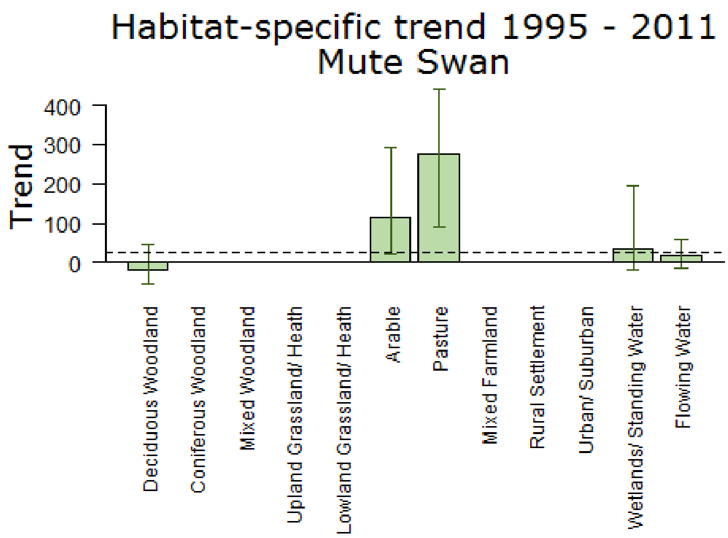


BBS UK graph



BBS England graph

Population trends by habitat



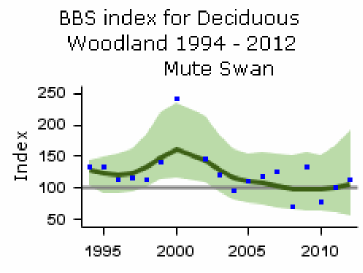
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

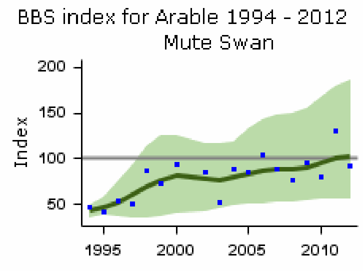
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	30	-20	-53	44
Arable	16	1995-2011	30	114	20	293
Pasture	16	1995-2011	58	274	91	440
Wetlands/ Standing Water	16	1995-2011	40	34	-17	195
Flowing Water	16	1995-2011	97	19	-14	60

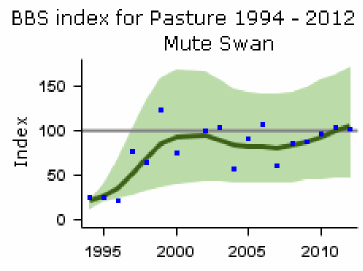
Further information on habitat-specific trends, please follow link here.



Habitat graph



Habitat graph



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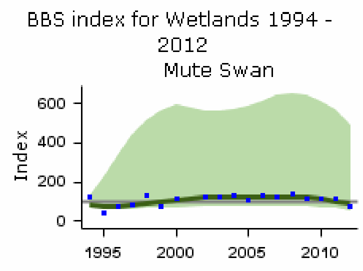
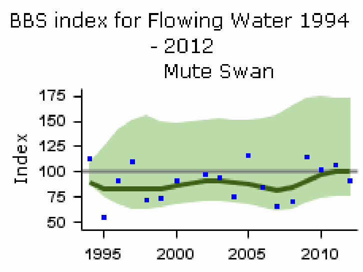
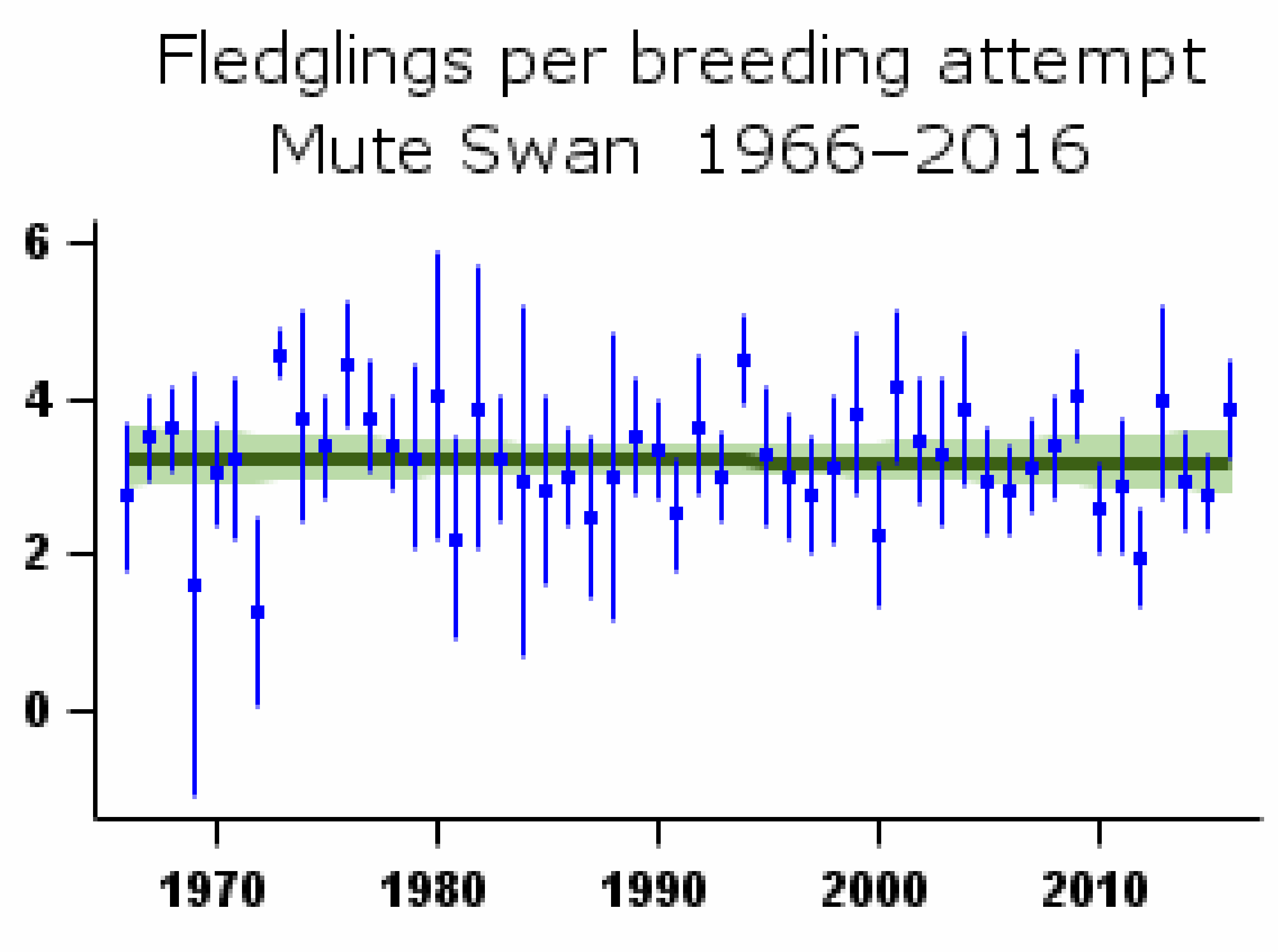


Habitat graph

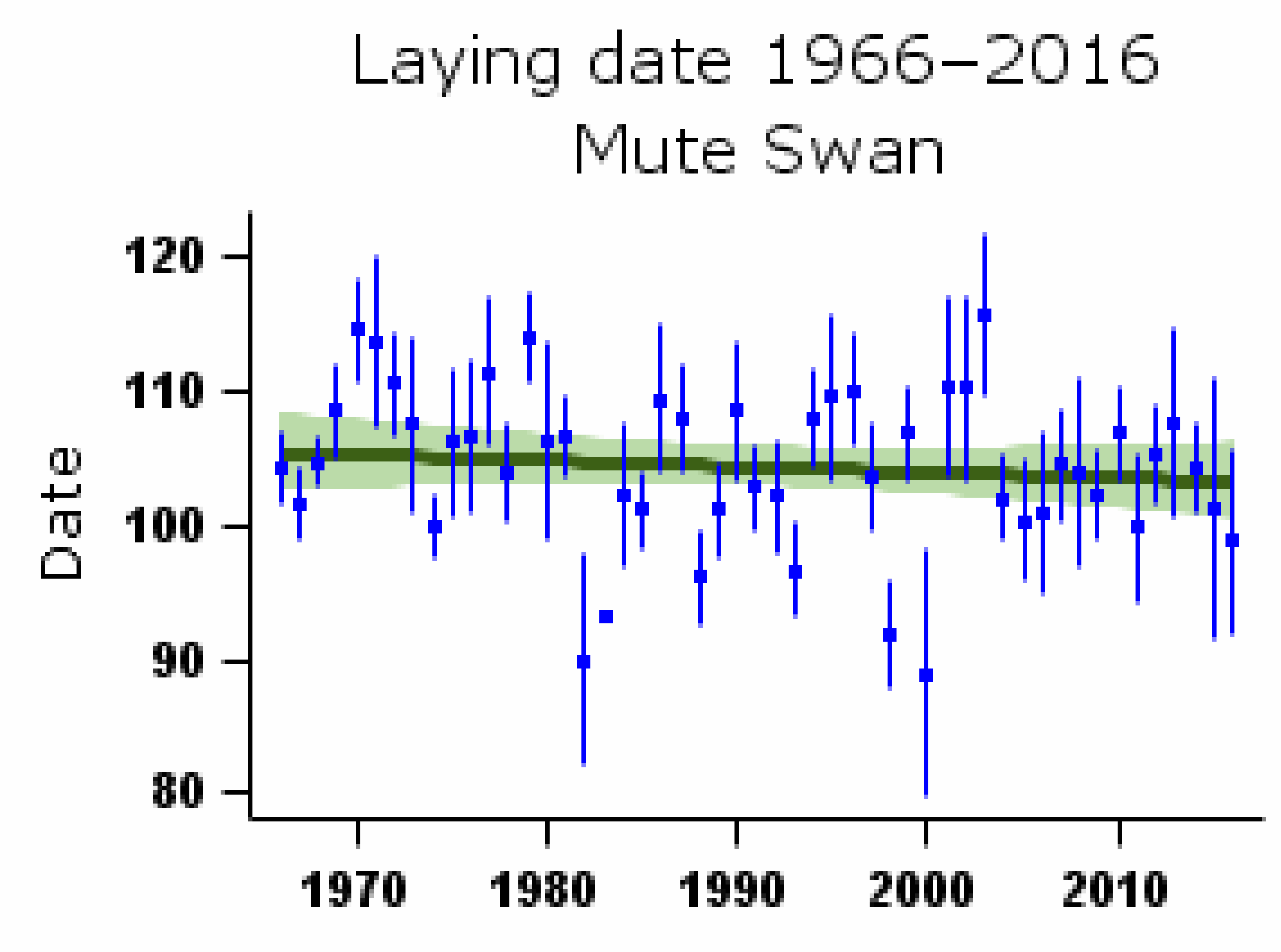


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

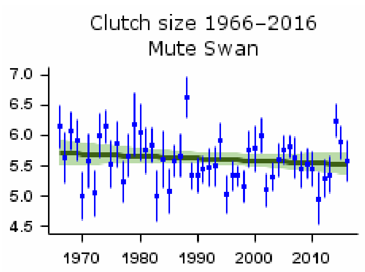


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

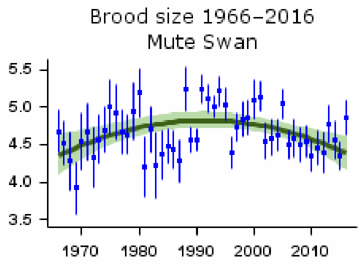
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	34	None					
Clutch size	48	1967-2015	32	None					
Brood size	48	1967-2015	68	Curvilinear	4.39 chicks	4.42 chicks	0.7%		
Nest failure rate at egg stage	48	1967-2015	38	None					
Nest failure rate at chick stage	48	1967-2015	43	None					
Laying date	48	1967-2015	17	None			0 days		Small sample

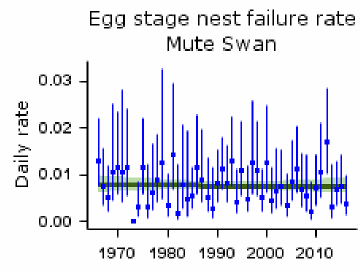
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



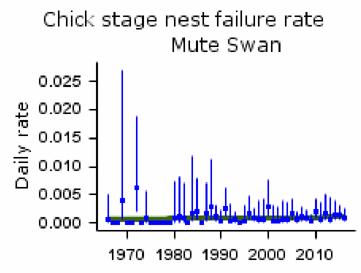
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The increase in this species has been attributed to the banning of lead weights for fishing and the positive implications of this on survival. Milder winters have also been a factor, increasing overwinter survival and having knock-on effects on breeding success.

Change factor	Primary driver	Secondary driver
Demographic	Increased survival	Increased breeding success
Ecological	Other	Climate change

Further information on causes of change

The main hypothesis relating to the factors causing the increase in this species concerns the use of lead as fishing weights (Rowell & Spray 2004, Ward et al. 2007). In the late 1970s lead poisoning was shown to be the largest single cause of death among Mute Swans in England, accounting for the deaths of 3,000-3,500 birds annually (Kirby et al. 1994). There is good evidence showing that lead contamination of Mute Swans in England caused local population declines during the late 1970s and 1980s (Blus 1994, Birkhead & Perrins 1985). The increase in the British Mute Swan population seen between the 1983 and 1990 censuses can thus be explained partly by the ban on the use of lead weights in fishing imposed by the Water Authorities in 1987 (Rowell & Spray 2004). There is no evidence to suggest that lead poisoning was ever a problem in Scotland (e.g. Brown & Brown 1984).

A second, not mutually exclusive, hypothesis is that warmer winter weather has benefited this species. Deaths during the winter due to poor weather are an important cause of mortality in many areas (Spray 1981, Perrins & Sears 1991) and a run of mild winters is likely to have reduced this (Rowell & Spray 2004). Mild winters are not only associated with low mortality but are also followed by high reproductive output (Delany et al. 1992) which has also contributed to the increase in the Mute Swan population. A study examining five years' data on breeding biology found that winter temperature was one of the factors significantly affecting the date of laying, which in turn was related to clutch size, which in itself was the most significant factor determining the number of cygnets fledged (Birkhead et al. 1983), hence demonstrating an effect on breeding performance. Esselink & Beekman (1991) have also shown that mild winters are not only associated with low mortality but are also followed by high reproductive output be enabling adults attain peak body condition. This may have been particularly important in Scotland.

Whilst the recovery of the British Mute Swan population may in large part be attributed to the reduced incidence of lead poisoning, locally other factors may have had an equal or more important contribution to the observed changes (Ward et al. 2007). Recent years have also seen an increase in the availability of suitable breeding habitats, in the form of the large numbers of gravel pits and ponds that have been created. Improvements to the water quality of rivers and canals, as a result of efforts to reduce pollution, may have also helped the species (Coleman et al. 2001, Rowell & Spray 2004). The number and activity of Swan Rescue Centres may also have an effect on the Mute Swan population size (Delany et al. 1992, Perrins & Martin 1999), although there is little documented evidence to support this. Other factors affecting local populations include increased protection of nesting birds; in an English Midlands study area, this was considered a key factor in the reversal of the 1960s and 1970s decline (Coleman et al. 2001).

In Scotland (and presumably elsewhere), the increased autumn sowing of cereals has improved the winter food supply for swans, enabling a higher proportion of birds to survive the winter (Delany et al. 1992, Ward et al. 2007), although there are no specific analyses to support this.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Greylag Goose

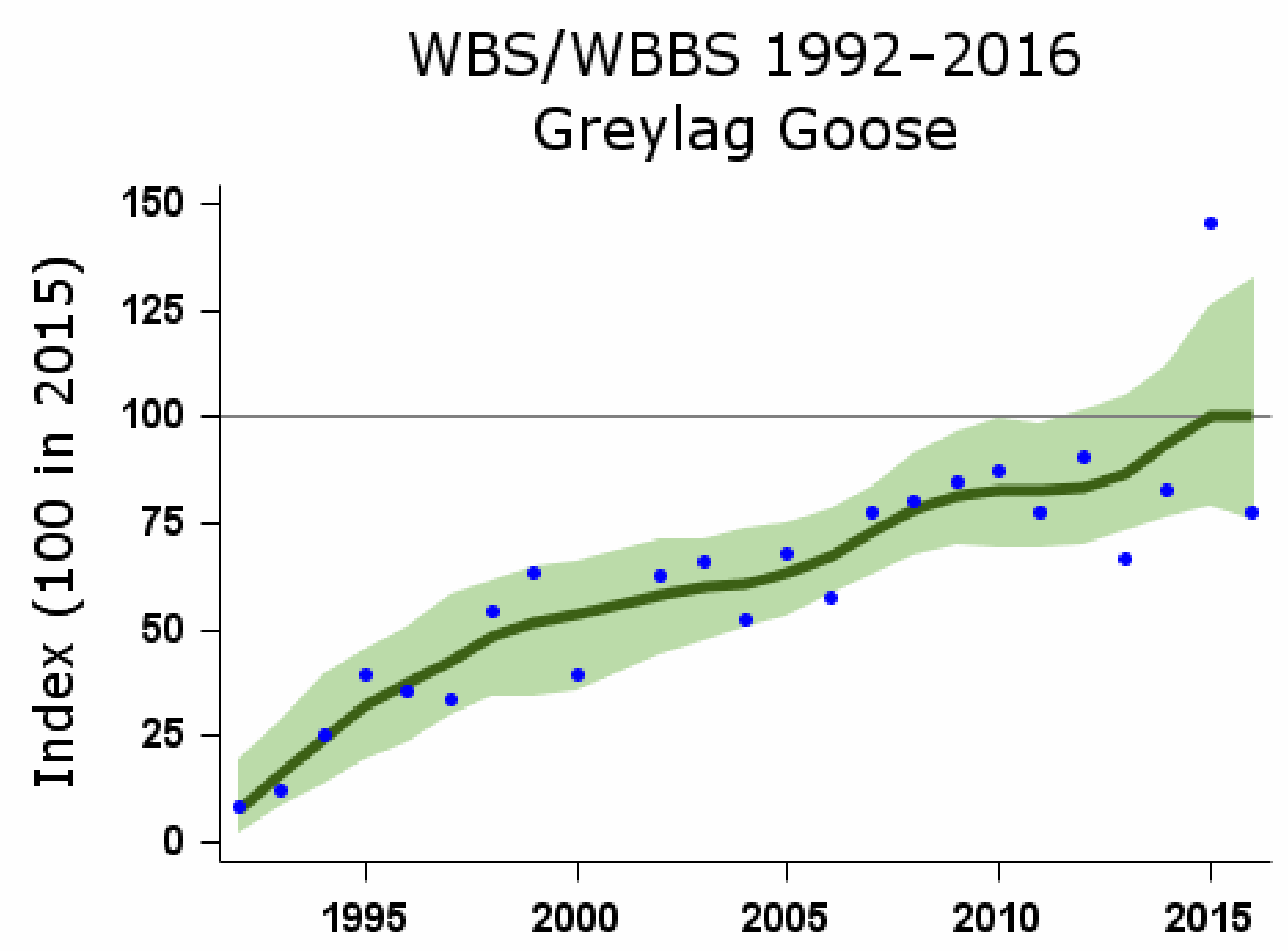
Anser anser

Key facts

Conservation listings:	Global: amber (non-breeding localisation)
Long-term trend:	UK waterways: rapid increase
Population size:	46,000 pairs in 2004-08 (APEP13)

Status summary

Apart from an indigenous population in northwest Scotland and the Western Isles, and winter visitors mainly from Iceland, the Greylag Goose is a re-established species throughout the UK. Re-established Greylags increased very rapidly, at a rate estimated at 12% per annum in southern Britain between the 1988-91 Atlas period and 1999 (Rehfisch et al. 2002). This equates across Britain to 170%, or 9.4% per annum, in the period to 2000 (Austin et al. 2007). In Scotland, the native population has grown at an annual rate of 11.7% since 1997 and the re-established birds at 9.7% per annum since 1989 (Mitchell et al. 2011). It has become impossible to distinguish native from re-established populations and they are best now treated as a single unit (Mitchell et al. 2012). The WBS sample became large enough for annual monitoring in 1992, since when further steep increase has been recorded along linear waterways with no sign yet of levelling off. Annual breeding-season monitoring in a wider range of habitats through BBS has shown similar strong increases. Winter counts of resident birds have increased rapidly since the late 1960s (Frost et al. 2017). Expanding populations of geese, including indigenous Scottish Greylag Geese, are creating a number of economic, social and environmental challenges and, increasingly, adaptive policies are required to manage native goose populations (Bainbridge 2017).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	22	1993-2015	46	512	166	1297		
	10	2005-2015	65	58	8	130		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	67	21	-12	60		
BBS UK	20	1995-2015	237	232	28	586		
	10	2005-2015	344	54	10	136		
	5	2010-2015	401	15	-23	88		
BBS England	20	1995-2015	197	284	176	526		
	10	2005-2015	287	88	54	120		
	5	2010-2015	335	16	2	33		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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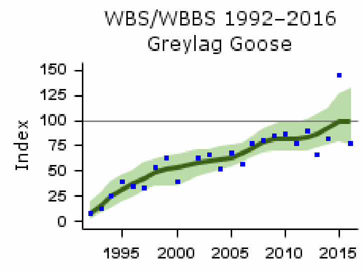
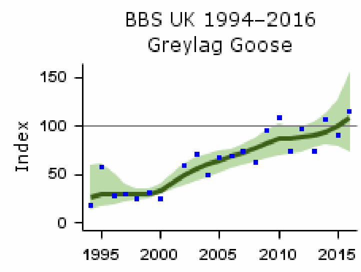
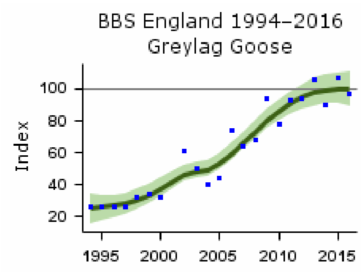


WBS/WBBS waterways graph



BBS UK graph

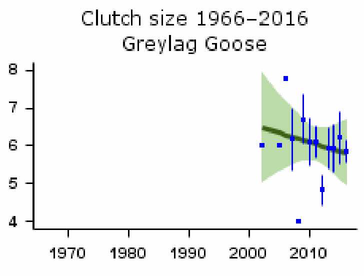


BBS England graph

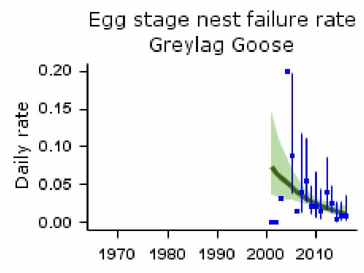
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	13	2002-2015	12	None					Small sample
Nest failure rate at egg stage	23	1992-2015	10	Linear decline	20.40% nests/day	1.32% nests/day	-93.5%		Small sample
Nest failure rate at chick stage	23	1992-2015	2	None					Small sample
Laying date	11	2004-2015	4	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Canada Goose

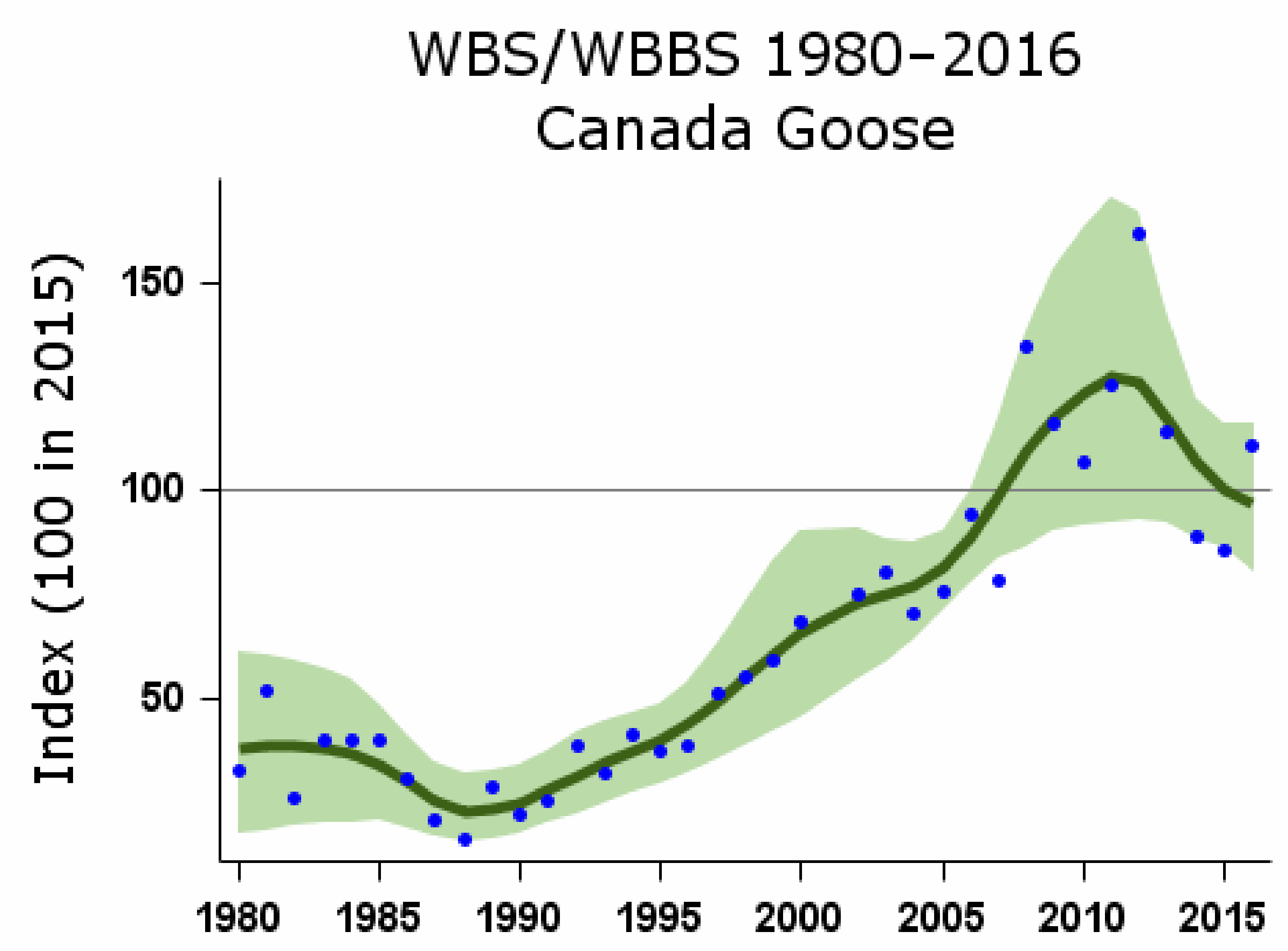
Branta canadensis

Key facts

Conservation listings:	Global: Least Concern Europe: Least Concern UK: unlisted (introduced)
Long-term trend:	UK waterways: rapid increase
Population size:	62,000 pairs in 2004-08 (APEP13)

Status summary

Canada Geese were first introduced to English parkland around 1665 but have expanded hugely in range and numbers following translocations in the 1950s and 1960s. They increased rapidly, at a rate estimated at 9.3% per annum in Britain between the 1988-91 Atlas period and 2000, with no sign of any slowing in the rate of increase (Austin et al. 2007). Most of this increase, amounting to 166% during that decade alone, has been in areas previously with low goose densities. The WBS sample became large enough for annual monitoring in 1980, since when further, apparently exponential increase has occurred on linear waterways. Annual breeding-season monitoring in a wider range of habitats through BBS has shown similar strong increases in England and in the UK as a whole but with significant reversals over the last ten years. Winter monitoring shows a strong long-term increase, but with little change since about 2001 (Frost et al. 2017). In Scotland, the population has increased from 119-194 in 1953, to 1,244 in 2000 and to a tentative figure of 3,000+ in 2015 (Bainbridge 2017). Expanding populations of geese, including non-native Canada Geese, are creating a number of economic, social and environmental challenges and, increasingly, adaptive policies are required to manage goose populations.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	34	1981-2015	72	159	42	560		
	25	1990-2015	91	307	151	596		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	121	23	2	49		
	5	2010-2015	115	-19	-42	9		
BBS UK	20	1995-2015	524	75	46	123		
	10	2005-2015	664	-8	-20	15		
	5	2010-2015	692	2	-11	20		
BBS England	20	1995-2015	484	60	37	108		
	10	2005-2015	608	-11	-21	12		
	5	2010-2015	632	2	-10	24		

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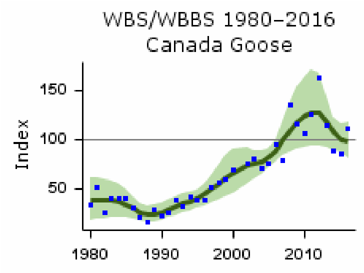
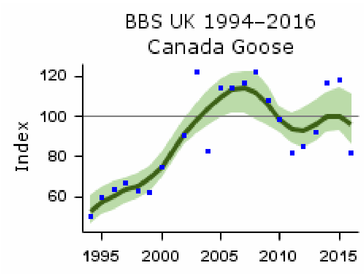
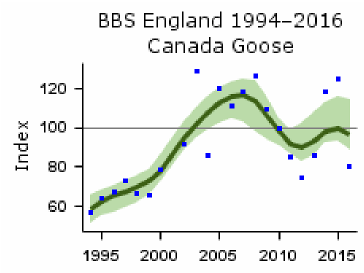


WBS/WBBS waterways graph

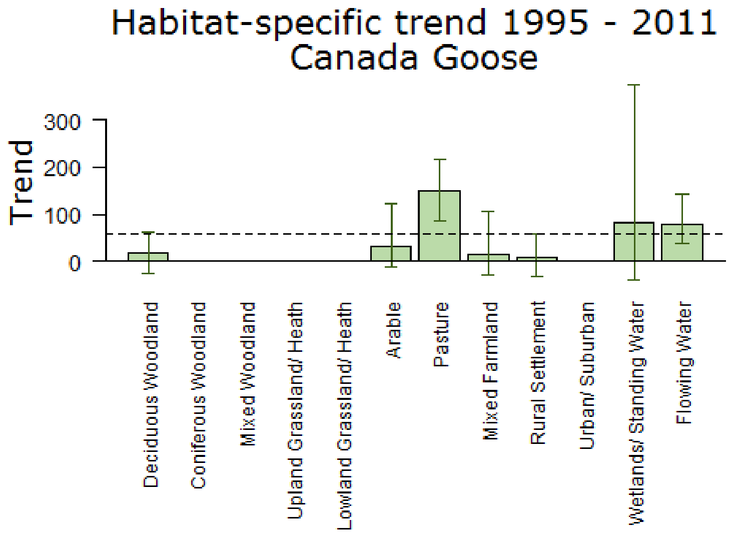


BBS UK graph



BBS England graph

Population trends by habitat



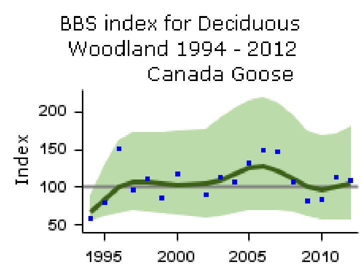
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

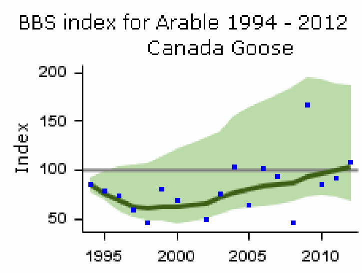
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	47	18	-25	63
Arable	16	1995-2011	33	32	-12	122
Pasture	16	1995-2011	111	148	84	216
Mixed Farmland	16	1995-2011	36	15	-31	106
Rural Settlement	16	1995-2011	44	8	-34	57
Wetlands/ Standing Water	16	1995-2011	35	82	-39	375
Flowing Water	16	1995-2011	103	79	38	144

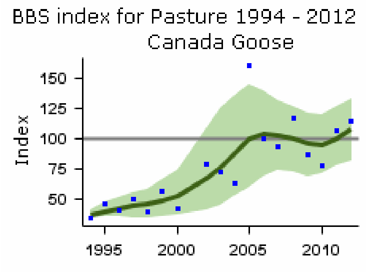
Further information on habitat-specific trends, please follow link here.



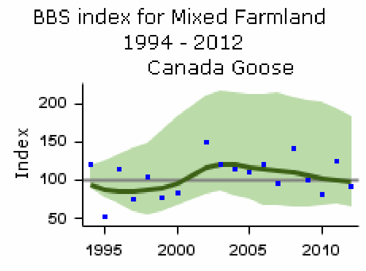
Habitat graph



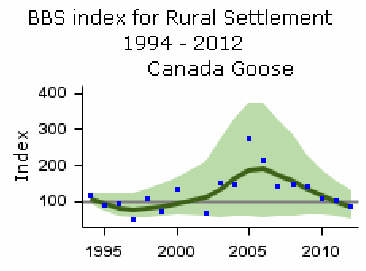
Habitat graph



Habitat graph



Habitat graph



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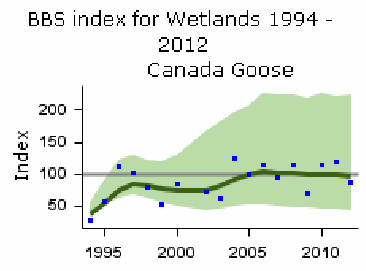
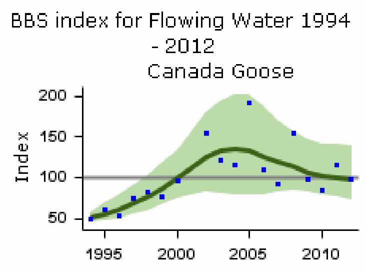


Habitat graph



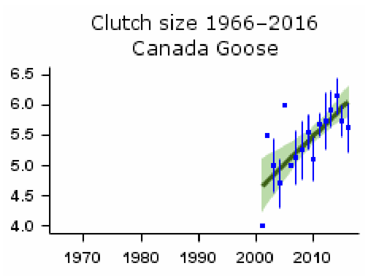
Habitat graph

Demographic trends

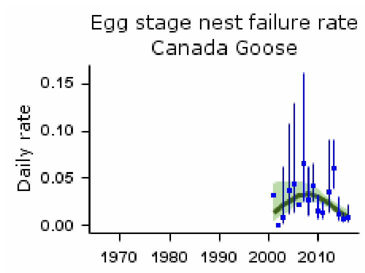
Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	14	2001-2015	18	Linear increase	4.65 eggs	5.95 eggs	28.0%		Small sample
Nest failure rate at egg stage	14	2001-2015	20	Curvilinear	1.35% nests/day	1.16% nests/day	-14.1%		Small sample
Nest failure rate at chick stage	14	2001-2015	6	None					Small sample
Laying date	14	2001-2015	10	None			0 days		Small sample

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Shelduck

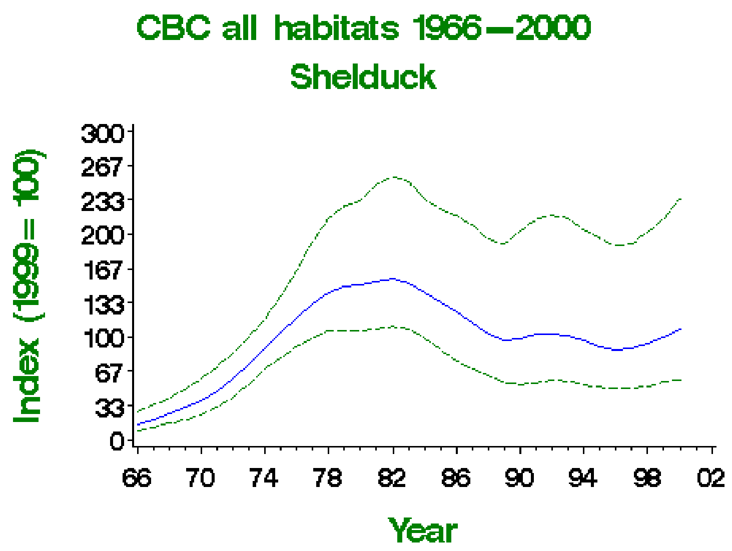
Tadorna tadorna

Key facts

Conservation listings:	Global: amber (breeding population decline & international importance; non-breeding localisation & international importance)
Long-term trend:	UK: probable increase
Population size:	15,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

Shelducks occurred on relatively few CBC plots, most of which were close to a coast or an estuary, and it is unclear how well the CBC trend represented the UK breeding population. The CBC showed a substantial increase from the mid 1960s until the early 1980s, some decrease during the 1980s, and stability during the 1990s, although the wide confidence intervals provide scope for other interpretations. Population increase was associated with expansion of range, measured as an additional 20% of occupied 10-km squares in Britain between 1968-72 and 1988-91 (Gibbons et al. 1993). The UK winter Shelduck population rose during the 1960s and 1970s, alongside the rise in breeding numbers, but has been falling again since the mid 1990s (Frost et al. 2017). The BBS index is affected by occasional large counts, and therefore its confidence intervals are again relatively wide. BBS results show no clear population trend since 1994, but there has been further expansion of breeding population (Balmer et al. 2013). There has been widespread moderate increase across Europe since 1991 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in 1999, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC all habitats	31	1968-1999	18	300	94	787		Small CBC sample
	25	1974-1999	21	12	-40	118		Small CBC sample
	10	1989-1999	21	3	-21	40		Small CBC sample
	5	1994-1999	23	4	-18	39		
BBS UK	20	1995-2015	153	-5	-40	33		
	10	2005-2015	177	-9	-22	4		
	5	2010-2015	185	-2	-17	15		
BBS England	20	1995-2015	124	29	-13	60		
	10	2005-2015	143	5	-10	21		
	5	2010-2015	148	5	-13	27		

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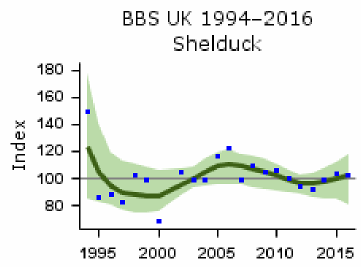
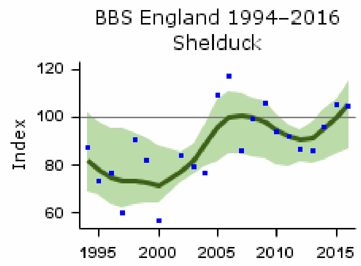
Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green



Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green



Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Gadwall

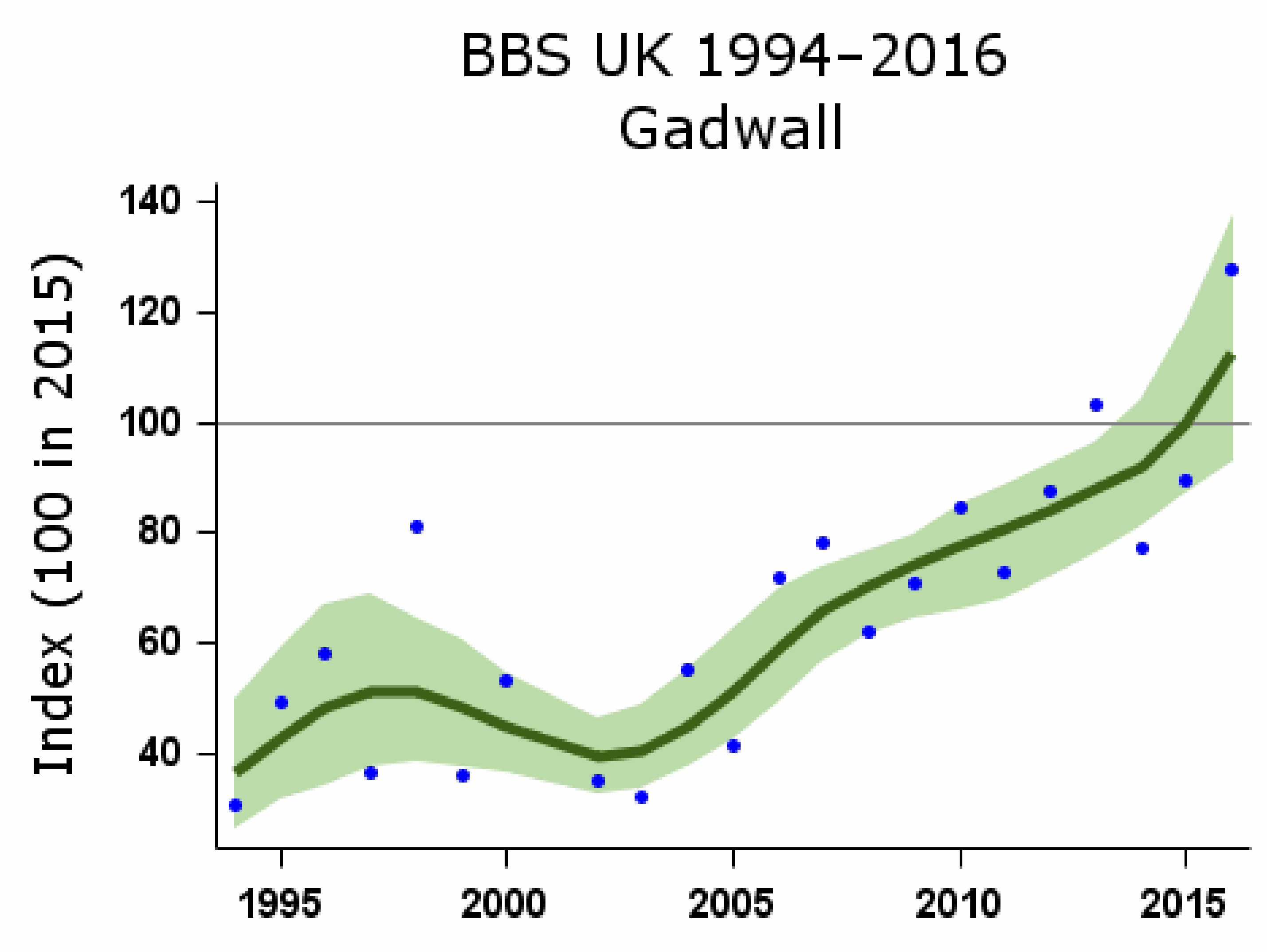
Mareca strepera

Key facts

Conservation listings:	Global: amber (non-breeding international importance); former RBBP species
Long-term trend:	UK, England: rapid increase
Population size:	690-1,730 pairs in 2006-09 (APEP13: RBBP data)

Status summary

Since wildfowlers released a wing-clipped pair of migrants in Norfolk in 1850, far from their native UK breeding distribution in Scotland, the breeding distribution of Gadwall has expanded and now covers much of lowland Britain, though with many gaps still in the west of the country (Balmer et al. 2013). Range expansion has been rapid since the 1950s. Numbers have recently surpassed the level where a BBS trend can be calculated: further strong increases are indicated and the population may even have redoubled over the latest 10-year period. Winter numbers, which include many continental visitors, are also rising strongly in England, Wales and Scotland but are fluctuating in Northern Ireland (Frost et al. 2017).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	42	131	42	286		
	10	2005-2015	55	95	47	169		
	5	2010-2015	61	29	11	62		
BBS England	20	1995-2015	40	121	29	304		
	10	2005-2015	53	114	62	185		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	59	25	5	68		

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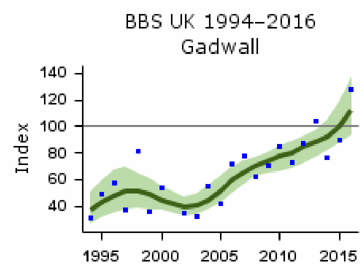
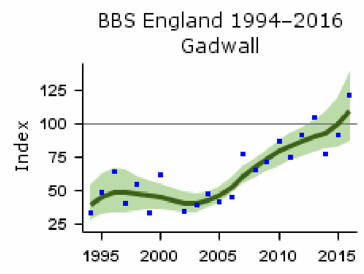


BBS UK graph



BBS England graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Mallard

Anas platyrhynchos

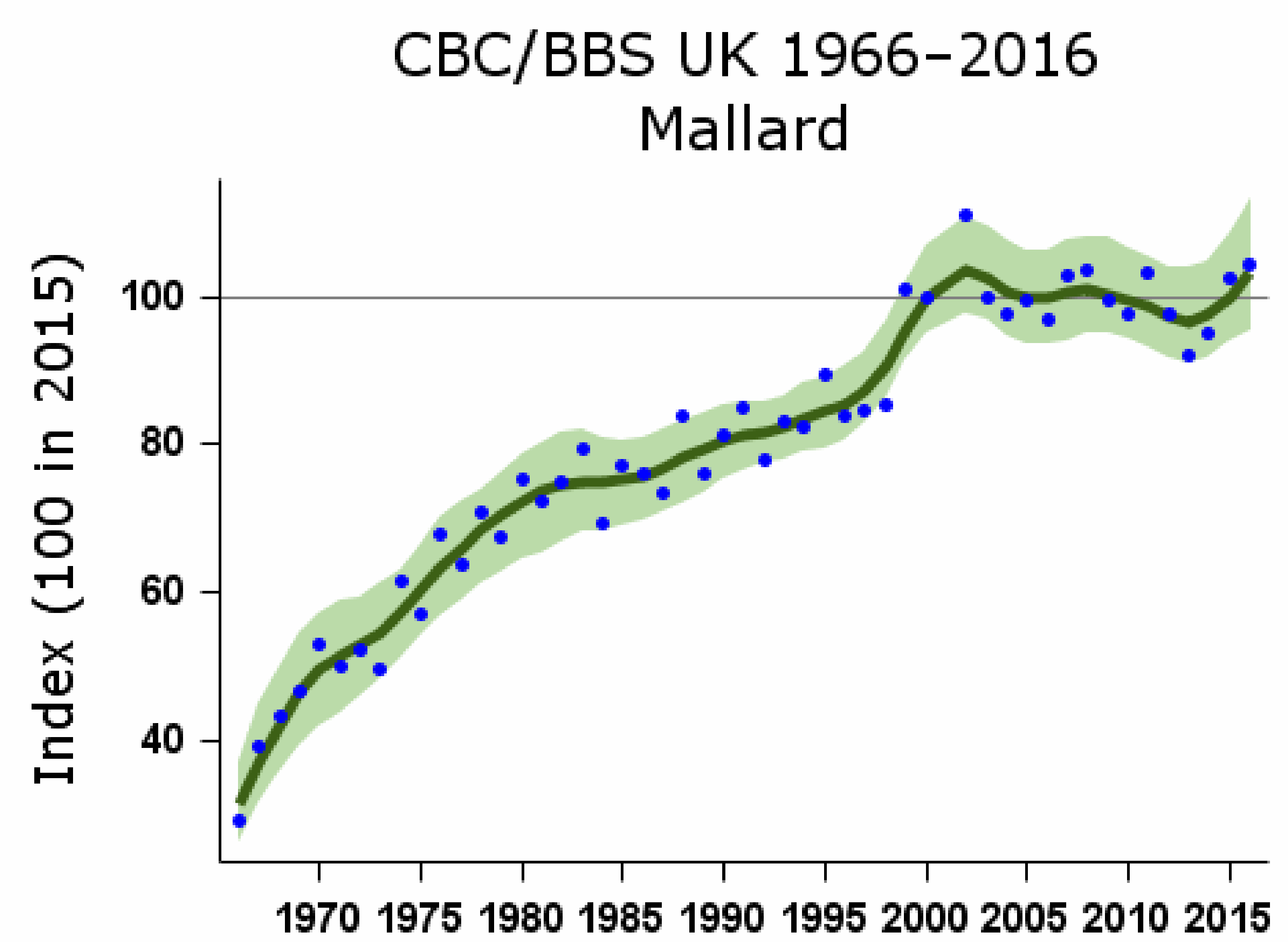
Key facts

Conservation listings:	Global: amber (non-breeding population decline)
Long-term trend:	UK, England: rapid increase
Population size:	61,000-146,000 pairs in 2009 (APEP13: 1988-91 estimate (APEP06) updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

The Mallard increased steadily as a breeding bird in the UK from the 1960s to around 2000, especially in England, with the trend levelling off since then. The BBS Frost et al. 2017). The species has recently been moved from the green to the amber list on the strength of this decline in the UK wintering population. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	673	169	105	246		
	25	1990-2015	1190	24	11	42		
	10	2005-2015	1693	0	-6	8		
	5	2010-2015	1738	0	-5	7		
CBC/BBS England	48	1967-2015	566	204	132	275		
	25	1990-2015	999	33	17	52		
	10	2005-2015	1424	0	-7	8		
	5	2010-2015	1452	-1	-7	6		
WBS/WBBS waterways	40	1975-2015	174	181	110	254		
	25	1990-2015	226	38	18	58		
	10	2005-2015	277	-7	-13	-1		
	5	2010-2015	255	-10	-15	-4		
BBS UK	20	1995-2015	1395	18	8	32		
	10	2005-2015	1693	0	-6	6		
	5	2010-2015	1738	0	-5	7		
BBS England	20	1995-2015	1170	28	16	43		
	10	2005-2015	1424	-1	-7	7		
	5	2010-2015	1452	-1	-6	5		
BBS Scotland	20	1995-2015	114	-12	-26	6		
	10	2005-2015	134	-1	-18	17		
	5	2010-2015	144	6	-10	28		
BBS Wales	20	1995-2015	72	-12	-47	47		
	10	2005-2015	84	0	-26	25		
	5	2010-2015	89	4	-16	28		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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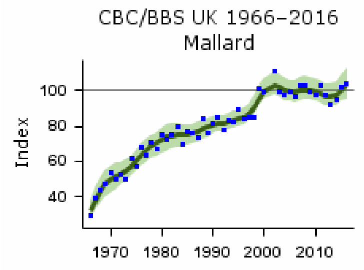
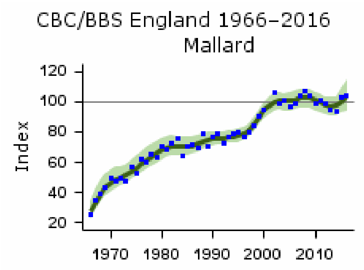
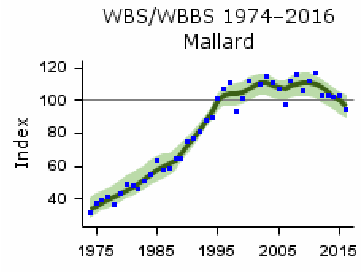


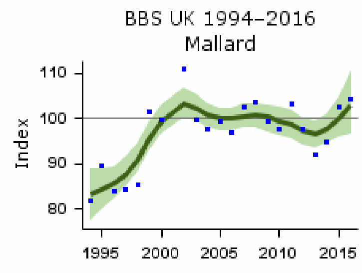
CBC/BBS UK graph



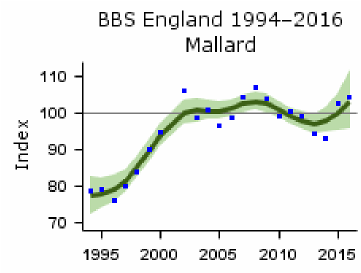
CBC/BBS England graph



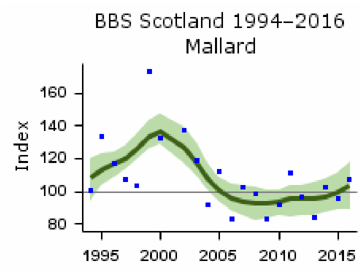
WBS/WBBS waterways graph



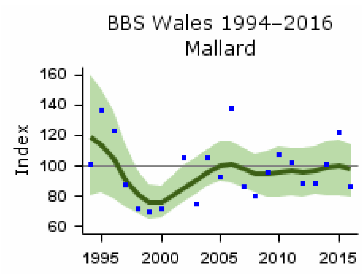
BBS UK graph



BBS England graph

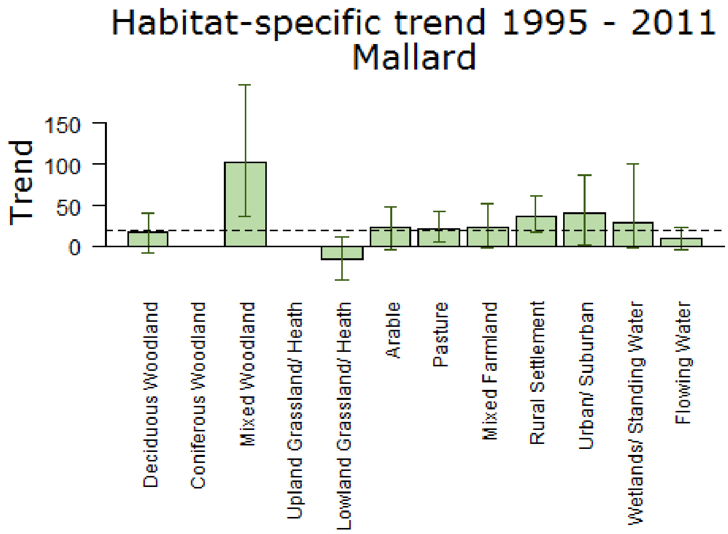


BBS Scotland graph



BBS Wales graph

Population trends by habitat



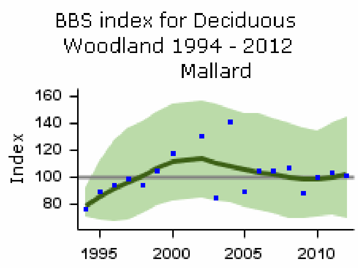
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

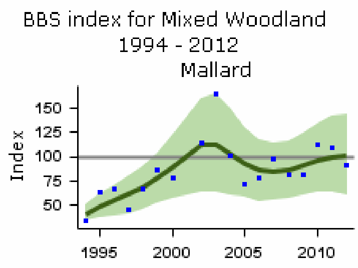
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	163	17	-8	40
Mixed Woodland	16	1995-2011	72	102	38	197
Lowland Grassland/ Heath	16	1995-2011	35	-15	-40	12
Arable	16	1995-2011	184	23	-3	48
Pasture	16	1995-2011	386	21	5	42
Mixed Farmland	16	1995-2011	147	23	-2	53
Rural Settlement	16	1995-2011	180	36	18	63
Urban/ Suburban	16	1995-2011	106	40	3	87
Wetlands/ Standing Water	16	1995-2011	89	29	-2	101
Flowing Water	16	1995-2011	354	10	-3	23

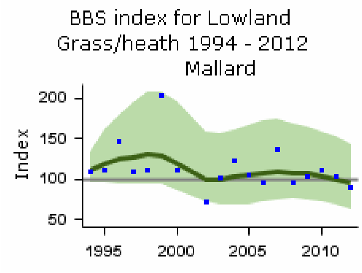
Further information on habitat-specific trends, please follow link here.



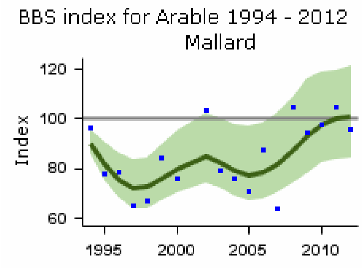
Habitat graph



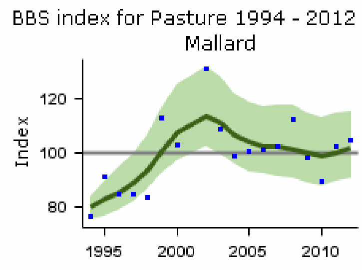
Habitat graph



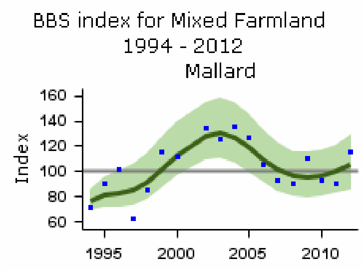
Habitat graph



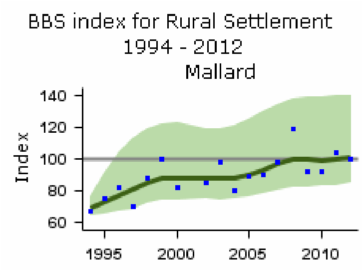
Habitat graph



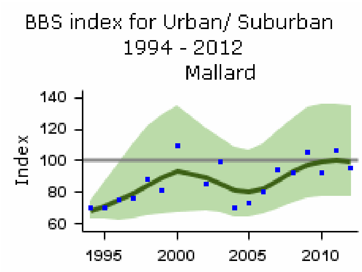
Habitat graph



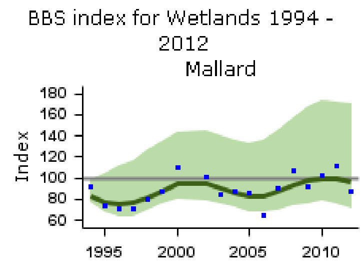
Habitat graph



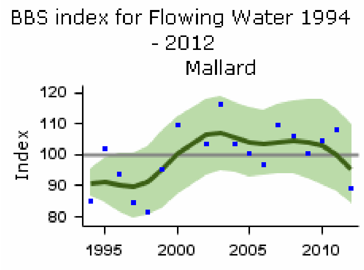
Habitat graph



Habitat graph



Habitat graph

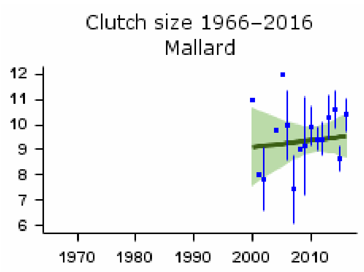


Habitat graph

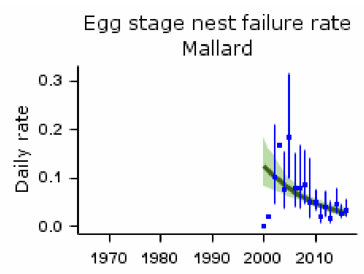
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	15	2000-2015	11	None					Small sample
Nest failure rate at egg stage	15	2000-2015	17	Linear decline	12.50% nests/day	2.91% nests/day	-76.7%		Small sample
Nest failure rate at chick stage	15	2000-2015	7	Linear increase	0.04% nests/day	1.61% nests/day	3925.0%		Small sample
Laying date	14	2001-2015	6	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is little good evidence available regarding the drivers of the breeding population increase in this species in the UK.

Change factor	Primary driver	Secondary driver

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

There are no demographic trends available for this species and there is very little evidence generally relating to the causes of the population increases in the UK.

Mallards originating from domesticated birds and not resembling wild-type birds in either plumage or behaviour are very abundant but perhaps under-represented in survey data, especially since many individuals might appear to be semi-captive. A large part of the increase in breeding numbers may be attributable to such birds, rather than to true-bred stock. It is also likely that increases may be at least partly attributable to ongoing large-scale releases for shooting (Marchant et al. 1990). In a study in central France, Champagnon et al. (2016), found that overall survival rate of released birds was low, and equivalent to half the first-year survival of wild Mallards in the same area. Nonetheless, they estimated that a minimum of 34% of the Mallards in the region at the start of the next breeding season were of captive origin.

Declines in wintering numbers have been linked to a decrease in continental immigration (Mitchell et al. 2002, Sauter et al. 2010). The effects of ingested lead gunshot has also been identified as a possible cause of declines in wintering numbers. Analysis of the trends for eight duck species, including Mallard, identified a significant negative correlation between levels of ingested lead gunshot and population changes, and did not find any evidence to support a link to decreased immigration (Green & Pain 2016 1990). Guillemain et al. (2010) found trends of increasing average body mass of Mallard in France which were large enough to have major fitness consequences with respect to winter survival, suggesting that overwinter survival has not decreased. Overwinter loss was investigated in Mallard at 35 inland waters in the Midlands and southern England (Hill 1984). Duckling mortality was the key factor, explaining 58% of total mortality between years and this was weakly density dependent. Overwinter loss was higher following years when a large number of young were produced and was the main regulatory factor.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Mandarin Duck

Aix galericulata

Key facts

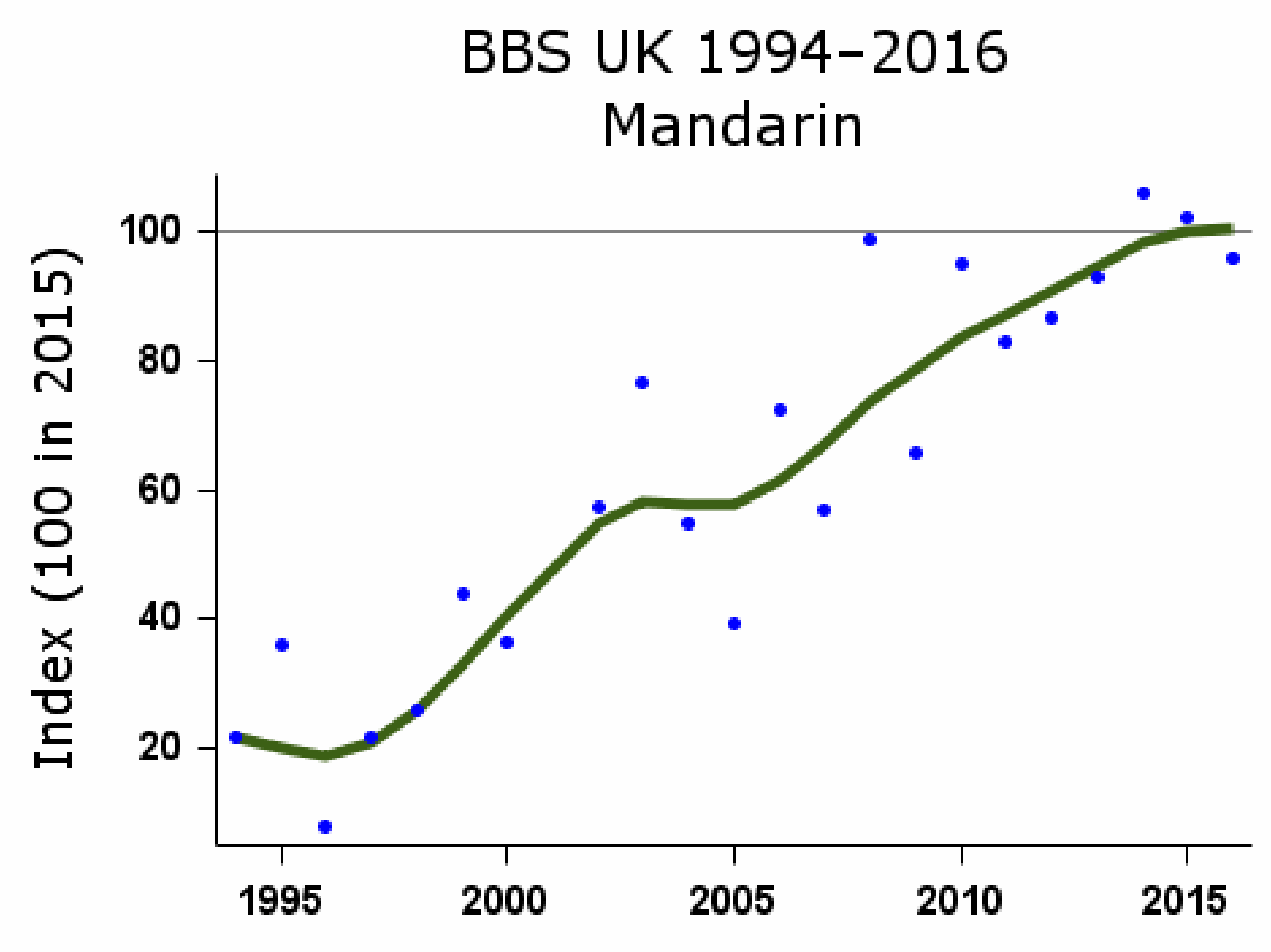
Conservation listings:	Global: Least Concern Europe: unlisted (introduced) UK: unlisted (introduced)
Long-term trend:	UK, England: increase
Population size:	2,300 pairs in 1988 (APEP13: major range expansion has occurred since this estimate was made)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Omnivorous (mostly vegetation)
Winter diet:	Mostly Vegetation

Status summary

The Mandarin Duck is native to Asia and became established in the UK in the early 1930s in the Virginia Water and Windsor Great Park area (Surrey/Berkshire), following release of stock which had been shipped from China to Paris (Lever 2013). This became the centre of the initial main population of Mandarin Ducks breeding in the wild in the UK, although other free-flying birds also bred in other localities. By 1988, the population was estimated at 7,000 individuals in winter (Davies 1988) which was used by Musgrove et al. (APEP13) to produce a breeding estimate of 2,300 pairs. Considerable range expansion has occurred since, particularly in central and southern England, and Mandarin Duck is now breeding in all four countries of the UK. The range increased by 123% between 1988-91 and 2007-11 (Balmer et al. 2013). BBS shows a steady increase in numbers since 1994. Although the habitat used by Mandarin Duck is generally not well covered by WeBS, this survey also shows a similar pattern since 1993 (Frost et al. 2017).

The species may have benefited from its ability to fill a vacant ecological niche in southern England, as a cavity nesting duck species, although following its range expansion it may come in to conflict with Goldeneye and Goosander in the north of the UK.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	10	2005-2015	47	73	.	.		
	5	2010-2015	56	20	.	.		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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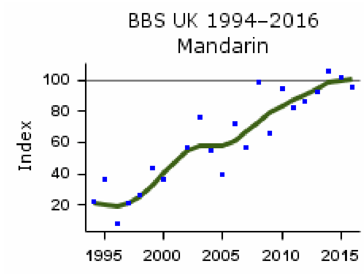

BBS UK graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

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Tufted Duck

Aythya fuligula

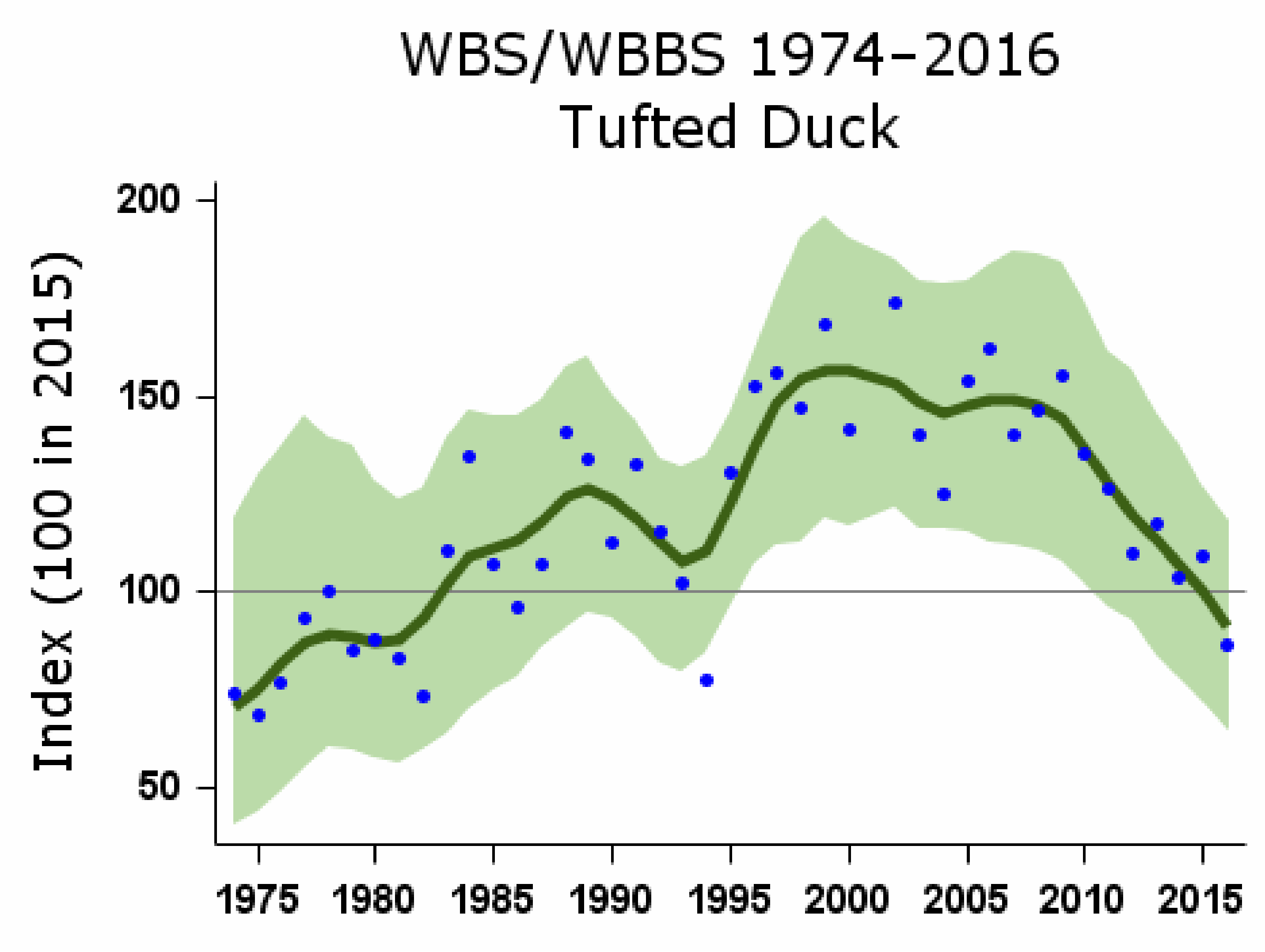
Key facts

Conservation listings:	Global: green
Long-term trend:	possible increase
Population size:	16,000-19,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

The colonisation of the UK by Tufted Ducks, which began in 1849, was aided by the spread of the zebra mussel Dreissena polymorpha, a non-native invasive species that had been introduced accidentally to Britain a few decades earlier. The long-term increase shown by WBS/WBBS, and the increase in range in Britain between the three atlas periods (Gibbons et al. 1993, Balmer et al. 2013) indicate that population expansion and in-filling of range are still occurring, although WBS/WBBS data since around 2010 suggest a recent downturn, and the long-term increase measured by this survey is no longer statistically significant. However, this recent trend contrasts with BBS data which show significant increase since 1994 in the UK as a whole. The species' winter trend in the UK since the 1960s, which includes many continental visitors, is also shallowly upward, but with little recent change (Frost et al. 2017).

Moderate recent declines elsewhere in northern Europe resulted in a period on the amber list in the UK from 2009-15, but the species is now green listed once more (Eaton et al. 2015). In Finland, there was a highly significant difference between stable trends in oligotrophic wetlands and declines in eutrophic wetlands from 1986 to 2013 (Lehikoinen et al. 2016).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	37	32	-41	182		
	25	1990-2015	47	-19	-52	35		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	52	-32	-49	-11	>25	
	5	2010-2015	47	-27	-45	-7	>25	
BBS UK	20	1995-2015	164	43	12	77		
	10	2005-2015	193	13	-4	37		
	5	2010-2015	202	6	-7	21		
BBS England	20	1995-2015	142	26	0	56		
	10	2005-2015	168	6	-10	25		
	5	2010-2015	175	-3	-15	11		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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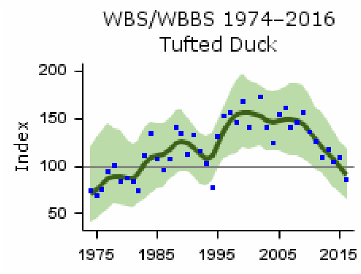
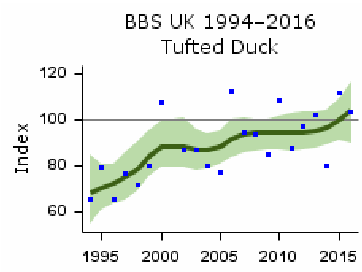
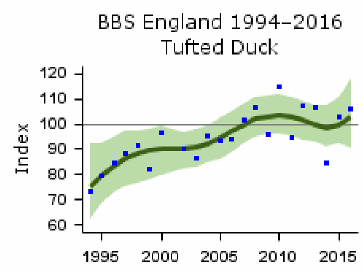


WBS/WBBS waterways graph

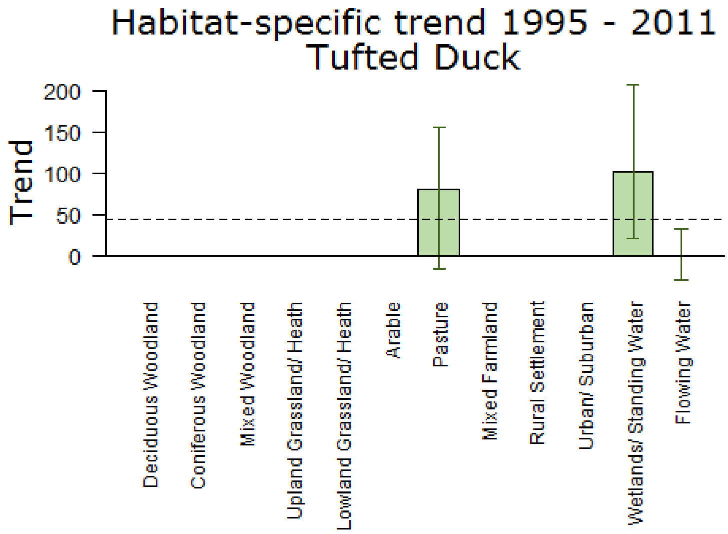


BBS UK graph



BBS England graph

Population trends by habitat



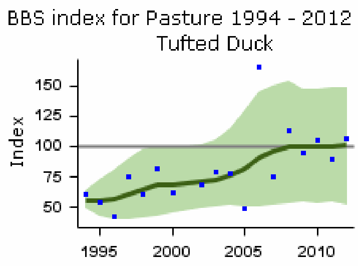
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

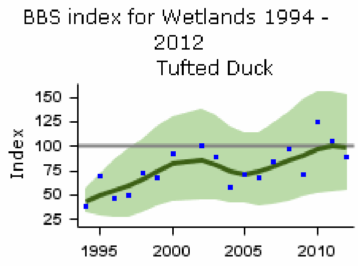
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Pasture	16	1995-2011	40	81	-16	156
Wetlands/ Standing Water	16	1995-2011	32	102	20	207
Flowing Water	16	1995-2011	66	-1	-28	32

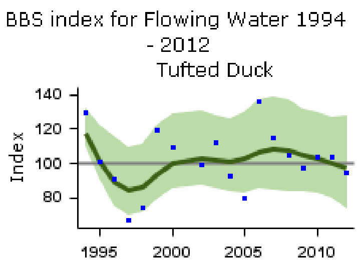
Further information on habitat-specific trends, please follow link here.



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	14	2001-2015	4	None					Small sample
Nest failure rate at egg stage	17	1998-2015	4	None					Small sample
Nest failure rate at chick stage	17	1998-2015	3	None					Small sample
Laying date	11	2004-2015	4	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

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Goosander

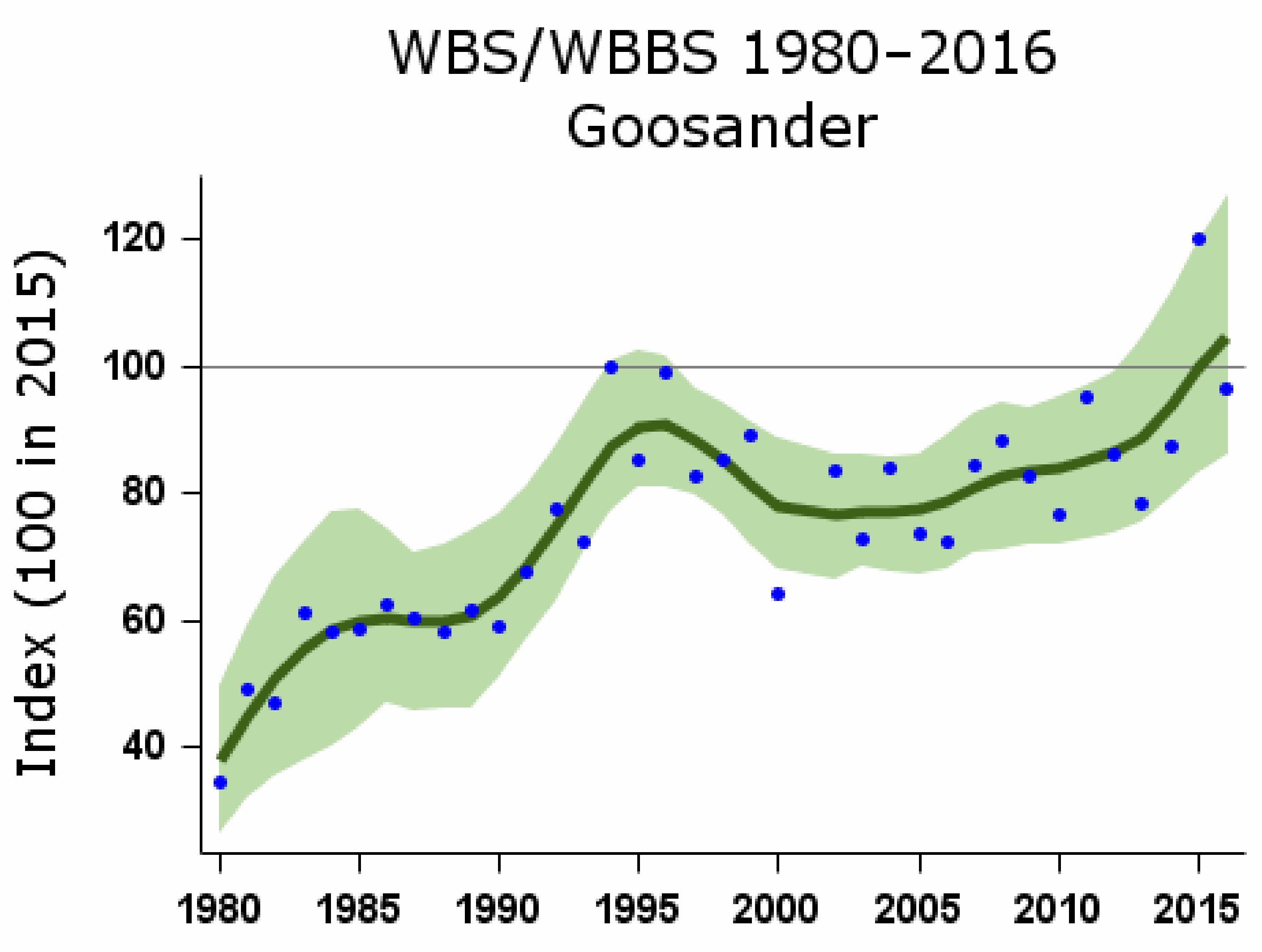
Mergus merganser

Key facts

Conservation listings:	Global: green
Long-term trend:	UK waterways: rapid increase
Population size:	3,500 (3,100-3,800) pairs in 2009 (APEP13: 1987 estimate (Gregory et al. 1997) updated using WBS/WBBS trend)

Status summary

Goosanders were first discovered to have colonised the UK in Perthshire in 1871, and spread from Scotland into northern England in the 1940s (Holloway 1996). Between the first two breeding atlases, the species expanded its range in northern England, and colonised Wales and southwest England. WBS samples became large enough for annual monitoring in 1980, and showed sustained population increase, apart from a slight dip in the late 1990s. The BTO's two national surveys of sawbills demonstrated an average increase in population size of 3% per annum between 1987 and 1997 (Rehfisch et al. 1999). There has been considerable further range expansion since 1990 (Balmer et al. 2013). Reasons for the colonisation of the UK, and the subsequent range expansion and population increase, are unknown. The species' winter trend in Britain, comprising British breeders and continental visitors, rose steeply from the late 1960s and peaked in the mid 1990s, before falling back, and now stands at early 1990s levels (Frost et al. 2017).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

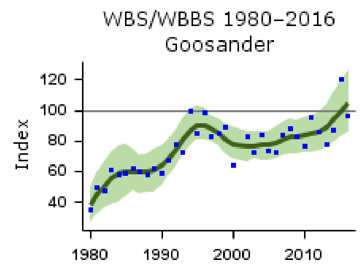
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	34	1981-2015	44	122	41	272		
	25	1990-2015	54	57	7	147		
	10	2005-2015	65	29	9	56		
	5	2010-2015	58	19	0	44		

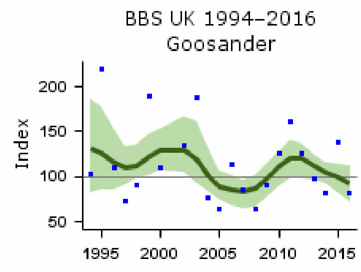
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	43	-21	-49	25		
	10	2005-2015	51	12	-19	37		
	5	2010-2015	55	-10	-36	27		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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



WBS/WBBS waterways graph



BBS UK graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Red-legged Partridge

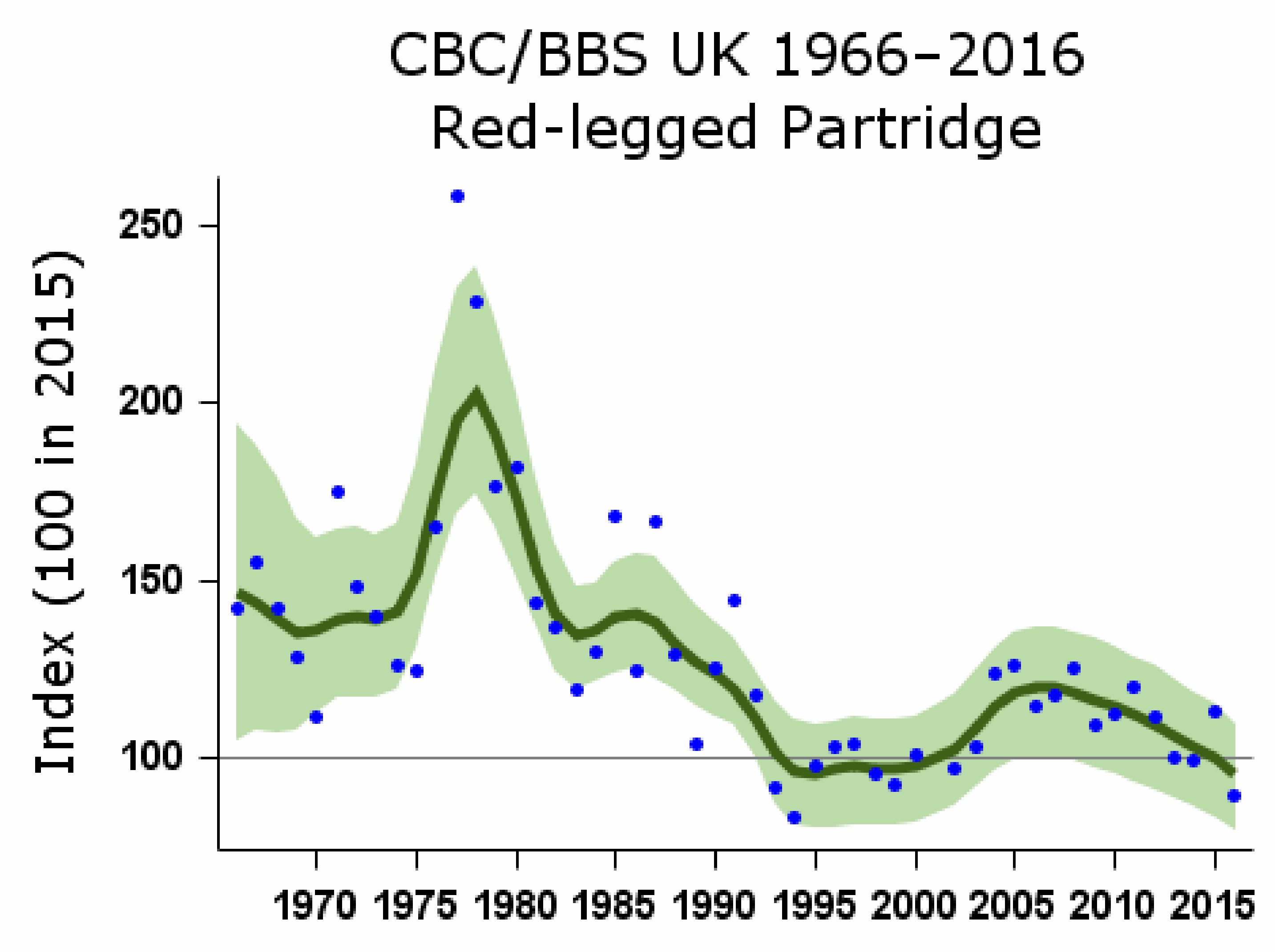
Alectoris rufa

Key facts

Conservation listings:	Global: Least Concern Europe: Least Concern UK: unlisted (introduced)
Long-term trend:	UK: possible moderate decline England: moderate decline
Population size:	82,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Since Red-legged Partridge is a non-native species released in the UK for the purpose of being shot by hunters, its long-term CBC/BBS population decrease in England raises no conservation concern. Significant increases shown in the UK and England during the first 10 years of BBS have been reversed during the second decade of BBS. PACEC 2006). The effects on native fauna of releases of such vast scale of this species and Watson et al. 2007). There has been widespread moderate decline across Europe since 1998 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

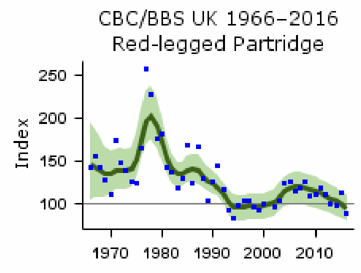
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	274	-30	-56	11		
	25	1990-2015	495	-19	-34	-4		
	10	2005-2015	719	-16	-21	-10		
	5	2010-2015	720	-13	-17	-7		

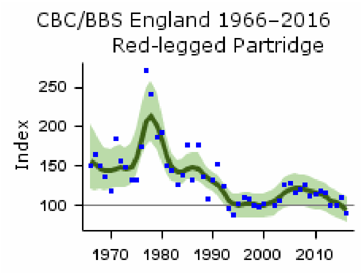
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	266	-34	-59	-2	>25	
	25	1990-2015	479	-23	-38	-10		
	10	2005-2015	691	-18	-23	-13		
	5	2010-2015	690	-14	-18	-9		
BBS UK	20	1995-2015	587	6	-4	17		
	10	2005-2015	719	-16	-21	-9		
	5	2010-2015	720	-13	-17	-7		
BBS England	20	1995-2015	568	0	-10	13		
	10	2005-2015	691	-17	-22	-12		
	5	2010-2015	690	-15	-19	-10		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

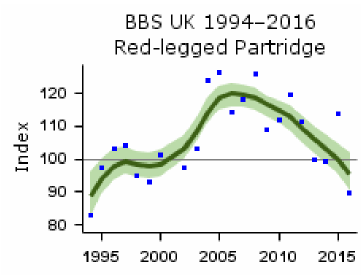
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



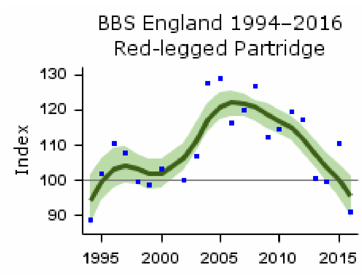
CBC/BBS UK graph



CBC/BBS England graph

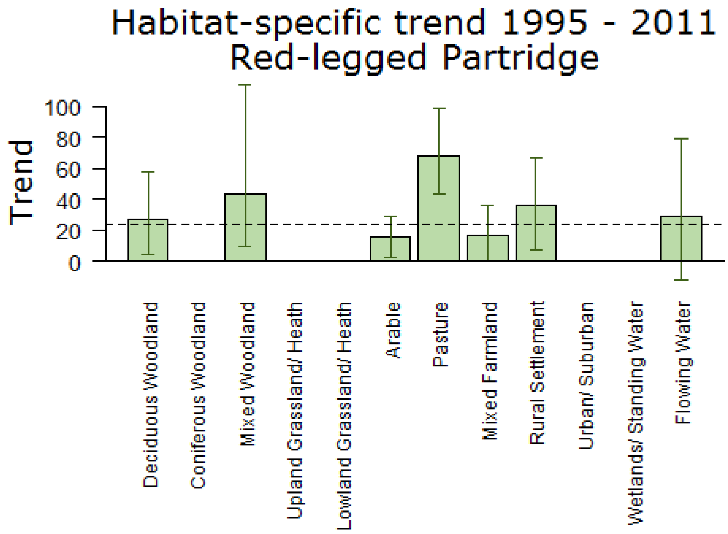


BBS UK graph



BBS England graph

Population trends by habitat



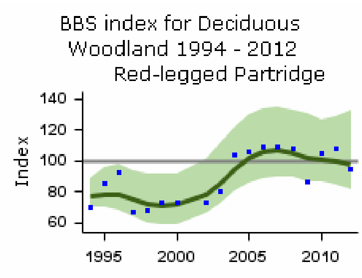
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

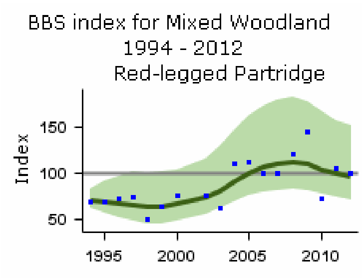
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	86	27	4	58
Mixed Woodland	16	1995-2011	40	43	9	114
Arable	16	1995-2011	264	16	3	30
Pasture	16	1995-2011	179	68	43	98
Mixed Farmland	16	1995-2011	158	17	1	37
Rural Settlement	16	1995-2011	102	37	7	67
Flowing Water	16	1995-2011	41	29	-12	79

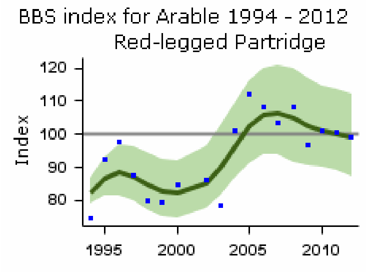
Further information on habitat-specific trends, please follow link here.



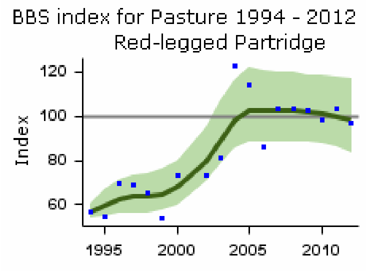
Habitat graph



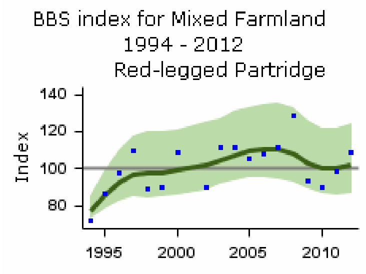
Habitat graph



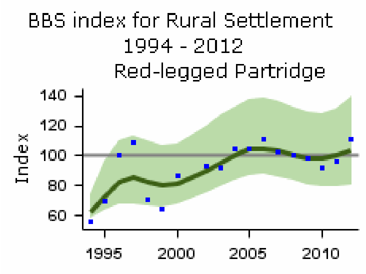
Habitat graph



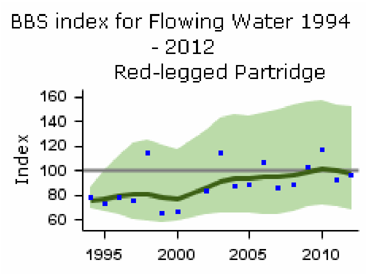
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Red Grouse

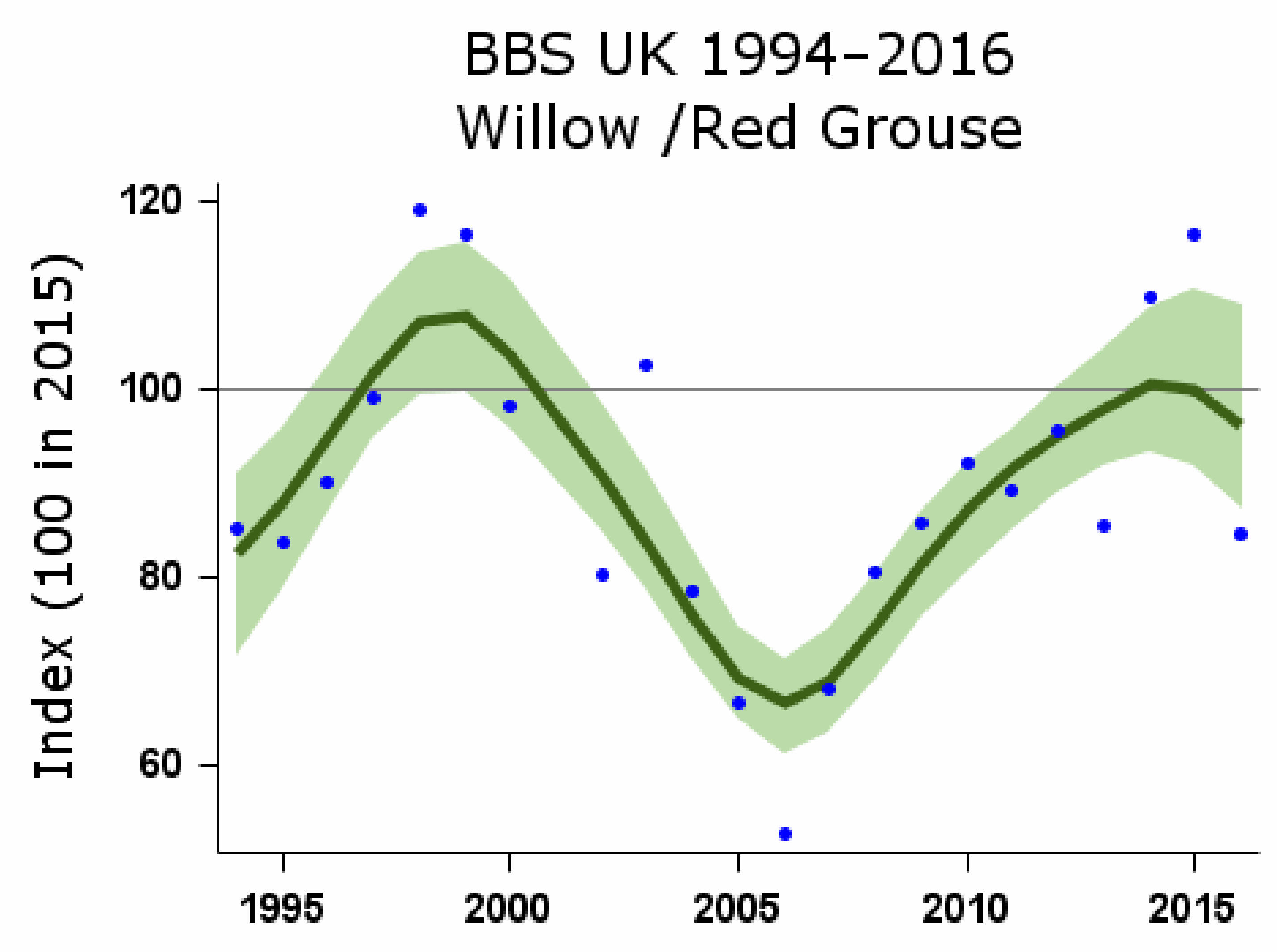
Lagopus lagopus

Key facts

Conservation listings:	Global: amber (European status)
Long-term trend:	UK: decline
Population size:	230,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using National Gamebag Census to 1995 and then by BBS trend)

Status summary

The distinctive dark-winged race scotica is endemic to Britain and Ireland and the vast bulk of its population occurs within the UK, thus conferring global significance to the UK trend. It is economically significant to some rural communities as a game bird and has benefited from intensive management of moorland (particularly in the east of the country) designed specifically to increase the numbers of grouse available to be shot. BBS shows fluctuations but no overall trend since 1994. Hudson 1992, Newton 2004). This prompted the move of the species from the green to the amber list in 2002. Following the 2015 review (Eaton et al. 2015), Red Grouse remains on the amber list as the species (as a whole) is considered 'Vulnerable' in a European context. Montane Fennoscandian populations also declined during 2002-12 (Lehikoinen et al. 2014), however it is no longer listed for population decline in the UK.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	151	13	-4	40		
	10	2005-2015	188	44	25	65		
	5	2010-2015	192	15	3	32		
BBS England	20	1995-2015	90	14	-11	56		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	128	45	19	63		
	5	2010-2015	127	16	0	32		
BBS Scotland	20	1995-2015	55	8	-13	34		
	10	2005-2015	54	34	11	61		
	5	2010-2015	59	11	-4	39		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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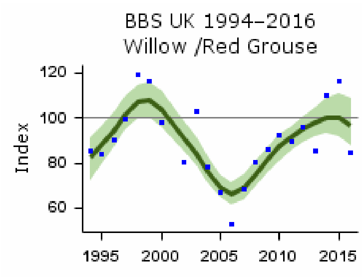
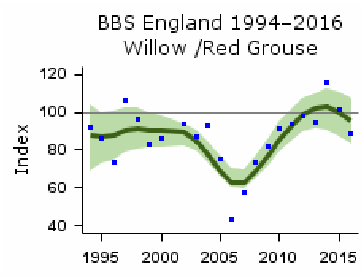
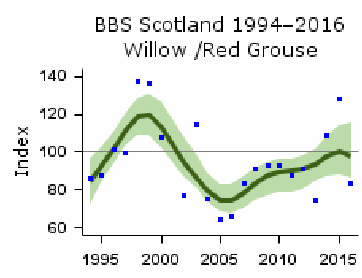


BBS UK graph



BBS England graph



BBS Scotland graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Causes of change

Longer-term trends in Red Grouse abundance are overlain by cycles, with periods that vary regionally, linked to the dynamics of infection by a nematode parasite and to interrelated variations in the aggressiveness of males in autumn.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

Given its economic significance, long-term population trends of Red Grouse are likely to be closely associated with changes in management practices (see below).

However, these trends appear to be overlain by cycles, with periods that vary regionally, linked to the dynamics of infection by a nematode parasite Trichostrongylus tenuis (Dobson & Hudson 1992, Gibbons et al. 1993) and to interrelated variations in the aggressiveness of males in autumn (Martinez-Padilla et al. 2014). Recent increases in the Red Grouse population have been attributed to the use of higher strengths of medicated grit (Thompson et al. 2016).

Strip burning of heather is undertaken to increase suitable habitat for Red Grouse, although the short-term effect is to reduce the abundance of birds using the recently burnt areas (Douglas et al. 2017). The wider environmental impacts of moorland management for grouse are contested (Thompson et al. 2016, Sotherton et al. 2017). In a study looking at four upland areas in the UK, higher Red Grouse abundance was correlated positively with higher predator control (Buchanan et al. 2017). However, raptor predation is believed not to affect breeding populations significantly, although it can reduce numbers in the post-breeding period (Redpath & Thirgood 1997). Thompson et al. 2009, 2016). The relative importance of predation and habitat management on numbers of Red Grouse, and other moorland birds, is the source of much debate with strongly opposing views (Thompson et al. 2016, Sotherton et al. 2017), which has consequences for wider moorland management and the bird populations that live there (Redpath & Thirgood 2009, Thompson et al. 2016).

Laying dates in the Scottish Highlands advanced by about ten days between 1992 and 2011, and were inversely correlated with pre-laying temperatures, but no overall effect of climate change on chick survival could be identified (Fletcher et al. 2013).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Grey Partridge

Perdix perdix

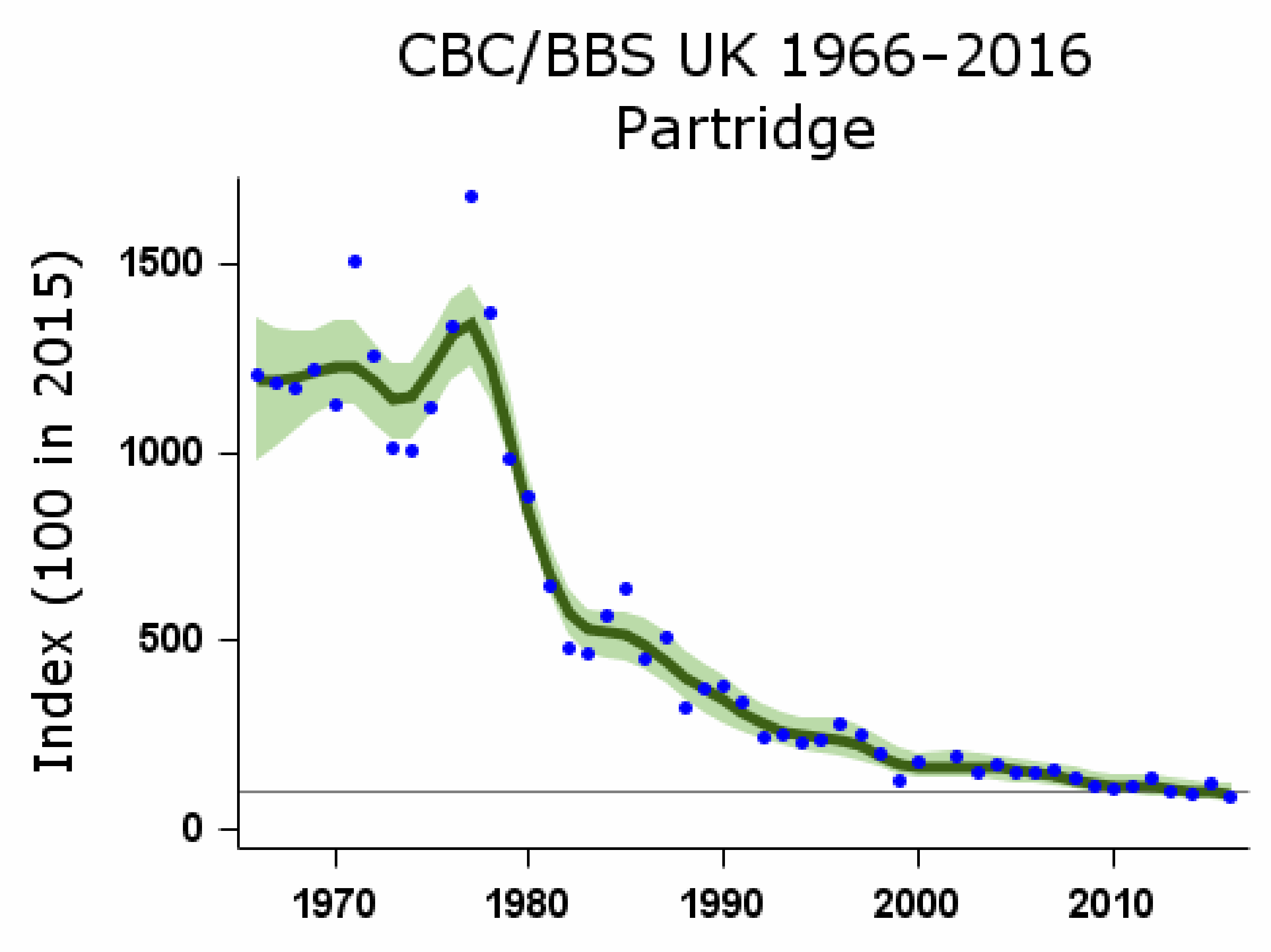
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK, England: rapid decline
Population size:	43,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

This native gamebird has declined enormously and, despite years of research and the application of a government biodiversity action plan, the continuing decline shown by CBC/BBS suggests that all efforts to boost the population in the wider countryside have so far been unsuccessful. Grey Partridge is one of the most strongly decreasing bird species in Europe (Kuijper et al. 2009, PECBMS 2009, PECBMS 2016a). Numbers can be artificially increased within shooting estates where nesting habitat can be provided and pesticide use restricted, but at the expense of corvids, mustelids and foxes (Sotherton et al. 2014).



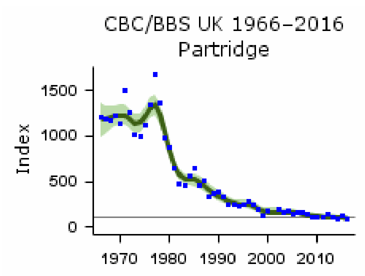
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

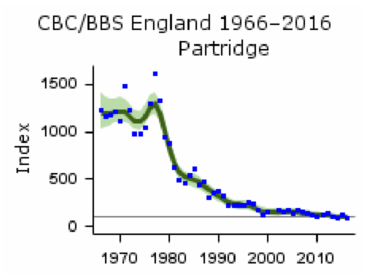
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	139	-92	-94	-88	>50	
	25	1990-2015	205	-71	-77	-63	>50	
	10	2005-2015	234	-37	-44	-26	>25	
	5	2010-2015	215	-16	-26	-4		
CBC/BBS England	48	1967-2015	125	-92	-95	-88	>50	
	25	1990-2015	184	-69	-77	-63	>50	
	10	2005-2015	212	-36	-43	-27	>25	
	5	2010-2015	194	-16	-26	-5		
BBS UK	20	1995-2015	227	-60	-66	-54	>50	
	10	2005-2015	234	-37	-45	-28	>25	
	5	2010-2015	215	-16	-27	-4		
BBS England	20	1995-2015	203	-57	-63	-49	>50	
	10	2005-2015	212	-36	-44	-26	>25	
	5	2010-2015	194	-16	-27	-2		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

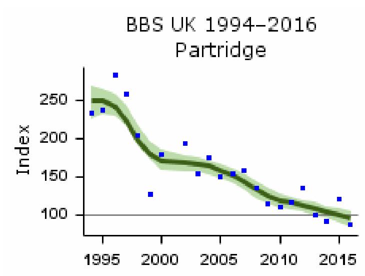
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



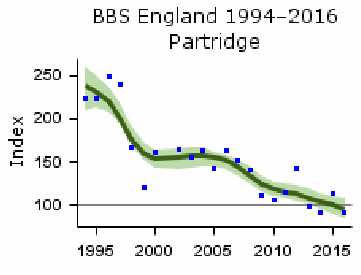
CBC/BBS UK graph



CBC/BBS England graph

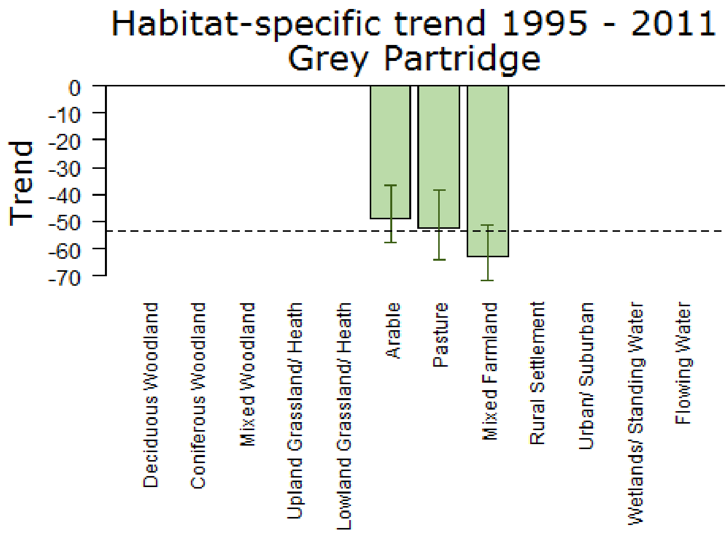


BBS UK graph



BBS England graph

Population trends by habitat



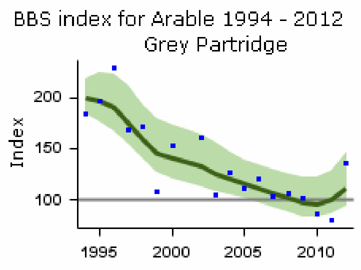
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

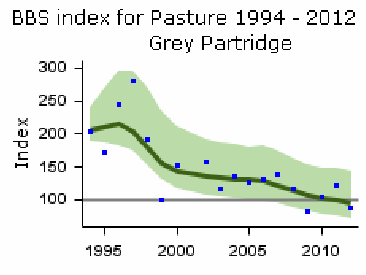
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Arable	16	1995-2011	91	-49	-58	-37
Pasture	16	1995-2011	68	-53	-64	-38
Mixed Farmland	16	1995-2011	51	-63	-71	-51

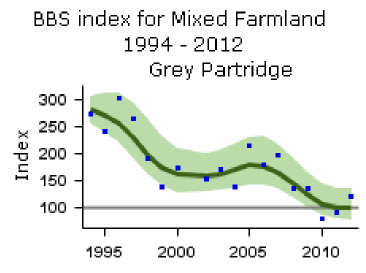
Further information on habitat-specific trends, please follow link here.



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Causes of change

The ultimate factor behind the decline is the deterioration of the bird's agricultural habitat. There is convincing evidence showing that a steep drop in chick survival rate as a result of decreasing chick food availability due to agricultural intensification is the primary driver of population declines. A reduction of hen survival rate during incubation, lower nest success and reduction of winter survival, related to increased predation rates, have all been reported as also playing secondary roles.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	Reduced adult survival
Ecological	Agricultural intensification	Increased predation

Further information on causes of change

The ultimate factor behind the decline of this species is the deterioration of the bird's agricultural habitat (Aebischer & Ewald 2004). A detailed field and modelling study in the 1980s provides excellent evidence relating to the ecology and population dynamics of the Grey Partridge in a large (62 sq km) study area in Sussex (Potts 1980, Potts 2012). Potts (1980, 2012) identified a reduction in chick survival during the first six weeks after hatching due to a herbicide-induced fall in cereal invertebrate abundance as the primary reason for the decline. More recently, the intensive use of broad-spectrum insecticides on cereals in the summer has been associated with a further reduction in average chick survival rate (Aebischer & Potts 1998). A field study involving an experimental set-up using sprayed and non-sprayed fields confirmed that invertebrate food supplies were important as it was shown that use of pesticides reduced food available to chicks, resulting in lower chick survival and thus depleting numbers of birds being recruited into the population (Rands 1985). Further support for this comes from Sotherton et al. (1993), who also both found that chick survival rate was lower in sprayed than in unsprayed areas. A tracking study found that breeding birds preferred unimproved rough grazing habitat on hill farms in north-east England. This habitat provided tall rushes as nesting cover and invertebrate food for chicks, especially sawfly larvae (Warren et al. 2017)

Potts also identified two other causes for the decline: the disappearance of nesting cover as field boundaries were removed to improve farming efficiency and lower brood production resulting from increased predation. There is evidence from various sources indicating that a reduction of hen survival rate during incubation, lower nest success and a reduction of winter survival, related to increased predation rates, have been influential in the continued population decrease from the 1970s (Potts & Aebischer 1995, Tapper et al. 1996, Bro et al. 2000, De Leo et al. 2004, Panek 2005).

Aebischer & Ewald (2010) offer convincing evidence that, since 2002, local Grey Partridge recoveries have been made possible by sympathetic management of rotational set-aside to provide cover for chicks. In an area of nearly 1,000 ha in Hertfordshire, set-aside was used for habitat creation and Grey Partridge breeding density increased sixfold. However, the disappearance of rotational set-aside in 2007, which halved the amount of brood-rearing habitat, with concurrent poor weather, reversed the increase and effectively removed this potential mechanism for national population recovery.

Overshooting due to the failure of hunters to separate Grey Partridges from Red-legs can have local population effects, but this is not likely to be a national problem (Aebischer & Ewald 2004). Aebischer & Ewald (2010) showed that on Partridge Count Scheme (PCS) sites, the annual change in spring density in recent years was not related to either shooting pressure or intensity of Red-legged Partridge releasing and suggest that provision of brood-rearing habitats and game cover increased with the latter, which probably counteracted the shooting losses of Grey Partridges on Red-legged Partridge shoots.

In some areas, parasite-mediated apparent competition with the Tompkins et al. 2000a, b). However, the evidence for this is conflicting, as Sage et al. (2002) found no deleterious fitness effects of the parasite and Browne et al. (2006) found that poor wild brood survival was indicative of low habitat and food quality rather than of a high rate of parasite infection.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Pheasant

Phasianus colchicus

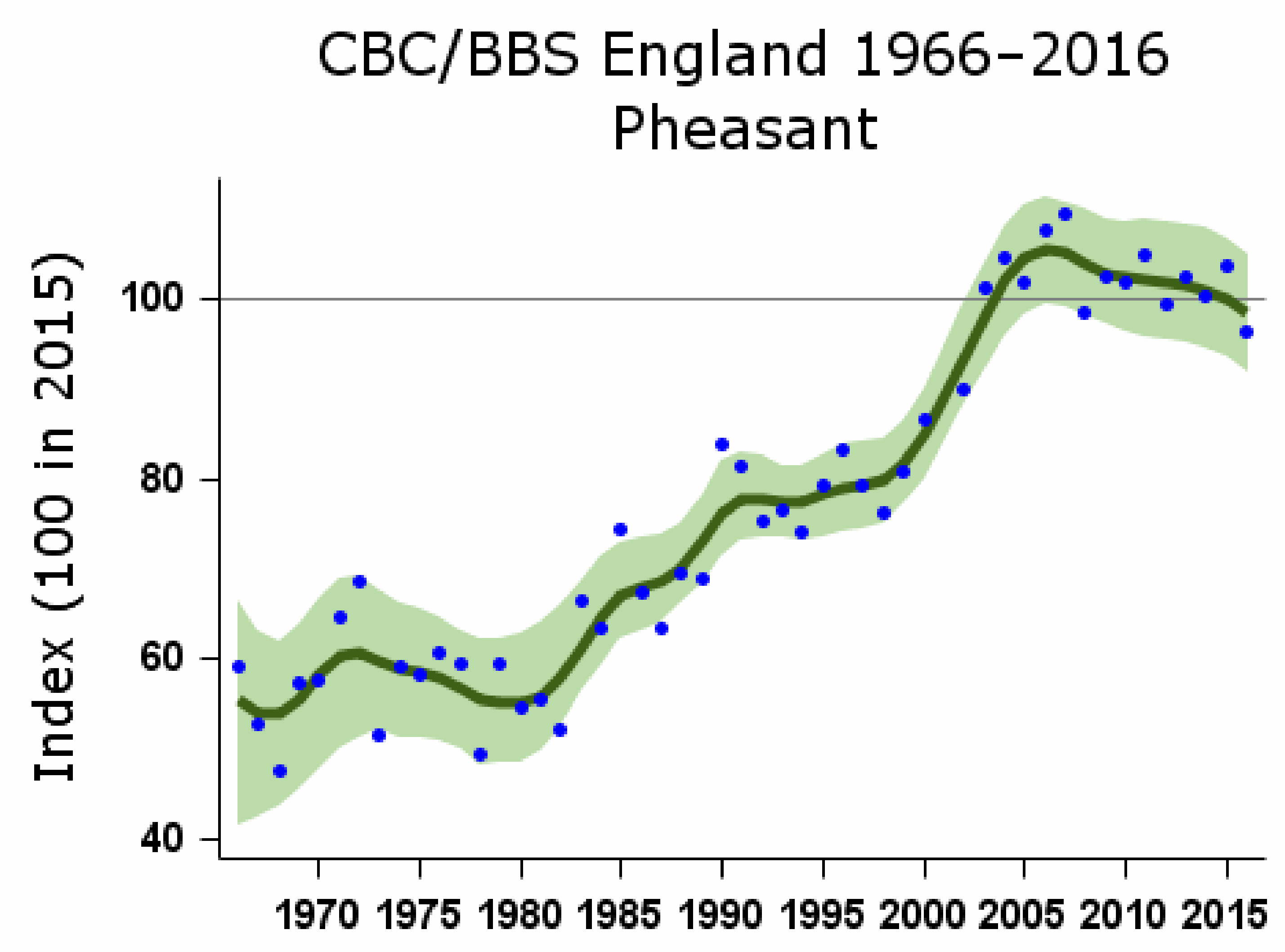
Key facts

Conservation listings:	Global: Least Concern Europe: Least Concern UK: unlisted (introduced)
Long-term trend:	England: moderate increase
Population size:	2.3 million females in 2009 (APEP13: 1988-91 Atlas estimate (Robertsonet al. 1989) updated using CBC/BBS trend for England); at least 35 million captive-reared birds released each autumn (PACEC 2006)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	Woodland
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

Pheasants have increased steeply in abundance since the 1960s. BBS shows shallow increases in England, Scotland and Wales, and a moderate increase in Northern Ireland, since 1994, with most of these increases occurring during the first ten years of the survey. During 1968-88, a period when the total biomass of birds in Britain fell by an estimated 10%, CBC data indicate that Pheasant biomass rose by about 2,500 tonnes - more than ten times more than any other species (Dolton & Brooke 1999). The increase has been fuelled by a concurrent steep rise in the numbers of Pheasants released onto shooting estates (PECBMS 2016a).



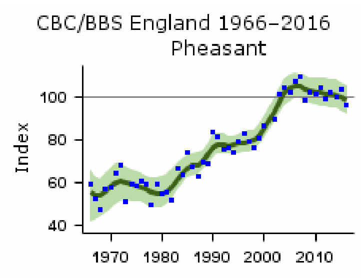
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

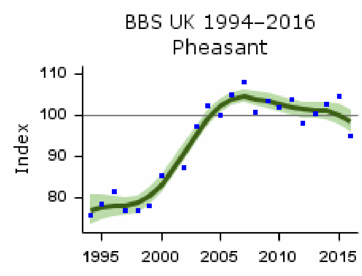
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	776	85	49	161		
	25	1990-2015	1397	31	17	46		
	10	2005-2015	2020	-4	-8	0		
	5	2010-2015	2049	-2	-5	1		
BBS UK	20	1995-2015	1949	29	22	37		
	10	2005-2015	2412	-2	-6	1		
	5	2010-2015	2449	-2	-5	1		
BBS England	20	1995-2015	1638	29	21	37		
	10	2005-2015	2020	-4	-8	0		
	5	2010-2015	2049	-2	-5	1		
BBS Scotland	20	1995-2015	155	20	0	38		
	10	2005-2015	195	10	-1	22		
	5	2010-2015	201	-1	-9	7		
BBS Wales	20	1995-2015	102	47	18	79		
	10	2005-2015	126	5	-8	21		
	5	2010-2015	129	10	-4	27		
BBS N.Ireland	20	1995-2015	43	89	10	157		
	10	2005-2015	55	-10	-27	14		
	5	2010-2015	55	-29	-41	-12	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

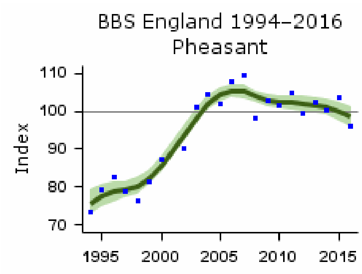
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



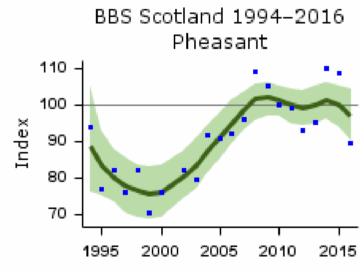
CBC/BBS England graph



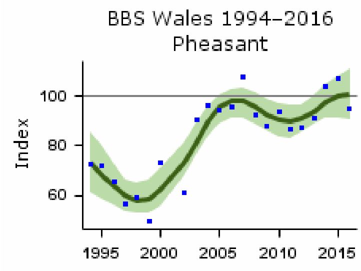
BBS UK graph



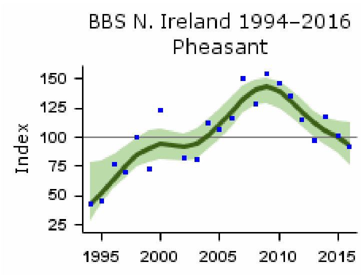
BBS England graph



BBS Scotland graph

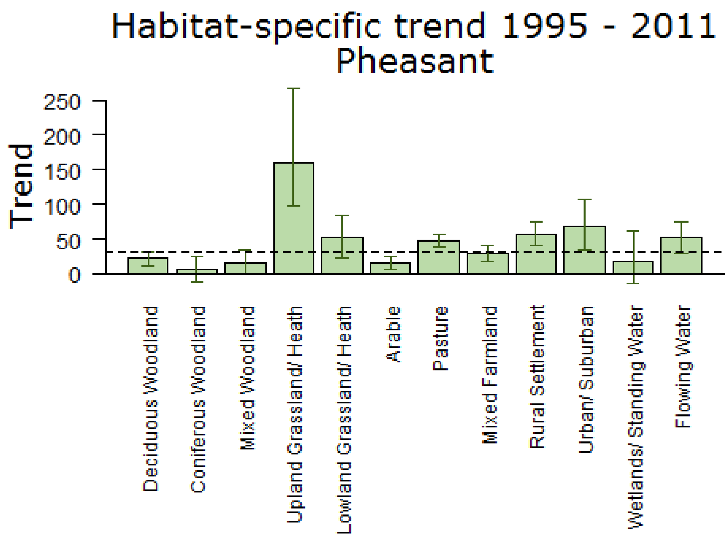


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

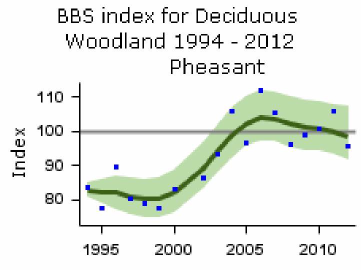
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

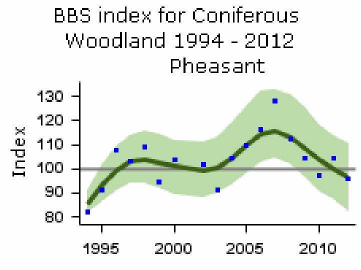
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	564	22	11	31

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Coniferous Woodland	16	1995-2011	123	8	-12	25
Mixed Woodland	16	1995-2011	318	15	0	34
Upland Grassland/ Heath	16	1995-2011	34	160	97	267
Lowland Grassland/ Heath	16	1995-2011	104	51	22	85
Arable	16	1995-2011	659	15	8	24
Pasture	16	1995-2011	961	49	39	58
Mixed Farmland	16	1995-2011	553	31	19	41
Rural Settlement	16	1995-2011	493	57	40	76
Urban/ Suburban	16	1995-2011	77	68	35	108
Wetlands/ Standing Water	16	1995-2011	51	18	-13	62
Flowing Water	16	1995-2011	287	52	29	74

Further information on habitat-specific trends, please follow link here.



Habitat graph



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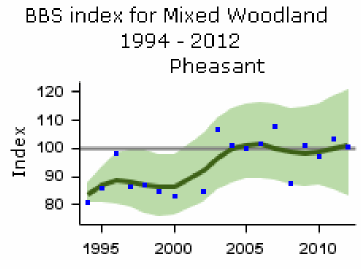
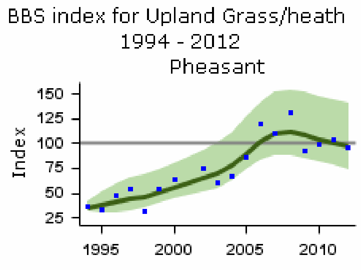
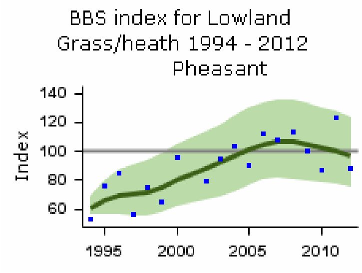


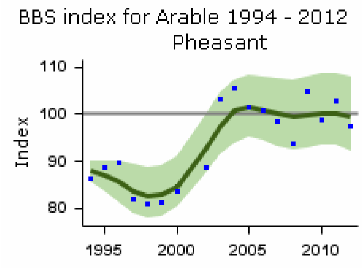
Habitat graph



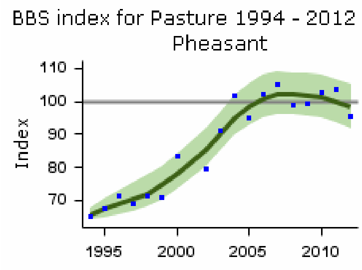
Habitat graph



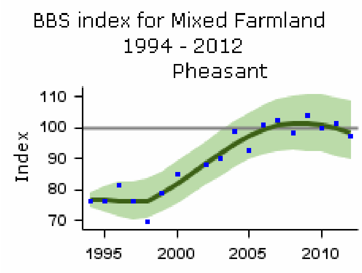
Habitat graph



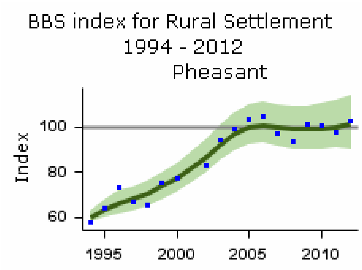
Habitat graph



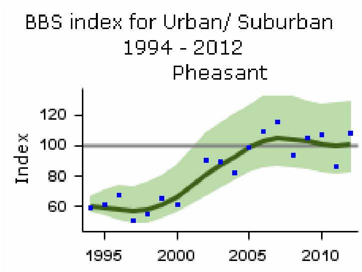
Habitat graph



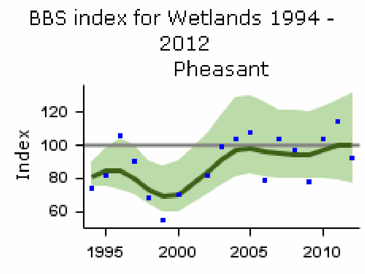
Habitat graph



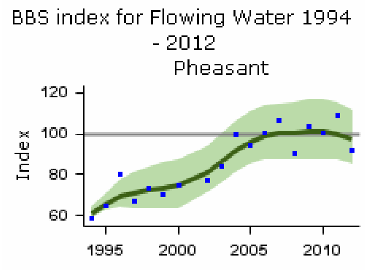
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Causes of change

The population size of this species is principally determined by releases of reared birds for shooting, which have increased sixfold since 1960. Little is known about the impacts of changes in demographic parameters among wild-breeding birds.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Other	

Further information on causes of change

It must be noted that numbers of this introduced gamebird are determined principally by releases of reared birds for shooting (Marchant et al. 1990). Such releases have increased approximately sixfold since 1960 (game-bag data) and were recently running at around 35 million birds annually (PACEC 2006). Robertson (1991) studied records of Pheasant nests from the Nest Record Scheme and found that productivity is probably too low to sustain a population. There is little else known about changes in demographic parameters of Pheasants in the UK.

High Pheasant densities potentially have negative effects, which have not been adequately studied, on native UK birds: these include their effect on the structure of the field layer in woodland, the spread of disease and parasites and competition for food (Fuller et al. 2005). Infection with caecal nematodes from farm-reared Pheasants may be contributing to the decline of Tompkins et al. 2000b), although Sage et al. (2002) found that this had no population impact.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Red-throated Diver

Gavia stellata

Key facts

Conservation listings:	Global: green; current RBBP species
Long-term trend:	UK: increase
Population size:	1,300 (1,000-1,600) pairs in 2006 (APEP13: Dillon et al. 2009), restated as 1,268 (937-1,722) pairs, with regional breakdown, by Wilson et al. (2015)

Status summary

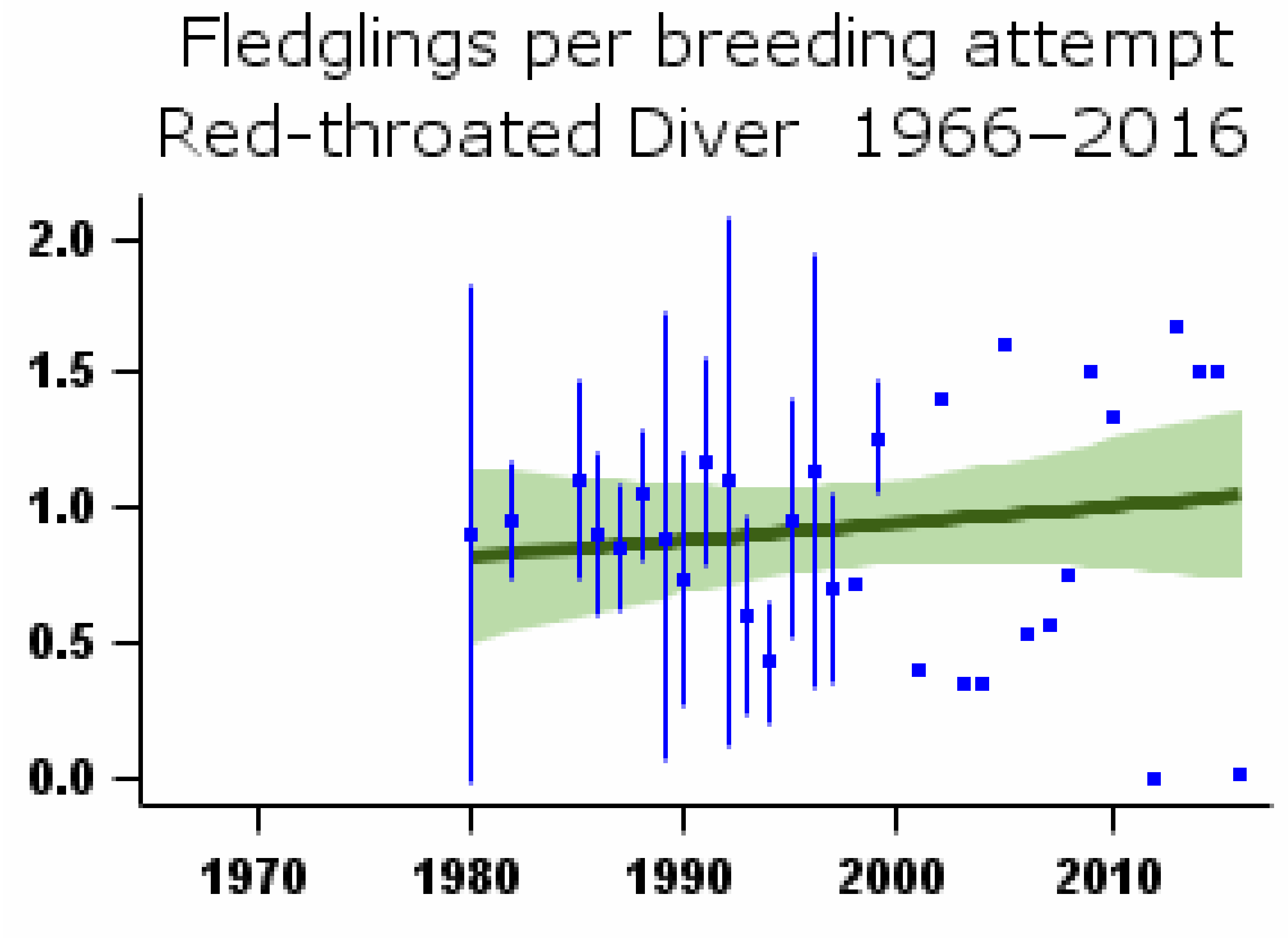
Breeding numbers are quite variable between years and not monitored annually by the BTO; trends are hard to assess except by intensive survey. There was a full UK survey in 1994 (935 pairs; Gibbons et al. 1997) and a repeat in 2006, by when the estimated UK breeding population had increased significantly by 34%, with stability in Shetland and Orkney but increase across the Hebrides and Scottish mainland (Dillon et al. 2009). Complete surveys of Shetland indicated a decrease of 36% there between 1983 and 1994 (Gomersall et al. 1984, Gibbons et al. 1997) and there was minor further decrease there by 2006 (Smith et al. 2009). The full surveys indicate that Shetland held 46% of the national total of breeding pairs in 1994 and 33% in 2006, though this decrease reflects the significant increases elsewhere in Scotland rather than the small decline in Shetland (Smith et al. 2009). JNCC's Mavor et al. 2008). Though previously amber listed through its 'depleted' status in Europe, the species was moved to the UK green list in 2015 (Eaton et al. 2015). Wintering numbers, mostly of birds from northern Europe, have shown a small overall increase (Frost et al. 2017).

Because food for chicks is obtained largely from the sea, a reliable supply of suitable marine prey nearby is a requirement for successful breeding. Red-throated Divers are thus vulnerable to losses of feeding grounds and to decreases in fish stocks. Shortages of sand eels have recently been a major factor in depressing breeding success in Shetland (Forrester et al. 2007). Since the 1980s, there may have been some tendency for more pairs to hatch a second chick, although two-chick broods are only occasional in Orkney and changes in the distribution of nests recorded might have influenced the results. In 2011, however, there were fewer two-chick broods in Shetland than in any year since at least 1979 (Holling et al. 2013).

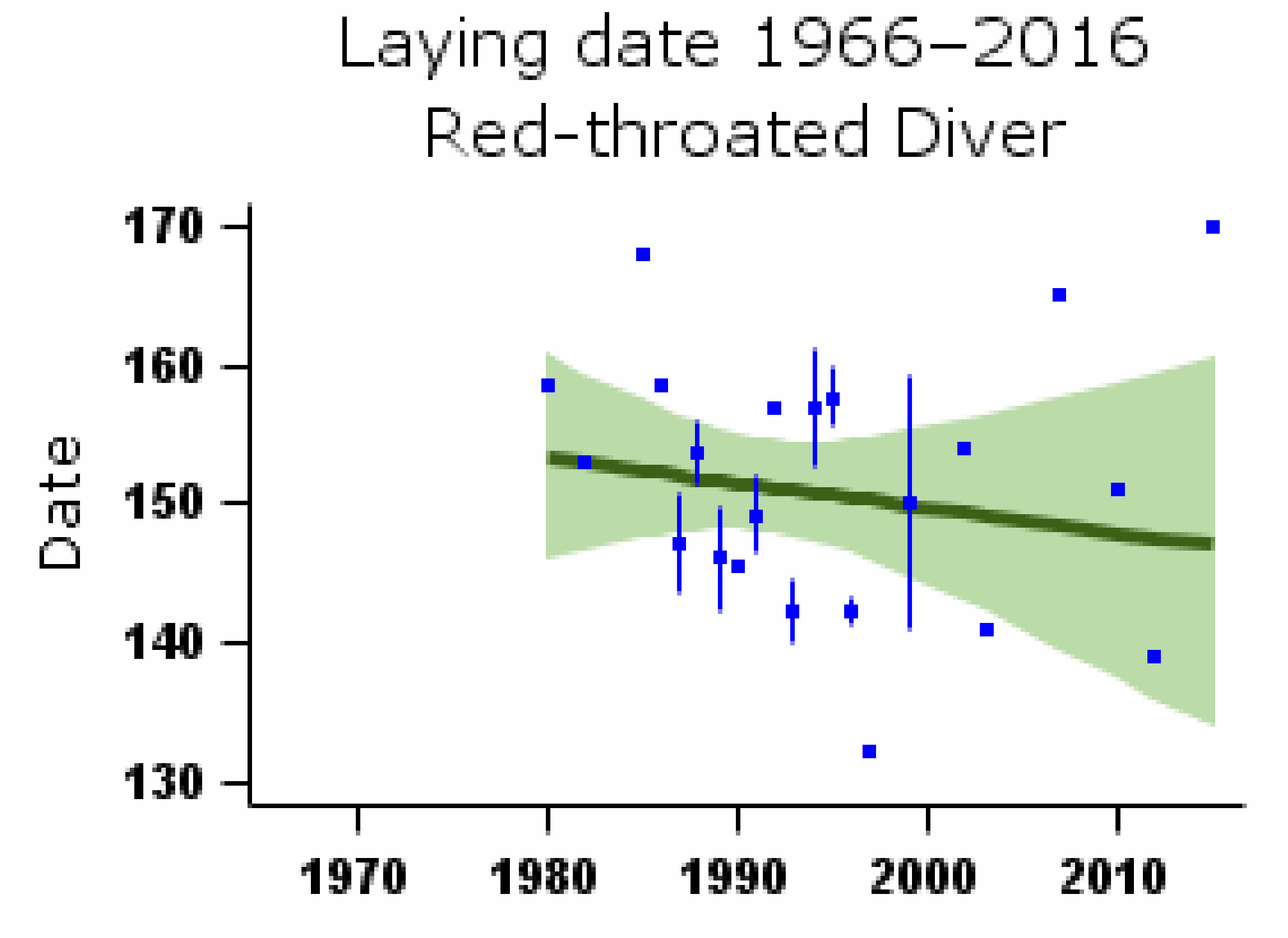
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

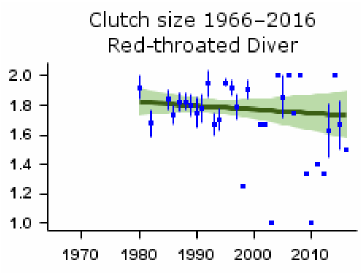


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

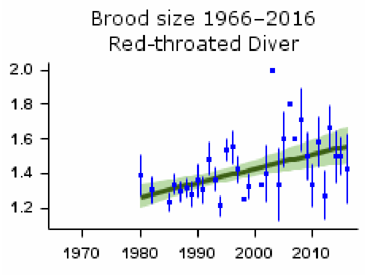
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	35	1980-2015	8	None					
Clutch size	35	1980-2015	17	None					Small sample
Brood size	35	1980-2015	27	Linear increase	1.27 chicks	1.55 chicks	22.6%		Small sample
Nest failure rate at egg stage	35	1980-2015	9	None					Small sample
Nest failure rate at chick stage	35	1980-2015	15	None					Small sample
Laying date	34	1980-2014	5	None			0 days		Small sample

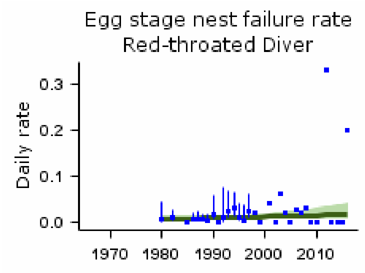
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



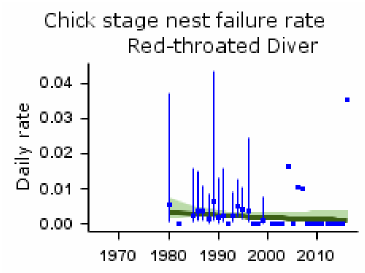
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Cormorant

Phalacrocorax carbo

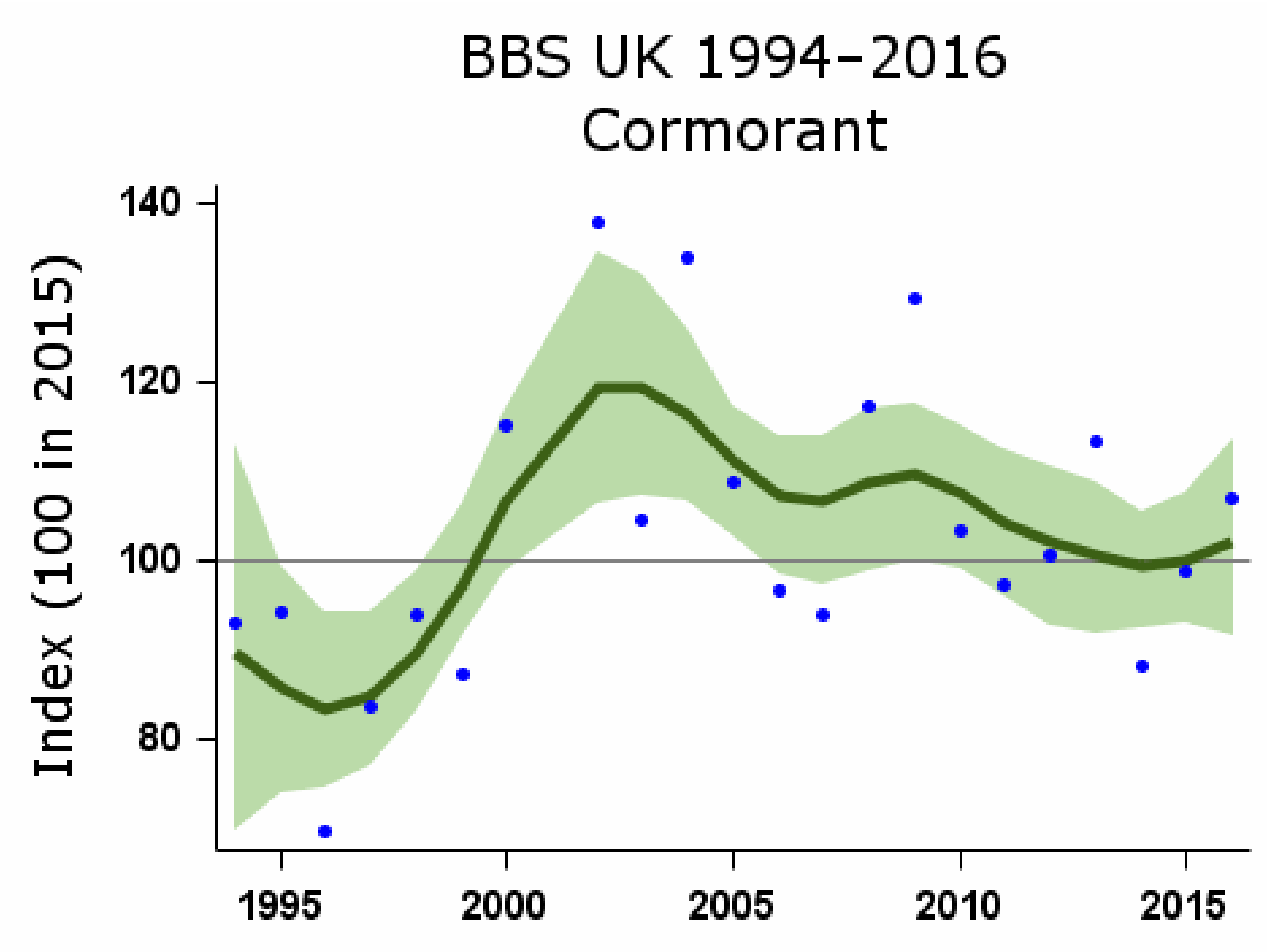
Key facts

Conservation listings:	Global: green; at race level, sinensis and carbo amber
Long-term trend:	UK: increase
Population size:	9,000 pairs in 1998-2002 (APEP13: Mitchell et al. 2004)

Status summary

The Cormorant was almost exclusively a coastal breeder in the UK until 1981, but has since established colonies in many inland areas of eastern and central England (Rehfisch et al. 1999; Newson et al. 2006). Breeding had been recorded at 89 inland sites by 2012, and the inland population had risen to about 2,130 pairs by 2005 and 2,362 pairs in 2012 (Newson et al. 2007, 2013). Inland breeding in England is thought to have been sparked by birds of the continental race sinensis from the Netherlands and Denmark, although many nominate carbo from coastal colonies in Wales and England have contributed to its development.

Breeding numbers and productivity at sample colonies have been monitored annually since 1986 by JNCC's JNCC 2015). Trends during 1986-2005 show decreases in Scotland and in northeast and southwest England, but no trend in Wales, and steep increases inland in England and in regions bordering the northern part of the Irish Sea (Mavor et al. 2008). Reasons for recent decline probably include increased mortality from licensed and unlicensed shooting. BBS counts are very largely of immature or other non-breeding birds inland and away from breeding sites and the generally upward, then stable trend adds little to what we know about breeding numbers from SMP. The winter trend in Britain, comprising British and Irish breeders and continental visitors, showed strong increase from the late 1980s but has been stable from around 2003 (Frost et al. 2017). An increase in shooting under licence since 2004 has had no detectable effect on population trend (Chamberlain et al. 2013). Although the species is now green listed, both races that occur in the UK qualify for amber listing, for reasons unconnected with the UK trend.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

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

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	258	17	-7	44		Non-breeders included
	10	2005-2015	324	10	-20	2		Non-breeders included
	5	2010-2015	322	-7	-17	4		Non-breeders included
BBS England	20	1995-2015	216	13	-6	43		Non-breeders included
	10	2005-2015	273	-8	-20	5		Non-breeders included
	5	2010-2015	271	-4	-11	7		Non-breeders included

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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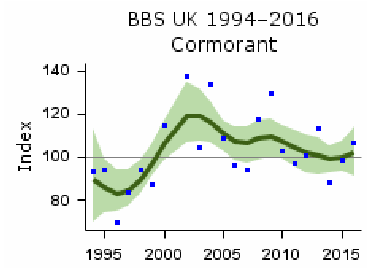
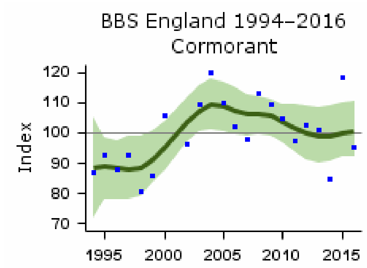


BBS UK graph



BBS England graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

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Little Egret

Egretta garzetta

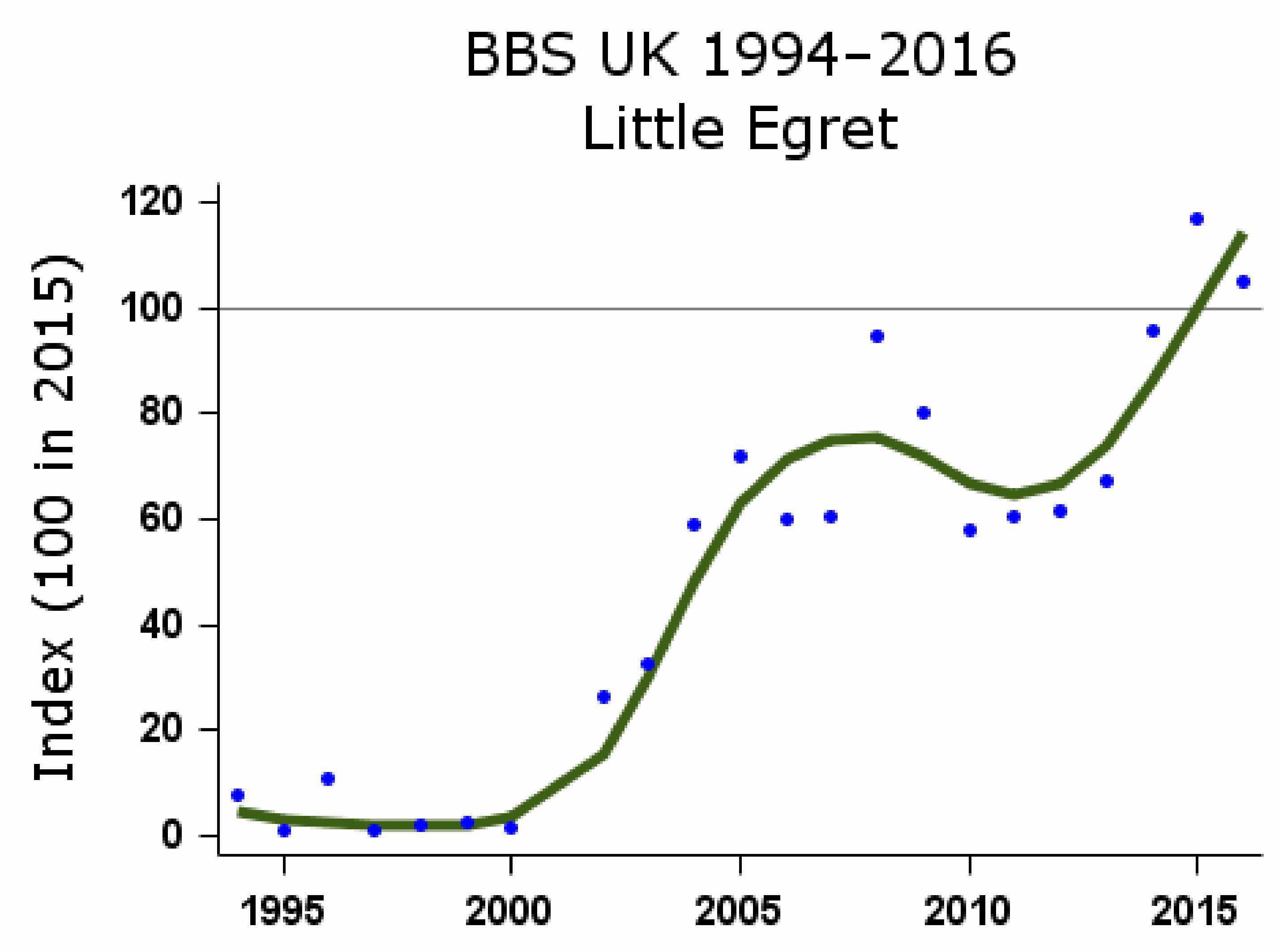
Key facts

Conservation listings:	Global: green; current RBBP species
Long-term trend:	UK, England: rapid increase
Population size:	660-740 pairs in 2006-10 (APEP13: RBBP data); 1,025-1,033 pairs in 2015 (Holling & RBBP 2017)

Status summary

Until the 1980s the Little Egret was a very scarce migrant to Britain, especially as an overshoot on spring passage. Since then, its status has utterly changed. Following a rapid build-up of wintering birds, the first breeding pair ever in UK was found in Dorset in 1996 (Lock & Cook 1998, Musgrove 2002). By 2001 the number of breeding pairs had passed 100 and in 2015 it passed 1,000 pairs for the first time (Holling & RBBP 2017). Most of these birds remain over winter and are joined by additional birds from the Continent. The primary source of trend data is the nest counts collated by BTO Heronries Census. It is notable that the BBS index met a temporary small setback between 2007 and 2012. This was probably the result of unusually cold winter weather, to which the species is susceptible (Holt 2012). This trend is matched by the trend in winter numbers which also rose rapidly until 2008/09 then fell slightly before starting another rise (Frost et al. 2017). Limited data suggest numbers have been stable across Europe (PECBMS 2016a)

Though previously amber listed through its concentration at a few key breeding sites, the species was moved to the UK green list in 2015 (Eatonet al. 2015).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	44	2894	.	.		
	10	2005-2015	73	59	.	.		

	5	2010-2015	88	49				

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS England	20	1995-2015	40	2779	.	.		
	10	2005-2015	67	58	.	.		
	5	2010-2015	81	47	.	.		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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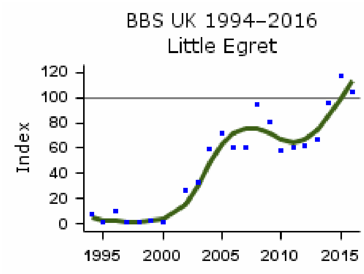
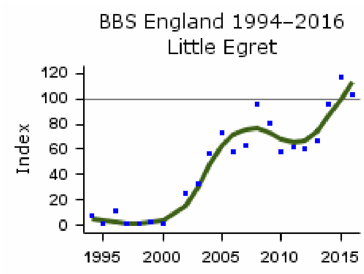


BBS UK graph



BBS England graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Grey Heron

Ardea cinerea

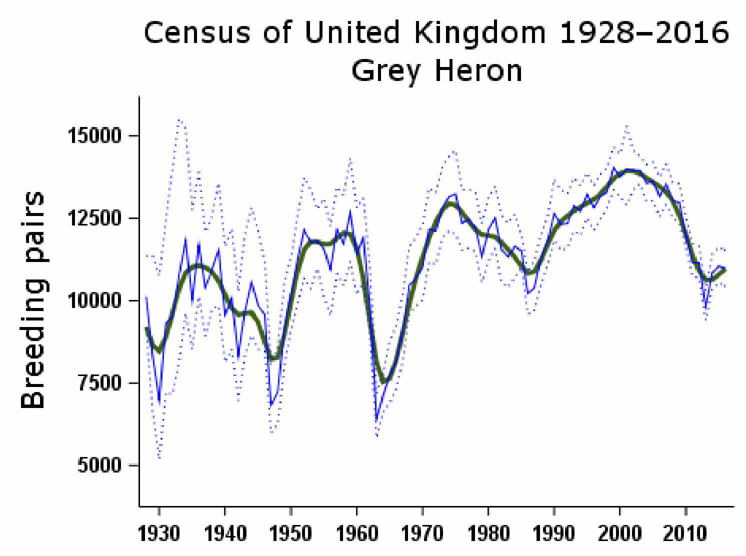
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: shallow increase Scotland: probable shallow decline Wales: probable moderate decline
Population size:	13,000 pairs in 2007-11 (APEP13); 10,977 (10,450-11,532) apparently occupied nests in 2016 (Heronries Census)

Status summary

The BTO Heronries Census, which has monitored Grey Herons since 1928, shows the species to have been more abundant in the early 2000s than at any time in the last 90 years. In the latest special survey of UK heronries, carried out in 2003 to mark the 75th anniversary of the Heronries Census, a record total of more than 10,441 Grey Heron nests were counted, around 75% of the estimated total population for that year.

The effects of harsh winters, which induce severe mortality in this species (Besbeaset al. 2002), are clearly visible in the long-term trend. The general increase that underlies these fluctuations may stem from reduced persecution, improvements in water quality, the provision of new habitat as new lakes and gravel pits mature, and increased feeding opportunities at freshwater fisheries (Gibbons et al. 1993, Marchant et al. 2004). A strong downturn evident since 2001 is, as yet, unexplained, though recent cold winter weather and spring gales appear to have accelerated the decline. High rates of nest failure at the chick stage were noted in the late 1960s, but not subsequently. Clutch and brood sizes have fallen in the long term. Wintering numbers, which include some Scandinavian breeders, fell between 2006/07 and 2012/13, but have since increased slightly, mirroring the heronries census trend (Frost et al. 2017). Numbers have shown widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Estimated population size for each year in blue, with 85% confidence limits in green and smoothed trend in red

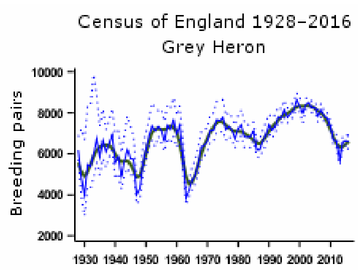
Population changes in detail

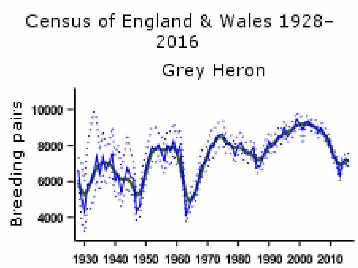
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
Heronries UK	86	1929-2015	349	25	-5	53		
	25	1990-2015	572	-11	-18	-2		
	10	2005-2015	645	-21	-24	-16		
	5	2010-2015	655	-10	-13	-7		
Heronries England and Wales	86	1929-2015	287	29	1	56		
	25	1990-2015	467	-10	-16	-4		
	10	2005-2015	512	-22	-25	-18		
	5	2010-2015	514	-11	-14	-8		
Heronries England	86	1929-2015	244	27	-6	49		
	25	1990-2015	397	-9	-16	-2		
	10	2005-2015	443	-21	-25	-18		
	5	2010-2015	448	-10	-14	-6		
Heronries Scotland	80	1935-2015	49	-20	.	.		

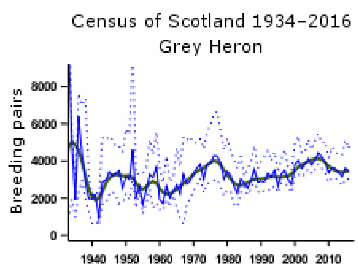
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	25	1990-2015	78	13	.	.		
	10	2005-2015	87	-15	.	.		
	5	2010-2015	80	-8	.	.		
Heronries Wales	80	1935-2015	43	-40	.	.		
	25	1990-2015	67	-29	.	.		
	10	2005-2015	68	-31	.	.		
	5	2010-2015	65	-20	.	.		
BBS UK	20	1995-2015	688	-12	-21	-1		Non-breeders included
	10	2005-2015	810	-28	-35	-21	>25	Non-breeders included
	5	2010-2015	764	-10	-17	-3		Non-breeders included
BBS England	20	1995-2015	565	-18	-29	-9		Non-breeders included
	10	2005-2015	671	-28	-34	-22	>25	Non-breeders included
	5	2010-2015	626	-10	-16	-5		Non-breeders included
BBS Scotland	20	1995-2015	55	0	-22	31		Non-breeders included
	10	2005-2015	64	-33	-48	-12	>25	Non-breeders included
	5	2010-2015	63	-8	-24	15		Non-breeders included
BBS Wales	20	1995-2015	45	-10	-37	29		Non-breeders included
	10	2005-2015	48	-23	-43	-3		Non-breeders included
	5	2010-2015	47	9	-17	51		Non-breeders included

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

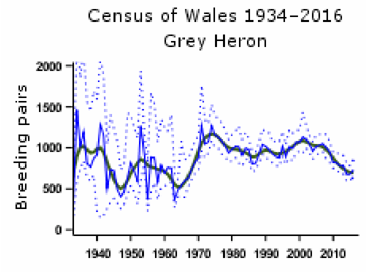
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



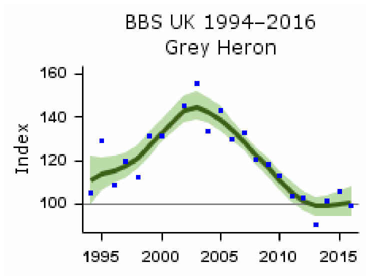




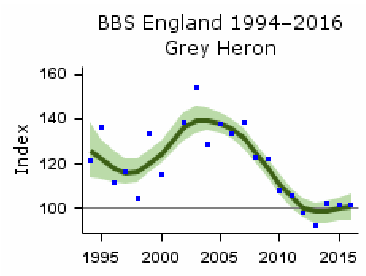
Grey Heron Scotland graph



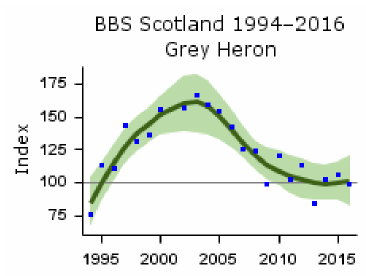
Grey Heron Wales graph



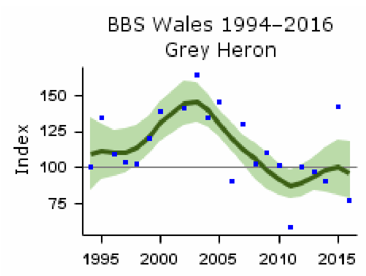
Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green



Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green

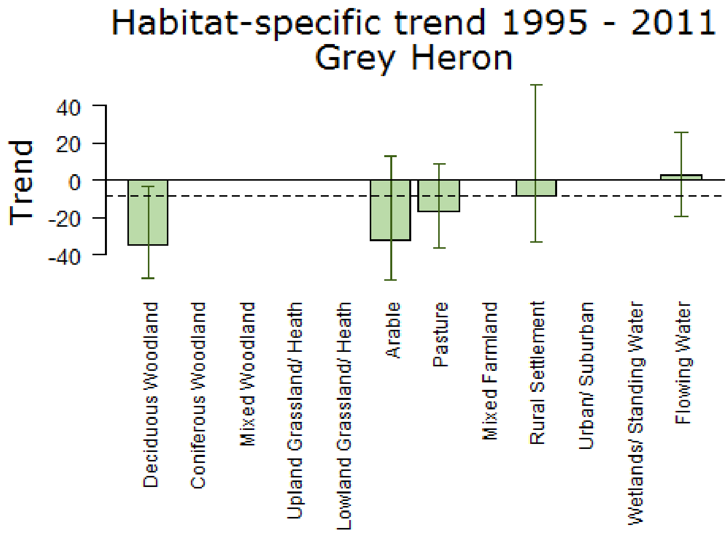


Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green



Smoothed population index, relative to an arbitrary 100 in 2009, with 85% confidence limits in green

Population trends by habitat



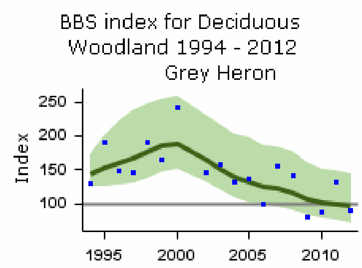
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

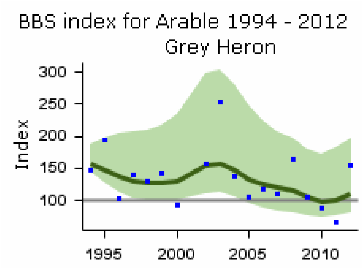
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	40	-35	-53	-3
Arable	16	1995-2011	35	-32	-53	13
Pasture	16	1995-2011	104	-17	-37	9
Rural Settlement	16	1995-2011	38	-8	-33	51
Flowing Water	16	1995-2011	99	3	-19	26

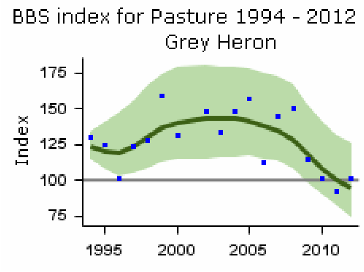
Further information on habitat-specific trends, please follow link here.



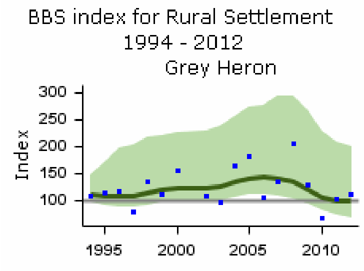
Habitat graph



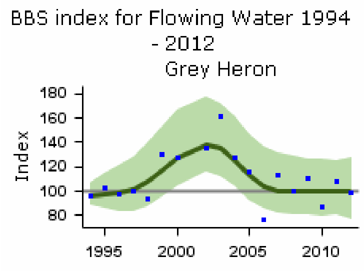
Habitat graph



Habitat graph

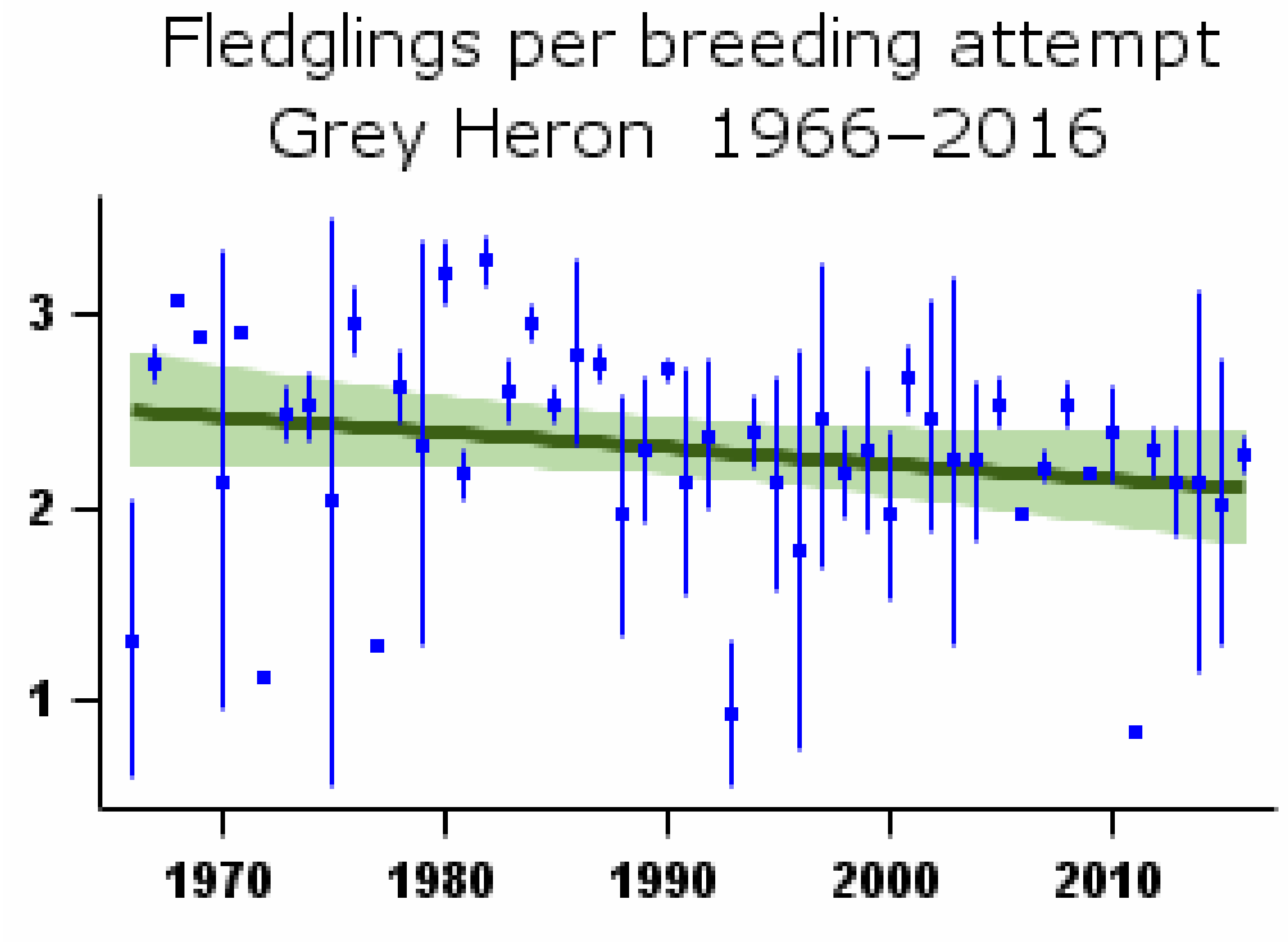


Habitat graph

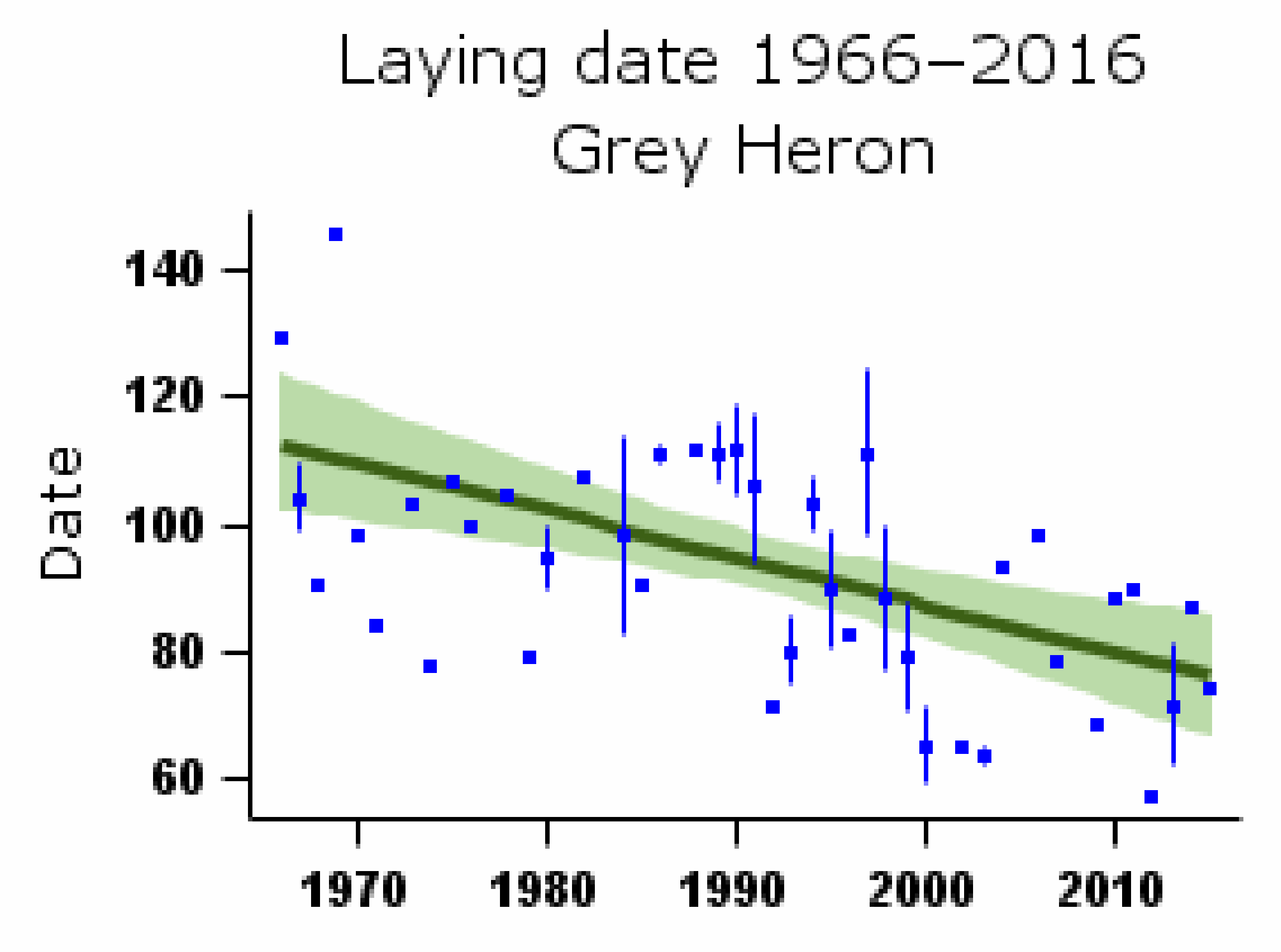


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

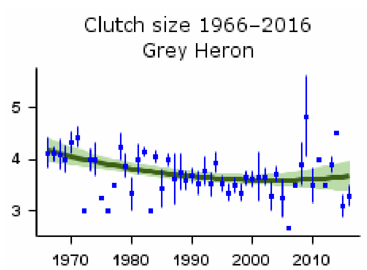


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

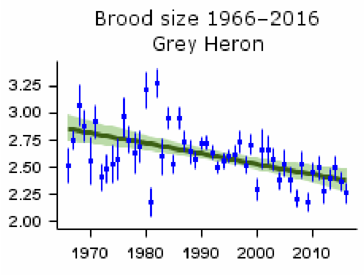
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	17	None					
Clutch size	48	1967-2015	14	Curvilinear	4.15 eggs	3.66 eggs	-11.8%		Small sample
Brood size	48	1967-2015	90	Linear decline	2.85 chicks	2.39 chicks	-16.2%		
Nest failure rate at egg stage	48	1967-2015	17	Curvilinear	0.01% nests/day	0.08% nests/day	700.0%		Small sample
Nest failure rate at chick stage	48	1967-2015	40	None					
Laying date	47	1967-2014	5	Linear decline	Apr 22	Mar 18	-35 days		Small sample

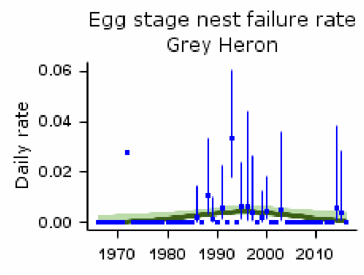
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



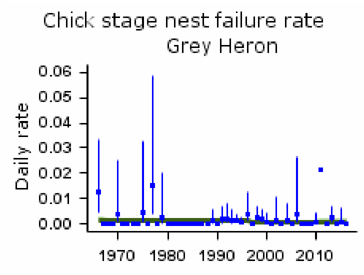
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Little Grebe

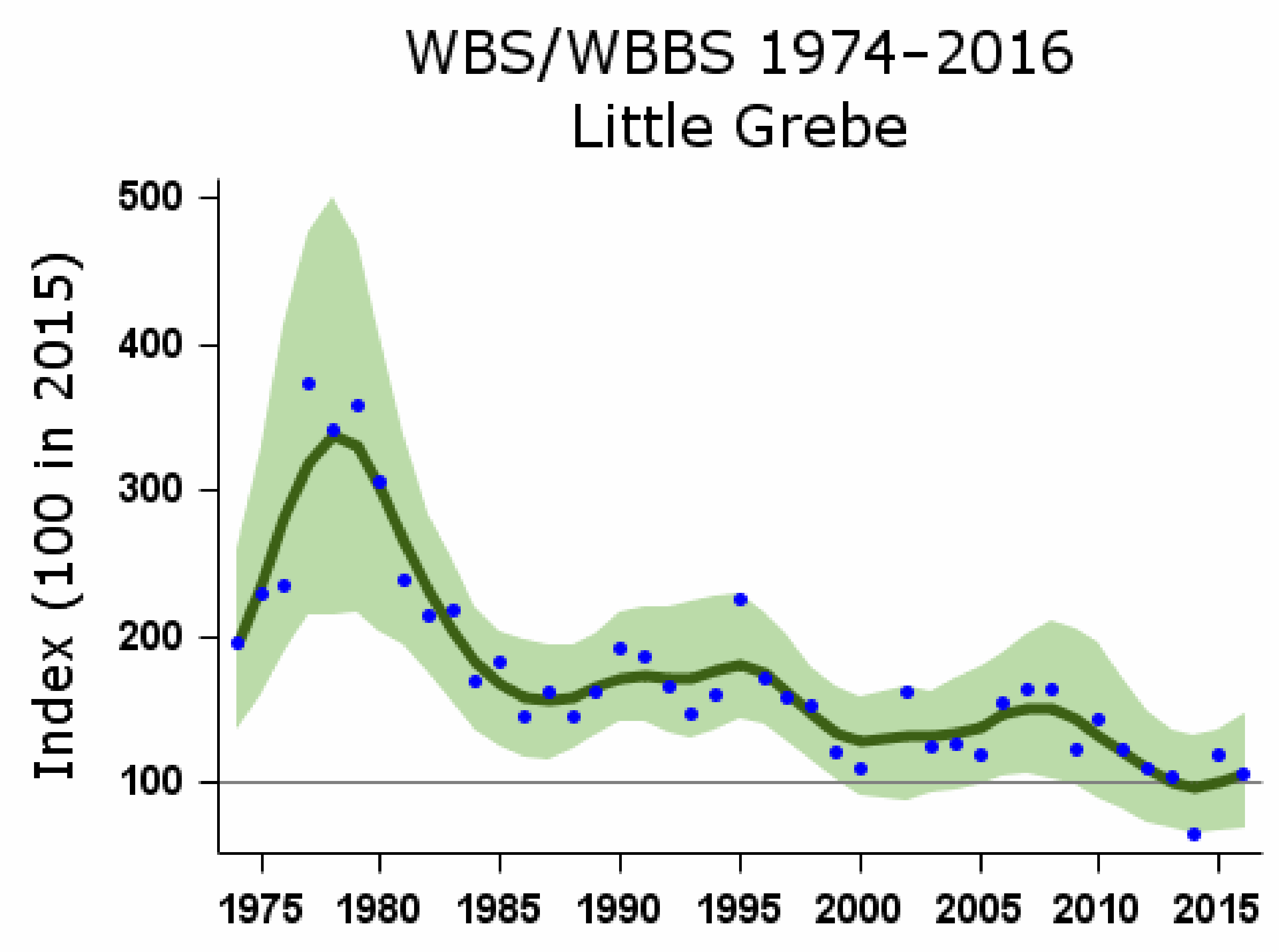
Tachybaptus ruficollis

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: uncertain
Population size:	3,900-7,800 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The moderate decline shown by the WBS/WBBS may reveal problems among birds on linear waterways during the early 1980s and since the late 1990s, but a shallow increase in the BBS UK trend suggests that wider populations (including birds on small still waters) have been more healthy. Because of the shortage of data, and the conflict between WBS and BBS assessments, the rapid decline indicated by WBS in the 1980s did not initially trigger a conservation listing. After a period on the amber list through its UK decline during 2009-15, the species is now again on the green list (Eaton et al. 2015). In an analysis of nest record cards, Moss & Moss (1993) found that nests on ponds and lakes were significantly more successful than those on rivers and streams and that nests on rivers, subject to fluctuating water levels, experienced significantly higher failure rates through flooding than those on canals, where water levels are artificially maintained. Winter numbers showed sustained shallow increase, apart from a brief period of decline between 2008 and 2013 (Frost et al. 2017). Numbers have been broadly stable across Europe since 1990 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	20	-58	-82	-11	>50	
	25	1990-2015	21	-42	-65	-6	>25	
	10	2005-2015	20	-28	-46	2		
	5	2010-2015	16	-25	-51	-5		Small sample

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	74	42	6	84		
	10	2005-2015	88	15	-5	39		
	5	2010-2015	86	31	7	57		
BBS England	20	1995-2015	58	15	-19	59		
	10	2005-2015	68	3	-24	33		
	5	2010-2015	66	16	-6	38		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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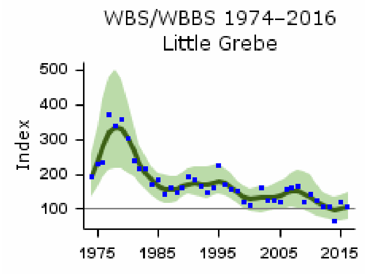
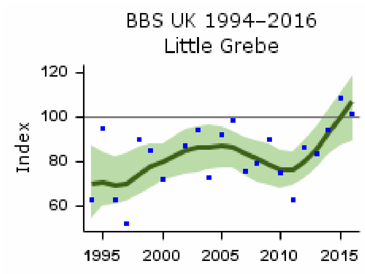
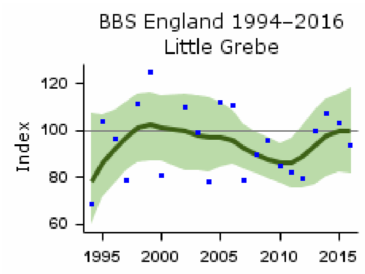


WBS/WBBS waterways graph

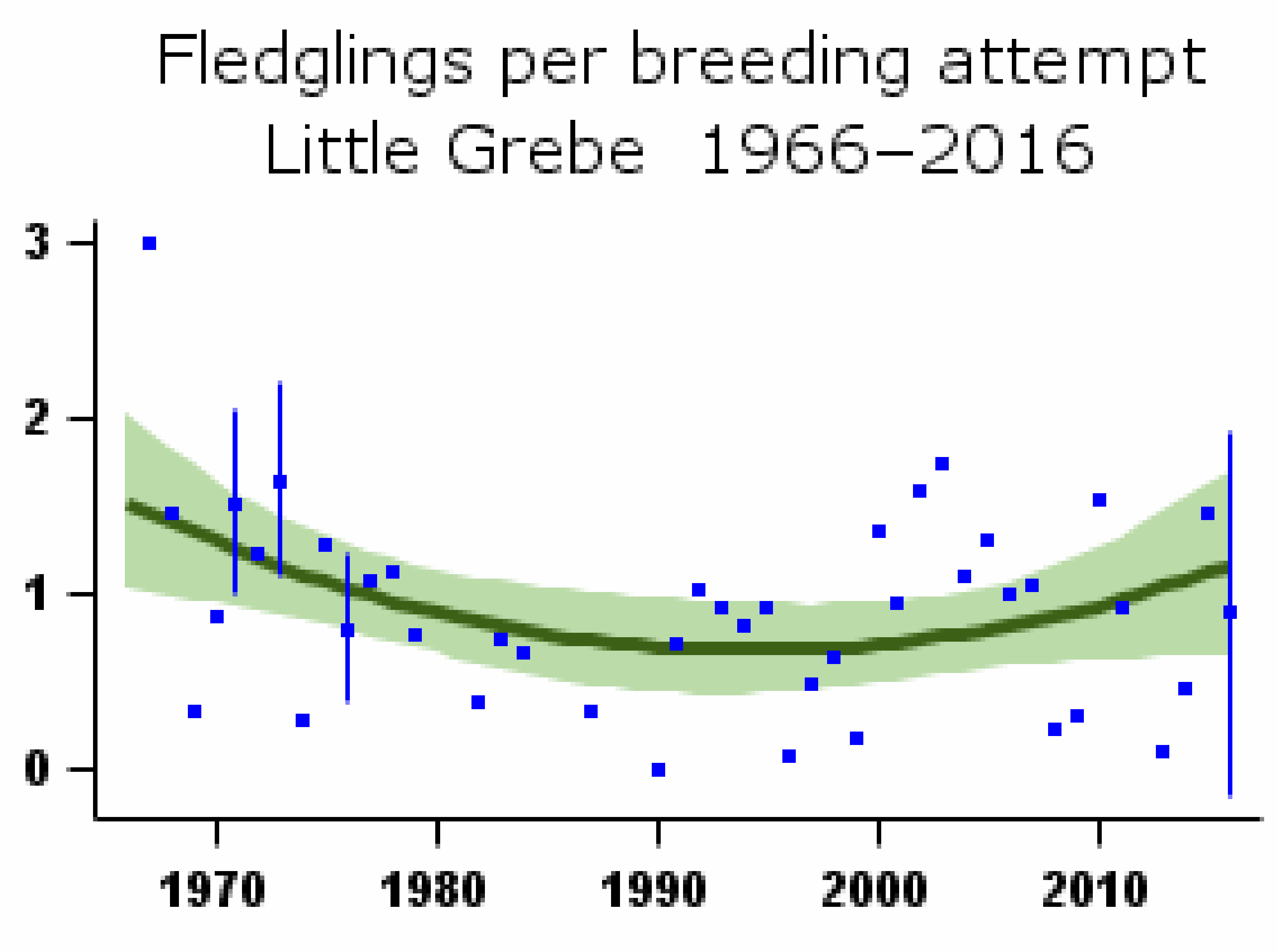


BBS UK graph

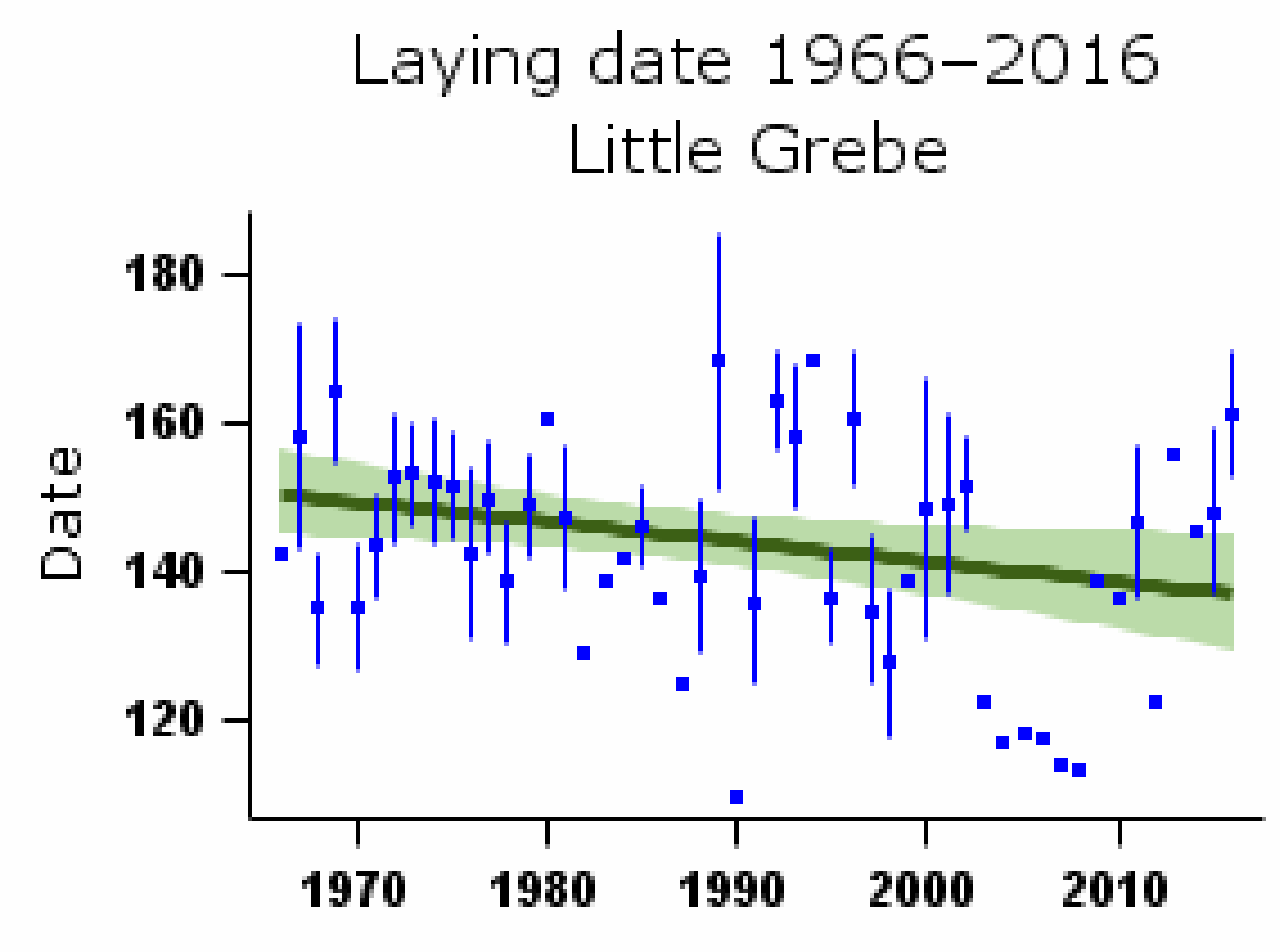


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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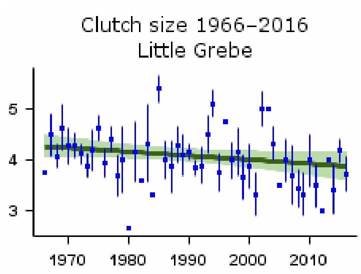
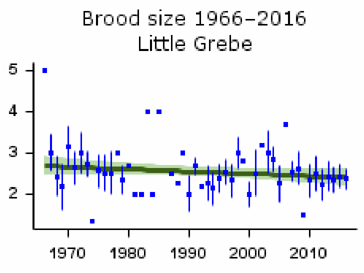
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	3	Curvilinear	1.45 fledglings	1.11 fledglings	-23.3%		
Clutch size	48	1967-2015	9	None					Small sample
Brood size	48	1967-2015	7	None					Small sample
Nest failure rate at egg stage	48	1967-2015	14	Curvilinear	3.55% nests/day	4.28% nests/day	20.6%		Small sample
Nest failure rate at chick stage	48	1967-2015	3	None					Small sample
Laying date	48	1967-2015	7	Linear decline	May 30	May 17	-13 days		Small sample

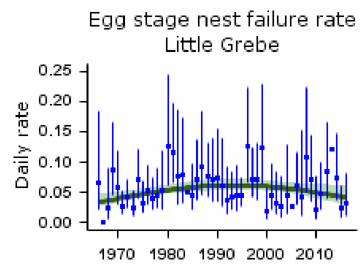
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



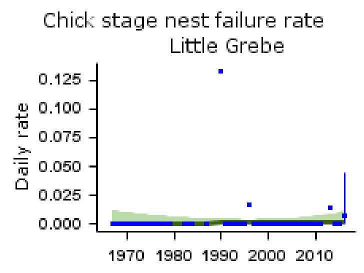
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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Great Crested Grebe

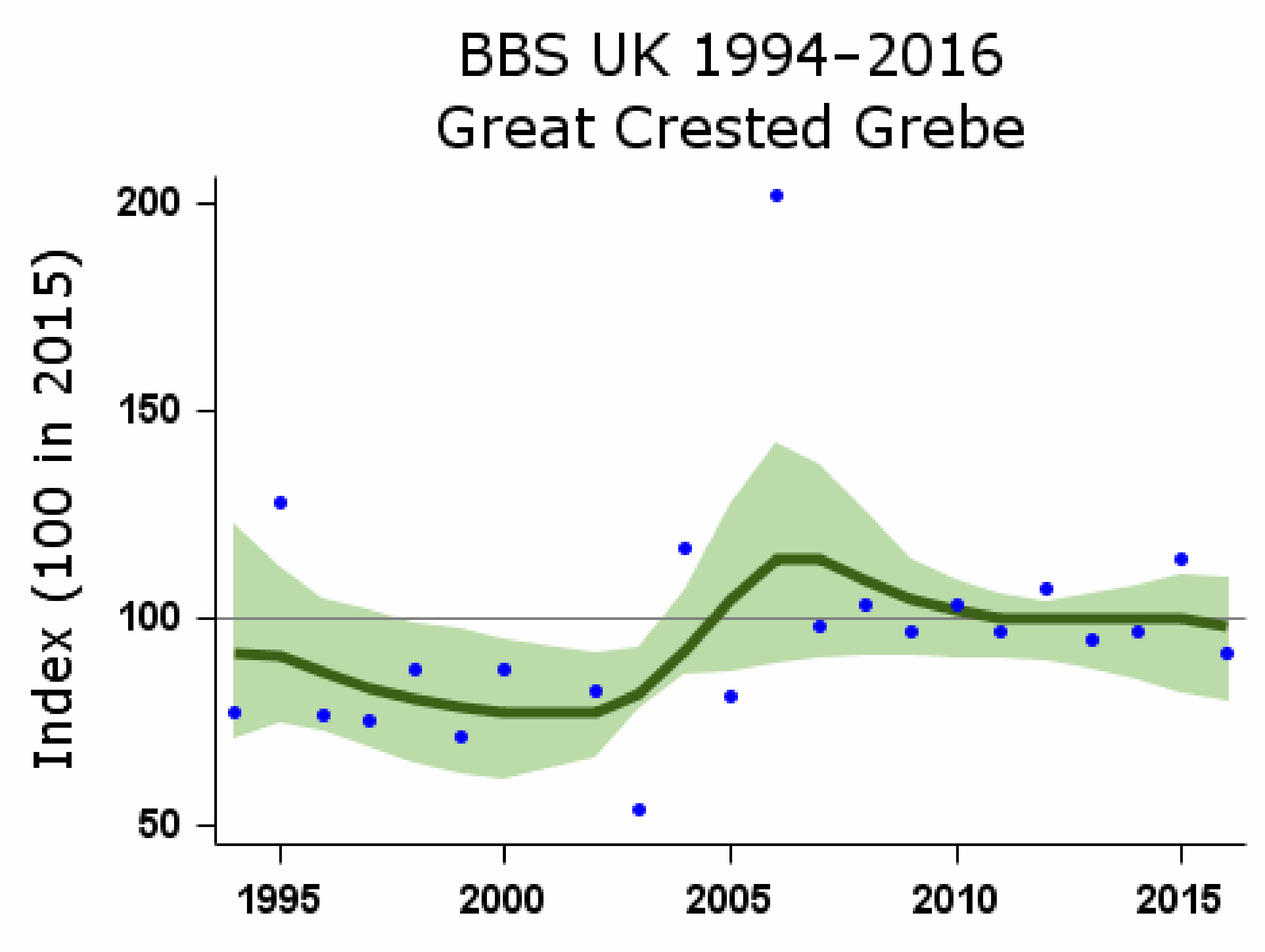
Podiceps cristatus

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: stable
Population size:	5,300 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

This species was believed to be on the verge of extinction in Britain around 1860, when only 32-72 pairs were known in England (Holloway 1996). A subsequent increase followed reductions in persecution, aided by statutory protection, and the creation of extensive new habitat in the form of gravel pits (Gibbons et al. 1993). Increase was tracked by special surveys to around 7,000 adult birds in Britain by 1975 (Hughes et al. 1979). The BBS provides the first national-scale annual monitoring of this species and indicates no clear trend since 1994. Winter numbers have shown a long-term shallow increase which peaked in the mid-2000s, followed by a subsequent shallow decline until around 2013 (Frost et al. 2017). The trend across Europe has been stable since 1990 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	75	10	-24	45		
	10	2005-2015	87	-4	-34	21		
	5	2010-2015	86	-2	-23	23		
BBS England	20	1995-2015	68	-3	-24	28		
	10	2005-2015	80	13	-14	43		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	79	6	15	33		

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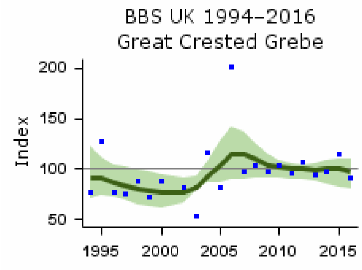
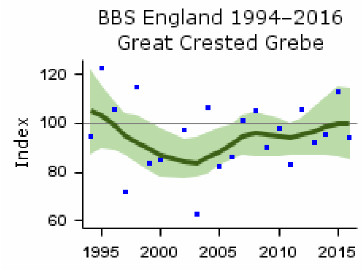
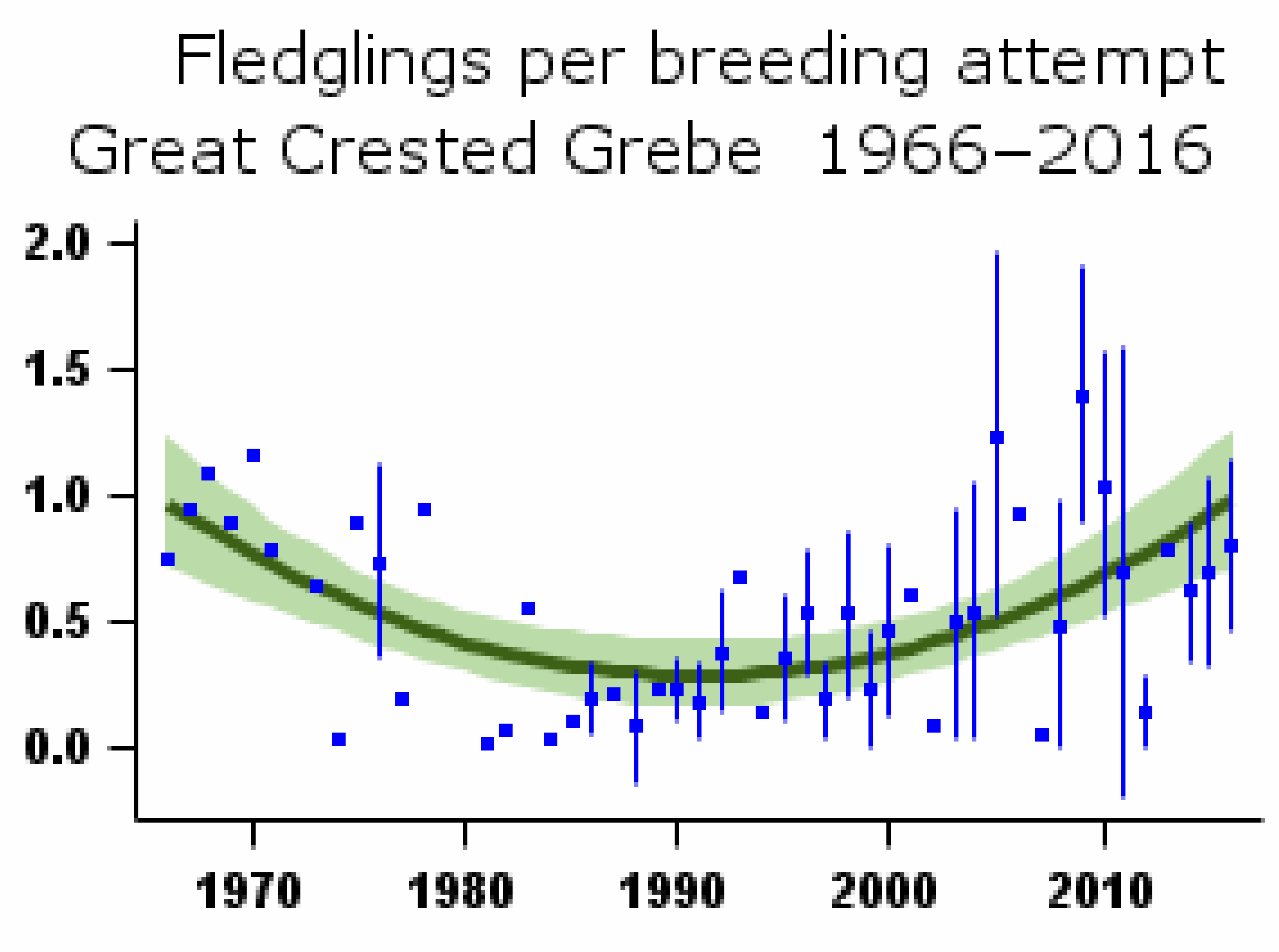


BBS UK graph

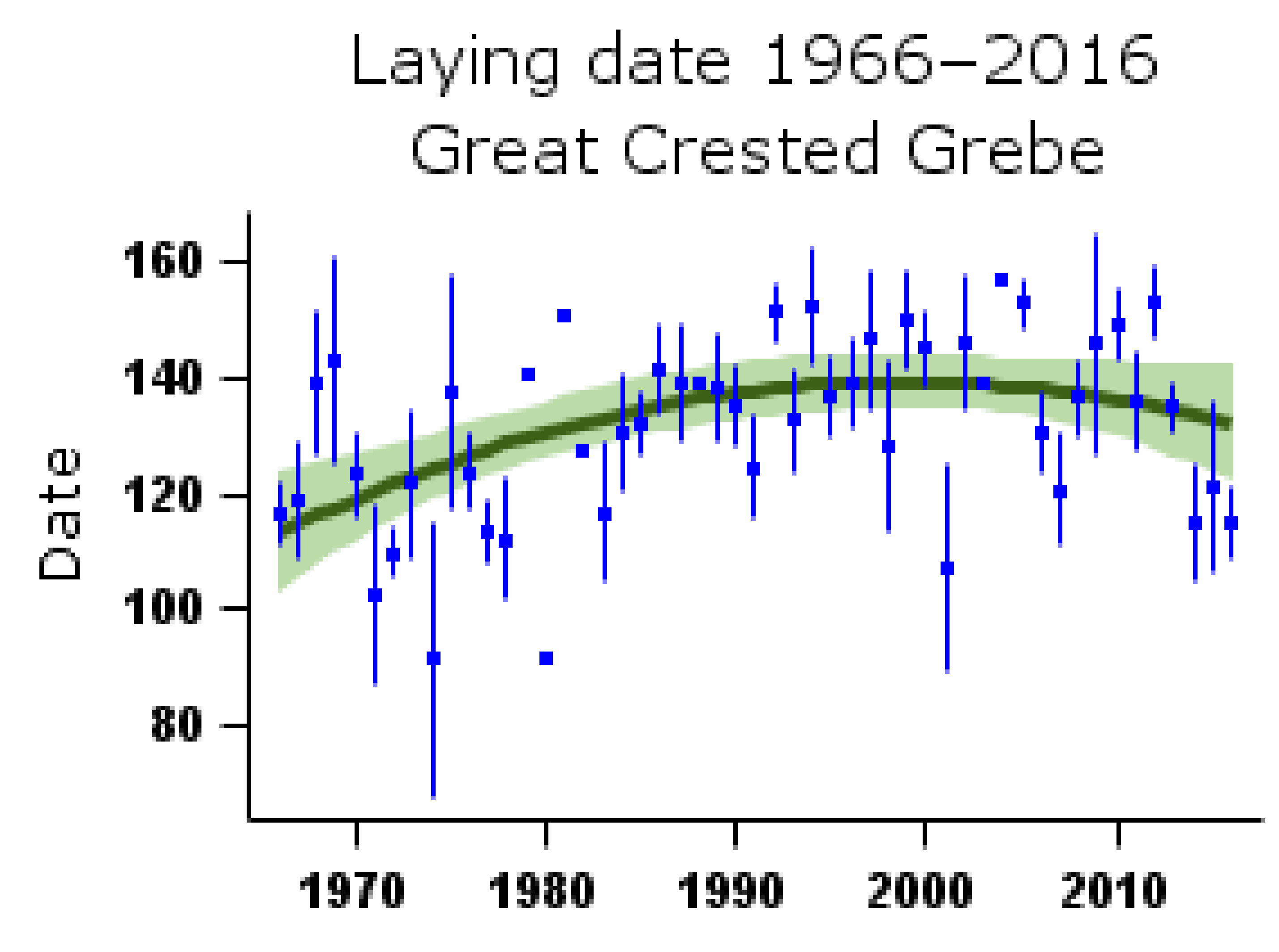


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

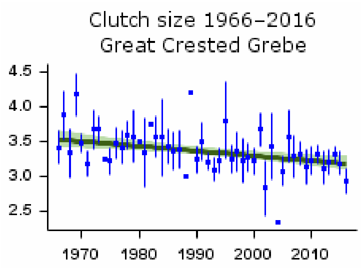


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

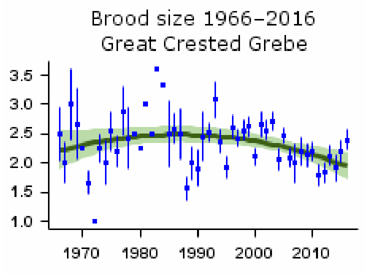
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	7	Curvilinear	0.91 fledglings	0.92 fledglings	0.6%		
Clutch size	48	1967-2015	15	Linear decline	3.52 eggs	3.19 eggs	-9.4%		Small sample
Brood size	48	1967-2015	13	Curvilinear	2.24 chicks	1.97 chicks	-11.7%		Small sample
Nest failure rate at egg stage	48	1967-2015	23	Curvilinear	2.72% nests/day	1.95% nests/day	-28.3%		Small sample
Nest failure rate at chick stage	48	1967-2015	7	None					Small sample
Laying date	48	1967-2015	9	Curvilinear	Apr 25	May 13	18 days		Small sample

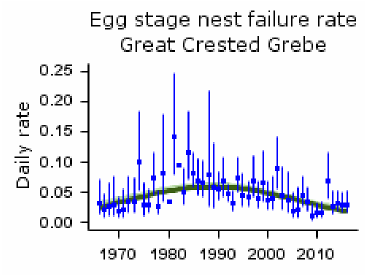
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



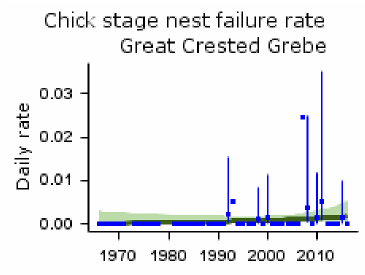
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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Red Kite

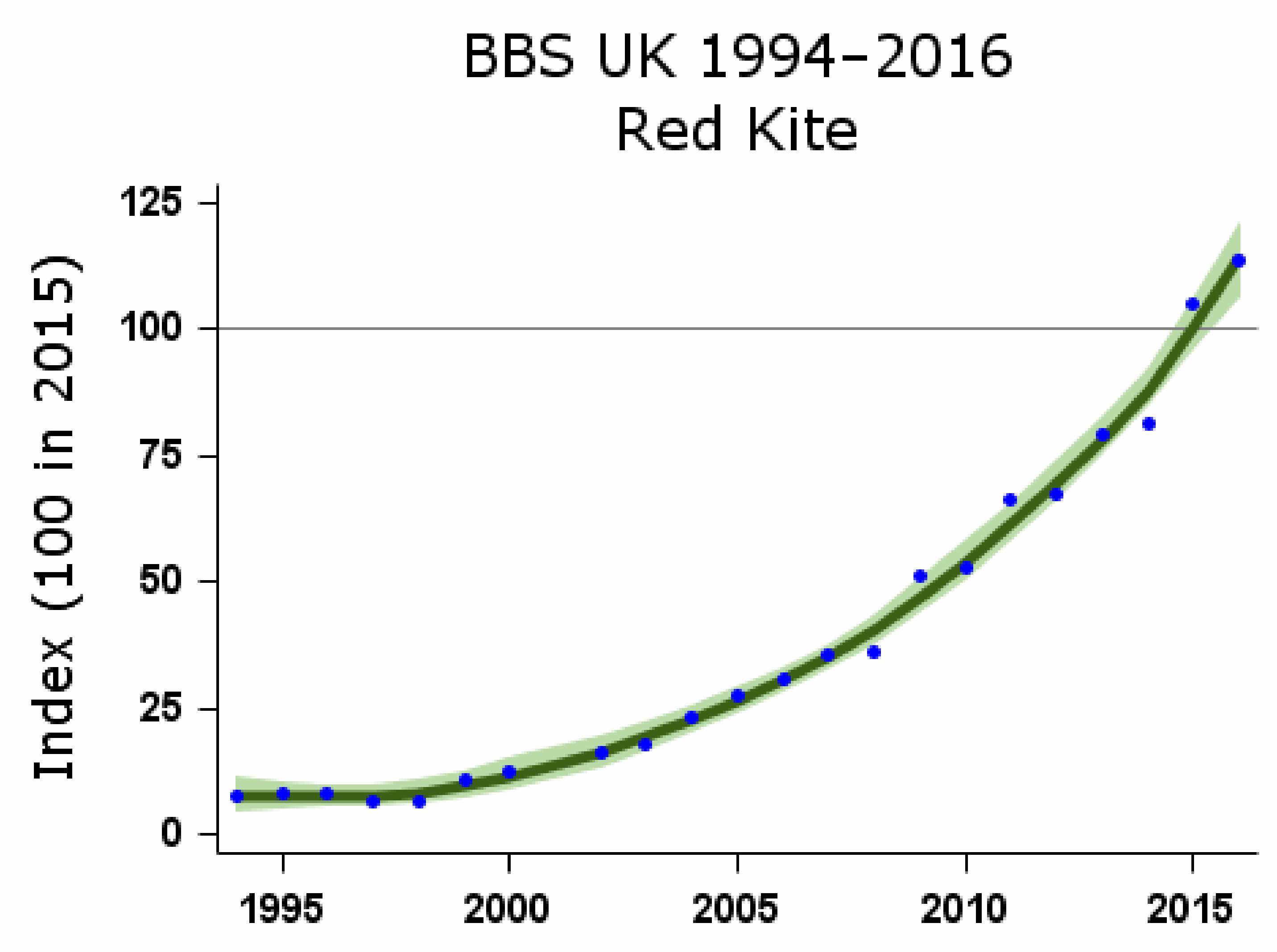
Milvus milvus

Key facts

Conservation listings:	Global: green; former RBBP species
Long-term trend:	UK, England: rapid increase
Population size:	1,600 pairs in 2006-10 (APEP13: RBBP data); approaching 2,500 pairs by 2012 (Holling & RBBP 2014)

Status summary

Red Kite was historically widespread across Britain but, following widespread persecution, fewer than ten breeding pairs remained by the 1930s and 1940s, concentrated into a small area of mid Wales. Through careful husbandry organised by a 'Kite Committee' of local conservationists and landowners, including RSPB bounties paid to farmers for successful nests during 1922-90, the Welsh population rose to 100 pairs by 1993. Most birds were descended from a single female that had continued to breed successfully during the population bottleneck (Carter 2001). As a step towards restoring the original breeding range, birds were introduced in 1989 into the Chilterns (Oxfordshire and Buckinghamshire) and into the Black Isle in Easter Ross (Evans & Pienkowski 1991). Successful breeding populations quickly established in both areas. Further releases were begun in Northamptonshire in 1995, central Scotland in 1996, Yorkshire in 1999, Dumfries & Galloway in 2001, northeast England in 2004, Aberdeen in 2007 and County Down in 2008. Each of these centres has given rise to a productive breeding group, in some cases benefiting from large-scale provision of food (e.g. Orros & Fellowes 2014, 2015) or the development of a well-established communal roost. Introduced birds and their offspring wander widely across Britain and Ireland but, as yet, pairs have been slow to set up breeding sites distant from the release areas (Balmer et al. 2013). BBS sightings have shown an exponential rise since 1994. Illegal killing is continuing and in northern Scotland the use of poisoned baits deliberately to kill raptors has severely limited the growth of the Red Kite population (Smart et al. 2010, Sansom et al. 2016). Nevertheless, the species was moved to the green list in the UK in 2015 (Eatonet al. 2015).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

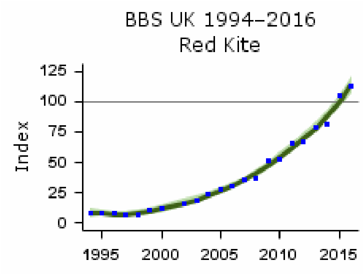
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	137	1231	780	2106		

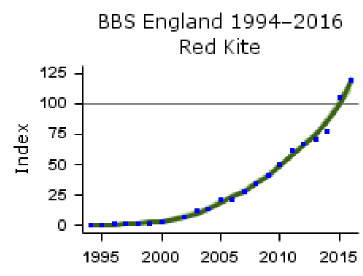
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	226	276	228	347		
	5	2010-2015	299	85	66	107		
BBS England	20	1995-2015	101	>10000	9007	>10000		
	10	2005-2015	173	442	359	550		
	5	2010-2015	232	103	85	128		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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



BBS UK graph



BBS England graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Hen Harrier

Circus cyaneus

Key facts

Conservation listings:	Global: red (historical decline); current RBBP species
Long-term trend:	UK: probable increase
Population size:	662 (576-770) pairs in UK and Isle of Man in 2010 (Hayhow et al. 2013); provisional 2016 survey figure of 575 pairs in UK and Isle of Man (Wotton et al., in prep).

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Moorland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

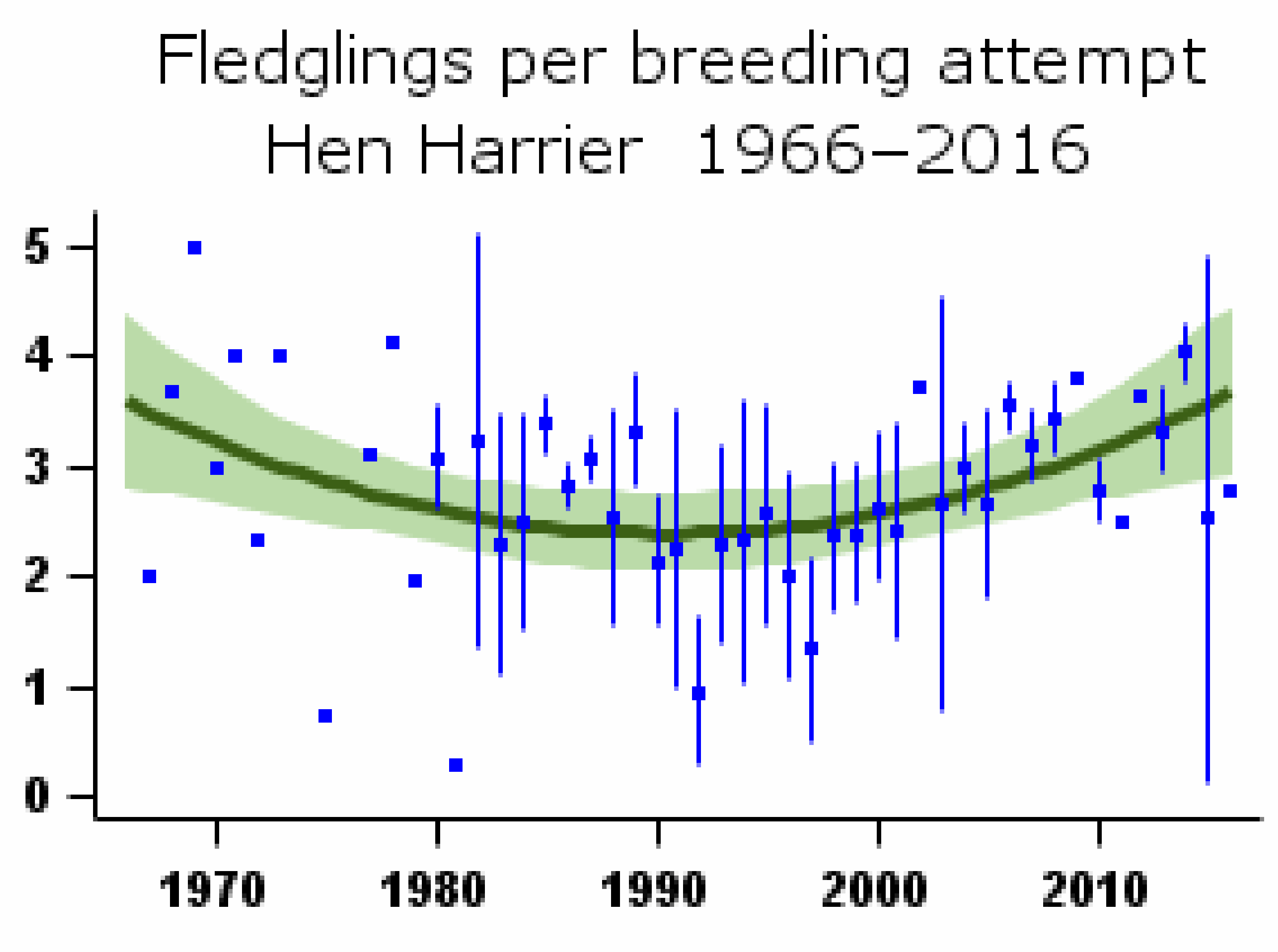
This species was red listed because of substantial declines over the last two centuries. However, the population increased in Scotland from the 1940s to at least the 1970s (Forrester et al. 2007). The UK population was unchanged between surveys in 1988-89 and 1998, with declines in Orkney and England but increases in Northern Ireland and the Isle of Man (Sim et al. 2001). A 41% increase was recorded in the UK and Isle of Man during 1998-2004, possibly due to increased use of non-moorland habitats, but with decreases in the Southern Uplands, east Highlands and England, all being areas with many managed grouse moors (Sim et al. 2007a). The most recent published survey, in 2010, revealed a decline of around 18% since the 2004 survey: a notable decrease in Scotland might stem from habitat change and illegal persecution (Hayhow et al. 2013, Rebecca et al. 2016), while illegal persecution continues to limit harriers in England to very low levels of population (Hayhow et al. 2013). A new survey was carried out in 2016, with the provisional results showing further declines across the four UK countries since 2010, and stability since 2010 on the Isle of Man (Wotton et al., in prep). There are renewed efforts currently to resolve the conflict between managed moorland and raptor conservation, amid public petitions and demonstrations against wildlife crime on grouse moors (Amar 2014, Elston et al. 2014).

Further information about Hen Harrier populations can be found here.

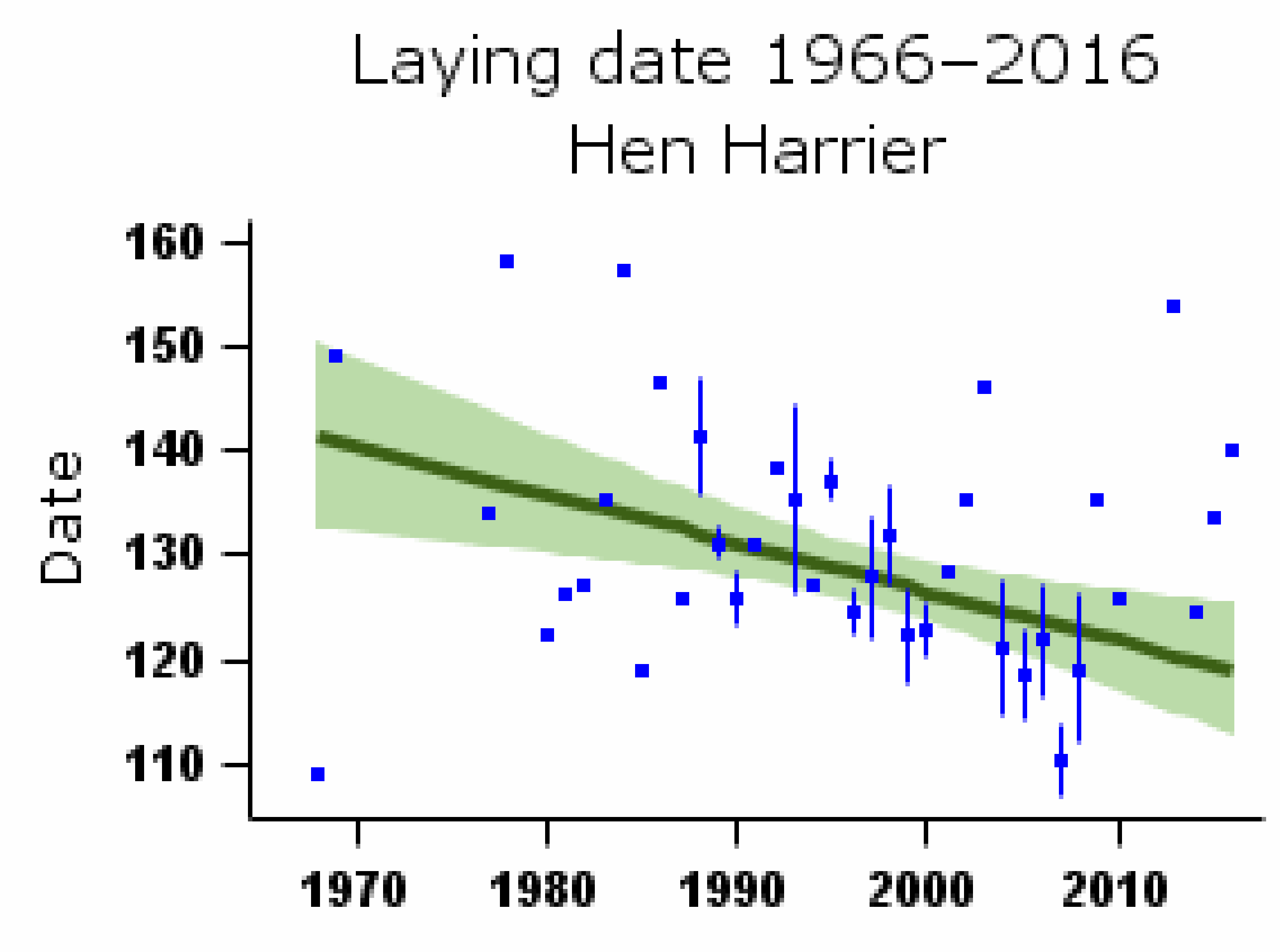
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

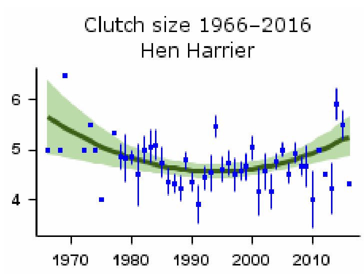


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

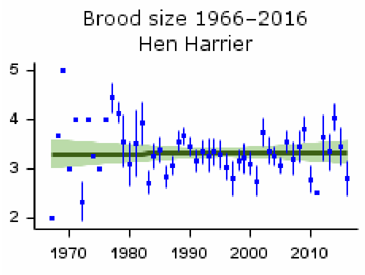
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	9	Curvilinear	3.49 fledglings	3.59 fledglings	2.7%		
Clutch size	48	1967-2015	11	Curvilinear	5.58 eggs	5.20 eggs	-6.8%		Small sample
Brood size	48	1967-2015	18	None					Small sample
Nest failure rate at egg stage	48	1967-2015	10	Curvilinear	0.05% nests/day	0.04% nests/day	-20.0%		Small sample
Nest failure rate at chick stage	48	1967-2015	13	None					Small sample
Laying date	47	1968-2015	5	Linear decline	May 21	Apr 30	-21 days		Small sample

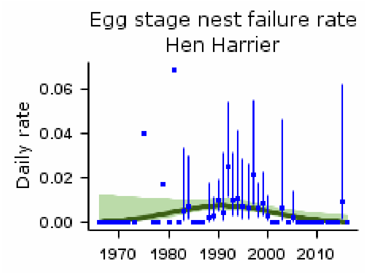
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



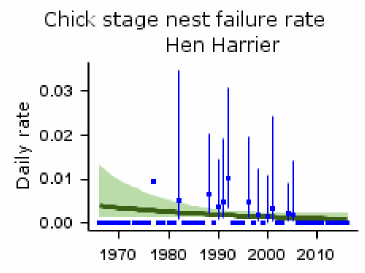
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Based on multiple field studies providing good evidence, the main driver of declines in Hen Harrier populations appears to have been illegal persecution, causing a reduction in nesting success, annual productivity and survival of breeding females.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	Decreased survival
Ecological	Other	

Further information on causes of change

Demographic data presented here show that clutch size decreased by 7% between 1968 and 2015 (although further investigation has shown that this trend is due to the increased proportions in recent years of records from Orkney, where clutch sizes tend to be smaller than on the mainland: Summers 1998, Crick 1998).

There is good evidence showing that, although the Hen Harrier has been protected under UK law since 1961, many are still unlawfully killed or disturbed in efforts to protect the economic viability of driven shooting of Redpath & Thirgood 1997, Thompson et al. 2009, 2016, Rebecca et al. 2016). A study combining Atlas data and a two-year field study provided good evidence that nesting success, annual productivity and survival of female Hen Harriers was lower on grouse moors than on other moorland or in young conifer forests, due to destruction by humans (Bibby & Etheridge 1993, Etheridge et al. 1997). Fielding et al. (2011) conclude that illegal killing is the biggest single factor affecting the species and that it is having a dramatic impact on the population in core areas of its range in northern England and Scotland. Keepering that remains within the law, however, can benefit harrier populations by increasing their prey and reducing their nest predators, especially crows and foxes (Baines & Richardson 2013).

Recovery of the Welsh harrier population, in contrast to those elsewhere in the UK, has been attributed to an increase in the breeding productivity, apparently due to a combination of cessation of human interference in recent years and warmer temperatures, leading to increased productivity (Whitfield et al. 2008). Whitfield et al. (2008) also provide strong field-based evidence from the Welsh harrier population that human interference has been the primary driver of population change, through its impact on breeding productivity (specifically, an increased proportion of breeding females laying eggs, combined with a general increase in the average number of young fledged).

In areas where illegal persecution is minimal, food availability restricts numbers. Good-quality recent studies found that rough grass, a preferred habitat for field voles, is a critical foraging habitat for Orkney Hen Harriers (Amar & Redpath 2005, Amar et al. 2008a) and that habitat characteristics around harrier nest-sites (at a 1-km radius) can have a strong influence on breeding performance (Amar et al. 2002).

A field experiment showed that food shortage just before the laying period resulted in low levels of polygyny and reduced nesting success among secondary females, resulting in reduced productivity (Amar & Redpath 2002, Amar et al. 2005). The area of rough grassland has decreased during the same period as sheep numbers have increased and this is thought have reduced food supplies (Amar et al. 2003, 2005, Amar & Redpath 2005), but there was no detectable effect of rough grass area on fledging success or fledged brood size (Amar et al. 2008). Further, these studies provide no evidence that the effects on breeding success have an impact on abundance. However, Redpath et al. (2002a) present good evidence from a different field study in Scotland which also shows that food availability, notably numbers of field voles, can influence population change in Hen Harriers, where there is no persecution. Harrier densities were highest in areas and years where their small prey animals were most abundant. Clutch size was positively correlated with the number of field voles, although fledging success was not significantly correlated with the relative abundance of small prey (Redpath &Thirgood 1999, Redpath et al. 2002a). Madders (2000) also highlighted the importance of foraging habitat in Scotland, finding that the extent of young first-rotation forestry, the preferred foraging habitat in this area, is currently in decline and states that this has contributed to many of the reported changes in local Hen Harrier populations (although no specific research into demographic parameters were presented).

There is some evidence that climate also affects demography, although this is secondary to drivers outlined above and there is no evidence for effects on abundance. In Scotland, chick mortality increased in cold temperatures and annual values of harrier fledged brood size were positively related to summer temperature (Redpath et al. 2002b) and warmer temperatures led to increased productivity (in the absence of persecution) in Wales (Whitfield et al. 2008).

A study in Ireland which investigated whether wind farms could be having an effect on population trends found that the evidence for an impact was weak; the relationship between wind farm presence and population trends was negative but (marginally) non-significant and may not be causal (Wilson et al. 2017).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Sparrowhawk

Accipiter nisus

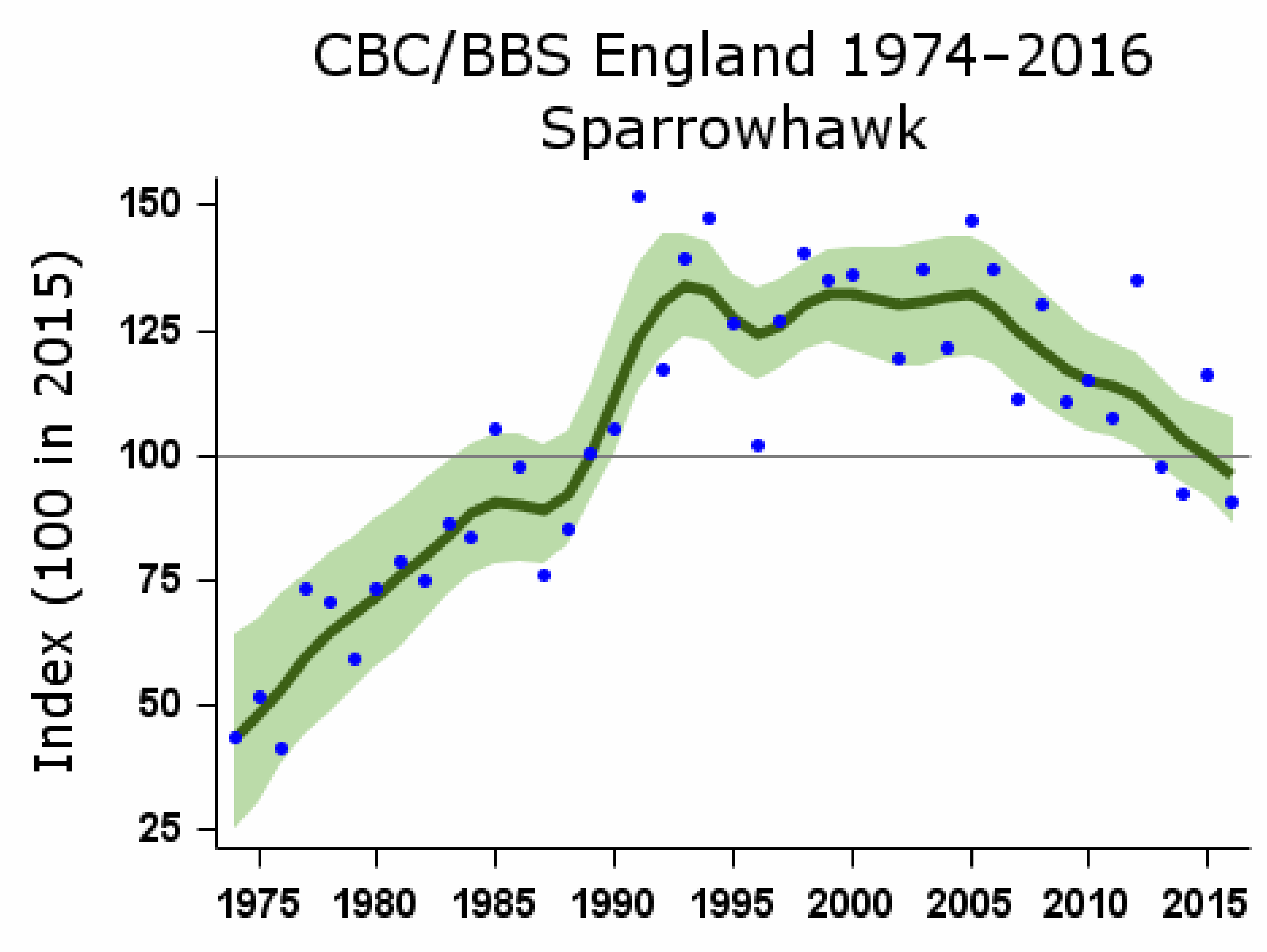
Key facts

Conservation listings:	Global: green
Long-term trend:	England: rapid increase
Population size:	35,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate (Newton 1986) updated using CBC/BBS trend for England)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Between the 1970s and the mid 1990s, the CBC charted a steep increase in this species. Many former haunts especially in the Midlands and east of England were reoccupied between the first two atlas periods (Gibbons et al. 1993). The population has stabilised since the mid 1990s, though population fluctuations are now evident, and BBS figures suggest a shallow decline has occurred over the last ten years. Nest productivity has risen, especially during the period of strong population increase. Numbers have been broadly stable across Europe since 1980 (PECBMS 2016a).



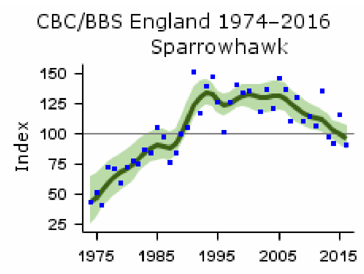
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

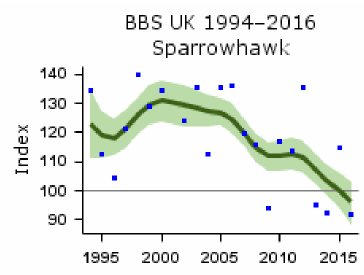
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	40	1975-2015	180	108	37	281		
	25	1990-2015	269	-10	-27	5		
	10	2005-2015	351	-24	-31	-18		
	5	2010-2015	338	-13	-19	-6		
BBS UK	20	1995-2015	362	-16	-25	-6		
	10	2005-2015	423	-21	-28	-14		
	5	2010-2015	406	-11	-18	-3		
BBS England	20	1995-2015	301	-21	-29	-11		
	10	2005-2015	351	-24	-31	-18		
	5	2010-2015	338	-13	-18	-7		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

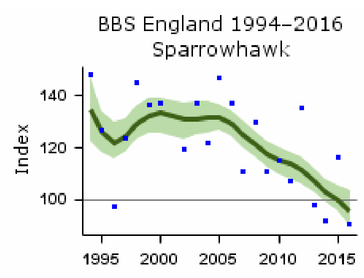
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



CBC/BBS England graph

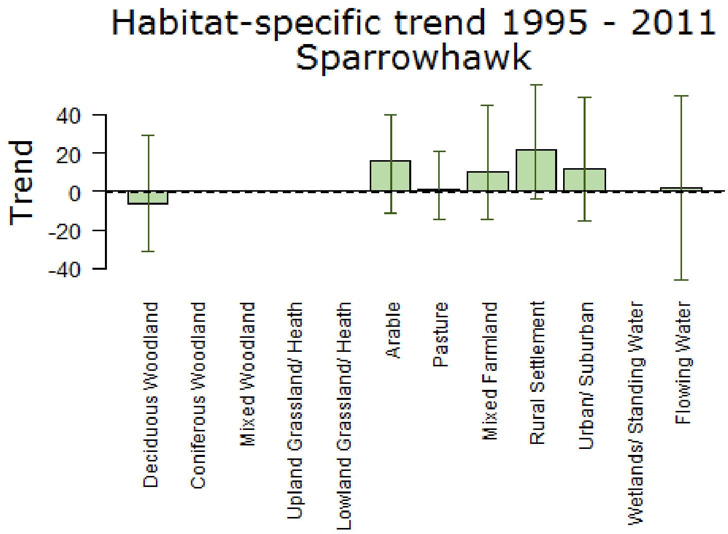


BBS UK graph



BBS England graph

Population trends by habitat



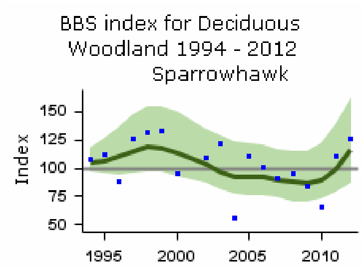
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

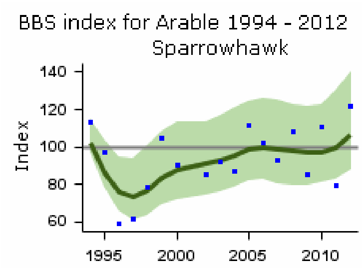
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	56	-7	-31	29
Arable	16	1995-2011	60	16	-11	40
Pasture	16	1995-2011	111	1	-14	21
Mixed Farmland	16	1995-2011	46	10	-15	45
Rural Settlement	16	1995-2011	54	22	-4	55
Urban/ Suburban	16	1995-2011	43	12	-15	49
Flowing Water	16	1995-2011	33	2	-46	50

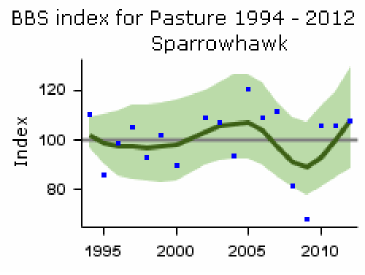
Further information on habitat-specific trends, please follow link here.



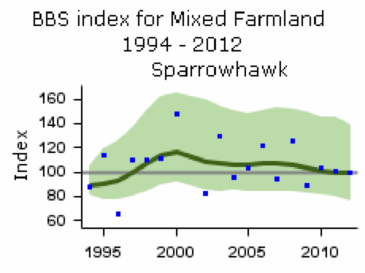
Habitat graph



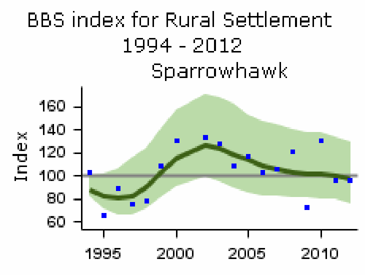
Habitat graph



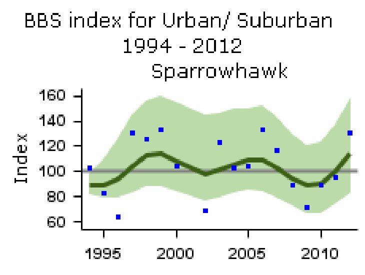
Habitat graph



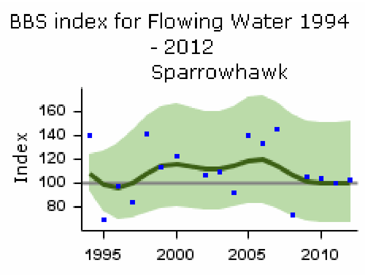
Habitat graph



Habitat graph

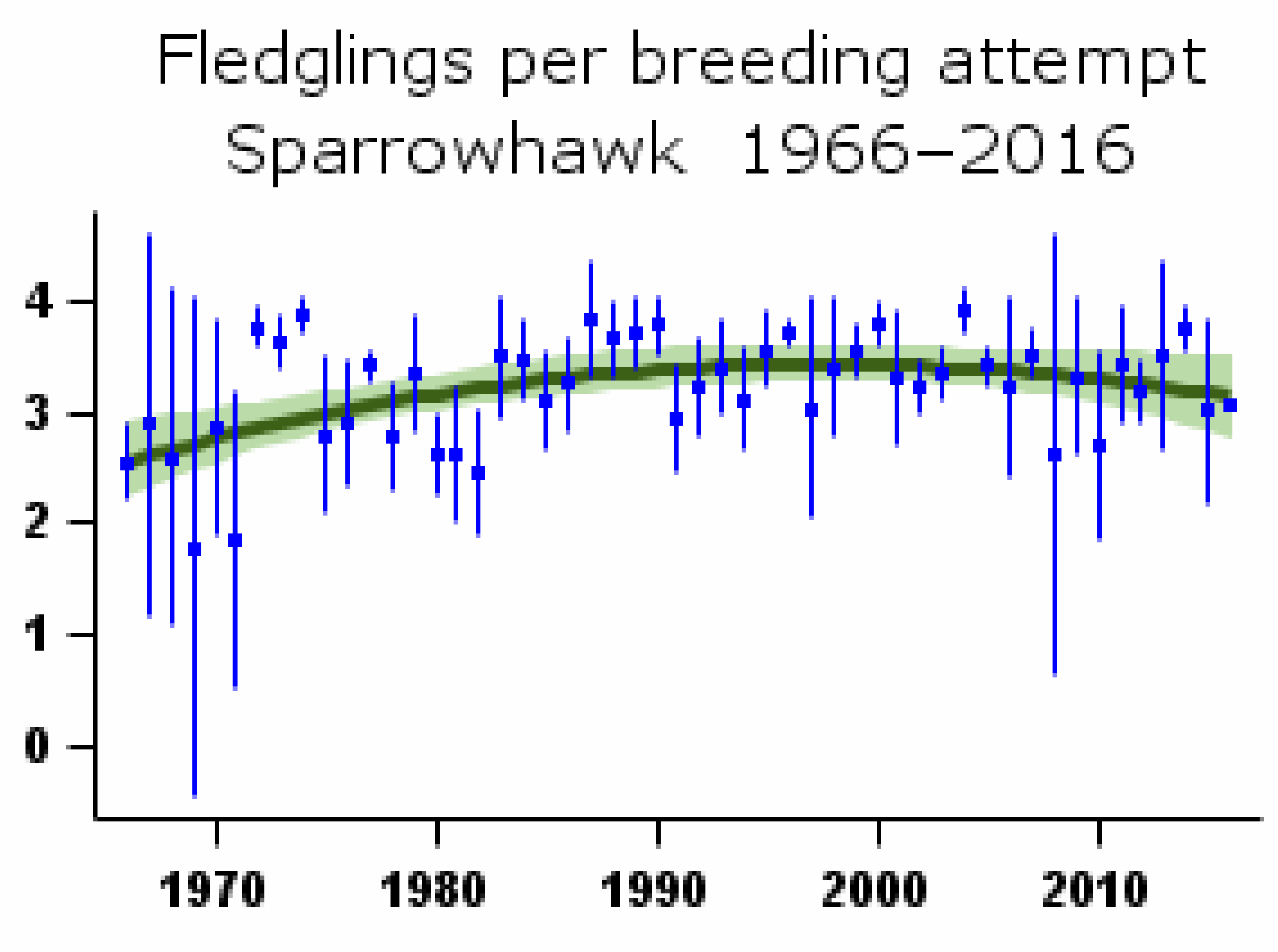


Habitat graph

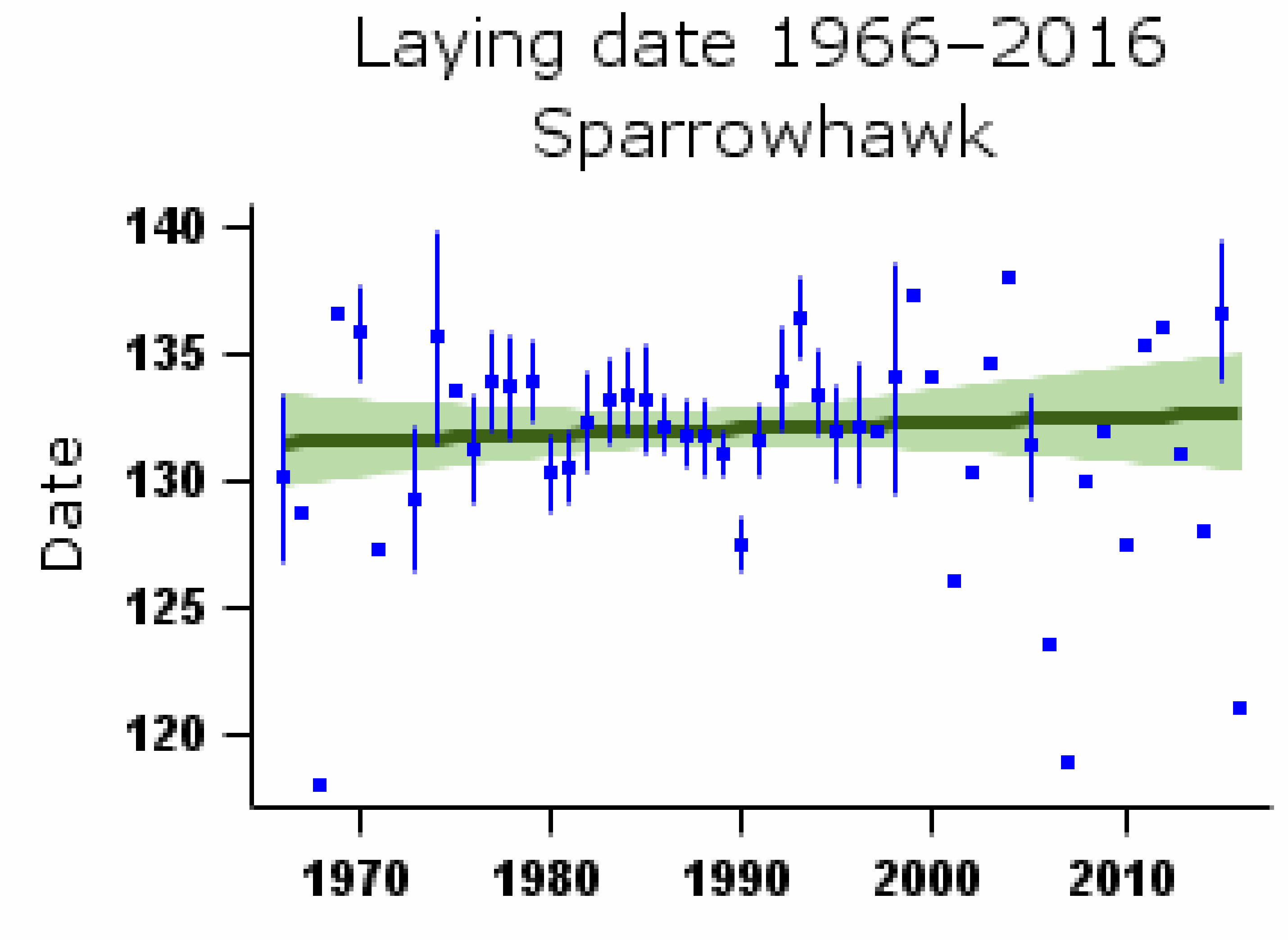


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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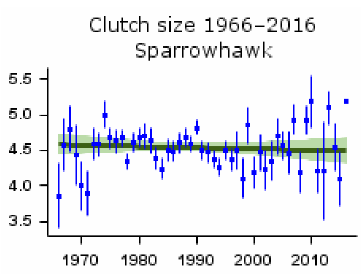
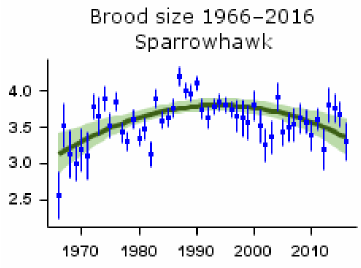
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	30	Curvilinear	2.62 fledglings	3.19 fledglings	21.5%		
Clutch size	48	1967-2015	32	None					
Brood size	48	1967-2015	66	Curvilinear	3.17 chicks	3.40 chicks	7.3%		
Nest failure rate at egg stage	48	1967-2015	30	Linear decline	0.44% nests/day	0.06% nests/day	-86.4%		
Nest failure rate at chick stage	48	1967-2015	43	None					
Laying date	48	1967-2015	12	None			0 days		Small sample

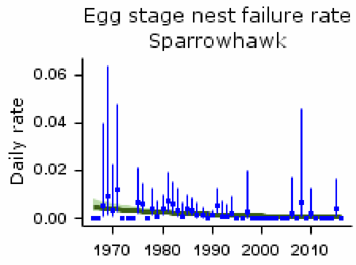
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



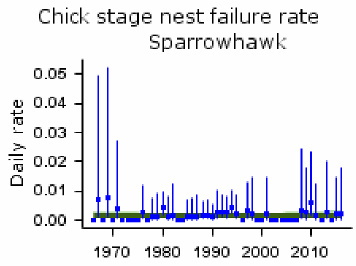
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



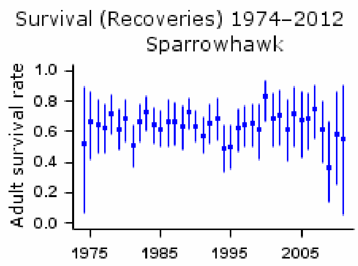
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Causes of change

There is good evidence that improved breeding success due to a decline in organochlorine pesticide use is the most likely cause of the increase in this species, but that reduced survival, especially of young birds, may be driving the decline in Scottish populations.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	Increased survival
Ecological	Other	

Further information on causes of change

Sparrowhawks suffered a severe population crash caused by organochlorine pesticides in the 1950s and 1960s, when the species was extinguished from large areas of lowland Britain (Newton 1986, 2013). Studies of this species in eastern England confirmed this, and the recovery of the Sparrowhawk in this area was primarily dependent on declining organochlorine contamination which resulted in an improvement of breeding success mainly due to an increase in hatching success, itself associated with improved eggshell thickness and reduced egg breakage (Newton & Wyllie 1992). The figures above support this, showing improving numbers of fledglings per breeding attempt, a fall in failure rates at the egg stage and increases in brood size. Integrated population modelling supports the importance of productivity, as well as the survival of first-year birds, in determining population change (Robinson et al. 2014). This also suggested that an unknown factor, perhaps the availability of good-quality territories (and hence the number of individuals that can breed each year), also influences the annual population change.

Comparison of an increasing population in east-central England with stable and decreasing populations in southern Scotland showed that differences in population trend were associated mainly with differences in the recruitment of new breeders (greatest in the increasing and lowest in the decreasing population) and in age of first breeding (earliest in the increasing and latest in the decreasing population). There were also differences in the annual survival of breeders (greater in the increasing population) while differences in breeding success between areas were slight and non-significant (Wyllie & Newton 1991). A comprehensive long-running study of Sparrowhawks in Scotland during 1972-86 provides further detailed evidence. Overwinter loss operating in the period between the fledging of young and subsequent recruitment to the breeding population was identified as the key factor, explaining 77% of the variance in total annual loss, and largely accounting for the pattern of change in breeding numbers (Newton 1988). Work by Newton & Marquiss (1986) found that annual survival of established breeders and breeding performance was the same in both a declining and increasing population, but that recruitment of incoming breeders was lower in the declining population and state that this was the main proximate cause of decline.

The population has stabilised since the mid 1990s and, possibly through the effects of intraspecific competition, average brood size has begun to fall again (see above).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Buzzard

Buteo buteo

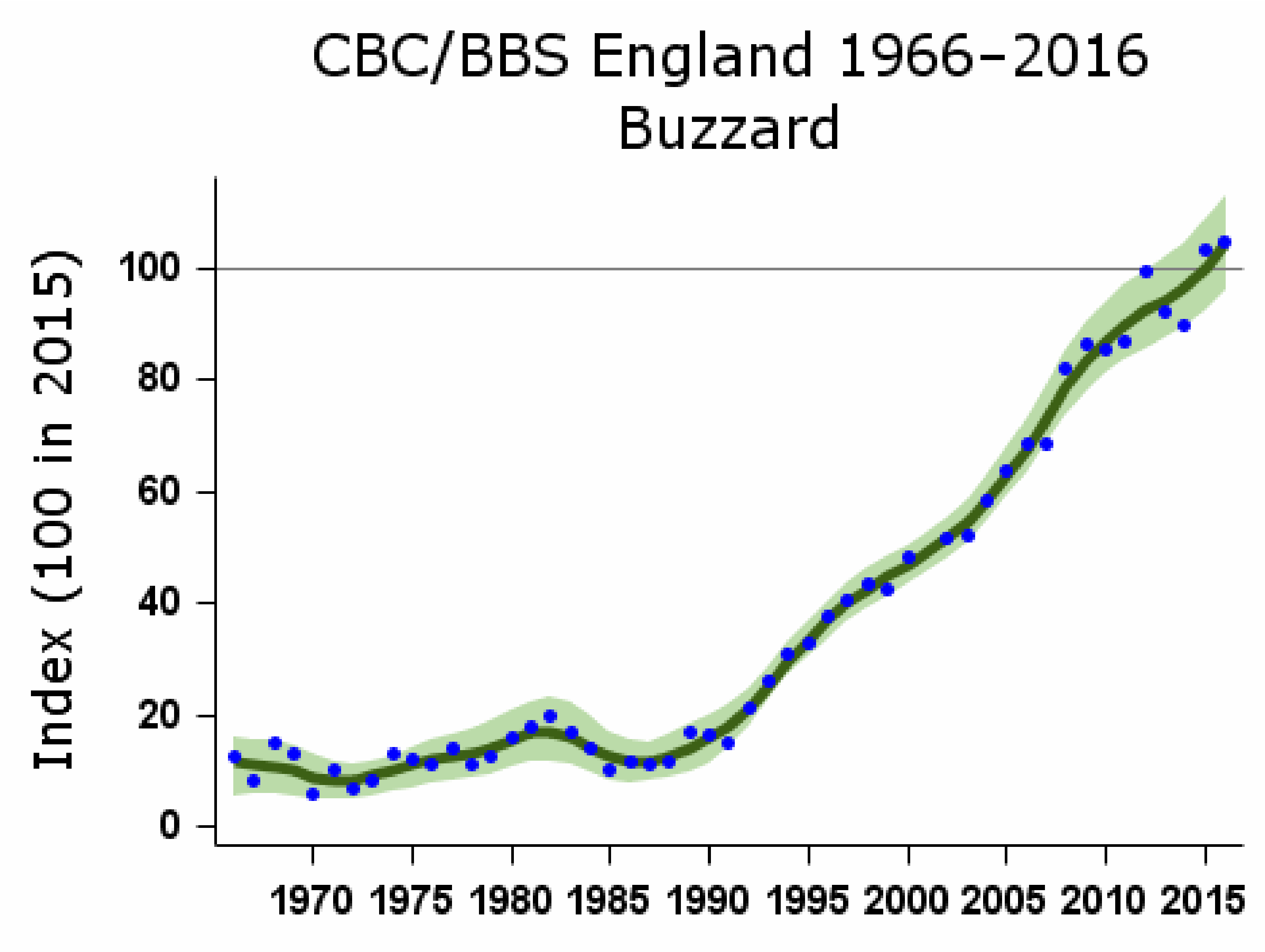
Key facts

Conservation listings:	Global: green
Long-term trend:	England: rapid increase
Population size:	57,000-79,000 pairs in 2009 (APEP13: 2001 estimate (Clements 2002) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	Farmland
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The Buzzard has shown a substantial eastward range expansion since the 1988-91 Atlas and is now an almost ubiquitous breeding bird in the UK (Balmer et al. 2013). For more than a decade it has been the most abundant UK raptor (Clements 2002). The increasing trend identified by the CBC relates especially to the spread of range into central and eastern Britain, where CBC was strongly represented. If anything, however, the upsurge has been amplified with the addition of the more widely representative BBS data since 1994. The BBS PECBMS 2016a). Though breeding success is still rising overall, a decrease in productivity has been documented in Avon, per pair but not per unit area, as the population has risen (Prytherch 2013) .



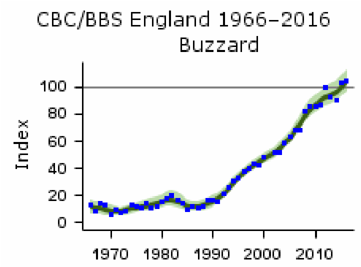
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

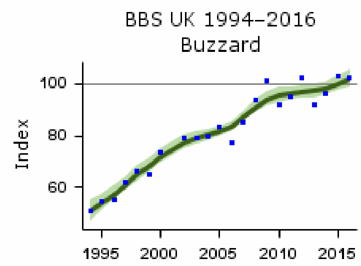
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	327	792	477	1892		Small CBC sample
	25	1990-2015	618	533	364	892		
	10	2005-2015	1093	59	50	69		
	5	2010-2015	1249	15	10	20		
BBS UK	20	1995-2015	1096	84	70	100		
	10	2005-2015	1517	22	17	29		
	5	2010-2015	1679	5	0	9		
BBS England	20	1995-2015	751	194	161	239		
	10	2005-2015	1093	59	51	69		
	5	2010-2015	1249	15	11	20		
BBS Scotland	20	1995-2015	158	22	2	46		
	10	2005-2015	199	-12	-20	-4		
	5	2010-2015	201	-11	-20	-2		
BBS Wales	20	1995-2015	152	-2	-18	14		
	10	2005-2015	176	-8	-17	3		
	5	2010-2015	178	-5	-14	7		
BBS N.Ireland	20	1995-2015	34	>10000	.	.		
	10	2005-2015	46	31	.	.		
	5	2010-2015	45	12	.	.		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

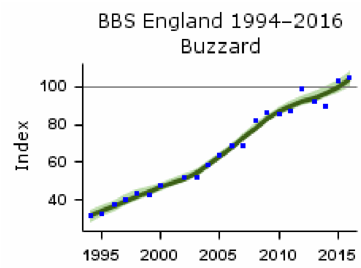
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



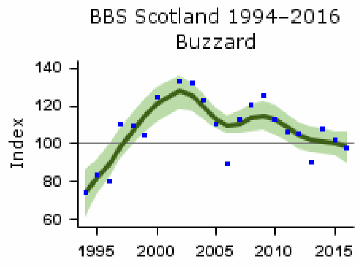
CBC/BBS England graph



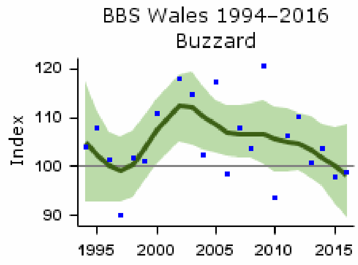
BBS UK graph



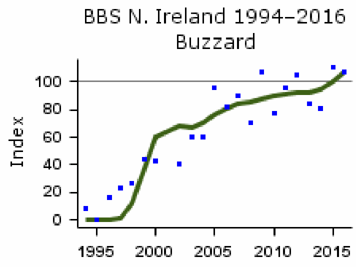
BBS England graph



BBS Scotland graph

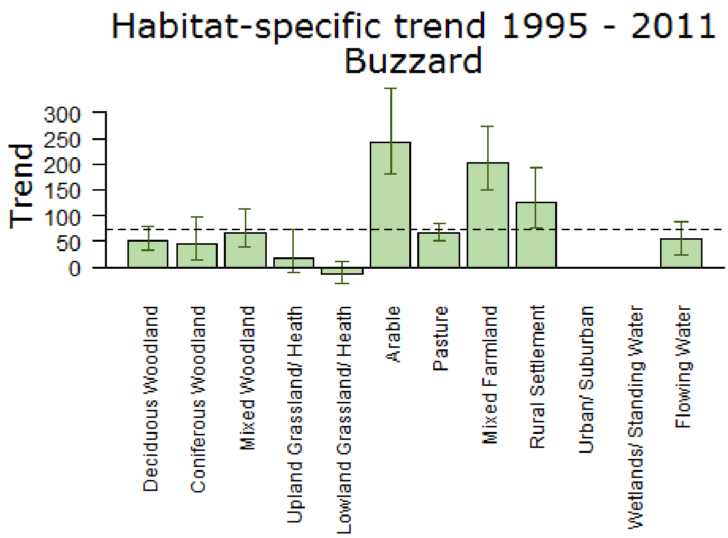


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

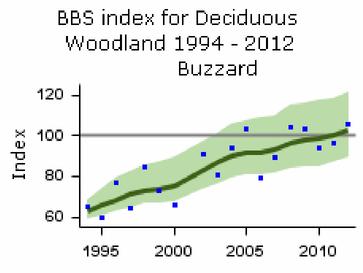
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

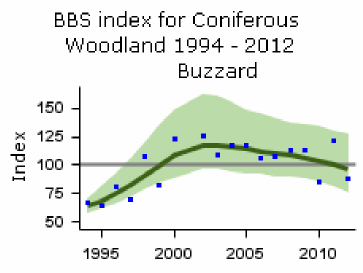
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	190	52	31	78

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Coniferous Woodland	16	1995-2011	75	45	14	96
Mixed Woodland	16	1995-2011	119	68	38	112
Upland Grassland/ Heath	16	1995-2011	37	18	-11	74
Lowland Grassland/ Heath	16	1995-2011	63	-14	-31	11
Arable	16	1995-2011	175	242	182	347
Pasture	16	1995-2011	429	65	50	84
Mixed Farmland	16	1995-2011	155	203	149	272
Rural Settlement	16	1995-2011	111	125	76	194
Flowing Water	16	1995-2011	107	53	24	89

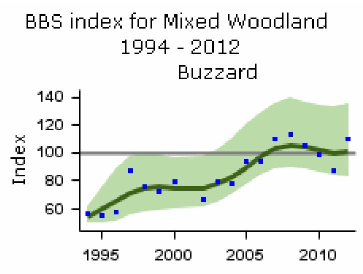
Further information on habitat-specific trends, please follow link here.



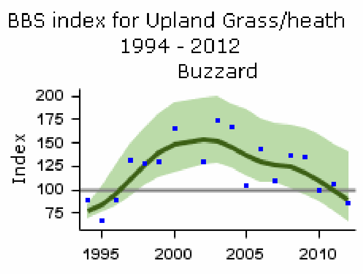
Habitat graph



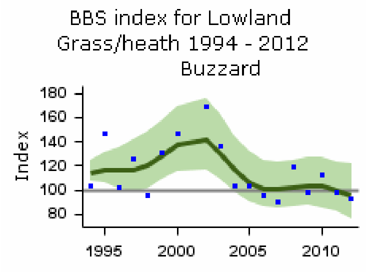
Habitat graph



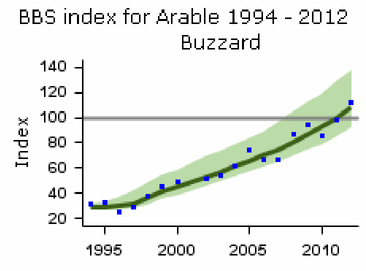
Habitat graph



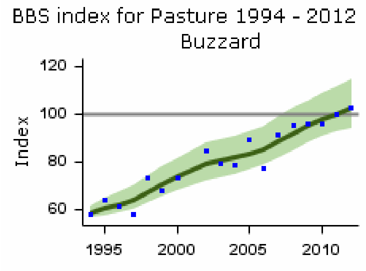
Habitat graph



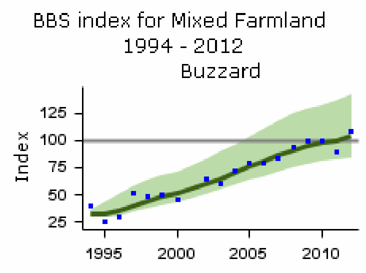
Habitat graph



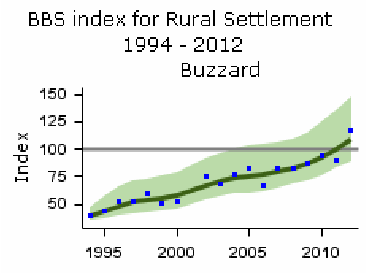
Habitat graph



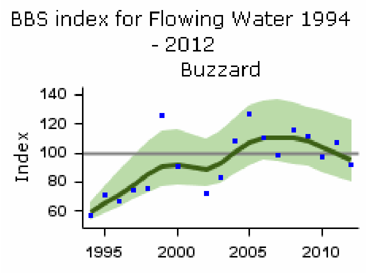
Habitat graph



Habitat graph

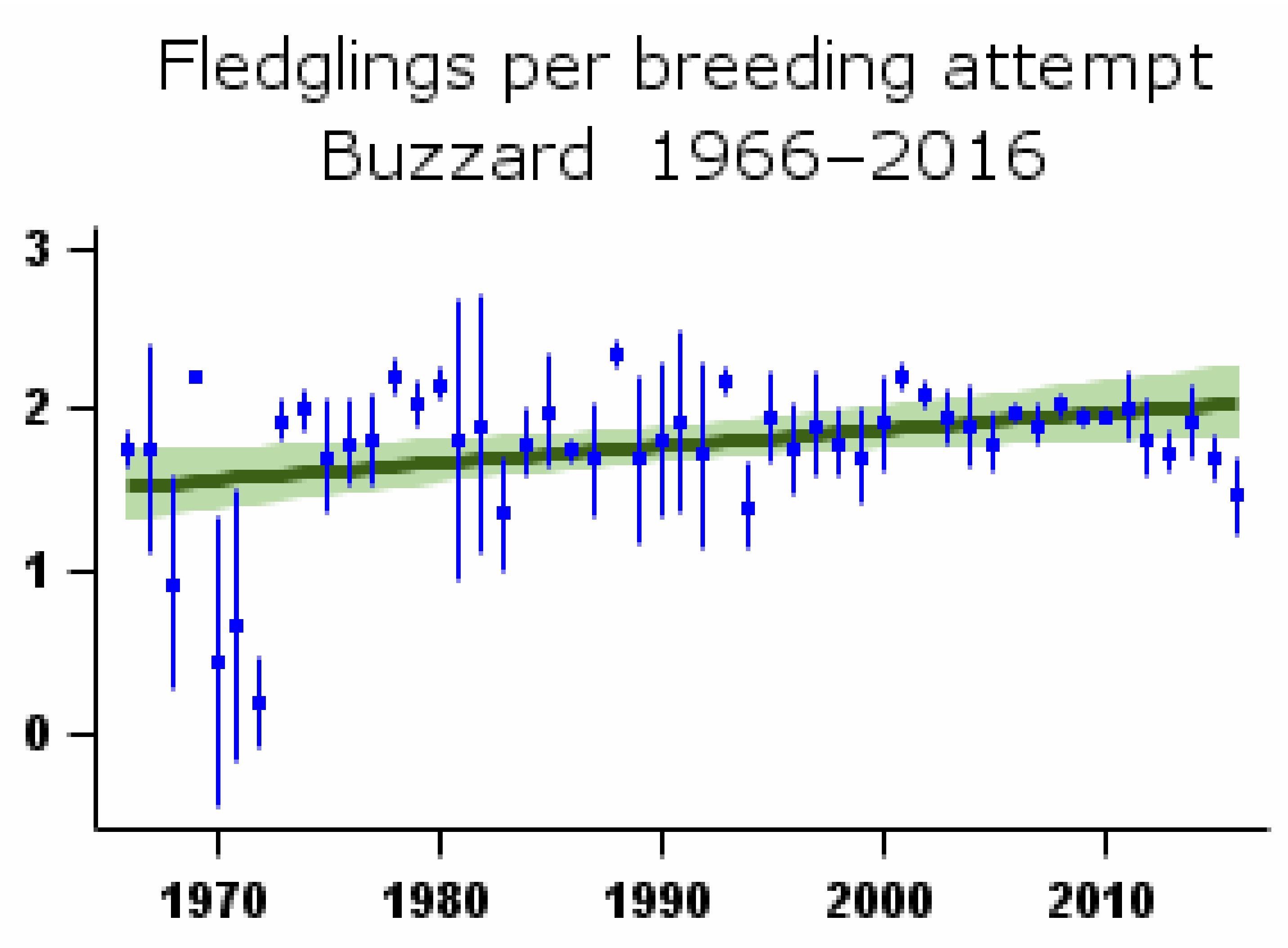


Habitat graph

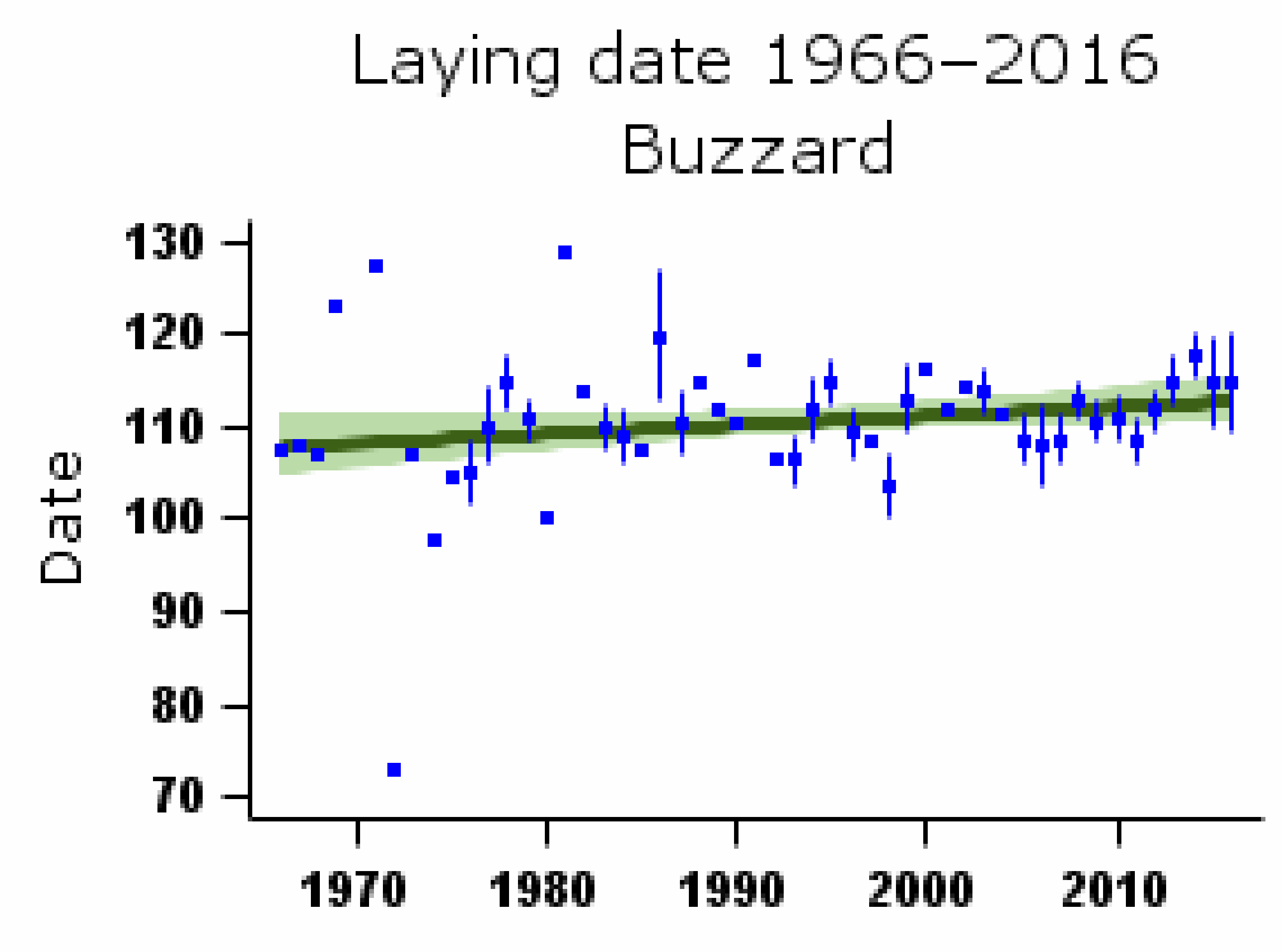


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

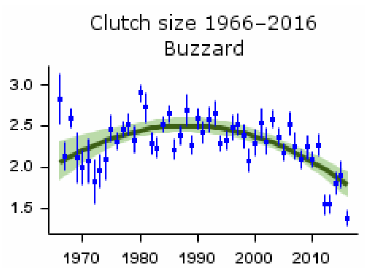


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

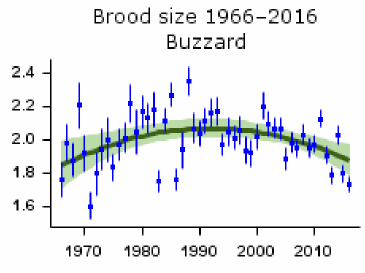
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	30	Linear increase	1.54 fledglings	2.03 fledglings	32.1%		
Clutch size	48	1967-2015	36	Curvilinear	2.10 eggs	1.84 eggs	-12.5%		
Brood size	48	1967-2015	115	Curvilinear	1.86 chicks	1.89 chicks	1.7%		
Nest failure rate at egg stage	48	1967-2015	30	Linear decline	0.88% nests/day	0.04% nests/day	-95.5%		Small sample
Nest failure rate at chick stage	48	1967-2015	56	None					
Laying date	48	1967-2015	6	None			0 days		Small sample

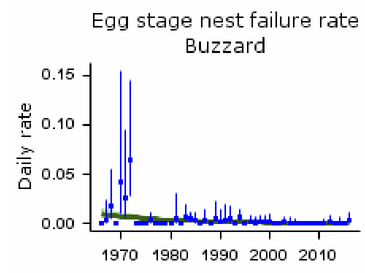
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



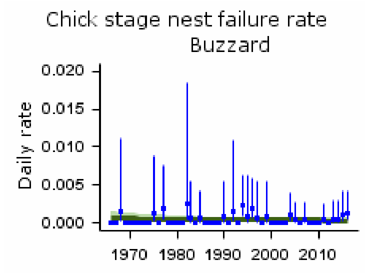
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that the increase in population numbers is associated with rapidly improving nesting success, which has been linked to reduced persecution (and therefore improved survival) and increased food supplies, for example due to the recovery of rabbit populations from the effects of myxomatosis. It is not possible to say which is the more important driver.

Change factor	Primary driver	Secondary driver
Demographic	Improved breeding success	Increased survival
Ecological	Other	

Further information on causes of change

As the figures above show, there has been an increase in the number of fledglings per breeding attempt and a decrease in daily failure rates at the egg stage. As such, the increase in population numbers has been associated with rapidly improving nesting success, through reduced persecution, the recovery of rabbit populations from the effects of myxomatosis and release from the deleterious effects of organochlorine pesticides (Elliott & Avery 1991, Sim et al. 2000, 2001a, Clements 2002). Numbers of Buzzard were relatively stable until the late 1980s when the population size began increasing steeply. Elliott & Avery (1991) analysed data collected by the RSPB to provide good evidence that, during 1975-89, persecution was a factor in restricting the Buzzard's range. Halley (1993) found that levels of persecution in Scotland had fallen and postulated that this was a factor in the increase in Buzzard population size. In a study of two local populations in Scotland, Swann & Etheridge (1995) provided some evidence to show that persecution was a factor in restricting population density at the site that benefited from higher productivity, although they did not specifically analyse the effects of persecution. Sim et al. (2000) provide good evidence from Buzzard populations in the West Midlands that persecution levels, especially poisonings, were lower in the 1990s when the population started increasing and state that higher survival rate due to reduced persecution was likely to be one of the main factors responsible for the rapid increase in the Buzzard population in this area. Gibbons et al. (1995) found that Buzzards were less common in the uplands where grouse moors were most frequent, stating that this was due to either persecution, unsuitable habitat management or lack of food, although did not specify which was the most important driver.

There is also good evidence to support the role of changing food availability in population increases. Graham et al. (1995) showed that Buzzard breeding density was positively related to lagomorph abundance and Swann & Etheridge (1995) found that Buzzards laid larger clutches, produced bigger broods and had significantly higher productivity where rabbits were more common. Sim et al. (2000, 2001a) also provided good evidence that increased productivity coincided with an increase in rabbit abundance. Other studies have also found that breeding success is related to food availability (Kostrzewa & Kostrzewa 1991, Austin & Houston 1997, Goszczynski 1997, 2001, Rooney et al. 2015). It is, therefore, plausible that Buzzard distribution is influenced by rabbit abundance, which has increased since rabbits have overcome the effects of myxomatosis. However, more recent declines in rabbit populations, which have been shown through Francksen et al. 2016a, 2016b). The same study also found that Buzzard did not switch to grouse in poor vole years (2017).

Habitat change may have played some role in the increases. High Buzzard breeding densities were associated with high proportions of unimproved pasture and mature woodland within estimated territories (Sim et al. 2000) and Sergio et al. (2002, 2005) found that Buzzard productivity benefited from the conversion of coppice woodland to mature forest in Italy. In Poland, the spread of oilseed rape has boosted vole populations (of a species not found in UK) and Buzzard productivity has correspondingly improved (Panek & Husek 2014). There is also some evidence that breeding success is related to climate, although there is little evidence for this from the UK. In Germany, Kostrzewa & Kostrzewa (1990) provide evidence to show that the number of young fledged was negatively correlated with rainfall in April and May. Although there is no evidence to support this, it is worth noting that these possible habitat/climate effects and food effects are not mutually exclusive.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Moorhen

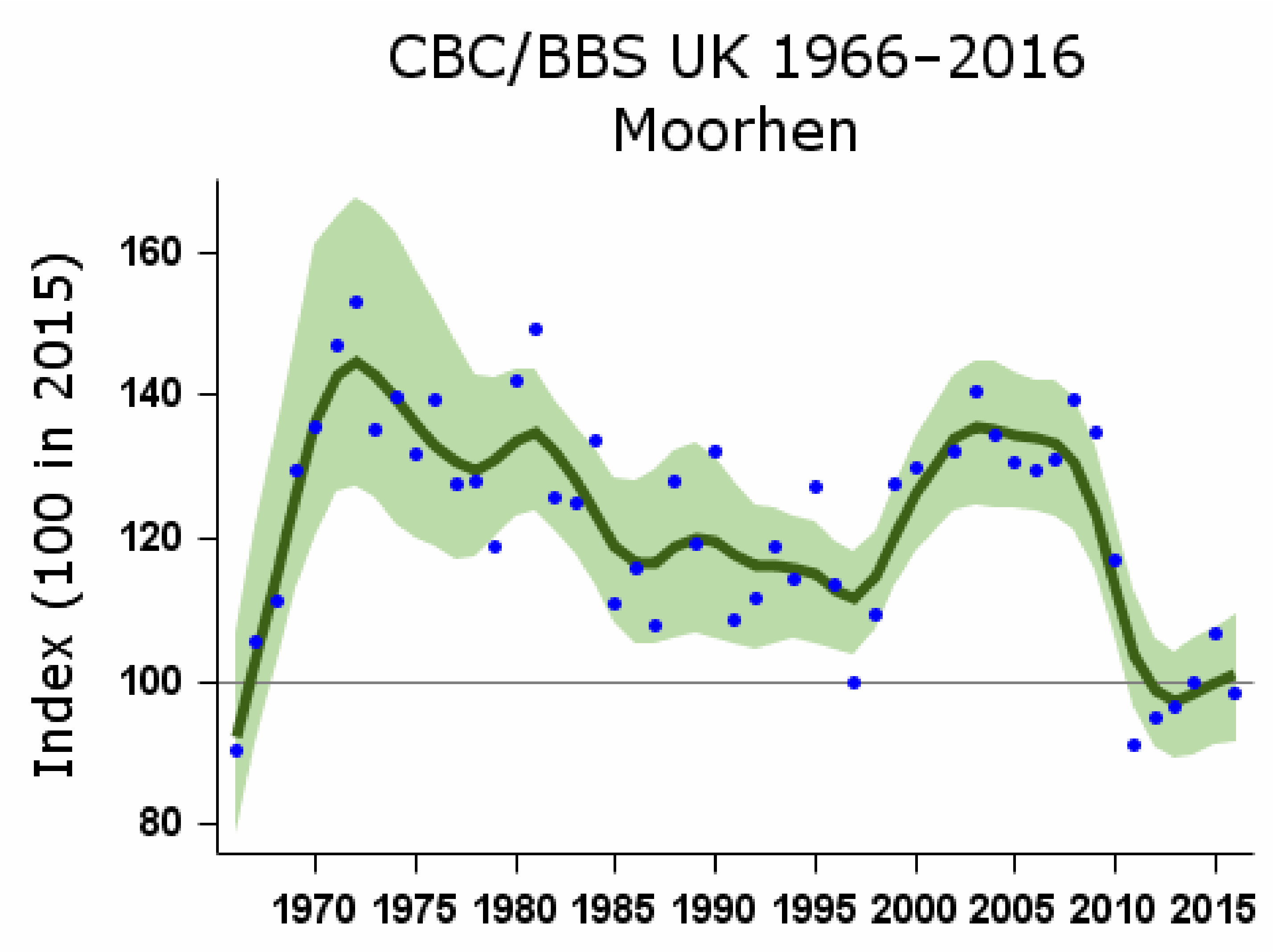
Gallinula chloropus

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: fluctuating, with no long-term trend
Population size:	270,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Trends for this species show wide fluctuations that are related to its high potential for reproduction and to its susceptibility to cold winter weather. The BBS Frost et al. 2017). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

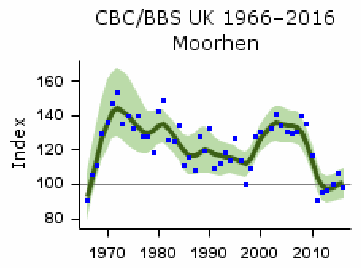
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	356	-3	-27	21		
	25	1990-2015	590	-16	-27	-6		
	10	2005-2015	768	-26	-30	-22	>25	
	5	2010-2015	726	-12	-18	-8		
CBC/BBS England	48	1967-2015	327	3	-21	33		
	25	1990-2015	546	-17	-28	-4		
	10	2005-2015	714	-25	-29	-20		

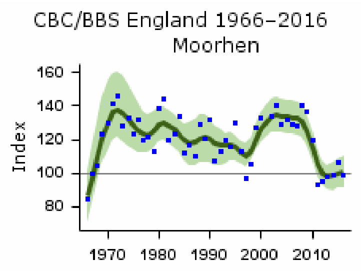
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	126	-32	-50	-13	>25	
	25	1990-2015	158	-14	-29	0		
	10	2005-2015	178	-23	-31	-15		
	5	2010-2015	153	-8	-14	0		
BBS UK	20	1995-2015	670	-12	-19	-4		
	10	2005-2015	768	-26	-30	-20	>25	
	5	2010-2015	726	-12	-18	-7		
BBS England	20	1995-2015	620	-13	-20	-5		
	10	2005-2015	714	-25	-29	-20	>25	
	5	2010-2015	674	-13	-18	-9		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

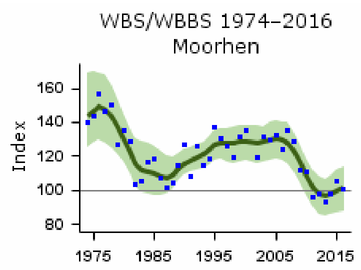
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



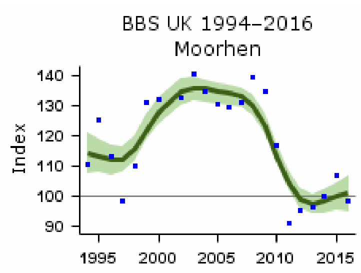
CBC/BBS UK graph



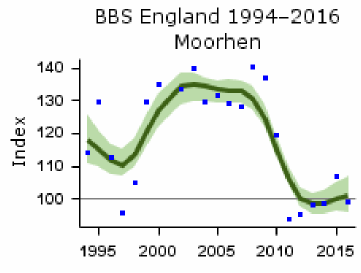
CBC/BBS England graph



WBS/WBBS waterways graph

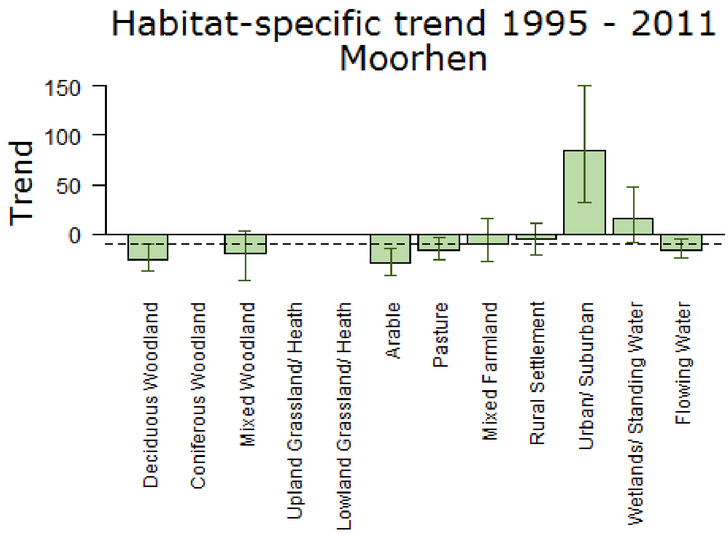


BBS UK graph



BBS England graph

Population trends by habitat



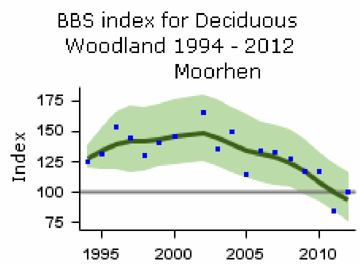
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

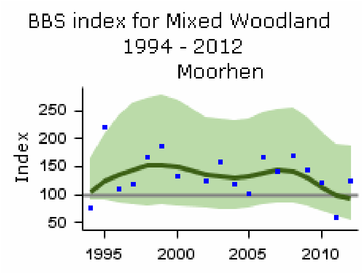
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	117	-26	-36	-10
Mixed Woodland	16	1995-2011	40	-19	-46	3
Arable	16	1995-2011	130	-29	-42	-15
Pasture	16	1995-2011	235	-16	-25	-4
Mixed Farmland	16	1995-2011	100	-10	-27	15
Rural Settlement	16	1995-2011	138	-6	-21	11
Urban/ Suburban	16	1995-2011	67	85	32	150
Wetlands/ Standing Water	16	1995-2011	61	16	-9	47
Flowing Water	16	1995-2011	252	-16	-24	-5

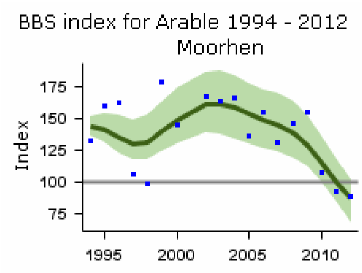
Further information on habitat-specific trends, please follow link here.



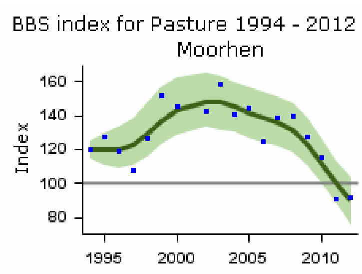
Habitat graph



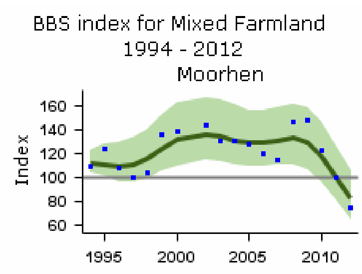
Habitat graph



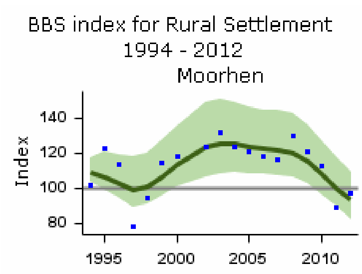
Habitat graph



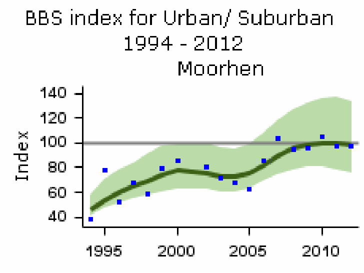
Habitat graph



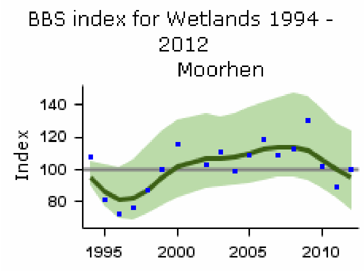
Habitat graph



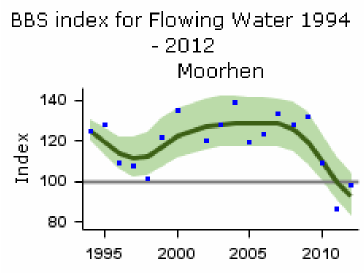
Habitat graph



Habitat graph

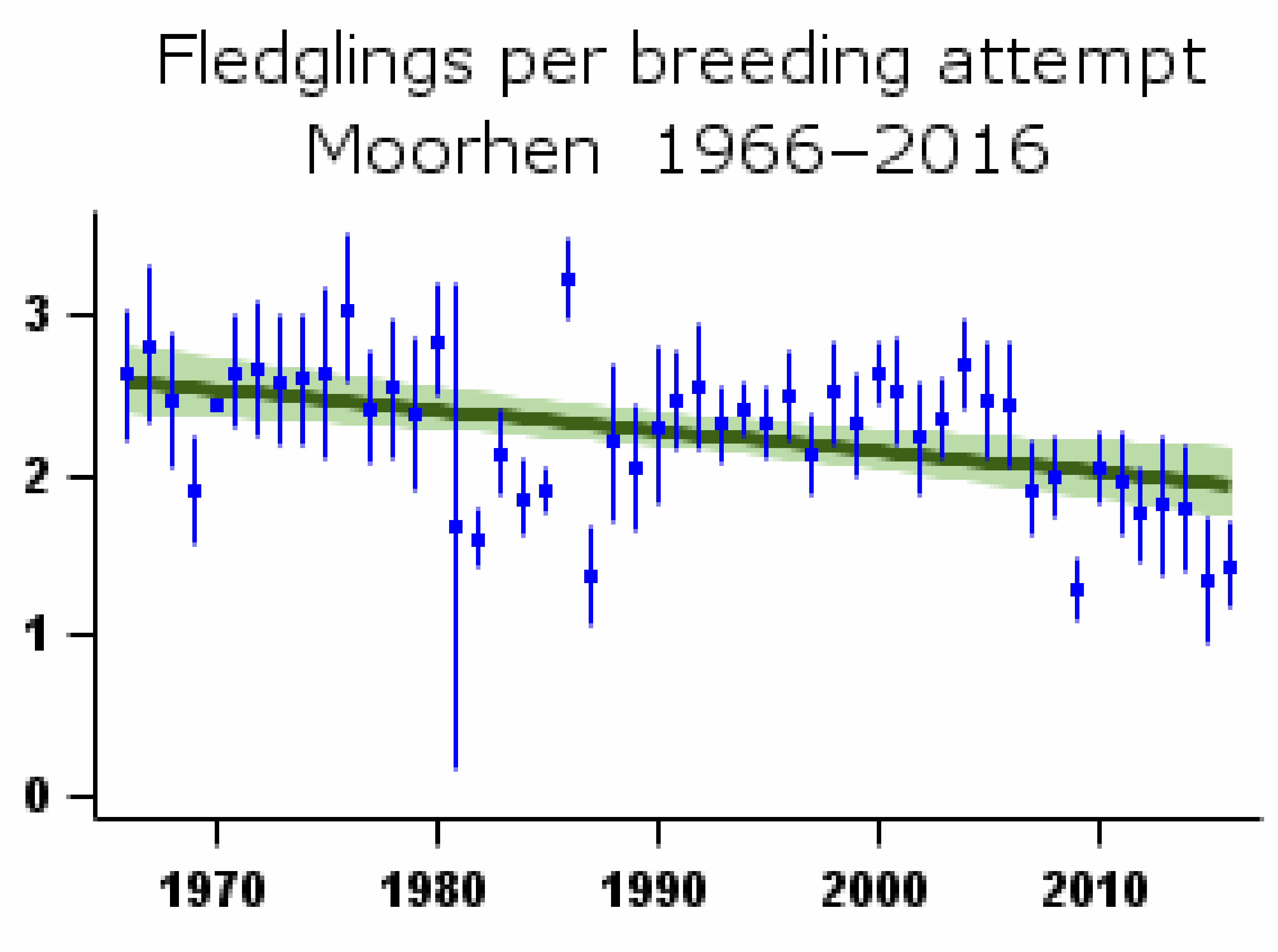


Habitat graph

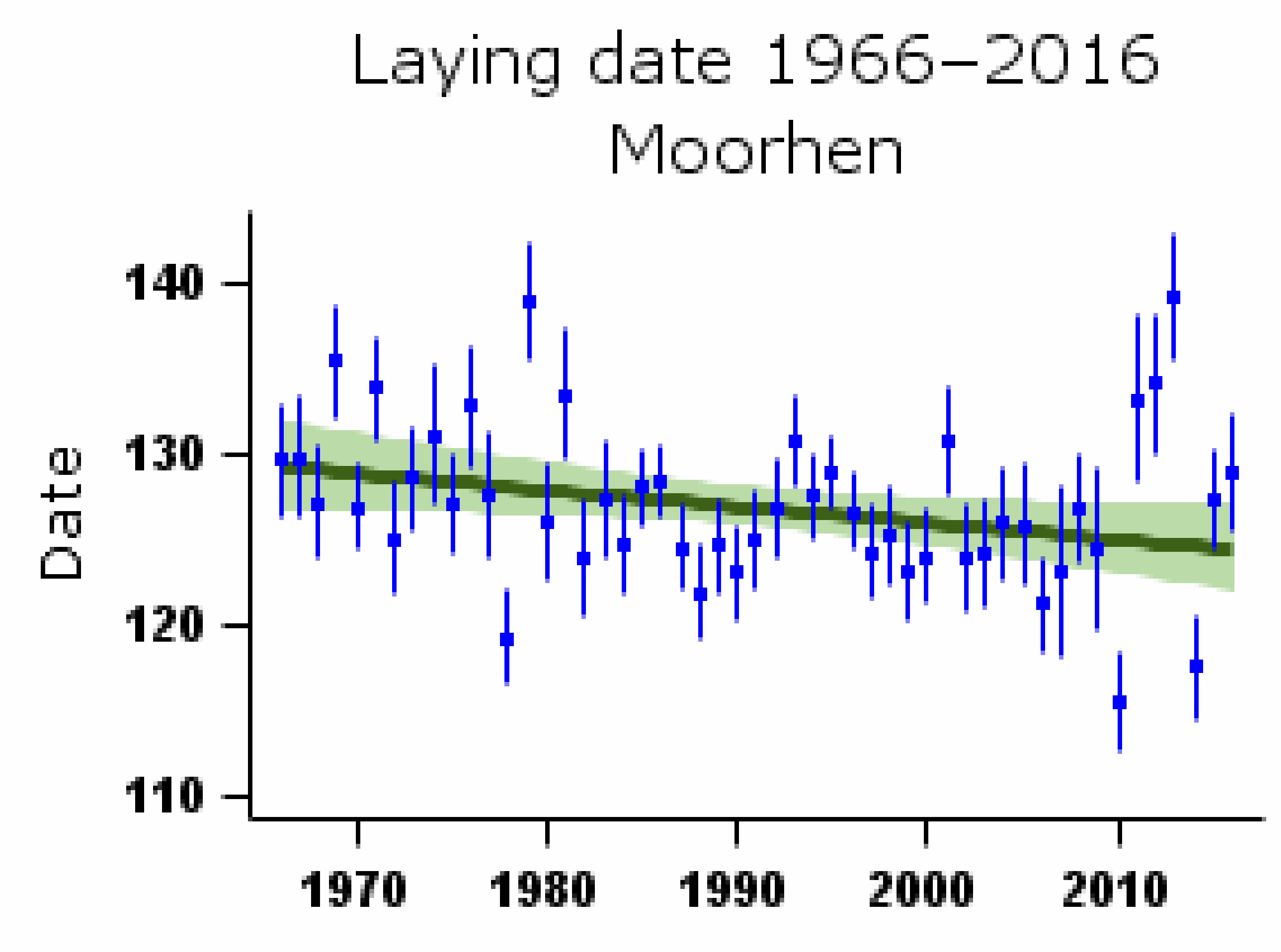


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
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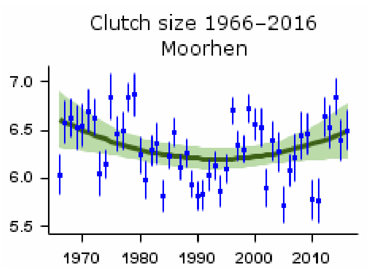
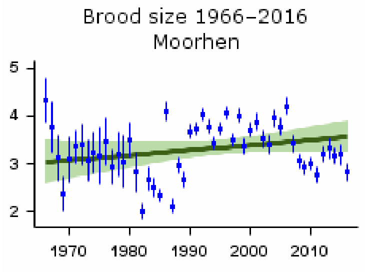
Clutch size	48	1967-2015	113	Curvilinear	6.58 eggs	6.46 eggs	-1.9%		
Brood size	48	1967-2015	107	None					
Nest failure rate at egg stage	48	1967-2015	139	Linear increase	1.07% nests/day	2.35% nests/day	119.6%		
Nest failure rate at chick stage	48	1967-2015	51	Linear increase	0.03% nests/day	0.26% nests/day	766.7%		
Laying date	48	1967-2015	82	Linear decline	May 9	May 5	-4 days		

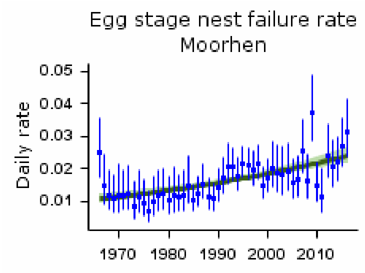
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



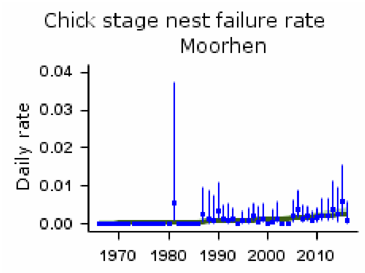
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Coot

Fulica atra

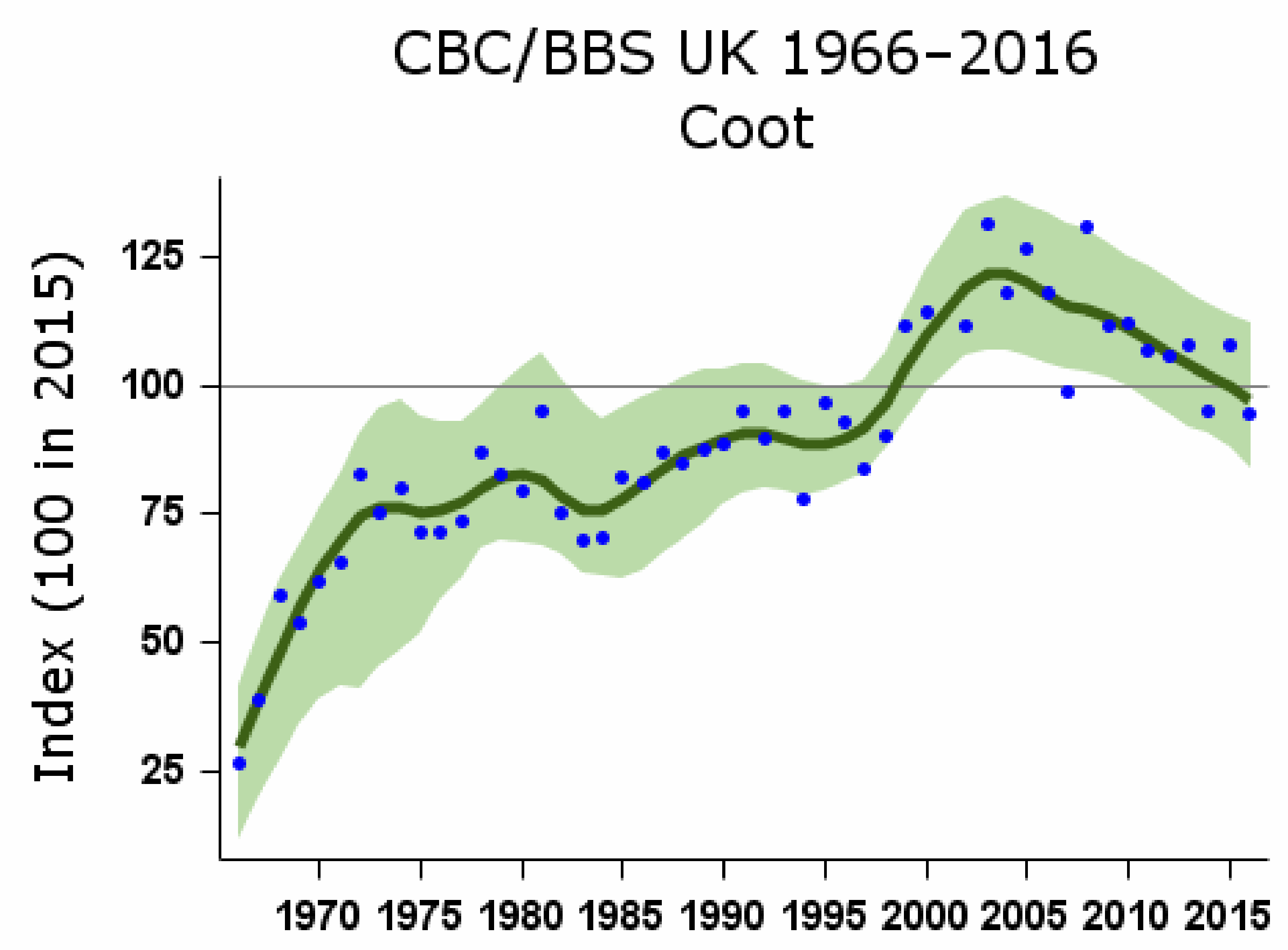
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	31,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

WBS/WBBS and CBC/BBS trends for Coot indicate a long-term increase, although the magnitude of the change is not clear. Small CBC samples, mainly of birds on small water-bodies, suggested a rapid rise in the late 1960s. WBS/WBBS and BBS include more birds on larger waters, and so may be more representative of Coot populations, but WBS/WBBS has not recorded the shallow increase found by BBS observers since 1994. However, the five- and ten-year trends are downward in all indices. The combination of CBC and BBS data suggests that the long-term increase in the UK and England has been rapid. There has been widespread moderate increase across Europe since 1980, although this trend should be treated with caution as the data from early years are based on limited coverage (PECBMS 2016a). Winter abundance on large still waters showed shallow increase from the mid 1980s to around 2000/01 but has since declined, especially in Northern Ireland (Frost et al. 2017).



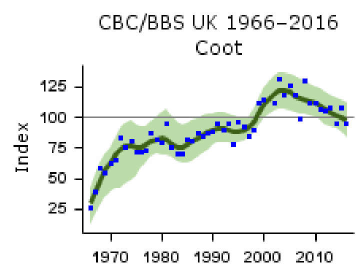
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

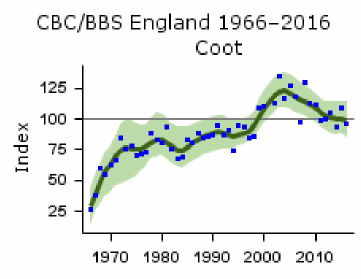
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	143	159	67	544		Small CBC sample
	25	1990-2015	248	11	-10	47		Small CBC sample
	10	2005-2015	343	-17	-28	-5		
	5	2010-2015	344	-10	-19	0		
CBC/BBS England	48	1967-2015	129	158	63	407		Small CBC sample
	25	1990-2015	224	13	-11	47		Small CBC sample
	10	2005-2015	310	-17	-29	-7		
	5	2010-2015	309	-8	-19	1		
WBS/WBBS waterways	40	1975-2015	62	40	-10	172		
	25	1990-2015	80	-24	-52	15		
	10	2005-2015	86	-29	-46	-9	>25	
	5	2010-2015	72	-28	-39	-15	>25	
BBS UK	20	1995-2015	286	17	-5	38		
	10	2005-2015	343	-17	-27	-6		
	5	2010-2015	344	-10	-19	0		
BBS England	20	1995-2015	258	19	2	46		
	10	2005-2015	310	-17	-28	-5		
	5	2010-2015	309	-8	-17	2		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

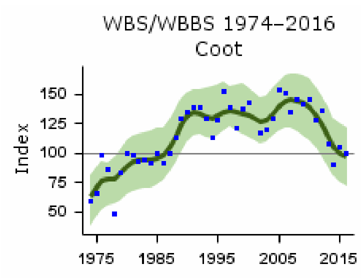
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



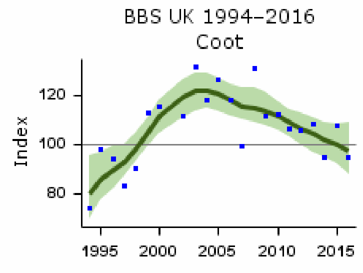
CBC/BBS UK graph



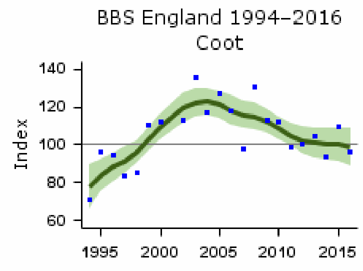
CBC/BBS England graph



WBS/WBBS waterways graph

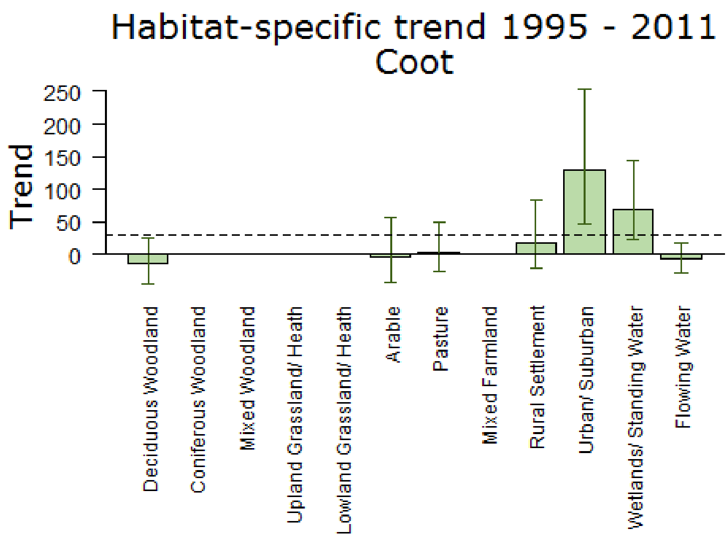


BBS UK graph



BBS England graph

Population trends by habitat



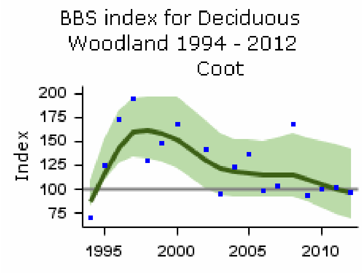
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

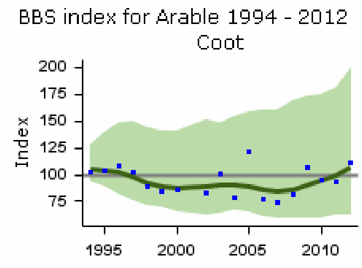
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	48	-14	-44	26
Arable	16	1995-2011	37	-4	-42	58
Pasture	16	1995-2011	77	4	-26	51
Rural Settlement	16	1995-2011	41	18	-20	83
Urban/ Suburban	16	1995-2011	30	129	48	253
Wetlands/ Standing Water	16	1995-2011	53	70	22	143
Flowing Water	16	1995-2011	127	-6	-27	19

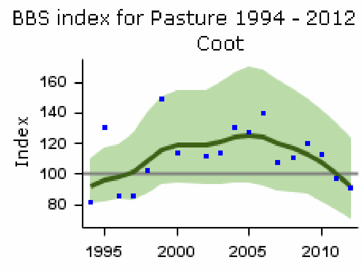
Further information on habitat-specific trends, please follow link here.



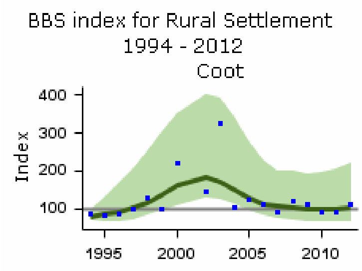
Habitat graph



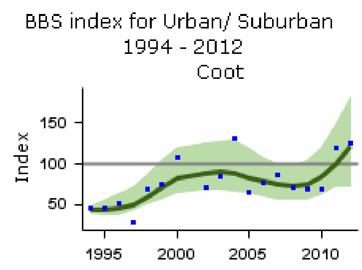
Habitat graph



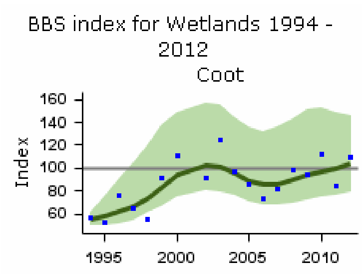
Habitat graph



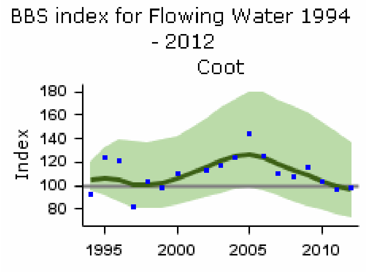
Habitat graph



Habitat graph

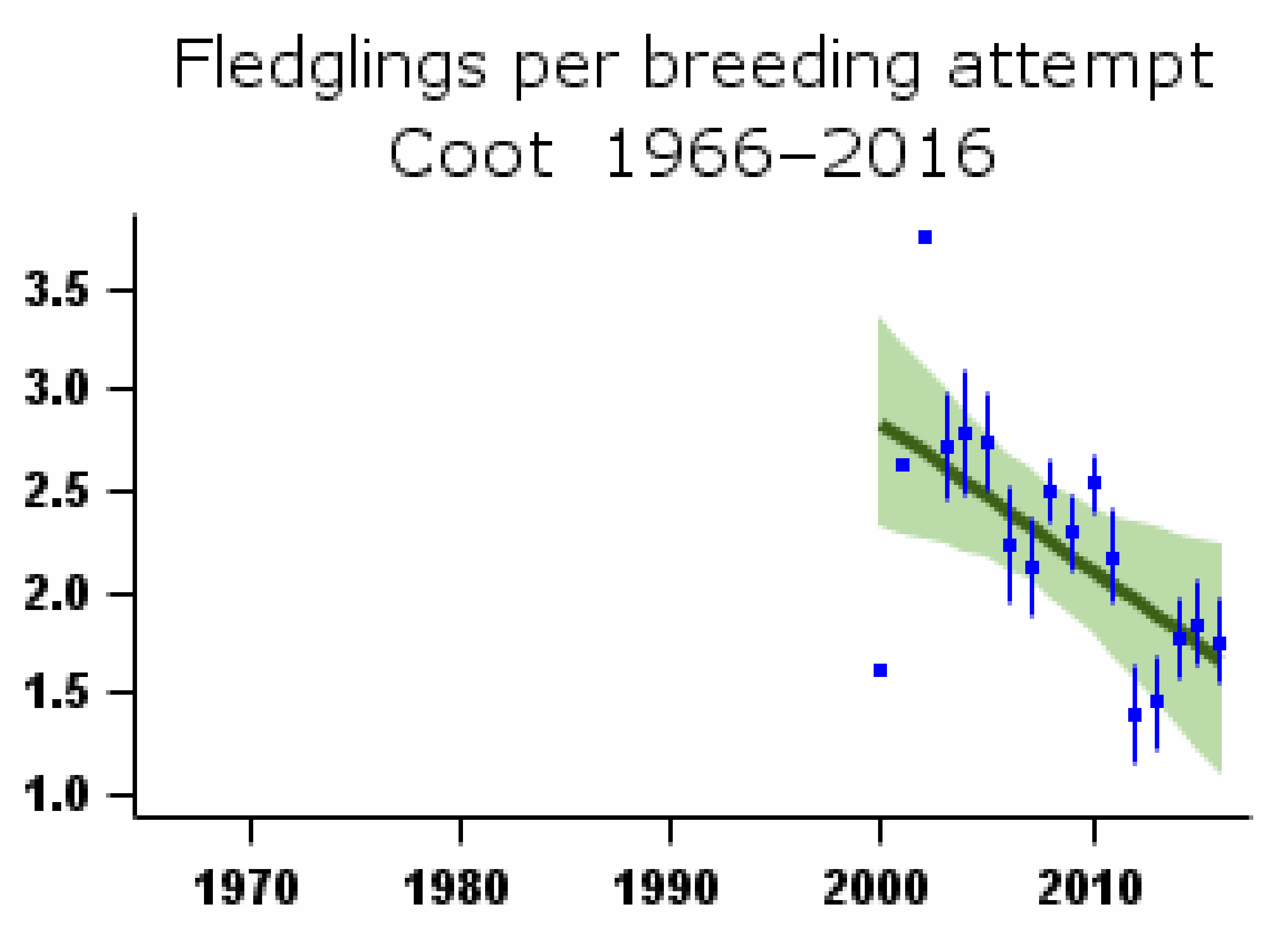


Habitat graph

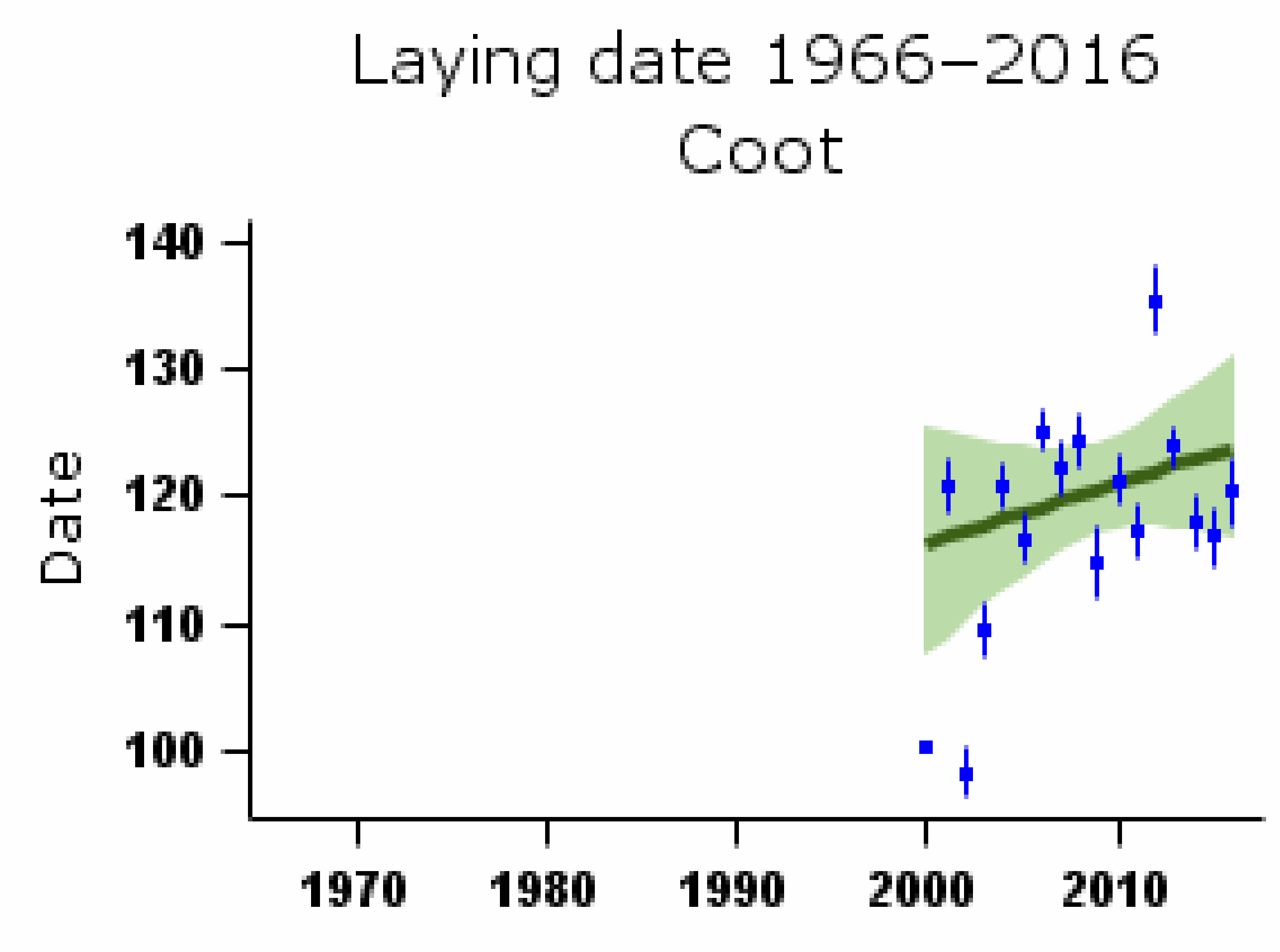


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

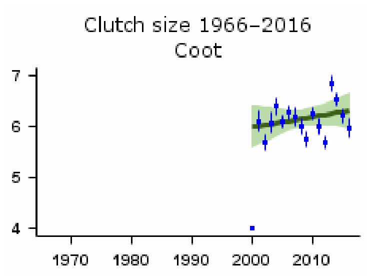


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

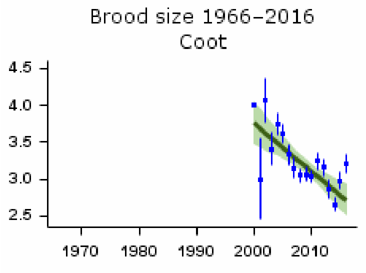
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	24	1991-2015	86	Linear decline	3.49 fledglings	1.74 fledglings	-50.1%		
Clutch size	15	2000-2015	151	None					
Brood size	15	2000-2015	171	Linear decline	3.75 chicks	2.77 chicks	-26.1%		
Nest failure rate at egg stage	15	2000-2015	194	Linear increase	0.68% nests/day	1.42% nests/day	108.8%		
Nest failure rate at chick stage	15	2000-2015	86	Linear increase	0.04% nests/day	0.36% nests/day	800.0%		
Laying date	15	2000-2015	99	None			0 days		

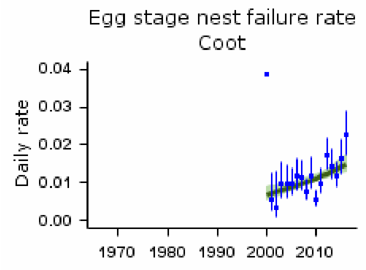
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



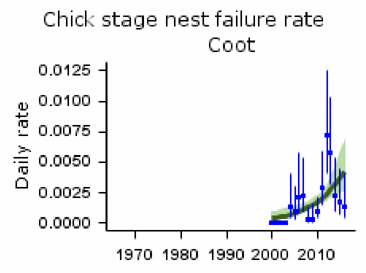
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There are no demographic trends available for this species and very little evidence regarding the ecological drivers of change.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

There is very little information available regarding the demographic or ecological drivers of population change in Coot.

Demographic data are only available for most recent 15 years, corresponding to a period of decline, and indicate that nest failure rate has increased and there has been a corresponding decrease in brood size over this period.

Brinkhof & Cave (1997) conducted a supplementary feeding experiment and found that seasonal variation in offspring production was in essence the result of seasonal variation in food availability. Thus, increases in food supply may have improved breeding success, but there is no evidence to support this.

Work from Finland (Ronka et al. 2005) has suggested that Coot are sensitive to overwinter weather: thus it is possible that this species may have benefited from milder winters.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Oystercatcher

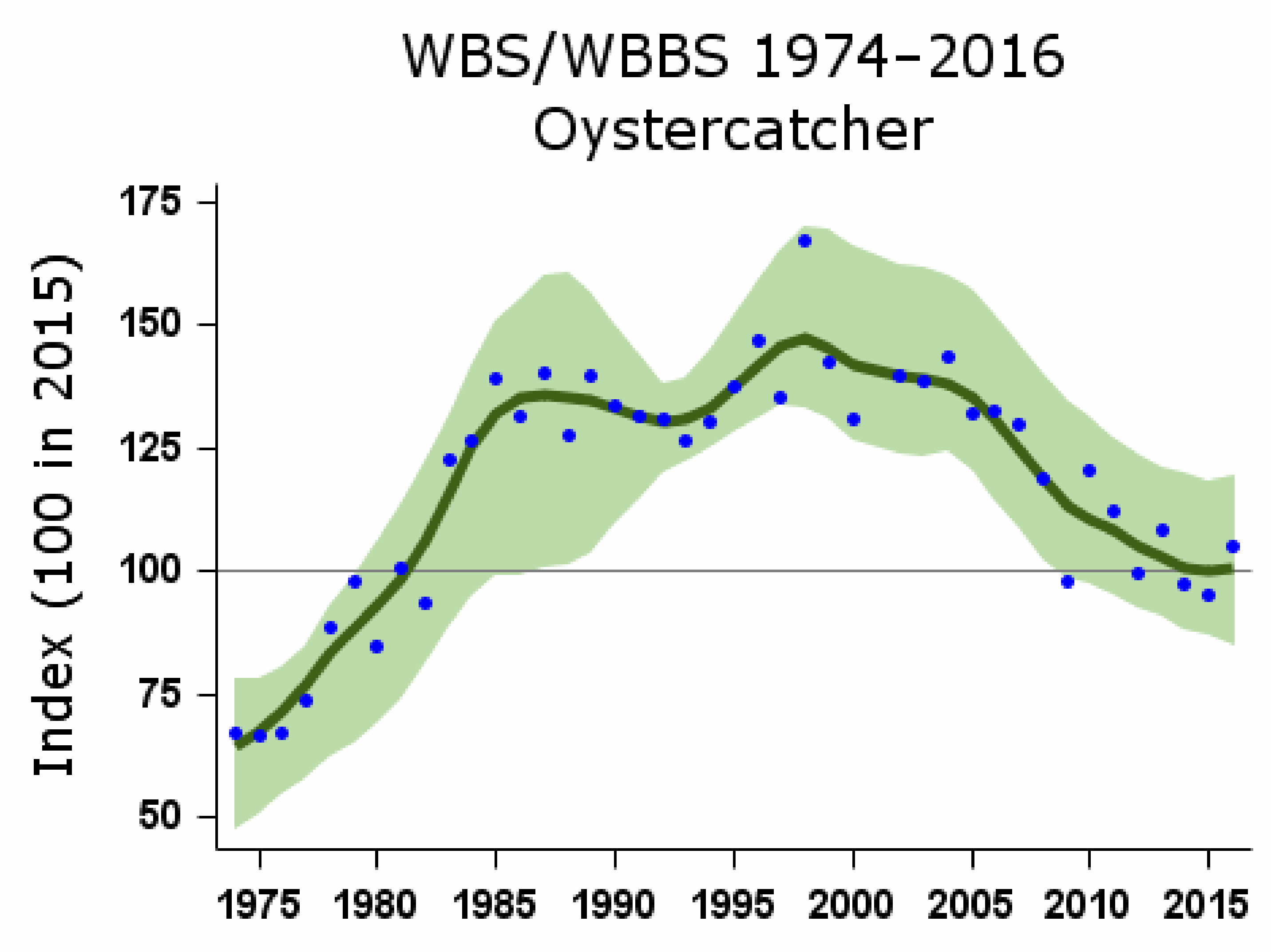
Haematopus ostralegus

Key facts

Conservation listings:	Global: amber (European status; breeding international importance; non-breeding localisation & international importance)
Long-term trend:	UK waterways: shallow increase
Population size:	110,000 pairs in 2009 (APEP13: 1985-99 estimate (O'Brien 2004) updated using CBC/BBS trend)

Status summary

Oystercatchers increased along linear waterways between 1974 and about 1986, as the species colonised inland sites across England and Wales (Gibbons et al. 1993). Thereafter, the WBS/WBBS index stabilised and now appears to be in decline, so showing a pattern similar to that in winter abundance (Frost et al. 2017). Surveys in England and Wales revealed an increase of 47% in breeding birds in wet meadows between 1982 and 2002 (Wilson et al. 2005). BBS data since 1994, which include birds in a broader range of locations and habitats, show strong increase in England but a significant, moderate decline in Scotland. The increase in nest failure rates during the 27-day egg stage (25 days for incubation and 2 days for laying) probably results from the spread of the species into less favourable habitats, where nest losses through predation or trampling may be more likely. A 95% decline over 1990-2015 at a study area in Perthshire, Scotland, was attributed to land use and crop type changes (Bell & Calladine 2017). The trend towards earlier laying may be linked to recent climate change (Crick & Sparks 1999). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

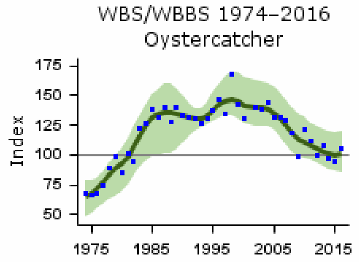
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	51	48	11	144		
	25	1990-2015	70	-25	-44	15		
	10	2005-2015	91	-26	-33	-17	>25	

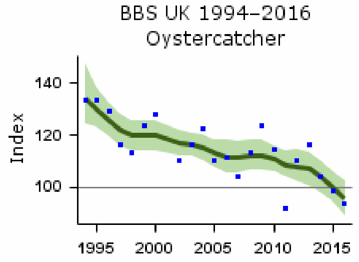
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	85	-10	-20	3		
BBS UK	20	1995-2015	363	-23	-31	-13		
	10	2005-2015	450	-12	-22	-3		
	5	2010-2015	465	-10	-16	-3		
BBS England	20	1995-2015	203	50	30	75		
	10	2005-2015	268	12	0	24		
	5	2010-2015	283	1	-7	10		
BBS Scotland	20	1995-2015	140	-37	-47	-30	>25	
	10	2005-2015	157	-20	-33	-10		
	5	2010-2015	155	-14	-24	-5		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

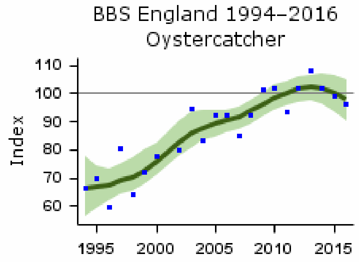
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



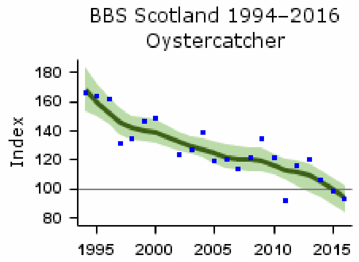
WBS/WBBS waterways graph



BBS UK graph



BBS England graph

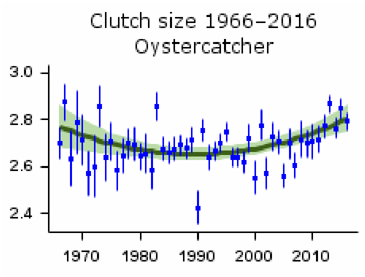


BBS Scotland graph

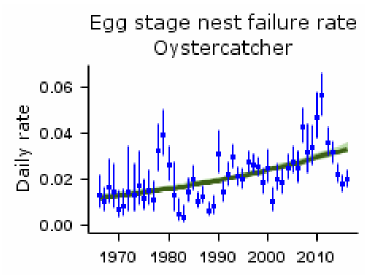
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	158	Curvilinear	2.76 eggs	2.79 eggs	1.2%		
Nest failure rate at egg stage	48	1967-2015	174	Linear increase	1.22% nests/day	3.29% nests/day	169.7%		
Laying date	48	1967-2015	72	Curvilinear	May 19	May 16	-3 days		

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Golden Plover

Pluvialis apricaria

Key facts

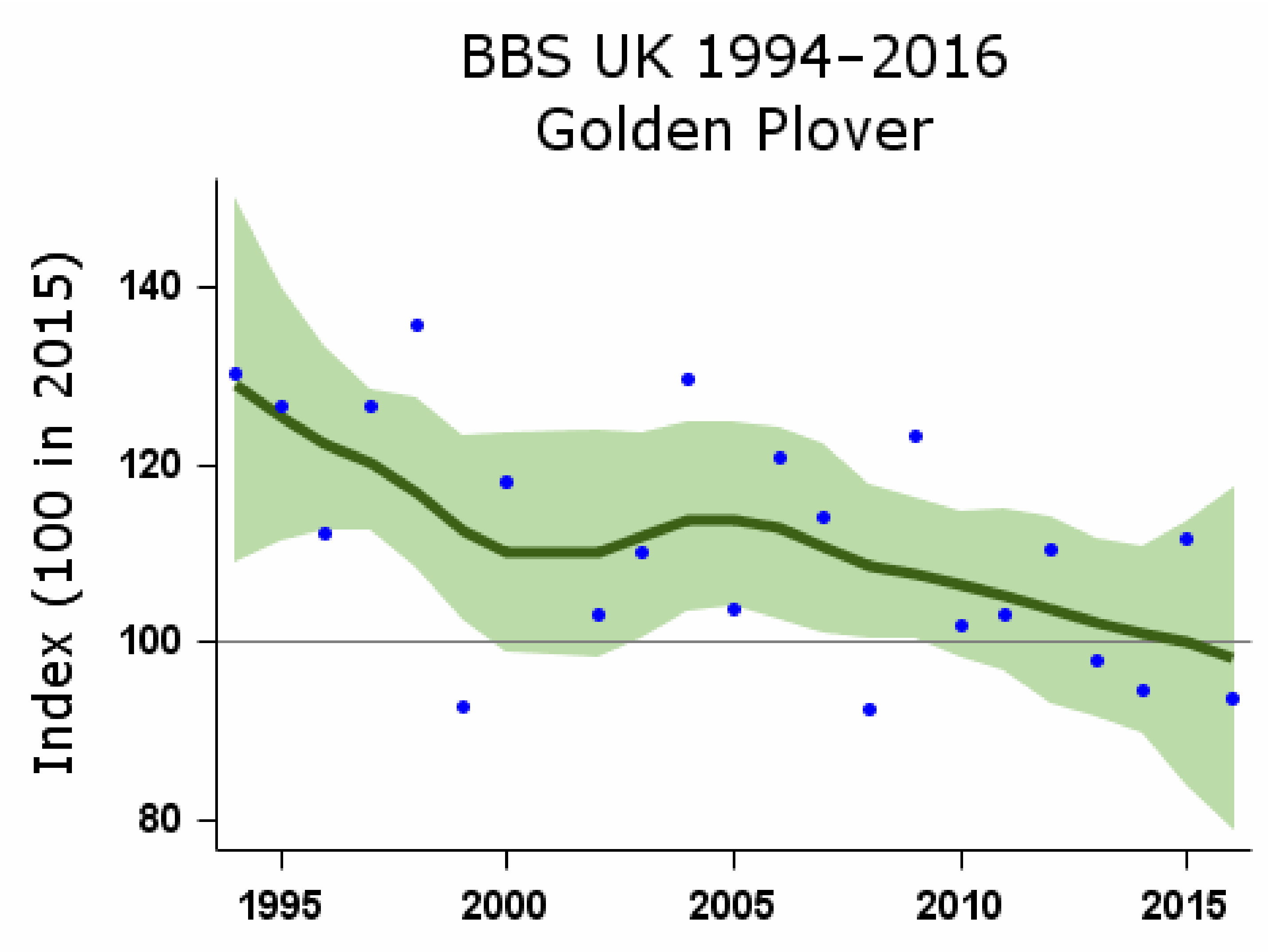
Conservation listings:	Global: green
Long-term trend:	UK: probable decline
Population size:	38,400-59,400 pairs in 1980-2000 (APEP13: BiE04)

Status summary

There was no annual monitoring of the breeding population before the inception of BBS. Since 1994, BBS has shown stability or minor decrease in the UK, with a moderate decline in Scotland. This is believed to follow an earlier decline (Gibbons et al. 1993). A detailed survey has confirmed that a sharp decline has occurred in Wales since the 1980s, with just 36 pairs located in 2007 (Johnstone et al. 2008). A study alongside the Pennine Way indicates avoidance of areas heavily used by walkers and the potential for clearer definition of paths to increase the habitat available to Golden Plovers (Finney et al. 2005). Nest survival on grass moors, unlike that on heather moors, may have declined over time (Crick 1992), perhaps linked to increased stocking densities of sheep (Fuller 1996), though other studies have found abundance was lower with reduced sheep densities (Douglas et al. 2017) or taller vegetation (Buchanan et al. 2017). Clutch size is unchanged, in spite of the fact that the records shown in the clutch size graph during 1996-98 include a large number of late-season nest records, with higher proportions of two- and three-egg clutches, which were submitted from an intensive study (J.W. Pearce-Higgins, pers. comm.).

Warmer springs are reported to advance the breeding phenology of Golden Plovers and of their tipulid prey (Pearce-Higginset al. 2005) and it is likely that the effects of climatic warming on cranefly (tipulid) populations will cause northward contraction of the Golden Plover's range (Pearce-Higgins et al. 2010). Conservation management options in the light of climate change have been explored by Pearce-Higgins (Pearce-Higgins 2011). Abundance was also positively correlated with the level of predator control in one study (Buchanan et al. 2017).

Numbers across Europe have been broadly stable since 1981 (PECBMS 2016a). Winter numbers counted by Frostet al. 2017); these birds are mainly of Fennoscandian or Russian origin. The species has recently been on the amber list, because of the international importance of the UK's wintering population, but was returned to the green list in 2015 (Eaton et al. 2015



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	66	-20	-38	-4		
	10	2005-2015	77	-12	-32	7		
	5	2010-2015	73	-6	-26	15		
BBS Scotland	20	1995-2015	38	-31	-47	-11	>25	
	10	2005-2015	35	-23	-44	0		
	5	2010-2015	31	-9	-27	15		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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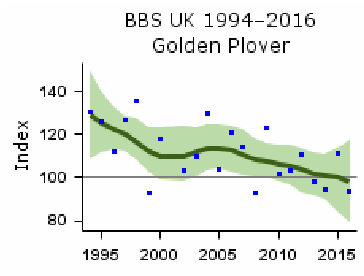
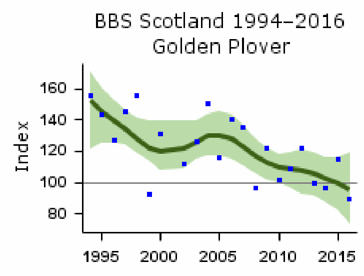


BBS UK graph

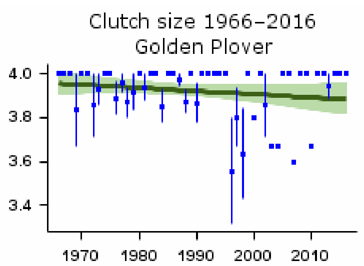


BBS Scotland graph

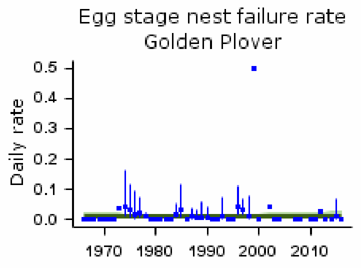
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	12	None					Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Laying date	48	1967-2015	4	Curvilinear	May 9	May 3	-6 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Lapwing

Vanellus vanellus

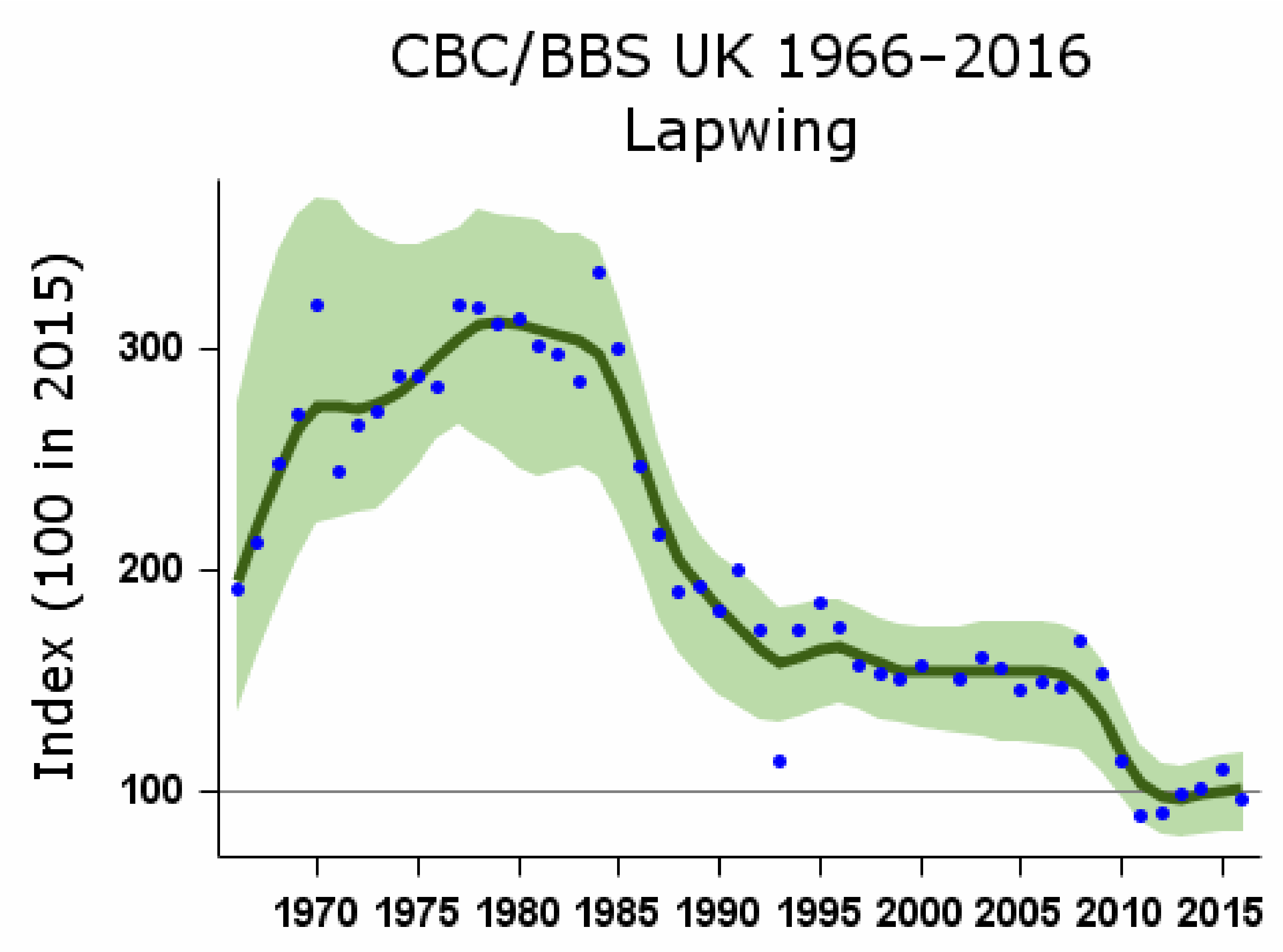
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: rapid decline England: moderate decline
Population size:	140,000 pairs in 2009 (APEP13: 1985-99 estimate (O'Brien 2004) updated using CBC/BBS trend)

Migrant status:	Short-distance migrant
Nesting habitat:	Ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	Farmland
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Although CBC recorded some increase in its early years, Lapwings have declined continuously on lowland farmland since the mid 1980s. National surveys in England and Wales showed a 49% population decline between 1987 and 1998 (Wilson et al. 2001). In Northern Ireland, the breeding population had shrunk to just 860 (277-1545) pairs by 2013, representing a decrease of around 89% since 1987, with the distribution becoming increasingly fragmented (Colhoun et al. 2015). Population declines there mirror similar declines throughout wet meadow areas of Wales and southeast England (Wilson et al. 2001, 2005a). The BBS Calladine et al. 2015). Winter numbers counted by Frost et al. 2017); these birds are mainly of continental origin. Lapwing is one of the most strongly declining bird species in Europe, having decreased in all regions since 1980, although with differing regional timing (PECBMS 2009, PECBMS 2016a). The 2009 review moved this species from amber to the UK red list, for which it continues to qualify on the strength of its UK decline.



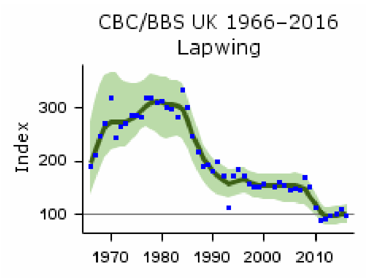
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

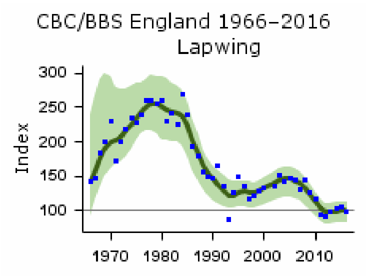
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	339	-54	-74	-32	>50	
	25	1990-2015	595	-45	-56	-30	>25	
	10	2005-2015	803	-35	-42	-28	>25	
	5	2010-2015	744	-15	-26	-8		
CBC/BBS England	48	1967-2015	285	-37	-70	-2	>25	
	25	1990-2015	500	-32	-43	-14	>25	
	10	2005-2015	688	-31	-37	-25	>25	
	5	2010-2015	641	-11	-18	-6		
WBS/WBBS waterways	35	1980-2015	70	-52	-75	-20	>50	
	25	1990-2015	82	-60	-72	-43	>50	
	10	2005-2015	96	-42	-57	-28	>25	
	5	2010-2015	81	-11	-39	18		
BBS UK	20	1995-2015	700	-43	-49	-36	>25	
	10	2005-2015	803	-35	-41	-27	>25	
	5	2010-2015	744	-15	-25	-8		
BBS England	20	1995-2015	589	-25	-33	-18	>25	
	10	2005-2015	688	-31	-36	-25	>25	
	5	2010-2015	641	-11	-18	-7		
BBS Scotland	20	1995-2015	89	-58	-68	-48	>50	
	10	2005-2015	92	-40	-53	-24	>25	
	5	2010-2015	84	-20	-40	-6		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

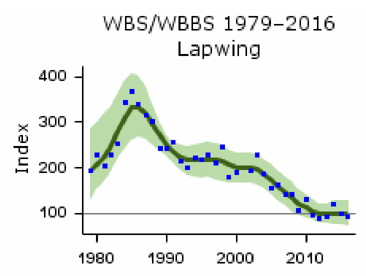
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



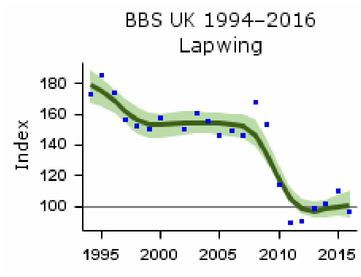
CBC/BBS UK graph



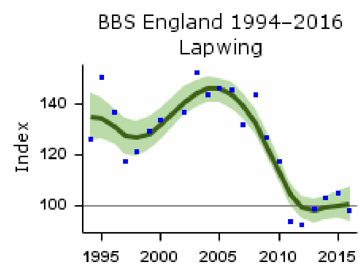
CBC/BBS England graph



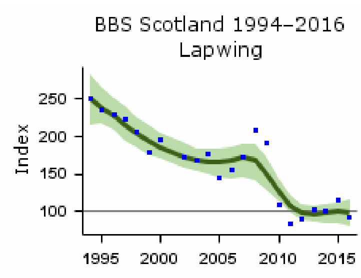
WBS/WBBS waterways graph



BBS UK graph



BBS England graph

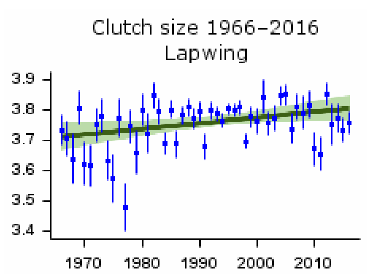


BBS Scotland graph

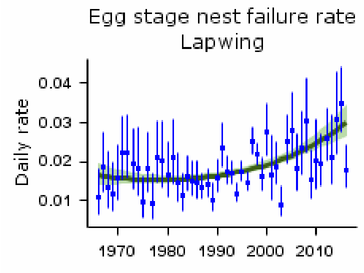
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	189	Linear increase	3.71 eggs	3.80 eggs	2.5%		
Nest failure rate at egg stage	48	1967-2015	208	Curvilinear	1.63% nests/day	2.91% nests/day	78.5%		
Laying date	48	1967-2015	45	None			0 days		

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that declines have resulted from habitat loss and degradation due to changes in agricultural practice, in particular change from spring to autumn sowing, drainage of grasslands and loss of mixed farmland, which have led to breeding productivity dropping below a sustainable level. Chick mortality is thought to be the main determinant of poor Lapwing productivity, and therefore of population decline.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	Decreased survival
Ecological	Agricultural intensification	

Further information on causes of change

The decline of the Lapwing exemplifies how different factors can combine to cause population change (Robinson et al. 2014). The decrease in the 1980s was due to a period of low survival, when annual life expectancy decreased from 7 years to just 4.5 years, caused by a series of cold winters. At the same time, though, average nest survival decreased markedly, meaning the population could not recover from what would normally have been only a temporary setback.

There is a good deal of research supporting the hypothesis that habitat loss and degradation due to the intensification of farming have reduced breeding productivity (e.g. Galbraith 1988, Shrubb 1990, Hotker 1991, Hudson et al. 1994, Siriwardena et al. 2000a, Taylor & Grant 2004, Wilsonet al. 2005, Milsom 2005, Fuller & Ausden 2008). These changes include extensive drainage, increased use of pesticides and fertilisers, re-seeding, earlier and more frequent mowing, increased grazing pressure and loss of spring cereals. Increases in intensity of grazing have reduced the habitat quality for Lapwing (Shrubb 1990, Fuller & Ausden 2008), whilst fertilisation has led to earlier spring grass growth, earlier cutting dates and higher stocking levels, which have increased egg and chick mortality and reduced relaying opportunities (Durant et al. 2008). Drainage and loss of wet features on grassland have also had a negative impact, reducing food supplies (Taylor & Grant 2004, Eglington et al. 2010).

Loss of mixed farming systems and extensive grazing have reduced the availability of high-quality foraging habitat close to nesting habitat, i.e. unimproved pasture and meadows, to birds breeding in arable areas, resulting in reduced breeding success (Galbraith 1988, Hudson et al. 1994, Henderson et al. 2004).

In the uplands, afforestation has also resulted in habitat loss (Fuller & Ausden 2008). On arable land, spring-sown cereals were once favoured nesting crops but these have been widely replaced by autumn-sown cereals, which are less suitable breeding habitats (Shrubb 1990, Shrubb et al. 1991, Mason & Macdonald 1999, Fuller & Ausden 2008). Land use changes causing a reduction in spring sward height also probably contributed to a decline on mixed farmland habitat in Scotland (Bell & Calladine 2017).

Lapwing population declines may also be explained partly by increased nest predation rates resulting from habitat changes due to agricultural intensification (Baines 1990, Liker & Szekely 1997, Jackson & Green 2000, Chamberlain & Crick 2003, Evans 2004, Jackson et al. 2004, Milsom 2005, Bolton et al. 2007, Teunissen et al. 2008, MacDonald & Bolton 2008b, Bellebaum & Bock 2009, Mason et al. 2017). Long-term nest record card analysis has shown that the proportion of nests lost to predators was substantially higher in the 1990s than in previous decades (Sharpe et al. 2008).

Recent empirical evidence suggests that levels of predation on wader nests are unsustainably high in many cases, even in some situations where breeding habitat is otherwise favourable (MacDonald & Bolton 2008a). Laidlaw et al. (2015, 2017) found that nest predation rates in wet grassland increased as the distance from patches of taller vegetation increased, and suggested that the distribution and activity of predators might be affected by the vegetation. In dry fields, nest predation rates were higher further from field edges (Laidlaw et al. 2017). Predation rates are also higher in areas with low Lapwing density (Laidlawet al. 2017).

In the Uists, where the overall population is stable (Calladineet al. 2015), clutch survival is significantly lower in areas where introduced HedgehogsErinaceus europaeus are more abundant; however the impact of predation on local populations was unclear and more complex factors may influence trends (Calladine et al. 2017).

McCallum et al. (2015, 2016) found that Lapwing density was greatest at higher elevation, but only where soils were less peaty and less acidic, opening the way to trials of whether soil amendments such as liming could contribute to conservation management for breeding Lapwings and other species of concern that depend upon soil-dwelling invertebrates. Declines among Lapwings are unlikely to be ameliorated by either habitat improvement or predator control in isolation, however (Bodey et al. 2011, Smart et al. 2013).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Ringed Plover

Charadrius hiaticula

Key facts

Conservation listings:	Global: red (wintering population decline); at race level, hiaticula red, tundrae green
Long-term trend:	UK: decline
Population size:	5,400 (5,300-5,600) pairs in 2007 (APEP13: Conway et al. 2008)

Status summary

The breeding population is monitored at intervals by special surveys. A BTO survey in 1984 showed increases throughout the UK since the previous survey in 1973-74 (Prater 1989). The spread of the breeding distribution inland between the first two atlas periods, especially in England, was probably associated with the increase in number of gravel pits and reservoirs (Gibbons et al. 1993). The 1984 survey revealed that over 25% of the UK population nested on the Western Isles, especially on the machair, but breeding waders there have subsequently suffered greatly from predation by introduced hedgehogs (Jackson et al. 2004) - a problem that appears increasingly severe (Jackson 2007). There was a marked decline in breeding numbers of Ringed Plovers in the Uists between 1983 and 2014, evident in areas both with and without hedgehogs (Calladine et al. 2015). Surveys in England and Wales revealed an increase of 12% in breeding birds in wet meadows between 1982 and 2002 (Wilson et al. 2005). The BTO's repeat national survey in 2007 found an overall decrease in UK population of around 37% since 1984, with the greatest decreases in inland areas (Burton & Conway 2008, Conway et al. 2008). Ringed Plovers that choose beaches for nesting are especially vulnerable to disturbance, however, and already in 1984 were largely confined in some regions to wardened reserves (Prater 1989). Human usage of beach areas severely restricts the availability of this habitat to nesting plovers (Liley & Sutherland 2007). There has been a marked increase in nest failures at the egg stage.

Wintering numbers have been in decline since the late 1980s (Frostet al. 2017). Through these winter declines, the species moved from amber to being red listed in the latest review (Eaton et al. 2015).

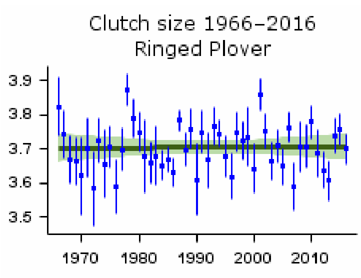
Population changes in detail

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

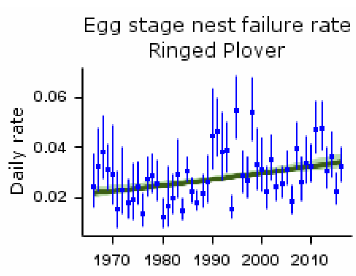
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	94	None					
Nest failure rate at egg stage	48	1967-2015	128	Linear increase	2.20% nests/day	3.40% nests/day	54.5%		
Laying date	48	1967-2015	42	None			0 days		

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Curlew

Numenius arquata

Key facts

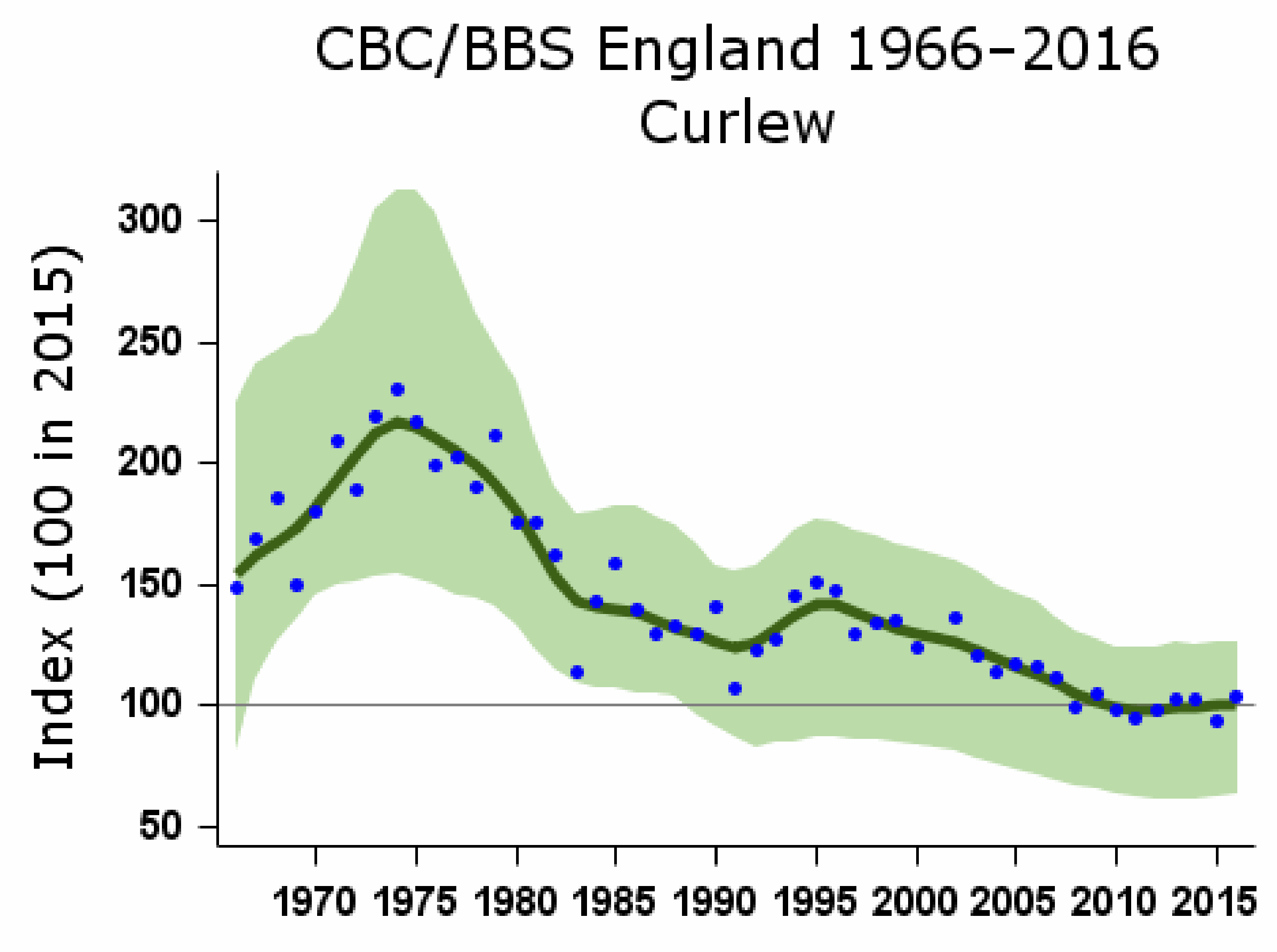
Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: moderate decline
Population size:	68,000 pairs in 2009 (APEP13: 1985-99 estimate (O'Brien 2004) updated using CBC/BBS trend)

Migrant status:	Short-distance migrant
Nesting habitat:	Ground nester
Primary breeding habitat:	Moorland
Secondary breeding habitat:	Wetland
Breeding diet:	Animal
Winter diet:	Animal

Status summary

CBC and BBS reveal a long-term decline, despite an initial increase that lasted until the mid 1970s. At WBS/WBBS sites, in contrast, the downturn did not begin until the late 1990s, suggesting there may have been some movement during the 1980s and 1990s from farmland onto wetter sites. Surveys of lowland wet grassland, however, showed Curlew losses of almost 39% between 1982 and 2002, more specifically of 34% in England and 75% in Wales (Wilson et al. 2004, 2005a). Breeding Curlews had declined significantly between 1980 and 2002 in six of 13 upland study areas across Britain (Sim et al. 2005). A 2006 survey in Wales highlighted the rapid decline of the species across all habitats, with low breeding success as a plausible mechanism (Johnstone et al. 2007). In Northern Ireland, the breeding population had shrunk to just 526 (252-783) pairs by 2013, representing a decrease of around 82% since 1987, with the distribution becoming increasingly fragmented (Colhoun et al. 2015). Through its UK breeding decline, the species moved from amber to being red listed in the latest review (Eaton et al. 2015).

BBS trends show continued declines since 1994 throughout the UK, with the strongest declines in Scotland and in Wales. The BBS Frost et al. 2017). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). Through its Near Threatened global status and the international importance of the declining UK populations, and bearing in mind the history of extinction and declines among its close relatives (Pearce-Higgins et al. 2017), Curlew has been identified by one paper as 'the most pressing bird conservation priority in the UK' (Brown et al. 2015).



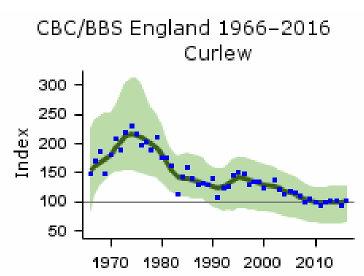
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

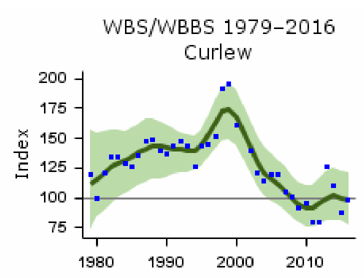
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	162	-38	-78	21		Small CBC sample
	25	1990-2015	297	-21	-42	0		Small CBC sample
	10	2005-2015	427	-14	-20	-7		
	5	2010-2015	422	1	-5	7		
WBS/WBBS waterways	35	1980-2015	47	-13	-48	45		
	25	1990-2015	57	-30	-49	7		
	10	2005-2015	72	-14	-29	5		
	5	2010-2015	64	9	-6	23		
BBS UK	20	1995-2015	537	-48	-53	-44	>25	
	10	2005-2015	610	-21	-27	-15		
	5	2010-2015	600	-8	-13	-3		
BBS England	20	1995-2015	351	-31	-39	-21	>25	
	10	2005-2015	427	-14	-20	-7		
	5	2010-2015	422	1	-6	7		
BBS Scotland	20	1995-2015	129	-59	-66	-52	>50	
	10	2005-2015	135	-25	-35	-11		
	5	2010-2015	133	-16	-25	-7		
BBS Wales	20	1995-2015	35	-68	-76	-55	>50	
	10	2005-2015	32	-40	-52	-25	>25	
	5	2010-2015	31	-30	-44	-8	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

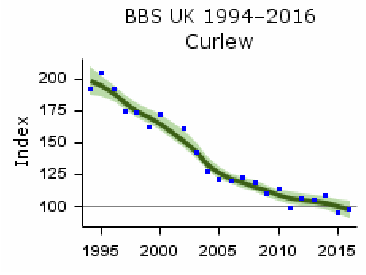
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



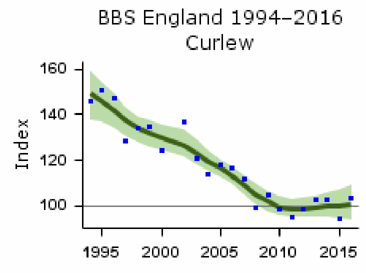
CBC/BBS England graph



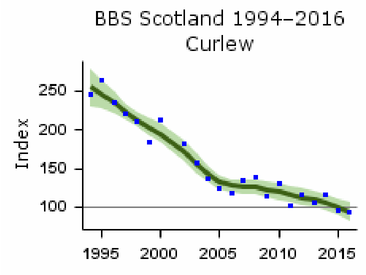
WBS/WBBS waterways graph



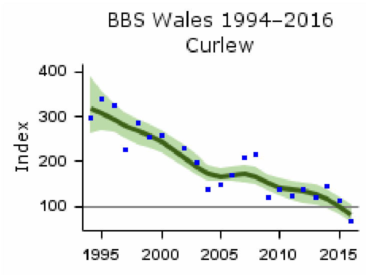
BBS UK graph



BBS England graph



BBS Scotland graph

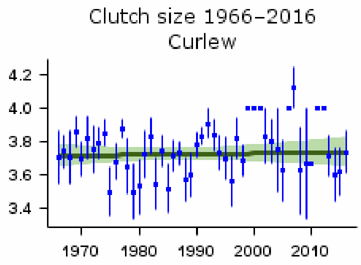


BBS Wales graph

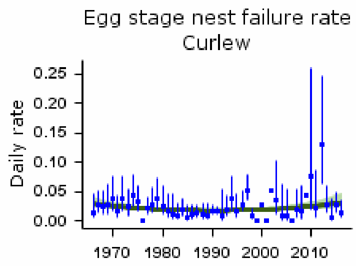
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	19	None					Small sample
Nest failure rate at egg stage	48	1967-2015	21	Curvilinear	2.84% nests/day	3.02% nests/day	6.3%		Small sample
Laying date	48	1967-2015	5	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that loss of habitat is the main cause of decline of Curlew. Decline of the species on grassland is likely to be correlated to draining of fields, whilst predation is likely to be important at a site level. The decline of Curlew recorded by WBS/WBBS may be related to other causes, such as land reclamation but data are not available. The conservation of Curlew is likely to benefit from wader-friendly management of land, including restoration of ditches, wet features within fields and heterogeneous vegetation. Further studies should concentrate on investigating the direct link between Curlew abundance and management of coastal areas, including the outcome of displacement of individuals from feeding sites on mudflats.

Change factor	Primary driver	Secondary driver
Demographic	Reduced breeding success	
Ecological	Agricultural intensification	Increased predation

Further information on causes of change

Analysis investigating potential drivers of breeding abundance and population change across Britain, using BBS data from 1995-99 and 2007-11, found support for the negative effects of intensive agriculture, forestry, increased predation and climate warming on Curlew abundance and population trends, and suggested that site protection, measures to reduce generalist predator abundance and wider improvements to breeding habitat may be required to halt and reverse declines (Franks et al. 2017).

Habitat change is the main cause of decline that has been identified by other studies, in particular drainage of grassland and management changes in the uplands. Loss of peatland, drainage of wetlands and afforestation have been suggested as the main causes of decline in Ireland (Partridge & Smith 1992). In a Northern Irish study, the preferred habitat for Curlew was bog/mire and unimproved grassland, with areas of standing water, whilst the species was less abundant than expected on improved grassland, upland rough grassland and arable land (Henderson et al. 2002). Amar et al. (2011) showed that, between 1980-93 and 2000-02, Curlews had declined most in heather-dominated upland sites and least in bog-dominated ones. An earlier study had found that Curlew abundance was higher on moorland managed for grouse shooting than on other moorland, probably mediated by increased predator control on grouse moors (Tharme et al. 2001): these results led to the suggestion that reduction in grouse moor, managed to favour heather regrowth and to control predators, might be behind the decline of wader populations in the uplands (Baines et al. 2008, Fletcher et al. 2010), but Amar et al. (2011) found no correlation between grouse moor and Curlew population change. Recent studies of upland moorland management have suggested that vegetation heterogeneity and structural complexity are important for Curlews (Buchanan et al. 2017) and abundance increased in a study in Cumbria when a greater area of vegetation was cut (Douglas et al. 2017)

Studies of the impact of predators on Curlew abundance and breeding success have reached opposing conclusions, suggesting some case-by-case relevance of predators to local Curlew populations. A study on upland waders found no negative spatial or temporal relationship between Ravens and Curlew abundance, using surveys from 1980 and 1993 repeated in 2000 and 2002 (Amar et al. 2010b). In contrast, control of foxes and crows on two moorland and marginal farmland plots in Northumberland increased breeding success from 15% to 50%, with an increase of 14% per annum in breeding numbers after a three-year lag (Fletcher et al. 2010), and a study covering four upland regions found a positive correlation between predator control and Curlew abundance (Buchanan et al. 2017). Predation was identified as the primary proximate cause of failure in up to 97% of nests in a study during 1993-95 on Curlews breeding in marginal farmland and agriculturally improved grassland in Northern Ireland, with higher daily failure rates during the egg-laying period than during incubation (Grant et al. 1999). On Shetland, no evidence was found of a relationship between Curlew and predator abundance over 40 farms participating in the Agri-Environment Scheme (AES) (van der Wal & Palmer 2008). In Sweden, Curlew nest predation rates were higher in mixed farm landscapes than in arable ones (Berg 1992). A study on mixed farmland in Perthshire, however, crop type changes were identified as a likely contributor to declines over 1990-2015, though mammalian predators were not monitored (Bell & Calladine 2017).

Curlews are expected to respond adversely to climate change (Renwick et al. 2012, Douglas et al. 2014). It has been suggested that Curlews and other breeding waders are becoming increasingly restricted to sites managed as nature reserve or under the higher tiers of AES (Ausden & Hirons 2002, Wilson et al. 2004, 2007, O'Brien & Wilson 2011). Some authors have found potential benefits of AES for Curlews and other waders, e.g. where stocking densities have been reduced (van der Wal & Palmer 2008), but others have found that the benefits of AES are not always apparent or do not apply to all wader species (O'Brien & Wilson 2011, Smart et al. 2013). Nevertheless, conservation of Curlew is likely to benefit from wader-friendly management of land, including restoration of ditches, of wet features within fields and of vegetation diversity.

An expert assessment of global threats to Curlew and its near relatives (Pearce-Higginset al. 2017) identified agricultural and land-use changes (crops, livestock and plantations), dams, drainage, invasive species and climate change as the threats most likely to have had the greatest breeding season impact on population trends within the East Atlantic flyway (which includes the British Isles). Outside the breeding season, they considered that the main threats came from agriculture (crops), aquaculture and fishing, renewable energy, transport, disturbance, drainage and climate change.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Common Sandpiper

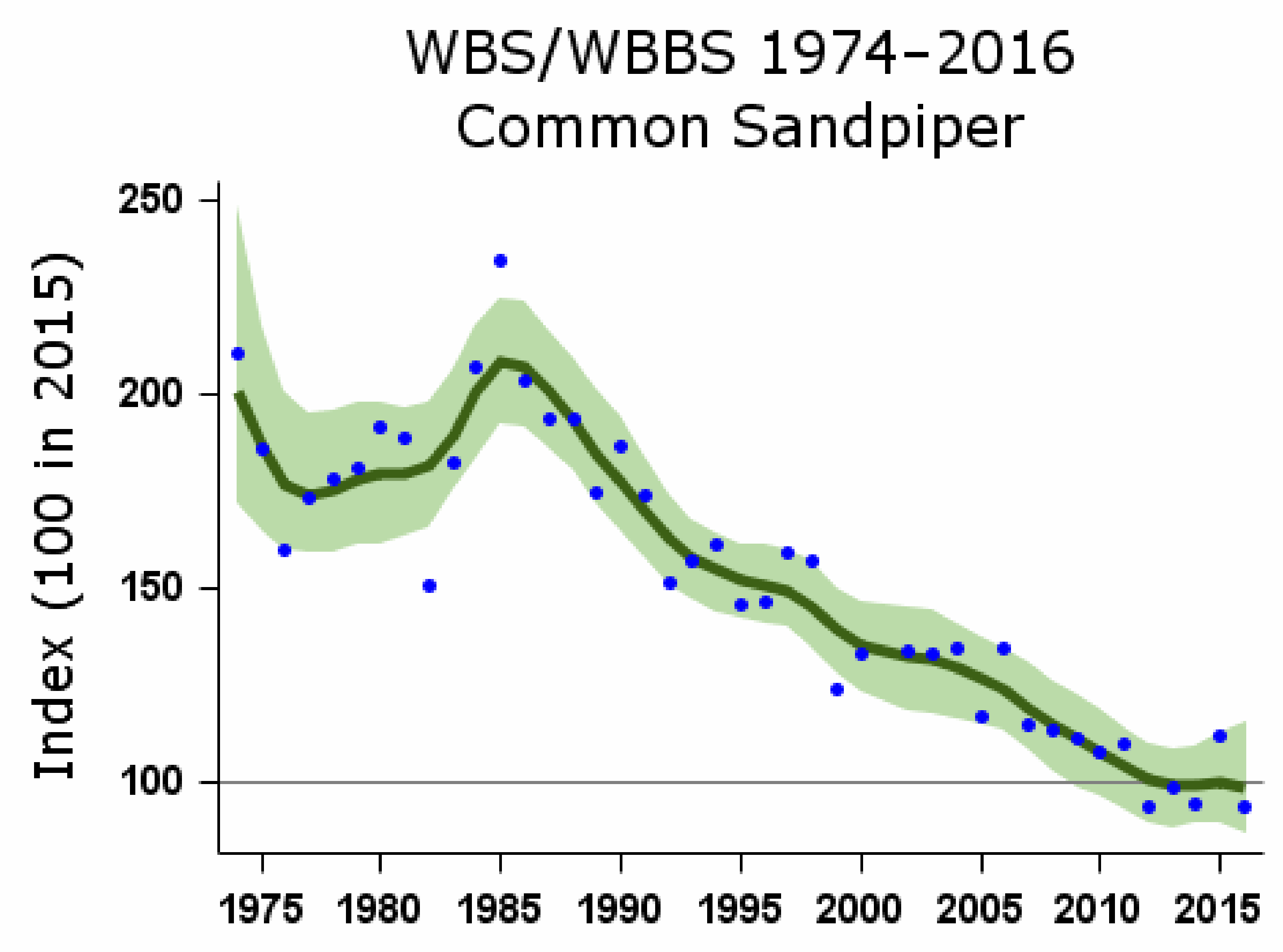
Actitis hypoleucos

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK waterways: moderate decline
Population size:	15,000 pairs in 2009 (APEP13: previous estimate (Dougall et al. 2004) updated using WBS/WBBS trend)

Status summary

WBS/WBBS results for this species show a decline from 1985 onwards (after a more gradual increase) that has yet to be explained. This decline is also evident in BBS squares in England though not in Scotland. Poorer breeding success and reduced survival of first-year birds over the winter in West Africa were both suggested as possible reasons for the failure of the Peak District population to recover after a hard-weather event in 1989 (Holland & Yalden 2002). The reasons for poor recruitment to the breeding population are hard to assess in the absence of firm information on where British birds spend the winter (Dougall et al. 2010). UK clutch sizes appear to have shown a slight decline since the 1960s. Following declines during the 1990s in the large Swedish and Finnish populations, the European status of this species is no longer considered 'secure' (BirdLife International 2004). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). The species was moved from the green to the amber list in 2009 on the strength of its declines in UK and across Europe.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	50	-46	-57	-34	>25	
	25	1990-2015	64	-44	-53	-32	>25	
	10	2005-2015	79	-21	-30	-10		
	5	2010-2015	73	-7	-15	5		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	72	-15	-29	4		
	10	2005-2015	80	6	-10	25		
	5	2010-2015	84	-1	-15	19		
BBS England	20	1995-2015	31	-43	-61	-19	>25	
	10	2005-2015	37	-16	-35	1		
	5	2010-2015	38	-14	-31	6		
BBS Scotland	20	1995-2015	35	-13	-30	3		
	10	2005-2015	36	6	-11	26		
	5	2010-2015	37	-1	-17	18		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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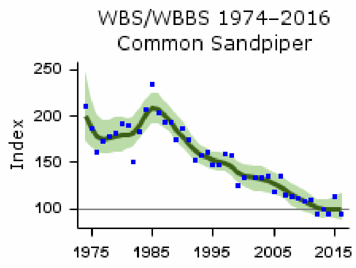
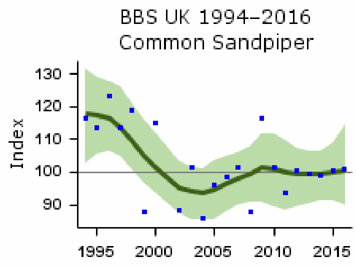
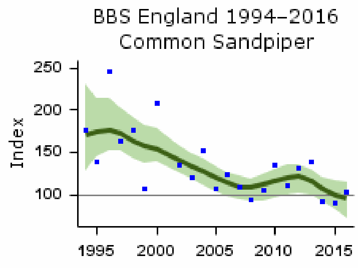


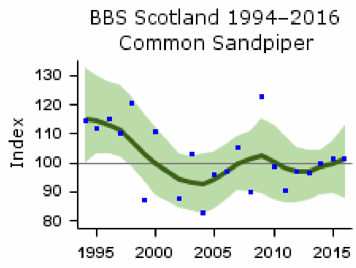
WBS/WBBS waterways graph



BBS UK graph



BBS England graph

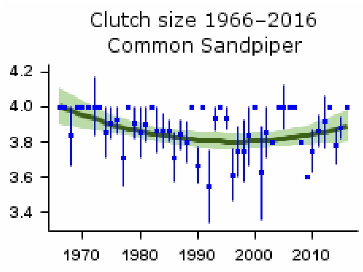


BBS Scotland graph

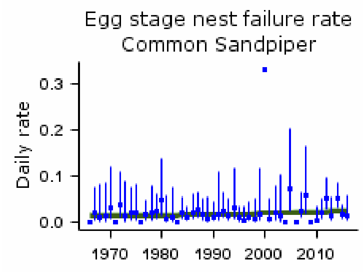
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	12	Curvilinear	3.99 eggs	3.88 eggs	-2.8%		Small sample
Nest failure rate at egg stage	48	1967-2015	13	None					Small sample
Laying date	48	1967-2015	6	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Redshank

Tringa totanus

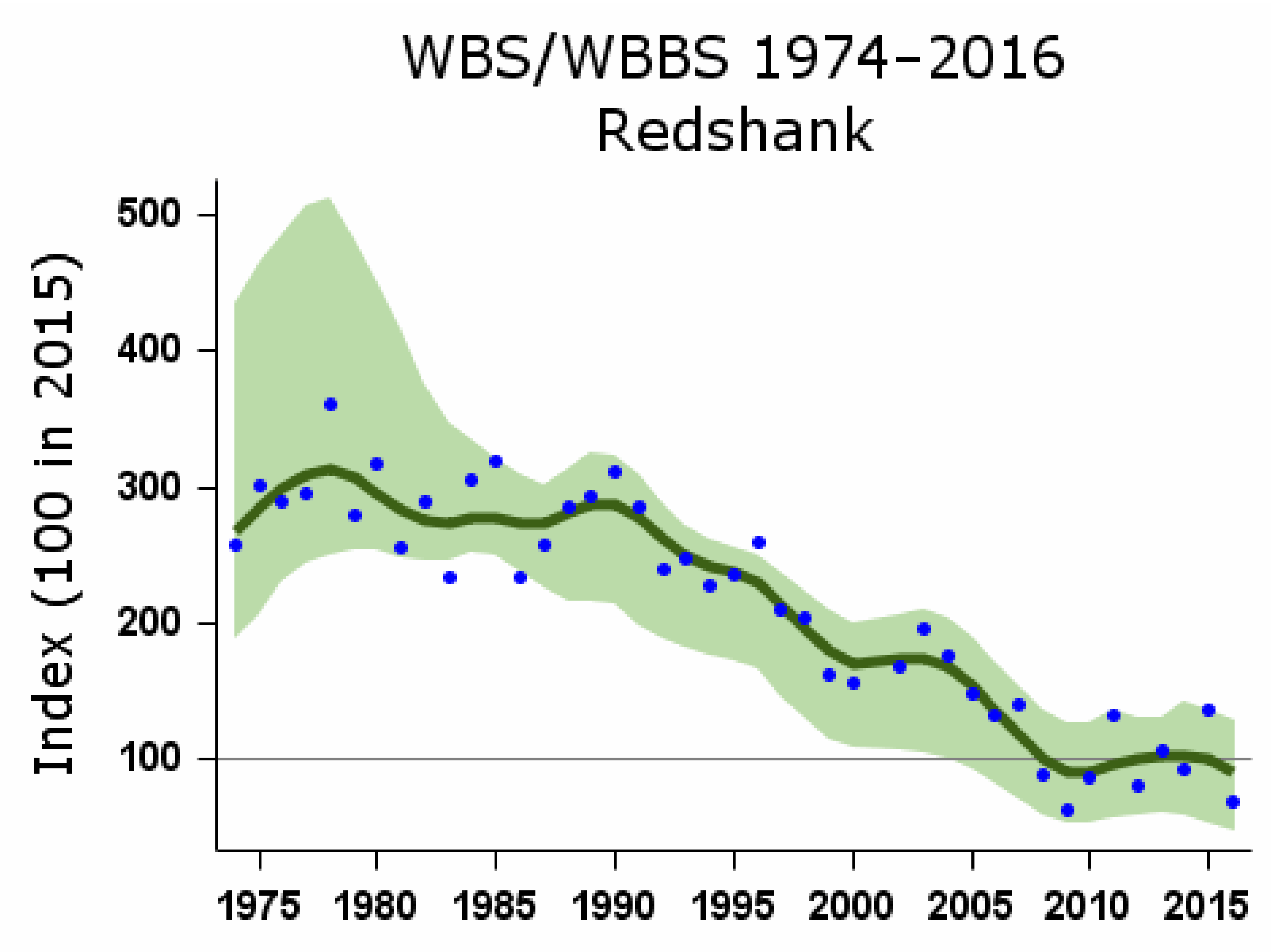
Key facts

Conservation listings:	Global: amber (breeding population & range declines; non-breeding population decline & international importance)
Long-term trend:	UK: decline UK waterways: rapid decline
Population size:	25,000 pairs in 2009 (APEP13: 1985-99 estimate (O'Brien 2004) updated using CBC/BBS trend)

Status summary

Range contraction had occurred from considerable areas of the UK by 1988-91, probably as a result of the drainage of farmland (Gibbons et al. 1993). WBS/WBBS results show a decline along waterways that apparently accelerated during the 1990s. BBS shows continuing overall decrease. Surveys in England and Wales revealed a decrease of 29% in breeding birds in wet meadows between 1982 and 2002, with the most pronounced declines recorded in the Midlands (over 80%) the southwest (over 50%) and the north of England (over 45%) (Wilson et al. 2005a). Another survey revealed that Redshank had disappeared from half of plots in grassland marginal upland areas of Britain between the 1970s and 1999-2000 (Henderson et al. 2004). The substantial section of the British population that nests on saltmarshes decreased by 23% between 1985 and 1996, apparently as a result of increased grazing pressure (Brindley et al. 1998, Norris et al. 1998). By 2011, fewer than 12,000 breeding pairs remained on saltmarshes, a decrease of 53% from the 1985 survey: a better understanding of saltmarsh grazing practices and longer-term management of this habitat is urgently needed (Malpas et al. 2013). The indications are that even light grazing of saltmarshes can reduce breeding success to near zero (Sharps, Eet al. 2015, 2016). Minor increase in breeding numbers in the Uists between 1983 and 2014 runs against the UK trend and heightens the relative importance of this population (Calladine et al. 2015). Wintering populations (augmented by many Icelandic and some other northern European breeders) have shown some increase since the 1970s but have been in decline since about 2001, although the most recent counts suggest this decline may now have slowed or started to reverse (Frost et al. 2017). The success of nests at the egg stage has risen steeply since the 1960s.

In 2009, UK population decline was added to the criteria by which Redshank qualifies for amber listing; the scale of decline reported here already meets the red-list criterion, however. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	24	-65	-89	-36	>50	
	25	1990-2015	26	-65	-80	-43	>50	
	10	2005-2015	26	-35	-57	-8	>25	
	5	2010-2015	21	10	-36	96		
BBS UK	20	1995-2015	89	-38	-59	-6	>25	
	10	2005-2015	102	-23	-40	0		
	5	2010-2015	97	2	-24	42		
BBS England	20	1995-2015	64	-35	-51	-19	>25	
	10	2005-2015	76	-33	-48	-17	>25	
	5	2010-2015	72	-11	-27	6		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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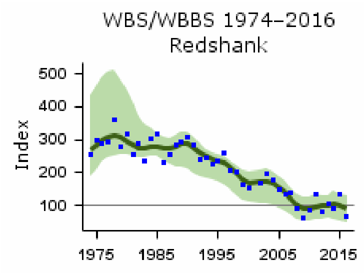
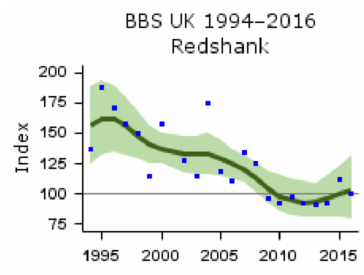
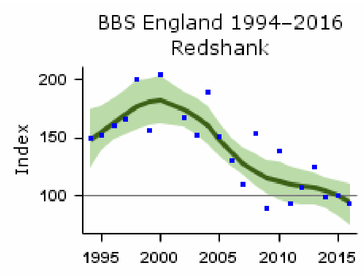


WBS/WBBS waterways graph



BBS UK graph

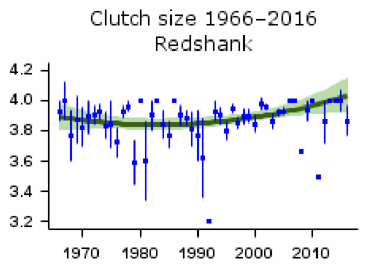


BBS England graph

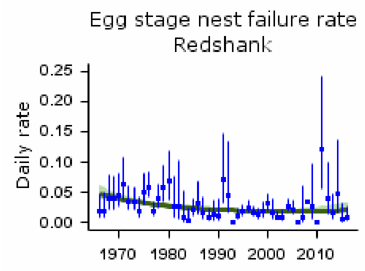
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	28	Curvilinear	3.89 eggs	4.02 eggs	3.5%		Small sample
Nest failure rate at egg stage	48	1967-2015	29	Curvilinear	4.59% nests/day	2.02% nests/day	-56.0%		Small sample
Laying date	48	1967-2015	8	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence to suggest that Redshank decline is related to changes in habitat management, in particular drainage and agricultural intensification. Where birds still nest in wet meadows, a suggested solution includes manipulating water levels, reducing grazing and suspending agricultural operations during the nesting period.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Agricultural intensification	

Further information on causes of change

Agricultural intensification has been associated with the decrease of several grassland breeding wader species (Wilson et al. 2004, 2005a). Conversion of grassland to arable cultivation (Robinson & Sutherland 2002) and grassland intensification, such as reseeding, use of artificial fertilizers, switch from hay to silage and lowering of water levels all decrease the suitability of habitat for breeding waders (Green & Robins 1993). Grass grown for silage presents a tall, dense and uniform sward in spring that is cut earlier than hay meadows, incurring additional losses of nests and chicks (Beintema & Muskens 1987, Kruk et al. 1996, Vickery et al. 2001, Atkinson et al. 2004). Grassland intensification and land drainage have resulted in dry ground with dense, homogenous swards which are rarely used by breeding waders (Smart et al. 2006). High stocking densities bring associated risks of trampling of nests and chicks (Beintema & Muskens 1987, Green 1988), though cattle produce taller swards than sheep, hence providing a better breeding habitat for Redshank (Smart et al. 2006). Studies of godwits and Lapwing have suggested that deteriorating breeding habitat makes wader nests and chicks particularly vulnerable to predators (Bolton et al. 2007, Teunissen et al. 2008, Schekkerman et al. 2009), though predation on Redshank eggs and chicks by native predators remains to be studied. However, in the Uists, where a minor population increase has occurred (Calladine et al. 2015), clutch survival is significantly lower in areas where introduced Hedgehogs Erinaceus europaeus are more abundant, and cameras showed that levels of nest predation by Hedgehogs are high in these areas (Calladine et al. 2017).

An intensive field study in Norfolk showed that density of breeding Redshank within coastal and inland grazing marshes was associated with wet features within each field: nest-site selection was associated with clumps of tall vegetation and hatching success was higher in areas of penetrable soil where this species prefers to feed (Smart et al. 2006). On coastal grassland, shallow wet features and vegetation structure have been shown to be important to several species of breeding waders (Vickery et al. 1997, Milsom et al. 2000, 2002, Eglington et al. 2008). Milsom et al. (2002) showed that adult Redshanks prefer to feed in wet rills than dry ones or on open grassland. Soil invertebrates are more accessible when water levels are just below the soil surface (Ausden et al. 2001).

In lowland England, where agricultural intensification has been intense and widespread, Redshank and other grassland-breeding waders have become restricted to areas managed as nature reserves or under agri-environment schemes (AES) (Wilson et al. 2004, 2007, Ausden & Hirons 2002). AES management can be successful in increasing breeding pairs of Redshank on grassland fields in Scotland but further studies at UK level should be carried out to understand the value of AES for Redshank populations (O'Brien & Wilson 2011). In Scotland, land use changes leading to a reduction in spring sward height were thought to have been a likely contributory factor to a 25-year decline on mixed farmland in Perthshire (Bell & Calladine 2017).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Woodcock

Scolopax rusticola

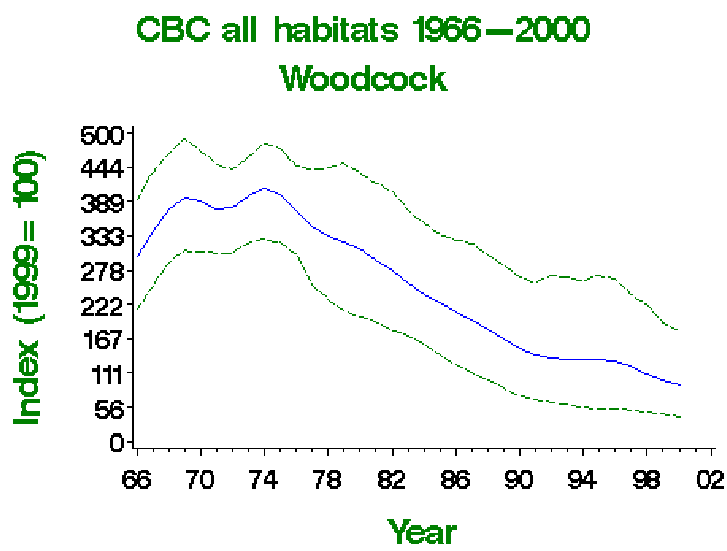
Key facts

Conservation listings:	Global: red (breeding range decline)
Long-term trend:	UK: probable rapid decline
Population size:	81,000 (64,000-100,000) males in 2003 (APEP13: Hoodless et al. 2009); 55,241 (41,806-69,004) males in 2013 (Heward et al. 2015)

Status summary

The Woodcock declined rapidly and significantly on CBC plots for the three decades up to 2000. Because CBC did not include many coniferous forests and its plots were concentrated in lowland Britain, however, it is not certain how clearly this trend represented the whole UK population at that time. Range contractions, that might have had the same cause as the decline in abundance, were recorded concurrently with part of the CBC decline (Gibbons et al. 1993). Recreational disturbance, the drying out of natural woodlands, overgrazing by deer, declining woodland management, and the maturation of new plantations are possible causes of the Woodcock's decline, but there is no strong hypothesis as yet (Fuller et al. 2005). BBS is inefficient at recording this scarce, mainly crepuscular species, and cannot continue the index series. The first special survey aimed at monitoring the UK's breeding Woodcock took place in 2003 and provided a new baseline population estimate for monitoring that was much higher than previously thought (Hoodless et al. 2009). It is important to note, though, that the upward revision of the population estimate is due to new methodology and carries nc information about population trends. A repeat survey of breeding Woodcocks conducted by BTO volunteers in spring 2013 found a decline of 29% since 2003 (Heward et al. 2015), which is line with the loss of occupied 10-km squares, also 29%, between 1988-91 and 2008-11 (Balmer et al. 2013).

Through the decline in its UK breeding range, the species moved from amber to being red listed in the latest review (Eaton et al. 2015). The CBC decline had been discounted in 2009 as a reason for the species' amber listing (BoCC3), which rested on the breeding declines recorded across Europe, especially European Russia (BiE04). Annual numbers shot in the UK, which include winter visitors from declining populations in Europe, have increased around threefold since 1945 and are currently running at a historically high level.



Smoothed population index, relative to an arbitrary 100 in 1999, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC all habitats	31	1968-1999	20	-74	-88	-49	>50	Small CBC sample
	25	1974-1999	20	-76	-88	-51	>50	Small CBC sample
	10	1989-1999	13	-40	-62	-11	>25	Small CBC sample
	5	1994-1999	13	-24	-44	-3		Small sample

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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CBC all habitats graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Snipe

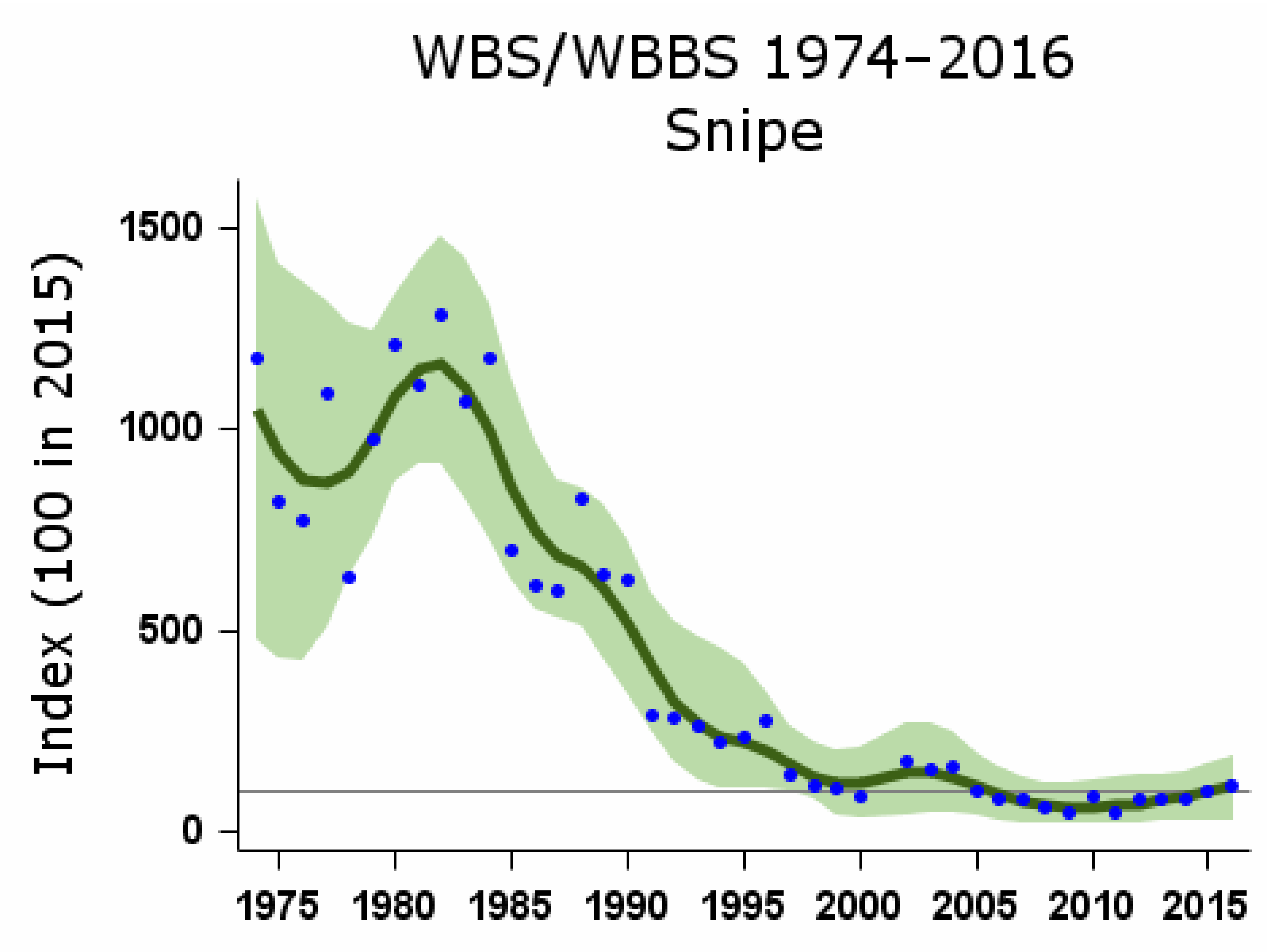
Gallinago gallinago

Key facts

Conservation listings:	Global: amber (breeding range decline)
Long-term trend:	UK waterways: rapid decline
Population size:	80,000 pairs in 2009 (APEP13: 1985-99 estimate (O'Brien 2004) updated using CBC/BBS trend)

Status summary

Snipe were monitored by the CBC mainly in lowland England, where numbers have fallen rapidly since the 1970s as farmland has been drained (Gibbons et al. 1993, Siriwardena et al. 2000a). The CBC index fell from the early 1970s until 1984, when the number of occupied plots became too small for further monitoring (Marchant et al. 1990), and the graph is not included here. Surveys in England and Wales revealed a decrease of 62% in breeding birds in wet meadows between 1982 and 2002, with the remaining birds becoming highly aggregated into a tiny number of suitable sites (Wilson et al. 2005). Birds were more likely to persist where soils remained soft and wet; the fact that Snipe have continued to decline, despite soil conditions being improved for them at many lowland wetland reserves, suggests that other key aspects of habitat quality, such as prey abundance, are more likely to be driving the decline (Smart et al. 2008). Buchanan et al. (2017) found that a varied vegetation composition was important and that abundance increased with higher vegetation height. The trend in the upland and moorland strongholds of the species is not fully known, but the 1988-91 atlas documented range loss widely in Wales, Northern Ireland and Scotland, as well as lowland England, and atlas work during 2008-11 confirmed that range loss or population decrease has been evident almost everywhere (Balmer et al. 2013). In Northern Ireland, the breeding population had shrunk to just 1,123 (527-1,782) pairs by 2013, representing a decrease of around 78% since 1987, with the distribution becoming increasingly fragmented (Colhoun et al. 2015). The BBS showed initial increases from 1994, especially in Scotland, but a sharp downturn over the recent decade, until around 2012. Daily nest failure rates at the egg stage appear to have halved. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). In Scotland at least, agri-environment schemes can benefit this species (O'Brien & Wilson 2011).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

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

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	14	-89	-98	-65	>50	Small sample
	25	1990-2015	17	-81	-96	-56	>50	Small sample
	10	2005-2015	22	-13	-47	22		
	5	2010-2015	21	62	3	89		
BBS UK	20	1995-2015	172	19	1	40		
	10	2005-2015	208	-17	-28	0		
	5	2010-2015	201	-3	-20	22		
BBS England	20	1995-2015	94	13	-13	46		
	10	2005-2015	122	2	-18	24		
	5	2010-2015	117	28	5	51		
BBS Scotland	20	1995-2015	62	22	0	50		
	10	2005-2015	70	-21	-34	1		
	5	2010-2015	69	-10	-29	17		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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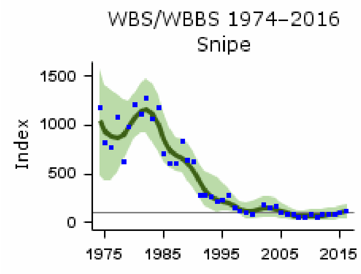
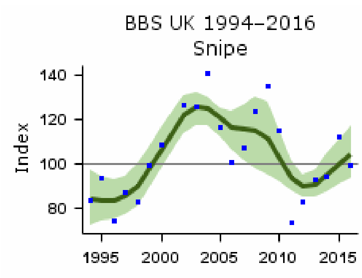
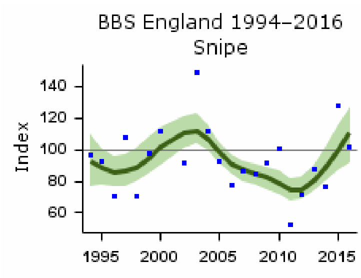


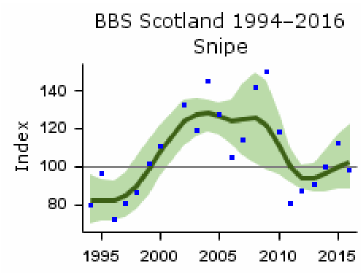
WBS/WBBS waterways graph



BBS UK graph



BBS England graph

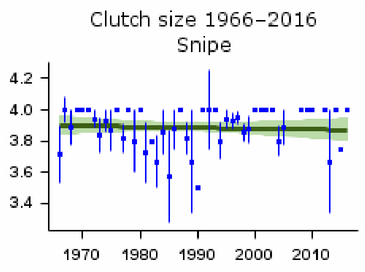


BBS Scotland graph

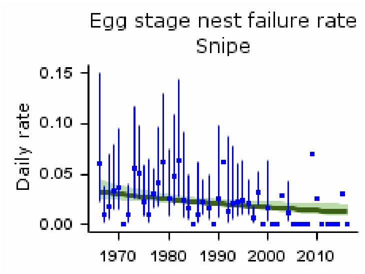
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	12	None					Small sample
Nest failure rate at egg stage	48	1967-2015	13	Linear decline	3.19% nests/day	1.27% nests/day	-60.2%		Small sample
Laying date	48	1967-2015	5	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Common Tern

Sterna hirundo

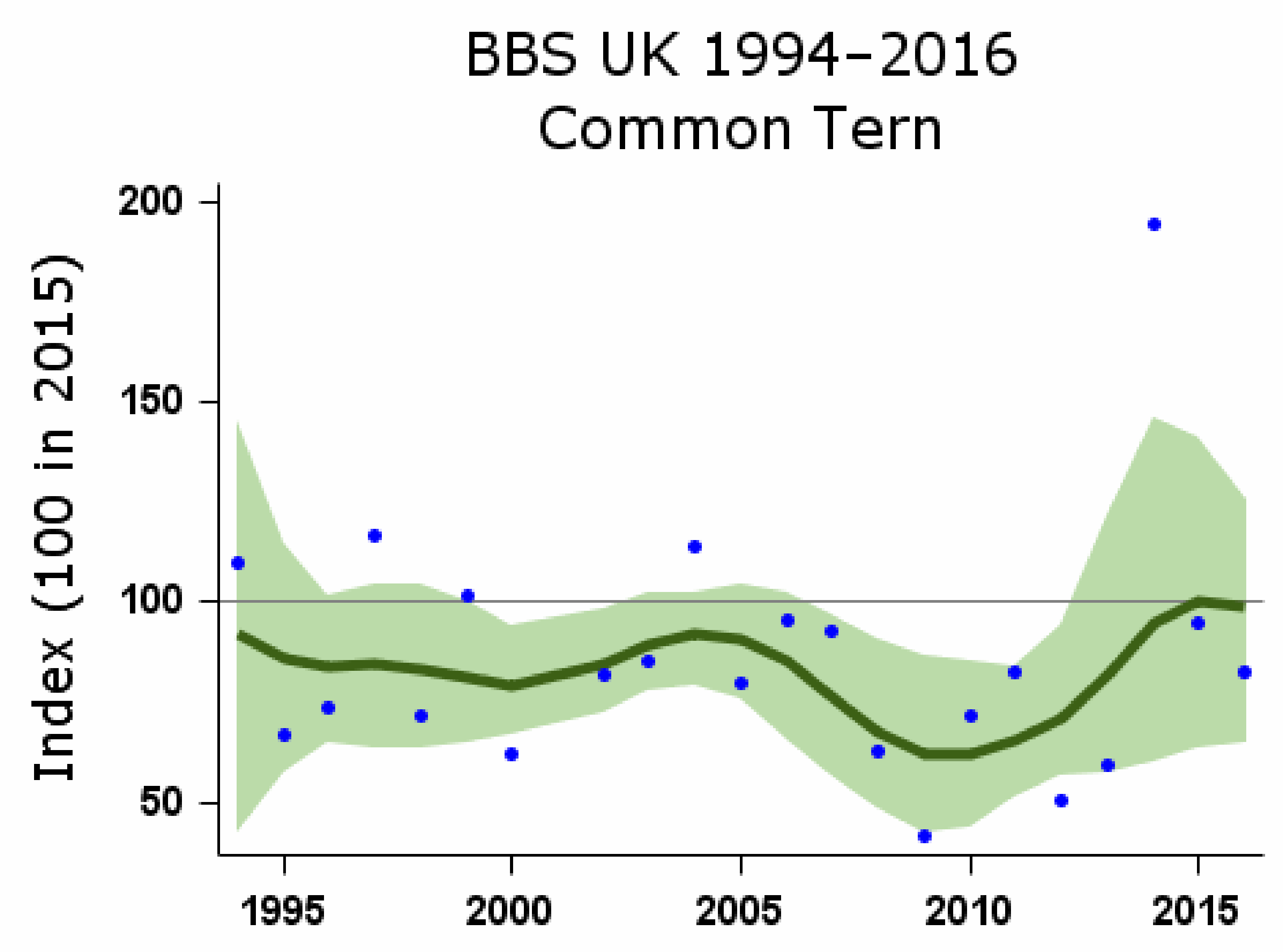
Key facts

Conservation listings:	Global: amber (breeding localisation)
Long-term trend:	UK: possible decline
Population size:	12,000 pairs in 2000 (APEP13: Seabird 2000 (Mitchell et al. 2004)

Status summary

Common Terns breed at lakes and reservoirs scattered across lowland Britain, especially in the major river valleys, and extensively at the coast. There are a few very large coastal colonies and groups of colonies that account for more than half the total population. Breeding numbers and productivity at sample colonies have been monitored annually since 1986 by JNCC's Seabird Monitoring Programme. The abundance trend shows approximate stability to about 2006, followed by a sharp downturn, equating to a 27% loss overall, while productivity appears to show a similar recent decline (SMP data here).

Common Terns are poorly covered by general breeding bird surveys because of their highly aggregated breeding population. There have been enough birds seen on BBS visits for a trend to be drawn but this has an exceptionally wide confidence interval and probably relates mainly to birds seen on overland passage, prospecting for nest sites or breeding in small, dispersed colonies. Extraordinary counts occurred in 2014 and created a temporary upturn in the population index, but subsequent counts have been similar to those from previous years.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

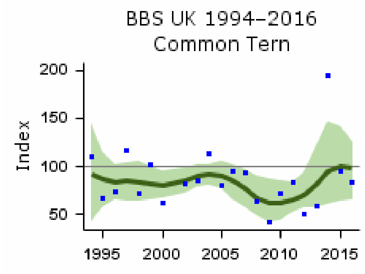
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	70	16	-43	141		Non-breeders included
	10	2005-2015	85	10	-37	95		Non-breeders included

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	85	61	-22	193		Non-breeders included

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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



BBS UK graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Feral Pigeon

Columba livia f. domestica

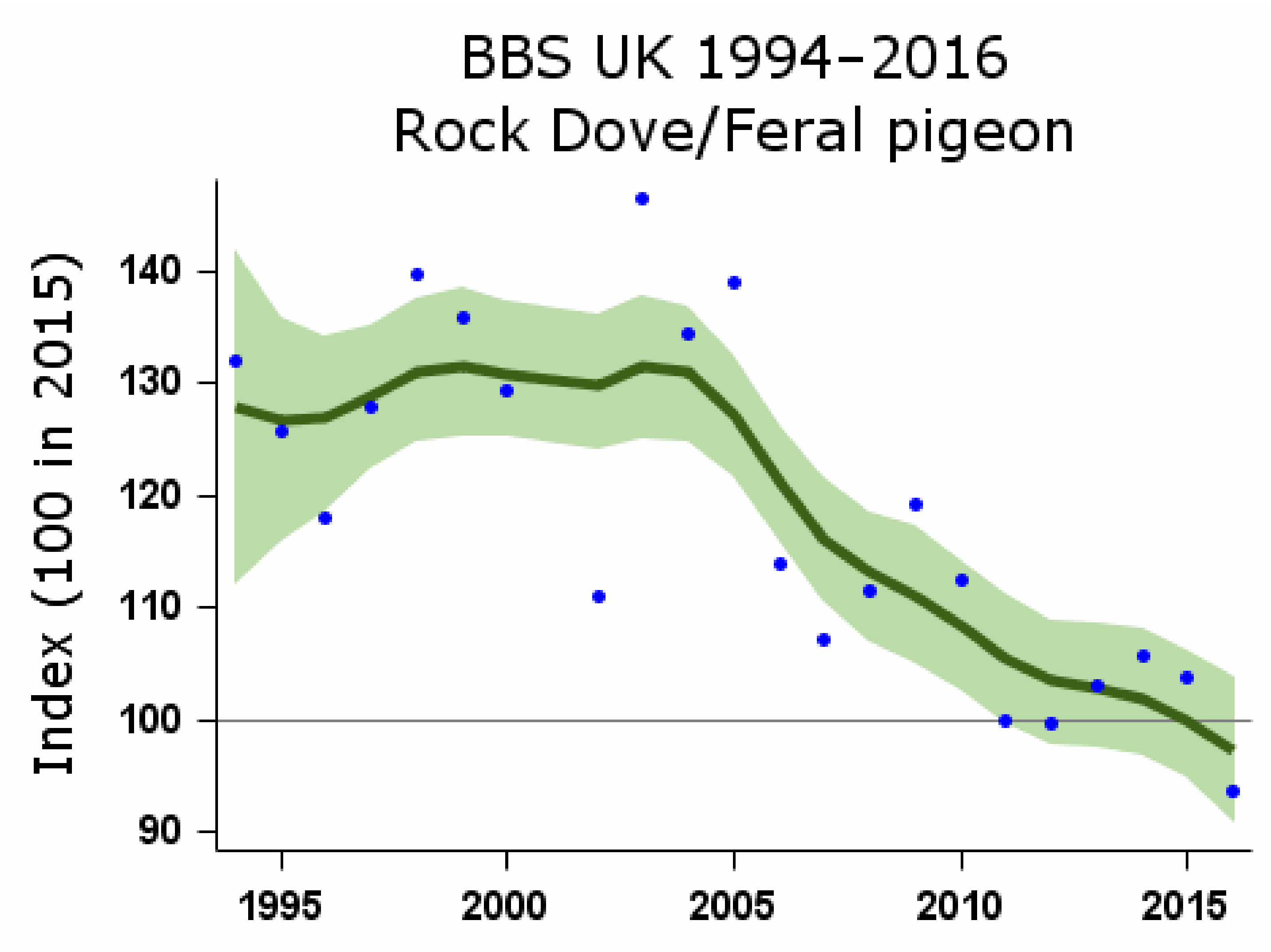
Key facts

Conservation listings:	Global: green (Rock Dove C. l. livia)
Long-term trend:	UK: uncertain
Population size:	550,000 (450,000-650,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

CBC samples for Feral Pigeon were consistently too small for annual monitoring, and there was no trend information before BBS began in 1994. Breeding atlas data have shown a 39% increase in occupied 10-km squares between 1968-72 and 1988-91 (Gibbons et al. 1993) and a further 5% or so by 2008-11 (Balmer et al. 2013), suggesting that Feral Pigeons may be on an upward trajectory, like the other Columba species in the UK. At the time of the first atlas, however, Feral Pigeons were more commonly overlooked during bird surveys, and some of the reported subsequent range increase may have been due to greater observer awareness. It is now clear that Feral Pigeons are almost ubiquitous in the UK, nesting in rural as well as urban habitats, and avoiding only the highest ground. No distinction can realistically be drawn between feral birds of domestic origin and true wild-type Rock Doves, although birds of wild-type plumage still predominate on some more-remote Scottish islands. In field conditions, it is often not possible to distinguish between pure native Rock Doves, wild-nesting Feral Pigeons, semi-captive dovecote breeders, and passing racing pigeons, nor between adults and young of the year, and BBS counts are likely to include birds from all of these groups. BBS indices suggest that there has been a moderate decline in numbers in England in recent years.

Recent studies in Europe have suggested that food shortages may affect productivity (Stock & Haag-Wackernagel 2016) and that pigeon densities could be reduced where people provide less food for them (Senar et al. 2017). It is possible that changes to food availability in urban areas may have affected this species in the UK; for example, pigeon feeding is now banned in Trafalgar Square in London. However, no studies have been carried out in the UK.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

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

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	718	-21	-31	-10		
	10	2005-2015	827	-21	-28	-14		
	5	2010-2015	833	-8	-15	2		
BBS England	20	1995-2015	588	-29	-38	-19	>25	
	10	2005-2015	668	-28	-36	-19	>25	
	5	2010-2015	661	-8	-16	2		
BBS Scotland	20	1995-2015	71	4	-29	53		
	10	2005-2015	86	-2	-26	27		
	5	2010-2015	96	-11	-28	6		
BBS Wales	20	1995-2015	37	49	8	105		
	10	2005-2015	44	10	-9	36		
	5	2010-2015	46	8	-13	34		

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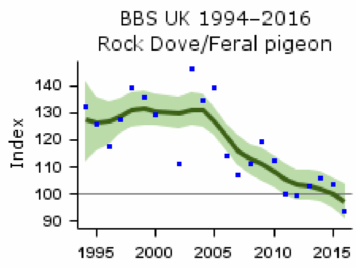
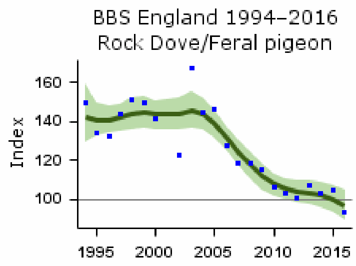
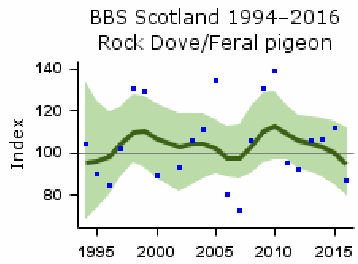


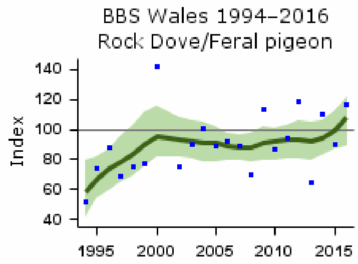
BBS UK graph



BBS England graph

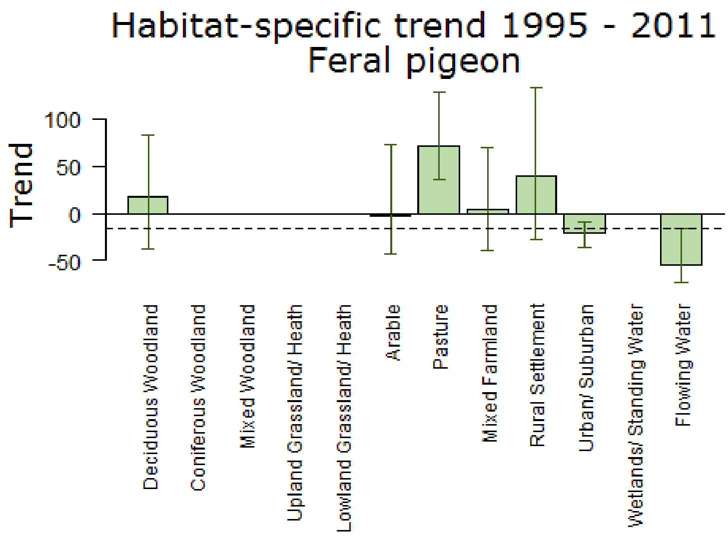


BBS Scotland graph



BBS Wales graph

Population trends by habitat



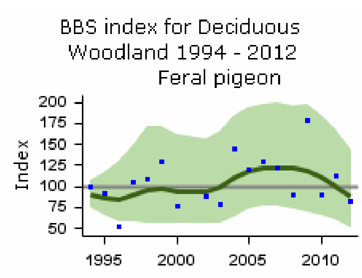
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

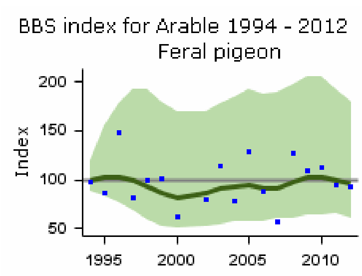
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	34	17	-37	84
Arable	16	1995-2011	55	-2	-42	72
Pasture	16	1995-2011	122	72	36	128
Mixed Farmland	16	1995-2011	57	5	-40	70
Rural Settlement	16	1995-2011	82	39	-27	133
Urban/ Suburban	16	1995-2011	175	-22	-36	-9
Flowing Water	16	1995-2011	48	-54	-72	-16

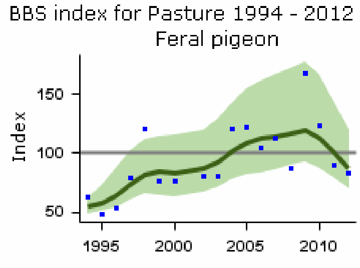
Further information on habitat-specific trends, please follow link here.



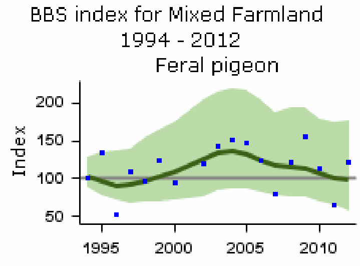
Habitat graph



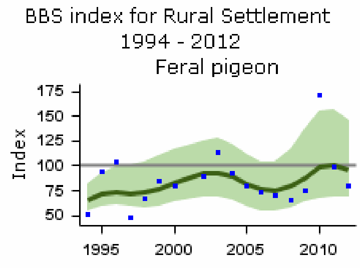
Habitat graph



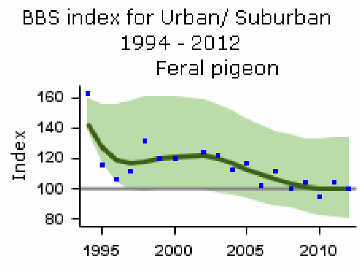
Habitat graph



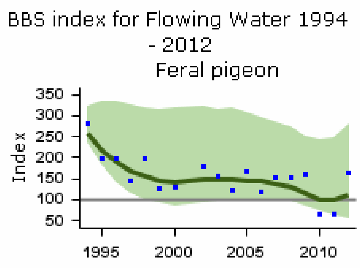
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Stock Dove

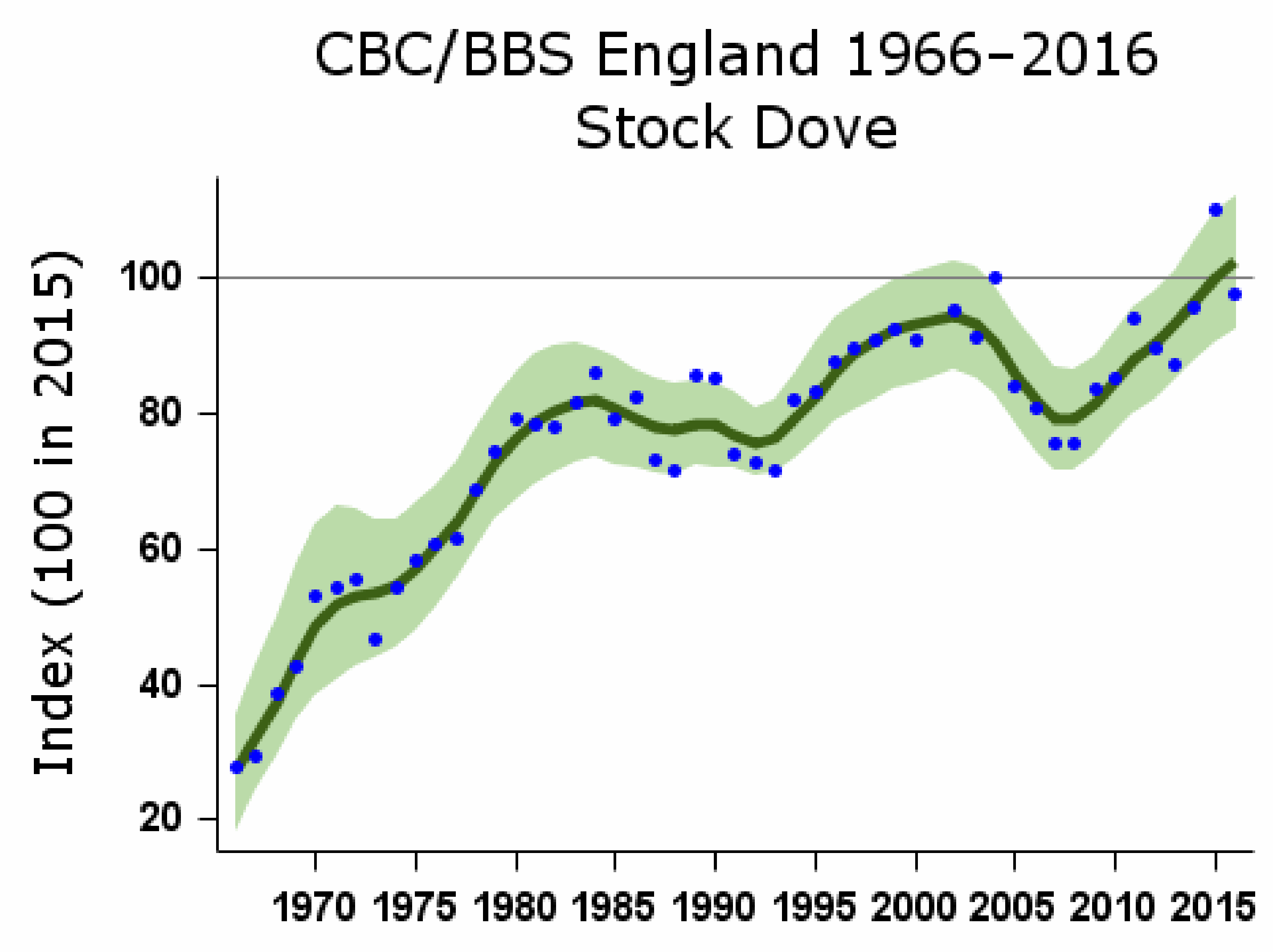
Columba oenas

Key facts

Conservation listings:	Global: amber (breeding international importance)
Long-term trend:	England: rapid increase
Population size:	260,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

Following release from the lethal and sublethal effects of the organochlorine seed-dressings used in the 1950s and early 1960s, Stock Dove populations have increased very substantially (O'Connor & Mead 1984). Numbers appeared to level off in the early 1980s, but the trend has been generally upward since the 1990s except for a sharp drop in numbers early in the current century. The BBS Siriwardena et al. 2000b). Overall, nest failure rates have fallen substantially since the 1980s and there has been a major increase in the number of fledglings raised per breeding attempt. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	383	212	111	347		
	25	1990-2015	672	28	11	48		
	10	2005-2015	936	16	8	25		
	5	2010-2015	1005	18	11	26		
BBS UK	20	1995-2015	848	20	9	34		
	10	2005-2015	1017	17	10	27		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	1051	17	12	25		
BBS England	20	1995-2015	781	18	4	33		
	10	2005-2015	936	16	8	25		
	5	2010-2015	1005	18	12	25		
BBS Wales	20	1995-2015	33	88	23	197		
	10	2005-2015	39	74	30	140		
	5	2010-2015	43	24	-2	50		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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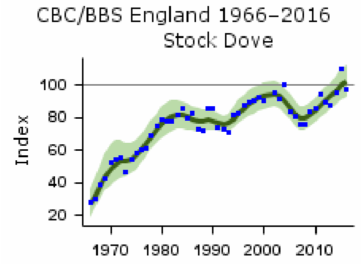
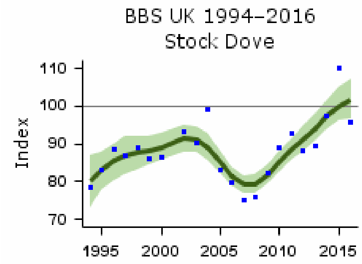
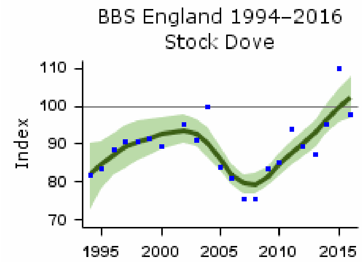


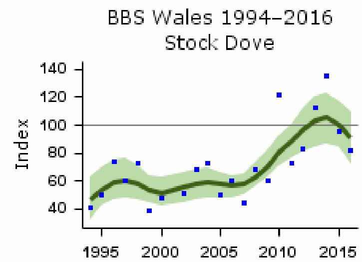
CBC/BBS England graph



BBS UK graph

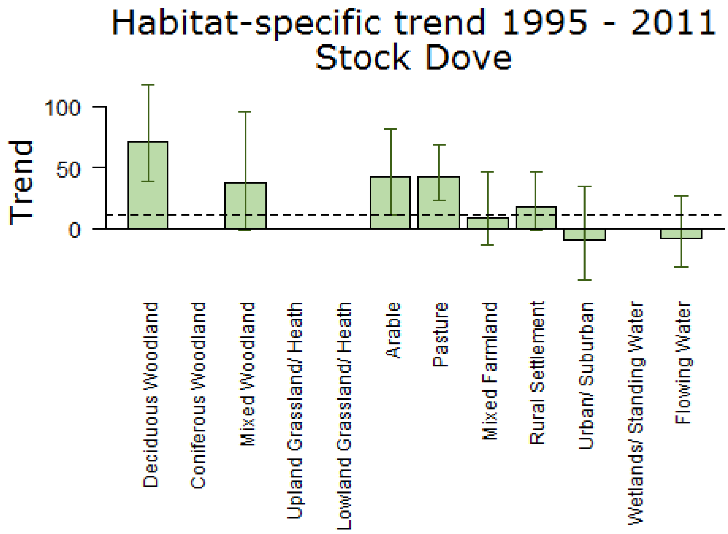


BBS England graph



BBS Wales graph

Population trends by habitat



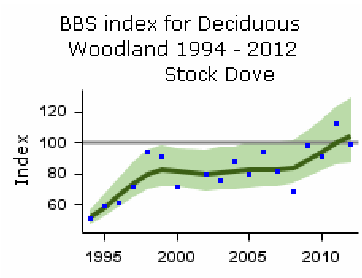
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

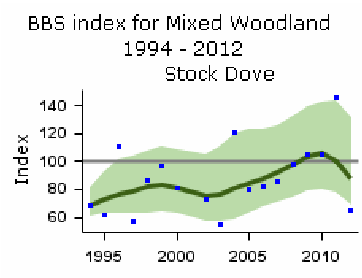
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	122	71	38	118
Mixed Woodland	16	1995-2011	53	38	-2	95
Arable	16	1995-2011	153	43	11	81
Pasture	16	1995-2011	220	42	23	69
Mixed Farmland	16	1995-2011	123	9	-14	47
Rural Settlement	16	1995-2011	124	18	-1	46
Urban/ Suburban	16	1995-2011	32	-9	-41	35
Flowing Water	16	1995-2011	60	-8	-31	27

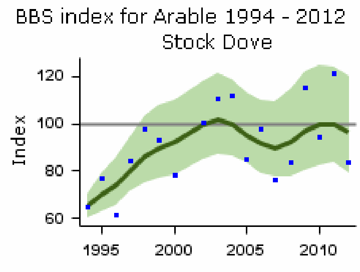
Further information on habitat-specific trends, please follow link here.



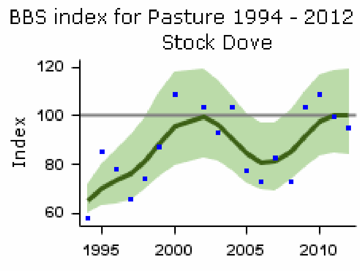
Habitat graph



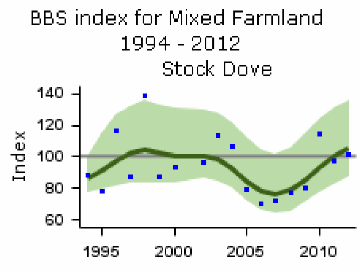
Habitat graph



Habitat graph



Habitat graph



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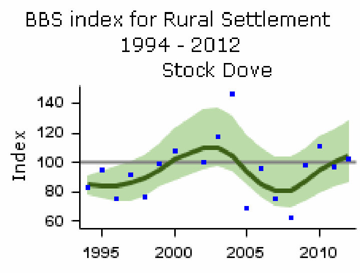
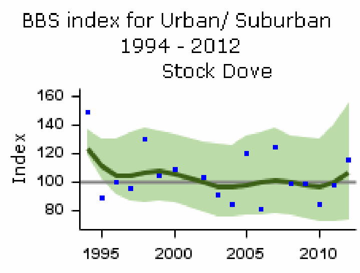
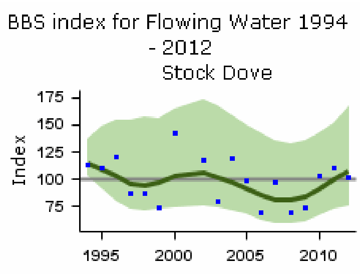


Habitat graph

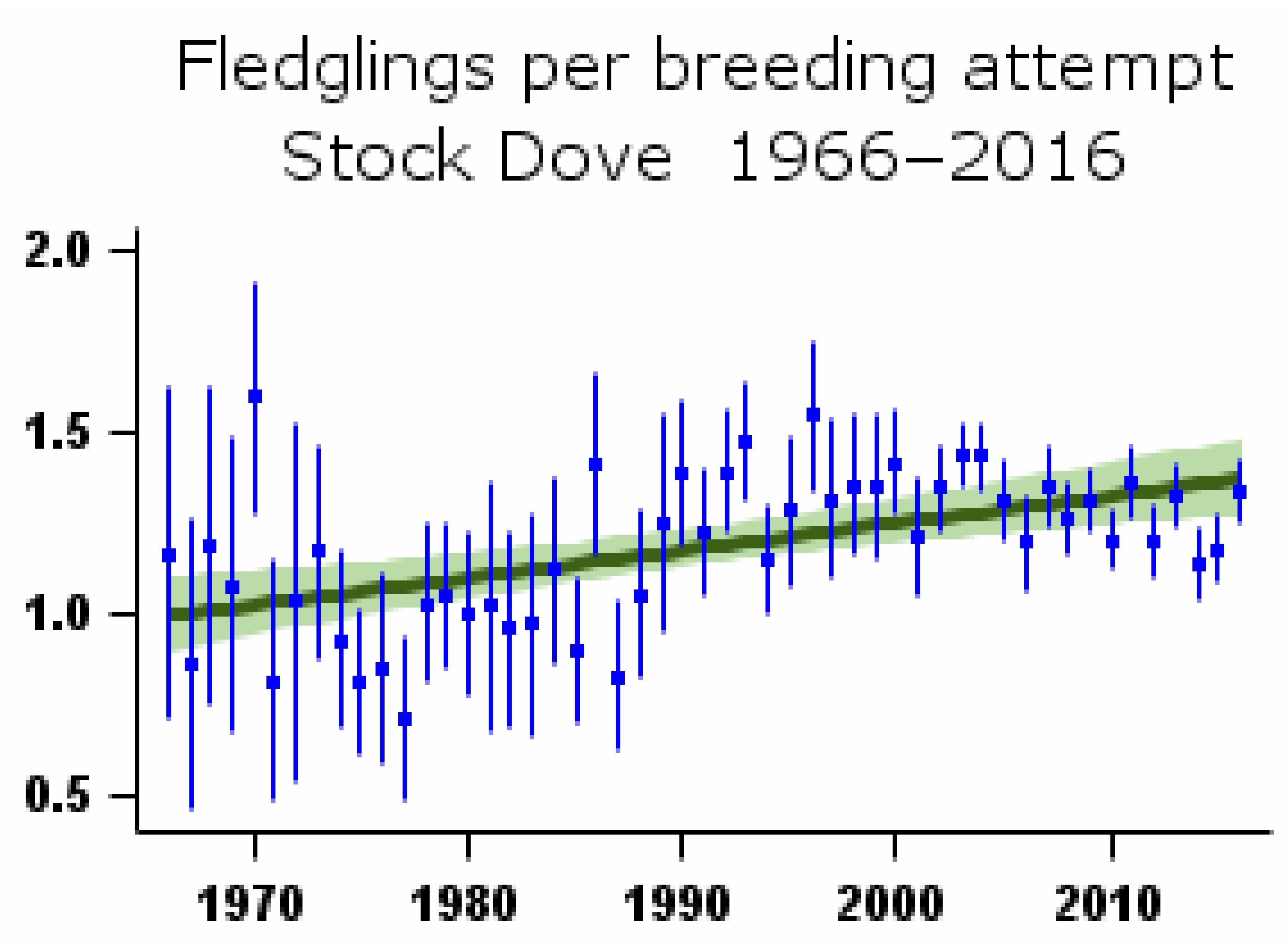


Habitat graph

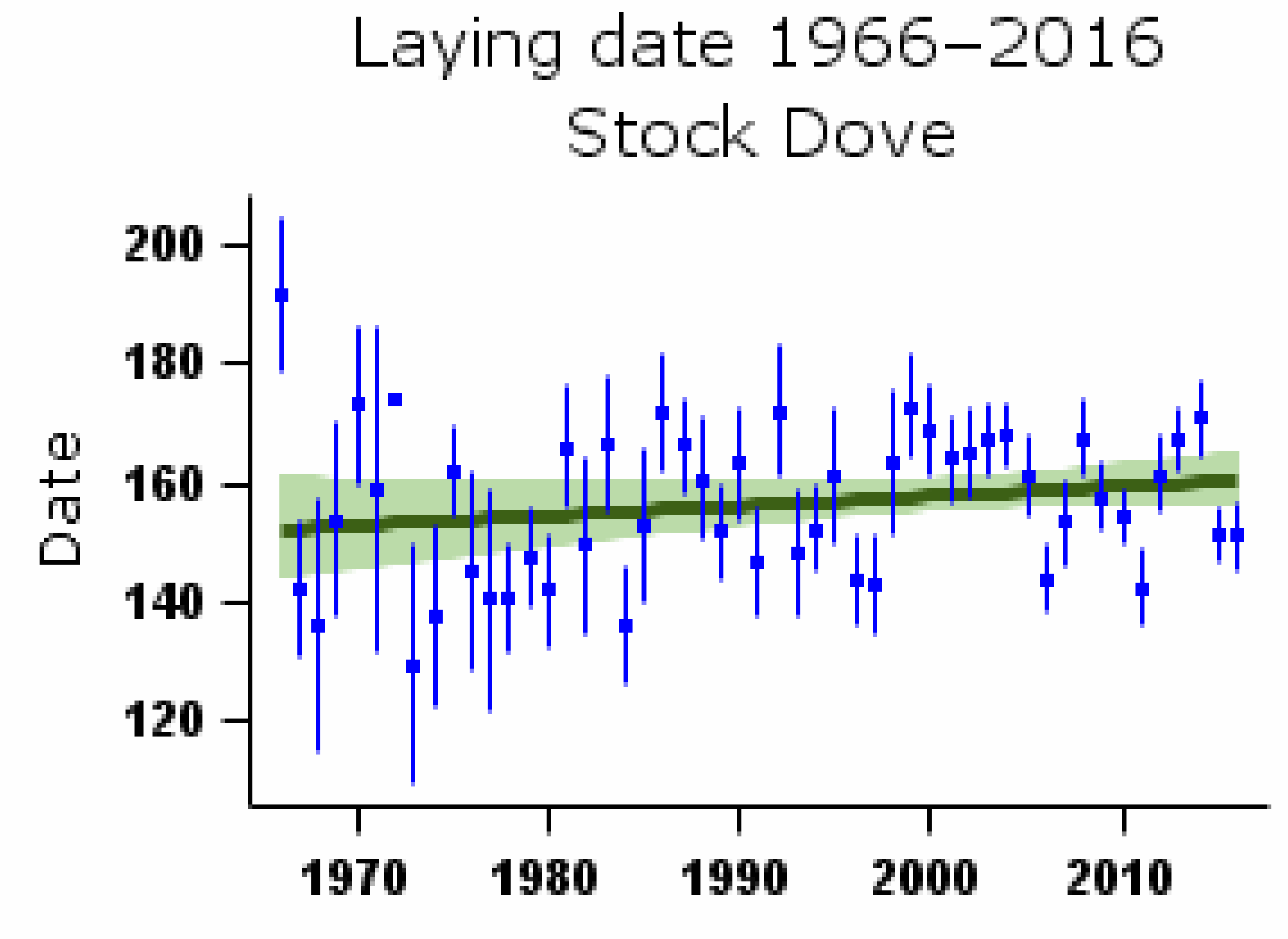


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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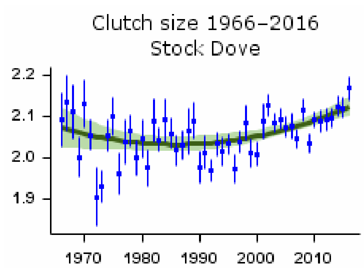
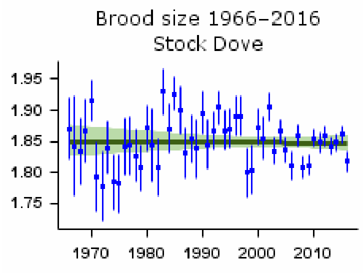
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	80	Linear increase	1.00 fledglings	1.36 fledglings	35.8%		
Clutch size	48	1967-2015	133	Curvilinear	2.07 eggs	2.11 eggs	2.4%		
Brood size	48	1967-2015	220	None					
Nest failure rate at egg stage	48	1967-2015	125	Curvilinear	1.89% nests/day	0.65% nests/day	-65.6%		
Nest failure rate at chick stage	48	1967-2015	80	None					
Laying date	48	1967-2015	28	None			0 days		Small sample

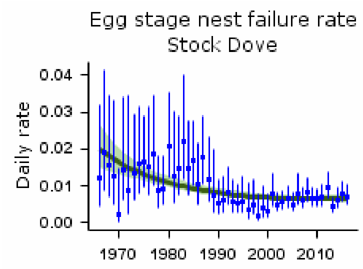
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



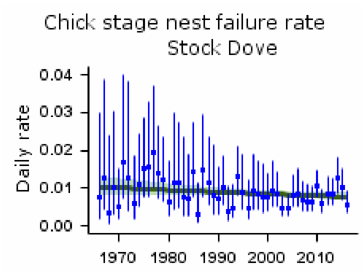
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The increase since the mid 1960s may be due to two phases: an initial recovery from the high mortality caused by organochlorines, followed by increased breeding performance.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Other	

Further information on causes of change

Stock Dove is a rare example of a farmland species in long-term increase. Its increase since the mid 1960s may fall into two phases: an initial recovery from the use of organochlorines, followed by an increase in breeding performance. It is not known why breeding should have become more productive. Overall, nest failure rates have fallen substantially since the 1980s and there has been a major increase in fledglings raised per breeding attempt.

A study based on nest record cards showed that egg-stage daily failure rate differed according to farm type between 1962-75 and 1976-95: breeding performance decreased on grazing farms and increased in arable farms, but did not differ in other farm types, suggesting that different environmental factors were acting across farm types (Siriwardena et al. 2000b).

Change from hunting quarry to protected status since 1982 has not affected the species' survival rates or population size (Aebischer 1995).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Woodpigeon

Columba palumbus

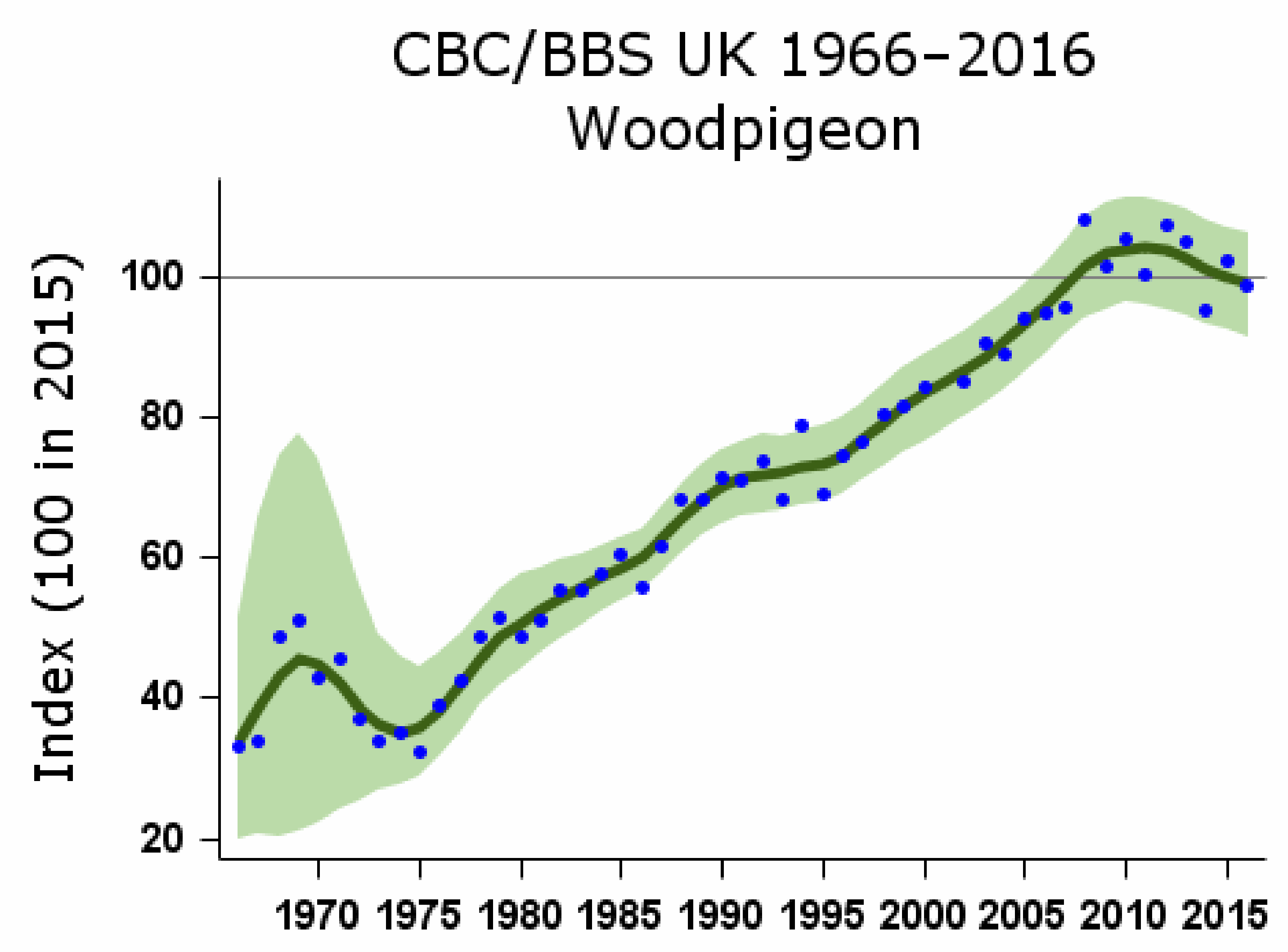
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	5.4 (5.1-5.7) million pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

The CBC/BBS trend for this species is of a steady, steep increase since at least the mid 1970s. This has only recently started to level off, with BBS showing a very shallow but statistically significant decline in England over the most recent five year period. Since 1994, BBS has recorded significantly upward trends in the UK, and in England, Wales and Northern Ireland separately, but stability in Scotland. The BBS PECBMS 2016a).



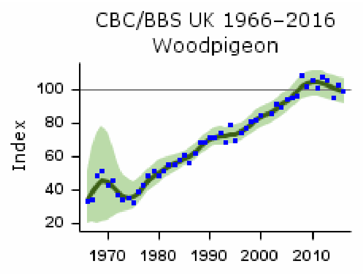
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

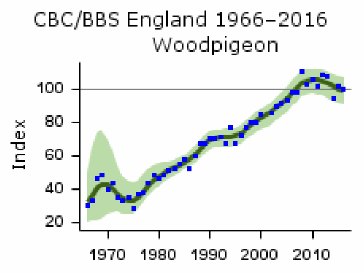
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1202	160	36	462		
	25	1990-2015	2243	42	31	54		
	10	2005-2015	3185	7	4	11		
	5	2010-2015	3244	-4	-7	-1		
CBC/BBS England	48	1967-2015	963	175	41	468		
	25	1990-2015	1796	45	33	58		
	10	2005-2015	2547	6	3	9		
	5	2010-2015	2591	-5	-7	-2		
BBS UK	20	1995-2015	2653	35	28	41		
	10	2005-2015	3185	7	4	11		
	5	2010-2015	3244	-4	-7	-1		
BBS England	20	1995-2015	2118	38	31	45		
	10	2005-2015	2547	6	3	10		
	5	2010-2015	2591	-5	-7	-2		
BBS Scotland	20	1995-2015	230	13	-8	38		
	10	2005-2015	282	14	0	28		
	5	2010-2015	290	4	-10	19		
BBS Wales	20	1995-2015	203	26	11	44		
	10	2005-2015	235	3	-9	16		
	5	2010-2015	242	-7	-16	4		
BBS N.Ireland	20	1995-2015	87	87	44	124		
	10	2005-2015	102	11	-1	20		
	5	2010-2015	101	-1	-10	7		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

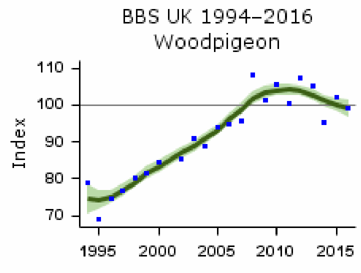
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



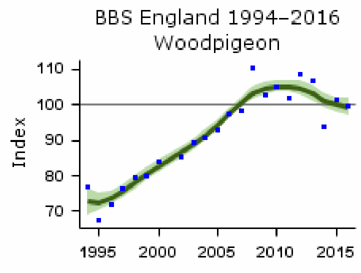
CBC/BBS UK graph



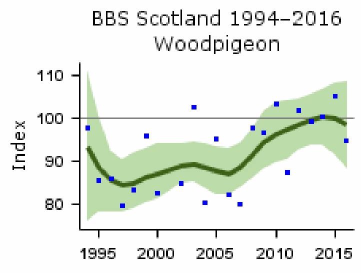
CBC/BBS England graph



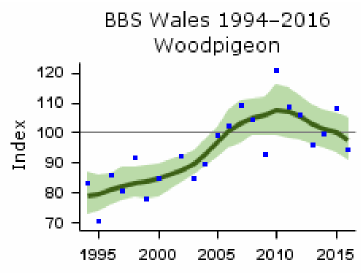
BBS UK graph



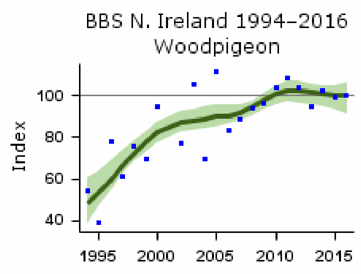
BBS England graph



BBS Scotland graph

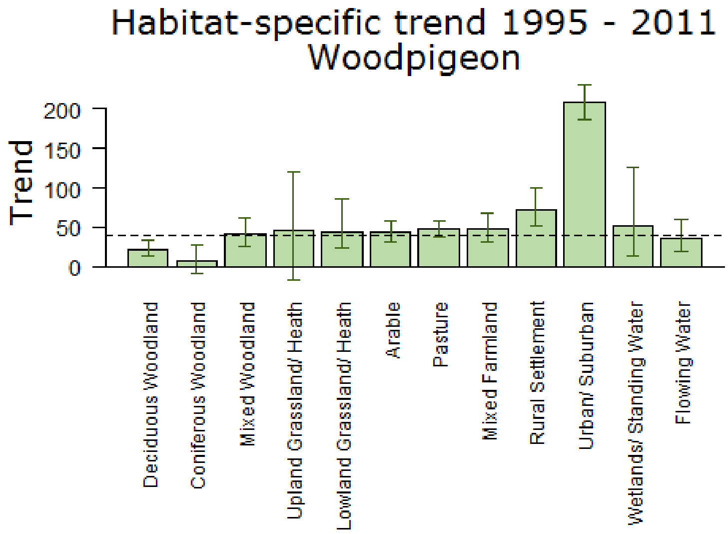


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



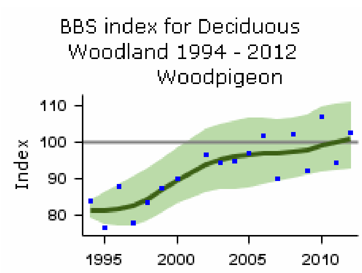
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

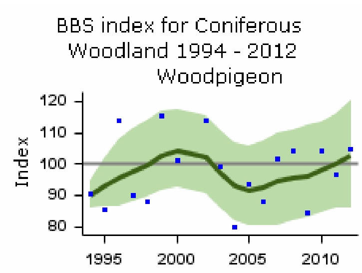
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	889	23	13	34
Coniferous Woodland	16	1995-2011	226	8	-8	29
Mixed Woodland	16	1995-2011	485	43	25	62
Upland Grassland/ Heath	16	1995-2011	32	46	-16	120
Lowland Grassland/ Heath	16	1995-2011	167	43	23	87
Arable	16	1995-2011	833	45	32	59
Pasture	16	1995-2011	1353	48	38	58
Mixed Farmland	16	1995-2011	764	49	32	69
Rural Settlement	16	1995-2011	866	73	51	100
Urban/ Suburban	16	1995-2011	432	210	188	231
Wetlands/ Standing Water	16	1995-2011	105	52	13	126
Flowing Water	16	1995-2011	527	36	19	61

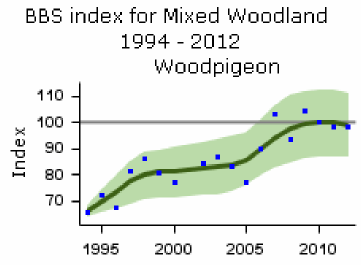
Further information on habitat-specific trends, please follow link here.



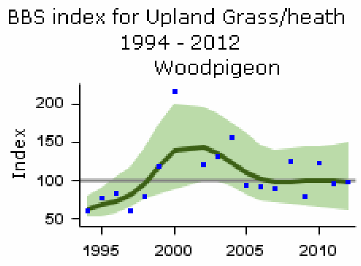
Habitat graph



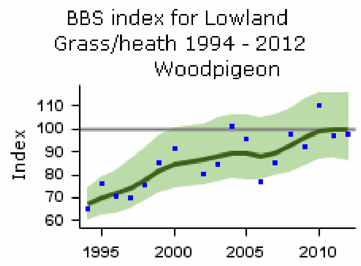
Habitat graph



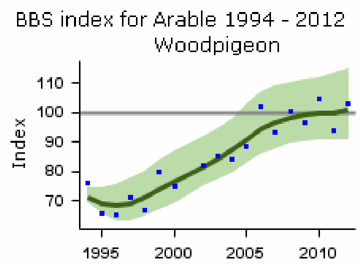
Habitat graph



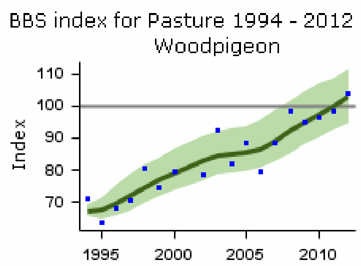
Habitat graph



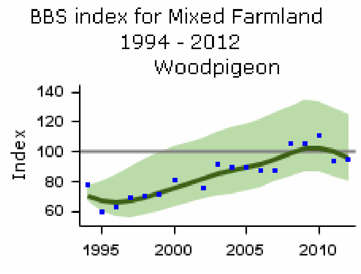
Habitat graph



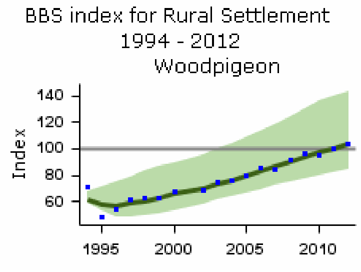
Habitat graph



Habitat graph



Habitat graph



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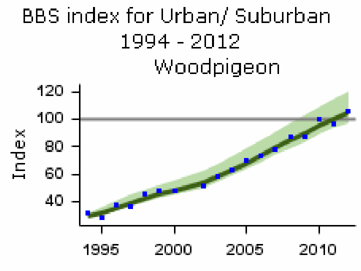

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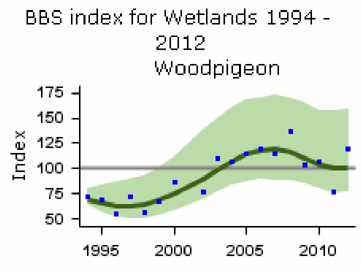
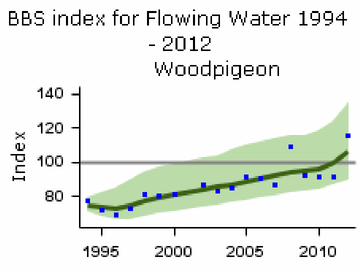
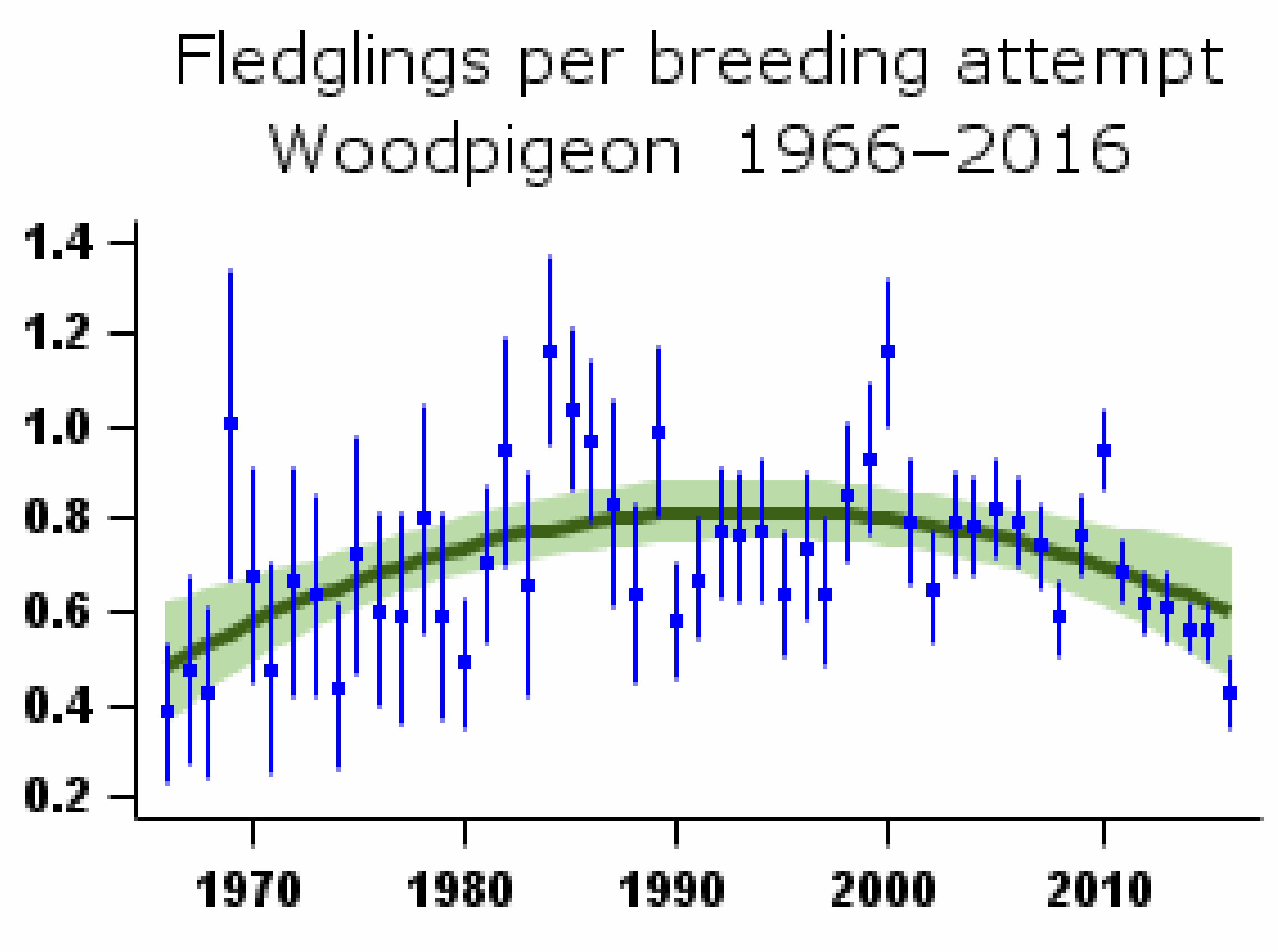


Habitat graph

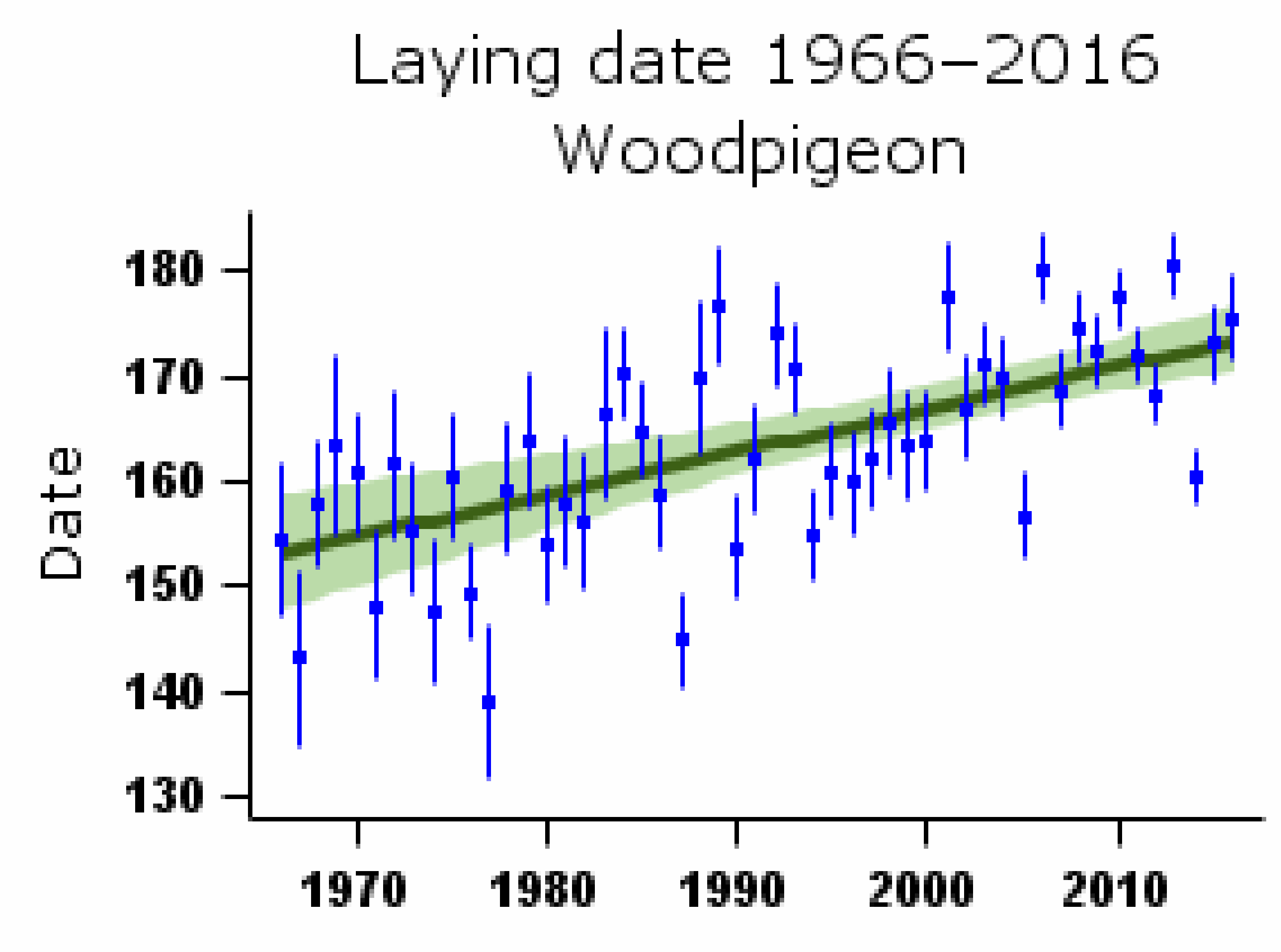


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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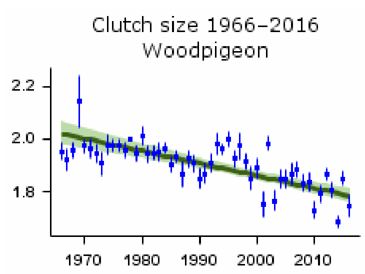
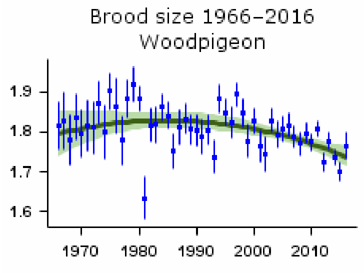
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	88	Curvilinear	0.51 fledglings	0.62 fledglings	20.8%		
Clutch size	48	1967-2015	97	Linear decline	2.02 eggs	1.79 eggs	-11.2%		
Brood size	48	1967-2015	136	Curvilinear	1.80 chicks	1.74 chicks	-3.1%		
Nest failure rate at egg stage	48	1967-2015	110	Curvilinear	4.61% nests/day	2.99% nests/day	-35.1%		
Nest failure rate at chick stage	48	1967-2015	88	Curvilinear	2.19% nests/day	2.23% nests/day	1.8%		
Laying date	48	1967-2015	100	Linear increase	Jun 3	Jun 22	19 days		

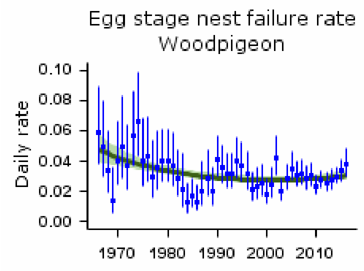
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



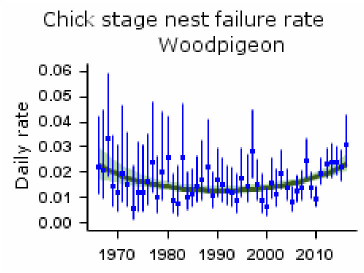
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is some evidence that the increase in this species has been due to the spread of intensive winter cereal and rape cultivation, probably by increasing food availability over winter, reflecting the species' ability to subsist on green vegetation, unlike other granivores.

Change factor	Primary driver	Secondary driver
Demographic	Increased overwinter survival	
Ecological	Agricultural intensification	

Further information on causes of change

There are few studies specifically examining demographic and ecological drivers of the long-term increase in this species but the spread of intensive arable cultivation, especially of oilseed rape and winter-sown cereal, which has been shown to reduce overwinter mortality, may explain the rise in numbers (Gibbons et al. 1993, Inglis et al. 1997). Inglis et al. (1997) conducted fieldwork to provide good evidence that, in their study area in Cambridgeshire, the overwintering population size was determined by the area of oilseed rape. Inglis et al. state that, since the introduction of oilseed rape, the number of fledged young produced has a more important effect upon the Woodpigeon population size than does overwinter mortality from starvation, i.e. winter food availability no longer limits the population.

The number of Woodpigeons feeding in gardens has also increased (Glue 1993, 1995, 1997), suggesting that this species may benefit from the trend of increasing urban feeding sites, although there is no direct evidence to support this.

The species is adaptable and O'Connor & Shrubb (1986) found that the breeding season had advanced in response to the switch to autumn sowing, and thus earlier ripening, of cereals, with more pairs nesting in May and June and relatively fewer during July-September. Climate change may have also permitted earlier nesting. A trend toward earlier nesting could have led CBC, with its fieldwork finishing in early July, to overestimate the rate of increase (Marchant et al. 1990). Newly available data indicate, however, that the species is now nesting almost three weeks later, on average, than it did in the 1960s.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Collared Dove

Streptopelia decaocto

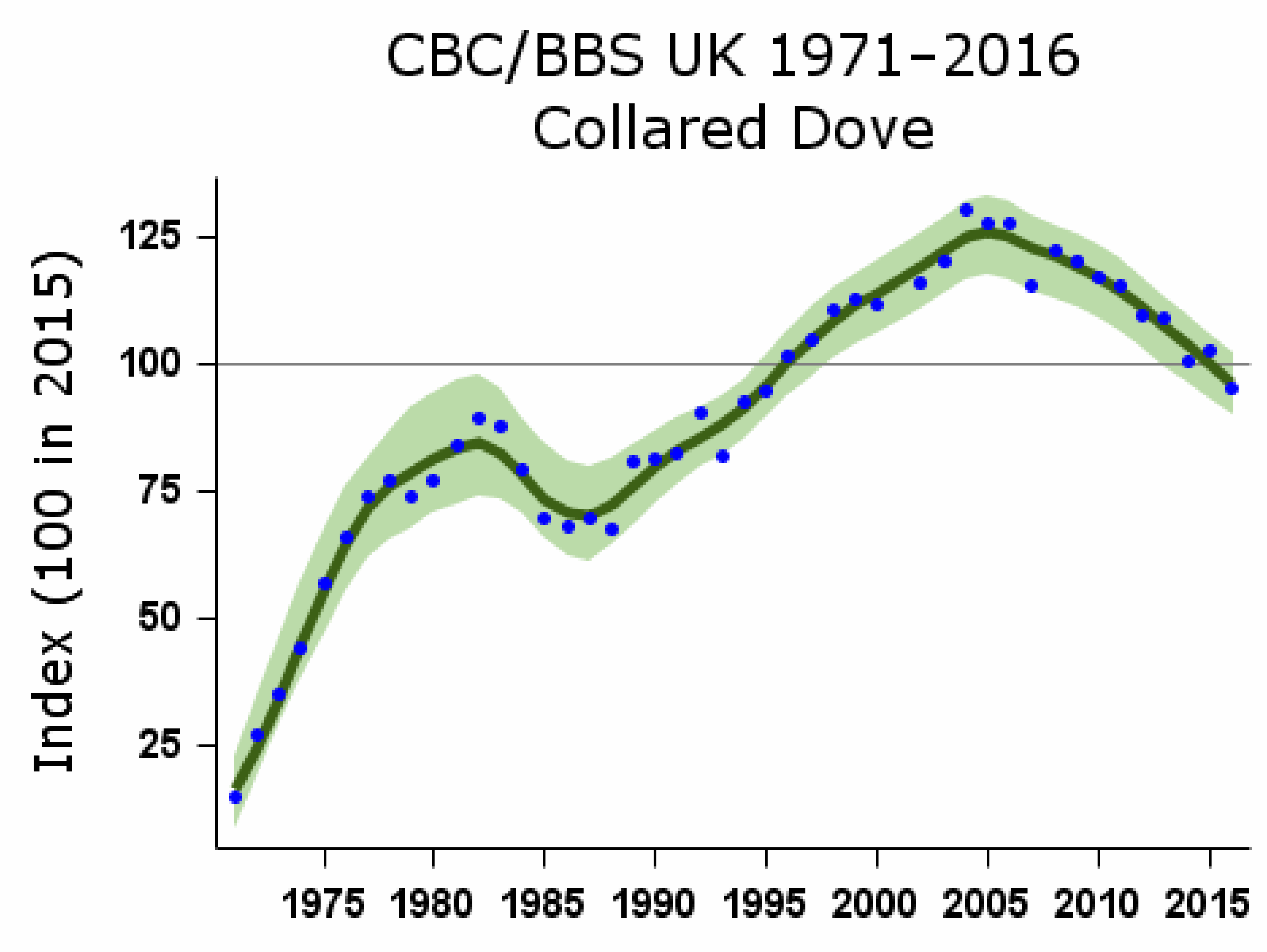
Key facts

Conservation listings:	Global: green
Long-term trend:	UK: rapid increase
Population size:	990,000 (900,000-1,090,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Human habitats
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

Collared Dove abundance has increased rapidly since the species first colonised Britain in 1955. From just four birds known to be present in that year, the population was put conservatively at 15,000-25,000 pairs by 1970 (Hudson 1972). The CBC index showed an almost exponential rise as colonisation continued during the early 1970s, but had levelled off by about 1980 only to rise again from the early 1990s. The early years of BBS showed this increase, but numbers are now similar to the mid-1990s following a recent downturn, apart from in Northern Ireland, where BBS records a strong increase. The BBS PECBMS 2016a).



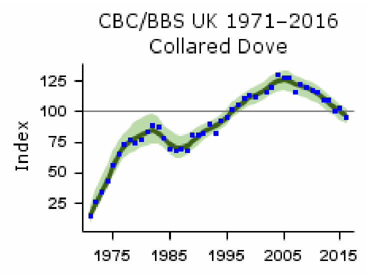
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

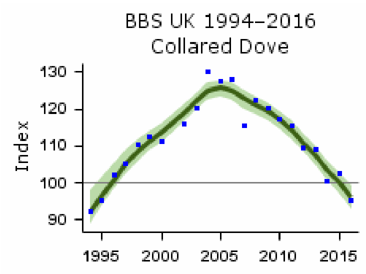
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	43	1972-2015	734	311	168	500		
	25	1990-2015	1205	25	7	44		
	10	2005-2015	1705	-21	-25	-18		
	5	2010-2015	1707	-15	-17	-12		
BBS UK	20	1995-2015	1429	3	-4	10		
	10	2005-2015	1705	-20	-24	-17		
	5	2010-2015	1707	-15	-18	-11		
BBS England	20	1995-2015	1245	0	-7	7		
	10	2005-2015	1471	-23	-27	-20		
	5	2010-2015	1463	-18	-20	-14		
BBS Scotland	20	1995-2015	59	20	-21	74		
	10	2005-2015	77	9	-25	38		
	5	2010-2015	82	18	-10	42		
BBS Wales	20	1995-2015	79	21	-17	66		
	10	2005-2015	95	-22	-32	-11		
	5	2010-2015	98	-18	-29	-7		
BBS N.Ireland	20	1995-2015	34	97	16	143		
	10	2005-2015	46	15	-9	40		
	5	2010-2015	48	9	-12	39		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

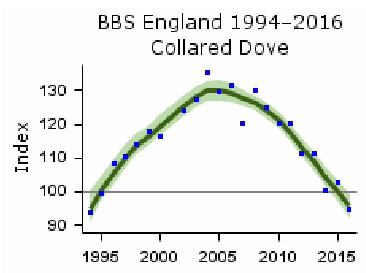
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



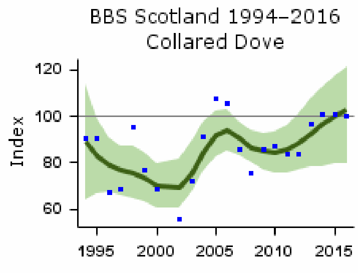
CBC/BBS UK graph



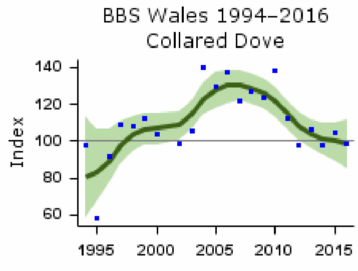
BBS UK graph



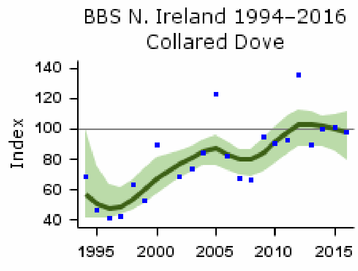
BBS England graph



BBS Scotland graph

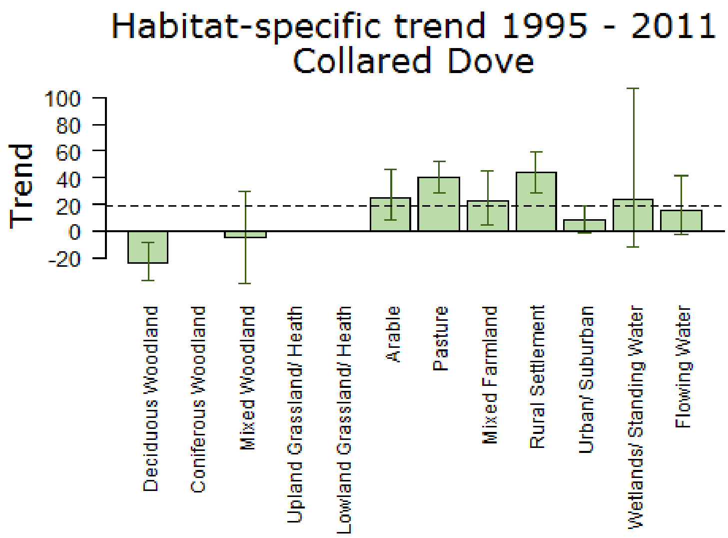


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

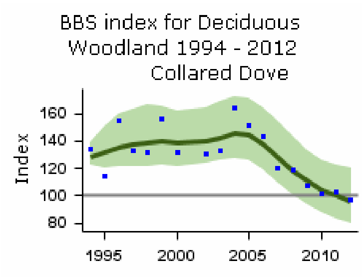
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

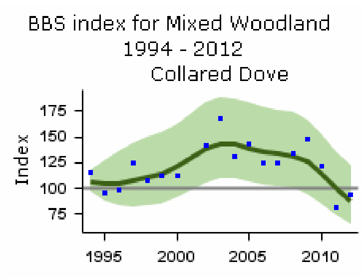
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	183	-24	-37	-8

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Mixed Woodland	16	1995-2011	64	5	-39	30
Arable	16	1995-2011	247	25	9	46
Pasture	16	1995-2011	510	40	29	53
Mixed Farmland	16	1995-2011	244	22	5	45
Rural Settlement	16	1995-2011	506	43	29	59
Urban/ Suburban	16	1995-2011	370	8	-1	19
Wetlands/ Standing Water	16	1995-2011	30	23	-13	107
Flowing Water	16	1995-2011	138	15	-2	41

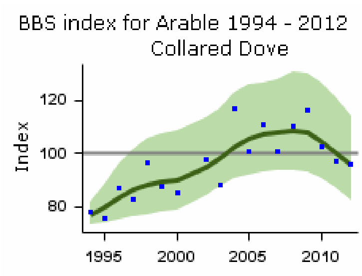
Further information on habitat-specific trends, please follow link here.



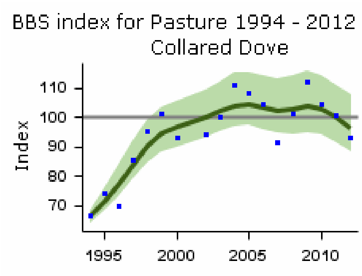
Habitat graph



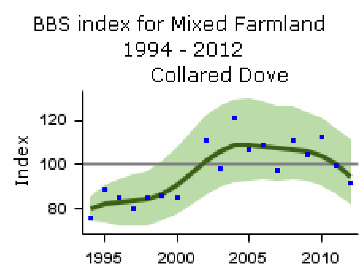
Habitat graph



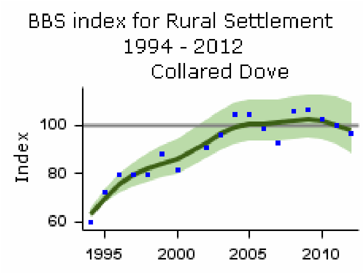
Habitat graph



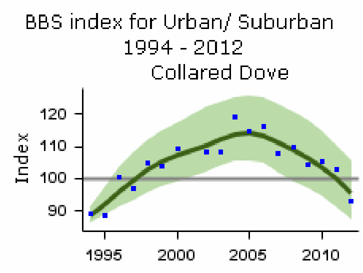
Habitat graph



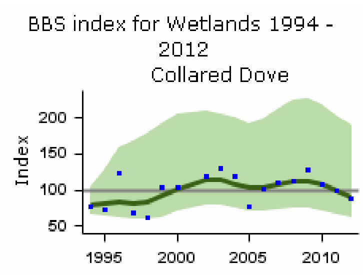
Habitat graph



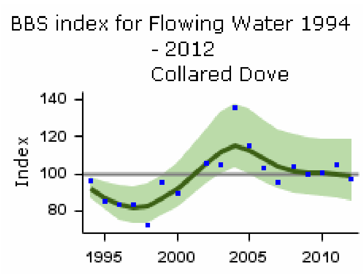
Habitat graph



Habitat graph

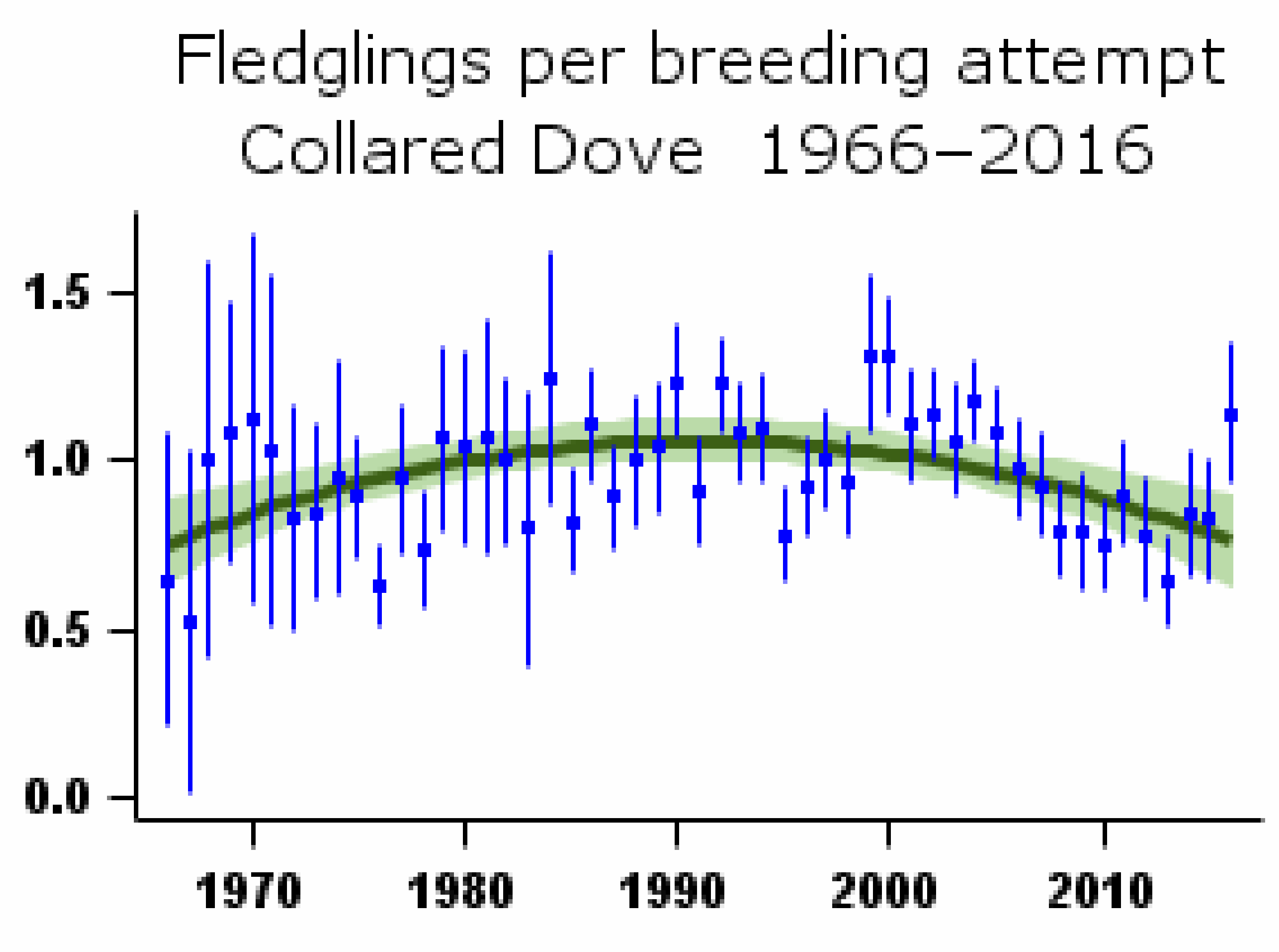


Habitat graph

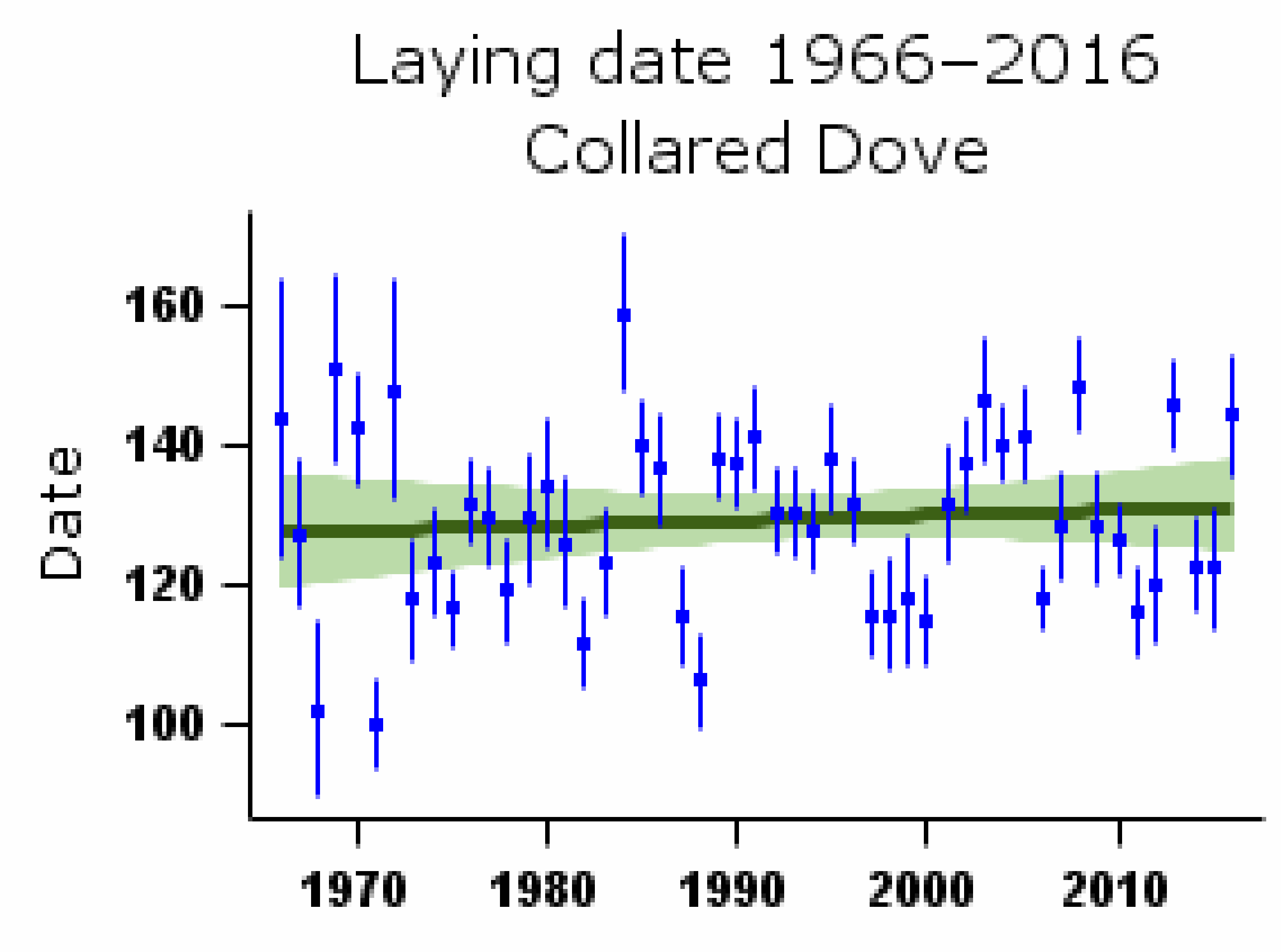


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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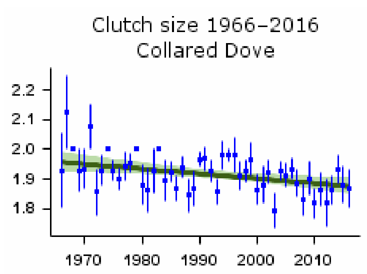
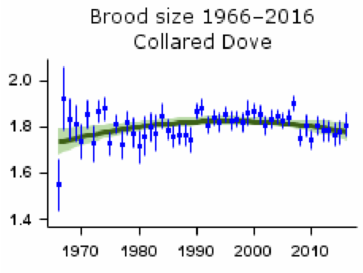
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	55	Curvilinear	0.78 fledglings	0.79 fledglings	0.7%		
Clutch size	48	1967-2015	44	Linear decline	1.96 eggs	1.88 eggs	-3.9%		
Brood size	48	1967-2015	74	Curvilinear	1.74 chicks	1.79 chicks	2.6%		
Nest failure rate at egg stage	48	1967-2015	62	Curvilinear	3.23% nests/day	3.19% nests/day	-1.2%		
Nest failure rate at chick stage	48	1967-2015	55	Curvilinear	2.22% nests/day	1.80% nests/day	-18.9%		
Laying date	48	1967-2015	44	None			0 days		

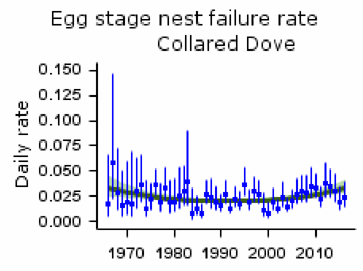
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



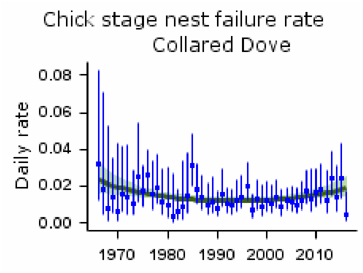
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is little evidence available relating to the drivers of the increase in this species but it appears to have been able to fill an empty niche and exploit the intermittent seed resources available in gardens and may also benefit from milder winters. Given the long-term rise, there is no baseline of 'stability' against which to compare demographic rates that might be causing a change but there have been increases in nesting productivity.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Other	Climate change

Further information on causes of change

There are very few studies from the UK looking at the causes of population change in Collared Dove. Apart from clutch size, the demographic data show a curvilinear trend, with fledglings per nesting attempt peaking during the 1980s and 1990s but now falling back to earlier levels (see graphs above). The species appears to have filled a previously empty niche, perhaps because it is able to adapt to new environments, and it is commonly found in gardens, exploiting the intermittent seed resources available. It may also benefit from milder winters, which the species can exploit with its long breeding seasons. However, evidence for this is anecdotal.

Robertson (1990) measured high productivity and a long breeding season in rural Collared Doves in Oxfordshire and suggested that these were made possible by feeding on superabundant, predictable and persistent supplies of commercial crop seed in and around farmyards. However, there is little evidence based on specific analyses to support this.

There is evidence that the recent slowing of population increase may be due to increasing numbers of grey squirrels, as Newson et al. (2010b) provided good evidence from nest record data which showed a positive relationship between nest failure at the egg stage and squirrel abundance. They may also have been approaching the saturation of their niche. The outbreak of trichomonosis first noted in 2006 is thought to have affected this species quite severely and may be the primary cause of the current downturn. Population trends have been different in Scotland but the reasons for this are unclear.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO,

Thetford. www.bto.org/birdtrends

Turtle Dove

Streptopelia turtur

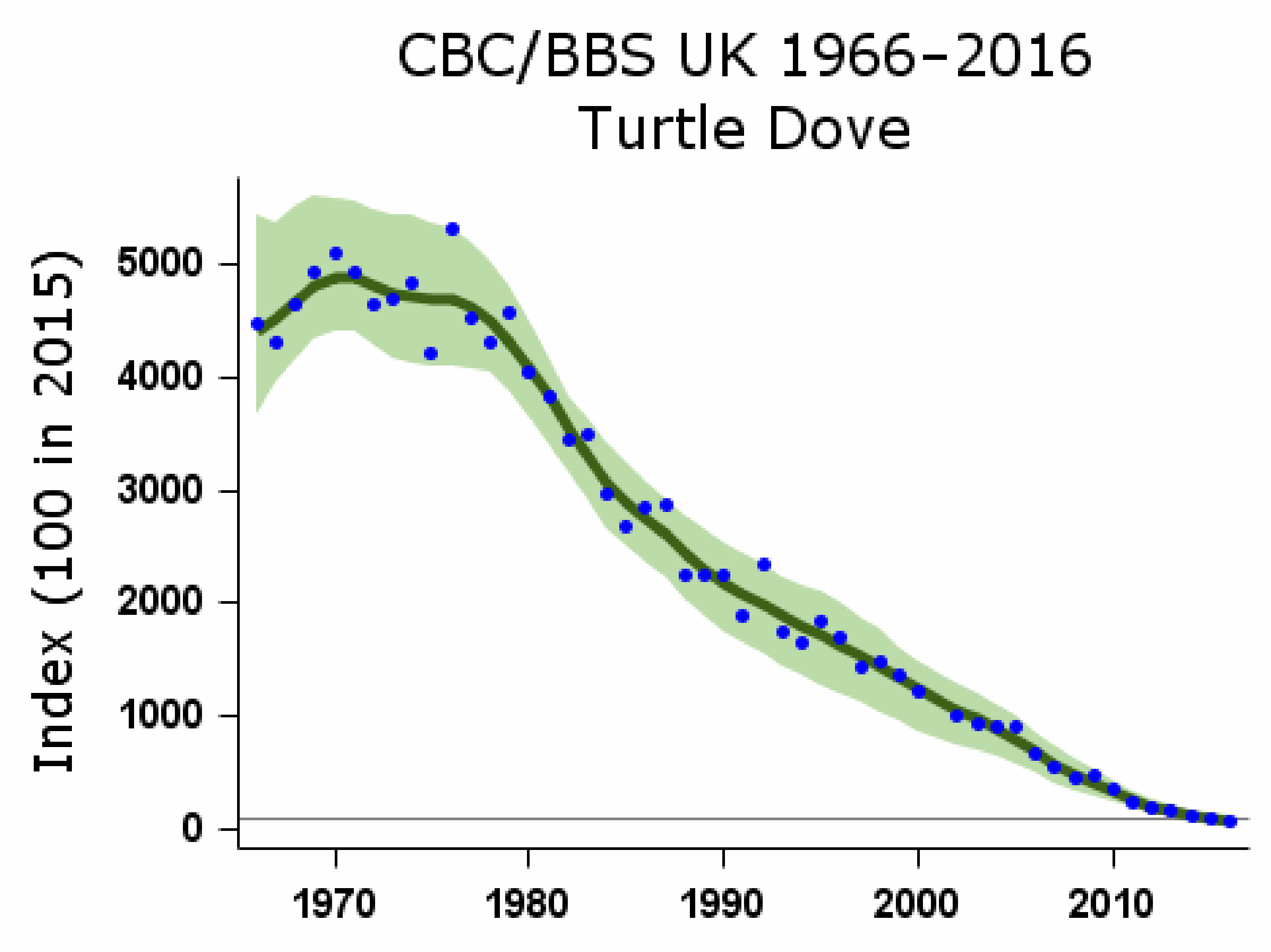
Key facts

Conservation listings:	Global: red (globally threatened, UK breeding population & range declines)
Long-term trend:	UK, England: rapid decline
Population size:	14,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

The CBC/BBS trend shows severe declines in Turtle Dove abundance, beginning in the late 1970s and continuing steeply to the present. Atlas data show that more than half the 10-km squares occupied in 1968-72 had been lost by 2008-11, with the population withdrawing towards East Anglia and Kent (Balmer et al. 2013). These trends, unless halted or reversed, would bring the species close to extinction in the UK within the next two decades. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a) and the species is now classed by IUCN as globally threatened (Vulnerable).



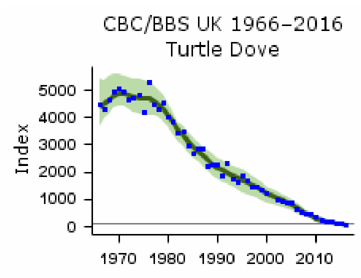
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

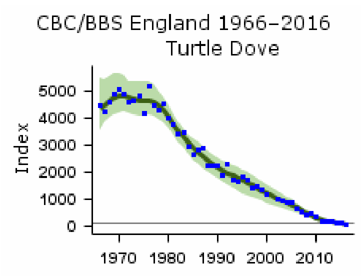
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	101	-98	-99	-97	>50	
	25	1990-2015	131	-95	-97	-94	>50	
	10	2005-2015	93	-88	-91	-84	>50	
	5	2010-2015	56	-70	-78	-60	>50	
CBC/BBS England	48	1967-2015	100	-98	-99	-96	>50	
	25	1990-2015	129	-95	-97	-94	>50	
	10	2005-2015	92	-87	-91	-83	>50	
	5	2010-2015	54	-69	-79	-61	>50	
BBS UK	20	1995-2015	136	-94	-96	-93	>50	
	10	2005-2015	93	-87	-91	-85	>50	
	5	2010-2015	56	-70	-79	-64	>50	
BBS England	20	1995-2015	134	-94	-96	-92	>50	
	10	2005-2015	92	-87	-91	-84	>50	
	5	2010-2015	54	-69	-79	-62	>50	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

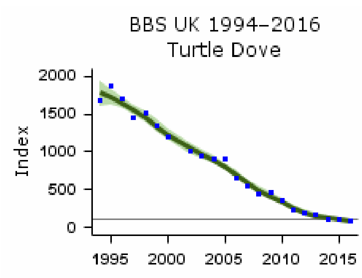
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



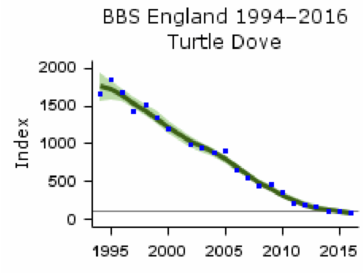
CBC/BBS UK graph



CBC/BBS England graph

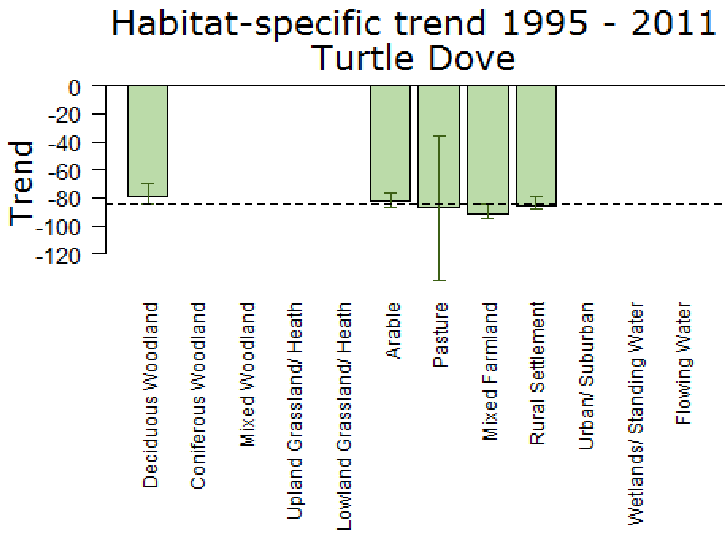


BBS UK graph



BBS England graph

Population trends by habitat



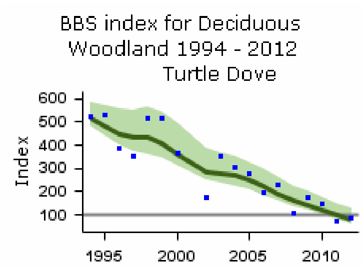
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

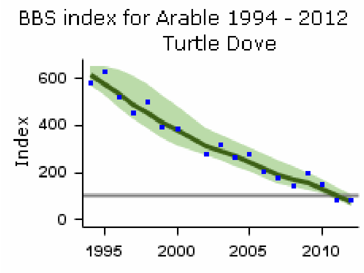
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	31	-79	-84	-70
Arable	16	1995-2011	59	-83	-86	-77
Pasture	16	1995-2011	36	-87	-138	-36
Mixed Farmland	16	1995-2011	33	-91	-94	-84
Rural Settlement	16	1995-2011	38	-85	-88	-78

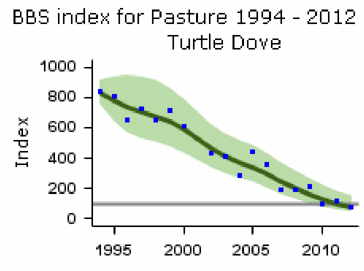
Further information on habitat-specific trends, please follow link here.



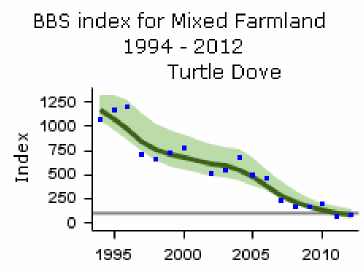
Habitat graph



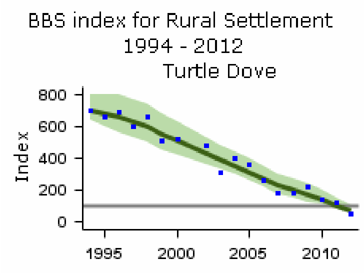
Habitat graph



Habitat graph

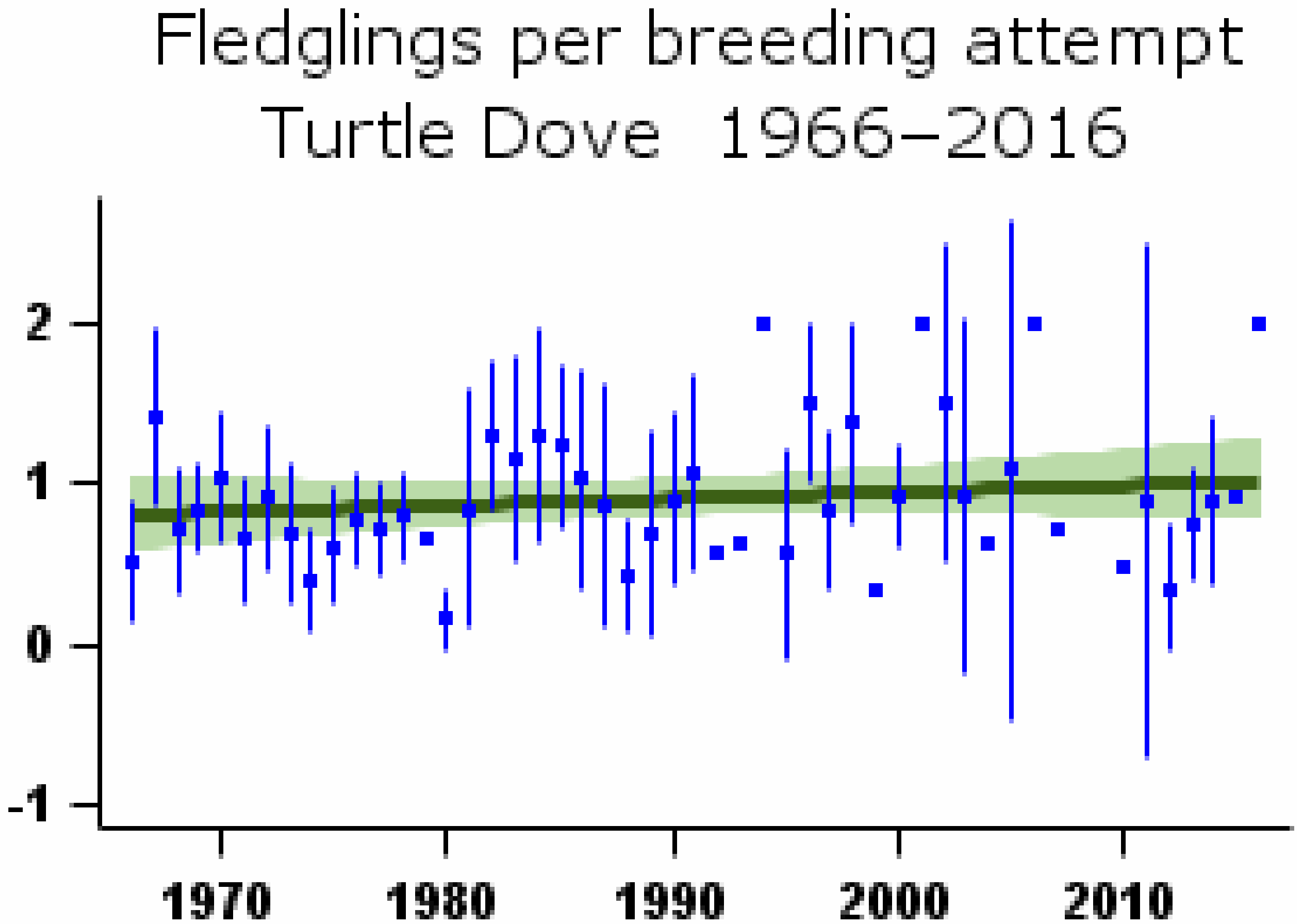


Habitat graph

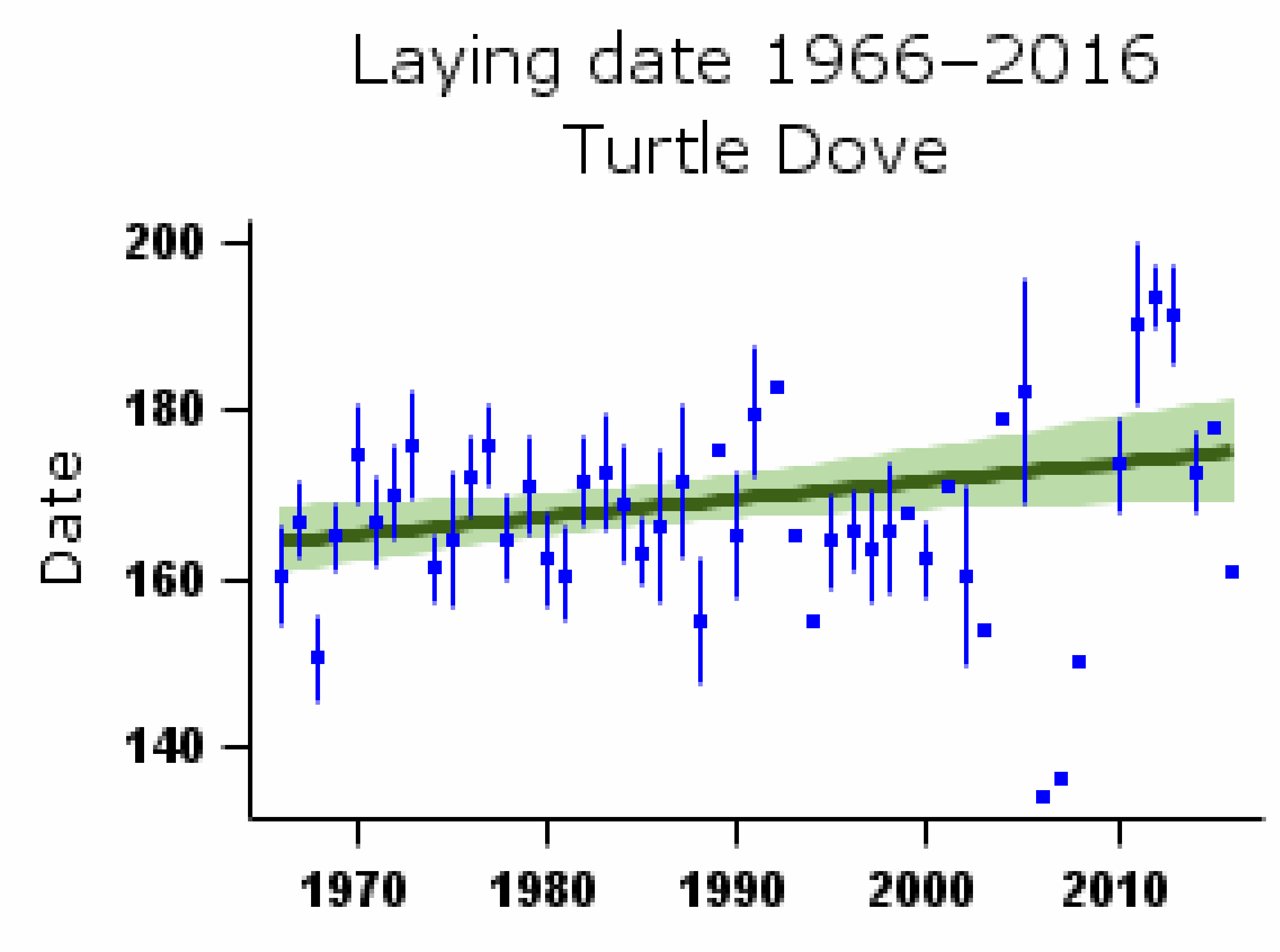


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

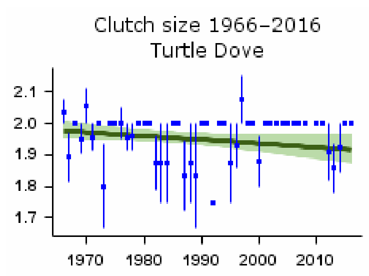


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

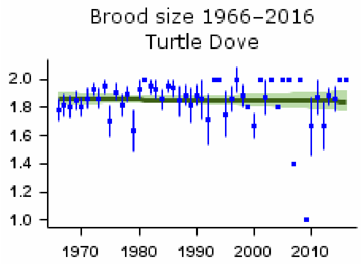
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	11	None					
Clutch size	48	1967-2015	11	None					Small sample
Brood size	48	1967-2015	15	None					Small sample
Nest failure rate at egg stage	48	1967-2015	14	None					Small sample
Nest failure rate at chick stage	48	1967-2015	11	Curvilinear	2.15% nests/day	3.49% nests/day	62.3%		Small sample
Laying date	48	1967-2015	12	Linear increase	Jun 14	Jun 24	10 days		Small sample

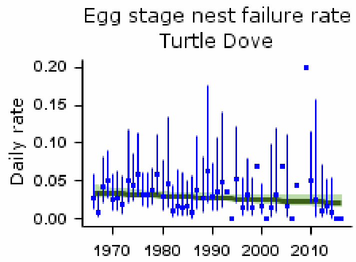
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



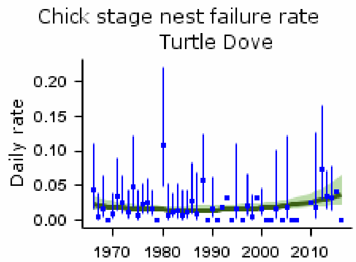
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence to support the hypothesis that the primary demographic driver of Turtle Dove declines is a shortened breeding period, which has reduced the number of nesting attempts. This is thought to be driven by reduced food availability due to increased herbicide use, although analyses that test this directly are lacking. Note, however, that data do not permit analyses of variation in annual survival rates, but mortality both on the wintering grounds (due to habitat deterioration) and on migration (particularly through hunting) could be important.

Change factor	Primary driver	Secondary driver
Demographic	Reduced breeding success	
Ecological	Agricultural intensification	

Further information on causes of change

A four-year intensive field study in East Anglia provided good evidence that the role of breeding productivity in the decline of Turtle Doves is likely to be through a reduction in the average number of nesting attempts per pair (Browne & Aebischer 2005). Browne & Aebischer (2003, 2004, 2005) concluded that Turtle Doves today have a substantially earlier close to the breeding season and consequently produce fewer clutches and young per pair than they did in the 1960s. Reduced food availability due to increased herbicide use and efficacy may make birds more likely to cease breeding earlier than during the 1960s and reduce their number of nesting attempts (Browne & Aebischer 2001, 2002), although this was not specifically tested. Browne & Aebischer (2003) state that it may be a change in phenology of Turtle Doves and their food species which has resulted in reduced availability of food supplies, although they do not support this with any specific analyses of these two factors. Loss of quality and quantity of breeding habitat are also thought to contribute to declines. Browne et al. (2004) used long-term CBC data to provide good evidence that breeding density fell in proportion to loss of nesting, rather than feeding, habitat and that changes in Turtle Dove density were positively related to changes in the amount of hedgerow and woodland edge. Dunn & Morris (2012) suggest however that, although established scrub and large hedgerows were important in retaining Turtle Dove territories, it may be foraging habitat that is limiting their distribution. A small sample (15) of fledglings tracked using radio tags were found to remain close to the nest for the first three weeks, and select seed-rich habitats on foraging trips, and heavier birds were more likely to survive, suggesting nearby foraging habitat was important both pre- and post-fledging (Dunn et al. 2016). Recent research has also investigated customized management options which might provide foraging habitat for Turtle Doves (Dunnet al. 2015).

There is good evidence to suggest that the population decline experienced by Turtle Doves breeding in Britain is not due to lower success of individual nesting attempts. Analysis of nest record cards and ringing data for farmland Turtle Doves shows a non-significant increase in productivity per nesting attempt while annual survival has fallen (Siriwardena et al. 2000a, 2000b, Browne et al. 2005) so this may have also contributed to the decline. The demographic trends shown here support the view that nesting success per attempt is not the main driver of population change, with only a slight decrease in brood size being reported (see above).

Turtle Dove is a quarry species in many European countries and Vickery et al. (2014) estimate that 2-4 million Turtle Doves are shot annually in southern Europe. Hunting during migration has been cited as another possible cause of the UK decline, although there is little evidence to support this (Browne & Aebischer 2004). Ring-recovery sample sizes are small and there is only weak evidence suggesting a decrease in annual survival (Siriwardena et al. 2000b). Nevertheless, survival could also have been negatively affected by a reduction in the quality of wintering habitat: this is thought to have contributed to the decline (Marchant et al. 1990) and one recent study has demonstrated a positive correlation between survival rate among breeding adults in France and food supply in West Africa, as measured by cereal production (Eraud et al. 2009). Further work on the ecology of Turtle Doves on their wintering grounds is needed to investigate the relevance of this result for UK birds. Trichomonosis, a disease widespread since 2005 that reduces fitness and survival among pigeons and other birds, has been recently observed in Turtle Doves and might therefore be a new factor in its decline (Stockdale et al. 2015).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Cuckoo

Cuculus canorus

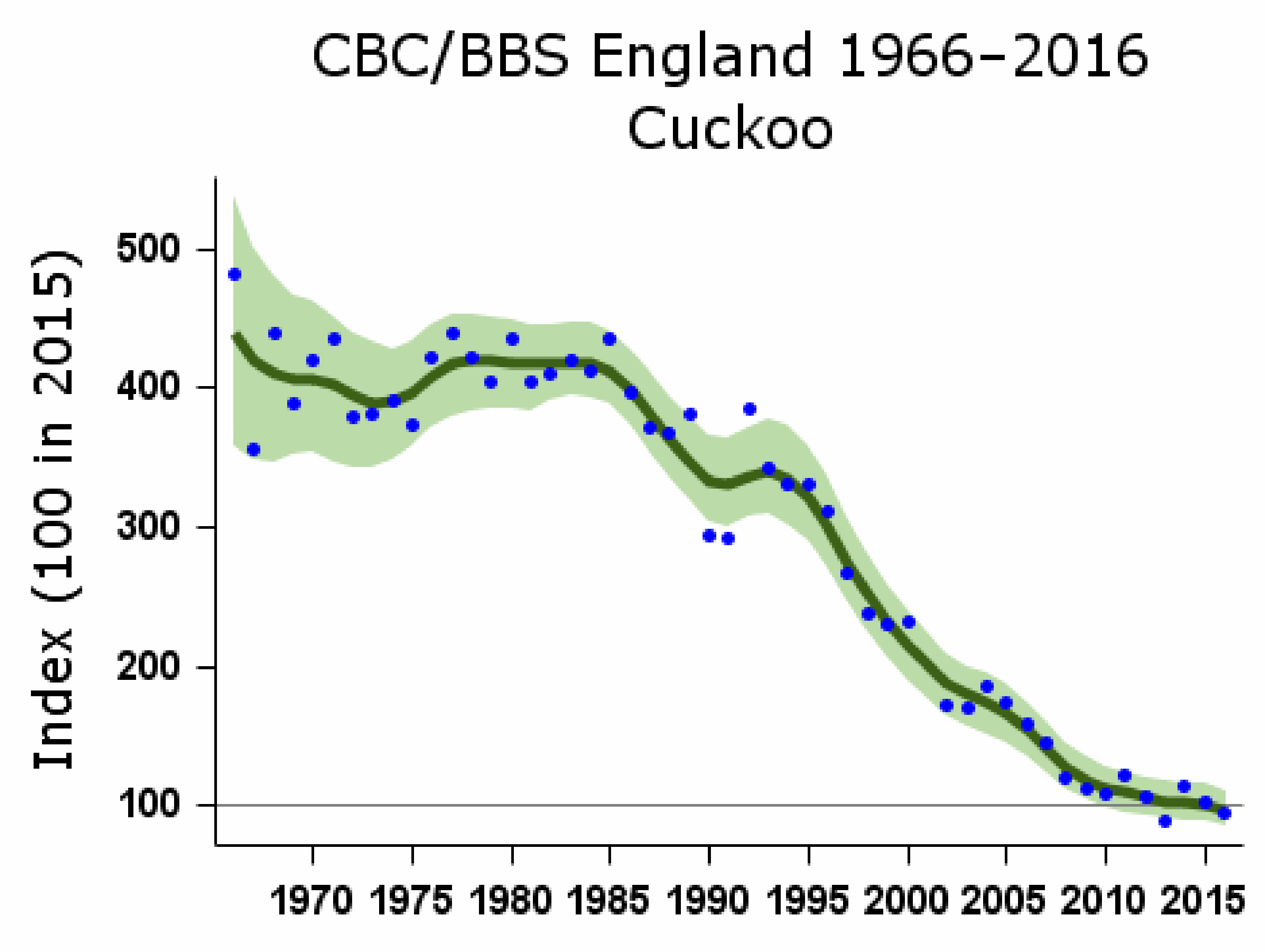
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	16,000 (9,000-24,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Host-specific
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The CBC/BBS trend shows Cuckoo abundance to have been in decline since the early 1980s. The species was moved in 2002 from the green to the amber list, and in the 2009 review met red-list criteria. The sensitivity of CBC to change in this species may have been relatively low, mainly because Cuckoo territories were typically larger than census plots (Marchant et al. 1990). BBS shows a continuing strong decline in England, but not in Scotland, where a shallow increase has occurred. In Wales, the species declined in the first 15 years of BBS but have increased over the most recent five year period. The BBS Newson et al. 2009). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



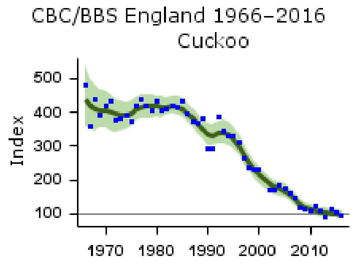
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

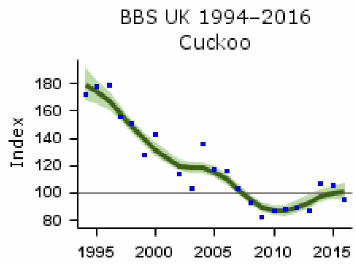
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	307	-76	-82	-66	>50	
	25	1990-2015	498	-70	-74	-66	>50	
	10	2005-2015	525	-40	-44	-34	>25	
	5	2010-2015	479	-11	-16	-4		
BBS UK	20	1995-2015	711	-43	-48	-36	>25	
	10	2005-2015	700	-14	-20	-7		
	5	2010-2015	657	15	8	22		
BBS England	20	1995-2015	551	-69	-72	-66	>50	
	10	2005-2015	525	-40	-44	-34	>25	
	5	2010-2015	479	-11	-17	-4		
BBS Scotland	20	1995-2015	79	33	10	64		
	10	2005-2015	90	17	1	30		
	5	2010-2015	88	42	27	59		
BBS Wales	20	1995-2015	61	-16	-36	3		
	10	2005-2015	65	15	-6	40		
	5	2010-2015	72	27	7	55		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

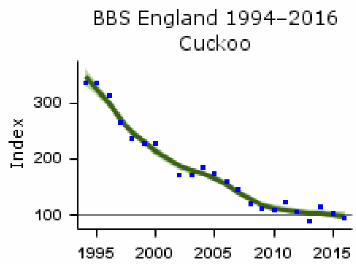
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



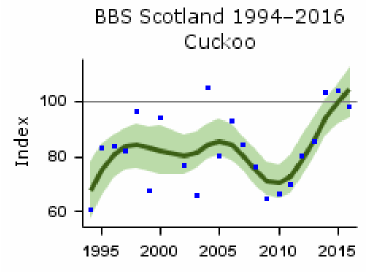
CBC/BBS England graph



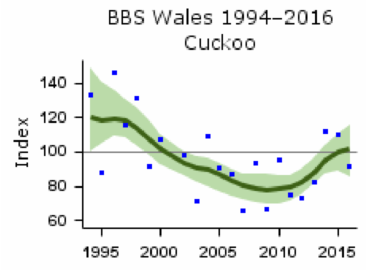
BBS UK graph



BBS England graph

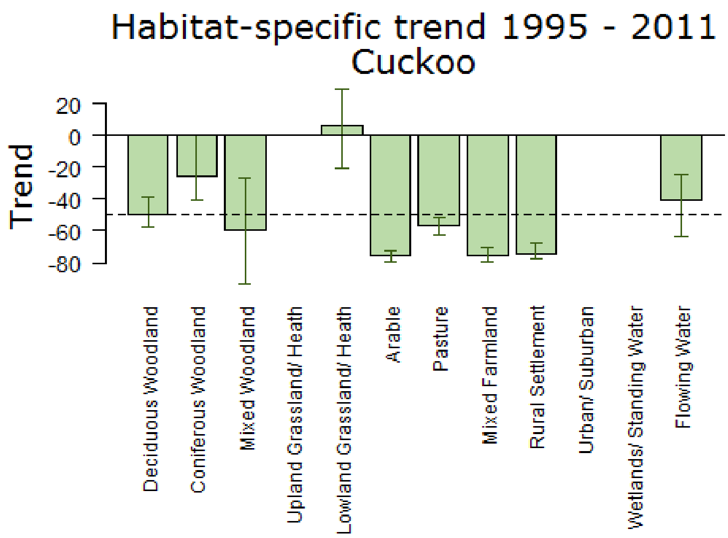


BBS Scotland graph



BBS Wales graph

Population trends by habitat



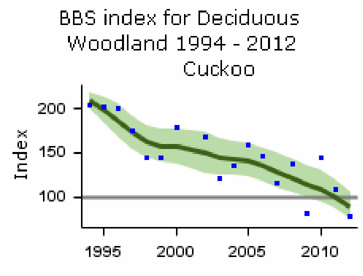
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

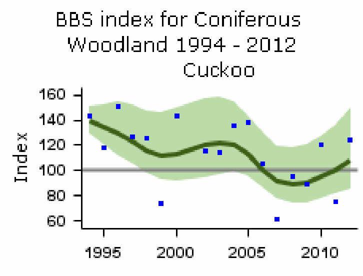
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	130	-49	-57	-39
Coniferous Woodland	16	1995-2011	52	-26	-41	0
Mixed Woodland	16	1995-2011	65	-60	-93	-27
Lowland Grassland/ Heath	16	1995-2011	58	6	-21	29
Arable	16	1995-2011	148	-76	-79	-72
Pasture	16	1995-2011	242	-57	-63	-51
Mixed Farmland	16	1995-2011	109	-75	-80	-71
Rural Settlement	16	1995-2011	113	-74	-78	-68
Flowing Water	16	1995-2011	79	-40	-63	-24

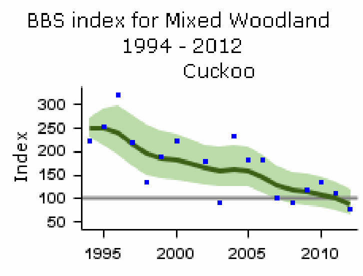
Further information on habitat-specific trends, please follow link here.



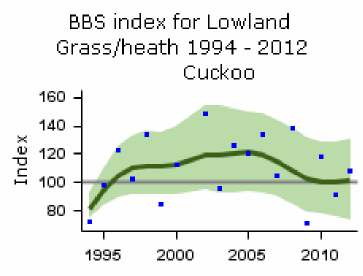
Habitat graph



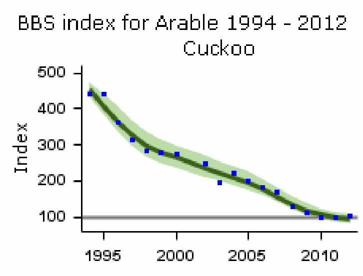
Habitat graph



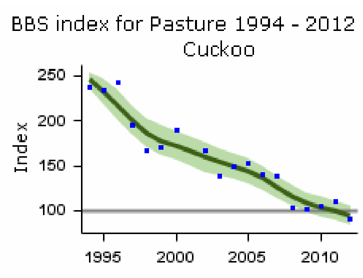
Habitat graph



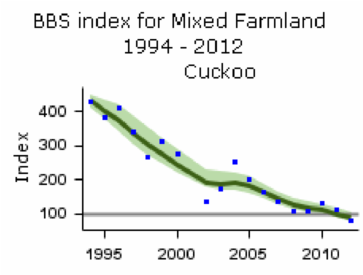
Habitat graph



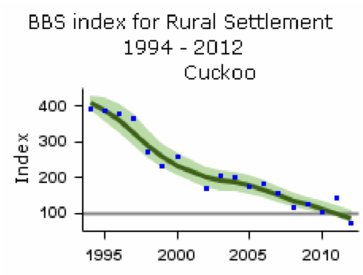
Habitat graph



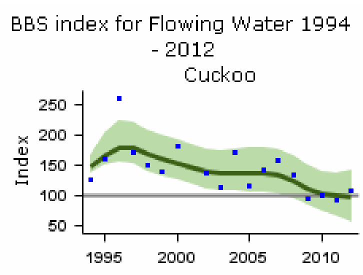
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Nest failure rate at egg stage	48	1967-2015	14	Linear decline	6.94% nests/day	2.63% nests/day	-62.1%		Small sample
Nest failure rate at chick stage	48	1967-2015	16	Curvilinear	2.63% nests/day	2.75% nests/day	4.6%		Small sample
Laying date	48	1967-2015	18	Linear decline	Jun 10	Jun 3	-7 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Causes of change

Recent tracking work suggests that reduced survival on migration could be a primary driver of population decline in Cuckoos. However, this may not be the only driver and a number of other hypotheses have been proposed.

Change factor	Primary driver	Secondary driver
Demographic	Reduced survival on migration	
Ecological	Unknown	

Further information on causes of change

Recent tracking work from nine tagging locations across the UK has identified that Cuckoos nesting in the UK use two distinct routes to reach the same wintering grounds, and identified a strong correlation between population trends in each area and the proportion of Cuckoos following each migration route. This suggests that recent problems on the western migration route through Spain may have contributed to the population decline (Hewson et al. 2016). Decreased food supplies on the breeding grounds has also been suggested as a possible cause (Glue 2006, Denerley 2014), following the rapid declines of many British moth species (Conrad et al. 2006), important prey items in Cuckoo diet. Given that the Cuckoo is a migrant, and the fact that many long-distance migrants have been found to be declining (Sanderson et al. 2006, Hewson & Noble 2009), factors operating on wintering grounds have also been suggested as a possible primary driver of Cuckoo declines (Glue 2006, Payevsky 2006, Newson et al. 2009). However, as trends differ across the UK, the fact that the tracking work (Hewsonet al. 2016) found that all Cuckoos used the same wintering grounds suggests that over-winter factors can be discounted.

Cuckoo abundance may be related to their breeding success, which might in turn be determined by the abundance of breeding success of host species. Evidence from BBS data show strong variation in Cuckoo population trends between habitats, which may reflect regional differences in the main hosts and differing trends in Cuckoo breeding success among those host species (Newson et al. 2009). Douglas et al. (2010b) found a strong positive correlation between change in Cuckoo numbers and numbers of Brooke & Davies 1987) but the authors also thought that this was unlikely to be the main cause of population decline. There has perhaps been a disproportionate emphasis on the role of brood parasitism aspects in Cuckoo decline.

Another hypothesis for the decline of Cuckoos relates to phenological mismatch in the timing of host and Cuckoo breeding. There is evidence relating to climate-induced changes in phenology, although the extent to which this may be driving population declines is unclear. Newson et al. (2016) found that Cuckoo had not changed its arrival date between the 1960s and the 2000s (the date advance slightly by c.3 days but this change was not significant). Douglaset al. (2010b) used BBS data and found that in recent decades, earlier breeding Douglas et al. 2010b). In Europe, other recent studies have suggested that climate change might disrupt the association between the life cycles of the Cuckoo and its short-distance migrant hosts and they state that this mismatch may contribute to the decline in Cuckoo (Saino et al. 2009, Moller et al. 2011). Thus, evidence at European scale at least is equivocal.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Barn Owl

Tyto alba

Key facts

Conservation listings:	Global: green; former RBBP species
Long-term trend:	UK: possible decline
Population size:	4,000 (3,000-5,000) pairs in 1995-97 (APEP13: Toms et al. 2001)

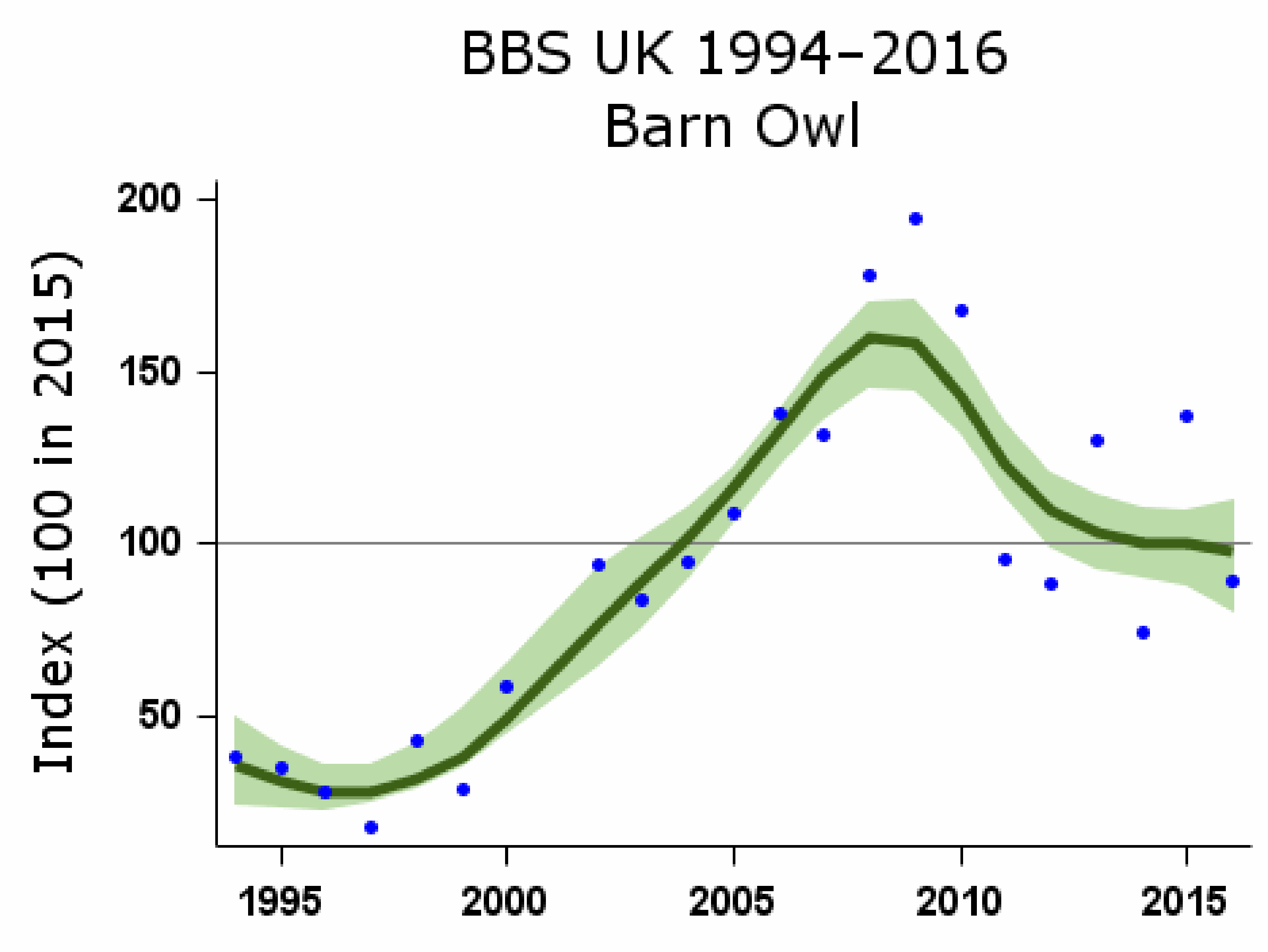
Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

An early population estimate for 1932 of 12,000 breeding pairs in England and Wales concluded that there had been substantial decline over the previous 30-40 years (Blaker 1933, 1934). Decline continued through the 1950s and 1960s (Prestt 1965, Parslow 1973). The 1968-72 Atlas suggested a population of 4,500-9,000 pairs (Sharrock 1976) and the 1988-91 Atlas estimated a 37% loss of occupied 10-km squares in Britain since then (Gibbons et al. 1993). Project Barn Owl, organised jointly by BTO and Hawk and Owl Trust and carried out during 1995-97, estimated 4,000 pairs in the UK, Isle of Man and Channel Islands (Toms 1997, Toms et al. 2000, 2001). The potential for breeding numbers to double or halve over periods as short as 3-4 years, due to the cycles of vole abundance (Taylor et al. 1988), and to crash following severe winters (Altwegg et al. 2006), hampers the interpretation of such studies. The lack of detailed demographic data for this species was addressed by the BTO's Dadam et al. 2011).

Numbers of Barn Owls recorded via BBS have increased strongly since 1995 and reached a peak around 2009. As BBS is a diurnal survey, the detectability of primarily nocturnal species is low and could be influenced quite markedly by changes in behaviour: thus the trends should be interpreted with extra care. The number of nest records for Barn Owl has also increased rapidly over the same period, strengthening the evidence that a national population increase has indeed occurred since Project Barn Owl in 1995-97. There is likely to be some regional variation in population trends, however. RBBP provide a county breakdown of 2005 nesting totals Holling & RBBP 2008).

Though previously amber listed through its loss of UK range, the species was moved to the UK green list in 2015 (Eaton et al. 2015). Data from the BTO Nest Record Scheme show a large reduction in nest failures and an increase in fledglings per breeding attempt.



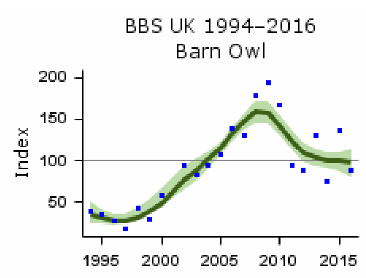
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

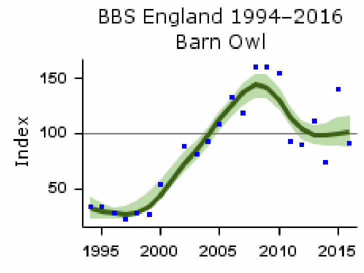
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	50	217	128	350		
	10	2005-2015	72	-14	-28	2		
	5	2010-2015	65	-30	-44	-20	>25	
BBS England	20	1995-2015	48	238	159	400		
	10	2005-2015	70	-11	-22	9		
	5	2010-2015	64	-23	-36	-9		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

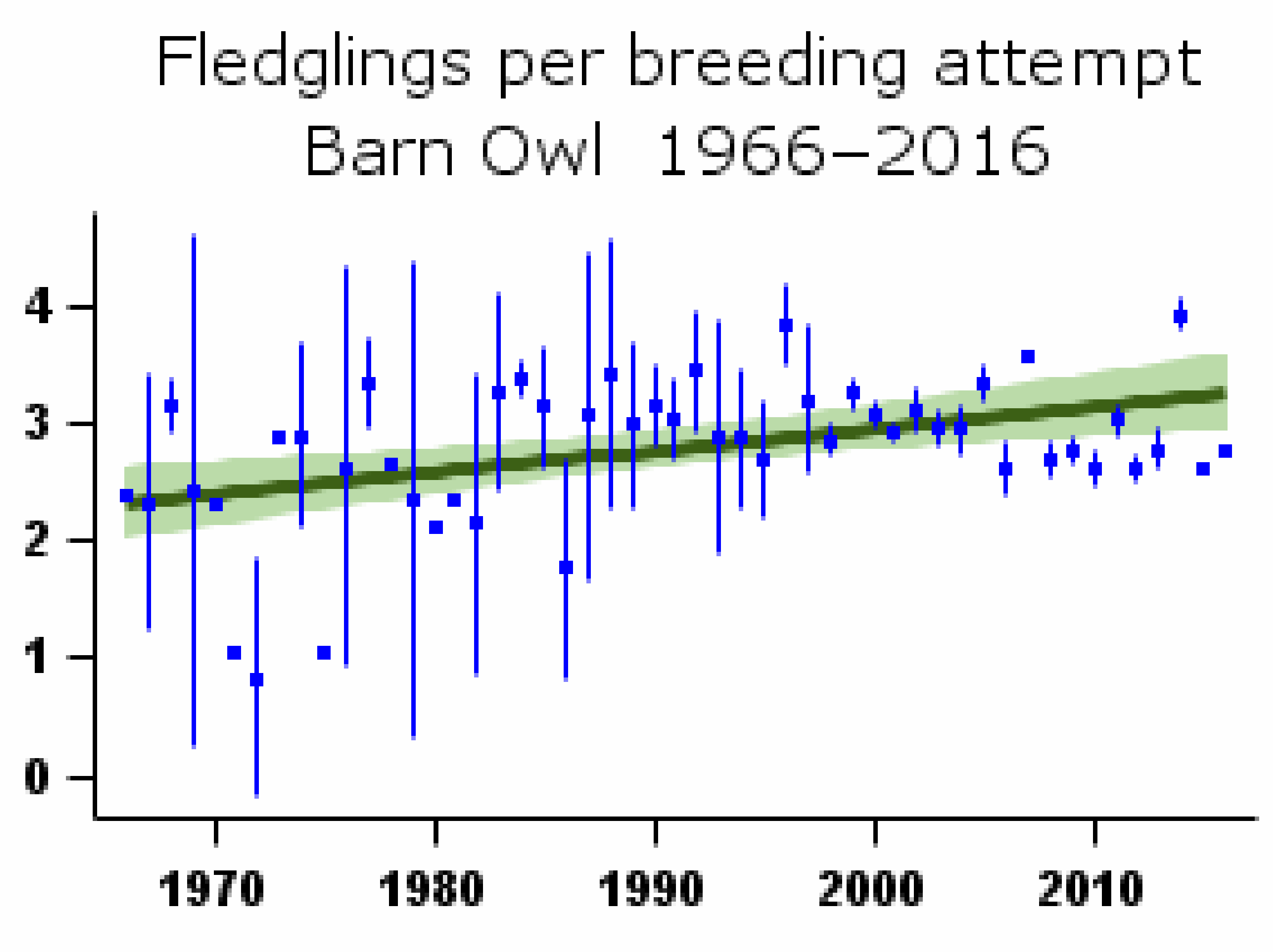


BBS UK graph

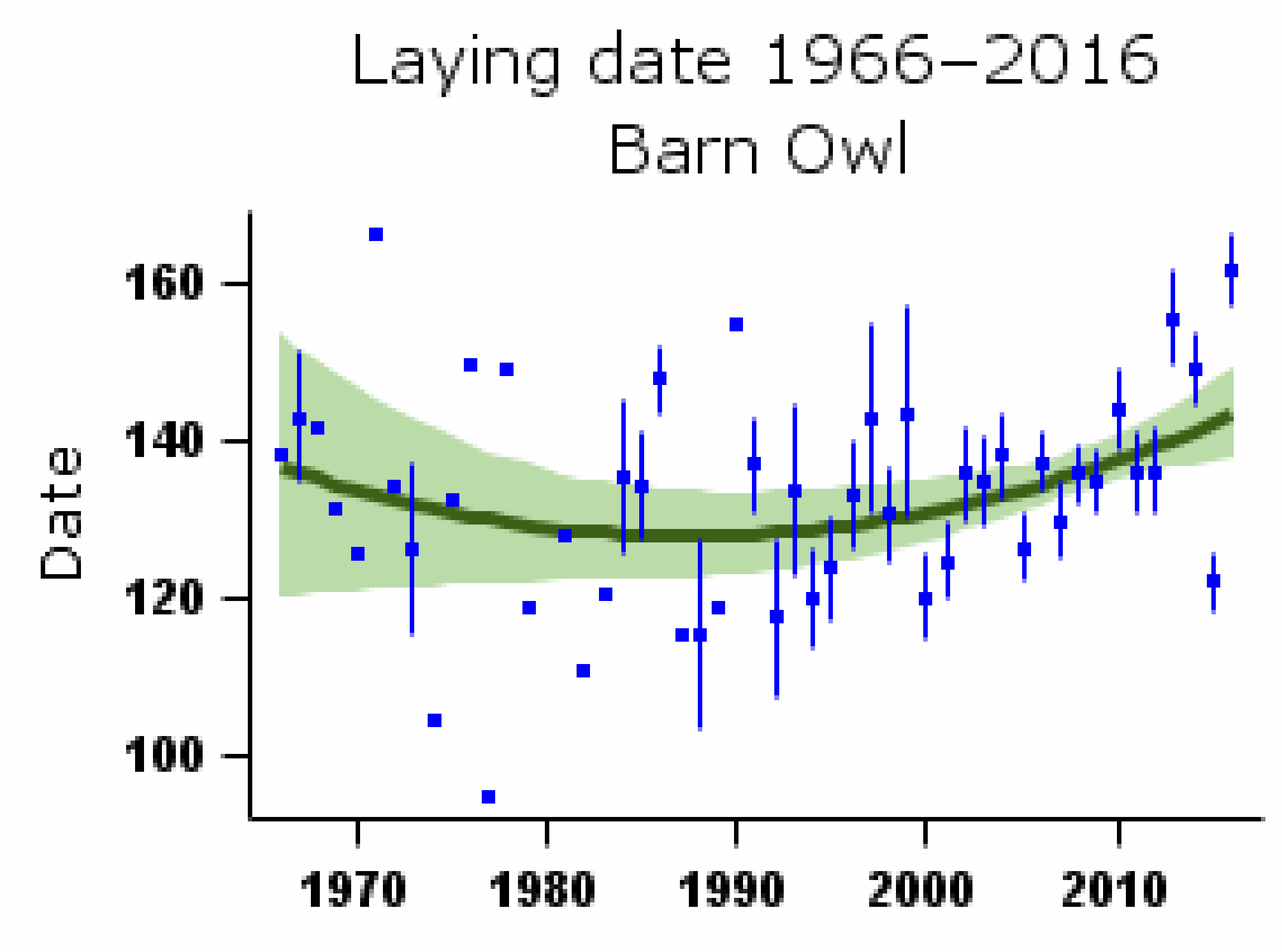


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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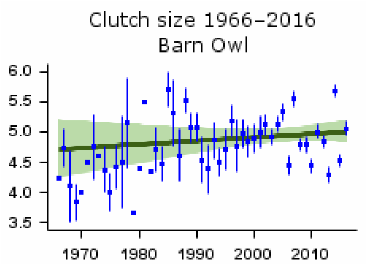
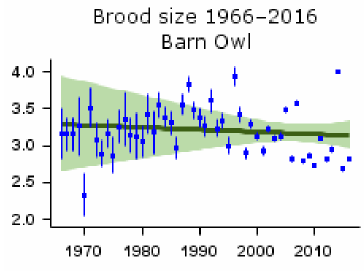
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	35	Linear increase	2.34 fledglings	3.25 fledglings	38.7%		
Clutch size	48	1967-2015	52	None					
Brood size	48	1967-2015	467	None					
Nest failure rate at egg stage	48	1967-2015	35	Linear decline	0.81% nests/day	0.04% nests/day	-95.1%		
Nest failure rate at chick stage	48	1967-2015	164	Curvilinear	0.34% nests/day	0.03% nests/day	-91.2%		
Laying date	48	1967-2015	22	Curvilinear	May 16	May 22	6 days		Small sample

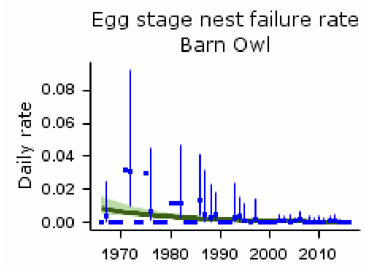
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



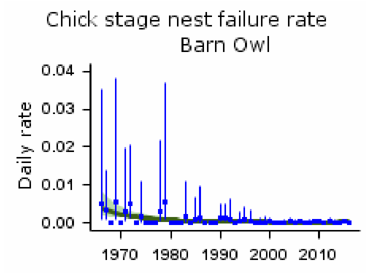
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



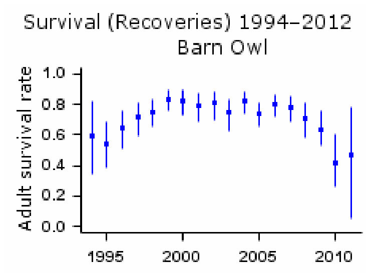
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Causes of change

The use of toxic farm chemicals, loss of hunting habitat, increased disturbance, hard winters and the increase in traffic collisions have all been suggested as possible reasons for decline, but clear evidence is lacking. The upturn over recent decades has been aided by conservation measures including the widespread erection of nestboxes.

Change factor	Primary driver	Secondary driver
Demographic	Overwinter survival	
Ecological	Other	

Further information on causes of change

Decline during the 1950s and 1960s was probably associated with use of toxic farm chemicals (especially organochlorine seed dressings), but also loss of hunting habitat, increased disturbance and the hard winters of 1946/47 and 1962/63 (Dobinson & Richards 1964, Percival 1990).

Causes of mortality potentially linked to the species' further decline include poisoning (Shawyer 1985) and collision with road traffic (Bourquin 1983, Massemin & Zorn 1998, Shawyer & Dixon 1999). Barn Owls are vulnerable to secondary poisoning from ingesting rodents killed by 'second-generation' rodenticides, which are used to control warfarin-resistant brown rats Rattus norvegicus (Shawyer 1985, 1987, Harrison 1990). Toxicological studies found that a small proportion of dead Barn Owls contained potentially lethal doses of rodenticide (Newton et al. 1991; Newton & Wyllie 1992a). There is no clear evidence, however, that links either poisoning or traffic collisions to population changes.

More recently, the erection of Barn Owl nestboxes, already numbering c. 25,000 by the mid 1990s, may have enabled the species to occupy areas (notably the Fens) that were previously devoid of nesting sites, and may have been a factor in improving nesting success (Dadam et al. 2011). In earlier decades, the plight of such a charismatic and popular bird led to extensive releasing of captive-bred birds in unguided attempts at restocking: by 1992, when licensing became a requirement for such schemes, it was estimated that between 2,000 and 3,000 birds were being released annually by about 600 operators, although many birds died quickly and never joined the nesting population (Balmer et al. 2000). There is some evidence, however, that releases might have aided population recovery (Meek et al. 2003).

The Barn Owl is a specialist predator of small mammals, in particular voles, mice, shrews and small rats (Shawyer 1998), but frogs and small birds are also taken (Bunn et al. 1982). The field vole *Microtus agrestis*, the most important prey of Barn Owls in mainland Britain (Glue 1974), favours grassy cover and a thick litter layer (Hansson 1977). In the UK, positive relationships were found between abundance of small mammals and sward height (Askew et al. 2007), whilst other authors have found a positive correlation between bank voles *Clethrionomys glareolus* and the width of grassy field margins (Shore et al. 2005). In Switzerland a similar result was found between unmown wildflower and herbaceous strips and densities of small mammals Aschwanden et al. (2007). Foraging of Barn Owl in an arable landscape is largely restricted to uncultivated or ungrazed field margins (Andries et al. 1994, Tome & Valkama 2001). It has been estimated that Barn Owls breeding in arable landscapes need about 35 km of rough grass margins, 4-6 m wide, within 2 km of the nest sites for the population to remain stable (Askew 2006).

Variation in adult survival contributes most to annual population changes (Robinson et al. 2014). Barn Owls experience reduced hunting opportunities in snowy or wet weather (Shawyer 1987). The recent downturn, after two decades of positive trend, may have resulted from a series of cold winters, during which higher-than-average numbers of individuals were reported dead (Clark 2011, Demog Blog). Poor hunting conditions in spring and summer may decrease adult or chick survival or reduce adult body condition, with associated lower investment in reproduction or, in some cases, the suspension of breeding (Shawyer 1987). Vegetation growth may also be affected by cold weather, with implications for the abundance or availability of small mammal prey (Shawyer 1987, Clark 2011).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Little Owl

Athene noctua

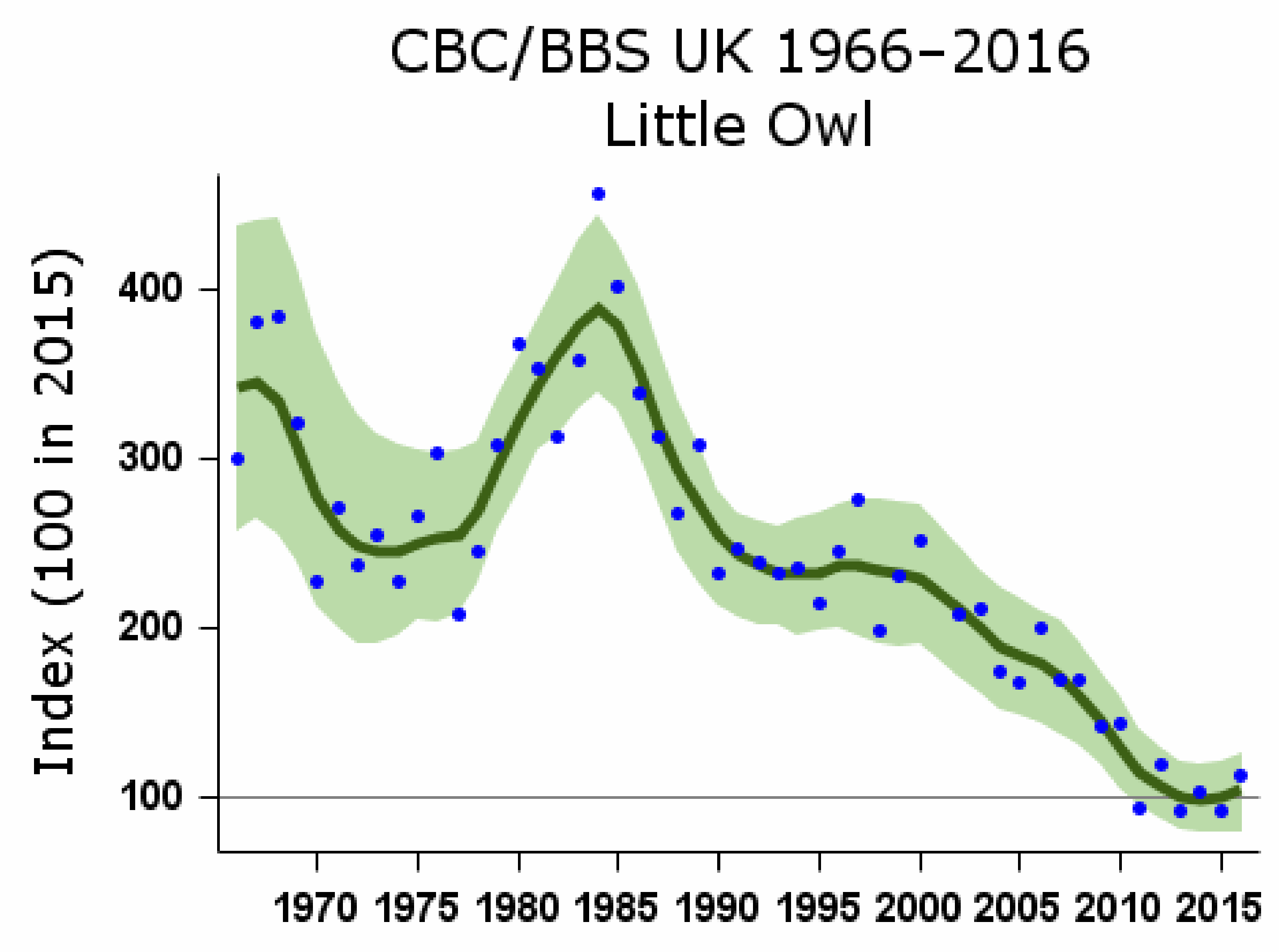
Key facts

Conservation listings:	Global: Least Concern Europe: Least Concern UK: unlisted (introduced)
Long-term trend:	UK, England: rapid decline
Population size:	5,700 (3,700-7,700) pairs in 2009 (distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The CBC/BBS trend for Little Owl in the UK shows very wide variation, but a downturn in recent decades suggests that a rapid decline now lies behind the observed fluctuations. Trends are unusually uncertain, however, because the species has large breeding territories and, being largely inactive during the day, is difficult to detect except by dedicated surveys. A figure of c. 7,000 pairs from the BTO/Hawk & Owl Trust's Project Barn Owl (Toms et al. 2000) was the first replicable population estimate for Little Owls in the UK. An independent BBS estimate is for c5,700 pairs in 2009, since when substantial further decrease has occurred.



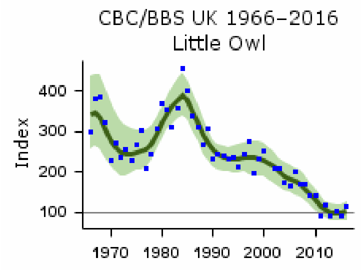
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

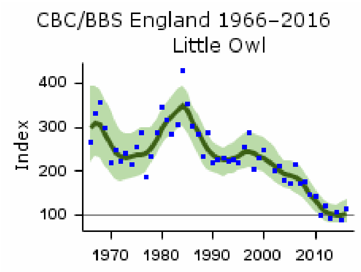
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	61	-71	-82	-53	>50	
	25	1990-2015	91	-61	-70	-50	>50	
	10	2005-2015	96	-45	-53	-36	>25	
	5	2010-2015	81	-22	-36	-6		
CBC/BBS England	48	1967-2015	59	-68	-79	-44	>50	
	25	1990-2015	88	-58	-67	-41	>50	
	10	2005-2015	94	-47	-56	-36	>25	
	5	2010-2015	78	-24	-37	-7		
BBS UK	20	1995-2015	96	-57	-66	-46	>50	
	10	2005-2015	96	-45	-55	-35	>25	
	5	2010-2015	81	-22	-36	-9		
BBS England	20	1995-2015	93	-57	-65	-47	>50	
	10	2005-2015	94	-47	-56	-38	>25	
	5	2010-2015	78	-24	-37	-10		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

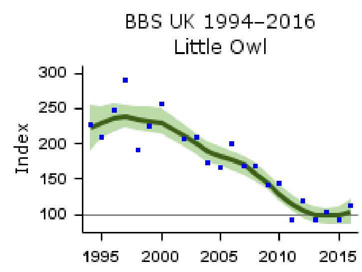
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



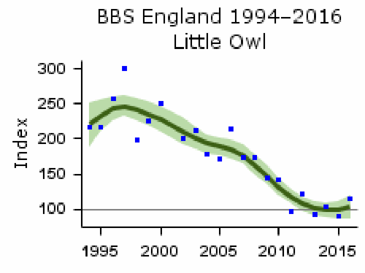
CBC/BBS UK graph



CBC/BBS England graph

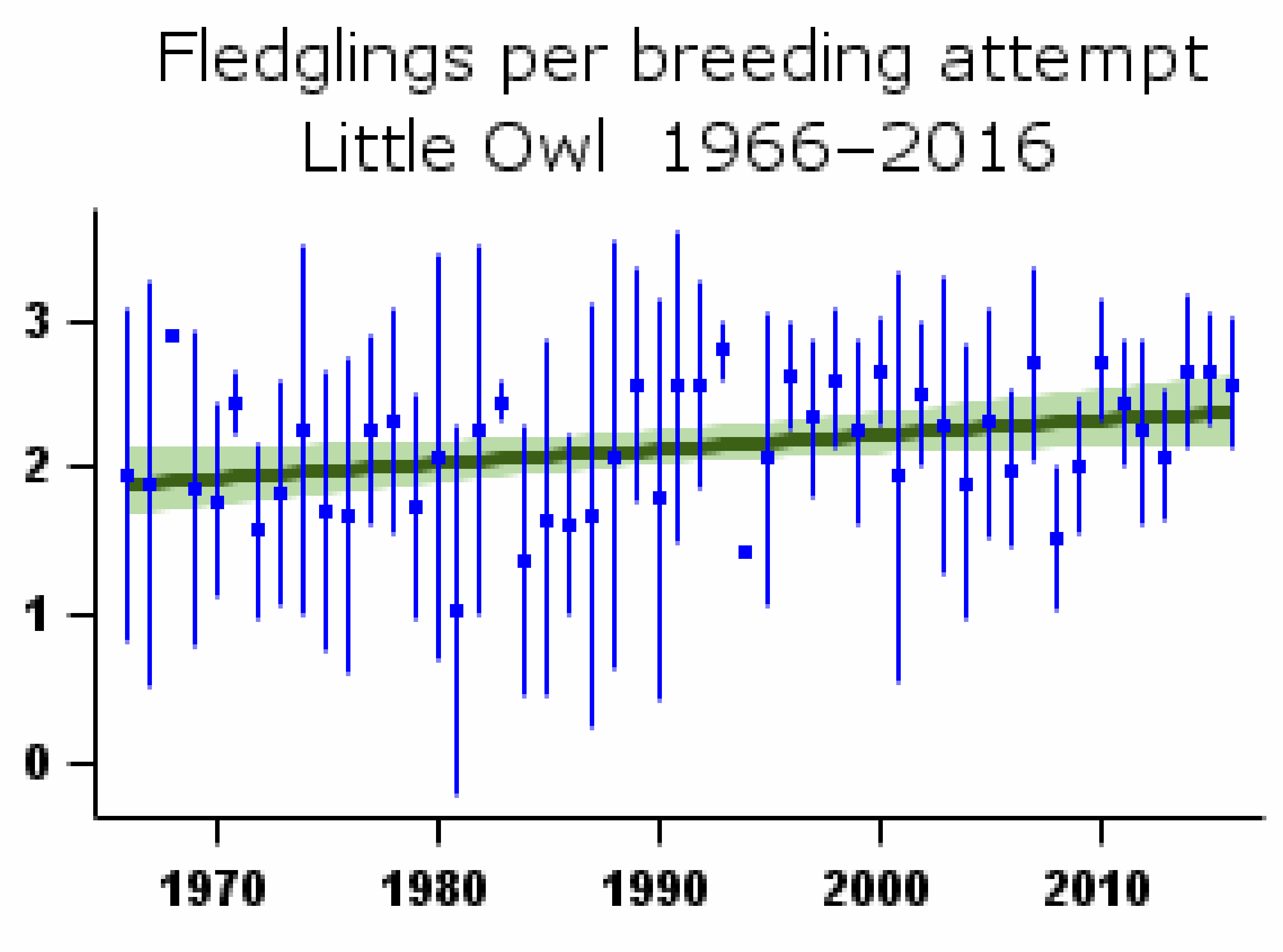


BBS UK graph

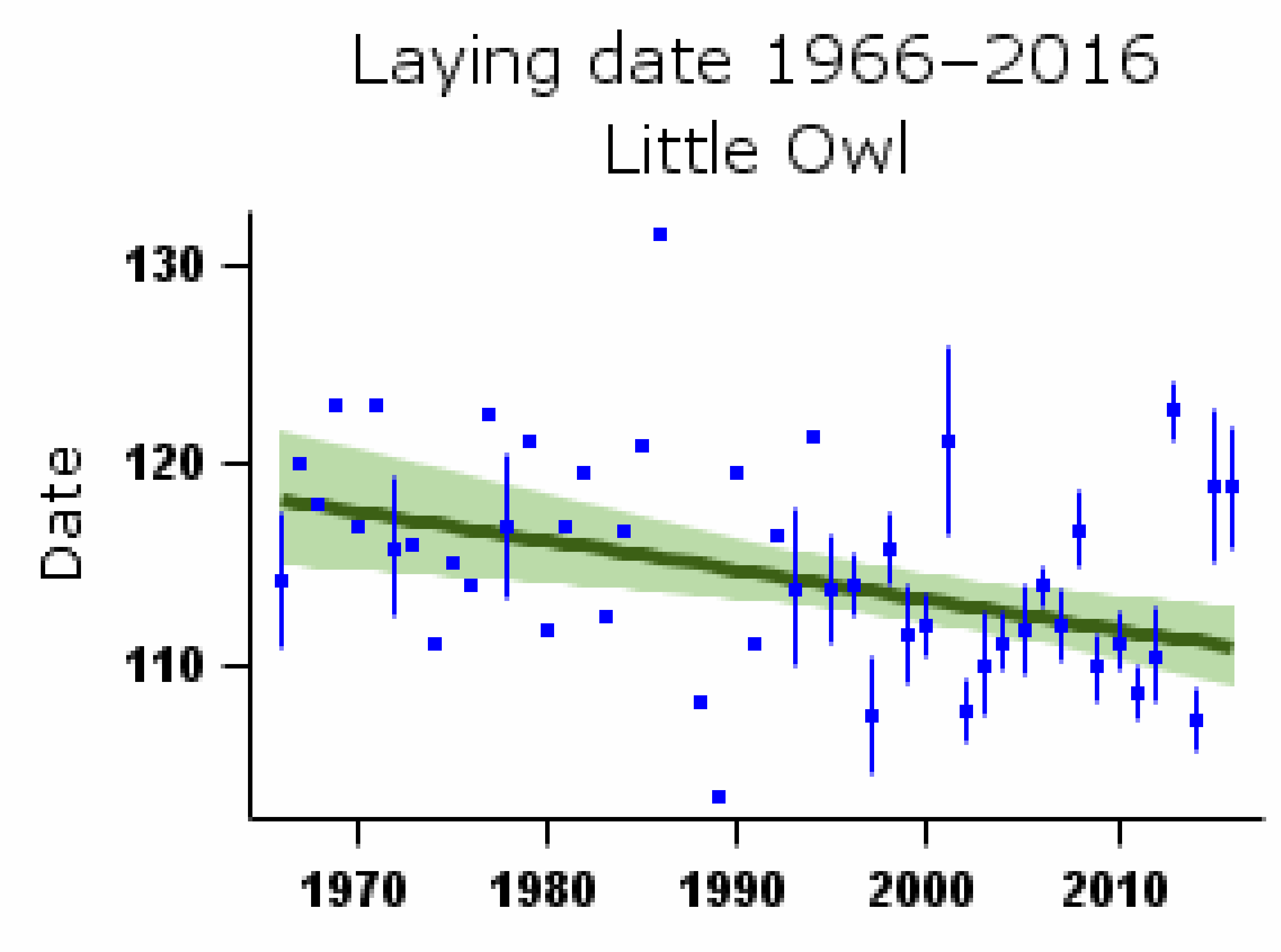


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

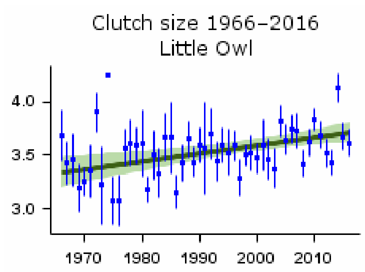


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

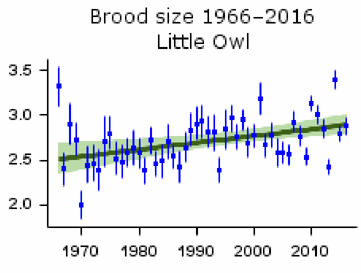
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	19	Linear increase	1.90 fledglings	2.37 fledglings	24.7%		
Clutch size	48	1967-2015	25	Linear increase	3.35 eggs	3.70 eggs	10.6%		Small sample
Brood size	48	1967-2015	53	Linear increase	2.52 chicks	2.89 chicks	14.7%		
Nest failure rate at egg stage	48	1967-2015	20	None					Small sample
Nest failure rate at chick stage	48	1967-2015	24	None					Small sample
Laying date	48	1967-2015	8	Linear decline	Apr 28	Apr 21	-7 days		Small sample

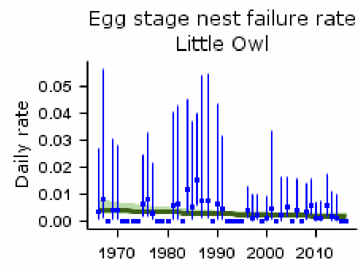
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



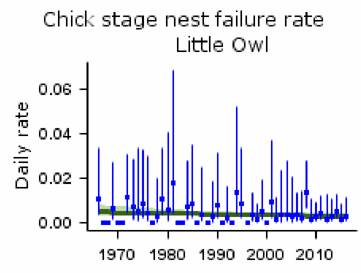
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



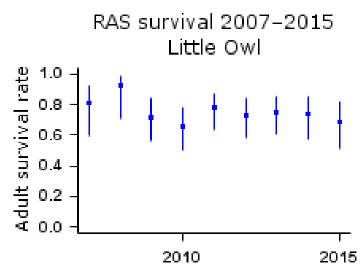
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

There is little evidence available from the UK but studies from Europe suggest that the main demographic driver of declines in Little Owl is falling rates of juvenile survival. Circumstantial evidence suggests that this may be occurring due to loss of habitat and changes in farming practices.

Change factor	Primary driver	Secondary driver
Demographic	Decreased juvenile survival	
Ecological	Agricultural intensification	

Further information on causes of change

Demographic trends, although based on a low sample size as few records are available, suggest that the decline is unlikely to be linked to failed nesting attempts, as all measures are unchanged or have increased, including the number of fledglings per breeding attempt (see above). There is very little evidence available from the UK regarding causes of the population decline. However, evidence from mainland Europe suggests that population changes are driven mainly by changes in survival. Le Gouar et al. (2011) analysed 35 years of ringing data from the Netherlands and found that juvenile survival rates decreased with time and that years when the population declined were associated with low juvenile survival. More than 60% of the variation in juvenile survival was explained by the increase in road traffic intensity or in average spring temperature. However, they state that these correlations reflect a gradual decrease in juvenile survival coinciding with long-term global change, rather than direct causal effects. The regular occurrence of years with poor adult survival (dry, cold years) was also important. In north-eastern France, Letty et al. (2001) also found that population dynamics were highly sensitive to adult and first-year survival and, in Switzerland and Southern Germany, Schaub et al. (2006) reported that variation of adult survival contributed most to variation of population growth rate while variation in fecundity contributed least. Thus, evidence from Europe at least suggests that changes in populations of Little Owl are largely due to changes outside of the breeding season (although note that survival can also be affected by breeding-season conditions).

However, in Denmark, Thorup et al. (2010) found, in a declining population, that first-year annual survival rates were much lower than values previously reported, but also that the mean number of fledglings per pair had declined. Measures of reproductive success were higher closer to important foraging habitats and were positively correlated with the amount of seasonally changing land cover (mostly farmland) around nests, as well as temperatures before and during the breeding season. Experimental food supplementation to breeding pairs increased the proportion of eggs that produced fledged chicks, suggesting that the main reason for the ongoing population decline is reduced productivity induced by energetic constraints after egg-laying.

In terms of ecological drivers, in Poland, there is anecdotal evidence that changes in the agricultural landscape associated with disappearance of traditional farming and management of grassland habitats were the main factors in the long-term population decline (Salek & Schropfer 2008). Zmihorski et al. (2006) concluded that the reduction in nesting sites and decreased food availability were the potential factors behind the Polish decline, although this evidence was circumstantial. In southern Germany, clutch size was affected by the availability of resources close to the nest site, and fledgling condition was negatively correlated with the size of the home range, suggesting the population is resource limited and that decreases in field and landscape heterogeneity may have reduced productivity (Michel et al. 2017). Evidence from Spain has also suggested that habitat loss has played a role in population declines, due to increasing urbanisation (Martinez & Zuberogoitia 2004) and in Denmark the extent of contraction of Little Owl distribution varied across the country and local disappearance was associated with reduced areas of agricultural land (Thorup et al. 2010).

It is possible that some of the drivers identified in Europe may also be affecting the UK population, although this is not necessarily the case and, as mentioned above, evidence from the UK is sparse.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Tawny Owl

Strix aluco

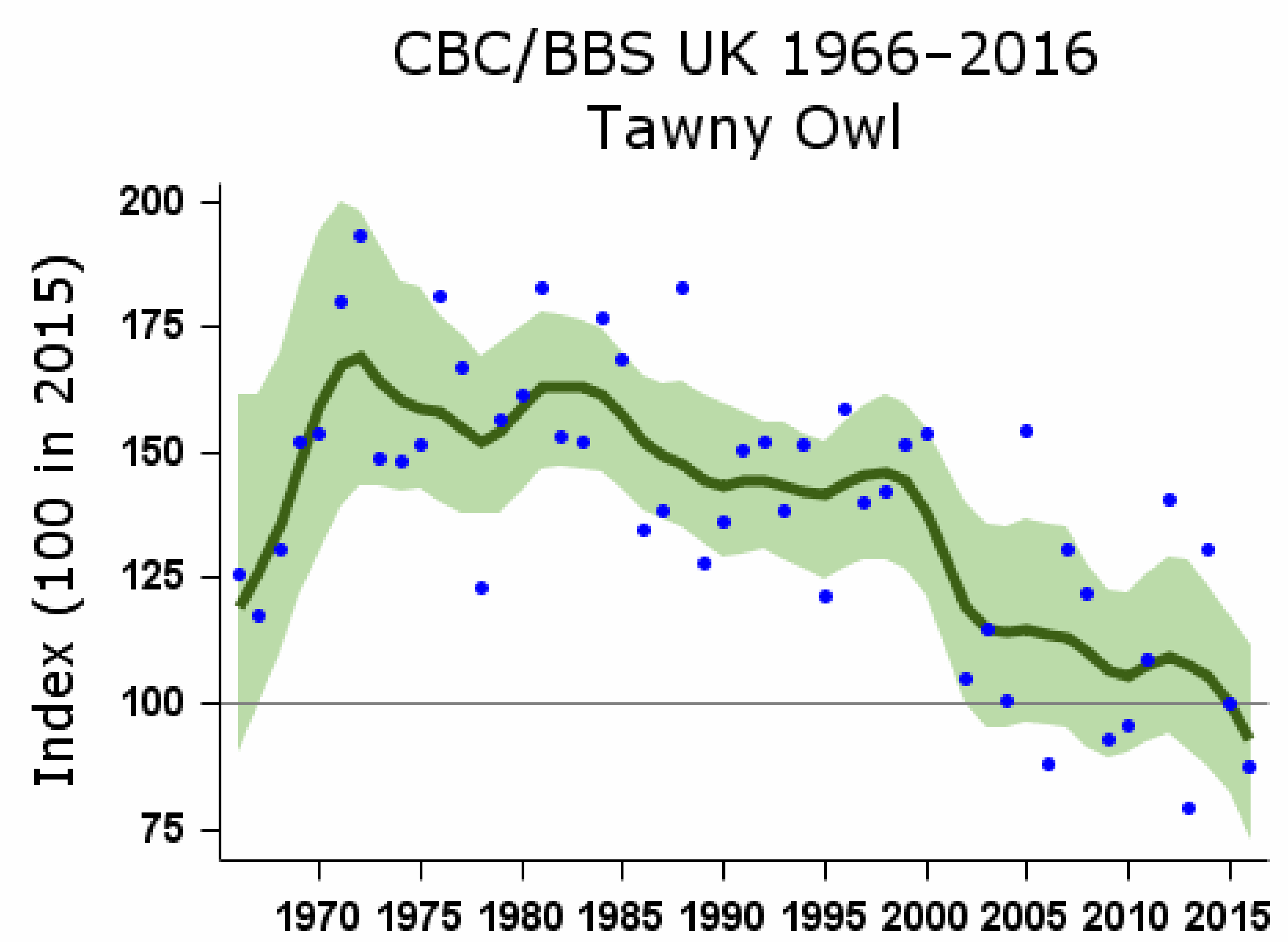
Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK, England: shallow decline
Population size:	50,000 pairs in 2005 (APEP13: Freeman et al. 2007a)

Status summary

As a nocturnal species, Tawny Owl is covered relatively poorly by the BTO's monitoring schemes. The pattern shown by CBC/BBS is a relatively stable one, however, in keeping with the longevity, sedentary behaviour, and slow breeding rate of this species. There has been a shallow downward trend in the index since the early 1970s. Gibbons et al. (1993) found evidence for a contraction of the species' UK range between the first two atlas periods, though these losses are now largely reversed (Balmer et al. 2013). Nevertheless, the downward drift of the UK population index has continued and, accordingly, the species moved from green to being amber listed in the latest review (Eaton et al. 2015).

The substantial improvements in nest success during the c.29-day egg stage could be linked to the declining impact of organochlorine pesticides, which were banned in the early 1960s. The numbers of fledglings per breeding attempt have increased steeply. Special post-breeding surveys of this species were conducted in autumn 2005 (Freeman et al. 2007a), following methodology established by an earlier survey in 1989 (Percival 1990). Integrated population modelling shows that all stages of the life cycle, including elements of both productivity and survival, make appreciable contributions to annual population change (Robinson et al. 2014). In Kielder Forest, vole numbers began fluctuating with a lower amplitude in the mid 1990s: the loss of productivity in years when voles are abundant may ultimately drive the Tawny Owl population there towards extinction (Millon et al. 2014).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

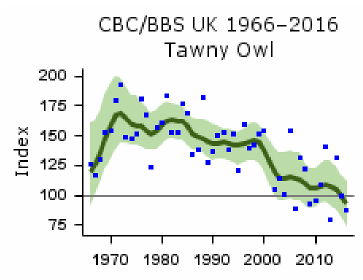
Population changes in detail

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

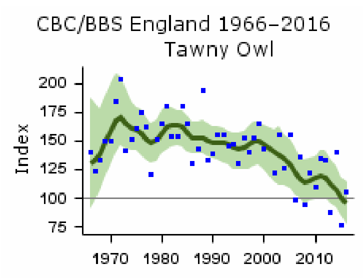
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	82	-21	-49	16		
	25	1990-2015	103	-30	-46	-12	>25	
	10	2005-2015	108	-13	-29	10		
	5	2010-2015	109	-5	-19	14		
CBC/BBS England	48	1967-2015	70	-25	-56	19		
	25	1990-2015	89	-33	-46	-15	>25	
	10	2005-2015	94	-22	-33	-7		
	5	2010-2015	95	-15	-25	-1		
BBS UK	20	1995-2015	95	-28	-42	-12	>25	Nocturnal species
	10	2005-2015	108	-13	-29	6		Nocturnal species
	5	2010-2015	109	-6	-19	10		Nocturnal species
BBS England	20	1995-2015	82	-29	-41	-10	>25	Nocturnal species
	10	2005-2015	94	-22	-33	-6		Nocturnal species
	5	2010-2015	95	-15	-25	2		Nocturnal species

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

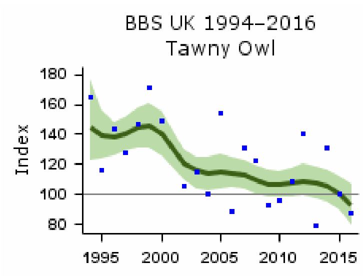
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



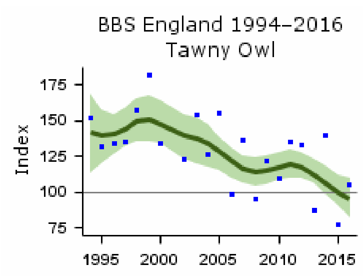
CBC/BBS UK graph



CBC/BBS England graph

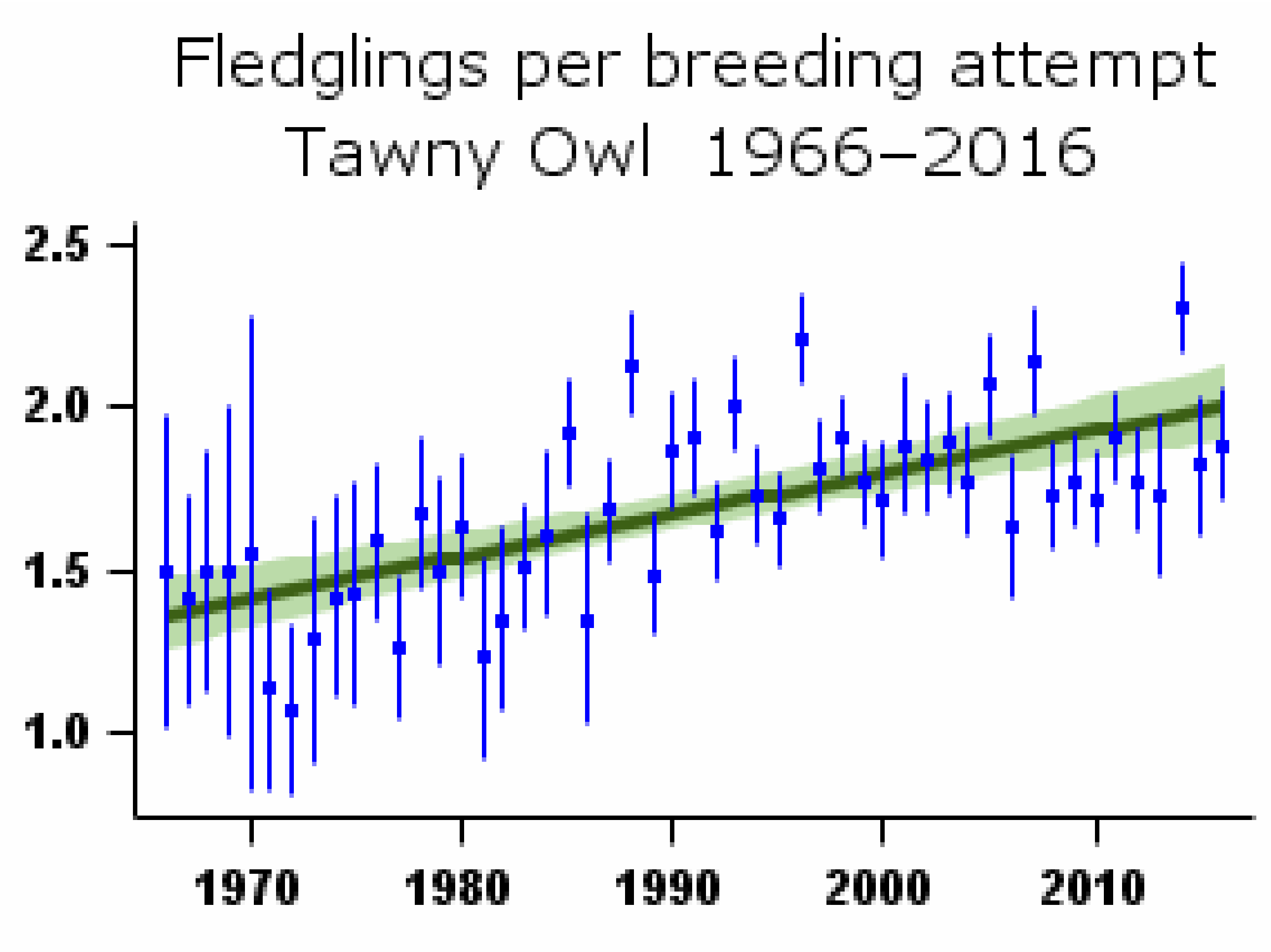


BBS UK graph

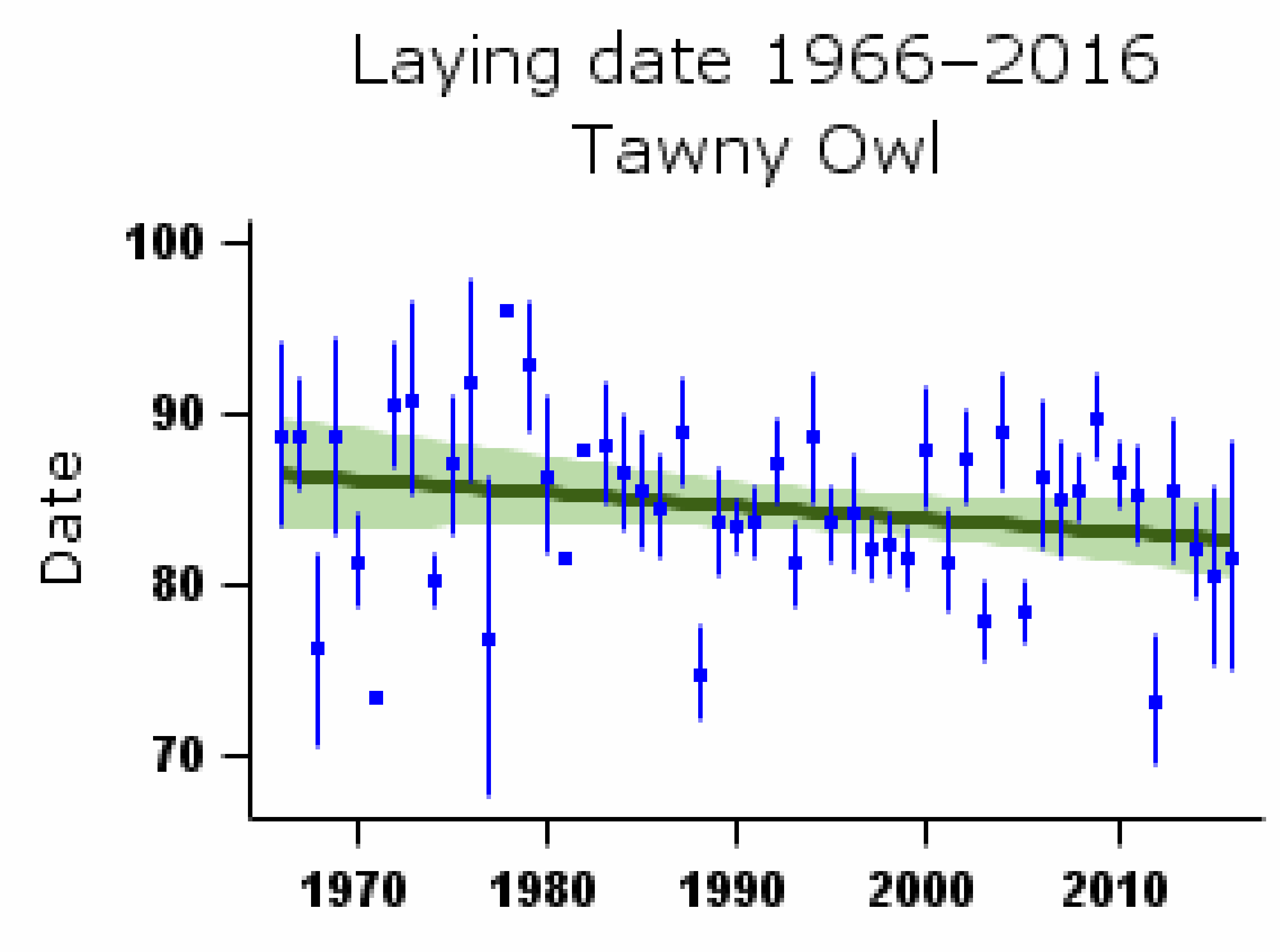


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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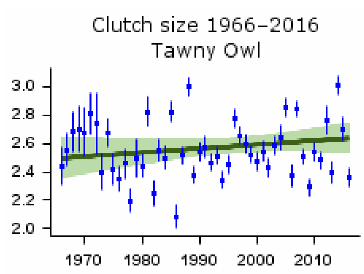
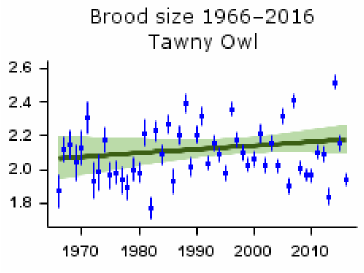
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	68	Linear increase	1.38 fledglings	1.99 fledglings	44.6%		
Clutch size	48	1967-2015	103	None					
Brood size	48	1967-2015	213	None					
Nest failure rate at egg stage	48	1967-2015	68	Curvilinear	1.21% nests/day	0.25% nests/day	-79.3%		
Nest failure rate at chick stage	48	1967-2015	106	Curvilinear	0.35% nests/day	0.08% nests/day	-77.1%		
Laying date	48	1967-2015	20	None			0 days		Small sample

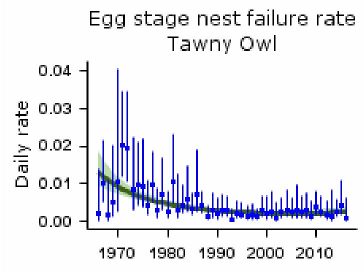
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



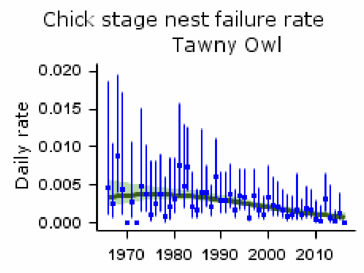
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



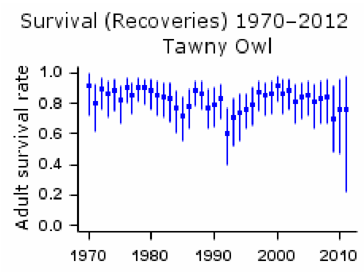
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Nightjar

Caprimulgus europaeus

Key facts

Conservation listings:	Global: amber (breeding range decline)
Long-term trend:	UK: uncertain
Population size:	4,600 (3,700-5,500) males in 2004 (APEP13: Conway et al. 2007)

Status summary

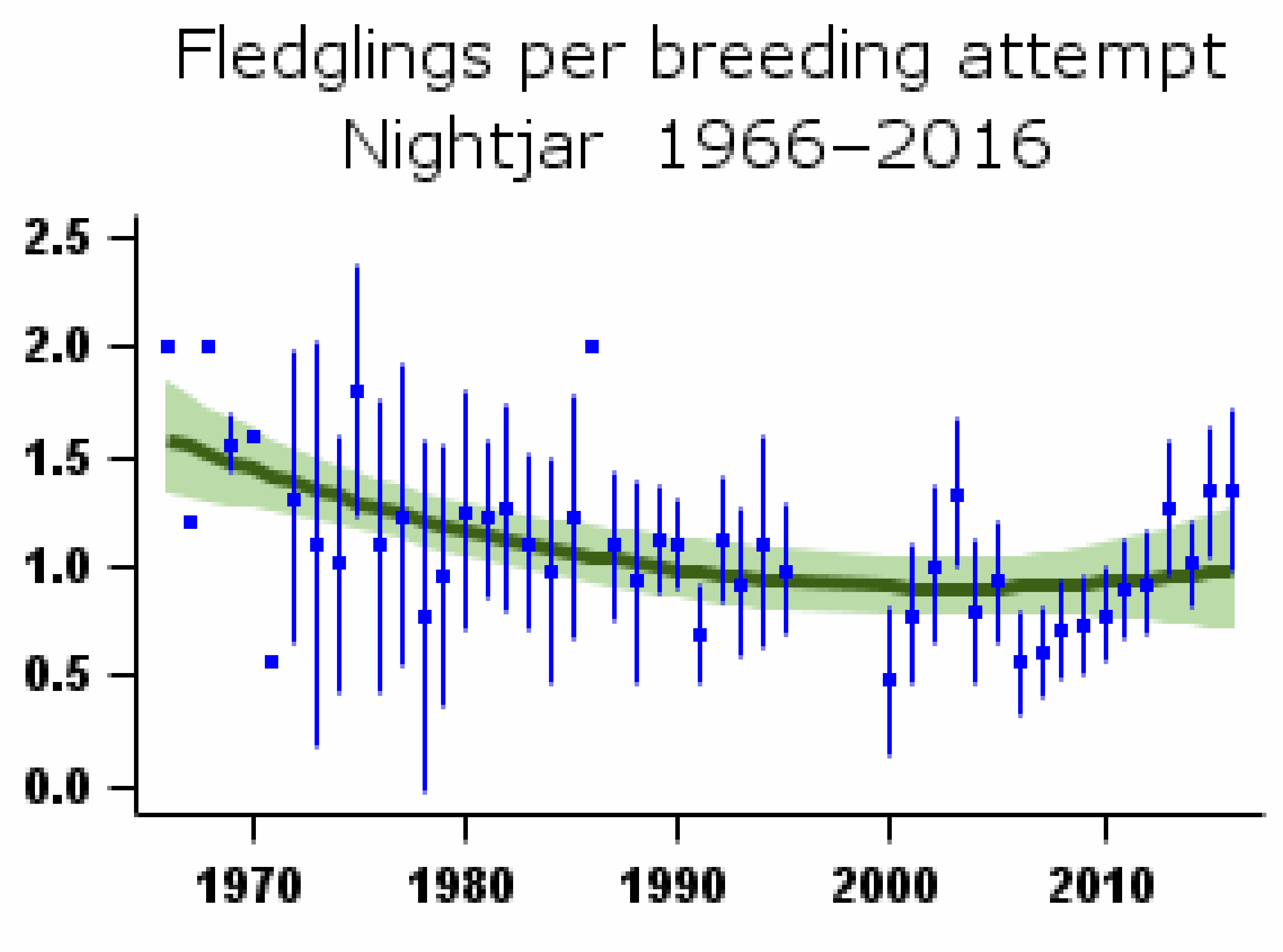
Following a catastrophic decline in range of more than 50% of 10-km squares between the 1968-72 and 1988-91 breeding atlases, the 1992 national survey revealed a welcome increase of 50% in population size since an earlier survey in 1981 (Morris et al. 1994). A national Nightjar Survey in 2004 revealed that a further 36% increase had taken place in the UK population in 12 years, with a 2.6% increase in the number of 10-km squares occupied (Conway et al. 2007). There was evidence of population declines and range contractions since 1992, however, in North Wales, northwest England, and Scotland. Atlas data from 2008-11 show an 18% range increase in Britain since 1988-91 but some parts of the 1968-72 range remain unoccupied (Balmer et al. 2013). Through its partial recovery of UK range, the species moved from red to being amber listed in the latest review (Eaton et al. 2015).

Although annual nest record sample are very small, nest failure rates have increased and clutch size has decreased. A steep decrease is evident in the number of fledglings per breeding attempt.

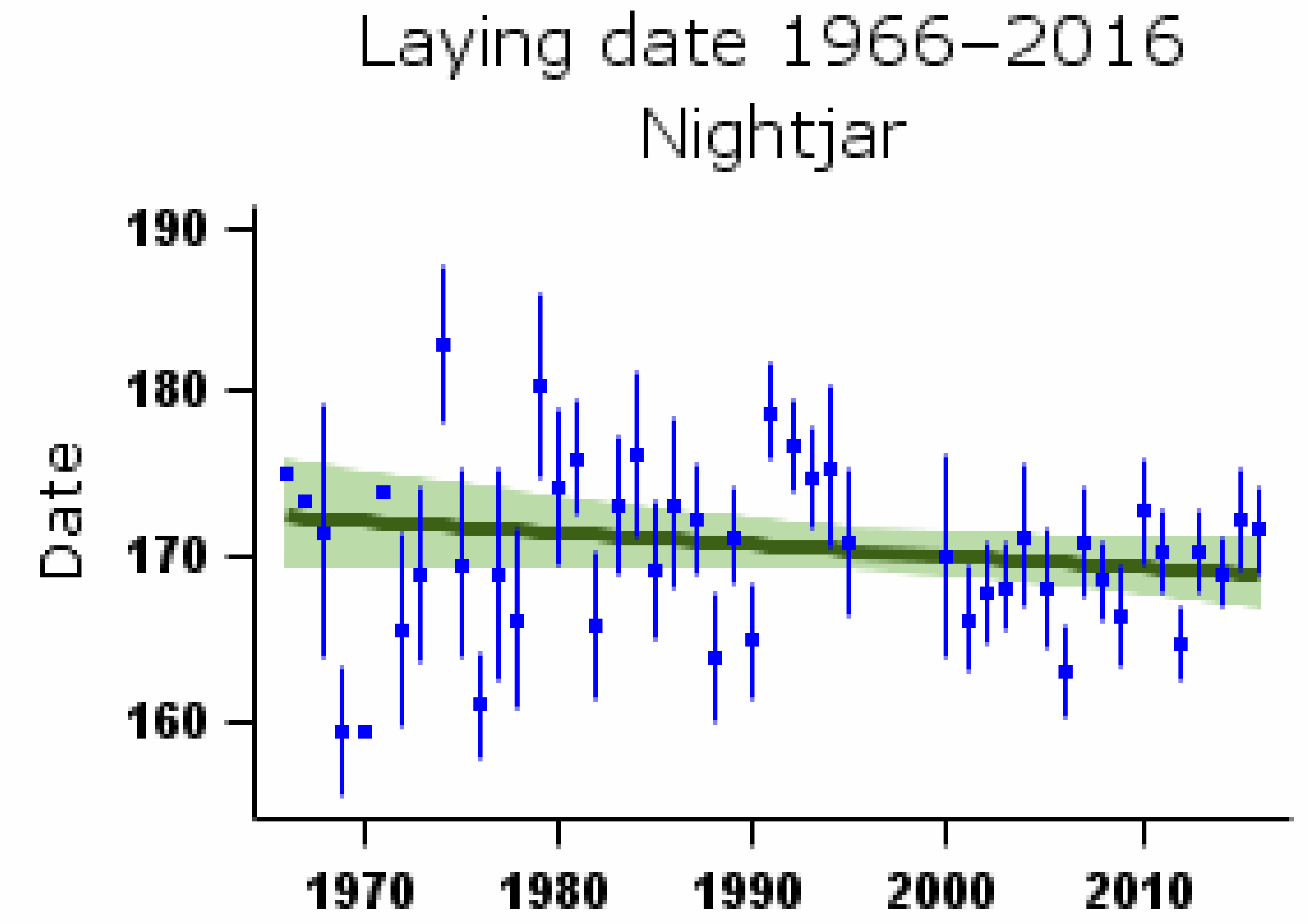
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

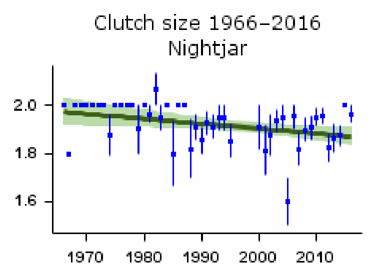


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

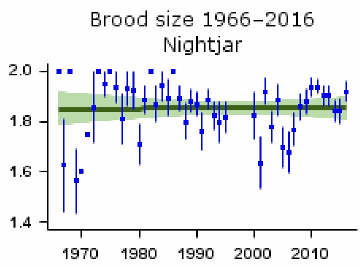
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	23	Curvilinear	1.55 fledglings	0.98 fledglings	-36.6%		
Clutch size	48	1967-2015	21	Linear decline	1.97 eggs	1.88 eggs	-4.9%		Small sample
Brood size	48	1967-2015	30	None					Small sample
Nest failure rate at egg stage	48	1967-2015	26	Linear increase	1.62% nests/day	3.08% nests/day	90.1%		Small sample
Nest failure rate at chick stage	48	1967-2015	24	Curvilinear	0.18% nests/day	0.85% nests/day	372.2%		Small sample
Laying date	48	1967-2015	23	None			0 days		Small sample

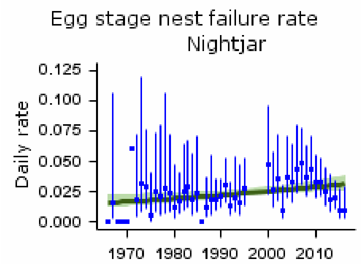
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



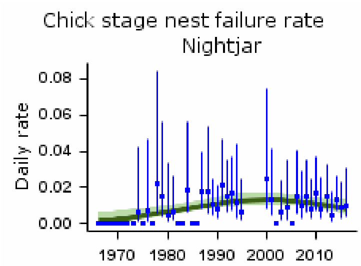
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The recovery of this species coincided with the availability of suitable open ground habitat resulting from the felling of forests planted in the late 1920s and 1930s, the clearance and restocking of areas damaged by storms in the late 1980s and, importantly, the restoration of heathland habitats. Management, protection, restoration and re-creation of key habitats remains critical for maintaining Nightjar numbers.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Changes to heathland and woodland	

Further information on causes of change

The historical population decline and contraction of range have been attributed to large-scale losses of heathland to agriculture, construction and afforestation (Conway et al. 2007, Langston et al. 2007b). Recovery has coincided with more suitable open ground becoming available through the felling of forests planted in the late 1920s and 1930s, the clearance and restocking of areas damaged by storms in 1987 and 1990 and the restoration of heathland (Scott et al. 1998, Ravenscroft 1989, Morris et al. 1994, Conway et al. 2007, Langston et al. 2007b). While most recent increase has been consolidation within the existing range, there has been colonisation of conifer plantations at higher altitude in southwest England and on the North York Moors: this might be a density-dependent effect as new habitat becomes available or could be evidence of positive effects of climate change (G.J. Conway pers comm).

Prospects for further recovery may be limited, however, due to a reduction of suitable habitat as newly restocked forests grow and to the effects of human disturbance: studies have found that concentrated human disturbance can affect territory densities (Liley & Clarke 2003) and that nest failure is most likely in areas heavily frequented by walkers and dogs (Langston et al. 2007a), though another study, in Thetford Forest, concluded that recreational disturbance was not a factor in nest failure (Dolman 2010). The Thetford study also observed that all nest predators were mammalian (foxes and badgers), but their impact was unlikely to affect Nightjar population size (Dolman 2010).

Burgess et al. (1990) reported that, at Minsmere, creating glades in woodland and sculpting woodland margins to increase the area of edge habitat, leaving woodland shelter belts standing and providing abundant potential nesting sites, mainly by clearing small patches of heather from the base of small birch trees, resulted in an increase in the Nightjar population. In Thetford Forest, Dolman & Morrison (2012) found that density of Nightjars was highest in areas of restock at pre-thicket stages (6-10 years) and that management of conifer plantations plays an important role in determining the population of Nightjars. Radio-tracking there indicated that a variety of growth stages is important for this species and that grazing of open habitats within and adjacent to forest will also be of benefit (Sharps, K. et al. 2015).

New tracking studies suggest that Nightjars consistently forage in non-forest habitats, such as grasslands and semi-natural habitats, sometimes on farmlands, and that the availability and management of the adjacent landscape could affect Nightjar populations (Evens et al. 2017, Henderson/Conway, in prep.). However, management, protection, restoration and creation of key forest and heathland breeding habitats remain critical for the long-term conservation of this species (Ravenscroft 1989, Morris et al. 1994, Scott et al. 1998, Conway et al. 2007).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Swift

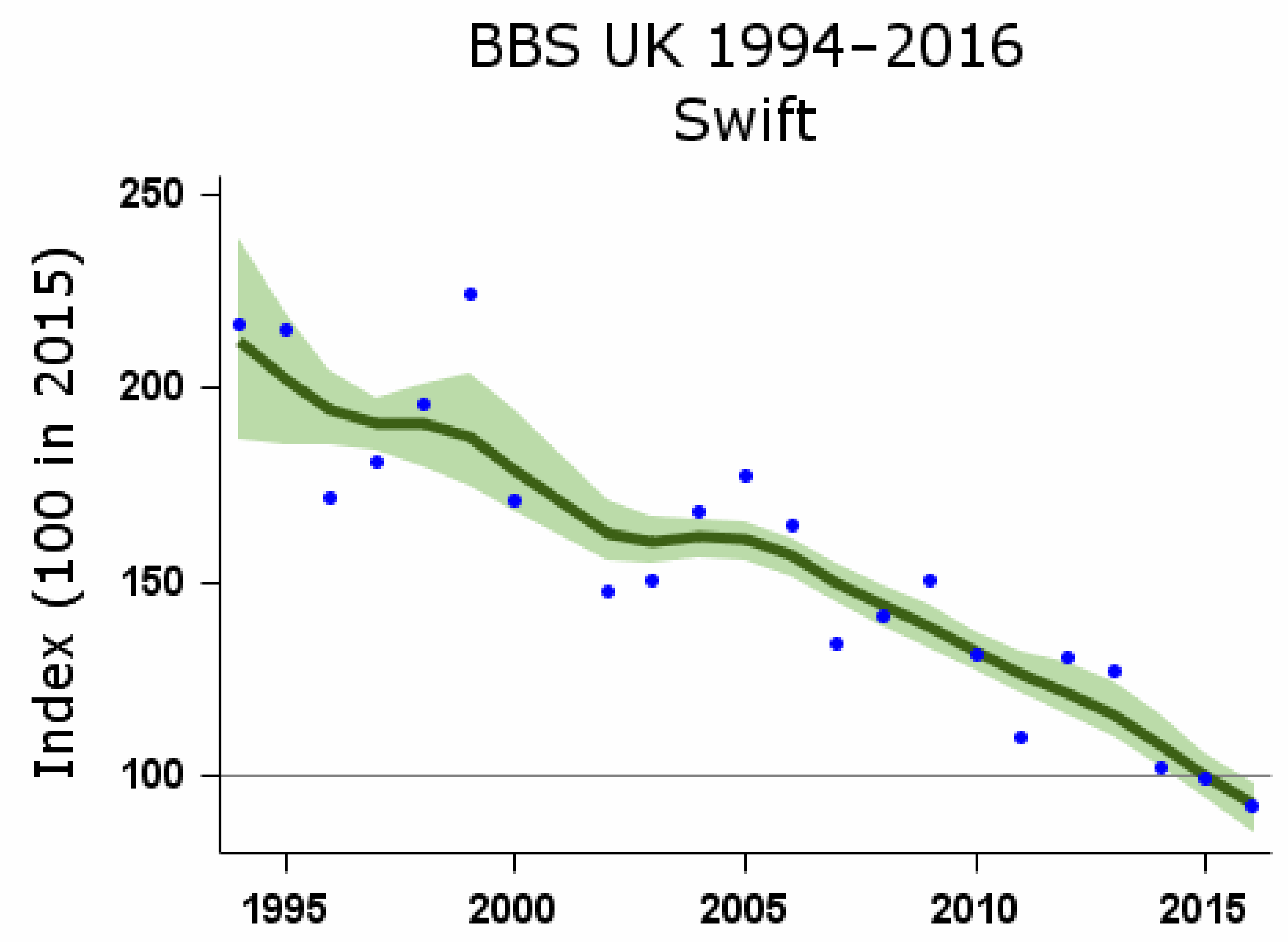
Apus apus

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK: decline
Population size:	87,000 (64,000-111,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Swifts were not monitored before the inception of the BBS. Their monitoring is complicated by the difficulty of finding occupied nests, by the weather-dependent and sometimes extraordinary distances from the nest at which breeding adults may forage, and by the often substantial midsummer influx of non-breeding individuals to the vicinity of breeding colonies. Since Swifts do not normally begin breeding until they are four years old, non-breeding numbers can be large. BBS results indicate that steep declines have occurred in England, Scotland and Wales since 1994. Many Swifts seen on BBS visits will not necessarily be nesting nearby, however, and the relationship between BBS transect counts and nesting numbers has not yet been investigated. The BBS Eaton et al. 2009). Analysis of phenological change suggests that swifts both arrive and depart in the UK earlier than in the 1960s, with the length of stay consequently remaining unchanged (Newson et al. 2016). Modern building design and refurbishment of old buildings can unnecessarily deprive Swifts of nest sites and may be contributing to population decline: the provision of nest boxes and integration of potential nest sites into new buildings and renovations are strongly supported by Crowe 2012). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

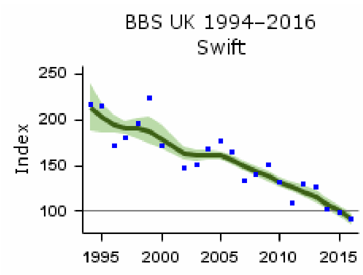
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	1061	-51	-56	-45	>50	
	10	2005-2015	1192	-38	-42	-33	>25	

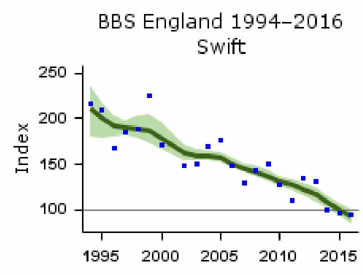
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	1117	-24	-30	-18		
BBS England	20	1995-2015	914	-50	-56	-43	>25	
	10	2005-2015	1028	-36	-41	-31	>25	
	5	2010-2015	963	-24	-31	-17		
BBS Scotland	20	1995-2015	55	-57	-68	-38	>50	
	10	2005-2015	65	-37	-55	-14	>25	
	5	2010-2015	63	-18	-43	15		
BBS Wales	20	1995-2015	68	-59	-70	-41	>50	
	10	2005-2015	71	-45	-59	-28	>25	
	5	2010-2015	68	-26	-46	-2	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

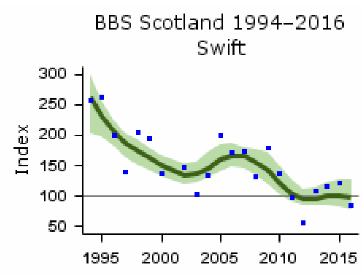
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



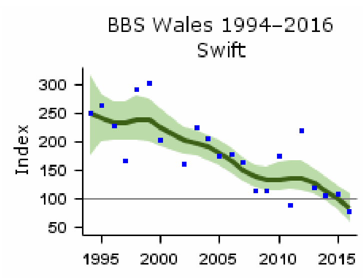
BBS UK graph



BBS England graph

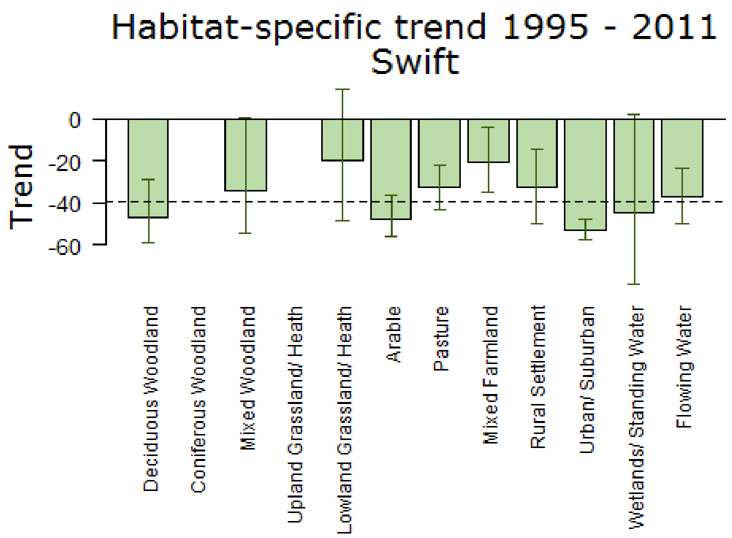


BBS Scotland graph



BBS Wales graph

Population trends by habitat



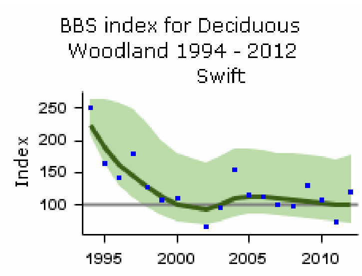
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

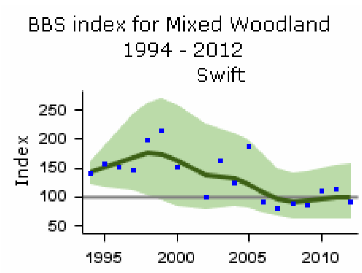
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	152	-47	-59	-29
Mixed Woodland	16	1995-2011	59	-34	-55	1
Lowland Grassland/ Heath	16	1995-2011	47	-20	-48	14
Arable	16	1995-2011	215	-47	-56	-37
Pasture	16	1995-2011	369	-33	-43	-22
Mixed Farmland	16	1995-2011	164	-21	-35	-4
Rural Settlement	16	1995-2011	242	-33	-50	-14
Urban/ Suburban	16	1995-2011	276	-53	-57	-47
Wetlands/ Standing Water	16	1995-2011	39	-45	-79	2
Flowing Water	16	1995-2011	151	-37	-50	-24

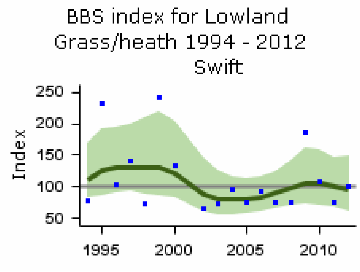
Further information on habitat-specific trends, please follow link here.



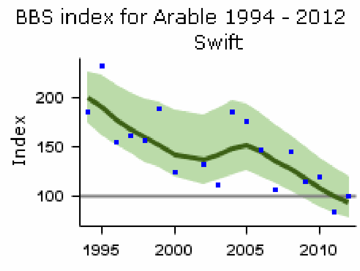
Habitat graph



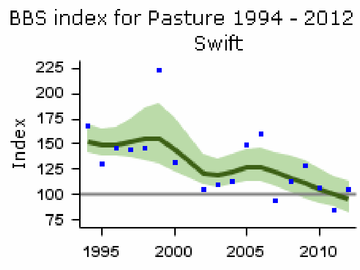
Habitat graph



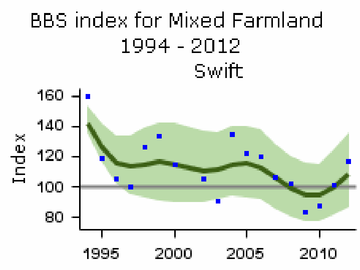
Habitat graph



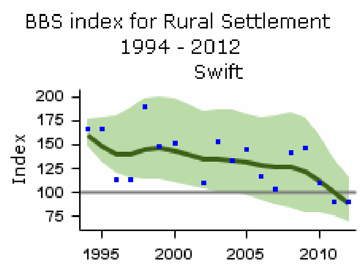
Habitat graph



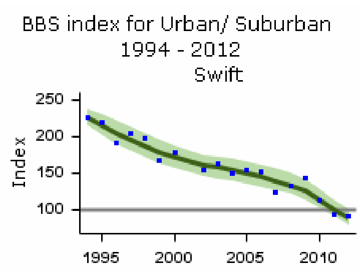
Habitat graph



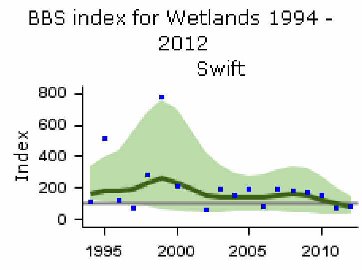
Habitat graph



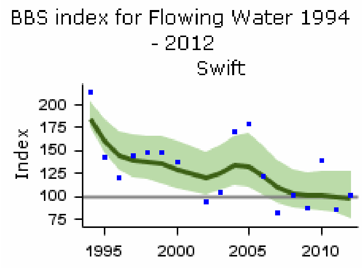
Habitat graph



Habitat graph



Habitat graph

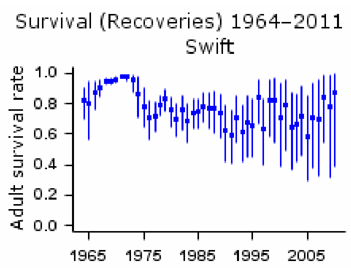


Habitat graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	14	Curvilinear	2.44 eggs	2.35 eggs	-3.5%		Small sample
Brood size	48	1967-2015	54	None					
Nest failure rate at egg stage	48	1967-2015	21	None					Small sample
Nest failure rate at chick stage	48	1967-2015	30	None					Small sample
Laying date	48	1967-2015	13	Curvilinear	May 26	May 26	0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Kingfisher

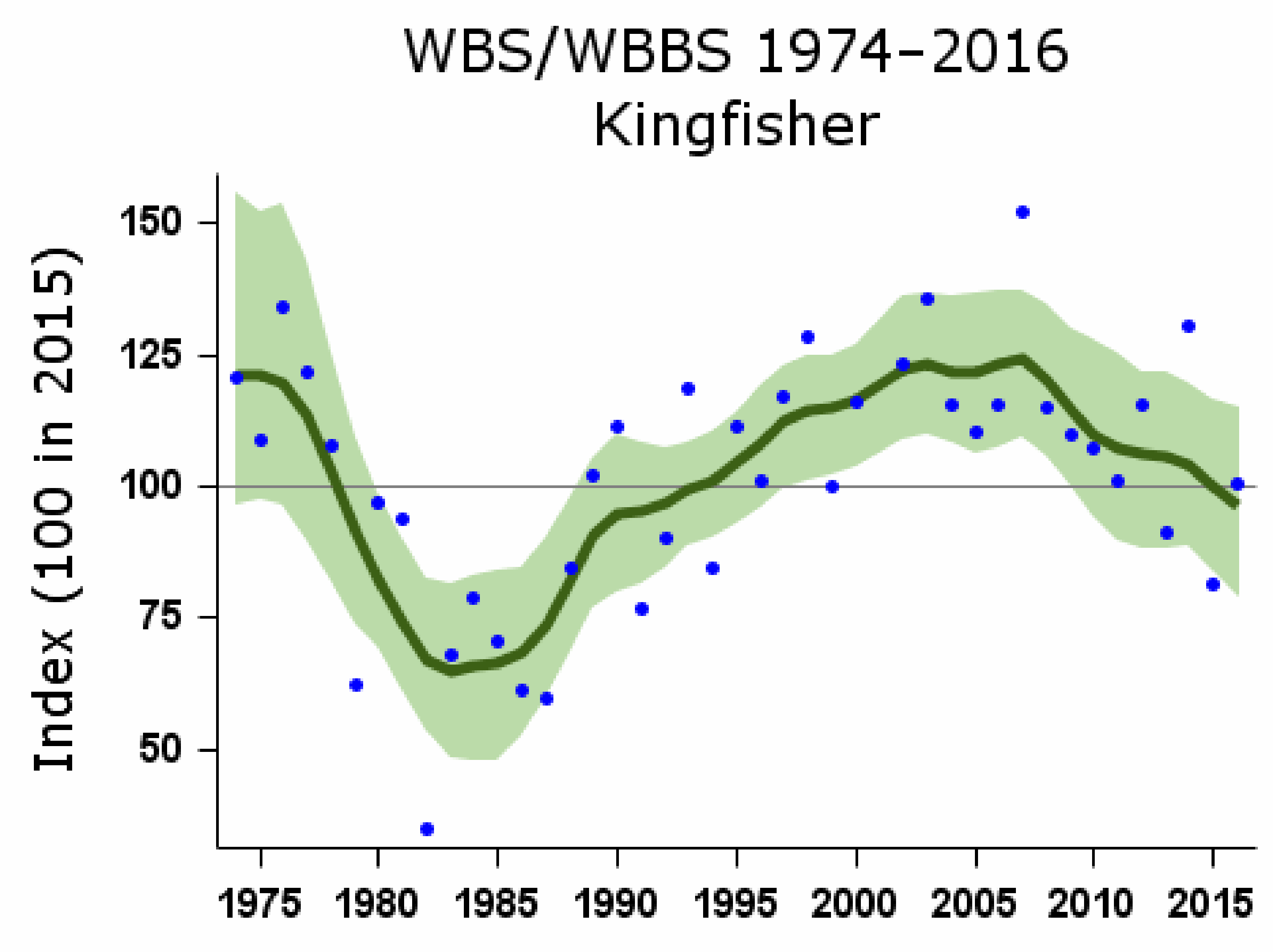
Alcedo atthis

Key facts

Conservation listings:	Global: amber (European status); at race level, ispida red; former RBBP species
Long-term trend:	UK waterways: fluctuating, with no long-term trend
Population size:	3,800-6,400 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The Kingfisher declined along linear waterways (its principal habitat) until the mid 1980s, since when it seems to have made a complete recovery, only to enter another decline, though numbers are still much higher now than in the mid 1980s. The initial decline was associated with a contraction of range in England (Gibbons et al. 1993). Kingfishers suffer severe mortality during harsh winters but, with up to three broods in a season, and up to six chicks in a brood, their potential for rapid population growth is unusually high. It is likely, therefore, that winter weather is the main driver of population change. Though the amber listing of this species in the UK results from its 'depleted' status in Europe as a whole, numbers across Europe have been broadly stable since 1991 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

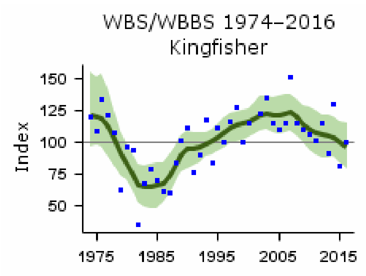
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	57	-17	-44	19		
	25	1990-2015	74	5	-22	48		
	10	2005-2015	85	-18	-29	-3		
	5	2010-2015	71	-9	-22	7		
BBS UK	20	1995-2015	57	-8	-35	35		

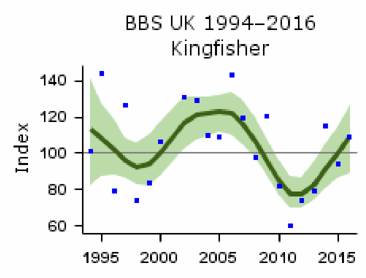
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	66	-19	-32	2		
	5	2010-2015	59	18	-3	43		
BBS England	20	1995-2015	51	0	-27	36		
	10	2005-2015	60	-19	-32	0		
	5	2010-2015	54	15	-8	40		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

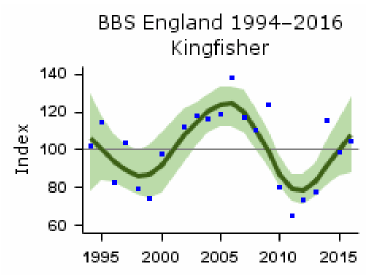
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



WBS/WBBS waterways graph



BBS UK graph



BBS England graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	47	1968-2015	2	None					Small sample
Brood size	47	1968-2015	9	Curvilinear	5.05 chicks	4.20 chicks	-16.9%		Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Nest failure rate at chick stage	48	1967-2015	8	Curvilinear	0.00% nests/day	0.12% nests/day			Small sample
Laying date	47	1968-2015	2	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Green Woodpecker

Picus viridis

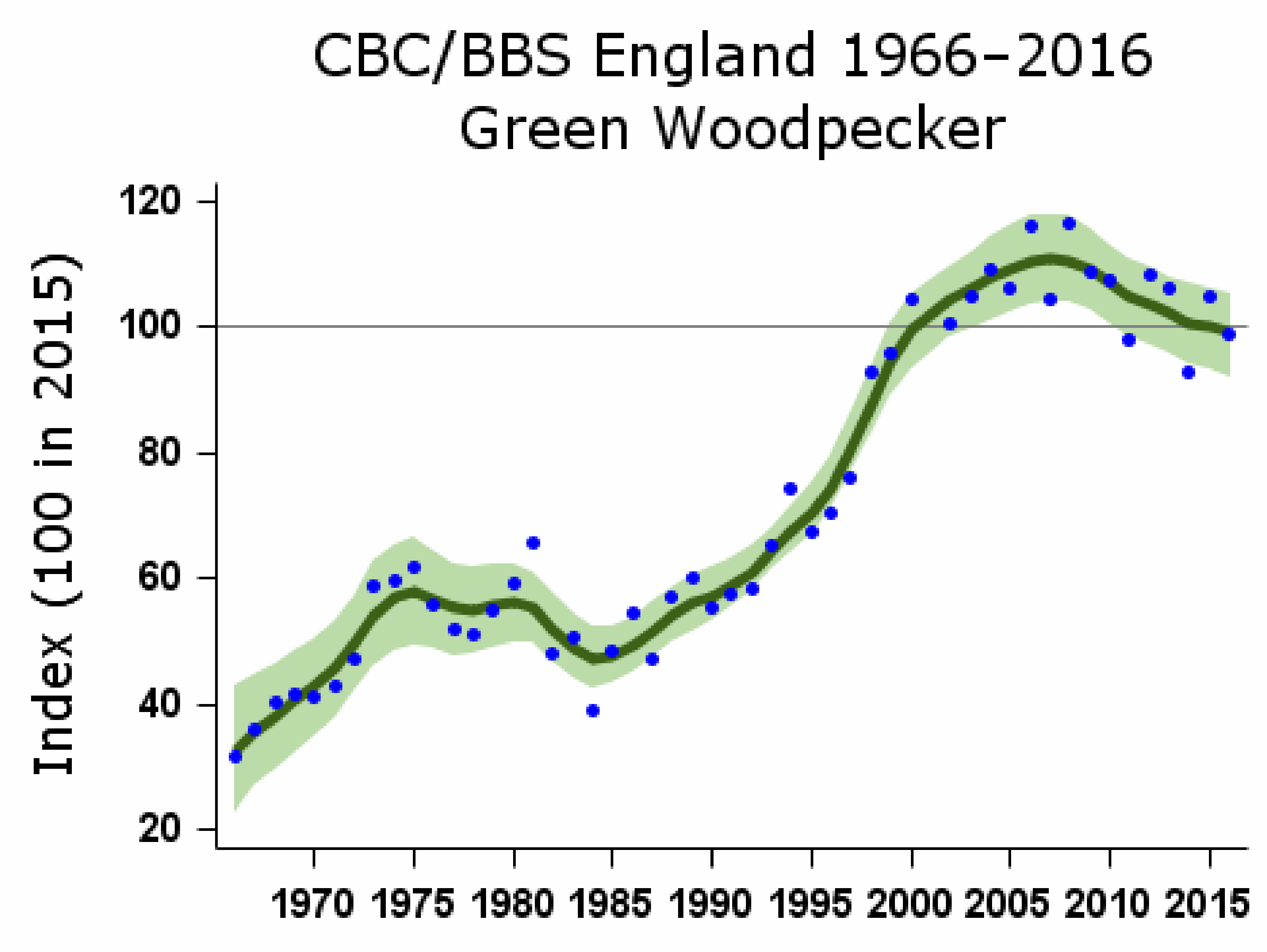
Key facts

Conservation listings:	Global: green
Long-term trend:	England: rapid increase
Population size:	52,000 (47,000-58,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Green Woodpecker populations rose steadily in Britain from 1966 until around 2008, except for a period of stability or shallow decline centred around 1980. There was considerable range expansion in central and eastern Scotland between the 1968-72 and 1988-91 atlas periods. Recent atlas results indicate that expansion is continuing across England and Scotland, but not in Wales, where major retraction from some western regions was detected in 2008-11 (Balmer et al. 2013). Similarly, the BBS PECBMS 2016a). Following a review of its status in Europe, the species was moved from amber to the UK green list in 2015 (Eaton et al. 2015).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	397	182	110	296		
	25	1990-2015	702	75	52	97		
	10	2005-2015	1002	-8	-13	-4		
	5	2010-2015	1003	-6	-10	-3		
BBS UK	20	1995-2015	865	31	22	41		
	10	2005-2015	1062	-10	-14	-6		
	5	2010-2015	1057	-6	-10	-2		
BBS England	20	1995-2015	810	41	31	52		
	10	2005-2015	1002	-9	-12	-4		
	5	2010-2015	1003	-6	-10	-2		
BBS Wales	20	1995-2015	48	-20	-43	23		
	10	2005-2015	52	-20	-39	15		
	5	2010-2015	48	-4	-28	38		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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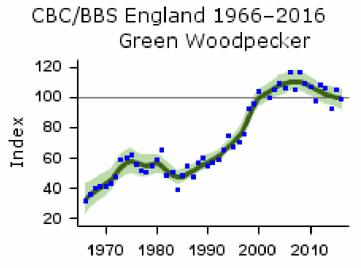
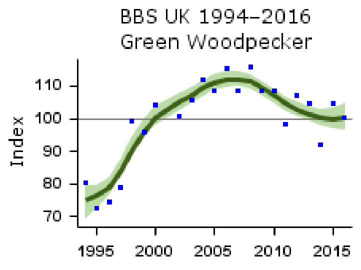
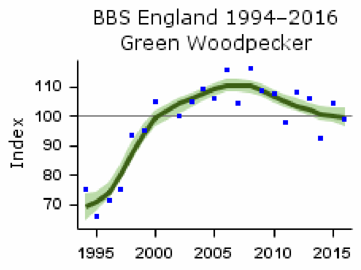


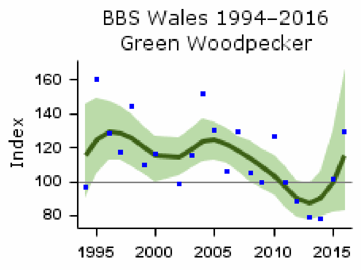
CBC/BBS England graph



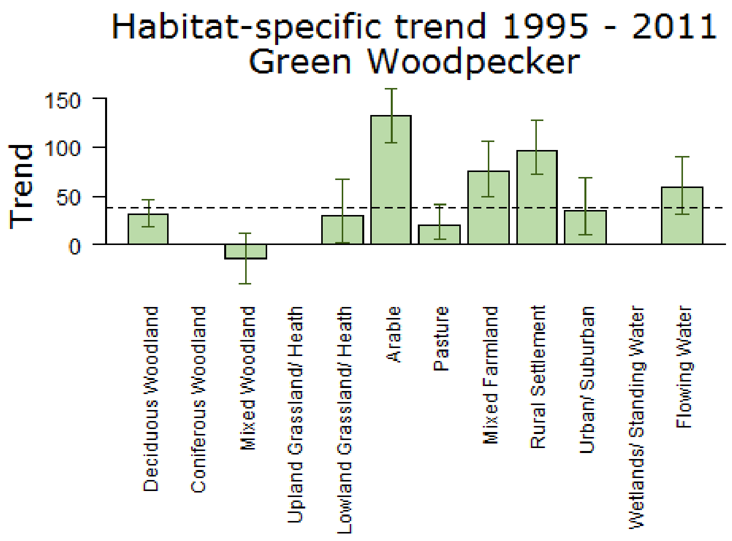
BBS UK graph



BBS England graph



Population trends by habitat



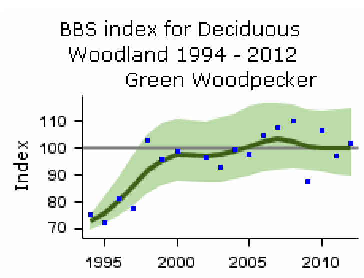
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

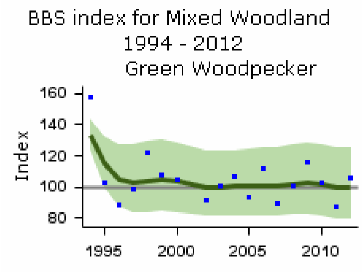
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	234	31	19	46
Mixed Woodland	16	1995-2011	112	-13	-39	13
Lowland Grassland/ Heath	16	1995-2011	38	31	2	67
Arable	16	1995-2011	173	133	105	160
Pasture	16	1995-2011	307	20	5	42
Mixed Farmland	16	1995-2011	144	76	50	107
Rural Settlement	16	1995-2011	179	97	72	128
Urban/ Suburban	16	1995-2011	76	35	10	69
Flowing Water	16	1995-2011	93	59	32	89

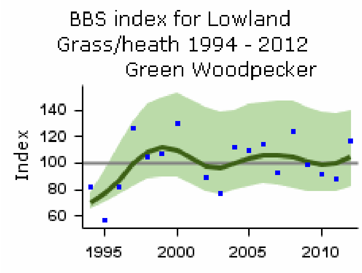
Further information on habitat-specific trends, please follow link here.



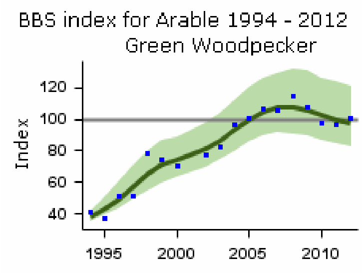
Habitat graph



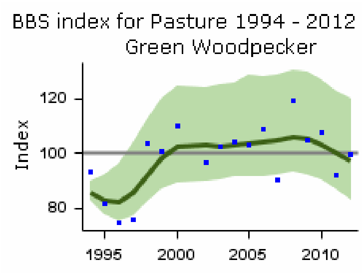
Habitat graph



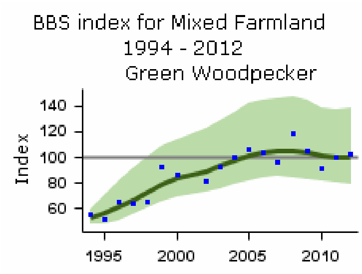
Habitat graph



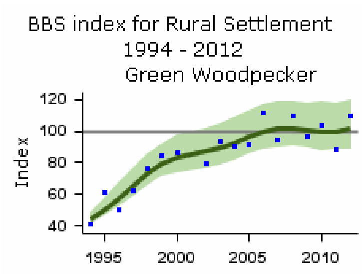
Habitat graph



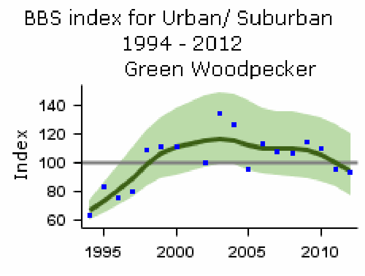
Habitat graph



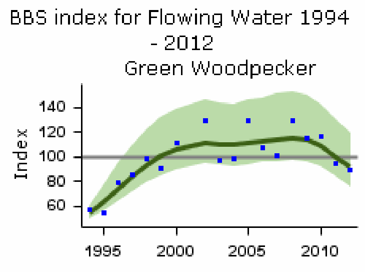
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	45	1969-2014	2	None					Small sample
Brood size	48	1967-2015	5	Curvilinear	4.06 chicks	3.63 chicks	-10.7%		Small sample
Nest failure rate at egg stage	48	1967-2015	2	None					Small sample
Nest failure rate at chick stage	48	1967-2015	4	None					Small sample
Laying date	46	1969-2015	2	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Causes of change

There is little evidence available regarding the demographic or ecological causes of population increase in this species.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

No information on demographic trends for this species is available. The ecological factors underlying the increase in population size are not yet known but, given the species' susceptibility to cold weather, it may be related to climate change. Smith (2007) found that Green Woodpeckers were not limited by nest-sites in his study woods in southern England and linked the upward trend in numbers to the availability of food outside the woods and higher survival due to a series of mild winters.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Great Spotted Woodpecker

Dendrocopos major

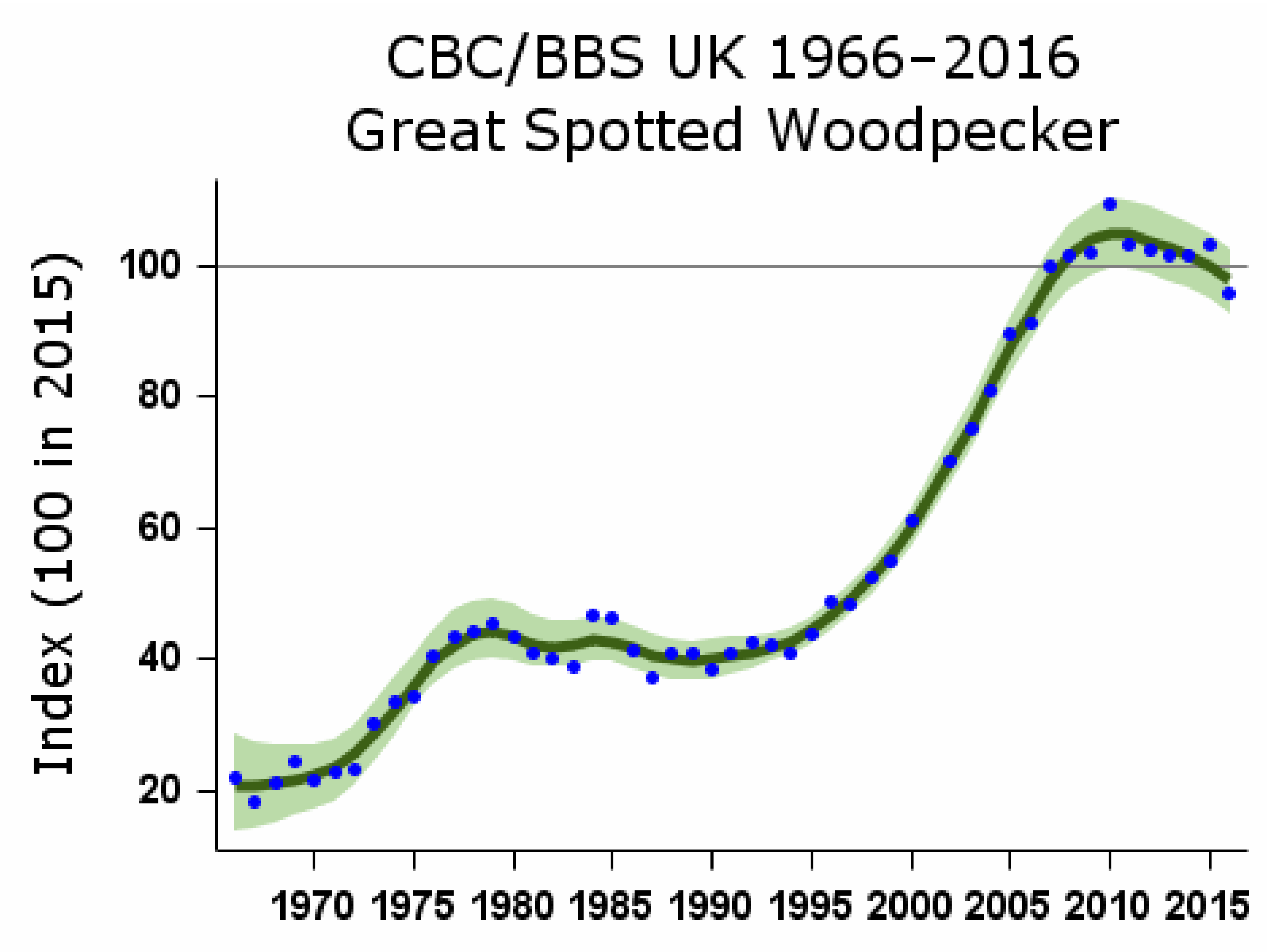
Key facts

Conservation listings:	Global: green; at race level, anglicus amber
Long-term trend:	UK, England: rapid increase
Population size:	140,000 (130,000-150,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

This species increased rapidly in the 1970s and began a further increase in the mid 1990s. The BBS Balmer et al. 2013). There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

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

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	561	387	235	708		
	25	1990-2015	998	151	124	179		
	10	2005-2015	1541	14	9	19		
	5	2010-2015	1603	-5	-8	-2		
CBC/BBS England	48	1967-2015	493	330	215	554		
	25	1990-2015	873	127	104	156		
	10	2005-2015	1331	4	1	8		
	5	2010-2015	1378	-8	-11	-5		
BBS UK	20	1995-2015	1166	130	116	146		
	10	2005-2015	1541	14	9	20		
	5	2010-2015	1603	-5	-7	-1		
BBS England	20	1995-2015	1016	105	92	118		
	10	2005-2015	1331	4	0	9		
	5	2010-2015	1378	-8	-11	-5		
BBS Scotland	20	1995-2015	59	413	284	592		
	10	2005-2015	89	62	29	100		
	5	2010-2015	95	14	1	29		
BBS Wales	20	1995-2015	89	180	134	262		
	10	2005-2015	118	53	33	69		
	5	2010-2015	129	-1	-12	8		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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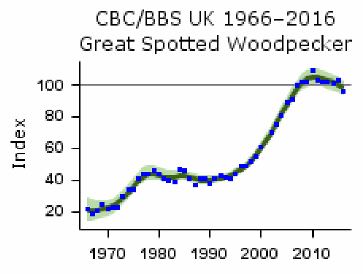
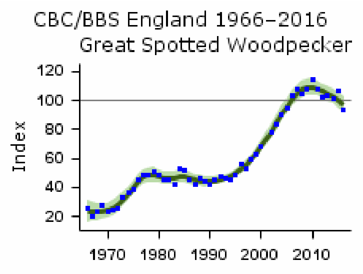
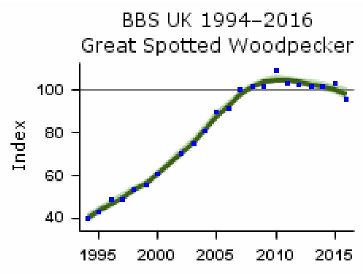


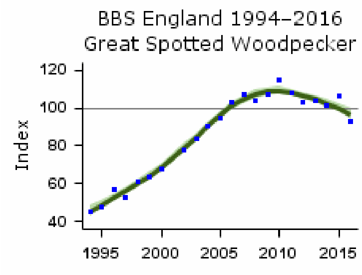
CBC/BBS UK graph



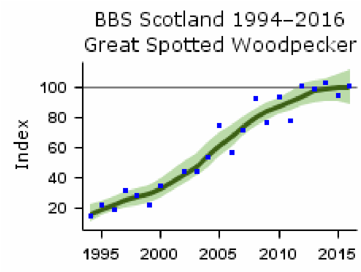
CBC/BBS England graph



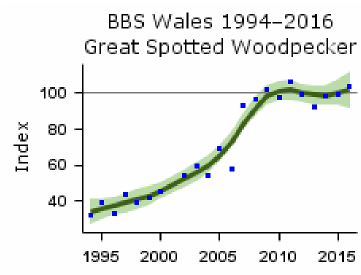
BBS UK graph



BBS England graph

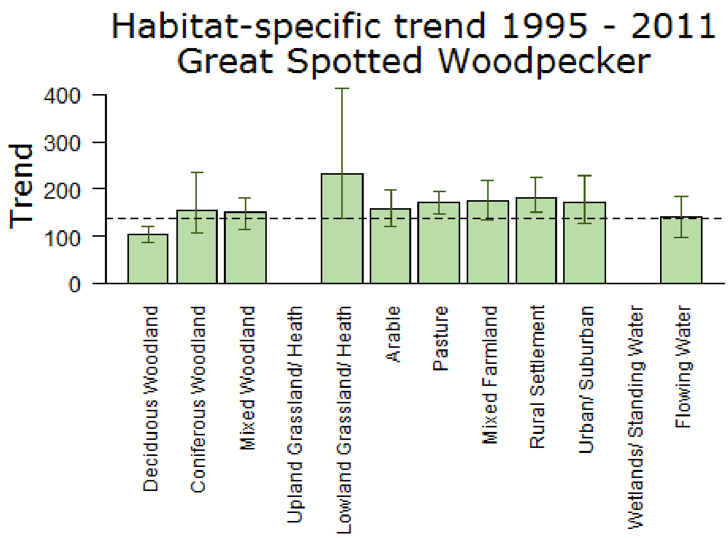


BBS Scotland graph



BBS Wales graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

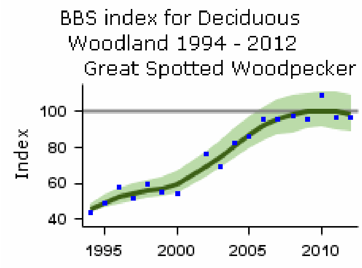
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

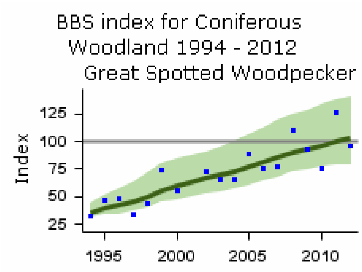
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	332	103	85	119

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Coniferous Woodland	16	1995-2011	54	154	105	235
Mixed Woodland	16	1995-2011	175	151	115	183
Lowland Grassland/ Heath	16	1995-2011	32	232	136	413
Arable	16	1995-2011	194	156	121	196
Pasture	16	1995-2011	386	172	147	194
Mixed Farmland	16	1995-2011	145	173	135	219
Rural Settlement	16	1995-2011	211	182	151	225
Urban/ Suburban	16	1995-2011	91	172	126	227
Flowing Water	16	1995-2011	119	140	96	184

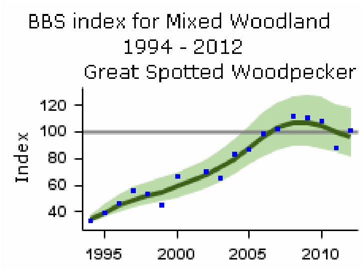
Further information on habitat-specific trends, please follow link here.



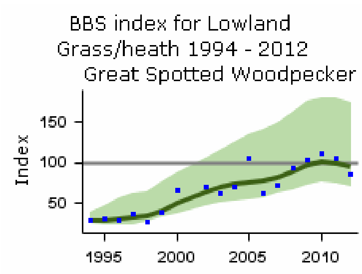
Habitat graph



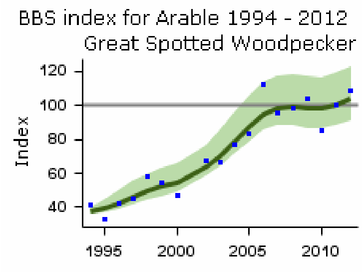
Habitat graph



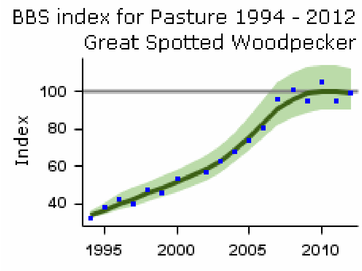
Habitat graph



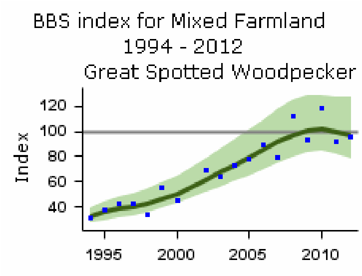
Habitat graph



Habitat graph



Habitat graph



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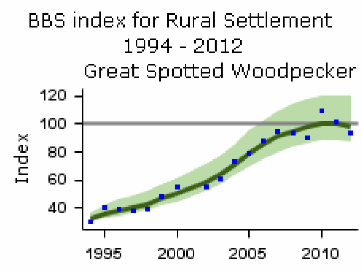

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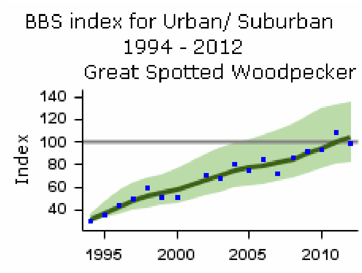

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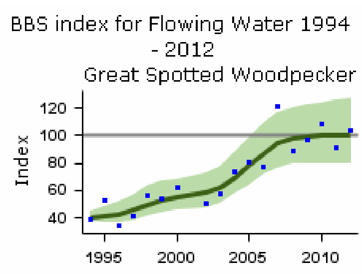
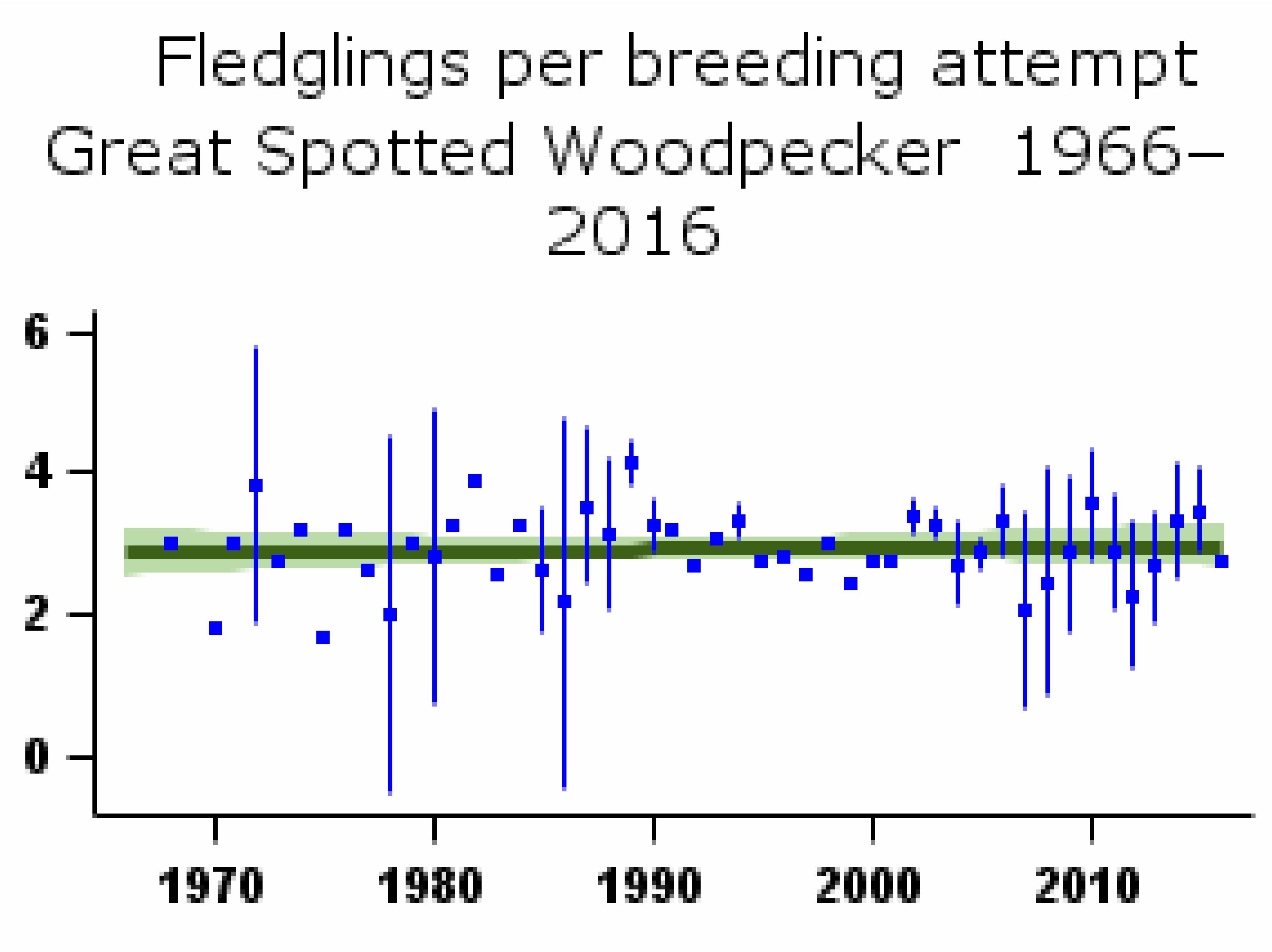
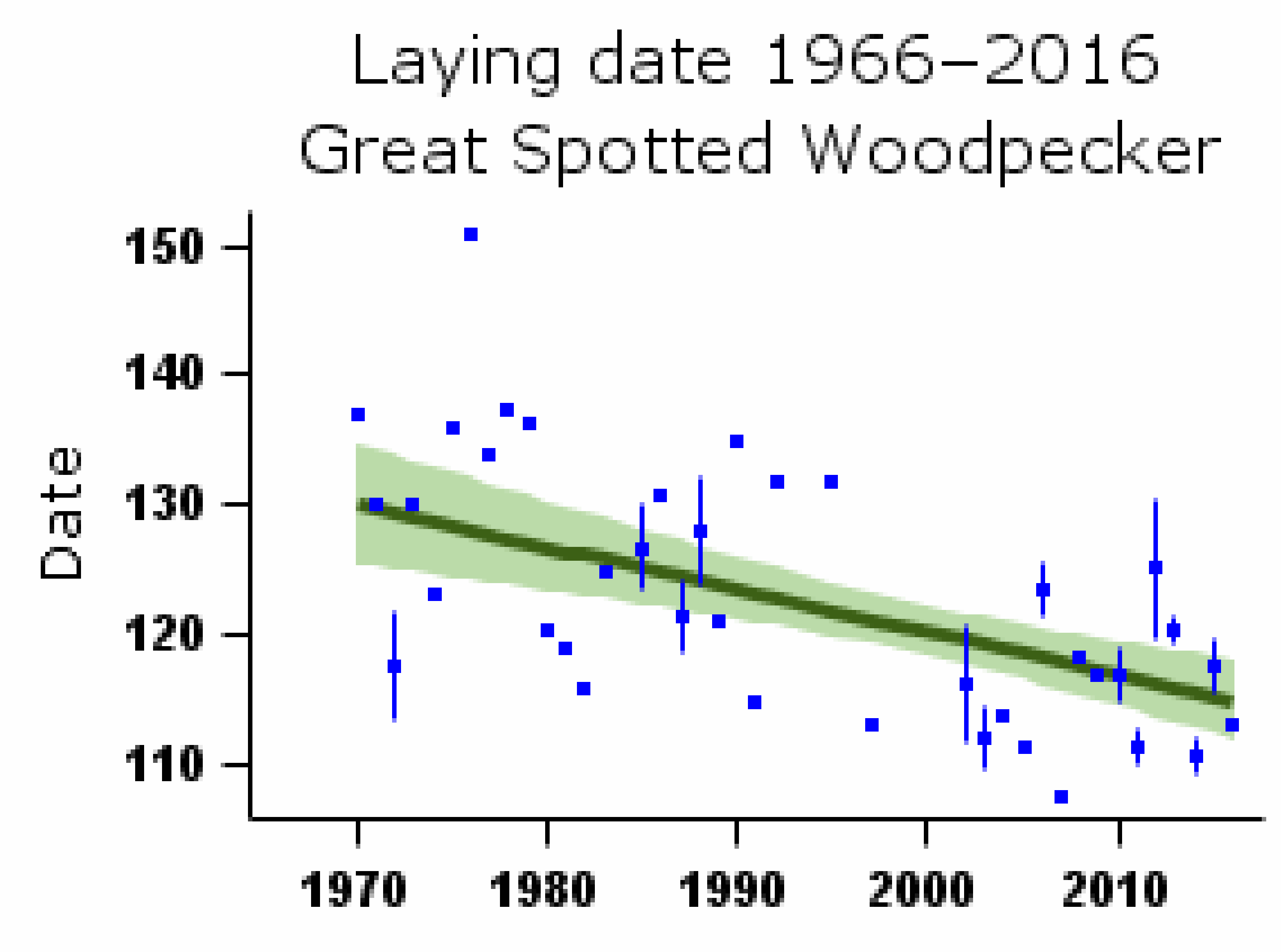


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

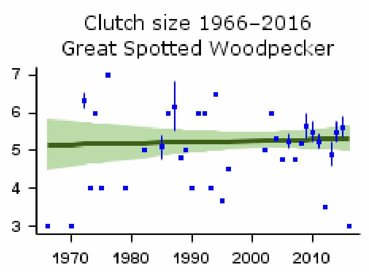


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

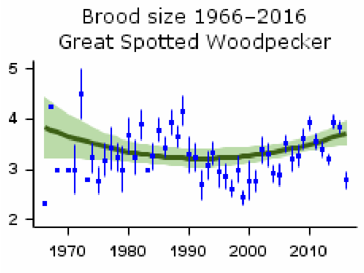
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	7	None					
Clutch size	48	1967-2015	5	None					Small sample
Brood size	48	1967-2015	24	Curvilinear	3.78 chicks	3.68 chicks	-2.6%		Small sample
Nest failure rate at egg stage	48	1967-2015	7	None					Small sample
Nest failure rate at chick stage	48	1967-2015	26	None					Small sample
Laying date	45	1970-2015	4	Linear decline	May 10	Apr 25	-15 days		Small sample

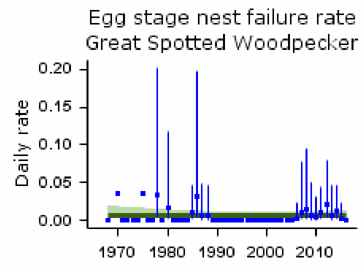
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



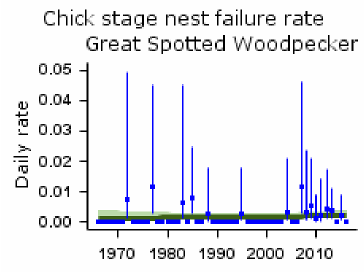
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that nest survival has increased, most likely due to decreased competition with Starlings. This is based on one local study but supported by more extensive analysis of nest record cards. Use of garden feeders may be another of many factors contributing to their population increase.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Decreased competition	

Further information on causes of change

The initial increase in Great Spotted Woodpeckers during the 1970s has been attributed to Dutch elm disease, which greatly increased the amount of standing dead timber, thereby increasing associated insects and so improving food supplies and providing nest sites (Marchant et al. 1990). However, studies giving demographic evidence supporting the effects of this are sparse. There has been speculation that the storms of 1987 and 1990 also benefited Great Spotted Woodpeckers by increasing the availability of dead wood, although a detailed study by Smith (1997), in two study woodlands, reported no specific link between woodpecker increase and the storms, despite the increase in dead wood.

A long-term study of the breeding success of an increasing population of Great Spotted Woodpeckers in southern England provides good evidence that nest survival has increased dramatically over the last 20 years (Smith 2005, 2006). Nest-site interference by 2005) analysed national nest record cards and found similar trends in nest survival, supporting the hypothesis that reduced competition with Starlings has led to the increase in woodpecker population. The decline in Starling numbers in recent decades may also have allowed Great Spotted Woodpeckers to expand their breeding distribution into less-wooded habitats (Smith 2005). Great Spotted Woodpeckers appear limited in their ability to advance their breeding period to maintain synchrony with their natural prey and thus their ready use of garden feeders has the potential to increase breeding success (Smith & Smith 2013).

It is possible that recent increases of Great Spotted Woodpeckers, are also, at least in part, driven by changing climate (Fuller et al. 2005). In Scandinavia (Nilsson et al. 1992) and Bialowiecza Forest, Poland (Wesolowski & Tomialojc 1986), breeding numbers were found to be related to the severity of the preceding winter and the availability of conifer seeds on which the birds then feed. No similar relationship has been found in Britain (Marchant et al. 1990), which is probably not surprising given our relatively mild winters (Smith 1997). Smith (2006) found no evidence that increasing spring temperatures impacted on clutch size, nesting success or number of young fledged.

Lesser Spotted Woodpecker

Dryobates minor

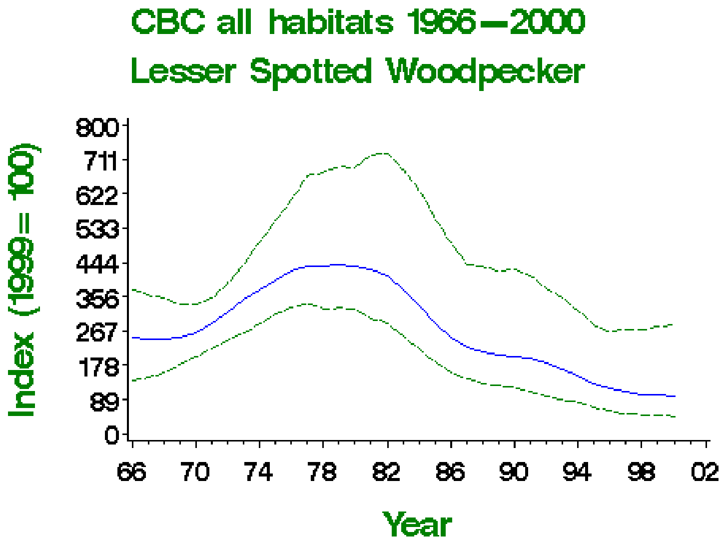
Key facts

Conservation listings:	Global: red (breeding population decline); current RBBP species
Long-term trend:	UK: rapid decline
Population size:	1,000-2,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The Lesser Spotted Woodpecker has declined significantly and very rapidly since around 1980, following a shallower increase; it had already contracted in range between the first two atlas periods (Gibbons et al. 1993), and has subsequently disappeared from many more of its former localities (Balmeret al. 2013). It has become so rare that BBS observers have been unable to continue the annual monitoring that was possible until 2000 through CBC. The species qualifies easily for red listing. All UK breeding records since 2010 should be forwarded to the Rare Breeding Birds Panel, who have established PECBMS 2007): the European trend is described currently as 'uncertain' (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in 1999, with 85% confidence limits in green

Population changes in detail

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

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

CBC all habitats graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	45	1970-2015	2	None					Small sample
Brood size	47	1967-2014	3	None					Small sample
Nest failure rate at egg stage	48	1967-2015	1	None					Small sample
Nest failure rate at chick stage	48	1967-2015	3	None					Small sample
Laying date	47	1968-2015	2	Curvilinear	May 5	Apr 19	-16 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Causes of change

The demographic causes of decline are not yet known and, although there is low breeding success in some populations, the reasons for the decline are unclear.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

The demographic causes of decline are not yet known, and although there is low breeding success in some populations the reasons for the decline in the UK and elsewhere in Europe are unclear (Charman et al. 2009). A detailed field study in Sweden provided good evidence that neither clutch size, brood size in successful nests, fledging success in successful nests nor mean nestling weight differed significantly between years, despite a threefold difference in population variation (Wiktander et al. 2001).

Loss of open woodland is one factor that has been suggested to have contributed to declines in this species. Lesser Spotted Woodpecker is a species that requires mature, open woodland and large areas of woodland at a landscape scale (Wiktander et al. 2001, Charman et al. 2010). Wiktander et al. postulate that the decrease in the area of deciduous forest in Sweden is probably one cause of this species' decline, although they present no specific evidence to support this (Wiktander et al. 1992). Loss of dead wood within woodlands has been proposed as another factor; however, given that dead wood has increased in Britain (Amar et al. 2010) this seems an unlikely cause here. A field study in Poland provided evidence that Lesser Spotted Woodpecker presence is closely correlated with the amount of dead wood and large deciduous trees (Angelstam et al. 2002). In their review of the causes of declines of woodland birds Fuller et al. (2005) state that reductions in small-diameter dead wood suitable for foraging may be a factor in the decline, although recent surveys provided evidence that there was no difference in dead-wood abundance between occupied and unoccupied woods (Charman et al. 2010). However, dead snags have a high turnover and were found to be suitable for nesting sites by woodpeckers for only a few years after death and, furthermore, dead-wood conditions may now be more favourable for Smith 2007).

A third hypothesis relates to competition and predation. A field study in Sweden found that Great Spotted Woodpeckers compete with Lesser Spotteds for insect food in dead wood when spruce seed crops are low (Nilsson et al. 1992), but evidence for this in Britain is limited (Charman et al. 2010). The two species may compete for nest sites, since they overlap considerably in their use of nesting substrates (Glue & Boswell 1994). Amar et al. (2006) found that Lesser Spotted Woodpecker decreased more heavily in woods with relatively high numbers of grey squirrel dreys but there was no other evidence that squirrel density was a significant factor in declines.

Changing climate has been found to have an impact on survival and reproduction in some populations. In Norway, a positive relationship between spring numbers of Lesser Spotted Woodpecker and previous June temperatures has been interpreted as an effect of temperatures on woodpecker survival and reproduction during the breeding season (Steen et al. 2006, Selas et al. 2008). Steen et al. (2006) also found that winter temperatures exhibit a direct positive effect on winter survival. However, given that there has been a general trend for increasing temperatures in the UK (see here), it seems unlikely that changes in climate have been responsible for Lesser Spotted Woodpecker declines. Work in Sweden and Germany suggests that changes in phenology could play a role in breeding success, finding that declines in food availability during the breeding season are likely to be related to seasonal declines in reproductive performance as woodpeckers adjust their timing of breeding to coincide with the seasonal food peak (Wiktander et al. 2001, Rossmanith et al. 2007). However, there is little further evidence for this. In Britain, breeding success has fallen and is lower than in recent studies in Germany and Sweden; chick mortality is especially high, most probably related to food shortages in the breeding period (Charman et al. 2012, Smith & Charman 2012).

Kestrel

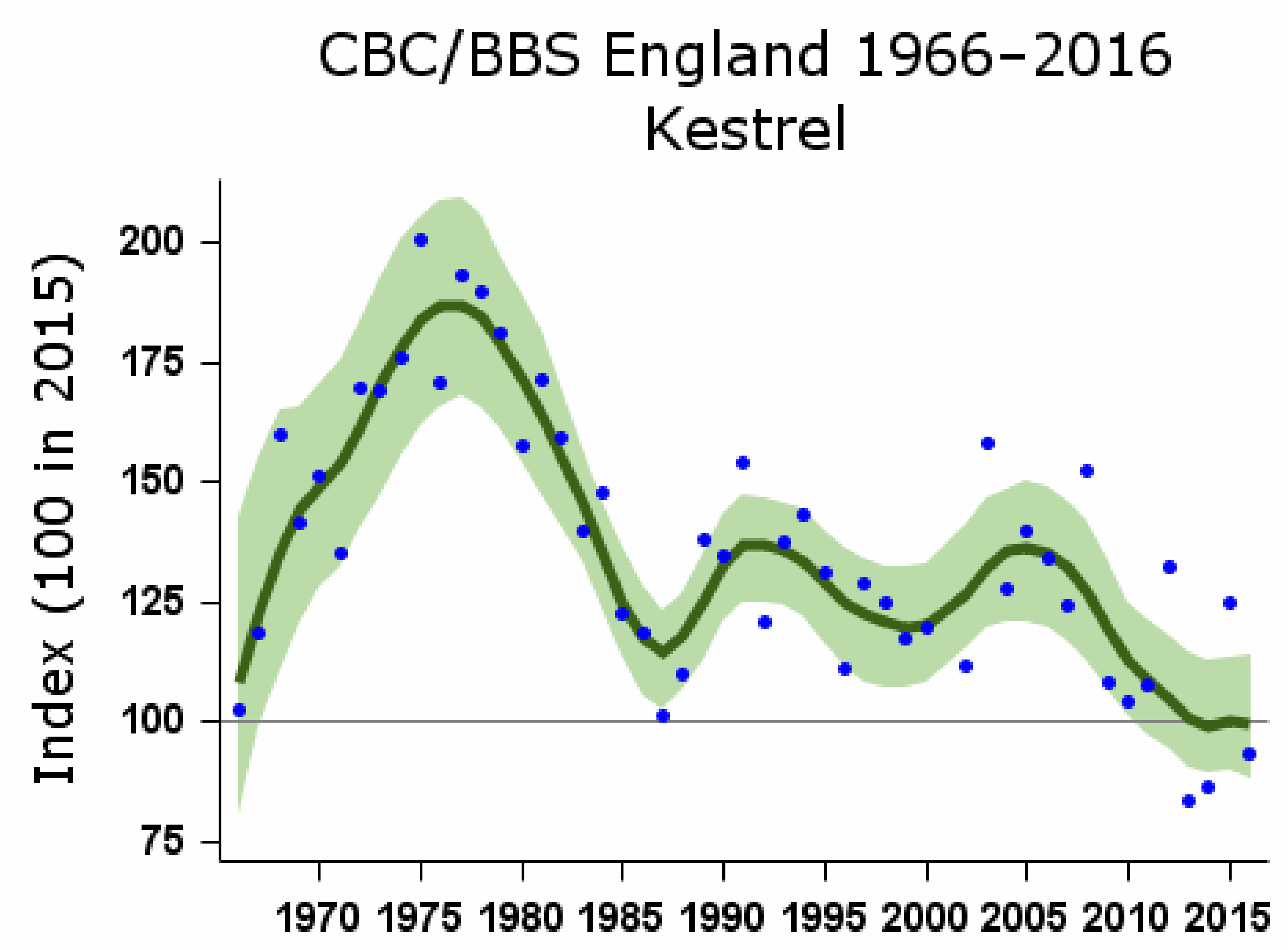
Falco tinnunculus

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	England: shallow decline
Population size:	46,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

Kestrels had recovered from the lethal and sublethal effects of organochlorine pesticides by the mid 1970s, the recovery probably driven by improving nesting success, but subsequently entered a decline. Since the mid 1980s, the English population has fluctuated without a long-term trend being apparent but there are significant declines over the BBS period in England and especially in Scotland. The BBS Clements 2008). A moderate decrease has been recorded in the Republic of Ireland since 1998 (Crowe 2012). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

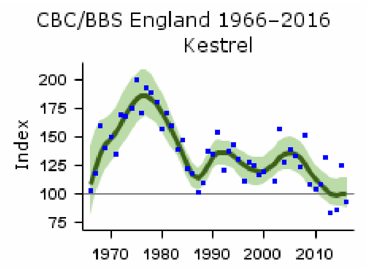
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	311	-18	-43	17		
	25	1990-2015	529	-25	-33	-13		
	10	2005-2015	717	-27	-31	-21	>25	
	5	2010-2015	673	-12	-15	-7		
BBS UK	20	1995-2015	686	-38	-44	-31	>25	
	10	2005-2015	802	-35	-39	-29	>25	

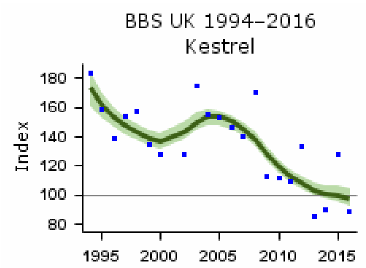
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS England	20	1995-2015	604	-24	-29	-17		
	10	2005-2015	717	-27	-30	-21	>25	
	5	2010-2015	673	-12	-16	-6		
BBS Scotland	20	1995-2015	42	-69	-78	-52	>50	
	10	2005-2015	42	-59	-69	-40	>50	
	5	2010-2015	36	-32	-50	-4	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

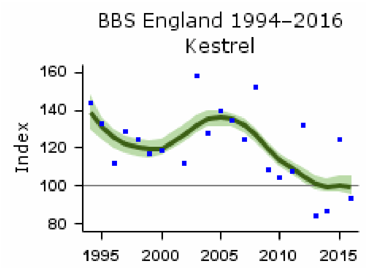
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



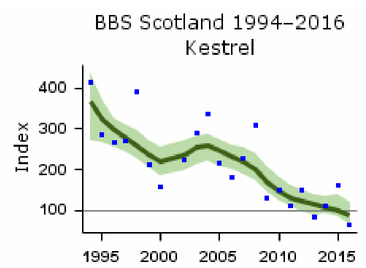
CBC/BBS England graph



BBS UK graph

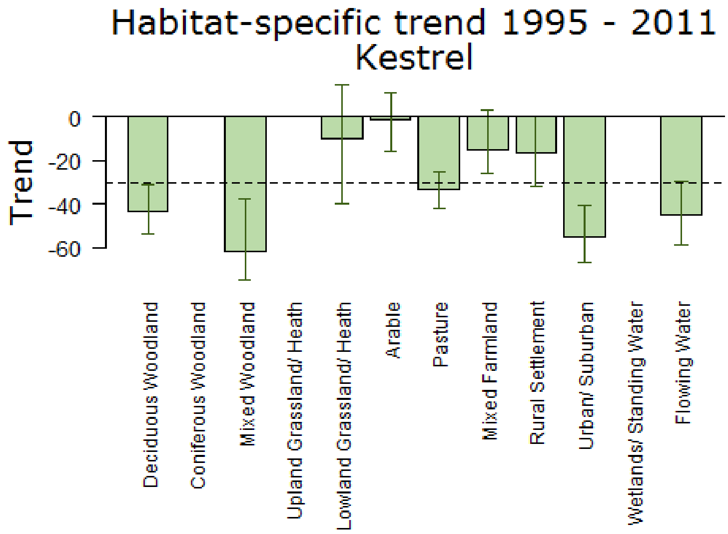


BBS England graph



BBS Scotland graph

Population trends by habitat



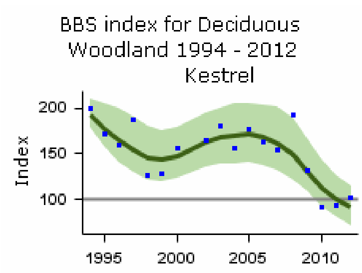
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

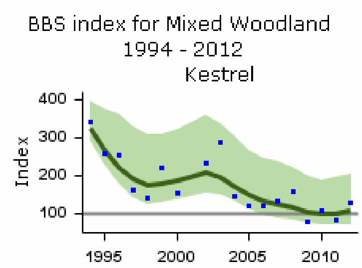
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	89	-44	-54	-31
Mixed Woodland	16	1995-2011	38	-62	-75	-38
Lowland Grassland/ Heath	16	1995-2011	39	-10	-40	15
Arable	16	1995-2011	144	-2	-16	11
Pasture	16	1995-2011	225	-33	-42	-25
Mixed Farmland	16	1995-2011	110	-15	-26	3
Rural Settlement	16	1995-2011	109	-17	-32	0
Urban/ Suburban	16	1995-2011	44	-55	-67	-41
Flowing Water	16	1995-2011	63	-45	-59	-30

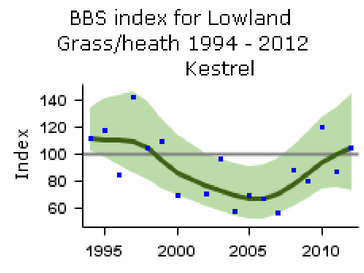
Further information on habitat-specific trends, please follow link here.



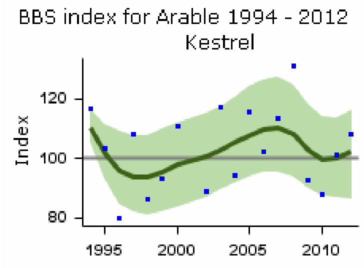
Habitat graph



Habitat graph



Habitat graph



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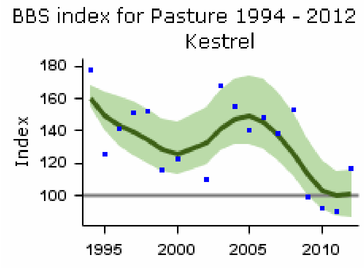
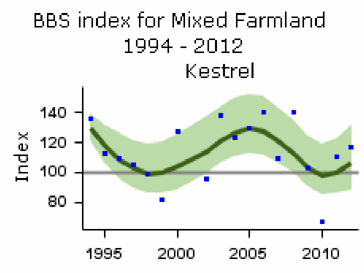


Habitat graph



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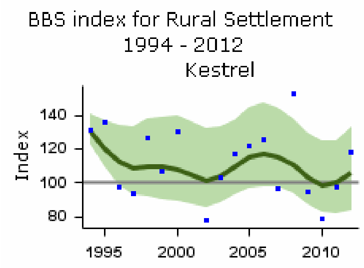

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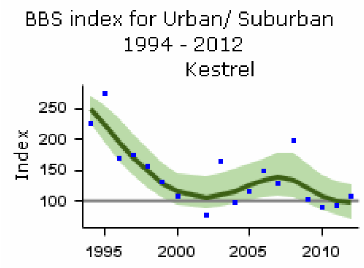
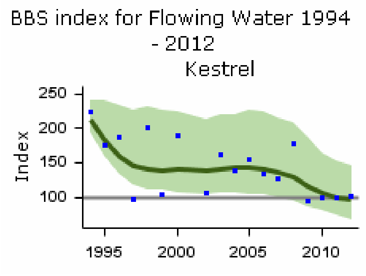
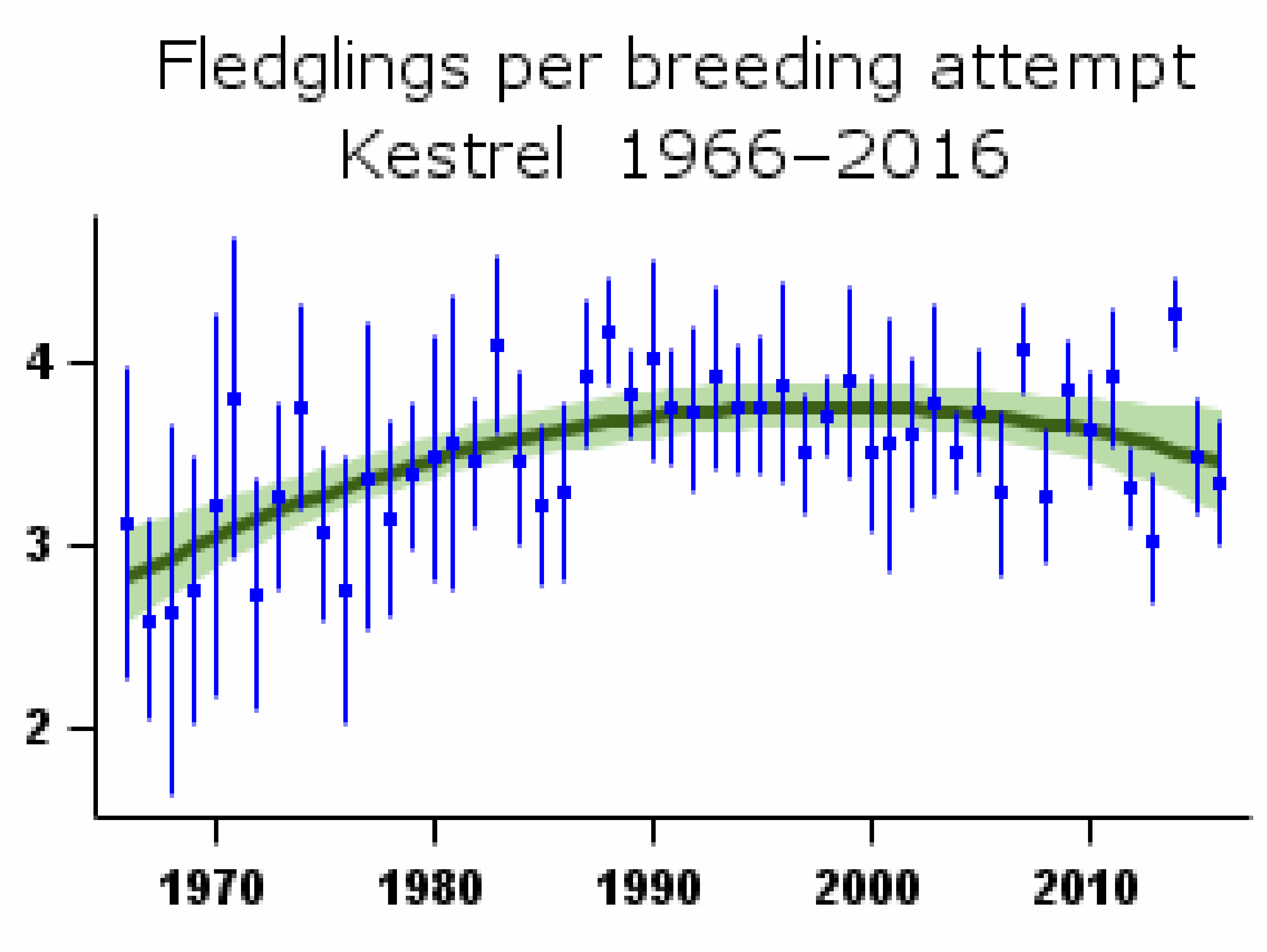


Habitat graph

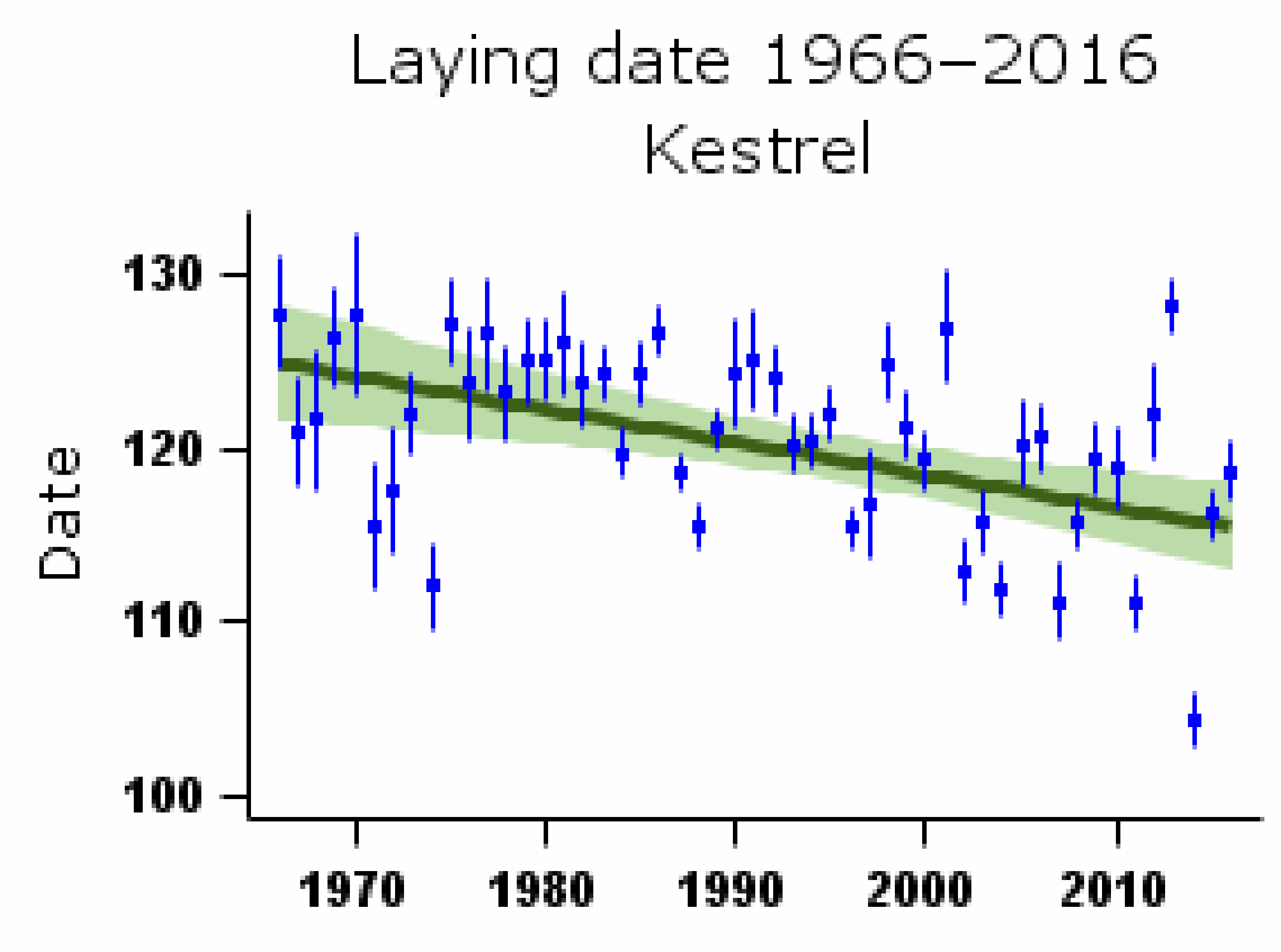


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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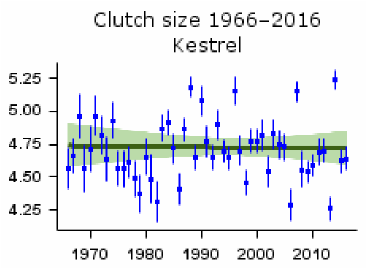
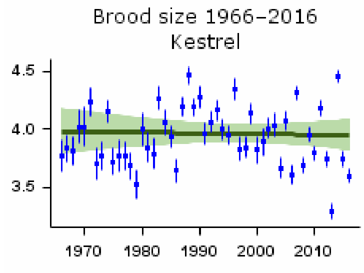
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	44	Curvilinear	2.89 fledglings	3.50 fledglings	21.1%		
Clutch size	48	1967-2015	65	None					
Brood size	48	1967-2015	181	None					
Nest failure rate at egg stage	48	1967-2015	44	Curvilinear	0.80% nests/day	0.11% nests/day	-86.2%		
Nest failure rate at chick stage	48	1967-2015	77	None					
Laying date	48	1967-2015	26	Linear decline	May 5	Apr 26	-9 days		Small sample

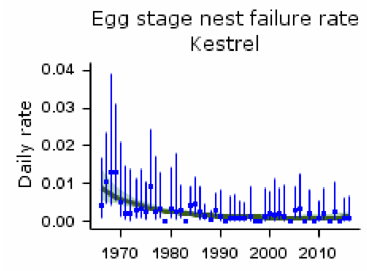
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



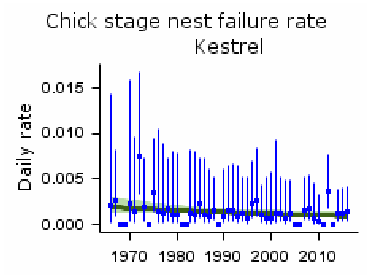
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



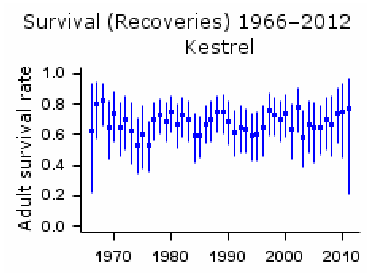
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Causes of change

At present, the link between potential factors and the population trend of Kestrels has not been established and new research is needed. In the meantime, landowners keen to offer suitable Kestrel habitat should provide grassy cover for small mammals.

Change factor	Primary driver	Secondary driver
Demographic	Reduced survival	
Ecological	Unknown	

Further information on causes of change

The main period of decline in Britain occurred from the mid 1970s to the late 1980s and it has been linked to the effects of agricultural intensification on farmland habitats and their populations of small mammals (Gibbons et al. 1993), but it is interesting to notice that the number of nestlings fledged per breeding attempt had not declined, suggesting that, in areas retaining Kestrels, small mammals were not limiting fledging success. Integrated analyses suggest that changes in first-year and, particularly, adult survival are the primary contributors to population change (Robinson et al. 2014).

Kestrels hunt a variety of prey, including voles, in particular in farmland settings (Shrubb 1993). Field voles Microtus agrestis favour habitats that can provide dense, grassy cover and a thick litter layer (Hansson 1977). Their population fluctuates in four-year cycles and it has been suggested that this might affect Kestrels that do not switch to other prey such as other small mammals, birds and insects (Shrubb 1993). There is no evidence, however, that Kestrels in the UK fluctuate alongside vole numbers. There is also, at present, no evidence that availability of nest sites limit population size of this raptor. A study over 23 years in a coniferous forest in northern England found a negative relationship between the numbers of Kestrels and Goshawks Accipiter gentilis, and remains of the smaller species near Goshawk nests (Petty et al. 2003). The impact of this larger raptor on population trend of Kestrels is not clear at the national level; however, it may be a factor at a local scale and more studies should focus on predation on Kestrels by other raptors.

Species high in the food chain are at risk of secondary poisoning, and birds of prey feeding on rodents are particularly vulnerable to anticoagulant rodenticides, but these are not the main cause of mortality of Kestrel in the UK (Walker et al. 2013) nor abroad (Christensen et al. 2012). A study on causes of death in raptors showed that the majority of Kestrels had died from collision and starvation (Newton et al. 1999). Carcasses reported for toxicology might be biased towards certain circumstances of death (eg collisions with vehicles) and could therefore underestimate the impact of rodenticides on Kestrel and other birds of prey. Targeted studies should be carried out, ideally to collect samples from live birds as well as dead ones.

Declining population of Kestrel is likely to be due to multiple factors. Changes in agricultural practice have reduced the habitat for its prey species, such as voles (although population trends of small mammals are not easy to establish (Flowerdew et al. 2004, Macdonald et al. 2007). Small rodents are abundant in road verges which provide suitable habitat for these mammals (Bellamy et al. 2000). In turn, Kestrel may be drawn to hunting along roads with increased risks of collision with passing vehicles, although there is no evidence for this at present. More research is needed to establish links between potential factors and Kestrel population change. In the meantime, landowners keen to offer suitable Kestrel habitat should provide grassy cover for small mammals.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Merlin

Falco columbarius

Key facts

Conservation listings:	Global: red (historical decline); at race level, aesalon red, subaesalon amber; current RBBP species
Long-term trend:	UK: probable increase
Population size:	1,200 (900-1,500) pairs in 2008 (APEP13: Ewing et al. 2011)

Status summary

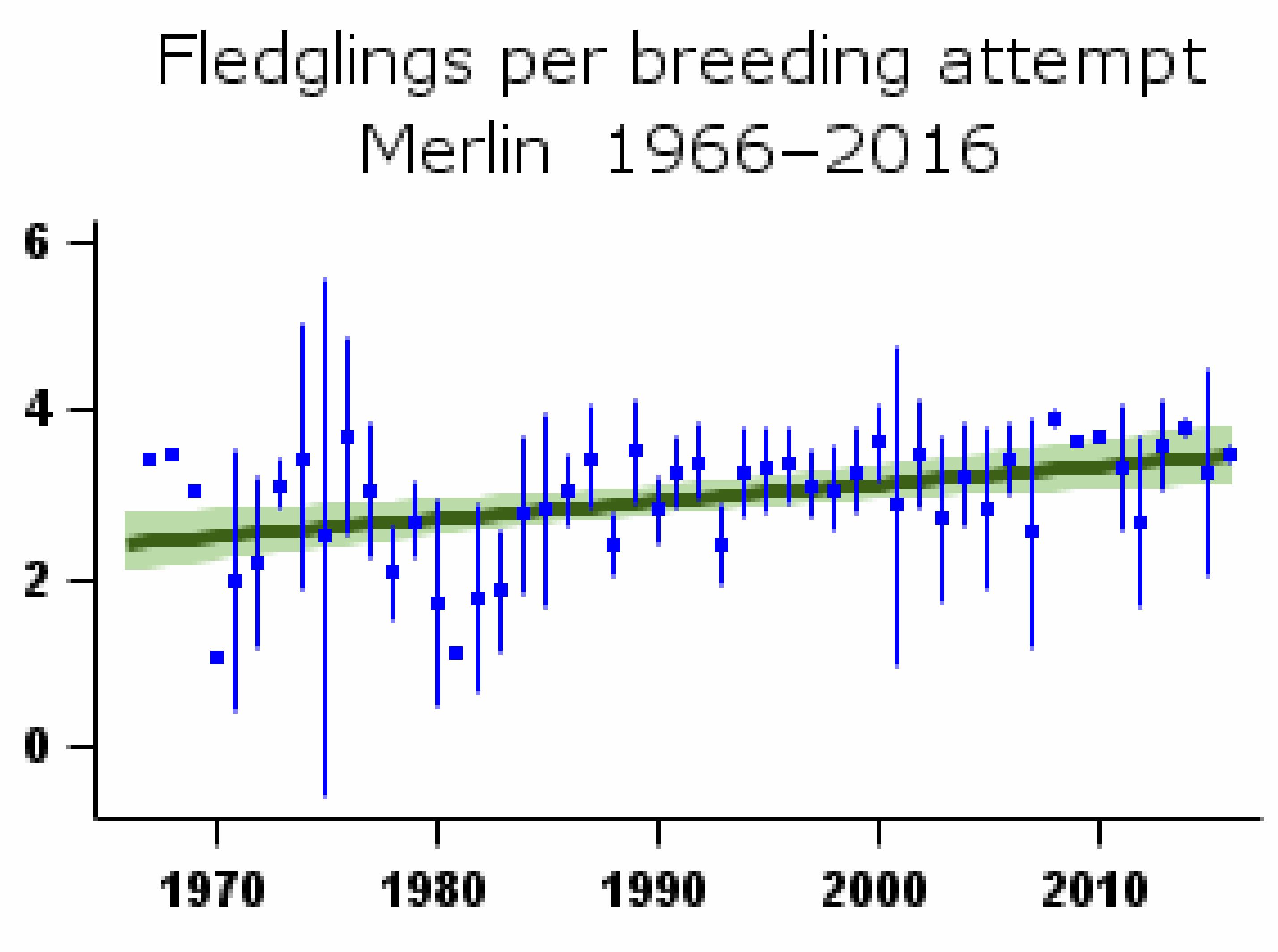
Having declined substantially over the past two centuries, Merlin shows indications of a recent doubling of UK population (Rebecca & Bainbridge 1998). This increase may be associated with an increased use of forest edge as a nesting habitat (Parr 1994, Little et al. 1995, Rebecca 2011). Because of its recent population upturn, the species was moved from the red to the amber list in 2002. It remains much too scarce, however, for annual population monitoring via BBS: dedicated observers and specialised field methods are required, as described by Hardey et al. (2009). Submissions to the Rare Breeding Birds Panel fall well short of the estimated UK total population but show an average of 1.86 young fledged per occupied territory during 1996-2004 (Holling & RBBP 2007a). Breeding performance has tended to improve since the 1960s, probably linked to the declining influence of organochlorine pesticides (Crick 1993, Newton 2013). Hatching rates in the southeast Yorkshire Dales were consistently higher than had been recorded in earlier studies in Northumberland (Wright 2005). A repeat survey of Merlin's British breeding status undertaken in 2008 found a non-significant decline of around 13% since the previous survey in 1993-94, with decline most noticeable in northern England (Ewing et al. 2011). A decline observed during a thirty year (1984-2014) study in south-east Scotland was attributed to changes in land use management in the breeding area (Heavisides et al. 2017).

The historical UK decline now warrants red rather than amber listing (Eatonet al. 2015).

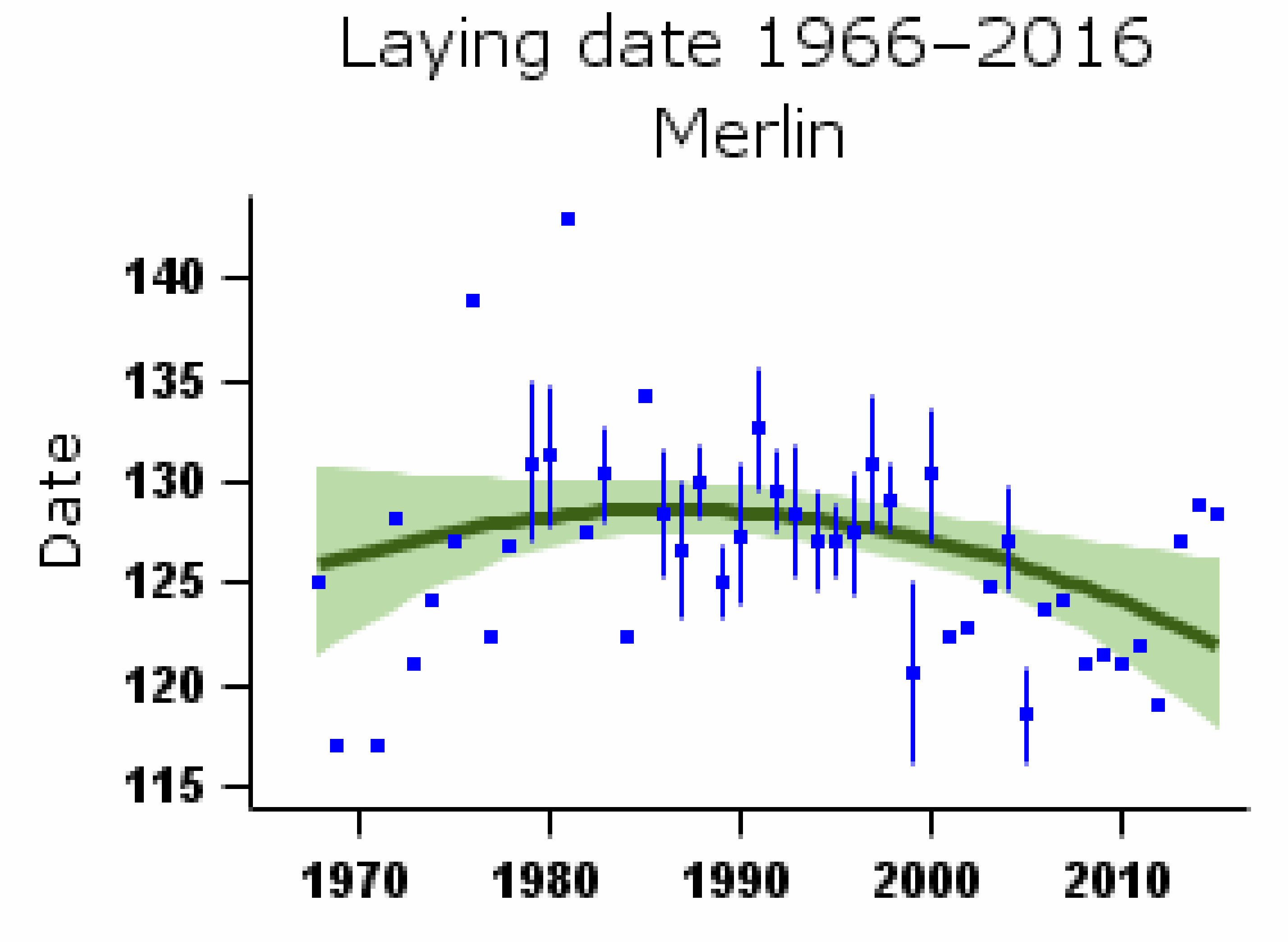
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

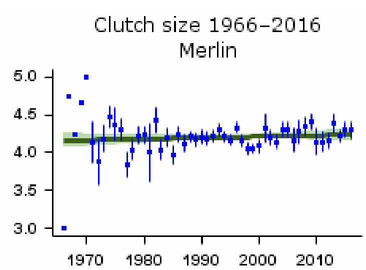


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

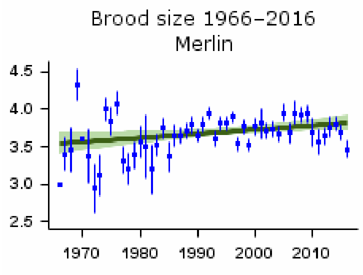
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	21	Linear increase	2.44 fledglings	3.44 fledglings	40.8%		
Clutch size	48	1967-2015	36	None					
Brood size	48	1967-2015	58	Linear increase	3.55 chicks	3.81 chicks	7.3%		
Nest failure rate at egg stage	48	1967-2015	23	Linear decline	0.73% nests/day	0.15% nests/day	-79.5%		Small sample
Nest failure rate at chick stage	48	1967-2015	29	Linear decline	0.99% nests/day	0.18% nests/day	-81.8%		Small sample
Laying date	46	1968-2014	7	Curvilinear	May 6	May 2	-4 days		Small sample

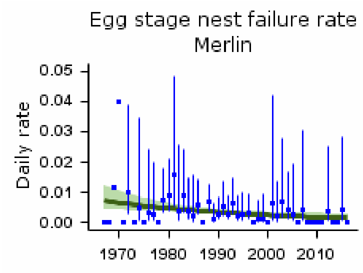
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



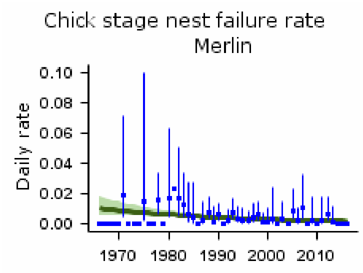
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Hobby

Falco subbuteo

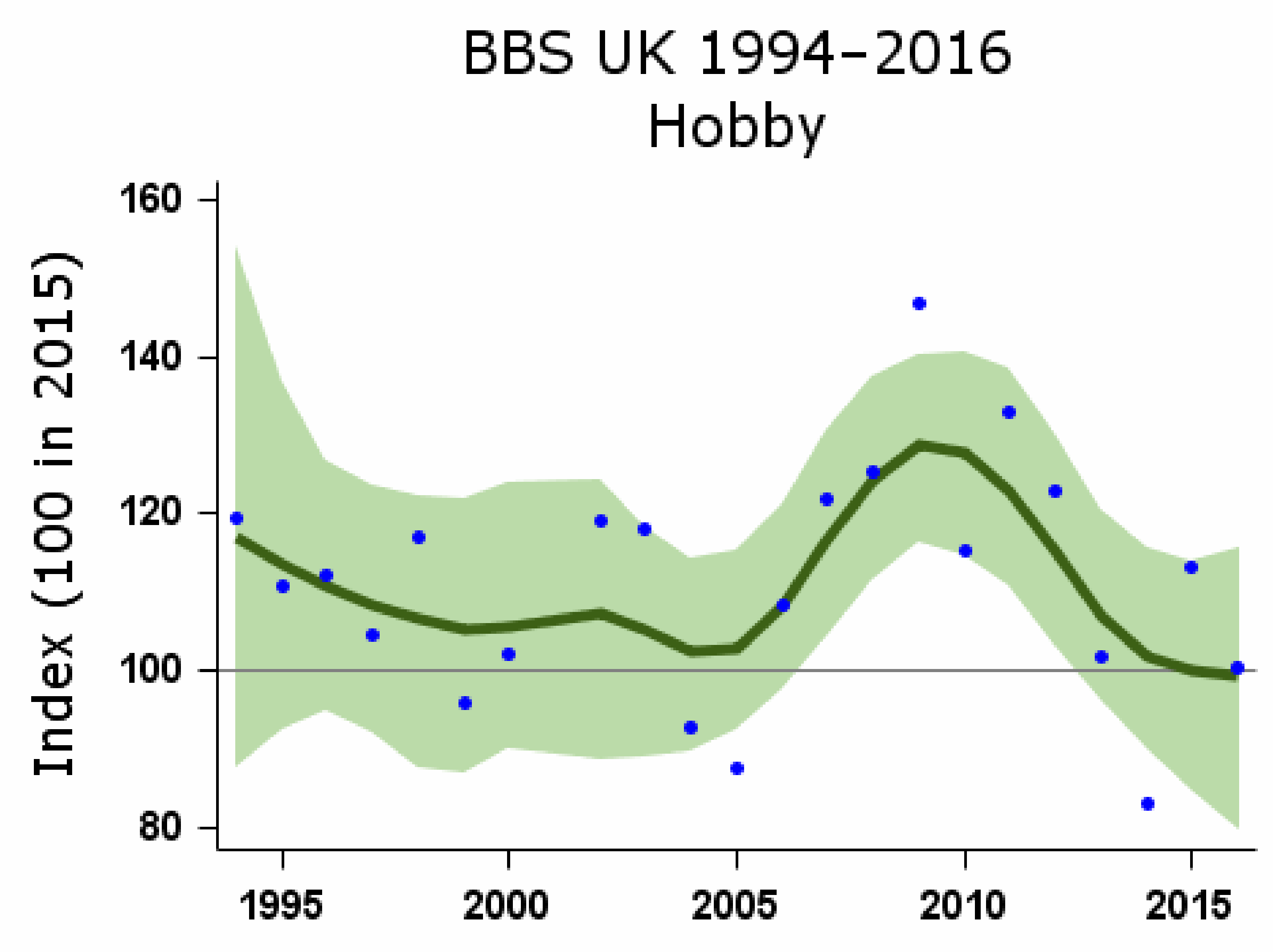
Key facts

Conservation listings:	Global: green; current RBBP species
Long-term trend:	UK, England: increase
Population size:	2,800 pairs in 2009 (APEP13: 2000 estimate (Clements 2001) updated using BBS trend)

Status summary

This species used to be too rare and unobtrusive for wide-scale monitoring but, following population increase, BBS is now able to produce a trend. Many BBS sightings must, however, refer to migrants, first-summer non-breeders, or to breeding birds from distant nests. To establish whether nesting occurs in a locality, dedicated observers and specialised field methods are required, as described by Hardey et al. (2009). The Rare Breeding Birds Panel collects annual data on nesting pairs, which under-represent the true population to unknown degrees, but adequately establish the long-term upward trend (eg Holling & RBBP 2014). RBBP guidelines for recording this species are 2016) looked at breeding densities from recent survey work in several areas, and concluded that the lower limit to the UK population estimate was 3,000 to 3,500 pairs, with perhaps as many as 5,000 pairs breeding. However, this is a tentative estimate, which needs to be confirmed with a full survey.

Numbers in parts of southeast England could be considerably higher than previously recognised (Clements & Everett 2012). The Hobby's distribution has spread markedly northwards in England since the 1970s (Gibbons et al. 1993), perhaps linked to increases in its dragonfly prey supplies (Prince & Clarke 1993) and to a decreasing dependency on its traditional heathland habitat, but the reasons underlying the increase are still only speculative (Clements 2001). The species is now widespread north to Lancashire and Co Durham (Balmer et al. 2013). A success rate of more than 90% was recorded for nests in Derbyshire during 1992-2001, with successful nests fledging a mean of 2.44 young (Messenger & Roome 2007). The small annual samples of nest record cards indicate no long-term change in either brood size or nest success.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

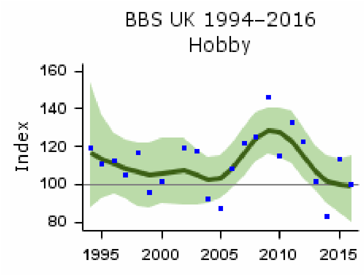
Population changes in detail

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

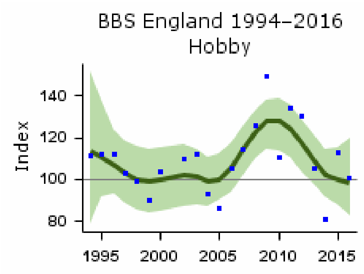
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	45	-12	-36	21		
	10	2005-2015	56	-3	-21	20		
	5	2010-2015	56	-22	-39	-3		
BBS England	20	1995-2015	43	-9	-35	24		
	10	2005-2015	54	0	-18	23		
	5	2010-2015	55	-22	-34	-1		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

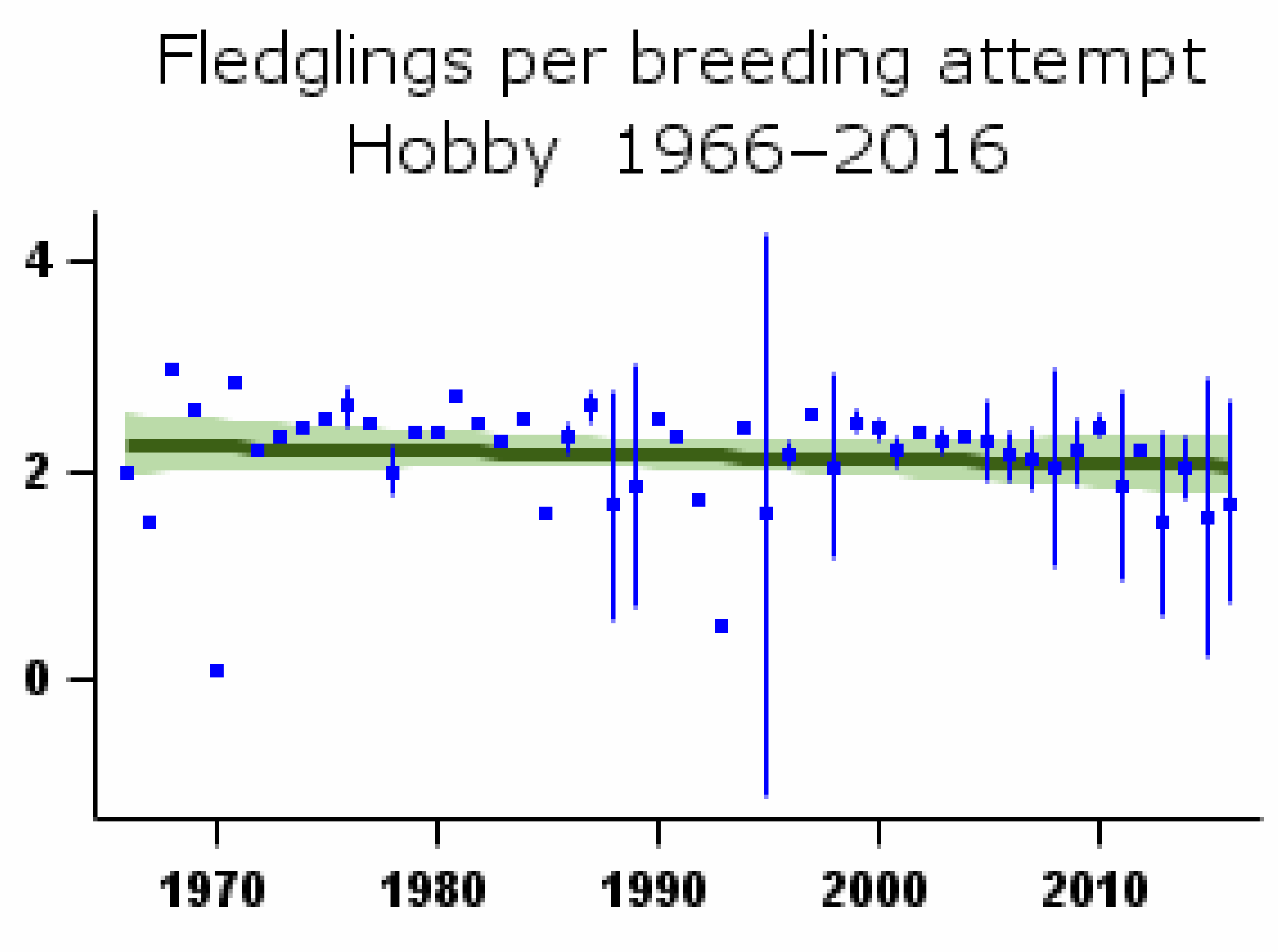


BBS UK graph

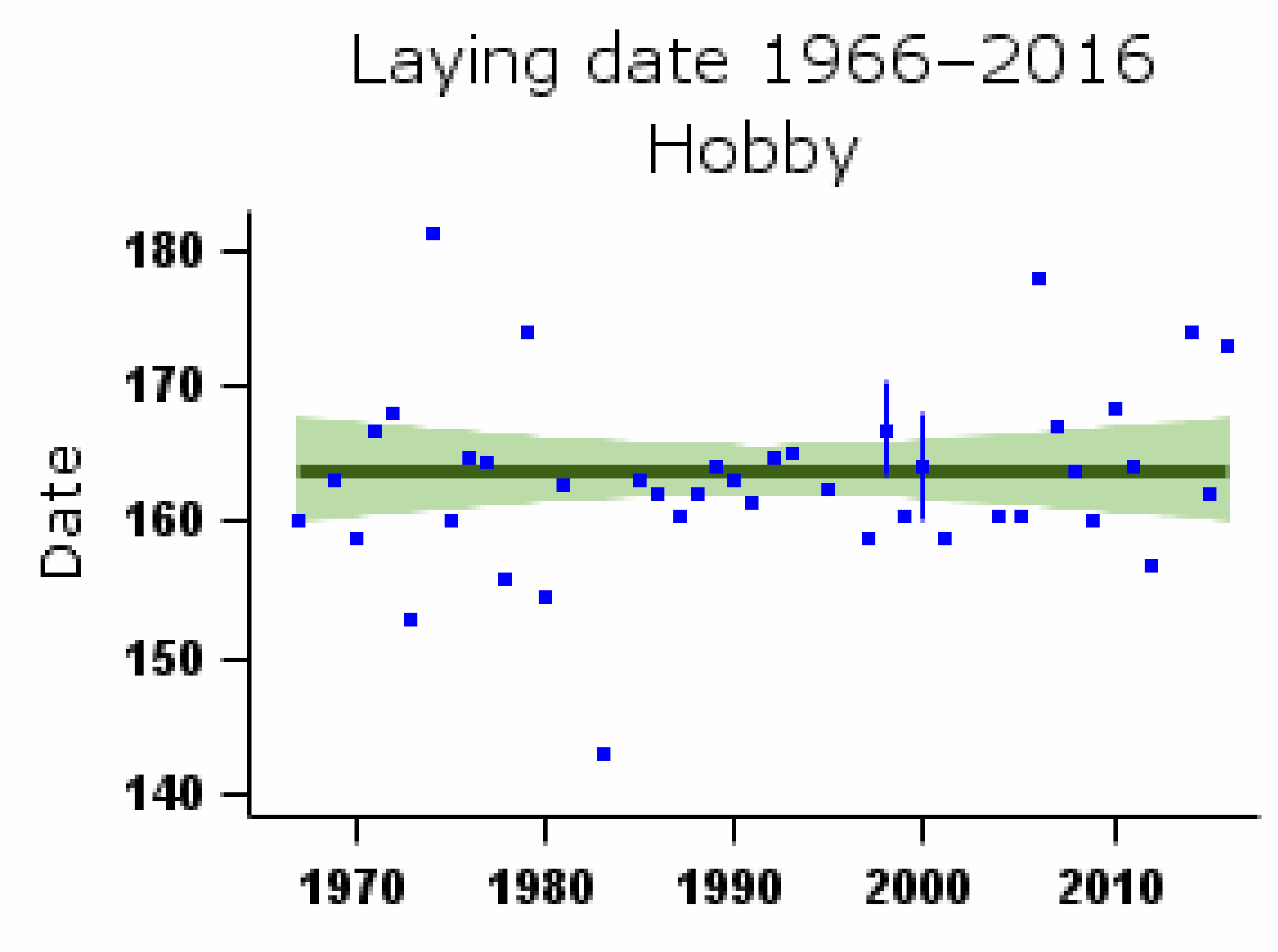


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

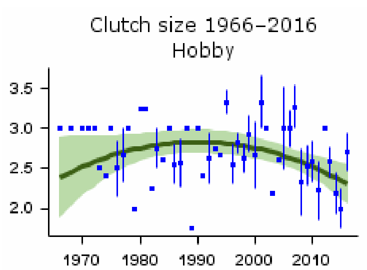


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

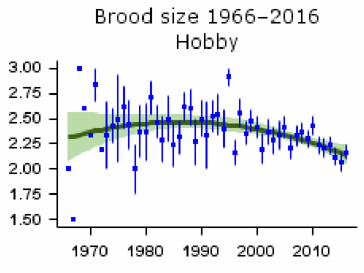
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	6	None					
Clutch size	48	1967-2015	7	Curvilinear	2.42 eggs	2.34 eggs	-3.3%		Small sample
Brood size	48	1967-2015	28	Curvilinear	2.33 chicks	2.15 chicks	-7.3%		Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Nest failure rate at chick stage	48	1967-2015	17	None					Small sample
Laying date	48	1967-2015	2	None			0 days		Small sample

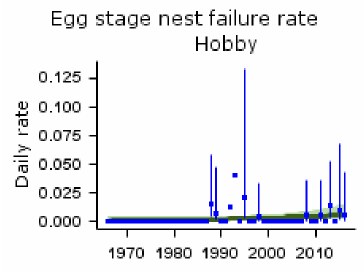
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



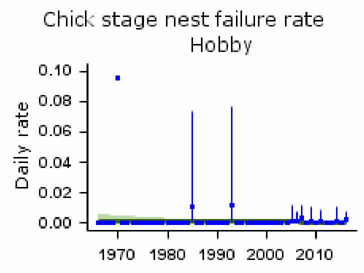
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Peregrine

Falco peregrinus

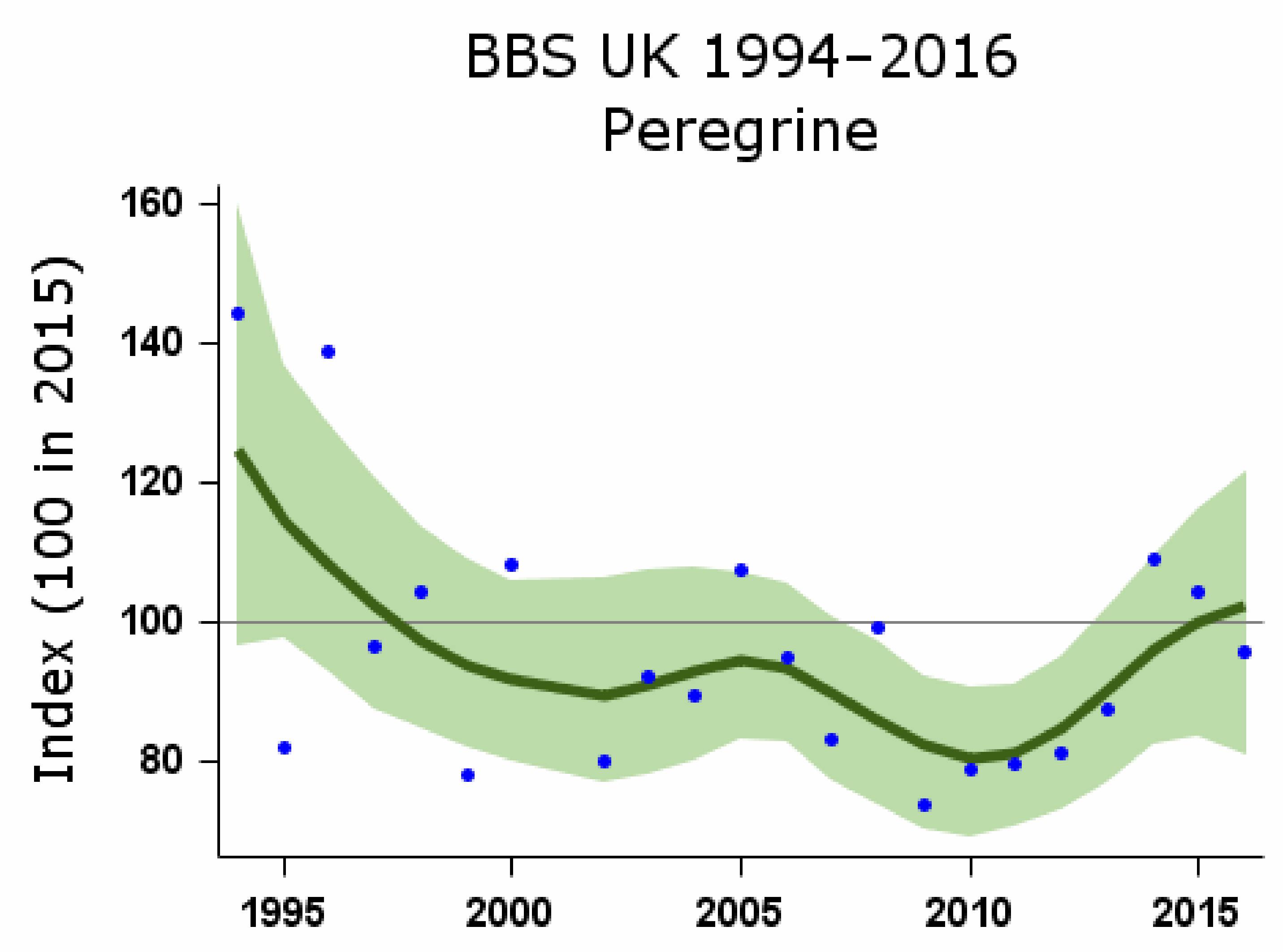
Key facts

Conservation listings:	Global: green; current RBBP species
Long-term trend:	UK, England, Northern Ireland: increase Scotland, Wales: decline since 2002
Population size:	1,500 pairs in UK and Isle of Man 2002 (APEP13: Banks et al. 2010); 1,505 pairs 2014 (Hayhow et al. 2015)

Status summary

The number of breeding pairs in the UK and Isle of Man is exceptionally well known. There is an estimate of 874 pairs for the 1930s and the population has been estimated every decade since 1961 as follows: 1961 - 385 pairs; 1971 - 489 pairs; 1981 - 728 pairs; and 1991 - 1,283 pairs (BTO/JNCC/RSPB/Raptor Study Groups; Ratcliffe 1993). In 2002, 1,437 breeding pairs were found in the UK and Isle of Man (Banks et al. 2003, 2010) though around 50 pairs were missed in Wales (Dixon et al. 2008). The latest figure, 1,505 pairs in 2014 (still provisional), represents a further increase of 5% overall since 2002 (Peregrine Survey; Hayhow et al. 2015).

The UK population size, distribution and breeding performance have all largely recovered from the poisonous effects of organochlorine pesticides in the 1950s and 1960s (Newton 2013). Nest record information for the UK as a whole shows a significant rise in the number of fledglings per breeding attempt. Populations and breeding performance have declined, however, in northwest Scotland and the Northern Isles (Crick & Ratcliffe 1995). Near stability between the 2002 and 2014 surveys masks a major distributional shift away from the uplands (North East Scotland Raptor Study Group 2015) and towards lowland regions and the coast; Peregrine pairs in England have increased fivefold since 1981 and now, for the first time, outnumber those in Scotland (Hayhow et al. 2015). Illegal persecution continues to limit numbers but persecution in lowland areas decreased during the 20th century, allowing numbers to benefit from the ban on organochlorine agrochemicals (Hayhow et al. 2015). In northern England, breeding productivity on grouse moors has been 50% lower than at nests in other habitats, indicating that illegal persecution on land managed for Amar et al. 2012).



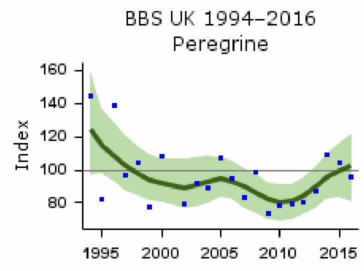
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	50	-13	-39	19		
	10	2005-2015	67	6	-19	32		
	5	2010-2015	68	25	-4	59		

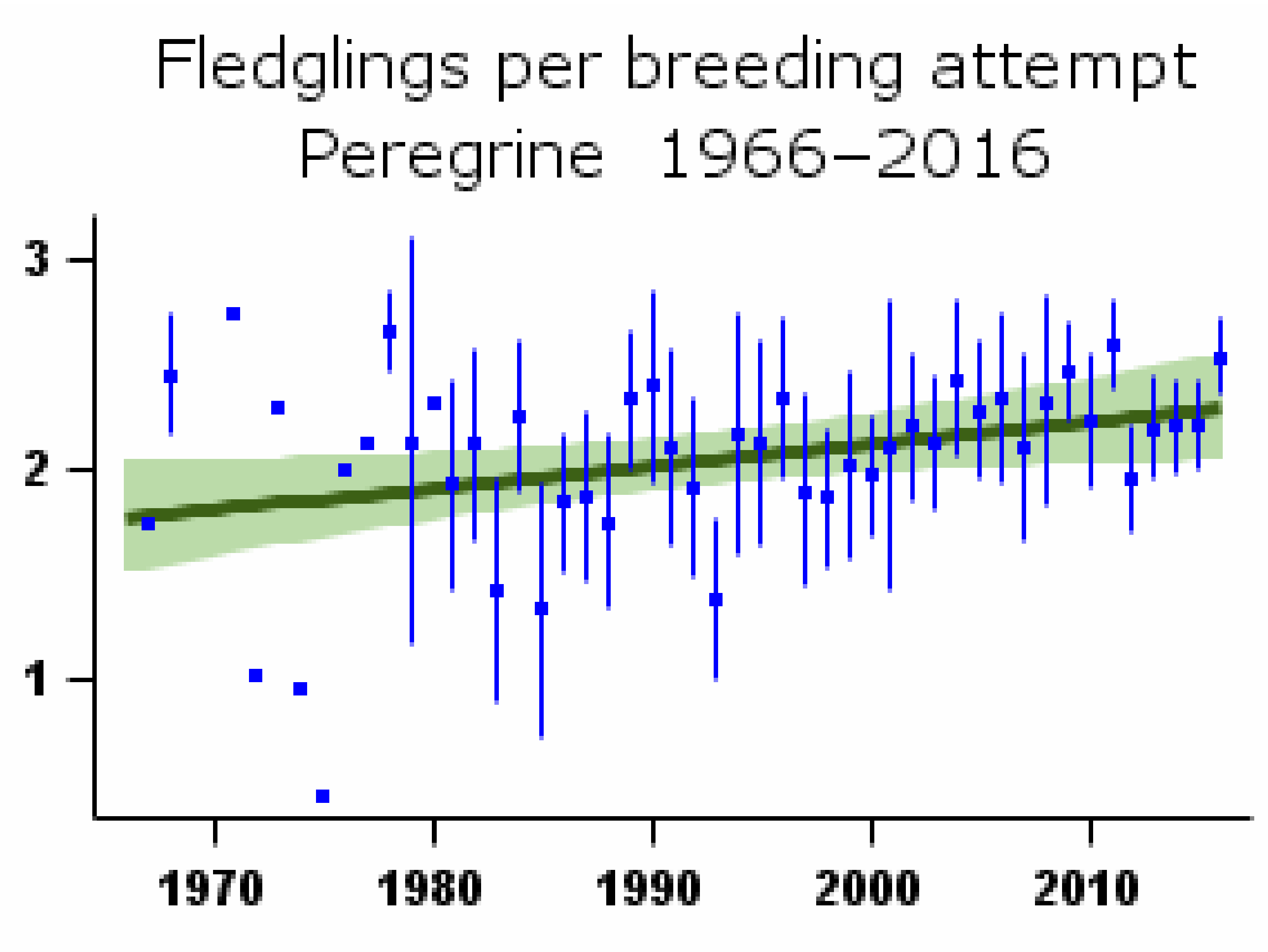
Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

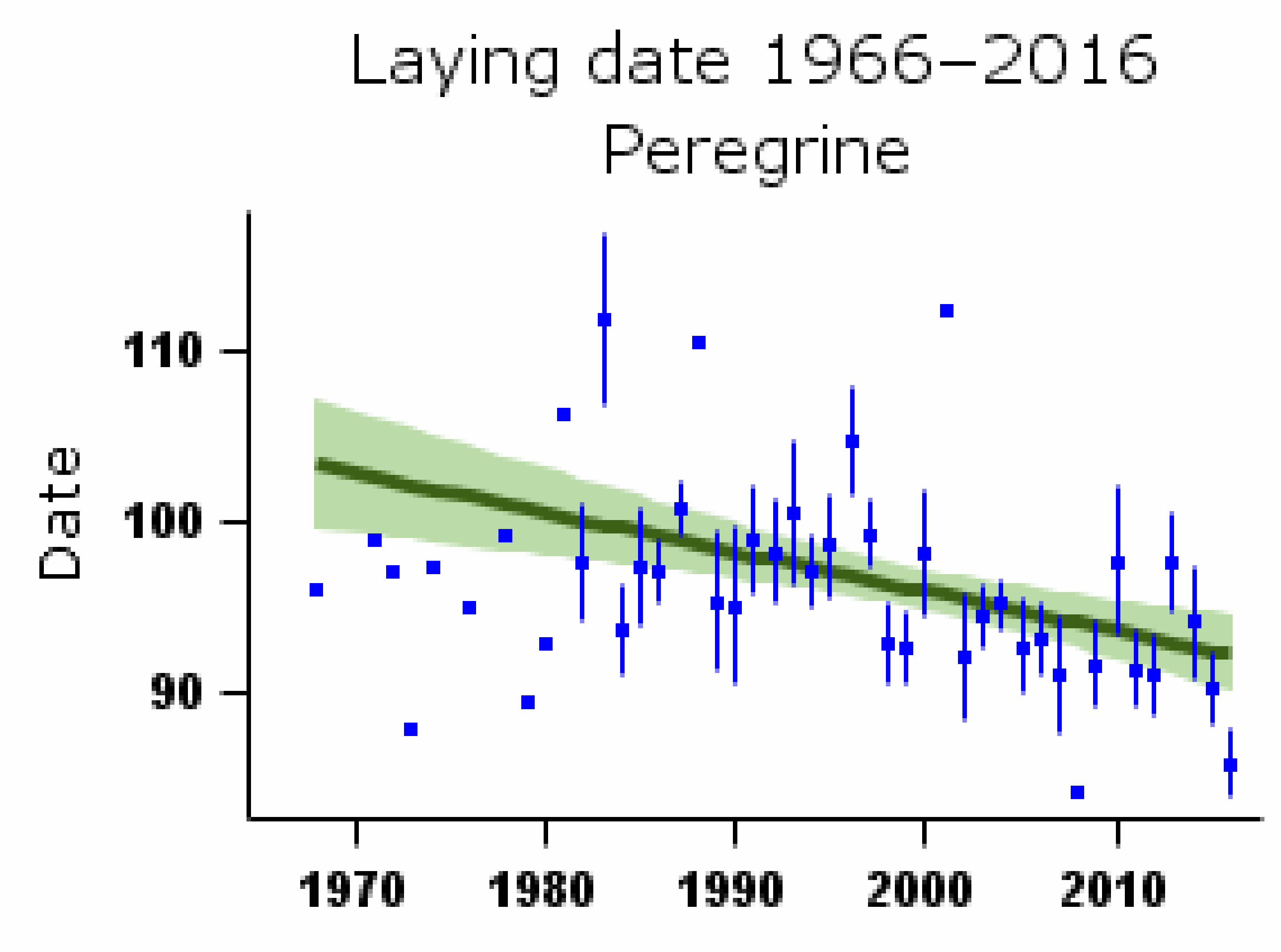


BBS UK graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

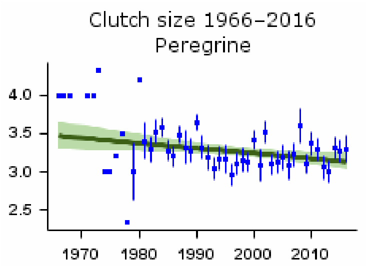


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

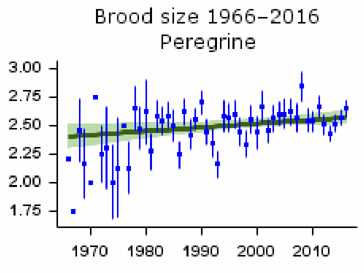
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	25	Linear increase	1.78 fledglings	2.28 fledglings	28.0%		
Clutch size	48	1967-2015	19	Linear decline	3.46 eggs	3.13 eggs	-9.4%		Small sample
Brood size	48	1967-2015	56	Linear increase	2.40 chicks	2.56 chicks	6.6%		
Nest failure rate at egg stage	48	1967-2015	26	Linear decline	0.73% nests/day	0.26% nests/day	-64.4%		Small sample
Nest failure rate at chick stage	48	1967-2015	31	None					
Laying date	47	1968-2015	12	Linear decline	Apr 13	Apr 3	-10 days		Small sample

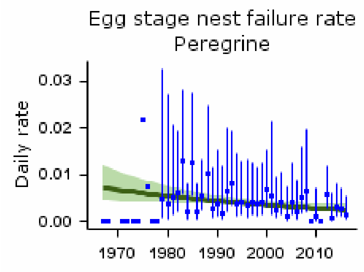
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



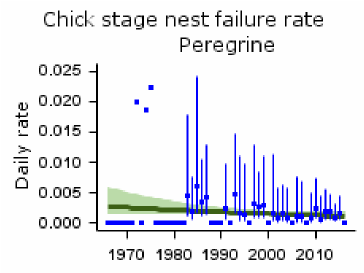
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Ring-necked Parakeet

Psittacula krameri

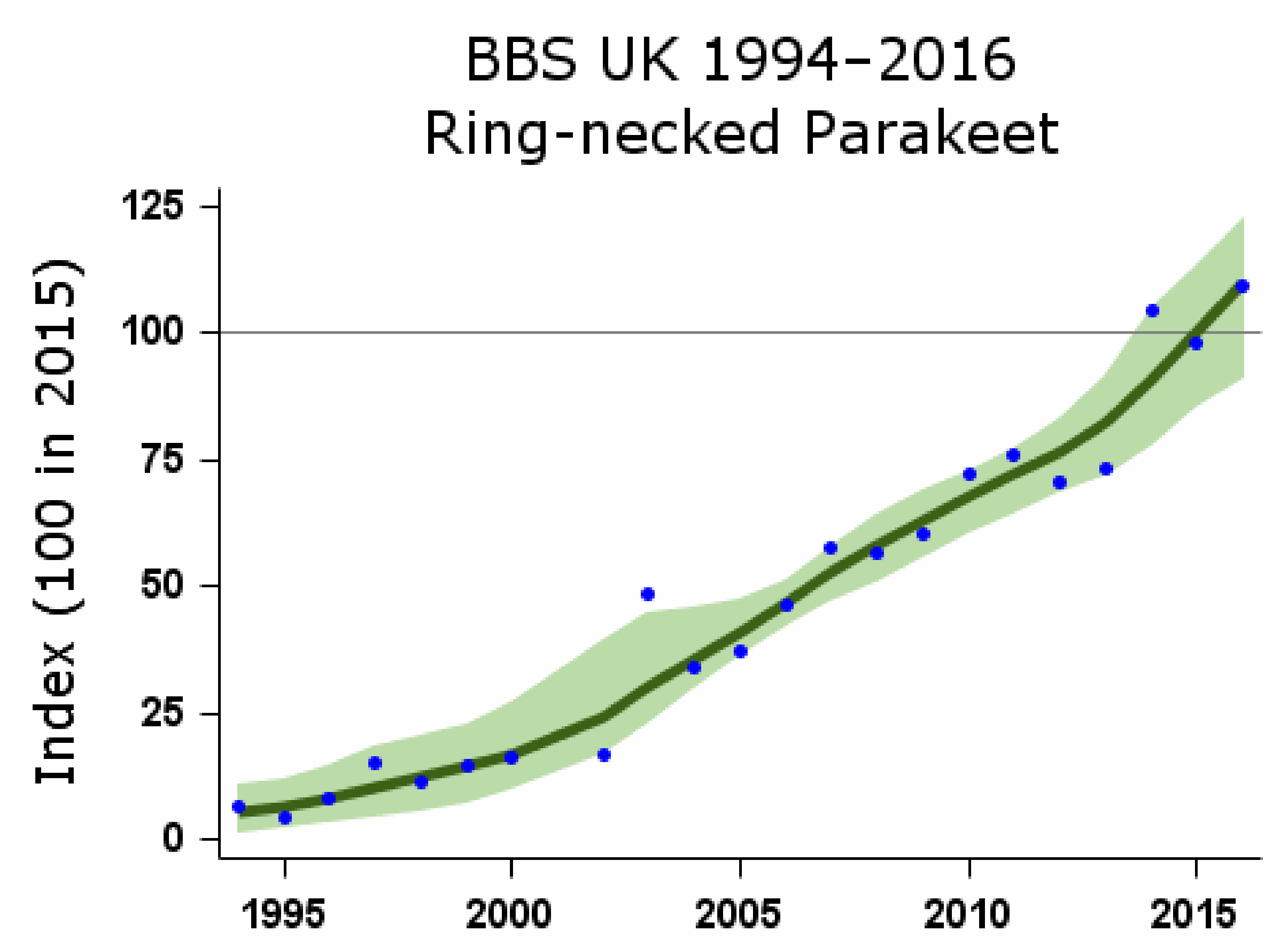
Key facts

Conservation listings:	Global: Least Concern Europe: unlisted (introduced) UK: unlisted (introduced)
Long-term trend:	England: rapid increase
Population size:	8,600 pairs in 2012 (APEP13: H. Peck pers. comm., Project Parakeet)

Status summary

Following escapes and releases over many decades, this parrot, native to Africa and southern Asia, began breeding annually in the UK in 1969. Substantial but highly localised self-sustaining populations have since built up, with the two largest being in Greater London and in the Isle of Thanet, east Kent. Genetic modelling has traced the origin of these birds, brought here initially by the cagebird trade, to the northerly parts of the native range in Pakistan and northern India (Jackson et al. 2015).

Population modelling has revealed that populations in Greater London have increased by approximately 30% per year, and those in Thanet by 15% per year, but that the range has expanded by only 0.4 km per year in the Greater London area and hardly at all in Thanet (Butler 2003). National BBS data indicate more than a tenfold increase since 1995. There have been recent post-breeding estimates of more than 30,000 birds at large in the UK (Holling & RBBP 2011a). From 108 nests located during 2001-03, the mean first-egg date was 26 March, median clutch size was 4, and overall nest success 72%, making productivity sufficient to account for the observed population rise, assuming mortality rates remained low (Butler et al. 2013). The species has already been reported causing economic damage to crops, as has occurred elsewhere in its native and introduced range (Butler 2003). A recent study in Belgium has identified negative effects on breeding Strubbe & Matthysen 2007, 2009, Strubbe et al. 2010). No such effects have yet been detectable in Britain, however (Newson et al. 2011). There is evidence, however, that the presence of parakeets reduces feeding rates among native birds (Peck et al. 2014), with a study using video recording in Paris suggesting that Le Louarnet al. 2016).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	77	1455	579	4457		
	10	2005-2015	121	143	75	217		
	5	2010-2015	139	47	27	79		
BBS England	20	1995-2015	77	1455	526	4650		
	10	2005-2015	120	143	81	220		
	5	2010-2015	139	47	28	80		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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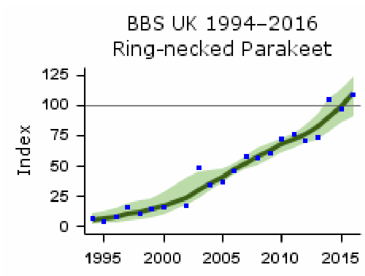
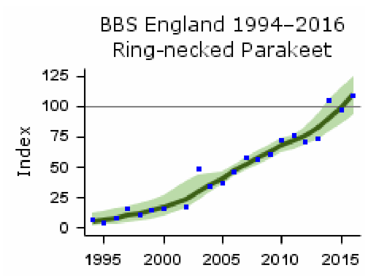


BBS UK graph



BBS England graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Magpie

Pica pica

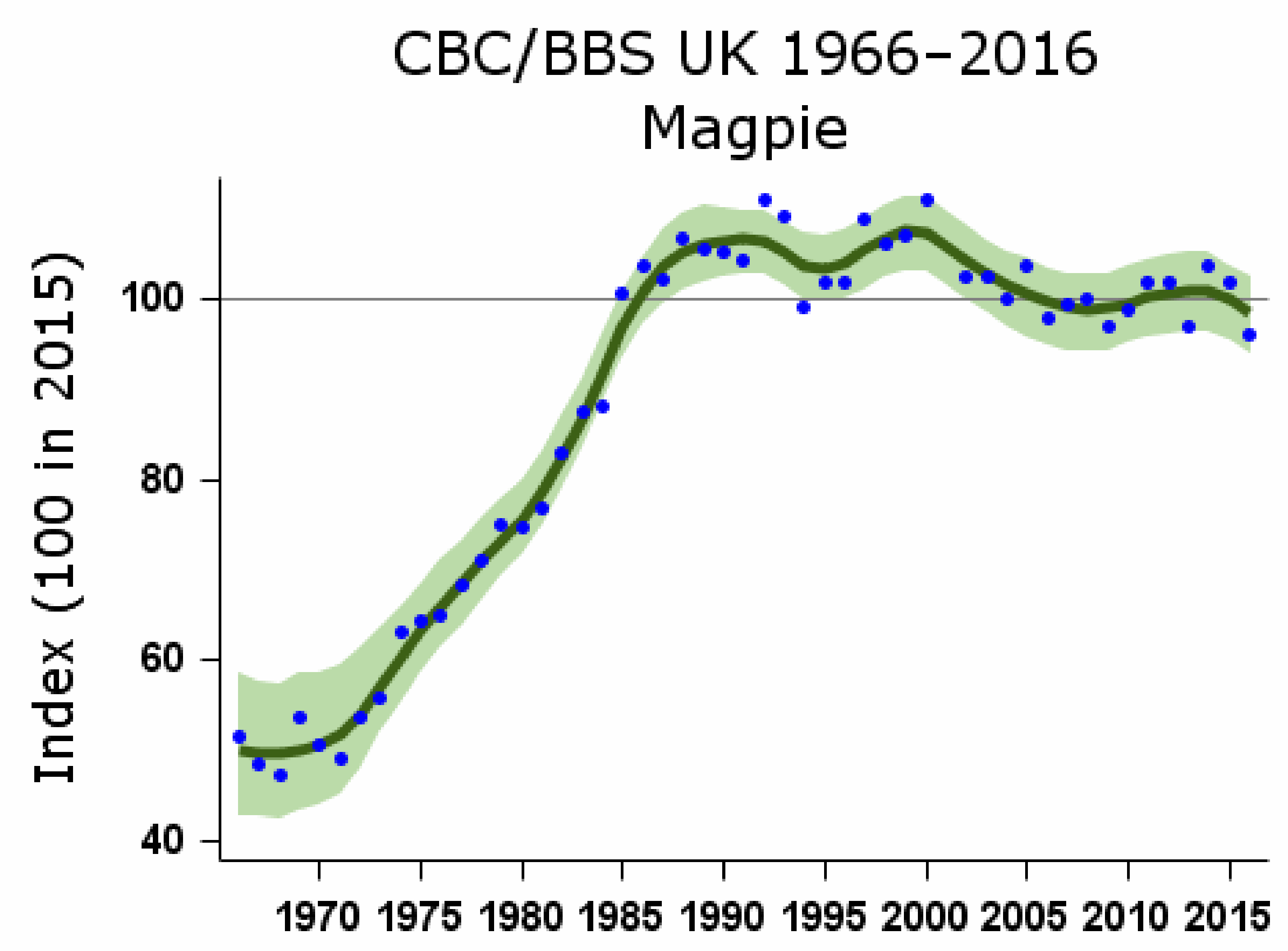
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	600,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	Human habitats
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Magpies increased steadily until the late 1980s, after which abundance stabilised (Gregory & Marchant 1996). The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

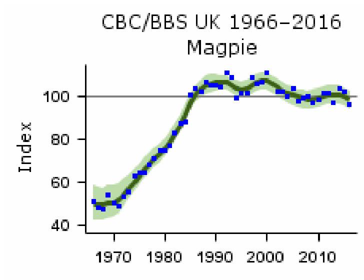
Population changes in detail

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

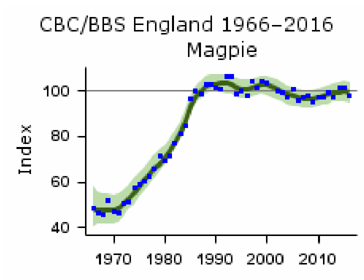
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	968	101	61	147		
	25	1990-2015	1719	-6	-12	0		
	10	2005-2015	2397	-1	-4	2		
	5	2010-2015	2452	0	-2	3		
CBC/BBS England	48	1967-2015	817	110	70	160		
	25	1990-2015	1445	-3	-10	3		
	10	2005-2015	2010	2	-1	5		
	5	2010-2015	2050	3	1	5		
BBS UK	20	1995-2015	2012	-2	-5	2		
	10	2005-2015	2397	-1	-4	2		
	5	2010-2015	2452	0	-2	2		
BBS England	20	1995-2015	1682	0	-3	5		
	10	2005-2015	2010	2	-1	5		
	5	2010-2015	2050	3	0	5		
BBS Scotland	20	1995-2015	57	39	4	103		
	10	2005-2015	75	15	-6	54		
	5	2010-2015	86	9	-6	26		
BBS Wales	20	1995-2015	173	-21	-30	-13		
	10	2005-2015	196	-7	-15	1		
	5	2010-2015	201	-10	-17	-3		
BBS N.Ireland	20	1995-2015	85	6	-19	36		
	10	2005-2015	99	-15	-26	-3		
	5	2010-2015	96	-8	-17	2		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

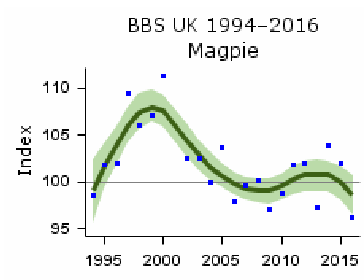
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



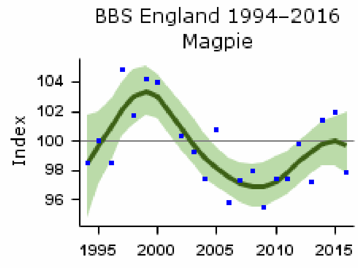
CBC/BBS UK graph



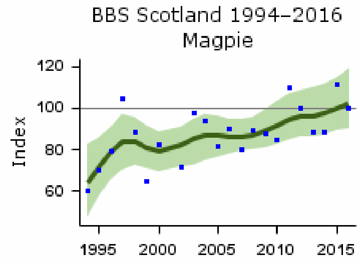
CBC/BBS England graph



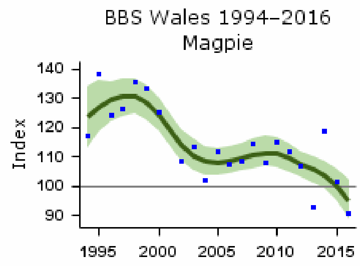
BBS UK graph



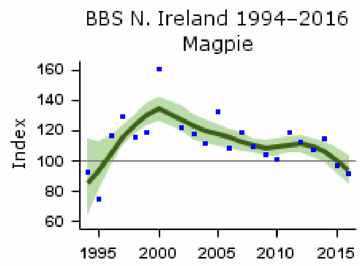
BBS England graph



BBS Scotland graph

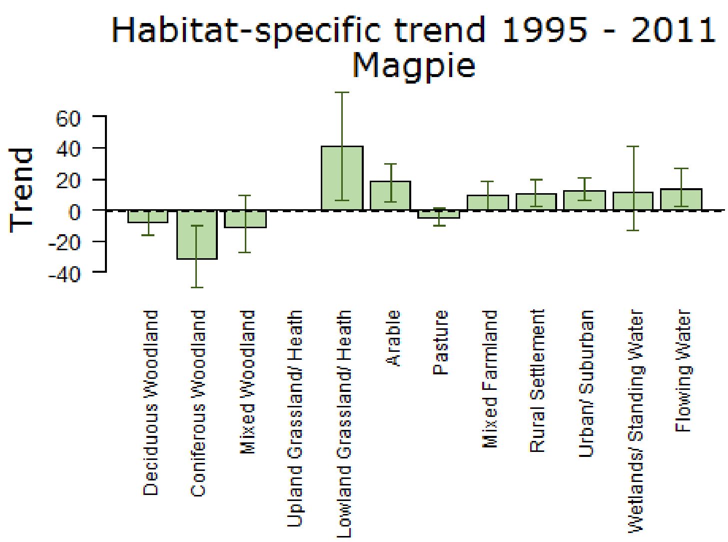


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



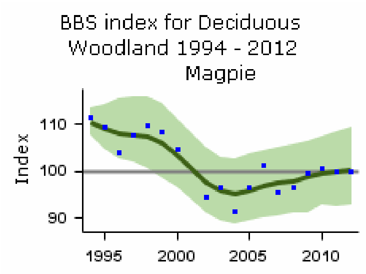
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

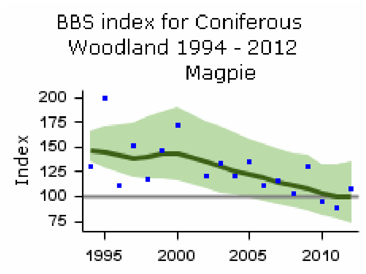
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	470	-8	-16	0
Coniferous Woodland	16	1995-2011	58	-31	-49	-10
Mixed Woodland	16	1995-2011	181	-11	-27	9
Lowland Grassland/ Heath	16	1995-2011	100	41	6	75
Arable	16	1995-2011	404	18	5	30
Pasture	16	1995-2011	911	-5	-10	1
Mixed Farmland	16	1995-2011	412	9	0	18
Rural Settlement	16	1995-2011	553	11	2	20
Urban/ Suburban	16	1995-2011	379	13	6	21
Wetlands/ Standing Water	16	1995-2011	67	11	-13	41
Flowing Water	16	1995-2011	310	14	2	27

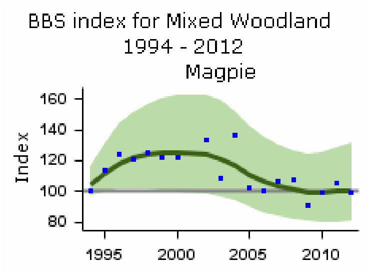
Further information on habitat-specific trends, please follow link [here](#).



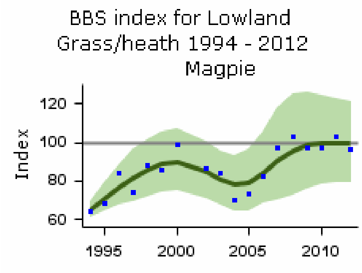
Habitat graph



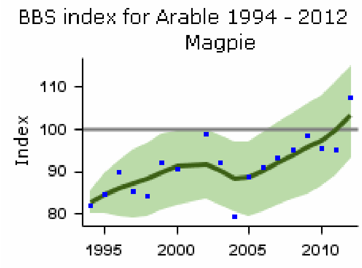
Habitat graph



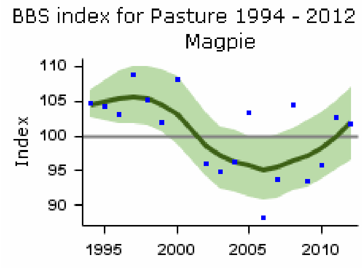
Habitat graph



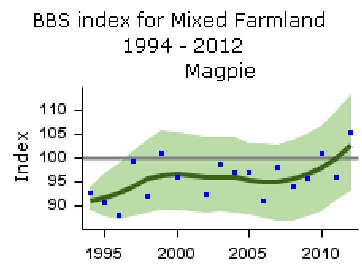
Habitat graph



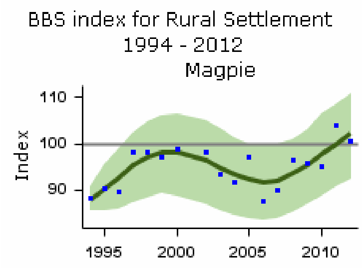
Habitat graph



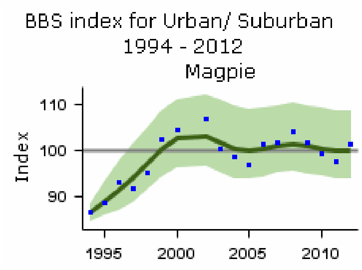
Habitat graph



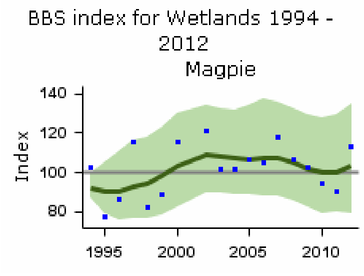
Habitat graph



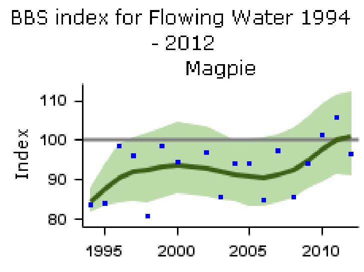
Habitat graph



Habitat graph

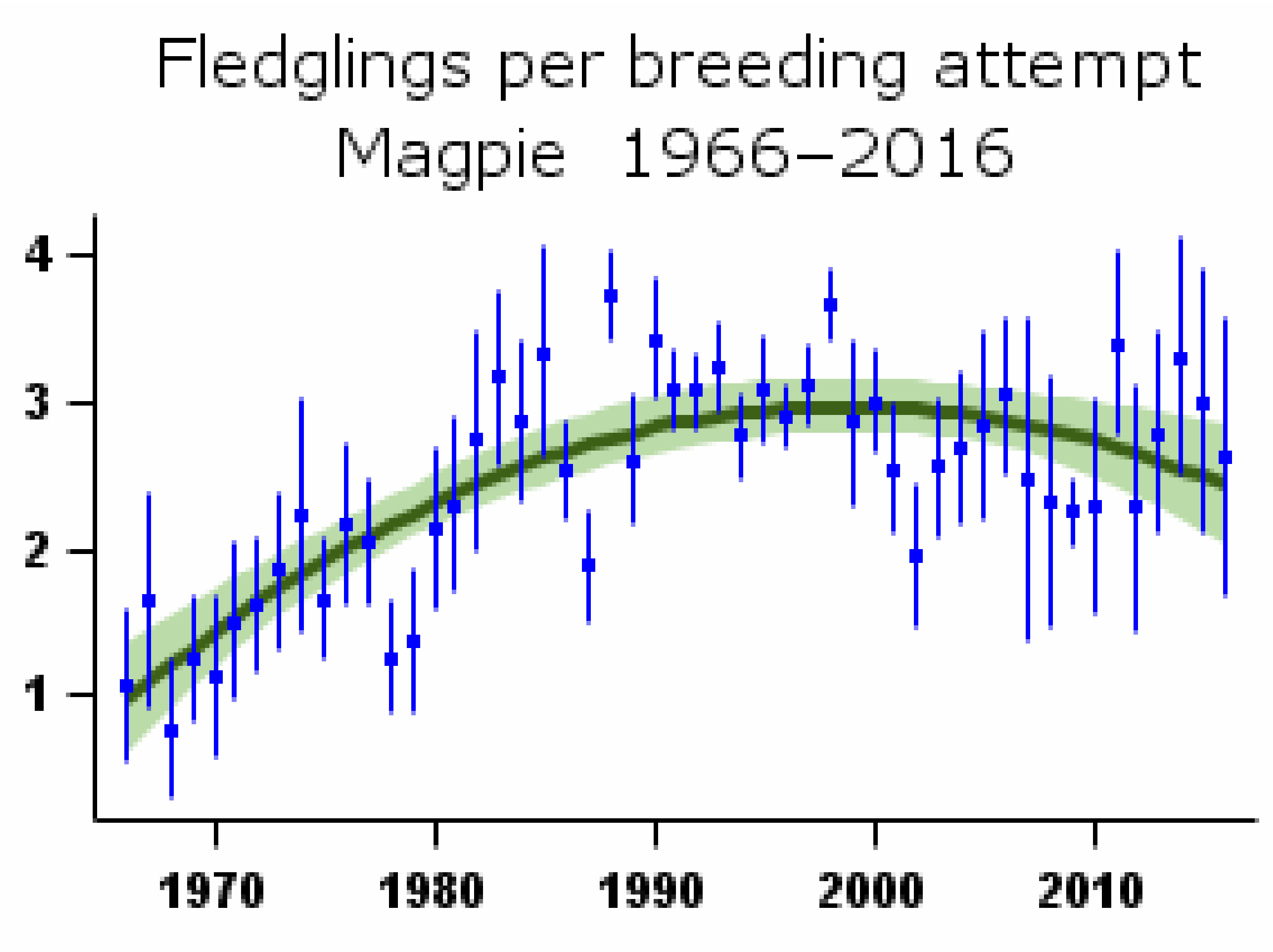


Habitat graph

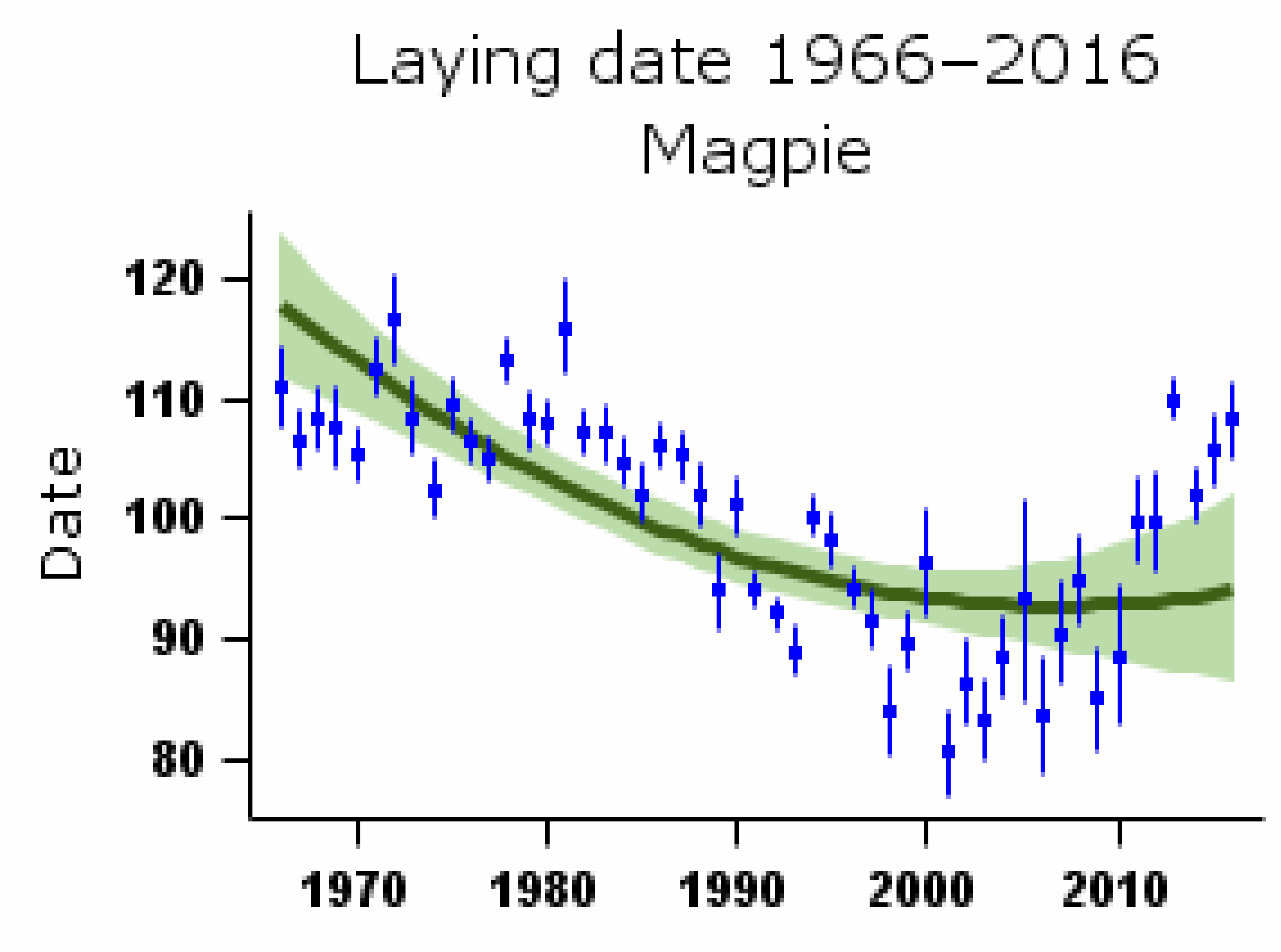


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

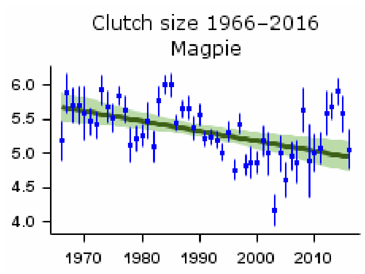


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

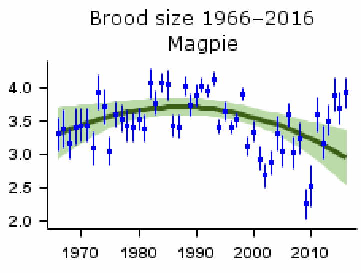
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	41	Curvilinear	1.10 fledglings	2.49 fledglings	127.1%		
Clutch size	48	1967-2015	41	Linear decline	5.67 eggs	4.97 eggs	-12.3%		
Brood size	48	1967-2015	79	Curvilinear	3.34 chicks	3.00 chicks	-10.2%		
Nest failure rate at egg stage	48	1967-2015	48	Linear decline	2.72% nests/day	0.20% nests/day	-92.6%		
Nest failure rate at chick stage	48	1967-2015	46	Curvilinear	2.21% nests/day	0.29% nests/day	-86.9%		
Laying date	48	1967-2015	32	Curvilinear	Apr 27	Apr 4	-23 days		

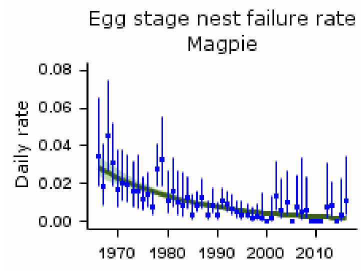
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



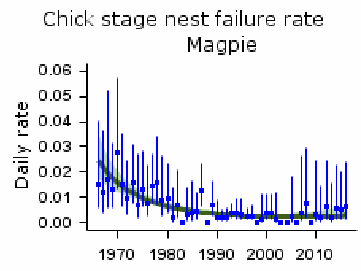
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The number of fledglings per breeding attempt increased strongly until the 1990s but then stabilised, a pattern mirroring the population index, which suggests that changing breeding success has been an important driver of population change. There is little published evidence about the ecological drivers of change. Changes in control of Magpies could have played a role, but their generalist ecology means that they are able to prosper in suburban and intensively farmed landscapes, which is likely to have allowed populations to reach a historically high equilibrium level.

Change factor	Primary driver	Secondary driver
Demographic	Change in breeding success	
Ecological	Unknown	

Further information on causes of change

Although there is little evidence directly supporting this, it is likely that the stabilisation in Magpie numbers reflects the population reaching carrying capacity in the intensively farmed and modern suburban landscapes. The fact that recent stability or decline is associated with parallel trends in fledglings per breeding attempt supports this. Demographic data presented here show that the number of fledglings per breeding attempt increased dramatically up until the 1990s but then stabilised (see above). Although clutch and brood sizes have declined over the whole time series (1968-2009), there have also been decreases in the failure of nests at the egg and chick stages (see above). A strong trend towards earlier laying has also been identified and may be partly explained by recent climate change (Crick & Sparks 1999).

The historical increases in Magpies have occurred at the same time as falling levels of control by gamekeepers from the time of the First World War (Tapper 1992), but there is no direct evidence for a causal link. Since 1990, the widespread adoption of the Larsen trap for predator control has been responsible for a large increase in Magpie numbers killed on shooting estates (GWCT data), and this could have played a role in stabilising population growth in some areas, but is unlikely to explain population change in towns and cities.

Magpies have increased in farmland and woodland habitats, with the largest population growth on mixed and pastoral farms, and the smallest on arable land (Gregory & Marchant 1996). The remarkable adaptability of Magpies has enabled them to colonise many new urban and suburban localities since the 1960s.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan,

Jay

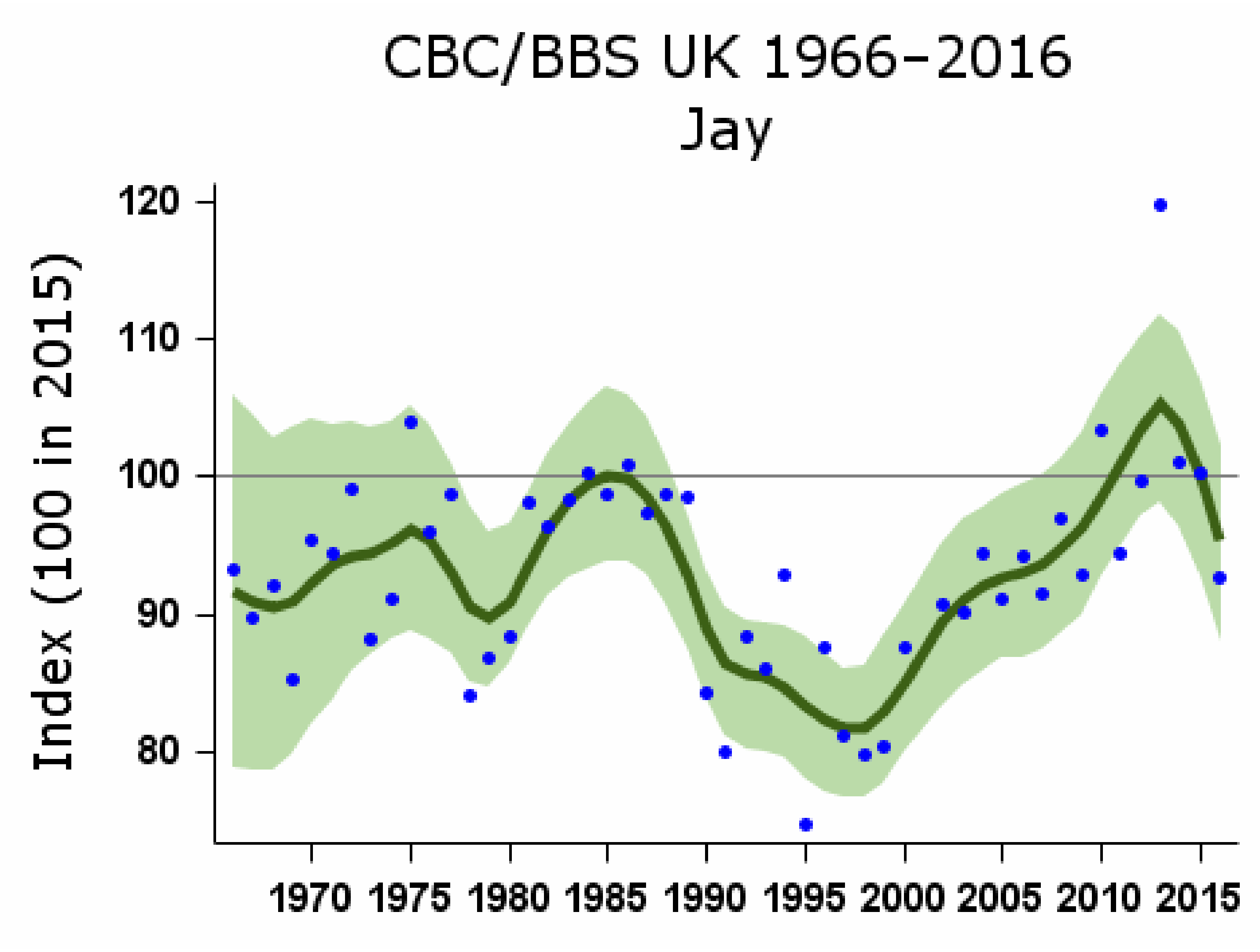
Garrulus glandarius

Key facts

Conservation listings:	Global: green; at race level, hibernicus and rufitergum amber, glandarius green
Long-term trend:	UK, England: fluctuating, with no long-term trend
Population size:	170,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The UK Jay population remained stable in the species' preferred woodland habitat until the late 1980s, after which the population began to decline. This decrease followed an earlier decline on farmland CBC plots (Gregory & Marchant 1996). With the losses since the 1980s now regained, long-term trends are stable overall. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

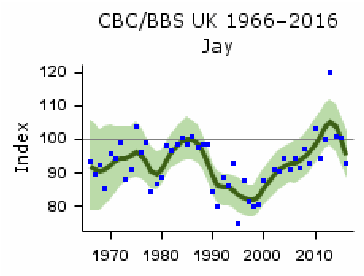
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	431	10	-10	37		Small CBC sample
	25	1990-2015	727	12	2	26		Small CBC sample
	10	2005-2015	1031	8	2	14		
	5	2010-2015	1084	1	-3	7		
CBC/BBS England	48	1967-2015	376	-1	-20	23		Small CBC sample
	25	1990-2015	630	3	-8	13		Small CBC sample

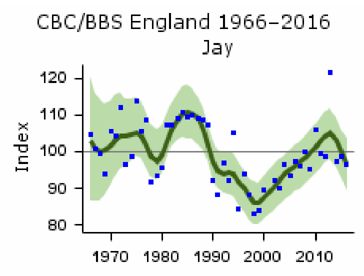
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	885	5	1	12		
	5	2010-2015	927	-1	-6	3		
BBS UK	20	1995-2015	825	19	11	30		
	10	2005-2015	1031	8	3	14		
	5	2010-2015	1084	1	-3	6		
BBS England	20	1995-2015	711	6	-1	14		
	10	2005-2015	885	5	0	11		
	5	2010-2015	927	-1	-5	3		
BBS Wales	20	1995-2015	80	38	3	76		
	10	2005-2015	97	6	-13	34		
	5	2010-2015	104	0	-16	23		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

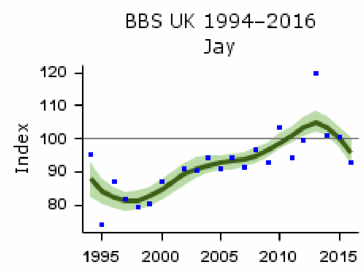
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



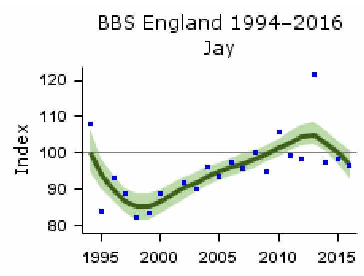
CBC/BBS UK graph



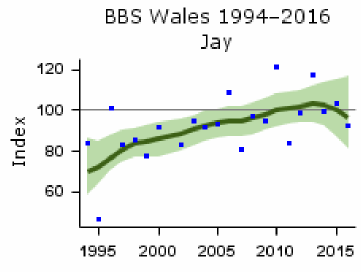
CBC/BBS England graph



BBS UK graph

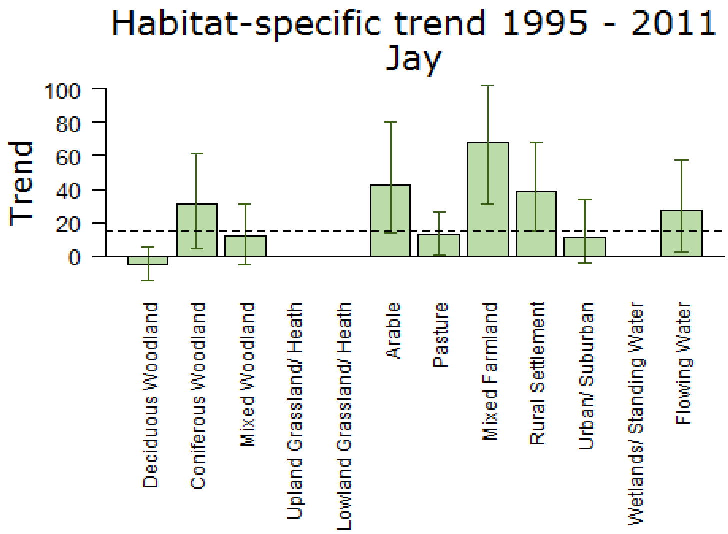


BBS England graph



BBS Wales graph

Population trends by habitat



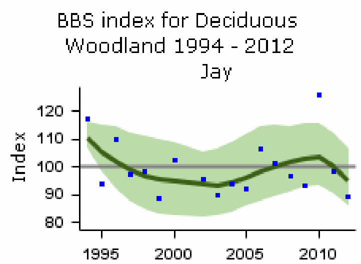
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

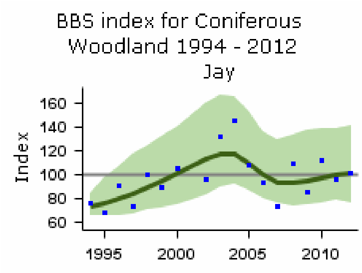
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	218	-5	-14	5
Coniferous Woodland	16	1995-2011	46	31	4	62
Mixed Woodland	16	1995-2011	121	12	-5	31
Arable	16	1995-2011	111	42	14	80
Pasture	16	1995-2011	206	13	1	26
Mixed Farmland	16	1995-2011	67	68	31	102
Rural Settlement	16	1995-2011	102	39	15	68
Urban/ Suburban	16	1995-2011	80	11	-4	34
Flowing Water	16	1995-2011	68	27	2	57

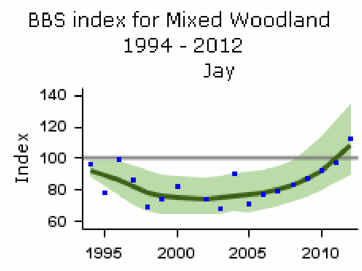
Further information on habitat-specific trends, please follow link here.



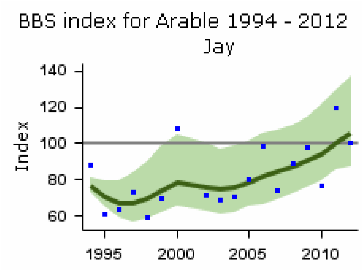
Habitat graph



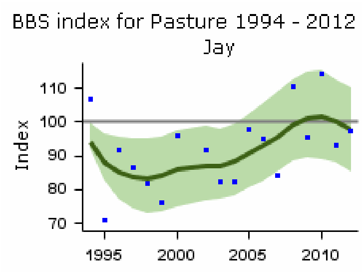
Habitat graph



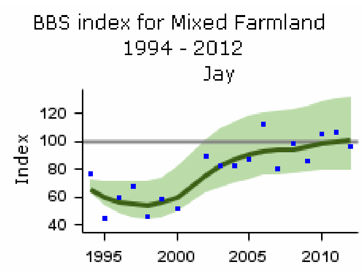
Habitat graph



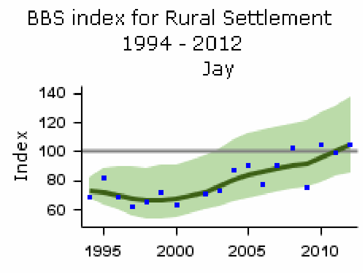
Habitat graph



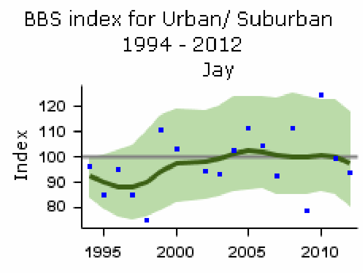
Habitat graph



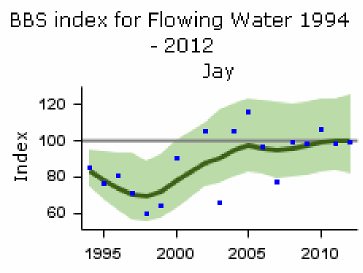
Habitat graph



Habitat graph

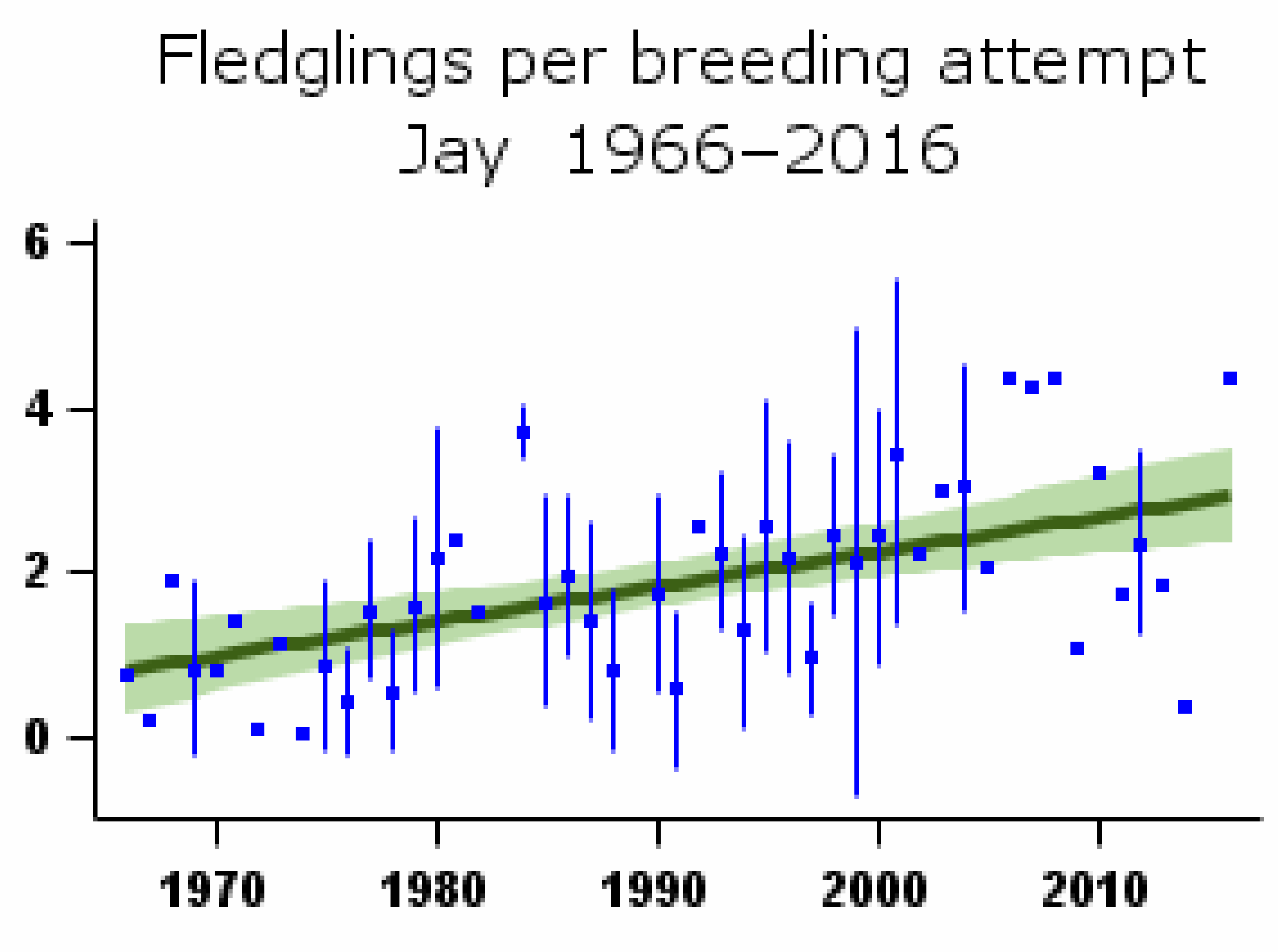


Habitat graph

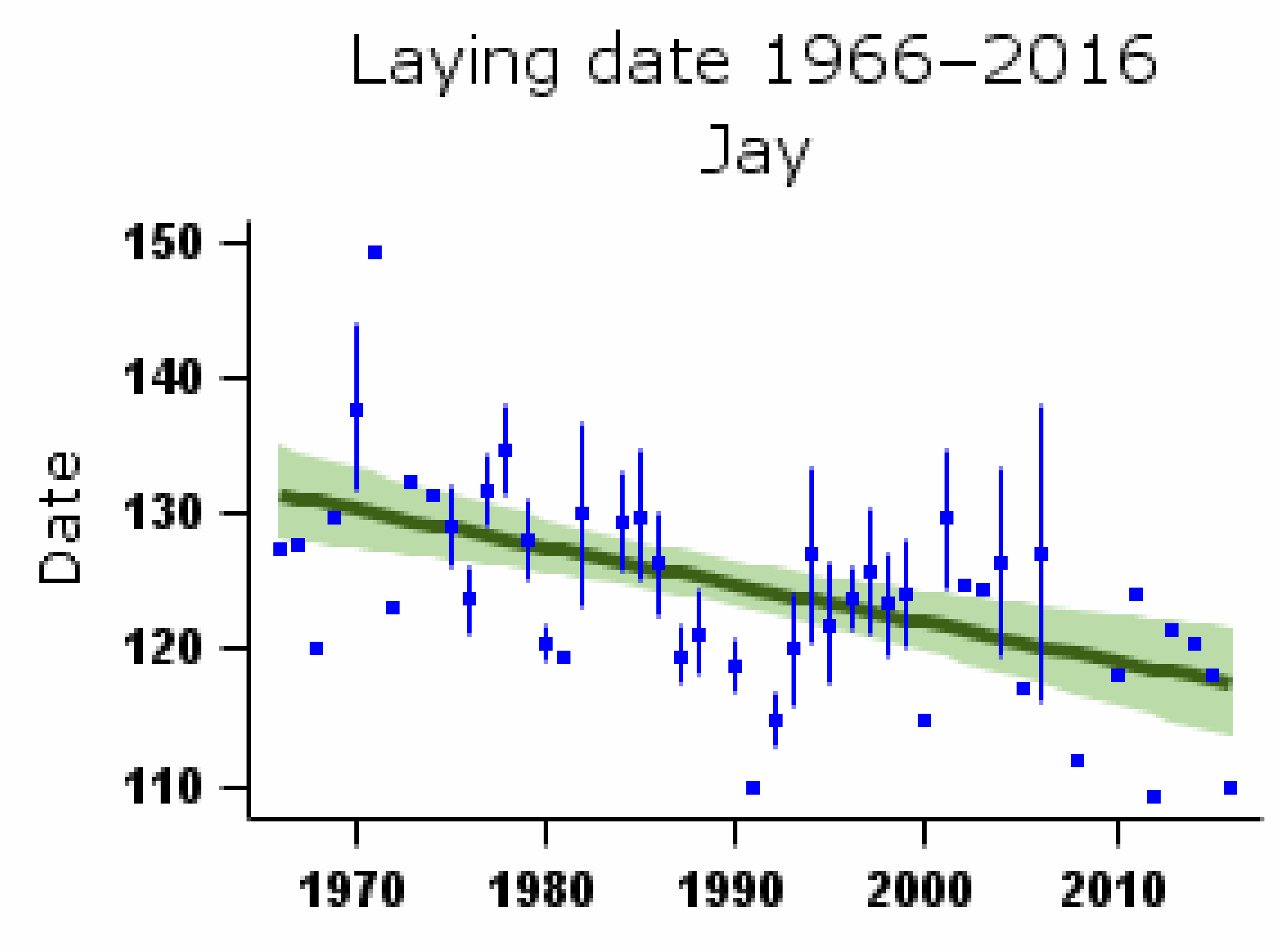


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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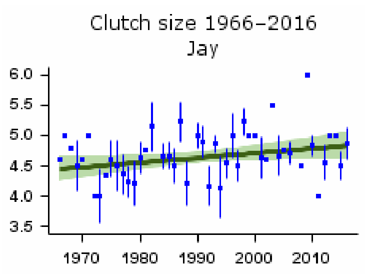
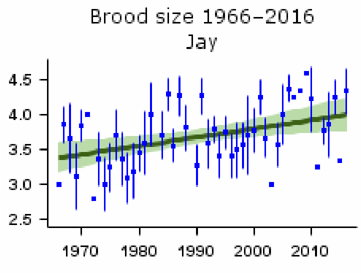
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	6	Linear increase	0.88 fledglings	2.89 fledglings	229.9%		
Clutch size	48	1967-2015	7	None					Small sample
Brood size	48	1967-2015	11	Linear increase	3.40 chicks	3.99 chicks	17.4%		Small sample
Nest failure rate at egg stage	48	1967-2015	9	Linear decline	4.70% nests/day	1.27% nests/day	-73.0%		Small sample
Nest failure rate at chick stage	48	1967-2015	7	Curvilinear	4.03% nests/day	2.17% nests/day	-46.2%		Small sample
Laying date	48	1967-2015	6	Linear decline	May 11	Apr 28	-13 days		Small sample

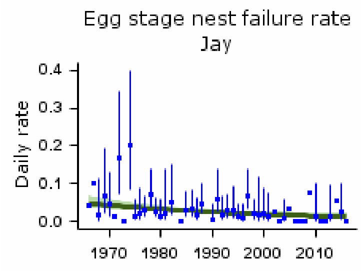
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



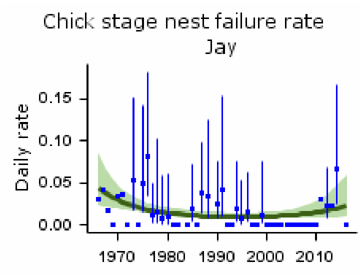
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Jackdaw

Coloeus monedula

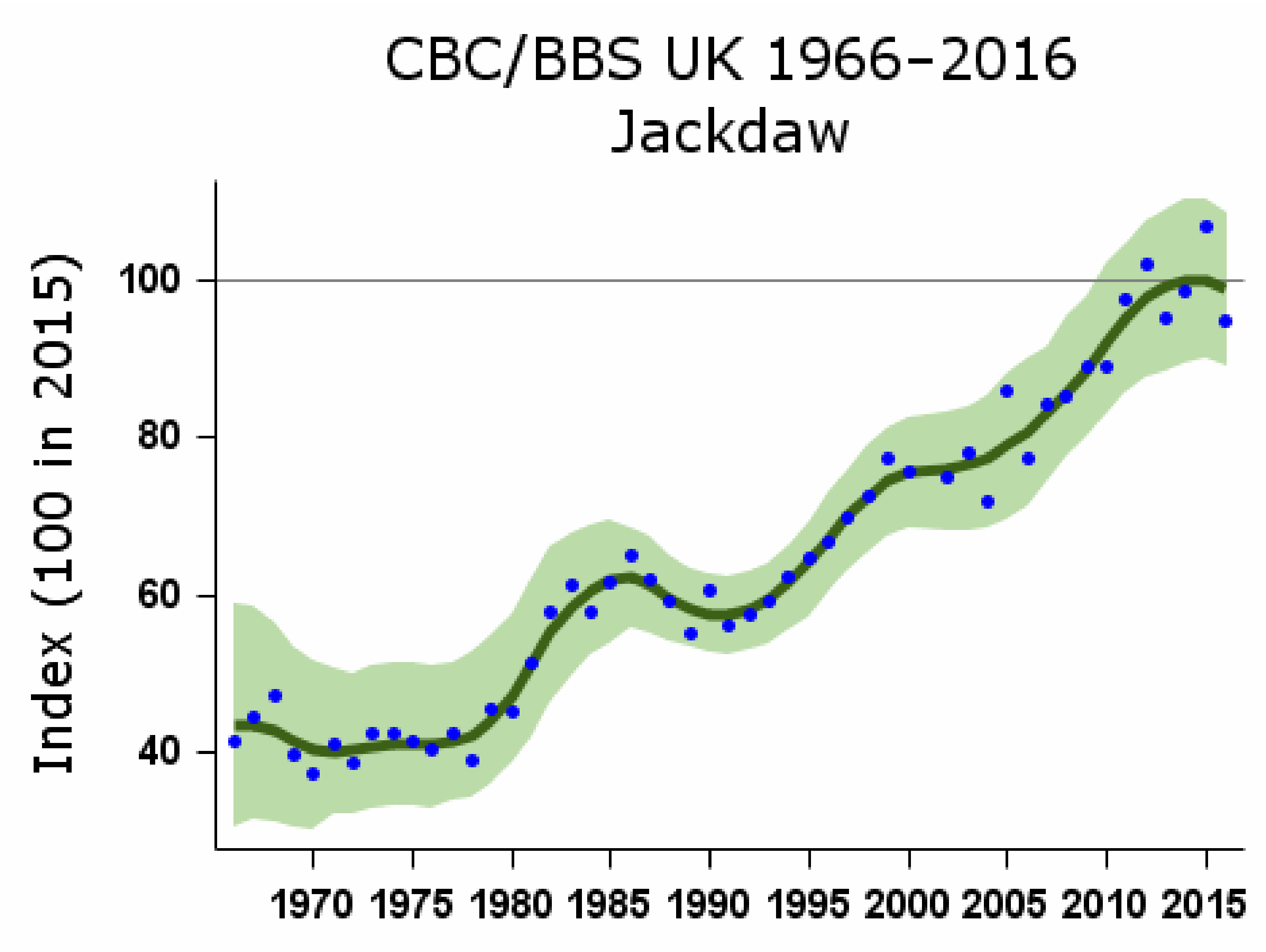
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	1.4 (1.2-1.5) million pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Jackdaws have increased in abundance since the 1960s (Gregory & Marchant 1996), and more recent BBS data suggest that the increase is continuing in all UK countries. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

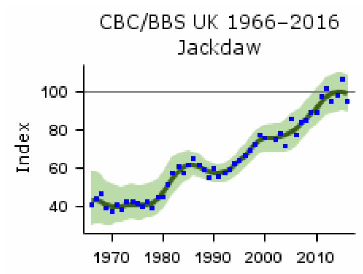
Population changes in detail

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

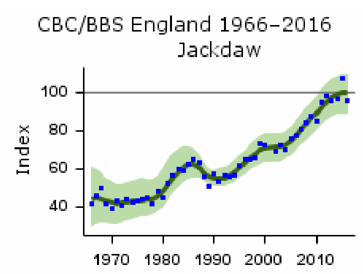
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	943	131	51	269		
	25	1990-2015	1554	74	49	105		
	10	2005-2015	2294	26	19	33		
	5	2010-2015	2403	9	5	13		
CBC/BBS England	48	1967-2015	679	124	47	270		
	25	1990-2015	1250	83	57	110		
	10	2005-2015	1862	34	28	39		
	5	2010-2015	1960	12	8	16		
BBS UK	20	1995-2015	1855	54	44	66		
	10	2005-2015	2294	26	19	33		
	5	2010-2015	2403	9	6	13		
BBS England	20	1995-2015	1490	65	54	76		
	10	2005-2015	1862	34	28	39		
	5	2010-2015	1960	12	9	15		
BBS Scotland	20	1995-2015	132	23	-1	56		
	10	2005-2015	163	20	3	45		
	5	2010-2015	172	-1	-15	17		
BBS Wales	20	1995-2015	151	27	-12	81		
	10	2005-2015	174	-6	-24	15		
	5	2010-2015	179	0	-10	13		
BBS N.Ireland	20	1995-2015	78	98	40	140		
	10	2005-2015	92	40	20	57		
	5	2010-2015	89	7	-4	18		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

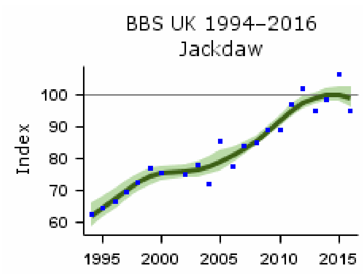
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



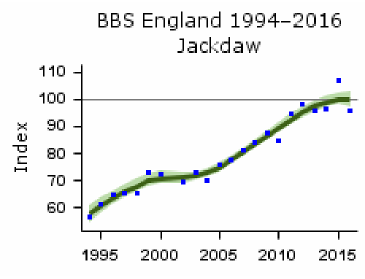
CBC/BBS UK graph



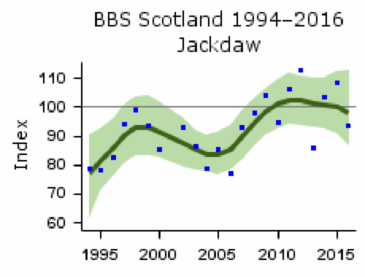
CBC/BBS England graph



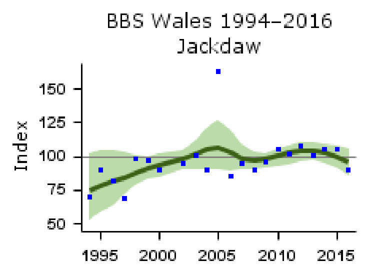
BBS UK graph



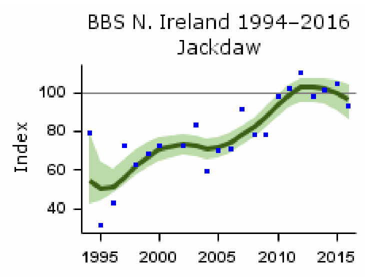
BBS England graph



BBS Scotland graph

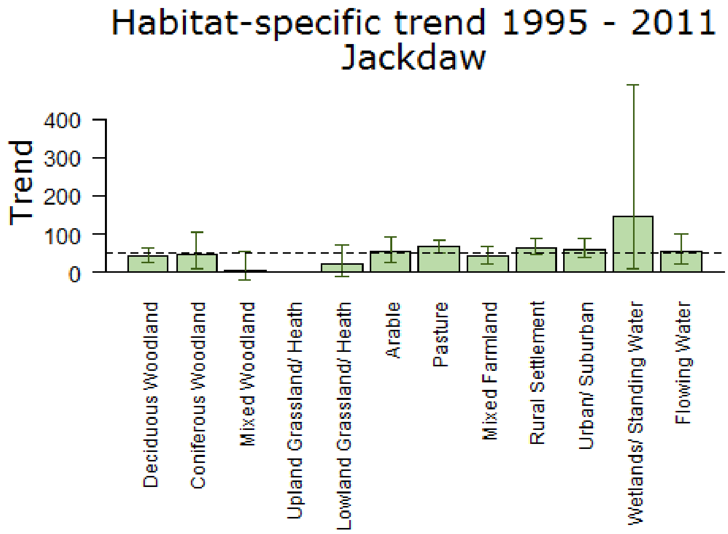


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



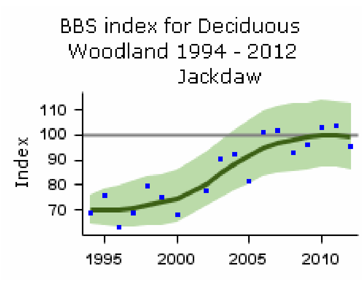
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

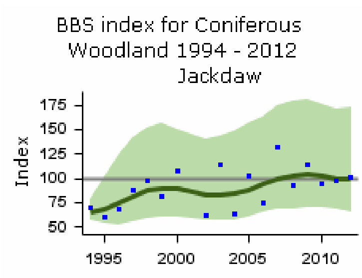
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	337	43	24	61
Coniferous Woodland	16	1995-2011	45	46	9	106
Mixed Woodland	16	1995-2011	158	5	-19	54
Lowland Grassland/ Heath	16	1995-2011	62	21	-13	73
Arable	16	1995-2011	306	56	27	93
Pasture	16	1995-2011	759	66	51	82
Mixed Farmland	16	1995-2011	330	42	23	67
Rural Settlement	16	1995-2011	504	64	45	87
Urban/ Suburban	16	1995-2011	213	59	39	87
Wetlands/ Standing Water	16	1995-2011	34	147	10	490
Flowing Water	16	1995-2011	210	55	22	98

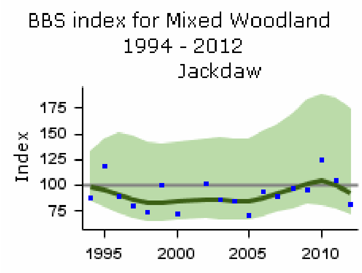
Further information on habitat-specific trends, please follow link here.



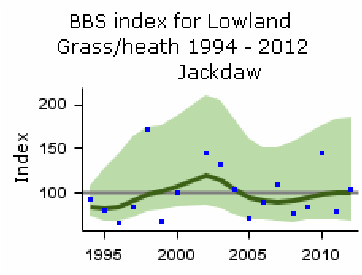
Habitat graph



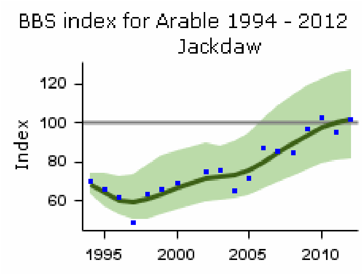
Habitat graph



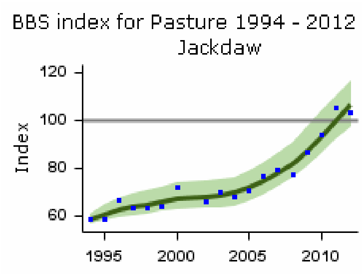
Habitat graph



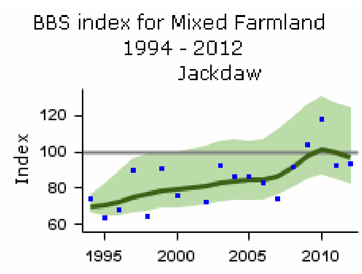
Habitat graph



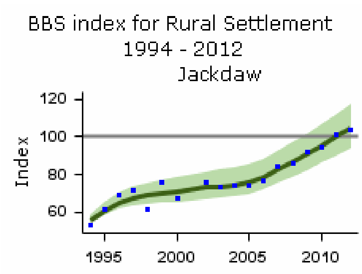
Habitat graph



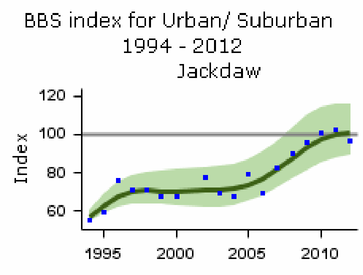
Habitat graph



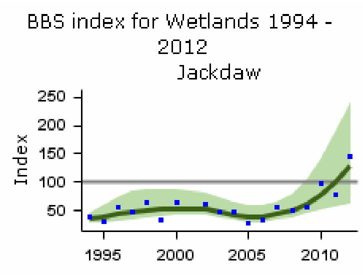
Habitat graph



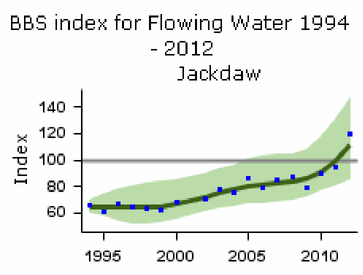
Habitat graph



Habitat graph

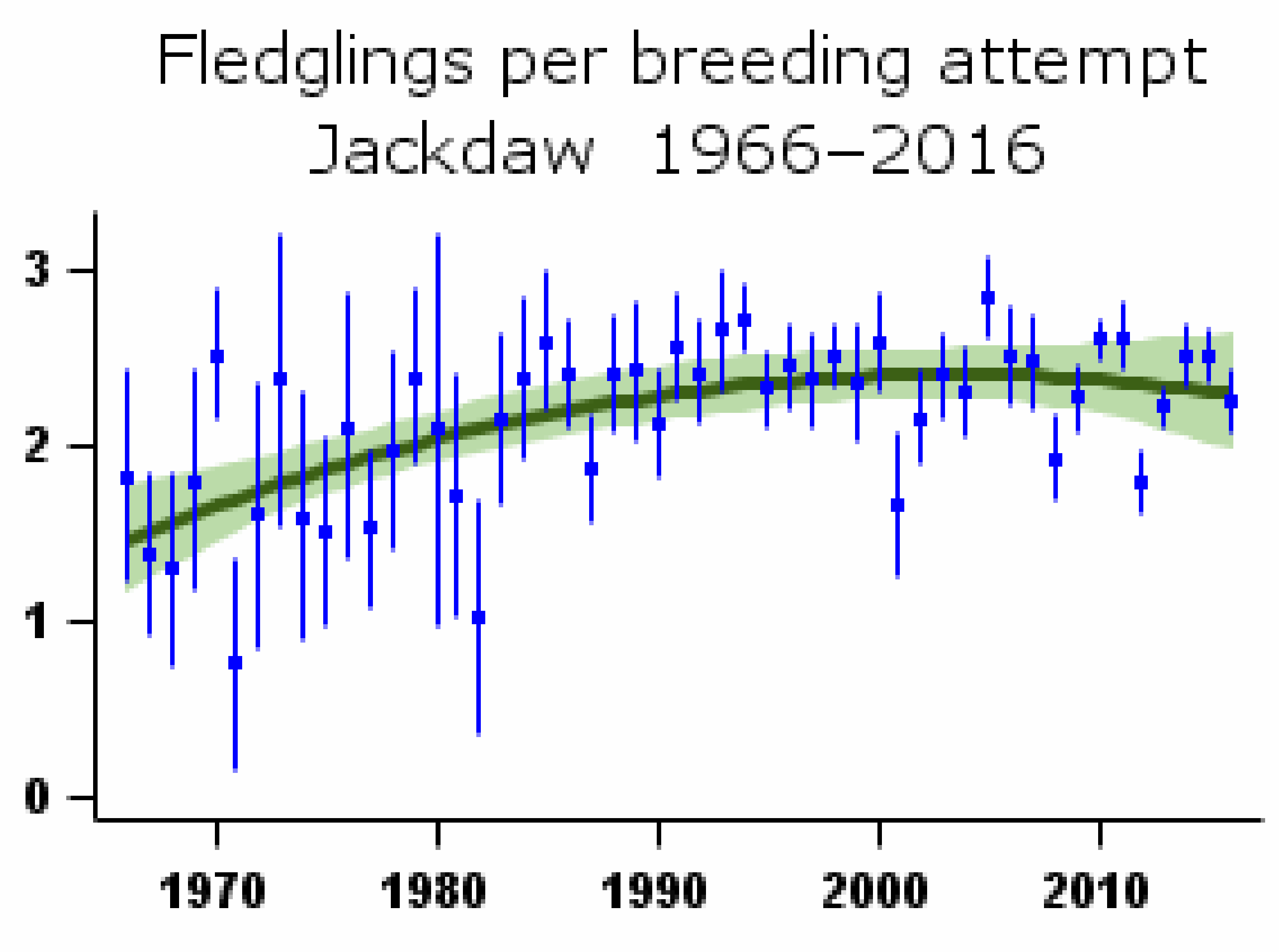


Habitat graph

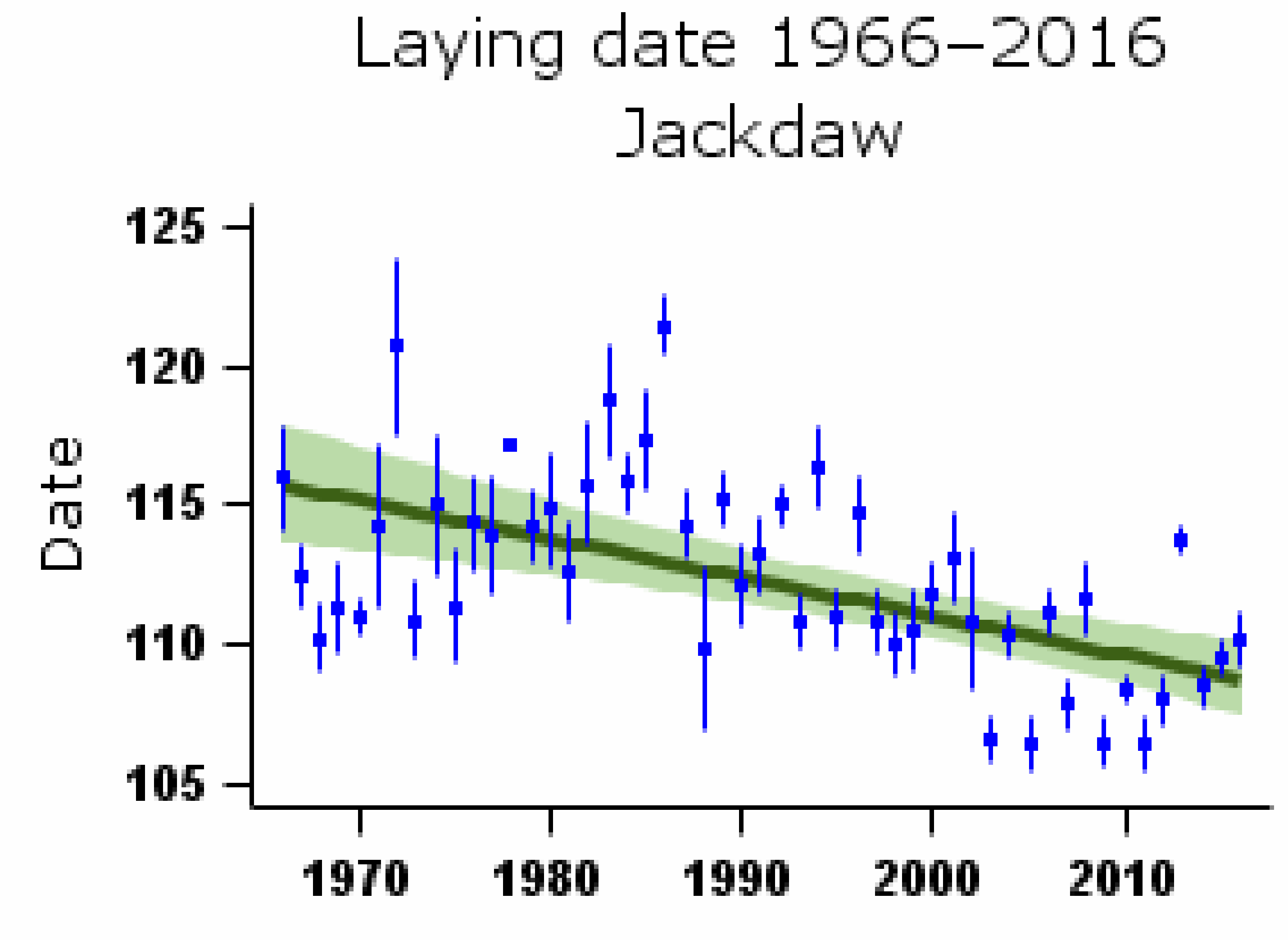


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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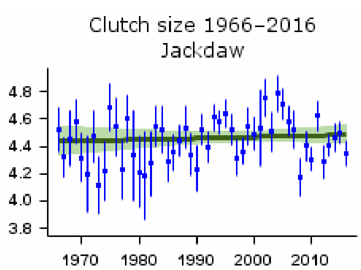
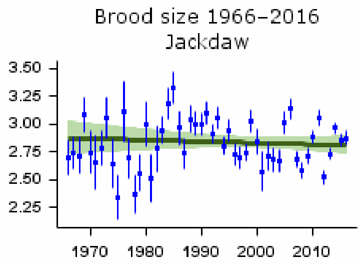
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	66	Curvilinear	1.52 fledglings	2.32 fledglings	52.8%		
Clutch size	48	1967-2015	59	None					
Brood size	48	1967-2015	147	None					
Nest failure rate at egg stage	48	1967-2015	77	Curvilinear	0.88% nests/day	0.29% nests/day	-67.0%		
Nest failure rate at chick stage	48	1967-2015	69	Curvilinear	1.40% nests/day	0.35% nests/day	-75.0%		
Laying date	48	1967-2015	33	Linear decline	Apr 26	Apr 19	-7 days		

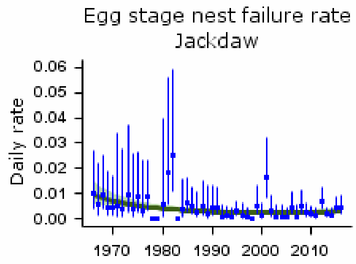
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



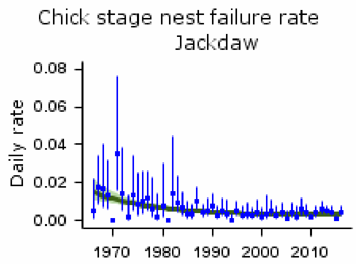
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



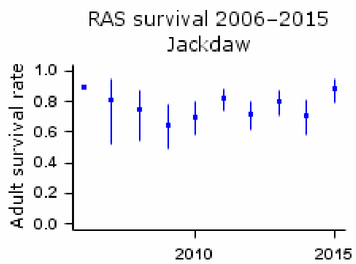
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

There is no evidence available regarding the ecological causes of increase for this species but changes have been associated with improvements in breeding performance, probably due to increased food availability.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Unknown	

Further information on causes of change

As with Balmer et al. 2013) show lower abundance for Jackdaw in very urban areas such as Greater London, unlike Magpie and Carrion Crow. Their ability to spread into more urban habitats may be limited by poorer food resources in these areas which lead to low breeding productivity (Meyrier et al. 2017).

Typically in this species, the younger chicks of a brood perish quickly if food becomes limited. Henderson & Hart (1993) provided evidence that increases in fledging success are likely to be due to improved provisioning by the parents. Most of the variation in annual reproductive output was caused by nestling mortality rather than clutch size or hatching success. Soler & Soler (1996) used data from Spain to show that additional food advanced the laying date, increased the clutch size, independently of laying date, and increased fledging success.

Changes in the landscape may have also benefited this species. Gregory & Marchant (1996) found an increase in Jackdaw numbers in agricultural habitats, particularly in the south-west, but an overall decrease in forests. These increases were associated with trends in cultivation and population gains have been most pronounced on grazing farms and in the north and south-west where such farms predominate. A similar pattern was found in Sweden by Andren (1992), who provided evidence that the density of Jackdaws increased as forest became fragmented and intermixed with agricultural land.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Rook

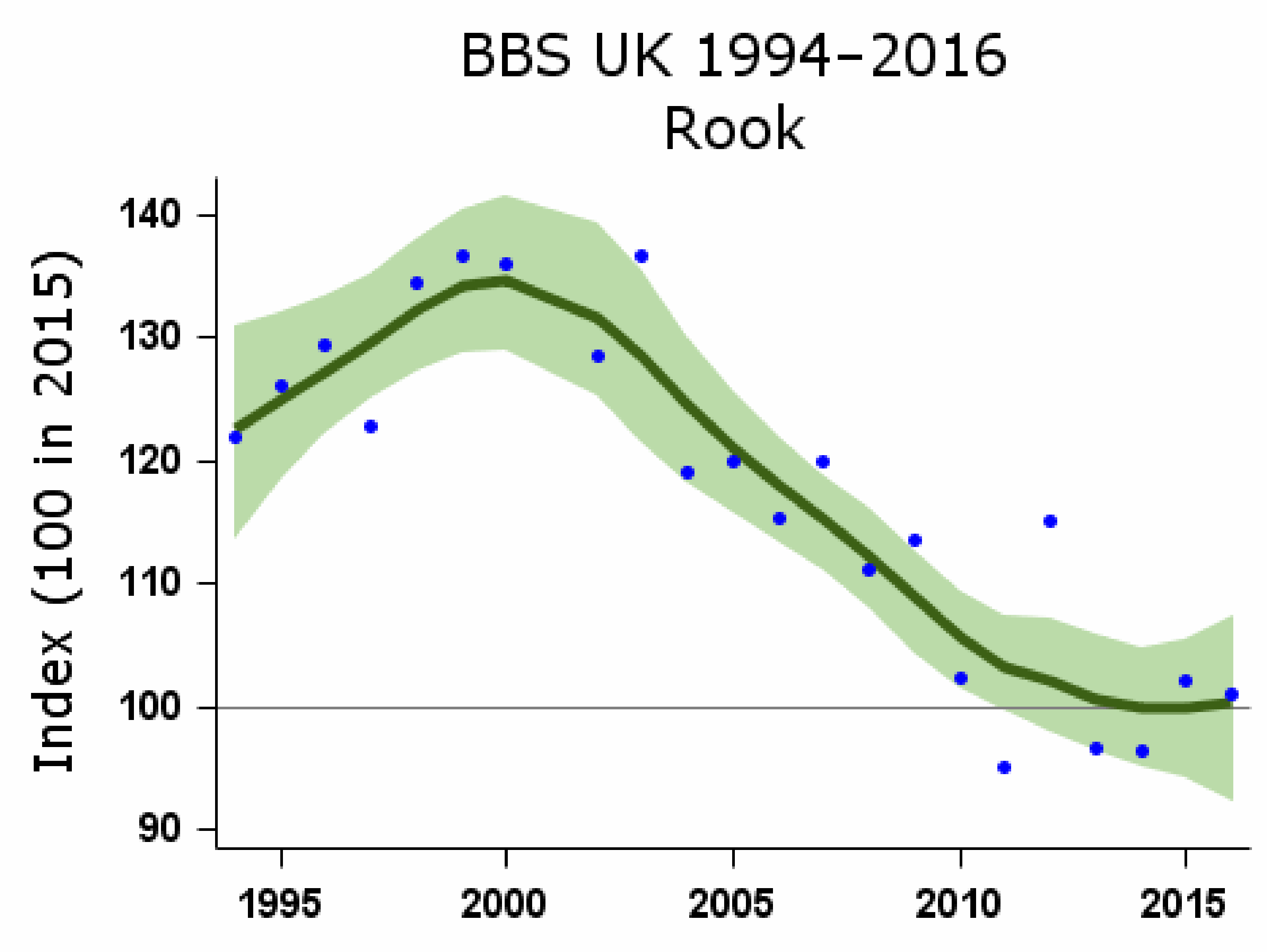
Corvus frugilegus

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: probable increase
Population size:	1.1 (1.0-1.2) million pairs in 2009 (APEP13: 1996 estimate (Marchant & Gregory 1999) updated using BBS trend)

Status summary

Relatively few rookeries fell within CBC plots, but an index calculated from the available CBC nest counts showed a shallow, long-term increase (Wilson et al. 1998). Increase to the mid 1990s was confirmed by the results of the most recent BTO rookeries survey, which identified a 40% increase in abundance between 1975 and 1996 (Marchant & Gregory 1999). This increase probably reflected the species' considerable adaptability in the face of agricultural change. BBS indices, which are drawn from sightings during transect walks and not from BBS's nest counts, suggest that a notable decrease has occurred subsequently, especially in Scotland, Wales and Northern Ireland. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

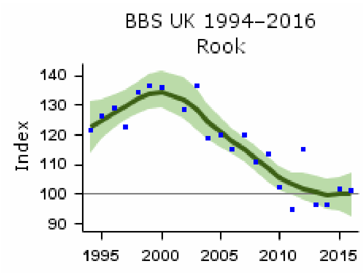
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	1377	-20	-28	-12		
	10	2005-2015	1618	-17	-25	-9		
	5	2010-2015	1637	-5	-12	3		
BBS England	20	1995-2015	1097	-13	-21	-4		
	10	2005-2015	1302	-11	-17	-4		

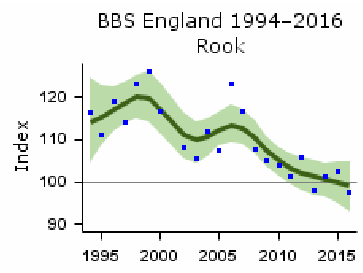
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	1323	-5	-10	1		
BBS Scotland	20	1995-2015	121	-33	-50	-15	>25	
	10	2005-2015	138	-28	-46	-6	>25	
	5	2010-2015	139	0	-24	22		
BBS Wales	20	1995-2015	82	-42	-59	-18	>25	
	10	2005-2015	90	-30	-43	-10	>25	
	5	2010-2015	94	-30	-42	-13	>25	
BBS N.Ireland	20	1995-2015	75	-13	-40	18		
	10	2005-2015	87	-25	-43	-2		
	5	2010-2015	80	-11	-29	11		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

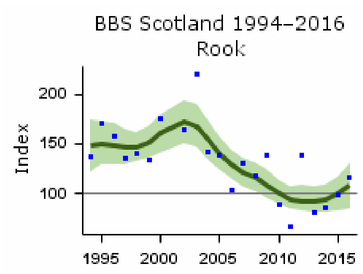
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



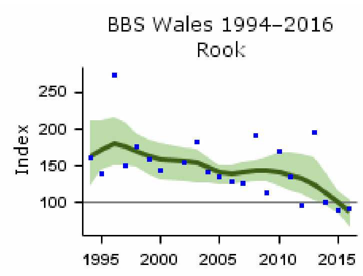
BBS UK graph



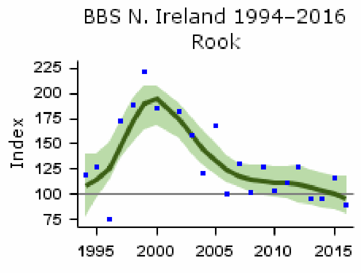
BBS England graph



BBS Scotland graph

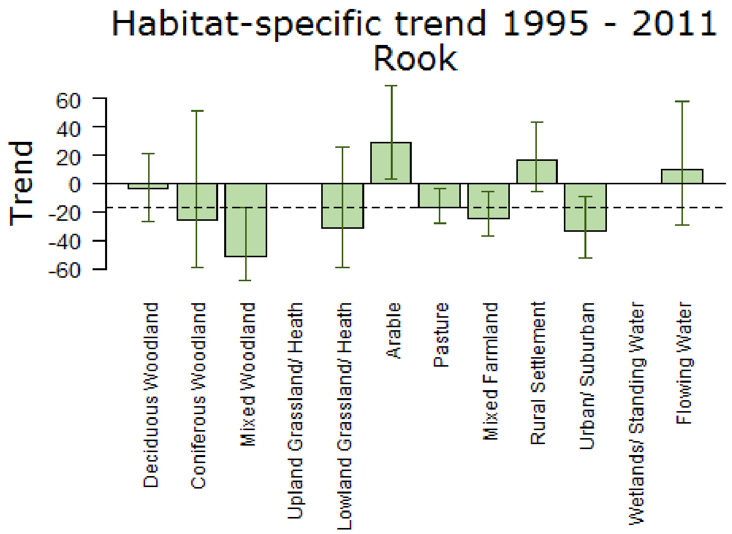


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

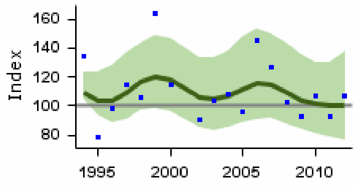
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	191	-4	-27	22
Coniferous Woodland	16	1995-2011	32	-26	-60	52
Mixed Woodland	16	1995-2011	86	-51	-68	-17
Lowland Grassland/ Heath	16	1995-2011	39	-32	-60	26
Arable	16	1995-2011	241	29	4	69
Pasture	16	1995-2011	538	-17	-28	-3
Mixed Farmland	16	1995-2011	263	-24	-37	-5
Rural Settlement	16	1995-2011	275	16	-6	43
Urban/ Suburban	16	1995-2011	91	-34	-53	-9
Flowing Water	16	1995-2011	121	10	-29	58

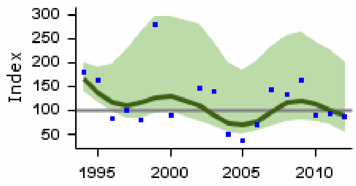
Further information on habitat-specific trends, please follow link here.

BBS index for Deciduous Woodland 1994 - 2012
Rook



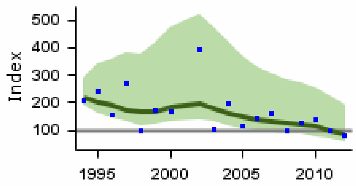
Habitat graph

BBS index for Coniferous Woodland 1994 - 2012
Rook



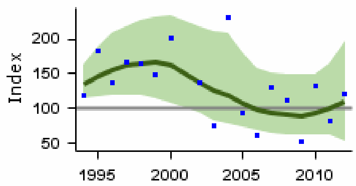
Habitat graph

BBS index for Mixed Woodland 1994 - 2012
Rook



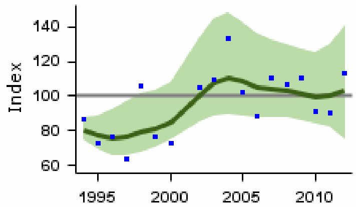
Habitat graph

BBS index for Lowland Grass/heath 1994 - 2012
Rook



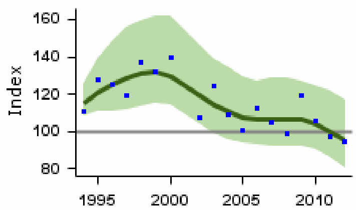
Habitat graph

BBS index for Arable 1994 - 2012
Rook

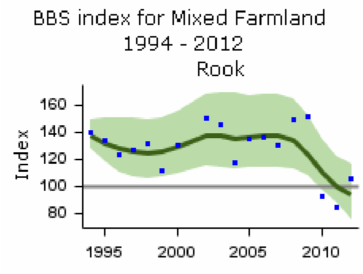


Habitat graph

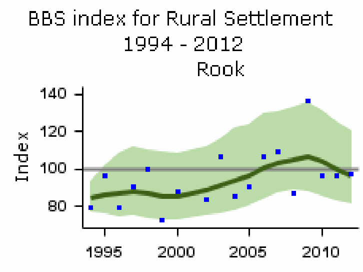
BBS index for Pasture 1994 - 2012
Rook



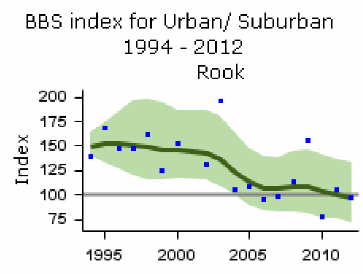
Habitat graph



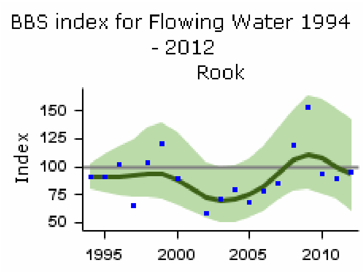
Habitat graph



Habitat graph

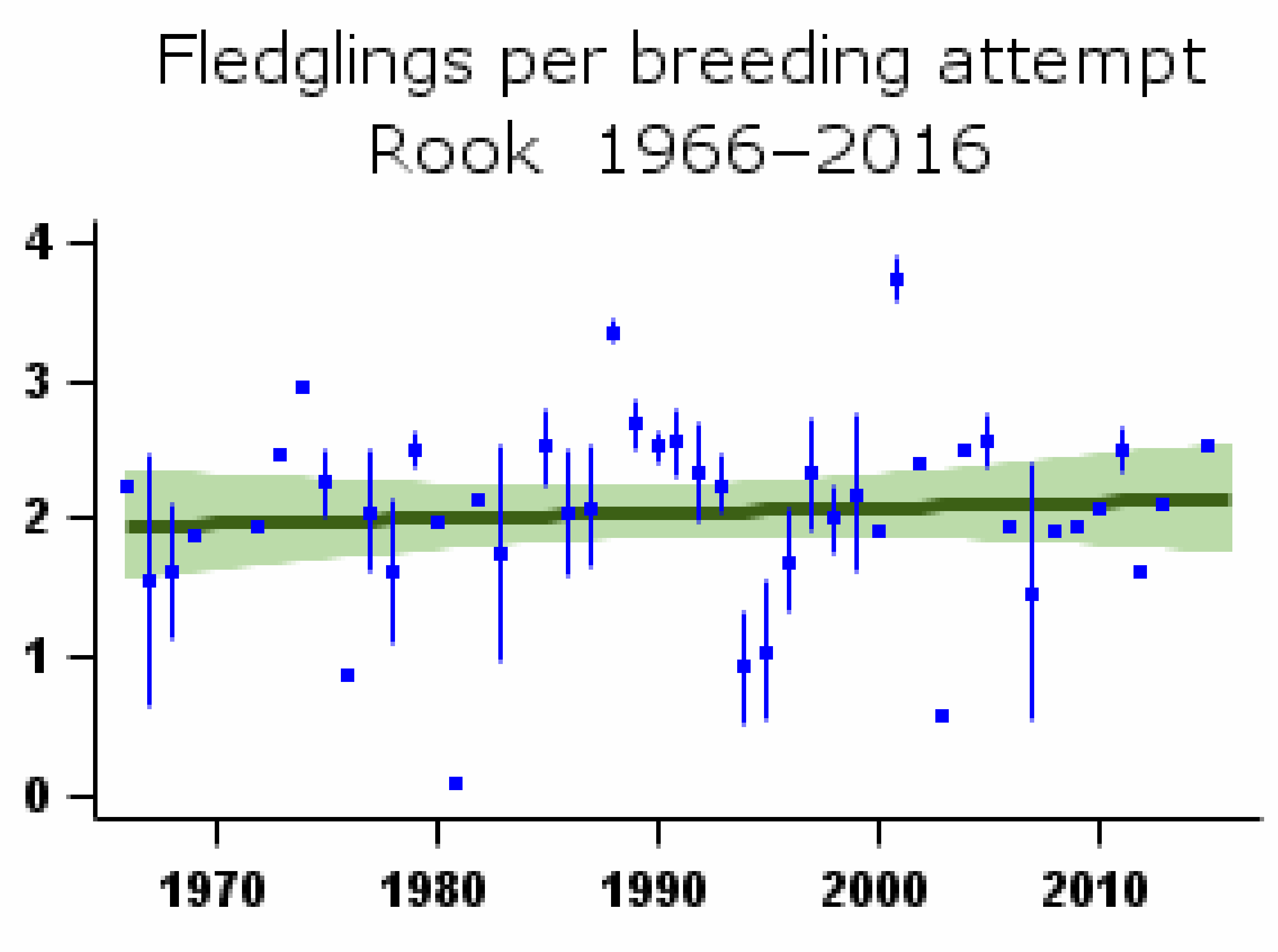


Habitat graph

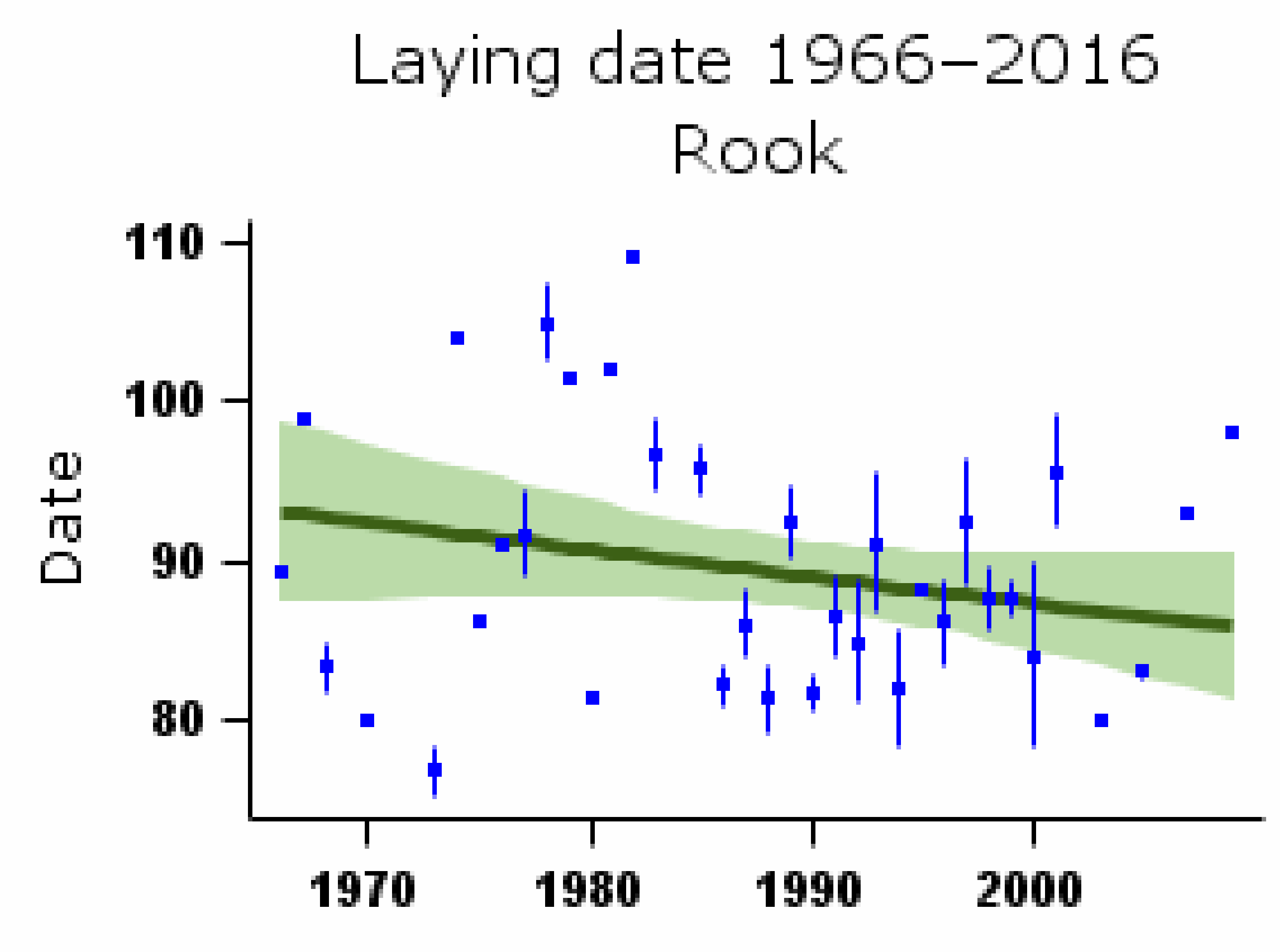


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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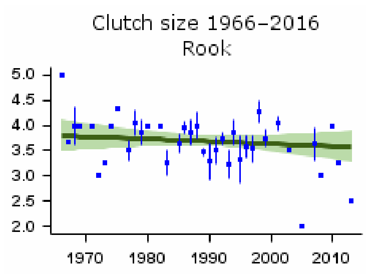
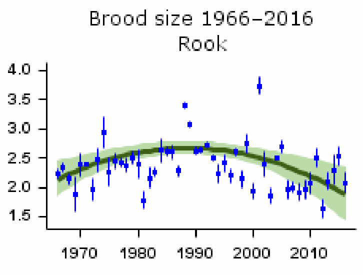
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	25	None					
Clutch size	45	1967-2012	12	None					Small sample
Brood size	48	1967-2015	74	Curvilinear	2.18 chicks	1.93 chicks	-11.4%		
Nest failure rate at egg stage	48	1967-2015	27	None					Small sample
Nest failure rate at chick stage	48	1967-2015	42	None					
Laying date	41	1967-2008	13	None			0 days		Small sample

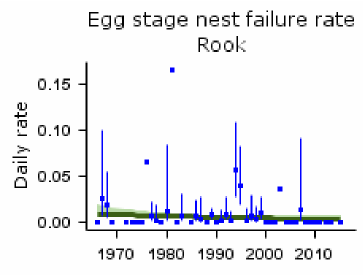
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



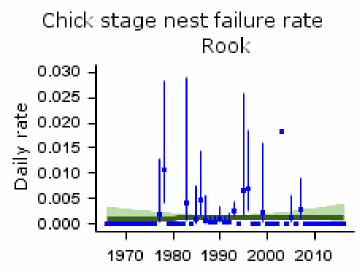
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Carrion Crow

Corvus corone

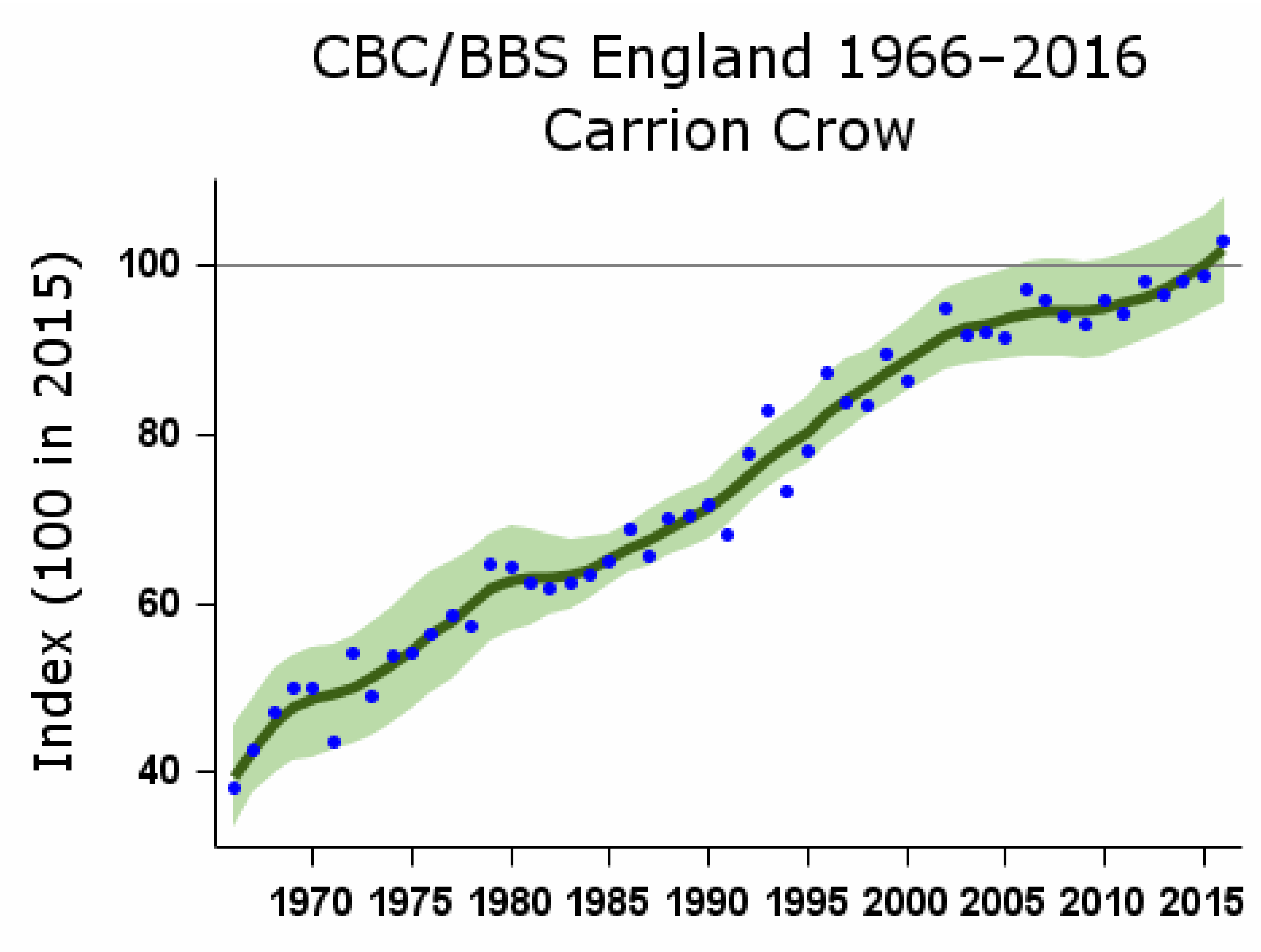
Key facts

Conservation listings:	Global: green
Long-term trend:	England: rapid increase
Population size:	1.0 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	?
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Carrion Crows increased consistently since the 1960s (Gregory & Marchant 1996) and reached a plateau around the turn of the century. Since then the BBS has recorded ongoing steep increase in England offset by stability or minor decrease in Scotland, with a fluctuating trend in Wales. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

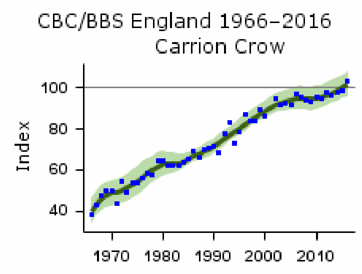
Population changes in detail

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

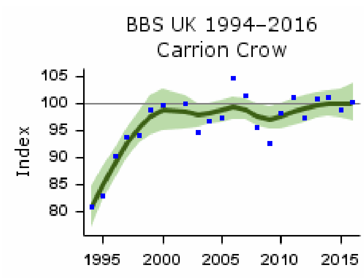
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	985	134	94	193		Includes Hooded Crow
	25	1990-2015	1764	40	29	52		Includes Hooded Crow
	10	2005-2015	2515	7	3	11		Includes Hooded Crow
	5	2010-2015	2558	5	1	9		
BBS UK	20	1995-2015	2521	18	11	24		
	10	2005-2015	3049	1	-3	6		
	5	2010-2015	3111	3	-1	7		
BBS England	20	1995-2015	2072	27	19	34		
	10	2005-2015	2515	7	2	12		
	5	2010-2015	2558	5	2	9		
BBS Scotland	20	1995-2015	214	-6	-22	21		
	10	2005-2015	260	-16	-27	-3		
	5	2010-2015	268	-10	-20	1		
BBS Wales	20	1995-2015	219	14	-1	30		
	10	2005-2015	252	-1	-13	12		
	5	2010-2015	260	9	-2	21		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

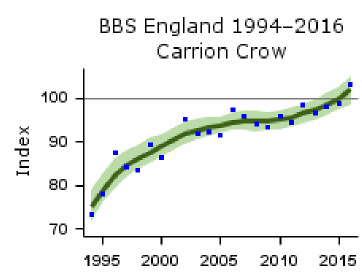
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



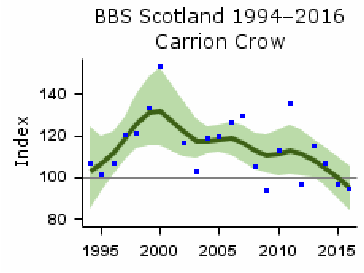
CBC/BBS England graph



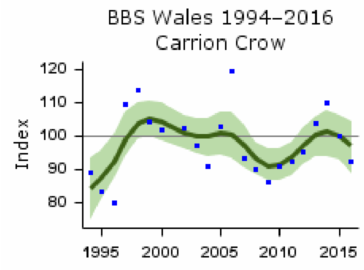
BBS UK graph



BBS England graph

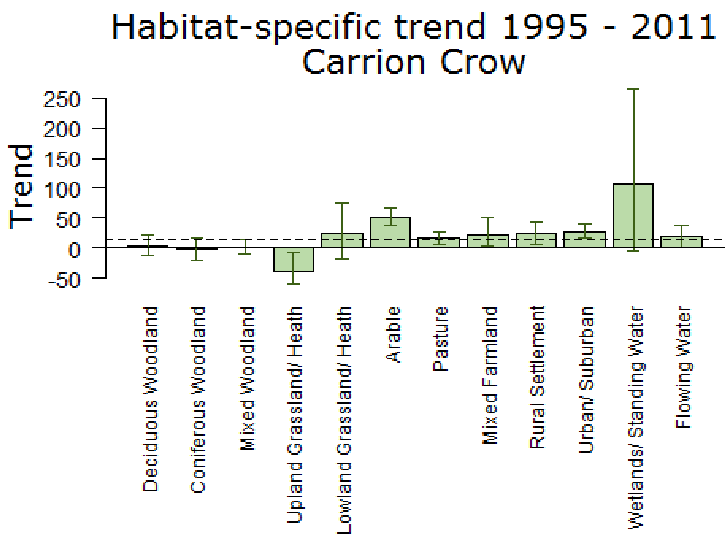


BBS Scotland graph



BBS Wales graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

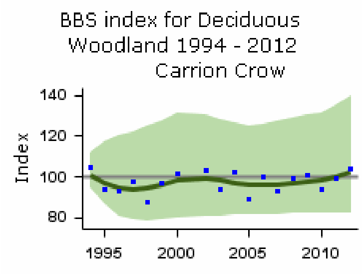
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

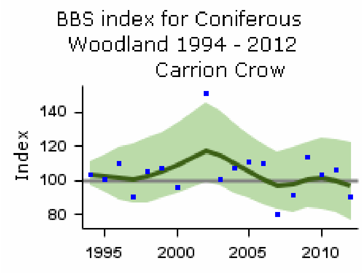
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	621	3	-12	22
Coniferous Woodland	16	1995-2011	136	-2	-21	18
Mixed Woodland	16	1995-2011	314	1	-11	14
Upland Grassland/ Heath	16	1995-2011	54	-38	-60	-7
Lowland Grassland/ Heath	16	1995-2011	138	24	-19	76
Arable	16	1995-2011	611	51	38	67
Pasture	16	1995-2011	1119	16	6	27
Mixed Farmland	16	1995-2011	568	23	3	52
Rural Settlement	16	1995-2011	629	24	6	43
Urban/ Suburban	16	1995-2011	367	27	16	42

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Wetlands/ Standing Water	16	1995-2011	78	[illegible]	[illegible]	[illegible]
Flowing Water	16	1995-2011	398	19	0	37

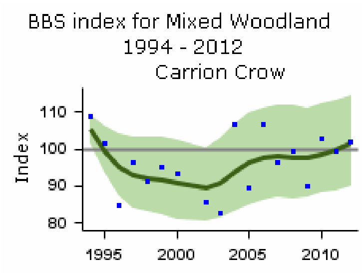
Further information on habitat-specific trends, please follow link here.



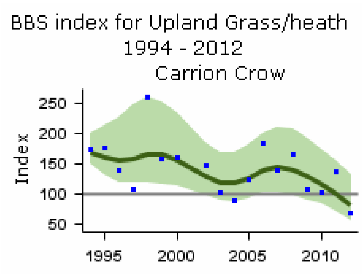
Habitat graph



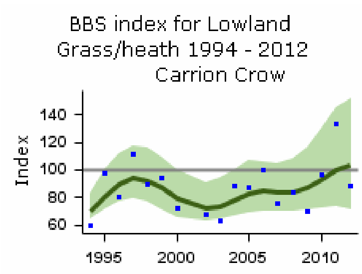
Habitat graph



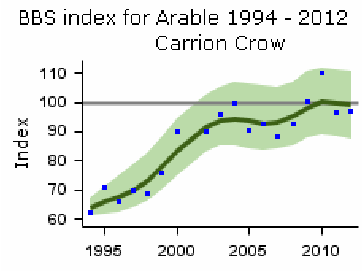
Habitat graph



Habitat graph



Habitat graph



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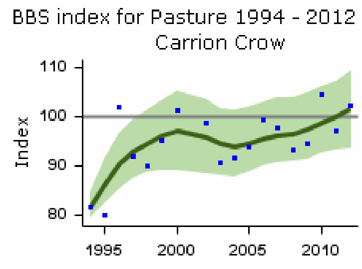
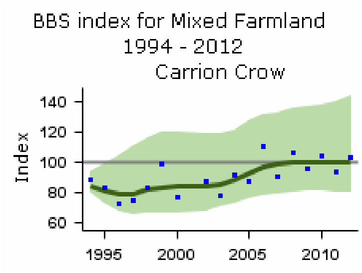
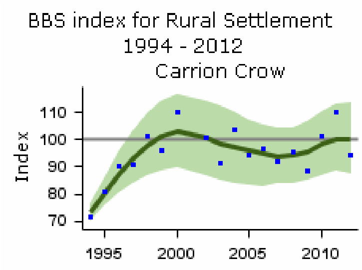


Habitat graph



Habitat graph



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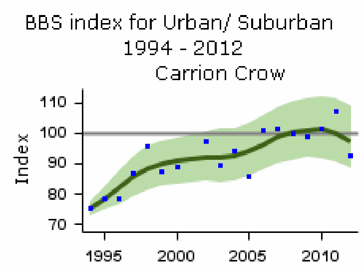

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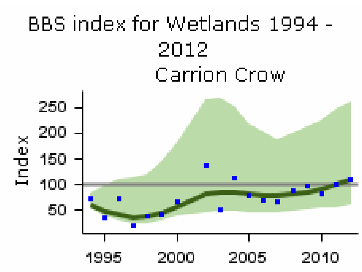
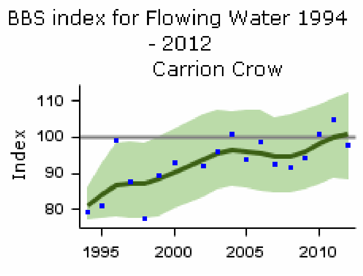
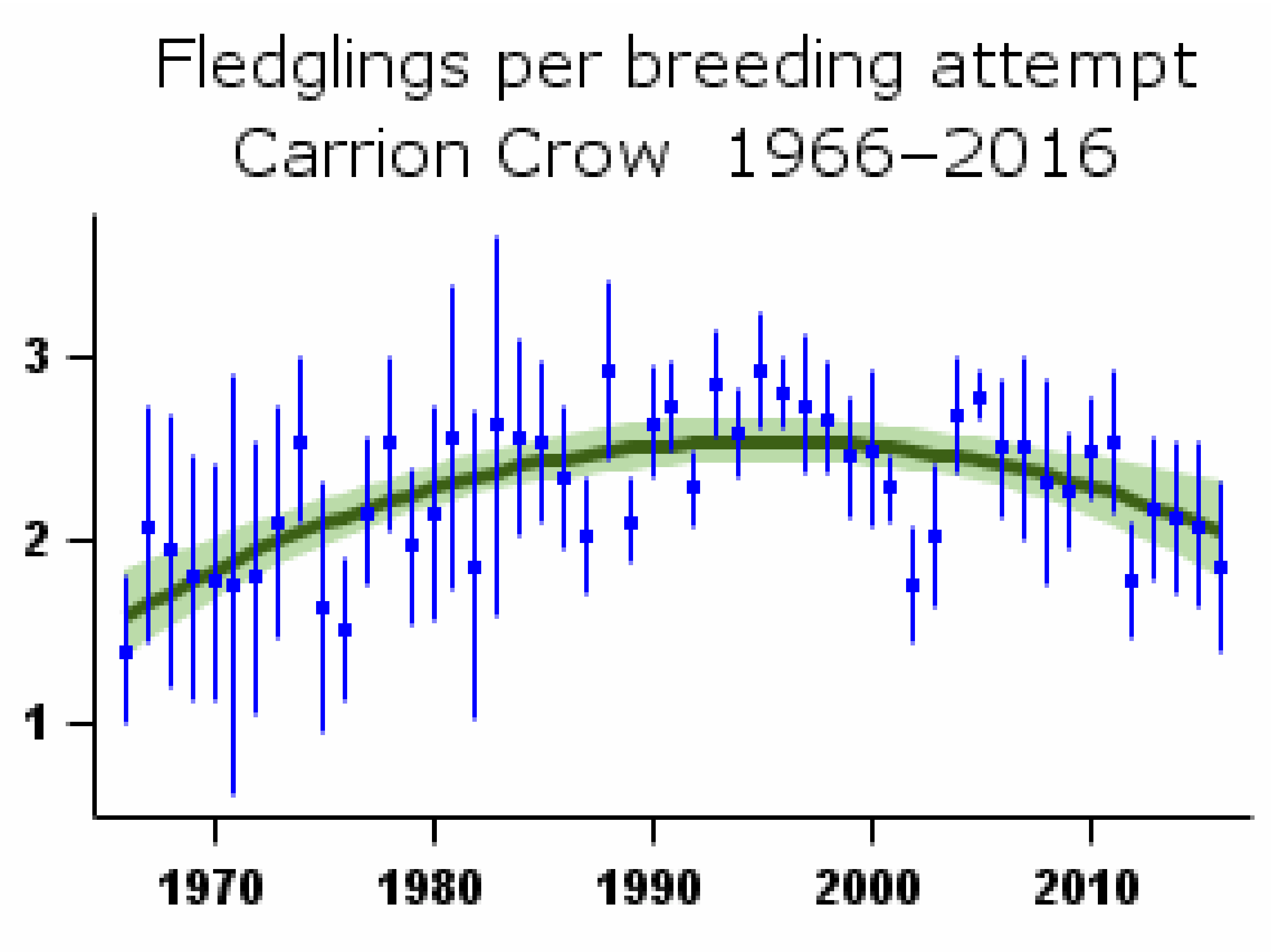


Habitat graph

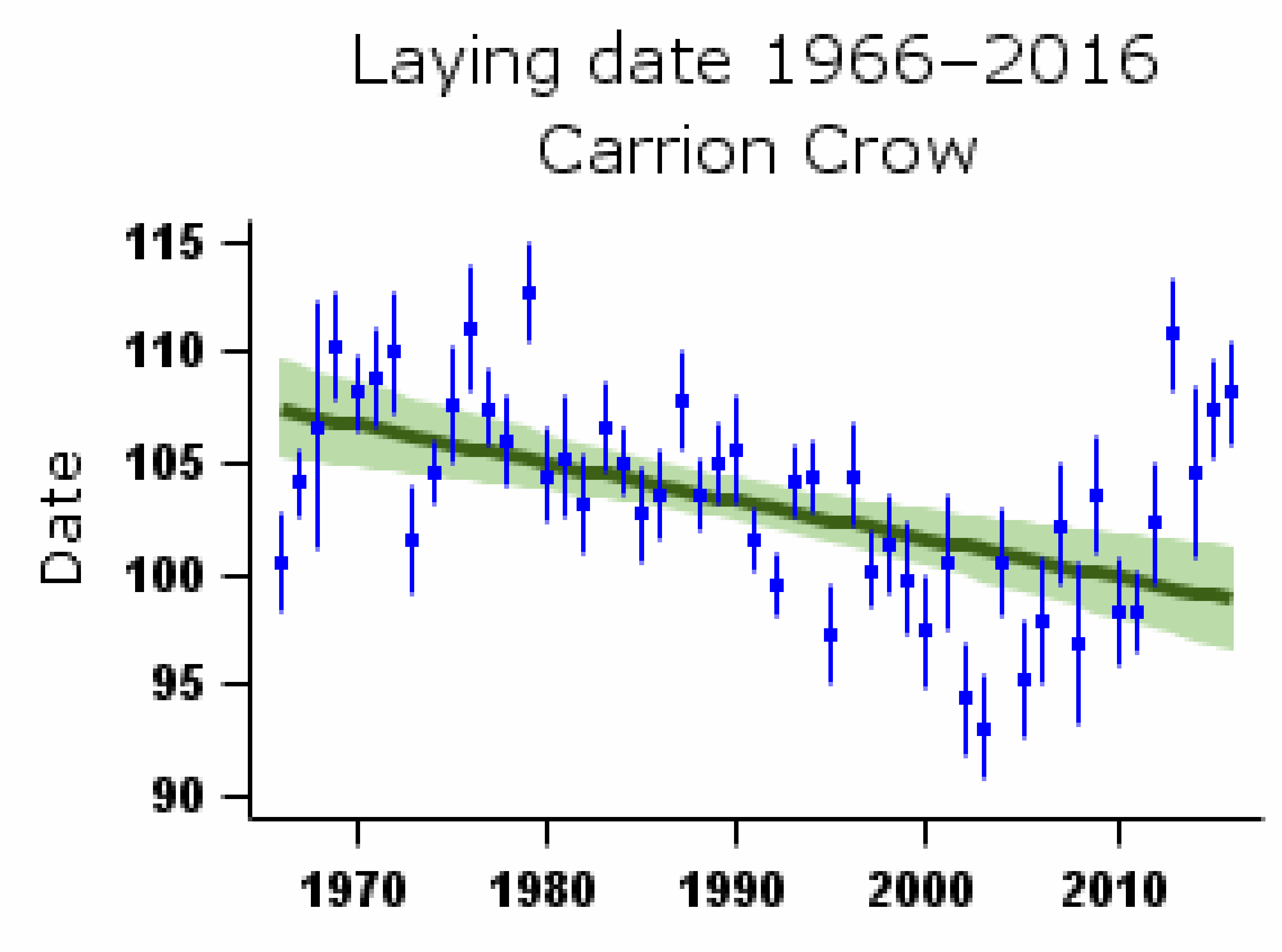


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

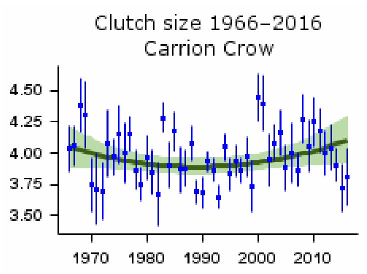


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

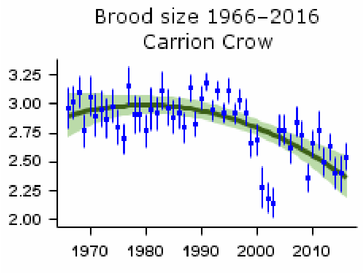
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	39	Curvilinear	1.65 fledglings	2.09 fledglings	27.1%		
Clutch size	48	1967-2015	31	Curvilinear	4.03 eggs	4.08 eggs	1.3%		
Brood size	48	1967-2015	78	Curvilinear	2.91 chicks	2.39 chicks	-17.7%		
Nest failure rate at egg stage	48	1967-2015	47	Curvilinear	2.09% nests/day	0.46% nests/day	-78.0%		
Nest failure rate at chick stage	48	1967-2015	40	Linear decline	0.70% nests/day	0.11% nests/day	-84.3%		
Laying date	48	1967-2015	29	Linear decline	Apr 17	Apr 9	-8 days		Small sample

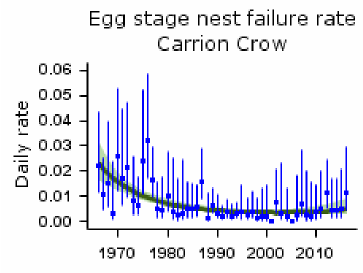
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



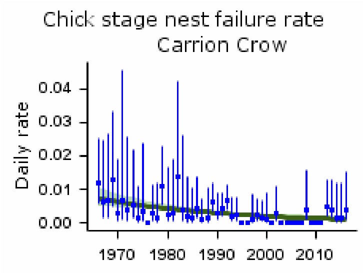
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There are few specific studies providing evidence for the causes of the increase in this species, although evidence presented here shows that increases in breeding success have been important. Ecological causes of this could be increases in food availability and the increasing suitability of urban areas (driving the species' expansion there), although specific evidence supporting these hypotheses is limited.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Other	

Further information on causes of change

The demographic trends shown here reveal that there has been a strong increase in the number of fledglings produced per breeding attempt between 1968 and 2008, reflecting a decline in daily failure rate of nests at the egg and chick stages. Clutch size is at a similar level to 1968, but brood size has decreased. This suggests that the increase in Carrion Crow numbers is related to increases in breeding success although, as there are no estimates of survival, it is not possible to say what part this has played.

This species is omnivorous and highly adaptable and is thus able to exploit changing habitats and the ephemeral food resources in intensive agriculture, from ploughed fields to grazed pasture, allowing breeding pairs to hold territories year-round. It is also able to exploit the varied food sources found in towns and cities. Richner (1992) provided good evidence that food-supplemented pairs had a higher nesting success and produced more and heavier fledglings, demonstrating that food limitation can cause low fitness for individuals and thus could potentially restrict population-level reproductive success. In a local study, Yom-Tov (1974) showed that provision of excess food improved chick survival, and concluded that the distribution pattern of food was the ultimate factor limiting breeding success, perhaps because this affects levels of intraspecific nest predation. Although the impact on population size was not considered in these studies, it is possible that food availability for Carrion Crows has increased and so helped support the population increase. O'Connor & Shrubb (1986) suggest that the general increase in density of sheep in upland areas, and the increase in carrion resulting from this, may be responsible for the expansion of Carrion Crow populations, although evidence for this was not given and this is clearly not relevant to lowland areas (where sheep numbers have decreased).

A second hypothesis to explain this species' increase is that control by gamekeepers has reduced, but evidence supporting this is limited. Tharme et al. (2001) stated that the control of Carrion Crows by gamekeepers was the most probable cause of the low densities on grouse moors, although they found no significant relationship between the number of gamekeepers and Carrion Crow density. Furthermore, bag returns have shown no overall change in the number of Carrion Crows killed since 1961 (Tapper 1992, Tapper & France 1992).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Hooded Crow

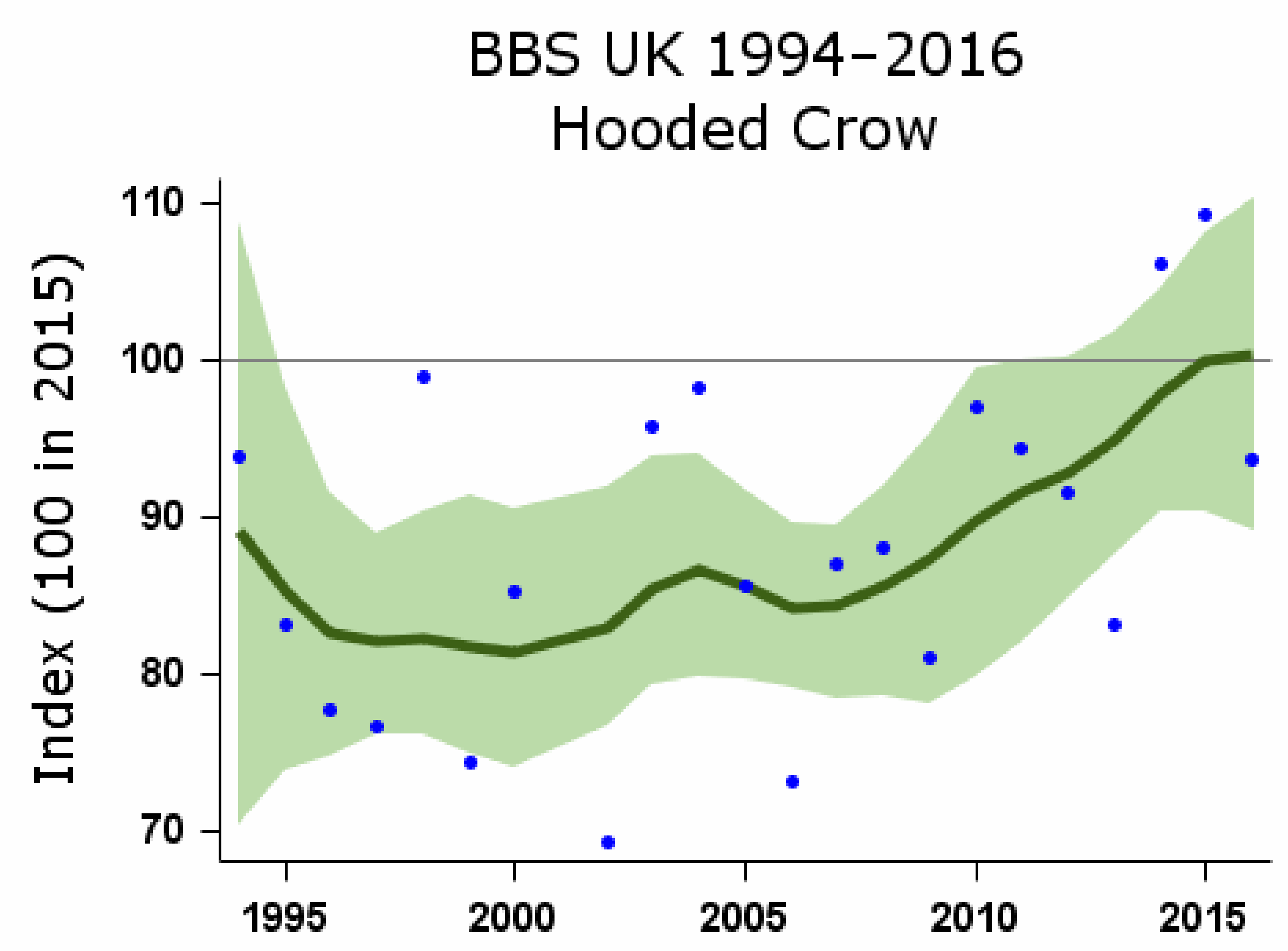
Corvus cornix

Key facts

Conservation listings:	Global: unlisted (included with Carrion Crow) Europe: unlisted (included with Carrion Crow) UK: green
Long-term trend:	UK: uncertain
Population size:	260,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The BOU Records Committee took the decision in 2002 to treat Hooded Crow and Parkin et al. 2003). This split is not recognised in BirdLife International's conservation listings. In the UK, Hooded Crows occur in Northern Ireland, the Isle of Man, and in Scotland, mainly west and north of the Great Glen. Retrospective analysis of BBS trends is simple because observers have always recorded Hooded Crows (coded HC) separately from Carrion Crows and from intermediates (coded HB). Intermediate forms between Carrion and Hooded, which predominate in a band across western Scotland and occur less frequently elsewhere in the UK, are not included in either species' BBS index. BBS data suggest that some decrease in Hooded Crows may have occurred in Scotland, but that this has been countered by increase in Northern Ireland. Hooded Crows had increased markedly in Ireland since 1924 (Hutchinson 1989). The 2007-11 Atlas records little change in the distribution of Hooded Crows but further incursion of Carrion Crows into northwest Scotland and eastern Ireland (Balmer et al. 2013). There has been widespread moderate increase among Hooded and Carrion Crows, taken together, across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

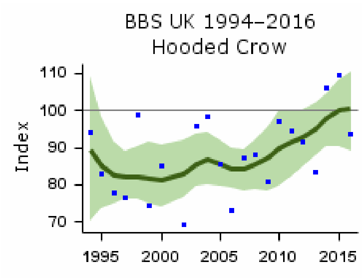
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	140	17	-5	49		
	10	2005-2015	155	17	-1	34		

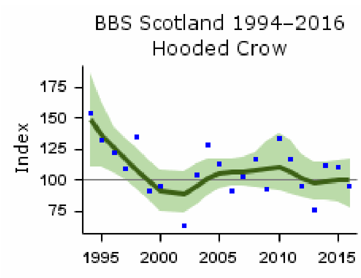
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	149	11	4	28		
BBS Scotland	20	1995-2015	53	-27	-50	4		
	10	2005-2015	55	-6	-26	27		
	5	2010-2015	52	-9	-30	13		
BBS N.Ireland	20	1995-2015	84	179	111	252		
	10	2005-2015	98	44	24	62		
	5	2010-2015	96	38	22	53		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

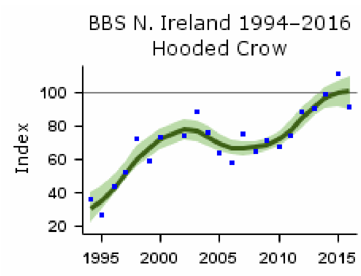
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



BBS UK graph



BBS Scotland graph



BBS N.Ireland graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Raven

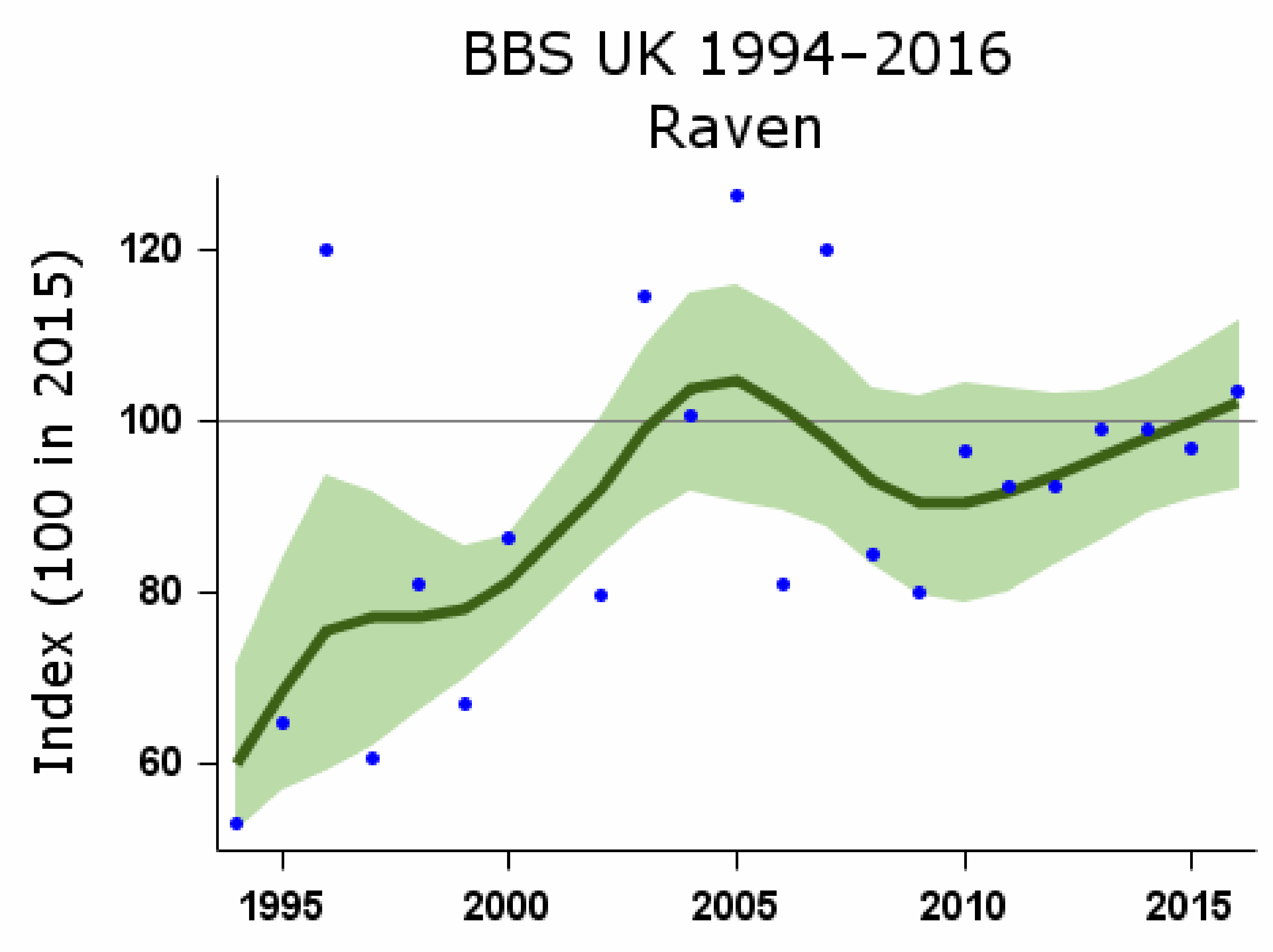
Corvus corax

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: increase
Population size:	7,400 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Between the 1968-72 and 1988-91 atlas periods, the Raven's range contracted from some areas of Scotland and northern England. Declines in southern Scotland and northern England were associated with large-scale afforestation (Marquiss et al. 1978), while closer sheep husbandry and conversion of pasture to arable were also implicated (Mearns 1983). A thorough survey of northwest Wales during 1998 to 2005 found at least 69% more nesting pairs than a previous survey of the same area during 1978-85 and evidence of an increase of 173% since around 1950, at a rate that accelerated after 1990 (Driver 2006). Ravens have increased along the English-Welsh border and colonised extensive new areas of the south coast, western and midland England and southern Scotland since 1988-91 (Cross 2002, Balmer et al. 2013). BBS indicates overall increase in England, Scotland and Wales since 1994. Nesting success appears to have improved, but brood size has fallen. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a): increases are evident in all regions but have been weakest in the south and west, including UK (PECBMS 2009).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

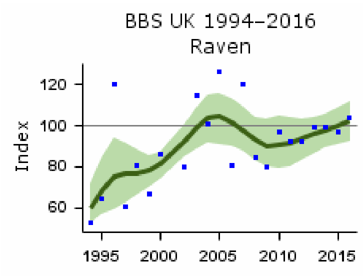
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	332	46	12	83		
	10	2005-2015	446	-4	-21	19		
	5	2010-2015	494	11	-6	30		

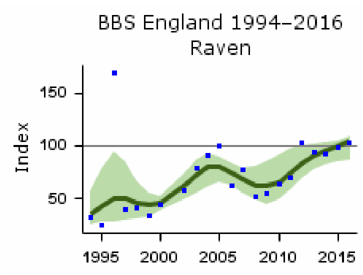
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS England	20	1995-2015	155	130	7	280		
	10	2005-2015	234	24	-6	52		
	5	2010-2015	271	51	4	95		
BBS Scotland	20	1995-2015	52	35	-12	108		
	10	2005-2015	63	-4	-45	56		
	5	2010-2015	67	-3	-21	14		
BBS Wales	20	1995-2015	98	34	-6	105		
	10	2005-2015	118	-19	-35	1		
	5	2010-2015	127	3	-13	23		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

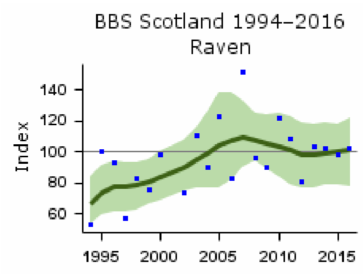
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



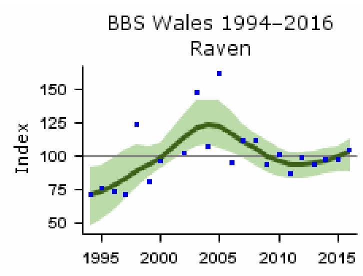
BBS UK graph



BBS England graph

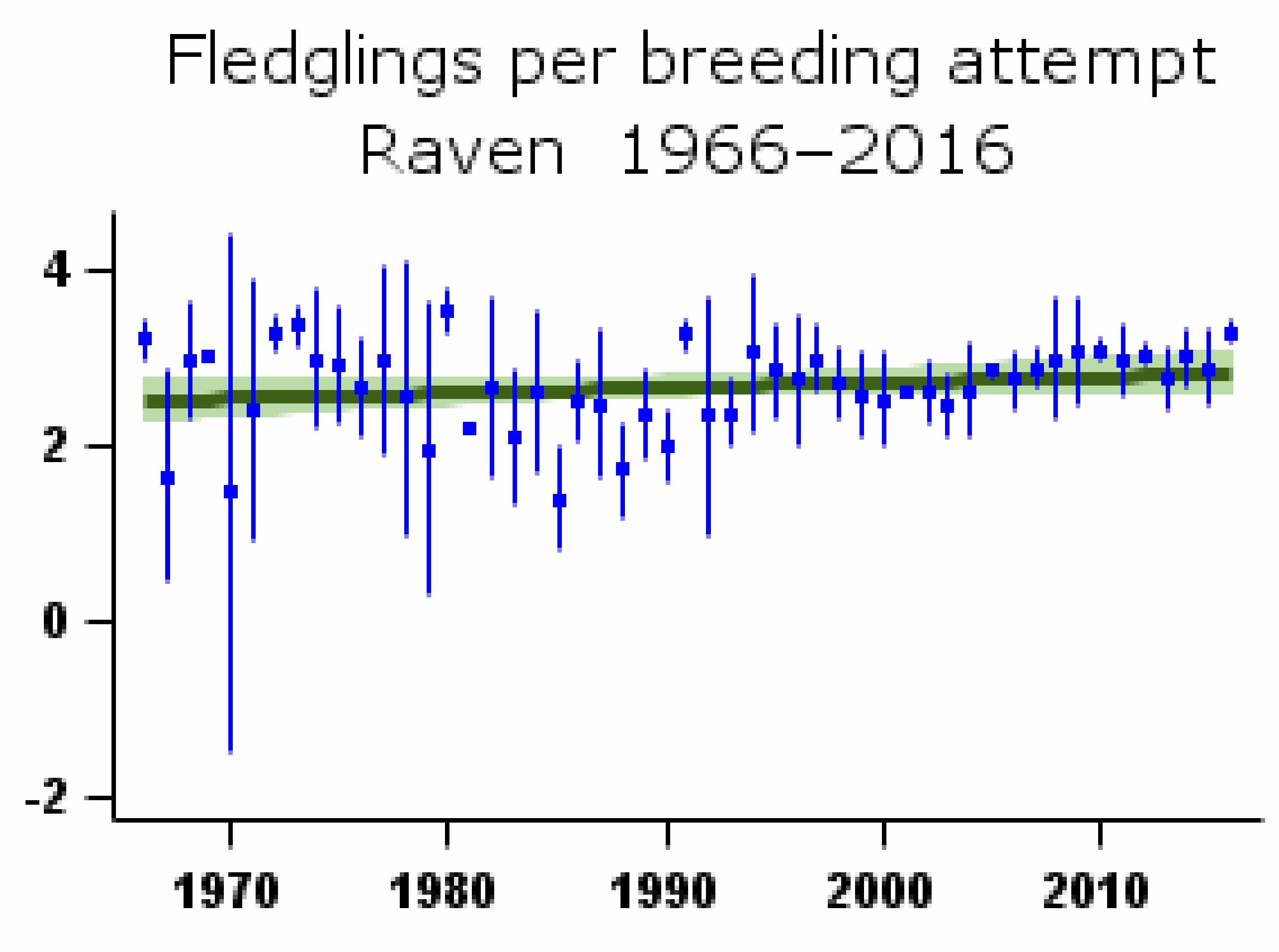


BBS Scotland graph

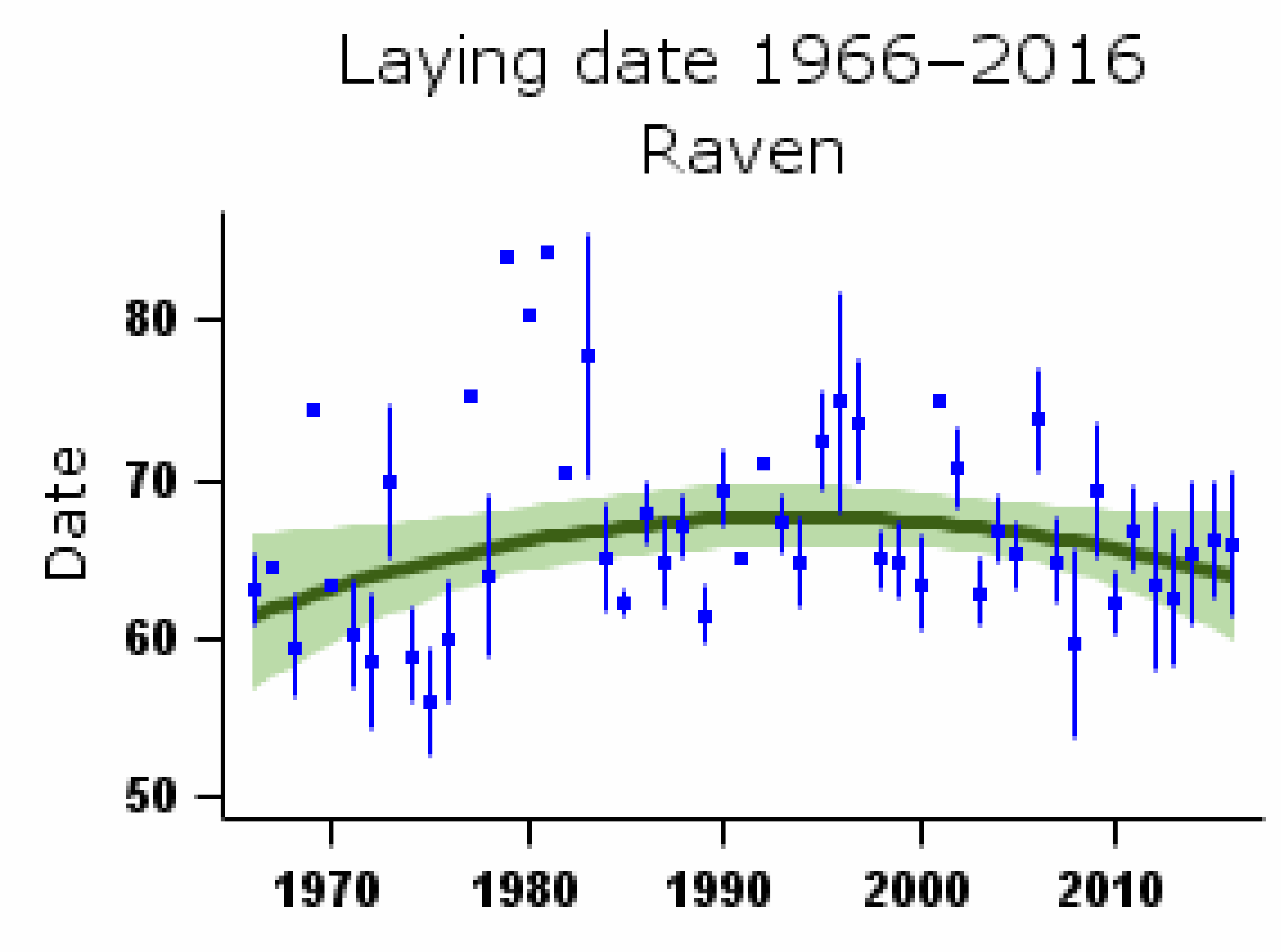


BBS Wales graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

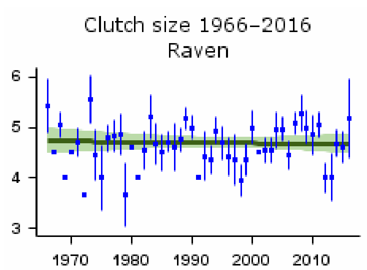


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

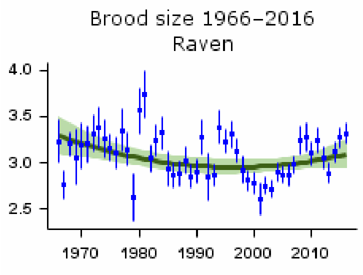
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	22	None					
Clutch size	48	1967-2015	14	None					Small sample
Brood size	48	1967-2015	73	Curvilinear	3.27 chicks	3.08 chicks	-5.9%		
Nest failure rate at egg stage	48	1967-2015	23	Curvilinear	0.25% nests/day	0.02% nests/day	-92.0%		Small sample
Nest failure rate at chick stage	48	1967-2015	32	None					
Laying date	48	1967-2015	12	Curvilinear	Mar 3	Mar 5	2 days		Small sample

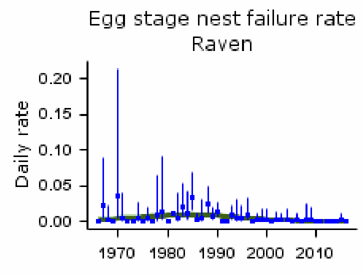
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



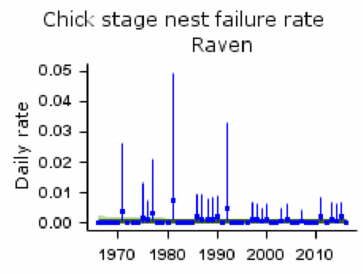
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Goldcrest

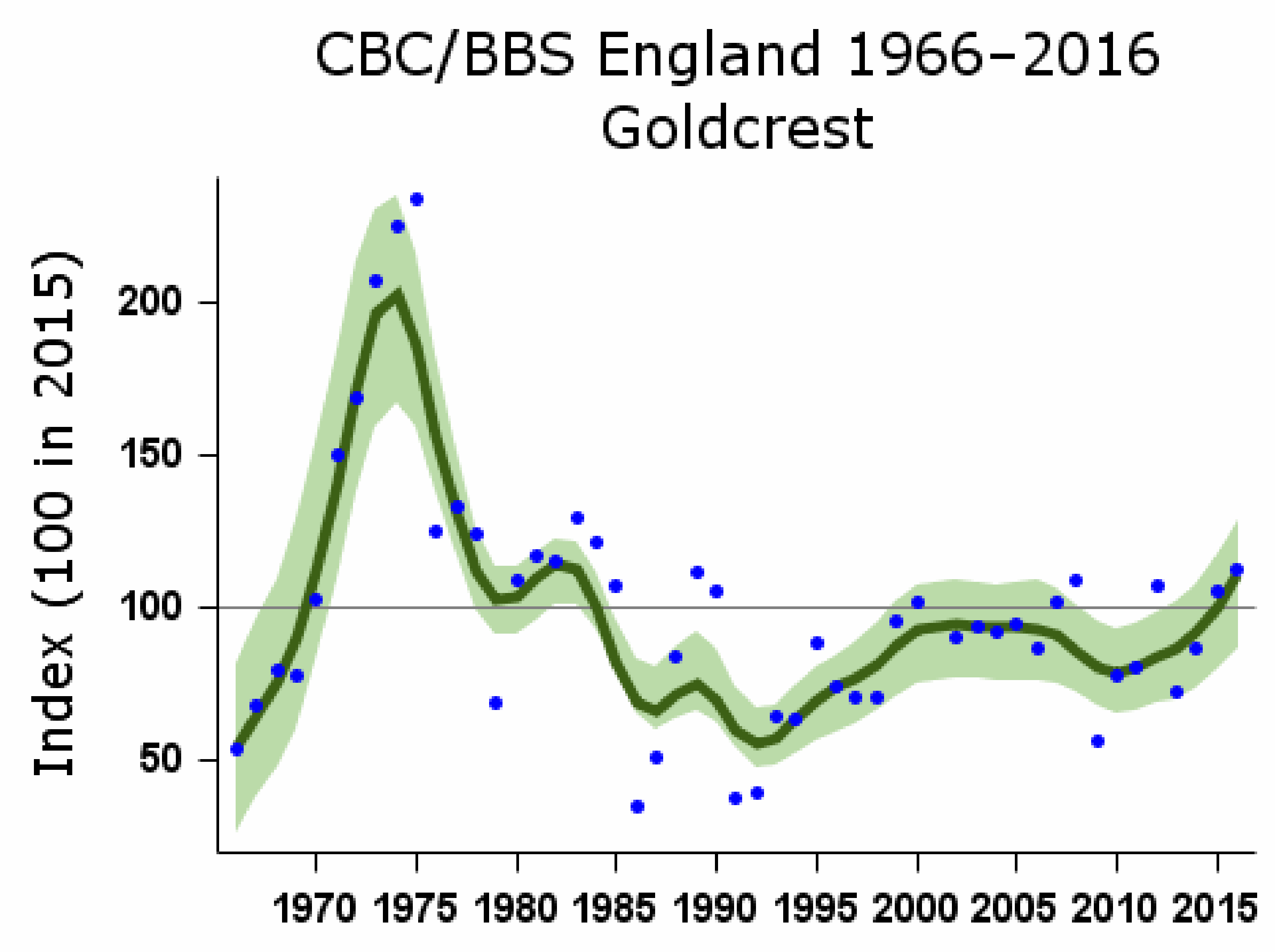
Regulus regulus

Key facts

Conservation listings:	Global: green
Long-term trend:	England: fluctuating, with no long-term trend
Population size:	610,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Goldcrest abundance is affected unusually severely by winter weather, and the strong increase in the species' CBC/BBS index up to the mid 1970s can be interpreted as recovery from the cold winters of the early 1960s. The subsequent decline temporarily moved the species to the amber list, but its status has now been restored to green. The long-term trend looks very much like a series of damped oscillations following recovery from the 1962/63 winter. The high amplitude of year-to-year change reflects the species' high breeding potential, and its sensitivity to cold winter weather. CBC had relatively poor coverage of conifer plantations, in which Goldcrests occur at increasing densities as the trees mature. A general increase in the area of prime habitat has therefore been poorly reflected in the long-term trend. BBS has recorded some initial increase in all UK countries, followed by a long decline that ended around 2010. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	306	56	-21	233		
	25	1990-2015	514	44	3	66		
	10	2005-2015	727	7	-5	20		
	5	2010-2015	733	27	15	37		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	830	11	-4	31		
	10	2005-2015	1005	-17	-26	-8		
	5	2010-2015	995	22	8	30		
BBS England	20	1995-2015	592	39	21	61		
	10	2005-2015	727	7	-3	21		
	5	2010-2015	733	27	14	38		
BBS Scotland	20	1995-2015	99	14	-17	56		
	10	2005-2015	119	-43	-52	-25	>25	
	5	2010-2015	108	9	-17	32		
BBS Wales	20	1995-2015	88	-30	-51	9		
	10	2005-2015	99	12	-14	49		
	5	2010-2015	103	57	24	94		
BBS N.Ireland	20	1995-2015	46	35	-16	51		
	10	2005-2015	56	-31	-48	-10	>25	
	5	2010-2015	50	12	-27	31		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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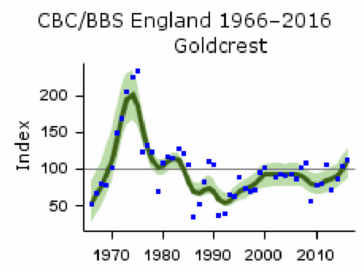
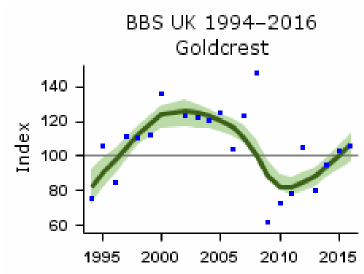
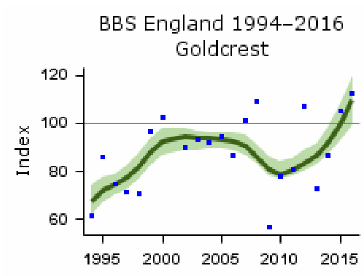


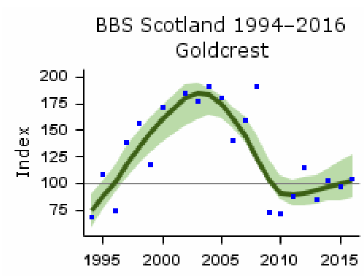
CBC/BBS England graph



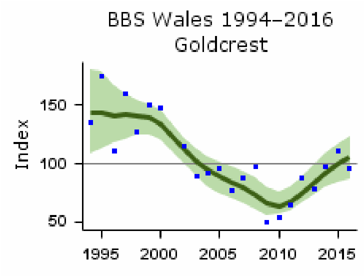
BBS UK graph



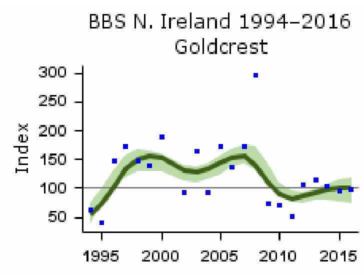
BBS England graph



BBS Scotland graph

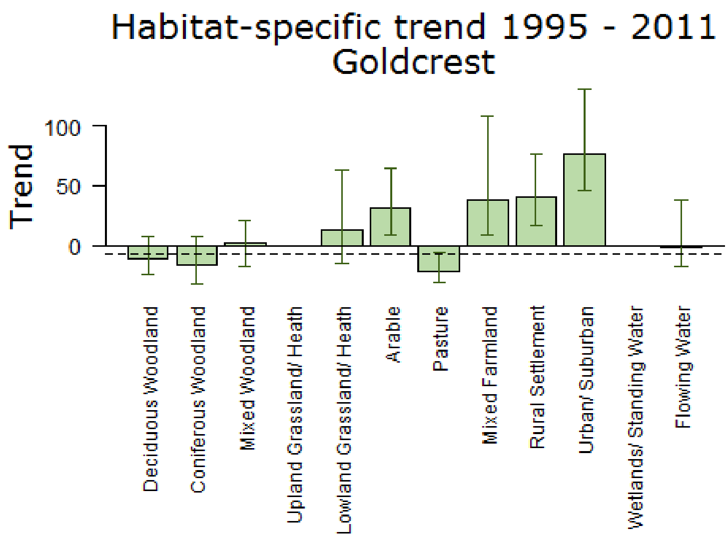


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

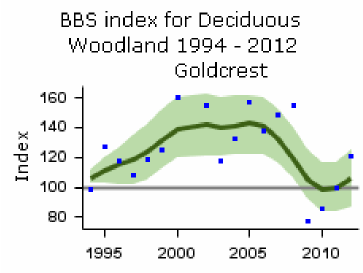
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

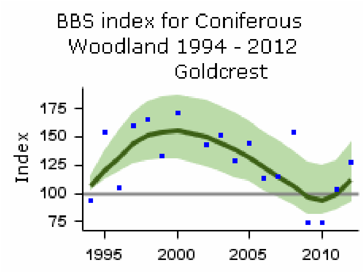
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	189	-10	-24	8
Coniferous Woodland	16	1995-2011	152	-17	-32	7
Mixed Woodland	16	1995-2011	207	2	-17	21
Lowland Grassland/ Heath	16	1995-2011	45	13	-15	63
Arable	16	1995-2011	102	31	9	65
Pasture	16	1995-2011	273	-22	-31	-5
Mixed Farmland	16	1995-2011	65	38	9	109
Rural Settlement	16	1995-2011	164	41	17	77

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Urban/ Suburban	16	1995-2011	92	76	46	161
Flowing Water	16	1995-2011	89	-1	-18	38

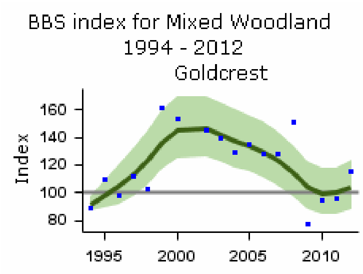
Further information on habitat-specific trends, please follow link here.



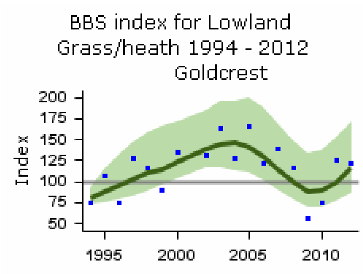
Habitat graph



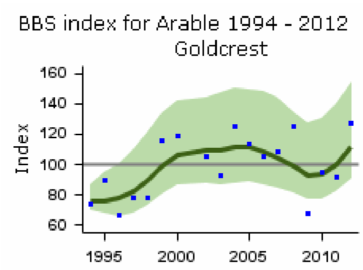
Habitat graph



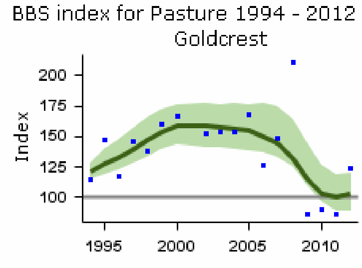
Habitat graph



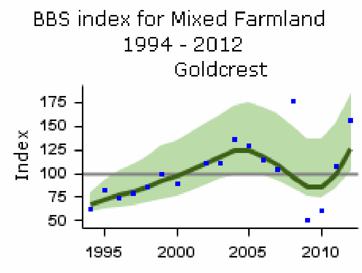
Habitat graph



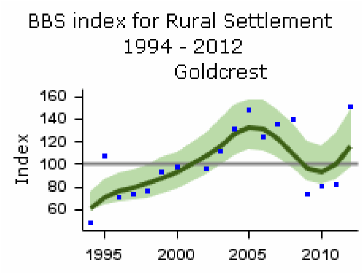
Habitat graph



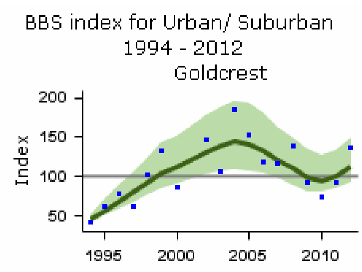
Habitat graph



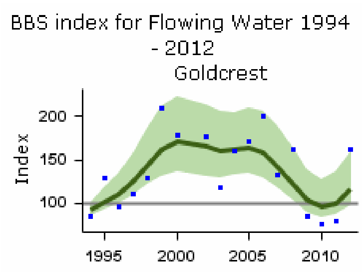
Habitat graph



Habitat graph



Habitat graph



Habitat graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	4	None					Small sample
Brood size	48	1967-2015	7	Linear decline	6.04 chicks	5.05 chicks	-16.4%		Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Nest failure rate at chick stage	48	1967-2015	6	None					Small sample

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Laying date	48	1967-2015	5	Linear decline	May 12	Apr 29	-13 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Blue Tit

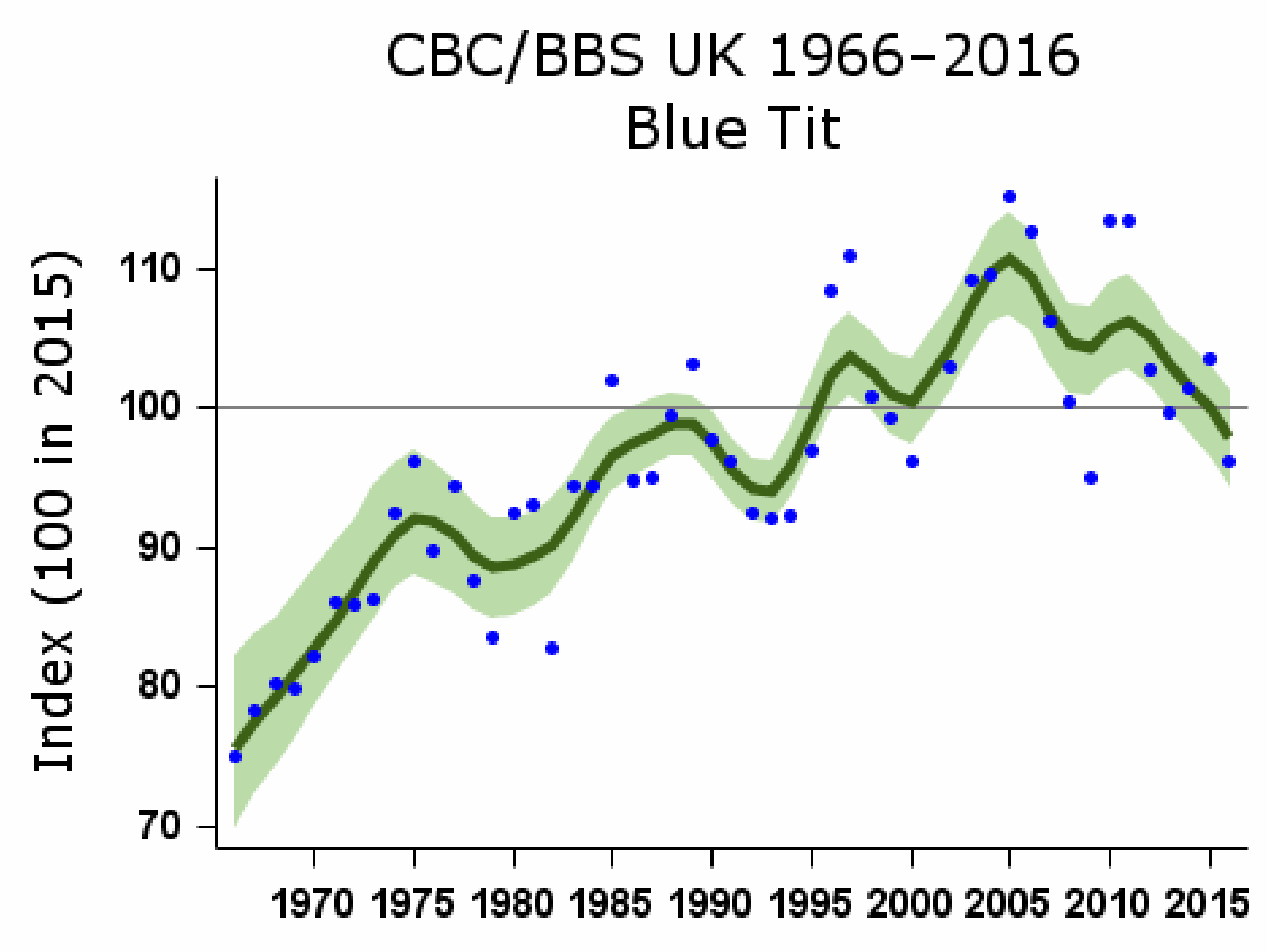
Cyanistes caeruleus

Key facts

Conservation listings:	Global: green; at race level, obscurus amber, caeruleus green
Long-term trend:	UK, England: shallow increase
Population size:	3.6 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Blue Tit populations have increased in abundance, with brief pauses in the long-term upward trend. The recent years of the CBC/BBS index show fluctuations and now a possible decrease. The BBS Robinson et al. 2014). Food provision in gardens during winter and availability of nest boxes, which may reduce egg and nestling predation, have both increased and may have contributed to the rise in population. There have been no clear changes in fledglings per breeding attempt or in survival, however, to accompany the population increase. First-egg dates have advanced by over a week since 1968. Earlier nesting can be linked to the phenology of spring greening in woodland, though with much small-scale spatial variation (Cole et al. 2015). There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1202	29	15	44		
	25	1990-2015	2109	3	-2	7		
	10	2005-2015	2953	-10	-12	-7		
	5	2010-2015	3008	-5	-8	-4		
CBC/BBS England	48	1967-2015	982	27	13	40		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	25	1990-2015	1716	-1	-5	4		
	10	2005-2015	2396	-9	-11	-7		
	5	2010-2015	2442	-6	-8	-4		
CES adults	31	1984-2015	101	10	-8	34		
	25	1990-2015	110	8	-8	29		
	10	2005-2015	109	0	-8	9		
	5	2010-2015	114	6	-4	17		
CES juveniles	31	1984-2015	101	-49	-64	-26	>25	
	25	1990-2015	110	-33	-47	-17	>25	
	10	2005-2015	109	-9	-19	2		
	5	2010-2015	115	-22	-32	-12		
BBS UK	20	1995-2015	2460	1	-3	4		
	10	2005-2015	2953	-9	-12	-7		
	5	2010-2015	3008	-5	-8	-4		
BBS England	20	1995-2015	1994	-1	-5	2		
	10	2005-2015	2396	-9	-11	-6		
	5	2010-2015	2442	-6	-8	-4		
BBS Scotland	20	1995-2015	183	5	-10	19		
	10	2005-2015	227	-14	-24	-5		
	5	2010-2015	232	-6	-15	2		
BBS Wales	20	1995-2015	191	11	-4	23		
	10	2005-2015	221	-9	-19	1		
	5	2010-2015	227	-6	-16	4		
BBS N.Ireland	20	1995-2015	79	14	-19	41		
	10	2005-2015	93	-12	-21	-3		
	5	2010-2015	90	7	-3	19		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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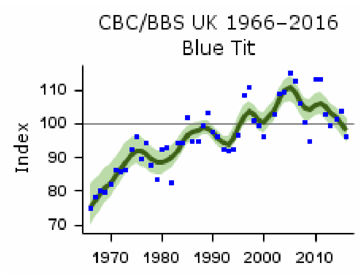
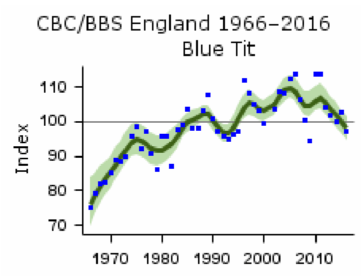
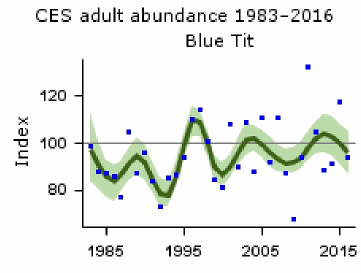


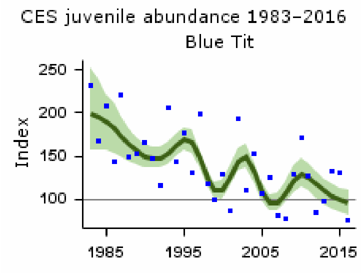
CBC/BBS UK graph



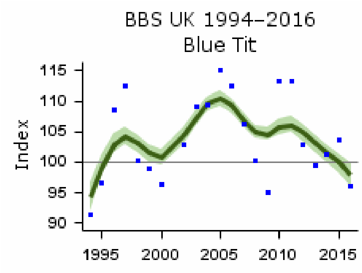
CBC/BBS England graph



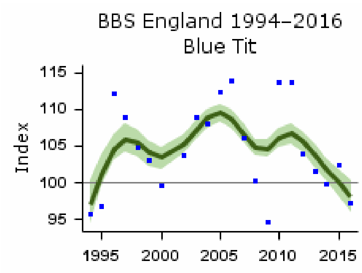
CES adults graph



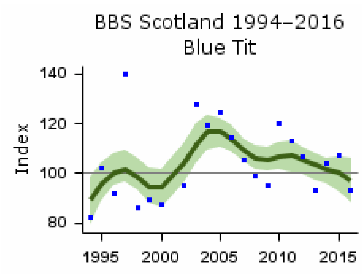
CES juveniles graph



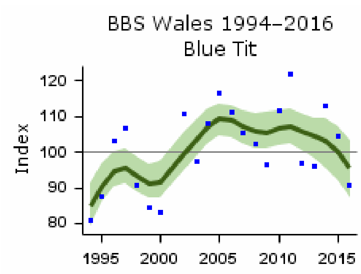
BBS UK graph



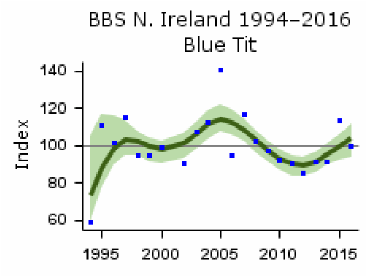
BBS England graph



BBS Scotland graph

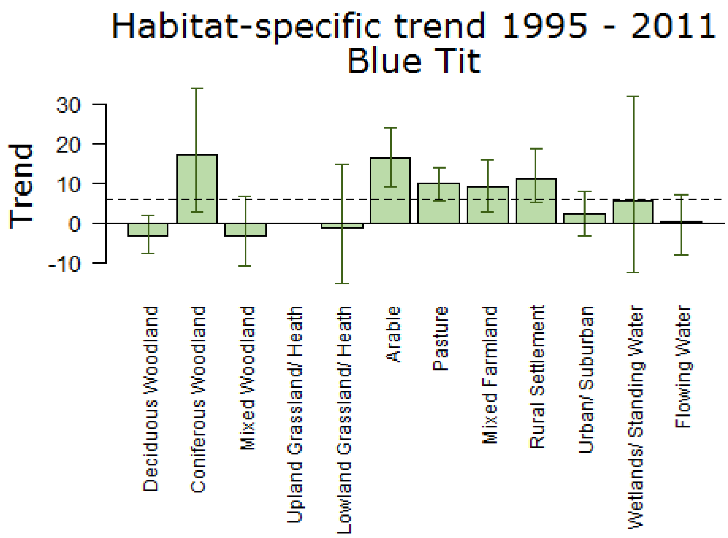


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



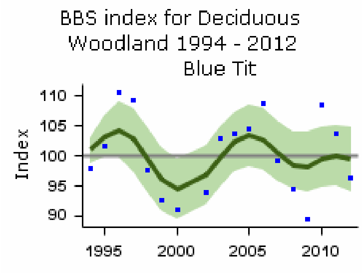
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

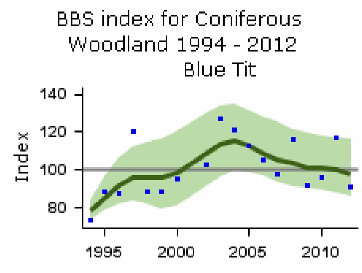
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	877	-3	-8	2
Coniferous Woodland	16	1995-2011	169	17	3	34
Mixed Woodland	16	1995-2011	459	-3	-11	7
Lowland Grassland/ Heath	16	1995-2011	141	-1	-15	15
Arable	16	1995-2011	722	16	9	24
Pasture	16	1995-2011	1260	10	6	14
Mixed Farmland	16	1995-2011	677	9	3	16
Rural Settlement	16	1995-2011	842	11	5	19
Urban/ Suburban	16	1995-2011	434	2	-3	8
Wetlands/ Standing Water	16	1995-2011	97	6	-12	32
Flowing Water	16	1995-2011	501	0	-8	7

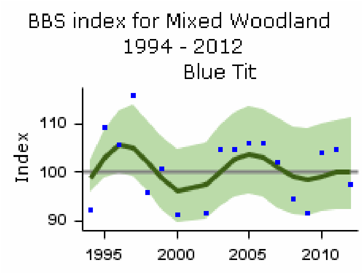
Further information on habitat-specific trends, please follow link here.



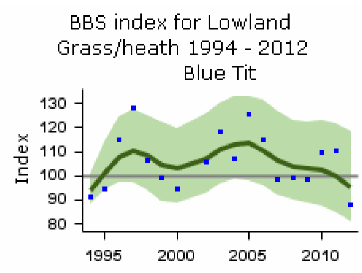
Habitat graph



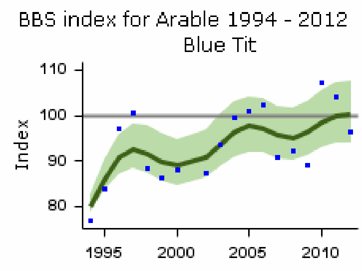
Habitat graph



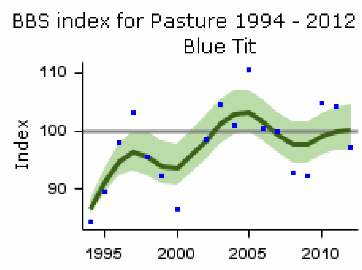
Habitat graph



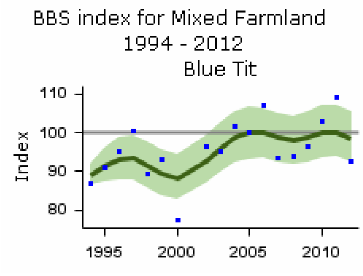
Habitat graph



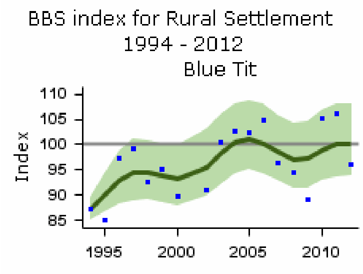
Habitat graph



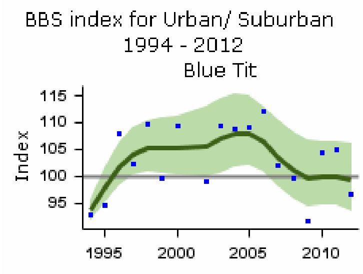
Habitat graph



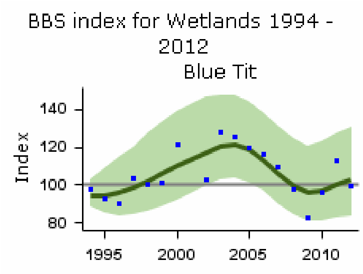
Habitat graph



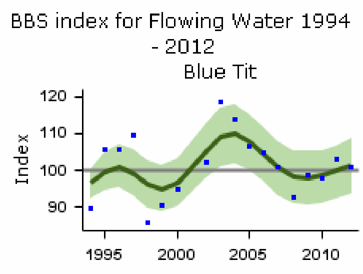
Habitat graph



Habitat graph

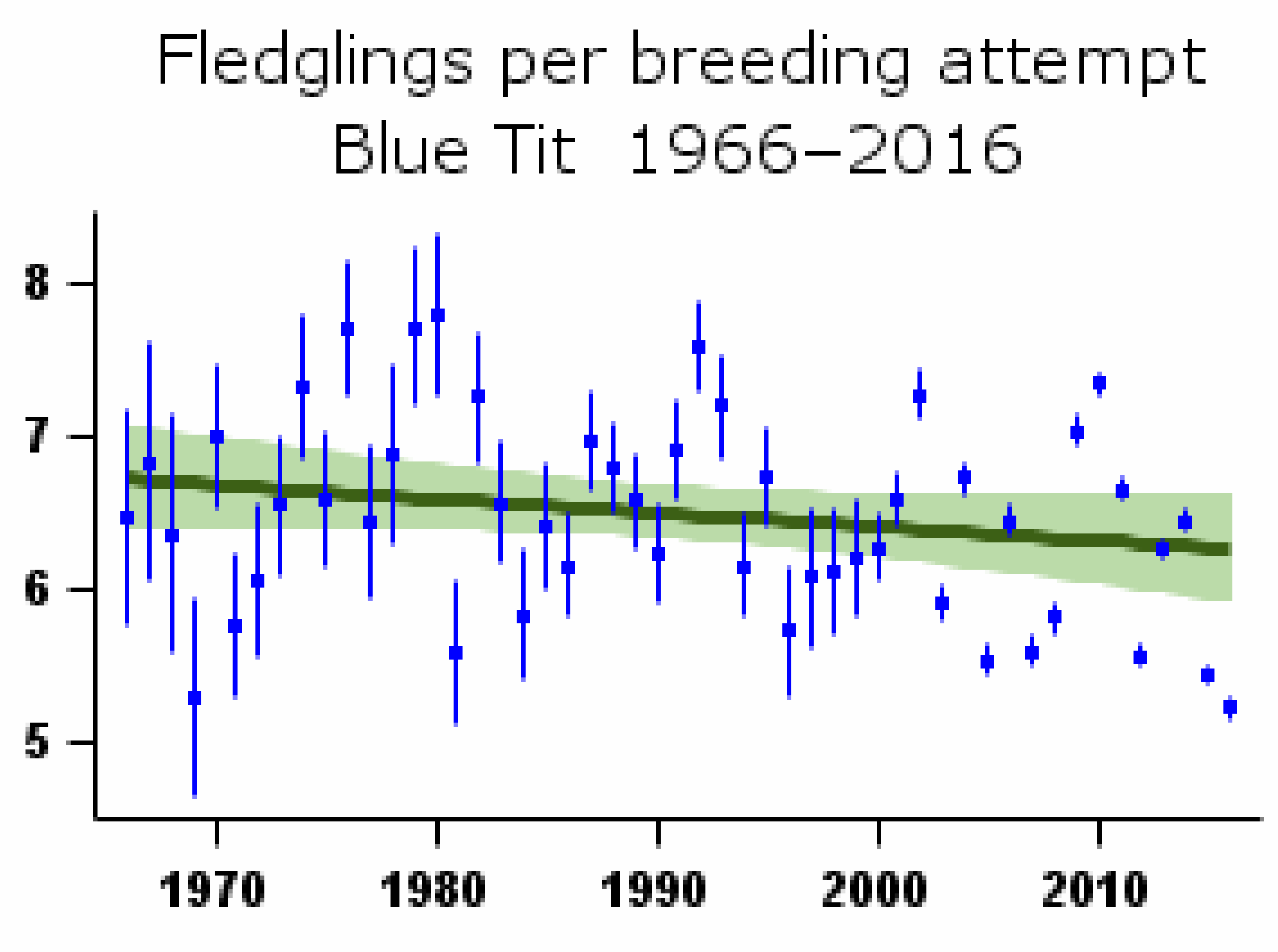


Habitat graph

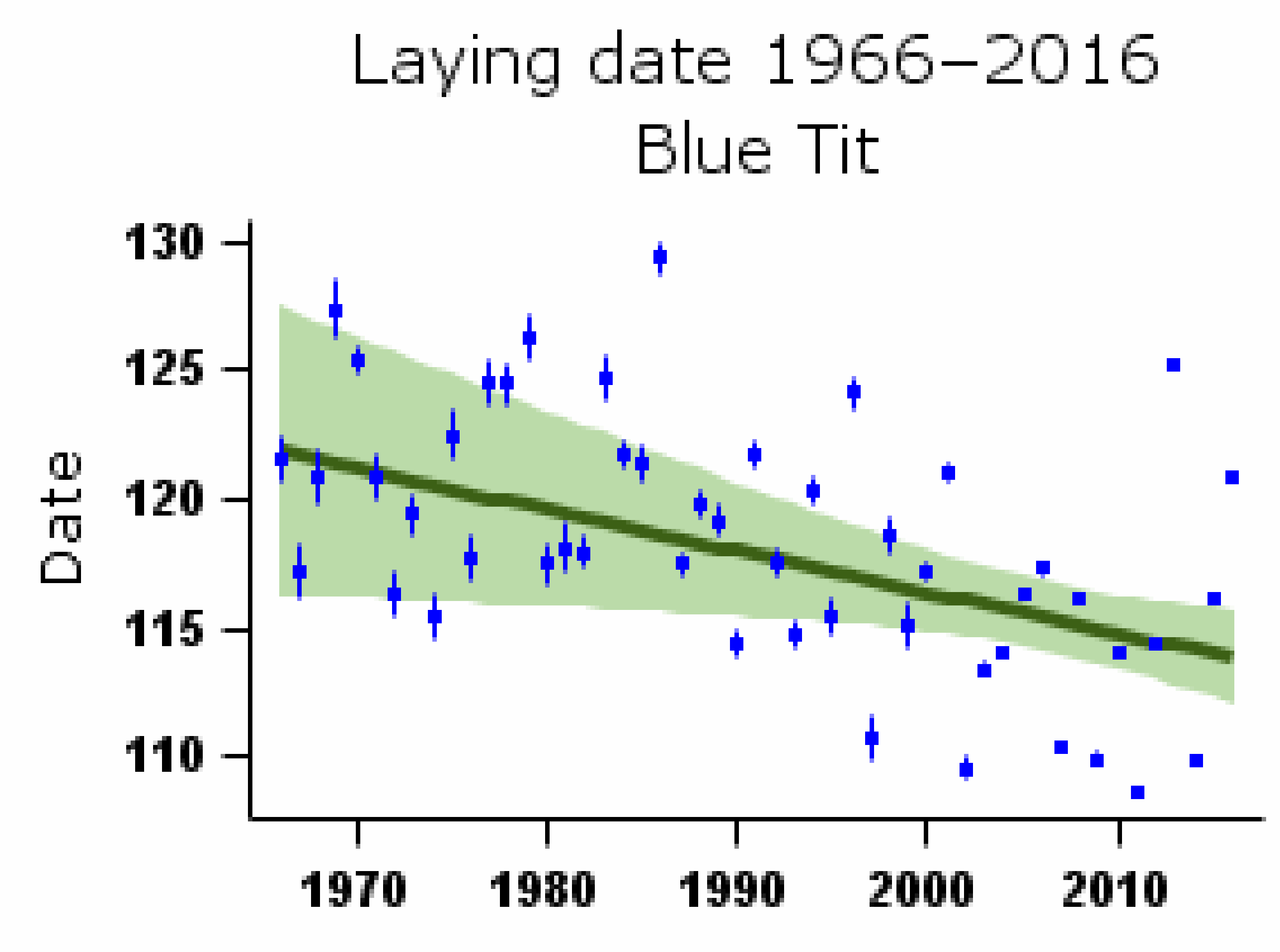


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

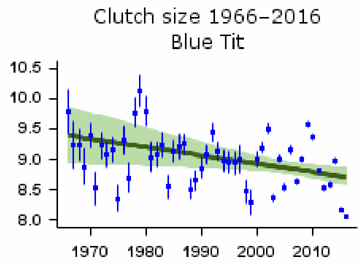


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

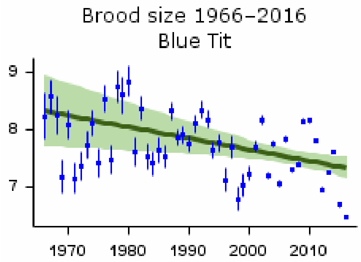
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	689	None					
Clutch size	48	1967-2015	572	Linear decline	9.38 eggs	8.72 eggs	-7.0%		
Brood size	48	1967-2015	1058	Linear decline	8.30 chicks	7.34 chicks	-11.5%		
Nest failure rate at egg stage	48	1967-2015	1006	Curvilinear	0.45% nests/day	0.25% nests/day	-44.4%		
Nest failure rate at chick stage	48	1967-2015	689	None					
Laying date	48	1967-2015	741	Linear decline	May 2	Apr 24	-8 days		
Juvenile to Adult ratio (CES)	31	1984-2015	105	Smoothed trend	258 Index value	100 Index value	-61%	>50	
Juvenile to Adult ratio (CES)	25	1990-2015	114	Smoothed trend	189 Index value	100 Index value	-47%	>25	
Juvenile to Adult ratio (CES)	10	2005-2015	113	Smoothed trend	120 Index value	100 Index value	-17%		
Juvenile to Adult ratio (CES)	5	2010-2015	118	Smoothed trend	141 Index value	100 Index value	-29%	>25	

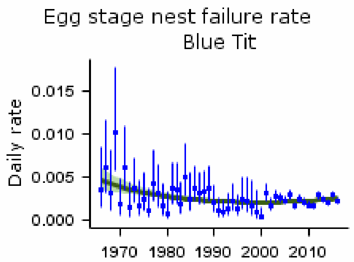
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



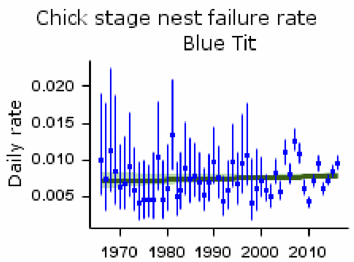
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



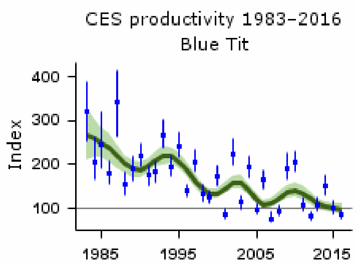
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



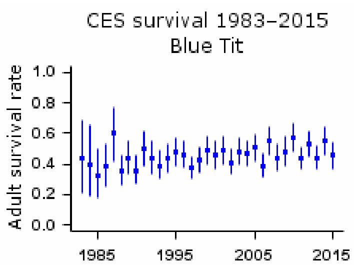
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Great Tit

Parus major

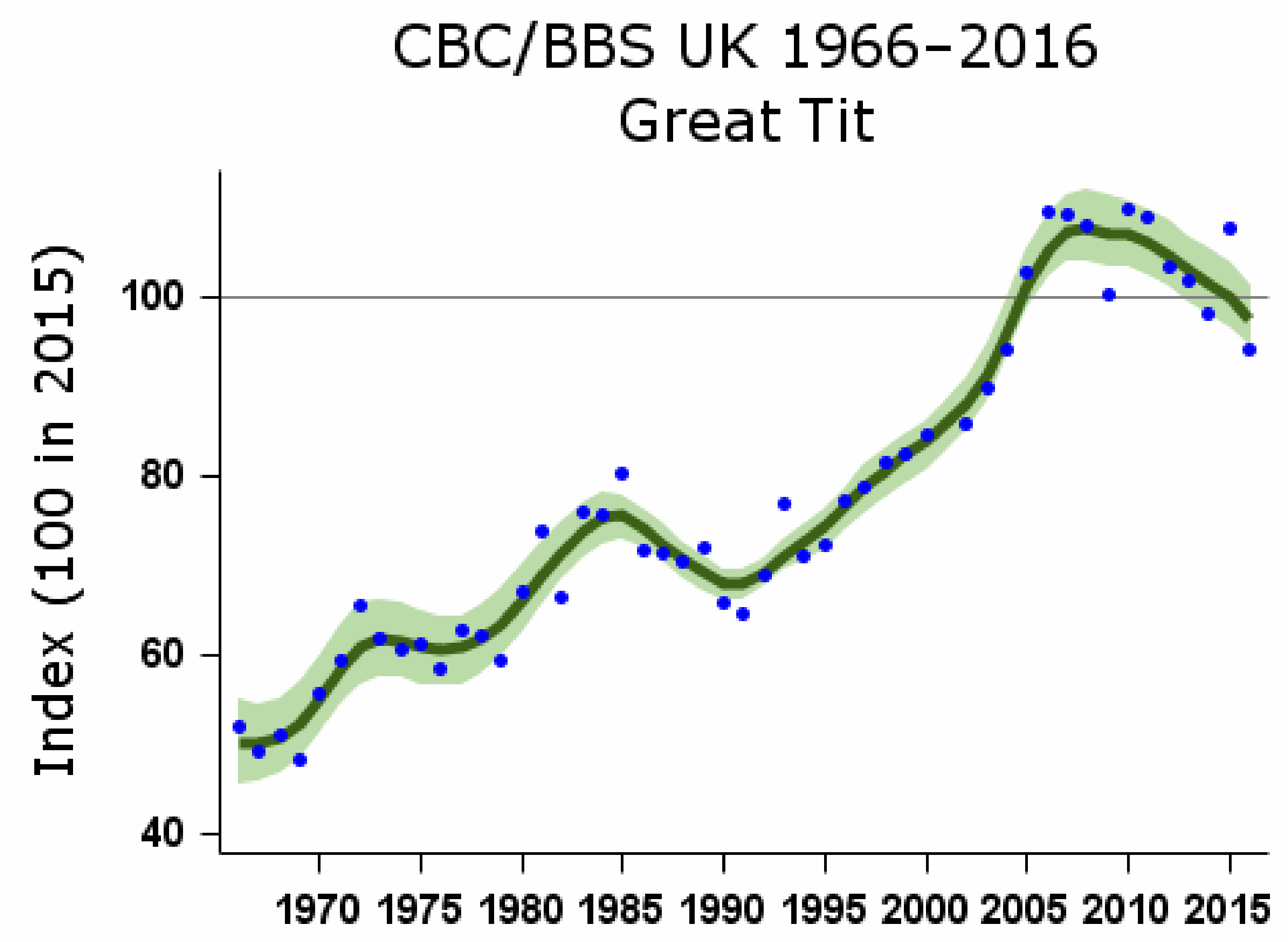
Key facts

Conservation listings:	Global: green; at race level, newtoni amber, major green
Long-term trend:	UK, England: moderate increase
Population size:	2.6 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Great Tit numbers have increased fairly steadily since the 1960s, with the exception of two or three brief periods of stability or shallow decline. The BBS Lawson et al. 2012a). Laying dates have advanced by 10 days since 1968. Earlier nesting can be linked to the phenology of spring greening in woodland, though with much small-scale spatial variation (Cole et al. 2015). There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



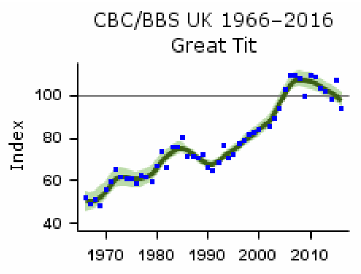
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

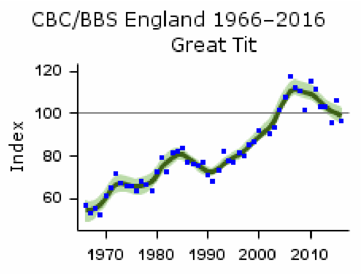
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1145	99	76	127		
	25	1990-2015	2007	47	40	55		
	10	2005-2015	2854	-1	-4	1		
	5	2010-2015	2917	-6	-8	-5		
CBC/BBS England	48	1967-2015	936	83	63	116		
	25	1990-2015	1632	38	31	46		
	10	2005-2015	2310	-6	-9	-4		
	5	2010-2015	2359	-9	-11	-7		
CES adults	31	1984-2015	95	20	-1	49		
	25	1990-2015	104	30	9	61		
	10	2005-2015	105	-8	-17	4		
	5	2010-2015	110	-3	-11	7		
CES juveniles	31	1984-2015	98	-21	-39	4		
	25	1990-2015	107	-5	-25	16		
	10	2005-2015	107	-22	-30	-11		
	5	2010-2015	112	-24	-34	-12		
BBS UK	20	1995-2015	2340	37	32	42		
	10	2005-2015	2854	-1	-4	2		
	5	2010-2015	2917	-7	-9	-4		
BBS England	20	1995-2015	1895	28	24	32		
	10	2005-2015	2310	-6	-9	-4		
	5	2010-2015	2359	-9	-10	-7		
BBS Scotland	20	1995-2015	171	64	41	89		
	10	2005-2015	217	17	4	31		
	5	2010-2015	226	6	-3	15		
BBS Wales	20	1995-2015	184	36	18	55		
	10	2005-2015	215	-1	-9	9		
	5	2010-2015	221	-13	-20	-6		
BBS N.Ireland	20	1995-2015	76	172	107	214		
	10	2005-2015	92	32	17	48		
	5	2010-2015	90	3	-5	15		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

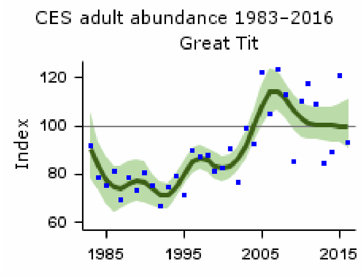
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



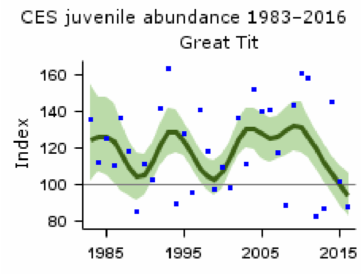
CBC/BBS UK graph



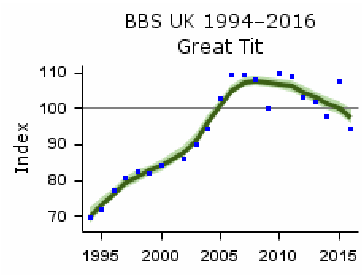
CBC/BBS England graph



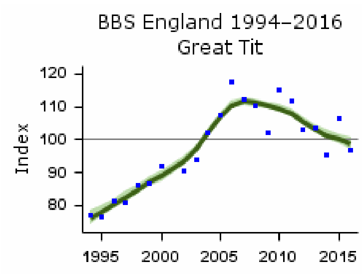
CES adults graph



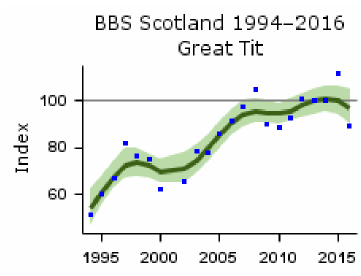
CES juveniles graph



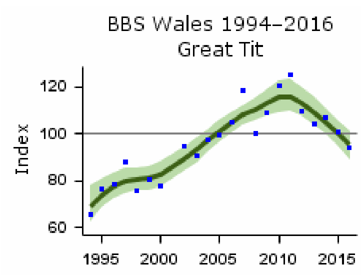
BBS UK graph



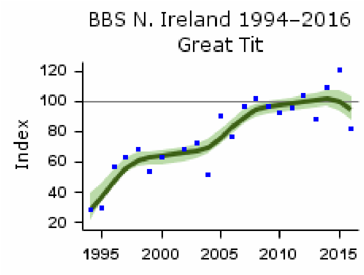
BBS England graph



BBS Scotland graph

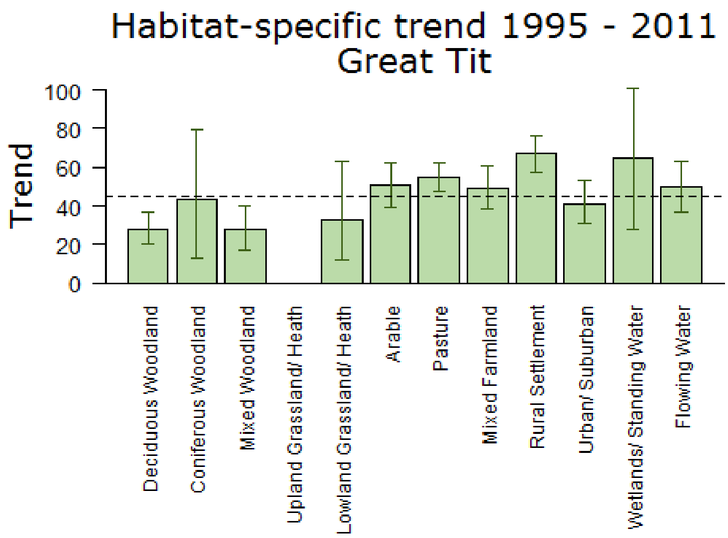


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



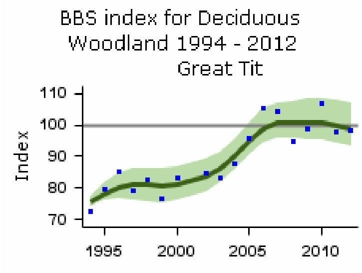
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

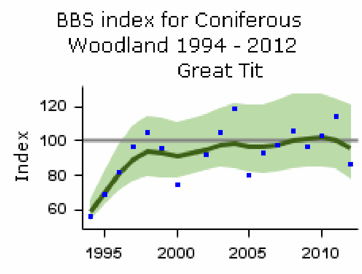
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	775	28	20	37
Coniferous Woodland	16	1995-2011	146	43	13	80
Mixed Woodland	16	1995-2011	397	28	17	40
Lowland Grassland/ Heath	16	1995-2011	125	33	12	63
Arable	16	1995-2011	626	51	39	62
Pasture	16	1995-2011	1121	55	48	62
Mixed Farmland	16	1995-2011	571	49	39	61
Rural Settlement	16	1995-2011	722	67	57	77
Urban/ Suburban	16	1995-2011	368	41	31	53
Wetlands/ Standing Water	16	1995-2011	78	65	28	101
Flowing Water	16	1995-2011	421	50	36	63

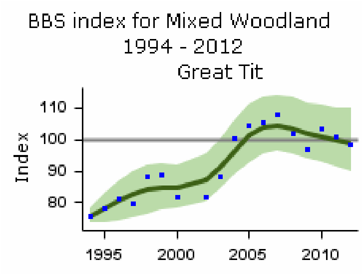
Further information on habitat-specific trends, please follow link here.



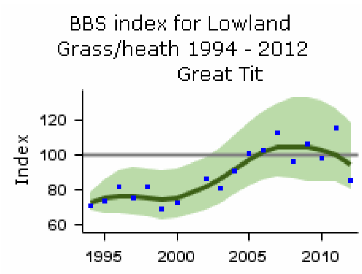
Habitat graph



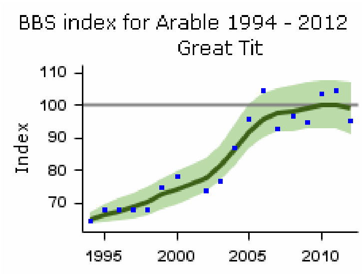
Habitat graph



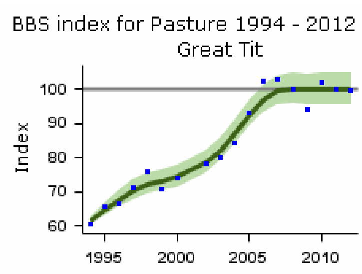
Habitat graph



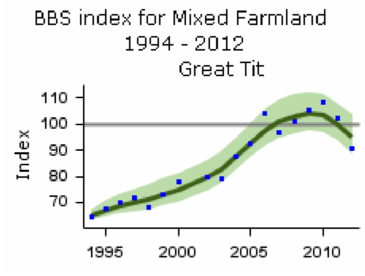
Habitat graph



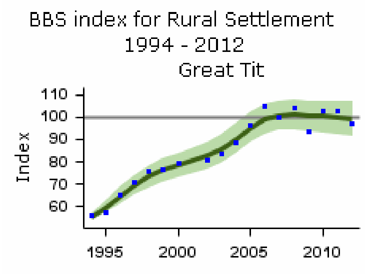
Habitat graph



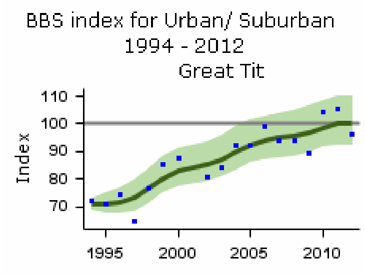
Habitat graph



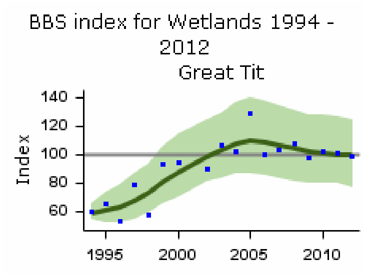
Habitat graph



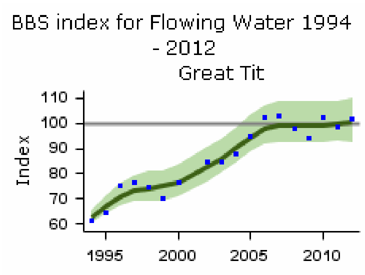
Habitat graph



Habitat graph

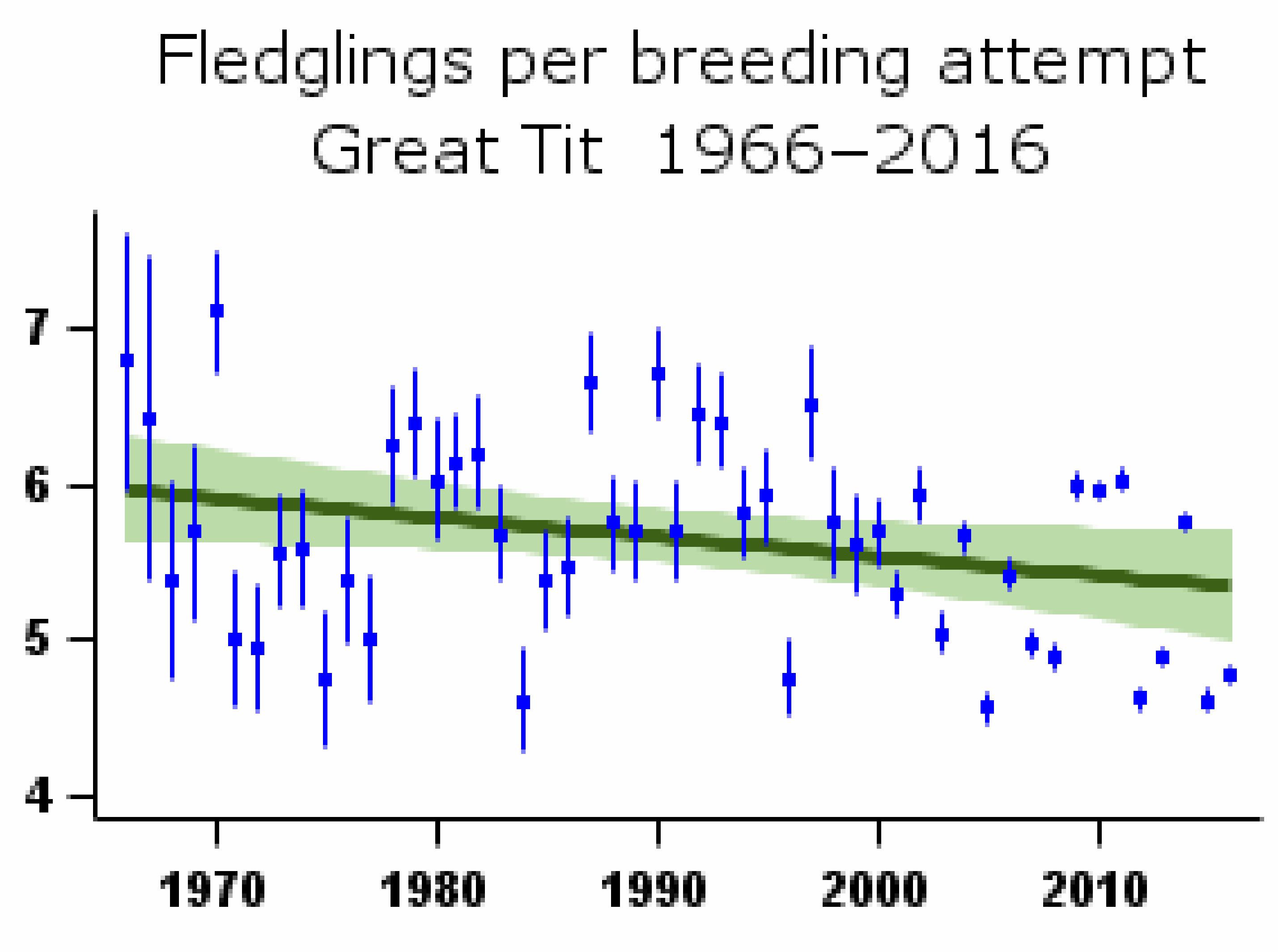


Habitat graph

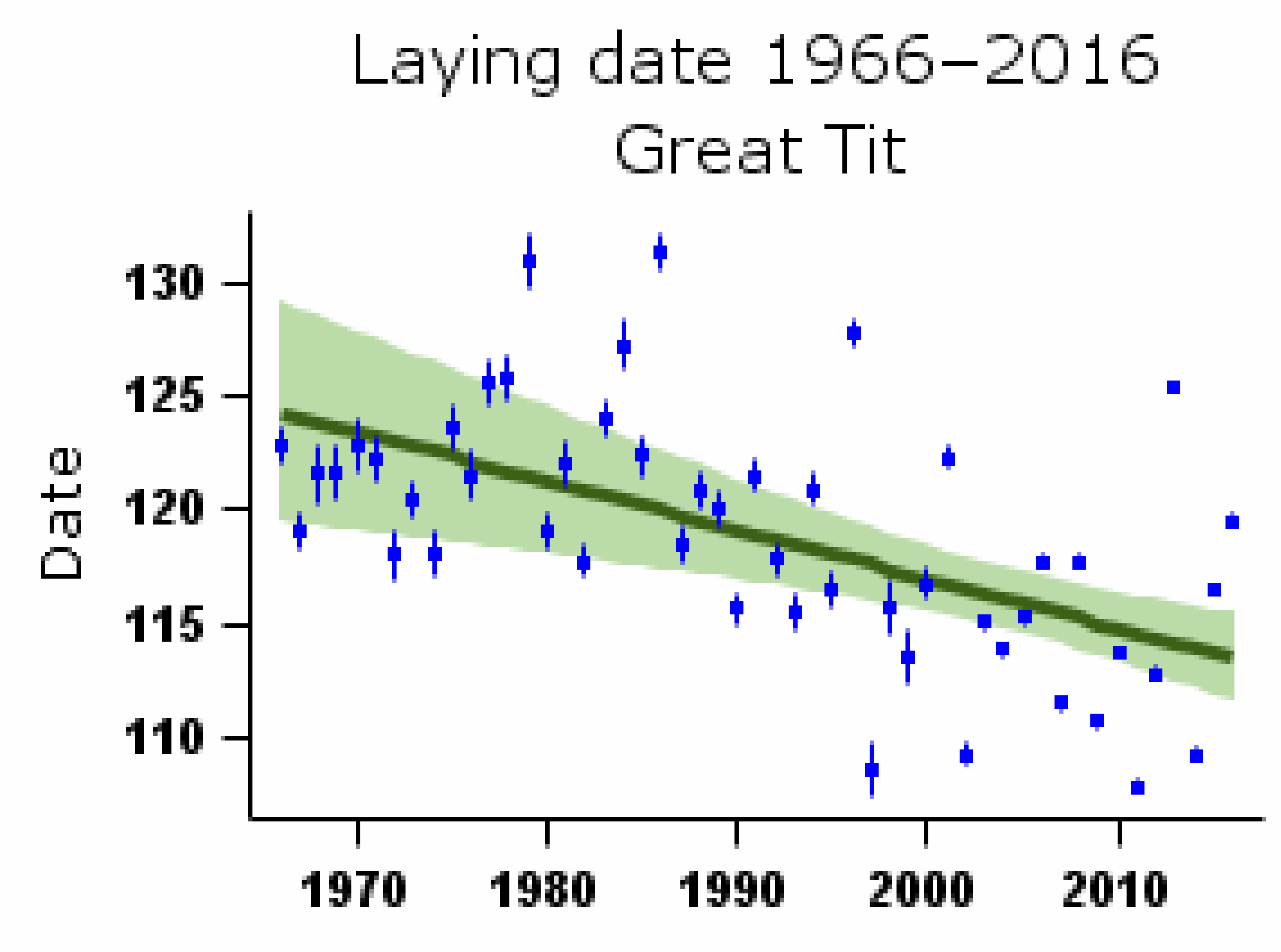


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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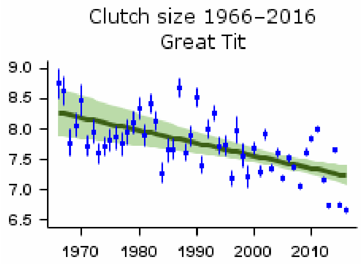
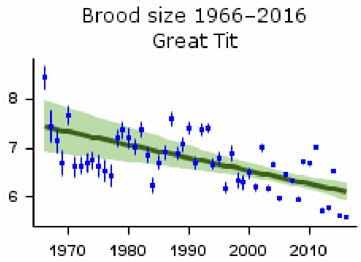
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	541	Linear decline	5.95 fledglings	5.36 fledglings	-9.9%		
Clutch size	48	1967-2015	416	Linear decline	8.25 eggs	7.25 eggs	-12.2%		
Brood size	48	1967-2015	877	Linear decline	7.41 chicks	6.14 chicks	-17.2%		
Nest failure rate at egg stage	48	1967-2015	801	Curvilinear	0.60% nests/day	0.26% nests/day	-56.7%		
Nest failure rate at chick stage	48	1967-2015	541	None					
Laying date	48	1967-2015	490	Linear decline	May 4	Apr 24	-10 days		
Juvenile to Adult ratio (CES)	31	1984-2015	103	Smoothed trend	180 Index value	100 Index value	-44%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	112	Smoothed trend	142 Index value	100 Index value	-30%	>25	
Juvenile to Adult ratio (CES)	10	2005-2015	112	Smoothed trend	122 Index value	100 Index value	-18%		
Juvenile to Adult ratio (CES)	5	2010-2015	117	Smoothed trend	134 Index value	100 Index value	-25%	>25	

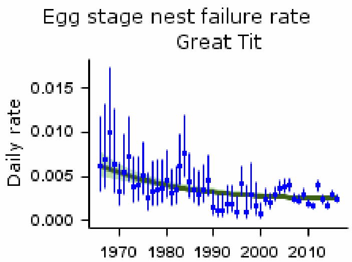
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



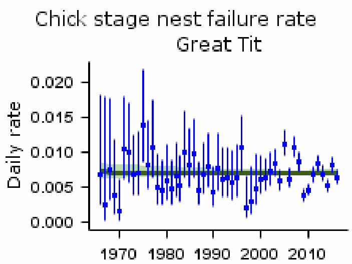
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



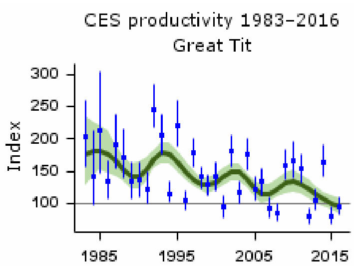
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



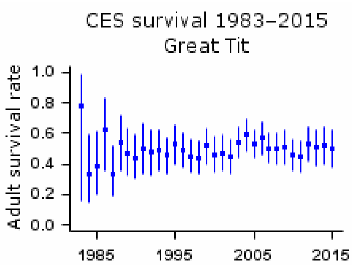
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

Demographic trends in breeding parameters do not suggest that increases in this species are due to improvements in breeding performance. There is some evidence, albeit limited, that improvements in survival rates, due to amelioration in wintering conditions, may have been responsible. Evidence for ecological drivers of the population increase is limited but increased provisioning in gardens and milder winters may have played a role.

Change factor	Primary driver	Secondary driver
Demographic	Improved survival	
Ecological	Other	Climate change

Further information on causes of change

The number of fledglings per breeding attempt have decreased alongside decreases in clutch and brood sizes (see above). Daily failure rates at the egg stage have also decreased but daily failure rates at the chick stage has not changed. Consequently, breeding success does not contribute substantially to population change, and integrated modelling confirms that variation in adult survival is the primary driver of annual population change (Robinson et al. 2014).

Increases in survival rates, due to more widespread food provision in gardens during winter is one possible explanation for the increase. Horak & Lebreton (1998) found that survival rates in Estonia were higher in urban populations than rural ones and suggested that this was partly due to supplementary feeding in gardens. Increasing winter temperature may have also played a role. Ahola et al. (2009) suggested that, for their study population in Sweden, increasingly favourable conditions in winters have enhanced the survival rates of Great Tit and resulted in the observed increase in Great Tit breeding density.

Other factors are also likely to influence survival rates. There is some evidence that the beech crop may be influential and it has been shown that survival rates can be related to beechmast production (Verhulst 1992, Perdeck et al. 2000), although there is no evidence that beechmast production has gone up. Perdecket al. (2000) provided further evidence for this as supplemental food increased survival of both juveniles and adults, supporting the winter-food limitation hypothesis. In a Finnish population, Orell (1989) reported that the high survival rates of resident juveniles after a warm August may be attributable to food availability during the time when the birds undergo their post-juvenile moult. Great Tits have advanced their laying date, in line with climatic change. This has been found by several studies (e.g. Sanz 2002, Visser et al. 2009, Bauer et al. 2010), but does not seem to be influencing the population trend.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Coal Tit

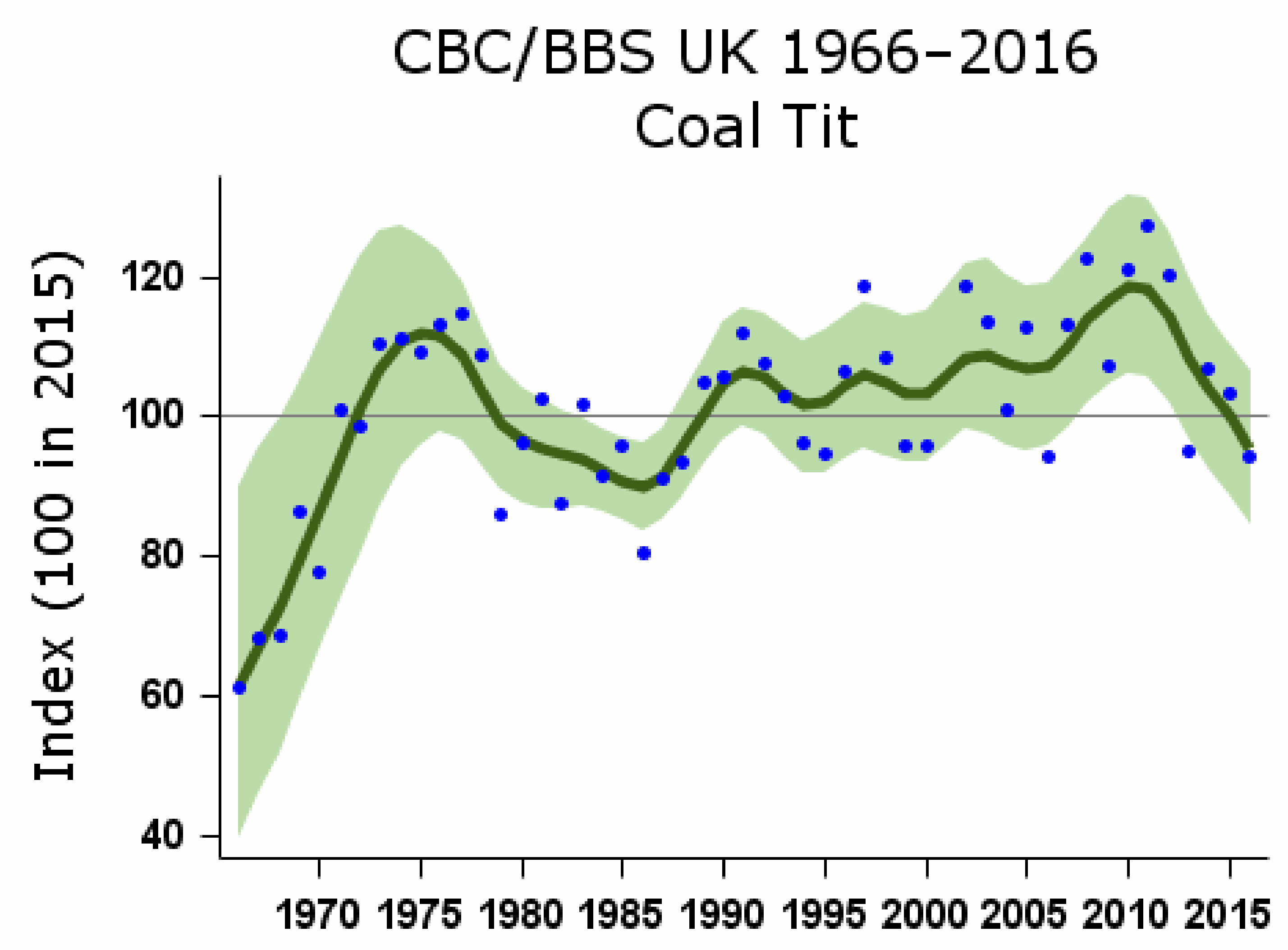
Periparus ater

Key facts

Conservation listings:	Global: green; at race level, britannicus amber, ater and hibernicus green
Long-term trend:	UK: shallow increase England: moderate increase
Population size:	760,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

While other common tit species have increased, the UK Coal Tit population has been rather stable since the mid 1970s, following earlier rapid increase. The ratios of Coal Tit to Perrins 2003), however, although in these figures population change may be confounded to some degree with changes in behaviour among birds and bird ringers. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

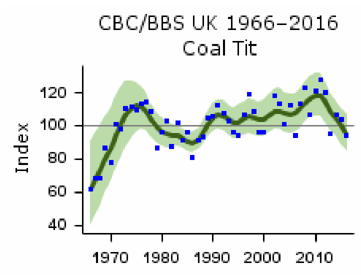
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	451	49	-9	143		
	25	1990-2015	764	-5	-16	8		
	10	2005-2015	1089	-6	-13	1		
	5	2010-2015	1135	-16	-21	-11		
CBC/BBS England	48	1967-2015	312	60	-18	201		
	25	1990-2015	518	6	-10	29		

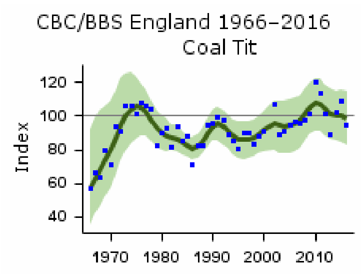
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	740	6	-3	16		
	5	2010-2015	776	-7	-12	-2		
BBS UK	20	1995-2015	874	0	-9	11		
	10	2005-2015	1089	-6	-14	1		
	5	2010-2015	1135	-15	-22	-10		
BBS England	20	1995-2015	585	19	2	40		
	10	2005-2015	740	6	-3	16		
	5	2010-2015	776	-7	-12	-2		
BBS Scotland	20	1995-2015	143	-13	-28	10		
	10	2005-2015	177	-15	-29	3		
	5	2010-2015	179	-22	-31	-11		
BBS Wales	20	1995-2015	80	-24	-40	-3		
	10	2005-2015	92	5	-12	31		
	5	2010-2015	100	-17	-29	-5		
BBS N.Ireland	20	1995-2015	66	48	-4	95		
	10	2005-2015	79	-14	-28	3		
	5	2010-2015	79	-14	-27	-1		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

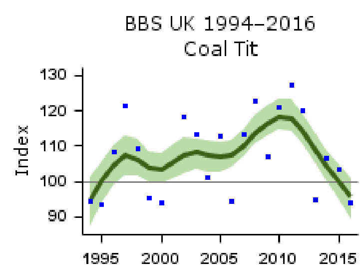
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



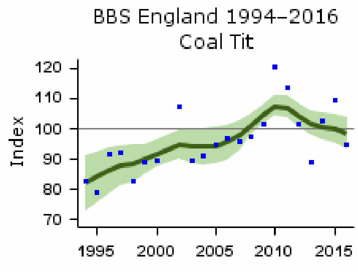
CBC/BBS UK graph



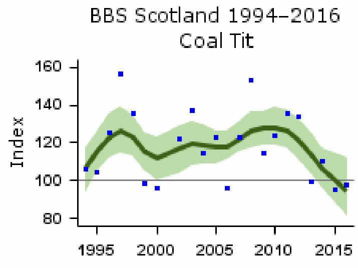
CBC/BBS England graph



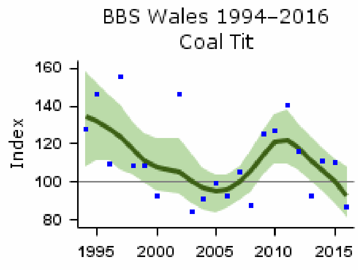
BBS UK graph



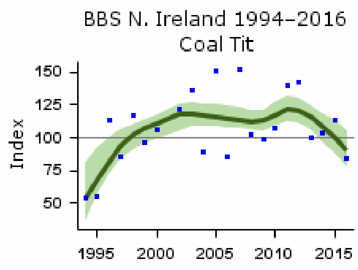
BBS England graph



BBS Scotland graph

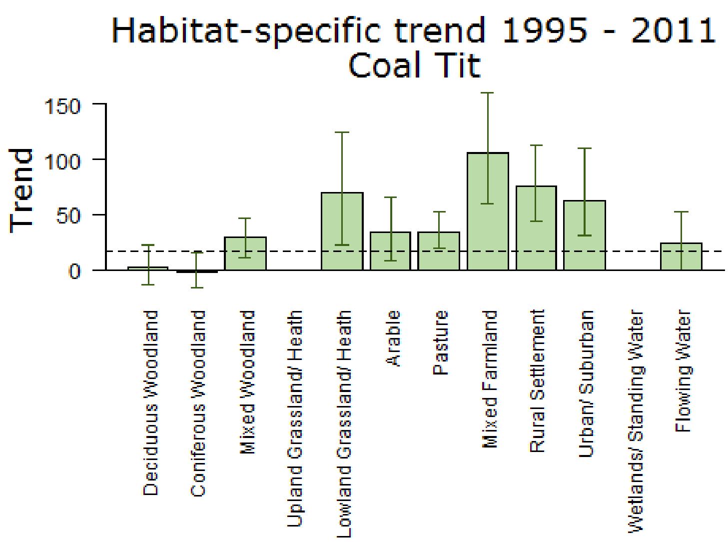


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



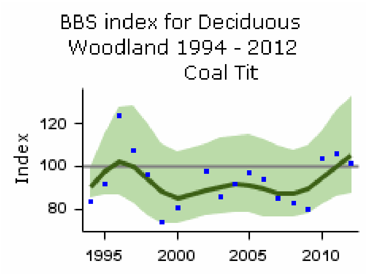
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

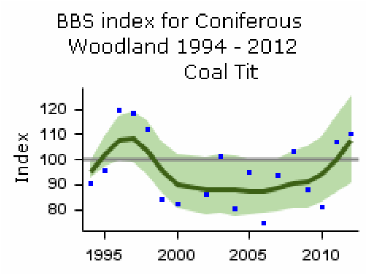
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	217	3	-13	22
Coniferous Woodland	16	1995-2011	164	-2	-16	15
Mixed Woodland	16	1995-2011	216	29	11	47
Lowland Grassland/ Heath	16	1995-2011	55	70	22	125
Arable	16	1995-2011	106	34	8	65
Pasture	16	1995-2011	292	34	20	53
Mixed Farmland	16	1995-2011	66	106	61	160
Rural Settlement	16	1995-2011	133	76	43	112
Urban/ Suburban	16	1995-2011	78	63	30	109
Flowing Water	16	1995-2011	85	24	-1	52

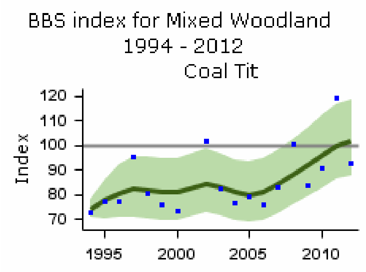
Further information on habitat-specific trends, please follow link here.



Habitat graph

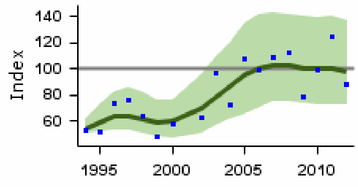


Habitat graph



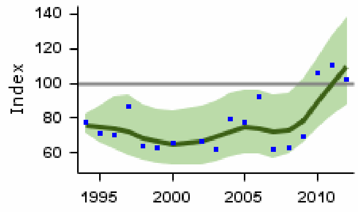
Habitat graph

BBS index for Lowland Grass/heath 1994 - 2012
Coal Tit



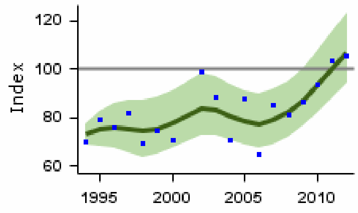
Habitat graph

BBS index for Arable 1994 - 2012
Coal Tit



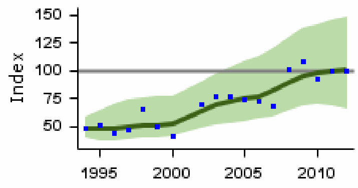
Habitat graph

BBS index for Pasture 1994 - 2012
Coal Tit



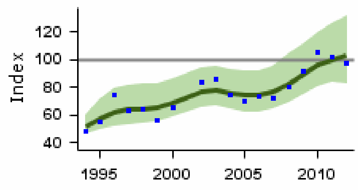
Habitat graph

BBS index for Mixed Farmland 1994 - 2012
Coal Tit



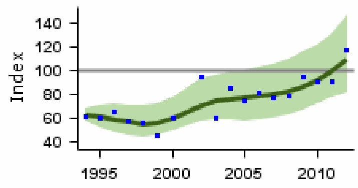
Habitat graph

BBS index for Rural Settlement 1994 - 2012
Coal Tit

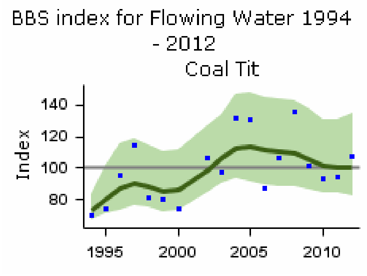


Habitat graph

BBS index for Urban/ Suburban 1994 - 2012
Coal Tit

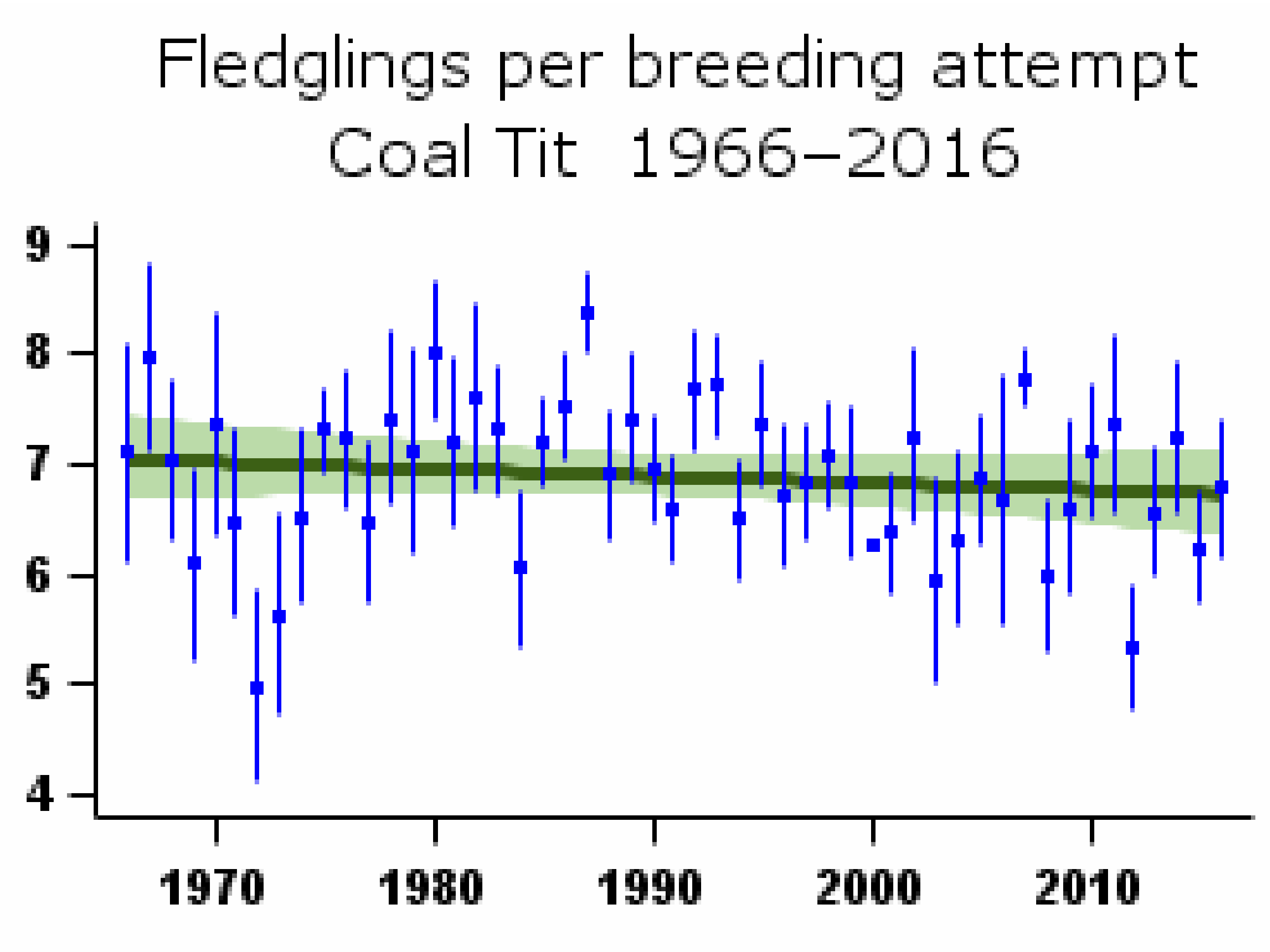


Habitat graph

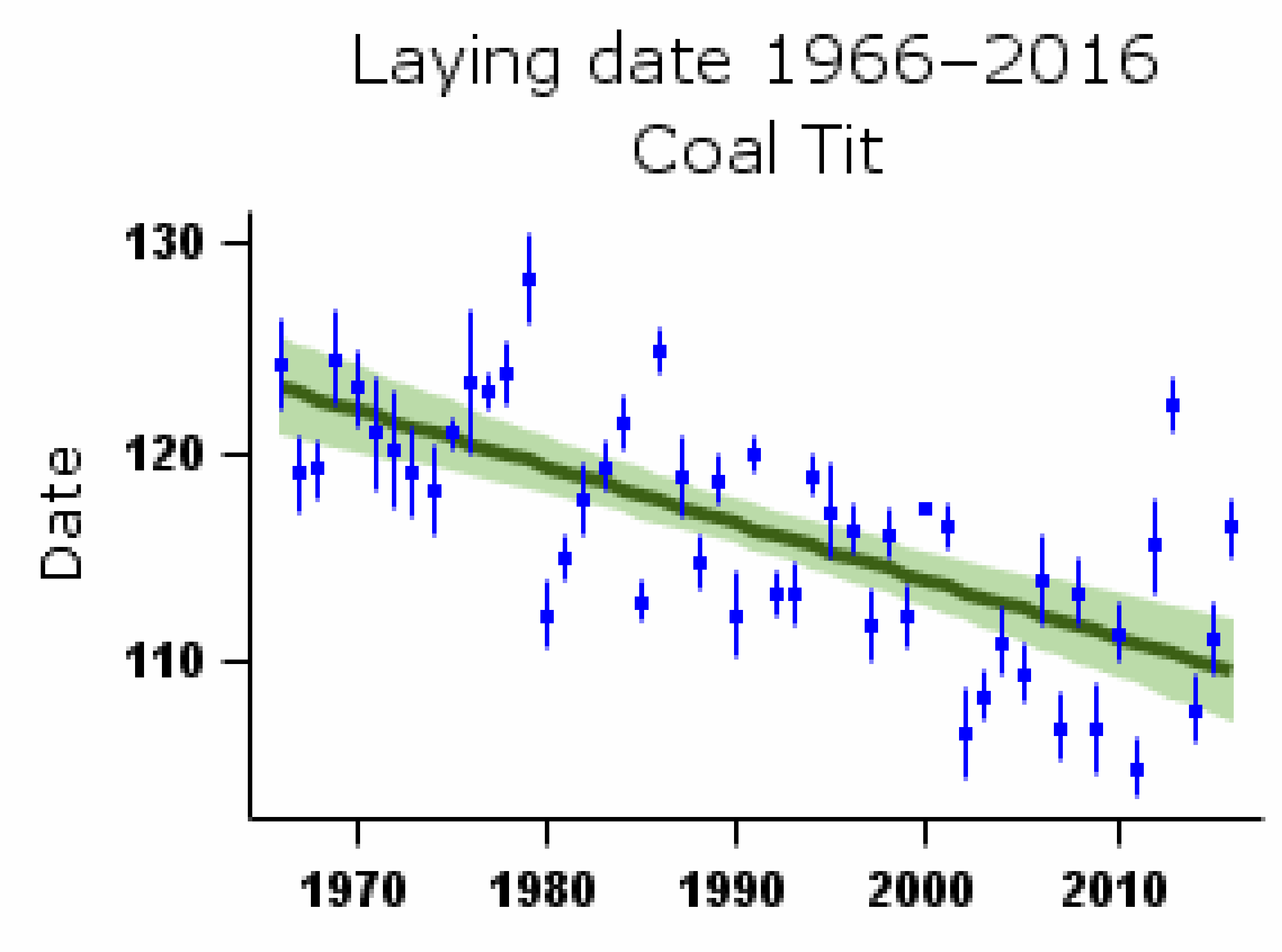


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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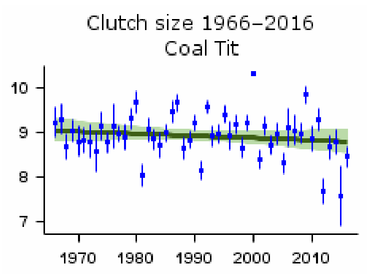
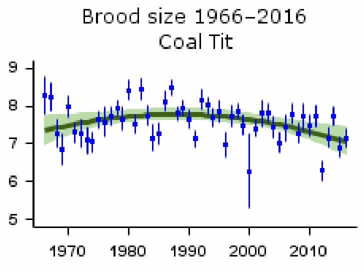
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	54	None					
Clutch size	48	1967-2015	39	None					
Brood size	48	1967-2015	73	Curvilinear	7.39 chicks	7.11 chicks	-3.8%		
Nest failure rate at egg stage	48	1967-2015	56	Linear decline	0.43% nests/day	0.18% nests/day	-58.1%		
Nest failure rate at chick stage	48	1967-2015	59	None					
Laying date	48	1967-2015	44	Linear decline	May 3	Apr 20	-13 days		

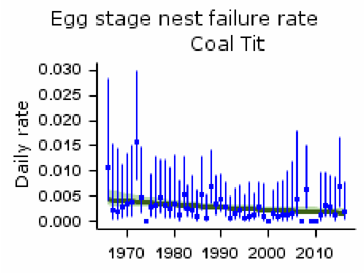
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



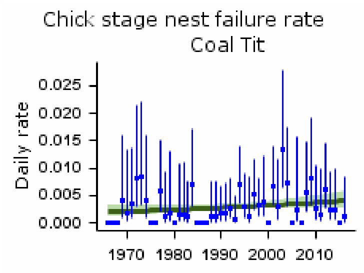
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Willow Tit

Poecile montanus

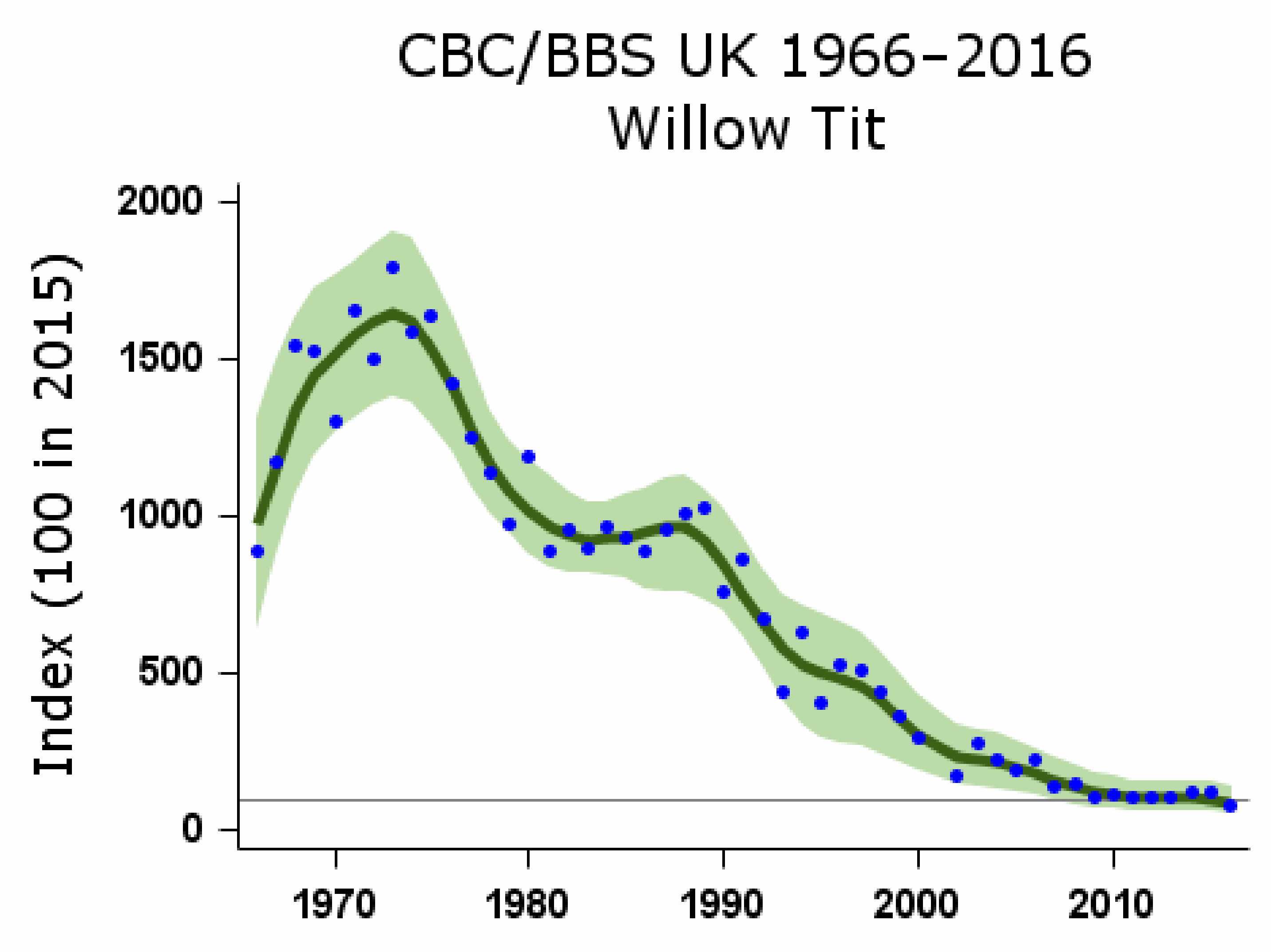
Key facts

Conservation listings:	Global: red (breeding population & range declines); current RBBP species
Long-term trend:	UK, England: rapid decline
Population size:	3,400 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Willow Tits have been in decline since the mid 1970s, and have become locally extinct in an ever-growing number of former haunts. The UK conservation listing was upgraded from amber to red in 2002. Atlas surveys during 2008-11 found that the species had virtually disappeared from the southeastern part of its English range since 1988-91 (Balmer et al. 2013). The continuing decline in the CBC/BBS index through the 1990s, following a brief period of stability during the 1980s, is replicated in the CES abundance trend. All UK breeding records since 2010 should be forwarded to the Rare Breeding Birds Panel, who have developed specific PECBMS 2007, PECBMS 2016a).



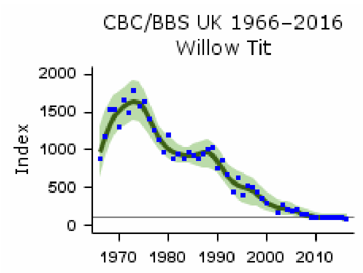
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

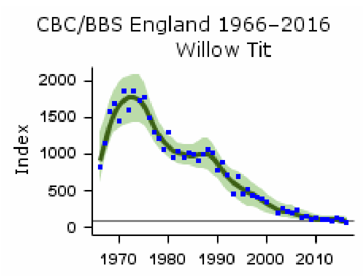
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	43	-91	-96	-82	>50	
	25	1990-2015	48	-88	-93	-82	>50	Small CBC sample
	10	2005-2015	43	-50	-62	-36	>50	
	5	2010-2015	37	-11	-33	13		
CBC/BBS England	48	1967-2015	39	-91	-96	-84	>50	
	25	1990-2015	43	-89	-93	-82	>50	Small CBC sample
	10	2005-2015	38	-51	-65	-33	>50	
	5	2010-2015	32	-18	-37	12		
CES adults	31	1984-2015	16	-61	-87	-22	>50	Small sample
	25	1990-2015	16	-60	-87	-19	>50	Small sample
CES juveniles	31	1984-2015	24	-81	-90	-71	>50	
	25	1990-2015	23	-85	-92	-76	>50	
	10	2005-2015	12	-54	-75	-31	>50	Small sample
	5	2010-2015	12	-36	-53	-14	>25	Small sample
BBS UK	20	1995-2015	48	-80	-85	-73	>50	
	10	2005-2015	43	-50	-62	-32	>50	
BBS England	20	1995-2015	42	-82	-87	-73	>50	
	10	2005-2015	38	-51	-64	-34	>50	
	5	2010-2015	32	-19	-37	6		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

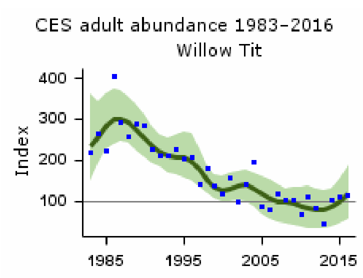
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



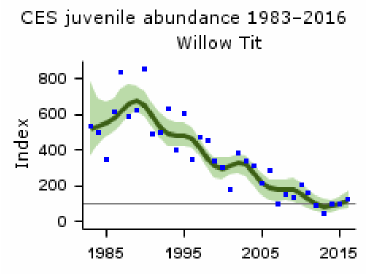
CBC/BBS UK graph



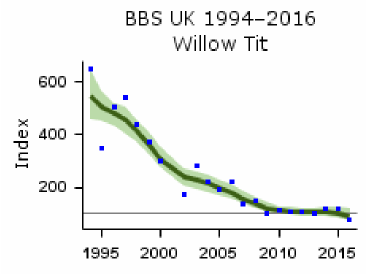
CBC/BBS England graph



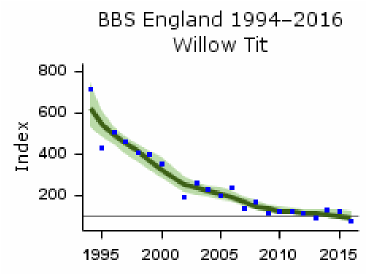
CES adults graph



CES juveniles graph

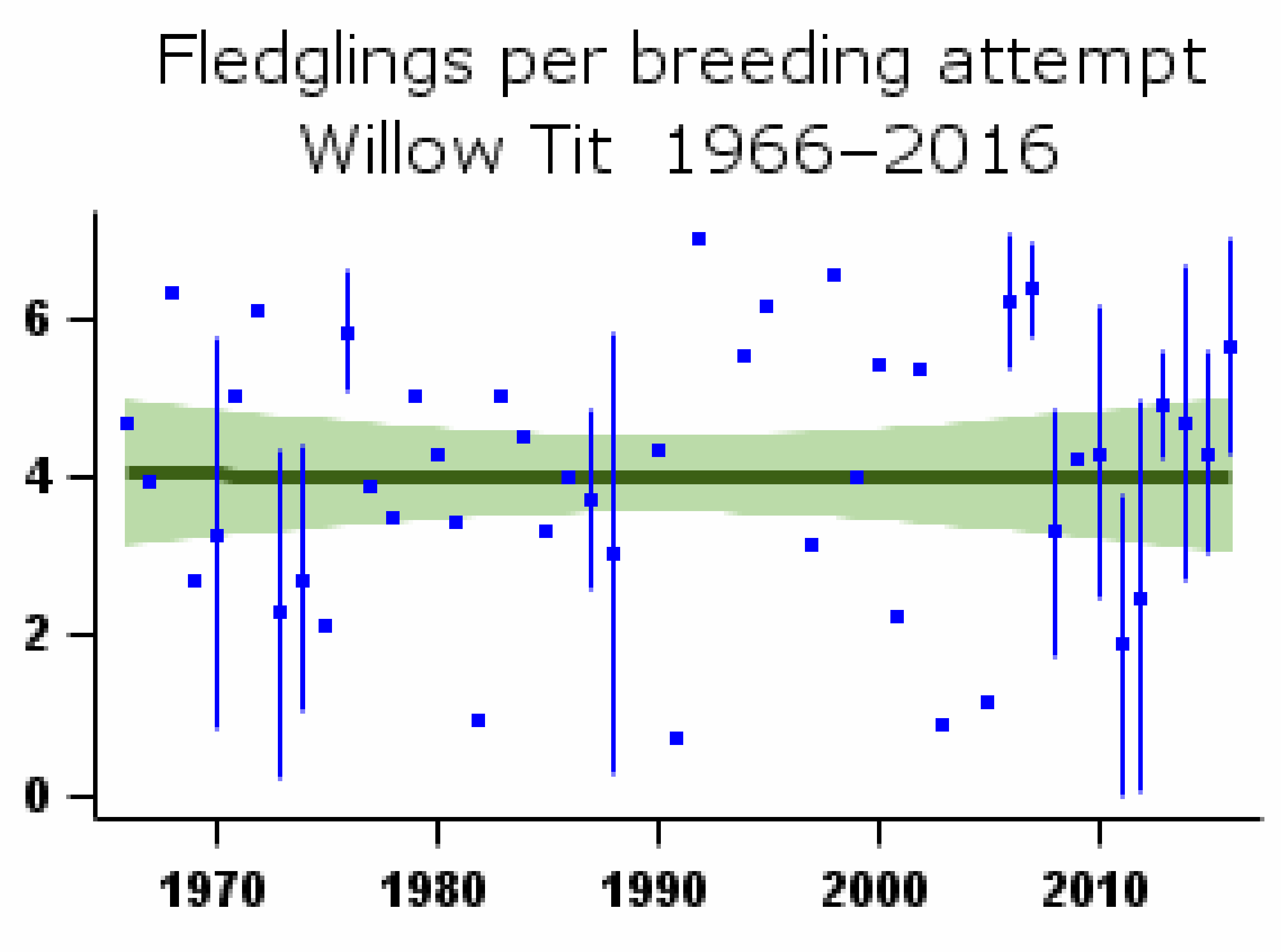


BBS UK graph

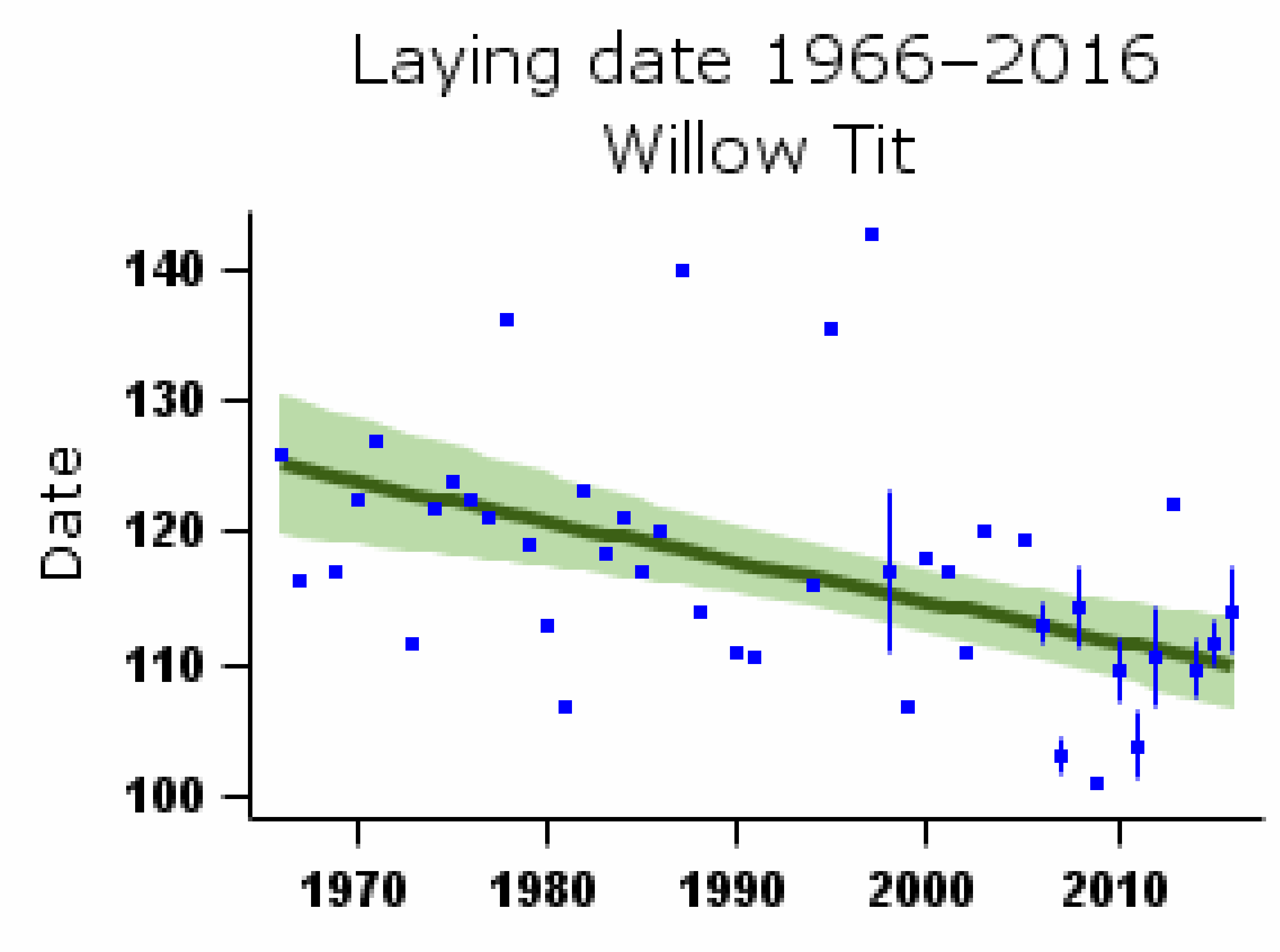


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

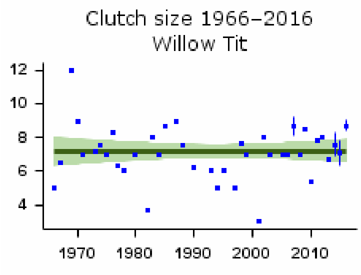


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

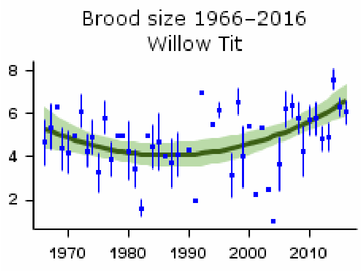
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	5	None					
Clutch size	48	1967-2015	3	None					Small sample
Brood size	48	1967-2015	8	Curvilinear	5.20 chicks	6.43 chicks	23.7%		Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Nest failure rate at chick stage	48	1967-2015	6	Linear increase	0.26% nests/day	1.32% nests/day	407.7%		Small sample
Laying date	48	1967-2015	4	Linear decline	May 5	Apr 20	-15 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	27	Smoothed trend	470 Index value	100 Index value	-79%	>50	
Juvenile to Adult ratio (CES)	25	1990-2015	26	Smoothed trend	434 Index value	100 Index value	-77%	>50	
Juvenile to Adult ratio (CES)	10	2005-2015	14	Smoothed trend	265 Index value	100 Index value	-62%		
Juvenile to Adult ratio (CES)	5	2010-2015	14	Smoothed trend	307 Index value	100 Index value	-67%	>50	

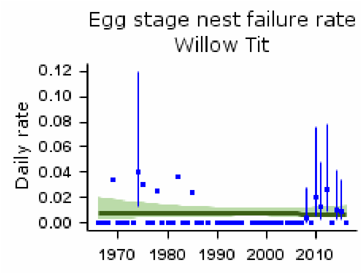
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



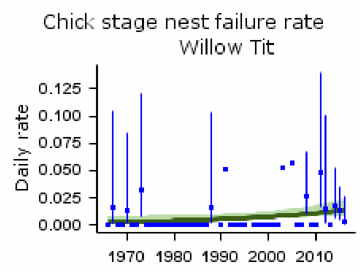
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



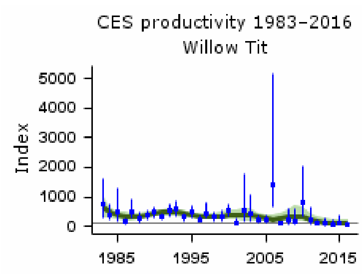
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits

Causes of change

Willow Tits have declined in woodland, probably because of habitat degradation. How this relates to demographic trends is unclear.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Changes in woodland	

Further information on causes of change

Little evidence is available regarding changes in the demography of this species but CES trends suggest a decline in productivity since 1983 (see above). Lampila et al. (2006) found that adult survival was the main driver of Willow Tit populations in northern Finland, although this was in a study in boreal forests, so the processes may not be the same as for the British population. The British subspecies shows very different habitat preferences to the Fennoscandian one, preferring wet woodland rather than conifers, emphasising that Continental studies may not be very relevant to population change in the UK.

There are several hypotheses that have been put forward to explain the cause of population declines of Willow Tit. One is that deterioration in the quality of woodland as feeding habitat for this species through canopy closure and increased browsing by deer (Perrins 2003, Siriwardena 2004, Fuller et al. 2005) has been important. The area of wet woodland and scrub is also thought to have declined as a result of drainage and the occurrence of increasingly dry summers (Vanhinsbergh et al. 2003). A field study based on former CBC sites and other woods that were known to have held the species in the past provided good evidence that the sites still holding Willow Tit tended to be wetter, so drying out of woodlands may have been a factor (Lewis et al. 2007, 2009a, 2009b). Siriwardena (2004) analysed long-term CBC trends and found that, although population trends have been stable in their preferred, wet habitats, Willow Tit have declined in woodland, probably because of habitat degradation.

A second hypothesis is that nest predation pressure, from Jays, Great Spotted Woodpeckers and grey squirrel, for example, has increased, both because some of these predators have grown more abundant (Harris et al. 1995, this report) and because restrictions in nest-site availability are likely to have forced more birds into suboptimal, more vulnerable sites. In the study mentioned above, Siriwardena (2004) found increases in Green Woodpecker abundance on CBC plots at the same time as declines in Willow Tit abundance, but this is unlikely to reflect a causal link - this woodpecker being unrecorded as a nest predator. A negative relationship between Great Spotted Woodpecker and Willow Tit abundance on farmland plots is more likely to reflect a real population effect, but farmland is only a minor habitat for the species, so it is unlikely that such a relationship has biological significance for Willow Tits nationally. There were no significant associations with other avian potential nest predators. Supporting this result, Lewis et al. (2007, 2009a, 2009b) found that sites that were known to have held the species in the past and that were still holding Willow Tits did not differ in the density of potential nest predators.

Thirdly, increases in the local populations of behaviourally dominant, sympatric species such as Blue Tit, Great Tit, Marsh Tit and Nuthatch could have led to increased competition, especially for nest-holes. There is little direct evidence specifically concerning foraging interactions involving Willow Tit in the UK but it is possible that increases in other tit species have placed extra pressure on Willow Tit populations through competition for food or nest sites (Vanhinsbergh et al. 2003). In Lanarkshire, central Scotland, Great and Blue Tits were found commonly to take over the nest sites of Willow Tit (Maxwell 2002, 2003) but it is unclear how widespread this phenomenon is. In the analysis of long-term CBC trends carried out by Siriwardena (2004), no negative relationships were found between Willow Tit and its potential competitors. Again, this was supported by field data from Lewis et al. (2007, 2009a, 2009b), who found that sites that were known to have held the species in the past and that that were still holding Willow Tits did not differ in the density of avian competitors.

Overall, therefore, habitat deterioration is the strongest candidate as the cause of Willow Tit decline nationally. As well as increasing woodland drainage, degradation has been hypothesised to have occurred via a reduction in nest-site availability resulting from falls in the amount of dead wood and number of dead trees in woodland reducing nesting opportunities (Vanhinsbergh et al. 2003). This has yet to be tested formally, however, probably because historical data on quantities of dead wood are not available.

Marsh Tit

Poecile palustris

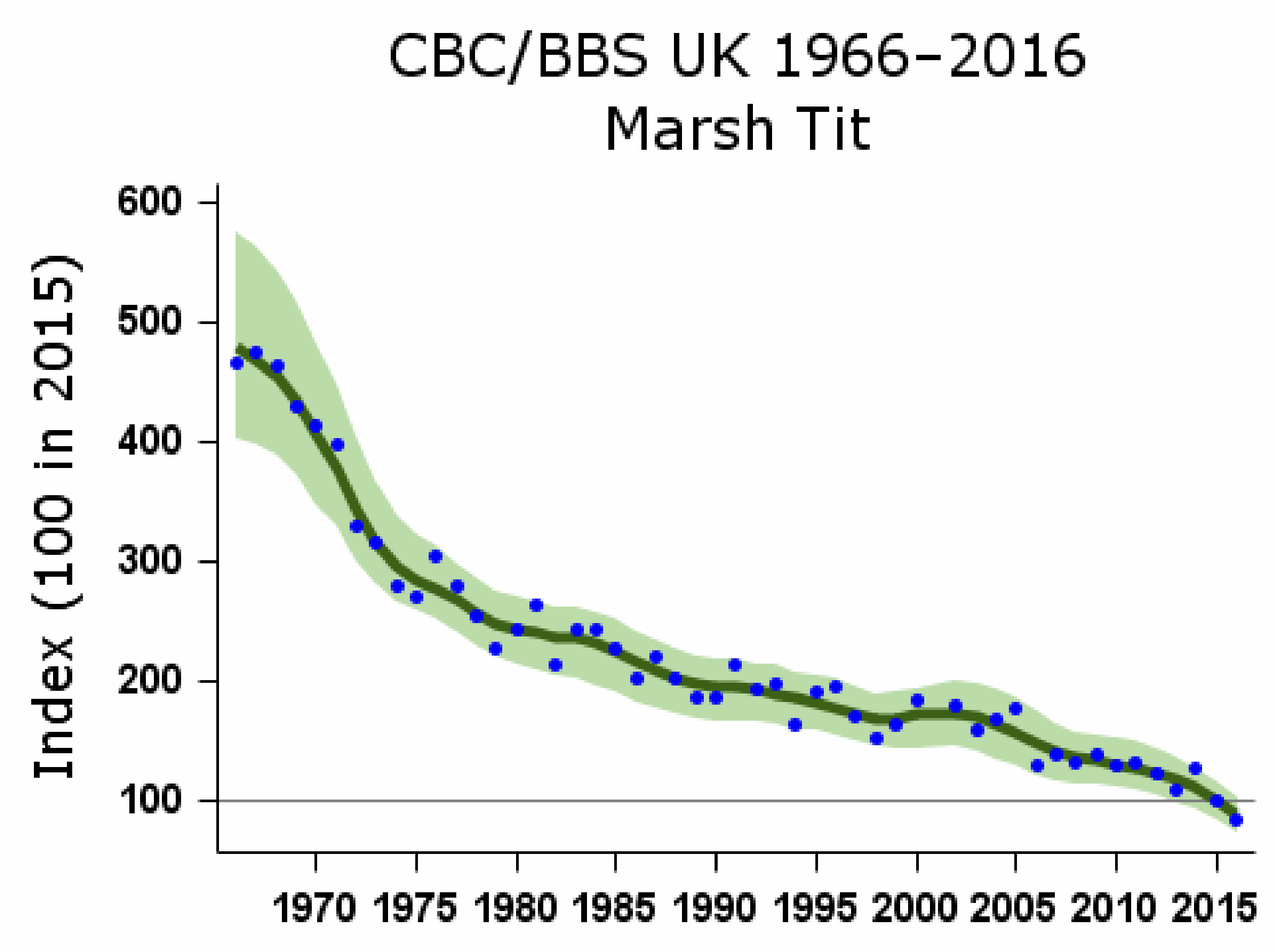
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK, England: rapid decline
Population size:	41,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Marsh Tit abundance has declined almost continuously since BTO monitoring began. Because of worsening decline, the species' UK conservation listing was upgraded from amber to red in 2002. Atlas surveys during 2007-11 showed continuing loss of breeding and winter range since 1968-72, especially in northern England and the north Midlands (Balmer et al. 2013). Conservationists are keen to prevent Marsh Tit replicating the deeper decline and regional range losses shown already by Broughton & Hinsley 2015). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



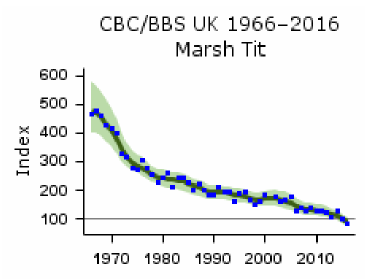
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

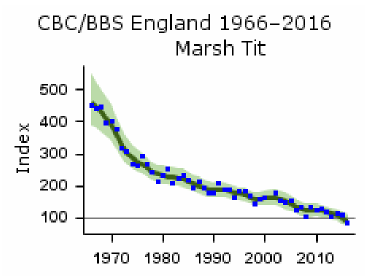
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	104	-79	-85	-70	>50	
	25	1990-2015	148	-49	-57	-36	>25	
	10	2005-2015	169	-36	-45	-26	>25	
	5	2010-2015	163	-23	-31	-12		
CBC/BBS England	48	1967-2015	95	-78	-85	-68	>50	
	25	1990-2015	135	-47	-58	-37	>25	
	10	2005-2015	154	-31	-42	-19	>25	
	5	2010-2015	151	-19	-28	-9		
BBS UK	20	1995-2015	152	-41	-51	-30	>25	
	10	2005-2015	169	-36	-45	-26	>25	
	5	2010-2015	163	-23	-32	-12		
BBS England	20	1995-2015	137	-41	-51	-31	>25	
	10	2005-2015	154	-31	-40	-20	>25	
	5	2010-2015	151	-19	-28	-8		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

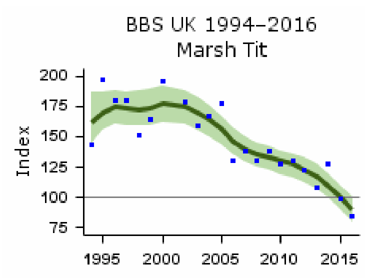
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



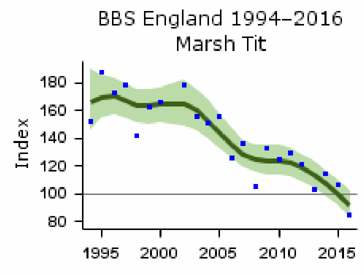
CBC/BBS UK graph



CBC/BBS England graph

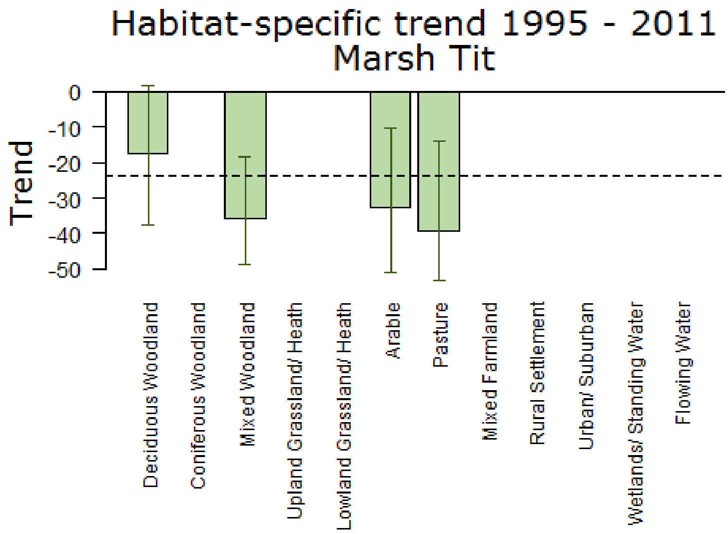


BBS UK graph



BBS England graph

Population trends by habitat



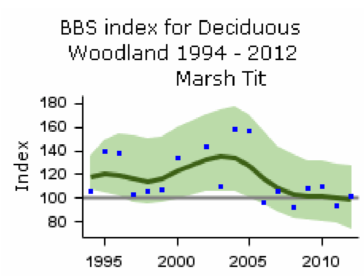
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

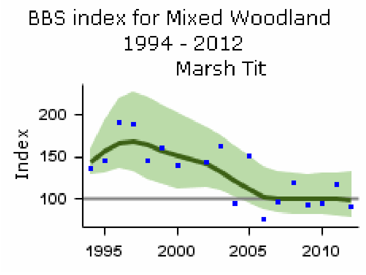
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	60	-17	-37	2
Mixed Woodland	16	1995-2011	38	-36	-49	-18
Arable	16	1995-2011	30	-33	-51	-10
Pasture	16	1995-2011	43	-39	-53	-14

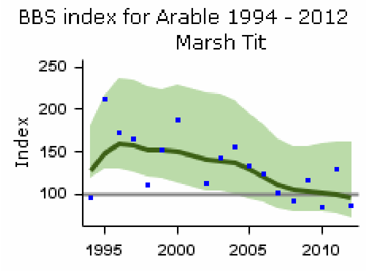
Further information on habitat-specific trends, please follow link here.



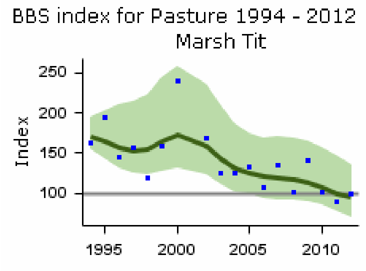
Habitat graph



Habitat graph

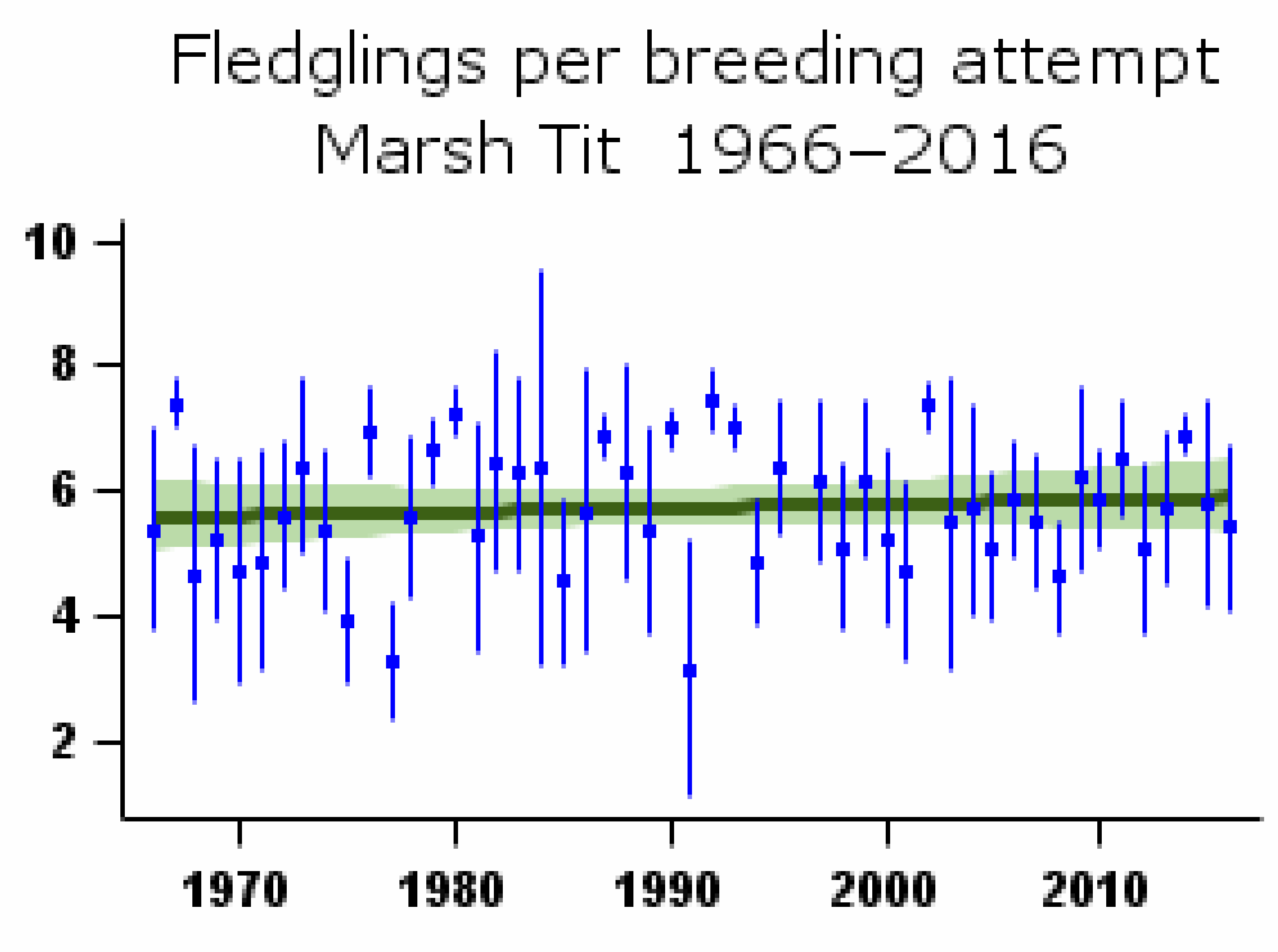


Habitat graph

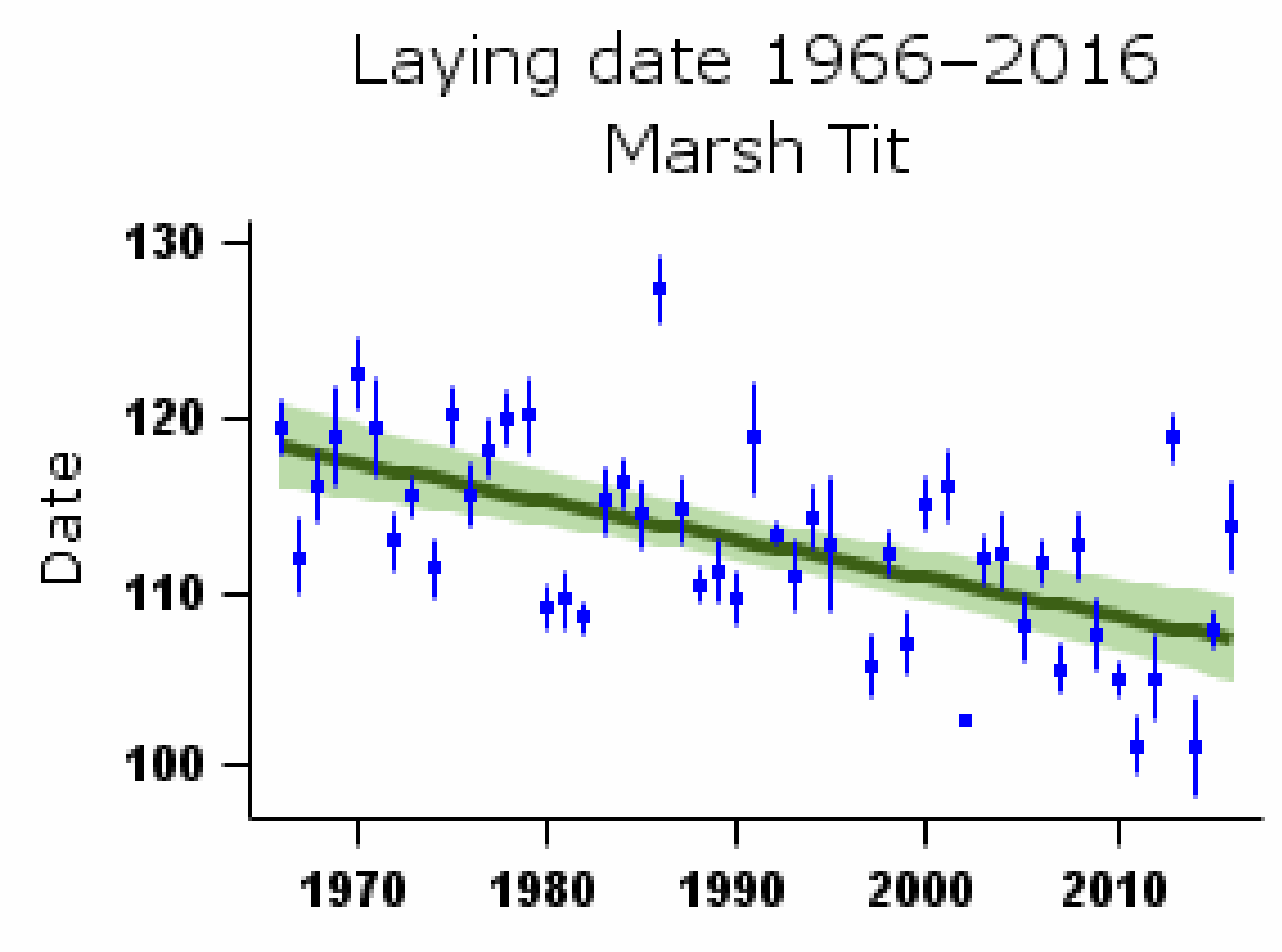


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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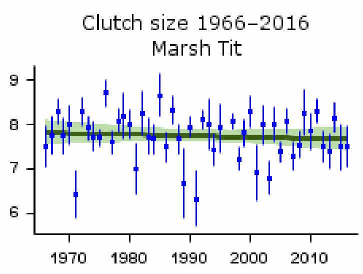
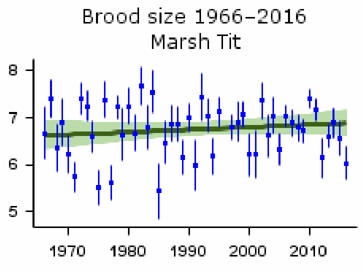
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	19	None					
Clutch size	48	1967-2015	14	None					Small sample
Brood size	48	1967-2015	25	None					Small sample
Nest failure rate at egg stage	48	1967-2015	21	Linear decline	0.75% nests/day	0.10% nests/day	-86.7%		Small sample
Nest failure rate at chick stage	48	1967-2015	20	None					Small sample
Laying date	48	1967-2015	14	Linear decline	Apr 28	Apr 18	-10 days		Small sample

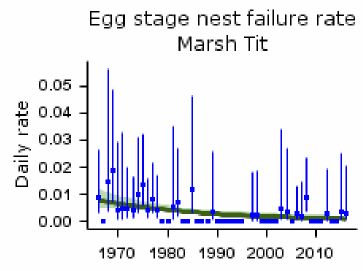
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



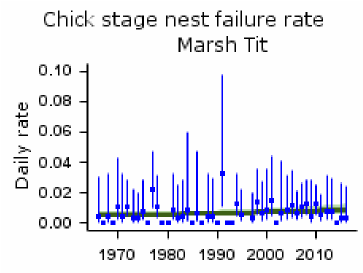
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that changes in the habitat quality of woodlands, particularly a loss of understorey, have been responsible for the decline in Marsh Tits. Analysis of the BTO's ring-recovery archive provides evidence that there has been a significant negative trend in annual survival rates during the period of decline, although this is based on a small sample size.

Change factor	Primary driver	Secondary driver
Demographic	Reduced survival	
Ecological	Changes in woodland	

Further information on causes of change

Analysis of the BTO's ring-recovery archive provides evidence that there has been a significant negative trend in annual survival rates during the period of decline, although this is based on a small sample size. The absence of any reduction in breeding performance as the population has declined supports a reduction in annual survival as the demographic mechanism (Siriwardena 2006). Nest failure rates have fallen during the period of decline, but no trend is evident in the number of fledglings per breeding attempt.

One hypothesis relating to the causes of decline is that changes in woodland understorey have reduced habitat quality, due to increased browsing by deer (Perrins 2003, Fuller et al. 2005). Carpenter (2008) and Carpenteret al. (2010) conducted a detailed study providing good evidence that Marsh Tits were more likely to locate their territories in sections of woodland with more understorey cover. Carpenter found that birds in territories with more understorey raised more and heavier young than did birds in territories with less understorey, although this was based on only one year of data. The same study reported that understorey and low canopy sections were also important during winter while Hinsley et al. (2007) provide further evidence that this was important, showing that that Marsh Tits were selecting the understorey and habitat lower down in the woodland canopy. Another field study conducted by Broughton et al. (2006), however, did not find any difference in the amount of shrub layer in Marsh Tit territories compared to pseudo-territories, although this was from just one site and the authors noted that the understorey there was unusually healthy and complete, perhaps explaining this result.

A reduction in habitat quality through fragmentation is another possible factor that has contributed to declines, although there has been little fragmentation of woodland in a gross sense in recent years. Nevertheless, Hinsley et al. (1995) found that Marsh Tits need a minimum wood size of 0.5 ha and it's possible that habitat deterioration has reduced effective habitat patch size.

Another hypothesis concerning causes of decline relates to competition and nest predation. Marsh Tit is subdominant to both 2006) found no evidence for population effects of the Marsh Tit being outcompeted for natural nest cavities. Similarly, the same study found no evidence that avian nest predation is a major factor in the long-term decline as Marsh Tit abundance was not significantly related to abundance in the previous year of any of the nest predators considered (Siriwardena 2006). Amar et al. (2006) found no association between population change and grey squirrel abundance and adding to this, Smart et al. (2007) conducted an initial analysis and showed that Marsh Tit declines were also unlikely to be caused by predation by grey squirrel, as presence and abundance of Marsh Tit was positively related to squirrel density.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Woodlark

Lullula arborea

Key facts

Conservation listings:	Global: green; former RBBP species
Long-term trend:	UK: increase
Population size:	3,100 (2,500-3,700) pairs in 2006 (APEP13: Conway et al. 2009)

Status summary

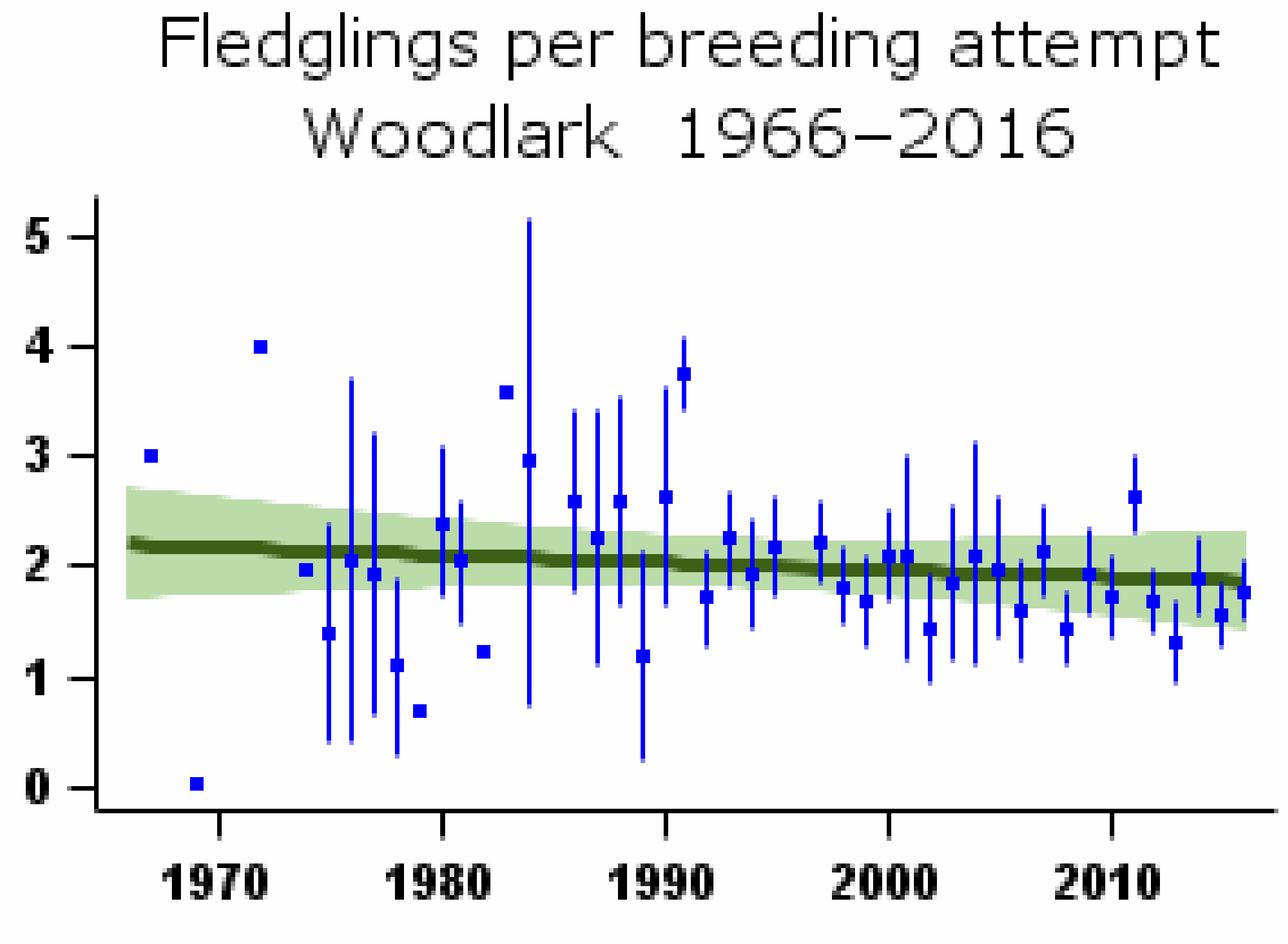
This species is too rare and restricted in range for population changes to be monitored annually by BTO volunteer surveys. A 62% reduction occurred in the number of 10-km squares occupied between 1968-72 and 1988-91; the species had ceased to breed in Wales and in several southern English counties over this period (Gibbons et al. 1993). Sitters et al. (1996) report that the UK population increased from c.250 pairs in 1986 to c.600 pairs in 1993, probably helped by mild winters and increased habitat availability due to storm damage in plantations, forest restocking, and heathland management. A repeat national survey in 1997 showed that the population had increased further, accompanied by expansion of the range into new areas (Wotton & Gillings 2000). A further repeat in 2006 recorded an increase since 1997 of 88% accompanied by major range expansion, with a pair breeding in Wales for the first time since 1981 (Conway et al. 2009). Atlas data for 2008-11 indicate losses of range since 1968-72 in southwestern and southern England, and in Wales, offset by expansion in central southern England and northwards in eastern England (Balmer et al. 2013).

Farmland setaside, especially close to forest, was valuable additional habitat for the expanding population, although clutch sizes may be lower there than in more traditional habitats (Wright et al. 2007). Climate change may benefit Woodlark, because it is able to make more nesting attempts in warmer years (Wright et al. 2009). The cold 2009/10 winter may, however, have brought about the small reduction in numbers reported to RBBP for 2010 (Holling & RBBP 2012). The small NRS sample suggests that nest failure rates have become less frequent at the egg stage. There has been no trend, however, in the number of fledglings per breeding attempt. Human disturbance at heathland sites apparently reduces population density, but the effects are partly offset by higher breeding productivity at lower densities (Mallord et al. 2007). The species' partial recovery in numbers and range resulted in a move from the red to the amber list at the 2009 review (Eaton et al. 2009) and on to the UK green list in 2015 (Eaton et al. 2015). There has been widespread moderate increase across Europe since 1980, although this trend should be treated with caution as the data from early years are based on limited geographical coverage (PECBMS 2016a).

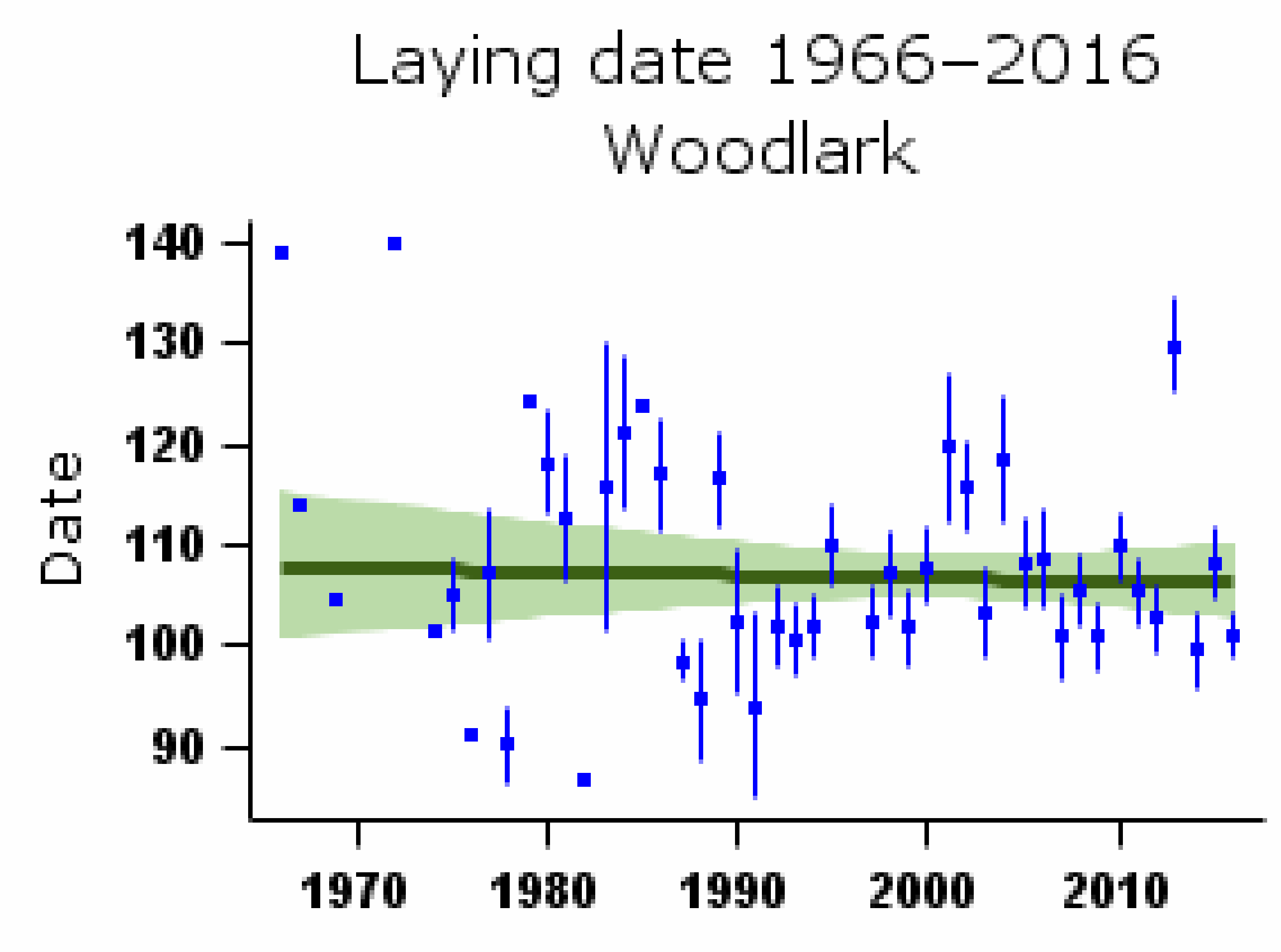
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

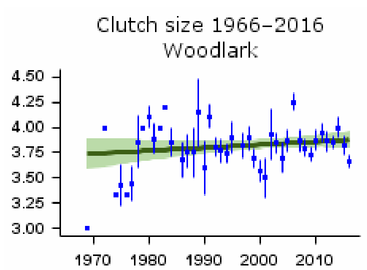


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

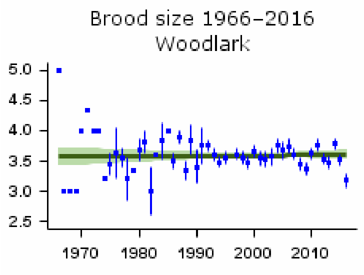
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	25	None					
Clutch size	46	1969-2015	23	None					Small sample
Brood size	48	1967-2015	36	None					
Nest failure rate at egg stage	48	1967-2015	26	Curvilinear	6.87% nests/day	3.44% nests/day	-49.9%		Small sample
Nest failure rate at chick stage	48	1967-2015	37	None					
Laying date	48	1967-2015	25	None			0 days		Small sample

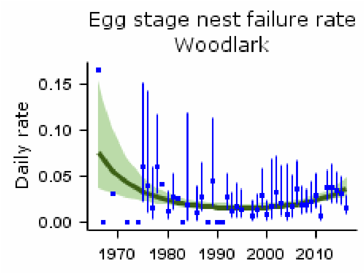
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



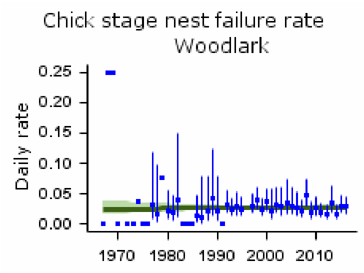
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Skylark

Alauda arvensis

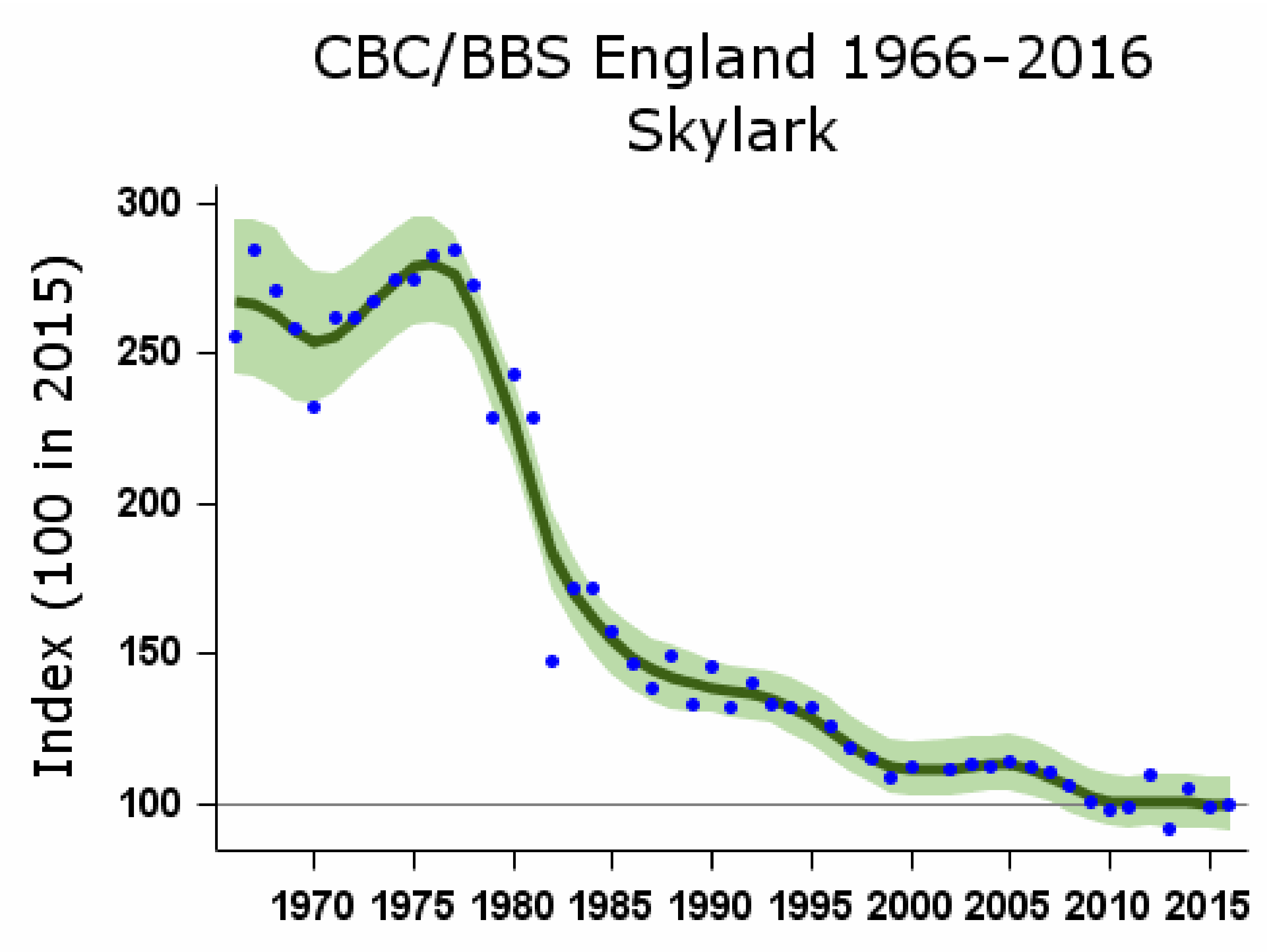
Key facts

Conservation listings:	Global: red (breeding population decline); at race level, arvensis red, scotica amber
Long-term trend:	England: rapid decline
Population size:	1.5 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The Skylark declined rapidly from the mid 1970s until the mid 1980s, when the rate of decline slowed. BBS data show further decline, recently extending to Scotland. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

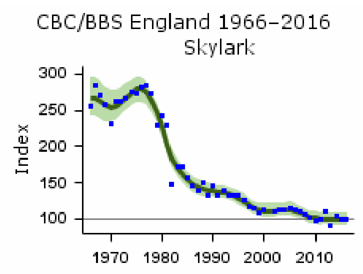
Population changes in detail

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

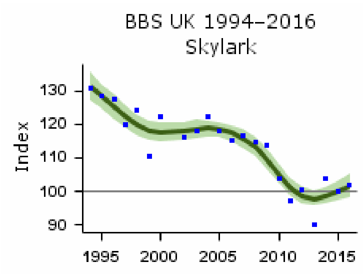
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	908	-63	-69	-55	>50	
	25	1990-2015	1238	-28	-36	-21	>25	
	10	2005-2015	1710	-11	-15	-8		
	5	2010-2015	1693	-1	-4	2		
BBS UK	20	1995-2015	1820	-22	-26	-18		
	10	2005-2015	2116	-16	-19	-11		
	5	2010-2015	2091	-5	-9	-1		
BBS England	20	1995-2015	1454	-23	-27	-19		
	10	2005-2015	1710	-11	-15	-8		
	5	2010-2015	1693	-1	-4	2		
BBS Scotland	20	1995-2015	223	-23	-32	-13		
	10	2005-2015	252	-25	-32	-17		
	5	2010-2015	249	-13	-22	-5		
BBS Wales	20	1995-2015	109	6	-13	30		
	10	2005-2015	122	7	-7	26		
	5	2010-2015	122	21	6	39		
BBS N.Ireland	20	1995-2015	32	-48	-58	-39	>25	
	10	2005-2015	31	-35	-47	-24	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

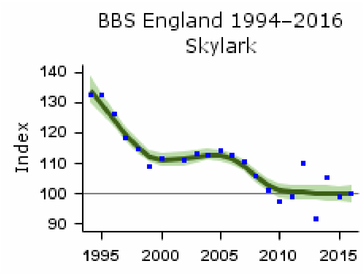
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



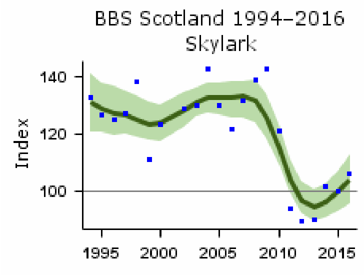
CBC/BBS England graph



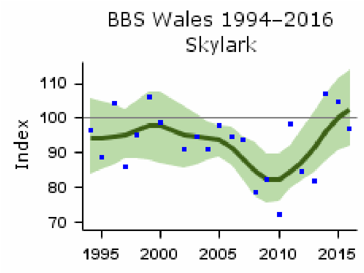
BBS UK graph



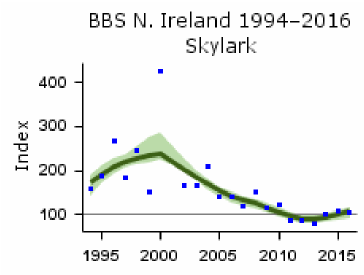
BBS England graph



BBS Scotland graph

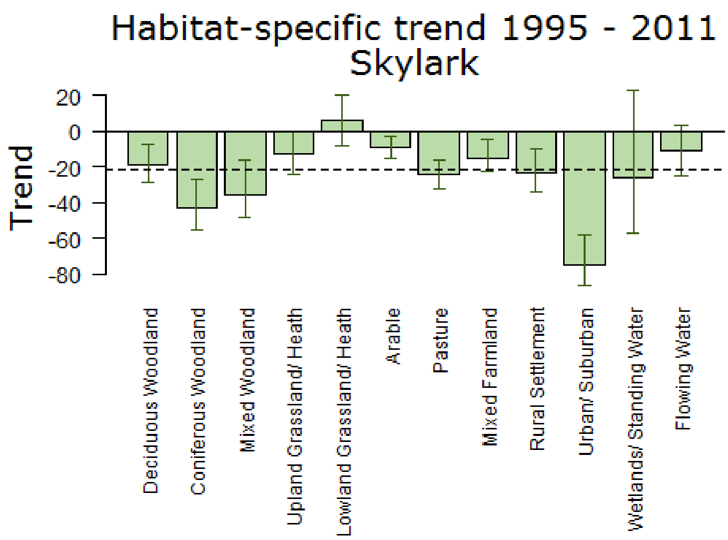


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

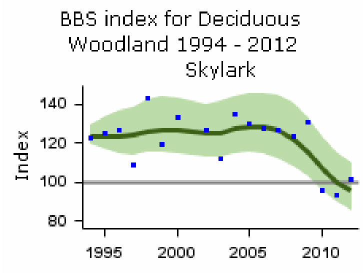
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

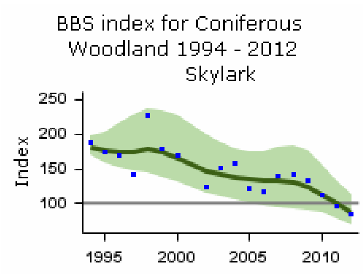
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	306	-19	-29	-7

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Coniferous Woodland	16	1995-2011	75	-43	-56	-27
Mixed Woodland	16	1995-2011	129	-36	-48	-17
Upland Grassland/ Heath	16	1995-2011	91	-13	-24	0
Lowland Grassland/ Heath	16	1995-2011	155	6	-9	20
Arable	16	1995-2011	659	-9	-15	-3
Pasture	16	1995-2011	738	-24	-32	-16
Mixed Farmland	16	1995-2011	498	-15	-22	-5
Rural Settlement	16	1995-2011	336	-23	-34	-10
Urban/ Suburban	16	1995-2011	61	-75	-86	-58
Wetlands/ Standing Water	16	1995-2011	45	-26	-58	23
Flowing Water	16	1995-2011	233	-11	-25	3

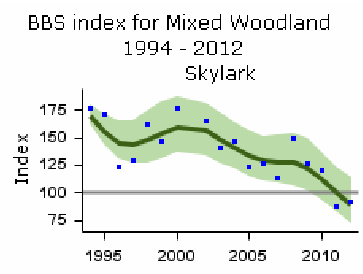
Further information on habitat-specific trends, please follow link here.



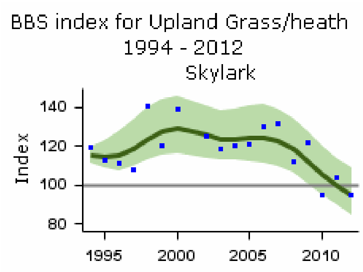
Habitat graph



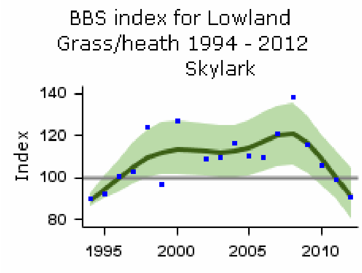
Habitat graph



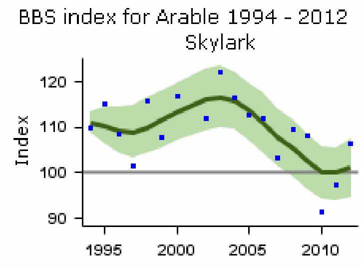
Habitat graph



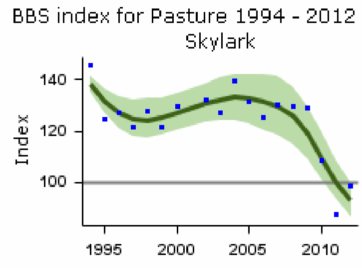
Habitat graph



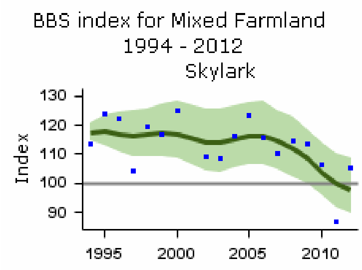
Habitat graph



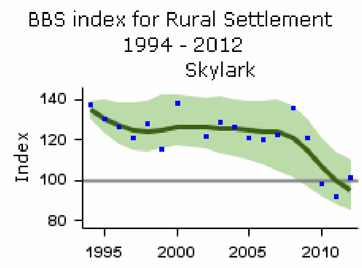
Habitat graph



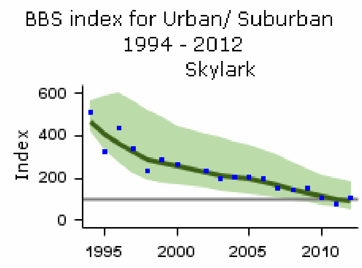
Habitat graph



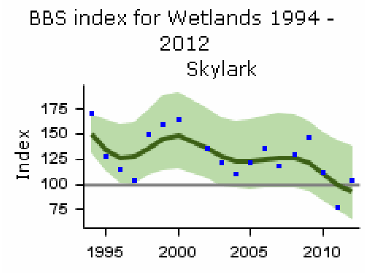
Habitat graph



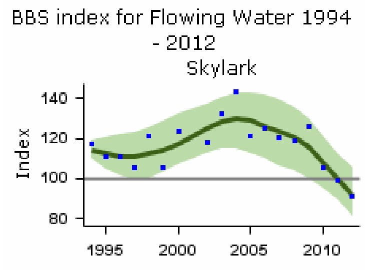
Habitat graph



Habitat graph

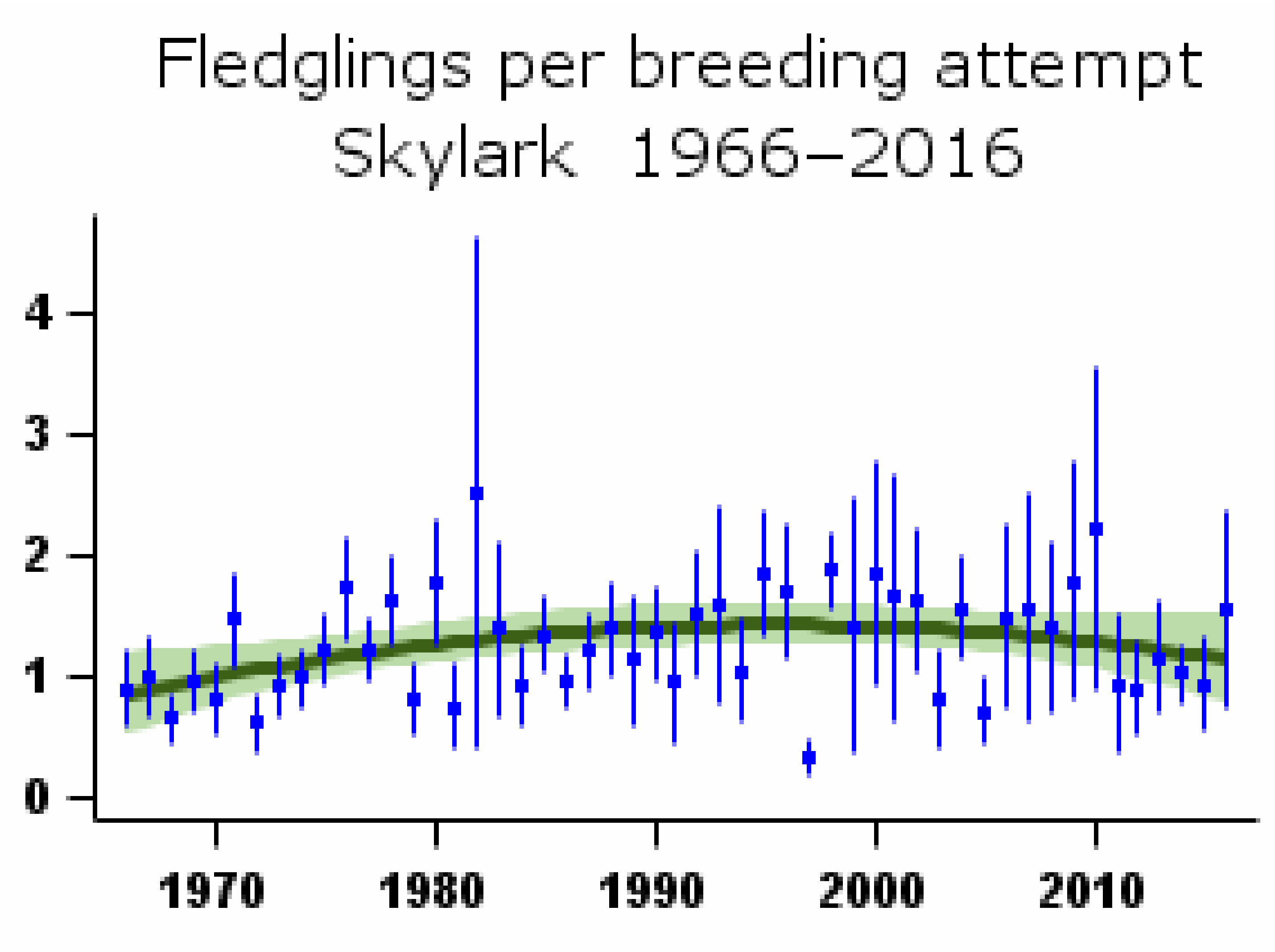


Habitat graph

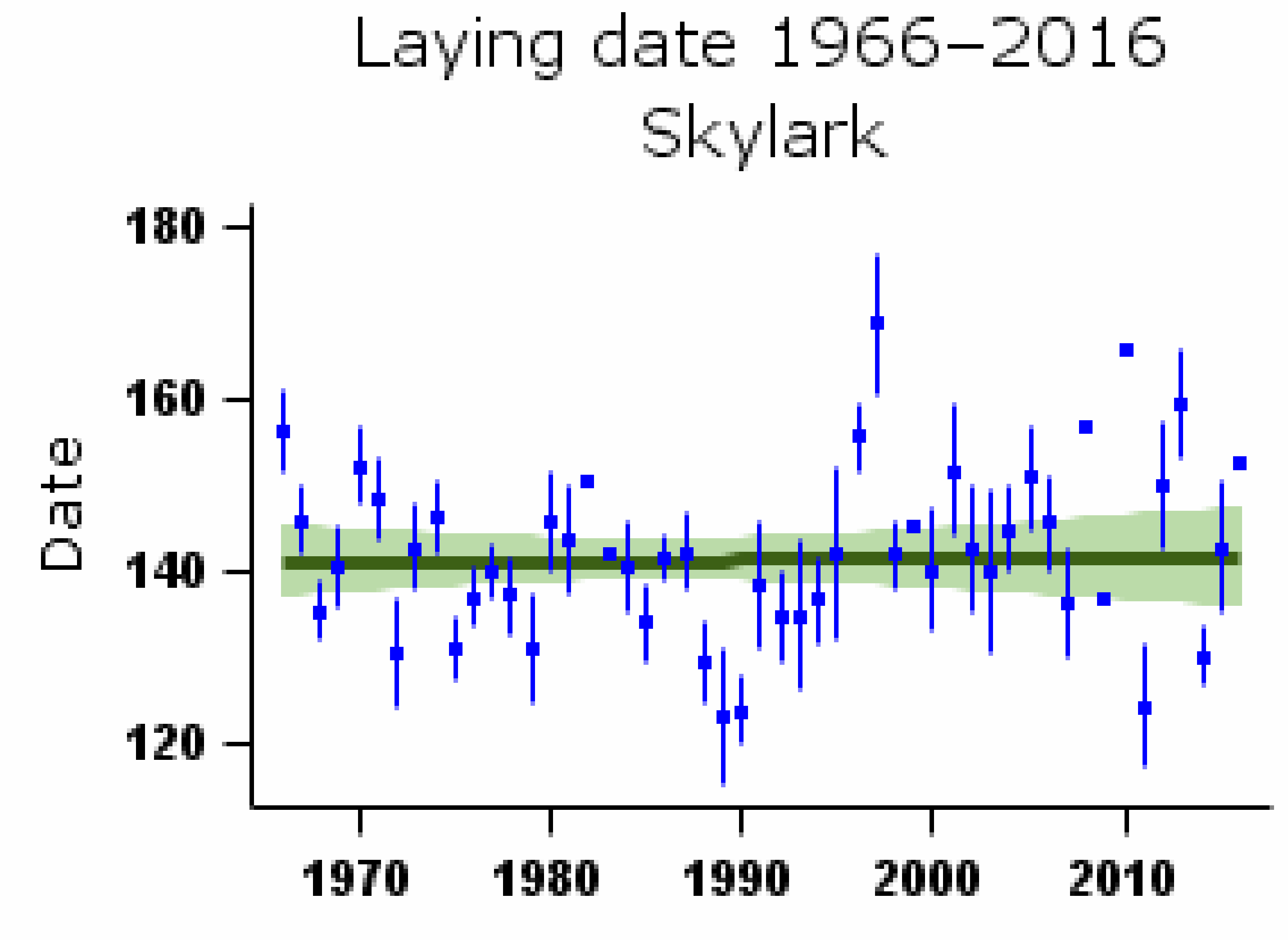


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

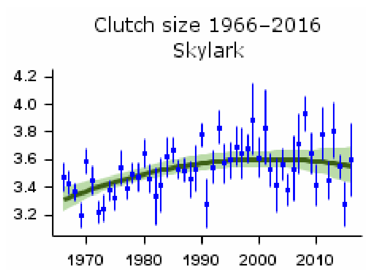


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

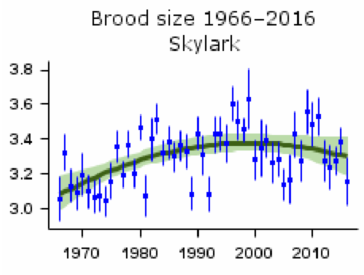
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	42	Curvilinear	0.89 fledglings	1.18 fledglings	31.6%		
Clutch size	48	1967-2015	35	Curvilinear	3.33 eggs	3.56 eggs	7.1%		
Brood size	48	1967-2015	65	Curvilinear	3.10 chicks	3.31 chicks	6.7%		
Nest failure rate at egg stage	48	1967-2015	44	Curvilinear	3.77% nests/day	5.06% nests/day	34.2%		
Nest failure rate at chick stage	48	1967-2015	53	Linear decline	4.77% nests/day	3.03% nests/day	-36.5%		
Laying date	48	1967-2015	18	None			0 days		Small sample

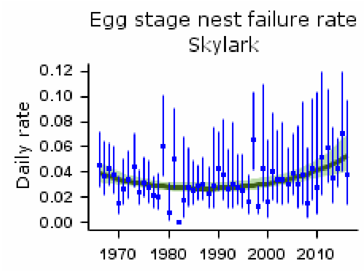
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



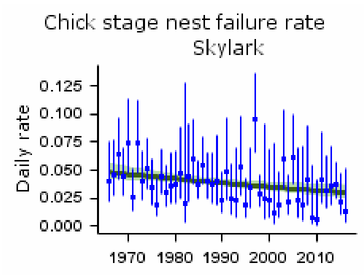
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence to indicate that the most likely cause of declines in Skylark is agricultural intensification, specifically the change from spring to autumn sowing of cereals, which reduces the number of breeding attempts possible and may also reduce overwinter survival due to loss of winter stubbles.

Change factor	Primary driver	Secondary driver
Demographic	Reduced breeding succes	
Ecological	Agricultural intensification	

Further information on causes of change

Demographic trends presented here show that there has been a general increase in the number of fledglings per breeding attempt, because clutch size and brood size have increased while the daily failure rate of nests at the chick stage has gone down. Chamberlain & Crick (1999) and Siriwardena et al. (2000b) found that breeding success per nesting attempt increased during the steepest period of decline, suggesting that these demographic changes have not contributed to the causes of population decline. The available data do not allow tests for effects of survival. Conversely, it is easy to test for effects on breeding success, especially locally and with respect to contemporary as opposed to historical land use. This creates a big imbalance in the amounts of evidence available.

Agricultural intensification has been put forward as the ultimate cause of Skylark declines. The relevant changes in agriculture have been decreases in preferred crops (spring cereals and cereal stubble) and an increase in unfavourable habitats (winter cereals, oilseed rape and intensively managed or grazed grass) (Chamberlain & Siriwardena 2000). There is good evidence that the most likely cause of the decline is the change from spring to autumn sowing of cereals. This practice restricts opportunities for late-season nesting attempts, because the crop is by then too tall. Chamberlain et al. (2000a) used habitat data from CBC surveys to show that the occurrence of autumn-sown, winter cereals increased from 33% to 78% between 1965 and 1995. Evans et al. (1995) and Wilson et al. (1997) all found that Skylarks deserted areas of autumn-sown crops as soon the sward reached a critical height, which occurred before the end of the breeding season. Jenny (1990), Chamberlain et al. (1999, 2000a, 2000b) and Donald & Vickery (2000) all recorded low and seasonally declining densities of Skylarks in cereals and suggested that this was at least partly due to the effects of changing vegetation structure. As well as preventing nesting, crop development also influences the positioning of the nests that are produced and hence their productivity: as the crop develops the birds are forced to nest closer to tramlines with a consequent increase in nest predation rate (Donald & Vickery 2000, Morris & Gilroy 2008). Skylark plots in crop fields have been found to support higher densities of breeding pairs (Schmidt et al. 2017) and may have the potential to help reverse population declines, but further research is needed on this subject.

Analyses by Chamberlain & Crick (1999) provided detailed evidence from both regional and habitat-based analyses that the greatest declines in Skylark numbers were associated with agricultural habitat, although their evidence suggests that different patterns of decline were unlikely to be due to differences in breeding success per attempt between habitats. However, Siriwardena et al. (2001) showed that the population trend can be explained by national changes in crop areas, together with a cold winter in 1981/82.

There is also some evidence that the increase in autumn sowing may depress overwinter survival by reducing the area of stubbles (Wilson et al. 1997, Donald & Vickery 2000, 2001). Donald & Vickery (2001) used data from BTO and RSPB studies to show that, in winter, cereal stubbles were strongly selected by Skylarks, probably owing to the presence of spilt grain and regenerating weeds, and go on to state that the area of stubbles has declined greatly in recent years. Gillings et al. (2005) identified better population performance in areas with extensive winter stubble, presumably because overwinter survival is relatively high. Note, however, that definitive evidence about Skylark survival rates and what may have influenced them is not available because the species is rarely ringed and ring-recovery sample sizes are extremely small.

Use of pesticides and associated declines in weed populations and weed-seed abundance have been suggested as another factor in the decline of Skylarks (Wilson 2001). Wilson et al. (1997) found higher densities of Skylarks in organic systems. Chamberlain & Crick (1999) suggest that the use of toxic pesticides mediated through effects on food supplies may be responsible for declines in invertebrate food, due to non-target insects being killed by insecticide and insect food-plants being killed by herbicide. However, since this would in theory affect breeding success, it doesn't seem to have been a problem. Donald et al. (2001) state that, although recent agricultural changes have affected diet and possibly body condition of nestlings, these effects are unlikely to have been an important factor in recent population declines. There may also be implications for overwinter survival, as herbicides reduce weeds, and hence seeds for the winter, making stubbles and uncropped land less valuable as a food resource. However, the increases in pesticide use have happened at the same time as the switch to autumn sowing, so is hard to detect this as a specific effect.

There is some evidence to suggest that high densities of raptors may reduce the abundance of local Skylark populations (Amar et al. 2008b). Chamberlain & Crick (1999) state that recovery of Sparrowhawk numbers has been most evident in the most intensively farmed areas, and that this is correlated with the declines in Skylark numbers across habitats and regions. However, this apparent link cannot be taken as evidence of a causal relationship as there have been many other broad-scale changes in the countryside that are at least as well correlated with Skylark changes. They state that it is doubtful whether predation alone could account for the decreases in Skylark numbers.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Sand Martin

Riparia riparia

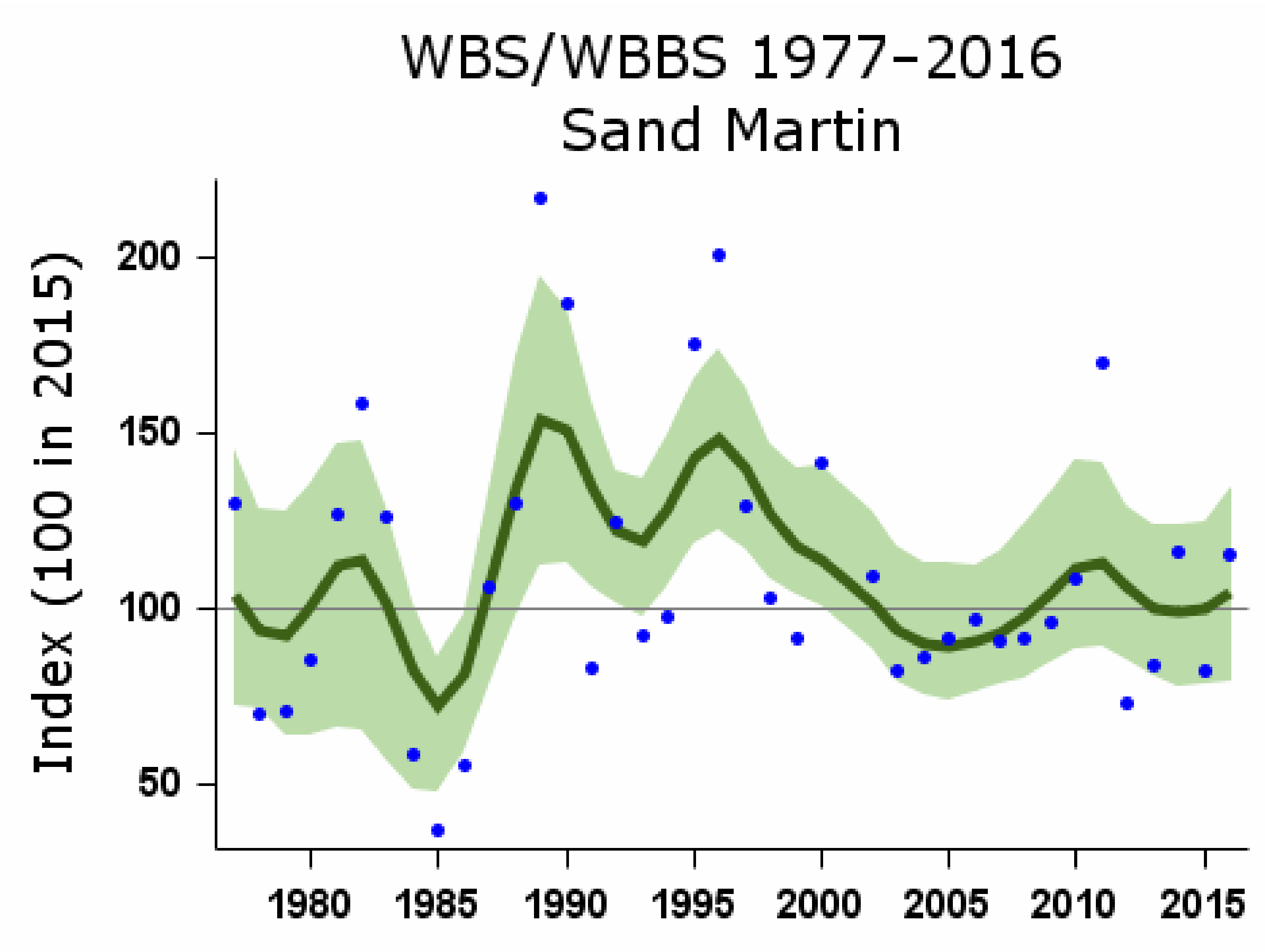
Key facts

Conservation listings:	Global: green
Long-term trend:	UK: fluctuating, with no long-term trend
Population size:	54,000-174,000 nests in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

This species is unusually difficult to monitor, because active and inactive nest holes are difficult to distinguish, and because whole colonies frequently disperse or shift to new locations as suitable sand cliffs are created and destroyed. WBS counts were of apparently occupied nest holes along riverbanks but BBS and WBBS record birds seen. WBS/WBBS suggests a stable or shallowly increasing population, with wide fluctuations, although the decrease during the late 1990s and early 2000s was steep enough to raise BTO alerts in previous reports. BBS counts show clearly that large year-to-year changes occur, but do not yet reveal a clear long-term trend. Though previously amber listed through its 'depleted' status in Europe, the species was moved to the UK green list in 2015 (Eaton et al. 2015).

Arrival dates in the UK advanced by over three weeks between the 1960s and the 2000s (Newsonet al. 2016), but laying dates have not changed so it is unclear whether this may have an effect on the population. Nest-record samples are small, but indicate that nest failure rates have decreased enormously since the 1960s; however no trend can be detected in the numbers of fledglings per breeding attempt. Rainfall in the species' trans-Saharan wintering grounds prior to the birds' arrival promotes annual survival and thus abundance in the following breeding season (Szep 1995). However, a study in Italy found that, since around 2000, this link no longer held, perhaps because more recent wintering conditions had been less extreme, although the data suggested that there may still be some weak influence of winter climate on survival (Masoero et al. 2016). Annual survival rates from RAS sites in the UK for 1990-2004 were correlated positively with minimum monthly rainfall during the wet season in West Africa (Robinson et al. 2008). Mark-recapture in Cheshire during 1981-2003 found that, after allowing for the effects of African rainfall, some demographic measures were density dependent, with adult survival low when wintering densities (measured as the size of the western European population) were high and recruitment low when the local Cheshire population was high (Norman & Peach 2013). This study did not replicate an earlier finding (Cowley & Siriwardena 2005) that summer rainfall on the breeding grounds has a negative influence on survival rates through the following winter.



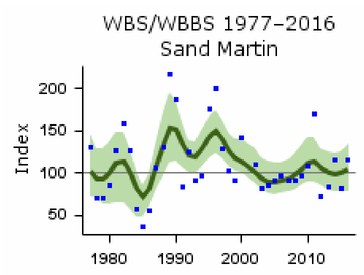
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

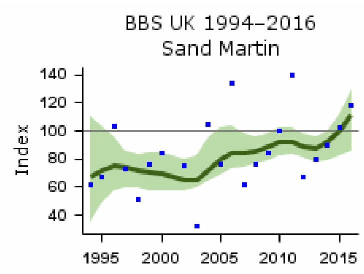
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	37	1978-2015	50	7	-39	88		
	25	1990-2015	67	-34	-58	12		
	10	2005-2015	88	12	-17	42		
	5	2010-2015	82	-10	-28	12		
BBS UK	20	1995-2015	140	39	-13	124		
	10	2005-2015	169	25	-19	59		
	5	2010-2015	169	8	-14	25		
BBS England	20	1995-2015	88	9	-27	35		
	10	2005-2015	103	0	-22	17		
	5	2010-2015	100	4	-17	23		
BBS Scotland	20	1995-2015	34	87	-22	418		
	10	2005-2015	46	79	-16	203		
	5	2010-2015	49	22	-21	64		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

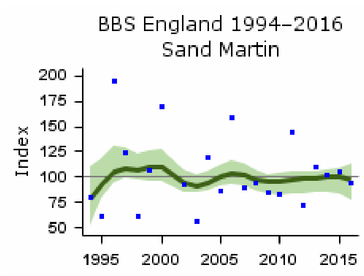
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



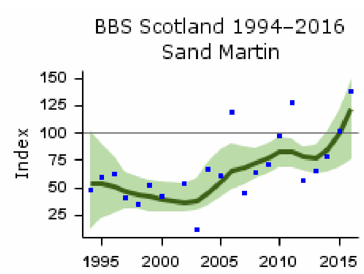
WBS/WBBS waterways graph



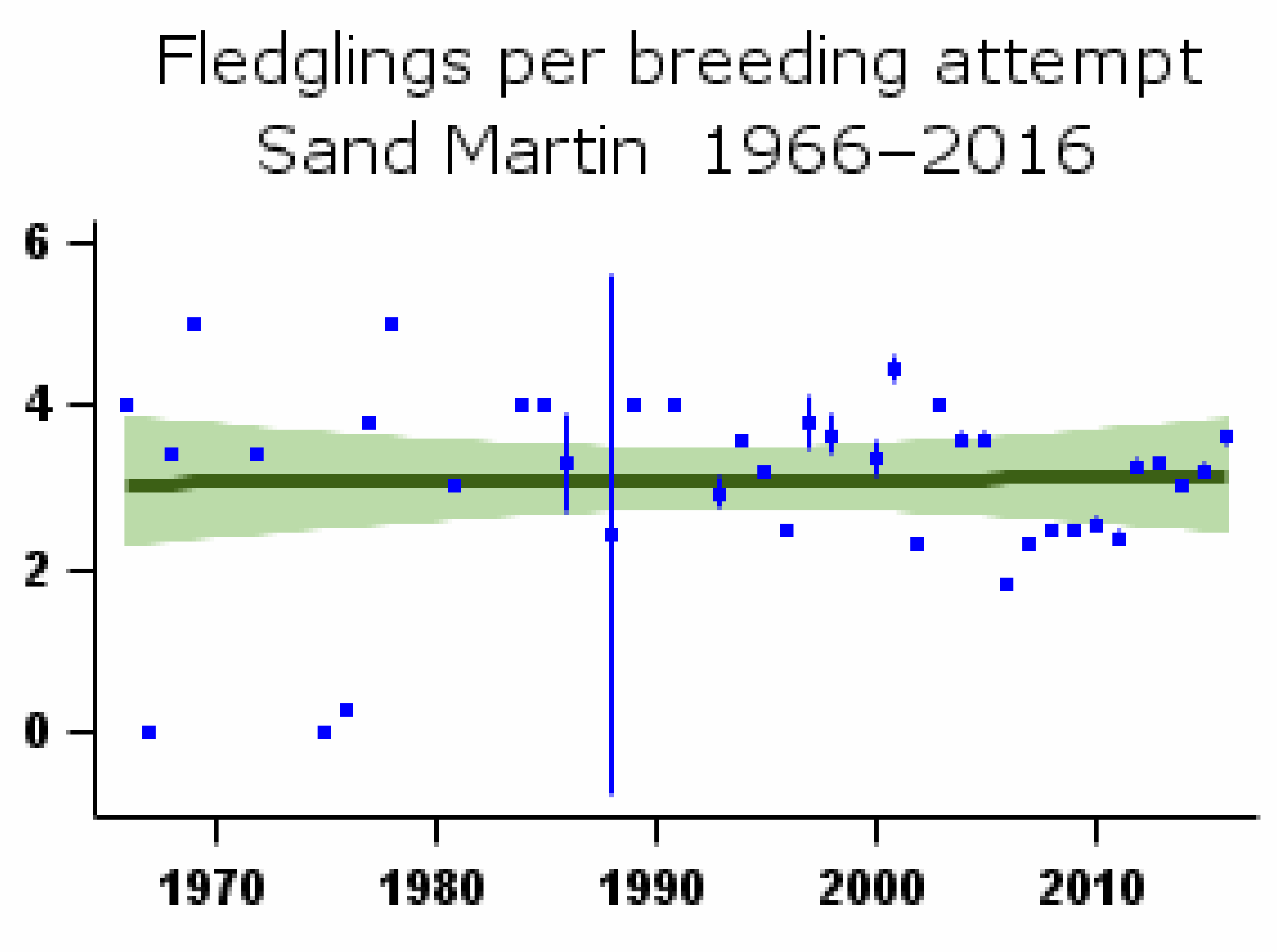
BBS UK graph



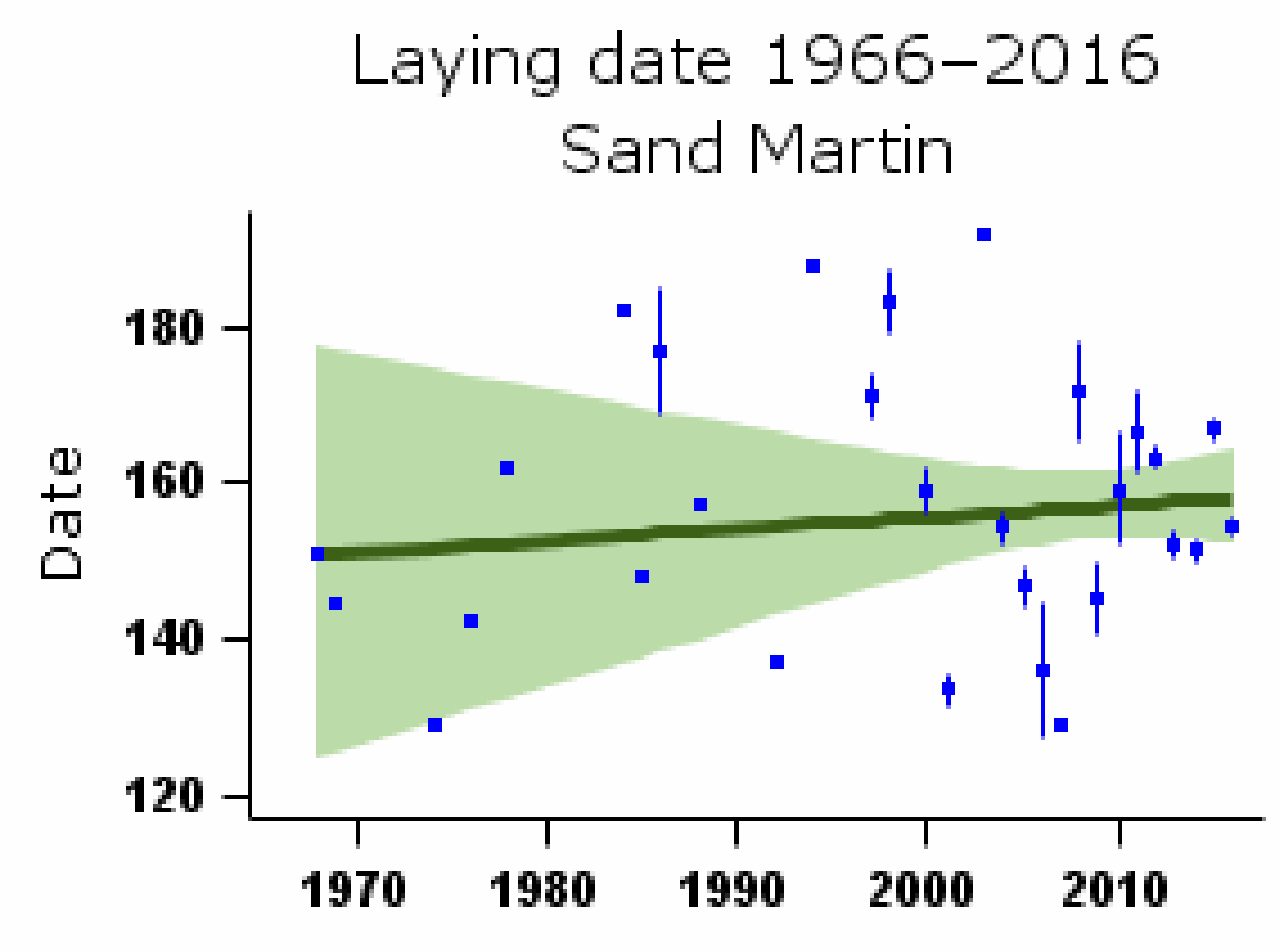
BBS England graph



Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

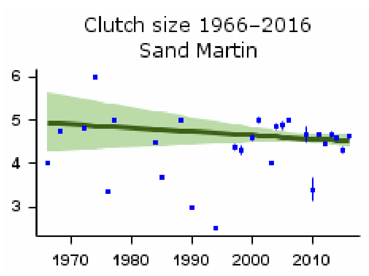


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

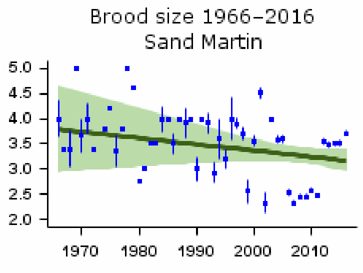
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	67	None					
Clutch size	48	1967-2015	78	None					
Brood size	48	1967-2015	90	None					
Nest failure rate at egg stage	48	1967-2015	68	Curvilinear	2.84% nests/day	0.77% nests/day	-72.9%		
Nest failure rate at chick stage	48	1967-2015	96	Curvilinear	2.71% nests/day	0.11% nests/day	-95.9%		
Laying date	47	1968-2015	82	None			0 days		

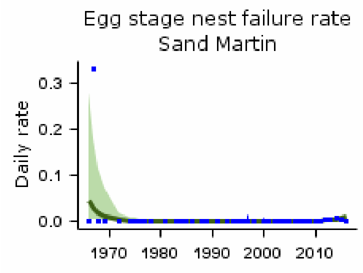
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



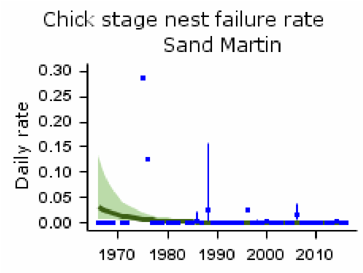
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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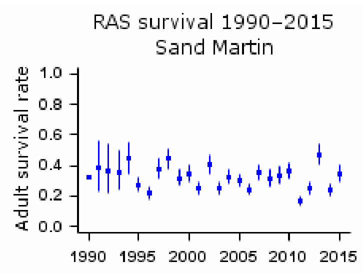

Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Swallow

Hirundo rustica

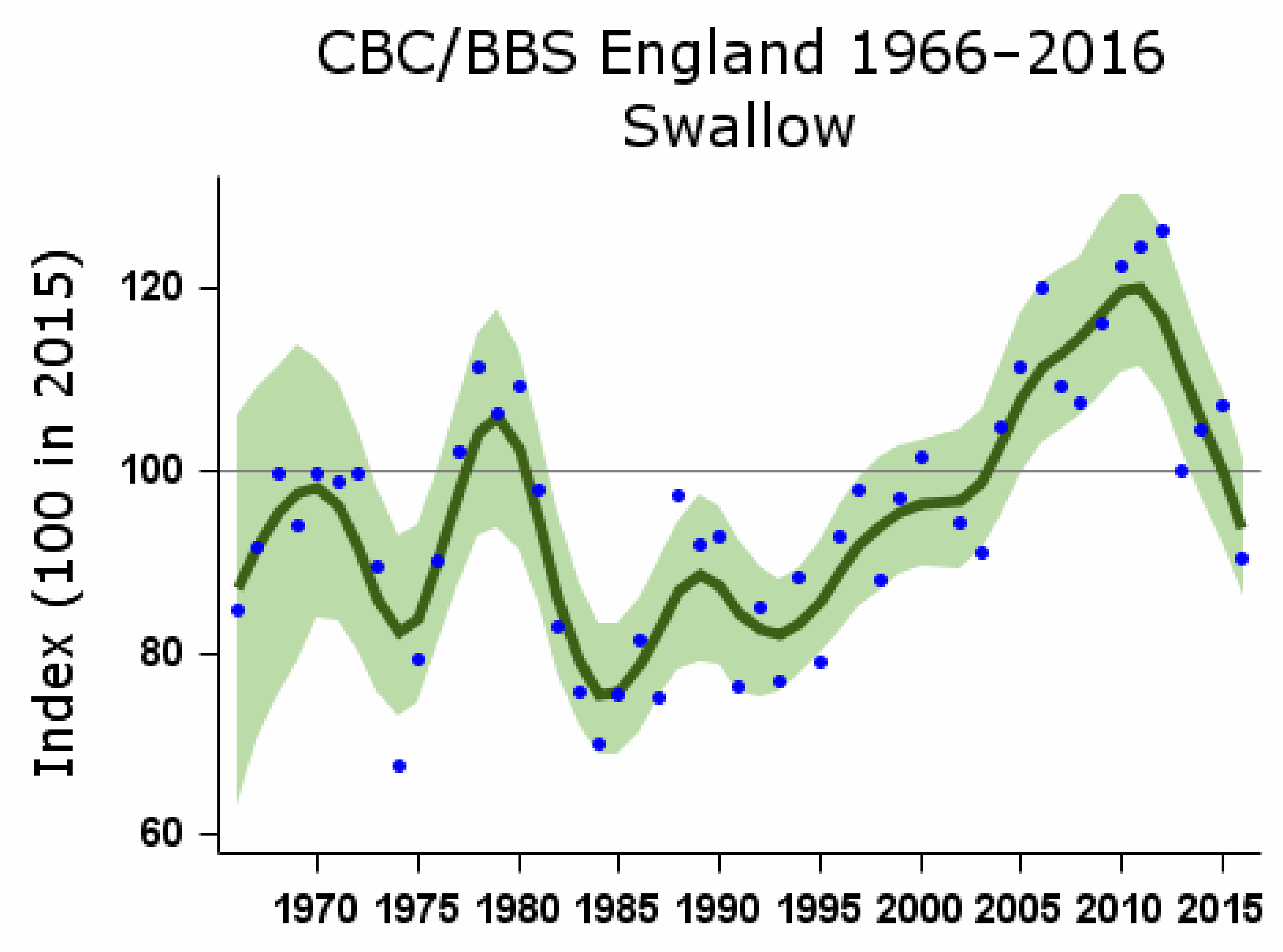
Key facts

Conservation listings:	Global: green
Long-term trend:	England: fluctuating, with no long-term trend
Population size:	860,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

Swallow was originally amber listed partly on the strength of a decline on CBC plots in the early 1980s, but later modelling of UK population change from CBC gave evidence of fluctuations but not of long-term decline (Robinson et al. 2003). Nevertheless, the species continued to qualify for amber listing through its 'depleted' status across the European continent (BirdLife International 2004). Following further review of its status in Europe, the species was moved to the UK green list in 2015 (Eaton et al. 2015). There has been a moderate decline in numbers across Europe since 1980 (PECBMS 2016a).

BBS data suggest increases in England, Scotland and Wales since 1994. The BBSmap of change in relative density between 1994-96 and 2007-09, however, indicates that decreases had occurred during that period in Northern Ireland and in eastern coastal regions of Britain, with the strongest increases in western Britain.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

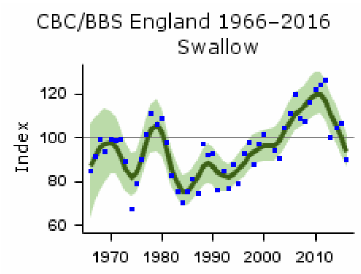
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	735	9	-17	57		
	25	1990-2015	1354	15	-1	34		
	10	2005-2015	1968	-7	-10	-3		
	5	2010-2015	2001	-17	-19	-12		

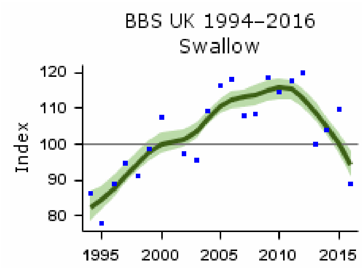
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	2101	18	11	25		
	10	2005-2015	2549	-9	-13	-5		
	5	2010-2015	2593	-14	-17	-10		
BBS England	20	1995-2015	1616	15	8	23		
	10	2005-2015	1968	-7	-11	-3		
	5	2010-2015	2001	-16	-20	-13		
BBS Scotland	20	1995-2015	198	33	13	54		
	10	2005-2015	244	-3	-14	12		
	5	2010-2015	253	-10	-21	3		
BBS Wales	20	1995-2015	186	30	10	59		
	10	2005-2015	217	-13	-29	8		
	5	2010-2015	223	-4	-16	16		
BBS N.Ireland	20	1995-2015	86	-6	-30	31		
	10	2005-2015	100	-29	-38	-20	>25	
	5	2010-2015	95	-14	-23	-2		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

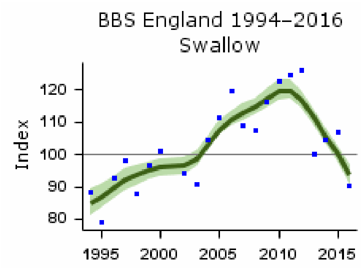
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



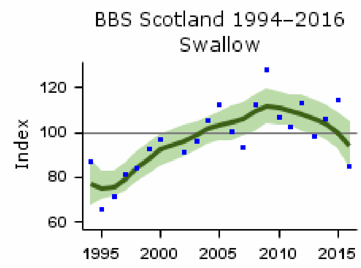
CBC/BBS England graph



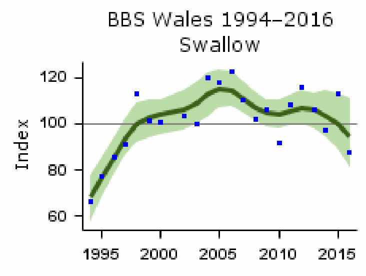
BBS UK graph



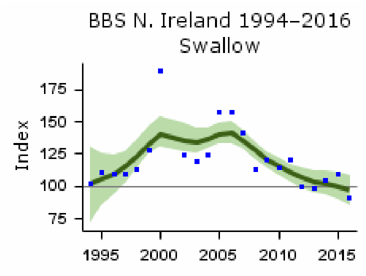
BBS England graph



BBS Scotland graph

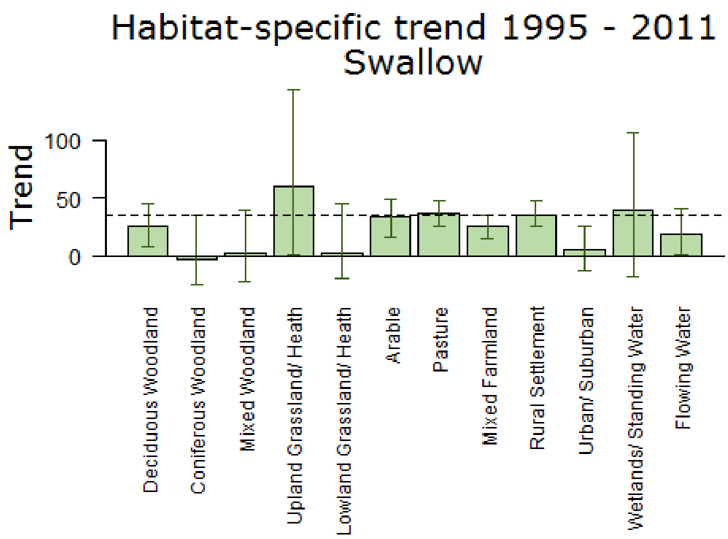


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

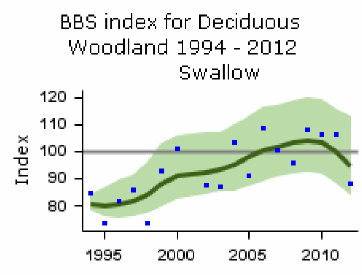
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

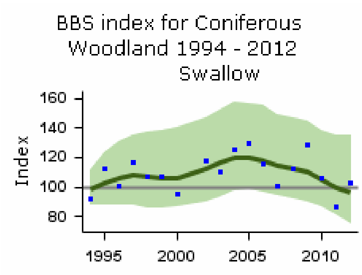
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	374	25	8	45
Coniferous Woodland	16	1995-2011	82	-3	-24	35
Mixed Woodland	16	1995-2011	166	3	-21	40
Upland Grassland/ Heath	16	1995-2011	44	59	1	143
Lowland Grassland/ Heath	16	1995-2011	114	3	-19	45
Arable	16	1995-2011	504	34	16	50
Pasture	16	1995-2011	1076	37	26	47
Mixed Farmland	16	1995-2011	523	26	15	36

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Rural Settlement	16	1995-2011	685	36	26	47
Urban/ Suburban	16	1995-2011	186	6	-13	25
Wetlands/ Standing Water	16	1995-2011	67	40	-18	106
Flowing Water	16	1995-2011	319	19	1	40

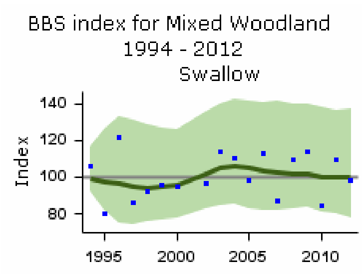
Further information on habitat-specific trends, please follow link here.



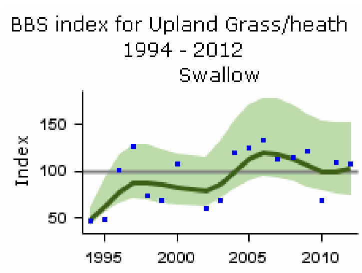
Habitat graph



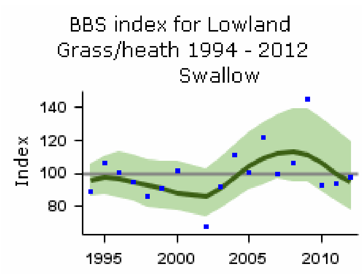
Habitat graph



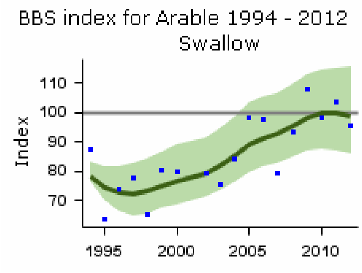
Habitat graph



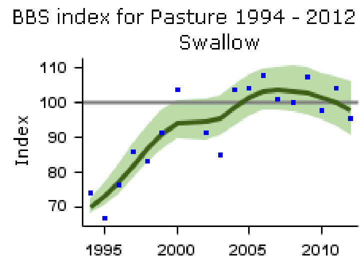
Habitat graph



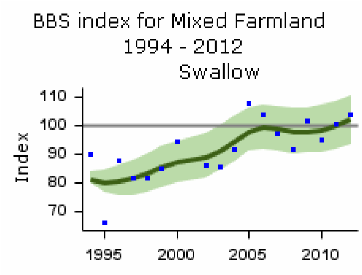
Habitat graph



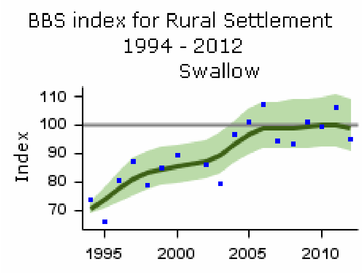
Habitat graph



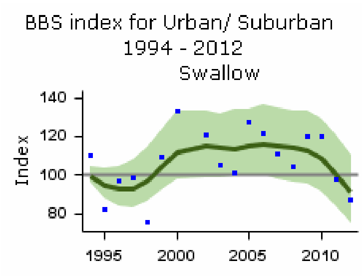
Habitat graph



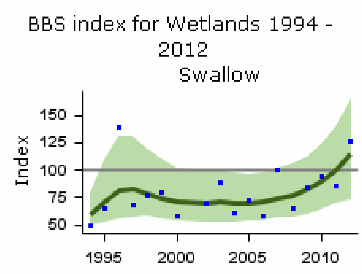
Habitat graph



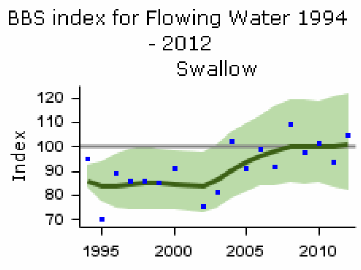
Habitat graph



Habitat graph

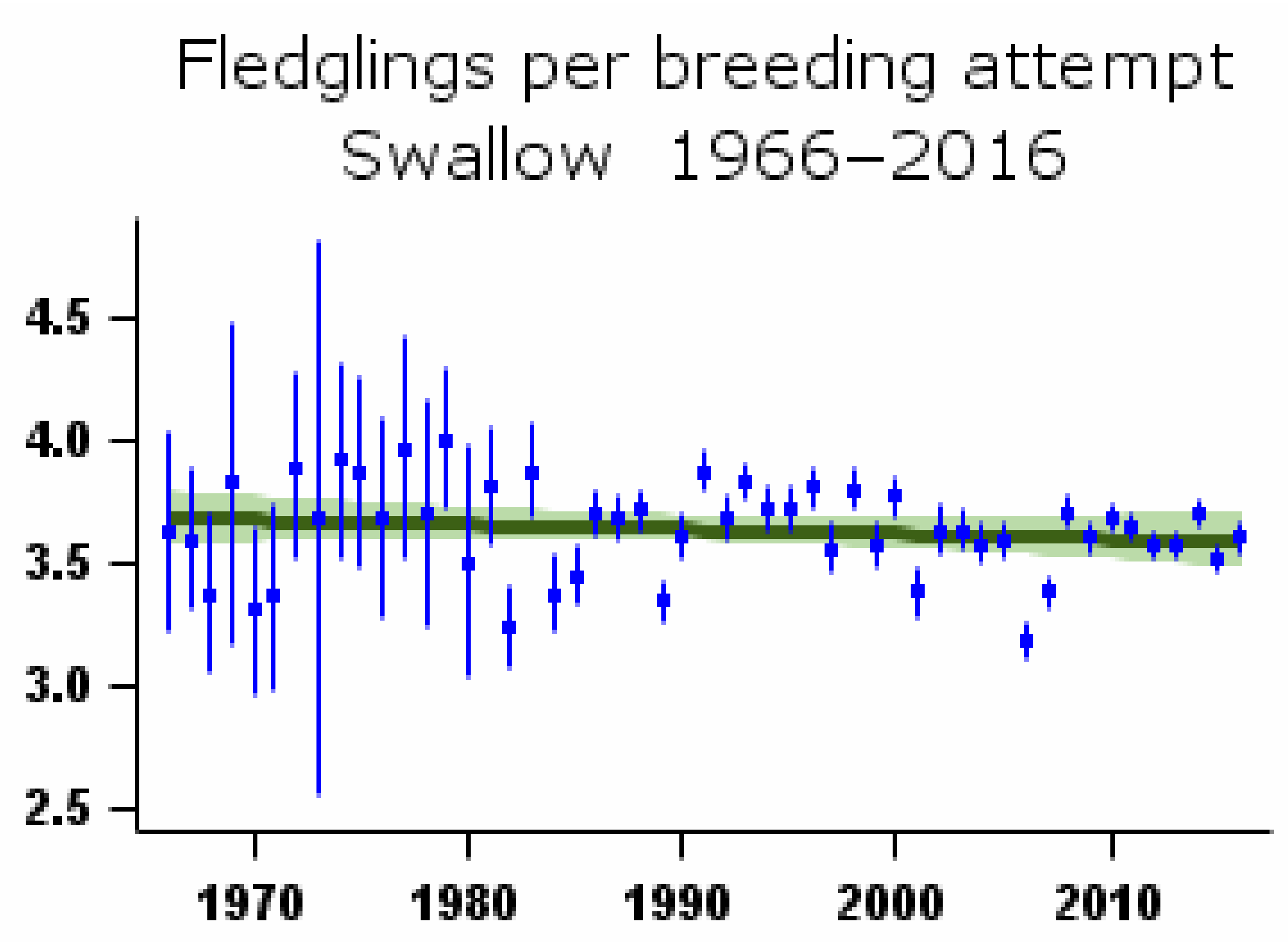


Habitat graph

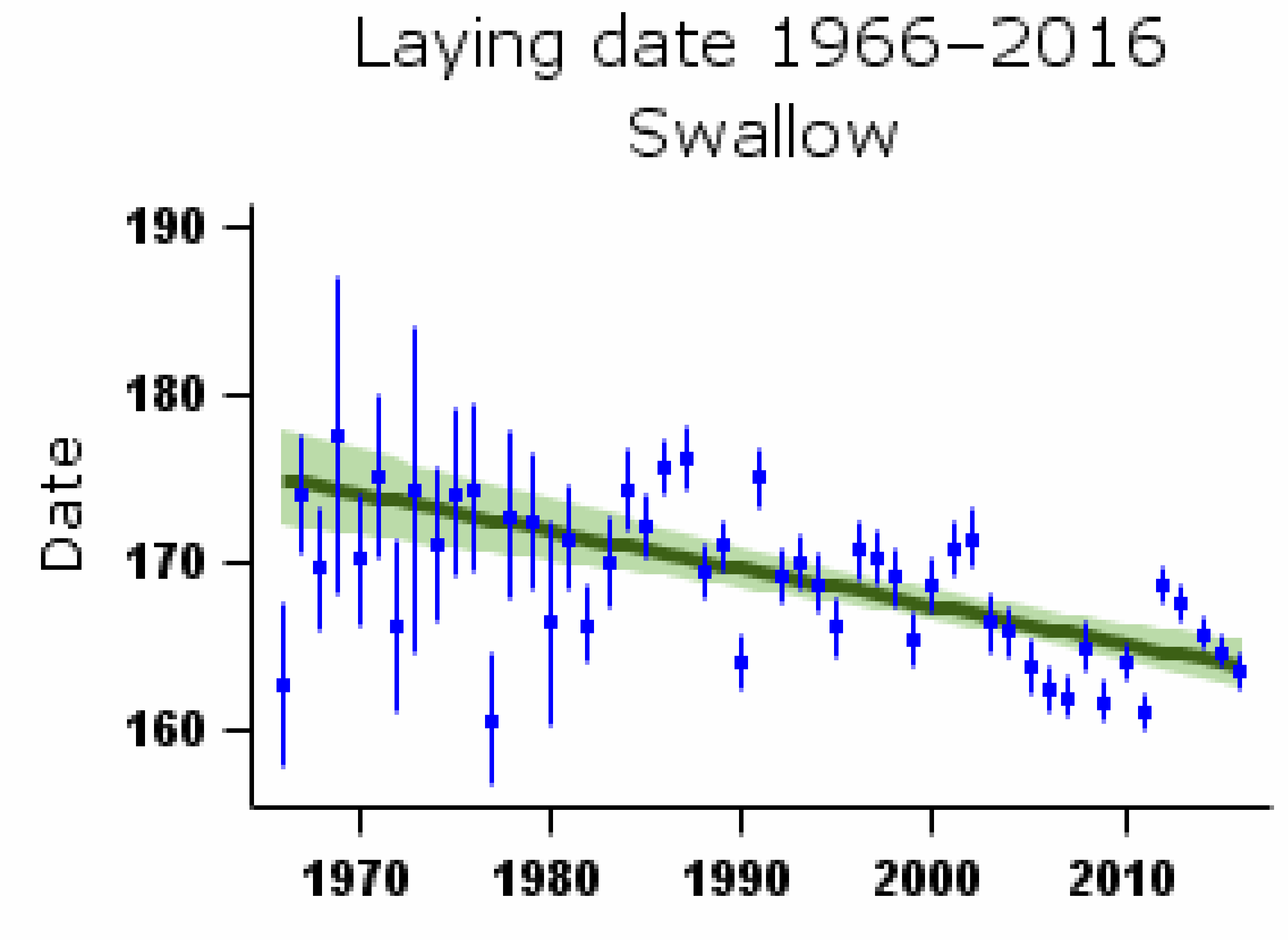


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

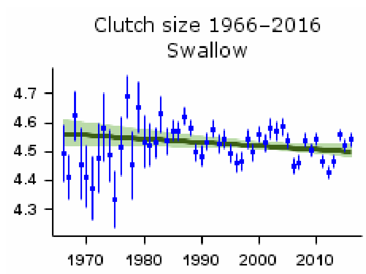


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

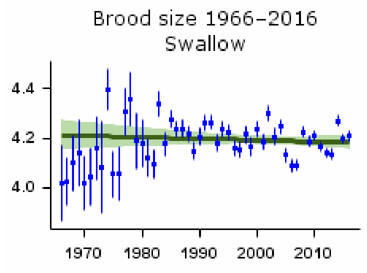
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	556	None					
Clutch size	48	1967-2015	542	None					
Brood size	48	1967-2015	930	None					
Nest failure rate at egg stage	48	1967-2015	665	None					
Nest failure rate at chick stage	48	1967-2015	557	Linear increase	0.32% nests/day	0.43% nests/day	34.4%		
Laying date	48	1967-2015	238	Linear decline	Jun 24	Jun 13	-11 days		

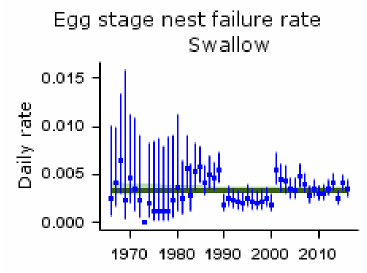
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



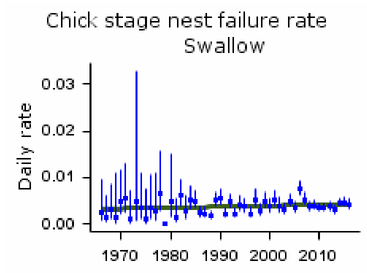
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



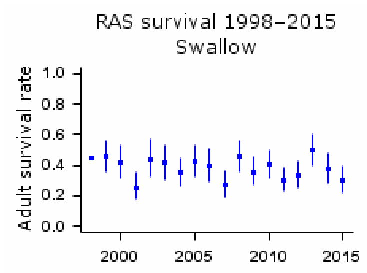
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

The reasons for change are currently unclear. Although agricultural intensification is likely to be a primary driver, over-winter survival and changes in habitat on the breeding grounds may both be having an effect.

Change factor	Primary driver	Secondary driver
Demographic	unknown	
Ecological	Agricultural intensification	

Further information on causes of change

Population fluctuations are most strongly related to variable levels of survival (Robinson et al. 2014), most likely on their wintering grounds (Baillie & Peach 1992). More particularly, annual population change has been shown to be correlated with rainfall in the western Sahel prior to the birds' spring passage through West Africa, but with neither cattle numbers nor nest-site availability in the UK (Robinson et al. 2003). Annual survival rates from RAS sites in the UK for 1998-2004 were correlated positively with mean monthly rainfall during the early austral summer in southern Africa (Robinson et al. 2008). It is likely that, in eastern parts of the UK, the loss of livestock farming and grazed grassland, together with arable intensification, has caused the Swallow population to decline, while an increase in the area of pasture in the west and north has promoted a population increase which apparently has more than compensated for declines elsewhere (Evans & Robinson 2004). A link between regional changes in the availability of preferred feeding habitats and the regional patterns of UK population change again suggests that habitat change on the breeding grounds may explain population trend, at least partly (Henderson et al. 2007). Brood size increased up to the late 1980s, however current data show no difference in brood size compared to the late 1960s, while nest losses have increased and the number of fledglings per breeding attempt shows no trend.

Climatic warming is leading to an earlier start to the breeding season for European Swallows, and analysis of phenological data has found that the arrival date in the UK has advanced, between the 1960s and 2000s, by 15 days (Newson et al. 2016), with the laying date also advancing (see above). However, Turner (2009) found that there has been increased chick mortality in hot, dry summers and reduced post-fledging survival because of poor conditions for birds migrating through North Africa. A study in eastern Germany also highlighted reduced breeding success despite earlier breeding, and suggested that a mismatch between local and large-scale climatic changes may mean that, for this species, earlier breeding was not sufficient in that region to respond to climate change (Grimm et al. 2015)

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

House Martin

Delichon urbicum

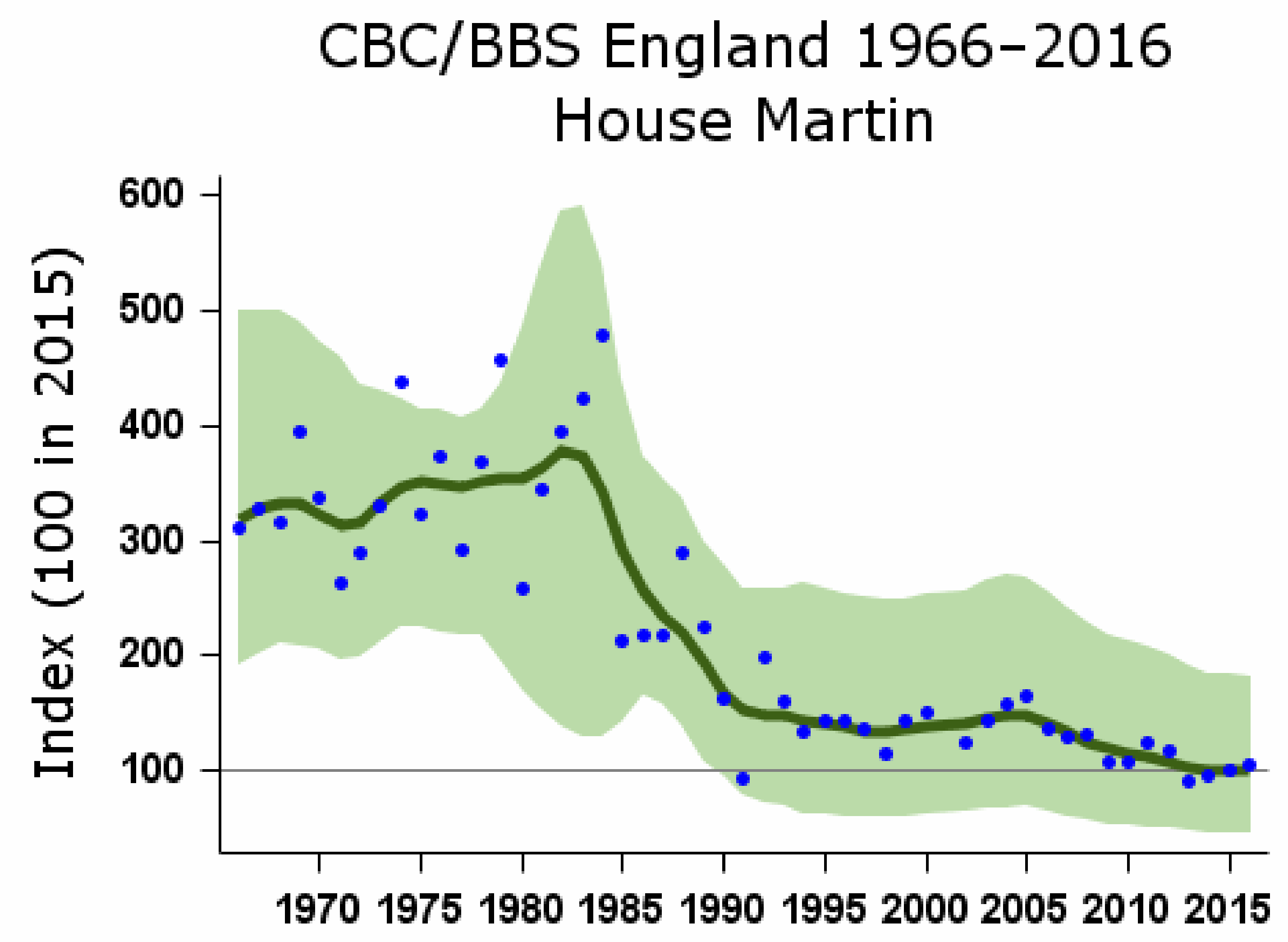
Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	England: probable rapid decline
Population size:	510,000 (360,000-670,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

The House Martin's loosely colonial nesting habits and its strong association with human settlements mean that it is extraordinarily difficult to monitor. Anecdotal evidence of decline is often unreliable, because demise of a colony may be balanced by single nests or small groups becoming established elsewhere. For these reasons, study areas should be large, covered thoroughly, and ideally randomly selected. A first national survey designed on these principles was undertaken by BTO in 2015 (see BirdLife International 2004). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).

Analysis of phenological data has found that the arrival date in the UK has advanced, between the 1960s and 2000s, by 16 days (Newson et al. 2016), although it is not currently known if and how this may affect breeding productivity for this species. Annual survival rates from RAS sites in the UK for 1994-2004 were correlated positively with maximum monthly rainfall in West Africa; some decline in survival rate is apparent over this period but does not correspond to the population decline (Robinson et al. 2008).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

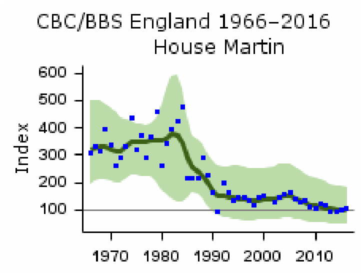
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	338	-69	-92	-2	>50	Small CBC sample
	25	1990-2015	630	-41	-68	-12	>25	Small CBC sample

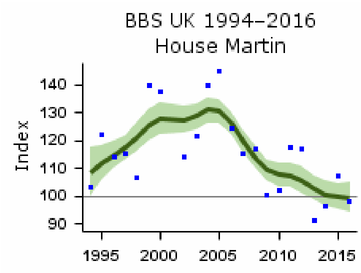
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	976	-11	-18	-2		
	10	2005-2015	1118	-23	-29	-18		
	5	2010-2015	1089	-7	-13	-1		
BBS England	20	1995-2015	756	-28	-34	-20	>25	
	10	2005-2015	856	-33	-37	-27	>25	
	5	2010-2015	817	-13	-20	-7		
BBS Scotland	20	1995-2015	76	121	60	203		
	10	2005-2015	98	-2	-20	21		
	5	2010-2015	105	-2	-17	15		
BBS Wales	20	1995-2015	93	-1	-27	33		
	10	2005-2015	101	-23	-46	10		
	5	2010-2015	104	-12	-33	16		
BBS N.Ireland	20	1995-2015	45	108	22	207		
	10	2005-2015	56	43	10	69		
	5	2010-2015	57	42	13	63		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

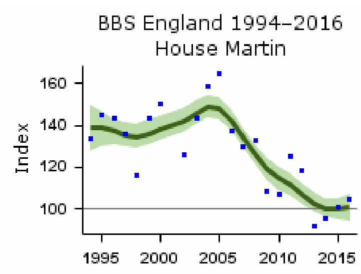
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



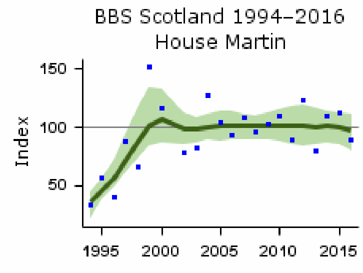
CBC/BBS England graph



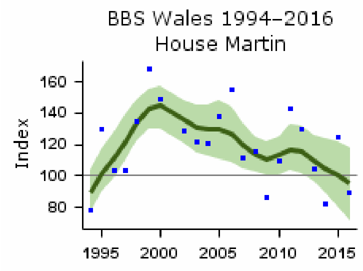
BBS UK graph



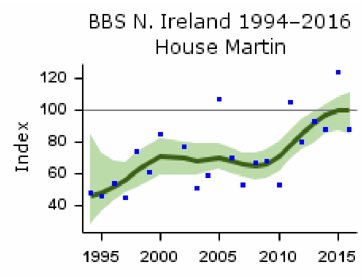
BBS England graph



BBS Scotland graph

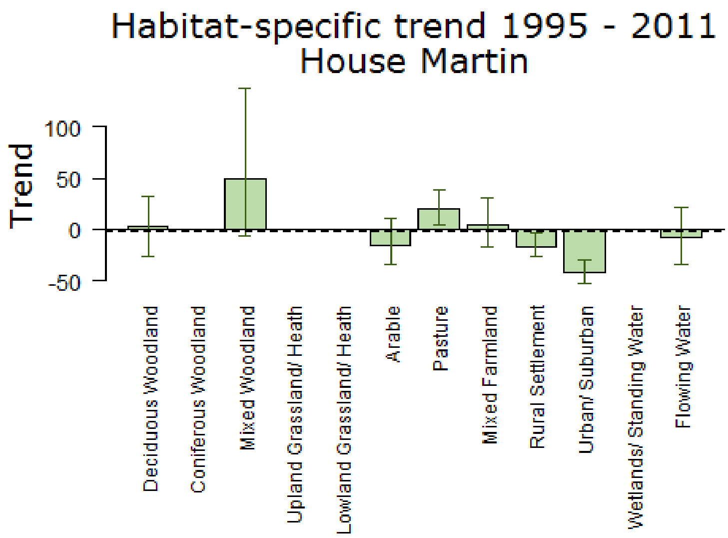


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

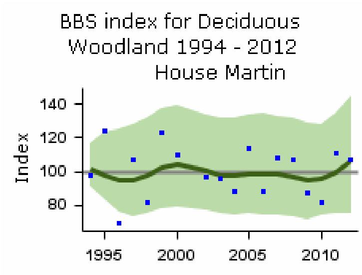
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

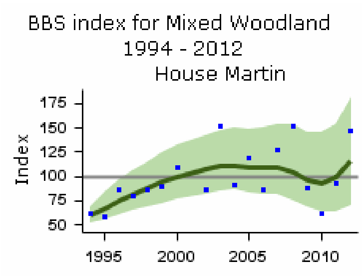
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	111	2	-26	33

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Mixed Woodland	16	1995-2011	49	50	7	137
Arable	16	1995-2011	161	-15	-35	11
Pasture	16	1995-2011	412	19	4	38
Mixed Farmland	16	1995-2011	164	4	-16	31
Rural Settlement	16	1995-2011	321	-17	-27	-4
Urban/ Suburban	16	1995-2011	174	-42	-52	-30
Flowing Water	16	1995-2011	120	-7	-35	22

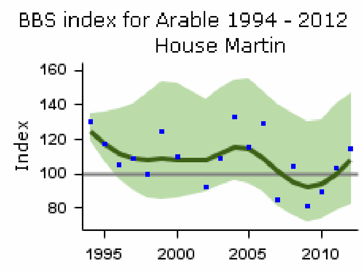
Further information on habitat-specific trends, please follow link here.



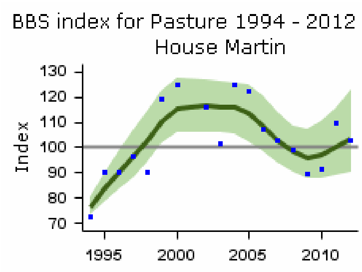
Habitat graph



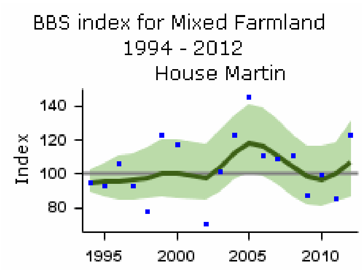
Habitat graph



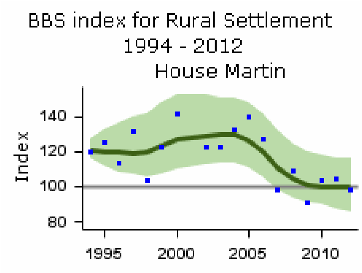
Habitat graph



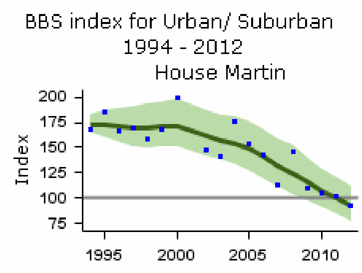
Habitat graph



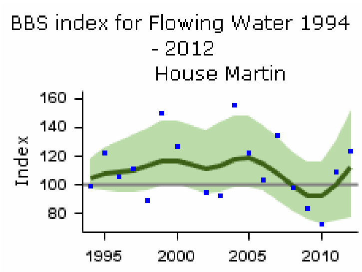
Habitat graph



Habitat graph



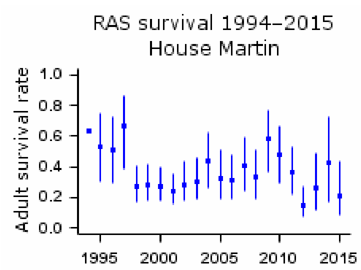
Habitat graph



Habitat graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Cetti's Warbler

Cettia cetti

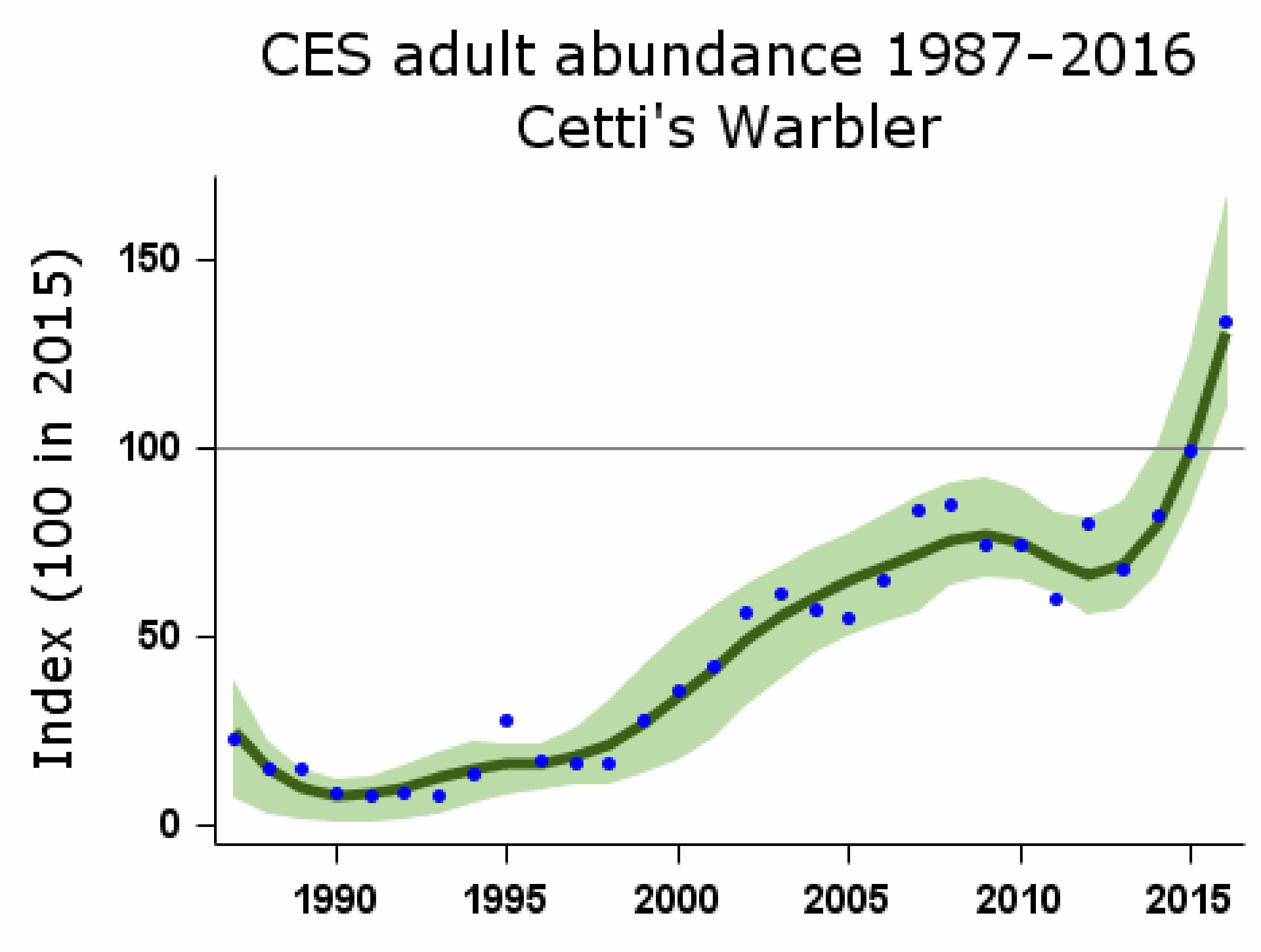
Key facts

Conservation listings:	Global: green; current RBBP species
Long-term trend:	England & Wales: increase
Population size:	2,000 males in 2006-10 (APEP13: RBBP data)

Status summary

Cetti's Warbler was first recorded in Britain as recently as 1961, as part of its range expansion across northwest Europe (Bonham & Robertson 1975). Colonisation, which began in Kent in 1972 or 1973, continues to be monitored annually by Holling & RBBP 2014. Numbers and breeding range increased spectacularly during the first 12 years, with Norfolk and Dorset gradually overtaking Kent as the main host counties (Gibbons et al. 1993, Wotton et al. 1998). Severe winters after 1978 led to the temporary extinction of the Kent population in 1988. Populations in milder regions continued to grow, but overall the UK population fell by over a third between 1984 and 1986. In the absence of severe winters during 1986-2009, increase and range expansion continued. The first breeding records north of the Humber were made in 2006 (Holling & RBBP 2009).

Much constant-effort ringing takes place in prime Cetti's Warbler habitat; despite the comparative rarity of this species, therefore, CES population and productivity indices are already available (Robinson et al. 2007a). CES data confirm the species' sensitivity to cold winters, which appears to have become more evident as the breeding range has expanded into more testing climates. There has been widespread moderate increase across Europe since 1989 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

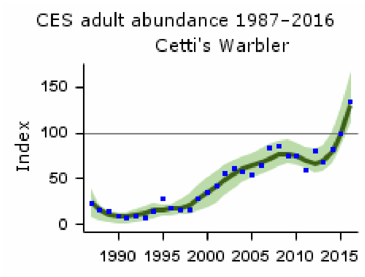
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CES adults	25	1990-2015	13	1115	668	>10000		Small sample
	10	2005-2015	21	54	12	146		

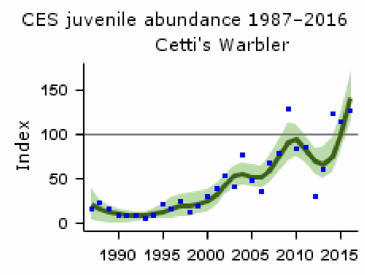
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CES juveniles	25	1990-2015	13	839	392	>10000		Small sample
	10	2005-2015	21	88	27	183		
	5	2010-2015	25	5	-23	56		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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



CES adults graph



CES juveniles graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Long-tailed Tit

Aegithalos caudatus

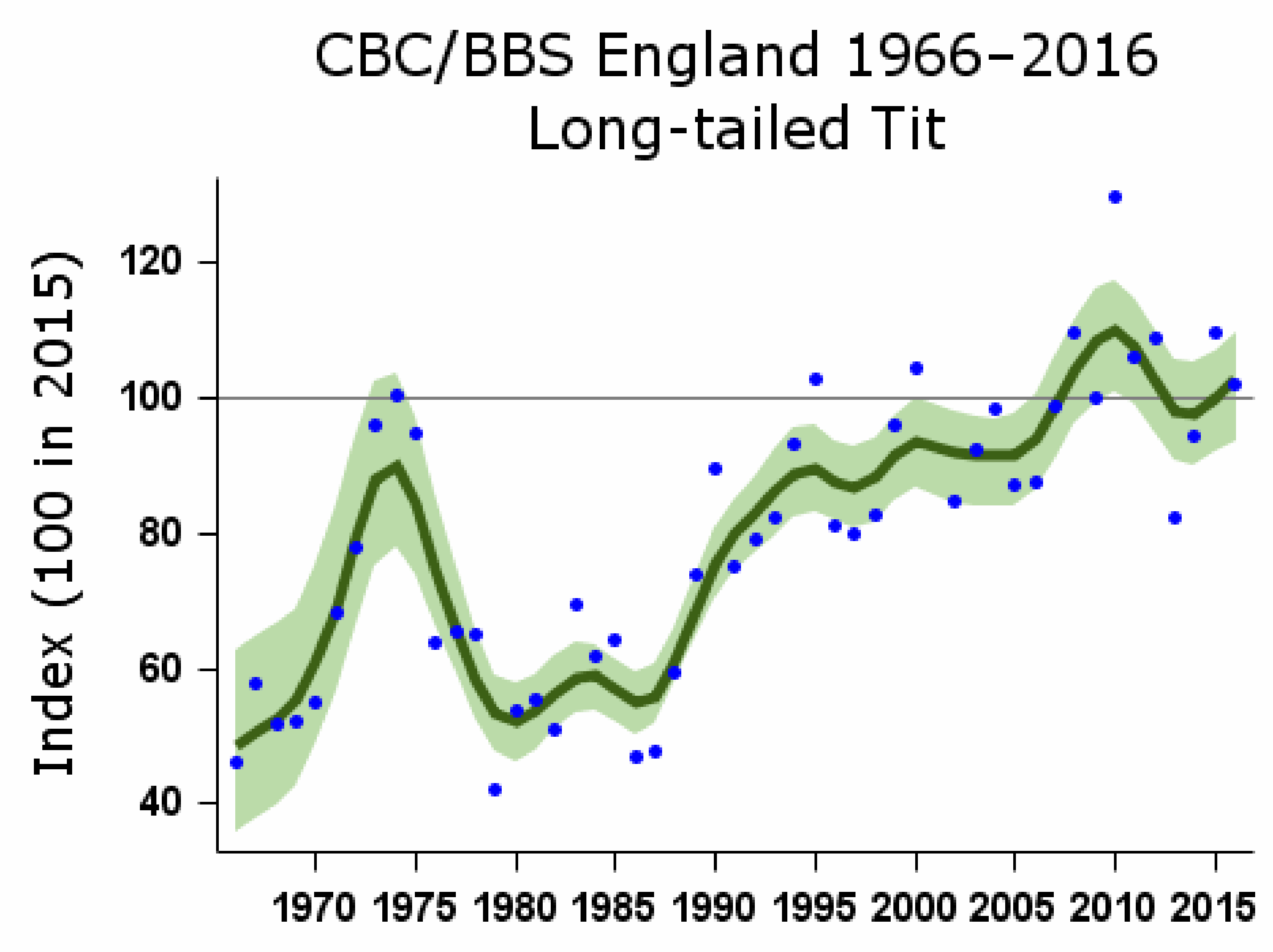
Key facts

Conservation listings:	Global: green; at race level, rosaceus amber
Long-term trend:	England: moderate increase
Population size:	340,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Status summary

This species undergoes wide fluctuations in numbers between breeding seasons, suffering heavy mortality in some years but able to recover quickly by virtue of its high breeding potential. In an ongoing mark-recapture study near Sheffield, weather explained 73% of the inter-annual variation in adult survival during 1994-2012: warm springs and autumns increased survival, wet springs reduced survival but, during the period of study, winter weather had little effect (Gullett et al. 2014). The same study found that warm weather in March depressed recruitment in the following year, whereas warm May weather enhanced it (Gullett et al. 2015). Numbers across England were low after the severe winters of the early 1960s and again during a series of relatively cold winters beginning in the late 1970s, and have fallen again after the cold winters since 2010, but winter mortality might not be the primary cause.

The starting years of the long-term monitoring periods coincides with a trough in population, thus exaggerating the long-term trend. CBC/BBS index trends show progressive increases in Long-tailed Tit abundance beginning in the early 1980s. The BBS Crick & Sparks 1999). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

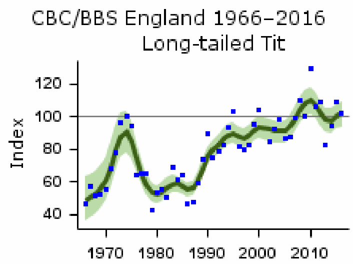
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	467	97	40	186		
	25	1990-2015	800	33	17	47		

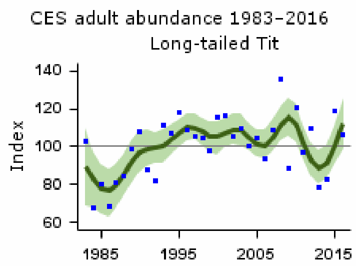
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	1193	-9	-14	-5		
CES adults	31	1984-2015	82	21	-4	66		
	25	1990-2015	92	3	-17	25		
	10	2005-2015	94	-1	-13	9		
	5	2010-2015	96	-10	-20	-2		
CES juveniles	31	1984-2015	77	-17	-47	38		
	25	1990-2015	87	-18	-40	13		
	10	2005-2015	87	-10	-23	7		
	5	2010-2015	89	-28	-38	-17	>25	
BBS UK	20	1995-2015	1023	17	8	28		
	10	2005-2015	1280	12	5	20		
	5	2010-2015	1341	-7	-13	-1		
BBS England	20	1995-2015	905	10	1	19		
	10	2005-2015	1135	9	3	16		
	5	2010-2015	1193	-9	-13	-4		
BBS Scotland	20	1995-2015	33	63	3	146		
	10	2005-2015	42	37	-2	117		
	5	2010-2015	42	3	-31	68		
BBS Wales	20	1995-2015	65	38	4	92		
	10	2005-2015	77	31	6	68		
	5	2010-2015	80	6	-14	31		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

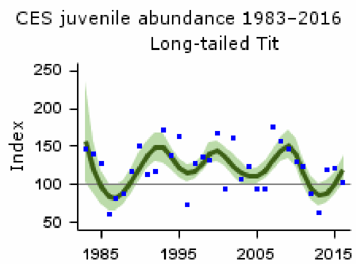
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



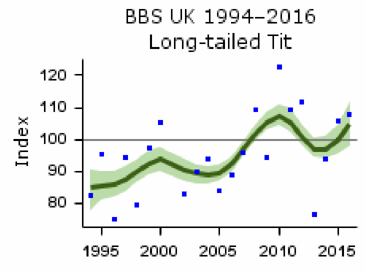
CBC/BBS England graph



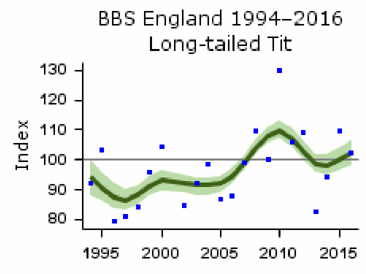
CES adults graph



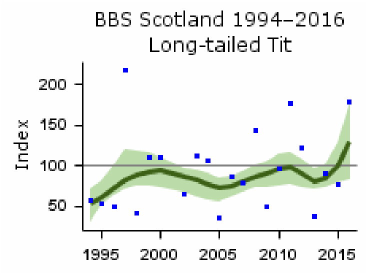
CES juveniles graph



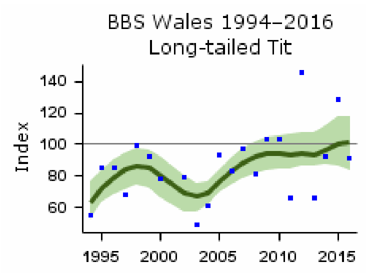
BBS UK graph



BBS England graph

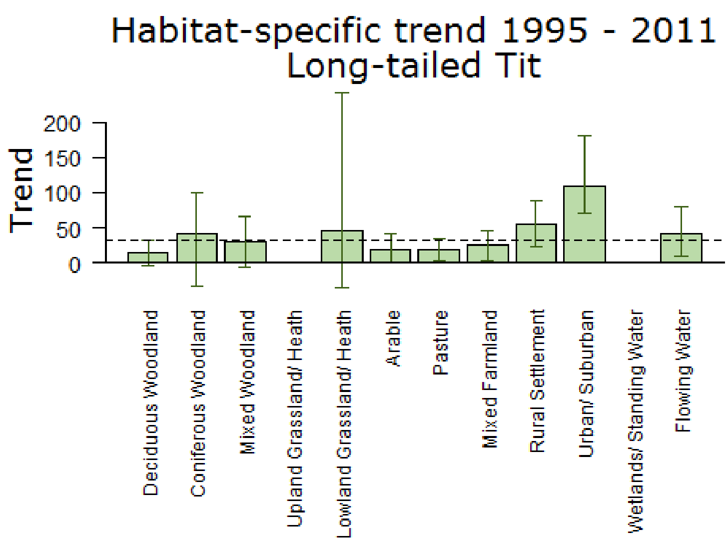


BBS Scotland graph



BBS Wales graph

Population trends by habitat



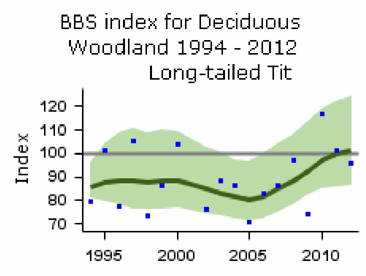
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

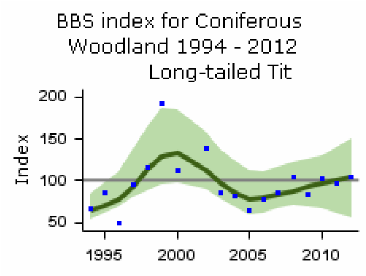
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	257	14	-3	32
Coniferous Woodland	16	1995-2011	33	42	-32	101
Mixed Woodland	16	1995-2011	125	31	-7	66
Lowland Grassland/ Heath	16	1995-2011	30	45	-34	241
Arable	16	1995-2011	190	20	2	42
Pasture	16	1995-2011	337	19	3	35
Mixed Farmland	16	1995-2011	137	26	3	47
Rural Settlement	16	1995-2011	173	54	24	90
Urban/ Suburban	16	1995-2011	111	109	70	180
Flowing Water	16	1995-2011	135	42	9	80

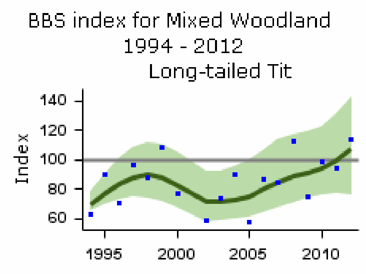
Further information on habitat-specific trends, please follow link here.



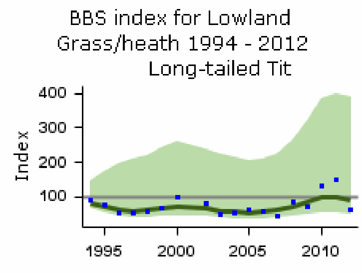
Habitat graph



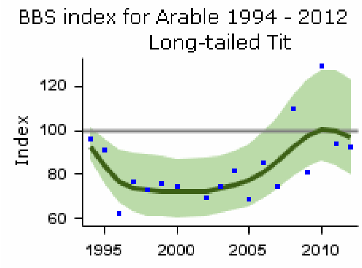
Habitat graph



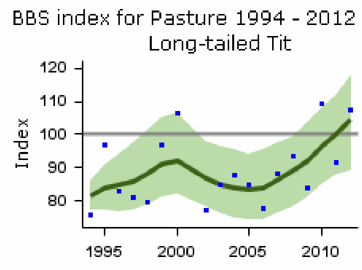
Habitat graph



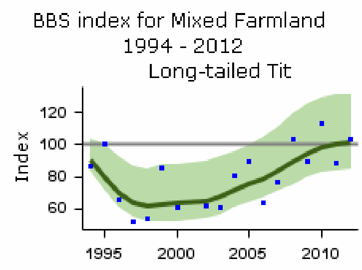
Habitat graph



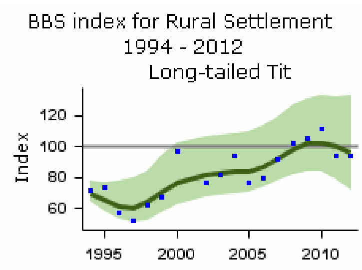
Habitat graph



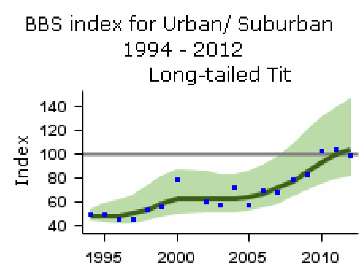
Habitat graph



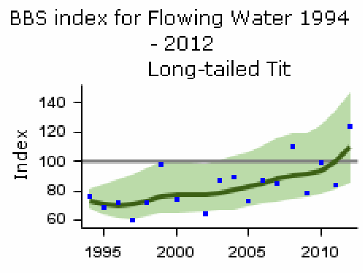
Habitat graph



Habitat graph

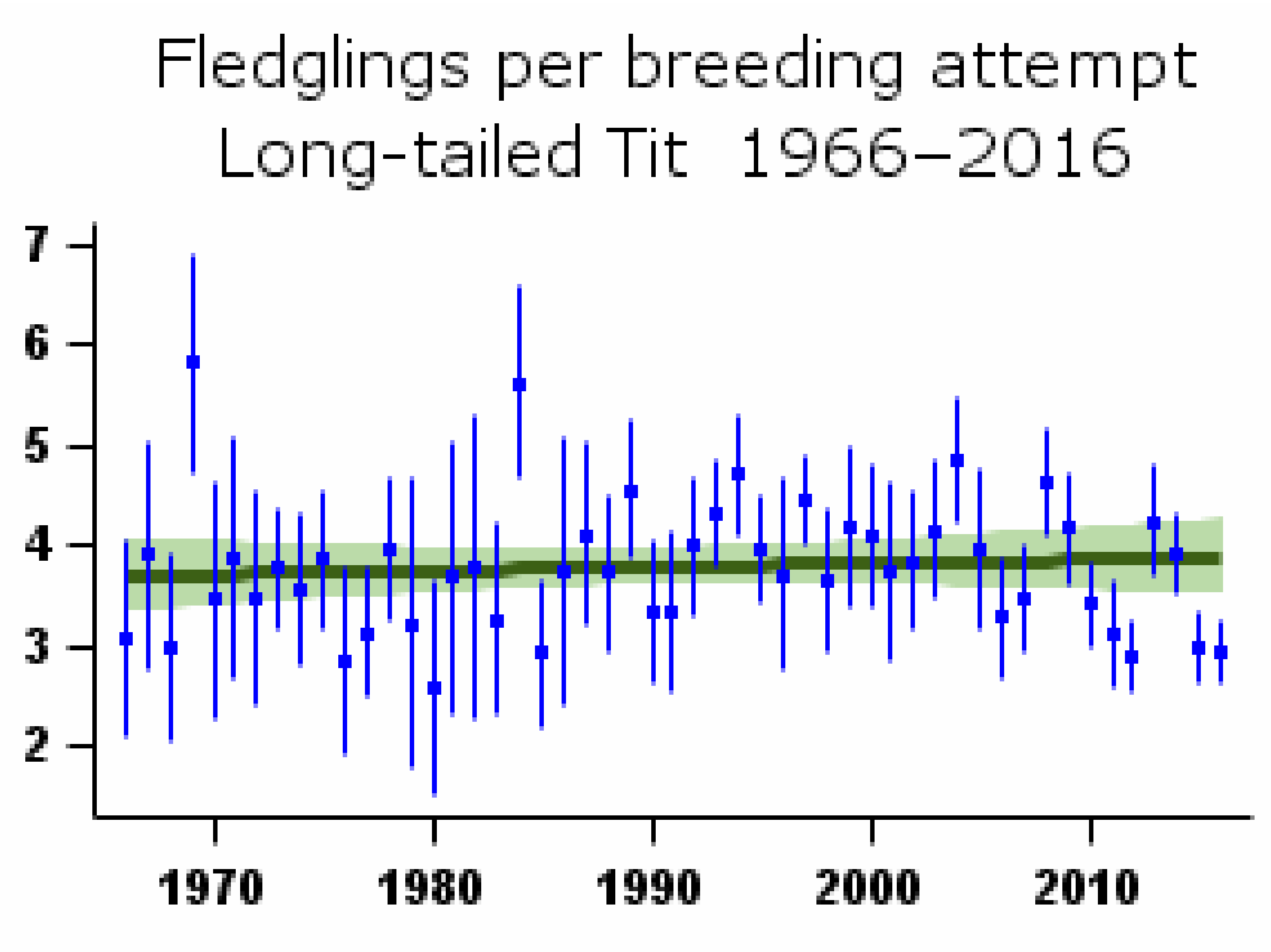


Habitat graph

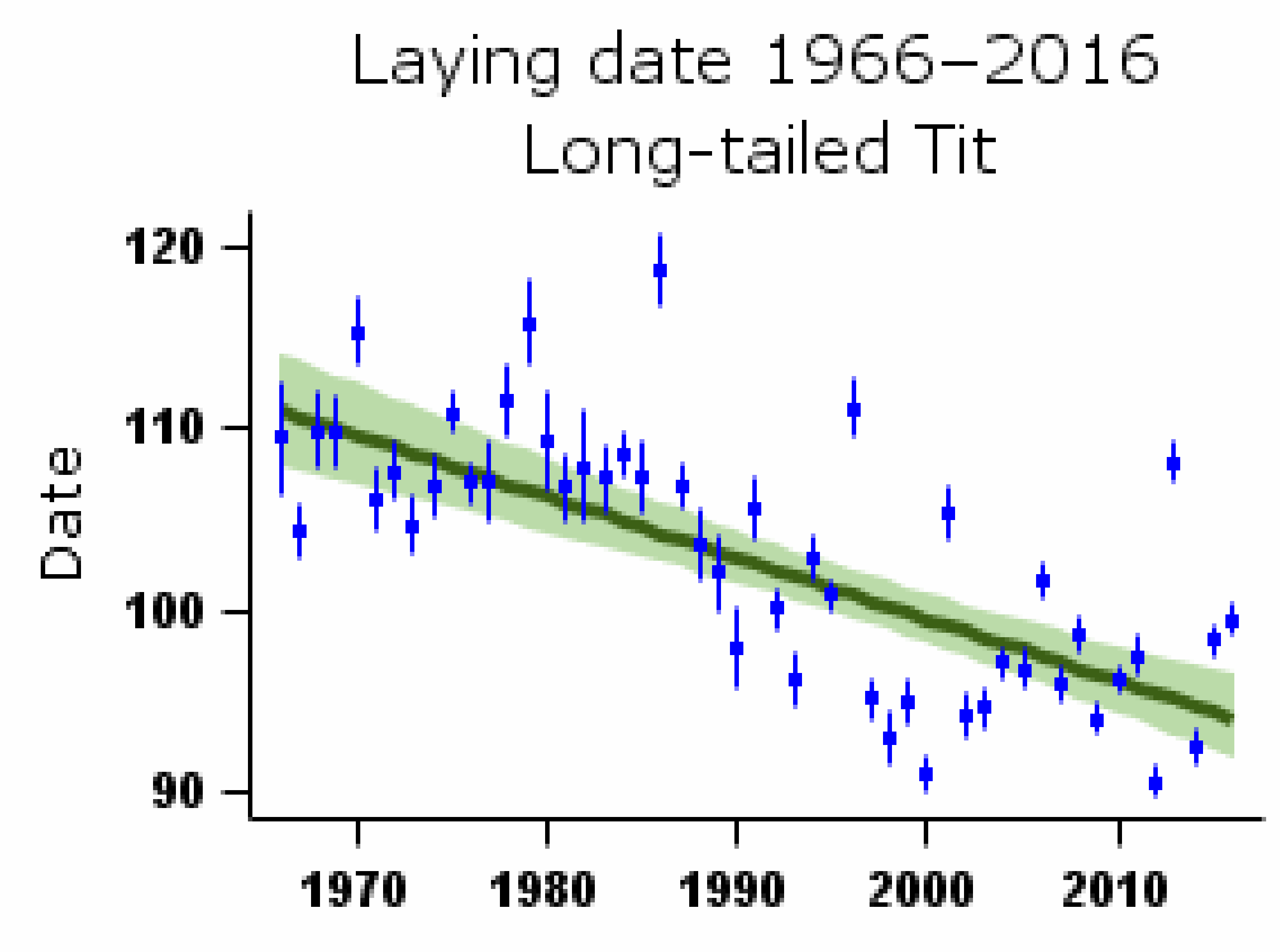


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

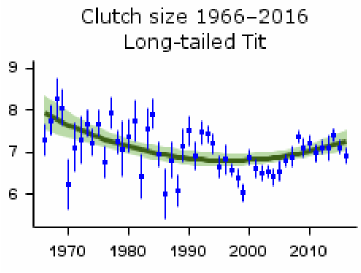


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

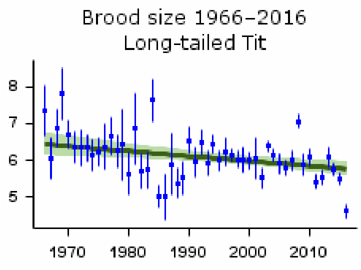
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	36	None					
Clutch size	48	1967-2015	46	Curvilinear	7.85 eggs	7.22 eggs	-8.0%		
Brood size	48	1967-2015	37	Linear decline	6.42 chicks	5.78 chicks	-9.9%		
Nest failure rate at egg stage	48	1967-2015	64	Curvilinear	3.91% nests/day	1.21% nests/day	-69.1%		
Nest failure rate at chick stage	48	1967-2015	43	Linear increase	0.76% nests/day	2.08% nests/day	173.7%		
Laying date	48	1967-2015	57	Linear decline	Apr 21	Apr 4	-17 days		
Juvenile to Adult ratio (CES)	31	1984-2015	89	Smoothed trend	132 Index value	100 Index value	-24%		
Juvenile to Adult ratio (CES)	25	1990-2015	100	Smoothed trend	103 Index value	100 Index value	-3%		
Juvenile to Adult ratio (CES)	10	2005-2015	101	Smoothed trend	105 Index value	100 Index value	-4%		
Juvenile to Adult ratio (CES)	5	2010-2015	105	Smoothed trend	117 Index value	100 Index value	-15%		

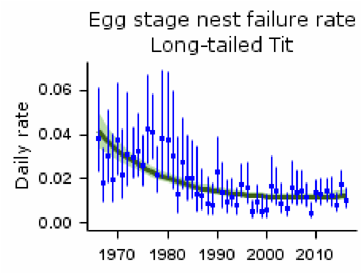
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



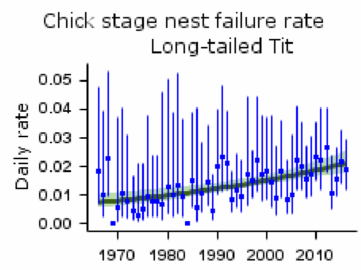
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



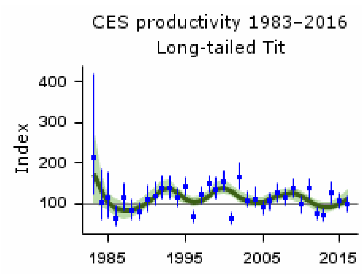
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



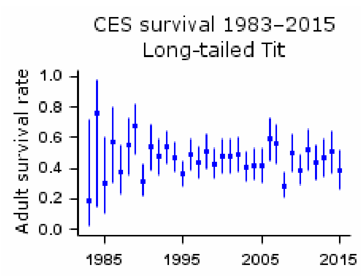
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Wood Warbler

Phylloscopus sibilatrix

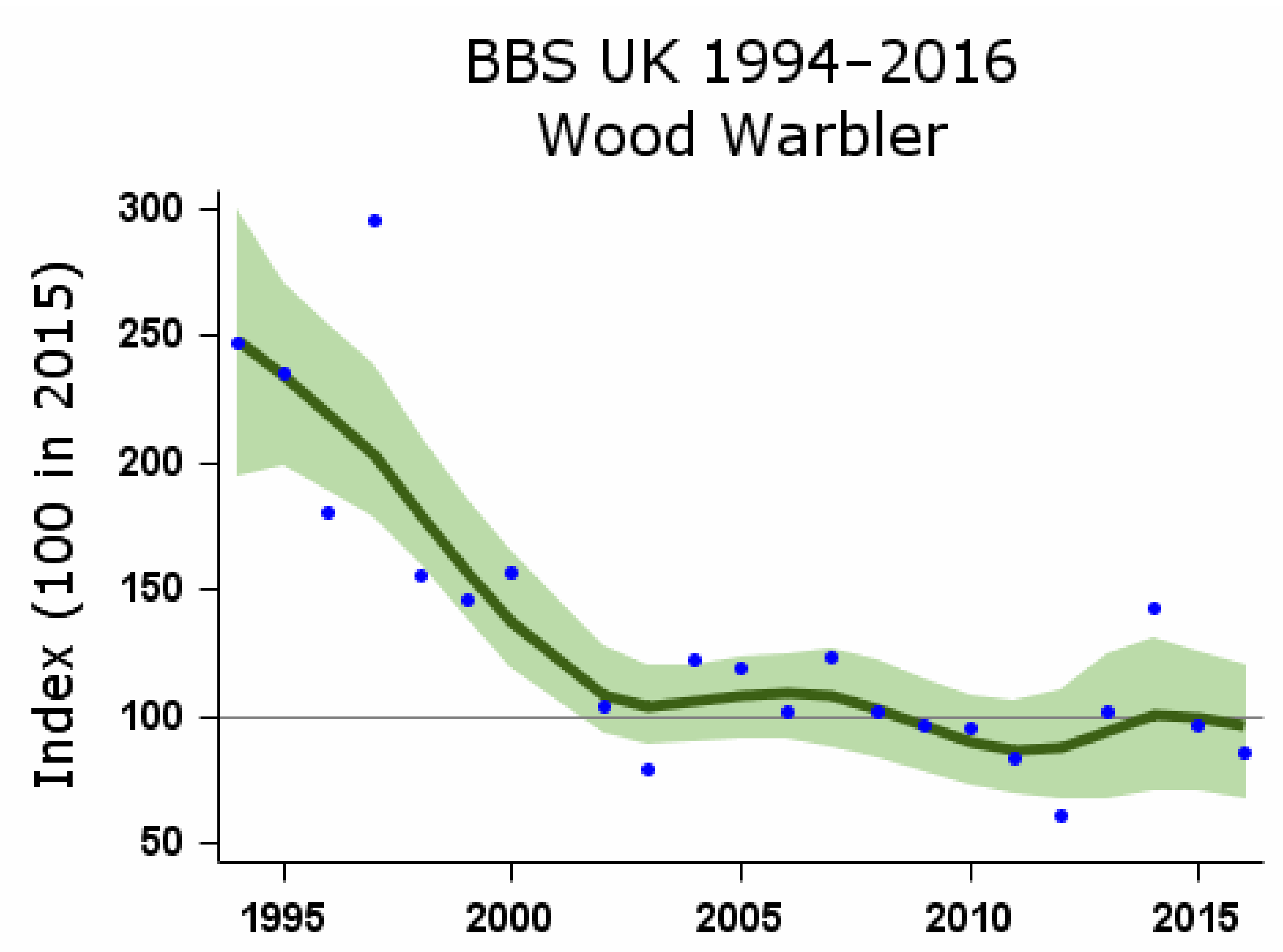
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: decline
Population size:	6,500 (5,900-7,000) males in 2009 (APEP13: 1984-85 estimate (Bibby 1989) updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Wood Warblers, which have a westerly distribution in Britain, were monitored relatively poorly until BBS began. Little change was evident at the few CBC plots on which the species occurred (Marchant et al. 1990). The species' breeding range varied little between the first two atlas periods (Gibbonset al. 1993), but has subsequently withdrawn from large areas of lowland England (Balmer et al. 2013). BBS shows a rapid and significant decline since 1994, and accordingly the species was moved from the green to the amber list in 2002; the continued decline warranted a further shift to the red list in 2009. With declines evident across northern and western Europe, this previously 'secure' species is now provisionally categorised as 'declining' (BirdLife International 2004). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



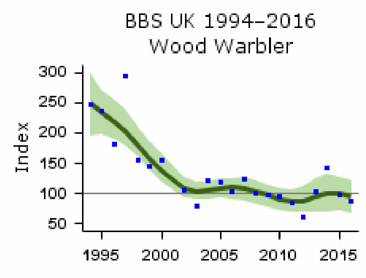
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	53	-57	-75	-30	>50	
	10	2005-2015	53	-8	-40	36		
	5	2010-2015	50	11	-27	52		

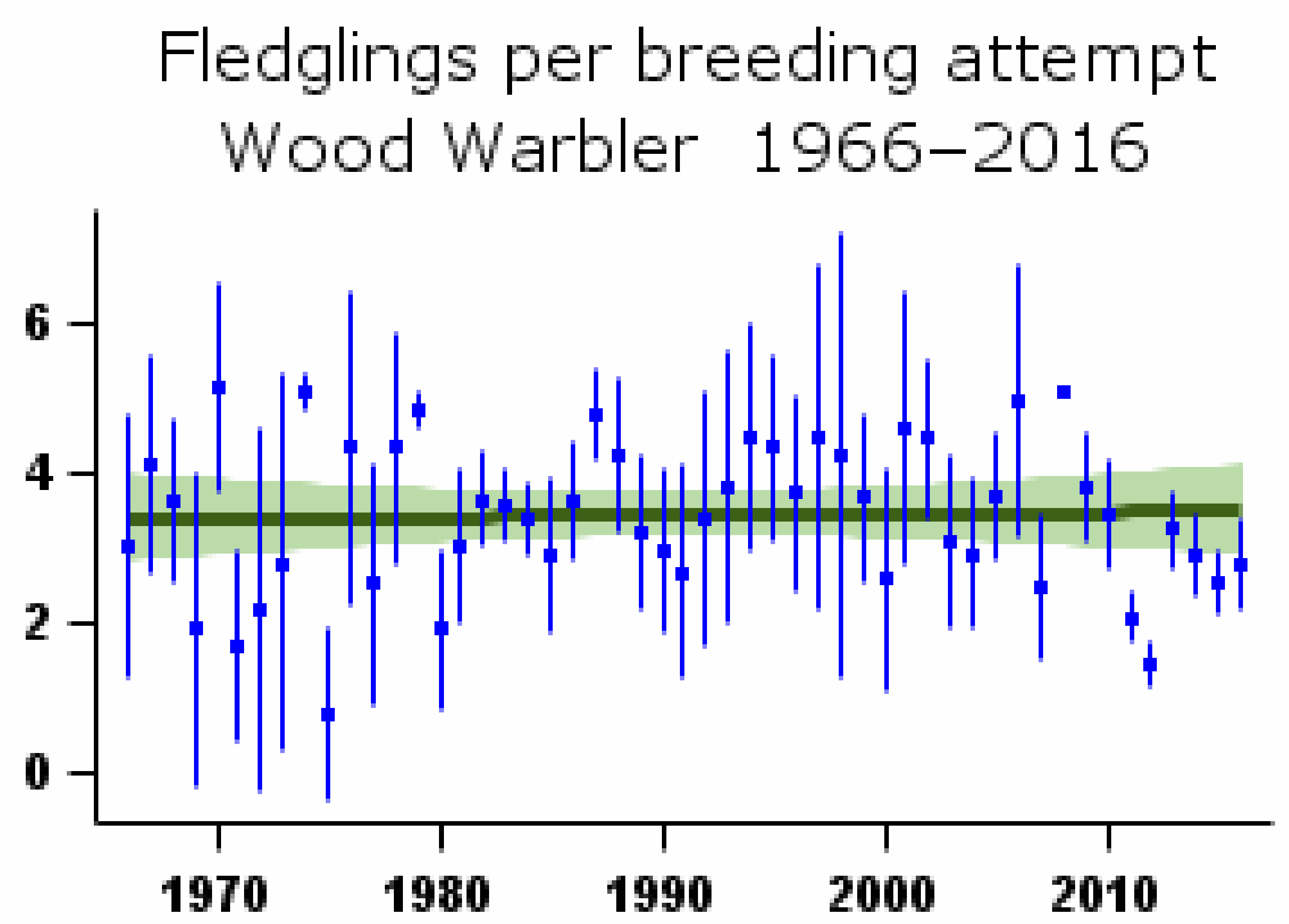
Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

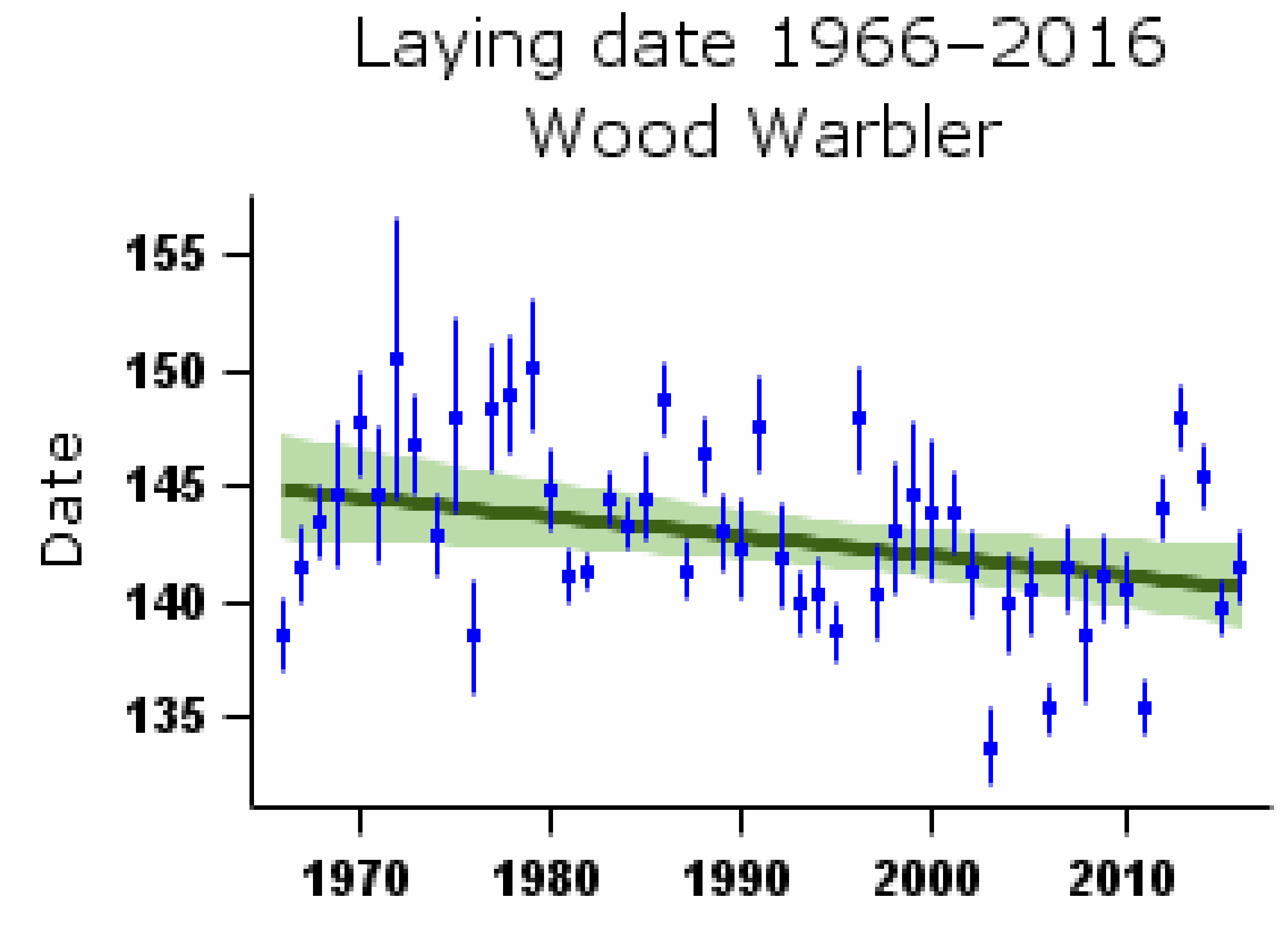


BBS UK graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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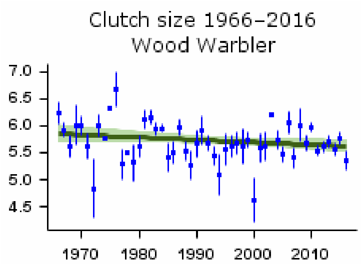
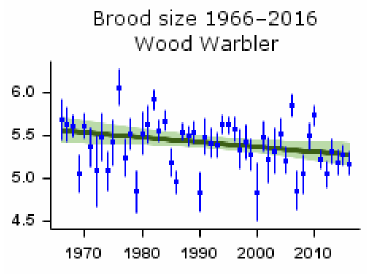
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	26	None					
Clutch size	48	1967-2015	22	None					Small sample
Brood size	48	1967-2015	41	Linear decline	5.55 chicks	5.28 chicks	-4.8%		
Nest failure rate at egg stage	48	1967-2015	26	Curvilinear	2.39% nests/day	1.43% nests/day	-40.2%		Small sample
Nest failure rate at chick stage	48	1967-2015	33	Curvilinear	2.36% nests/day	4.52% nests/day	91.5%		
Laying date	48	1967-2015	38	Linear decline	May 25	May 21	-4 days		

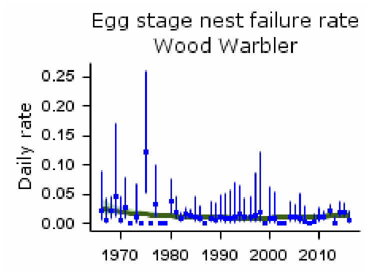
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



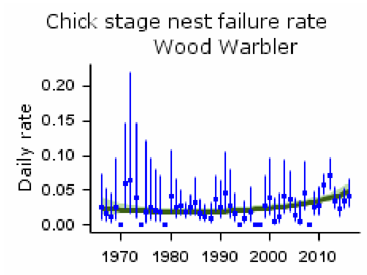
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is little evidence explaining either the demographic or ecological drivers of the decline in this species and the causes are largely unknown.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

There is little evidence regarding any demographic causes of the decline of this species. Nest failures now seem more likely to occur at the chick stage, although nest record samples are small. There has been no trend in the number of fledglings per breeding attempt.

Bibby (1989) postulated that soils, climate, competition or predator numbers have probably had an effect on Wood Warbler numbers but provided no evidence in support. Smart et al. (2007) state that the loss of oak trees, the decrease in canopy cover, and the large increases in understorey cover could have been particularly detrimental for Wood Warbler, but again, direct evidence to validate this is largely lacking, and Mallord et al. (2016) found no evidence that changes in woodland structure affected populations in their study areas in the west of the UK. Smart et al. (2007) and Amar et al. (2006) did find that Wood Warblers have tended to decrease more in woods with fewer dead limbs on trees and at sites surrounded by more woodland, which suggests that changes in dead wood could be important or that dead limbs could be a surrogate for other changes in habitat, although Smart et al. (2007) found an overall increase in the amount of dead wood, which should have been beneficial for this species. In another Welsh study, Mallord et al. (2012b) found that Wood Warblers were associated with a number of structural features of the study woods, which could relate to their past management; they suggest that management should aim to restore habitat quality through introducing a moderate grazing regime.

Studies in Poland, where an average of over 70% of nests were lost and predators were responsible for over 80% of the losses, have reported that varying predation rates were a main factor responsible for variation in production between years and habitats (Wesolowski 1985). Wesolowski & Maziarz (2009) provided further evidence relating to this, finding that both Wood Warbler numbers and ratios of their change were significantly negatively correlated with rodent numbers. However, the authors state that, since Wood Warblers simply don't settle in areas with high rodent outbreaks, the changes probably reflect changes in distribution rather than overall trends. In Wales, nest predators during 2009-11 were mainly avian and rates of predation did not appear to have changed since 1982-84 (Mallord et al. 2012a). This species is a long-distance migrant and therefore changes outside the breeding grounds cannot be ruled out.

Mismatch between timing of breeding and the seasonal peaks of caterpillar abundance is potentially not a serious problem for Wood Warblers, because of their ability to feed their young successfully on flying insects and spiders (Mallord et al. 2017).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Chiffchaff

Phylloscopus collybita

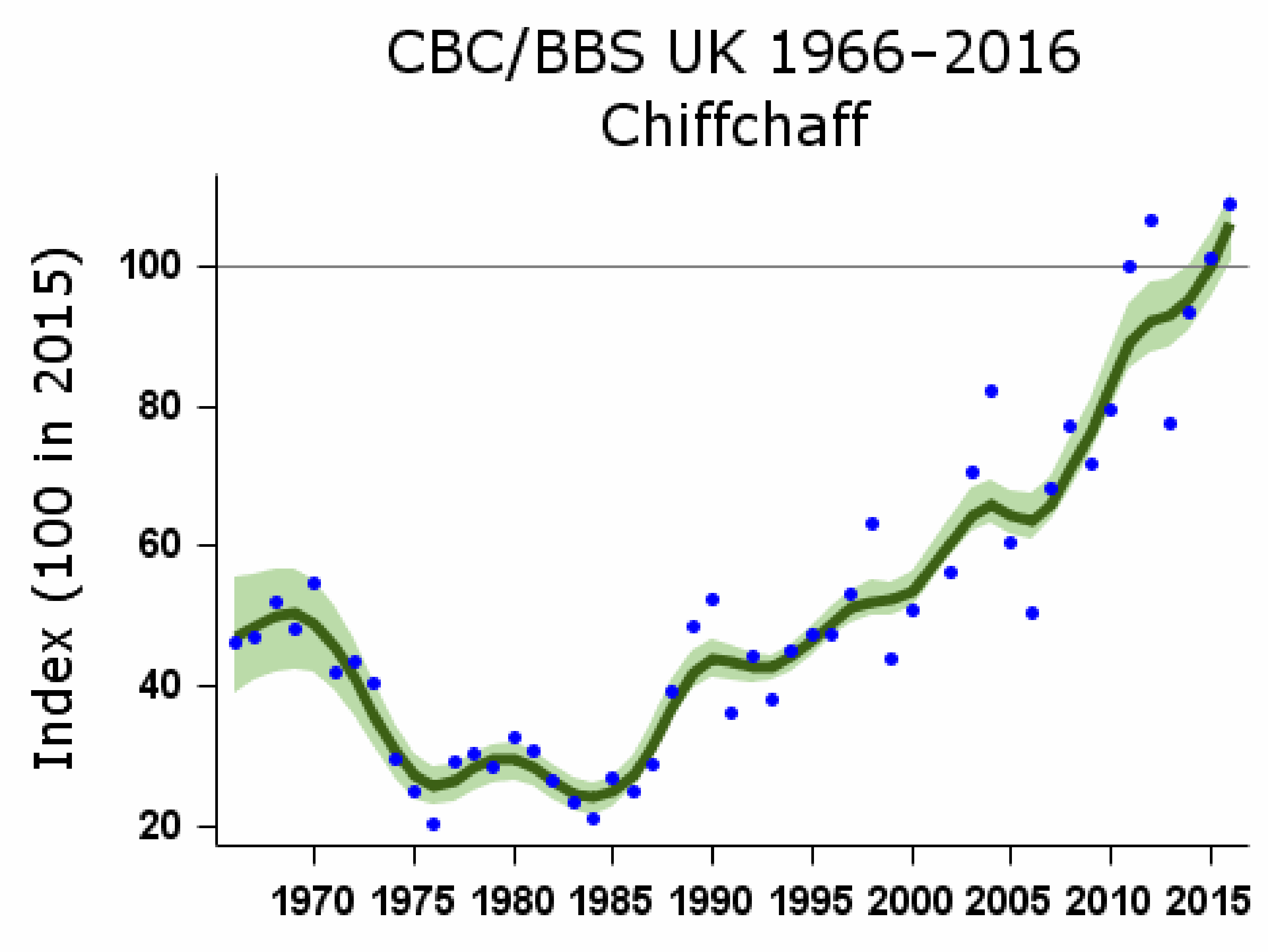
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	1.2 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Chiffchaff abundance declined in the late 1960s/early 1970s in common with that of other trans-Saharan warblers (Siriwardena et al. 1998a). After remaining stable for a decade, the population recovered strongly, and has continued to increase. This recovery is evident from both CBC/BBS and CES data. The BBS Crick & Sparks 1999), which is in line with an advance of two weeks in the arrival dates of Chiffchaff in the UK, between the 1960s and 2000s (Newson et al. 2016).

Overwinter survival may be the critical factor responsible for changes in abundance, as it is for Johnston et al. 2016). Productivity as measured by CES has decreased as the population has risen, but there has been no change in fledglings per breeding attempt or in CES survival. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

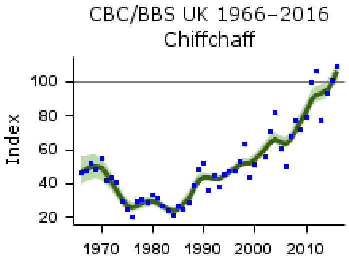
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	792	105	68	162		
	25	1990-2015	1410	127	106	149		
	10	2005-2015	2093	56	49	59		
	5	2010-2015	2303	20	17	23		

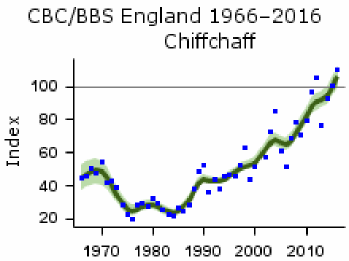
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	670	112	70	176		
	25	1990-2015	1188	128	106	150		
	10	2005-2015	1752	52	46	56		
	5	2010-2015	1921	21	18	24		
CES adults	31	1984-2015	77	308	191	620		
	25	1990-2015	86	109	62	231		
	10	2005-2015	96	51	37	69		
	5	2010-2015	103	22	12	32		
CES juveniles	31	1984-2015	87	305	135	714		
	25	1990-2015	97	91	36	217		
	10	2005-2015	103	50	36	67		
	5	2010-2015	111	-1	-12	9		
BBS UK	20	1995-2015	1646	109	98	121		
	10	2005-2015	2093	56	48	59		
	5	2010-2015	2303	21	17	22		
BBS England	20	1995-2015	1381	111	101	123		
	10	2005-2015	1752	52	46	57		
	5	2010-2015	1921	22	18	24		
BBS Scotland	20	1995-2015	64	648	426	1147		
	10	2005-2015	95	154	93	236		
	5	2010-2015	115	71	47	100		
BBS Wales	20	1995-2015	153	67	42	94		
	10	2005-2015	185	45	29	59		
	5	2010-2015	200	8	-1	13		
BBS N.Ireland	20	1995-2015	36	18	-21	36		
	10	2005-2015	45	54	18	95		
	5	2010-2015	50	-15	-33	4		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

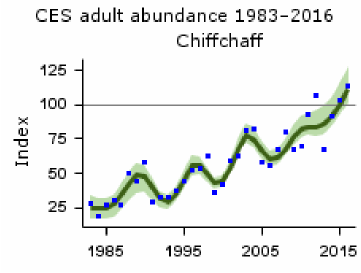
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



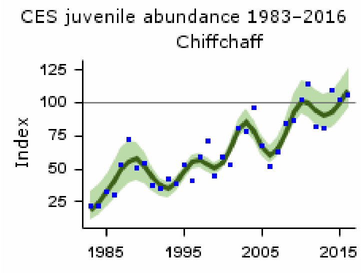
CBC/BBS UK graph



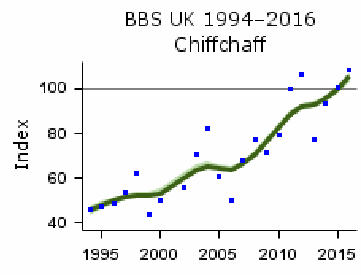
CBC/BBS England graph



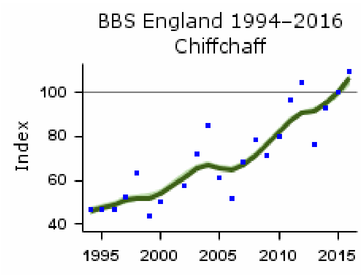
CES adults graph



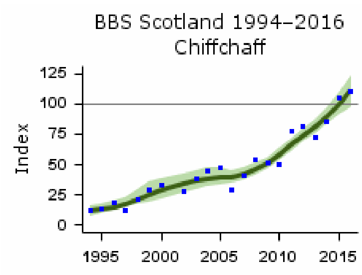
CES juveniles graph



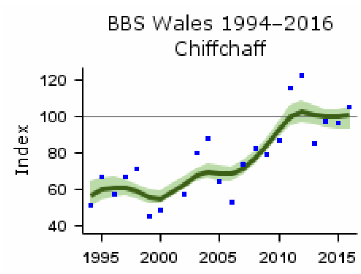
BBS UK graph



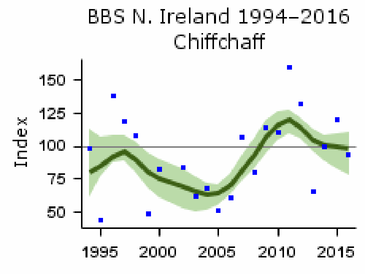
BBS England graph



BBS Scotland graph

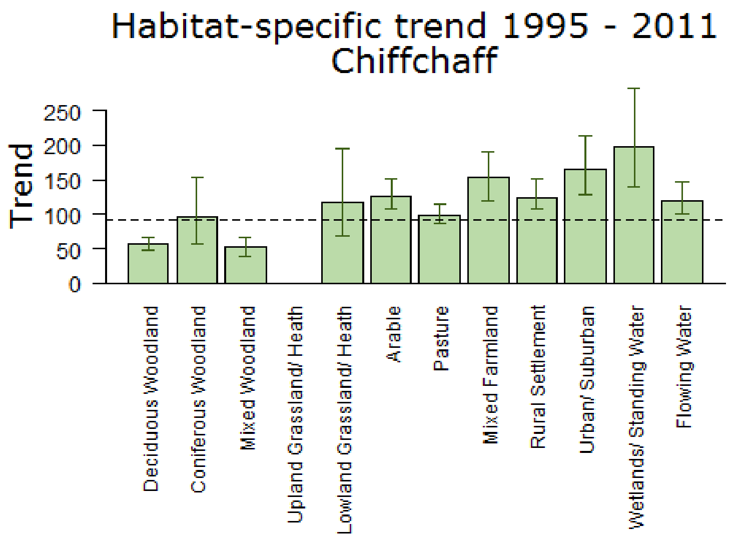


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



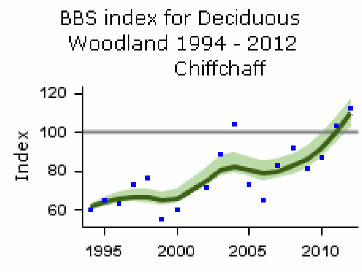
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

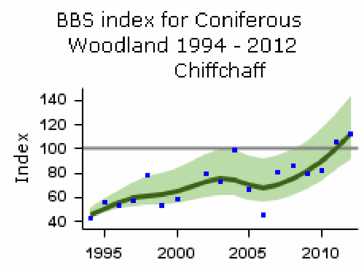
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	601	56	47	67
Coniferous Woodland	16	1995-2011	106	96	56	154
Mixed Woodland	16	1995-2011	319	53	38	67
Lowland Grassland/ Heath	16	1995-2011	77	117	67	196
Arable	16	1995-2011	372	127	107	151
Pasture	16	1995-2011	691	99	88	114
Mixed Farmland	16	1995-2011	296	154	120	190
Rural Settlement	16	1995-2011	401	125	107	152
Urban/ Suburban	16	1995-2011	178	166	129	214
Wetlands/ Standing Water	16	1995-2011	56	198	141	283
Flowing Water	16	1995-2011	265	120	101	148

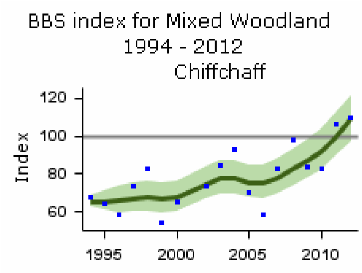
Further information on habitat-specific trends, please follow link here.



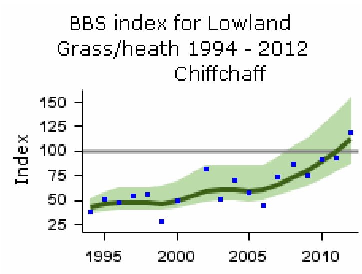
Habitat graph



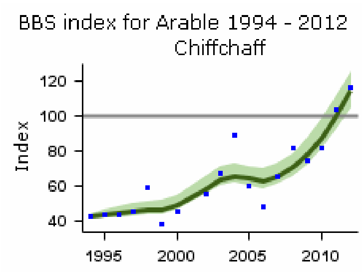
Habitat graph



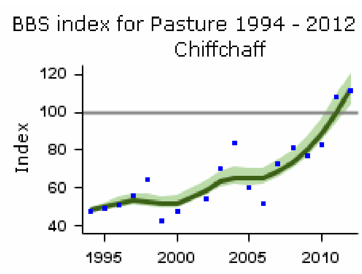
Habitat graph



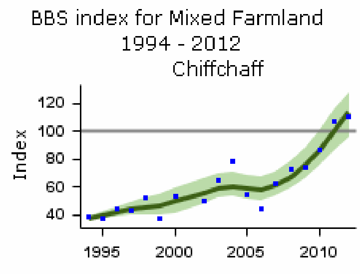
Habitat graph



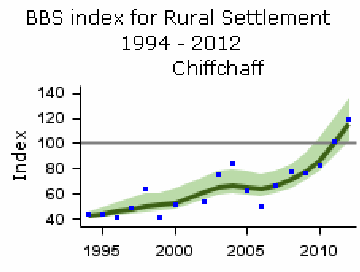
Habitat graph



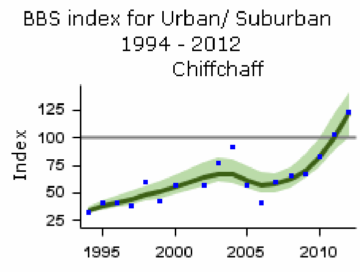
Habitat graph



Habitat graph



Habitat graph



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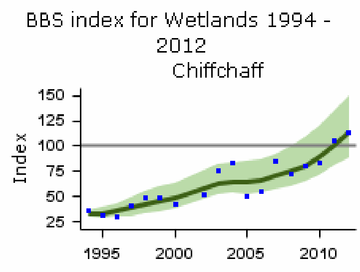
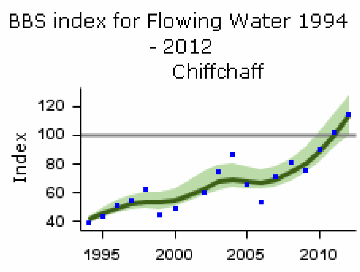
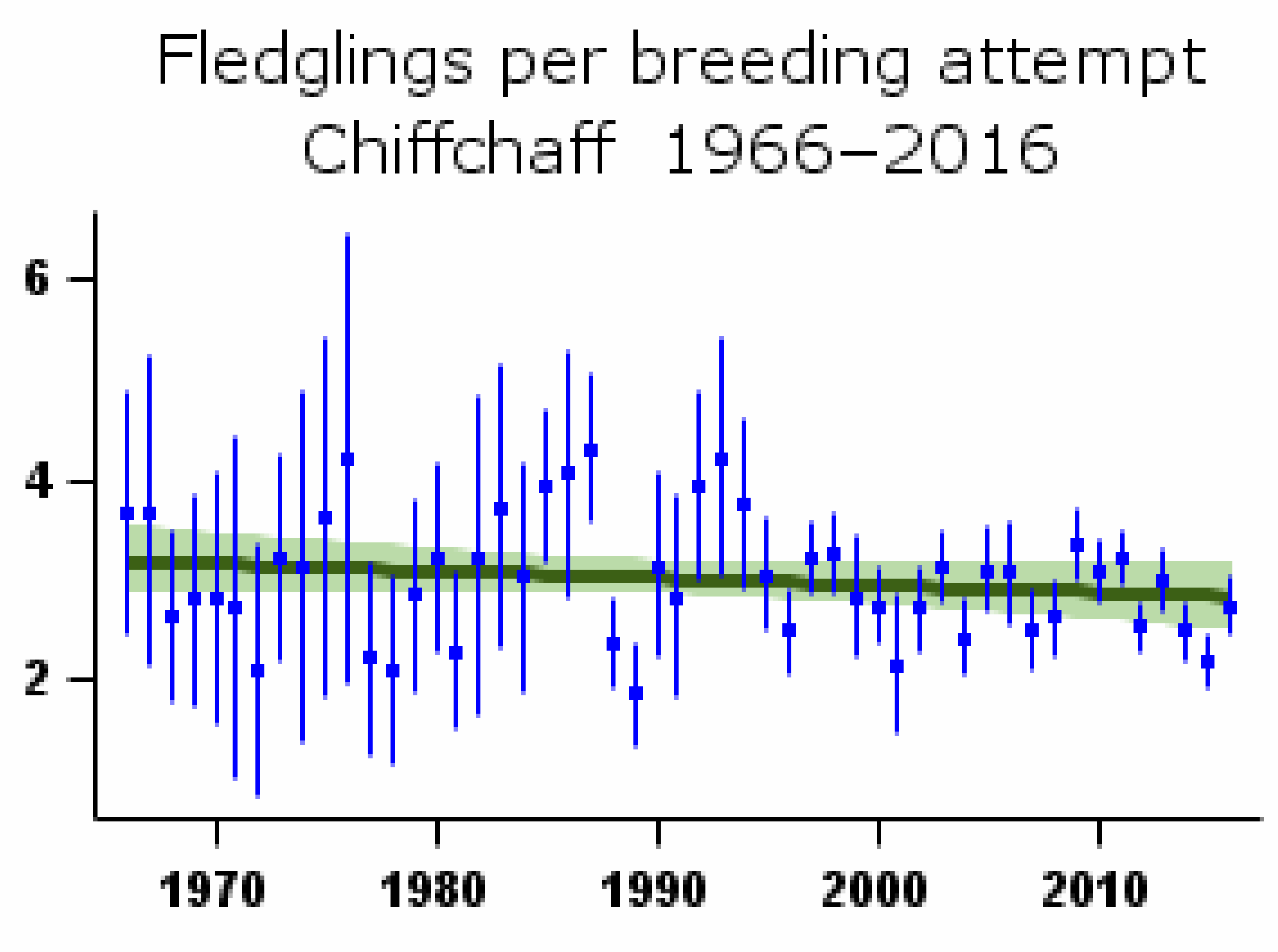


Habitat graph

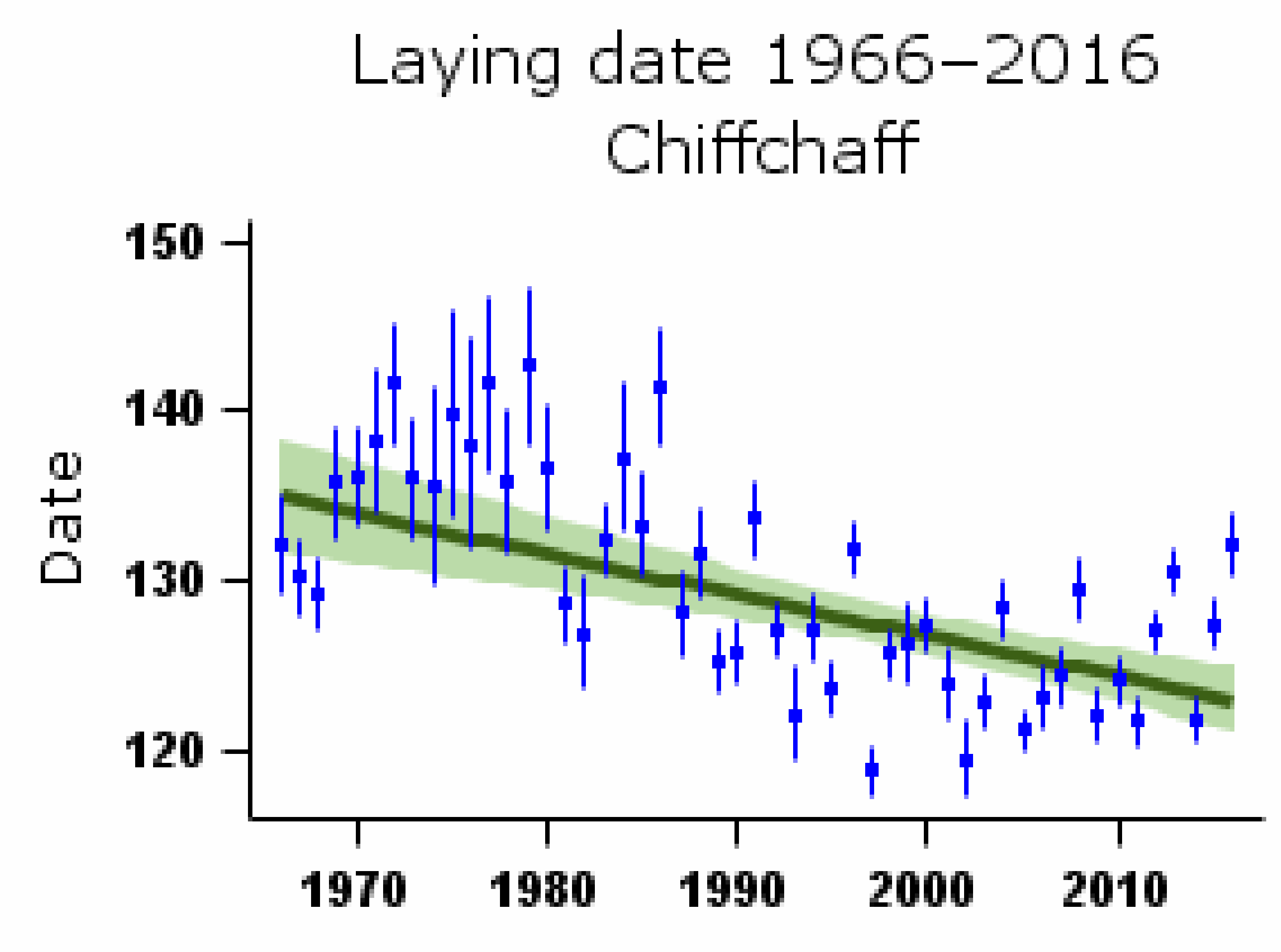


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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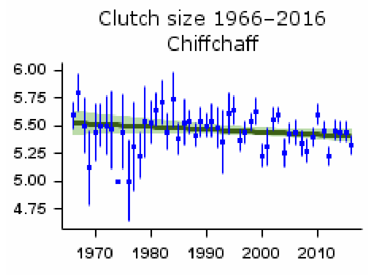
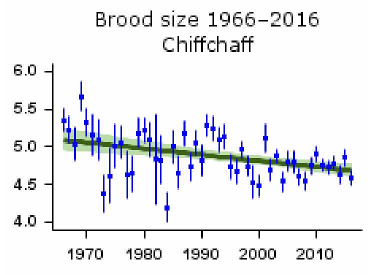
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	46	None					
Clutch size	48	1967-2015	44	None					
Brood size	48	1967-2015	50	Linear decline	5.08 chicks	4.69 chicks	-7.7%		
Nest failure rate at egg stage	48	1967-2015	55	Curvilinear	2.20% nests/day	2.12% nests/day	-3.6%		
Nest failure rate at chick stage	48	1967-2015	49	None					
Laying date	48	1967-2015	64	Linear decline	May 15	May 3	-12 days		
Juvenile to Adult ratio (CES)	31	1984-2015	93	Smoothed trend	119 Index value	100 Index value	-16%		
Juvenile to Adult ratio (CES)	25	1990-2015	103	Smoothed trend	134 Index value	100 Index value	-25%		
Juvenile to Adult ratio (CES)	10	2005-2015	107	Smoothed trend	92 Index value	100 Index value	9%		
Juvenile to Adult ratio (CES)	5	2010-2015	114	Smoothed trend	124 Index value	100 Index value	-20%		

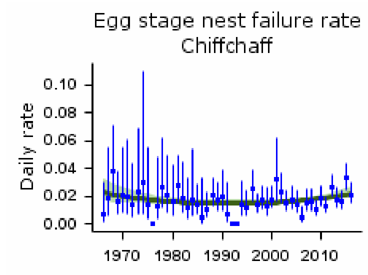
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



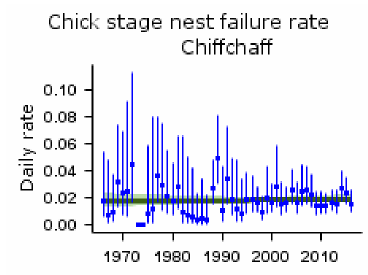
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



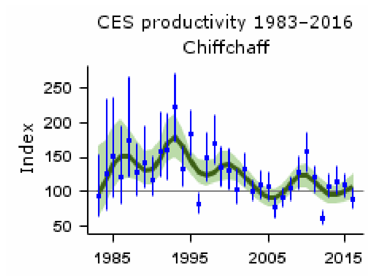
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



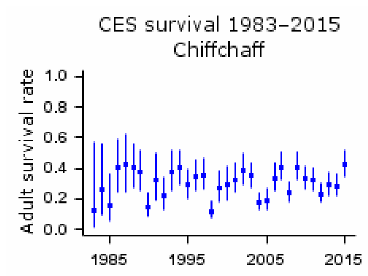
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Willow Warbler

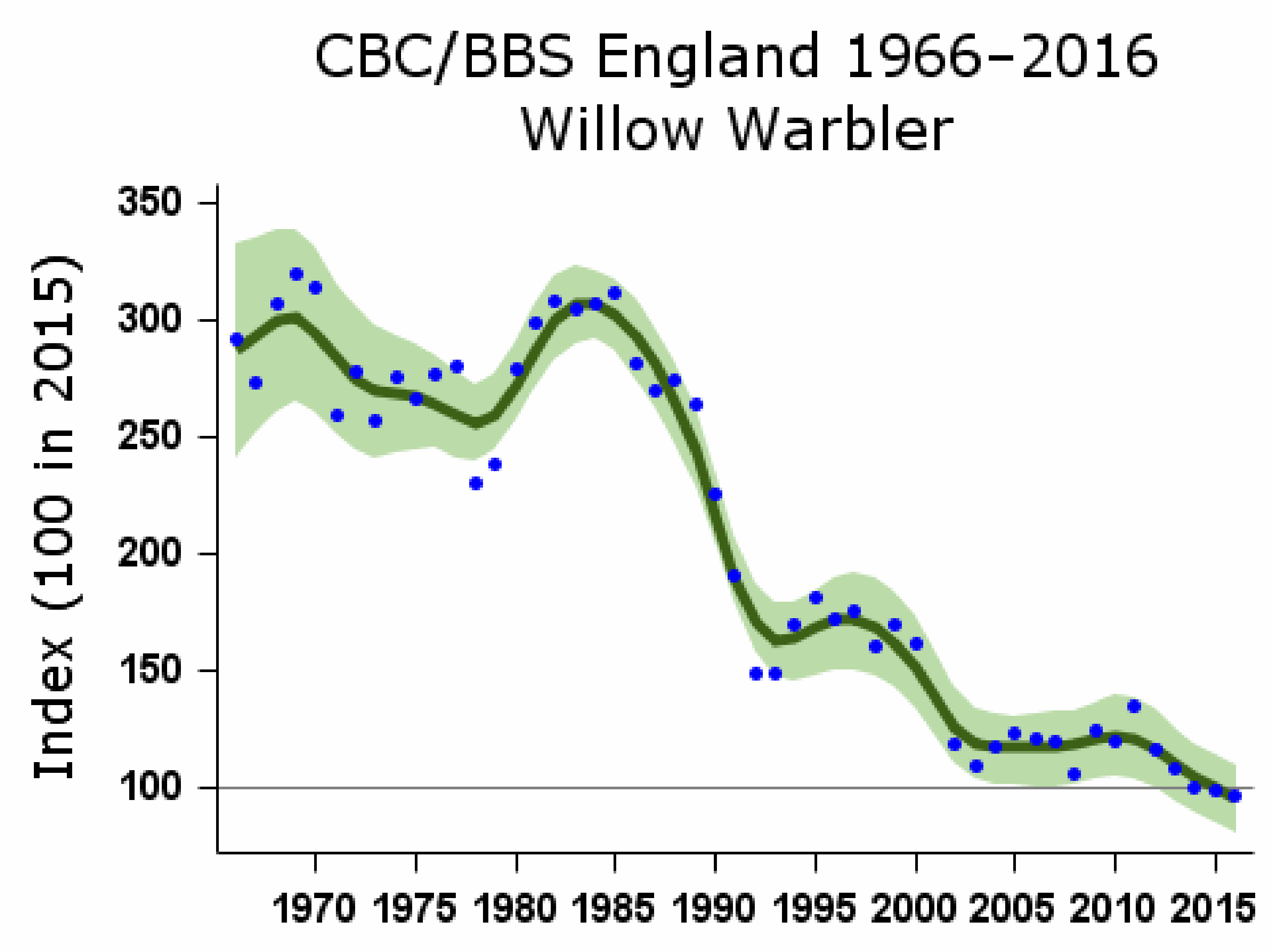
Phylloscopus trochilus

Key facts

Conservation listings:	Global: amber (breeding population decline); at race level, trochilus amber, acredula green
Long-term trend:	England: rapid decline
Population size:	2.4 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Willow Warbler abundance has shown regionally different trends within the UK (Morrison et al. 2010, 2013a, 2015, 2016c, Massimino et al. 2013, Balmer et al. 2013). The overall CBC/BBS trend shows a rapid decline during the 1980s and early 1990s, after 20 years of relative stability, and, on the strength of a 31% decline on CBC plots between 1974 and 1999, the species was moved from the green to the amber list. This decline occurred mainly in southern Britain, however, accompanied by a fall in survival rates there (Peach et al. 1995a), with Scottish populations remaining unaffected. The differing regional trends have been linked to differences in productivity (Morrison et al. 2016c). BBS figures since 1994 indicate a contrast between an upward trend in Scotland and in Northern Ireland, and continued severe decreases in England, with no overall trend in Wales. The BBS PECBMS 2016a; see also Lehikoinen et al. 2014).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	525	-66	-75	-54	>50	
	25	1990-2015	856	-54	-62	-48	>50	
	10	2005-2015	1046	-15	-21	-8		
	5	2010-2015	1038	-18	-23	-14		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CES adults	31	1984-2015	89	-74	-80	-68	>50	
	25	1990-2015	95	-70	-75	-65	>50	
	10	2005-2015	88	-27	-35	-21	>25	
	5	2010-2015	91	-17	-25	-9		
CES juveniles	31	1984-2015	94	-81	-86	-75	>50	
	25	1990-2015	102	-76	-81	-70	>50	
	10	2005-2015	98	-28	-38	-18	>25	
	5	2010-2015	104	-27	-38	-17	>25	
BBS UK	20	1995-2015	1443	-11	-19	-4		
	10	2005-2015	1605	5	0	11		
	5	2010-2015	1610	-12	-16	-9		
BBS England	20	1995-2015	958	-43	-49	-37	>25	
	10	2005-2015	1046	-15	-21	-8		
	5	2010-2015	1038	-18	-23	-14		
BBS Scotland	20	1995-2015	231	19	4	33		
	10	2005-2015	273	10	1	21		
	5	2010-2015	281	-9	-15	-3		
BBS Wales	20	1995-2015	169	-12	-24	0		
	10	2005-2015	188	20	6	34		
	5	2010-2015	195	-11	-18	-4		
BBS N.Ireland	20	1995-2015	82	72	32	90		
	10	2005-2015	95	31	18	48		
	5	2010-2015	94	-12	-19	-9		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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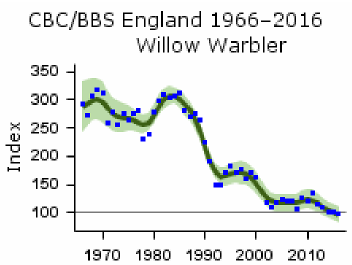
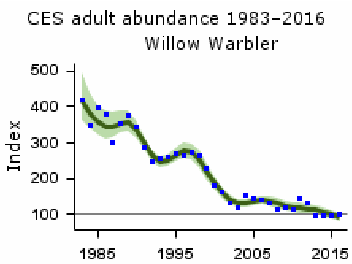
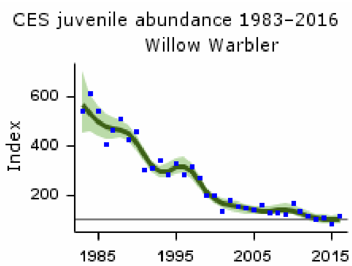


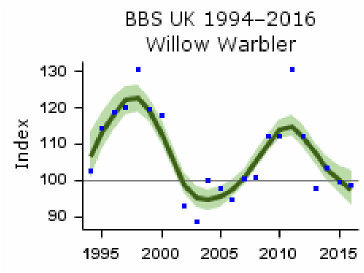
CBC/BBS England graph



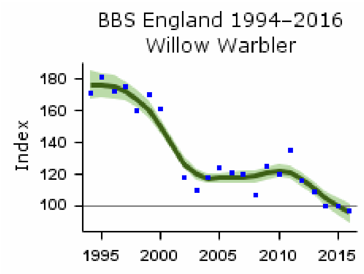
CES adults graph



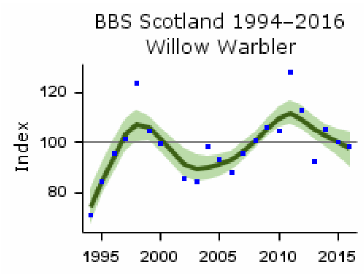
CES juveniles graph



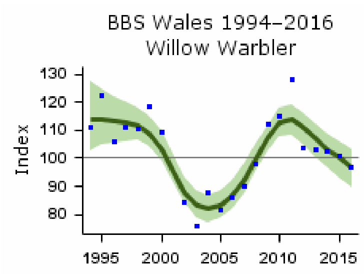
BBS UK graph



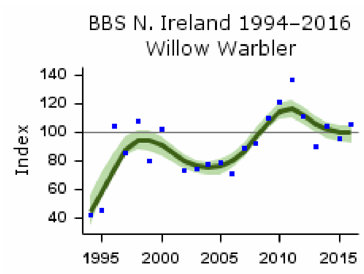
BBS England graph



BBS Scotland graph

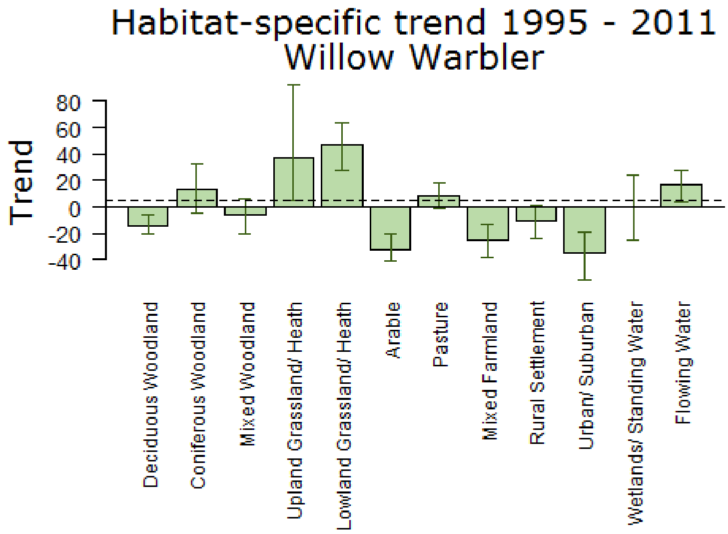


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



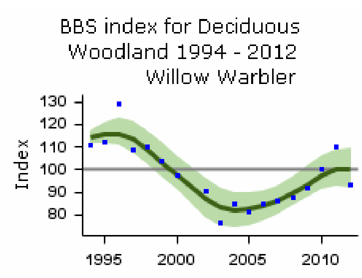
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

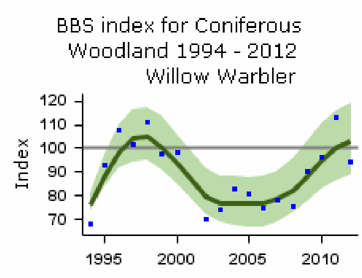
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	448	-14	-20	-6
Coniferous Woodland	16	1995-2011	185	13	-4	33
Mixed Woodland	16	1995-2011	260	-5	-20	6
Upland Grassland/ Heath	16	1995-2011	57	38	5	92
Lowland Grassland/ Heath	16	1995-2011	166	46	28	63
Arable	16	1995-2011	254	-32	-41	-20
Pasture	16	1995-2011	651	8	-1	18
Mixed Farmland	16	1995-2011	206	-25	-39	-14
Rural Settlement	16	1995-2011	294	-11	-23	1
Urban/ Suburban	16	1995-2011	110	-35	-55	-19
Wetlands/ Standing Water	16	1995-2011	61	1	-26	24
Flowing Water	16	1995-2011	273	17	4	27

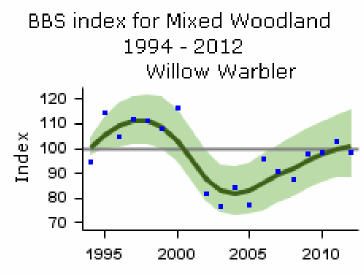
Further information on habitat-specific trends, please follow link here.



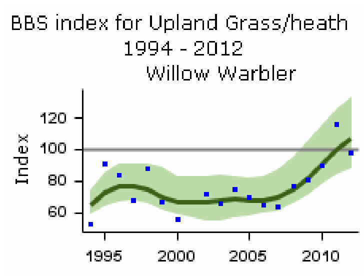
Habitat graph



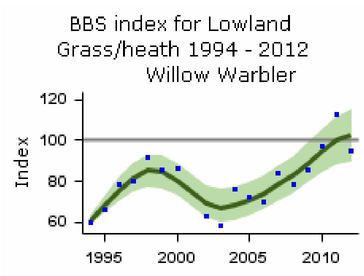
Habitat graph



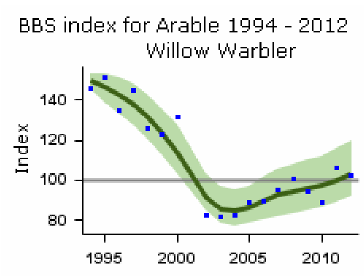
Habitat graph



Habitat graph



Habitat graph



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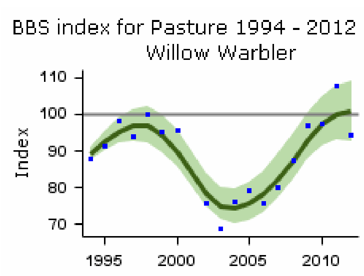

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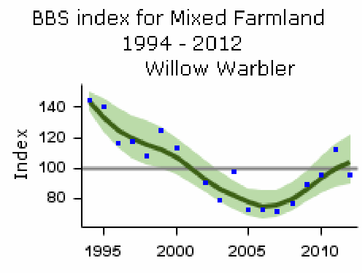

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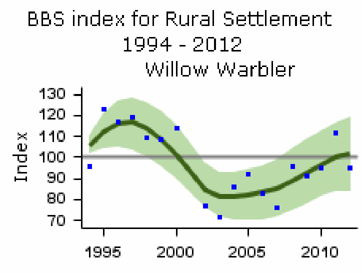

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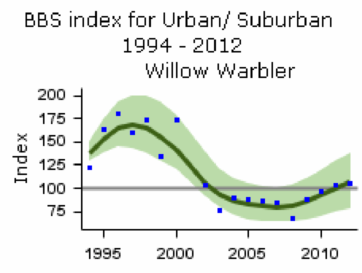
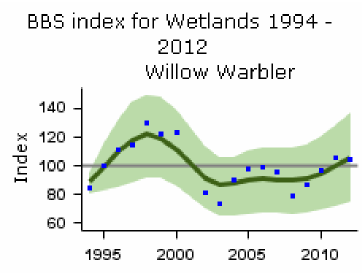
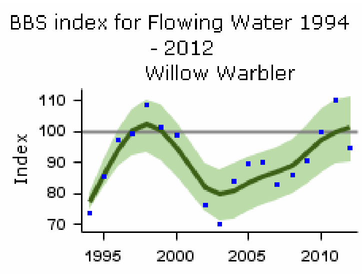


Habitat graph

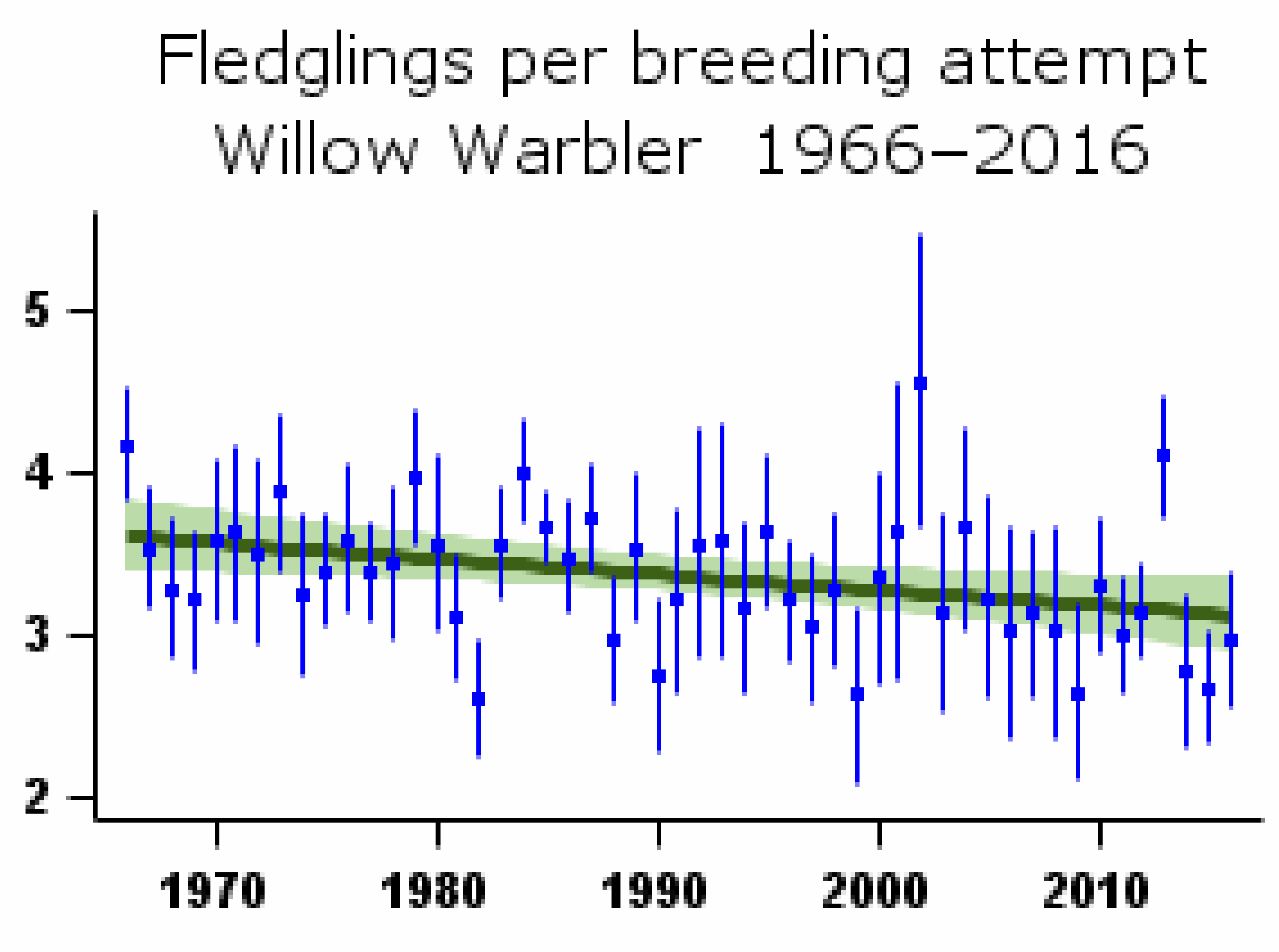


Habitat graph

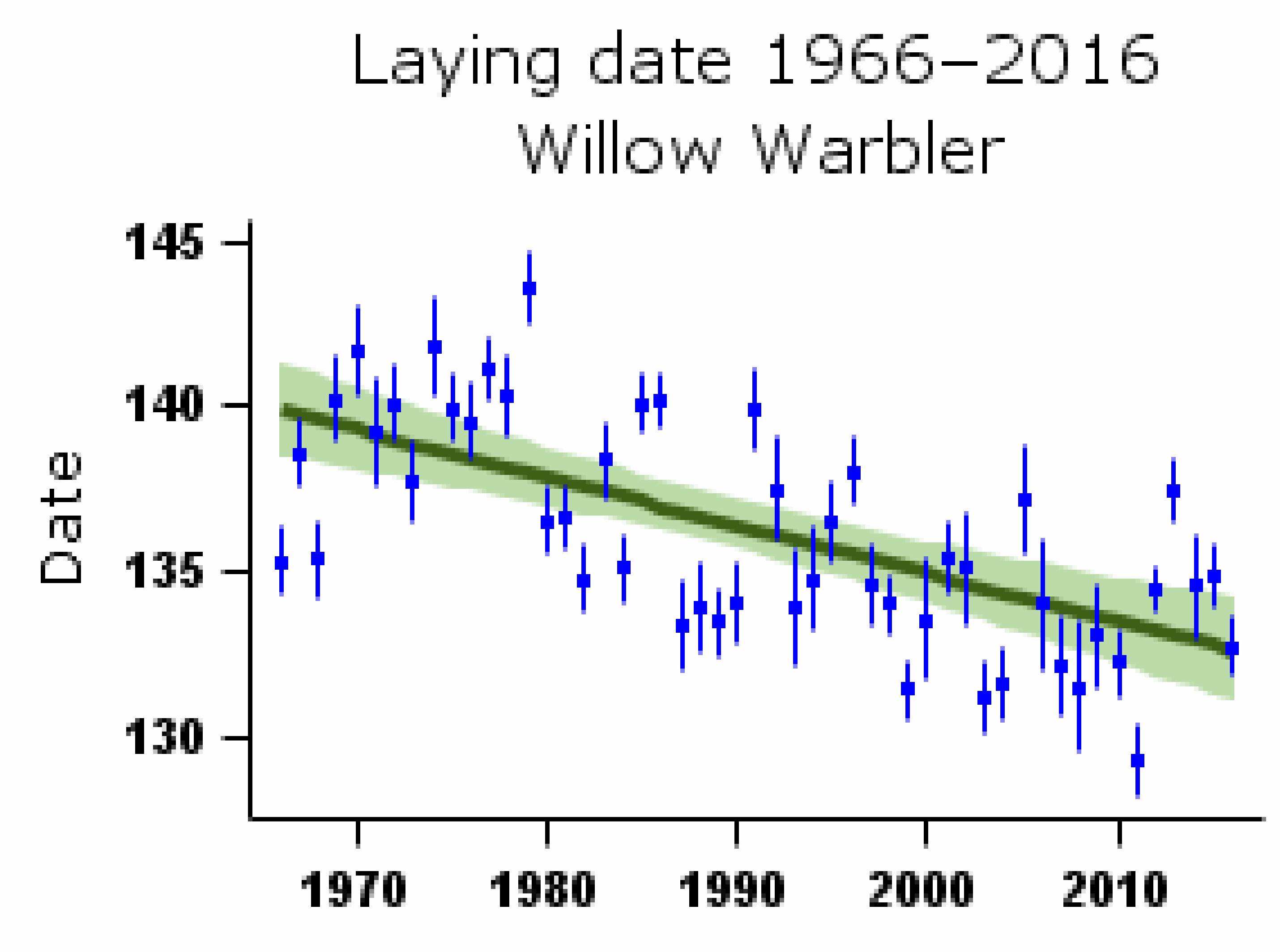


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

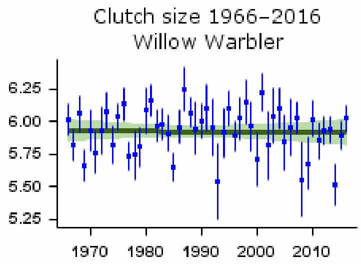


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

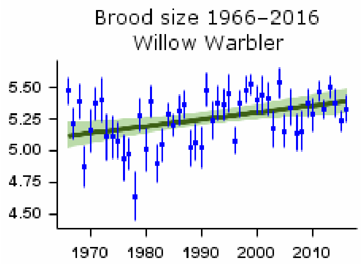
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	69	Linear decline	3.60 fledglings	3.13 fledglings	-12.9%		
Clutch size	48	1967-2015	51	None					
Brood size	48	1967-2015	151	Linear increase	5.12 chicks	5.38 chicks	5.1%		
Nest failure rate at egg stage	48	1967-2015	69	Linear increase	0.90% nests/day	1.92% nests/day	113.3%		
Nest failure rate at chick stage	48	1967-2015	130	None					
Laying date	48	1967-2015	89	Linear decline	May 20	May 13	-7 days		
Juvenile to Adult ratio (CES)	31	1984-2015	100	Smoothed trend	149 Index value	100 Index value	-33%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	108	Smoothed trend	123 Index value	100 Index value	-19%		
Juvenile to Adult ratio (CES)	10	2005-2015	104	Smoothed trend	94 Index value	100 Index value	6%		
Juvenile to Adult ratio (CES)	5	2010-2015	109	Smoothed trend	125 Index value	100 Index value	-20%		

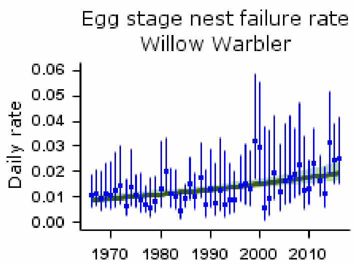
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



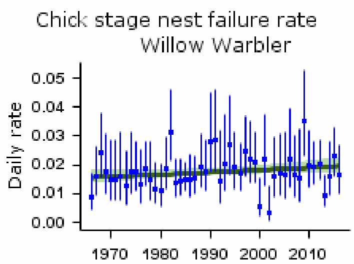
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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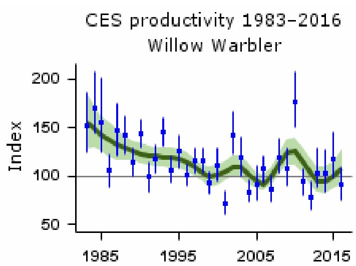
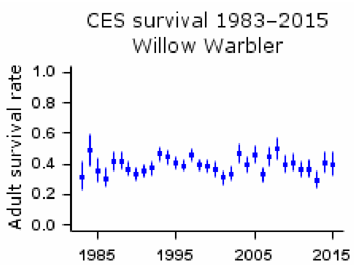


Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

The causes of decline are uncertain. Decreased breeding success is likely to be an important driver of the decline in the south-east, and the differing trends across the UK suggest that climate change (or possibly habitat changes occurring over wide areas) could be a factor behind the changes. However, problems on migration or in winter have not been completely ruled out.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	
Ecological	Climate change?	

Further information on causes of change

Willow warbler is among a suite of species that winter in the humid zone of West Africa and correspondingly are showing the strongest population declines among our migrant species (Ockendon et al. 2012, 2014). Pressures on migration and in the winter are likely to be affecting the population, as is a reduction in habitat quality on the breeding grounds (Fuller et al. 2005).

However, analysis of annual population changes and winter survival estimates across western Europe shows only a weak relationship between survival and population change, suggesting than long-term population change may be mostly driven by reduced productivity or juvenile survival (Johnston et al. 2016). This is supported by CES results: the recent population decline is associated with a decline in productivity as measured by CES and with a substantial increase in nest failure rates. There is also a small but significant decrease in the number of fledglings per breeding attempt. Average laying dates have shifted earlier by a week, perhaps in response to recent climatic warming (Crick & Sparks 1999). In the southeast, the seasonal decline in productivity has strengthened and, despite the advance in timing of breeding, overall productivity has declined, whereas overall productivity has been stable in the northwest (Morrison et al. 2015). Although annual productivity rates and survival are variable across the UK, regional integrated population models showed that high annual productivity during 1994-2012 sometimes coincided with high survival in the north-west of Britain, leading to population growth, but high productivity is rarer in the south-east and never coincided with high survival (Morrison et al. 2016c).

There is also evidence that sex ratios vary across Britain and have become male-biased in many areas of low abundance such as south-east England, which may affect local productivity (Morrison et al. 2016b).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Blackcap

Sylvia atricapilla

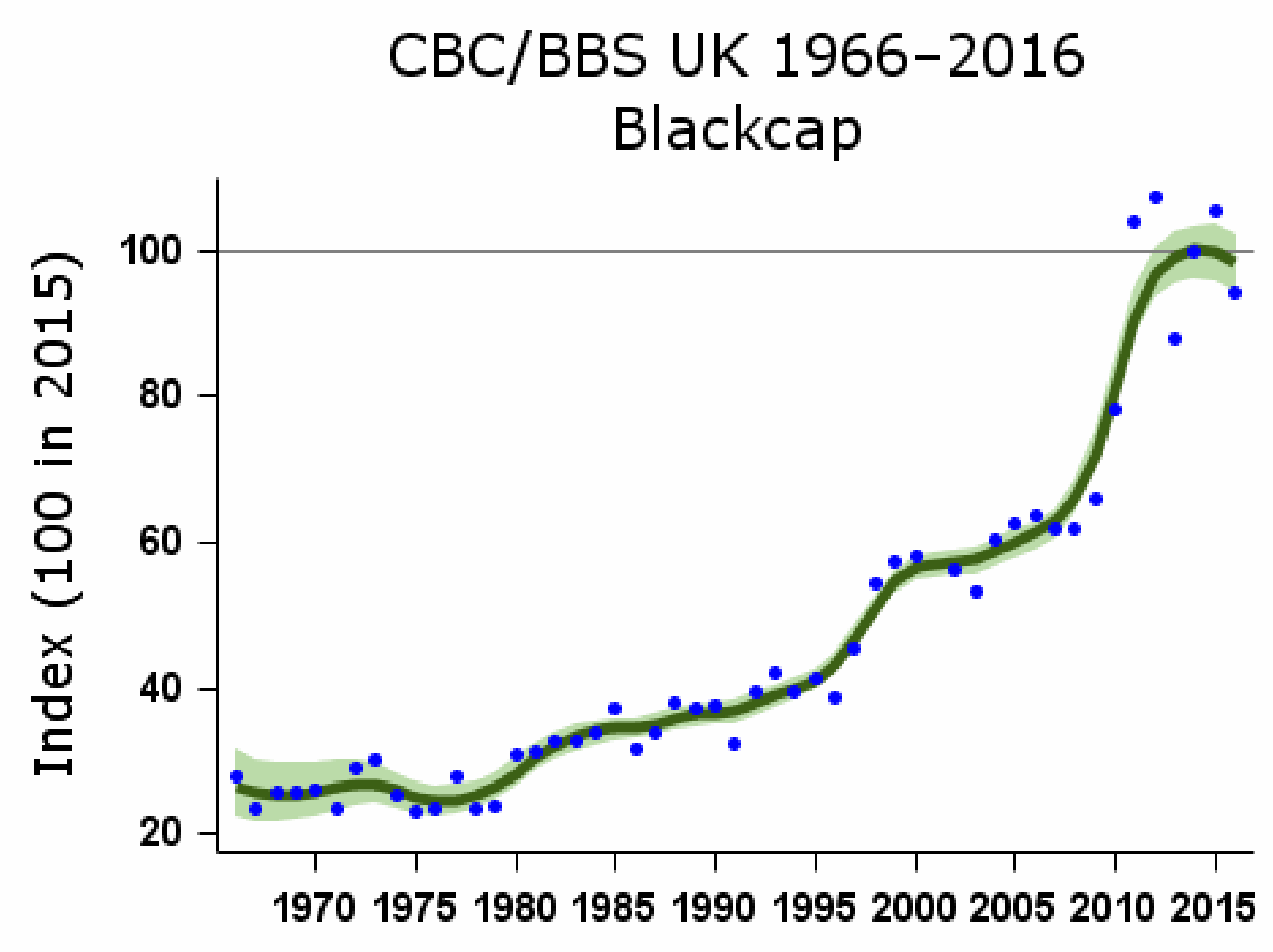
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	1.2 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Short-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Blackcap abundance in the UK has increased consistently since the late 1970s, a trend common to all habitats and evident from both the CBC/BBS and the CES indices. An extraordinary acceleration of the upward trend occurred from 2008 to 2013. Overall increase has occurred despite a reduction in habitat quality for Blackcap, and other species dependent on the understorey, brought about by deer browsing in young woodland (Holt et al. 2012d). The BBS Balmer et al. 2013), is indicated by the BBS trend. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



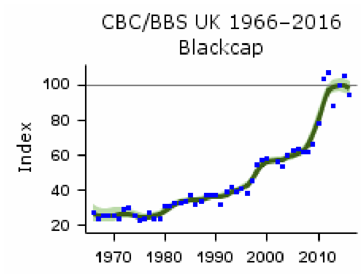
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

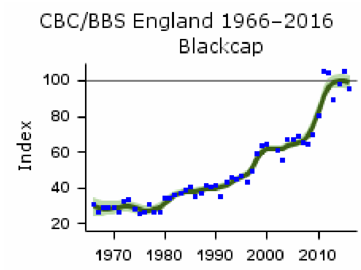
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	847	291	215	387		
	25	1990-2015	1495	174	154	192		
	10	2005-2015	2188	66	61	73		
	5	2010-2015	2390	24	19	25		
CBC/BBS England	48	1967-2015	728	248	188	341		
	25	1990-2015	1276	150	132	170		
	10	2005-2015	1845	55	49	59		
	5	2010-2015	1997	21	16	22		
CES adults	31	1984-2015	93	124	83	177		
	25	1990-2015	102	98	70	127		
	10	2005-2015	105	40	30	52		
	5	2010-2015	112	25	18	34		
CES juveniles	31	1984-2015	95	57	25	99		
	25	1990-2015	104	83	50	117		
	10	2005-2015	106	22	7	37		
	5	2010-2015	112	5	-6	22		
BBS UK	20	1995-2015	1736	145	132	159		
	10	2005-2015	2188	67	61	73		
	5	2010-2015	2390	24	19	24		
BBS England	20	1995-2015	1476	117	107	131		
	10	2005-2015	1845	55	49	61		
	5	2010-2015	1997	21	16	22		
BBS Scotland	20	1995-2015	73	460	298	736		
	10	2005-2015	105	121	88	168		
	5	2010-2015	123	39	18	57		
BBS Wales	20	1995-2015	137	151	109	197		
	10	2005-2015	167	69	53	96		
	5	2010-2015	187	17	3	22		
BBS N.Ireland	20	1995-2015	42	>10000	.	.		
	10	2005-2015	58	247	.	.		
	5	2010-2015	68	64	.	.		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

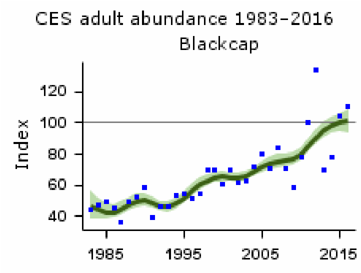
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



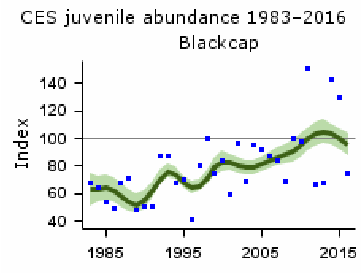
CBC/BBS UK graph



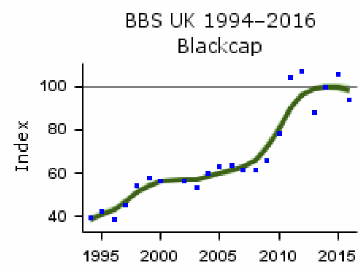
CBC/BBS England graph



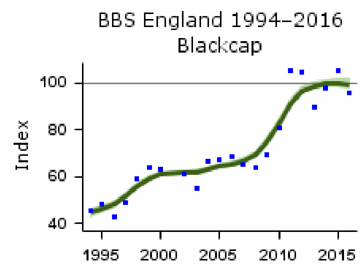
CES adults graph



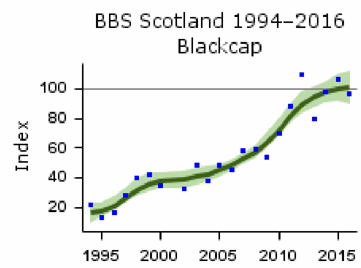
CES juveniles graph



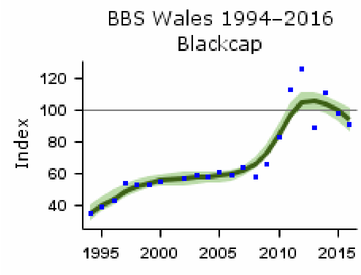
BBS UK graph



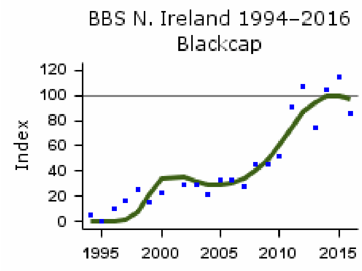
BBS England graph



BBS Scotland graph

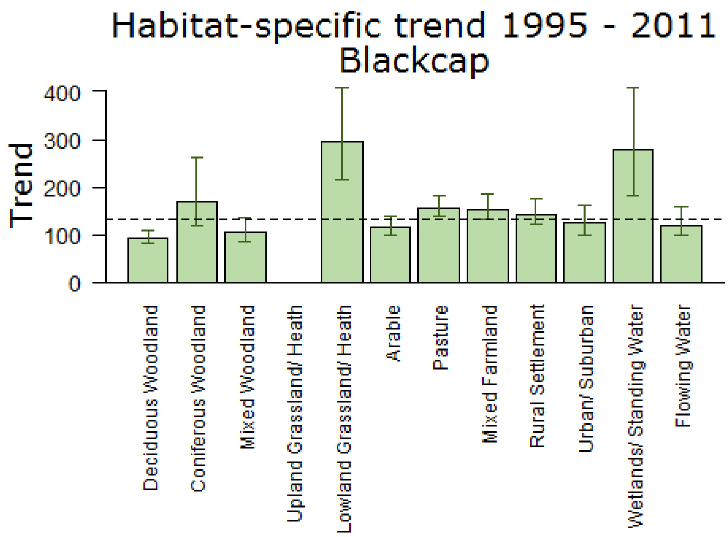


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

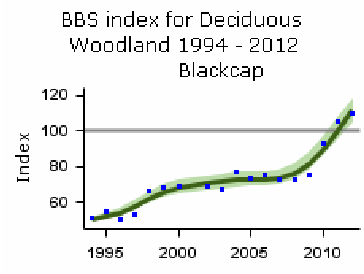
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

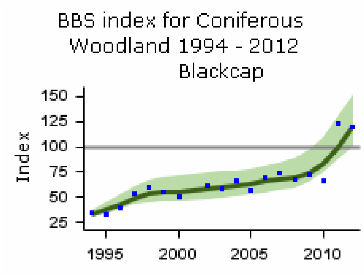
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	631	92	82	108
Coniferous Woodland	16	1995-2011	94	169	117	263
Mixed Woodland	16	1995-2011	326	106	85	136
Lowland Grassland/ Heath	16	1995-2011	76	295	214	407
Arable	16	1995-2011	441	116	100	139
Pasture	16	1995-2011	709	154	140	181
Mixed Farmland	16	1995-2011	324	152	133	184
Rural Settlement	16	1995-2011	416	143	122	175
Urban/ Suburban	16	1995-2011	201	126	100	163
Wetlands/ Standing Water	16	1995-2011	56	280	182	408

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Flowing Water	16	1995-2011	281	120	99	158

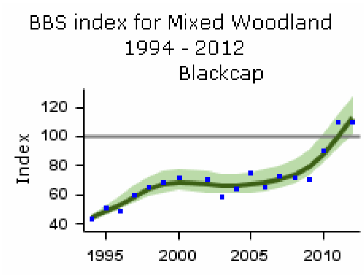
Further information on habitat-specific trends, please follow link here.



Habitat graph



Habitat graph



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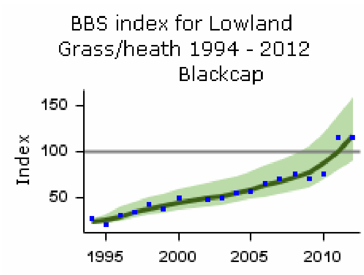

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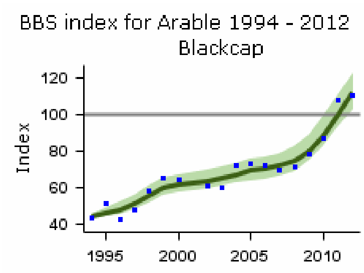
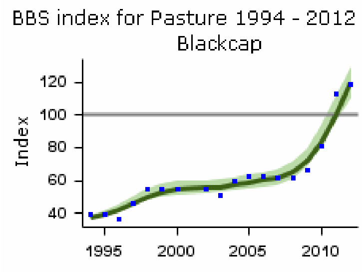
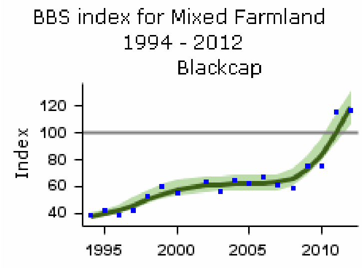


Habitat graph



Habitat graph



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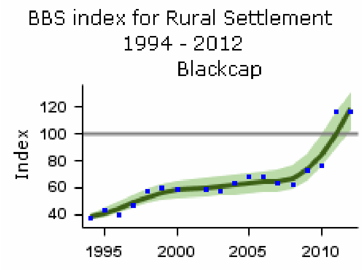

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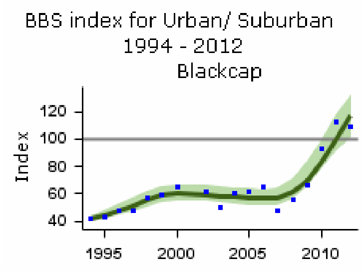

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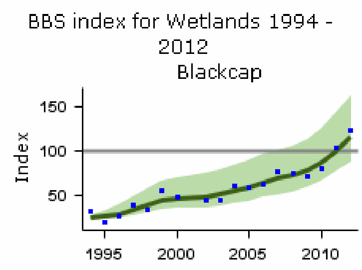

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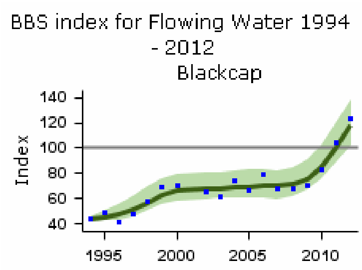
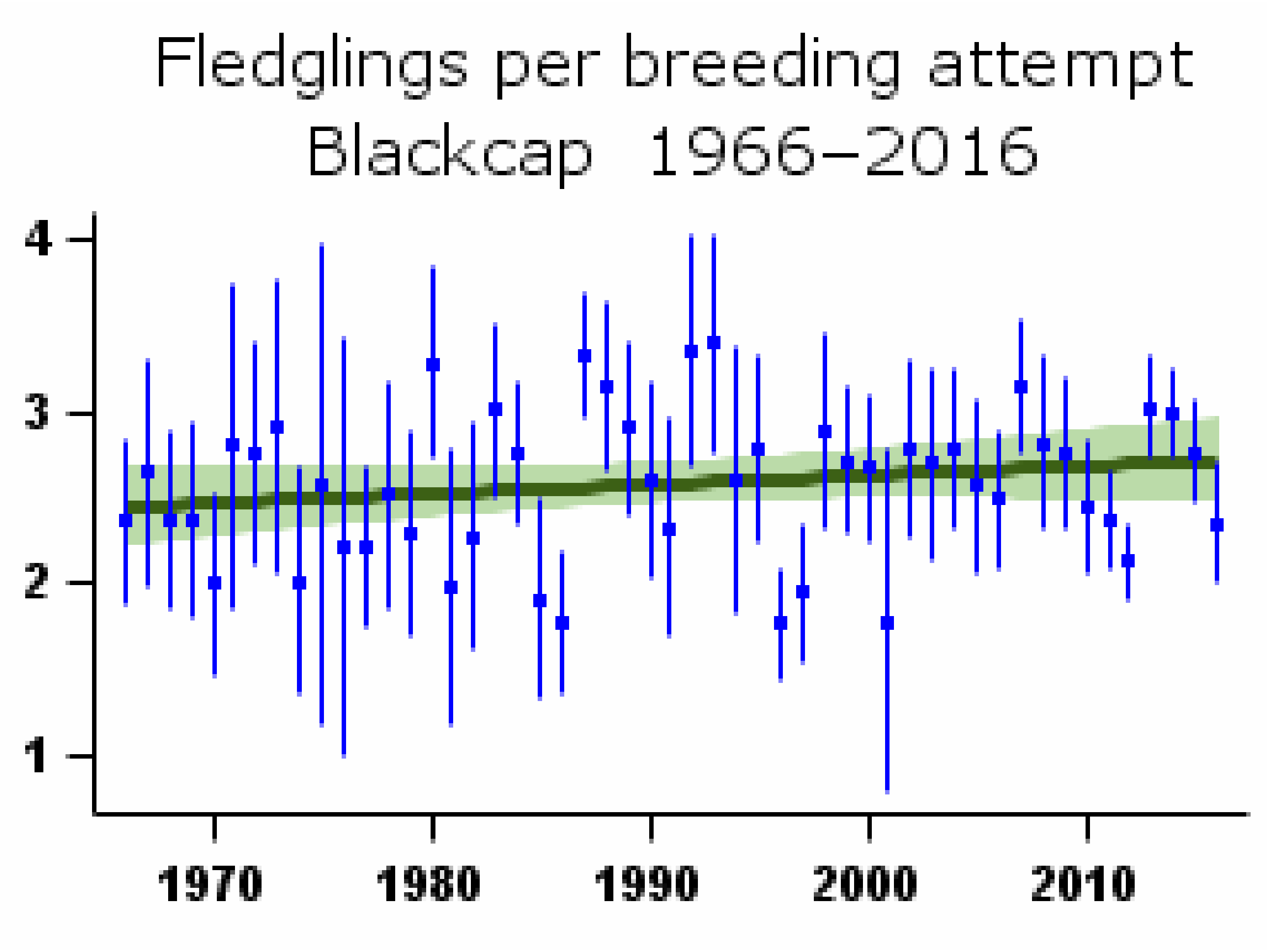
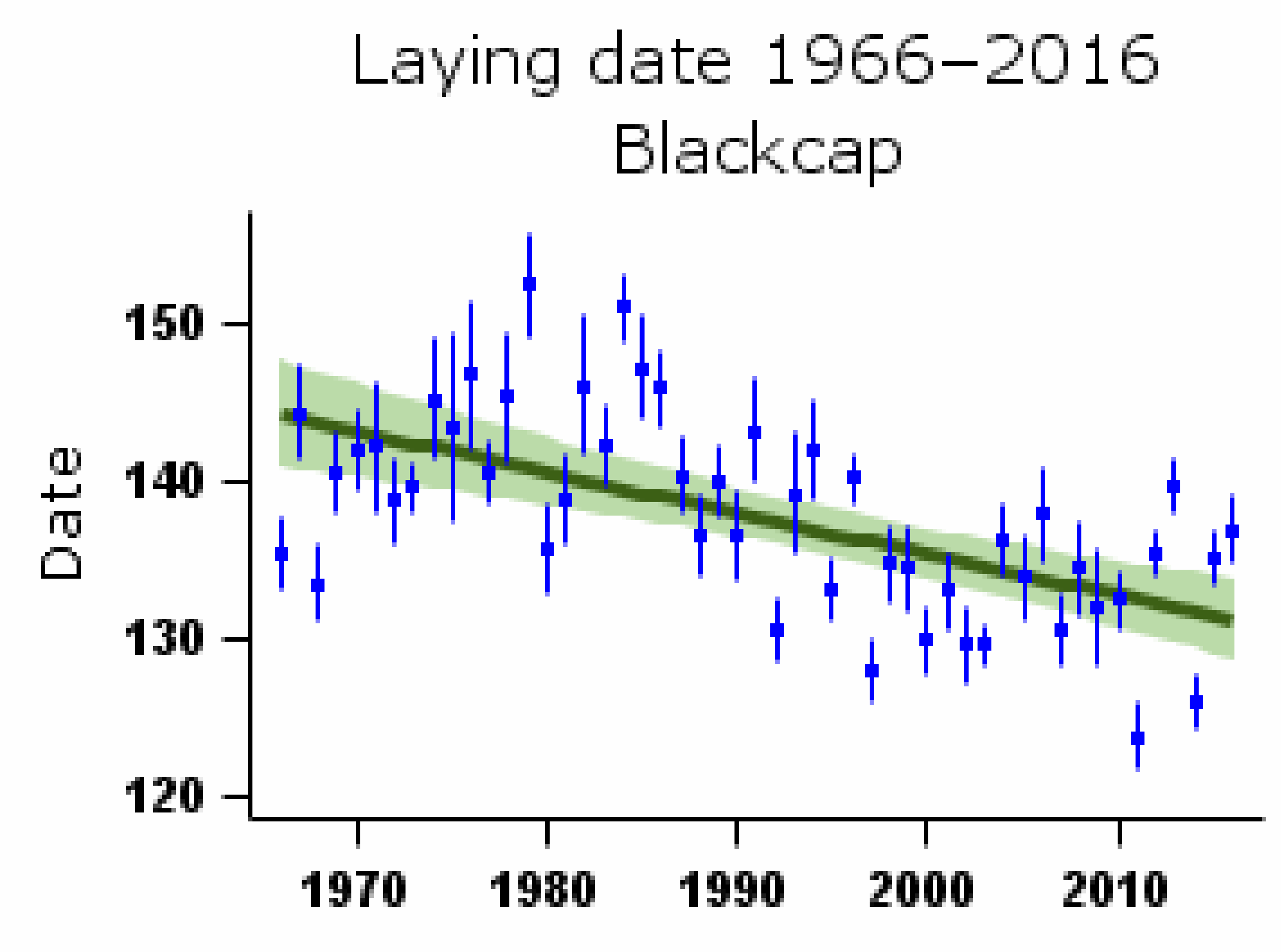


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	43	None					
Clutch size	48	1967-2015	45	None					
Brood size	48	1967-2015	52	None					
Nest failure rate at egg stage	48	1967-2015	57	None					
Nest failure rate at chick stage	48	1967-2015	44	None					
Laying date	48	1967-2015	45	Linear decline	May 24	May 11	-13 days		
Juvenile to Adult ratio (CES)	31	1984-2015	100	Smoothed trend	168 Index value	100 Index value	-40%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	110	Smoothed trend	116 Index value	100 Index value	-14%		
Juvenile to Adult ratio (CES)	10	2005-2015	110	Smoothed trend	140 Index value	100 Index value	-28%	>25	
Juvenile to Adult ratio (CES)	5	2010-2015	117	Smoothed trend	125 Index value	100 Index value	-20%		

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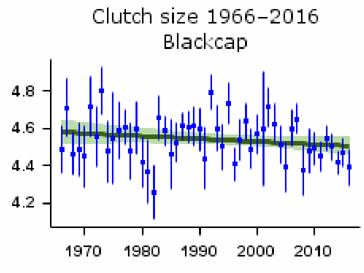
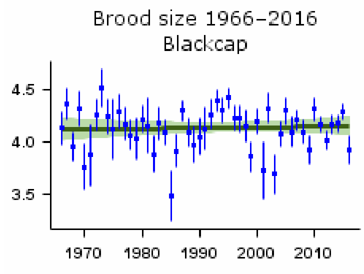
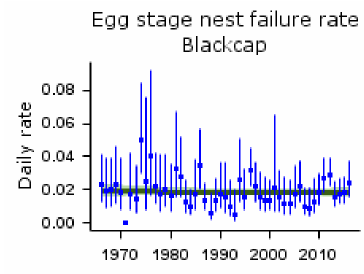


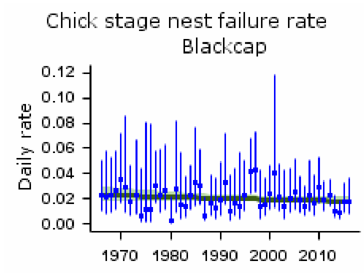
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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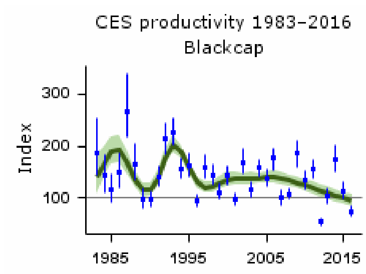
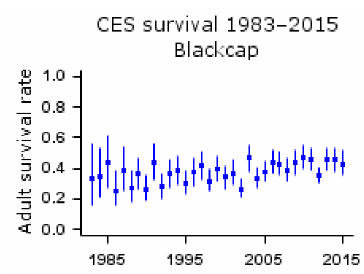


Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

The causes of the increase in this species remain unknown.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

According to CES, productivity has fluctuated markedly, obscuring any long-term trend in CES or NRS data. Survival rates have been stable. Using data from France, Julliard (2004) found that population growth rate was under the additive influence of survival and recruitment.

Analysis of phenological data has found that this species advanced its arrival date in the UK, between the 1960s and 2000s, by 18 days (Newson et al. 2016). This is in line with the trend towards earlier laying, amounting to an advance of almost two weeks since 1968, which may be a response to recent climate change (Crick & Sparks 1999, Croxton et al. 2006). The more rapid increase in Scotland indicated by BBS suggests that climatic warming may be allowing this species to extend its range northwards (Hewson et al. 2007).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Garden Warbler

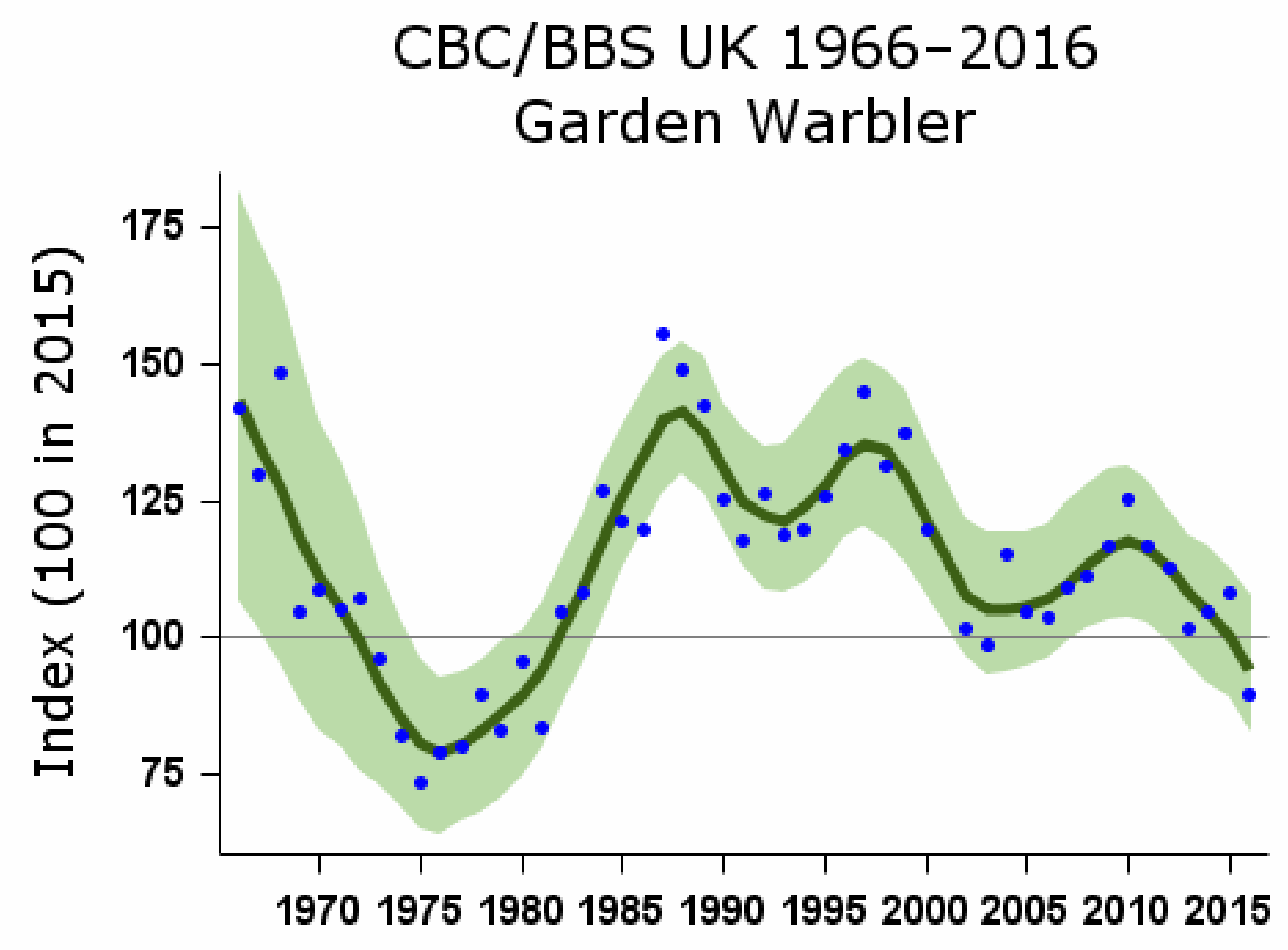
Sylvia borin

Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: moderate decline
Population size:	170,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Garden Warbler abundance has varied alongside that of other trans-Saharan migrant warblers (Siriwardena et al. 1998b), probably reflecting the influence of changes in their winter environment. Despite large short-term fluctuations in abundance, the CBC/BBS data suggest that the population may be in long-term decline, although the trend is not statistically significant. The BBS Johnston et al. 2016). There has been no change in CES survival rates, but there have been increases in nest failure rates and corresponding declines in the number of fledglings per breeding attempt; and post-fledging productivity, as measured by the CES, has declined sharply since 1983. Habitat creation could help counteract the effects of future climate change (Mustin et al. 2014). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

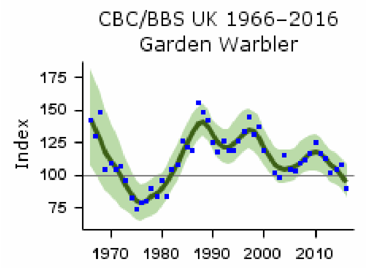
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	259	-26	-51	12		
	25	1990-2015	423	-24	-34	-12		
	10	2005-2015	525	-5	-14	5		
	5	2010-2015	532	-15	-23	-6		

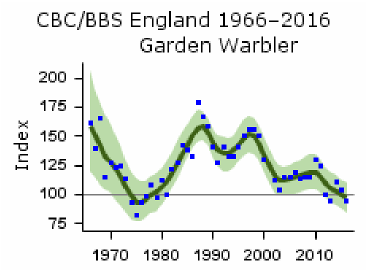
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	215	-33	-55	5		
	25	1990-2015	347	-31	-41	-21	>25	
	10	2005-2015	427	-11	-18	-3		
	5	2010-2015	429	-16	-22	-8		
CES adults	31	1984-2015	64	-22	-47	14		
	25	1990-2015	70	-20	-40	-2		
	10	2005-2015	64	-8	-20	7		
	5	2010-2015	66	-12	-22	1		
CES juveniles	31	1984-2015	64	-62	-71	-40	>50	
	25	1990-2015	69	-51	-63	-37	>50	
	10	2005-2015	64	-31	-44	-15	>25	
	5	2010-2015	66	-18	-31	0		
BBS UK	20	1995-2015	464	-23	-31	-12		
	10	2005-2015	525	-5	-13	8		
	5	2010-2015	532	-15	-22	-5		
BBS England	20	1995-2015	378	-31	-38	-23	>25	
	10	2005-2015	427	-11	-20	-4		
	5	2010-2015	429	-15	-22	-8		
BBS Wales	20	1995-2015	60	-23	-43	4		
	10	2005-2015	65	7	-15	40		
	5	2010-2015	70	-14	-30	5		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

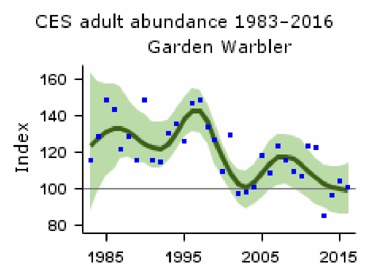
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



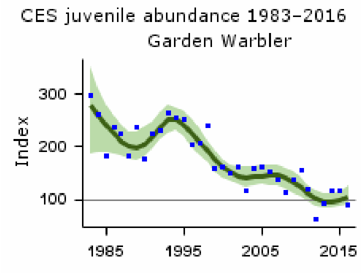
CBC/BBS UK graph



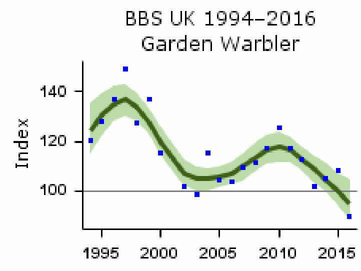
CBC/BBS England graph



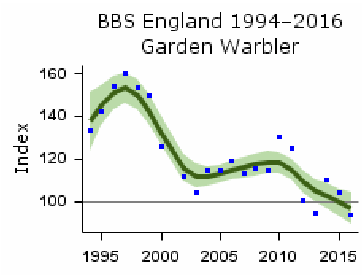
CES adults graph



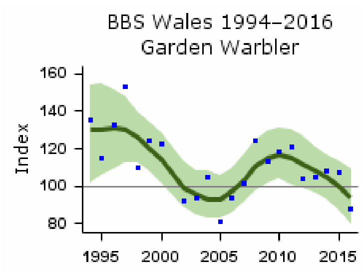
CES juveniles graph



BBS UK graph

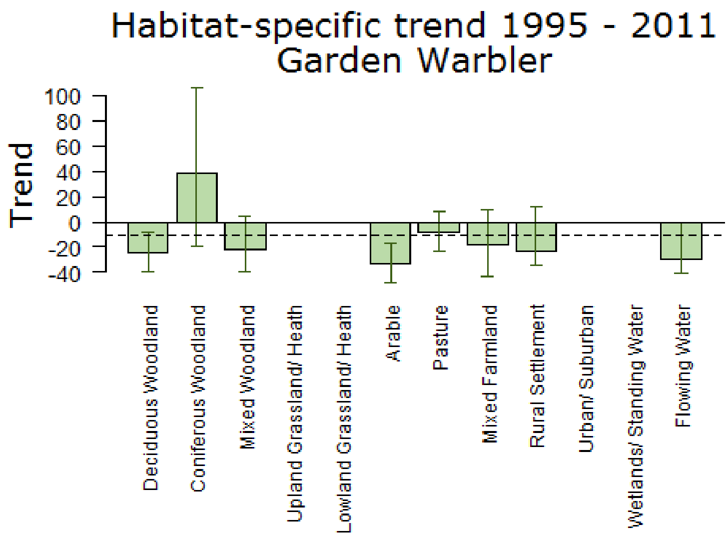


BBS England graph



BBS Wales graph

Population trends by habitat



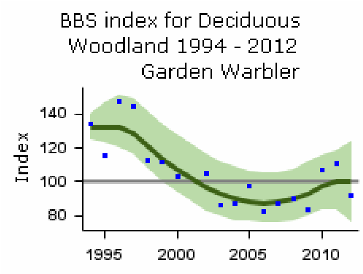
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

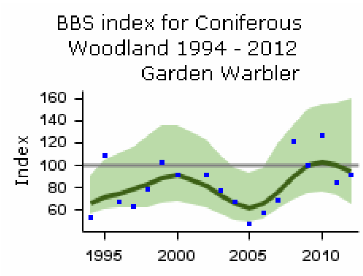
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	144	-24	-40	-8
Coniferous Woodland	16	1995-2011	31	38	-19	106
Mixed Woodland	16	1995-2011	87	-22	-40	4
Arable	16	1995-2011	85	-33	-48	-17
Pasture	16	1995-2011	165	-9	-23	9
Mixed Farmland	16	1995-2011	49	-18	-44	9
Rural Settlement	16	1995-2011	66	-23	-34	12
Flowing Water	16	1995-2011	62	-29	-41	0

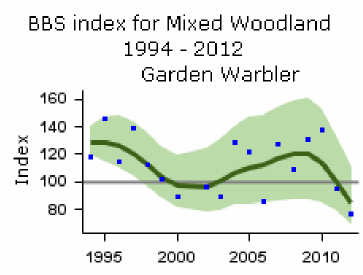
Further information on habitat-specific trends, please follow link here.



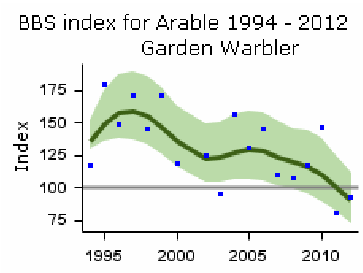
Habitat graph



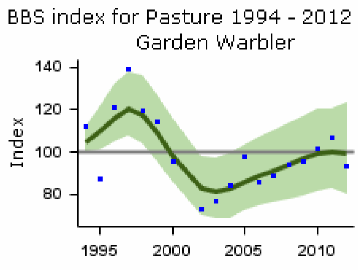
Habitat graph



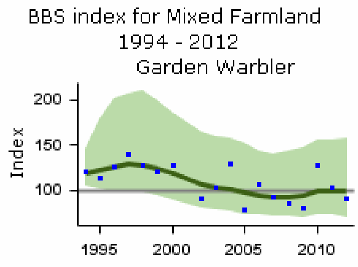
Habitat graph



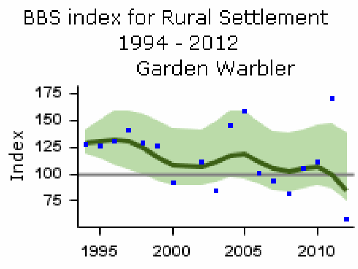
Habitat graph



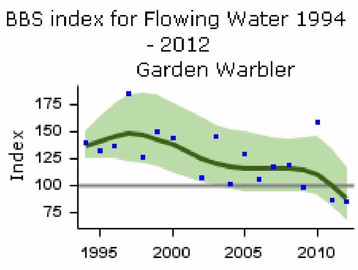
Habitat graph



Habitat graph

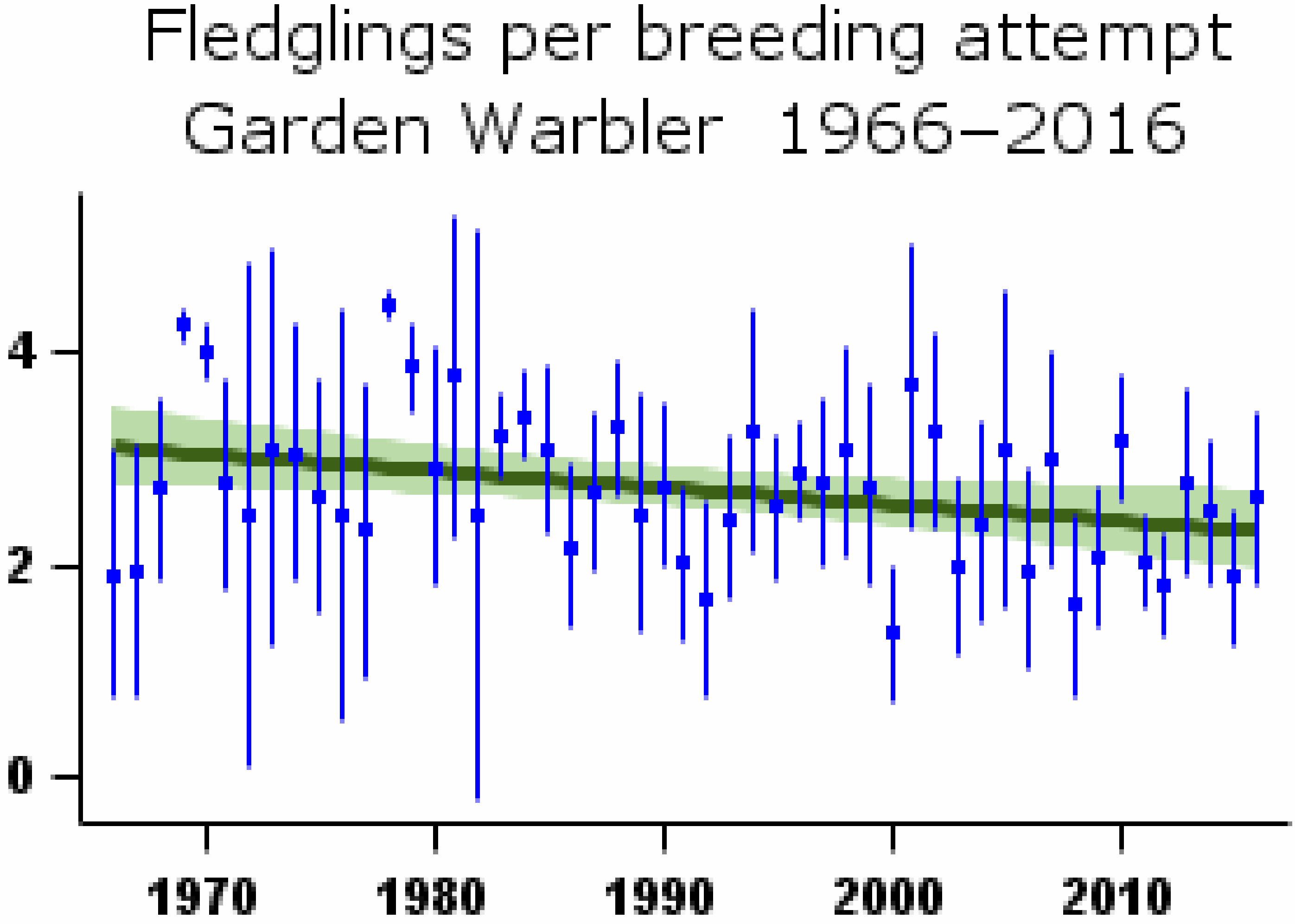


Habitat graph

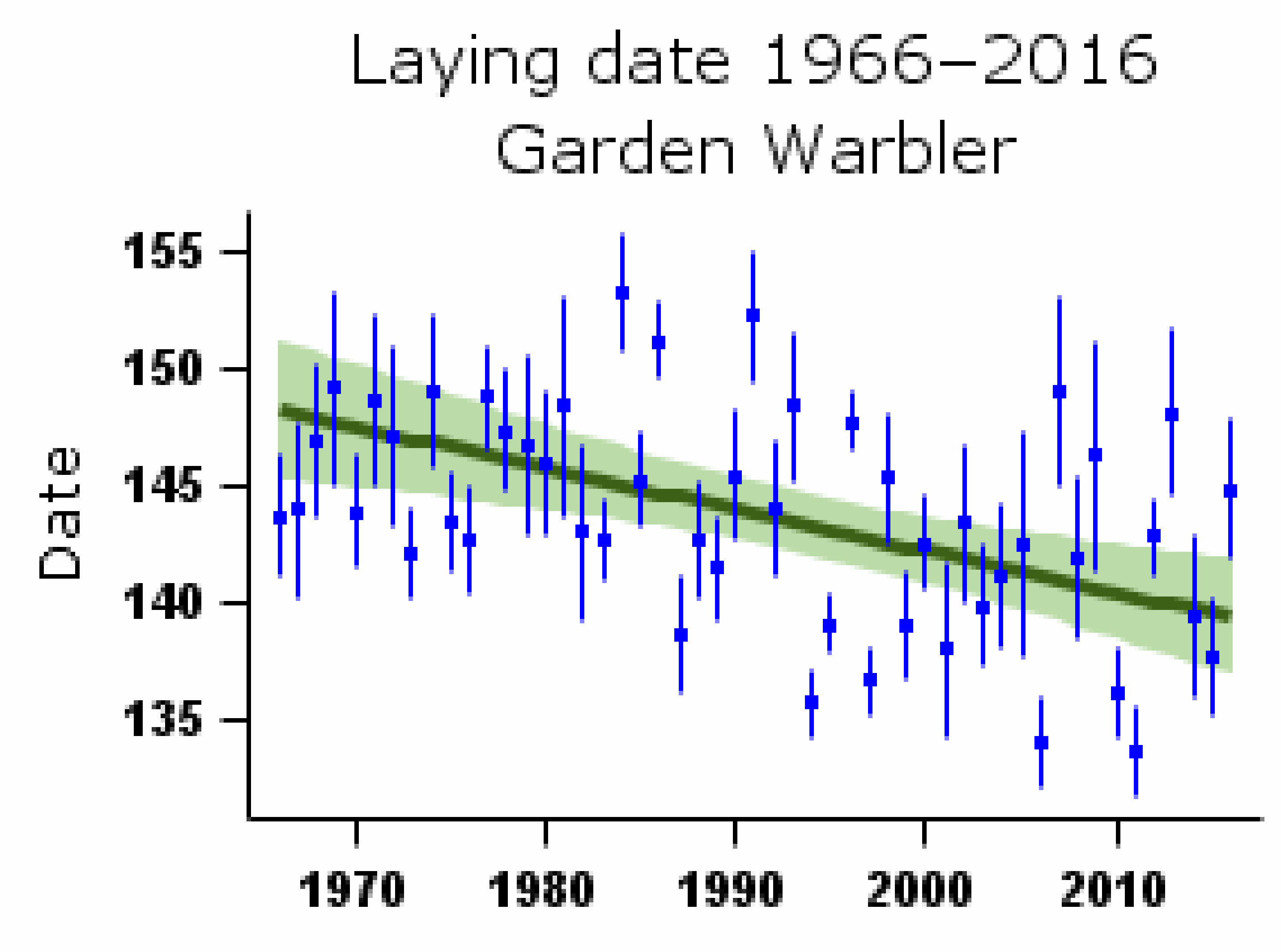


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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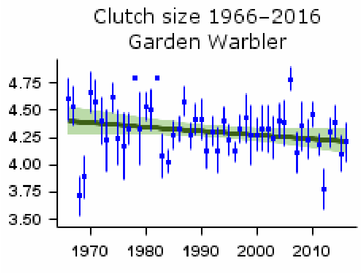
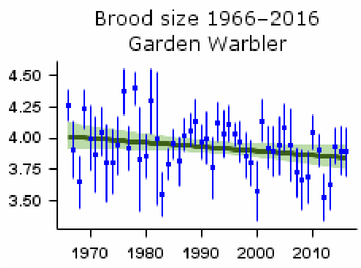
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	20	Linear decline	3.08 fledglings	2.33 fledglings	-24.2%		
Clutch size	48	1967-2015	18	None					Small sample
Brood size	48	1967-2015	26	None					Small sample
Nest failure rate at egg stage	48	1967-2015	24	Curvilinear	1.80% nests/day	2.72% nests/day	51.1%		Small sample
Nest failure rate at chick stage	48	1967-2015	20	Linear increase	1.13% nests/day	2.64% nests/day	133.6%		Small sample
Laying date	48	1967-2015	23	Linear decline	May 28	May 20	-8 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	78	Smoothed trend	176 Index value	100 Index value	-43%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	84	Smoothed trend	106 Index value	100 Index value	-6%		
Juvenile to Adult ratio (CES)	10	2005-2015	79	Smoothed trend	109 Index value	100 Index value	-8%		
Juvenile to Adult ratio (CES)	5	2010-2015	81	Smoothed trend	81 Index value	100 Index value	23%		

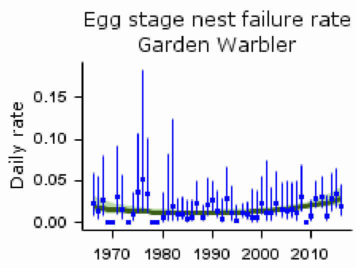
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



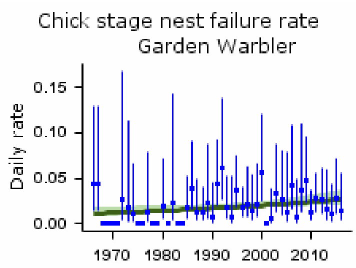
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



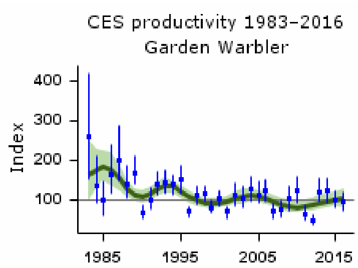
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



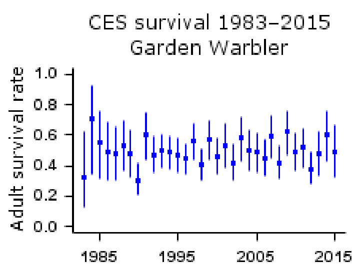
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Lesser Whitethroat

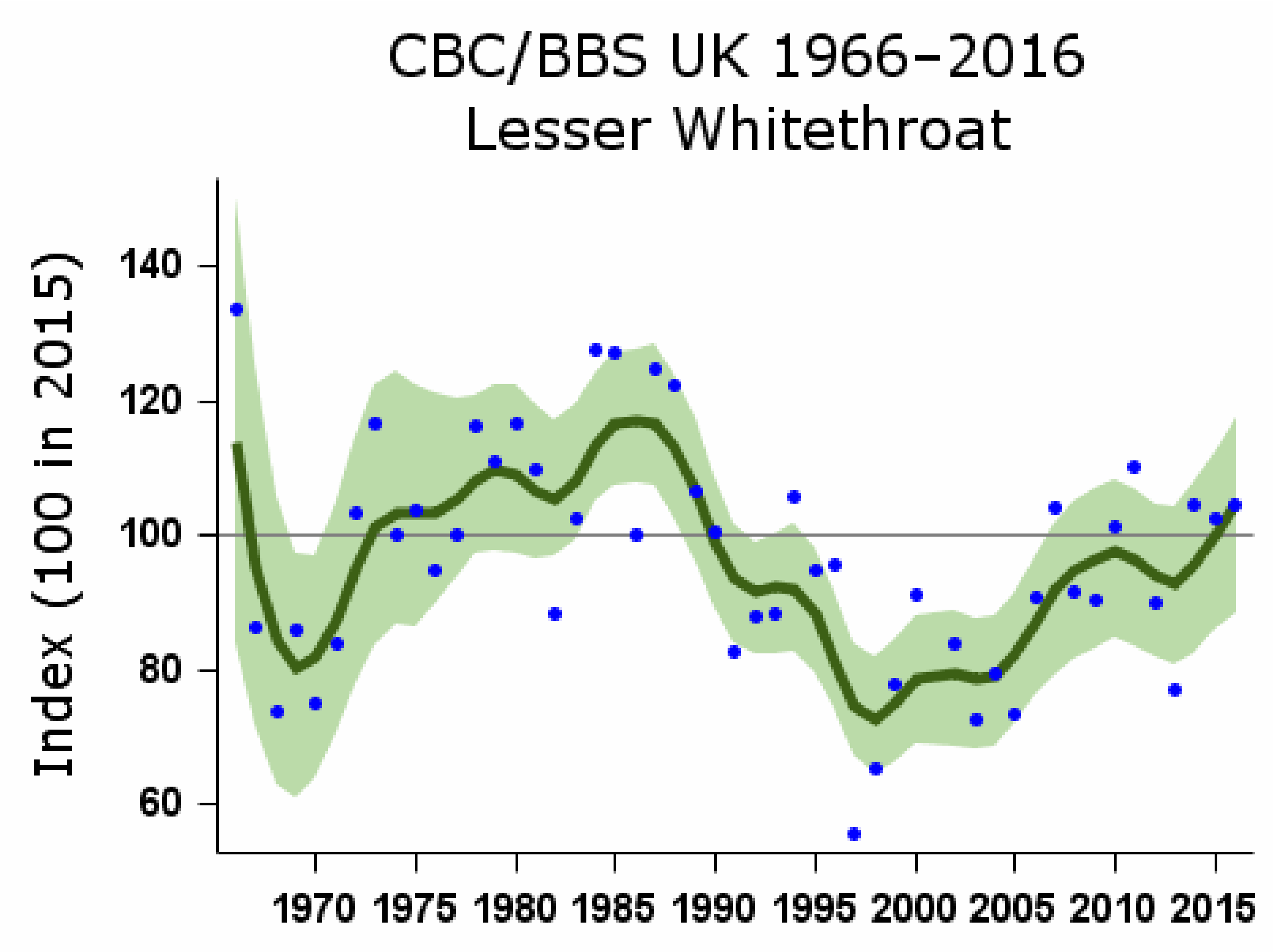
Sylvia curruca

Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: uncertain
Population size:	74,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Lesser Whitethroat abundance was roughly stable (albeit with short-term fluctuations) from the 1960s until the late 1980s, but the CBC/BBS and CES trends provide evidence for a subsequent moderate decline that lasted into the late 1990s. These changes were statistically significant, and large enough over the relevant periods to trigger BTO alerts. BBS has subsequently shown a significant sharp upturn, but this contrasts strongly with the continued decrease recorded by CES ringers. A northward redistribution of the UK breeding population (Balmer et al. 2013) may go some way to explaining inconsistencies in the monitoring results. Wide fluctuations in survival and productivity have been recorded by CES ringers, and may be influencing population change, but pressures during migration and in winter are the most likely causes of any decline (Fuller et al. 2005). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

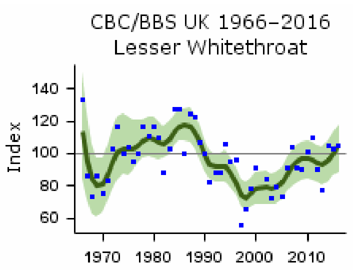
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	161	5	-31	56		
	25	1990-2015	258	1	-17	18		
	10	2005-2015	343	22	10	34		
	5	2010-2015	348	3	-5	14		

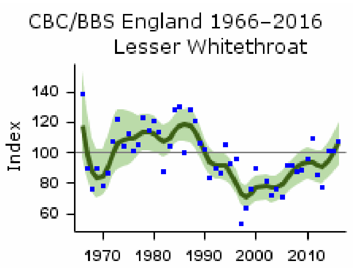
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	154	1	-31	33		
	25	1990-2015	246	0	-19	16		
	10	2005-2015	329	26	14	40		
	5	2010-2015	334	6	-3	17		
CES adults	31	1984-2015	37	-67	-84	-47	>50	
	25	1990-2015	39	-73	-83	-62	>50	
	10	2005-2015	32	-31	-50	-12	>25	
	5	2010-2015	34	-12	-29	6		
CES juveniles	31	1984-2015	44	-66	-85	-38	>50	
	25	1990-2015	46	-74	-83	-63	>50	
	10	2005-2015	41	-33	-49	-17	>25	
	5	2010-2015	40	-16	-34	8		
BBS UK	20	1995-2015	284	6	-10	19		
	10	2005-2015	343	21	10	35		
	5	2010-2015	348	3	-5	13		
BBS England	20	1995-2015	271	8	-6	23		
	10	2005-2015	329	25	13	39		
	5	2010-2015	334	7	-2	19		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

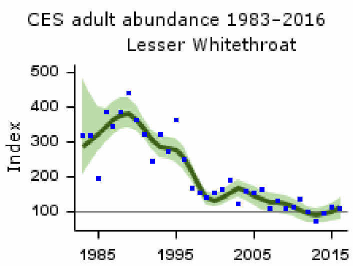
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



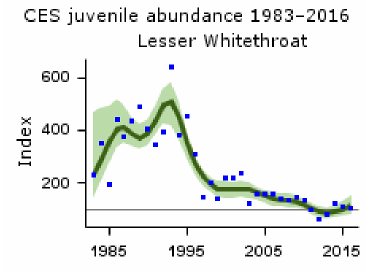
CBC/BBS UK graph



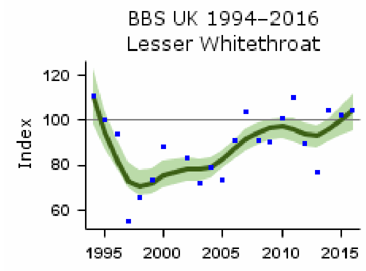
CBC/BBS England graph



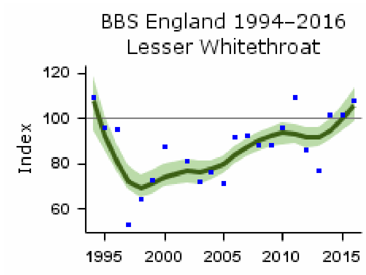
CES adults graph



CES juveniles graph

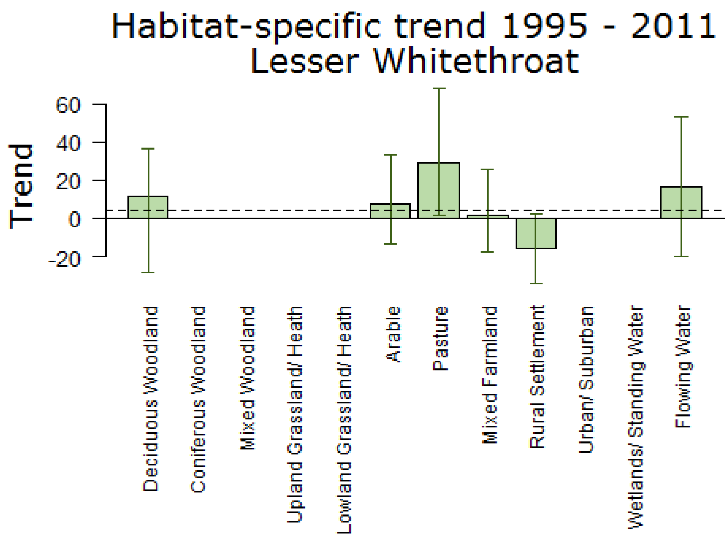


BBS UK graph



BBS England graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

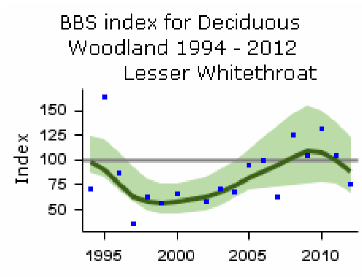
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

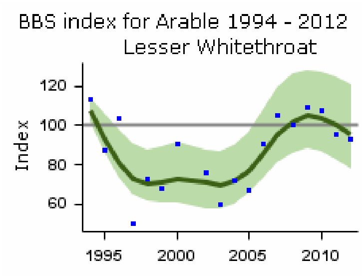
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	40	12	-28	36

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Arable	16	1995-2011	81	8	-13	33
Pasture	16	1995-2011	102	29	2	68
Mixed Farmland	16	1995-2011	62	2	-17	26
Rural Settlement	16	1995-2011	53	-16	-34	2
Flowing Water	16	1995-2011	34	16	-20	53

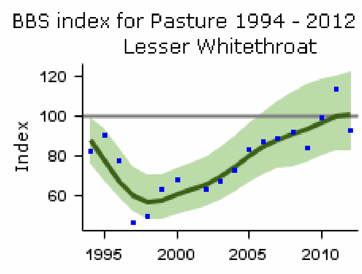
Further information on habitat-specific trends, please follow link here.



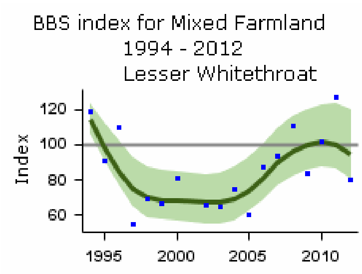
Habitat graph



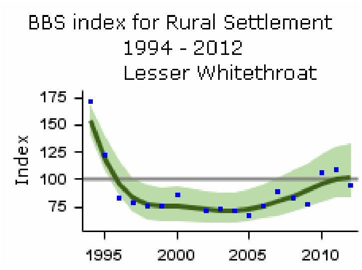
Habitat graph



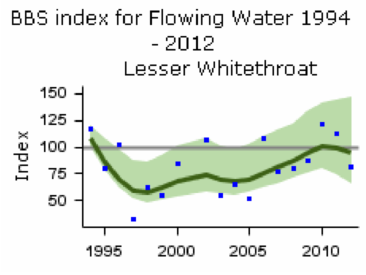
Habitat graph



Habitat graph



Habitat graph

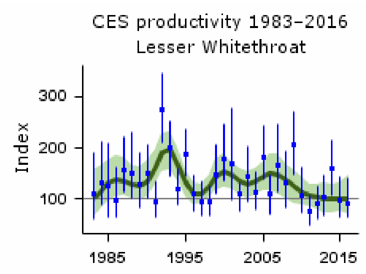


Habitat graph

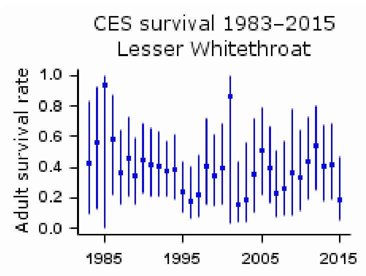
Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	7	None					
Clutch size	48	1967-2015	6	None					Small sample
Brood size	48	1967-2015	9	None					Small sample
Nest failure rate at egg stage	48	1967-2015	8	None					Small sample
Nest failure rate at chick stage	48	1967-2015	8	None					Small sample
Laying date	48	1967-2015	8	None			0 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	53	Smoothed trend	116 Index value	100 Index value	-13%		
Juvenile to Adult ratio (CES)	25	1990-2015	56	Smoothed trend	136 Index value	100 Index value	-26%		
Juvenile to Adult ratio (CES)	10	2005-2015	49	Smoothed trend	144 Index value	100 Index value	-30%		
Juvenile to Adult ratio (CES)	5	2010-2015	50	Smoothed trend	114 Index value	100 Index value	-12%		

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Whitethroat

Sylvia communis

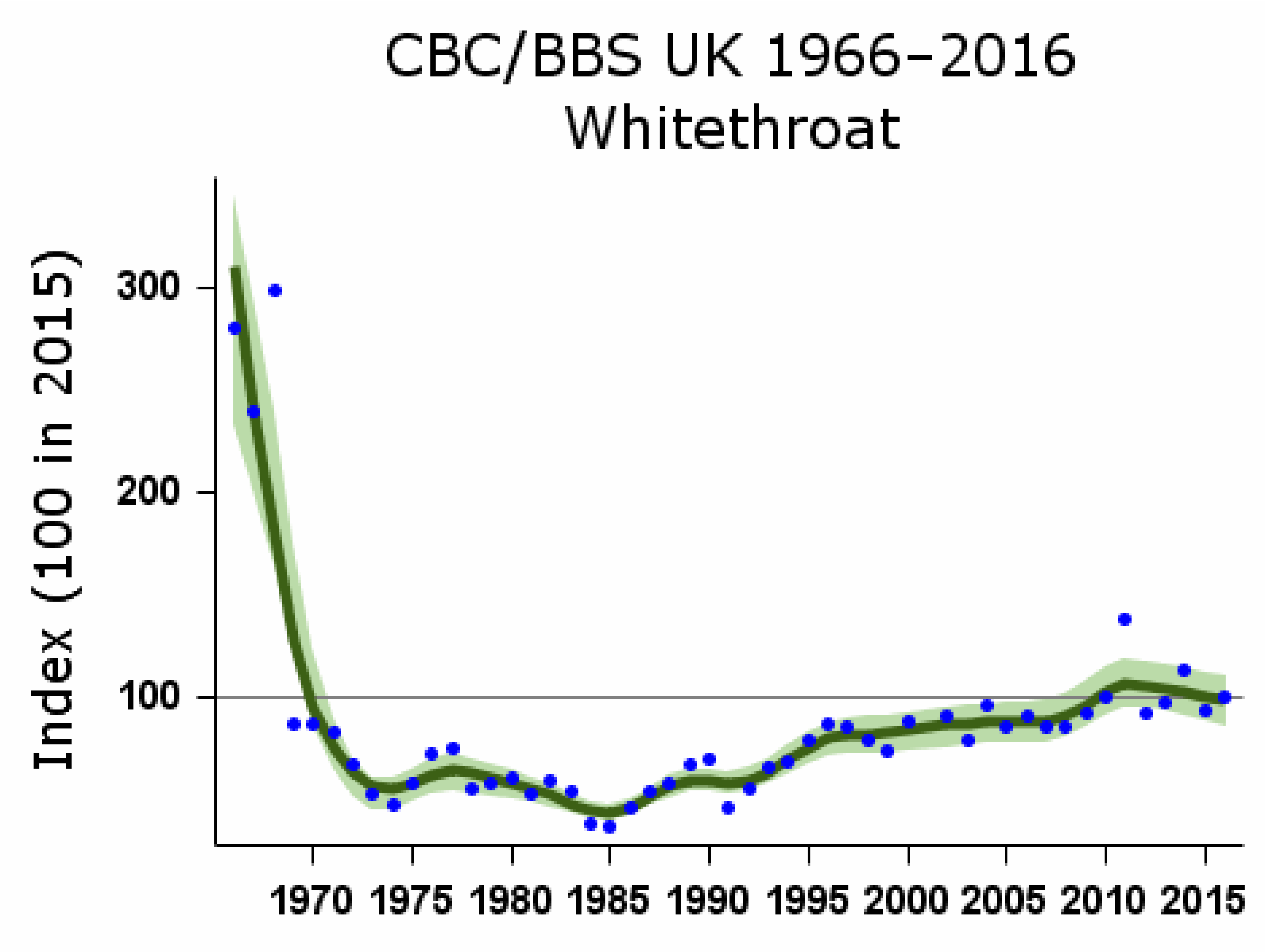
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid decline
Population size:	1.1 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Whitethroat numbers had been stable for a few years up to 1968 but, despite a normal departure for their West African wintering grounds in autumn 1968, crashed by around 70% between the 1968 and 1969 breeding seasons (Winstanley et al. 1974). They fluctuated around their lower level until the mid 1980s, since when the population has sustained a consistent shallow recovery. Recovery of the UK population has been most apparent along linear waterways. The BBS PECBMS 2016a). After a spell on the UK amber list during 2009-15, warranted by the limited extent of its UK recovery, further population increase has returned Whitethroat to the green list at the latest review (Eaton et al. 2015).



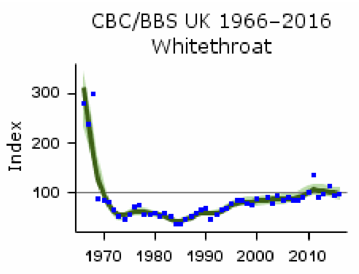
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

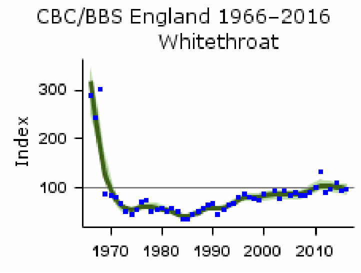
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	704	-59	-70	-43	>50	
	25	1990-2015	1241	68	49	91		
	10	2005-2015	1762	14	10	22		
	5	2010-2015	1858	-2	-7	2		
CBC/BBS England	48	1967-2015	607	-59	-72	-49	>50	
	25	1990-2015	1068	68	49	91		
	10	2005-2015	1510	15	11	20		
	5	2010-2015	1591	-1	-5	1		
WBS/WBBS waterways	40	1975-2015	87	145	7	354		
	25	1990-2015	122	161	103	248		
	10	2005-2015	152	10	0	21		
	5	2010-2015	142	-4	-10	5		
CES adults	31	1984-2015	64	-48	-65	-31	>25	
	25	1990-2015	71	-45	-61	-28	>25	
	10	2005-2015	72	-18	-32	-1		
	5	2010-2015	80	-30	-40	-21	>25	
CES juveniles	31	1984-2015	69	-58	-72	-35	>50	
	25	1990-2015	76	-51	-67	-24	>50	
	10	2005-2015	76	-14	-34	10		
	5	2010-2015	85	-30	-41	-16	>25	
BBS UK	20	1995-2015	1454	30	21	43		
	10	2005-2015	1762	15	9	23		
	5	2010-2015	1858	-2	-7	3		
BBS England	20	1995-2015	1250	28	21	34		
	10	2005-2015	1510	15	11	20		
	5	2010-2015	1591	-1	-5	1		
BBS Scotland	20	1995-2015	92	117	31	226		
	10	2005-2015	117	17	-16	57		
	5	2010-2015	124	4	-25	30		
BBS Wales	20	1995-2015	90	-19	-35	-4		
	10	2005-2015	107	10	-6	31		
	5	2010-2015	113	-16	-25	-6		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

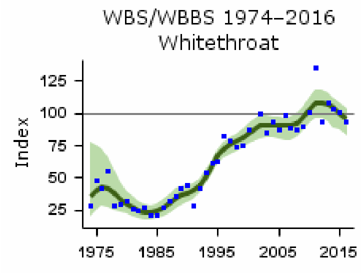
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



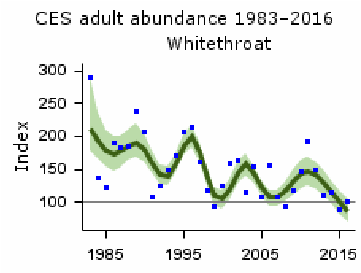
CBC/BBS UK graph



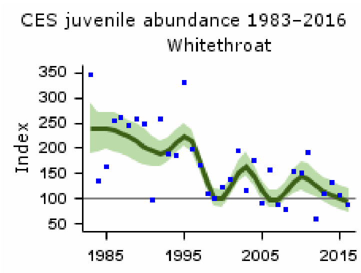
CBC/BBS England graph



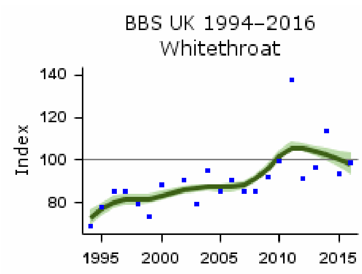
WBS/WBBS waterways graph



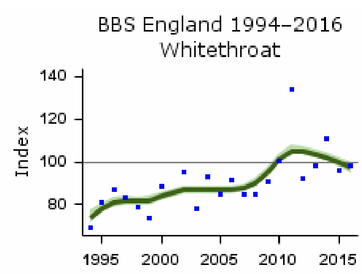
CES adults graph



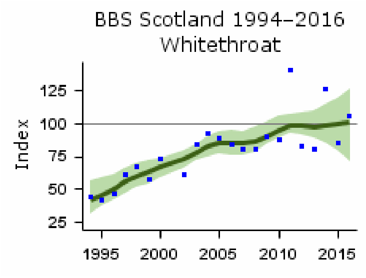
CES juveniles graph



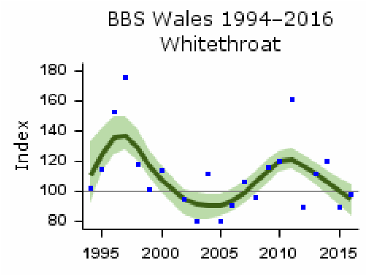
BBS UK graph



BBS England graph

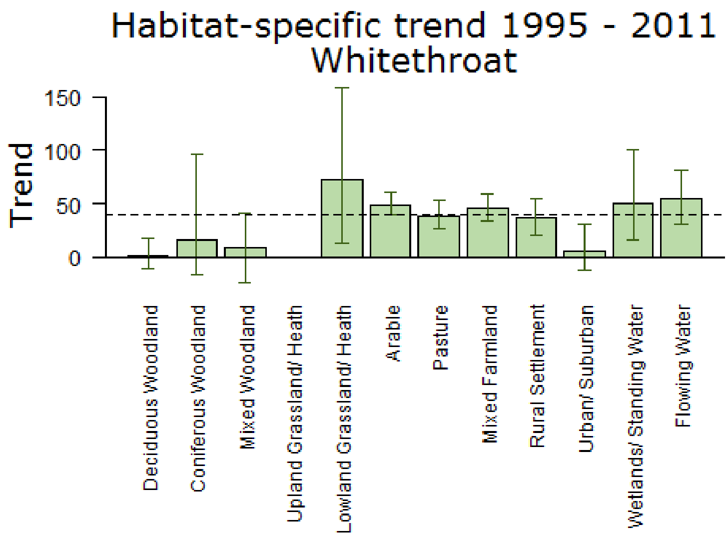


BBS Scotland graph



BBS Wales graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

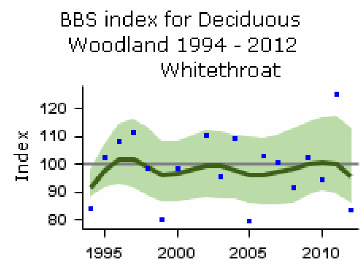
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

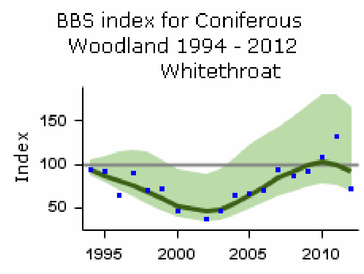
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	290	2	-10	18
Coniferous Woodland	16	1995-2011	39	16	-17	97
Mixed Woodland	16	1995-2011	108	8	-23	41
Lowland Grassland/ Heath	16	1995-2011	70	72	14	158
Arable	16	1995-2011	527	49	40	61
Pasture	16	1995-2011	586	38	26	54
Mixed Farmland	16	1995-2011	397	45	34	60
Rural Settlement	16	1995-2011	326	37	21	55
Urban/ Suburban	16	1995-2011	97	7	-12	31
Wetlands/ Standing Water	16	1995-2011	48	51	16	101

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Flowing Water	16	1995-2011	192	55	31	81

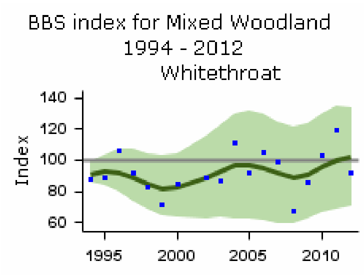
Further information on habitat-specific trends, please follow link here.



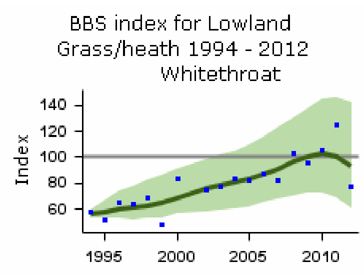
Habitat graph



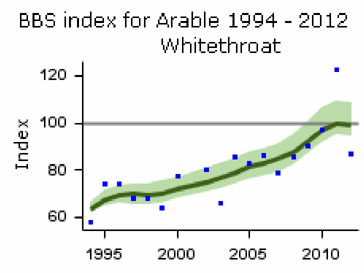
Habitat graph



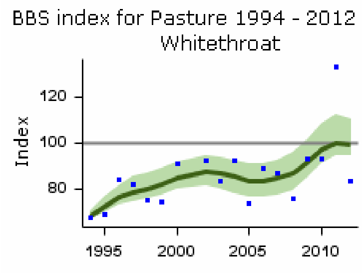
Habitat graph



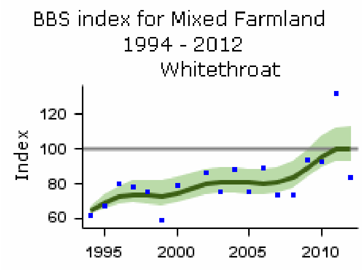
Habitat graph



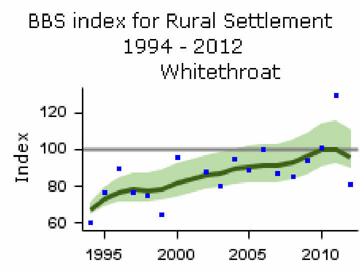
Habitat graph



Habitat graph



Habitat graph



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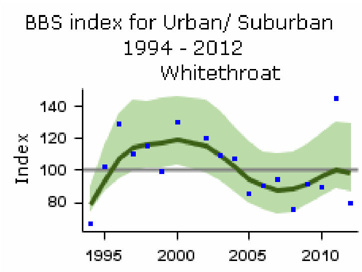
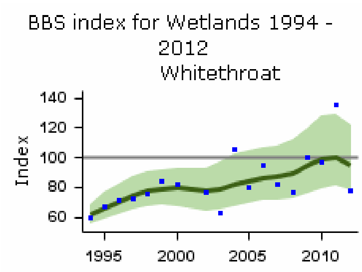
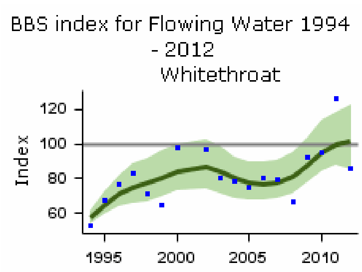


Habitat graph

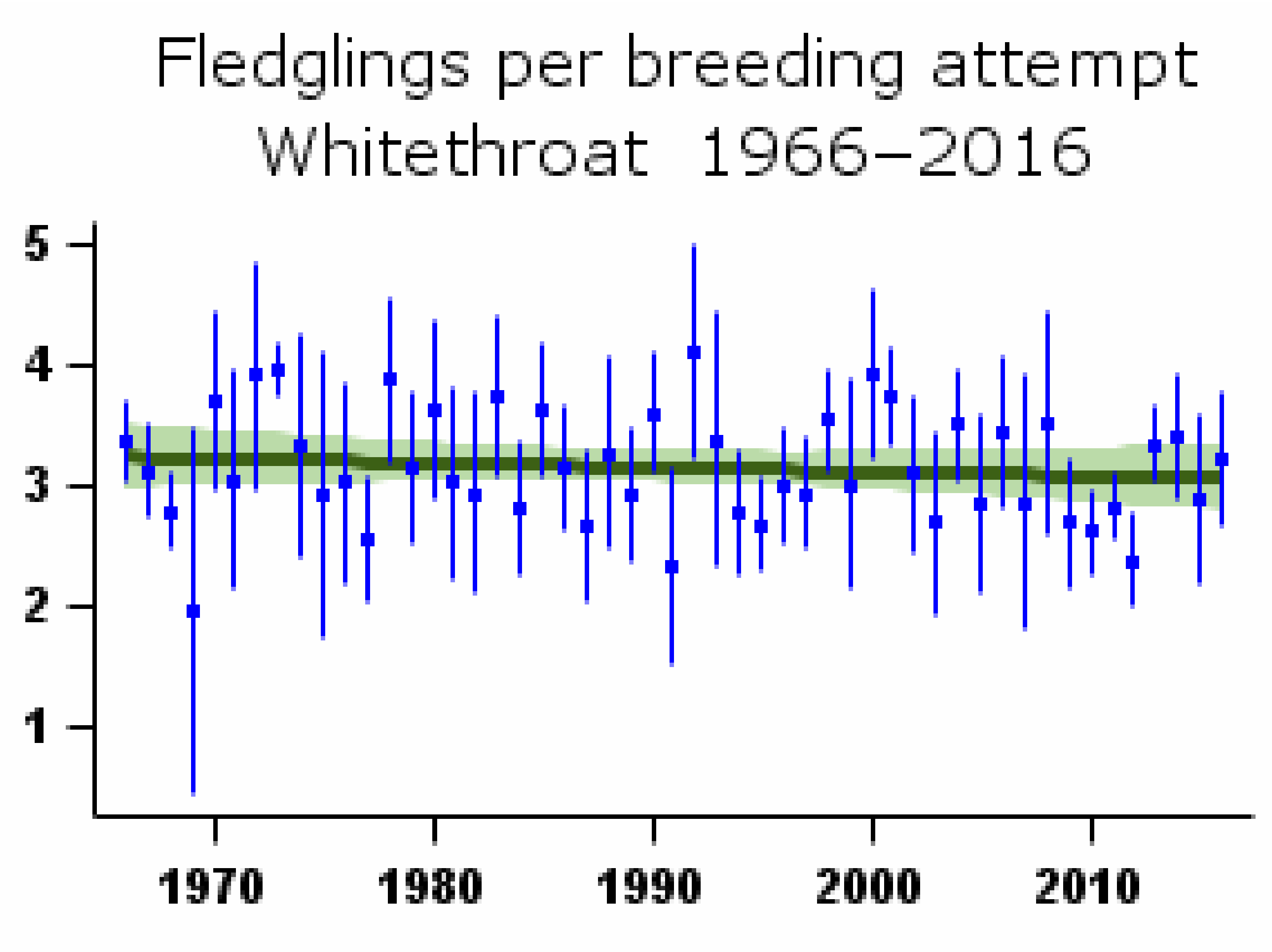


Habitat graph

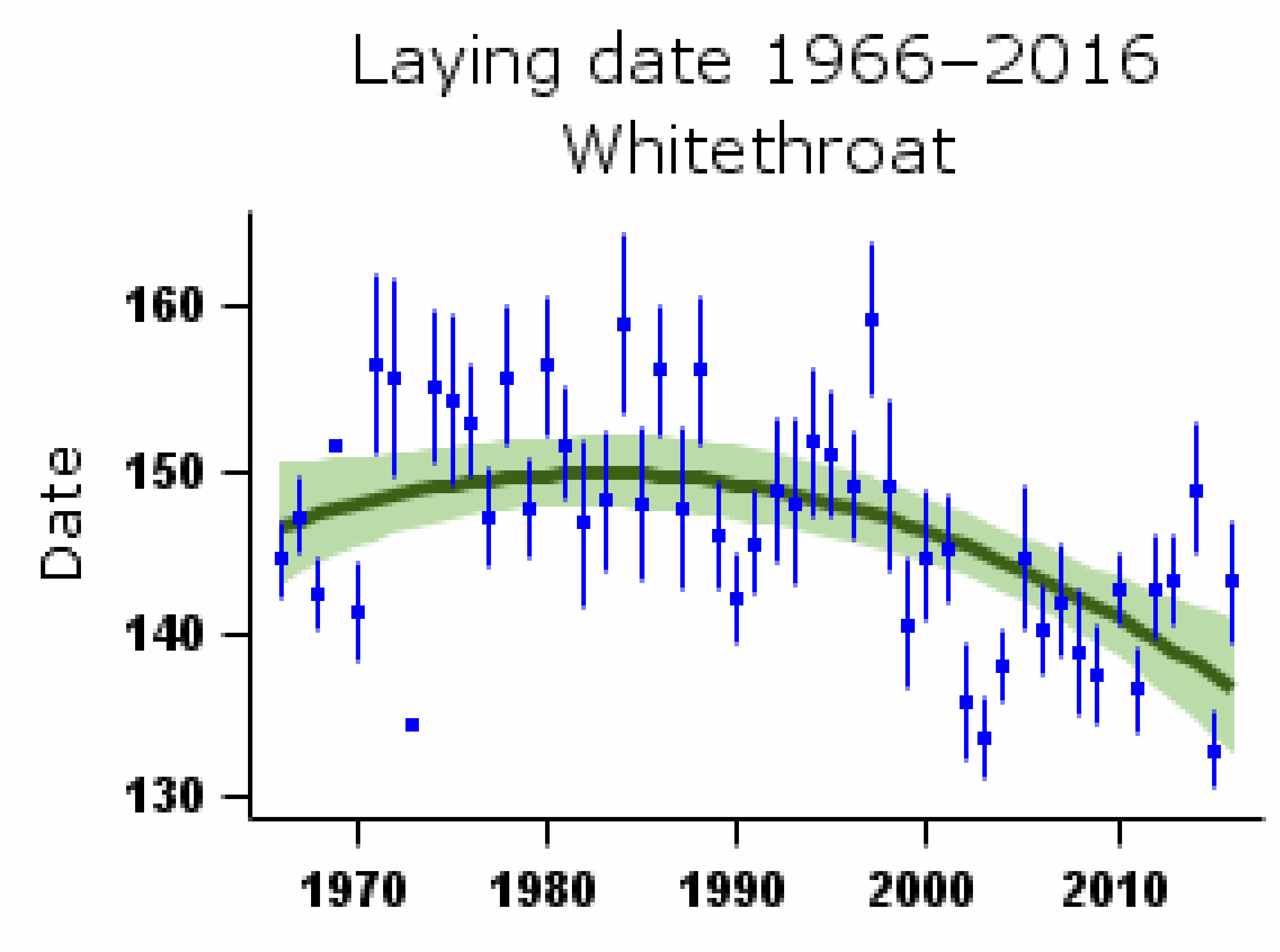


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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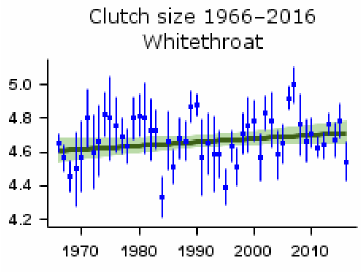
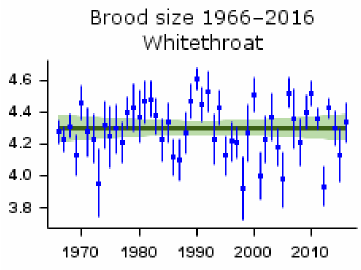
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	44	None					
Clutch size	48	1967-2015	33	None					
Brood size	48	1967-2015	69	None					
Nest failure rate at egg stage	48	1967-2015	45	Curvilinear	1.03% nests/day	1.78% nests/day	72.8%		
Nest failure rate at chick stage	48	1967-2015	52	None					
Laying date	48	1967-2015	21	Curvilinear	May 27	May 17	-10 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	79	Smoothed trend	74 Index value	100 Index value	35%		
Juvenile to Adult ratio (CES)	25	1990-2015	87	Smoothed trend	101 Index value	100 Index value	-1%		
Juvenile to Adult ratio (CES)	10	2005-2015	87	Smoothed trend	85 Index value	100 Index value	17%		
Juvenile to Adult ratio (CES)	5	2010-2015	96	Smoothed trend	100 Index value	100 Index value	0%		

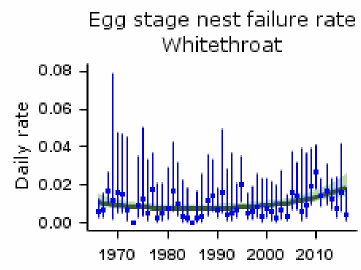
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



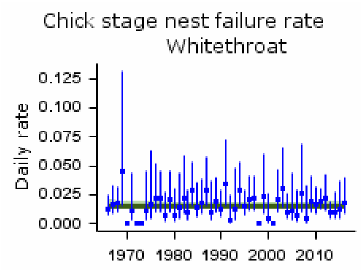
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



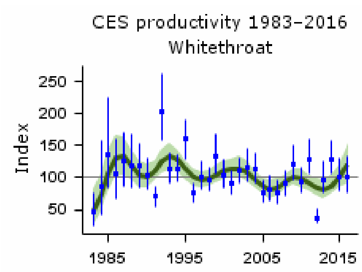
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



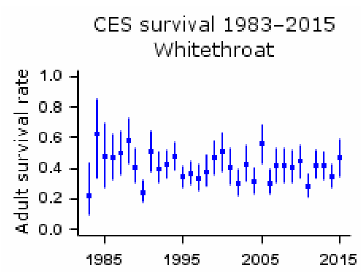
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

There is good evidence that the major changes in the population of this species have been driven by conditions on its wintering grounds and so are related to overwinter survival.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival	
Ecological	Changes on wintering grounds	

Further information on causes of change

In a pioneering study, Winstanley et al. (1974) provided good evidence to link the 1969 crash to drought in the Whitethroat's wintering grounds in the western Sahel, just south of the Sahara Desert. More recent analysis of data from four western European countries found a strong relationship between overwinter survival and population change over a 20-year period (Johnston et al. 2016). Correspondingly, Baillie & Peach (1992) found that breeding performance was poorly correlated with population changes. They found that fluctuations in losses of adult birds were correlated with conditions on the wintering grounds, and were correlated with Sahel rainfall. Thus, the population appears to be limited by food resources on the wintering grounds, because rainfall in the dry Sahelian landscape promotes greater invertebrate abundance. There has been no long-term trend in the number of fledglings per breeding attempt (see above). Productivity, as measured by CES, rose during the 1980s and has since fluctuated and fallen back.

More recent work has provided good evidence that the density of Whitethroats wintering in the Sahel is correlated with the number and size of trees, and that the increase in overall density of trees was related to an increase in Whitethroats in the area (Stevens et al. 2010). Wilson & Cresswell (2006) found that Whitethroats were most common in areas with intermediate tree heights. They suggest that Whitethroats appear to be able to survive in extremely degraded habitats, yet may be vulnerable to the disappearance of Salvadora trees, the fruit of which assists pre-migratory fattening. This is likely to be a separate mechanism to the earlier rainfall mechanism contributing to the population decline and is probably linked to the more recent gradual increase.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Grasshopper Warbler

Locustella naevia

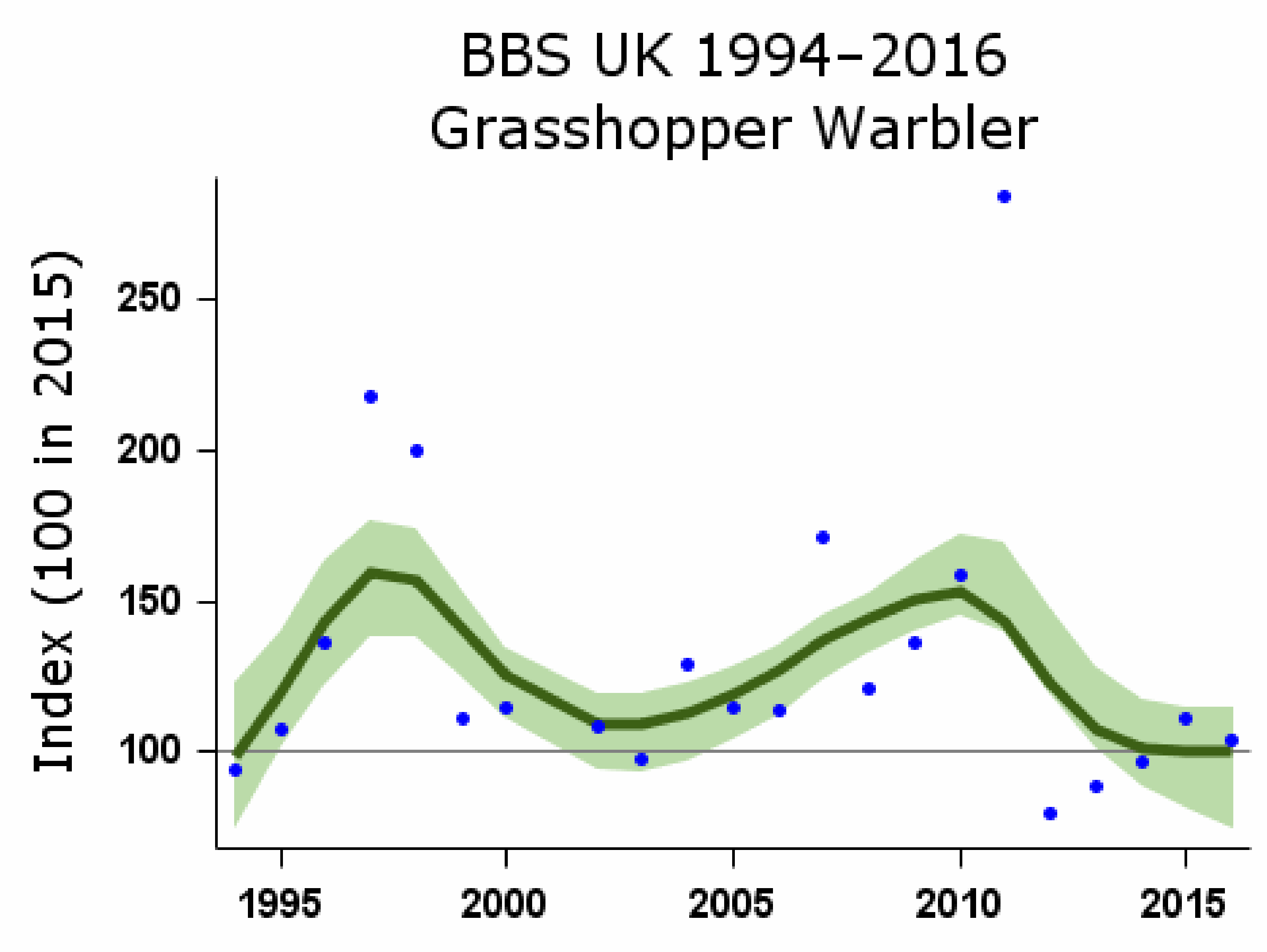
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: decline
Population size:	16,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Grasshopper Warbler was previously amber-listed because of a contraction in range during the period preceding the 1988-91 Atlas (Gibbons et al. 1993). The CBC index suffered from small and severely dwindling sample sizes, but the available data indicate a rapid population decline between the mid 1960s and mid 1980s, when numbers became too small for annual monitoring (Marchant et al. 1990). On this basis, the species is now red-listed. The BBS shows wide fluctuations in abundance since 1994, with no clear trend for the UK but a moderate decline in England. There has been a moderate decline across Europe since 1980 (PECBMS 2016a).



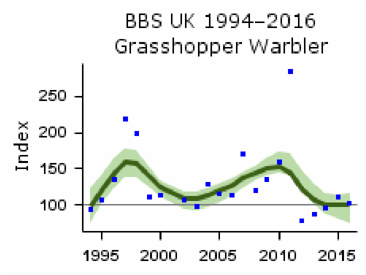
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

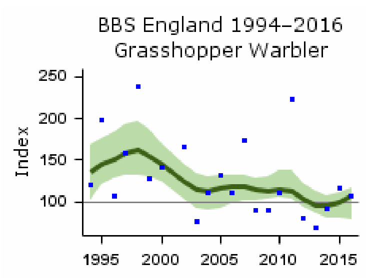
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	87	-17	-41	15		
	10	2005-2015	105	-16	-37	6		
	5	2010-2015	110	-35	-50	-29	>25	
BBS England	20	1995-2015	40	-31	-53	-11	>25	
	10	2005-2015	51	-14	-33	8		
	5	2010-2015	54	-13	-38	-4		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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



BBS UK graph



BBS England graph

Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	4	None					Small sample
Brood size	48	1967-2015	7	None					Small sample
Nest failure rate at egg stage	48	1967-2015	3	None					Small sample
Nest failure rate at chick stage	48	1967-2015	6	None					Small sample
Laying date	48	1967-2015	7	Curvilinear	May 22	May 18	-4 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Causes of change

The demographic and ecological causes of population change in this species are largely unknown.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Unknown	

Further information on causes of change

There are not enough data to carry out demographic analyses for this species and the causes of the decline, both demographic and ecological, are largely unknown.

Although there is no specific evidence available, as this species is a migrant, it is possible that it has suffered from changes in conditions in the African Sahel zone along with some other trans-Saharan migrants.

Another hypothesis, again lacking good evidence to support or refute it, is that the decline is related to a recent decrease in the amount of suitable scrub habitat preferred by breeding Grasshopper Warblers. There are strong pointers that structural aspects of preferred habitat are important, including heterogeneity, and it seems likely that breeding habitat is limited, at least in some parts of Britain (Gilbert 2012). However, the Grasshopper Warbler's decline has been fairly steep and perhaps too rapid for gradual changes in scrub habitat availability or post-afforestation decline to be major factors (Riddiford 1983).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Sedge Warbler

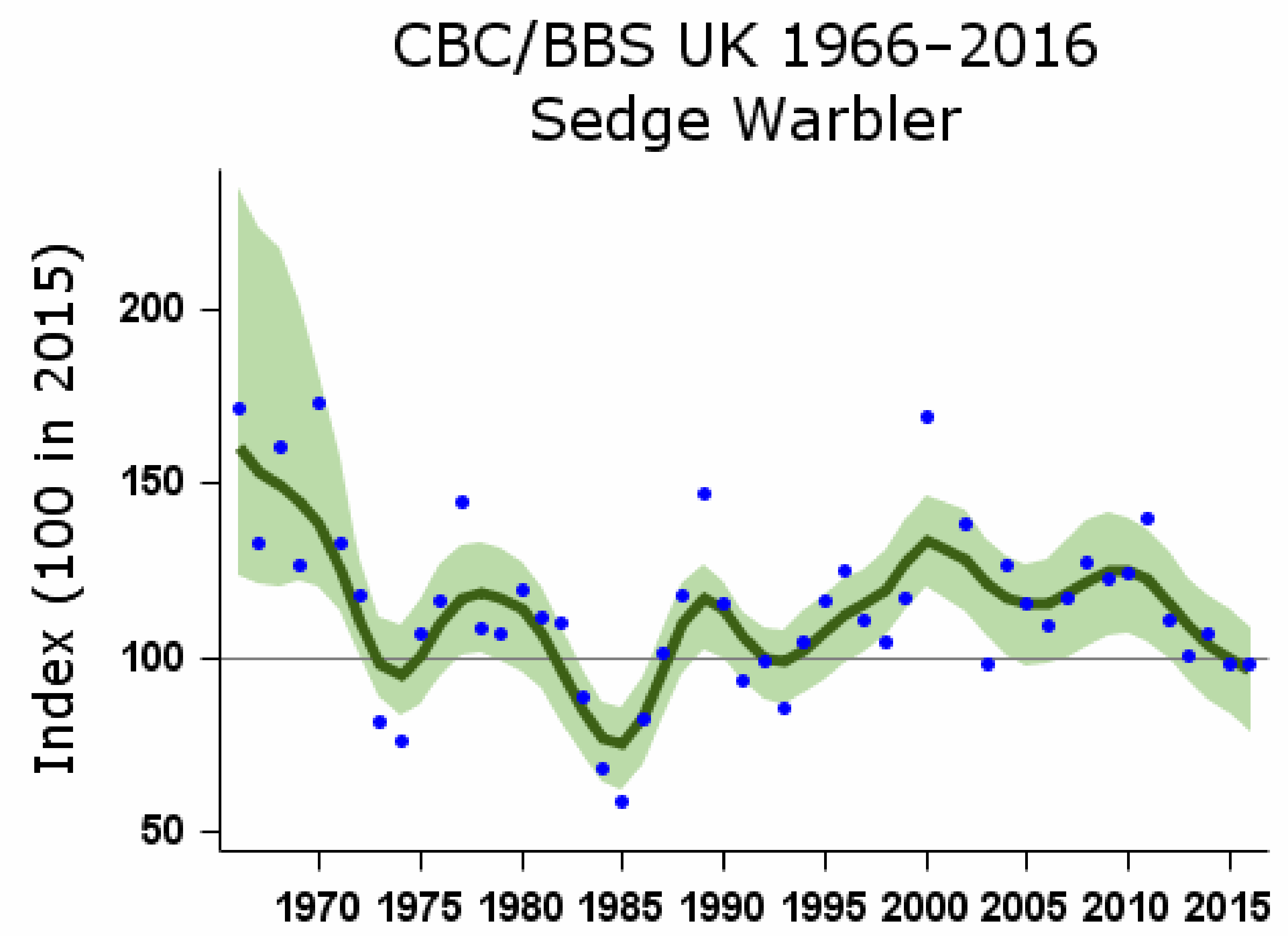
Acrocephalus schoenobaenus

Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: moderate decline
Population size:	290,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The trend, though apparently a moderate decline, is uncertain because the long-term changes are partly obscured by shorter fluctuations in numbers. Detailed analysis of BTO data sets has shown that much of the year-to-year variation in population size is driven by changes in adult survival rates which, in turn, are related to changes in rainfall on their wintering grounds, which lie just south of the Sahara Desert, in the West African Sahel (Peach et al. 1991), and analysis which also included additional data from western Europe also showed a strong relationship between overwinter survival and population change (Johnston et al. 2016). The smoothed CBC/BBS and WBS/WBBS trends show four troughs in population, related to years of poor West African rainfall, with a low point in 1984-85. The CES, which provides the biggest Sedge Warbler sample, shows the most recent three of the same troughs. Daily nest failure rates at the egg stage have increased slightly but the number of fledglings per breeding attempt has shown no change. CES productivity data show a sustained decrease since the late 1980s. Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

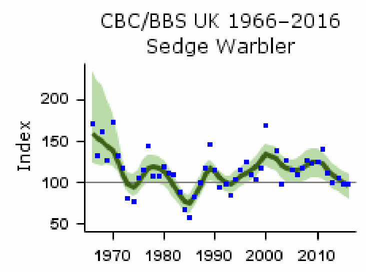
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	165	-35	-64	-5	>25	
	25	1990-2015	273	-12	-29	8		
	10	2005-2015	354	-13	-23	-2		

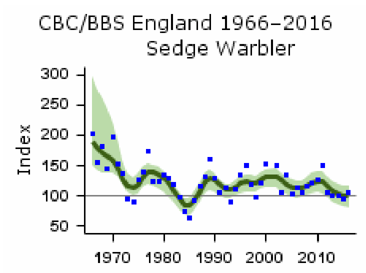
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	354	-20	-27	-13		
CBC/BBS England	48	1967-2015	109	-44	-72	-22	>25	
	25	1990-2015	176	-21	-37	2		
	10	2005-2015	225	-13	-26	3		
	5	2010-2015	225	-20	-28	-12		
WBS/WBBS waterways	40	1975-2015	73	-54	-68	-36	>50	
	25	1990-2015	95	-49	-60	-36	>25	
	10	2005-2015	105	-29	-39	-18	>25	
	5	2010-2015	97	-30	-38	-18	>25	
CES adults	31	1984-2015	67	-47	-64	-28	>25	
	25	1990-2015	74	-57	-66	-48	>50	
	10	2005-2015	72	-28	-36	-21	>25	
	5	2010-2015	75	-11	-19	-2		
CES juveniles	31	1984-2015	65	-62	-73	-44	>50	
	25	1990-2015	72	-68	-78	-57	>50	
	10	2005-2015	71	-35	-44	-23	>25	
	5	2010-2015	75	-11	-26	6		
BBS UK	20	1995-2015	312	-9	-26	9		
	10	2005-2015	354	-14	-24	-1		
	5	2010-2015	354	-20	-27	-12		
BBS England	20	1995-2015	198	-21	-36	-7		
	10	2005-2015	225	-13	-27	1		
	5	2010-2015	225	-19	-28	-12		
BBS Scotland	20	1995-2015	59	21	-16	74		
	10	2005-2015	67	-6	-26	15		
	5	2010-2015	68	-16	-26	0		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

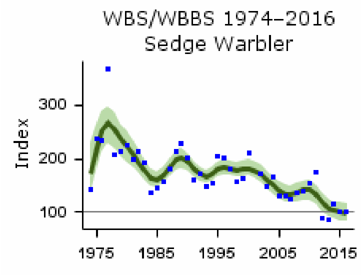
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



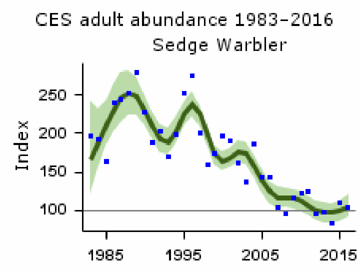
CBC/BBS UK graph



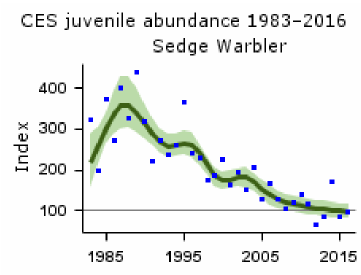
CBC/BBS England graph



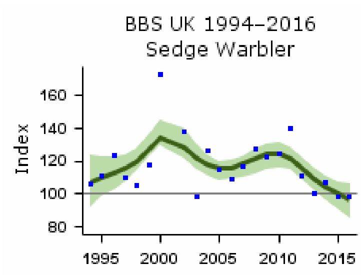
WBS/WBBS waterways graph



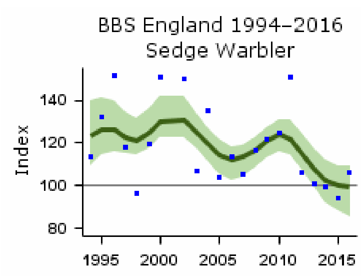
CES adults graph



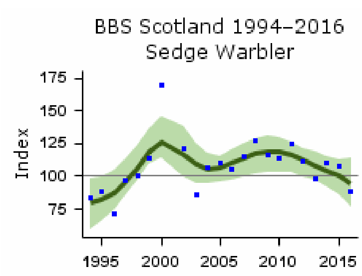
CES juveniles graph



BBS UK graph

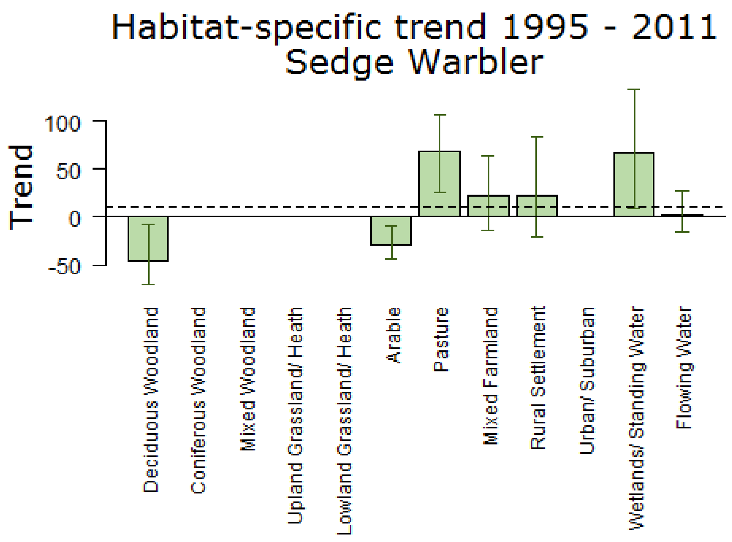


BBS England graph



BBS Scotland graph

Population trends by habitat



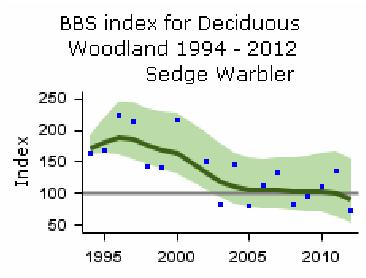
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

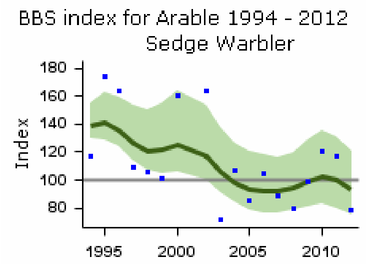
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	41	-45	-70	-8
Arable	16	1995-2011	71	-29	-45	-9
Pasture	16	1995-2011	117	68	26	106
Mixed Farmland	16	1995-2011	47	23	-13	64
Rural Settlement	16	1995-2011	42	22	-20	84
Wetlands/ Standing Water	16	1995-2011	40	67	9	133
Flowing Water	16	1995-2011	96	2	-16	27

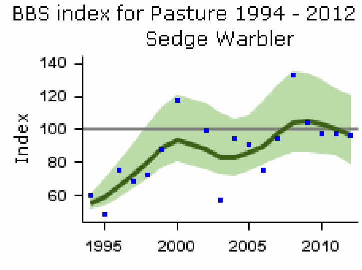
Further information on habitat-specific trends, please follow link here.



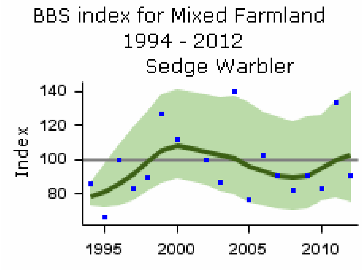
Habitat graph



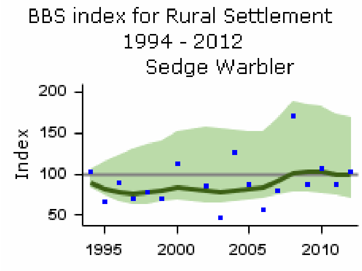
Habitat graph



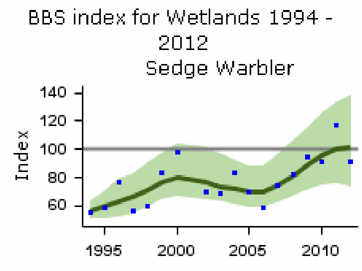
Habitat graph



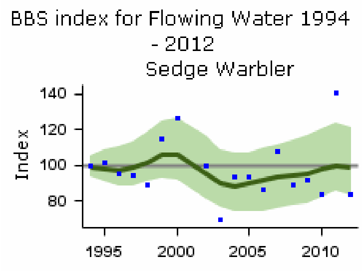
Habitat graph



Habitat graph

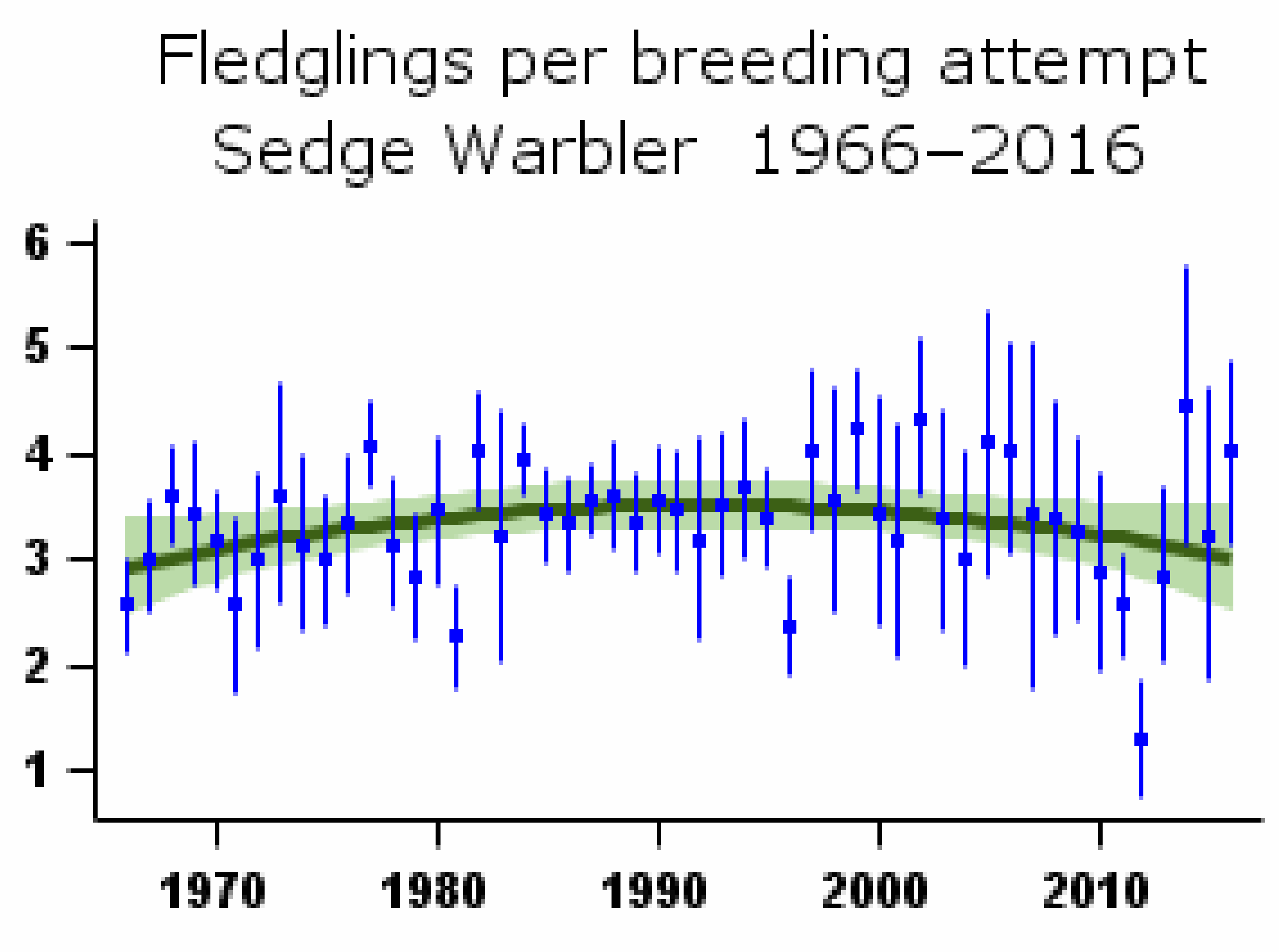


Habitat graph

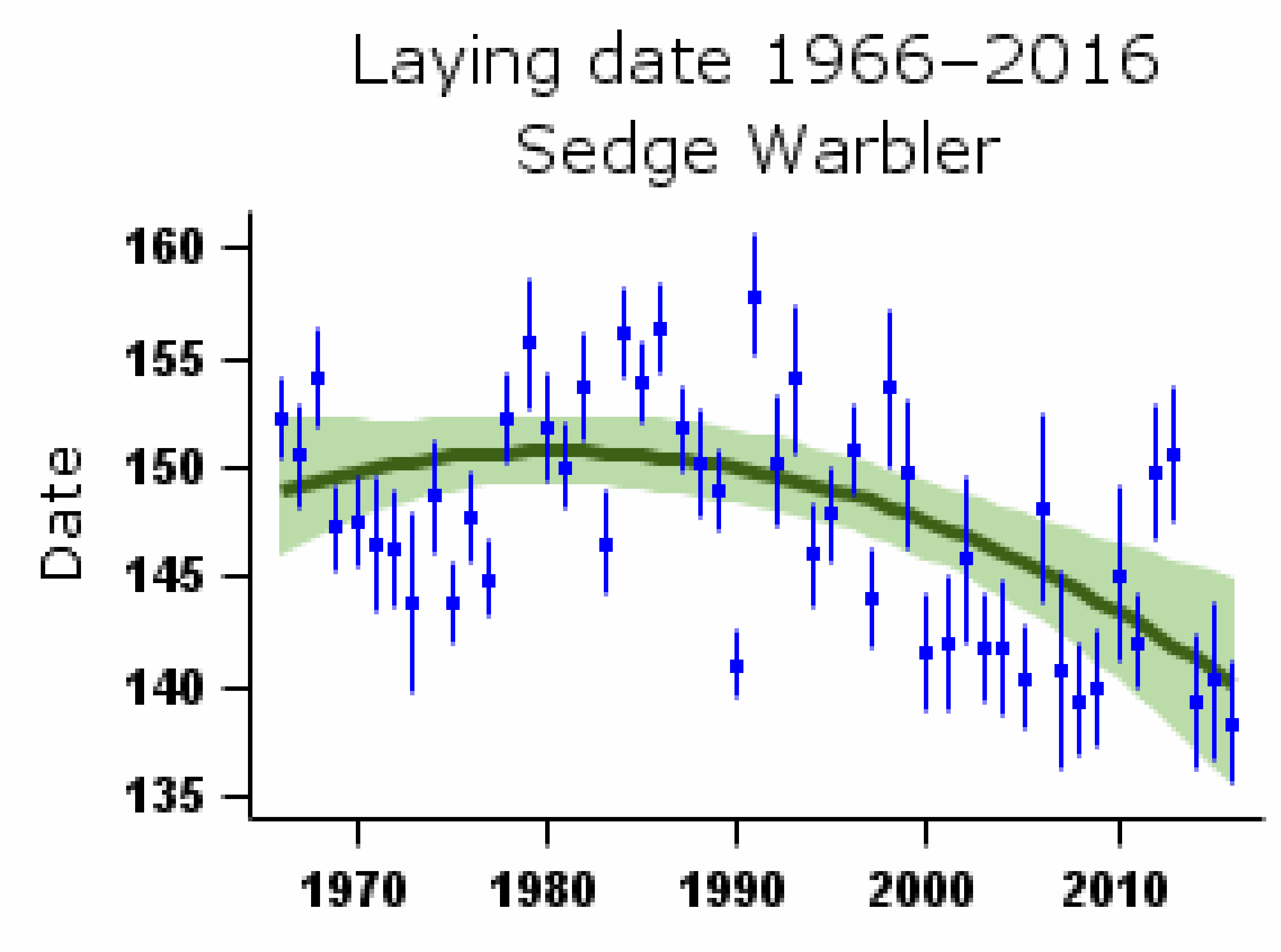


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

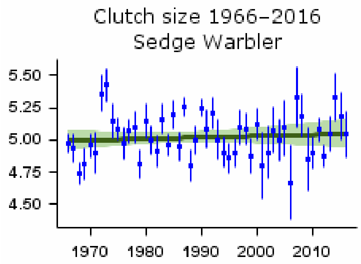


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

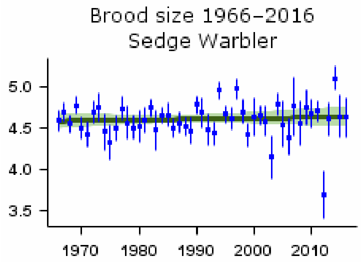
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	38	Curvilinear	2.97 fledglings	3.05 fledglings	2.7%		
Clutch size	48	1967-2015	33	None					
Brood size	48	1967-2015	53	None					
Nest failure rate at egg stage	48	1967-2015	40	Curvilinear	1.54% nests/day	2.03% nests/day	31.8%		
Nest failure rate at chick stage	48	1967-2015	45	None					
Laying date	48	1967-2015	45	Curvilinear	May 29	May 21	-8 days		
Juvenile to Adult ratio (CES)	31	1984-2015	73	Smoothed trend	262 Index value	100 Index value	-62%	>50	
Juvenile to Adult ratio (CES)	25	1990-2015	81	Smoothed trend	157 Index value	100 Index value	-36%	>25	
Juvenile to Adult ratio (CES)	10	2005-2015	80	Smoothed trend	125 Index value	100 Index value	-20%		
Juvenile to Adult ratio (CES)	5	2010-2015	84	Smoothed trend	117 Index value	100 Index value	-14%		

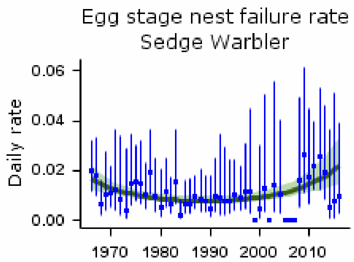
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



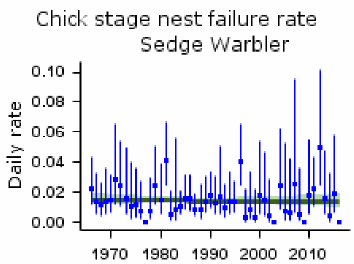
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



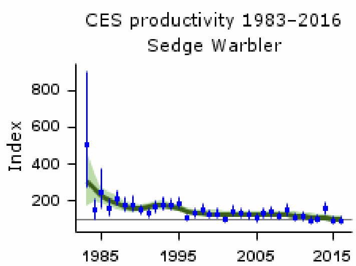
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



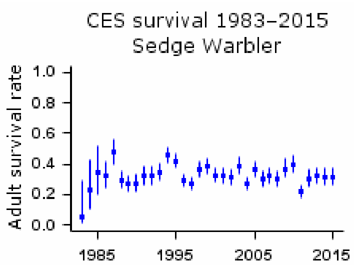
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Reed Warbler

Acrocephalus scirpaceus

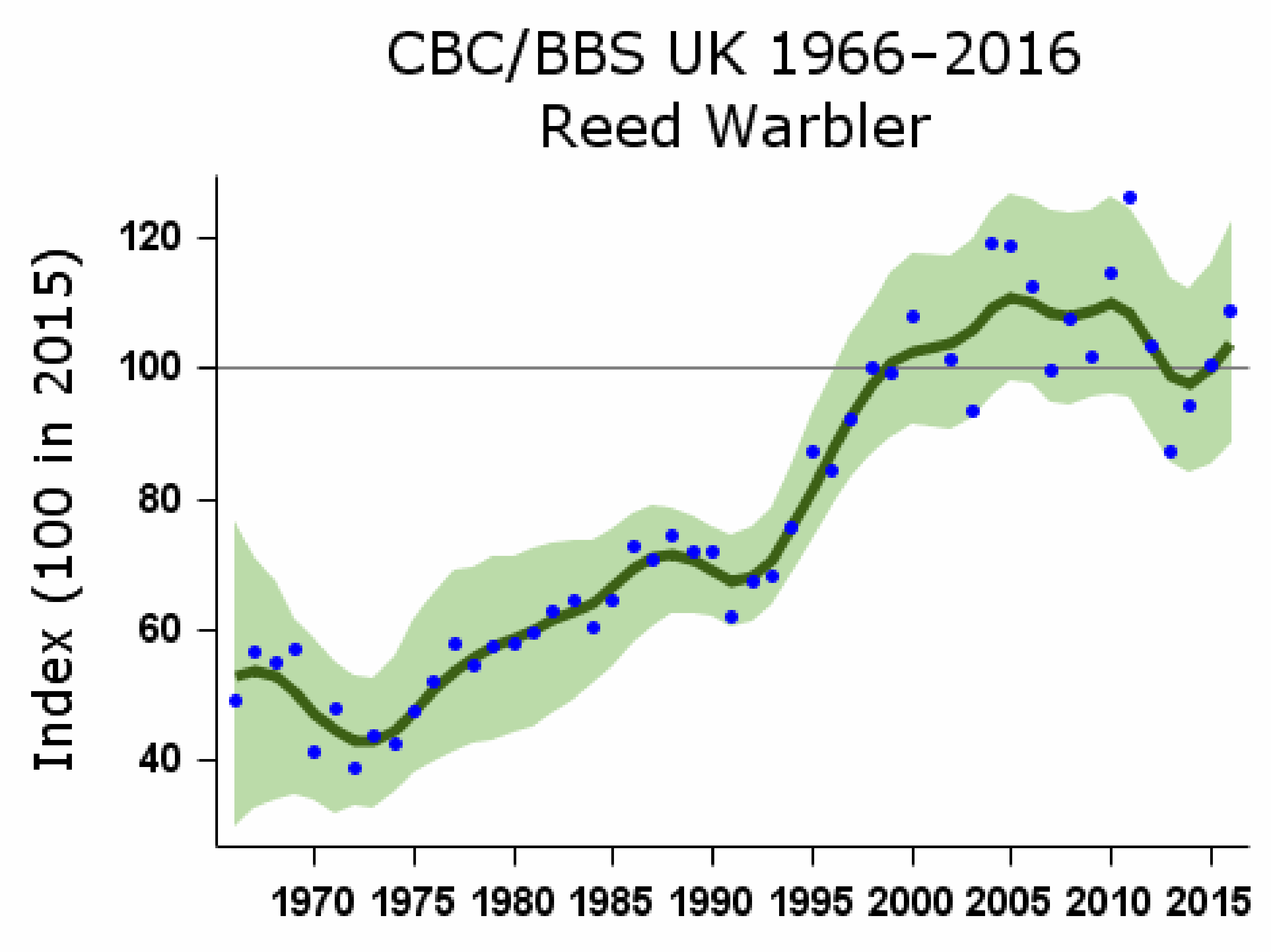
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: moderate increase
Population size:	130,000 (100,000-160,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Wetland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

This species has an unusually clumped distribution, with very high breeding concentrations in Phragmites reedbeds, where numbers are very hard to census. CES, which has many sites in reedbeds, ought perhaps to be a better measure of population change than either CBC/BBS or WBS/WBBS, where the species is encountered mainly at low density or in linear habitats. Both CBC/BBS and WBS/WBBS show progressive strong increases. CES, however, shows a decline from 1983 until the early 1990s, followed by a partial recovery, and another more recent decline. Population increase, as indicated by the census work, accords with the remarkable range expansion the species has achieved since the 1960s, as recorded by atlas projects. West Wales, northwest and northeast England were colonised, as was the east coast of Ireland, between 1968-72 and 1988-91 (Gibbons et al. 1993), and the species is now regular as far north as the Tay reedbeds (Robertson 2003, Balmeret al. 2013). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



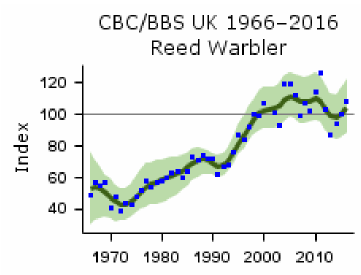
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

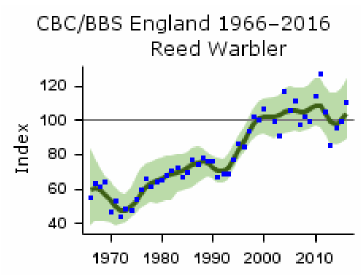
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	74	87	21	272		
	25	1990-2015	123	45	15	89		
	10	2005-2015	167	-10	-22	3		
	5	2010-2015	167	-9	-19	1		
CBC/BBS England	48	1967-2015	70	66	11	210		
	25	1990-2015	116	37	11	78		
	10	2005-2015	157	-5	-19	10		
	5	2010-2015	156	-8	-18	4		
WBS/WBBS waterways	34	1981-2015	45	80	-1	269		
	25	1990-2015	55	43	10	101		
	10	2005-2015	64	-1	-16	17		
	5	2010-2015	57	1	-13	17		
CES adults	31	1984-2015	57	-24	-44	-1		
	25	1990-2015	63	5	-18	27		
	10	2005-2015	65	10	-4	26		
	5	2010-2015	70	10	1	19		
CES juveniles	31	1984-2015	60	1	-29	34		
	25	1990-2015	66	28	-14	61		
	10	2005-2015	69	23	6	43		
	5	2010-2015	74	8	-6	21		
BBS UK	20	1995-2015	136	17	-4	44		
	10	2005-2015	167	-10	-23	6		
	5	2010-2015	167	-9	-19	2		
BBS England	20	1995-2015	128	16	-3	46		
	10	2005-2015	157	-5	-18	7		
	5	2010-2015	156	-8	-19	5		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

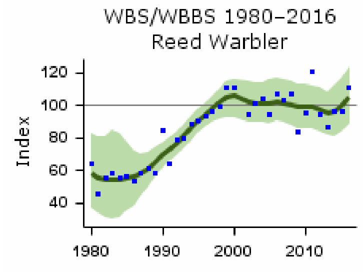
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



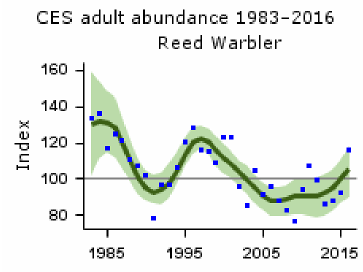
CBC/BBS UK graph



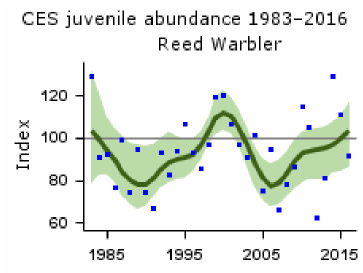
CBC/BBS England graph



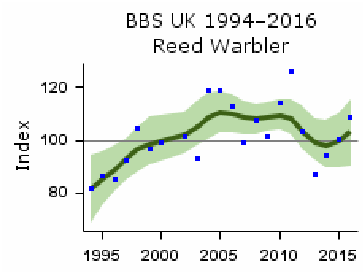
WBS/WBBS waterways graph



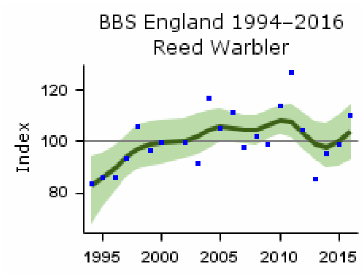
CES adults graph



CES juveniles graph

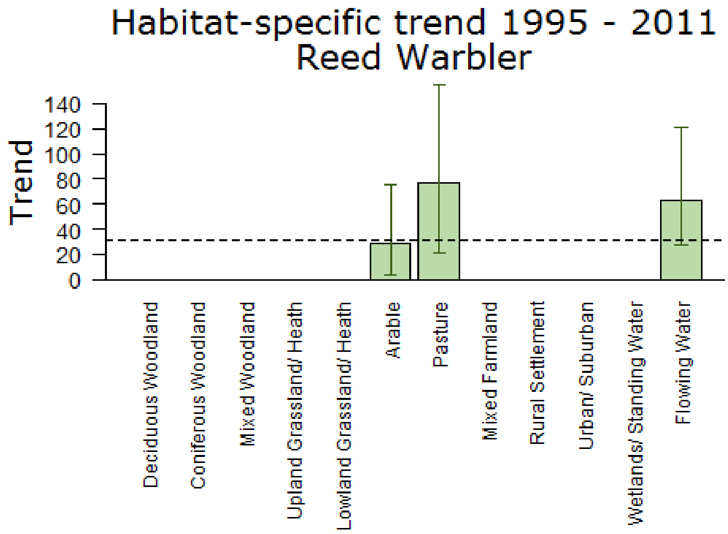


BBS UK graph



BBS England graph

Population trends by habitat



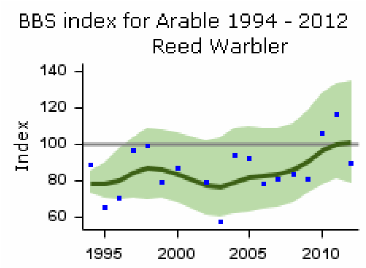
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

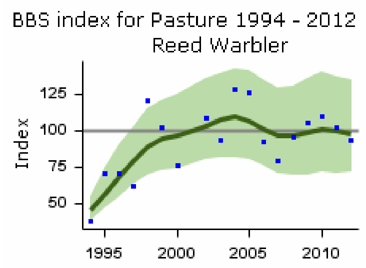
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Arable	16	1995-2011	37	29	3	75
Pasture	16	1995-2011	36	77	21	155
Flowing Water	16	1995-2011	49	63	28	121

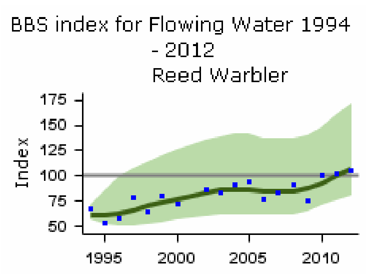
Further information on habitat-specific trends, please follow link here.



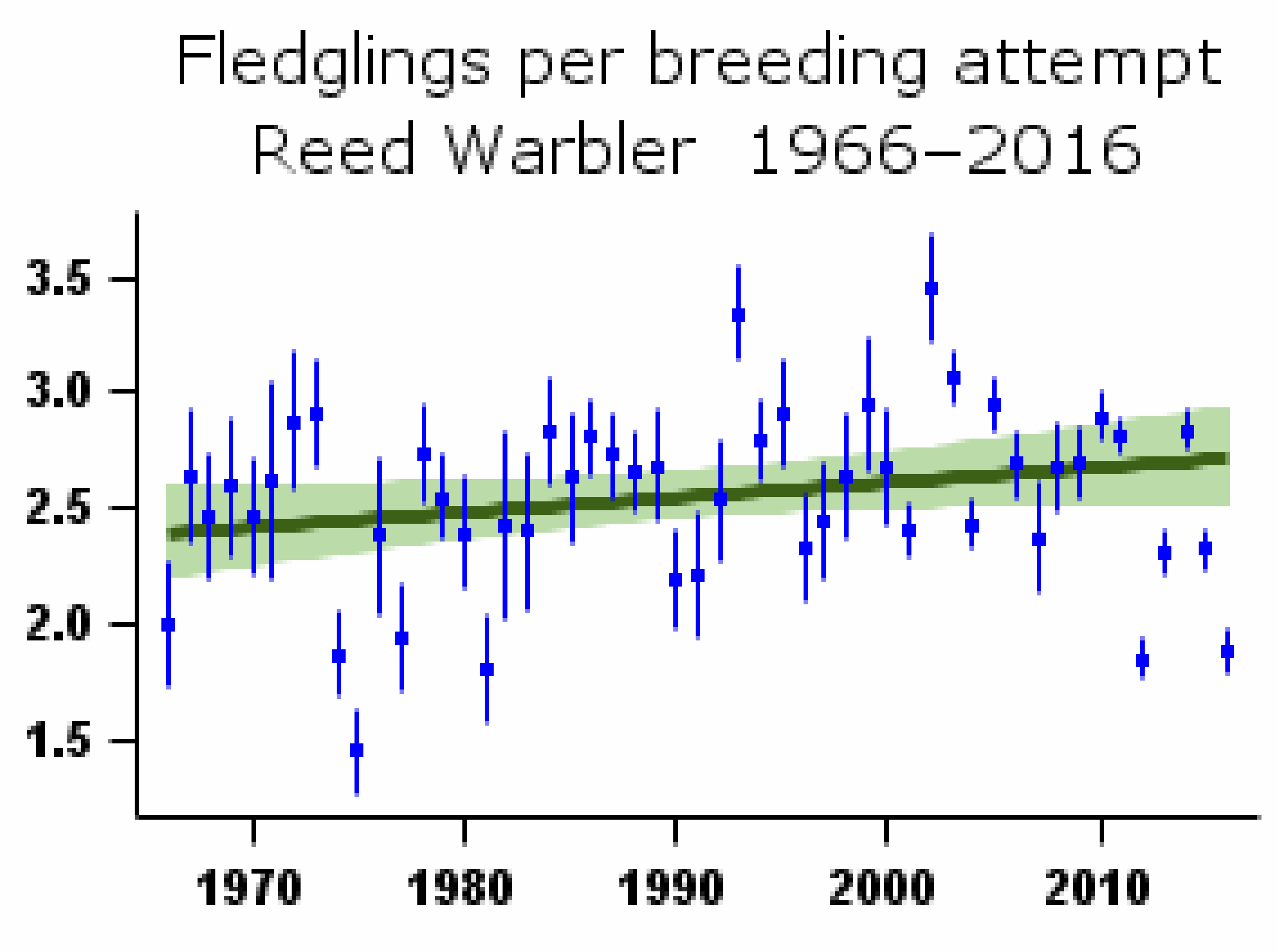
Habitat graph



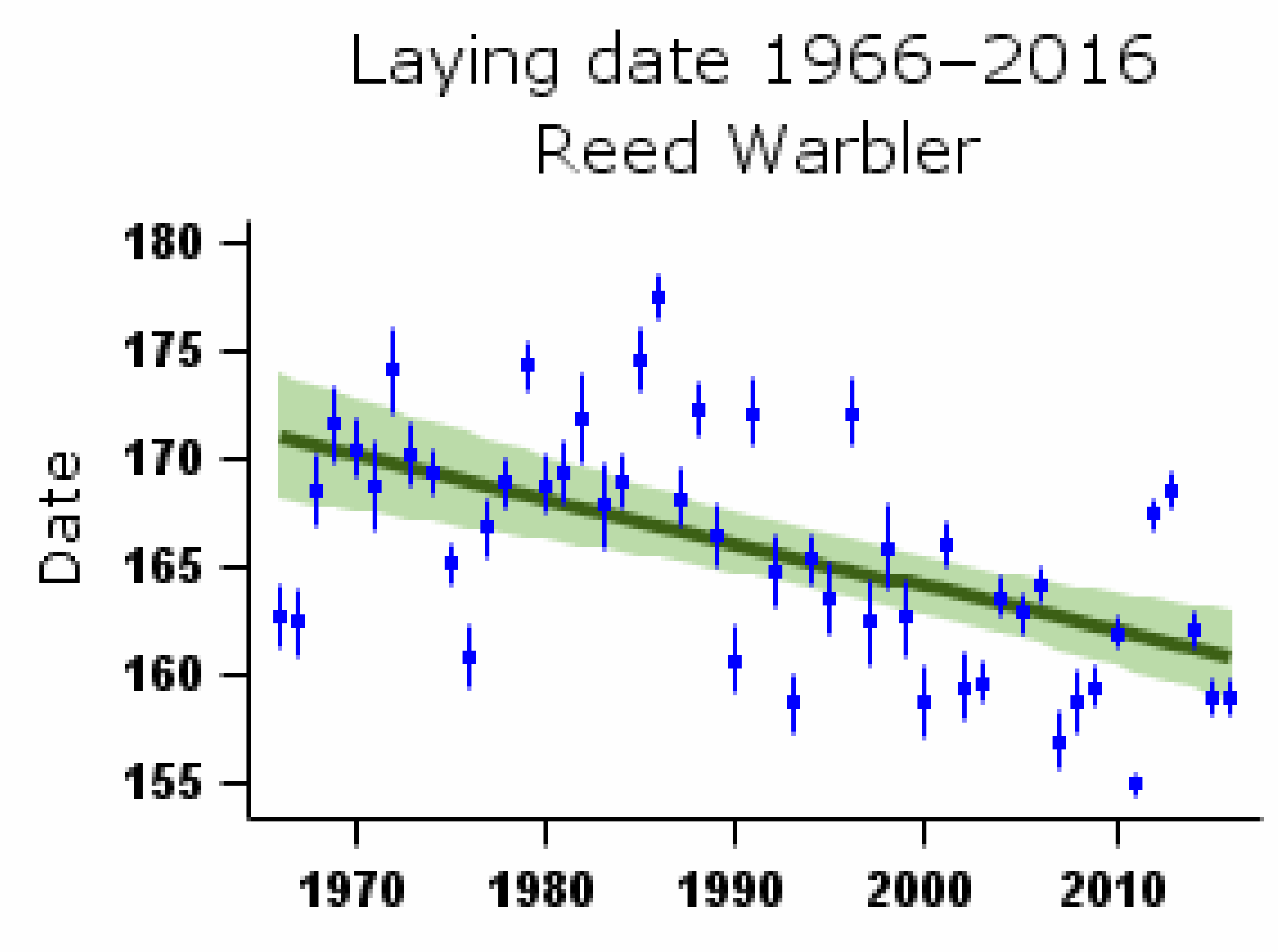
Habitat graph



Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

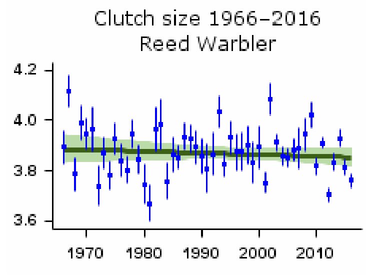


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

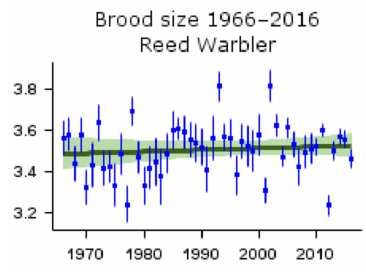
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	164	None					
Clutch size	48	1967-2015	173	None					
Brood size	48	1967-2015	186	None					
Nest failure rate at egg stage	48	1967-2015	214	Curvilinear	1.86% nests/day	2.04% nests/day	9.7%		
Nest failure rate at chick stage	48	1967-2015	165	Curvilinear	2.17% nests/day	0.84% nests/day	-61.3%		
Laying date	48	1967-2015	240	Linear decline	Jun 20	Jun 10	-10 days		
Juvenile to Adult ratio (CES)	31	1984-2015	64	Smoothed trend	77 Index value	100 Index value	29%		
Juvenile to Adult ratio (CES)	25	1990-2015	71	Smoothed trend	99 Index value	100 Index value	1%		
Juvenile to Adult ratio (CES)	10	2005-2015	73	Smoothed trend	108 Index value	100 Index value	-7%		
Juvenile to Adult ratio (CES)	5	2010-2015	78	Smoothed trend	107 Index value	100 Index value	-7%		

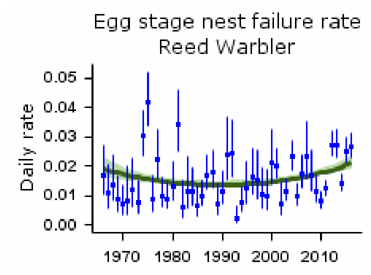
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



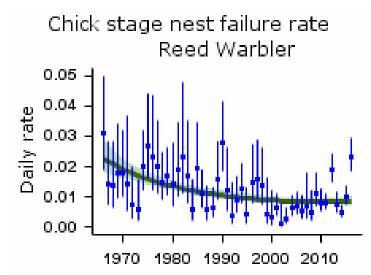
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



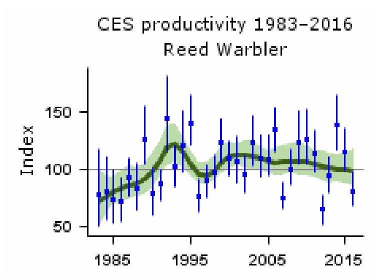
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



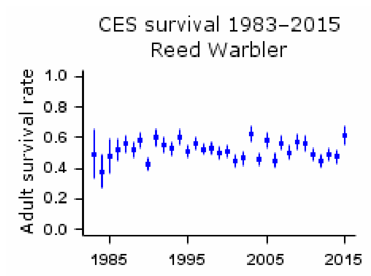
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

Breeding performance has increased, with some suggestion that this may be related to warming climate or improved habitat management, although the evidence for this is sparse.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Climate change	

Further information on causes of change

There is some evidence to suggest that this species has benefited from warmer climates. Reed Warblers have shown a trend towards earlier laying (see above), which can be partly explained by recent climate change (Crick & Sparks 1999, Halupka et al. 2008). Halupka et al. (2008) analysed changes in breeding parameters of Polish Reed Warblers, studied during 12 breeding seasons between 1970 and 2006, and found that the onset of breeding advanced with warming temperatures, although the end of breeding did not change, thus resulting in an extension of the breeding season. The lengthening of the laying period by about three weeks meant that more birds were able to rear second broods. Furthermore, mean temperature during May-July correlated negatively with the proportion of nests that failed and there was some evidence of a positive relationship with the number of fledglings. Eglington et al. (2015) also suggest that the spread of Reed Warbler may be due to higher productivity stemming from increased temperatures. Experimental provision of supplementary food at two sites in South Wales led to advanced laying and increased productivity, indicating that food supply may be a limiting factor; hence suggesting a mechanism through which the trends may have occurred (Vafadis et al. 2016); .

The demographic data show a decrease in nest failures at the chick stage, although no trend was detected in the numbers of fledglings per breeding attempt, and a small improvement is apparent in CES productivity, although there is no available evidence to suggest that this is related to changing climate.

Both CBC/BBS and WBS/WBBS trends show progressive moderate increases perhaps linked to increasingly sensitive management of small and linear wetland sites. Thaxter et al. (2006) analysed data from two sites and found indirect evidence linking good habitat management to local abundance and survival.

As this species is a migrant it is possible that factors operating outside the breeding season may be responsible for changes in population in the UK. Thaxter et al. (2006) found that, unlike in the 2004) found that the French Reed Warbler population appears to be strongly regulated and that population growth rate was more influenced by survival rate than by recruitment.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Nuthatch

Sitta europaea

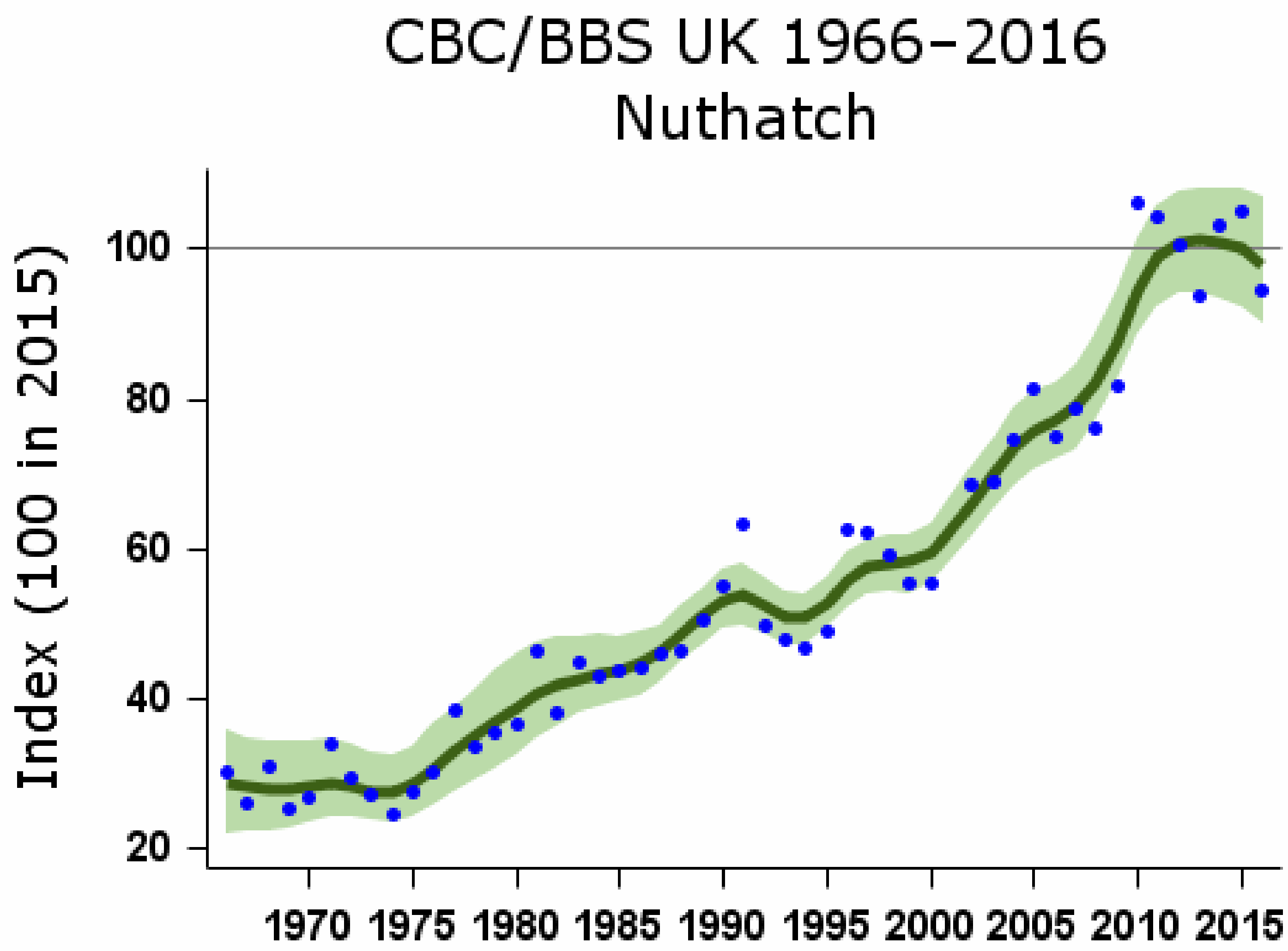
Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: rapid increase
Population size:	220,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Nuthatch abundance in the UK has increased rapidly since the mid 1970s. Despite minor setbacks during the 1990s, there is no indication yet of a halt to the upward trend. This increase has been accompanied by a range expansion into northern England and southern Scotland (Balmer et al. 2013). The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

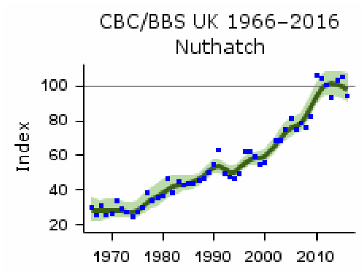
Population changes in detail

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

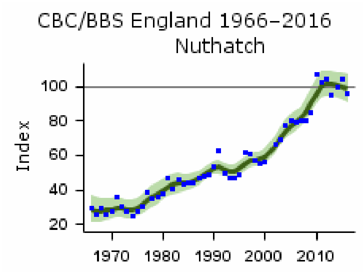
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	277	254	162	393		
	25	1990-2015	478	88	63	117		
	10	2005-2015	712	32	23	42		
	5	2010-2015	794	6	-1	11		
CBC/BBS England	48	1967-2015	238	258	151	417		
	25	1990-2015	409	90	66	116		
	10	2005-2015	613	29	21	38		
	5	2010-2015	686	4	-2	8		
BBS UK	20	1995-2015	545	90	71	109		
	10	2005-2015	712	32	24	42		
	5	2010-2015	794	6	0	12		
BBS England	20	1995-2015	464	91	72	112		
	10	2005-2015	613	30	22	41		
	5	2010-2015	686	4	-2	10		
BBS Wales	20	1995-2015	78	47	18	81		
	10	2005-2015	93	15	3	34		
	5	2010-2015	100	-1	-13	12		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

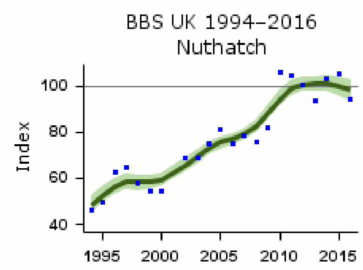
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



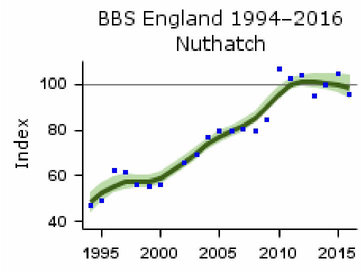
CBC/BBS UK graph



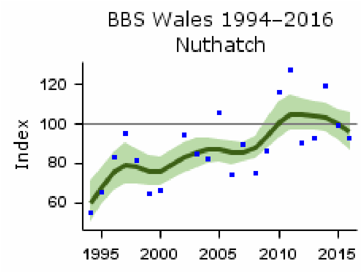
CBC/BBS England graph



BBS UK graph

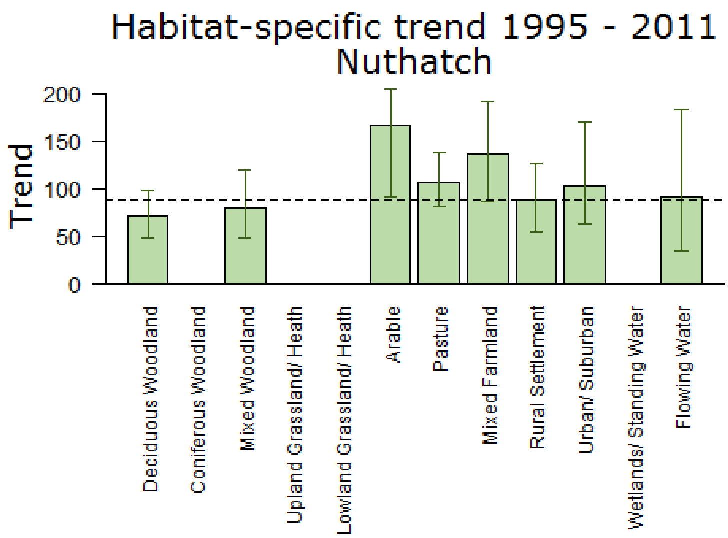


BBS England graph



BBS Wales graph

Population trends by habitat



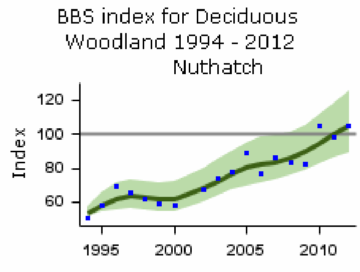
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

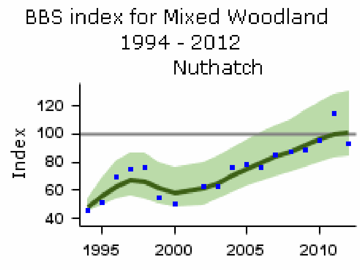
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	202	71	48	99
Mixed Woodland	16	1995-2011	110	79	47	119
Arable	16	1995-2011	59	166	91	204
Pasture	16	1995-2011	203	106	81	137
Mixed Farmland	16	1995-2011	47	136	87	191
Rural Settlement	16	1995-2011	106	87	55	126
Urban/ Suburban	16	1995-2011	45	103	63	170
Flowing Water	16	1995-2011	54	91	35	182

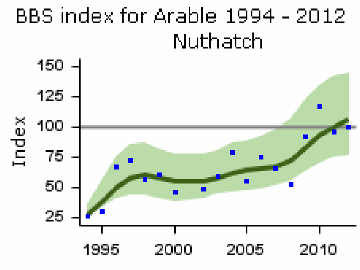
Further information on habitat-specific trends, please follow link here.



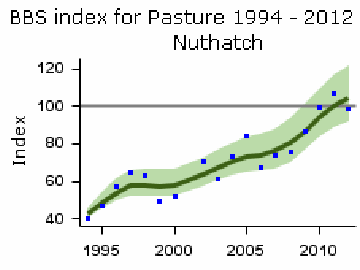
Habitat graph



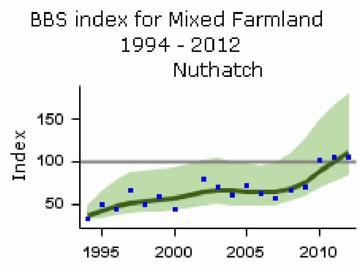
Habitat graph



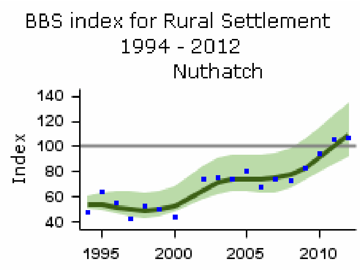
Habitat graph



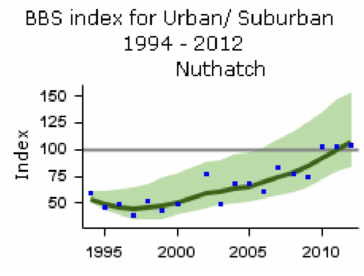
Habitat graph



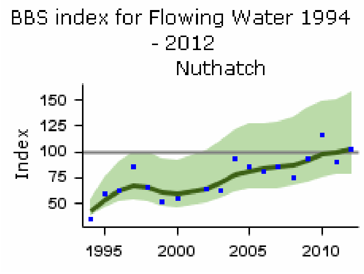
Habitat graph



Habitat graph

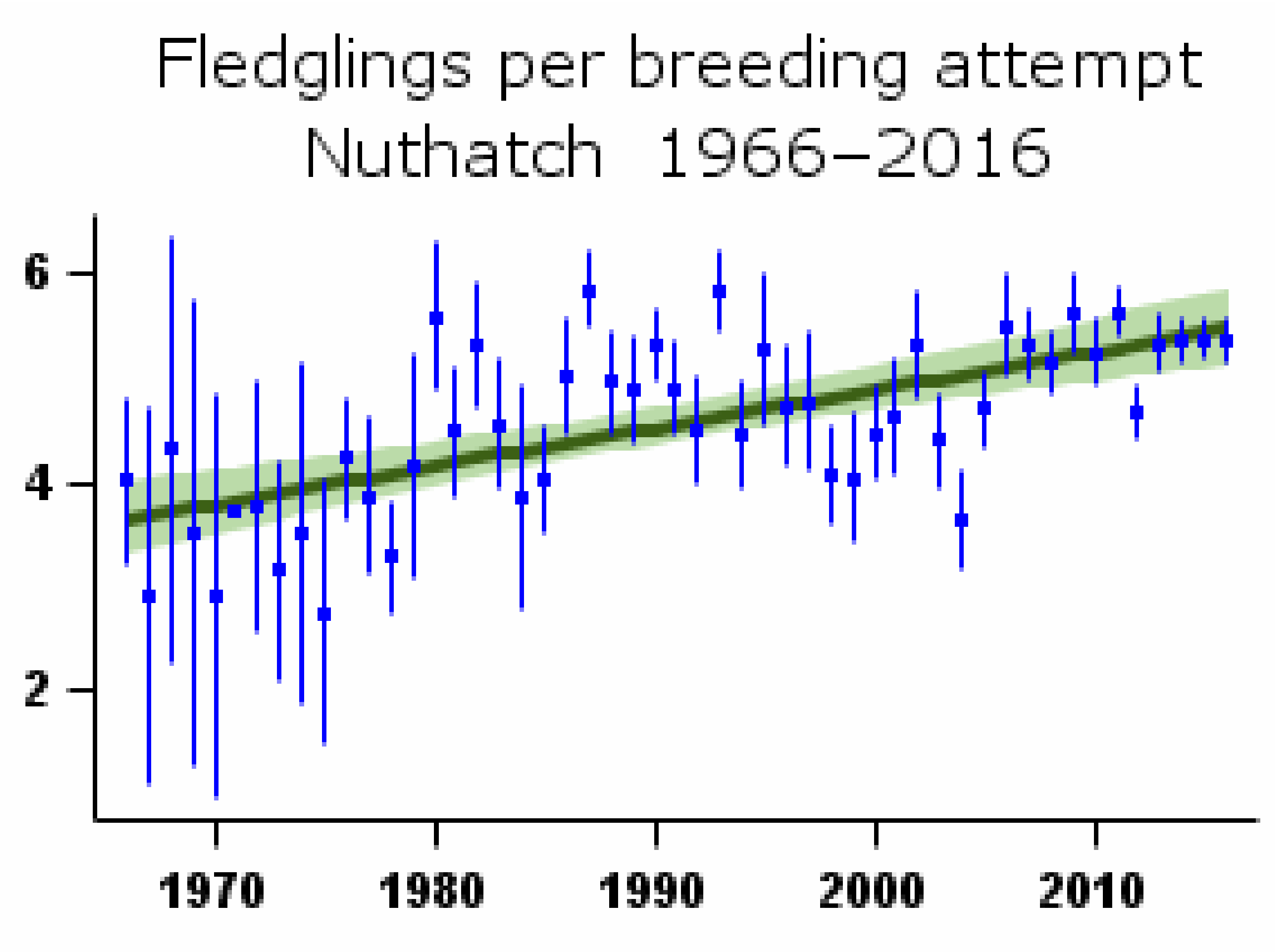


Habitat graph

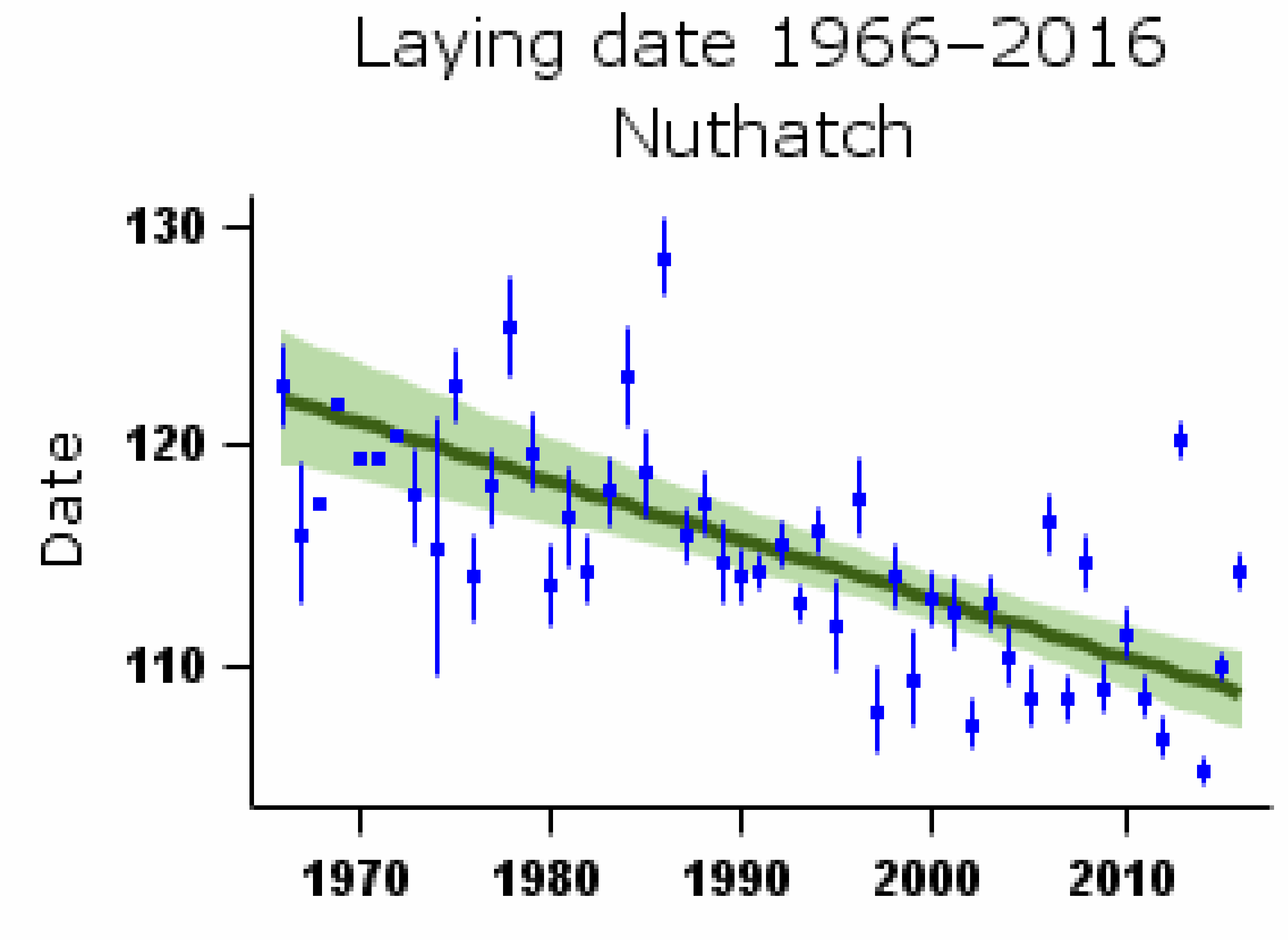


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

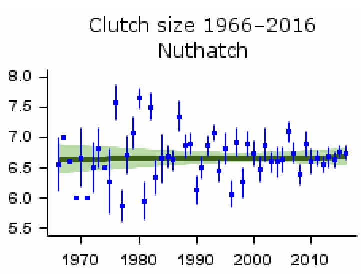


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

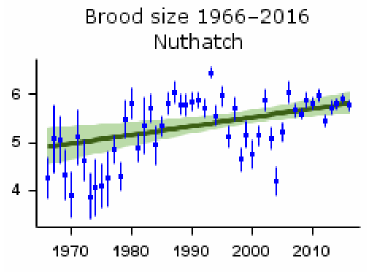
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	64	Linear increase	3.69 fledglings	5.44 fledglings	47.4%		
Clutch size	48	1967-2015	36	None					
Brood size	48	1967-2015	86	Linear increase	4.92 chicks	5.80 chicks	17.7%		
Nest failure rate at egg stage	48	1967-2015	65	Linear decline	0.90% nests/day	0.20% nests/day	-77.8%		
Nest failure rate at chick stage	48	1967-2015	71	Linear decline	0.43% nests/day	0.21% nests/day	-51.2%		
Laying date	48	1967-2015	38	Linear decline	May 2	Apr 19	-13 days		

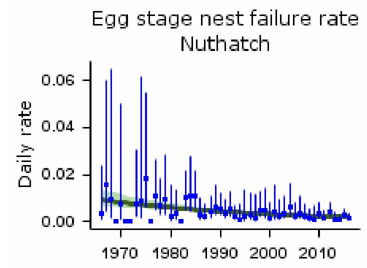
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



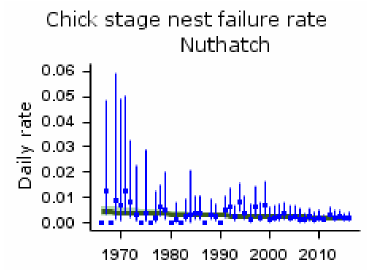
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The demographic causes of the population increase appear to be an increase in the number of fledglings per breeding attempt, larger brood sizes and a decrease in daily failure rates. However, it is unclear what the ecological drivers of these changes are.

Change factor	Primary driver	Secondary driver
Demographic	Increased breeding success	
Ecological	Unknown	

Further information on causes of change

The number of fledglings per breeding attempt has increased strongly, through an increase in brood size and a fall in nest failure rates.

There is little evidence relating to Nuthatch population change in the UK. However, studies from Europe provide evidence that mild winters are likely to have helped this species. Kallander (1997) used a long-term data set (1977-91) to provide good evidence that Nuthatches in a Swedish national park had a population size in spring which co-varied positively with winter temperatures and suggest that increases in population size may be associated with increasing mean winter temperature. Nilsson (1982, 1987) also found that mortality was concentrated in winter and that starvation was probably the major cause. However, a long-term study in Poland from 1975 to 1990 found that bird numbers in spring were not significantly correlated with the severity of the preceding winter, though winter survival was higher in the unusually mild winter of 1989/90, which had a rich supply of hornbeam seeds (Wesolowski & Stawarczyk 1991). It is not possible to say whether such factors have also operated in the UK, as the climate here is considerably less extreme.

Several studies have also reported a link between population size and the size of food availability in the autumn. A study of two Nuthatch populations in Sweden provided good evidence that autumn population size was correlated with the size of the hazelnut crop, suggesting food supplies play a role, although beechmast crop was not correlated with overwinter survival and nor was autumn population size correlated with the population density in spring (Enoksson & Nilsson 1983, Enoksson 1990). In the studies by Nilsson mentioned above, the main density-dependent factor, recruitment of young of the year to the autumn population, was positively related to the current beechmast supply and negatively to the density of adults (Nilsson 1982, 1987). A long-term study in Poland from 1975 to 1990 also found that Nuthatch numbers seemed to be influenced by autumn seed supply and also availability of caterpillars in the preceding spring (Wesolowski & Stawarczyk 1991). Another continental study in Europe found that local survival in autumn was higher in beechmast years for juveniles, but not for adults and that local winter survival was not higher in years with than in years without beechmast (Matthysen 1989). Thus there is some evidence that increases in population size are linked to food supplies, but again, this has not been directly tested for UK birds.

Although there is no direct evidence available, Nuthatches are known to favour dead wood, and so it is possible that they may have benefited from the increase in dead wood in the UK (Amar et al. 2010a).

In Belgium, competition for nest sites with the non-native, invasive Strubbe & Matthysen 2009). However, there is evidence showing that this is not a problem in the UK at present (Newson et al. 2011).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Treecreeper

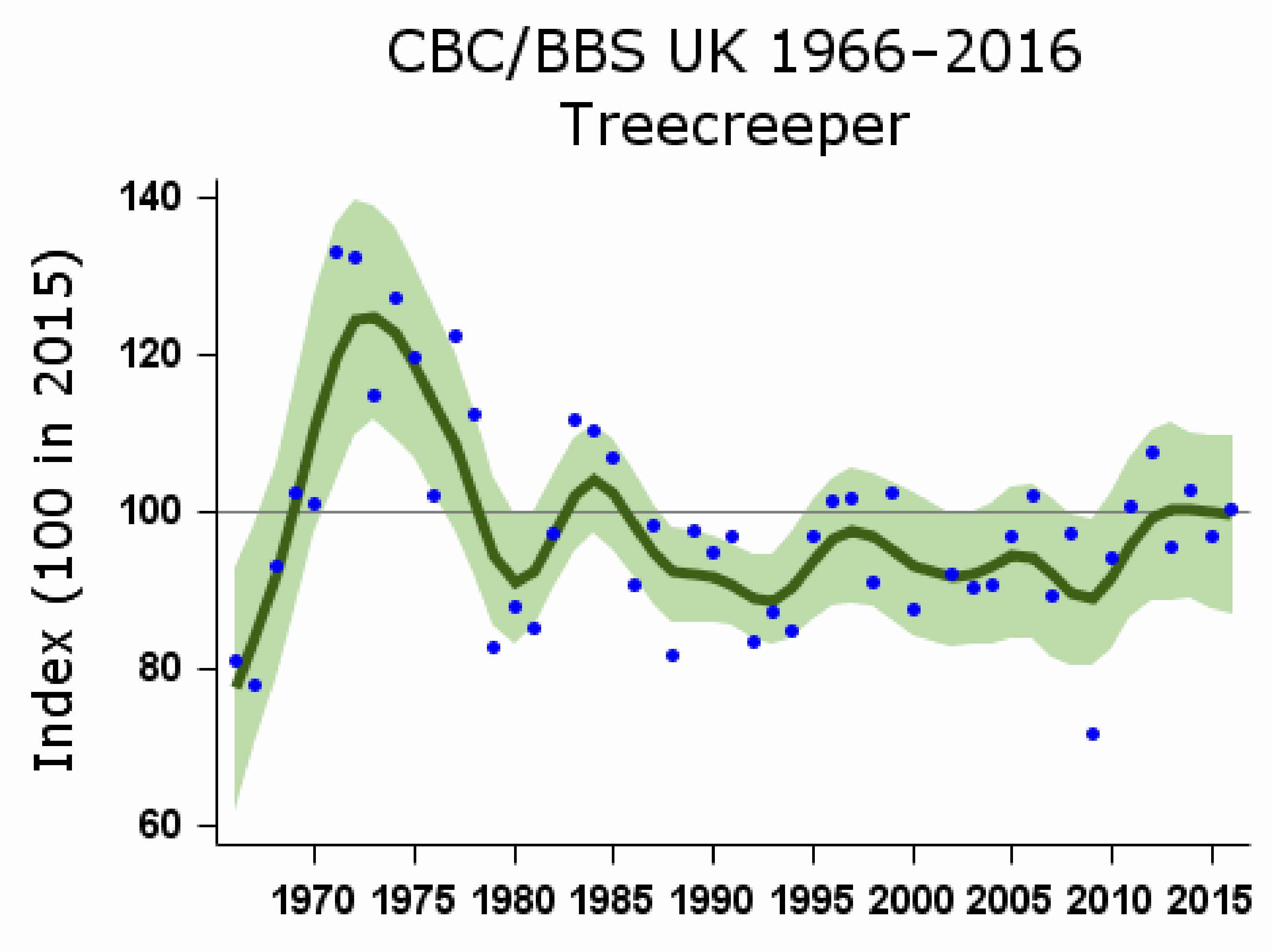
Certhia familiaris

Key facts

Conservation listings:	Global: green
Long-term trend:	UK, England: fluctuating, with no long-term trend
Population size:	200,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The UK Treecreeper population peaked in the mid 1970s, but has been roughly stable since about 1980. Intensive study has shown that Treecreeper numbers and survival rates are reduced by wet winter weather (Peach et al. 1995b). The influence of cold weather is also evident in the low start to the index, following the severe winter of 1962/63, and the trough around 1980. Productivity, calculated using CES data, shows fluctuations since the 1980s. There has been a significant fall in nest failure rates at the egg stage but an increase at the chick stage and overall nest success is now slightly lower than in the late 1960s, despite having increased during the 1970s and 1980s. The trend towards earlier laying can be partly explained by recent climate change (Crick & Sparks 1999). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

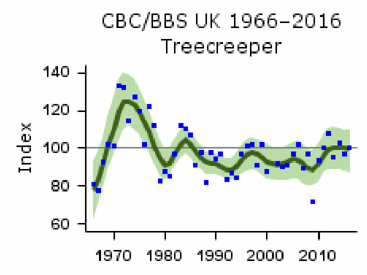
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	230	19	-9	55		
	25	1990-2015	353	9	-6	24		
	10	2005-2015	447	6	-3	15		
	5	2010-2015	478	9	-1	16		

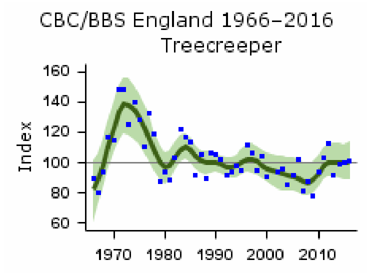
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	179	12	-15	59		
	25	1990-2015	268	0	-13	14		
	10	2005-2015	336	10	0	20		
	5	2010-2015	363	8	-2	17		
CES adults	31	1984-2015	37	40	-12	110		
	25	1990-2015	41	4	-17	38		
	10	2005-2015	37	5	-12	31		
	5	2010-2015	37	20	1	50		
CES juveniles	31	1984-2015	62	35	11	83		
	25	1990-2015	69	15	-5	43		
	10	2005-2015	67	21	6	41		
	5	2010-2015	73	-12	-19	-1		
BBS UK	20	1995-2015	375	9	-5	20		
	10	2005-2015	447	6	-5	17		
	5	2010-2015	478	9	-2	17		
BBS England	20	1995-2015	279	1	-11	12		
	10	2005-2015	336	10	-1	22		
	5	2010-2015	363	8	-2	17		
BBS Scotland	20	1995-2015	41	11	-22	52		
	10	2005-2015	52	-2	-25	24		
	5	2010-2015	50	3	-21	35		
BBS Wales	20	1995-2015	43	36	-8	81		
	10	2005-2015	46	16	-11	52		
	5	2010-2015	50	32	5	62		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

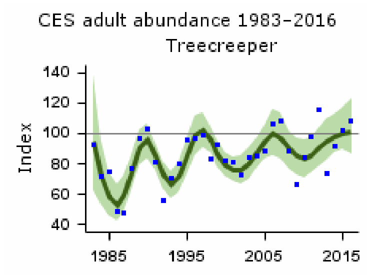
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



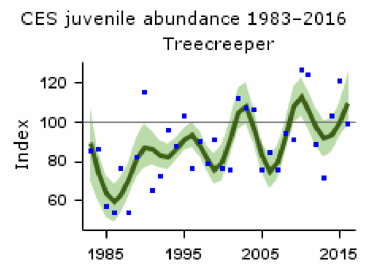
CBC/BBS UK graph



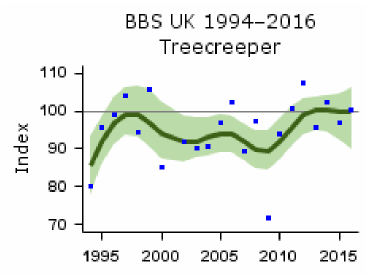
CBC/BBS England graph



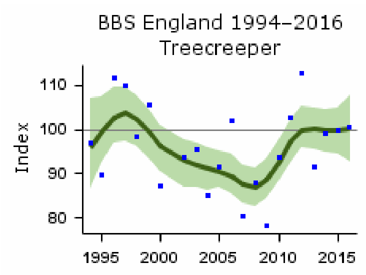
CES adults graph



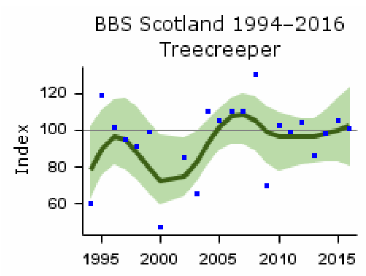
CES juveniles graph



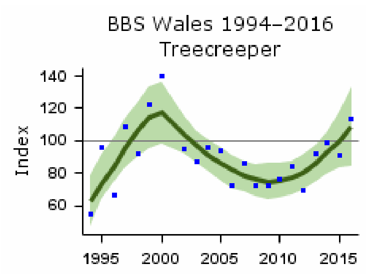
BBS UK graph



BBS England graph

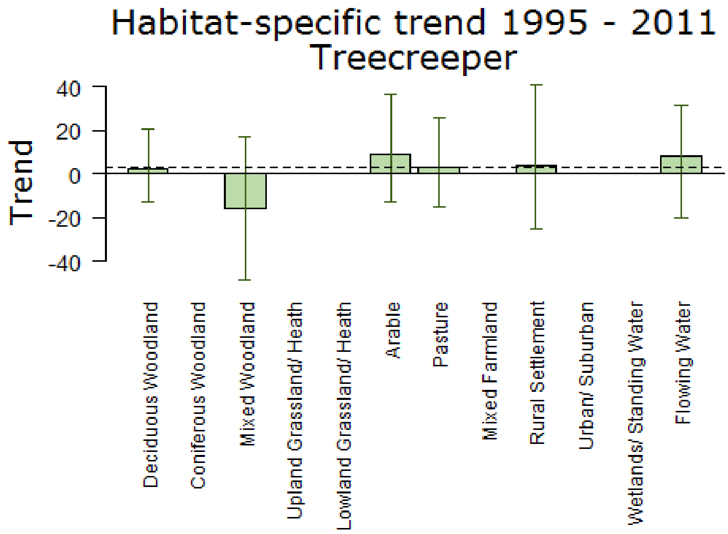


BBS Scotland graph



BBS Wales graph

Population trends by habitat



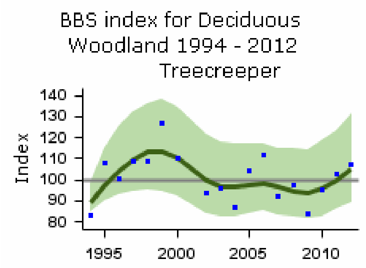
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

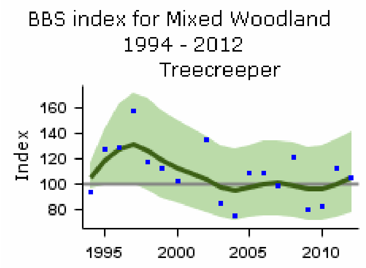
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	126	3	-13	21
Mixed Woodland	16	1995-2011	78	-16	-49	17
Arable	16	1995-2011	47	9	-13	37
Pasture	16	1995-2011	119	3	-15	26
Rural Settlement	16	1995-2011	39	4	-26	41
Flowing Water	16	1995-2011	50	8	-20	31

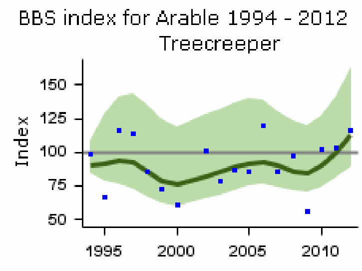
Further information on habitat-specific trends, please follow link here.



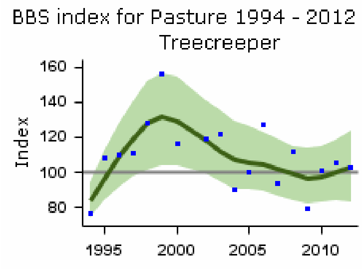
Habitat graph



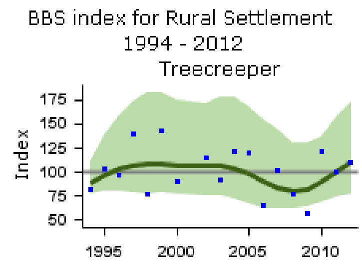
Habitat graph



Habitat graph



Habitat graph



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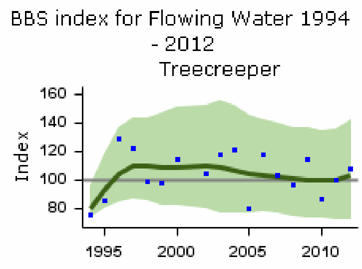
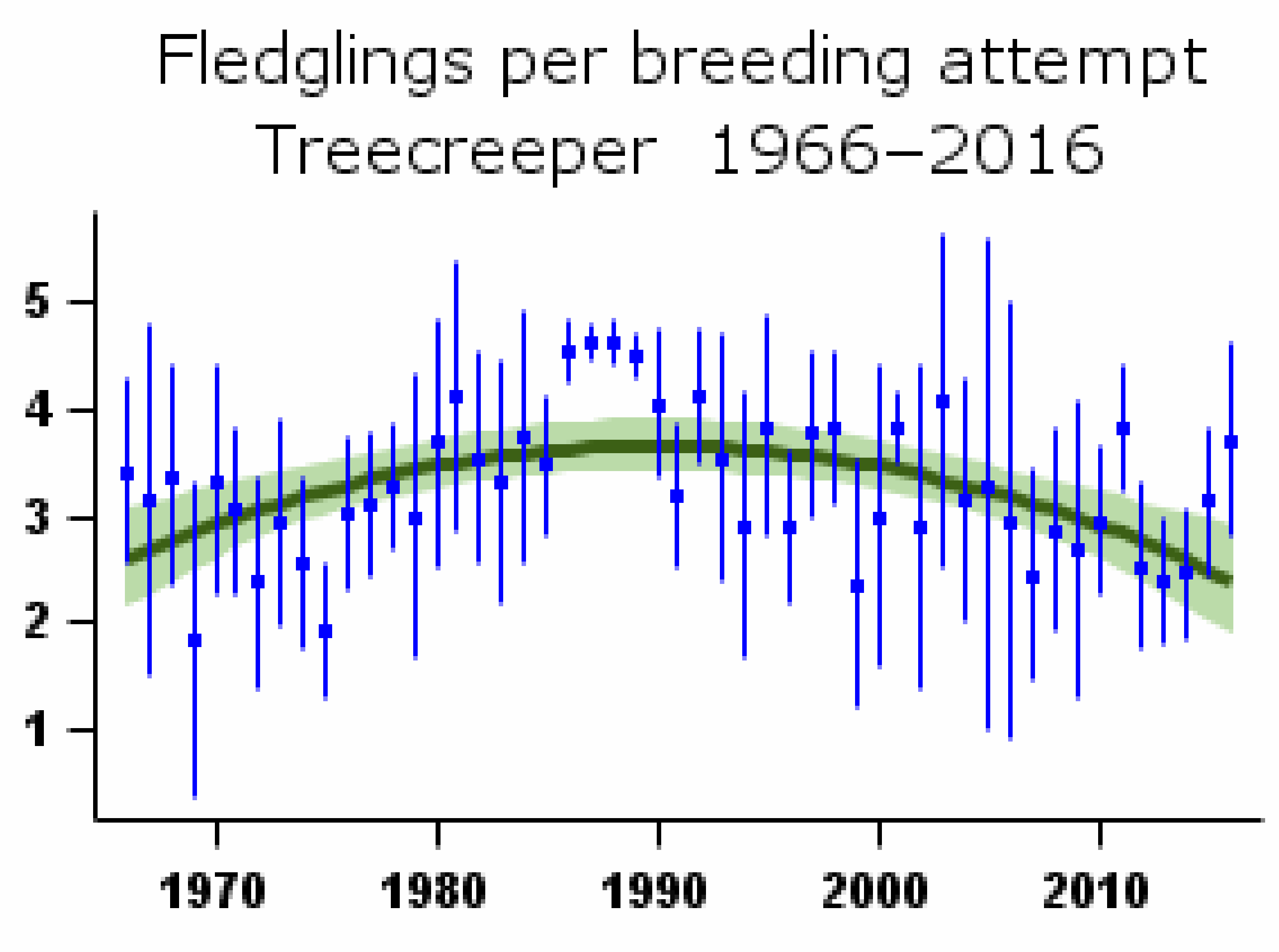
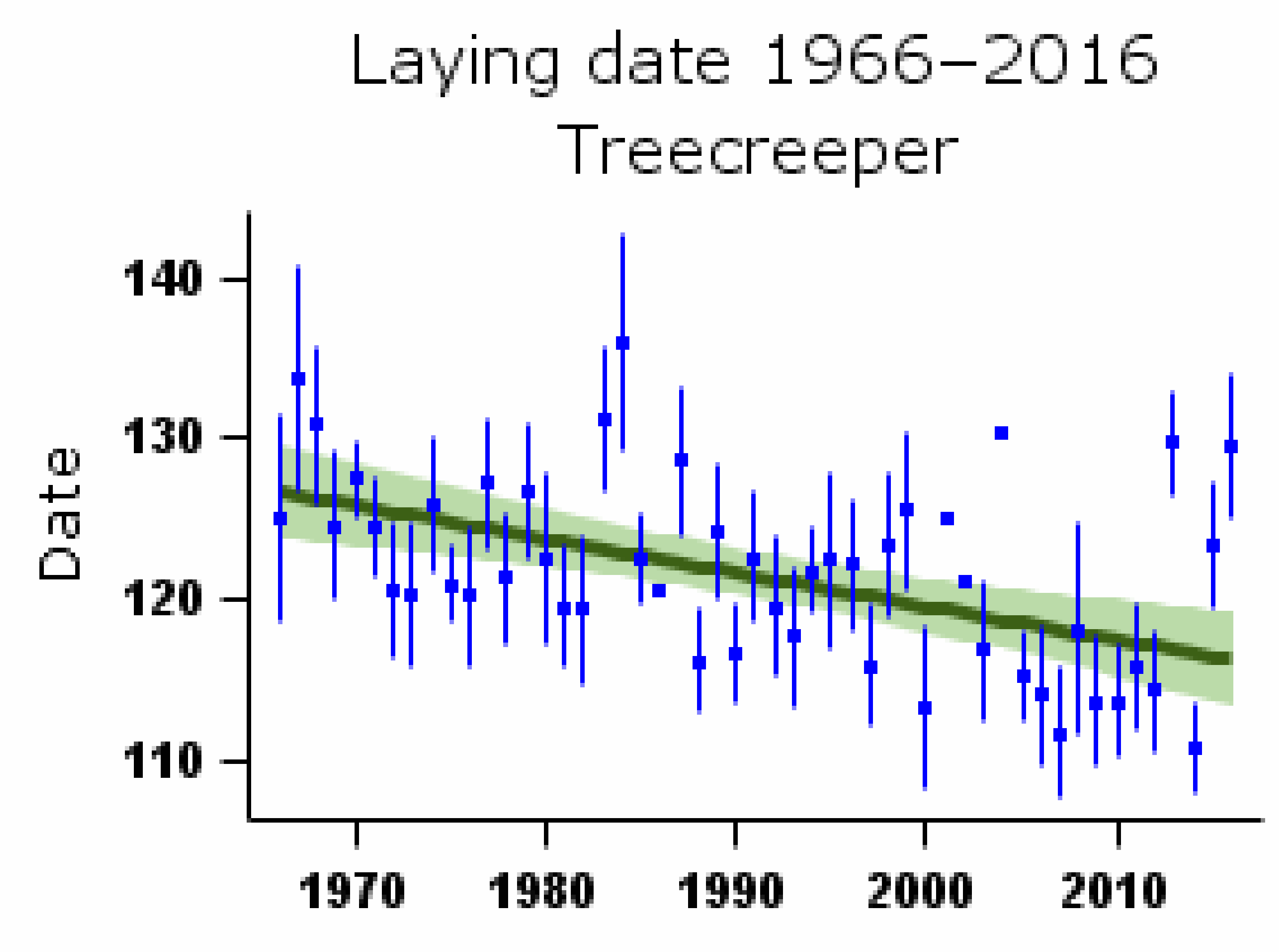


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

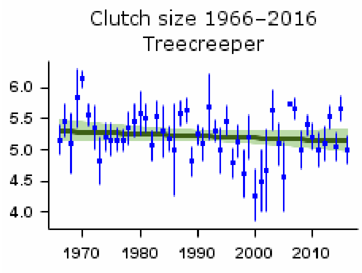


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

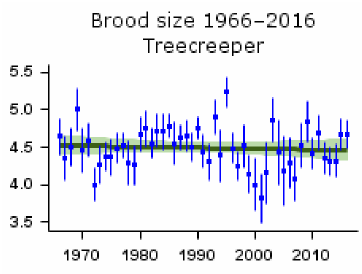
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	21	Curvilinear	2.68 fledglings	2.49 fledglings	-7.1%		
Clutch size	48	1967-2015	14	None					Small sample
Brood size	48	1967-2015	28	None					Small sample
Nest failure rate at egg stage	48	1967-2015	23	Curvilinear	2.44% nests/day	2.08% nests/day	-14.8%		Small sample
Nest failure rate at chick stage	48	1967-2015	22	Curvilinear	1.50% nests/day	1.68% nests/day	12.0%		Small sample
Laying date	48	1967-2015	13	Linear decline	May 6	Apr 26	-10 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	69	Smoothed trend	92 Index value	100 Index value	8%		
Juvenile to Adult ratio (CES)	25	1990-2015	77	Smoothed trend	92 Index value	100 Index value	9%		
Juvenile to Adult ratio (CES)	10	2005-2015	74	Smoothed trend	78 Index value	100 Index value	29%		
Juvenile to Adult ratio (CES)	5	2010-2015	79	Smoothed trend	122 Index value	100 Index value	-18%		

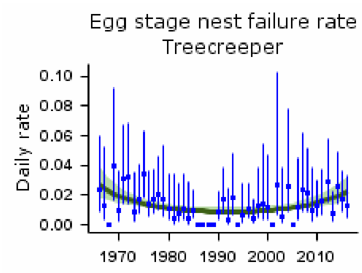
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



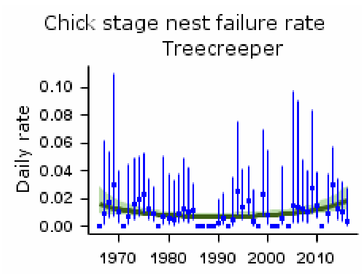
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



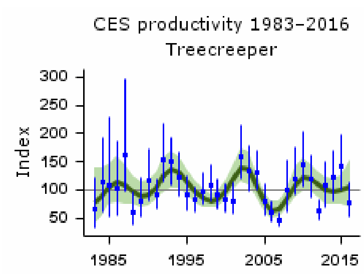
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Wren

Troglodytes troglodytes

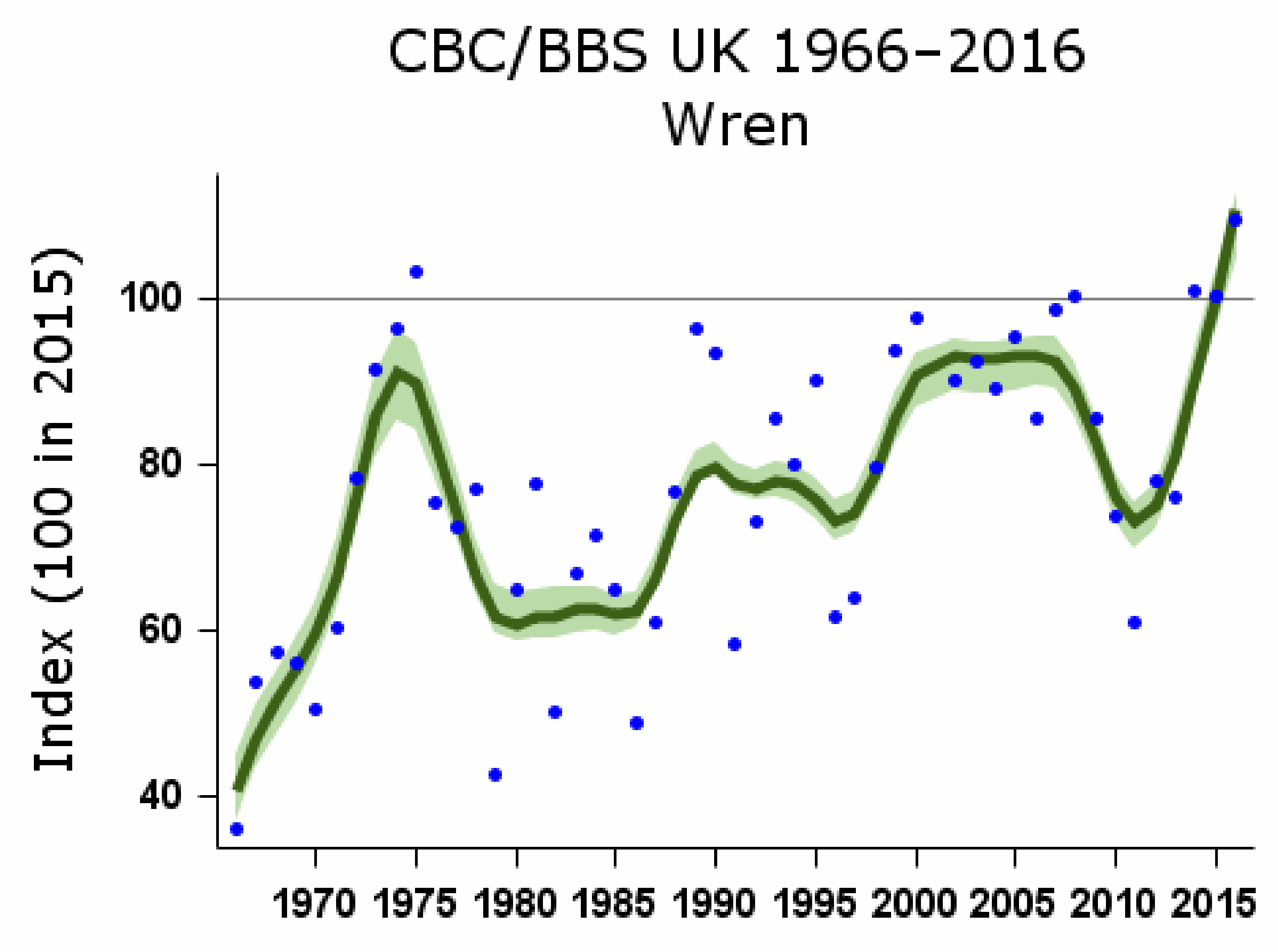
Key facts

Conservation listings:	Global: green; at race level, fridariensis and hirtensis red, hebridensis, zetlandicus and indigenus amber, troglodytes green; current RBBP species (races fridariensis and hirtensis only)
Long-term trend:	UK, England: rapid increase
Population size:	8.6 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend); race fridariensis (Fair Isle) 33 territories in 2013 (Holling & RBBP 2015); race hirtensis (St Kilda) 230-250 breeding pairs (Forrester et al. 2007)

Migrant status:	Resident
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

The Wren's current UK population estimate is the highest for any species and, on the latest figures, one in ten of our breeding birds is a Wren (APEP13). Abundance can vary sharply from year to year, however. Wren numbers in the UK were greatly depleted by the cold winter of 1962/63 (Marchant et al. 1990). Following a rapid recovery up to the mid 1970s, abundance fell again in response to a further series of cold winters, only to return to its previous high level. Following recent severe winters, numbers were somewhat depleted once more, especially in Scotland and Northern Ireland, but have now recovered. The BBS PECBMS 2016a).



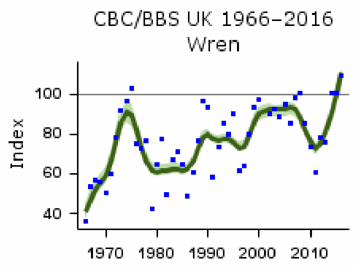
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

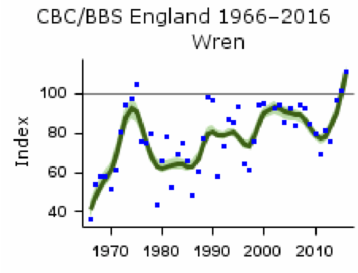
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1265	114	87	142		Small CBC sample
	25	1990-2015	2227	26	18	31		Small CBC sample
	10	2005-2015	3119	8	6	11		
	5	2010-2015	3131	31	28	33		
CBC/BBS England	48	1967-2015	1002	111	86	139		Small CBC sample
	25	1990-2015	1751	24	16	29		Small CBC sample
	10	2005-2015	2455	11	9	15		
	5	2010-2015	2476	26	24	29		
CES adults	31	1984-2015	101	77	50	105		
	25	1990-2015	110	20	7	36		
	10	2005-2015	110	9	1	16		
	5	2010-2015	114	49	40	60		
CES juveniles	31	1984-2015	101	65	33	104		
	25	1990-2015	110	15	0	34		
	10	2005-2015	111	16	9	25		
	5	2010-2015	117	37	28	48		
BBS UK	20	1995-2015	2600	32	27	38		
	10	2005-2015	3119	7	5	11		
	5	2010-2015	3131	31	27	33		
BBS England	20	1995-2015	2035	27	21	30		
	10	2005-2015	2455	11	9	14		
	5	2010-2015	2476	26	24	29		
BBS Scotland	20	1995-2015	243	67	47	82		
	10	2005-2015	291	-1	-9	7		
	5	2010-2015	280	49	29	49		
BBS Wales	20	1995-2015	212	34	21	45		
	10	2005-2015	244	13	3	23		
	5	2010-2015	251	43	32	53		
BBS N.Ireland	20	1995-2015	94	69	28	102		
	10	2005-2015	108	2	-6	11		
	5	2010-2015	103	32	18	36		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

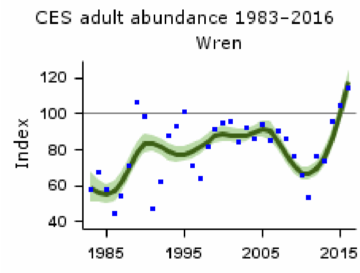
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



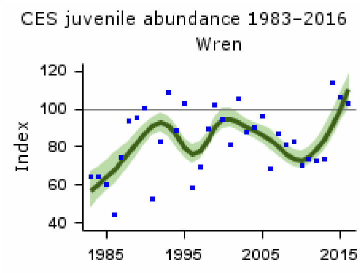
CBC/BBS UK graph



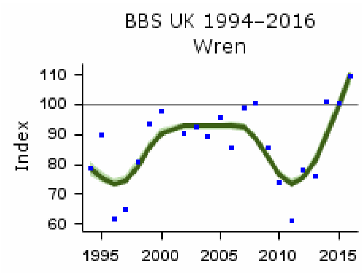
CBC/BBS England graph



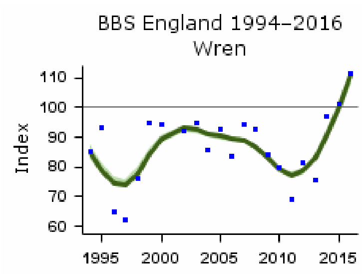
CES adults graph



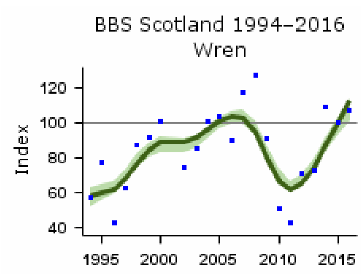
CES juveniles graph



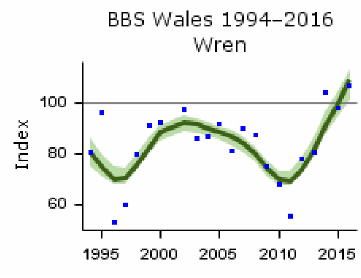
BBS UK graph



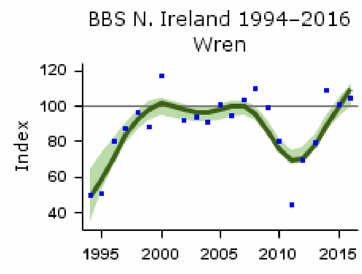
BBS England graph



BBS Scotland graph

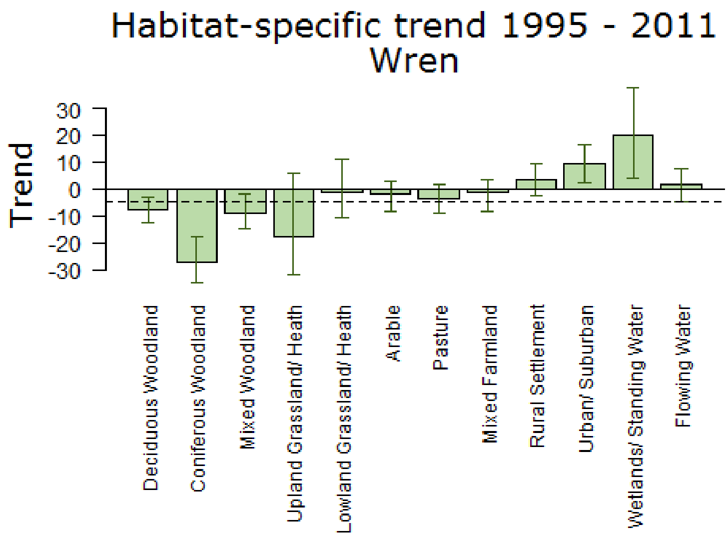


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

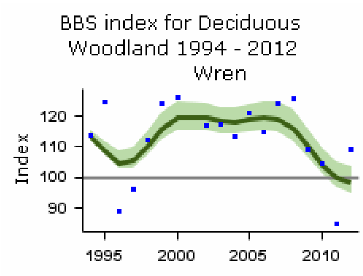
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

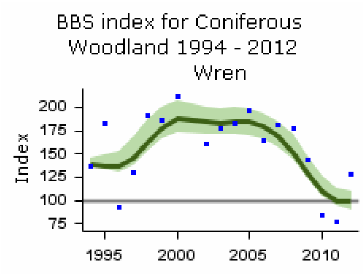
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	920	-8	-12	-3
Coniferous Woodland	16	1995-2011	247	-27	-35	-18
Mixed Woodland	16	1995-2011	493	-9	-15	-2
Upland Grassland/ Heath	16	1995-2011	73	-18	-32	6
Lowland Grassland/ Heath	16	1995-2011	205	-1	-11	11
Arable	16	1995-2011	773	-2	-8	3
Pasture	16	1995-2011	1324	-4	-9	2
Mixed Farmland	16	1995-2011	717	-1	-8	3
Rural Settlement	16	1995-2011	875	4	-3	9
Urban/ Suburban	16	1995-2011	403	9	2	16

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Wetlands/ Standing Water	16	1995-2011	113	20	4	38
Flowing Water	16	1995-2011	583	1	-5	8

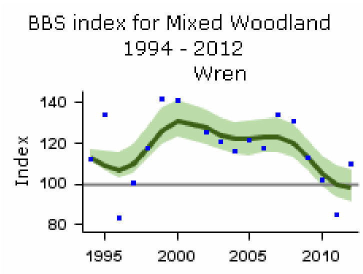
Further information on habitat-specific trends, please follow link here.



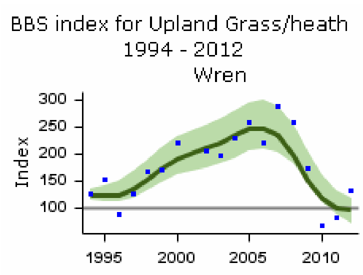
Habitat graph



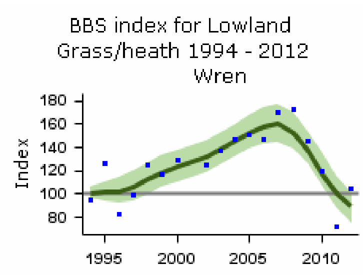
Habitat graph



Habitat graph

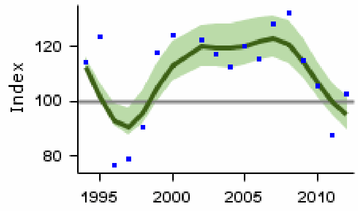


Habitat graph



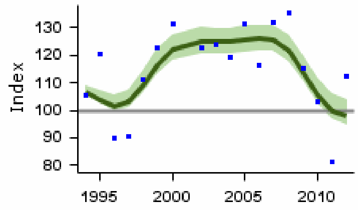
Habitat graph

BBS index for Arable 1994 - 2012
Wren



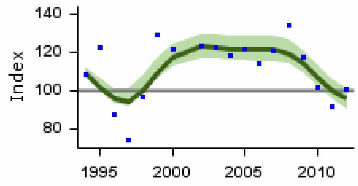
Habitat graph

BBS index for Pasture 1994 - 2012
Wren



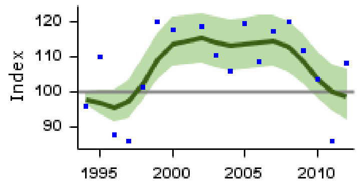
Habitat graph

BBS index for Mixed Farmland 1994 - 2012
Wren



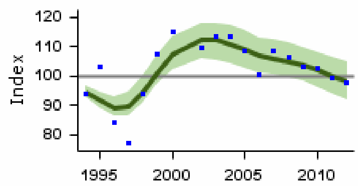
Habitat graph

BBS index for Rural Settlement 1994 - 2012
Wren



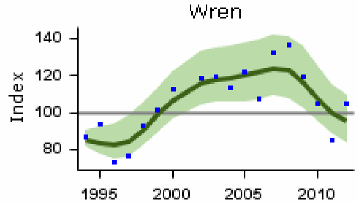
Habitat graph

BBS index for Urban/ Suburban 1994 - 2012
Wren

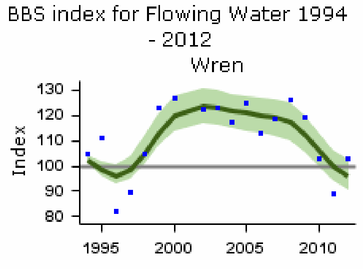


Habitat graph

BBS index for Wetlands 1994 - 2012
Wren

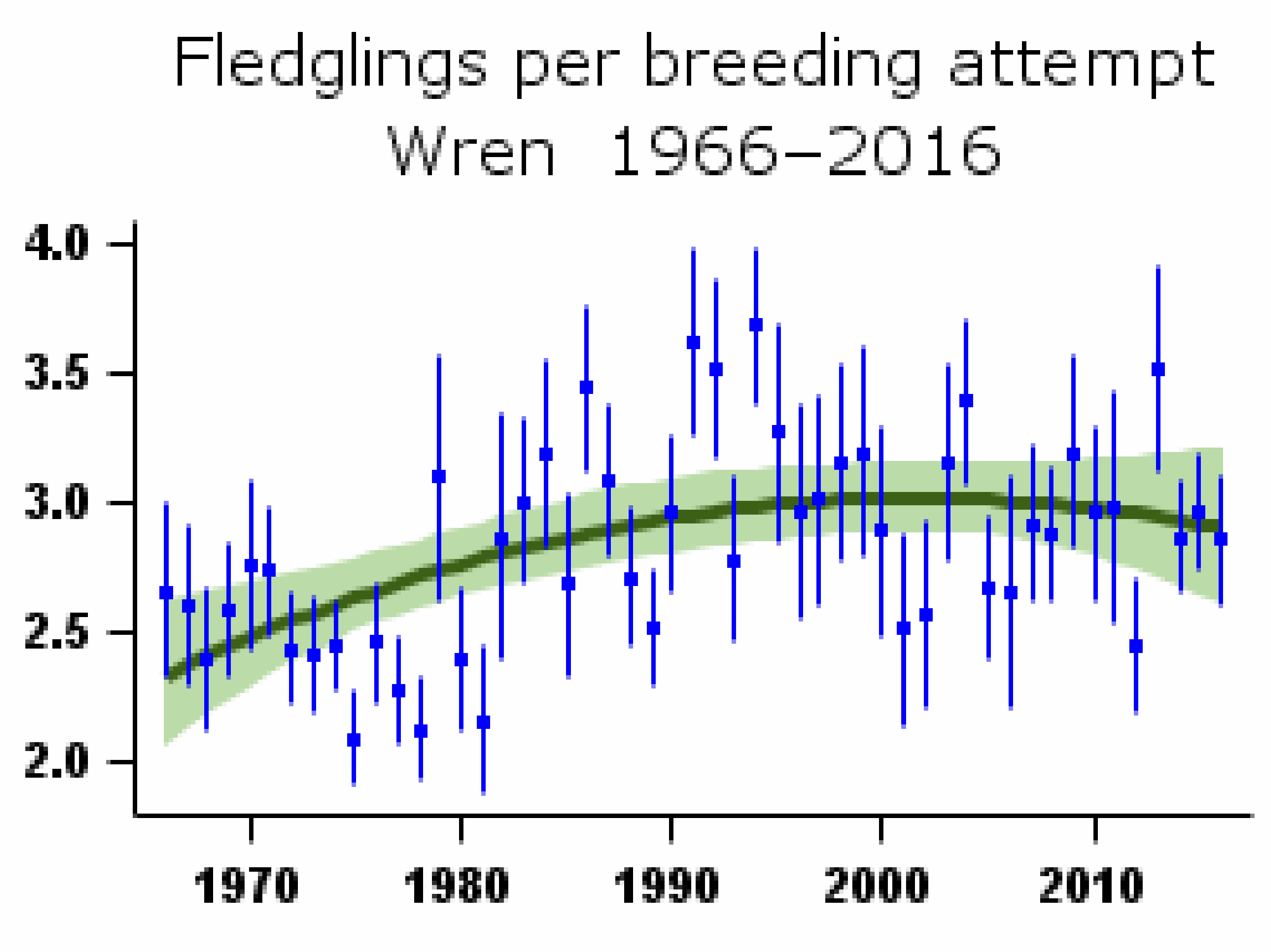


Habitat graph

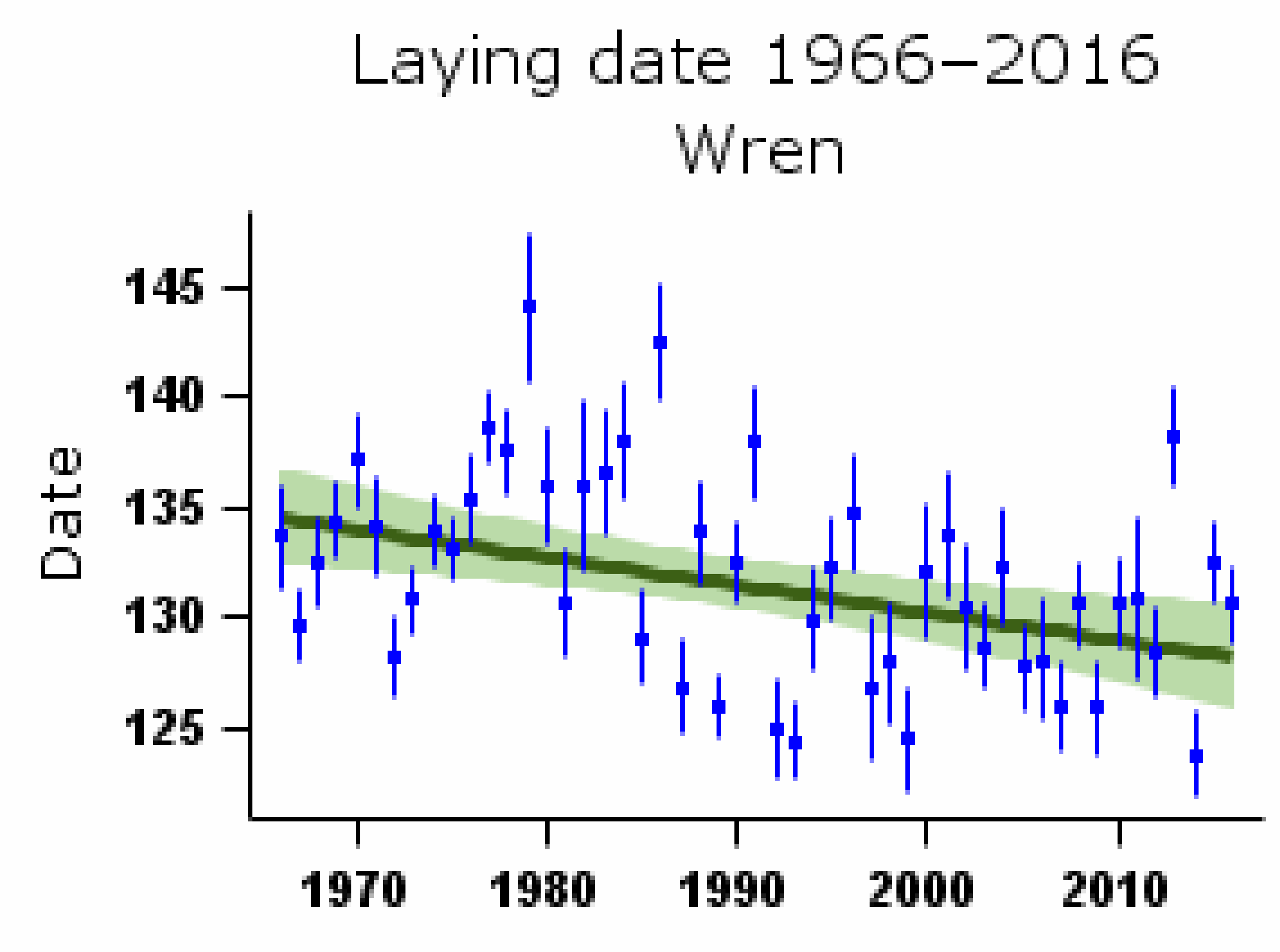


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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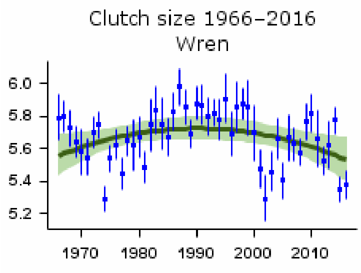
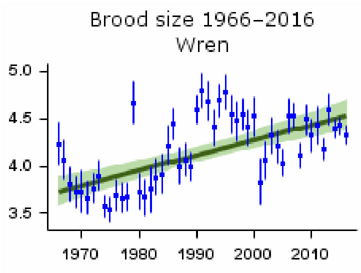
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	98	Curvilinear	2.37 fledglings	2.92 fledglings	23.2%		
Clutch size	48	1967-2015	99	Curvilinear	5.57 eggs	5.55 eggs	-0.5%		
Brood size	48	1967-2015	130	Linear increase	3.75 chicks	4.52 chicks	20.5%		
Nest failure rate at egg stage	48	1967-2015	143	Linear decline	1.81% nests/day	1.26% nests/day	-30.4%		
Nest failure rate at chick stage	48	1967-2015	98	Linear increase	0.74% nests/day	1.06% nests/day	43.2%		
Laying date	48	1967-2015	90	Linear decline	May 14	May 8	-6 days		
Juvenile to Adult ratio (CES)	31	1984-2015	105	Smoothed trend	102 Index value	100 Index value	-2%		
Juvenile to Adult ratio (CES)	25	1990-2015	114	Smoothed trend	101 Index value	100 Index value	-1%		
Juvenile to Adult ratio (CES)	10	2005-2015	114	Smoothed trend	94 Index value	100 Index value	6%		
Juvenile to Adult ratio (CES)	5	2010-2015	118	Smoothed trend	109 Index value	100 Index value	-8%		

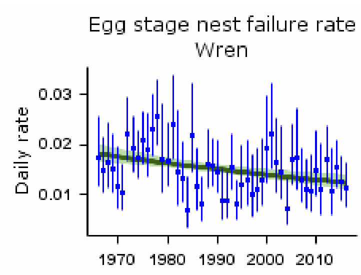
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



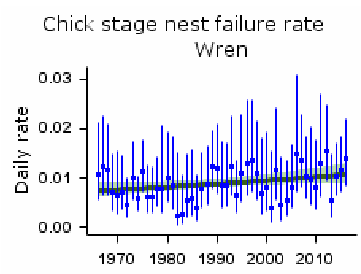
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



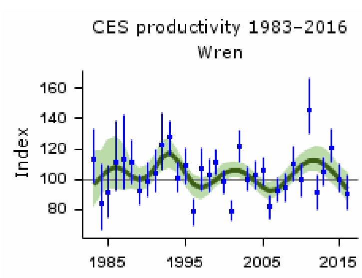
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



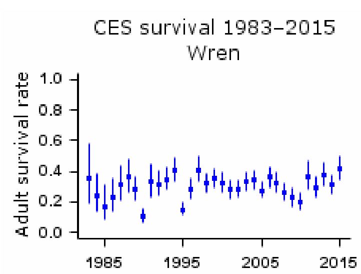
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

There is good evidence that mortality rates are severely affected by cold winter weather. Thus, a warming climate may have benefited this species, although there is only circumstantial evidence for this.

Change factor	Primary driver	Secondary driver
Demographic	Overwinter survival	
Ecological	Climate change	

Further information on causes of change

There has been a reduction in the failure rate of nests at the egg stage, reflected in larger brood sizes and an increase in fledglings per breeding attempt, but the effects of productivity are overshadowed by the strong influence of winter weather on this species.

There is good evidence that annual numbers are influenced by mortality rates and that mortality may be very high in severe winters (Peach et al. 1995b, Morrison et al. 2016a). Wren survival rates were negatively correlated with the number of snow days in winter (Peach et al. 1995b) and with the number of frost days in winter (Morrison et al. 2016a). Robinson et al. (2007b) showed that survival is related to the strength of the North Atlantic Oscillation, an ocean-scale weather pattern that has a strong influence on UK weather. First-year survival was more influenced by weather than that of adult birds, although adult survival was also affected. Morrison et al. (2016a) found that northern UK populations were more resilient that southern populations, with a higher number of frost days required before population levels were affected. These observations suggest that a warming climate may benefit this species.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Starling

Sturnus vulgaris

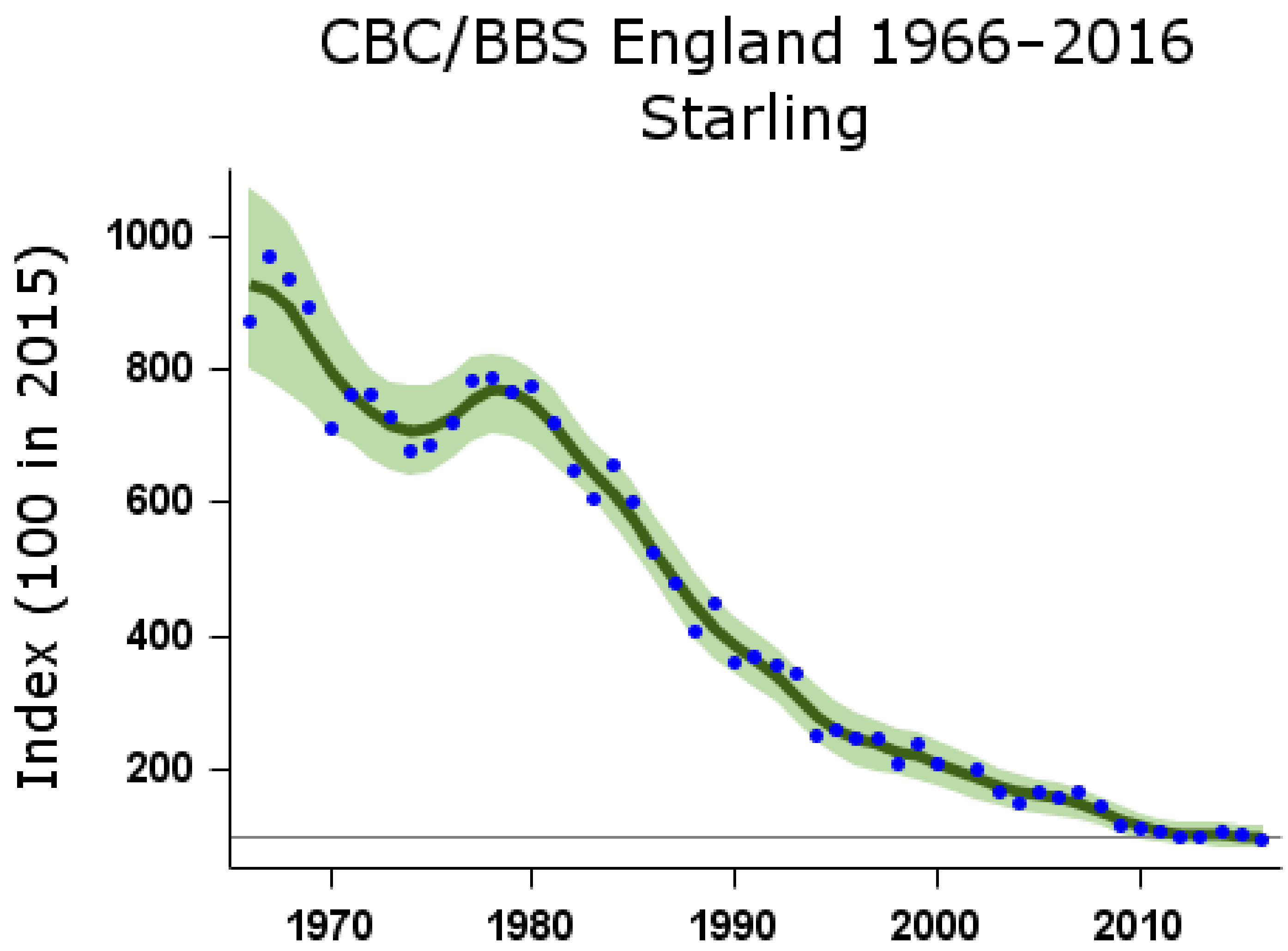
Key facts

Conservation listings:	Global: red (breeding population decline); at race level, vulgaris red, zetlandicus amber
Long-term trend:	England: rapid decline
Population size:	1,900,000 (1,700,000-2,200,000) pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

The abundance of breeding Starlings in the UK has fallen rapidly, particularly since the early 1980s and especially in woodland (Robinson et al. 2002, 2005a), and continues to be strongly downward. The BBS BirdLife International 2004). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

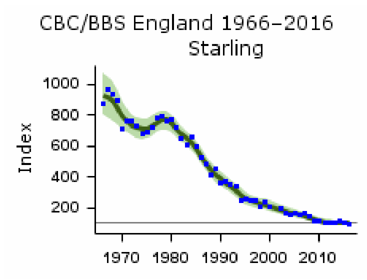
Population changes in detail

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

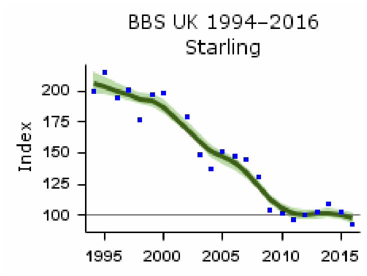
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	708	-89	-92	-85	>50	
	25	1990-2015	1254	-74	-78	-70	>50	
	10	2005-2015	1635	-38	-41	-33	>25	
	5	2010-2015	1564	-12	-17	-7		
BBS UK	20	1995-2015	1810	-51	-54	-48	>50	
	10	2005-2015	2015	-32	-36	-27	>25	
	5	2010-2015	1943	-5	-10	1		
BBS England	20	1995-2015	1474	-60	-63	-57	>50	
	10	2005-2015	1635	-38	-42	-34	>25	
	5	2010-2015	1564	-12	-17	-9		
BBS Scotland	20	1995-2015	161	-26	-42	-10	>25	
	10	2005-2015	188	-23	-34	-11		
	5	2010-2015	192	5	-9	22		
BBS Wales	20	1995-2015	82	-70	-79	-59	>50	
	10	2005-2015	82	-41	-52	-28	>25	
	5	2010-2015	80	-6	-19	12		
BBS N.Ireland	20	1995-2015	82	33	0	86		
	10	2005-2015	96	-17	-37	8		
	5	2010-2015	92	12	-3	31		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

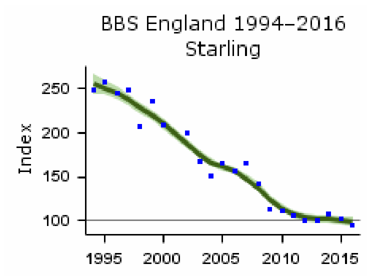
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



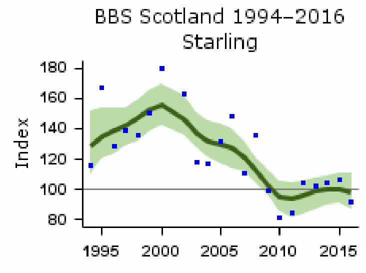
CBC/BBS England graph



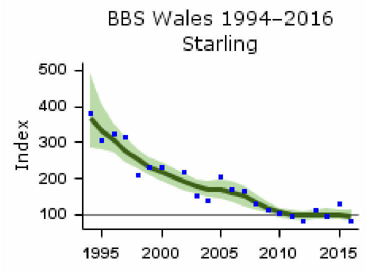
BBS UK graph



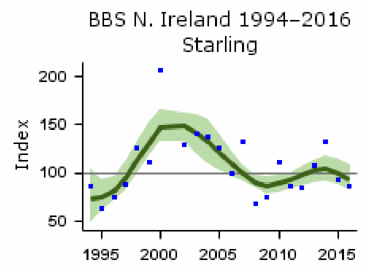
BBS England graph



BBS Scotland graph

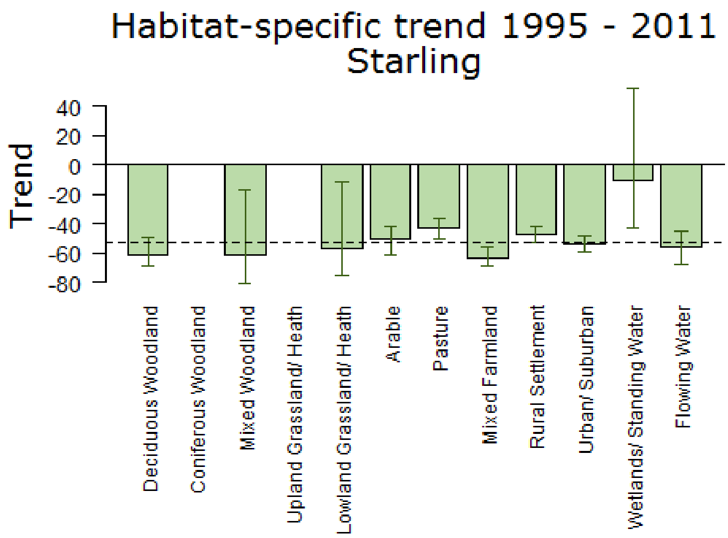


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

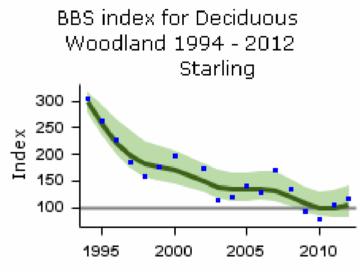
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

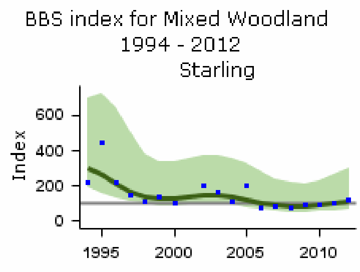
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	238	-61	-69	-50

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Mixed Woodland	16	1995-2011	86	-62	-80	-17
Lowland Grassland/ Heath	16	1995-2011	62	-57	-75	-12
Arable	16	1995-2011	312	-51	-62	-42
Pasture	16	1995-2011	759	-43	-50	-36
Mixed Farmland	16	1995-2011	349	-63	-69	-56
Rural Settlement	16	1995-2011	575	-47	-53	-42
Urban/ Suburban	16	1995-2011	414	-54	-59	-49
Wetlands/ Standing Water	16	1995-2011	46	-11	-43	52
Flowing Water	16	1995-2011	215	-56	-68	-45

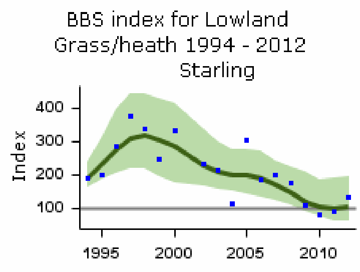
Further information on habitat-specific trends, please follow link here.



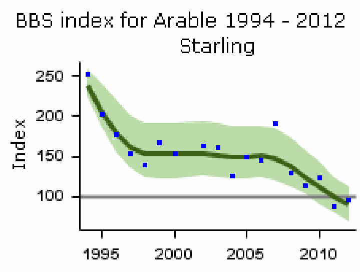
Habitat graph



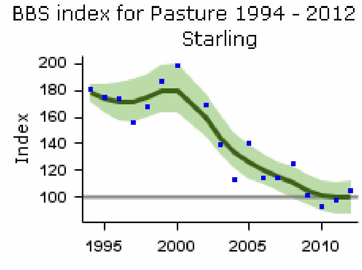
Habitat graph



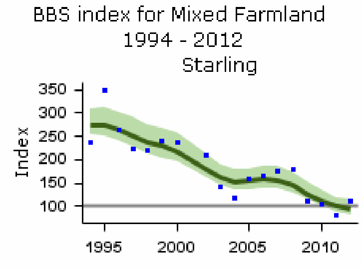
Habitat graph



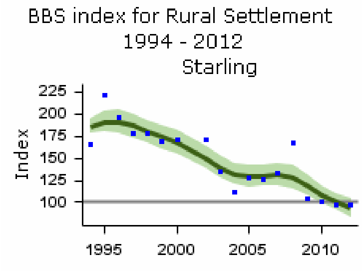
Habitat graph



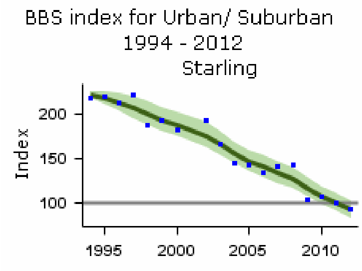
Habitat graph



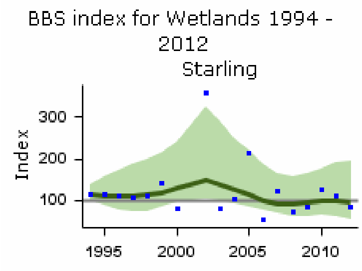
Habitat graph



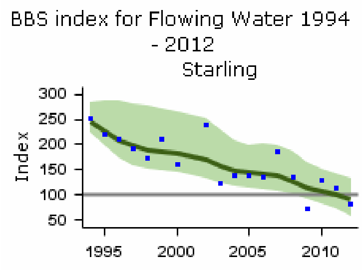
Habitat graph



Habitat graph

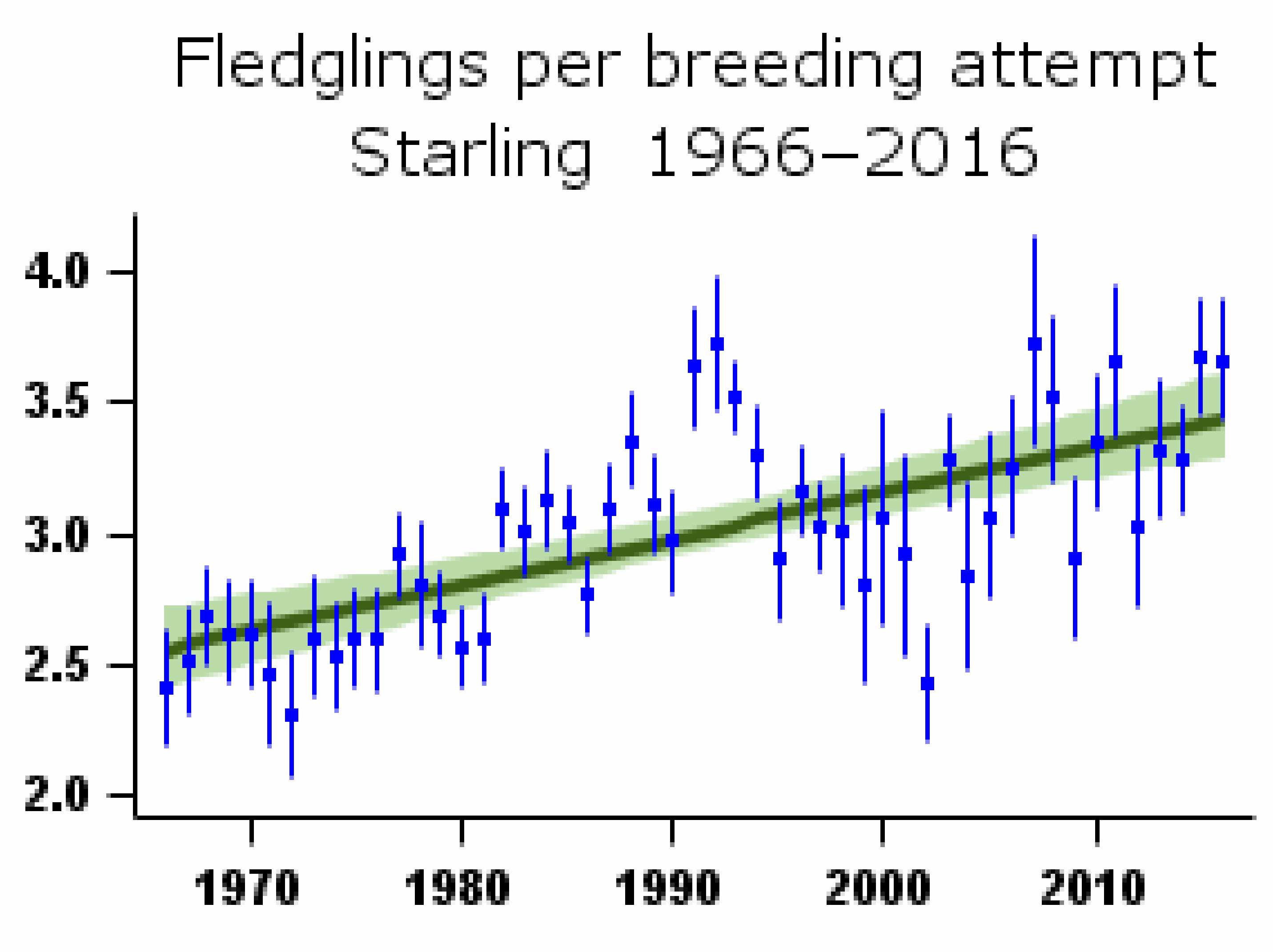


Habitat graph

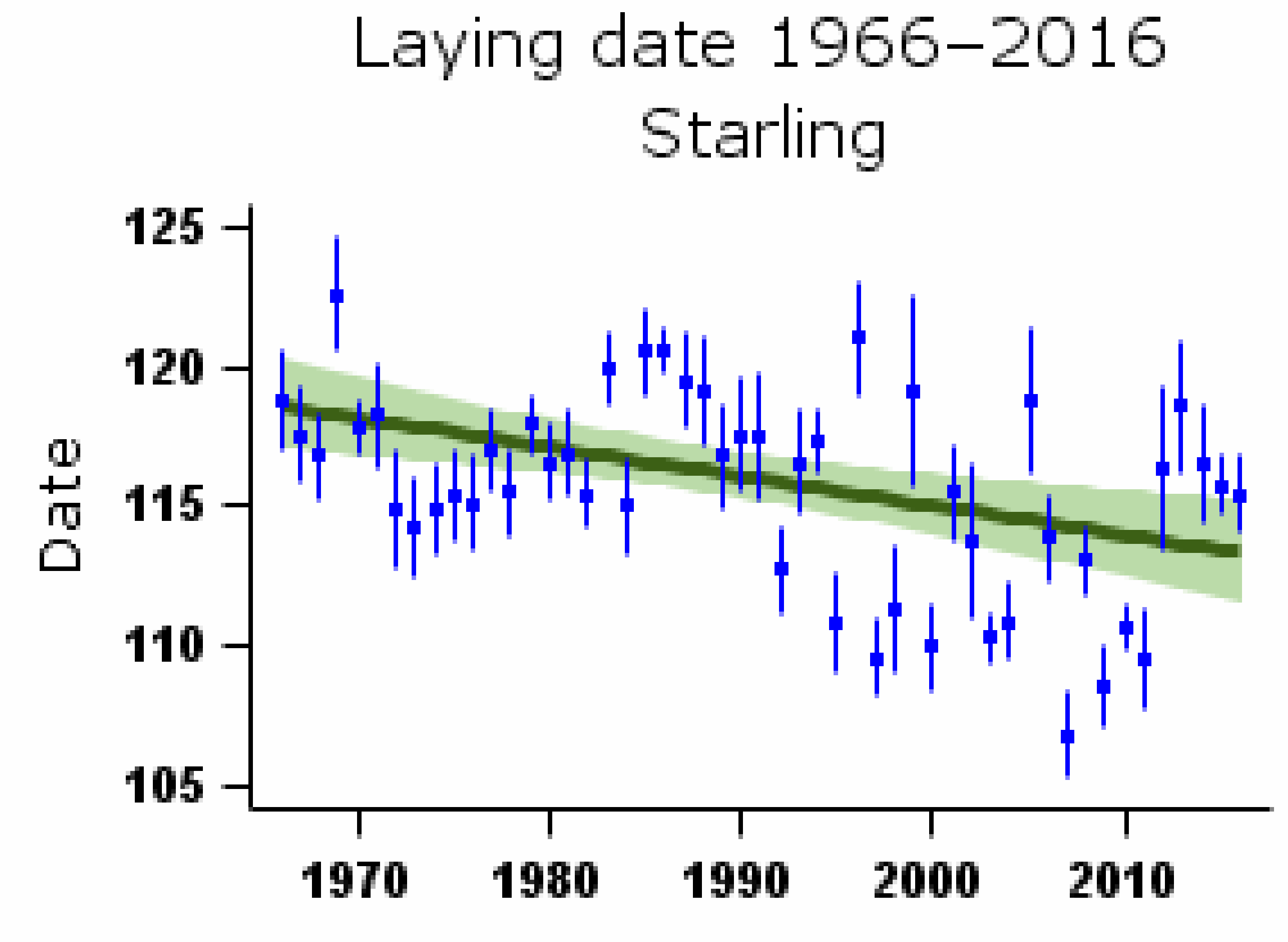


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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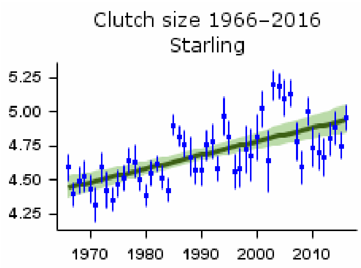
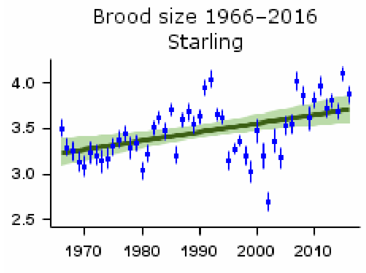
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	115	Linear increase	2.57 fledglings	3.42 fledglings	33.0%		
Clutch size	48	1967-2015	77	Linear increase	4.46 eggs	4.93 eggs	10.8%		
Brood size	48	1967-2015	238	Linear increase	3.25 chicks	3.71 chicks	14.2%		
Nest failure rate at egg stage	48	1967-2015	123	Linear decline	1.11% nests/day	0.24% nests/day	-78.4%		
Nest failure rate at chick stage	48	1967-2015	138	Curvilinear	0.69% nests/day	0.39% nests/day	-43.5%		
Laying date	48	1967-2015	86	Linear decline	Apr 28	Apr 23	-5 days		

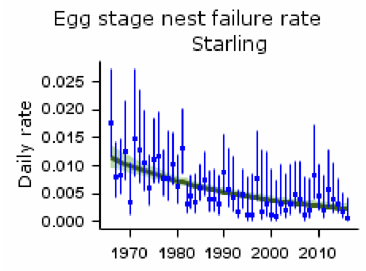
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



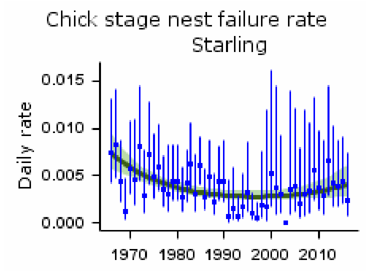
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



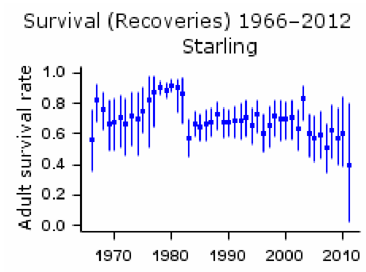
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Causes of change

There is good evidence that changes in first-year overwinter survival rates best account for observed population change. Although the ecological drivers of Starling decline are poorly understood, changes in the management of pastoral farmland are thought to be largely responsible.

Change factor	Primary driver	Secondary driver
Demographic	Decreased juvenile survival	
Ecological	Agricultural intensification	

Further information on causes of change

As the population has dropped, the numbers of fledglings per breeding attempt has increased markedly (see above); clutches are now larger, and rates of nest loss at the egg and chick stage have fallen. These improvements in breeding performance suggest that decreasing survival rates are likely to be responsible for the decline. Evidence for this is provided by Freeman et al. (2007b), who conducted a population modelling exercise and found that changes in first-year overwinter survival rates could best account for observed population change, and were sufficient, on their own, to explain the broad pattern of decline. This pattern is supported by a more recent, integrated, population analysis (Robinson et al. 2014). The decline in survival rates nationwide coincided with the major period of population decline. MacLeod et al. (2008) also provide evidence linking Starling declines to the environmental conditions outside the breeding season, suggesting that the species' population status is dependent on interactive or synergistic effects of food availability and predation. Recent research in The Netherlands has identified changes in juvenile survival as the most likely explanation for similar substantial declines which have affected the Dutch Starling population since the 1990s (Versluijs et al. 2016).

There is little direct evidence from studies analysing the ecological drivers of the declines. However, changes in pastoral farming practices are likely to account for at least some of the decline in the wider countryside, probably related to changes in food resources, though these are largely unquantified (Robinson et al. 2005a). In Denmark, the decline of the Starling has been linked to changes in grassland area and grazing density (Heldbjerg et al. 2016). Loss of permanent pasture, which is the species' preferred feeding habitat, and general intensification of livestock rearing are likely to be having adverse effects on rural populations in the UK, but other causes should be sought in urban areas (Robinson et al. 2002, 2005a). Whilst the number of cattle has declined, sheep numbers have increased, producing a different sward structure (Chamberlain et al. 2000b, Fuller & Gough 1999) and patterns of stock rearing have changed. These may have reduced foraging opportunities for Starling (Robinson et al. 2002, 2005a). Also the use of insecticides on grassland, though low, is targeted partly at tipulids, which may have reduced foraging opportunities further (Vickery et al. 2001). Although there is little published evidence that the density of tipulids has changed over time (Wilson et al. 1999), the area of permanent pasture, in which they are mainly found, has declined and the use of insecticides on them has increased. Drainage of grasslands is also thought to have reduced the quality of foraging conditions (Newton 2004). Even after considerable decline among farmland Starlings, tipulids remain important to them for provisioning young (Rhymer et al. 2012).

Further research into urban Starling population dynamics is to be encouraged if we are to understand the causes of decline of this charismatic species more fully.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Dipper

Cinclus cinclus

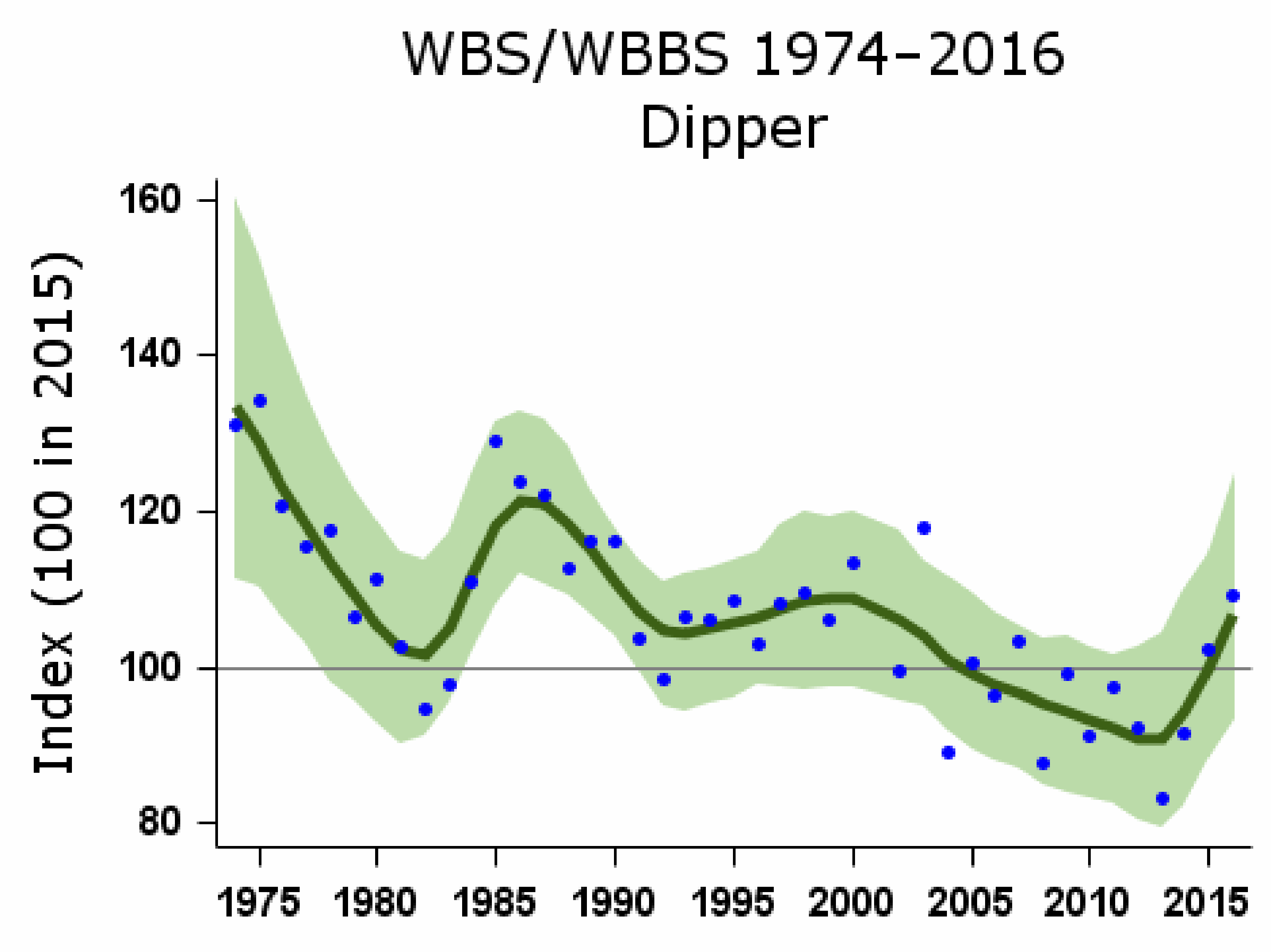
Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK waterways: shallow decline
Population size:	6,200-18,700 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The WBS/WBBS shows that Dipper populations have fluctuated over the last thirty years, but with an overall downward trend. Through its strengthening UK breeding decline, the species moved from green to being amber listed in the latest review (Eaton et al. 2015).

The species is unusually sensitive to acidity and other water-borne pollution (Ormerod & Tyler 1989, 1990), with lower breeding densities and productivity on acidic than on more neutral streams (Ormerod et al. 1991, Vickery 1991, 1992). Breeding performance has improved strongly over time, and laying dates have shifted earlier, perhaps because of climate change (Crick & Sparks 1999). Broods now average larger than in the late 1960s and 1970s, and there has been substantial reduction in failure rates of nests at the egg stage, leading to sustained increase in the number of fledglings per breeding attempt. In a river system in southern Norway, climate variables including winter temperature explained 84% of the variation in population level during 1978-2008 (Nilsson et al. 2011). Thus, some of the UK fluctuations may relate to winter weather.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

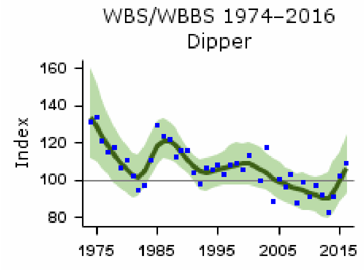
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	68	-22	-41	7		
	25	1990-2015	85	-10	-25	10		

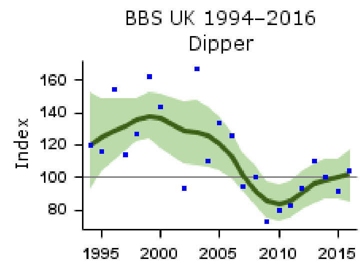
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	106	1	-10	13		
	5	2010-2015	98	7	-4	18		
BBS UK	20	1995-2015	65	-20	-40	10		
	10	2005-2015	78	-17	-35	7		
	5	2010-2015	80	20	-2	43		
BBS England	20	1995-2015	31	-39	-59	0	>25	
	10	2005-2015	42	4	-22	40		
	5	2010-2015	42	2	-19	32		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

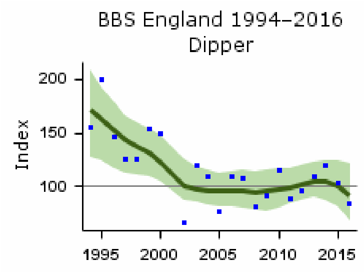
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



WBS/WBBS waterways graph

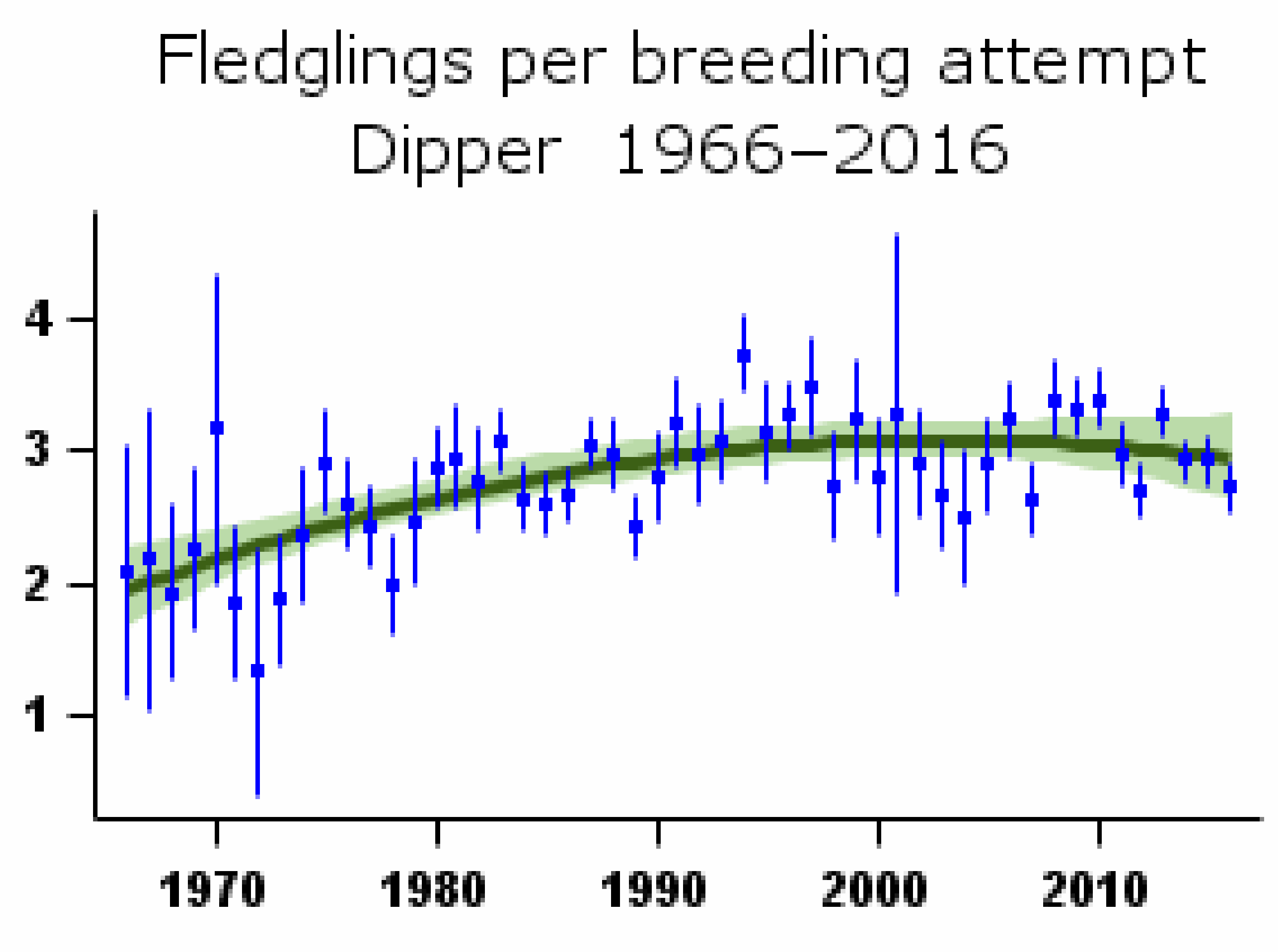


BBS UK graph

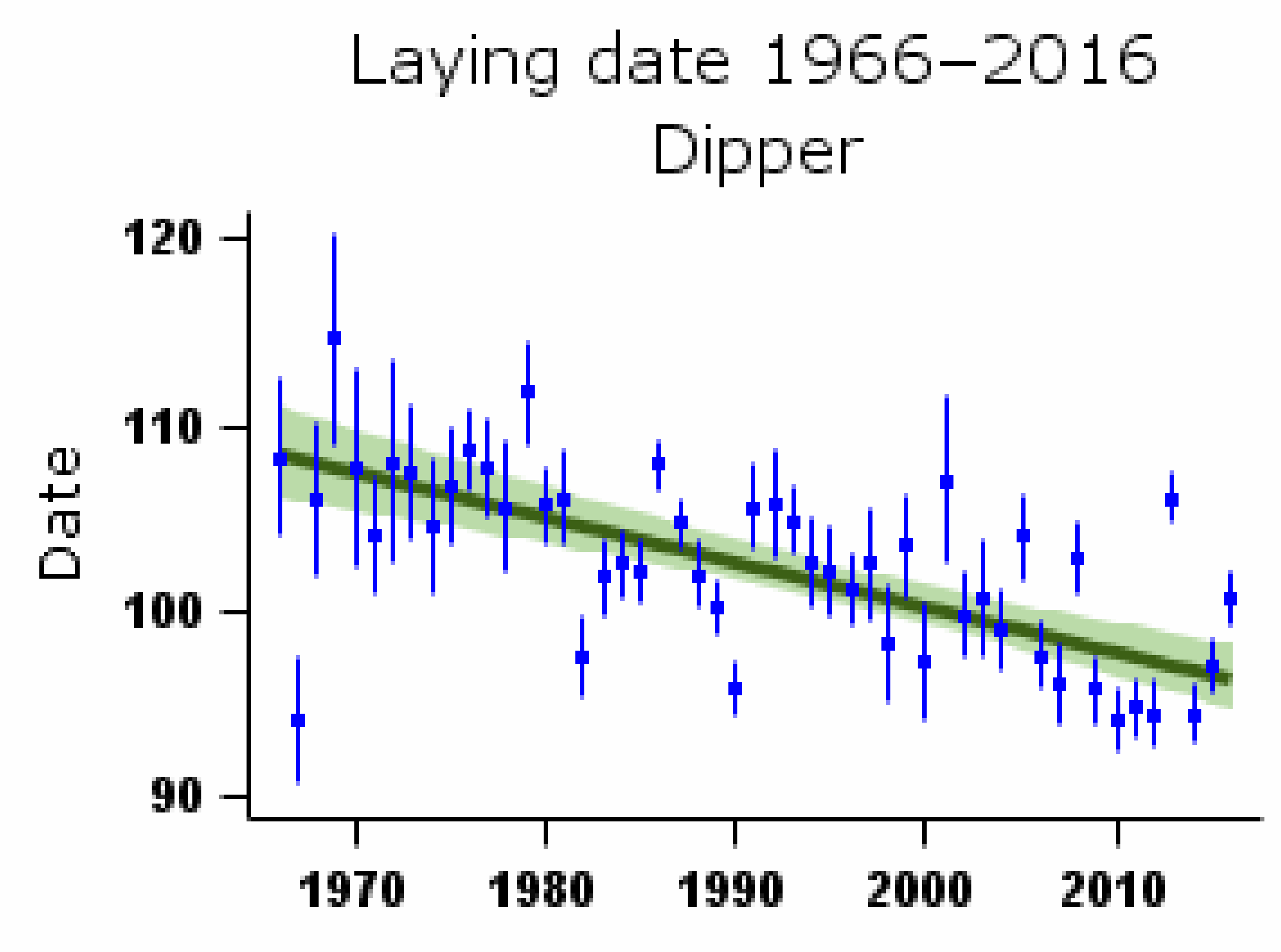


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

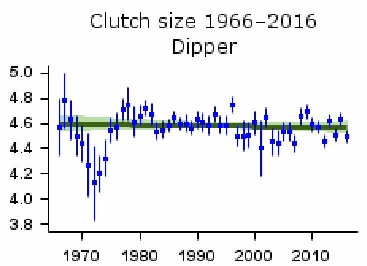


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

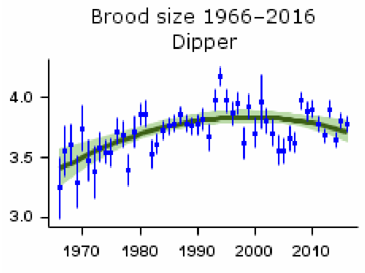
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	89	Curvilinear	2.01 fledglings	2.96 fledglings	47.6%		
Clutch size	48	1967-2015	89	None					
Brood size	48	1967-2015	160	Curvilinear	3.43 chicks	3.74 chicks	8.9%		
Nest failure rate at egg stage	48	1967-2015	121	Curvilinear	3.12% nests/day	0.47% nests/day	-84.9%		
Nest failure rate at chick stage	48	1967-2015	89	None					
Laying date	48	1967-2015	75	Linear decline	Apr 18	Apr 7	-11 days		

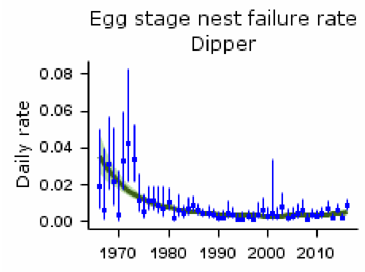
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



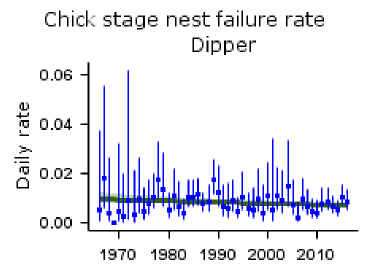
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



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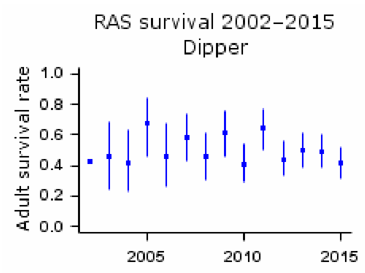

Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

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Ring Ouzel

Turdus torquatus

Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: decline
Population size:	6,200-7,500 pairs in 1999 (APEP13: Wotton et al. 2002a); 5,332 pairs in 2012, revised to 6,348 pairs when accounting for survey efficiency (Wottonet al. 2016)

Status summary

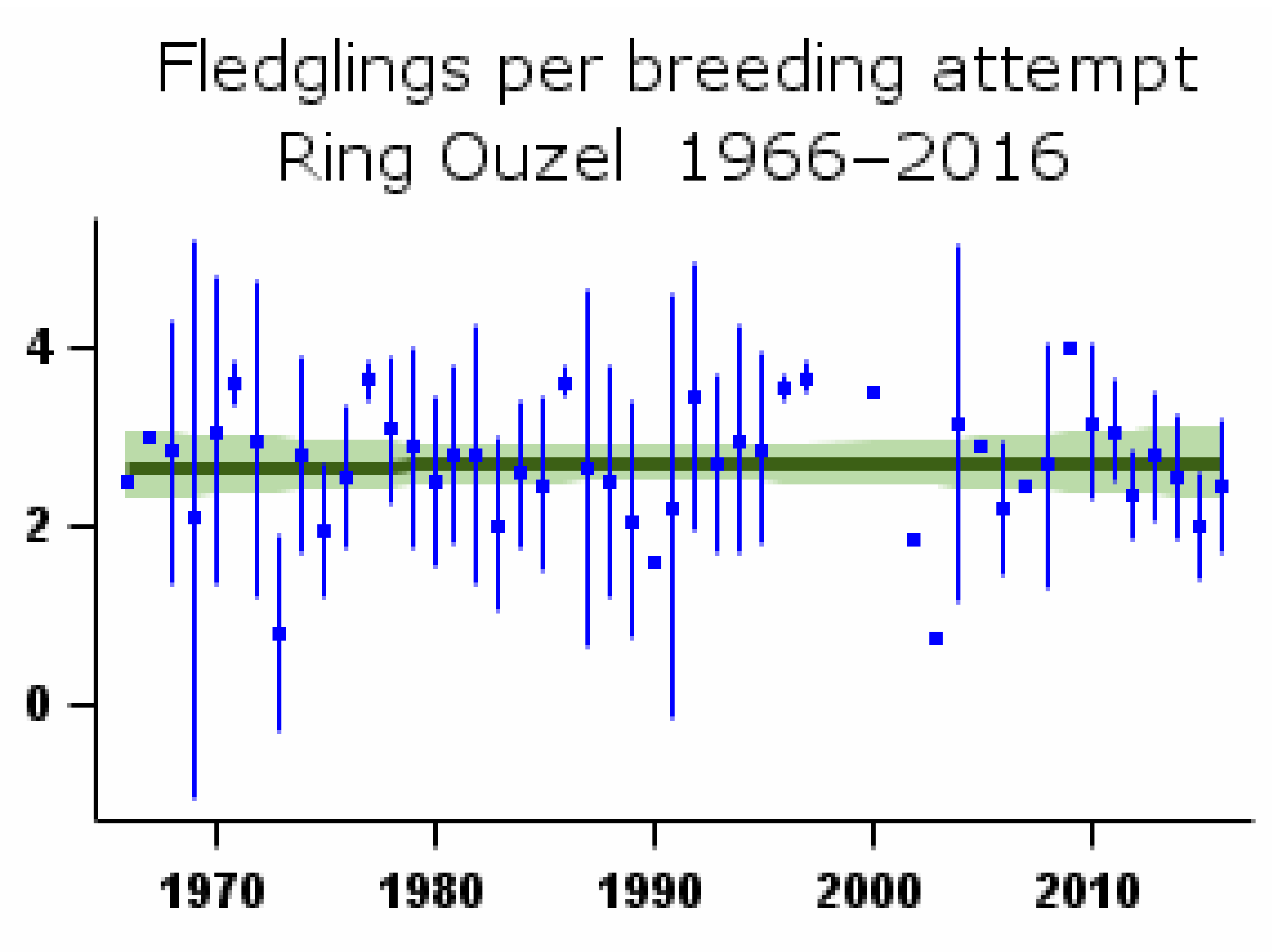
This species has been monitored by single species surveys: a 58% population decline was estimated for the period between 1988-91 and 1999, warranting red listing (Gregory et al. 2002). Further fieldwork in 2012 found 5,332 territories (4,096-6,875), using the same methods as in 1999; This equated to a (non-significant) decline of 29% since 1999 (Wotton et al. 2016). The 2012 study also used playback to measure the efficiency of the national survey methods and estimated that 84% of territories were located in 2012, giving a revised population estimate of 6,348 territories (4,825-8,198). Along with the population decline, the range of Ring Ouzel has also contracted: By 2008-11, the number of occupied 10-km squares had fallen by 43% since 1968-72 (Balmer et al. 2013).

Numbers across Europe have been broadly stable since 1998 (PECBMS 2016a).

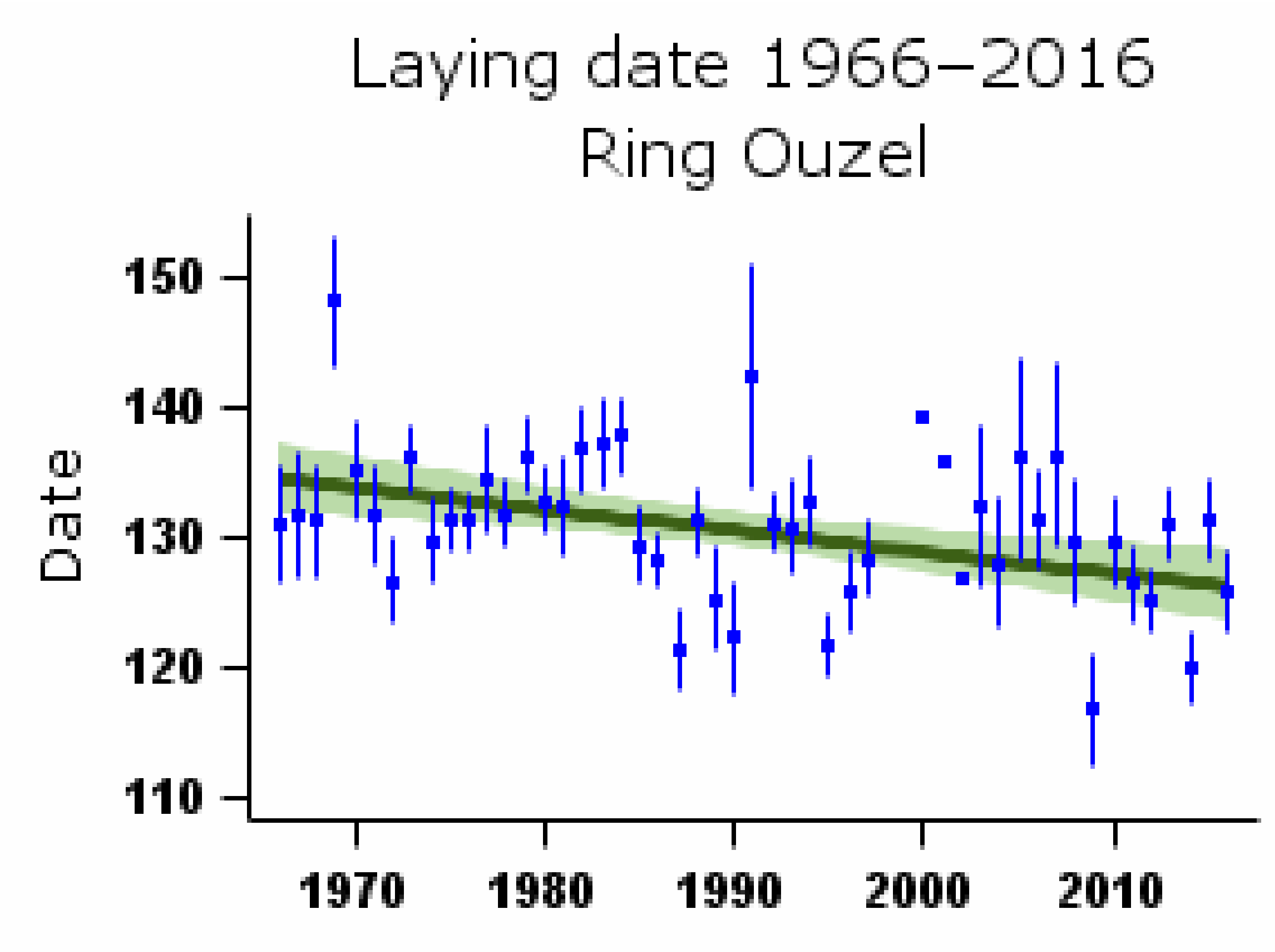
Population changes in detail

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

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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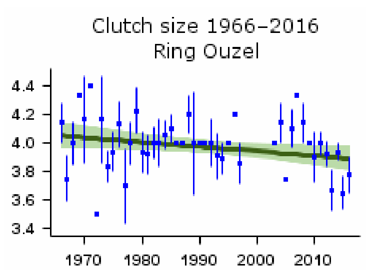
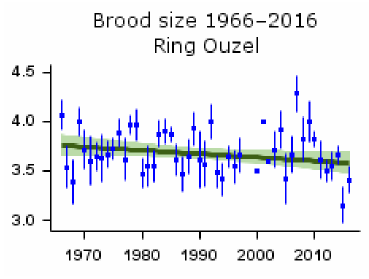
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	12	None					
Clutch size	48	1967-2015	11	Linear decline	4.05 eggs	3.90 eggs	-3.8%		Small sample
Brood size	48	1967-2015	23	None					Small sample
Nest failure rate at egg stage	48	1967-2015	12	None					Small sample
Nest failure rate at chick stage	48	1967-2015	17	None					Small sample
Laying date	48	1967-2015	24	Linear decline	May 14	May 6	-8 days		Small sample

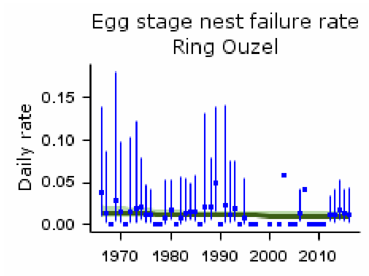
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



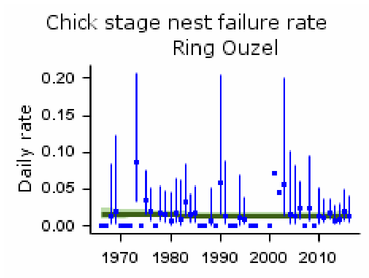
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is little evidence explaining either the demographic or ecological drivers of the decline in this species, although low survival between breeding seasons has been identified as a major cause of national decline.

Change factor	Primary driver	Secondary driver
Demographic	unknown	
Ecological	unknown	

Further information on causes of change

Long-term surveys coordinated by the Sim et al. 2010).

British & Irish bird observatory data show a decline in spring passage Ring Ouzels at western locations during 1970-98 that matches the estimated UK breeding decline, but no decline at eastern observatories where most birds are of Fennoscandian origin (Burfield & Brooke 2005). These authors infer that, since these populations winter together, the reasons for decline among UK breeders must lie on the breeding grounds or on passage: they also point out that UK birds are more exposed to hunting pressures, particularly in southwest France.

It has proved difficult to establish any reasons for decline that are linked to the breeding grounds (Buchananet al. 2003). In southeast Scotland, however, the breeding sites that are still occupied tend to be those at higher altitude and that have retained extensive cover of heather (Sim et al. 2007b). In the same study, it was shown that declines were greatest in years following warm summers on the breeding grounds and also greater two years after high spring rainfall in Morocco: these results suggest that the population decline could be linked to reduced food supplies, and consequently higher rates of natural mortality, in autumn and winter (Beale et al. 2006). Large areas of apparently suitable juniper scrub, with abundant berries but no wintering Ring Ouzels, exist in the Atlas Mountains, however (Green et al. 2012).

Low survival between breeding seasons is apparently a major national cause of decline (Simet al. 2010). Within Glen Clunie, however, Simet al. (2011) found that varying combinations of demographic factors produced each year-to-year decline, with reduced early-season productivity, rates of re-nesting and first-year survival all playing a part. A two-year experimental study found that the provision of supplementary food during the breeding season did not have an effect on reproductive success or post-fledging survival suggesting that invertebrate food availability was not a problem at this site, although the authors caution that the study area has intensive predator control so the results may only be directly relevant in similar areas (Sim et al. 2015).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Blackbird

Turdus merula

Key facts

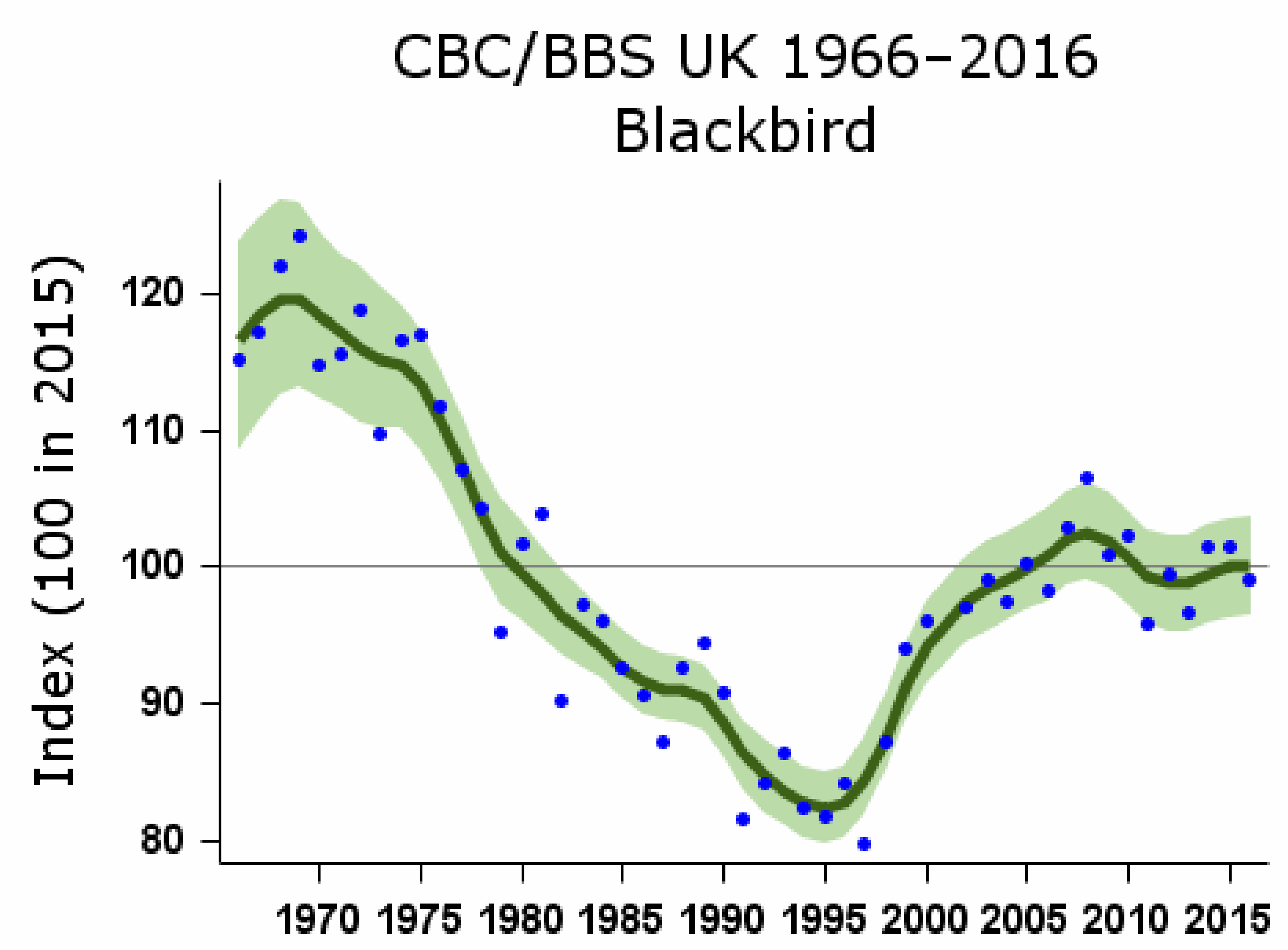
Conservation listings:	Global: green
Long-term trend:	UK, England: shallow decline
Population size:	5.1 (4.9-5.3) million pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Both CBC/BBS and CES data show long-term declines in Blackbird abundance up to about the mid 1990s followed by a strong but partial recovery, which currently has stalled. The BBS Harris et al. 2017). The moderate-decline criterion for amber listing is no longer met, and the species has been listed in the green category since 2002.

CBC results show that the decline began in the mid 1970s. It is likely that reduced survival drove the decline (Siriwardenaet al. 1998a), although there has been little overall change in survival as recorded by CES since 1983. Annual population changes correlate best with adult survival, but population processes appear to differ between eastern and western Britain (Robinson et al. 2012). Fledgling numbers per breeding attempt increased during the population decline and are now decreasing again. Agricultural intensification is likely to have contributed to the population decline (Fuller et al. 1995) but, since numbers fell in woodland as well as farmland, additional factors probably operated. Analysis of nest record data suggests that different factors may affect nest survival in urban and countryside habitats, and that nest productivity is higher in intermediate (urban rural) habitats (Miller et al. 2017)

There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

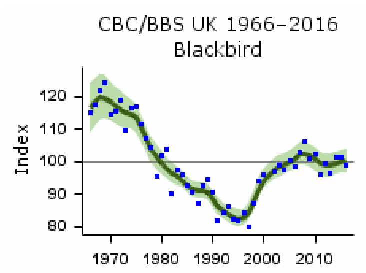
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1281	-16	-24	-6		

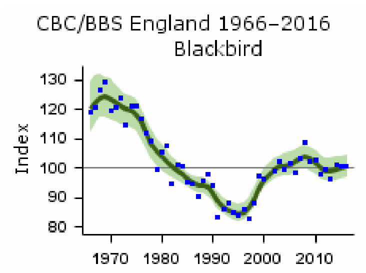
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	25	1990-2015	2250	13	7	18		
	10	2005-2015	3156	0	-2	2		
	5	2010-2015	3211	-1	-2	1		
CBC/BBS England	48	1967-2015	1030	-18	-27	-9		
	25	1990-2015	1799	10	5	14		
	10	2005-2015	2516	-1	-3	0		
	5	2010-2015	2559	-2	-3	0		
CES adults	31	1984-2015	101	-13	-25	1		
	25	1990-2015	109	-15	-24	-6		
	10	2005-2015	108	-9	-16	-1		
	5	2010-2015	111	-11	-18	-5		
CES juveniles	31	1984-2015	91	-36	-55	-9	>25	
	25	1990-2015	99	8	-15	31		
	10	2005-2015	96	-17	-31	-5		
	5	2010-2015	98	14	0	28		
BBS UK	20	1995-2015	2629	22	18	27		
	10	2005-2015	3156	0	-2	2		
	5	2010-2015	3211	-1	-2	1		
BBS England	20	1995-2015	2093	19	15	23		
	10	2005-2015	2516	-1	-4	1		
	5	2010-2015	2559	-2	-3	0		
BBS Scotland	20	1995-2015	218	37	21	64		
	10	2005-2015	269	10	1	21		
	5	2010-2015	276	5	-1	12		
BBS Wales	20	1995-2015	213	38	29	47		
	10	2005-2015	248	1	-4	8		
	5	2010-2015	255	-2	-8	4		
BBS N.Ireland	20	1995-2015	89	40	7	59		
	10	2005-2015	102	-4	-11	3		
	5	2010-2015	100	6	-1	13		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

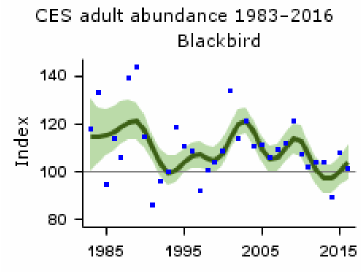
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



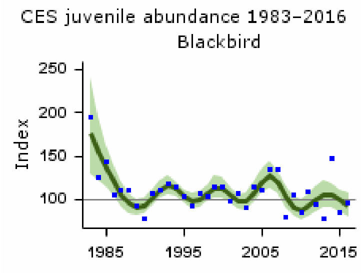
CBC/BBS UK graph



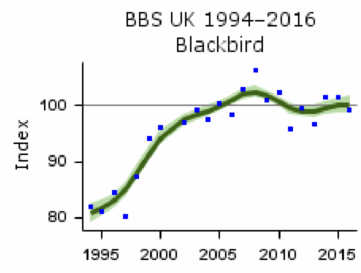
CBC/BBS England graph



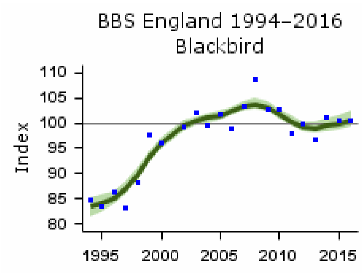
CES adults graph



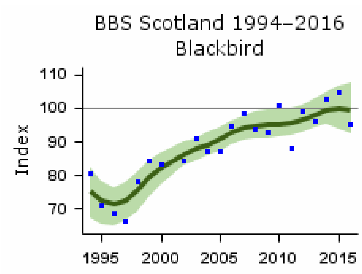
CES juveniles graph



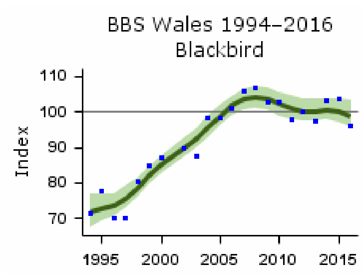
BBS UK graph



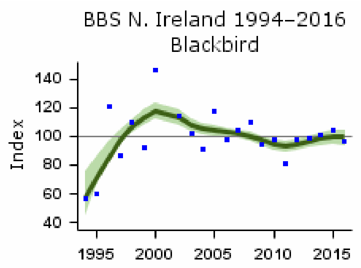
BBS England graph



BBS Scotland graph

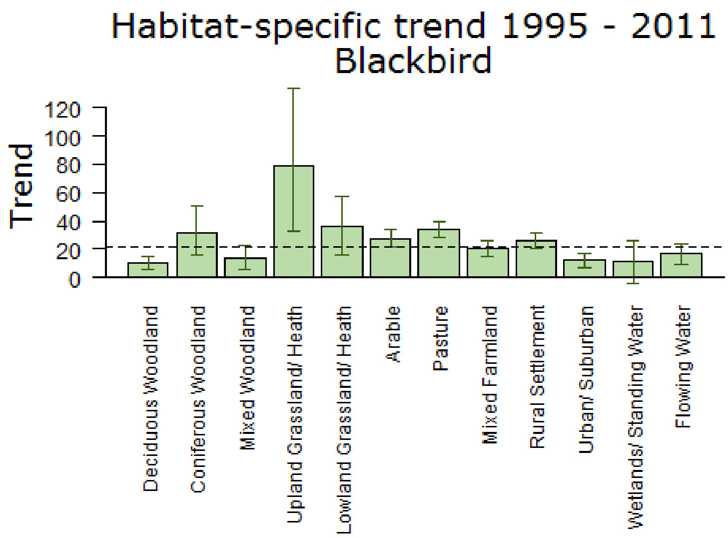


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



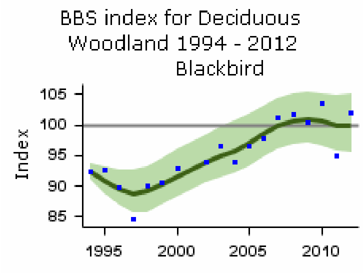
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

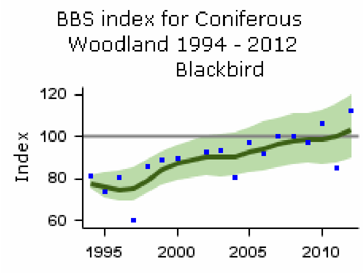
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	942	10	6	15
Coniferous Woodland	16	1995-2011	214	32	16	51
Mixed Woodland	16	1995-2011	498	14	6	22
Upland Grassland/ Heath	16	1995-2011	35	79	32	134
Lowland Grassland/ Heath	16	1995-2011	190	36	16	58
Arable	16	1995-2011	860	28	22	34
Pasture	16	1995-2011	1422	33	28	39
Mixed Farmland	16	1995-2011	824	20	15	26
Rural Settlement	16	1995-2011	968	26	20	32
Urban/ Suburban	16	1995-2011	469	12	7	18
Wetlands/ Standing Water	16	1995-2011	120	12	-4	26
Flowing Water	16	1995-2011	574	17	9	24

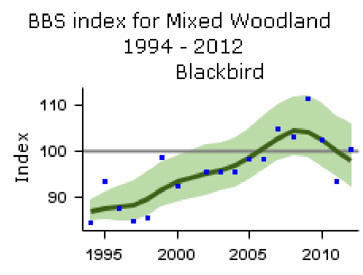
Further information on habitat-specific trends, please follow link here.



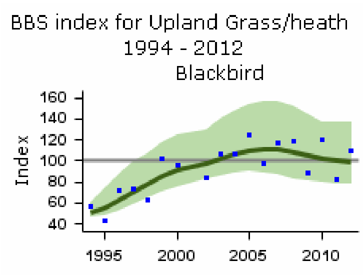
Habitat graph



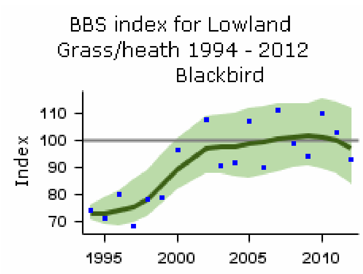
Habitat graph



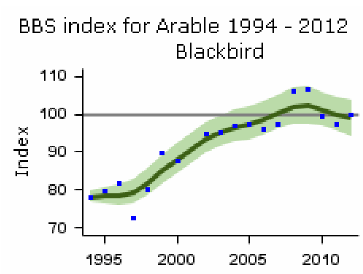
Habitat graph



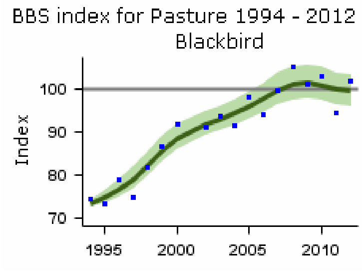
Habitat graph



Habitat graph



Habitat graph



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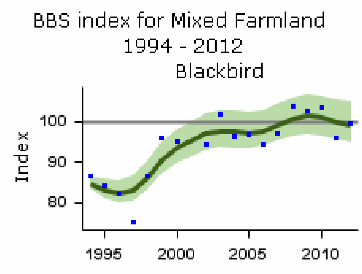
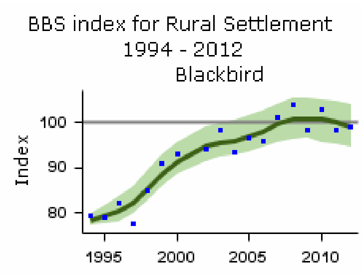
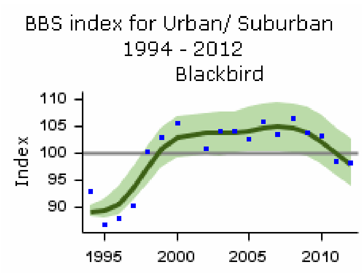


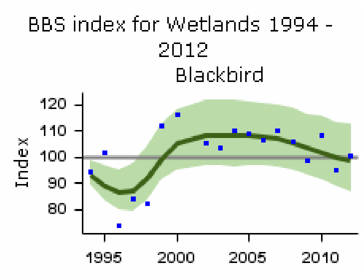
Habitat graph



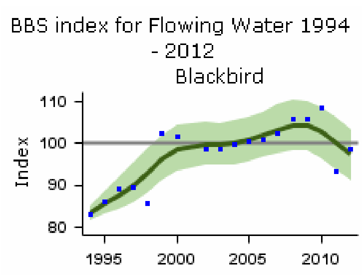
Habitat graph



Habitat graph

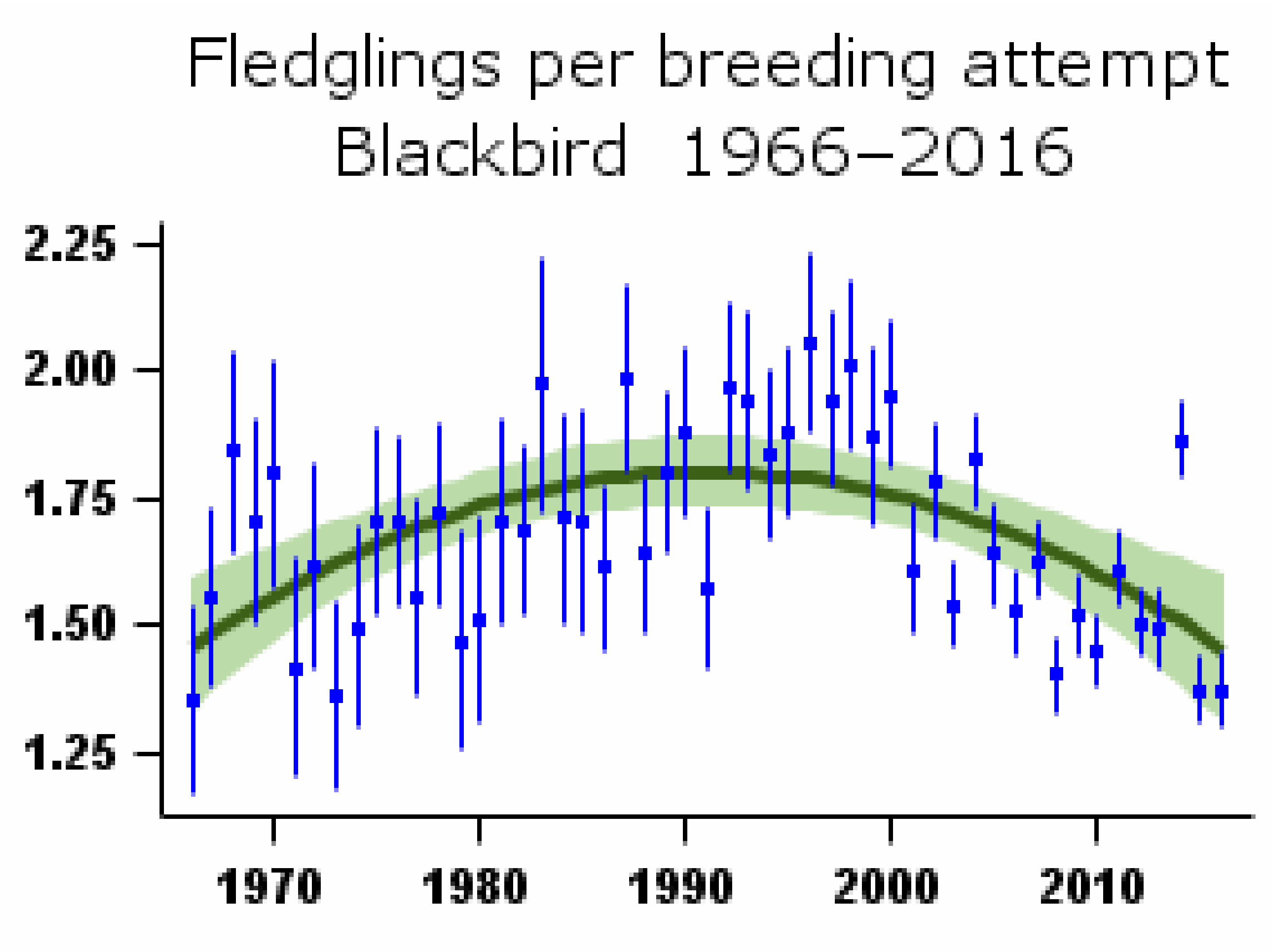


Habitat graph

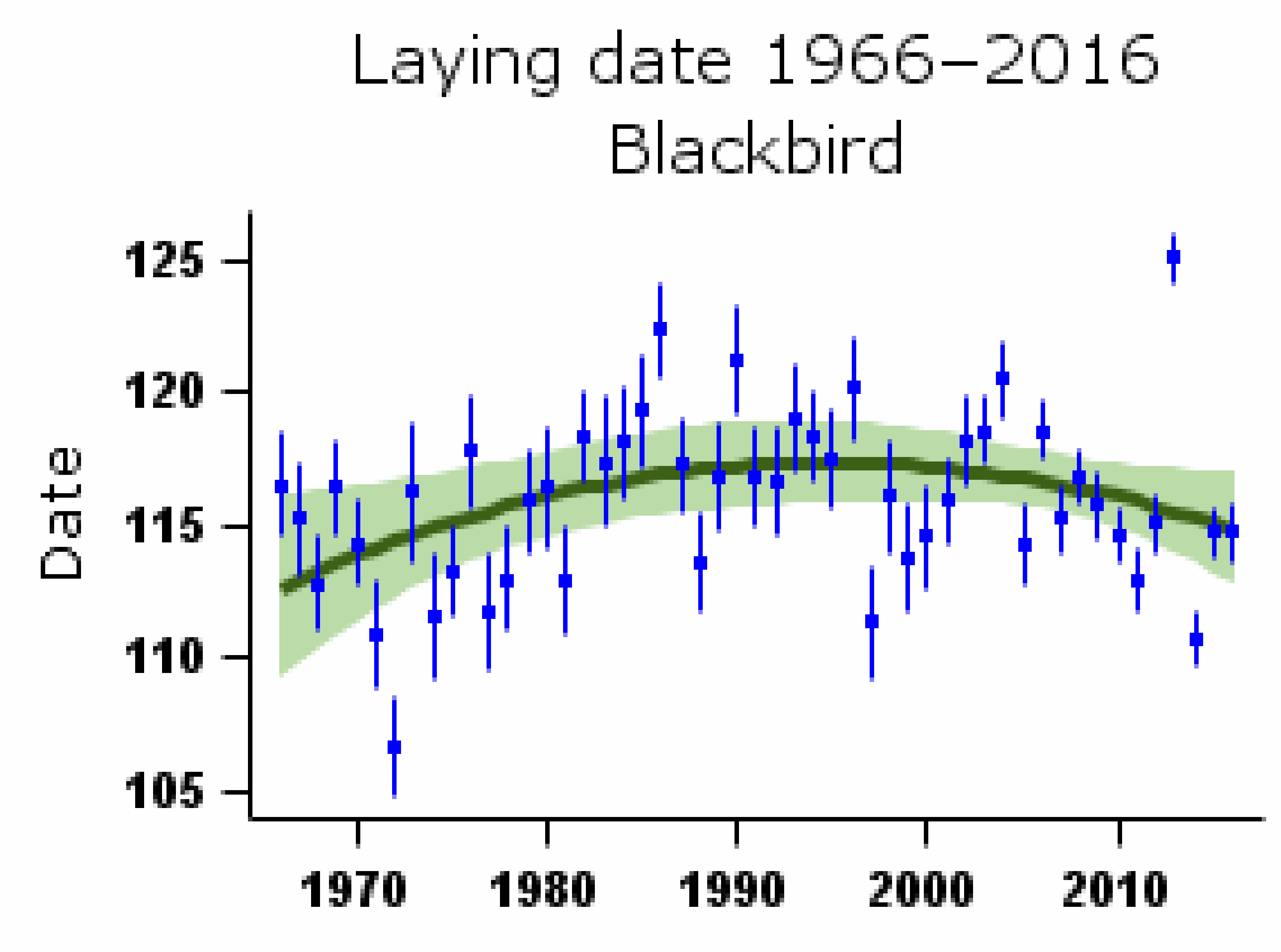


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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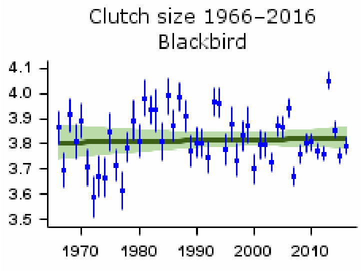
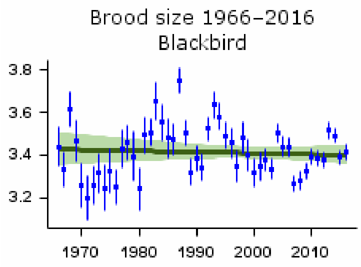
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	270	Curvilinear	1.48 fledglings	1.48 fledglings	-0.2%		
Clutch size	48	1967-2015	228	None					
Brood size	48	1967-2015	295	None					
Nest failure rate at egg stage	48	1967-2015	334	Curvilinear	2.52% nests/day	3.98% nests/day	57.9%		
Nest failure rate at chick stage	48	1967-2015	271	Linear decline	2.81% nests/day	1.95% nests/day	-30.6%		
Laying date	48	1967-2015	268	Curvilinear	Apr 23	Apr 25	2 days		
Juvenile to Adult ratio (CES)	31	1984-2015	103	Smoothed trend	144 Index value	100 Index value	-31%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	112	Smoothed trend	101 Index value	100 Index value	-1%		
Juvenile to Adult ratio (CES)	10	2005-2015	110	Smoothed trend	116 Index value	100 Index value	-14%		
Juvenile to Adult ratio (CES)	5	2010-2015	114	Smoothed trend	85 Index value	100 Index value	18%		

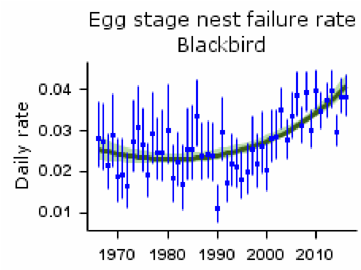
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



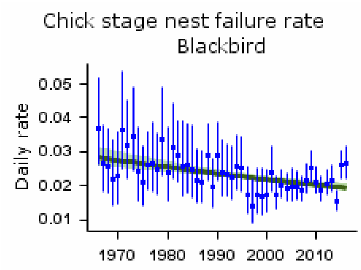
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



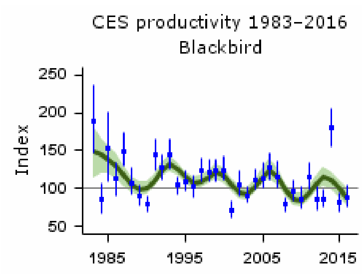
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



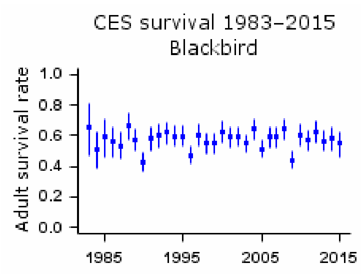
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Song Thrush

Turdus philomelos

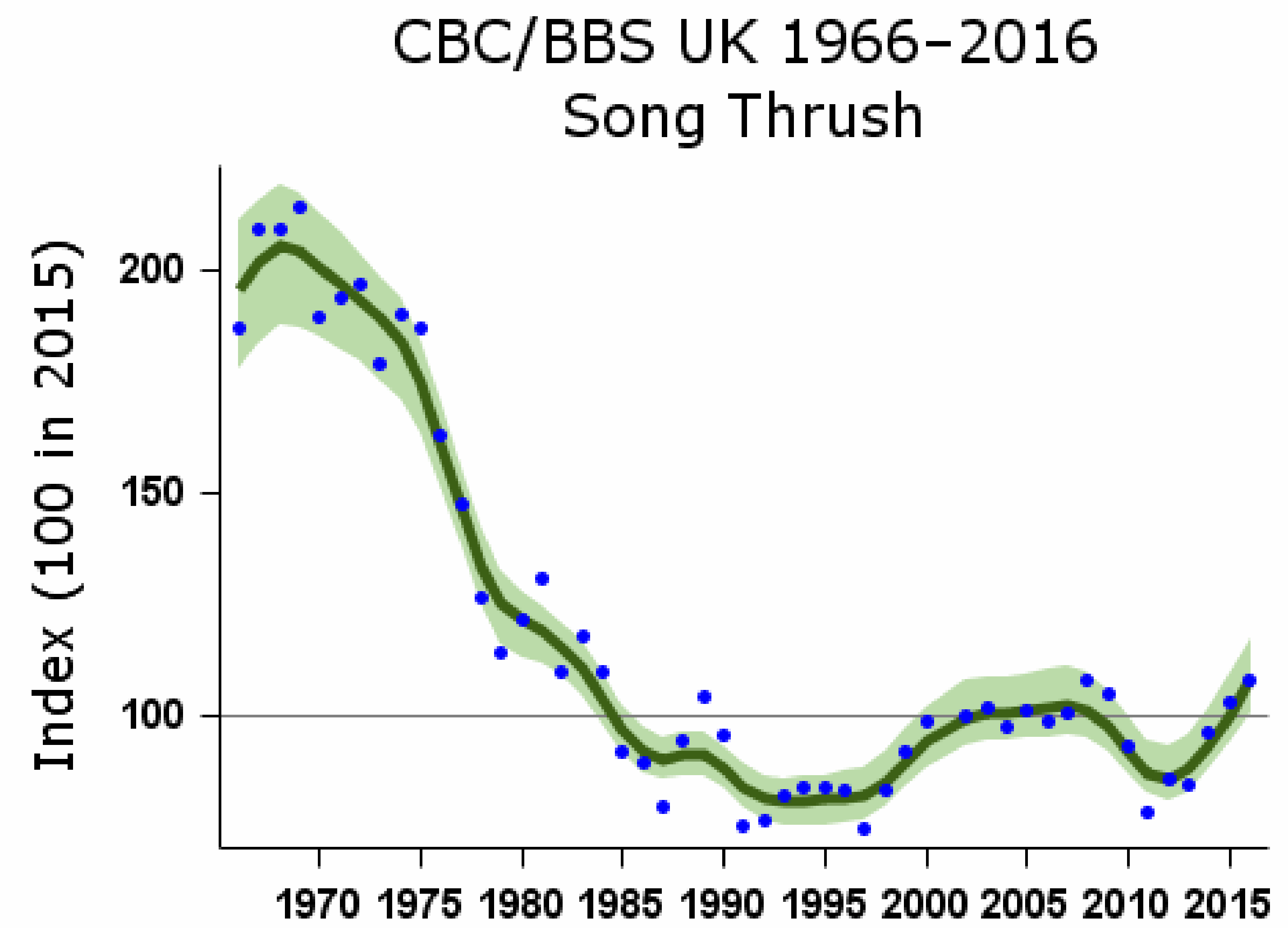
Key facts

Conservation listings:	Global: red (breeding population decline); at race level, clarkei and hebridensis red, philomelos green
Long-term trend:	UK, England: rapid decline
Population size:	1.2 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Short-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

CBC/BBS shows a rapid decline in Song Thrush abundance that began in the mid 1970s. The latter part of this decline can also be seen in the CES index. BBS data from all UK countries show increase from 1994 to 2008, followed by a sharp downturn from 2008 to 2012, but population levels remained relatively low throughout. The BBS PECBMS 2016a).



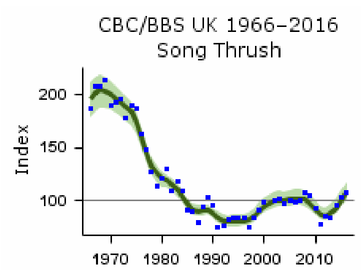
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

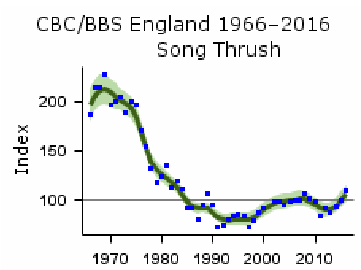
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1045	-50	-57	-40	>50	
	25	1990-2015	1815	13	5	23		
	10	2005-2015	2571	-1	-4	3		
	5	2010-2015	2590	9	6	12		
CBC/BBS England	48	1967-2015	828	-52	-60	-42	>50	
	25	1990-2015	1425	13	1	23		
	10	2005-2015	2022	0	-3	3		
	5	2010-2015	2045	5	2	7		
CES adults	31	1984-2015	83	-14	-30	9		
	25	1990-2015	90	-10	-23	8		
	10	2005-2015	89	2	-8	13		
	5	2010-2015	89	11	0	22		
CES juveniles	31	1984-2015	70	-52	-65	-34	>50	
	25	1990-2015	76	-8	-30	22		
	10	2005-2015	76	-15	-28	-3		
	5	2010-2015	76	2	-11	16		
BBS UK	20	1995-2015	2116	22	17	29		
	10	2005-2015	2571	-1	-4	2		
	5	2010-2015	2590	9	6	11		
BBS England	20	1995-2015	1654	20	15	27		
	10	2005-2015	2022	0	-3	4		
	5	2010-2015	2045	5	2	7		
BBS Scotland	20	1995-2015	193	28	9	52		
	10	2005-2015	236	1	-5	10		
	5	2010-2015	232	25	13	36		
BBS Wales	20	1995-2015	179	24	13	38		
	10	2005-2015	209	-9	-17	-1		
	5	2010-2015	209	6	-4	16		
BBS N.Ireland	20	1995-2015	79	52	18	96		
	10	2005-2015	93	-4	-16	10		
	5	2010-2015	90	10	-4	22		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

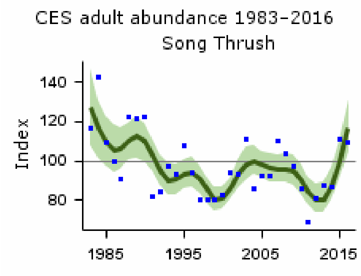
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



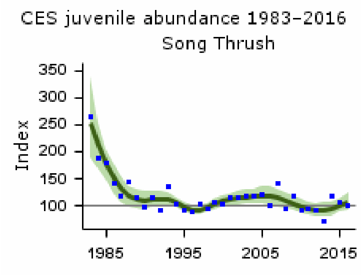
CBC/BBS UK graph



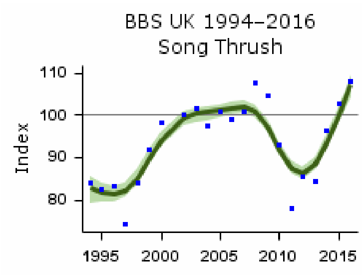
CBC/BBS England graph



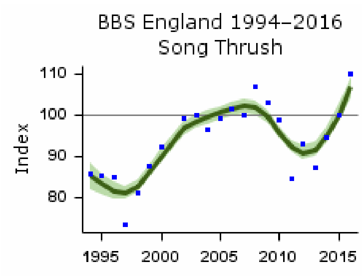
CES adults graph



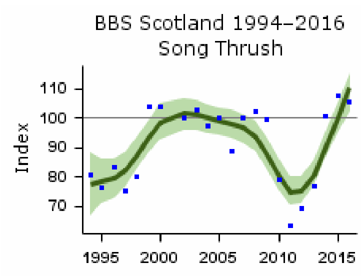
CES juveniles graph



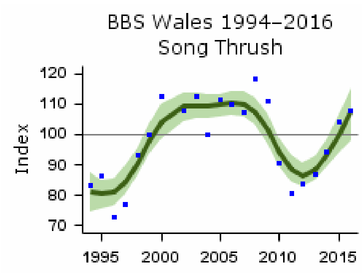
BBS UK graph



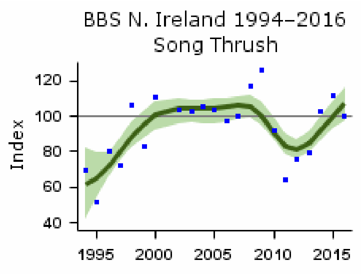
BBS England graph



BBS Scotland graph

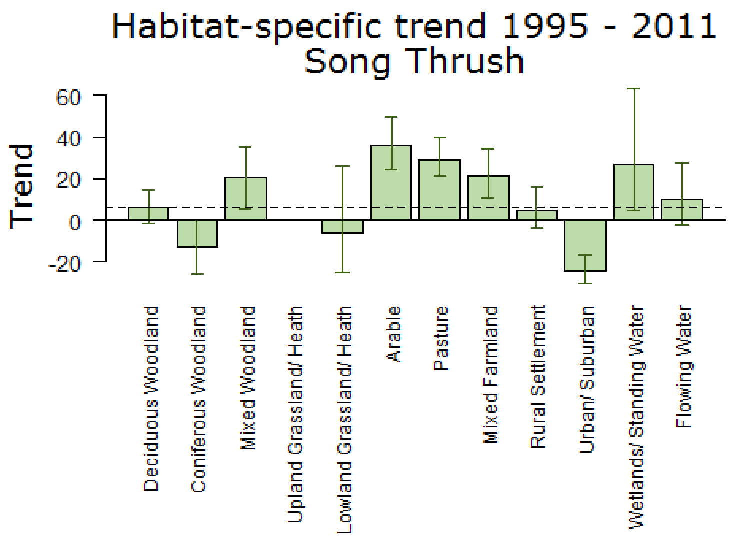


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



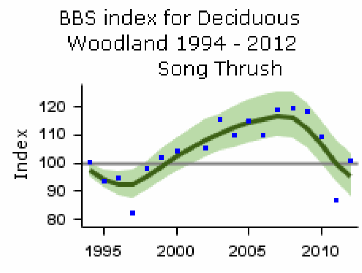
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

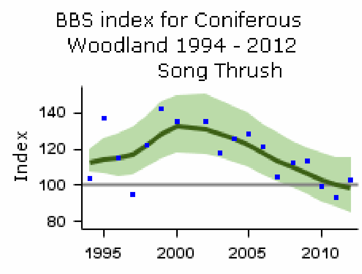
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	631	6	-1	15
Coniferous Woodland	16	1995-2011	166	-13	-26	0
Mixed Woodland	16	1995-2011	350	20	6	35
Lowland Grassland/ Heath	16	1995-2011	125	-6	-25	26
Arable	16	1995-2011	477	36	24	50
Pasture	16	1995-2011	937	29	22	40
Mixed Farmland	16	1995-2011	418	21	11	34
Rural Settlement	16	1995-2011	603	5	-4	16
Urban/ Suburban	16	1995-2011	313	-24	-30	-16
Wetlands/ Standing Water	16	1995-2011	62	27	5	63
Flowing Water	16	1995-2011	332	10	-2	27

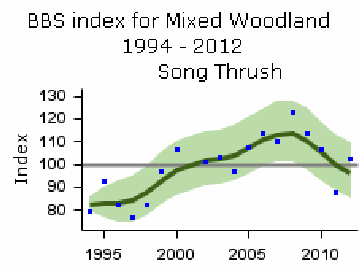
Further information on habitat-specific trends, please follow link here.



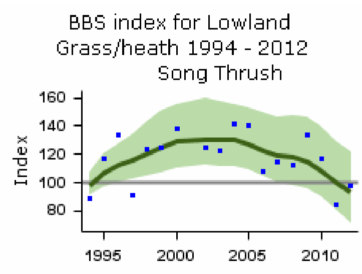
Habitat graph



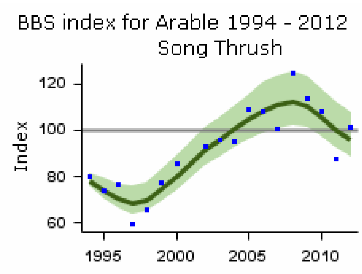
Habitat graph



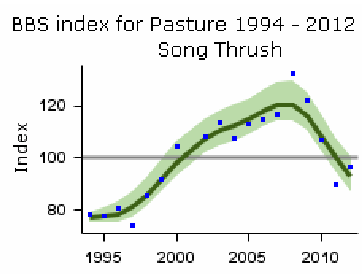
Habitat graph



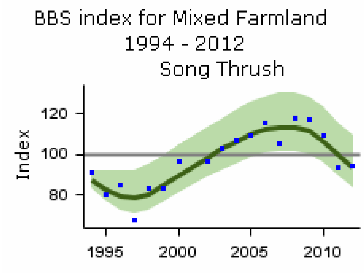
Habitat graph



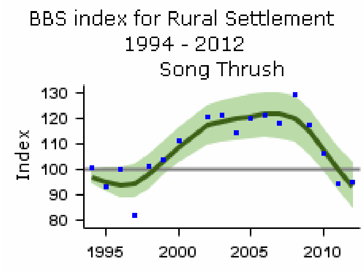
Habitat graph



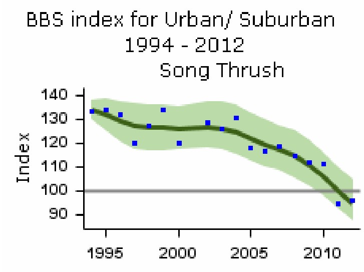
Habitat graph



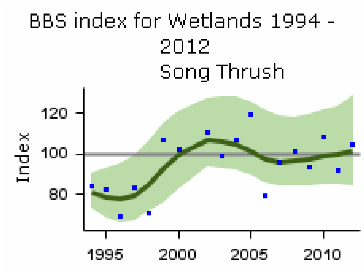
Habitat graph



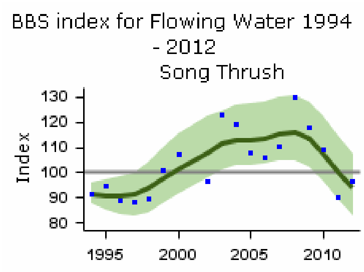
Habitat graph



Habitat graph

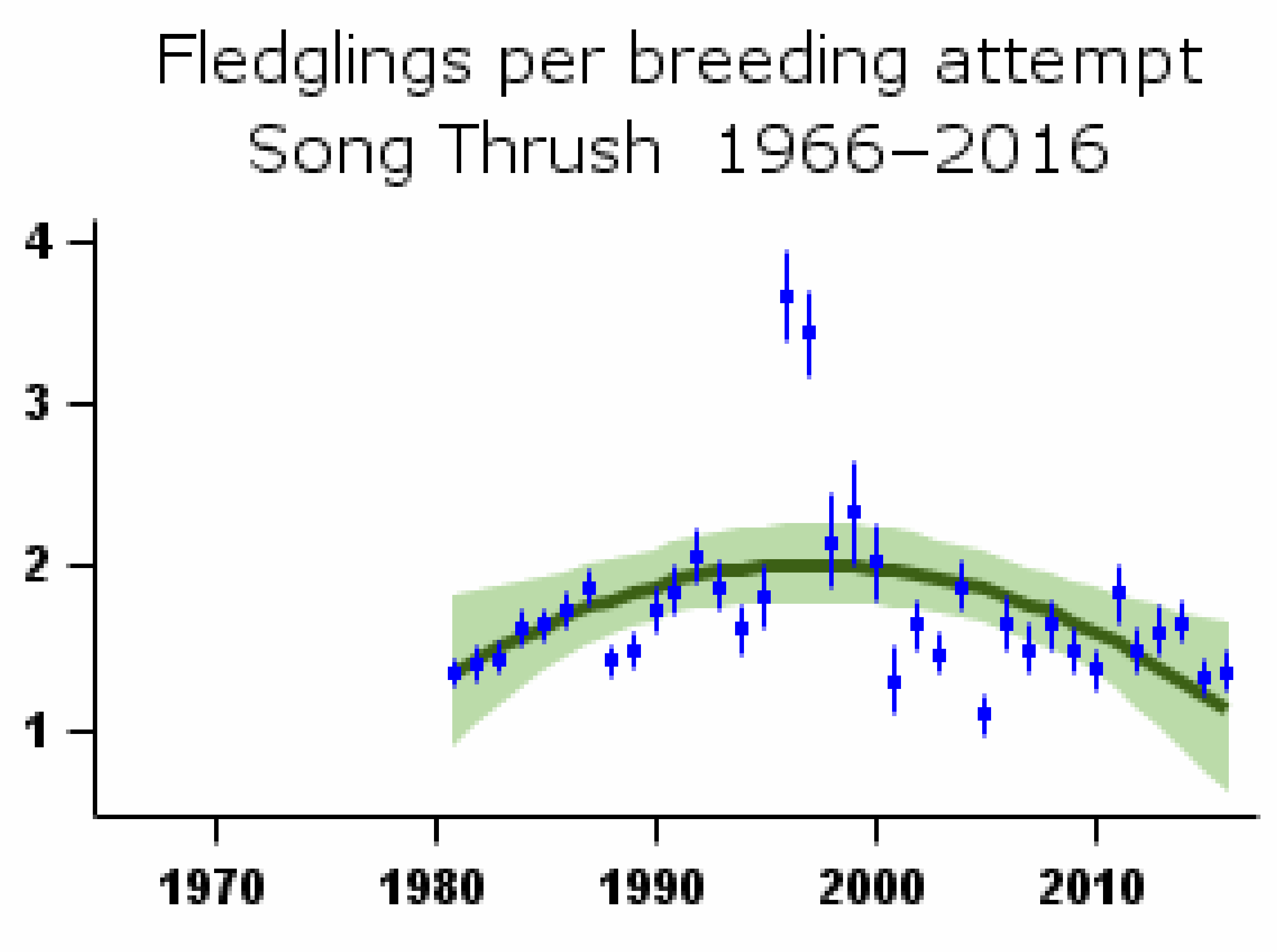


Habitat graph

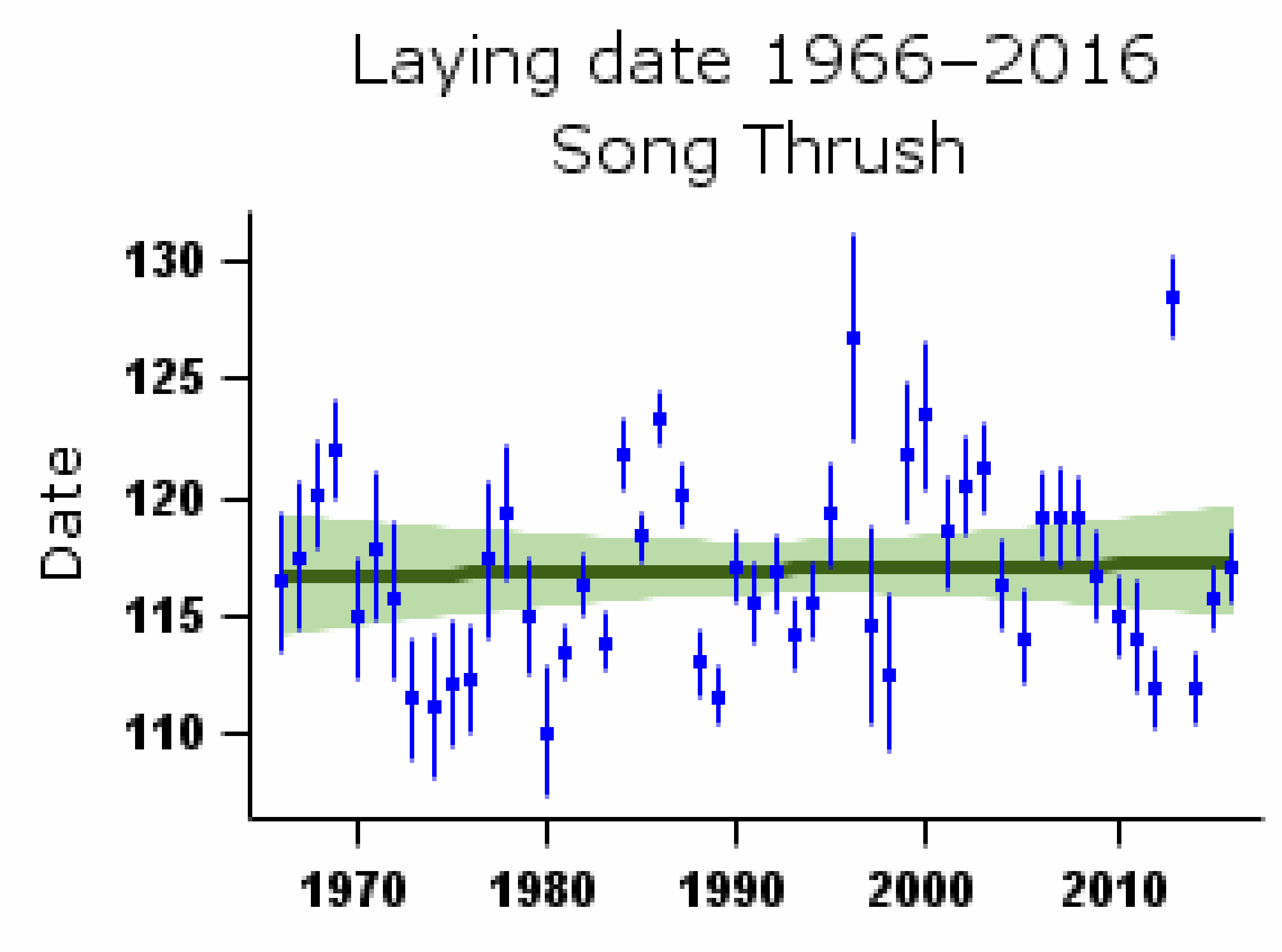


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

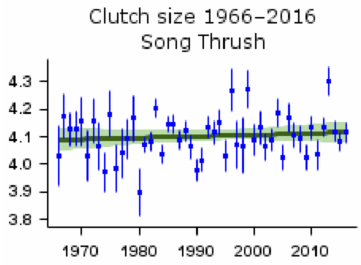


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

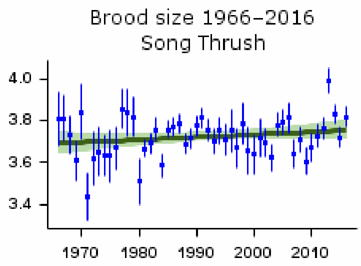
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	34	1981-2015	229	Curvilinear	1.35 fledglings	1.22 fledglings	-10.0%		
Clutch size	48	1967-2015	180	None					
Brood size	48	1967-2015	195	None					
Nest failure rate at egg stage	34	1981-2015	315	Curvilinear	4.18% nests/day	4.72% nests/day	12.9%		
Nest failure rate at chick stage	34	1981-2015	229	Curvilinear	2.55% nests/day	2.42% nests/day	-5.1%		
Laying date	48	1967-2015	204	None			0 days		
Juvenile to Adult ratio (CES)	31	1984-2015	92	Smoothed trend	177 Index value	100 Index value	-43%	>25	
Juvenile to Adult ratio (CES)	25	1990-2015	100	Smoothed trend	90 Index value	100 Index value	11%		
Juvenile to Adult ratio (CES)	10	2005-2015	100	Smoothed trend	110 Index value	100 Index value	-9%		
Juvenile to Adult ratio (CES)	5	2010-2015	102	Smoothed trend	111 Index value	100 Index value	-10%		

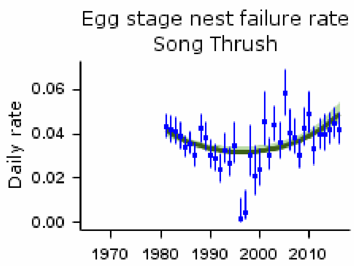
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



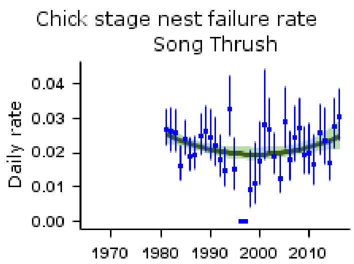
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



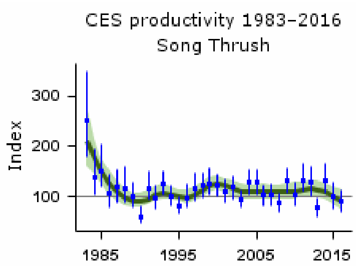
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



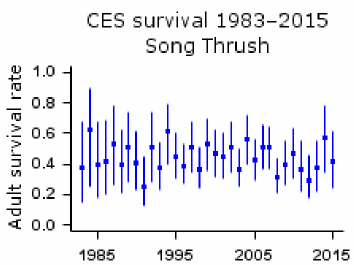
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

Changes in survival in the first winter, and also the post-fledging period, are sufficient to have caused the population decline. The environmental causes of this are unknown but are likely to include changes in farming practices, particularly land drainage and possibly increased pesticide usage.

Change factor	Primary driver	Secondary driver
Demographic	Decreased juvenile survival	
Ecological	Unknown	

Further information on causes of change

CES productivity shows an initial decrease, followed by fluctuations around a new lower level, and the number of fledglings per breeding attempt increased during the 1980s and 1990s but has since decreased (see above). There is good evidence to show that changes in survival in the first winter have contributed to the population decline (Thomson et al. 1997, Siriwardena et al. 1998b, Robinson et al. 2004). A more recent integrated analysis also indicated that post-fledging survival also made some contribution to annual population changes (Robinson et al. 2014).

Peach et al. (2004) suggested that loss of hedgerows, scrub and permanent grassland with livestock and the widespread installation of field drainage systems, all of which would act to reduce the availability of good quality foraging areas, have probably contributed to the decline of the Song Thrush in the UK. Similarly, it has been suggested that the species is unable to survive the winter in woodland, due to a lack of food, and a reduction of food supply in other habitat types has also been reported (Simms 1989). It is likely that a reduction in food supply would adversely affect the survival of juvenile birds to a greater extent than adult birds, as appears to be the case (Robinson et al. 2004). Furthermore, survival is reduced during periods of long drought or cold weather when food is likely to be less available (Robinson et al. 2007).

In woodland, drainage of damp ground and the depletion of woodland shrub layers through canopy closure and deer browsing may also be implicated (Fuller et al. 2005). There is also some concern of the impact of overgrazing by deer (e.g. Gill & Beardall 2001) and canopy closure (Mason 2007), due to changes in woodland management (Hopkins & Kirby 2007) on the low woodland layers, although good evidence from the UK is sparse (but there are some experimental studies in America on different species which demonstrate this effect, e.g. McShea & Rappole 2000). Several papers (e.g. Gosler 1990, Perrins & Overall 2001, Perrins 2003) state that the understorey has declined in Britain, but few data are available to support this on a national scale. However, Amar et al. (2006) found a 27% increase in understorey in the RSPB sites used in the Repeat Woodland Bird Survey.

Robinson et al. (2004) suggested that predation was a possible cause of reduced survival but there is conflicting evidence on the role of predators in Song Thrush decline, and further research is needed. Newson et al. (2010b) found no evidence of effects of avian predators or grey squirrels on Song Thrushes.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Mistle Thrush

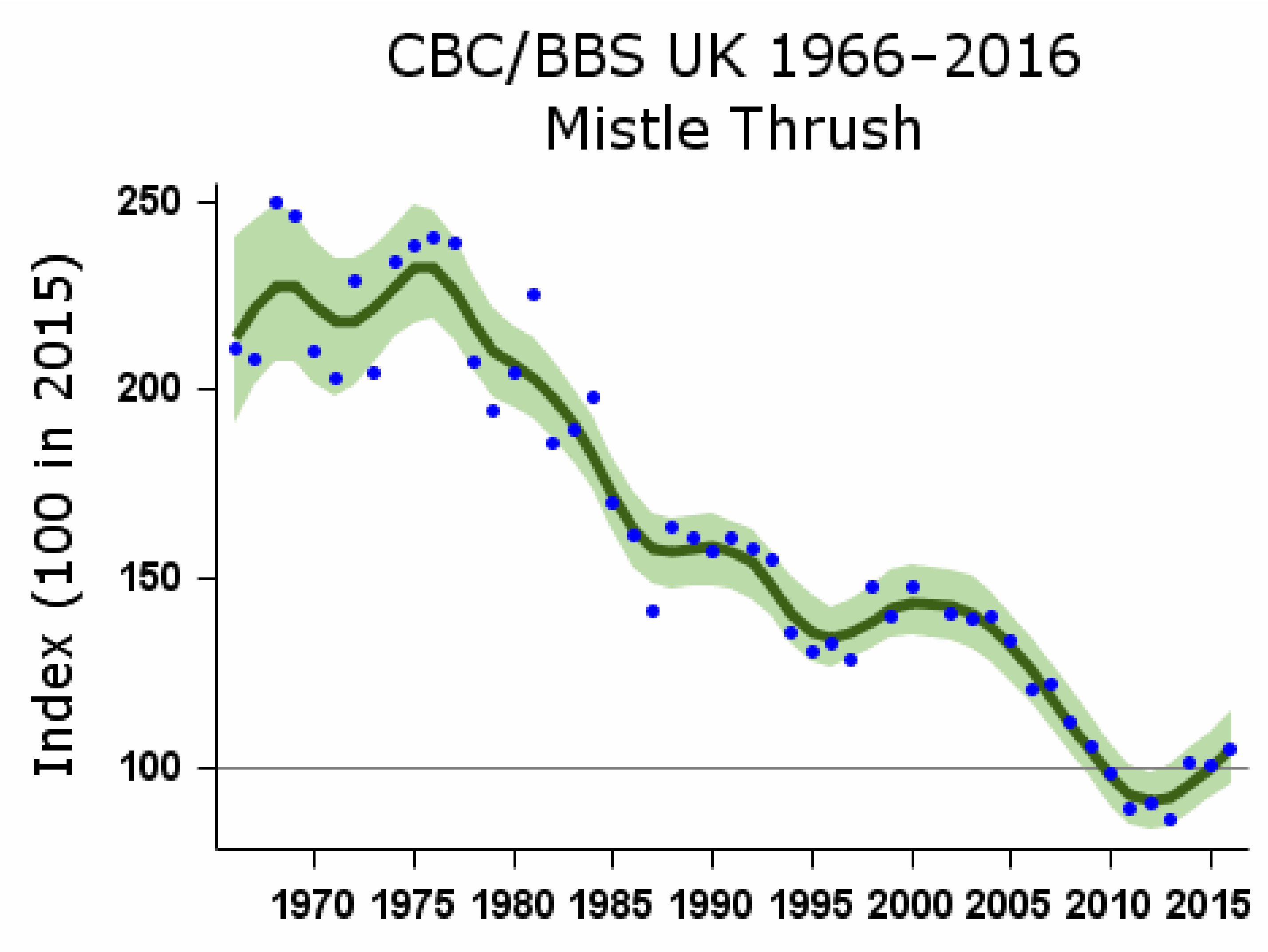
Turdus viscivorus

Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK, England: rapid decline
Population size:	170,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Like those of Eaton et al. 2015). The BBS Siriwardena et al. 1998b). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

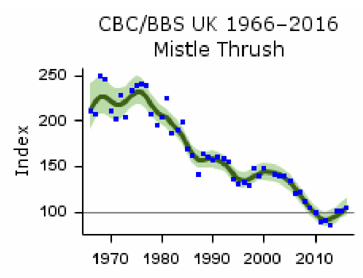
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	614	-55	-62	-45	>50	
	25	1990-2015	1043	-37	-43	-28	>25	
	10	2005-2015	1336	-24	-28	-20		
	5	2010-2015	1259	3	-4	9		
CBC/BBS England	48	1967-2015	495	-61	-68	-53	>50	
	25	1990-2015	831	-48	-53	-41	>25	
	10	2005-2015	1048	-29	-33	-26	>25	

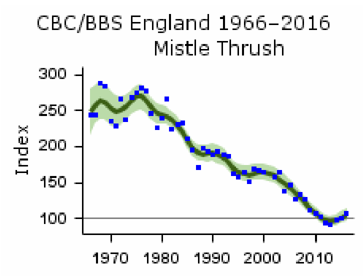
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	985	-6	-10	-2		
BBS UK	20	1995-2015	1200	-25	-30	-19		
	10	2005-2015	1336	-24	-28	-19		
	5	2010-2015	1259	2	-4	7		
BBS England	20	1995-2015	949	-38	-42	-33	>25	
	10	2005-2015	1048	-29	-33	-26	>25	
	5	2010-2015	985	-6	-11	-2		
BBS Scotland	20	1995-2015	82	28	-1	71		
	10	2005-2015	99	-13	-30	4		
	5	2010-2015	90	36	8	63		
BBS Wales	20	1995-2015	106	-4	-23	21		
	10	2005-2015	119	-10	-24	3		
	5	2010-2015	120	-1	-14	14		
BBS N.Ireland	20	1995-2015	60	-2	-51	64		
	10	2005-2015	68	-27	-39	-13	>25	
	5	2010-2015	63	3	-12	19		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

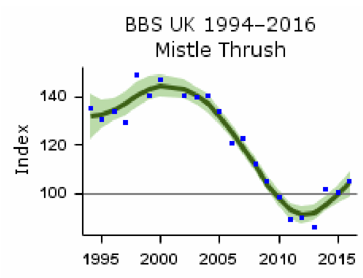
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



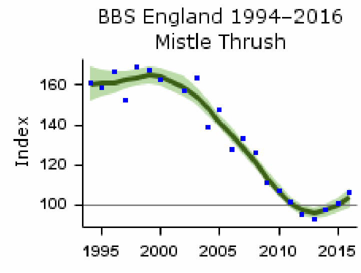
CBC/BBS UK graph



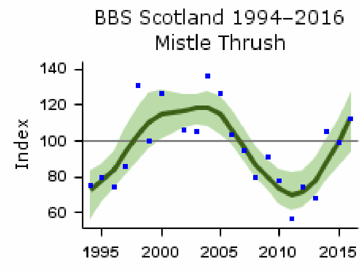
CBC/BBS England graph



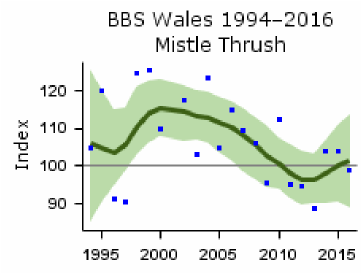
BBS UK graph



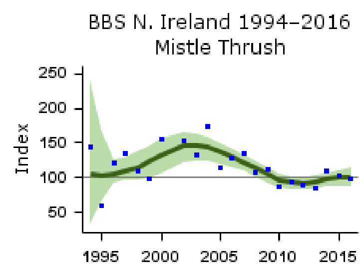
BBS England graph



BBS Scotland graph

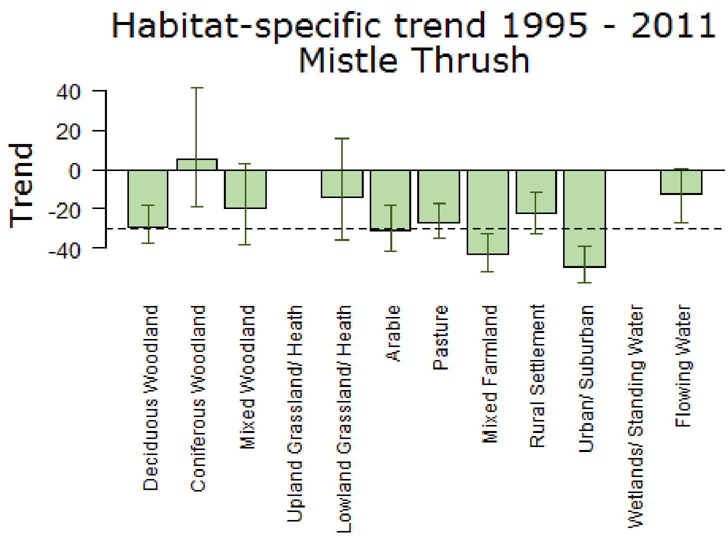


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



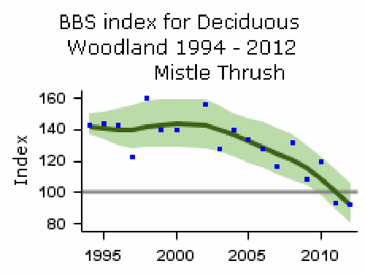
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

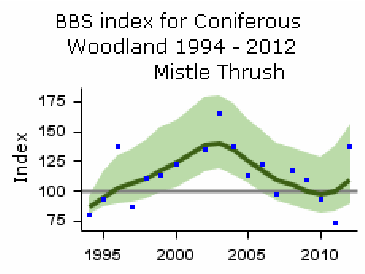
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	234	-29	-38	-18
Coniferous Woodland	16	1995-2011	69	5	-19	42
Mixed Woodland	16	1995-2011	130	-20	-38	3
Lowland Grassland/ Heath	16	1995-2011	58	-14	-36	16
Arable	16	1995-2011	180	-31	-41	-18
Pasture	16	1995-2011	441	-27	-36	-17
Mixed Farmland	16	1995-2011	160	-43	-52	-33
Rural Settlement	16	1995-2011	262	-22	-32	-11
Urban/ Suburban	16	1995-2011	143	-50	-57	-39
Flowing Water	16	1995-2011	122	-12	-27	0

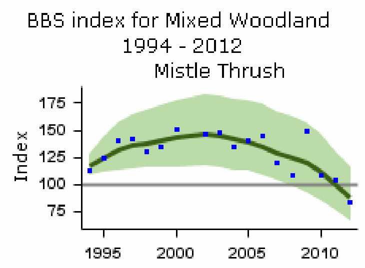
Further information on habitat-specific trends, please follow link here.



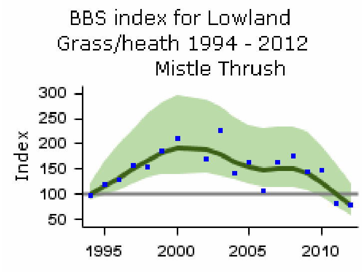
Habitat graph



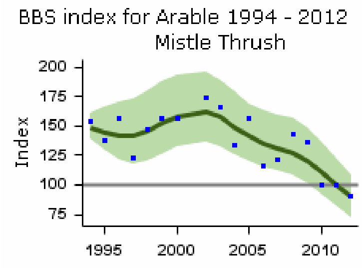
Habitat graph



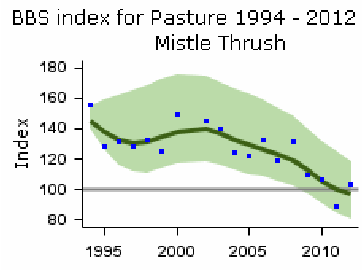
Habitat graph



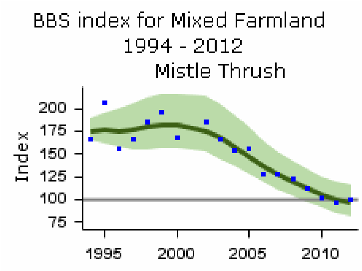
Habitat graph



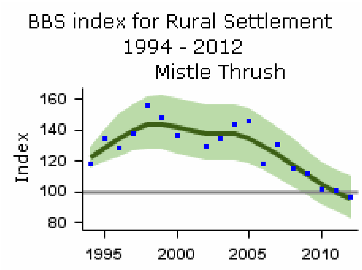
Habitat graph



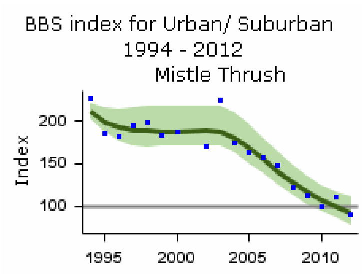
Habitat graph



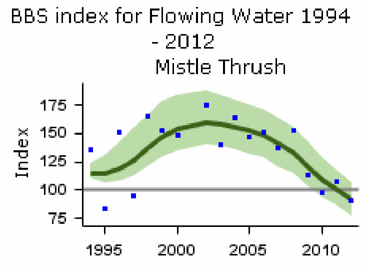
Habitat graph



Habitat graph

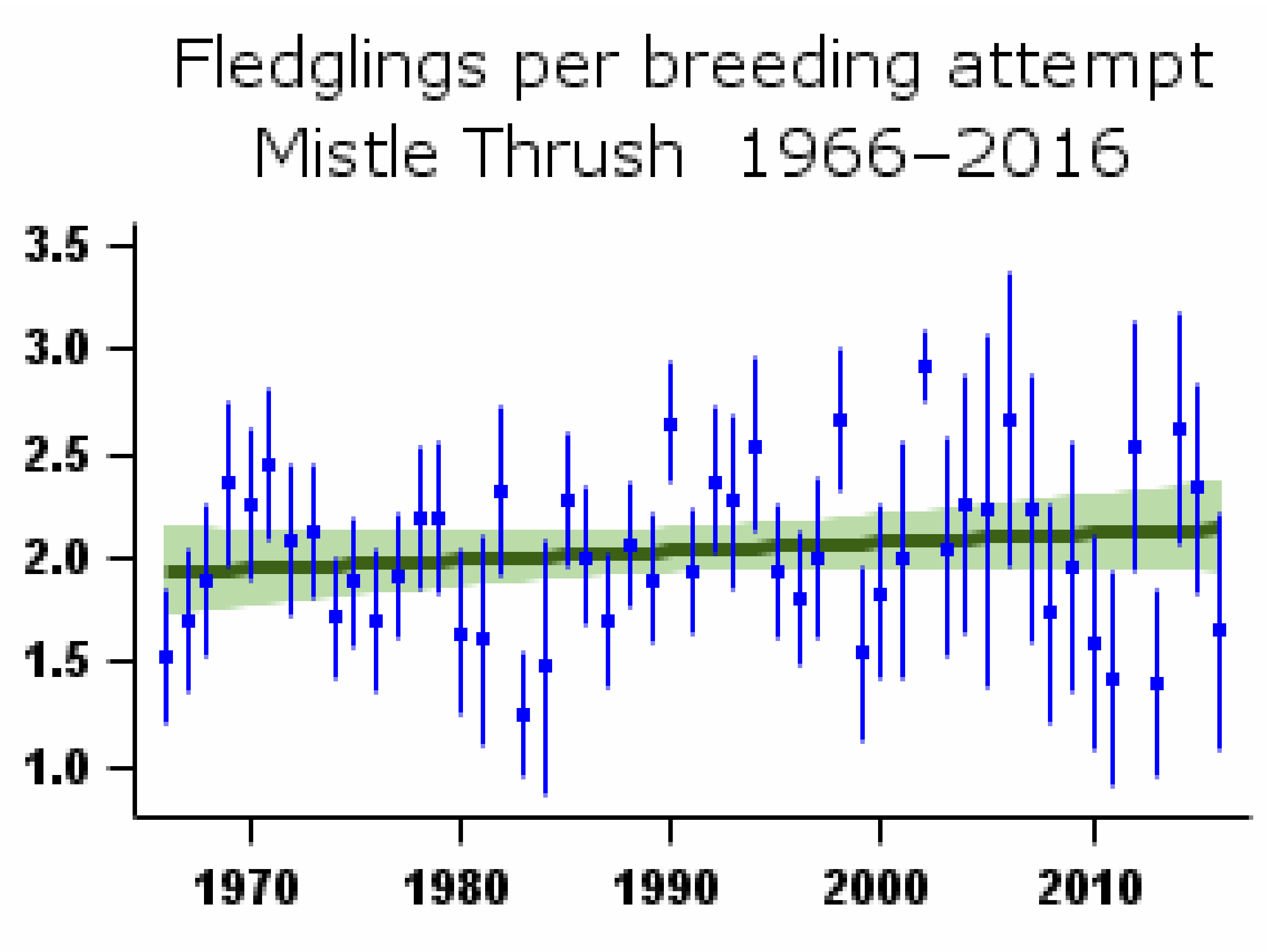


Habitat graph

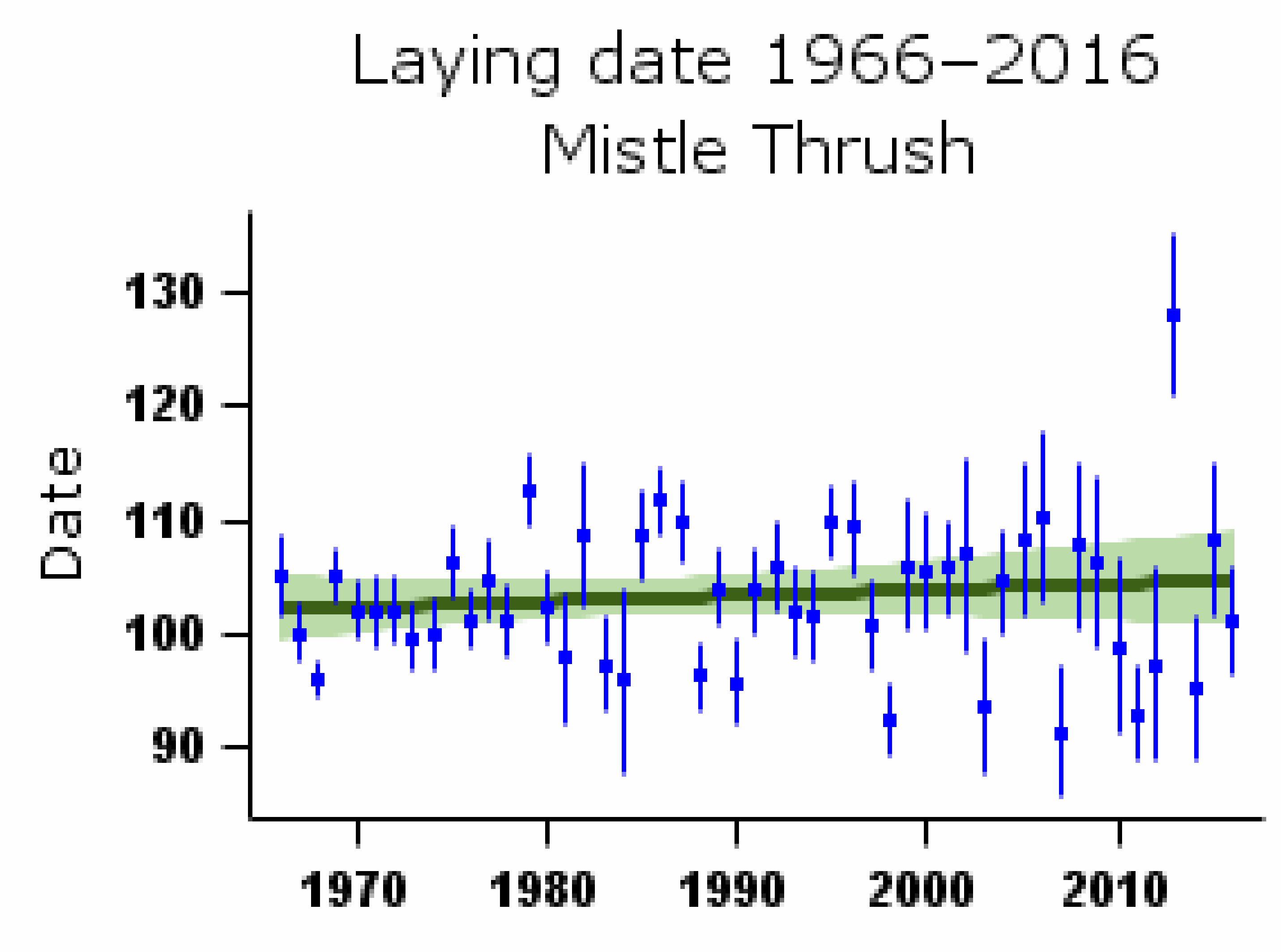


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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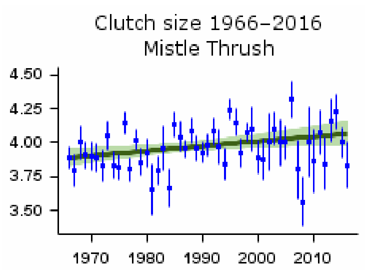
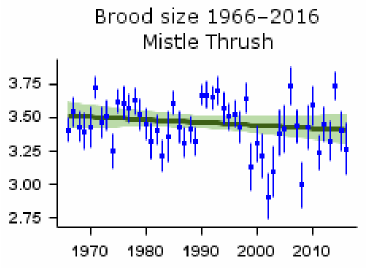
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	50	None					
Clutch size	48	1967-2015	32	Linear increase	3.89 eggs	4.07 eggs	4.4%		
Brood size	48	1967-2015	63	None					
Nest failure rate at egg stage	48	1967-2015	52	None					
Nest failure rate at chick stage	48	1967-2015	55	None					
Laying date	48	1967-2015	26	None			0 days		Small sample

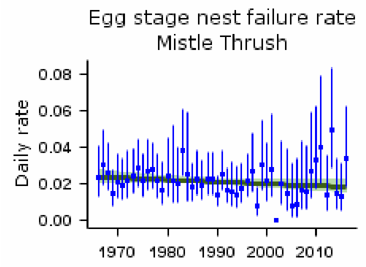
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



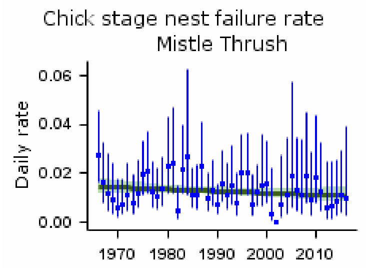
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Declines may be linked to reduced survival of juveniles. The paucity of information specific to Mistle Thrush represents a gap in knowledge that needs to be filled by new research.

Change factor	Primary driver	Secondary driver
Demographic	Decreased juvenile survival	
Ecological	Agricultural intensification	

Further information on causes of change

Similarities in population trends between Mistle Thrush, Siriwardena et al. 1998a). As for Song Thrush (Robinson et al. 2004), Mistle Thrush decline may be linked to reduced survival of juveniles: both adult and juvenile survival was lower during periods of negative population trend than in stable or increasing ones (Siriwardena et al. 1998b). Demographic data do not suggest any close link between the population trend of Mistle Thrush and its breeding productivity, as there is no evidence of increased failure rates at egg or chick stage, or of reduction in fledglings per breeding attempt.

Mistle Thrush declines recorded by CBC were especially evident on farmland. Drainage of fields and removal of hedgerows would have reduced the habitat available for Mistle Thrush, as they did for Song Thrush (Chamberlain et al. 2000b, Peach et al. 2004).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Spotted Flycatcher

Muscicapa striata

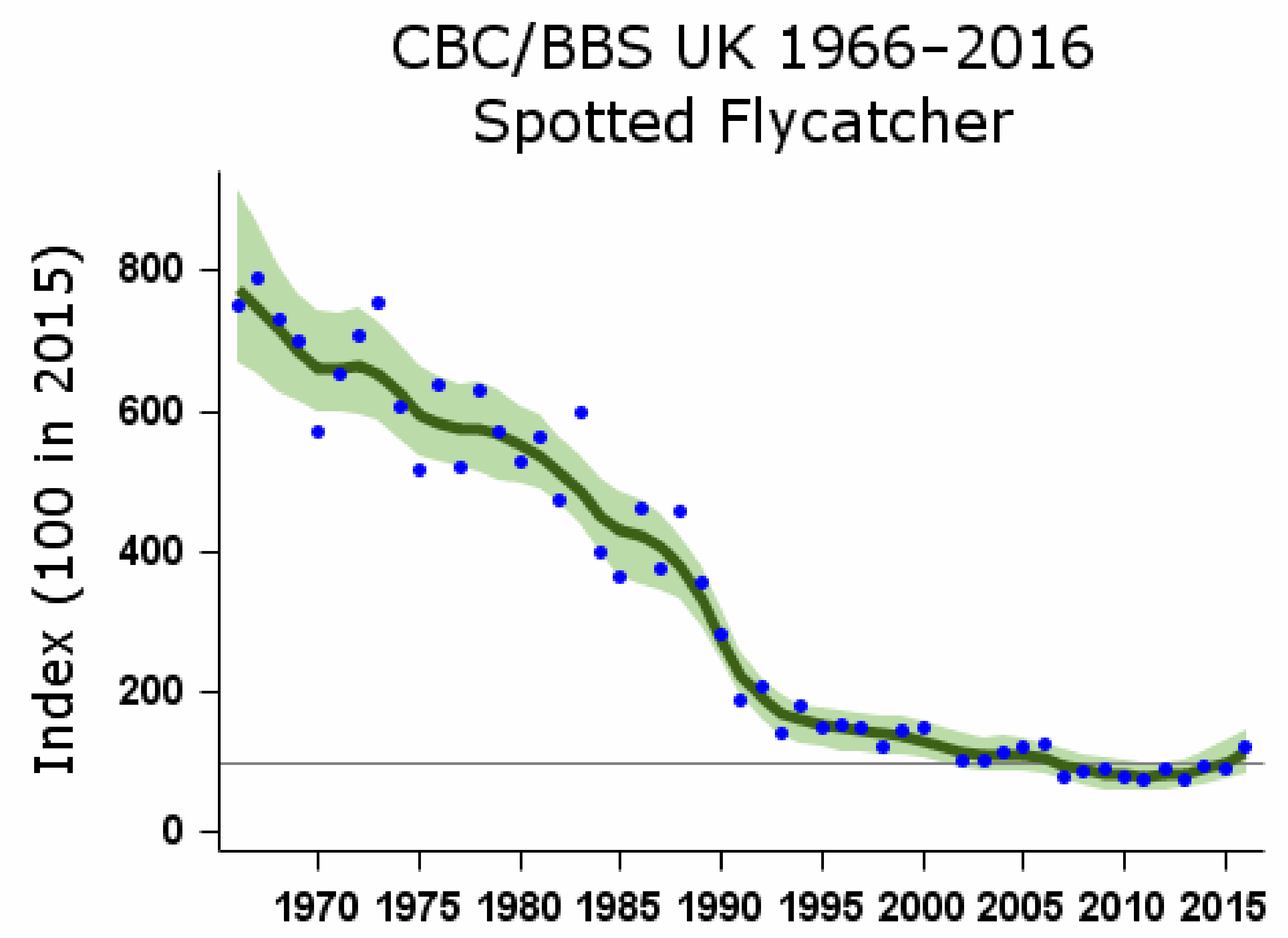
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK, England: rapid decline
Population size:	36,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Spotted Flycatchers have declined rapidly and consistently since the 1960s. It is among a suite of species that winter in the humid zone of West Africa and correspondingly are showing the strongest population declines among our migrant species (Ockendon et al. 2012, 2014). The Repeat Woodland Bird Survey, however, using a set of CBC woodland and RSPB sites, detected a significant increase between the 1980s and 2003-04 in southwest England (Amar et al. 2006, Hewson et al. 2007), suggesting that change has not been uniform across Britain. Gaps are already starting to appear in the 10-km distribution map, especially in urban areas and close to the east coast (Balmer et al. 2013). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



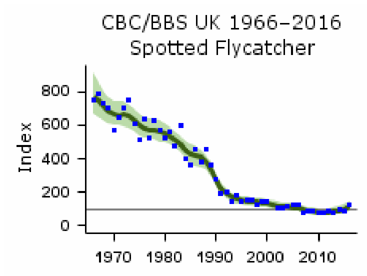
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

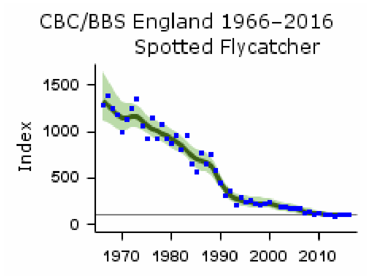
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	132	-87	-91	-81	>50	
	25	1990-2015	178	-63	-74	-54	>50	
	10	2005-2015	186	-9	-25	9		
	5	2010-2015	172	24	11	47		
CBC/BBS England	48	1967-2015	98	-92	-95	-89	>50	
	25	1990-2015	127	-78	-85	-73	>50	
	10	2005-2015	127	-41	-50	-28	>25	
	5	2010-2015	117	-13	-26	0		
BBS UK	20	1995-2015	192	-38	-51	-23	>25	
	10	2005-2015	186	-9	-27	8		
	5	2010-2015	172	24	11	43		
BBS England	20	1995-2015	134	-61	-68	-54	>50	
	10	2005-2015	127	-41	-49	-29	>25	
	5	2010-2015	117	-13	-25	3		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

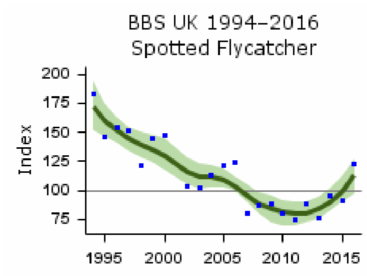
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



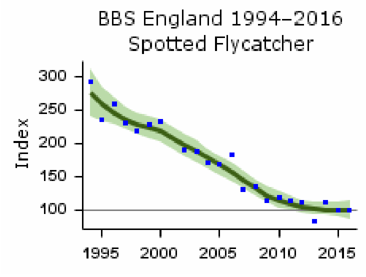
CBC/BBS UK graph



CBC/BBS England graph

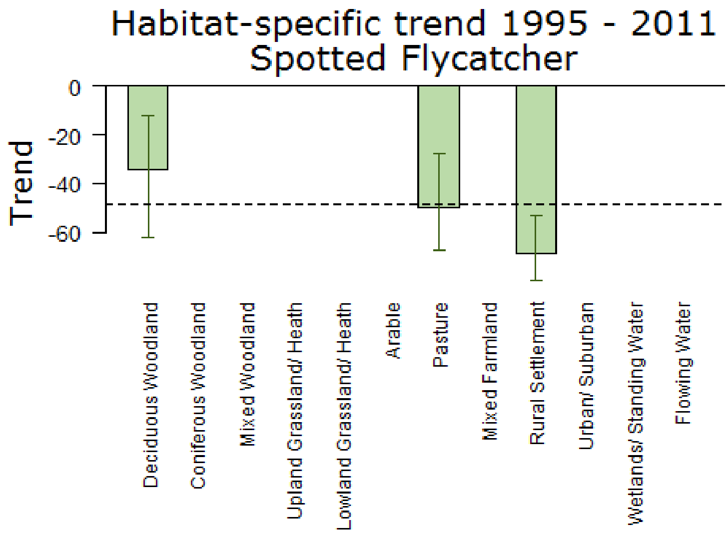


BBS UK graph



BBS England graph

Population trends by habitat



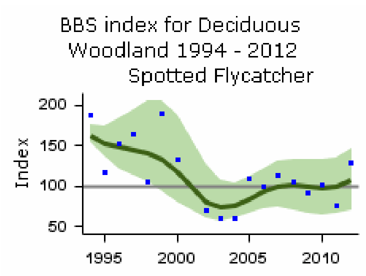
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

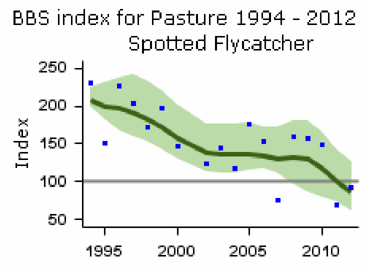
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	41	-34	-62	-13
Pasture	16	1995-2011	79	-50	-67	-28
Rural Settlement	16	1995-2011	53	-68	-79	-53

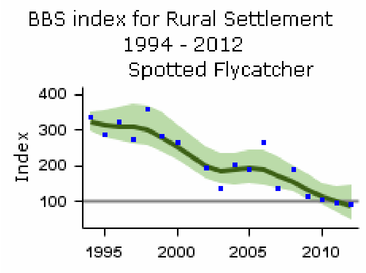
Further information on habitat-specific trends, please follow link here.



Habitat graph

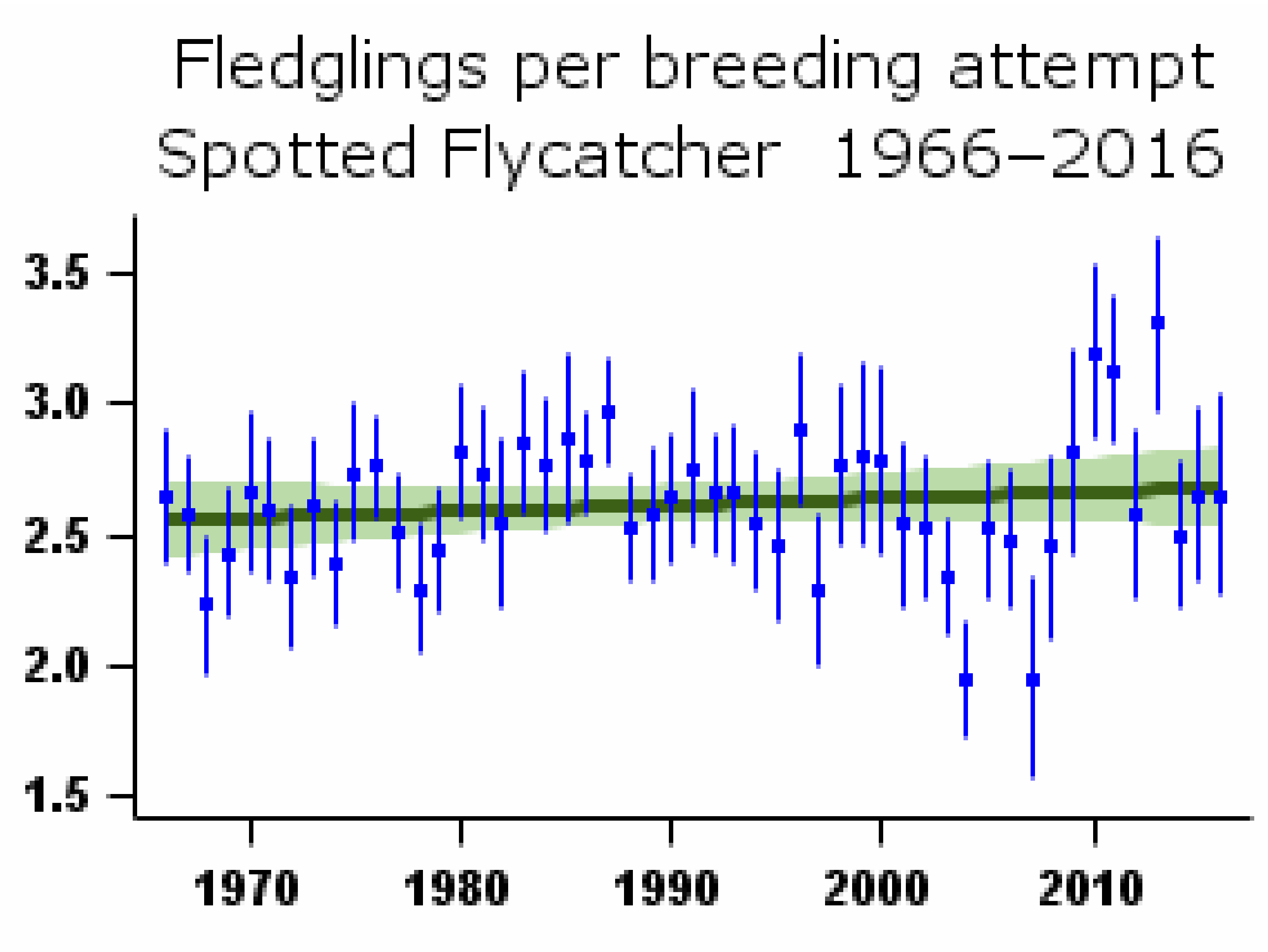


Habitat graph

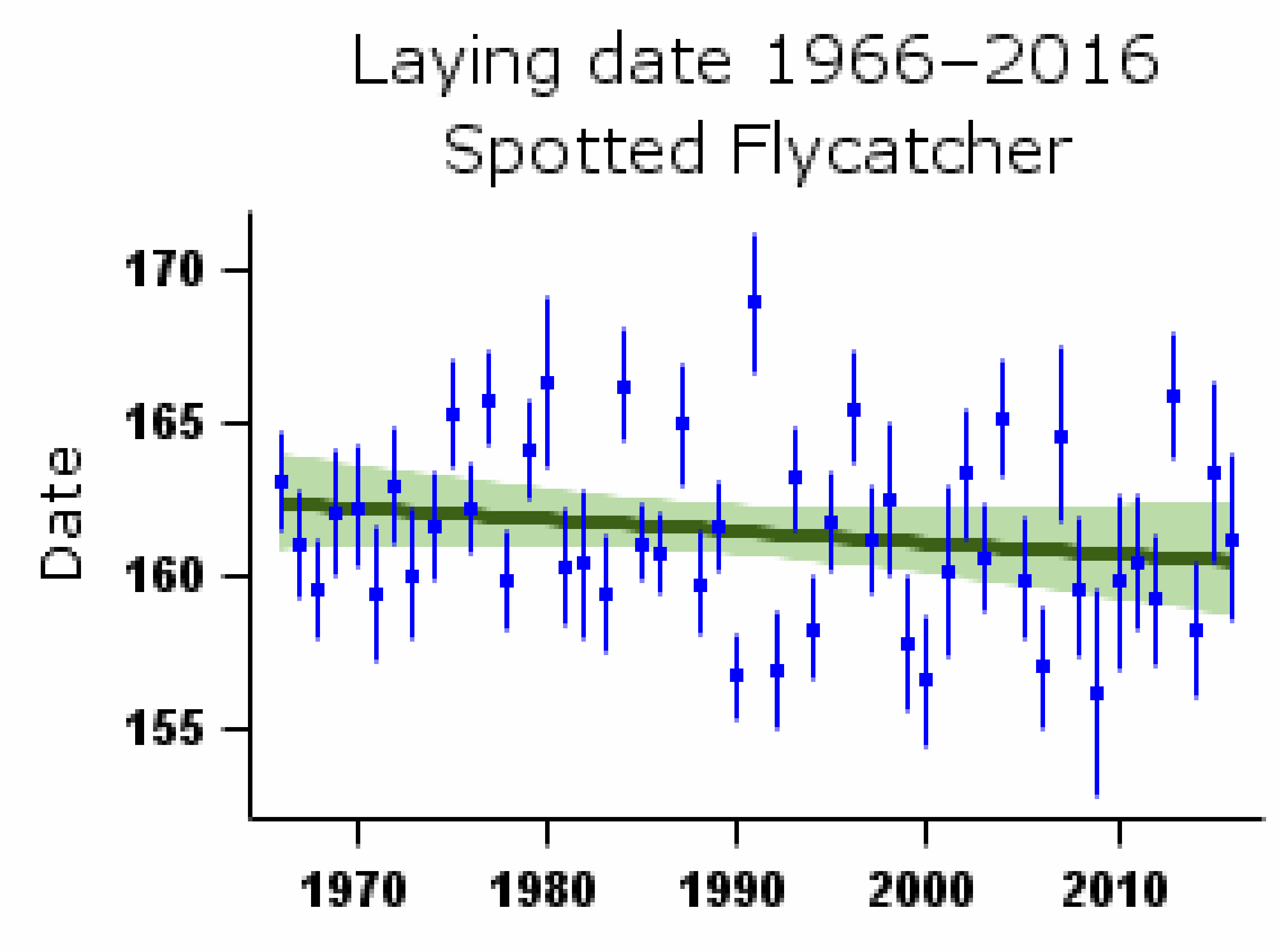


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

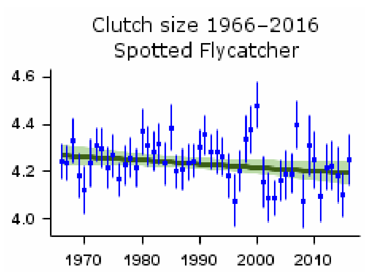


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

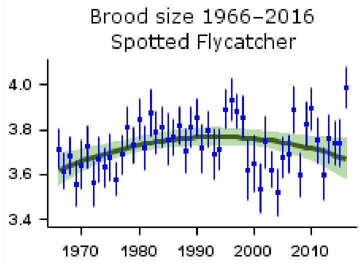
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	101	None					
Clutch size	48	1967-2015	77	None					
Brood size	48	1967-2015	126	Curvilinear	3.63 chicks	3.68 chicks	1.4%		
Nest failure rate at egg stage	48	1967-2015	113	Curvilinear	1.78% nests/day	1.51% nests/day	-15.2%		
Nest failure rate at chick stage	48	1967-2015	102	Curvilinear	0.86% nests/day	1.00% nests/day	16.3%		
Laying date	48	1967-2015	68	None			0 days		

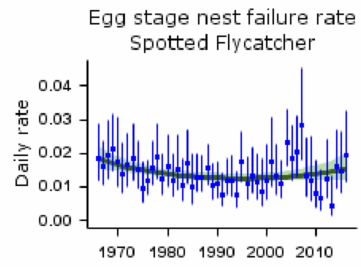
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



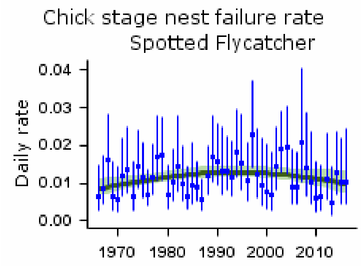
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Demographic modelling provides evidence that a decrease in the annual survival rates of birds in their first year may have driven the decline. The ecological causes of the decline are uncertain as good-quality, direct evidence is sparse.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival	
Ecological	Unknown	

Further information on causes of change

Nest failure rates have decreased but the number of fledglings per breeding attempt shows no trend. Though samples are too small to continue presenting a trend, there was a decrease overall in the ratio of juveniles to adults in CES captures. However, demographic modelling shows that decreases in the annual survival rates of birds in their first year of life are more likely to have driven the population decline than breeding parameters (Freeman & Crick 2003, Stevens et al. 2007). This effect on survival may operate in the pre-migration period, during migration or in the wintering quarters. The number of adult Spotted Flycatchers caught at CES ringing sites was found to have declined drastically, providing further evidence that post-fledging and overwinter survival may be important factors in the population decline (Peach et al. 1998).

Evidence for the ecological causes of the decline is sparse. Fuller et al. (2005) hypothesise that declines in large flying insects that are food to the flycatcher, or conditions either on the wintering grounds or along migration routes may be involved. However, there is little detailed evidence to directly support any of these ideas.

Data from the Repeat Woodland Bird Survey (Amaret al. 2006) showed that Spotted Flycatchers were more likely to have declined at sites with very open or very closed foliage conditions. Smart et al. (2007) also suggest this. However, overall, Amar et al. (2006) did not find that changes in habitat were significant in explaining population declines for this species. Stevens et al. (2007) found that nests in gardens fledged twice as many chicks as those in either woodland or farmland. The proximate cause of lower success in farmland and woodland was higher nest predation rates. In terms of nesting success, farmland and woodland appear to be suboptimal when compared with gardens, providing evidence of a problem on the breeding grounds for this species, at least in these two habitats (Stevens et al. 2007).

In Leicestershire, Stoate & Szczur (2006) found that the removal of nest predators prompted an increase in Spotted Flycatcher breeding success, especially in woodland, where nest success was lower overall than in gardens. However, Carpenter et al. (2009) found no link between presence/absence, abundance and population change of the species and avian predator abundance.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Robin

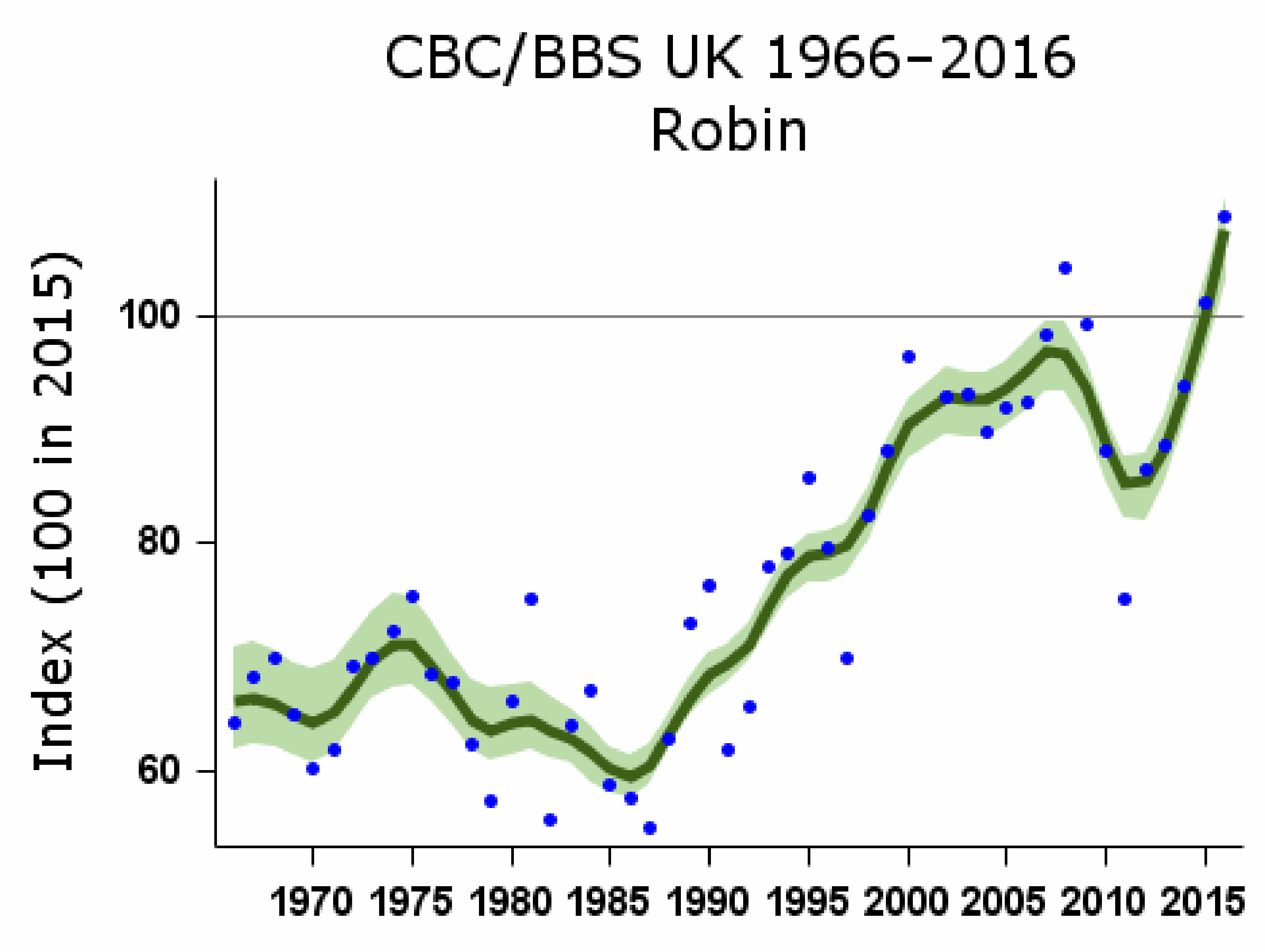
Erithacus rubecula

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: shallow increase England: moderate increase
Population size:	6.7 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Robins have increased markedly since the mid 1980s, according to both CBC/BBS and CES results, having been set back earlier by a succession of cold winters. Steep improvements have occurred concurrently in the numbers of fledglings per breeding attempt, as measured by nest record data, with a reduction in nest failure rates at the egg stage, although CES productivity measures have been relatively unchanged. Survival rates, as measured by CES, appear stable. The CES and BBS data show that marked and significant annual fluctuations occur in numbers, perhaps in response to winter weather, although these are not evident in the smoothed trends: numbers dropped sharply between 2008 and 2012 when three severe winters occurred, but have since recovered. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

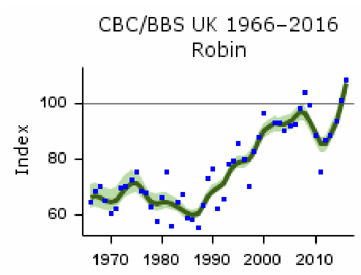
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1229	50	35	64		
	25	1990-2015	2160	46	38	53		
	10	2005-2015	3033	7	4	10		
	5	2010-2015	3070	13	10	15		

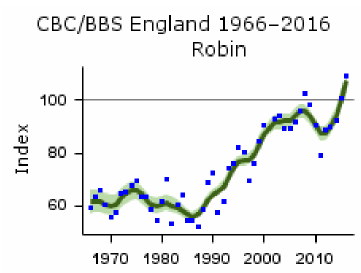
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	982	62	44	79		
	25	1990-2015	1715	55	47	61		
	10	2005-2015	2406	8	6	10		
	5	2010-2015	2442	11	9	13		
CES adults	31	1984-2015	95	54	30	82		
	25	1990-2015	104	23	8	40		
	10	2005-2015	103	-2	-9	7		
	5	2010-2015	105	23	12	32		
CES juveniles	31	1984-2015	101	30	7	61		
	25	1990-2015	110	13	3	23		
	10	2005-2015	109	4	-3	11		
	5	2010-2015	114	19	9	28		
BBS UK	20	1995-2015	2522	25	22	30		
	10	2005-2015	3033	7	4	9		
	5	2010-2015	3070	12	10	14		
BBS England	20	1995-2015	1993	29	25	33		
	10	2005-2015	2406	8	5	11		
	5	2010-2015	2442	10	8	13		
BBS Scotland	20	1995-2015	217	35	18	50		
	10	2005-2015	264	9	-1	19		
	5	2010-2015	264	17	8	25		
BBS Wales	20	1995-2015	207	11	2	22		
	10	2005-2015	238	-2	-9	7		
	5	2010-2015	242	22	13	31		
BBS N.Ireland	20	1995-2015	90	19	-1	36		
	10	2005-2015	105	6	-3	15		
	5	2010-2015	102	9	-1	16		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

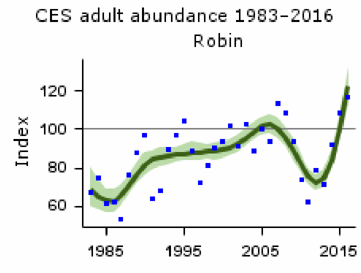
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



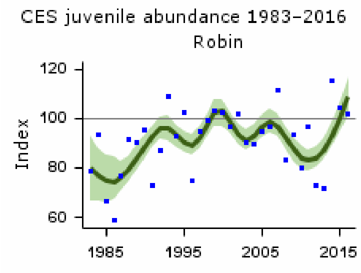
CBC/BBS UK graph



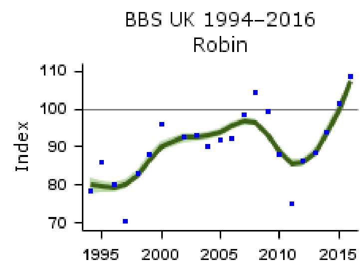
CBC/BBS England graph



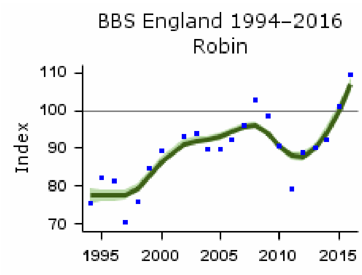
CES adults graph



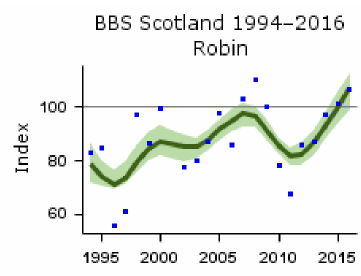
CES juveniles graph



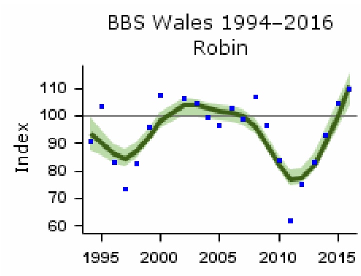
BBS UK graph



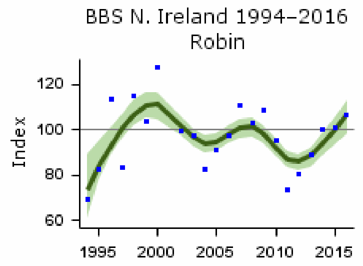
BBS England graph



BBS Scotland graph

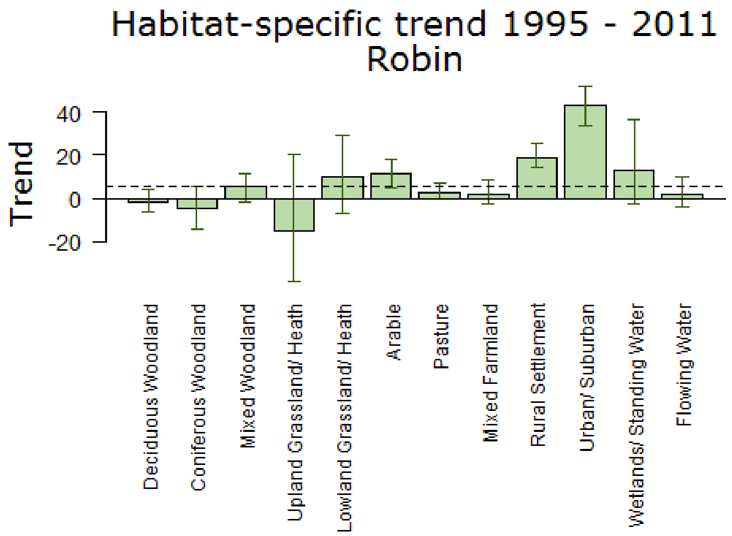


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



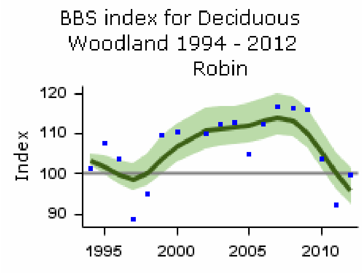
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

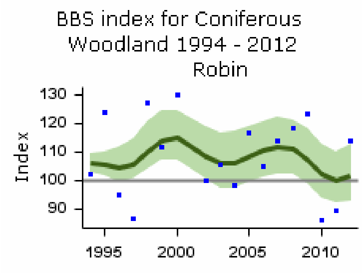
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	897	-2	-6	4
Coniferous Woodland	16	1995-2011	247	-5	-14	6
Mixed Woodland	16	1995-2011	491	5	-2	12
Upland Grassland/ Heath	16	1995-2011	40	-15	-38	20
Lowland Grassland/ Heath	16	1995-2011	179	10	-7	29
Arable	16	1995-2011	717	12	5	18
Pasture	16	1995-2011	1276	3	0	7
Mixed Farmland	16	1995-2011	669	2	-3	9
Rural Settlement	16	1995-2011	855	19	14	25
Urban/ Suburban	16	1995-2011	422	43	34	52
Wetlands/ Standing Water	16	1995-2011	96	13	-2	37
Flowing Water	16	1995-2011	500	2	-4	10

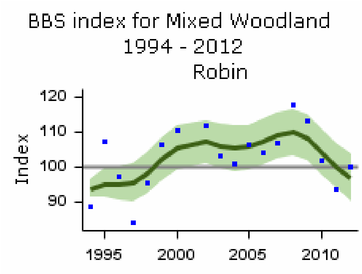
Further information on habitat-specific trends, please follow link here.



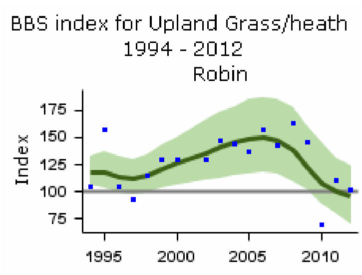
Habitat graph



Habitat graph



Habitat graph



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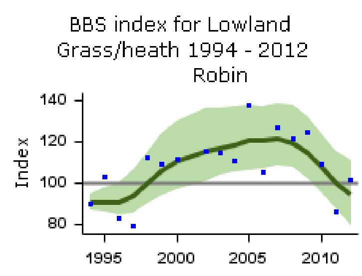
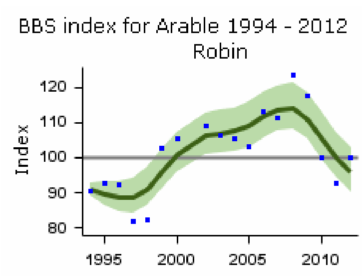


Habitat graph



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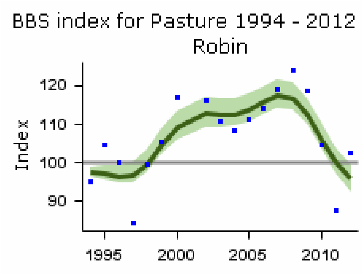

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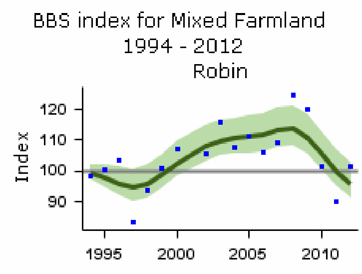

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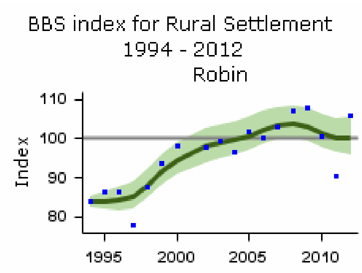

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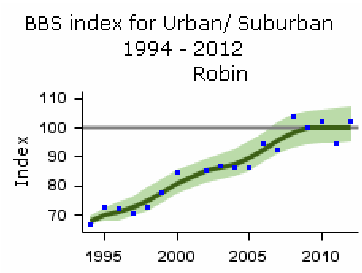
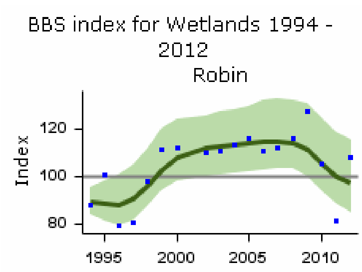
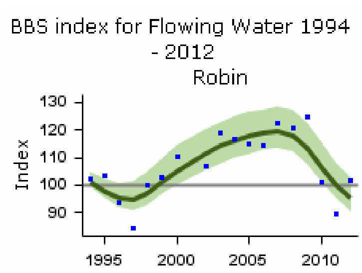


Habitat graph

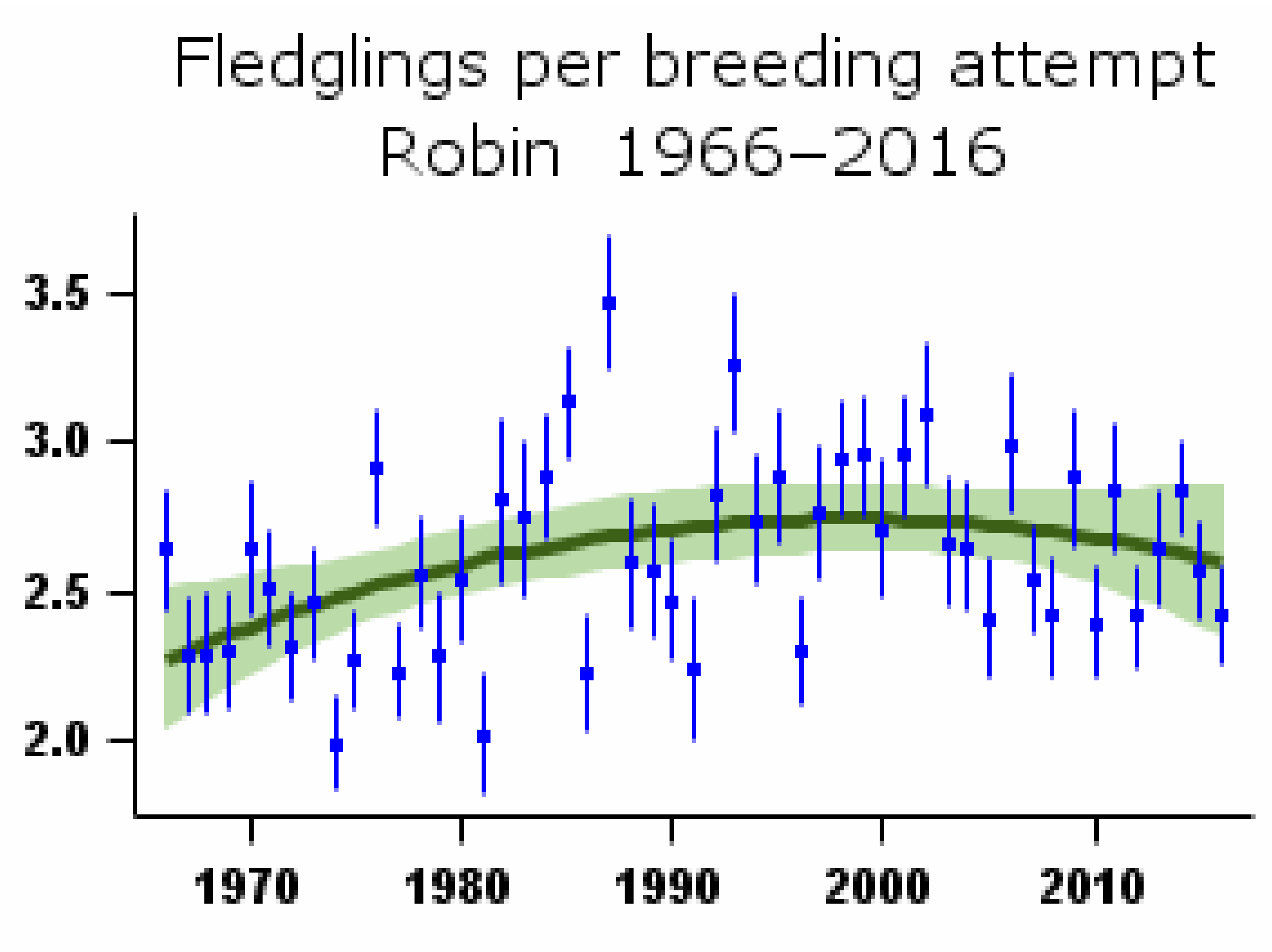


Habitat graph

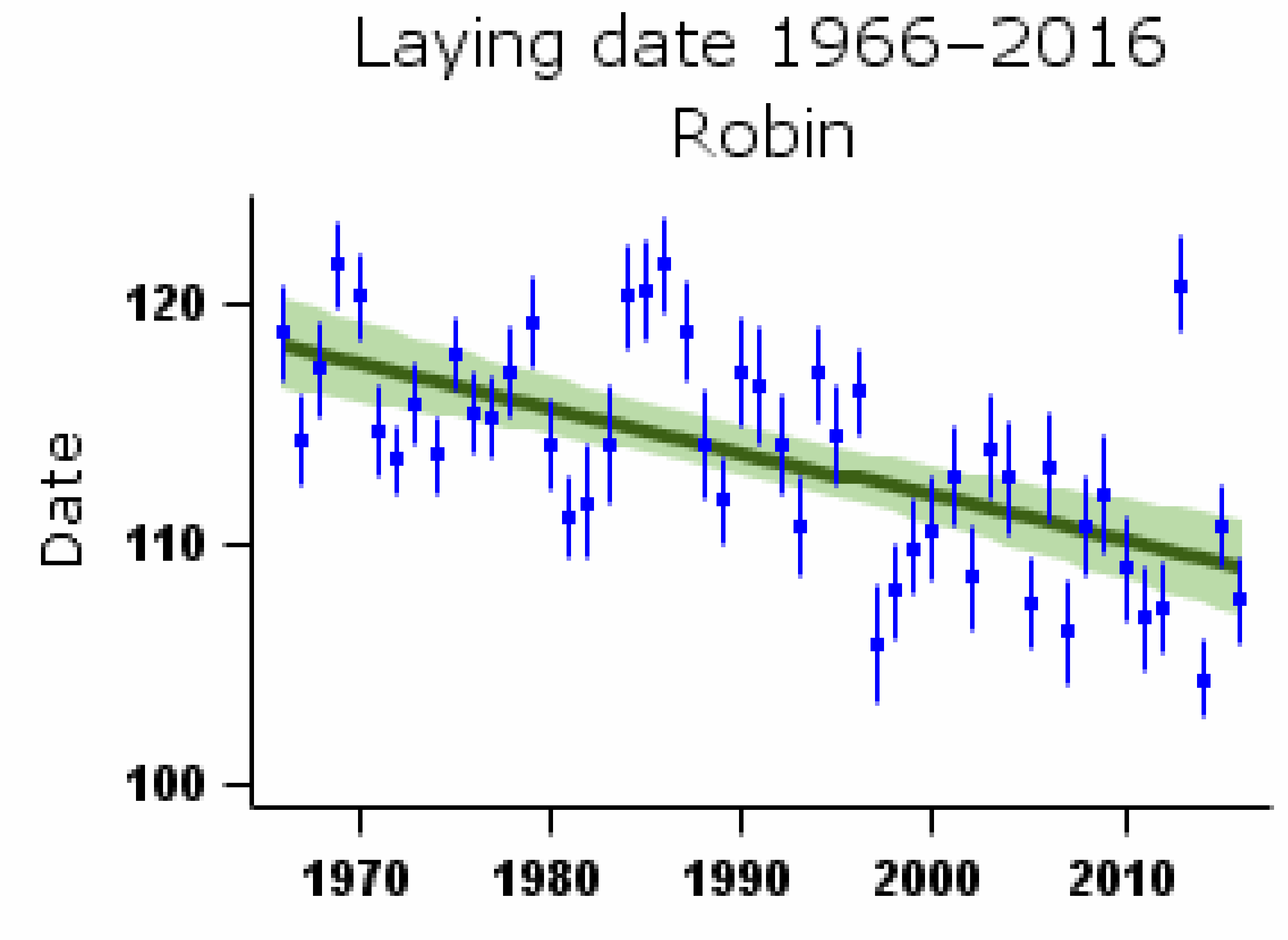


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

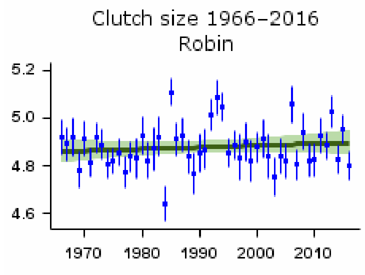


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

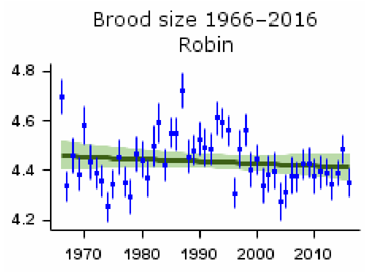
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	212	Curvilinear	2.30 fledglings	2.62 fledglings	13.7%		
Clutch size	48	1967-2015	159	None					
Brood size	48	1967-2015	236	None					
Nest failure rate at egg stage	48	1967-2015	233	Curvilinear	2.49% nests/day	1.43% nests/day	-42.6%		
Nest failure rate at chick stage	48	1967-2015	214	None					
Laying date	48	1967-2015	151	Linear decline	Apr 28	Apr 19	-9 days		
Juvenile to Adult ratio (CES)	31	1984-2015	104	Smoothed trend	116 Index value	100 Index value	-14%		
Juvenile to Adult ratio (CES)	25	1990-2015	113	Smoothed trend	124 Index value	100 Index value	-19%		
Juvenile to Adult ratio (CES)	10	2005-2015	112	Smoothed trend	102 Index value	100 Index value	-2%		
Juvenile to Adult ratio (CES)	5	2010-2015	116	Smoothed trend	110 Index value	100 Index value	-9%		

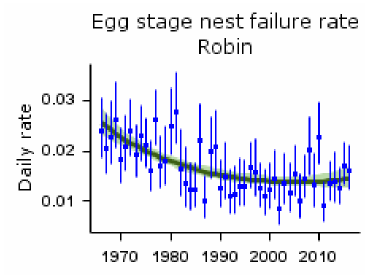
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



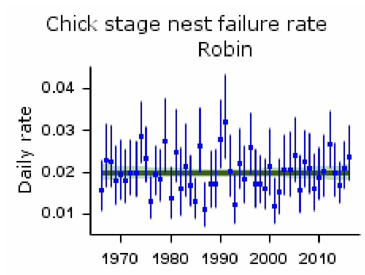
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



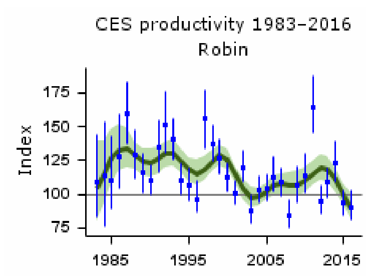
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



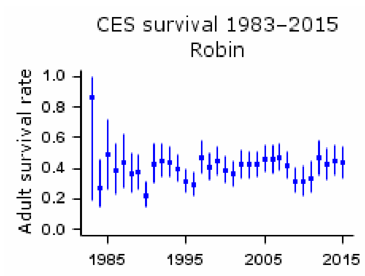
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Nightingale

Luscinia megarhynchos

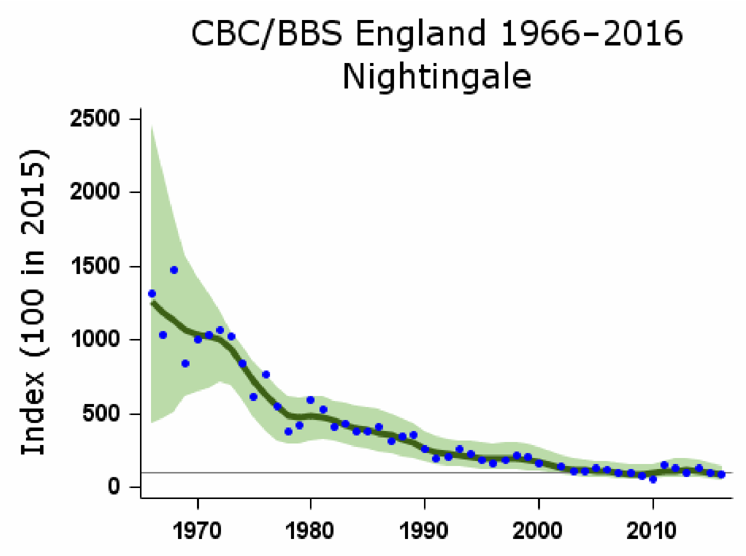
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: decline
Population size:	6,700 (5,600-9,400) males in 1999 (APEP13: Wilson et al. 2002); preliminary estimate of approximately 5,500 males in 2012 (Hayhow et al. 2015)

Status summary

The national survey of Nightingales organised by BTO in 1999 showed a marked range contraction since the previous survey in 1980, but only an 8% overall population decline (Wilson et al. 2002; for more details Hayhow et al. 2015), while atlas surveys in 2008-11 found a 43% reduction in occupied 10-km squares since 1968-72, with withdrawal especially from western parts of the range (Balmer et al. 2013). In 1976, over 71% of males were associated with woodland, especially coppice and young plantations, but by 2012 this had decreased to 37% and 55% of territories were then in scrub (Hayhow et al. 2015).

Despite small and decreasing samples, it has now proved possible to calculate a meaningful CBC/BBS trend. This evidence has been sufficient to upgrade the status of Nightingale from amber to the red list of Birds of Conservation Concern in 2015 (Eaton et al. 2015).Though samples are too small to continue presenting a trend, CES suggested a sharp decline in productivity during the 1980s, perhaps because Nightingale nesting success may be adversely affected by cold and wet springs. It is among a suite of species that winter in the humid zone of West Africa and correspondingly are showing the strongest population declines among our migrant species (Ockendon et al. 2012, 2014). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a); this overall trend masks a stark contrast between severe decreases in southern and western Europe and increases in the east of the range (PECBMS 2007).



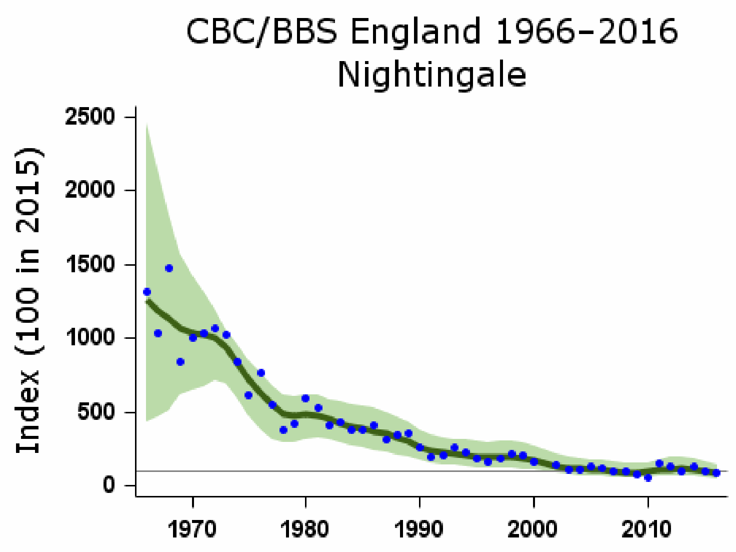
Smoothed population index, relative to an arbitrary 100 in 2013, with 85% confidence limits in green

Population changes in detail

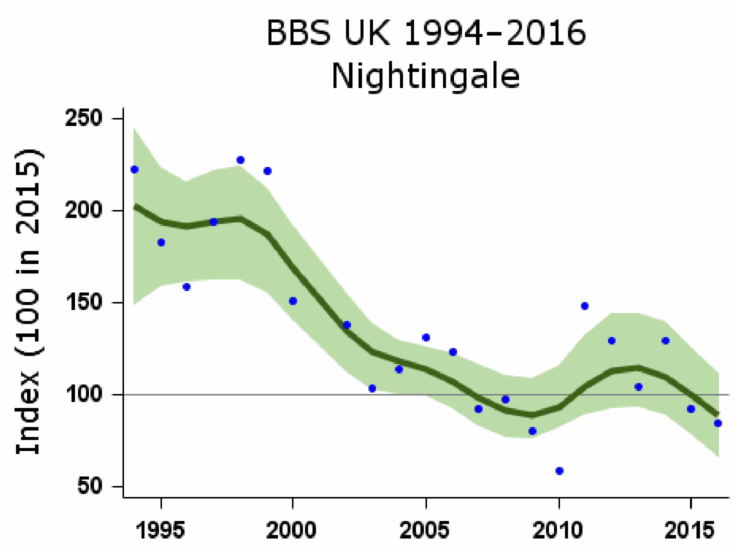
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	24	-92	-97	-62	>50	Small CBC sample
	25	1990-2015	33	-62	-75	-38	>50	Small CBC sample
	10	2005-2015	37	-12	-37	25		
	5	2010-2015	41	8	-18	26		
BBS UK	20	1995-2015	34	-48	-65	-22	>25	
	10	2005-2015	38	-12	-34	26		
	5	2010-2015	41	7	-16	24		
BBS England	20	1995-2015	33	-48	-64	-15	>25	
	10	2005-2015	37	-12	-32	31		
	5	2010-2015	41	7	-17	28		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

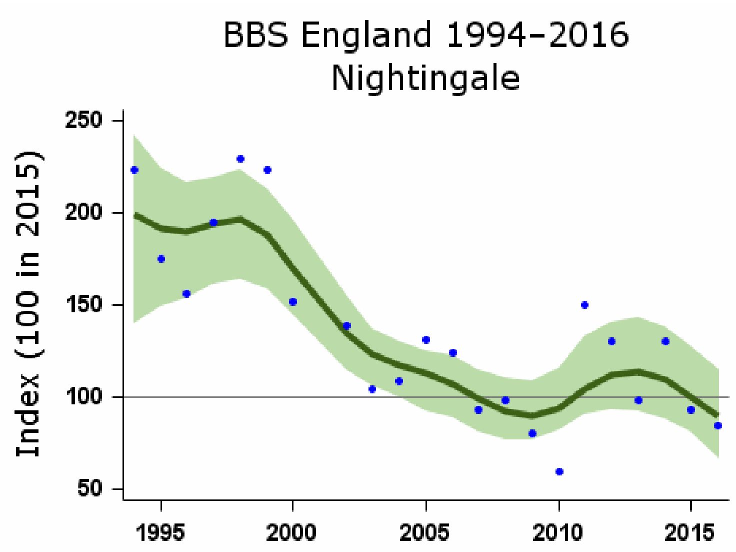
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



No CBC/BBS UK trend is available for this species. Smoothed CBC/BBS England trend graph



No long-term CBC/BBS trends available for this species. Smoothed BBS UK trend graph



No long-term CBC/BBS trends available for this species. Smoothed BBS England trend graph

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Demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Clutch size	48	1967-2015	3	None					Small sample
Brood size	48	1967-2015	6	None					Small sample
Nest failure rate at egg stage	48	1967-2015	4	None					Small sample
Nest failure rate at chick stage	48	1967-2015	5	Curvilinear	0.60% nests/day	0.83% nests/day	38.3%		Small sample
Laying date	48	1967-2015	5	None			0 days		Small sample

For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.

Causes of change

There is strong evidence that deer grazing is having a negative effect on Nightingale numbers. Conditions on the wintering grounds, such as changes in habitat, are also likely to have carry-over effects into the breeding season. Several studies have highlighted the benefit of habitat management for this species, involving coppicing and control of deer numbers to promote the heterogeneous vegetation structure that Nightingales need.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Changes in woodland	Changes on wintering grounds

Further information on causes of change

Several hypotheses have been put forward to explain Nightingale decline and are the subject of ongoing BTO research: these include reduction in coppicing, maturing of scrubland and conifer plantation, an increase in deer and their browsing pressure, higher predation pressure, reduced food quality, pressures on migration and deterioration of conditions on the wintering grounds (Fuller et al. 1999, 2005). Wintering habitat of British birds is being investigated by fitting geolocators to Nightingales (Holt et al. 2012b). Habitat deterioration on the wintering grounds may result in greater winter mortality or in birds arriving on the breeding grounds in poor condition (Ockendon et al. 2012). The potential roles of predation and reduced food quality have been little studied (Holt et al. 2012b). There is strong evidence, however, that increased browsing by deer has had a negative effect on Nightingale numbers.

Nesting Nightingales typically require closed-canopy scrub or young woodland, with bare ground under the canopy for feeding, but also area of low thick vegetation, generally associated with secondary succession and early regeneration after coppicing (Hewson et al. 2005, Wilson et al. 2005b). Canopy height in territories occupied by Nightingales is usually less than four metres in height (Wilson et al. 2005b). A study based in Cambridgeshire found that territory distribution peaked on areas where scrub height varied between three and five metres (Holt et al. 2012c). Nests are built on or close to the ground, in a thick field layer that will provide cover for nests and a refuge for newly fledged young. Scrub structure seems more important than its species composition, and the ideal habitat is probably a dome of increasing vegetation heights, with a crown of vegetation dense enough at the centre to create bare ground underneath, and a gradient of ground-cover towards the edges where the species can nest (Wilson et al. 2005b).

The structural diversity of woodland can be readily reduced by suspending coppicing and rotational cutting, as well as by increased grazing pressure from deer (Fuller et al. 1999). A study based on BBS results from 1995 to 2006 found a negative correlation between the abundance of deer and Nightingales at a regional level, with the species declining the most where deer population increase had been greatest, and modelling suggested that deer alone could have caused a decline of 14% in Nightingales over this period (Newson et al. 2012). Experimental approaches have demonstrated the effect of deer browsing on Nightingale numbers at site level: an exclusion experiment carried out over nine years found that Nightingale territory density within deer exclosures rose to ten times that of the rest of the wood, while radio-tracked Nightingales spent more time inside the deer exclosures than outside (Holt et al. 2010). Mist-netting confirmed that more Nightingales were present within the exclosures than in control plots, although the sample of birds was small (Holt et al. 2011). These findings fit with results across a wider range of breeding bird species that require low vegetation in woodland (Gill & Fuller 2007).

Woodland-scrub mosaics appear to be important breeding habitats for Nightingales, with implications for conservation practice (Holt et al. 2012c).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Pied Flycatcher

Ficedula hypoleuca

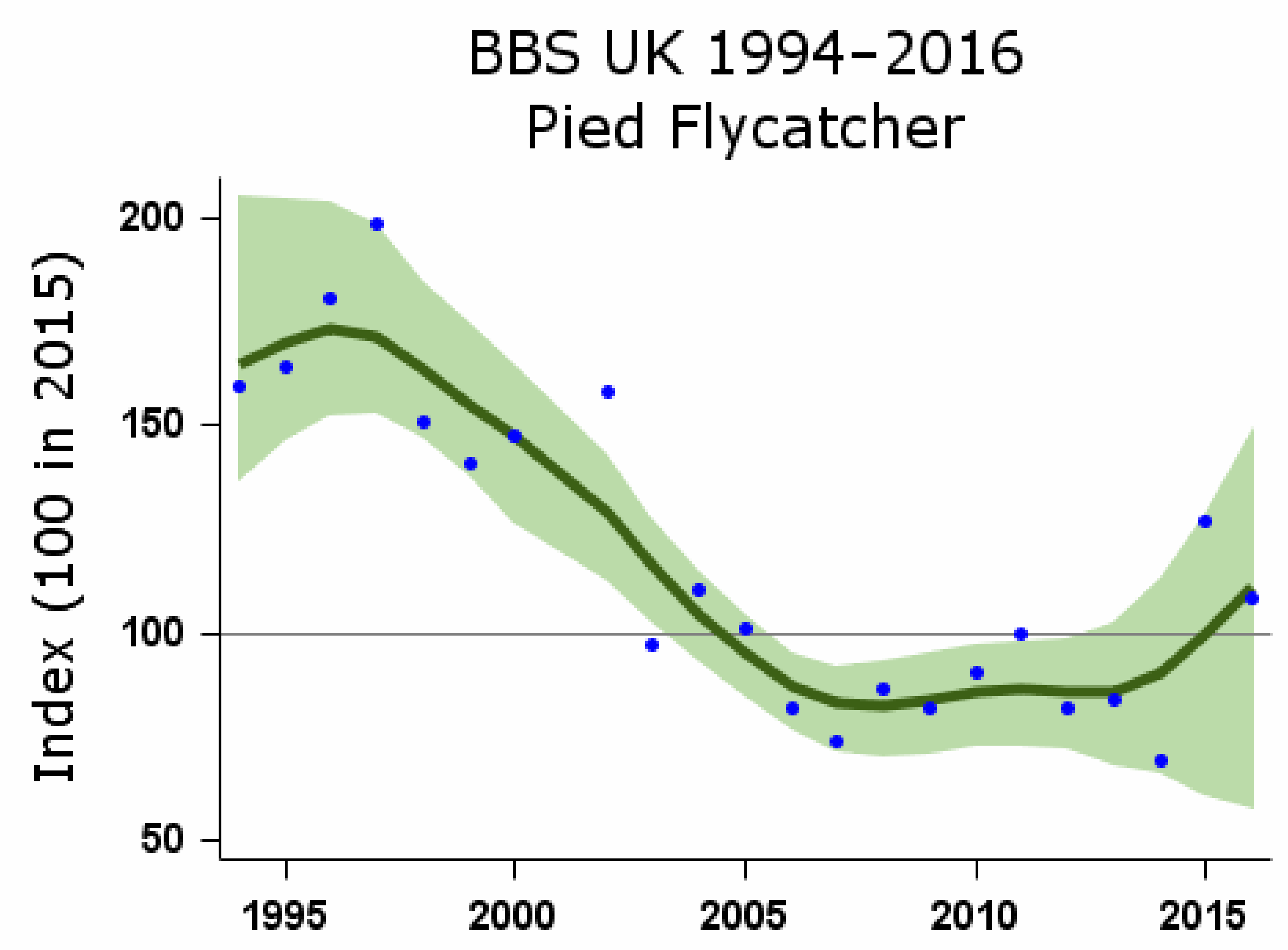
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: decline
Population size:	17,000-20,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Pied Flycatchers are restricted to upland deciduous woods in parts of western and northern Britain. The proportions of CBC plots occupied rose during the 1980s, but the species was never numerous enough for trends to be estimated (Marchant et al. 1990). The 1988-91 breeding atlas revealed a small expansion in range from 1968-72, aided by the provision of nest boxes in new areas (Gibbons et al. 1993). BBS indicates, however, that abundance has decreased steeply since 1994, prompting the species to be moved from the green to the amber list in 2009 and subsequently from amber to the UK red list at the latest review in 2015 (Eaton et al. 2015). Nest-box occupancy rates have also fallen over a similar period at a number of sites monitored as RAS projects. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



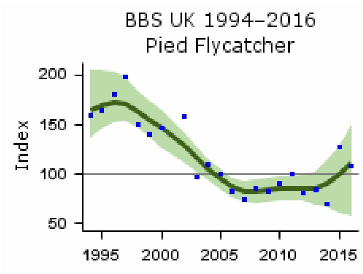
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	40	-41	-72	-7	>25	

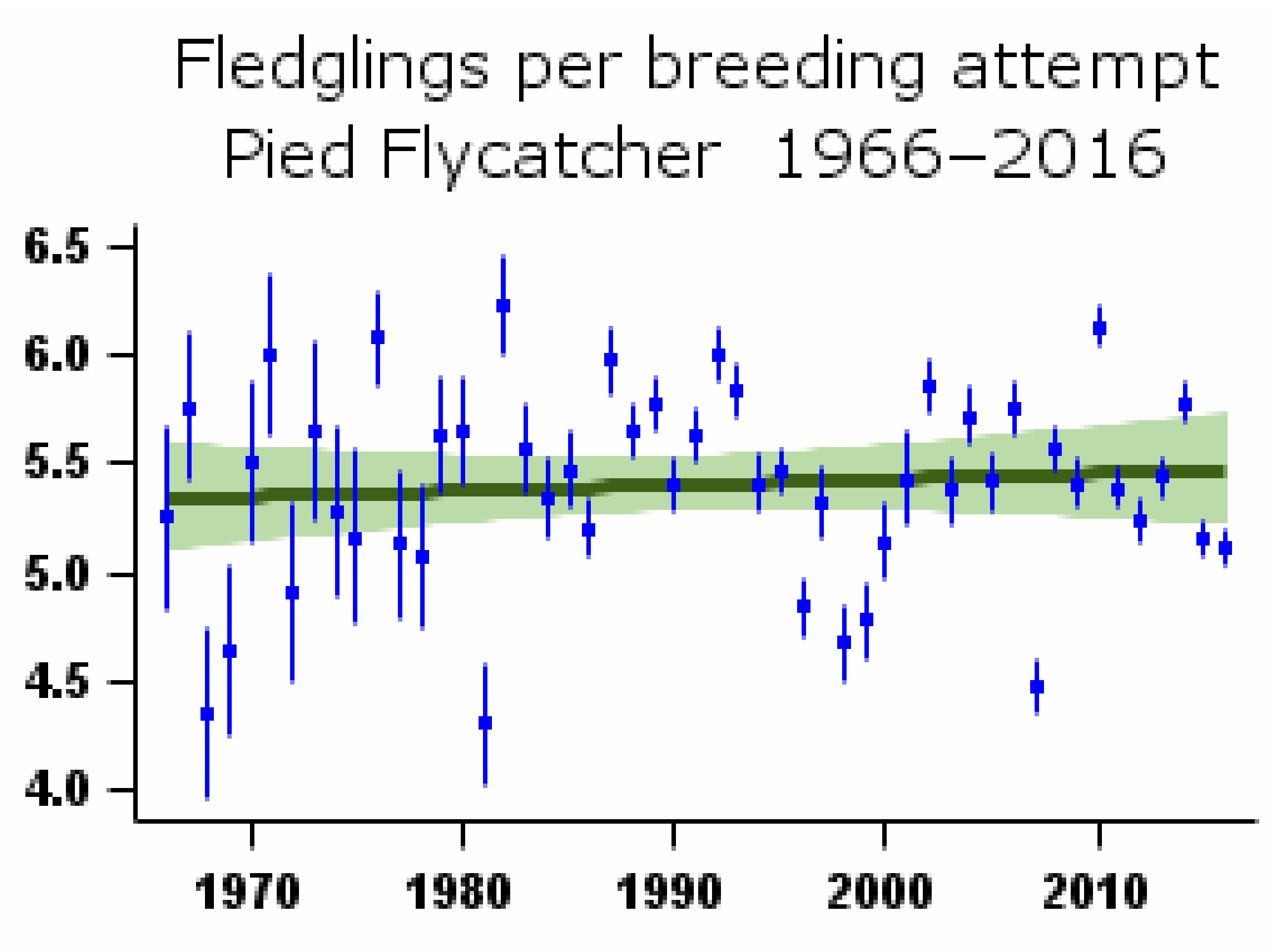
Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

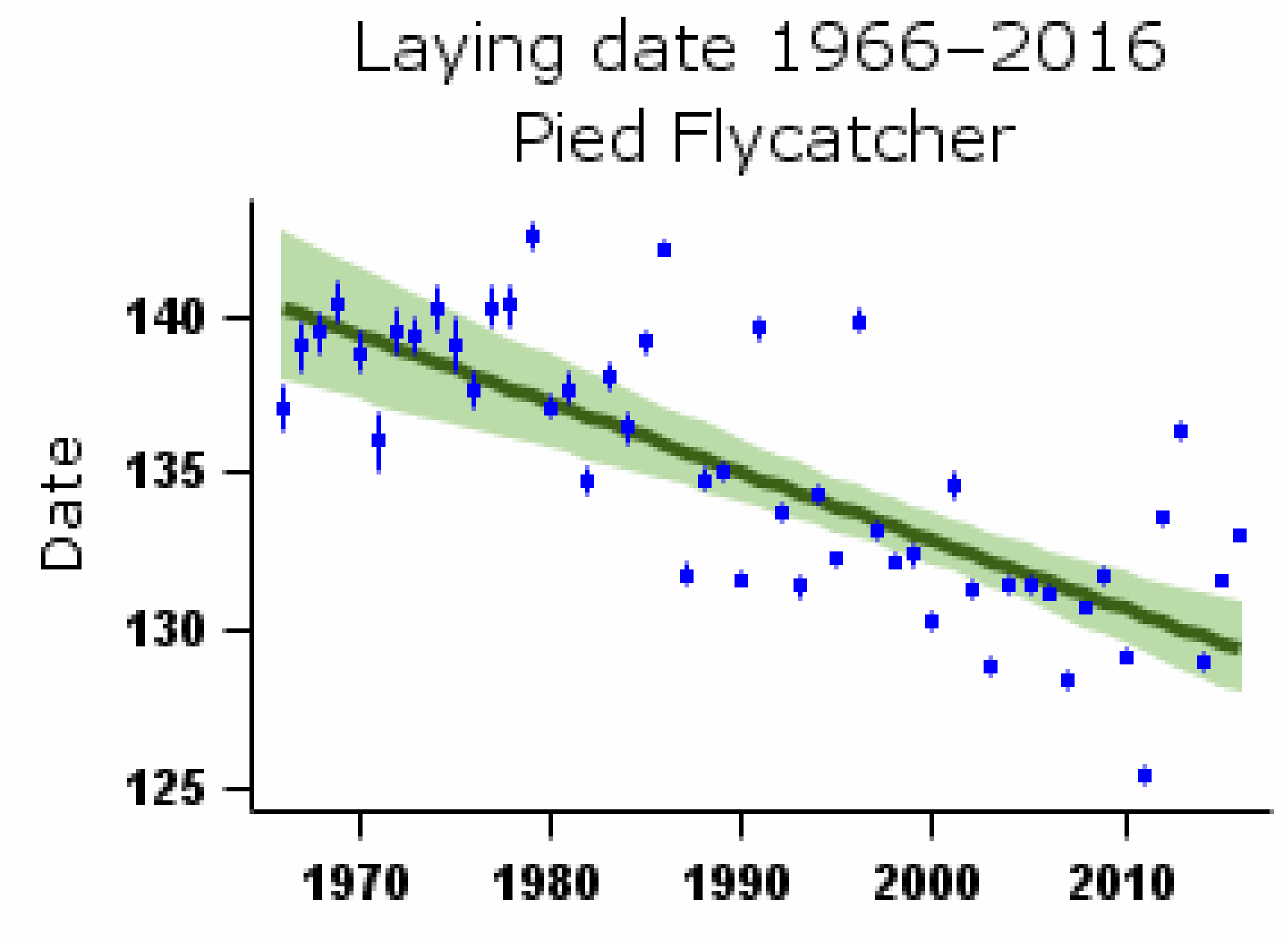


BBS UK graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

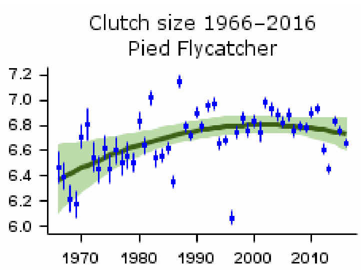


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

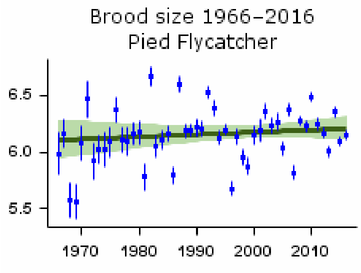
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	401	None					
Clutch size	48	1967-2015	395	Curvilinear	6.39 eggs	6.74 eggs	5.4%		
Brood size	48	1967-2015	436	None					
Nest failure rate at egg stage	48	1967-2015	485	Curvilinear	0.63% nests/day	0.31% nests/day	-50.8%		
Nest failure rate at chick stage	48	1967-2015	404	Curvilinear	0.29% nests/day	0.58% nests/day	100.0%		
Laying date	48	1967-2015	489	Linear decline	May 20	May 10	-10 days		

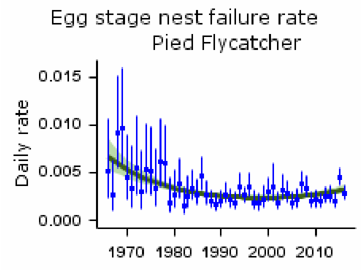
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



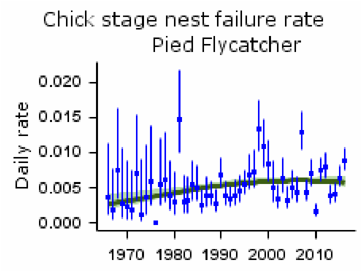
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



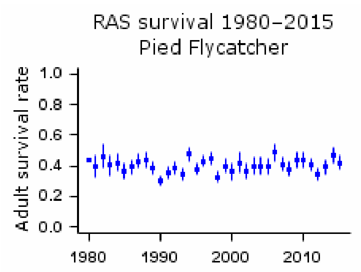
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

The reasons for this decline are unknown, but there is good evidence that they lie at least partly outside the breeding season and are thought to be linked to changing conditions on wintering grounds and migration.

Change factor	Primary driver	Secondary driver
Demographic	Overwinter survival	
Ecological	Changes on wintering grounds	

Further information on causes of change

The reasons for this decline are unknown, but there is good evidence that they lie at least partly outside the breeding season (Goodenough et al. 2009). No trends are evident in the number of fledglings per breeding attempt. There has been a linear increase in clutch size but although the failure rate at the egg stage has shown a decrease, failure rate at the chick stage has increased.

There is good evidence that declines are related to conditions outside the breeding season. Mallord et al. (2016) found no evidence that changes in woodland structure affected populations in six study areas in the west of the UK. Goodenough et al. (2009) found that decreasing breeding performance is contributing to decline, but that non-breeding factors are more important. Winter NAO index is a strong predictor of breeding population, probably because the North Atlantic oscillation influences food abundance in Africa and at migratory stopover points. Long-term autumn bird monitoring data from Russia were related to monthly mean temperatures on the West African wintering grounds; the positive relationship suggests that increasing bird numbers are explained by increasing mean November temperatures. Precipitation and European autumn, spring and breeding-range temperatures did not show a strong relationship (Chernetsov & Huettmann 2005). Thingstad et al. (2006) found that weather conditions at the flycatcher's wintering areas in western Africa were suspected to be responsible for the decrease in Scandinavia, although the breeding success of the sink populations was significantly correlated to June temperatures.

In the Netherlands, climate change may have brought about decline in Pied Flycatchers by advancing the peak period of food availability for this species in deciduous forests - the birds being unable to compensate for the change in food supply by breeding earlier (Both 2002, Both et al. 2006). A more recent paper found that timing of spring migration has responded flexibly to climate change as recovery dates during spring migration in North Africa advanced by ten days between 1980 and 2002, which was explained by improving Sahel rainfall and a phenotypic effect of birth date. However, there was no advance in arrival dates on the breeding grounds, most likely due to environmental constraints during migration (Both 2010). Futhermore, declines were found to be stronger in forests, as these were more seasonal habitats whereas less seasonal marshes showed less steep declines (Both et al. 2009). Climate change was also given as a potential factor by a Swedish study, that suggested warmer springs favoured resident Blue Tits and Great Tits over Pied Flycatchers, which were not able to adjust to increasing spring temperatures (Wittwer et al. 2015). It should be noted, however, that data presented here show that Pied Flycatchers in the UK have advanced their laying date by ten days, matching the change shown by Great Tit and exceeding the change of Blue Tit by two days.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Redstart

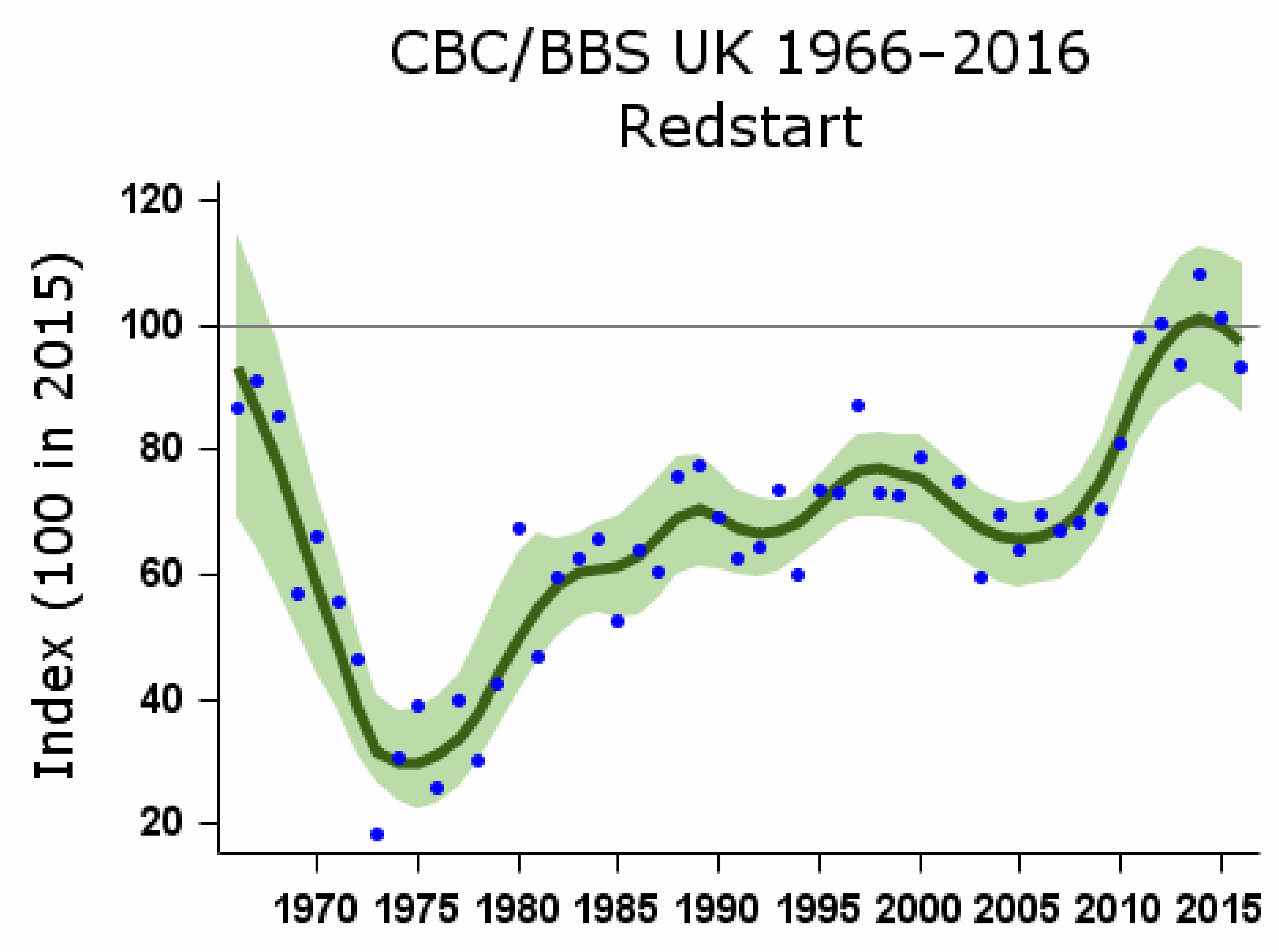
Phoenicurus phoenicurus

Key facts

Conservation listings:	Global: amber
Long-term trend:	UK, England: fluctuating, with no long-term trend
Population size:	100,000 (70,000-130,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

A sharp decline in the late 1960s and early 1970s was thought to be due to severe drought conditions in the Sahel wintering area in Africa (Marchant et al. 1990). There was a 20% loss of occupied 10-km squares in Britain between 1968-72 and 1988-91 (Gibbons et al. 1993). A recovery in population size began in the mid 1970s and appears to have been sustained subsequently, although with some setbacks. This increase has been associated with steeply improving numbers of fledglings per breeding attempt and progressively earlier laying dates. The trend towards earlier laying can be partly explained by recent climate change (Crick & Sparks 1999), and is in line with an advance of 12 days in the arrival dates of Redstart in the UK, between the 1960s and 2000s (Newson et al. 2016). Range, meanwhile, has contracted further, especially in the lowlands (Balmer et al. 2013). Mallord et al. (2016) found no evidence that changes in woodland structure affected populations in six study areas in the west of the UK. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

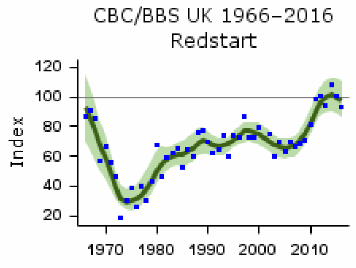
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	95	16	-17	79		
	25	1990-2015	162	44	25	69		
	10	2005-2015	221	52	36	79		
	5	2010-2015	250	21	9	39		

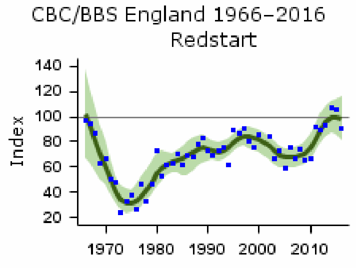
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	56	9	-32	75		Small CBC sample
	25	1990-2015	93	35	11	63		
	10	2005-2015	126	48	25	76		
	5	2010-2015	139	33	13	54		
BBS UK	20	1995-2015	184	43	22	62		
	10	2005-2015	221	52	33	79		
	5	2010-2015	250	21	6	34		
BBS England	20	1995-2015	102	28	6	49		
	10	2005-2015	126	47	23	80		
	5	2010-2015	139	32	14	53		
BBS Wales	20	1995-2015	66	33	11	61		
	10	2005-2015	77	43	18	79		
	5	2010-2015	90	4	-12	17		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

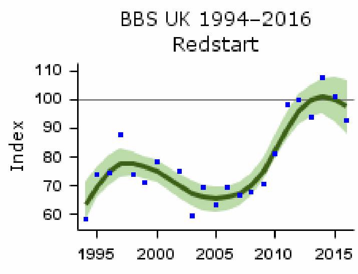
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



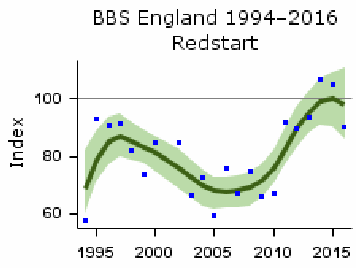
CBC/BBS UK graph



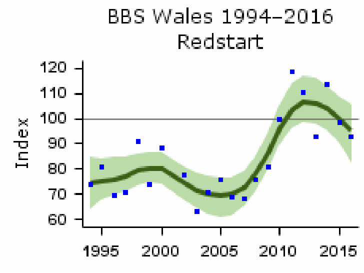
CBC/BBS England graph



BBS UK graph

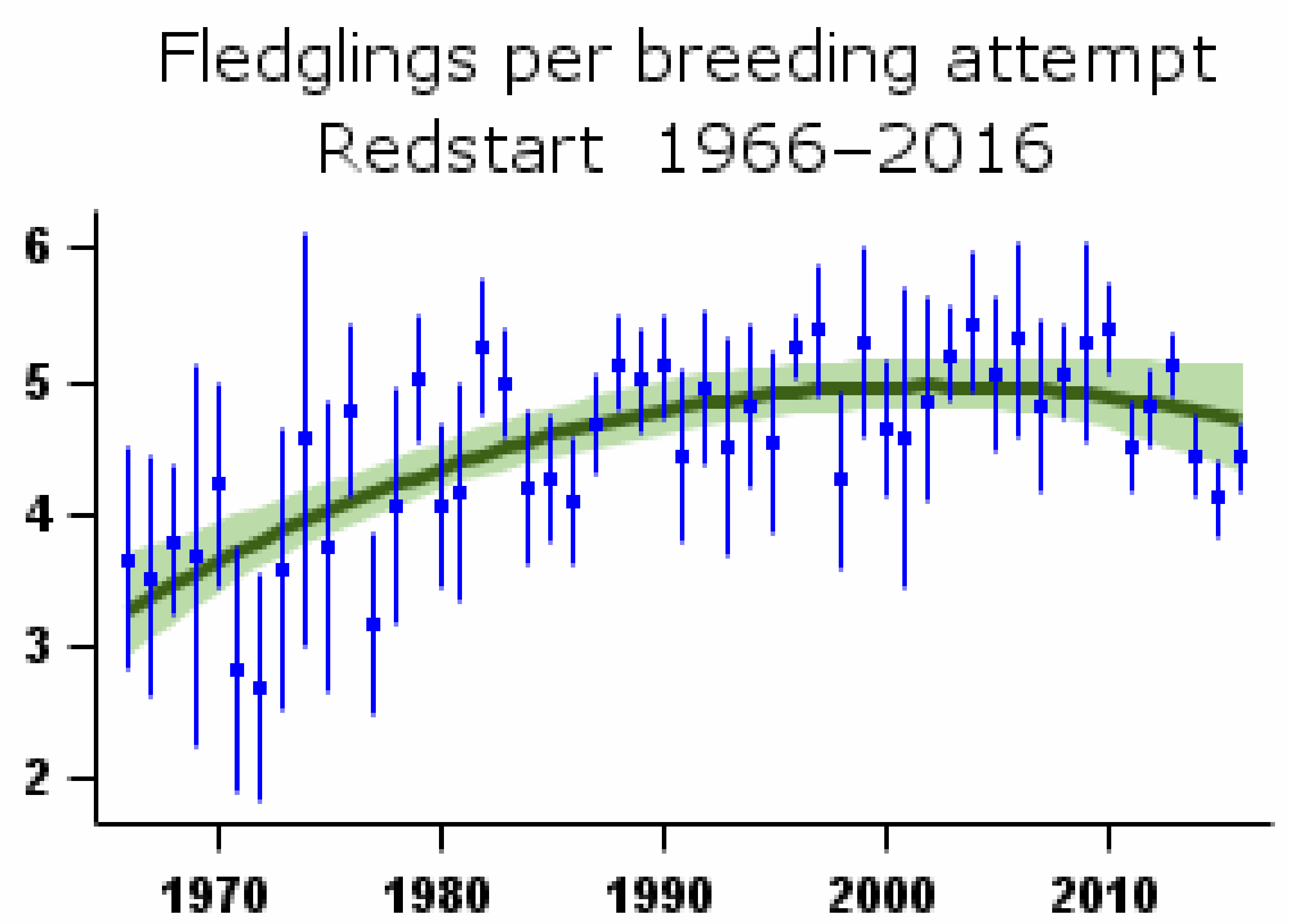


BBS England graph

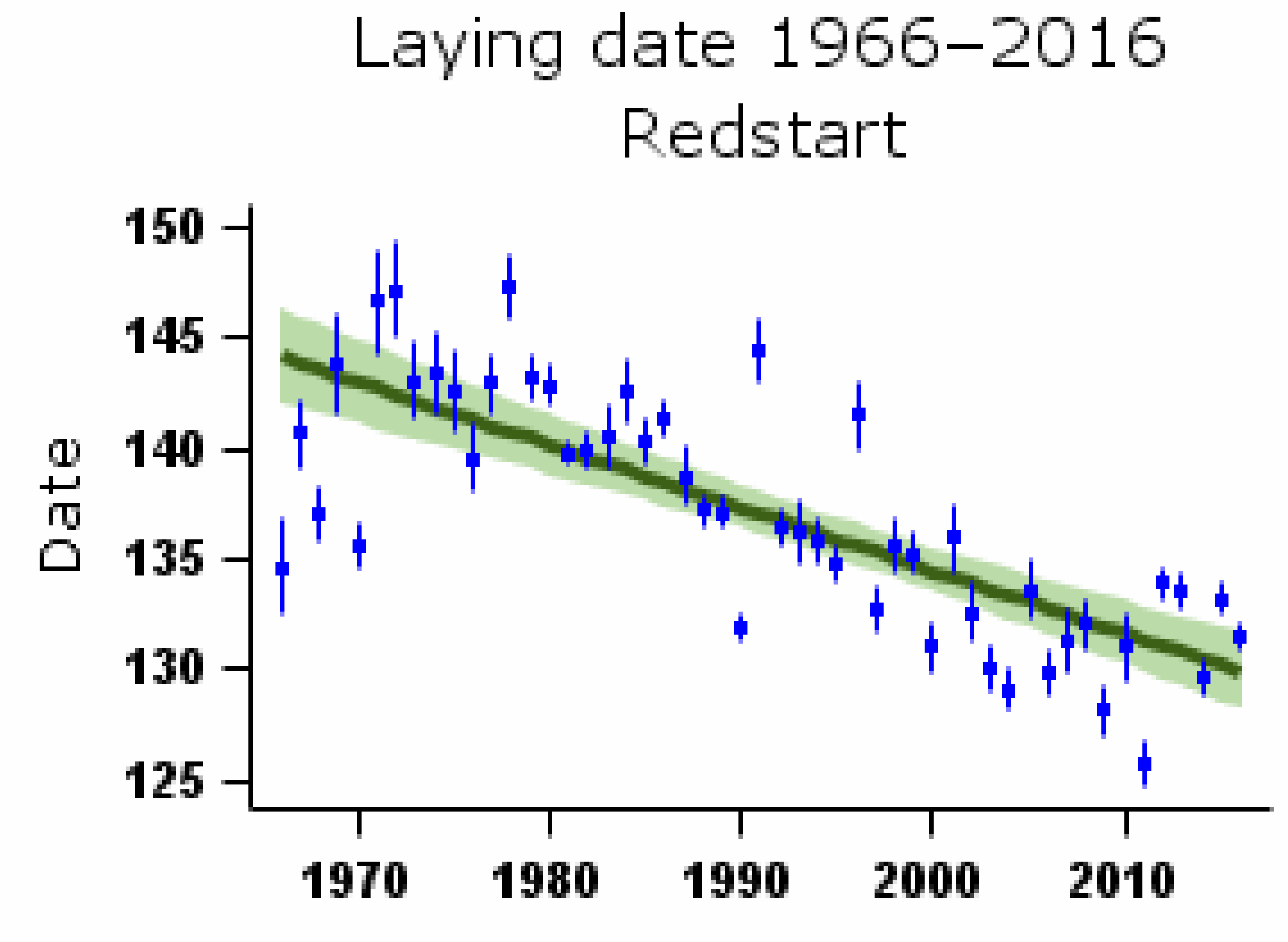


BBS Wales graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

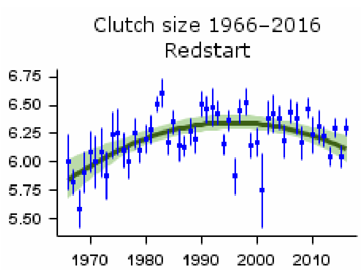


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

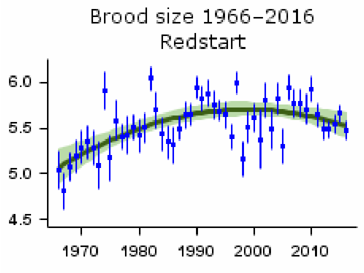
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	61	Curvilinear	3.39 fledglings	4.75 fledglings	40.3%		
Clutch size	48	1967-2015	55	Curvilinear	5.87 eggs	6.13 eggs	4.4%		
Brood size	48	1967-2015	98	Curvilinear	5.10 chicks	5.55 chicks	8.7%		
Nest failure rate at egg stage	48	1967-2015	84	Curvilinear	1.57% nests/day	0.86% nests/day	-45.2%		
Nest failure rate at chick stage	48	1967-2015	61	Linear decline	1.15% nests/day	0.36% nests/day	-68.7%		
Laying date	48	1967-2015	70	Linear decline	May 24	May 10	-14 days		

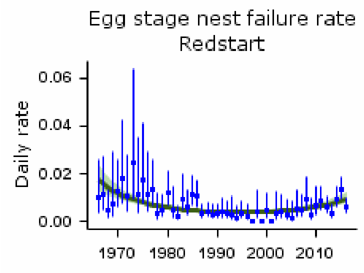
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



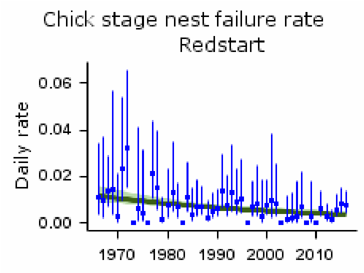
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Whinchat

Saxicola rubetra

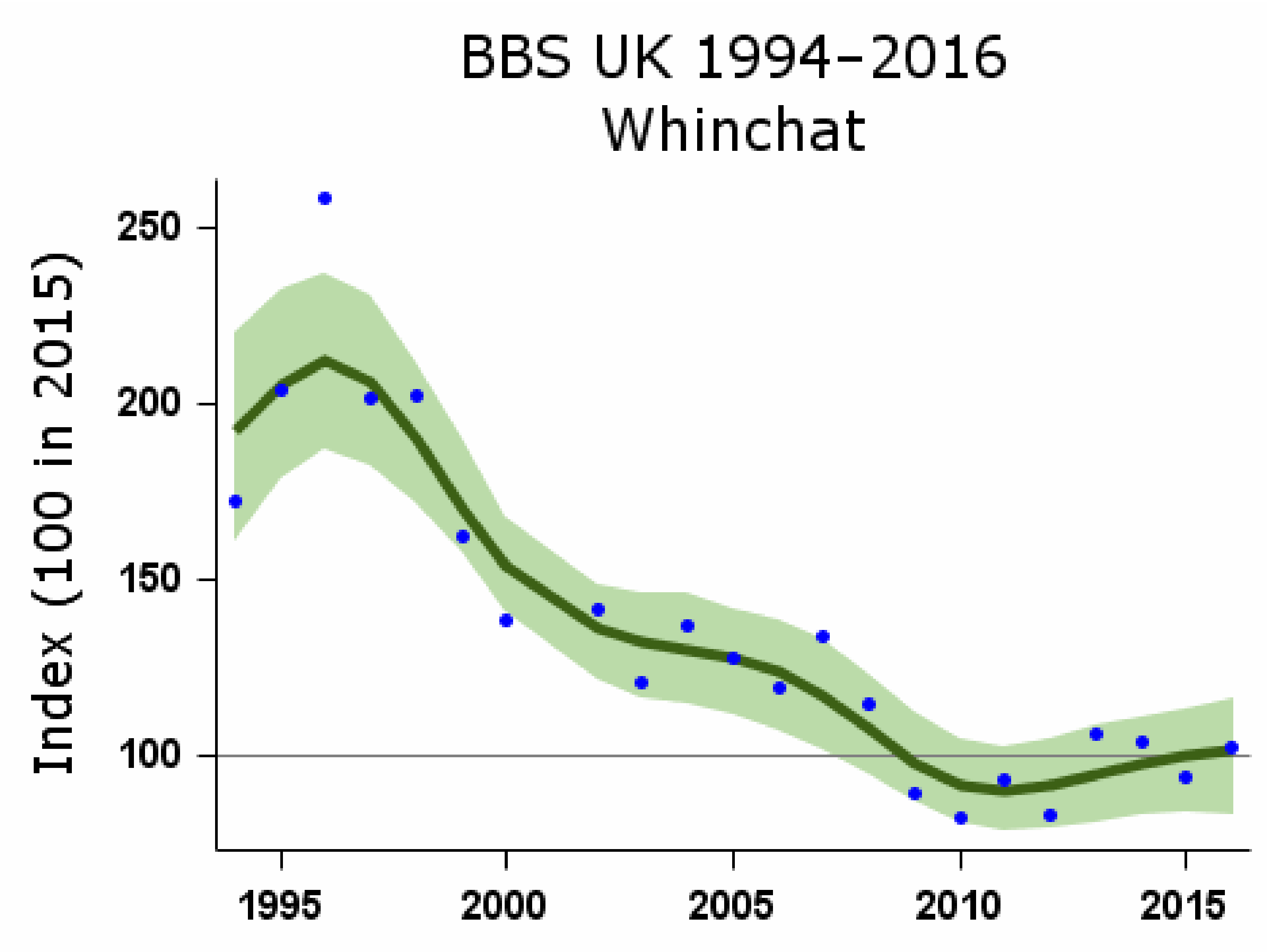
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK: decline
Population size:	47,000 (19,000-75,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Whinchats were not monitored by census surveys until the BBS began in 1994. By then, however, Gibbons et al. (1993) had already identified a major range contraction, mainly from lowland England, that was probably at least partly due to more intensive management of farmland (Marchant et al. 1990). Further extinctions have occurred since then among the remaining pockets of lowland breeders in apparently suitable habitat (Balmer et al. 2013) and the species has declined even in upland stronghold areas (Henderson et al. 2014). In the uplands, Whinchat habitat is now somewhat restricted, being sandwiched between intensive agriculture at lower levels and higher land unsuitable for breeding, and limited also by aspect (Calladine & Bray 2012). In a study focused on upland grasslands, a 95% decline was noted between 1968-80 and 1999-2000 (Henderson et al. 2004). BBS data indicate that strong population decline has taken place since 1994, raising BTO alerts for the UK as a whole as well as for England. Nest-record samples are small, but indicate a substantial recent rise in nest losses at the egg stage. In 2012 and 2013, BTO conducted a Henderson et al., in press).

There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). On the strength of its UK decline, Whinchat was moved from the green to the amber list of conservation concern in 2009 and subsequently from amber to the UK red list at the latest review in 2015 (Eaton et al. 2015). It is among a suite of species that winter in the humid zone of West Africa and correspondingly are showing the strongest population declines among our migrant species (Ockendon et al. 2012, 2014).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

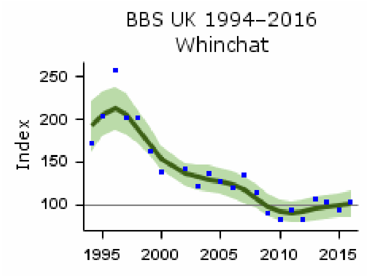
Population changes in detail

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

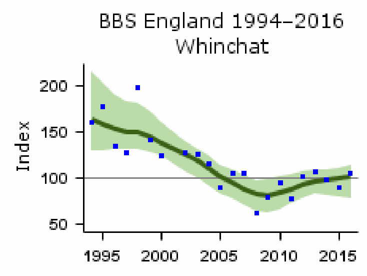
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	78	-51	-63	-37	>50	
	10	2005-2015	79	-22	-39	-5		
	5	2010-2015	78	9	-12	30		
BBS England	20	1995-2015	34	-37	-60	-19	>25	
	10	2005-2015	37	-2	-22	21		
	5	2010-2015	35	19	-10	51		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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

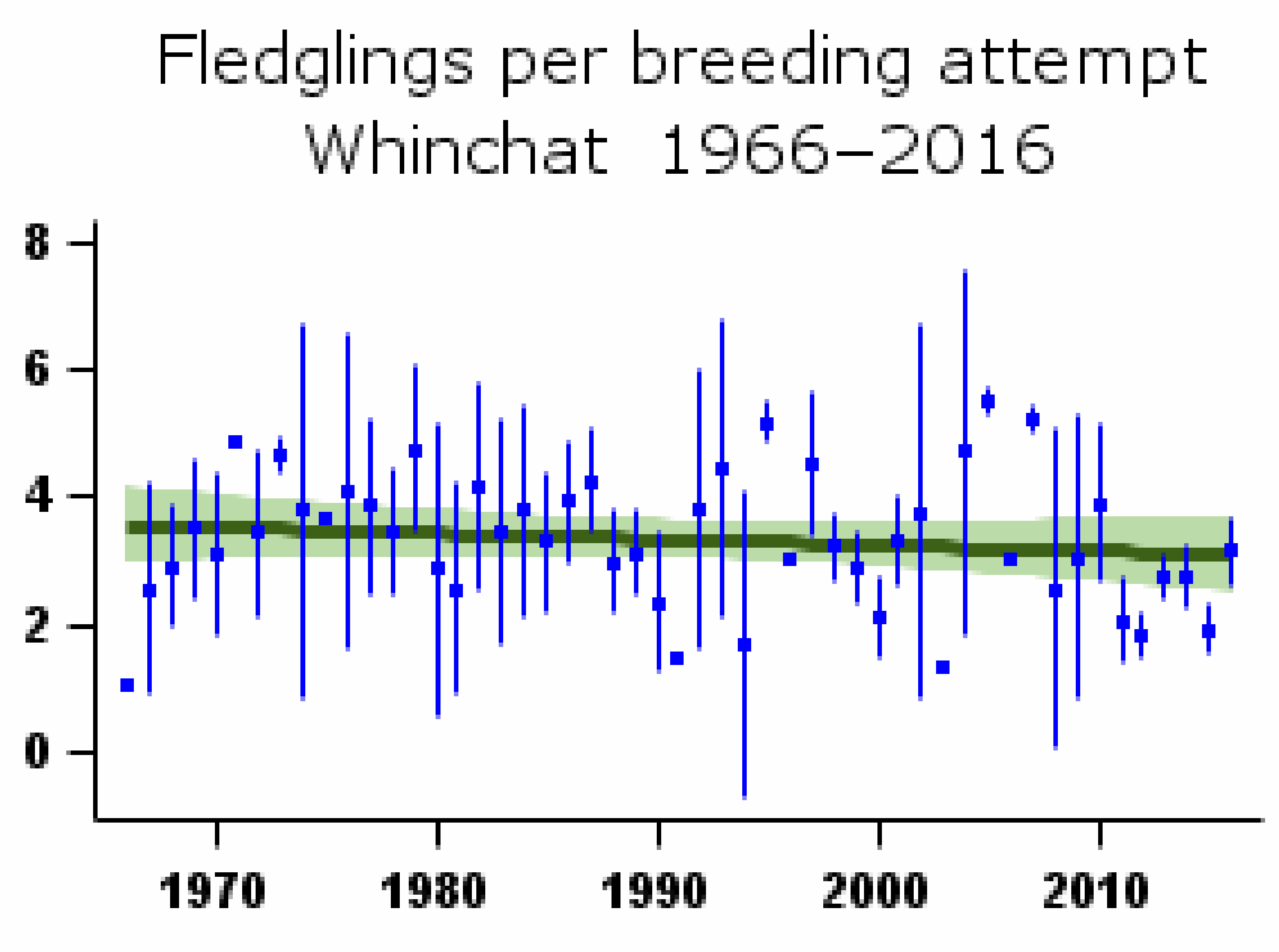


BBS UK graph

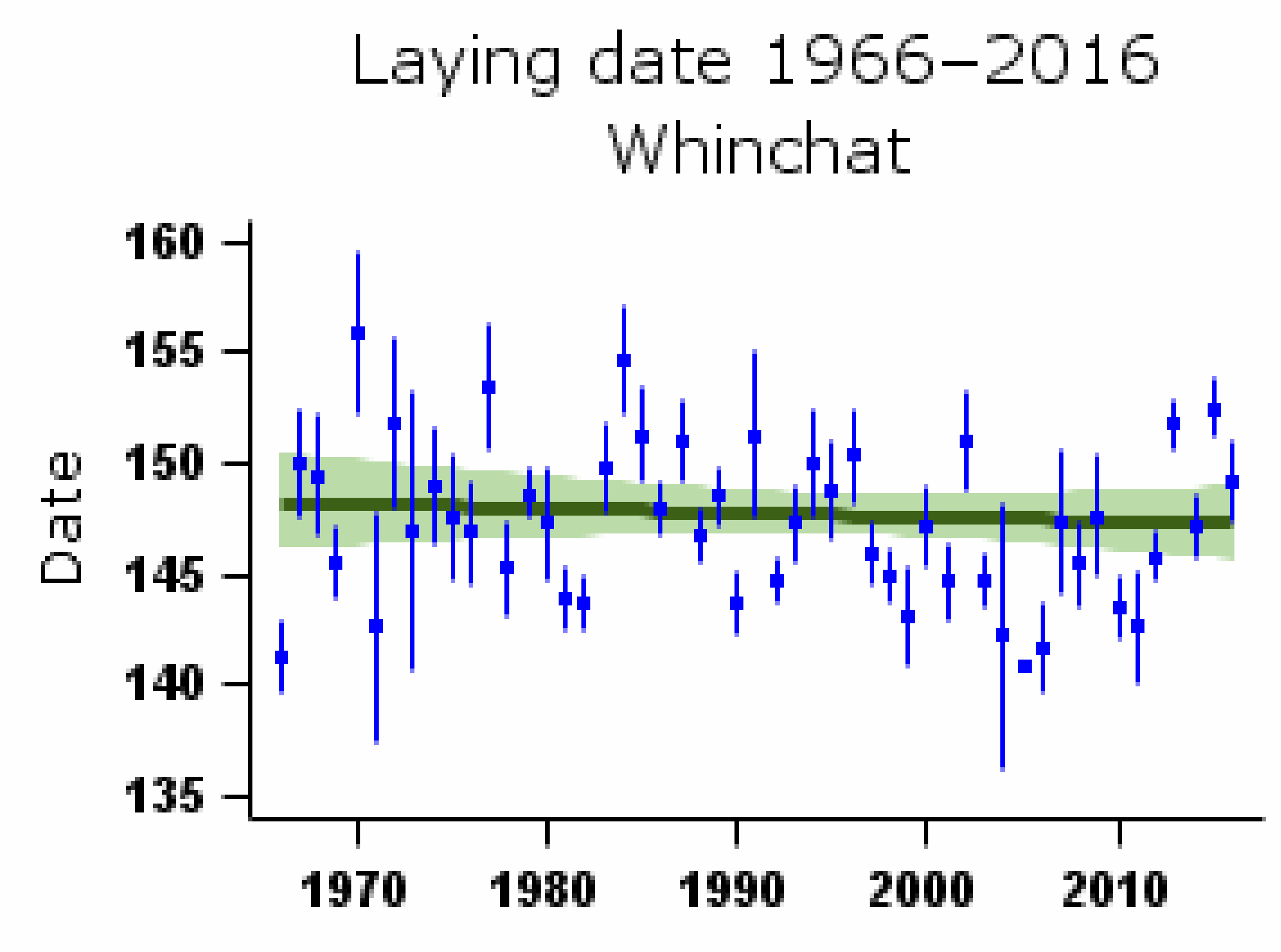


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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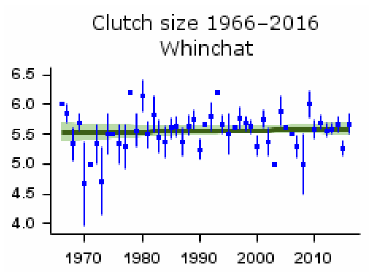
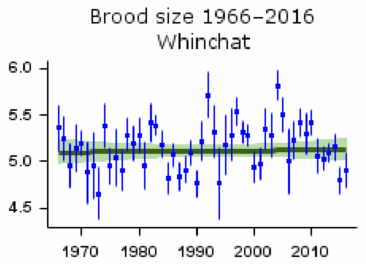
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	19	None					
Clutch size	48	1967-2015	16	None					Small sample
Brood size	48	1967-2015	43	None					
Nest failure rate at egg stage	48	1967-2015	20	Linear increase	0.58% nests/day	3.15% nests/day	443.1%		Small sample
Nest failure rate at chick stage	48	1967-2015	32	Curvilinear	2.53% nests/day	2.70% nests/day	6.7%		
Laying date	48	1967-2015	33	None			0 days		

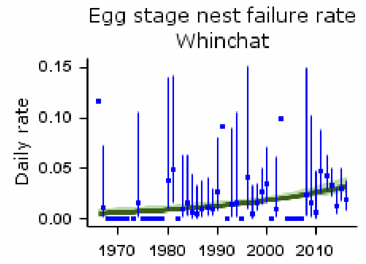
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



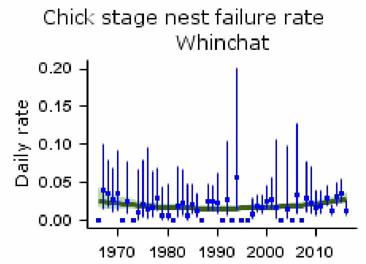
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

There is good evidence that the long-term historical decline of the Whinchat may be due to changes in management of grassland and semi-managed meadows, with reduction in habitat quality (invertebrates and structure) and scale, both being common features of existing populations. More ringing or colour-ringing data and more nest record data are necessary to fully establish productivity or survival as drivers of population change.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	Low first-year survival
Ecological	Agricultural intensification	Land-use change

Further information on causes of change

Whinchat is a species historically associated with lowland cultivated grassland and semi-natural meadows (Muller et al. 2005, Britschgi et al. 2006, Broyer 2009) as well as upland hill slopes (Calladine & Bray 2012). Specifically Whinchats have been shown to favour areas of long,structurally diverse tussock rich grassland, with a high density of tussocks and an abundance of perches to forage from (Border et al. 2016). Its historical decline in the lowlands has been linked to losses of suitable habitat and changes in management of grassland (Holloway 1996). Early mowing of grassland habitats generally causes direct losses of nests and even mortality of incubating females and, indirectly, makes the birds more conspicuous to predators (Gruebler et al. 2008). Grassland intensification reduces invertebrate availability, through direct removal with cut grass, and by reducing vegetation diversity due to the application of fertilisers (Britschgi et al. 2006).

An increasing proportion of the population in Europe is now found in the uplands, where agricultural intensification has been less marked (Muller et al. 2005, Archaux 2007, Broyer 2009), although some upland areas may now be at an early stage of intensification (Strebel et al. 2015). In the UK, Whinchats are now largely considered an 'upland' species because lowland populations are now rare and confined to expansive protected habitats, such as Salisbury Plain (Henderson et al. 2014). Upland margins have become refuges for species that have declined in farmland (Fuller et al. 2006), with upland grassland and moorland now supporting the breeding population of Whinchats (Stillman & Brown 1994, Gillings et al. 2000). However, even here populations have declined in the last 20 years (Hendersonet al. 2014). Calladine & Bray (2012) point out that such Whinchat habitat in the uplands is becoming more limited than may at first appear.

On British moorland, Whinchats are most visible in tall vegetation, such as bracken (Allen 1995) and scrub, but mainly where there is grassy ground cover (Pearce-Higgins & Grant 2006), and vegetation height is more complex instead of uniform (Buchanan et al. 2017). In all its breeding habitats, lowland and upland, common features are perches (tall flower stems, bracken, light scrub, small trees) admixed with structurally varied, insect rich, grassland (to provide food and tussocks for nest sites). Such conditions are available in expansive habitats such as plains, hillsides and meadows (Calladine & Bray 2012, Border et al. 2016). Vegetation that does not allow access to ground invertebrates is too dense to suit this species (Thompson et al. 1995), and grazing may help provide suitable mosaic conditions (Murrayet al. 2016, Douglas et al. 2017). On the other hand, grazing can reduce tussock density for nest sites and reduce breeding success by exposing nests to increased rick from predation (Taylor

2015). Certainly, upland margins are vulnerable to long-term changes in grazing pressure, which has been increasing since the mid 1970s (Fuller & Gough 1999, Fuller et al. 2006).

Demographic data are insufficient to investigate whether trends in breeding productivity or survival have influenced population size, but one intensive study on Salisbury Plain found that while adult return rates were good, first year return rates were low, and did not appear to be sufficient to maintain the observed population trend, perhaps suggesting high natal dispersal even though this population appears to be isolated (Border et al. 2017); At the same time, nest losses to predation were high (Taylor 2015). Meanwhile, a study over three winters at one site in Nigeria show high survival rates of marked Whinchats within and between winters, suggesting that mortality at this site occurs primarily outside the wintering period and probably during migration (Blackburn & Cresswell 2016a, 2016b).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Stonechat

Saxicola rubicola

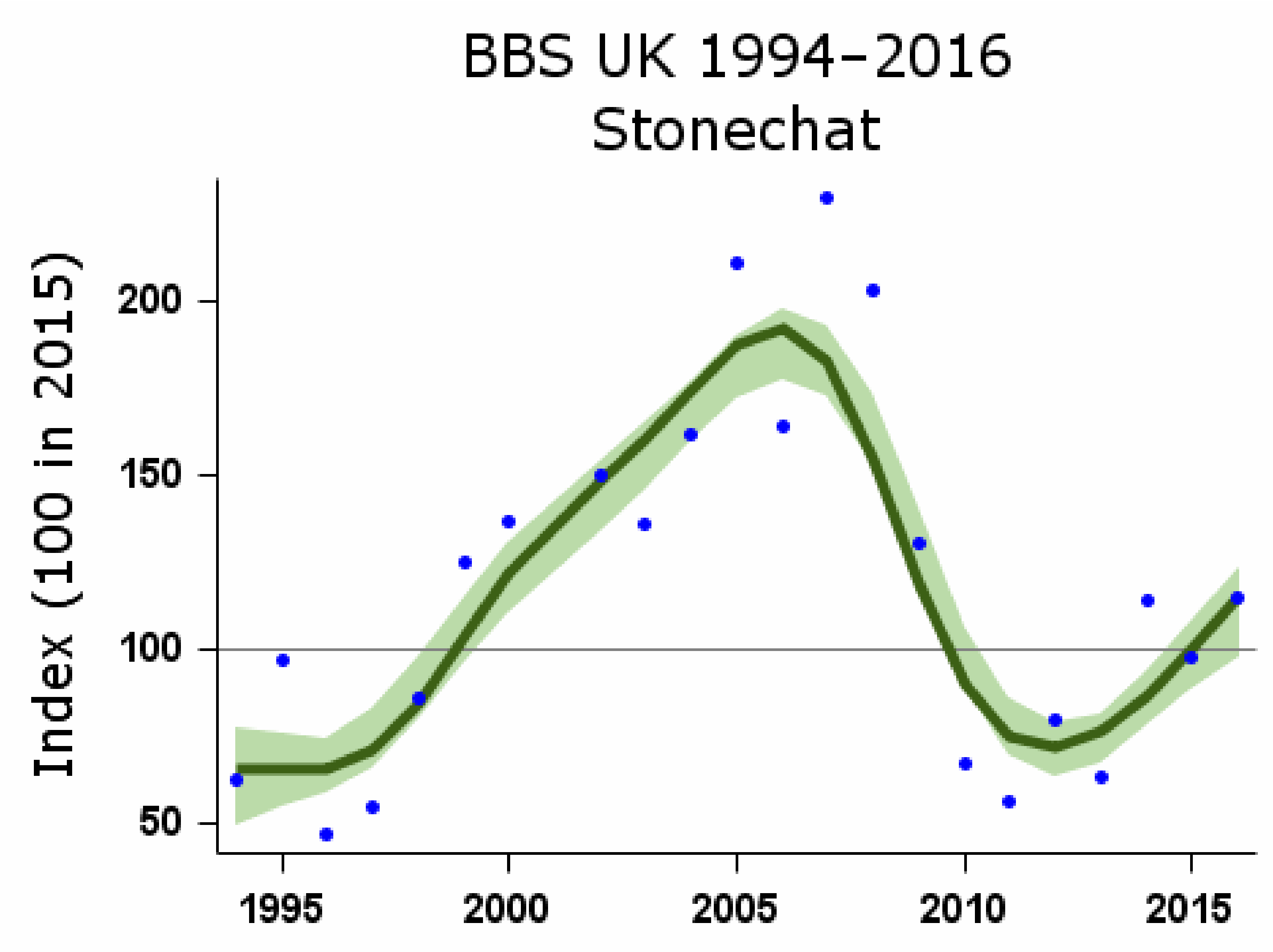
Key facts

Conservation listings:	Global: green
Long-term trend:	UK: probably fluctuating, with no long-term trend
Population size:	59,000 (39,000-79,000) pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Trends were poorly quantified before the start of the BBS, but a long-term decline is suspected in the preceding decades: severe winter weather, and loss and fragmentation of suitable breeding habitat in many inland regions, are believed to have reduced the population from the 1940s onward (Marchant et al. 1990). Breeding atlas data showed a substantial contraction in the Stonechat's range between 1968-72 and 1988-91 (Gibbons et al. 1993). Against this background, the strongly increasing BBS trend to 2006 represents substantial and possibly even complete recovery. By 2008-11, the earlier range losses had been almost entirely reversed (Balmer et al. 2013). Atlas and BBS data reveal complex shifts recently in the Stonechat's range, involving expansion northward and on the west coast and a detectable increase in altitude (Henderson et al. 2014). In 2012 and 2013, BTO conducted a Hendersonet al., in press).

Nest failure rates fell during the 1990s and clutch and brood sizes increased, though they are now similar to the late 1960s rates, and there is no trend in the number of fledglings per breeding attempt. Following increases widely across Europe, the species is now provisionally categorised as 'secure' (BirdLife International 2004) and consequently has recently been moved from the amber to the green list in the UK (Eaton et al. 2009). UK data from about 2008 to 2012 indicate a sharp decrease, however, partly in response to snowy winters during that period. Numbers across Europe have been broadly stable since 1989 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	159	53	15	97		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	10	2005-2015	207	-47	-53	-37	>25	
	5	2010-2015	145	1	-15	15		
BBS England	20	1995-2015	71	55	5	139		
	10	2005-2015	97	-41	-53	-25	>25	
	5	2010-2015	66	21	-5	41		
BBS Scotland	20	1995-2015	37	23	-20	75		
	10	2005-2015	49	-58	-69	-46	>50	
BBS Wales	20	1995-2015	39	139	71	272		
	10	2005-2015	49	-20	-31	3		
	5	2010-2015	44	10	-11	47		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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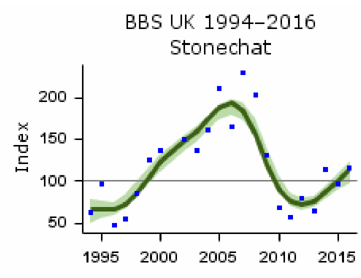
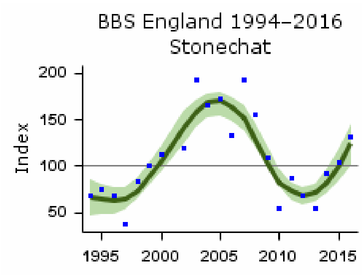
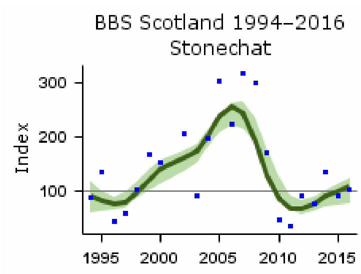


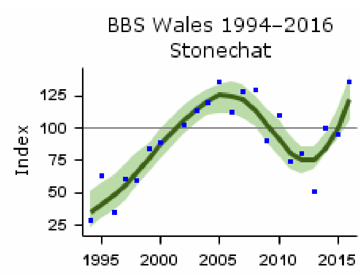
BBS UK graph



BBS England graph

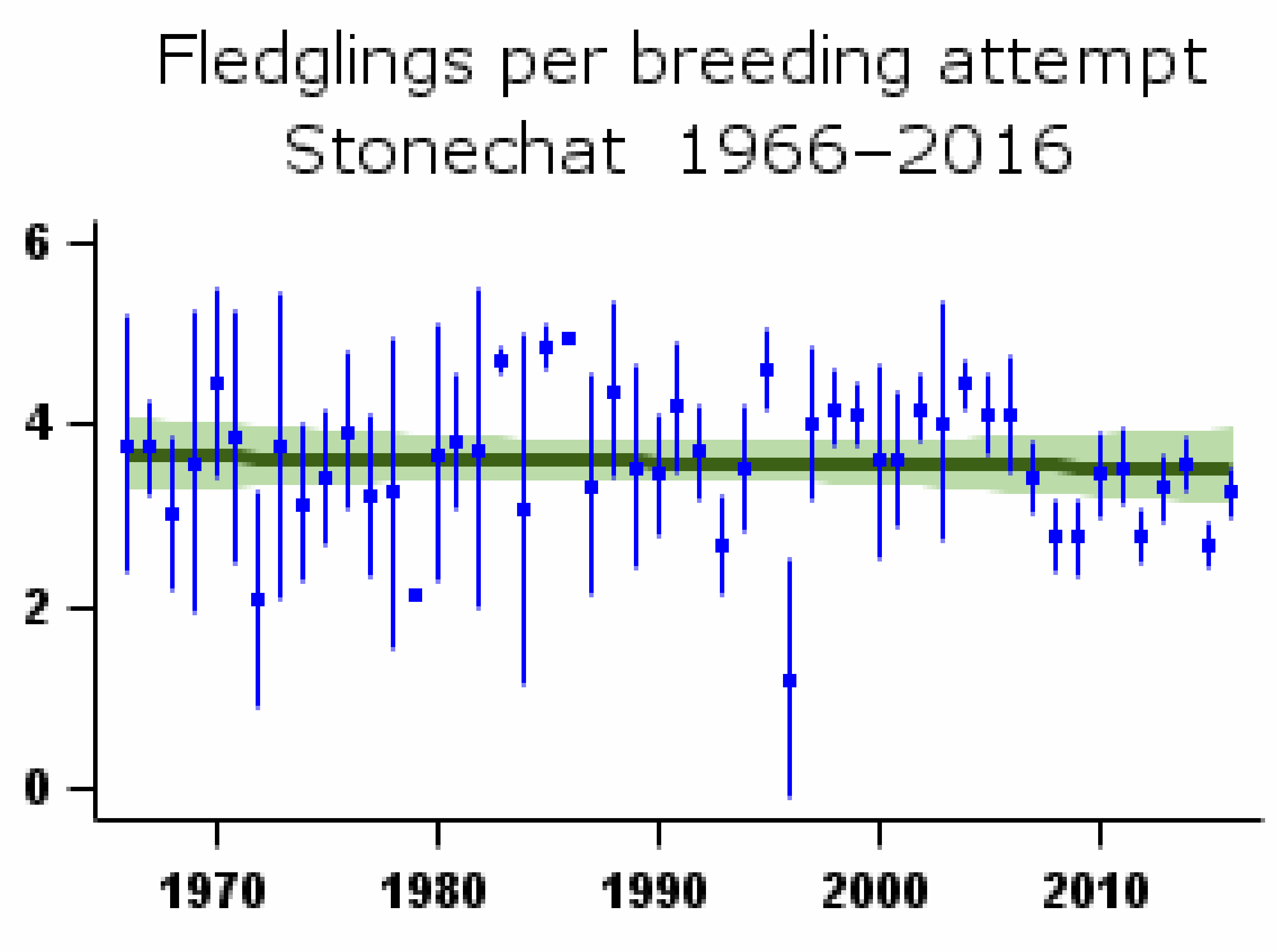


BBS Scotland graph

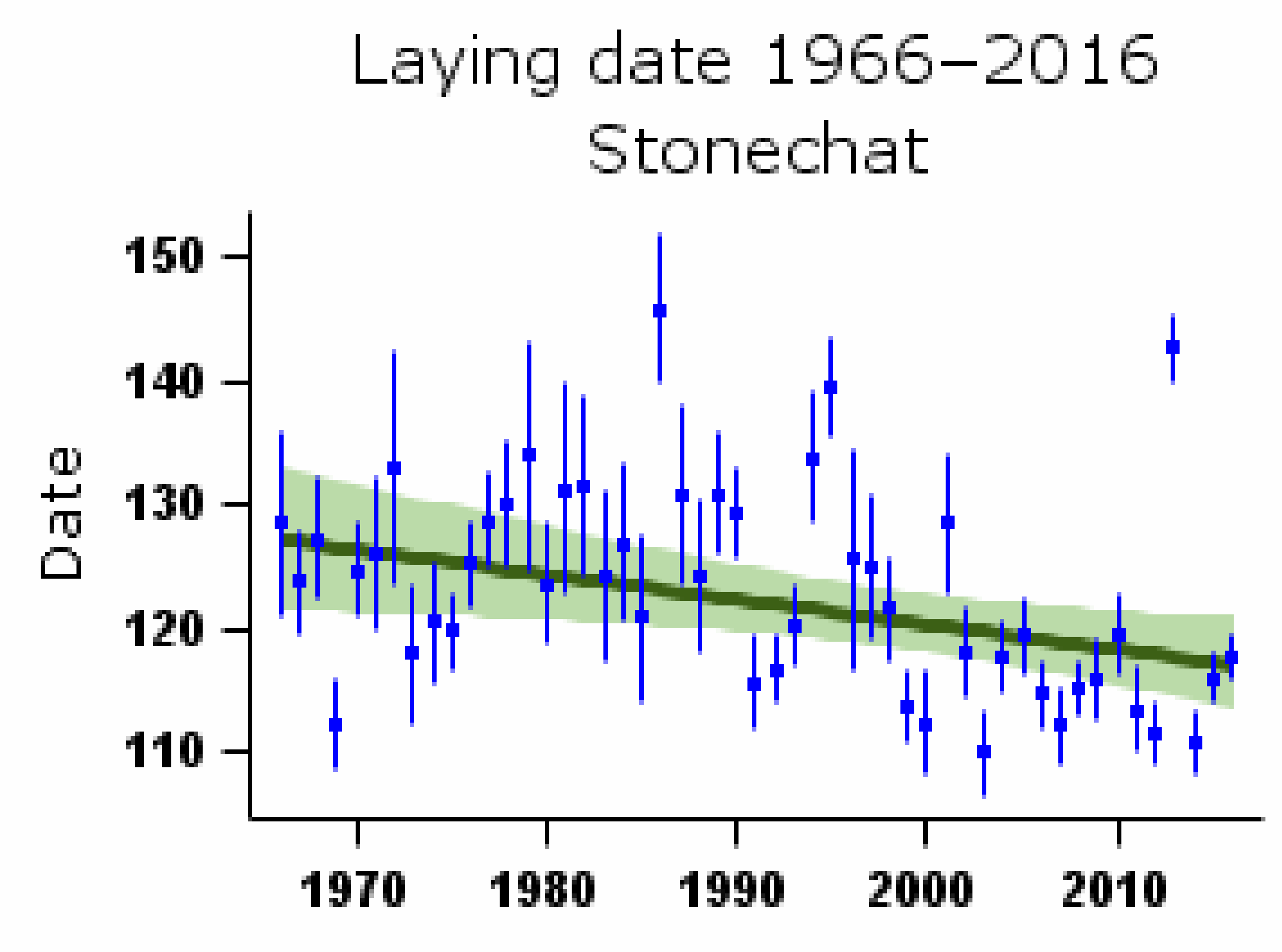


BBS Wales graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

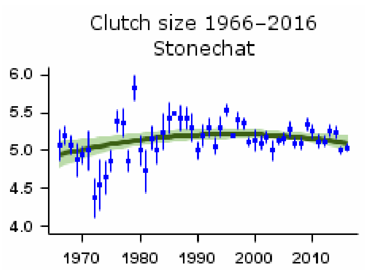


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

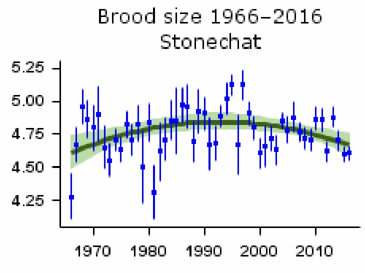
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	44	None					
Clutch size	48	1967-2015	40	Curvilinear	4.96 eggs	5.11 eggs	2.9%		
Brood size	48	1967-2015	79	Curvilinear	4.62 chicks	4.68 chicks	1.2%		
Nest failure rate at egg stage	48	1967-2015	45	None					
Nest failure rate at chick stage	48	1967-2015	73	Curvilinear	1.75% nests/day	1.86% nests/day	6.3%		
Laying date	48	1967-2015	51	Linear decline	May 7	Apr 27	-10 days		

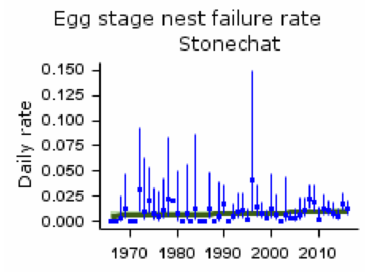
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



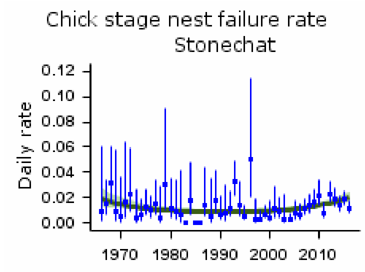
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



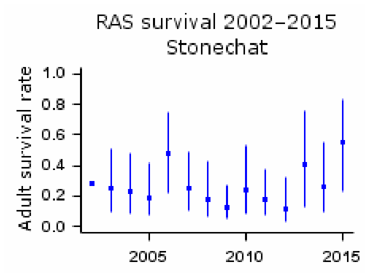
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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Wheatear

Oenanthe oenanthe

Key facts

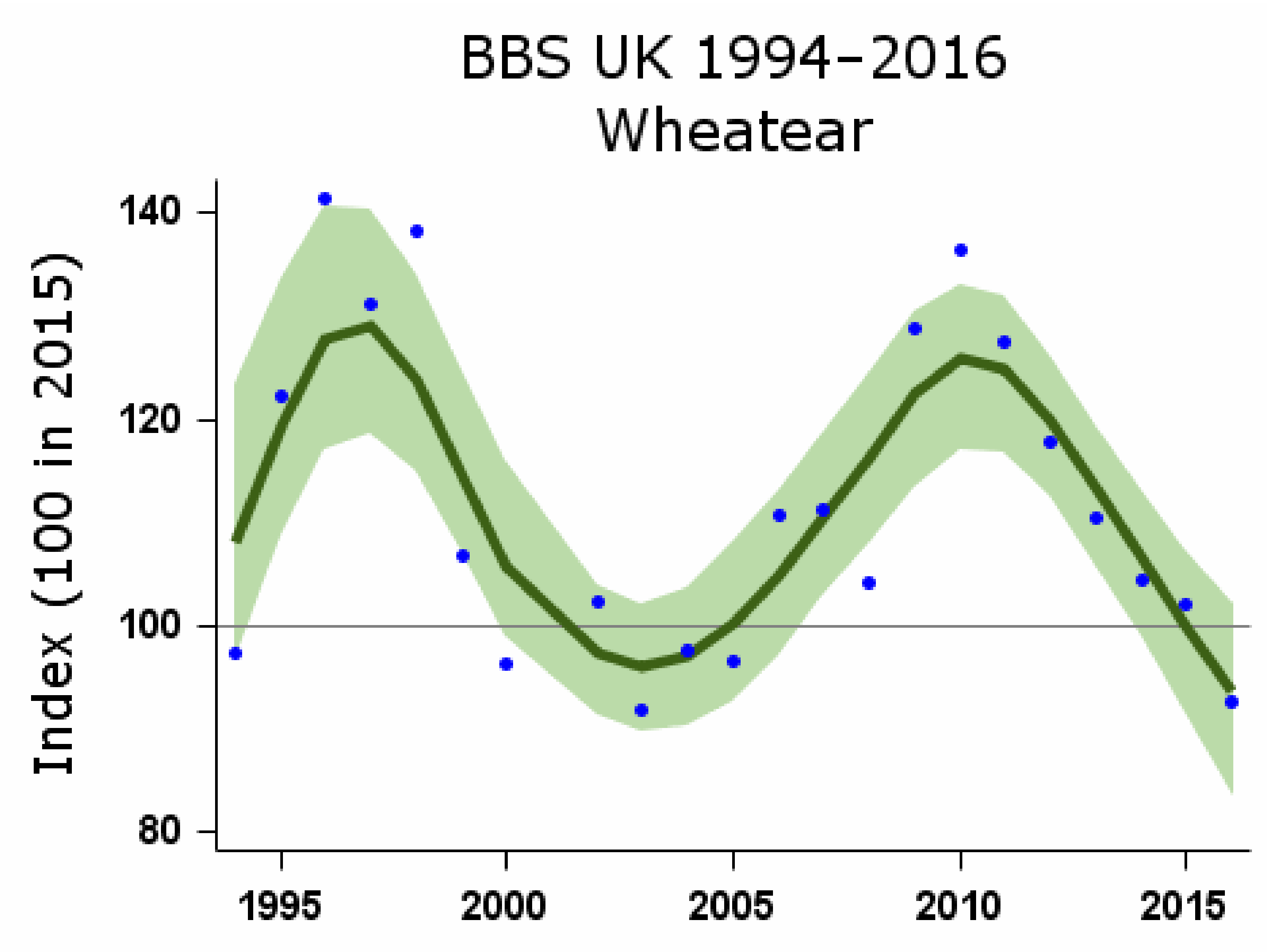
Conservation listings:	Global: green
Long-term trend:	UK: possible decline
Population size:	240,000 (170,000-310,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Although it is a common breeding species in many upland areas, the Wheatear was not monitored at the UK scale until the BBS began in 1994. Gibbons et al. (1993) had by then identified range contractions from lowland Britain since 1968-72, perhaps due to losses of suitable grassland and declines in rabbit abundance. Further loss of range, especially in lowland England, had been recorded by 2008-11 (Balmer et al. 2013). BBS trends show wide fluctuations, with little indication of directional change. Previous estimates of UK population have been revised strongly upward, based on BBS distance-sampling data (Gillings et al. 2007). Nest failure rates at the egg stage have fallen substantially and nest productivity has risen. In a study in Cumbria, abundance fell where sheep density was reduced and sward length increased, creating conditions where food was likely to be less accessible (Douglas et al. 2017).

There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). Following widespread declines during the 1990s, the European status of this species was no longer considered 'secure' (BirdLife International 2004). Accordingly, the species was moved from the green to the amber list in the UK in 2009 (Eaton et al. 2009). Following a review of its European status, however, Wheatear returned to the UK green list in 2015 (Eatonet al. 2015). Studies of remnant populations in the Netherlands indicate that conservation action may need to be site specific (van Oosten et al. 2015).

In 2012 and 2013, BTO conducted a Henderson et al., in press).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

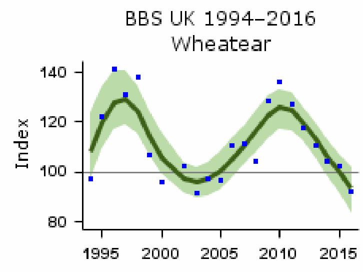
Population changes in detail

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

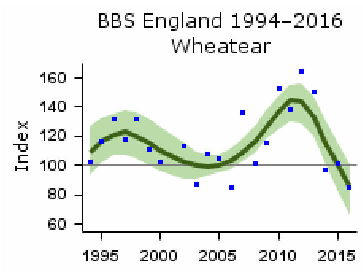
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	365	-16	-31	1		
	10	2005-2015	455	0	-14	14		
	5	2010-2015	486	-21	-30	-11		
BBS England	20	1995-2015	207	-14	-39	13		
	10	2005-2015	276	-1	-19	18		
	5	2010-2015	294	-27	-37	-18	>25	
BBS Scotland	20	1995-2015	86	-20	-37	3		
	10	2005-2015	97	-4	-25	17		
	5	2010-2015	102	-22	-36	-4		
BBS Wales	20	1995-2015	58	-21	-40	0		
	10	2005-2015	67	0	-22	31		
	5	2010-2015	73	-14	-32	13		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

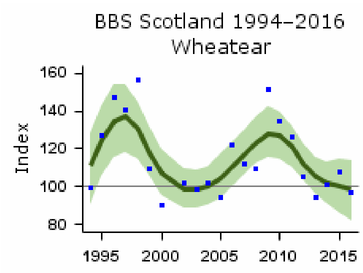
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



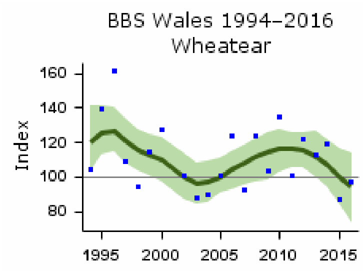
BBS UK graph



BBS England graph

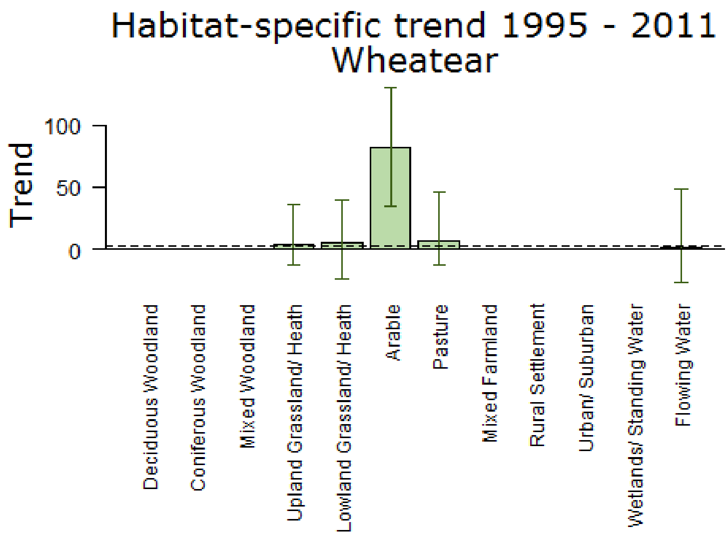


BBS Scotland graph



BBS Wales graph

Population trends by habitat



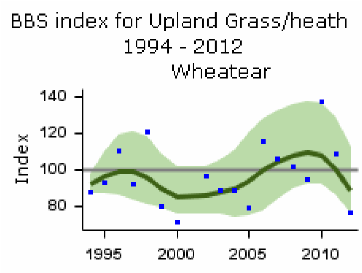
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

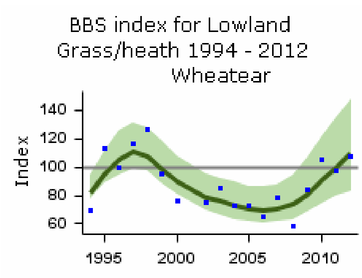
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Upland Grassland/ Heath	16	1995-2011	63	4	-12	35
Lowland Grassland/ Heath	16	1995-2011	49	5	-24	40
Arable	16	1995-2011	30	82	34	130
Pasture	16	1995-2011	114	6	-13	46
Flowing Water	16	1995-2011	40	1	-26	48

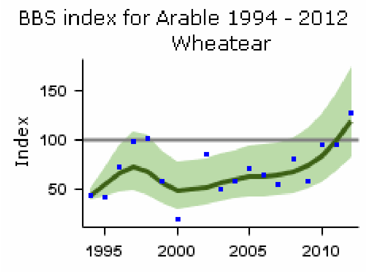
Further information on habitat-specific trends, please follow link here.



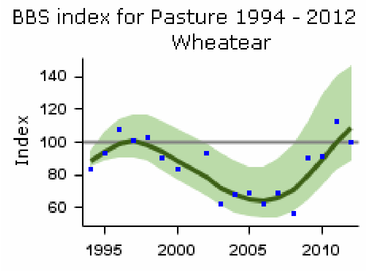
Habitat graph



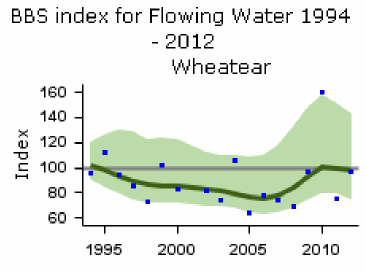
Habitat graph



Habitat graph

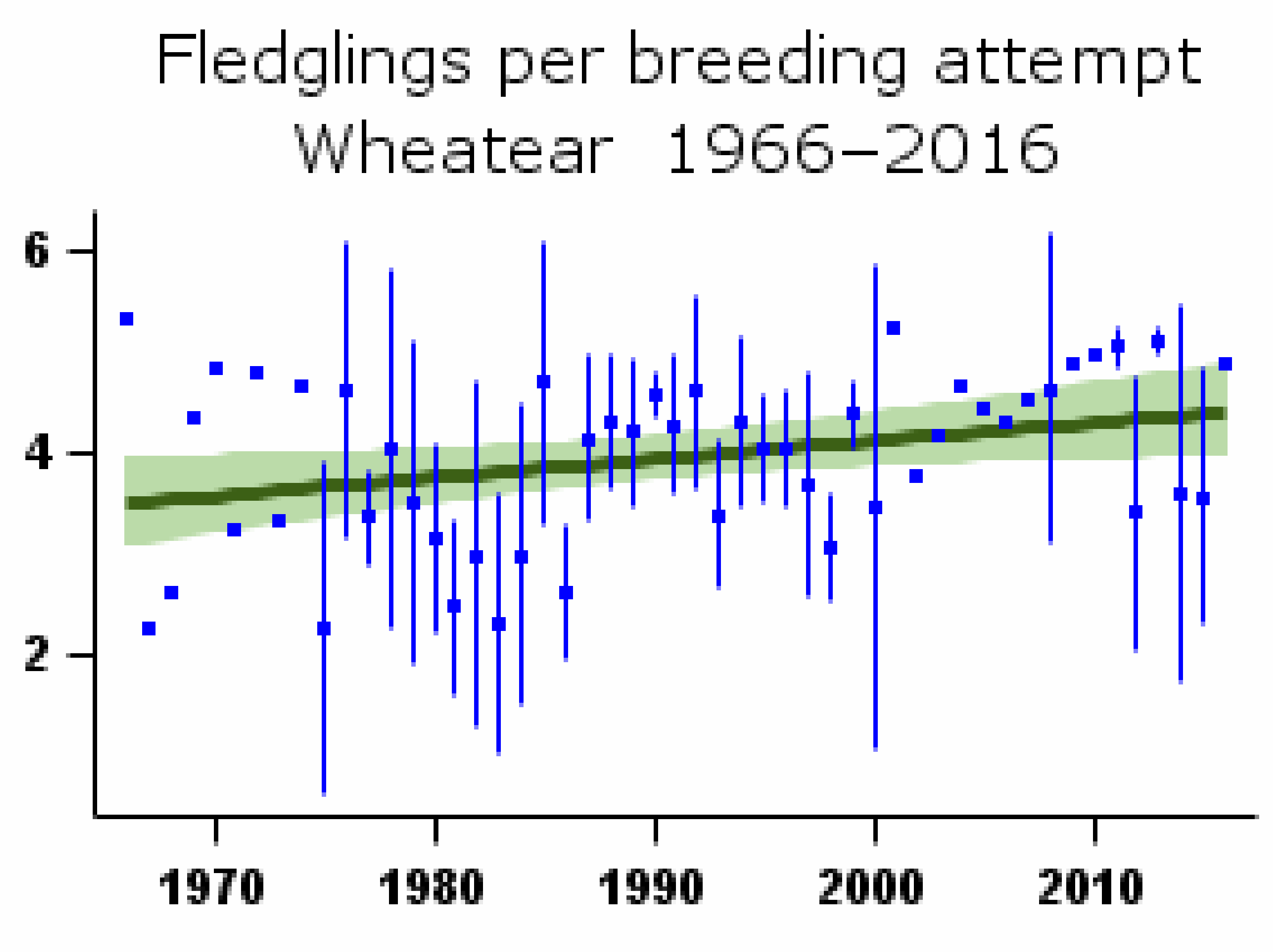


Habitat graph

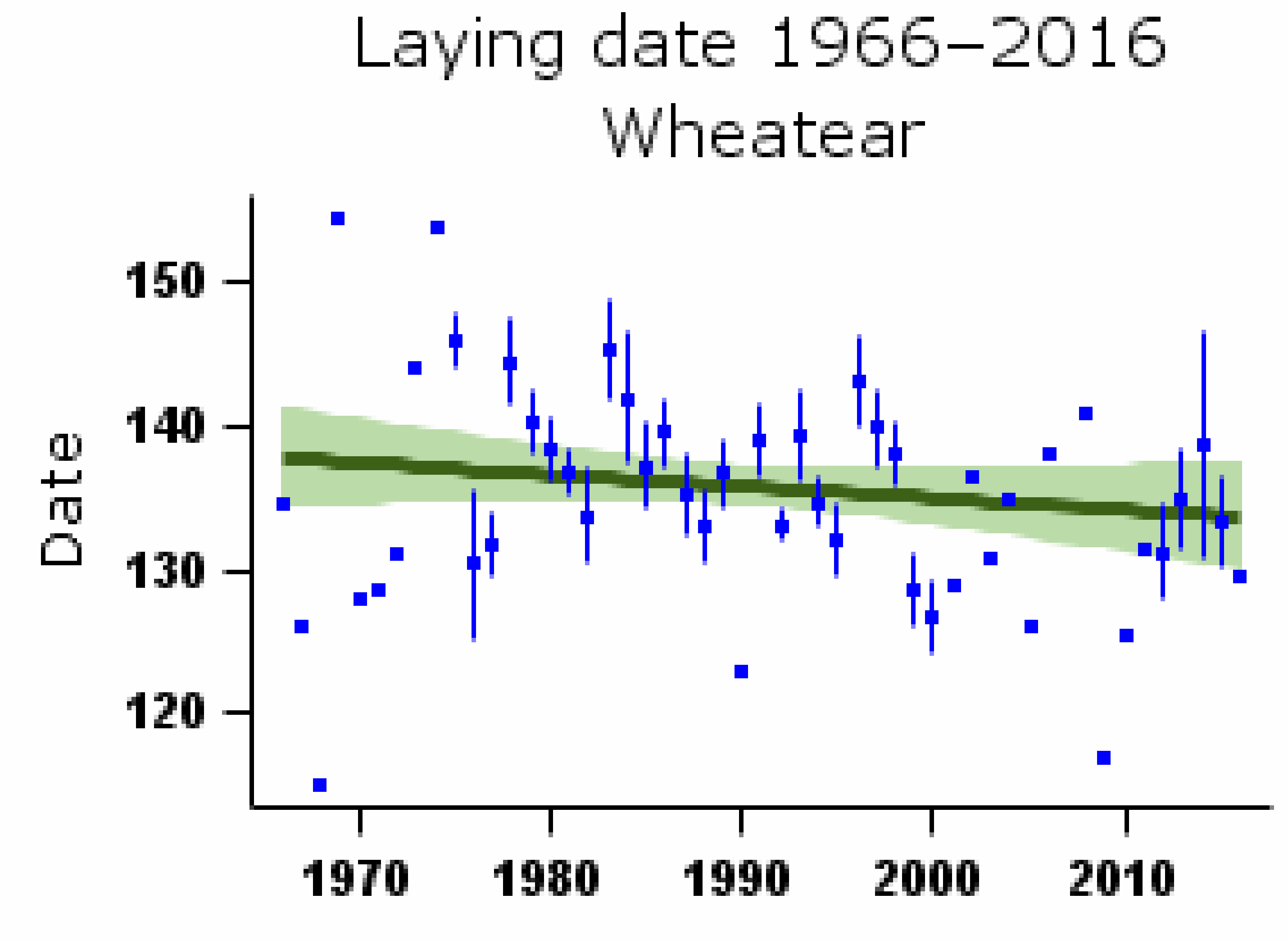


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

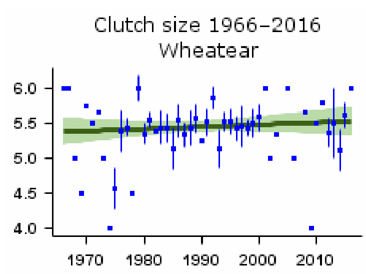


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

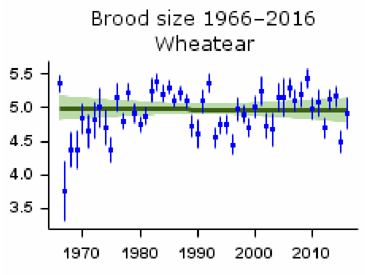
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	15	Linear increase	3.53 fledglings	4.40 fledglings	24.8%		
Clutch size	48	1967-2015	11	None					Small sample
Brood size	48	1967-2015	56	None					
Nest failure rate at egg stage	48	1967-2015	16	Linear decline	2.15% nests/day	0.44% nests/day	-79.5%		Small sample
Nest failure rate at chick stage	48	1967-2015	37	None					
Laying date	48	1967-2015	12	None			0 days		Small sample

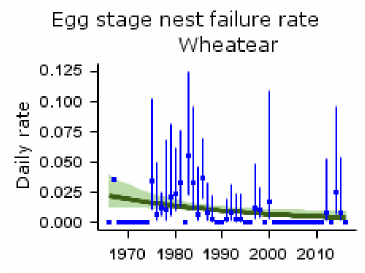
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



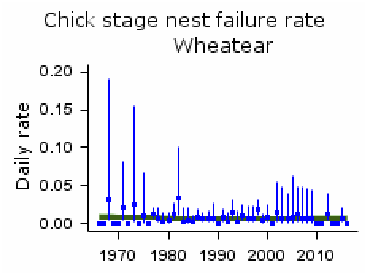
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



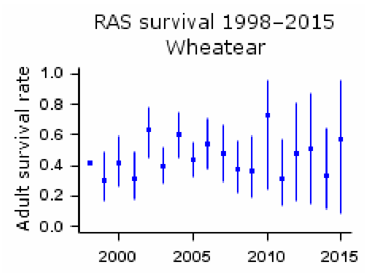
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Dunnock

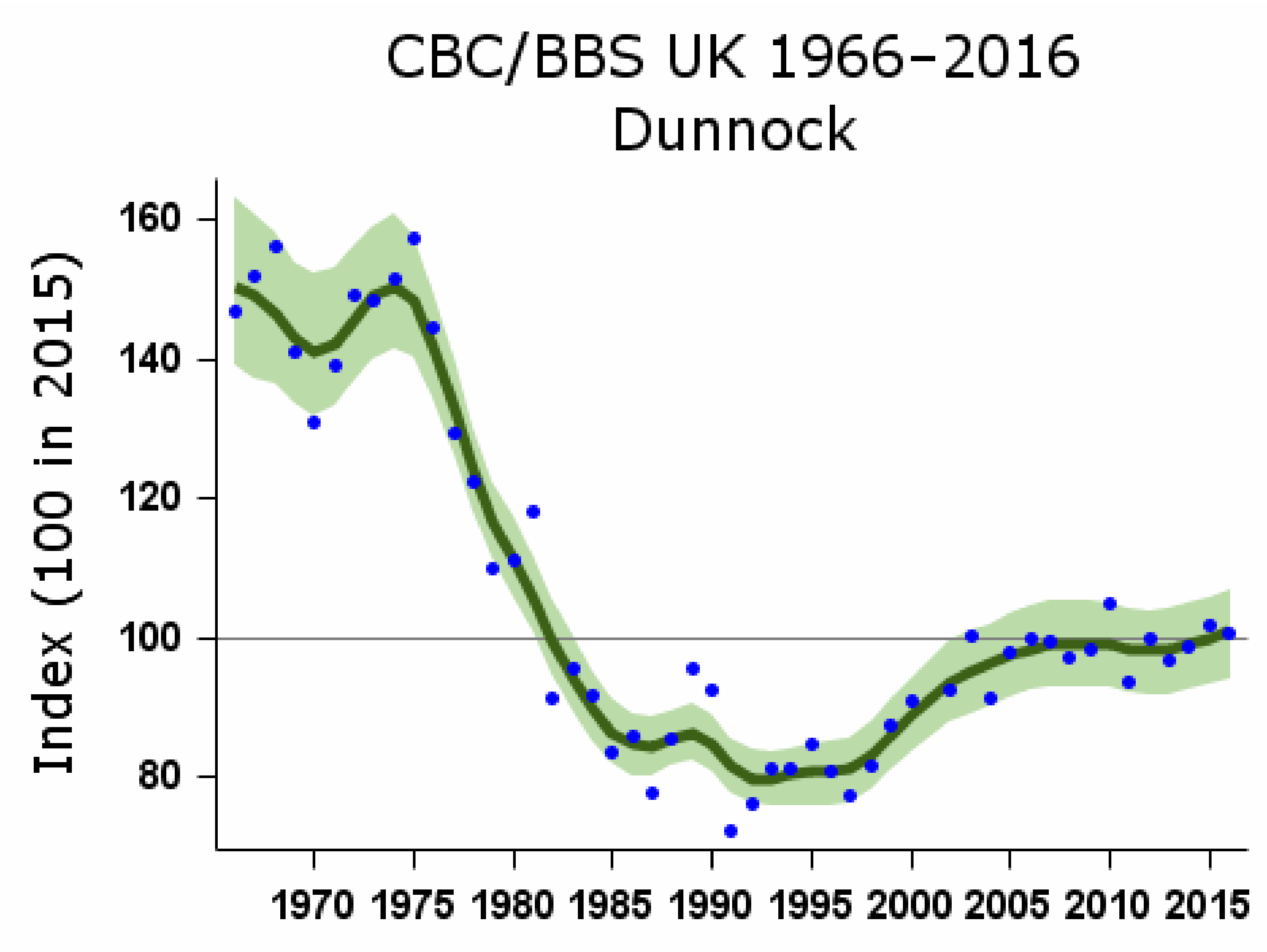
Prunella modularis

Key facts

Conservation listings:	Global: amber (breeding population decline); at race level, occidentalis amber, hebridium and modularis green
Long-term trend:	UK, England: moderate decline
Population size:	2.5 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Dunnock abundance fell substantially between the mid 1970s and mid 1980s, after a period of population stability. Some recovery has occurred throughout the UK since the late 1990s, but the species still meets amber-list criteria. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

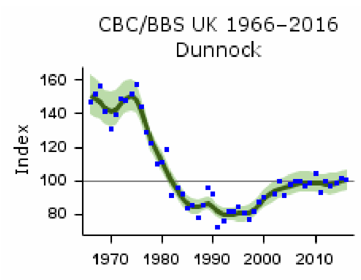
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1080	-33	-43	-23	>25	
	25	1990-2015	1880	18	9	28		
	10	2005-2015	2647	3	0	6		
	5	2010-2015	2698	1	-2	3		
CBC/BBS England	48	1967-2015	887	-37	-46	-28	>25	
	25	1990-2015	1537	13	3	22		
	10	2005-2015	2157	2	-1	5		

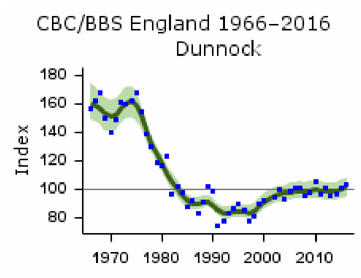
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CES adults	31	1984-2015	98	-12	-26	2		
	25	1990-2015	107	-12	-22	-2		
	10	2005-2015	105	-11	-17	-4		
	5	2010-2015	107	3	-3	10		
CES juveniles	31	1984-2015	96	-28	-43	-2	>25	
	25	1990-2015	105	-21	-32	-8		
	10	2005-2015	103	-17	-25	-6		
	5	2010-2015	106	-9	-17	-2		
BBS UK	20	1995-2015	2194	23	18	29		
	10	2005-2015	2647	3	0	6		
	5	2010-2015	2698	1	-1	3		
BBS England	20	1995-2015	1787	17	11	23		
	10	2005-2015	2157	2	-1	5		
	5	2010-2015	2197	1	-2	4		
BBS Scotland	20	1995-2015	155	57	35	85		
	10	2005-2015	193	11	-5	26		
	5	2010-2015	197	-3	-11	8		
BBS Wales	20	1995-2015	166	34	18	55		
	10	2005-2015	194	0	-9	9		
	5	2010-2015	203	3	-5	13		
BBS N.Ireland	20	1995-2015	72	86	20	137		
	10	2005-2015	85	-3	-13	9		
	5	2010-2015	81	11	-1	21		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

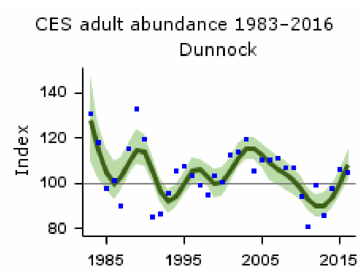
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



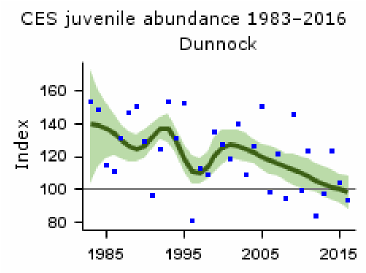
CBC/BBS UK graph



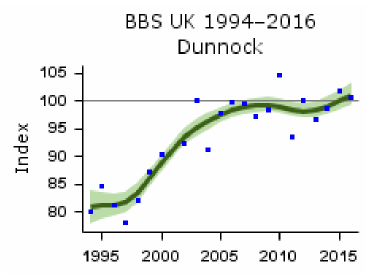
CBC/BBS England graph



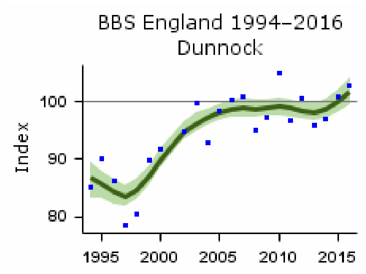
CES adults graph



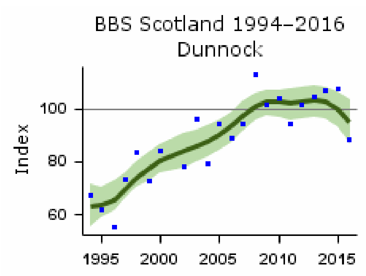
CES juveniles graph



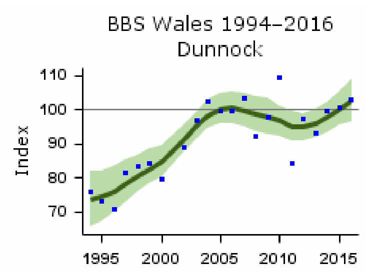
BBS UK graph



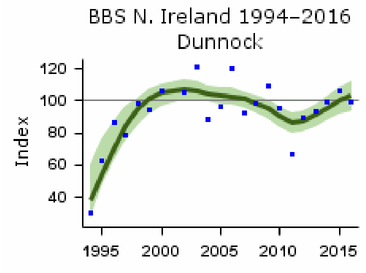
BBS England graph



BBS Scotland graph

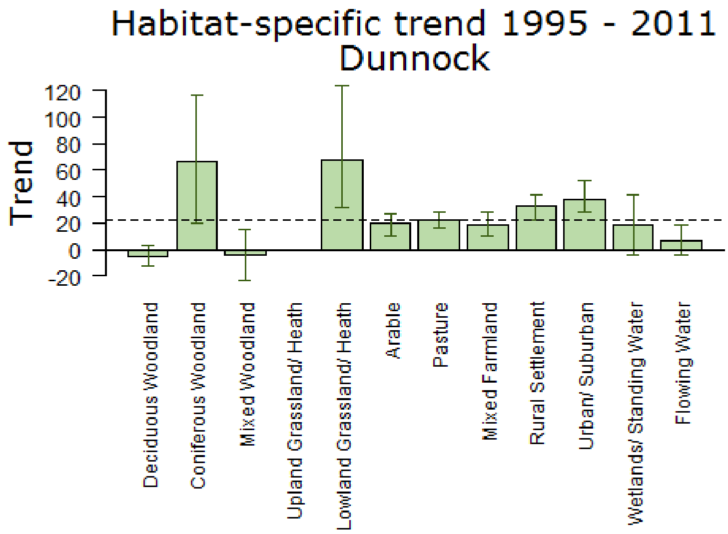


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



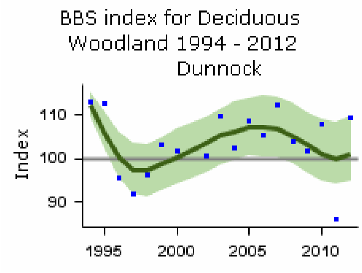
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

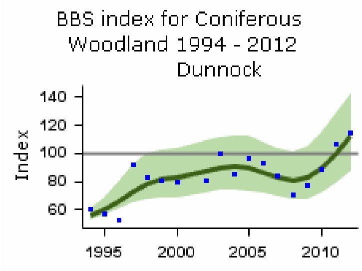
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	528	-6	-12	3
Coniferous Woodland	16	1995-2011	102	66	20	117
Mixed Woodland	16	1995-2011	240	-4	-23	15
Lowland Grassland/ Heath	16	1995-2011	100	68	32	124
Arable	16	1995-2011	605	20	10	27
Pasture	16	1995-2011	1033	22	16	29
Mixed Farmland	16	1995-2011	561	18	10	28
Rural Settlement	16	1995-2011	693	33	22	42
Urban/ Suburban	16	1995-2011	366	38	28	52
Wetlands/ Standing Water	16	1995-2011	68	18	-4	41
Flowing Water	16	1995-2011	325	7	-4	18

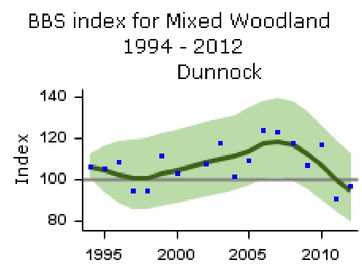
Further information on habitat-specific trends, please follow link here.



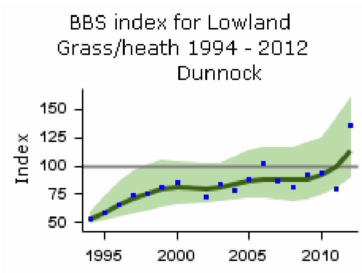
Habitat graph



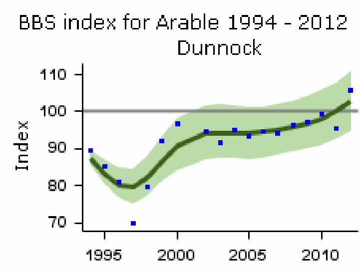
Habitat graph



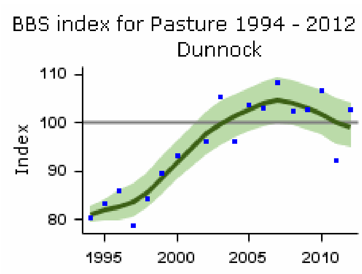
Habitat graph



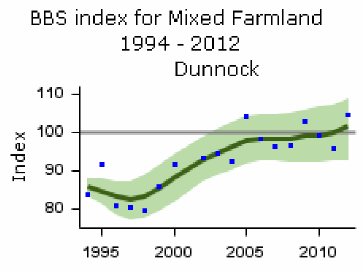
Habitat graph



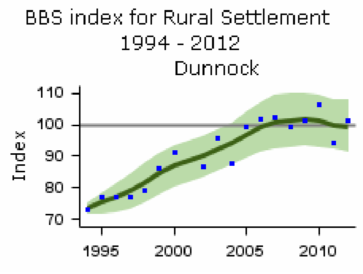
Habitat graph



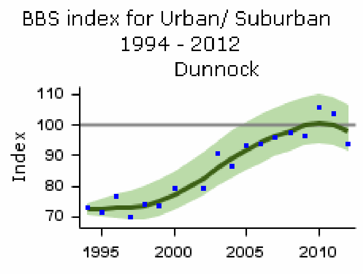
Habitat graph



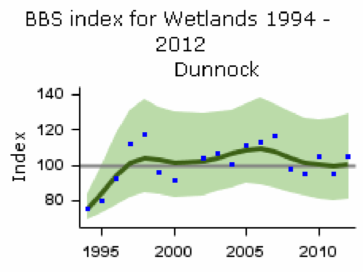
Habitat graph



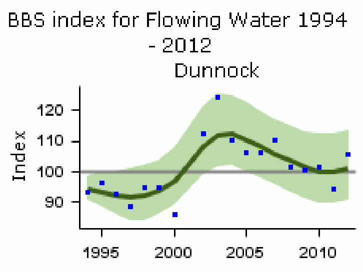
Habitat graph



Habitat graph

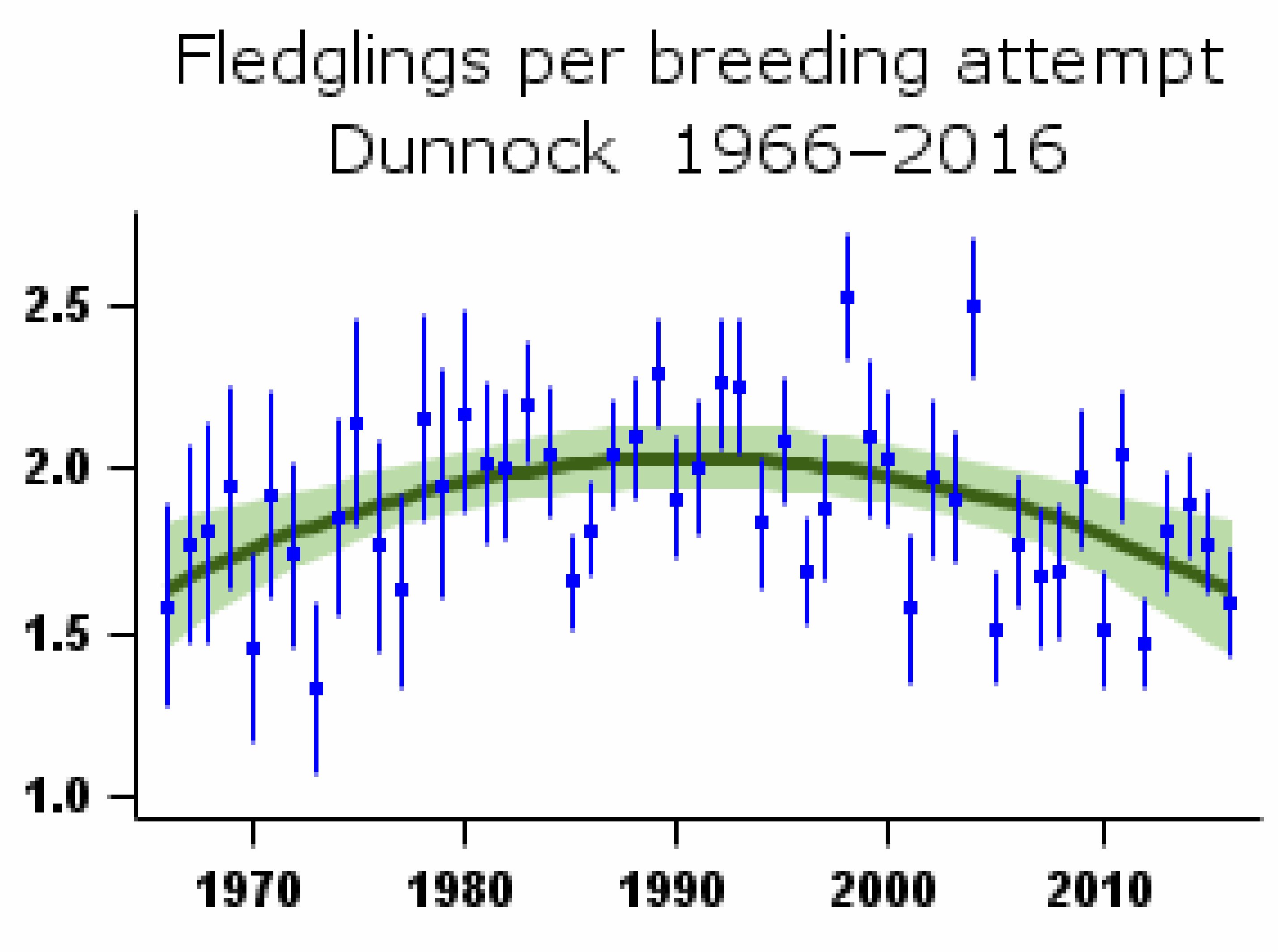


Habitat graph

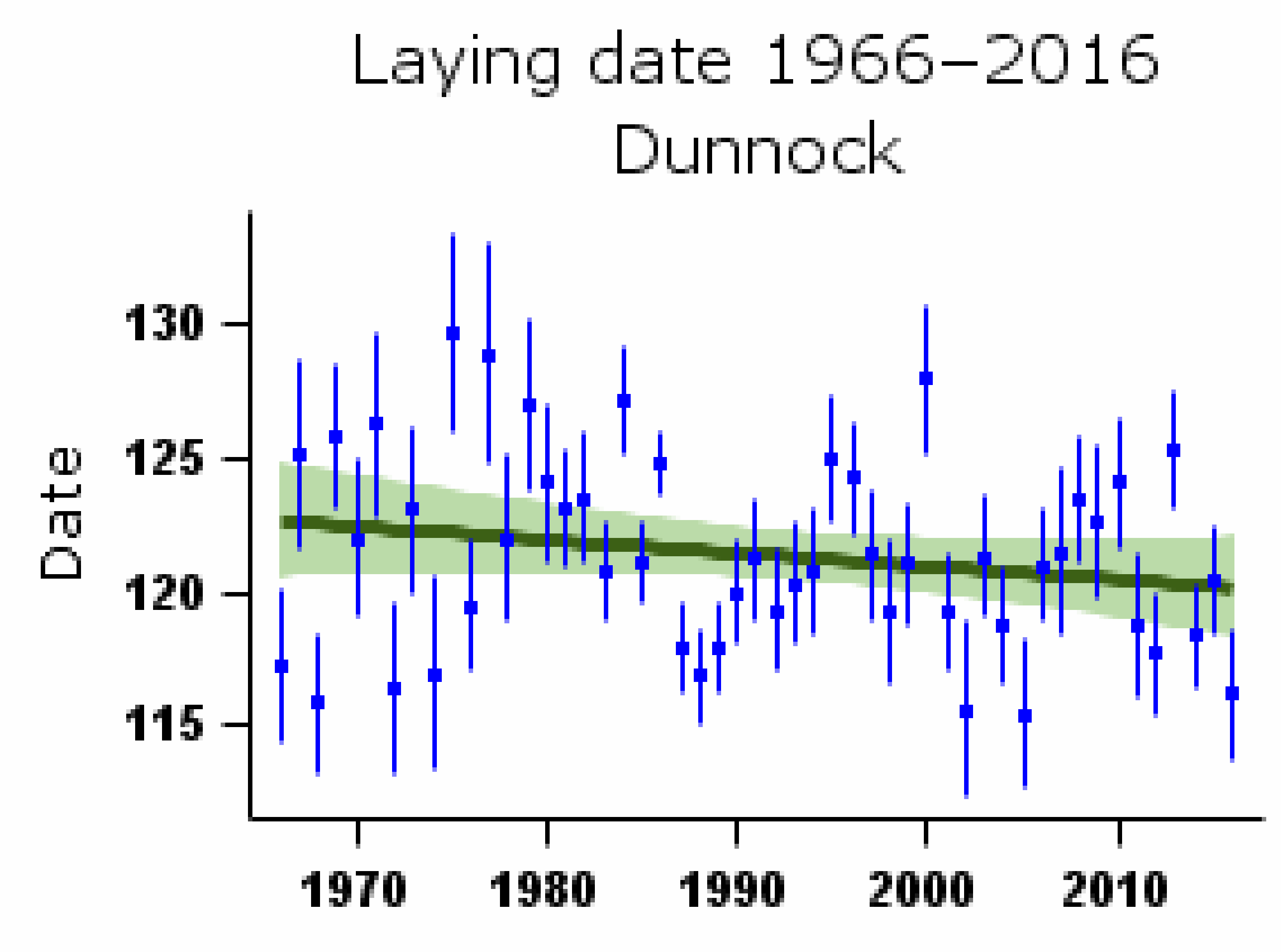


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

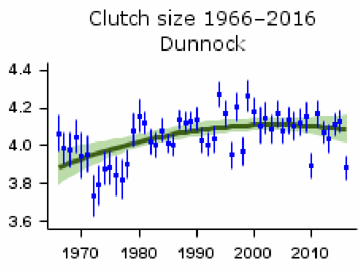


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

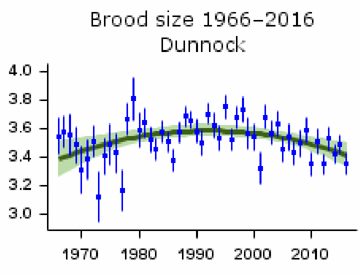
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	125	Curvilinear	1.66 fledglings	1.66 fledglings	-0.5%		
Clutch size	48	1967-2015	115	Curvilinear	3.90 eggs	4.10 eggs	5.0%		
Brood size	48	1967-2015	128	Curvilinear	3.40 chicks	3.43 chicks	0.8%		
Nest failure rate at egg stage	48	1967-2015	162	Curvilinear	2.59% nests/day	2.64% nests/day	1.9%		
Nest failure rate at chick stage	48	1967-2015	130	None					
Laying date	48	1967-2015	89	None			0 days		
Juvenile to Adult ratio (CES)	31	1984-2015	103	Smoothed trend	109 Index value	100 Index value	-8%		
Juvenile to Adult ratio (CES)	25	1990-2015	112	Smoothed trend	112 Index value	100 Index value	-11%		
Juvenile to Adult ratio (CES)	10	2005-2015	109	Smoothed trend	96 Index value	100 Index value	4%		
Juvenile to Adult ratio (CES)	5	2010-2015	112	Smoothed trend	112 Index value	100 Index value	-11%		

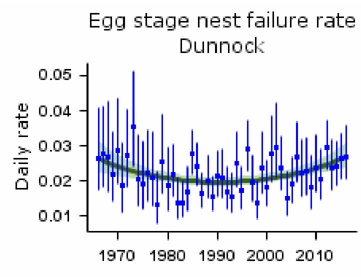
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



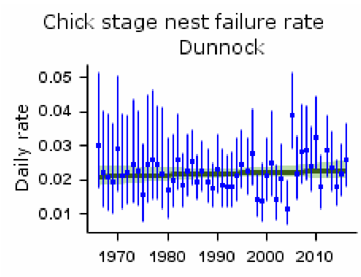
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



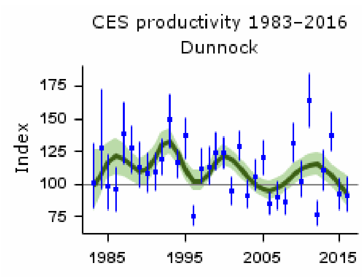
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



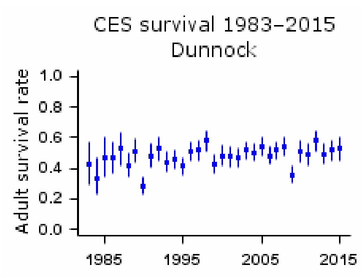
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Causes of change

The decline of the species between the mid 1970s and mid 1980s is likely to be due to several factors, but strong experimental evidence in farmland areas suggests that this may be linked to reduced winter food availability. This reflects similar results found for other species that suffer a 'hungry gap' in February and March.

Change factor	Primary driver	Secondary driver
Demographic	Overwinter survival	
Ecological	Agricultural intensification	Changes in woodland

Further information on causes of change

The cause of the decline between the mid 1970s and mid 1980s is unknown, but a recently constructed integrated population model suggests that variation in adult survival plays a key role in determining annual population change (Robinson et al. 2014). It is possible that decline was limited to the farmland and woodland habitats that were covered by CBC, prior to the inception of BBS in 1994.

Feeding experiments have revealed that the use Dunnocks make of farmland feeding stations peaks after mid February, as natural food becomes depleted, suggesting that food availability on farmland is a limiting factor in the population (Siriwardena et al. 2007, 2008). This reflects similar results found for other farmland birds that experience a 'hungry gap' in February and March (Siriwardena et al. 2008). Evidence from the study also suggested that breeding abundance was stable where the use of provided food was high, although this may be a density-dependent result as high use occurred at high abundance (Siriwardena et al. 2007).

The CBC trend in woodland plots suggested that the species had declined by 58% between 1966 and 2000 (Fuller et al. 2005). The most likely cause for this decline is loss of understorey due to canopy closure, in the absence of forest management and especially to increasing browsing pressure from deer (Gill & Fuller 2007). In Bradfield Woods, Suffolk, Dunnocks responded negatively to browsing pressure (Holt et al. 2011). Shrub density has been identified as the most important predictor of Dunnock abundance at this site (Fuller & Henderson 1992).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

House Sparrow

Passer domesticus

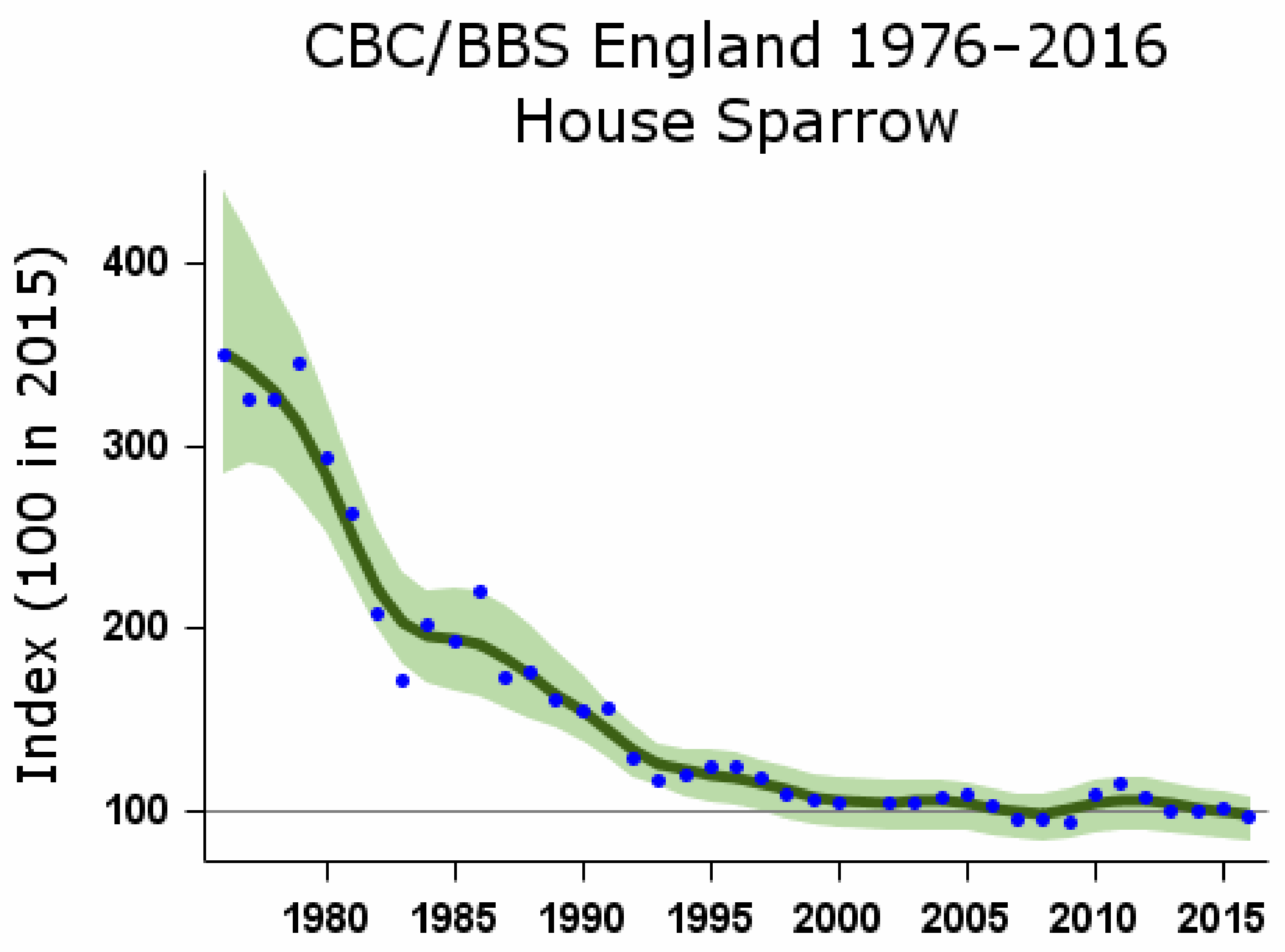
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	5.3 (4.8-5.8) million pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Human habitats
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

CBC sample sizes did not allow monitoring of House Sparrows until 1976; previously, there had been many farmland plots with high populations that CBC volunteers could not properly quantify without better access to farm buildings and housing. CBC/BBS data indicate a rapid decline in abundance over the last 25 years, as does the BTO's Garden Bird Feeding Survey (Siriwardena et al. 2002, Robinson et al. 2005b). These results are supported by many other studies and anecdotal reports, and have generated considerable conservation concern (see Summers-Smith 2003). The overall national decline since the 1970s masks much heterogeneity by region and habitat, and population processes may be relatively fine-grained: overall, populations in rural areas had declined by 47% by 2000, and those in urban and suburban areas by about 60% (CBC and GBFS data: Robinson et al. 2005b). The BBS PECBMS 2016a). The European status of this species is no longer considered 'secure' (BirdLife International 2004).



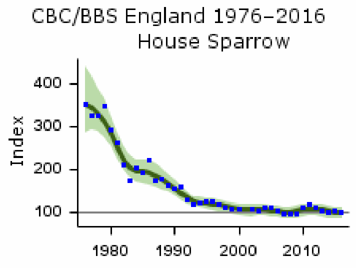
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

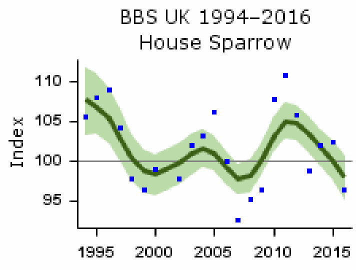
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	38	1977-2015	779	-71	-80	-62	>50	
	25	1990-2015	1163	-35	-51	-22	>25	
	10	2005-2015	1612	-4	-8	0		
	5	2010-2015	1632	-4	-7	-1		
BBS UK	20	1995-2015	1696	-6	-12	-2		
	10	2005-2015	1993	-1	-4	3		
	5	2010-2015	2039	-3	-6	0		
BBS England	20	1995-2015	1382	-18	-23	-13		
	10	2005-2015	1612	-4	-7	0		
	5	2010-2015	1632	-4	-7	-1		
BBS Scotland	20	1995-2015	108	50	22	79		
	10	2005-2015	134	4	-13	23		
	5	2010-2015	148	3	-6	16		
BBS Wales	20	1995-2015	135	79	50	115		
	10	2005-2015	160	7	-7	22		
	5	2010-2015	170	-7	-16	5		
BBS N.Ireland	20	1995-2015	57	54	-7	135		
	10	2005-2015	69	15	-6	39		
	5	2010-2015	71	5	-10	25		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

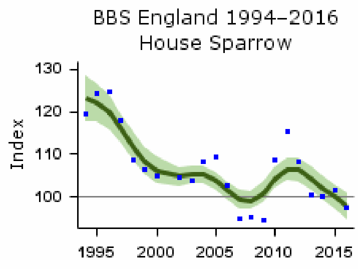
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



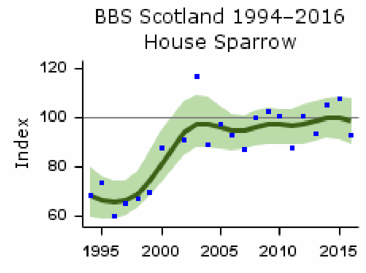
CBC/BBS England graph



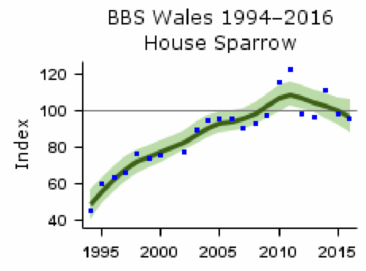
BBS UK graph



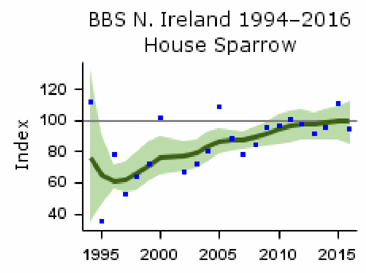
BBS England graph



BBS Scotland graph

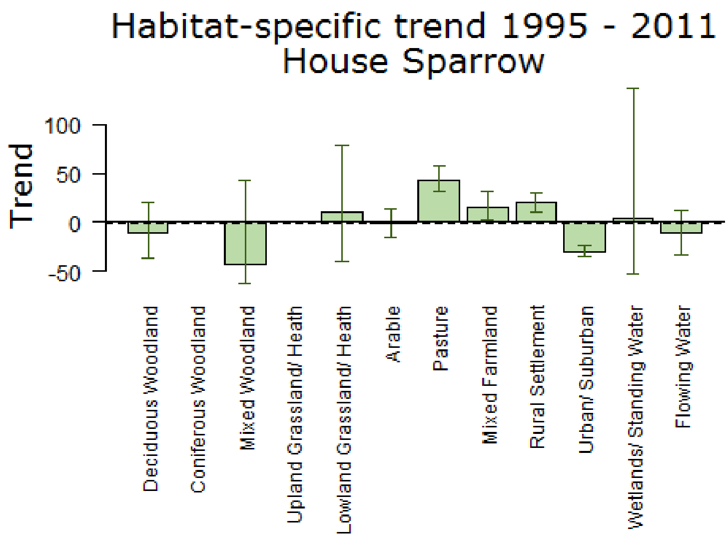


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

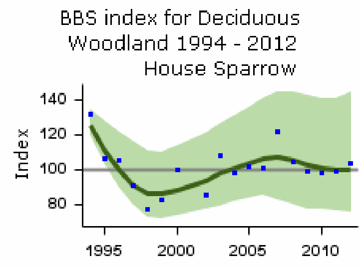
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

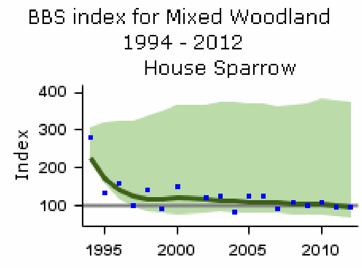
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	200	-10	-36	21

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Mixed Woodland	16	1995-2011	63	42	62	43
Lowland Grassland/ Heath	16	1995-2011	33	11	-40	78
Arable	16	1995-2011	321	-1	-15	13
Pasture	16	1995-2011	754	43	32	57
Mixed Farmland	16	1995-2011	360	16	3	31
Rural Settlement	16	1995-2011	661	21	11	30
Urban/ Suburban	16	1995-2011	414	-30	-35	-23
Wetlands/ Standing Water	16	1995-2011	37	4	-52	137
Flowing Water	16	1995-2011	180	-11	-34	12

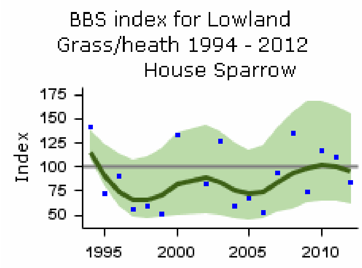
Further information on habitat-specific trends, please follow link here.



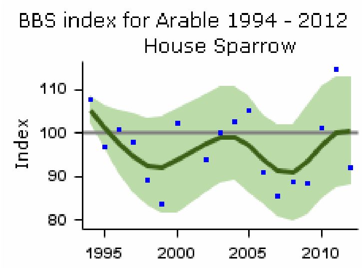
Habitat graph



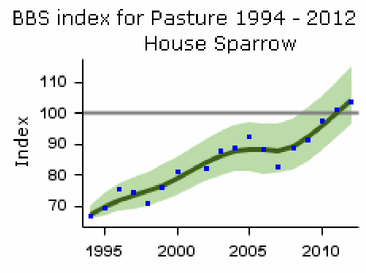
Habitat graph



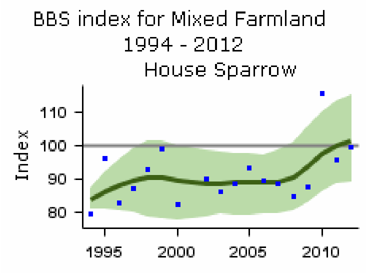
Habitat graph



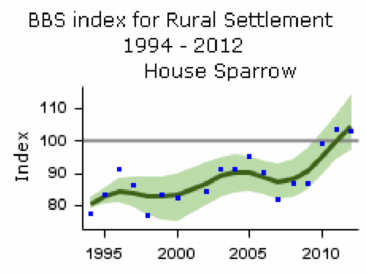
Habitat graph



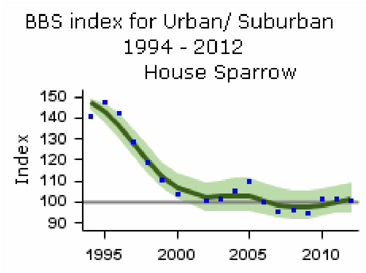
Habitat graph



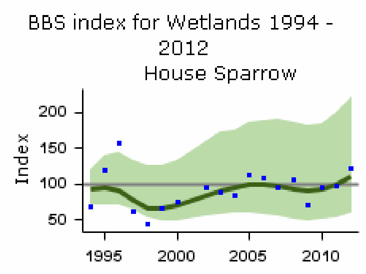
Habitat graph



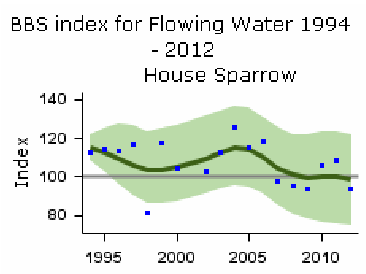
Habitat graph



Habitat graph

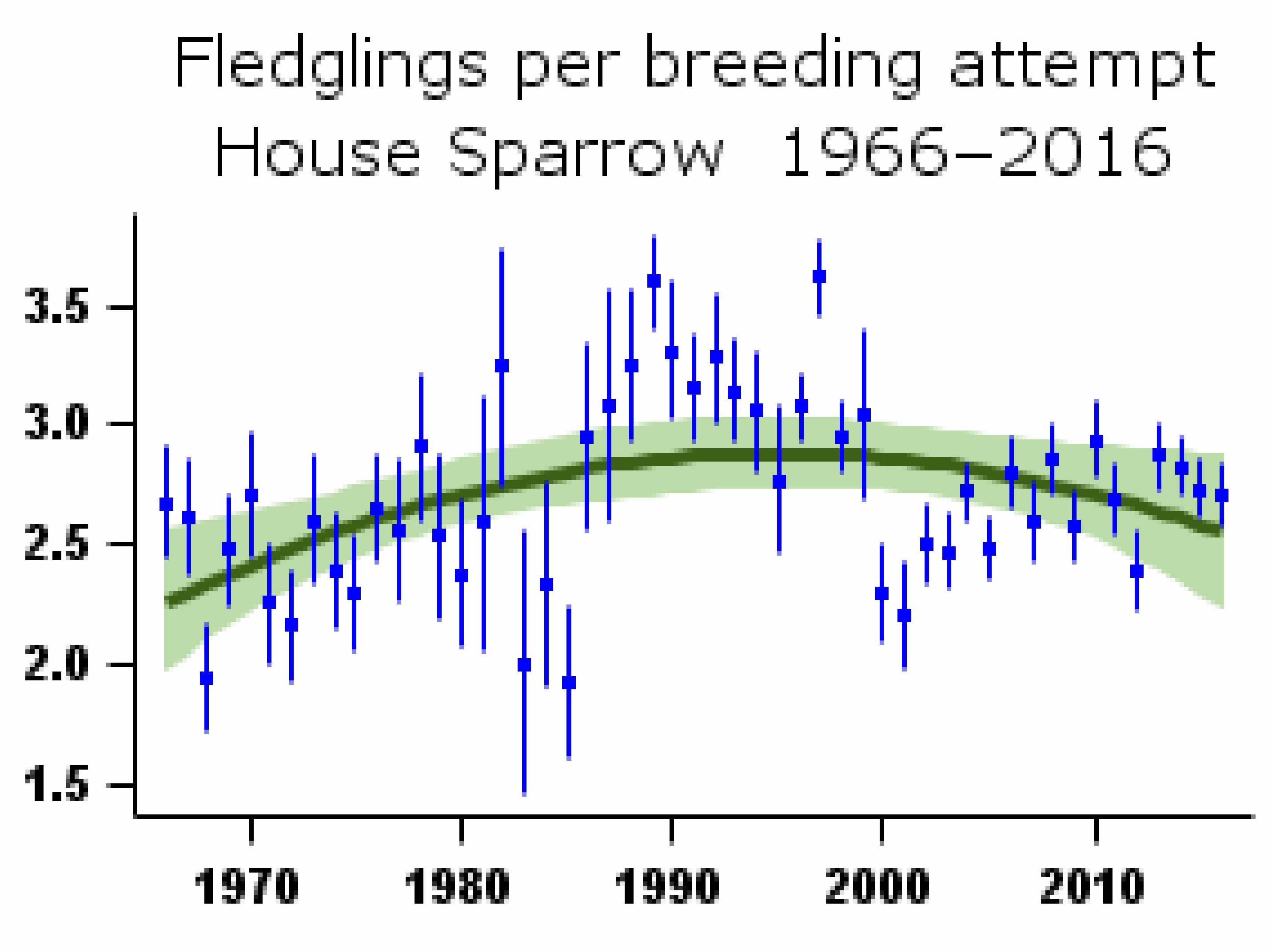


Habitat graph

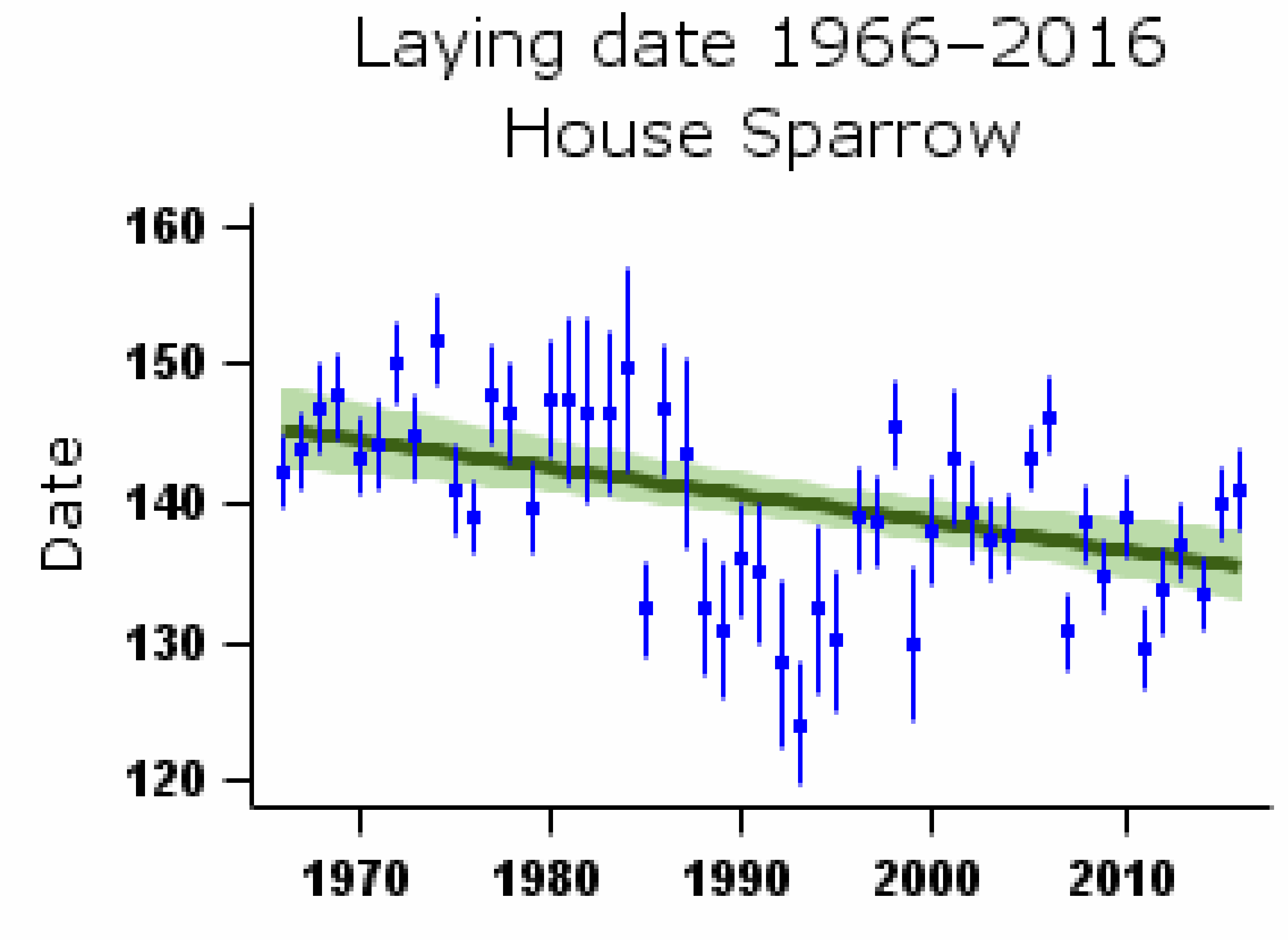


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

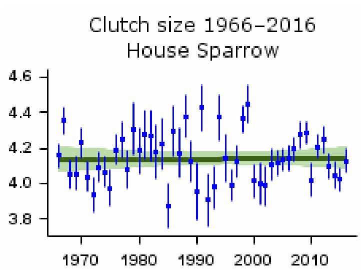


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

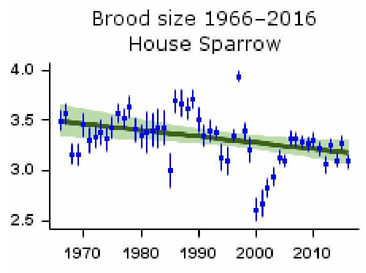
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	107	Curvilinear	2.31 fledglings	2.59 fledglings	12.3%		
Clutch size	48	1967-2015	87	None					
Brood size	48	1967-2015	164	Linear decline	3.48 chicks	3.18 chicks	-8.7%		
Nest failure rate at egg stage	48	1967-2015	121	Linear decline	1.10% nests/day	0.36% nests/day	-67.3%		
Nest failure rate at chick stage	48	1967-2015	121	Curvilinear	1.61% nests/day	0.85% nests/day	-47.2%		
Laying date	48	1967-2015	67	Linear decline	May 25	May 16	-9 days		

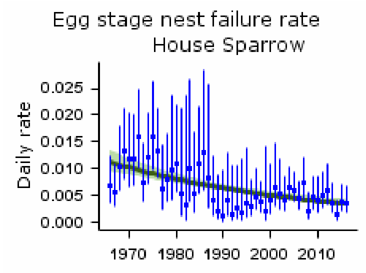
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



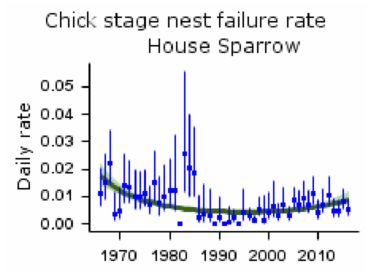
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



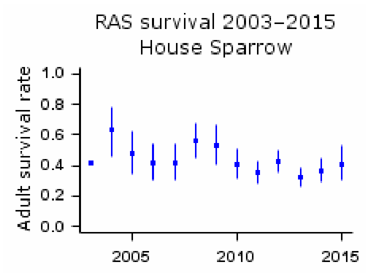
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

There is evidence that changes in survival rates due to lack of food resources, because of agricultural intensification, are the main driver of House Sparrow declines in farmland, although changes in breeding performance may also have played a role. Different processes have affected House Sparrows in towns, where breeding performance could be the most important driver of declines, although the evidence for the ecological causes is less clear.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival	Decreased breeding performance
Ecological	Agricultural intensification	

Further information on causes of change

A temporary drop in first-year survival coincided with the period of steepest decline, but changes in breeding performance, especially reduced nest failure rates at the chick stage, appear to have driven a levelling-off in the long-term population trend (Freeman & Crick 2002). Over the period since 1968, brood size has decreased (see above) but there has also been a major decrease in nest failure rates at the egg and chick stages, so the number of fledglings per breeding attempt has shown a net increase. Further evidence for the role of changing survival in House Sparrow declines has been provided by Hole et al. (2002), who found no evidence of significant differences in most breeding-ecology parameters in declining and stable populations in a farm-scale comparison, while Siriwardena et al. (1999) found that national survival rates were lower during the period of decline in the CBC index. That survival, especially of adult birds, appeared to make the largest contribution to annual population change was also found by Robinson et al. (2014). Crick & Siriwardena (2002), using NRS data, showed that breeding performance per nesting attempt had increased and was positively correlated with population growth rate in the wider countryside (although there was no such correlation in gardens). Analysis of Garden BirdWatch data found higher seasonal peak counts, however, relative to pre-breeding numbers, in the north and west of Britain than in the east and south where population decline is strongest, thus indicating that breeding productivity is influencing population trends (Morrison et al. 2014).

There appear to be different processes affecting urban and agricultural populations. On farmland, changes in farming practices due to intensification of agriculture and the tidying of farmyards have reduced the seed available to farmland populations of House Sparrows during winter, which has resulted in a reduction in survival rates (Siriwardena et al. 1999, Chamberlain et al. 2007, Hole 2001), specifically of first-year birds (Cricket al. 2002). This is supported by a positive effect of supplementary seed in winter on farmland House Sparrow population trends in a landscape-scale experiment in East Anglia (Siriwardena et al. 2007). House Sparrows have probably been deleteriously affected by the decrease in the amount of grain spilt around farm buildings and during the process of harvesting since the 1970s (O'Connor & Shrubb 1986). The move towards autumn-sowing of cereals has meant that cereal stubble has become much rarer, reducing food resources over winter, although Robinson et al. (2001) found no influence of spring-sown cereal on House Sparrow abundance in predominantly pastoral farmland. Conversely, breeding performance is worse where there is more spring cereal (Crick & Siriwardena 2002), although this may reflect geographical associations with areas where spring sowing remains widespread in the UK (the west and north) rather than direct effects of cropping.

Recent declines have been particularly severe in urban areas (Robinson et al. 2005b, Chamberlain et al. 2007). Increased predation by cats and Sparrowhawks, lack of nest sites, loss of food supplies, pollution and disease have all been cited as factors possibly depressing populations in towns (Crick et al. 2002), but supporting evidence for these is mixed. Within urban areas, Shaw et al. (2008) reviewed available evidence and hypothesised that House Sparrows have disappeared from more affluent areas, where changes to habitat structure such as planting of ornamental shrubs and increased demand for off-street parking is likely to reduce the amount of habitat available to House Sparrows and influenced foraging and predation risk. The conversion of private gardens to continuous housing has also had a negative effect on House Sparrow abundance (Chamberlain et al. 2007). Vincent (2005) found that annual productivity among suburban and rural human habitation in Leicestershire was lower than that measured on farmland House Sparrows in Oxfordshire, the main cause of the difference being starvation of chicks. Low body masses at fledging, and consequently low post-fledging survival, were also recorded in Leicestershire. Although only a two-year study, Peach et al. (2008) measured reproductive success in a declining House Sparrow population along an urbanisation gradient in Leicester and also found that a year in which reproductive success was too low to sustain the population was characterised by lower chick survival and body mass at fledging (a predictor of post-fledging survival). However, there is no direct evidence that invertebrate food supplies have declined in these areas and variation in survival has not been investigated. Supplying mealworms for garden-nesting House Sparrows substantially improved breeding success but did not increase nesting density (Peach et al. 2014, 2015).

Negative correlations between indices of Sparrowhawk presence during its post-organochlorine increase and House Sparrow abundance from the Garden Bird Feeding Survey have been interpreted as evidence that increasing predation rates are depressing House Sparrow populations (Bell et al. 2010). However, more sophisticated analyses of large-scale and extensive national monitoring data provide no evidence that House Sparrow population declines were linked to increases in Sparrowhawks (Newson et al. 2010b).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Tree Sparrow

Passer montanus

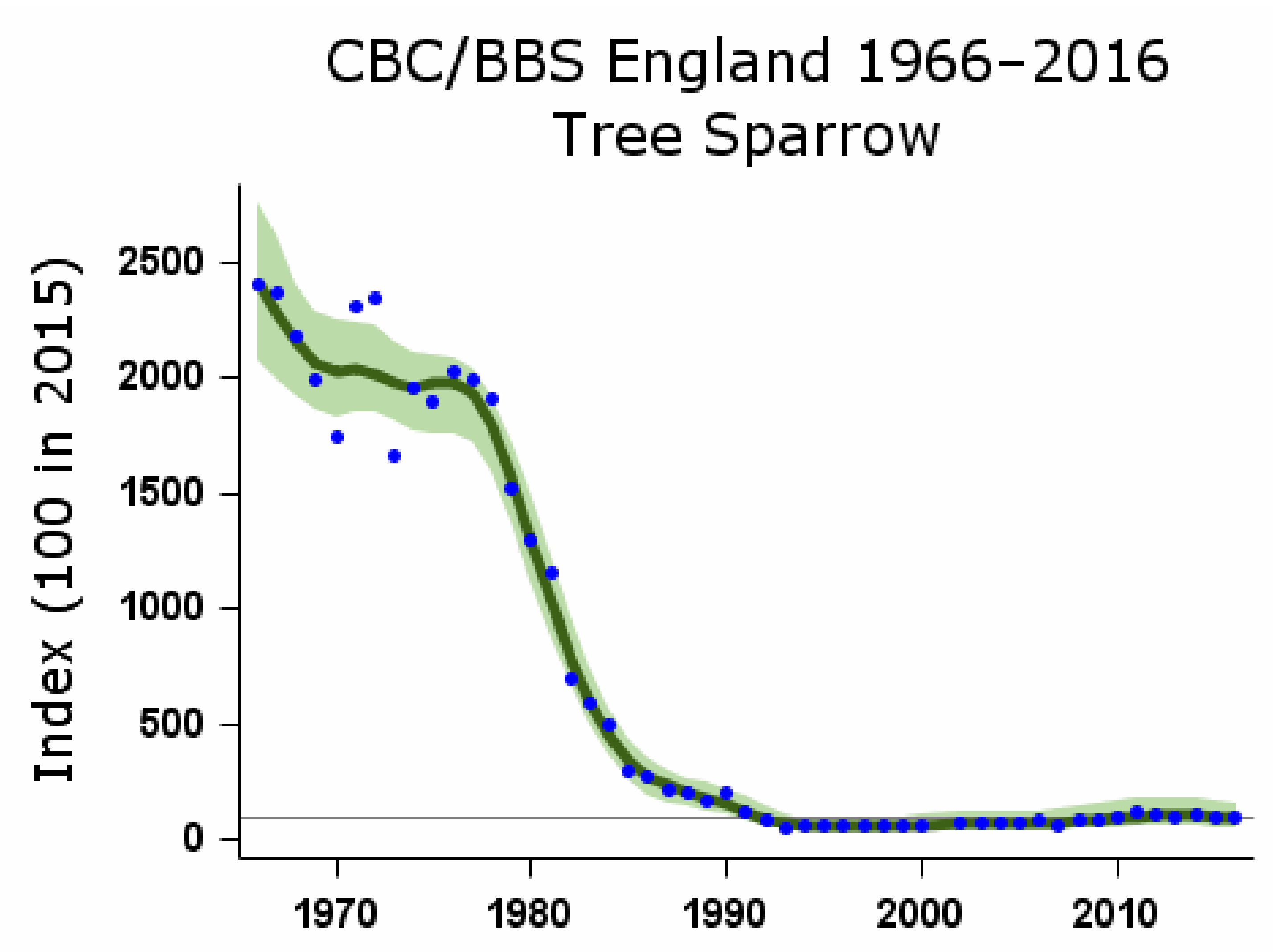
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	200,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Cavity nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

Tree Sparrow abundance nose-dived spectacularly in the UK between the late 1970s and the early 1990s. BBS data indicate a significant increase since 1994, but it should be remembered that, for every Tree Sparrow today there were perhaps around 20 in the 1970s, and any recovery therefore has a very long way to go. Clear range contractions occurred between the first two breeding atlas periods (Gibbons et al. 1993), and have accelerated subsequently: Tree Sparrows have now withdrawn completely from some southern and western regions of Britain, but conversely have spread in Northern Ireland (Balmer et al. 2013). Following declines across western and northwestern Europe during the 1990s, the European status of this species is no longer considered 'secure' (BirdLife International 2004). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



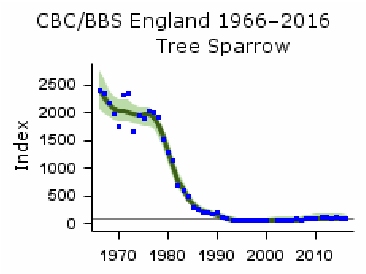
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

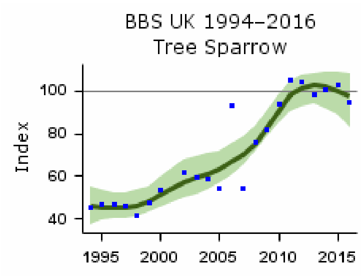
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	103	-96	-98	-91	>50	
	25	1990-2015	132	-33	-67	4		Small CBC sample
	10	2005-2015	181	41	15	68		
	5	2010-2015	198	6	-9	19		
BBS UK	20	1995-2015	195	119	71	167		
	10	2005-2015	240	57	24	89		
	5	2010-2015	268	10	-7	23		
BBS England	20	1995-2015	152	69	39	119		
	10	2005-2015	181	41	18	69		
	5	2010-2015	198	6	-9	22		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

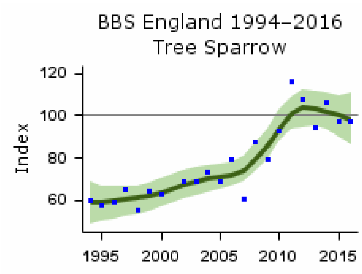
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



CBC/BBS England graph

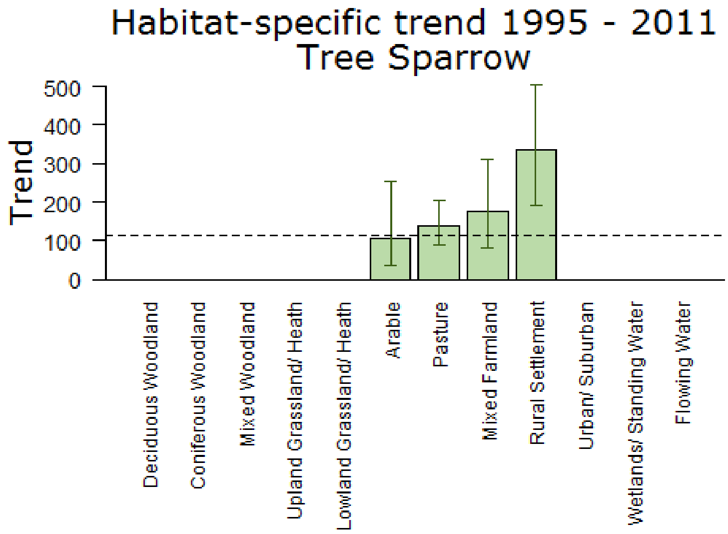


BBS UK graph



BBS England graph

Population trends by habitat



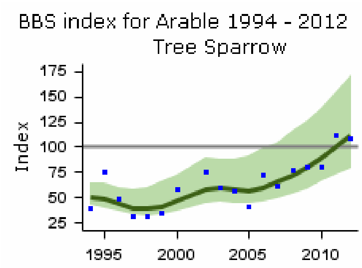
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

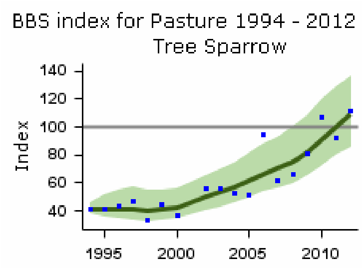
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Arable	16	1995-2011	55	106	35	254
Pasture	16	1995-2011	72	141	88	206
Mixed Farmland	16	1995-2011	51	177	82	313
Rural Settlement	16	1995-2011	48	336	191	504

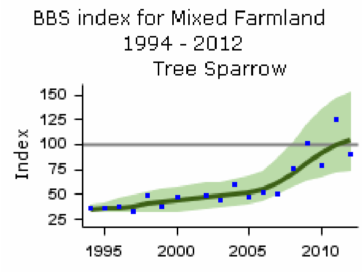
Further information on habitat-specific trends, please follow link here.



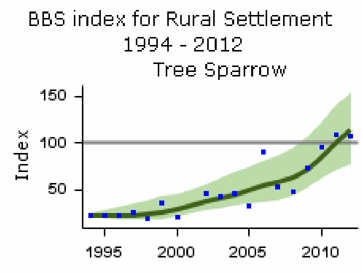
Habitat graph



Habitat graph

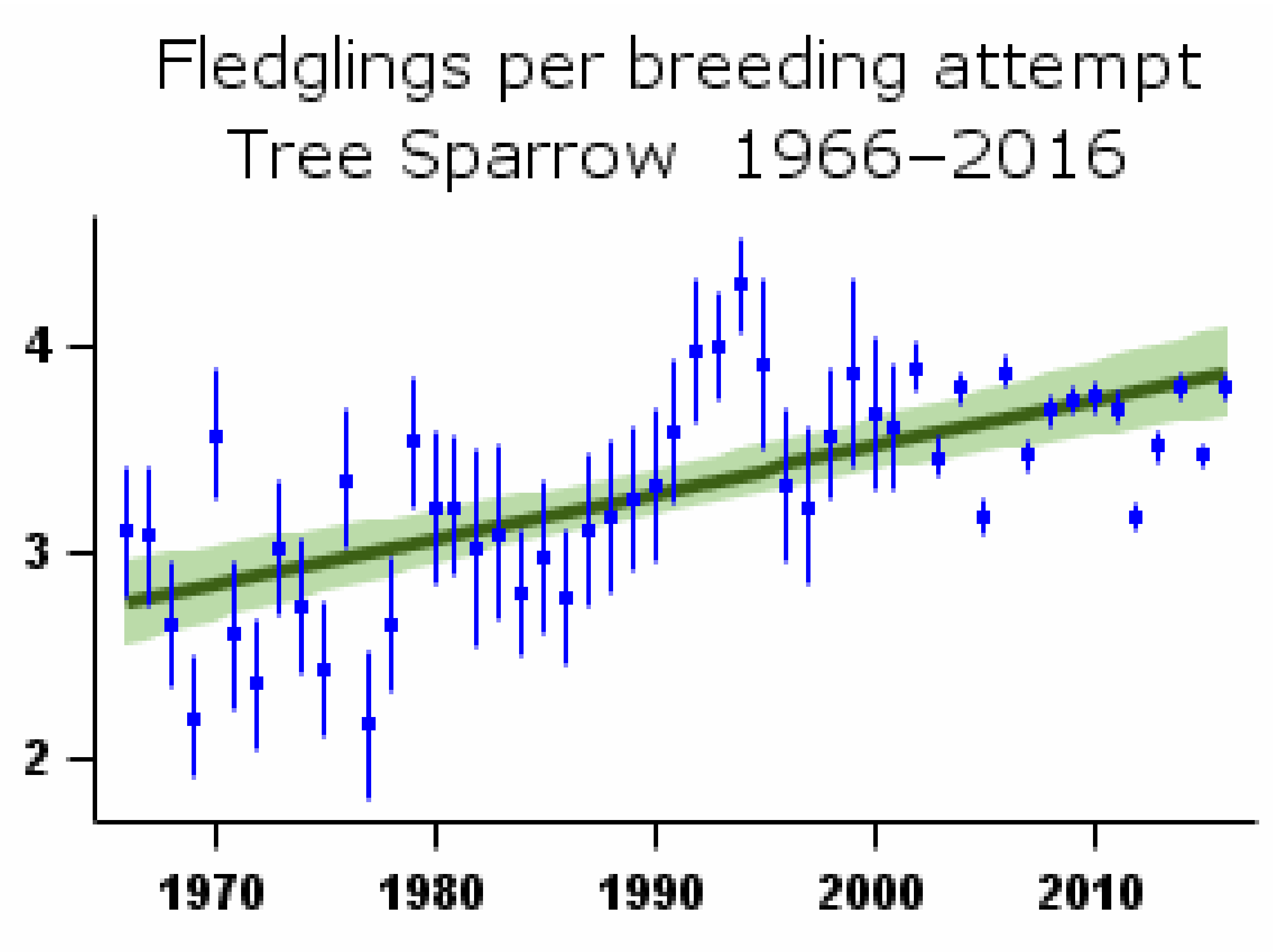


Habitat graph

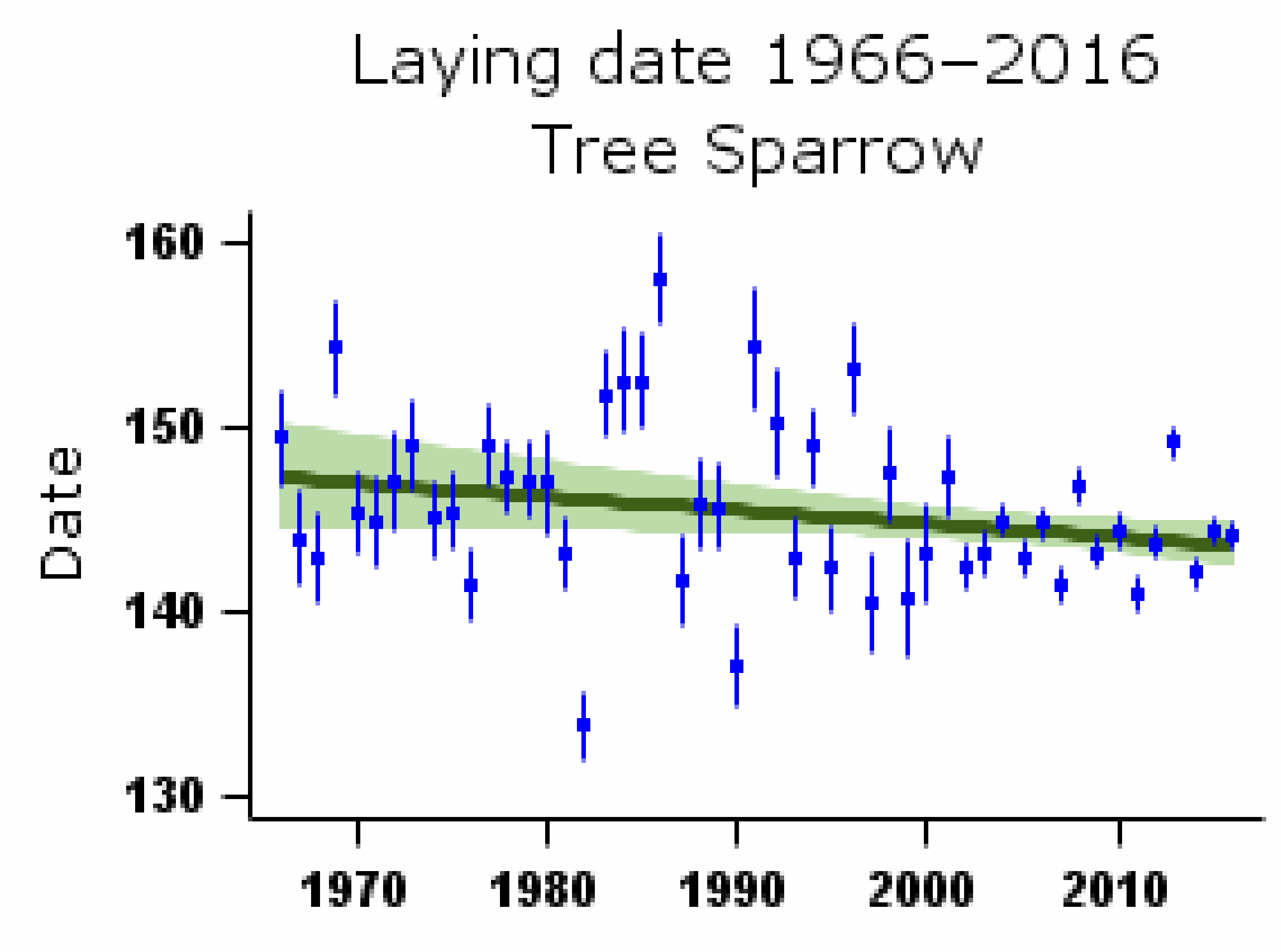


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

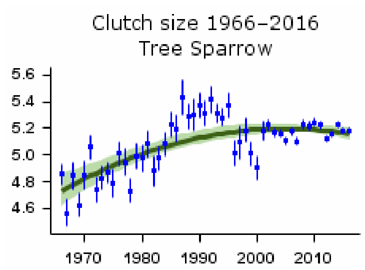


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

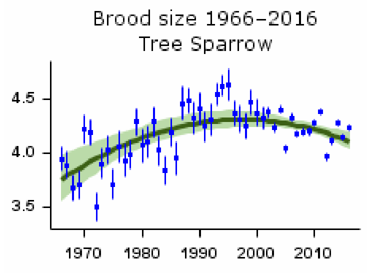
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	324	Linear increase	2.77 fledglings	3.84 fledglings	38.6%		
Clutch size	48	1967-2015	357	Curvilinear	4.75 eggs	5.16 eggs	8.6%		
Brood size	48	1967-2015	468	Curvilinear	3.79 chicks	4.13 chicks	9.0%		
Nest failure rate at egg stage	48	1967-2015	466	Linear decline	0.82% nests/day	0.32% nests/day	-61.0%		
Nest failure rate at chick stage	48	1967-2015	324	Linear decline	1.41% nests/day	0.58% nests/day	-58.9%		
Laying date	48	1967-2015	357	Linear decline	May 27	May 24	-3 days		

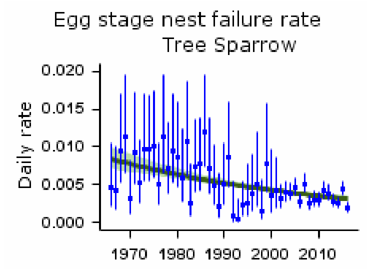
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



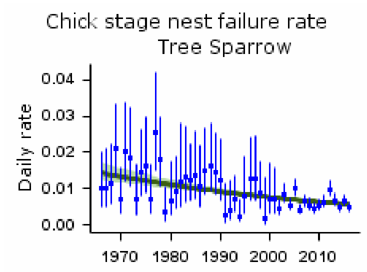
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The mechanisms underlying the decline in this species are largely unknown, although demographic trends suggest that factors operating during the breeding season are not the main driver.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival?	
Ecological	Agricultural intensification	

Further information on causes of change

The mechanisms underlying the decline in this species are largely unknown. The number of fledglings per breeding attempt has improved substantially as population sizes have decreased (see above), suggesting that decreases in productivity were not responsible for the decline. This has been driven by declines in daily failure rate at both the nest and chick stages and increases in clutch and brood sizes. It is thus more likely that survival has been the critical demographic measure, although ring-recovery analyses have produced equivocal results, perhaps because of small sample sizes (Siriwardena et al. 1998, 2000b).

Components of agricultural intensification, such as reductions in winter stubble, have been implicated in the decline, although direct evidence supporting such ideas is largely incidental. Tree Sparrows aggregate in areas where seed food is available during the winter and they have declined at the same time as other farmland seed-eaters (Siriwardena et al. 1998), providing circumstantial evidence for shortage of food. In winter in Scotland (Hancock & Wilson 2003), the highest densities of Tree Sparrows were recorded in cereal stubble fields (undersown with grass) and weedy brassica fodder crops. These habitats remain relatively seed-rich but have declined in area in the UK (Fuller 2000, Hancock & Wilson 2003). Field & Anderson (2004) also state that anecdotal evidence suggests that many Tree Sparrow colonies are strongly associated with winter seed food sources, and provision of new seed sources is frequently associated with the establishment of new breeding colonies. Although Siriwardena et al. (2007) did not find a significant positive relationship between winter food supply and breeding population trajectory in areas provisioned by RSPB Bird Aid, this may be due to the fact that the BBS trends for this species are increasing; therefore winter food may not currently be limiting, as the remaining populations are in small remnants of suitable habitat and many are subject to active conservation action (e.g. provision of nest boxes).

During the breeding season, Field & Anderson (2004) found that wetland-edge habitats played a key role in providing invertebrate prey to allow successful chick rearing throughout the long breeding season and suggest that it is possible that large areas of UK farmland that were formerly occupied no longer provide these invertebrate resources, due to the effects of intensification in the late 20th century. In a study in Wiltshire, McHugh et al. (2016a) examined faecal sacs from nestlings and found a higher proportion of seed in their diet in areas with wild bird seed cover planted to provide seed resources in winter. They surmised that this indicated a shortage of insects, which are a more suitable nestling food. In this study, colony size increased but breeding success decreased in areas with wild bird seed cover (McHugh et al. 2017)

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Yellow Wagtail

Motacilla flava

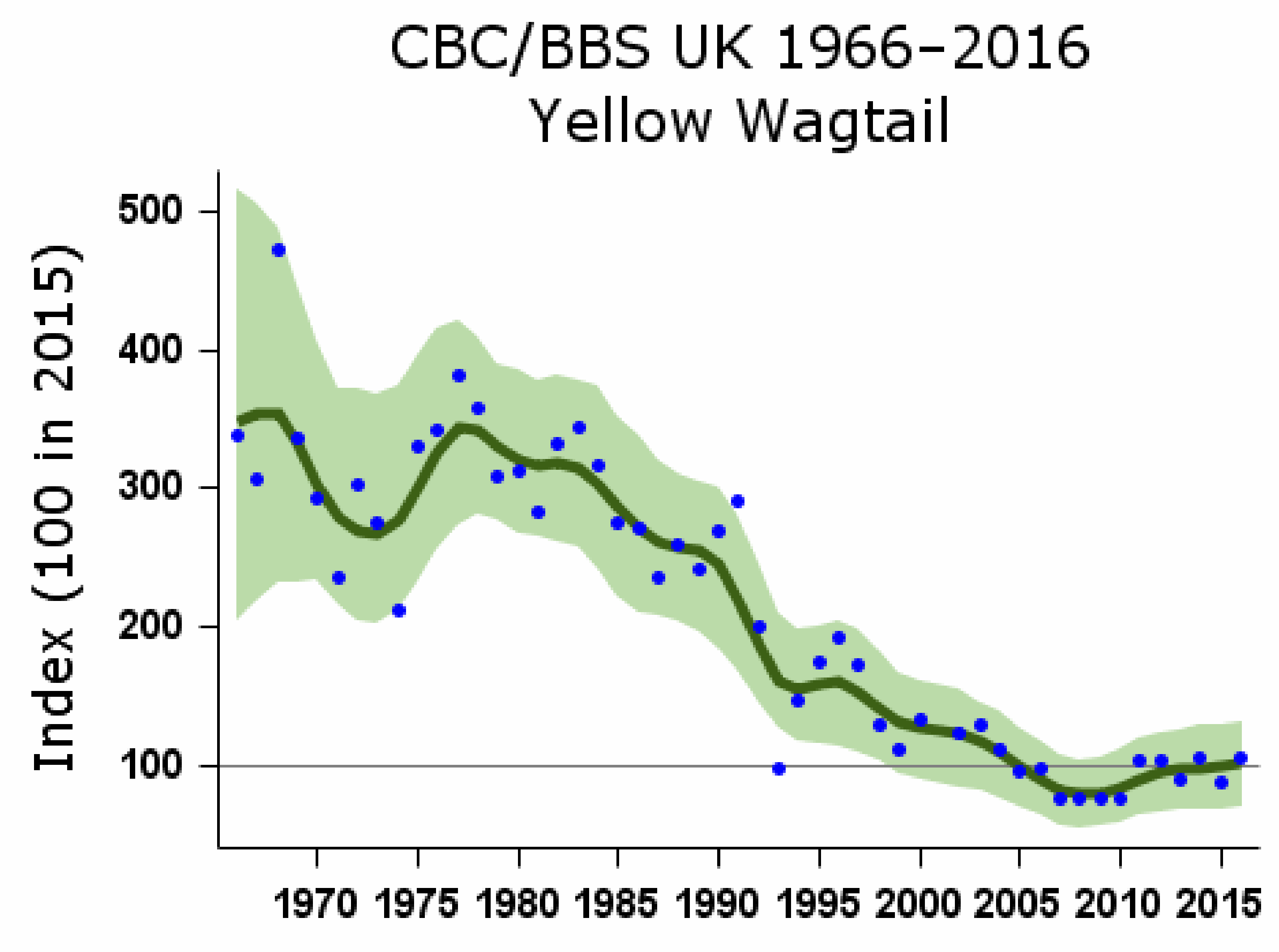
Key facts

Conservation listings:	Global: red (breeding population decline); at race level, flavissima red, flava and thunbergi amber; current RBBP species (race flava only)
Long-term trend:	UK, England: rapid decline
Population size:	15,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Britain holds almost the entire world population of the distinctive race flavissima, so population changes in the UK are of global conservation significance. Yellow Wagtails have been in rapid decline since the early 1980s, according to CBC/BBS and especially WBS/WBBS and, after a shift from the green to the amber list in 2002, the species was moved to the red list in 2009 (Eaton et al. 2009). Gibbons et al. (1993) identified a range contraction towards a core area in central England, concurrent with the early years of decline. Further range contraction has occurred extensively since then, especially in the west and south and in parts of East Anglia (Balmer et al. 2013). The European trend, which comprises several races of the species, has been of moderate decline since 1980 (PECBMS 2016a).



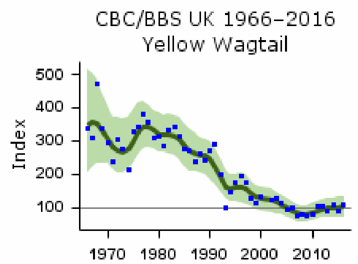
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

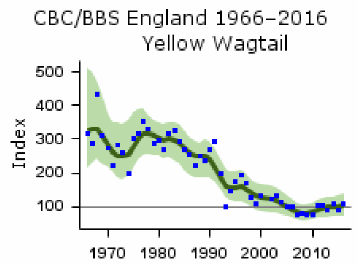
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	89	-72	-86	-38	>50	
	25	1990-2015	142	-59	-71	-44	>50	Small CBC sample
	10	2005-2015	166	0	-15	18		
	5	2010-2015	173	18	7	33		
CBC/BBS England	48	1967-2015	87	-70	-86	-42	>50	
	25	1990-2015	139	-58	-71	-45	>50	Small CBC sample
	10	2005-2015	162	0	-15	15		
	5	2010-2015	169	20	6	32		
WBS/WBBS waterways	40	1975-2015	23	-97	-99	-95	>50	
	25	1990-2015	21	-94	-98	-88	>50	
	10	2005-2015	19	-60	-77	-30	>50	Small sample
	5	2010-2015	15	-53	-72	-5	>50	Small sample
BBS UK	20	1995-2015	162	-42	-50	-31	>25	
	10	2005-2015	166	0	-13	18		
	5	2010-2015	173	18	6	30		
BBS England	20	1995-2015	158	-41	-50	-30	>25	
	10	2005-2015	162	0	-12	19		
	5	2010-2015	169	20	8	32		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

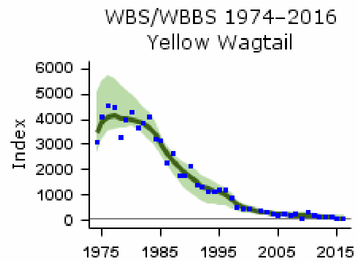
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



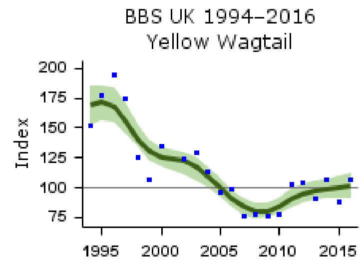
CBC/BBS UK graph



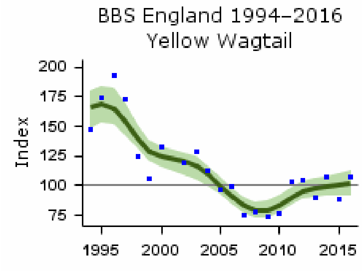
CBC/BBS England graph



WBS/WBBS waterways graph

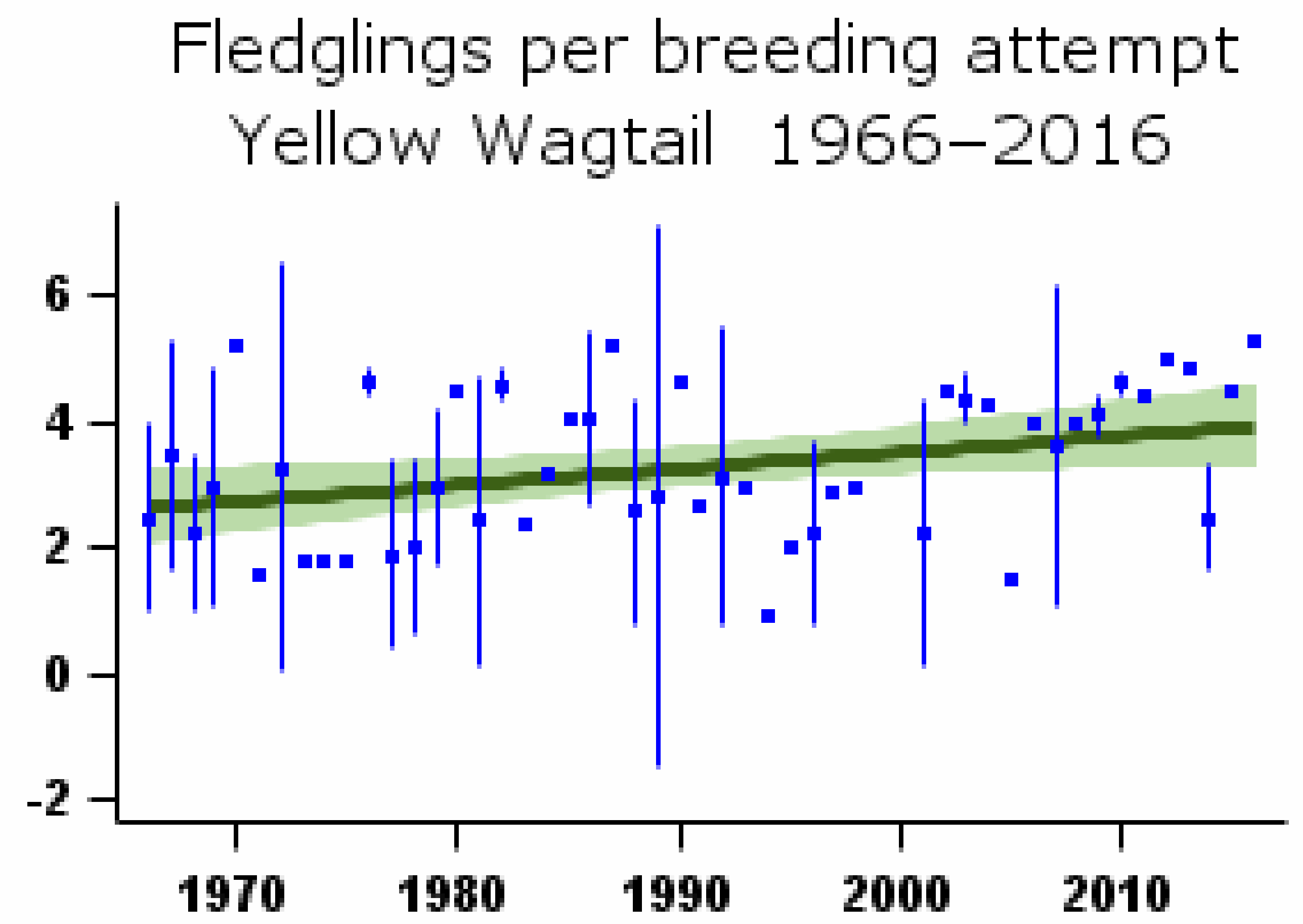


BBS UK graph

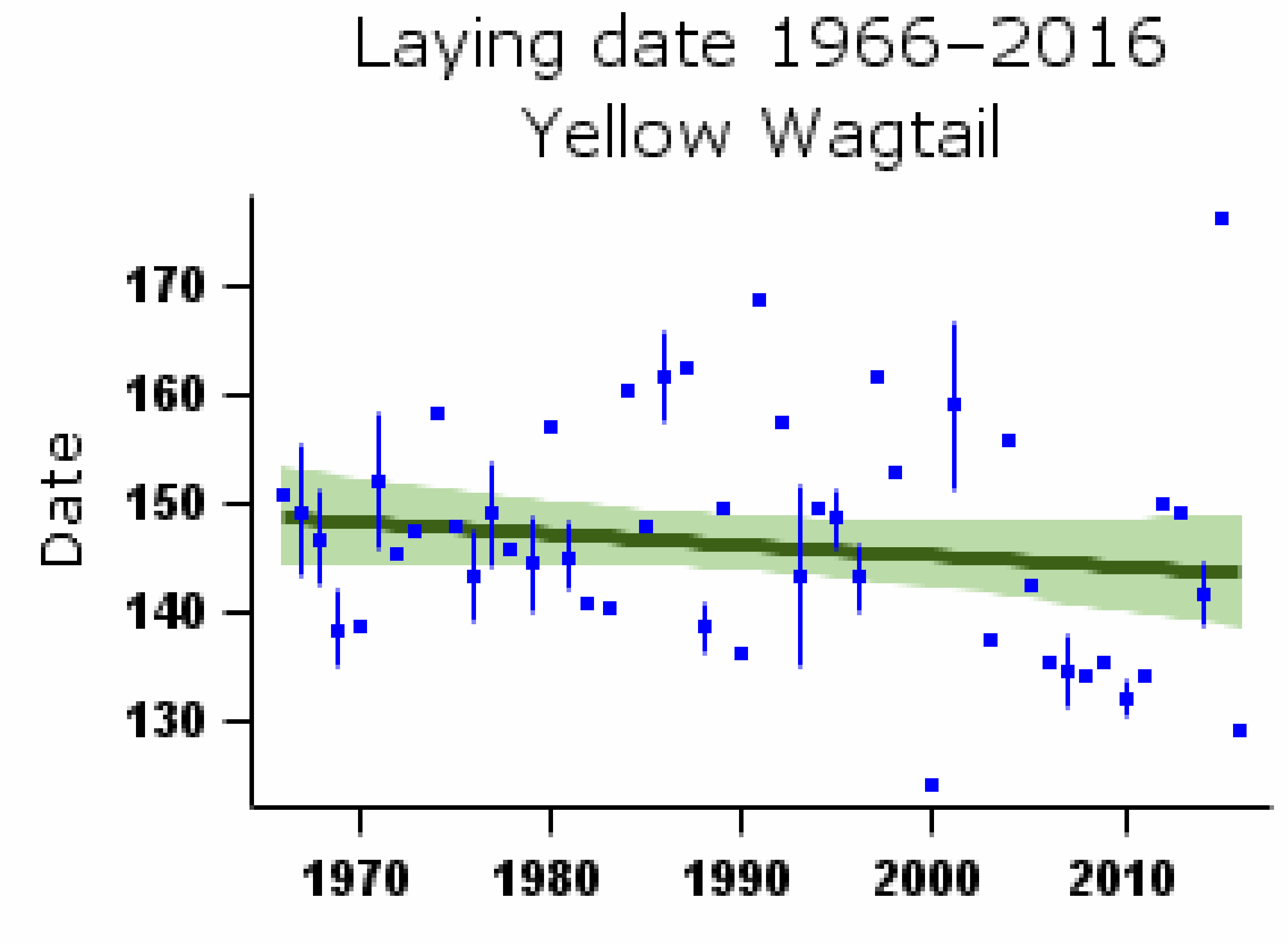


BBS England graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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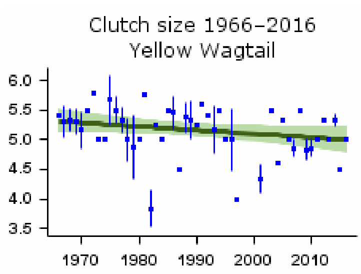
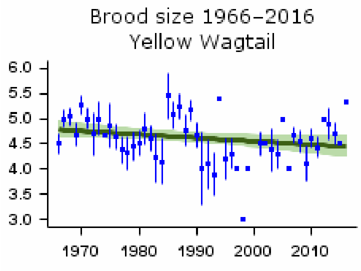
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	6	Linear increase	2.67 fledglings	3.92 fledglings	46.7%		
Clutch size	48	1967-2015	5	None					Small sample
Brood size	48	1967-2015	12	Linear decline	4.78 chicks	4.44 chicks	-6.9%		Small sample
Nest failure rate at egg stage	48	1967-2015	6	None					Small sample
Nest failure rate at chick stage	48	1967-2015	10	Linear decline	2.24% nests/day	0.57% nests/day	-74.6%		Small sample
Laying date	48	1967-2015	6	None			0 days		Small sample

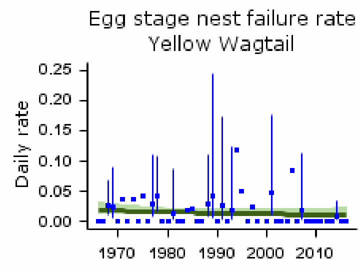
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



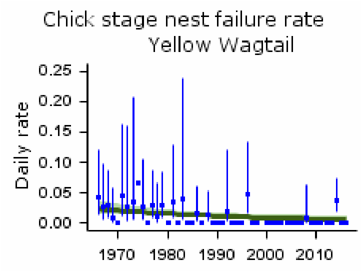
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Agricultural intensification is the ultimate cause of population declines. However, the mechanisms underlying the decline remain unclear.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Agricultural intensification	

Further information on causes of change

Changes in agricultural practices have been proposed as the main reason for declines via their impact on the quality of foraging and breeding habitats. The magnitude of Yellow Wagtail decline appears to vary between habitats, being strongest in wet grassland and marginal upland areas (Henderson et al. 2004, Wilson & Vickery 2005). Chamberlain & Fuller (2000, 2001) found that there were greater range contractions in regions dominated by pastoral agriculture. The decline in pastoral habitats has been proposed to be due to agricultural intensification, specifically farmland drainage, the conversion of pasture to arable land, changes in grazing and cutting regimes, the loss of insects associated with cattle and changes to grassland ecosystems in marginal upland areas (Gibbons et al. 1993, Chamberlain & Fuller 2000, 2001, Flyckt 1999, Vickery et al. 2001, Nelson et al. 2003, Bradbury & Bradter 2004, Henderson et al. 2004). Such changes are likely to have reduced the quality of grasslands as a nesting and foraging habitat. A detailed study on Yellow Wagtail breeding ecology by Bradbury & Bradter (2004) provided good evidence of the species' breeding requirements on grassland. Territories were associated with a greater proportion of bare earth in the sward, the presence of shallow-edged ponds or wet ditches in the field, and a greater probability of a prolonged winter/spring flood, although the relative importance of these and how they impact upon demographic processes was indecipherable.

Data from eastern England suggest a strong avoidance of grassland and preference for spring-sown crops (Mason & Macdonald 2000), though breeding can also be successful in landscapes dominated by winter cereals (Kirby et al. 2012). A detailed autecological study by Gilroy et al. (2008) provides good evidence that, on arable land, soil penetrability had a significant influence on the abundance of Yellow Wagtails, together with crop type and soil type, as these influenced invertebrate capture rates. There was a strong relationship between Yellow Wagtails and soil penetrability, suggesting a potential causative link between soil degradation and population decline (Gilroy et al. 2008). Breeding-season length may also be limited in cereal-dominated areas, as Yellow Wagtails avoid autumn-sown cereals late in the season (Gilroy et al. 2009, 2010). Predation was also considered and it was found that predation rate was closer nearer to tramlines and field-edges (Morris & Gilroy 2008). It is uncertain how important nest predation in tramlines is as a limiting factor for Yellow Wagtail populations but no studies have reported predation as a major driver of population decline for this species. Work carried out by Benton et al. (2002) showed that, in Scotland, arthropod abundance was significantly related to agricultural change and that this was also linked to measures of farmland bird density. Although Yellow Wagtail does not breed on Scottish farmland, it is an obligate insectivore, so this evidence adds support to the hypothesis that reduced food availability due to agricultural change may have contributed to the declines in this species.

Yellow Wagtails are long-distance migrants, moving to wintering grounds in western Africa south of the Sahara. Factors relating to conditions on the wintering grounds may also play a role (Bradbury & Bradter 2004, Heldbjerg & Fox 2008, Stevens et al. 2010) but evidence for this is lacking.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Grey Wagtail

Motacilla cinerea

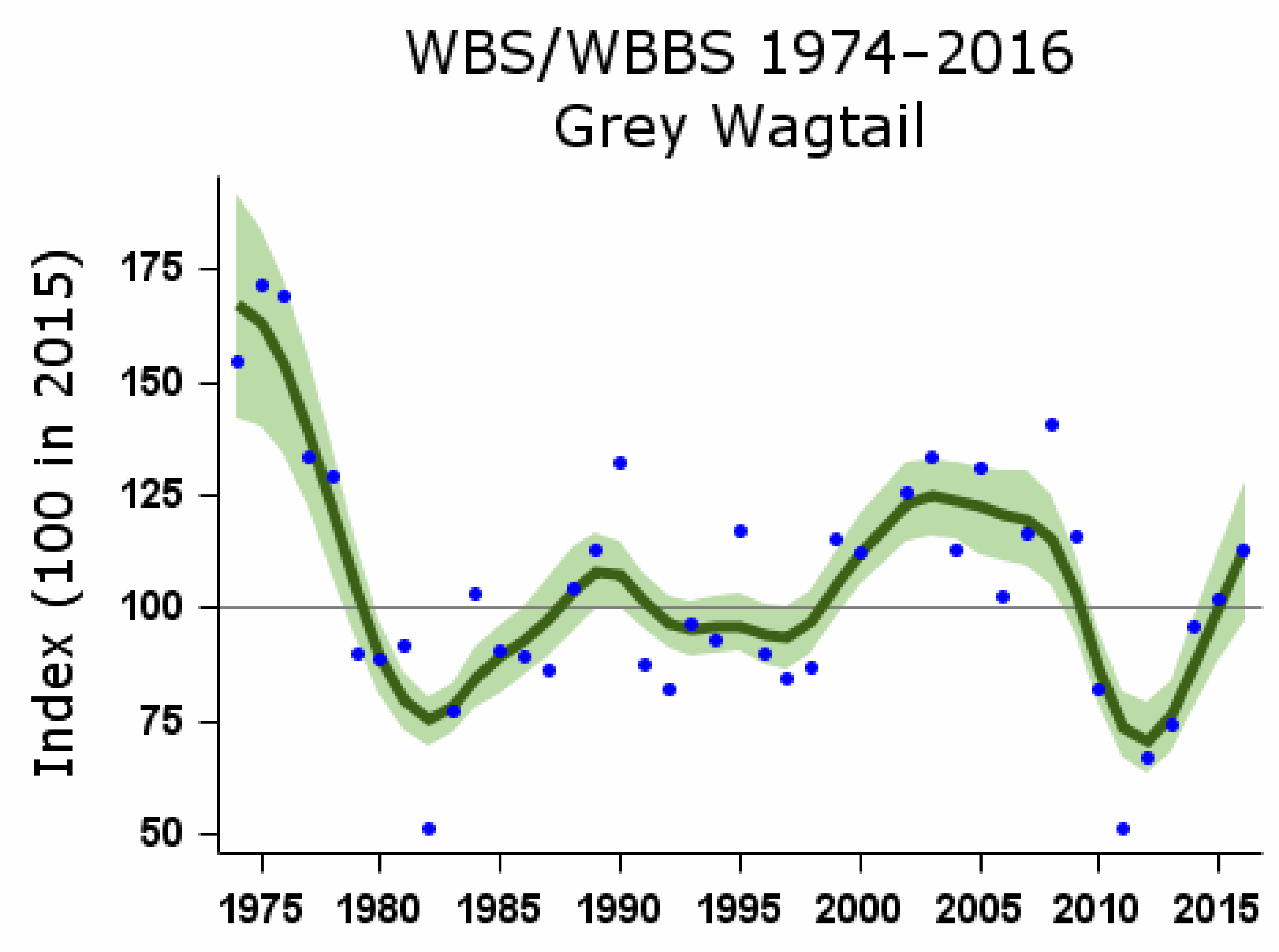
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK waterways: moderate decline
Population size:	38,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Grey Wagtails occur at highest densities along fast-flowing upland streams. WBS/WBBS shows a fluctuating population size along waterways, with a fall during the late 1970s and early 1980s from an initial high point in 1974, some increase since the late 1990s, and another steep drop around 2010. The BBS trend matches WBS/WBBS closely: there was an initial increase but from 2002 the trend was steeply downward, especially in Scotland. The species was moved from the green to the amber list in 2002, and subsequently from amber to the UK red list at the latest review in 2015 (Eaton et al. 2015). However, the long term decline is now categorised as moderate rather than rapid, as a result of a slight upturn since around 2012.

The trends for Grey Wagtail are very similar to those for PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

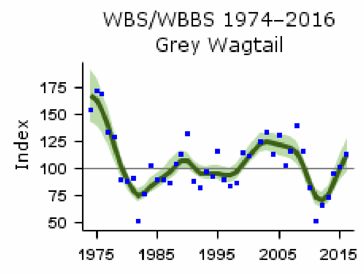
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
WBS/WBBS waterways	40	1975-2015	100	-39	-53	-22	>25	
	25	1990-2015	127	-7	-24	11		
	10	2005-2015	150	-18	-29	-7		
	5	2010-2015	121	15	-2	33		

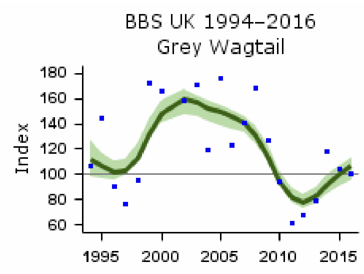
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	227	6	-21	40		
	10	2005-2015	269	-33	-40	-25	>25	
	5	2010-2015	224	7	-11	14		
BBS England	20	1995-2015	154	7	-12	28		
	10	2005-2015	188	-24	-32	-14		
	5	2010-2015	163	6	-8	18		
BBS Scotland	20	1995-2015	33	-20	-45	4		
	10	2005-2015	37	-47	-60	-31	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

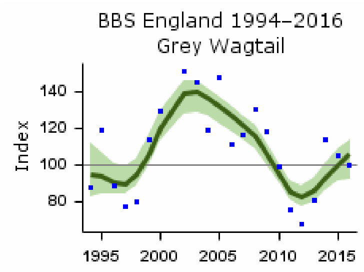
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



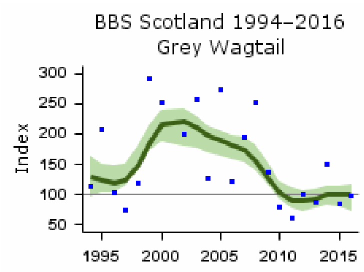
WBS/WBBS waterways graph



BBS UK graph

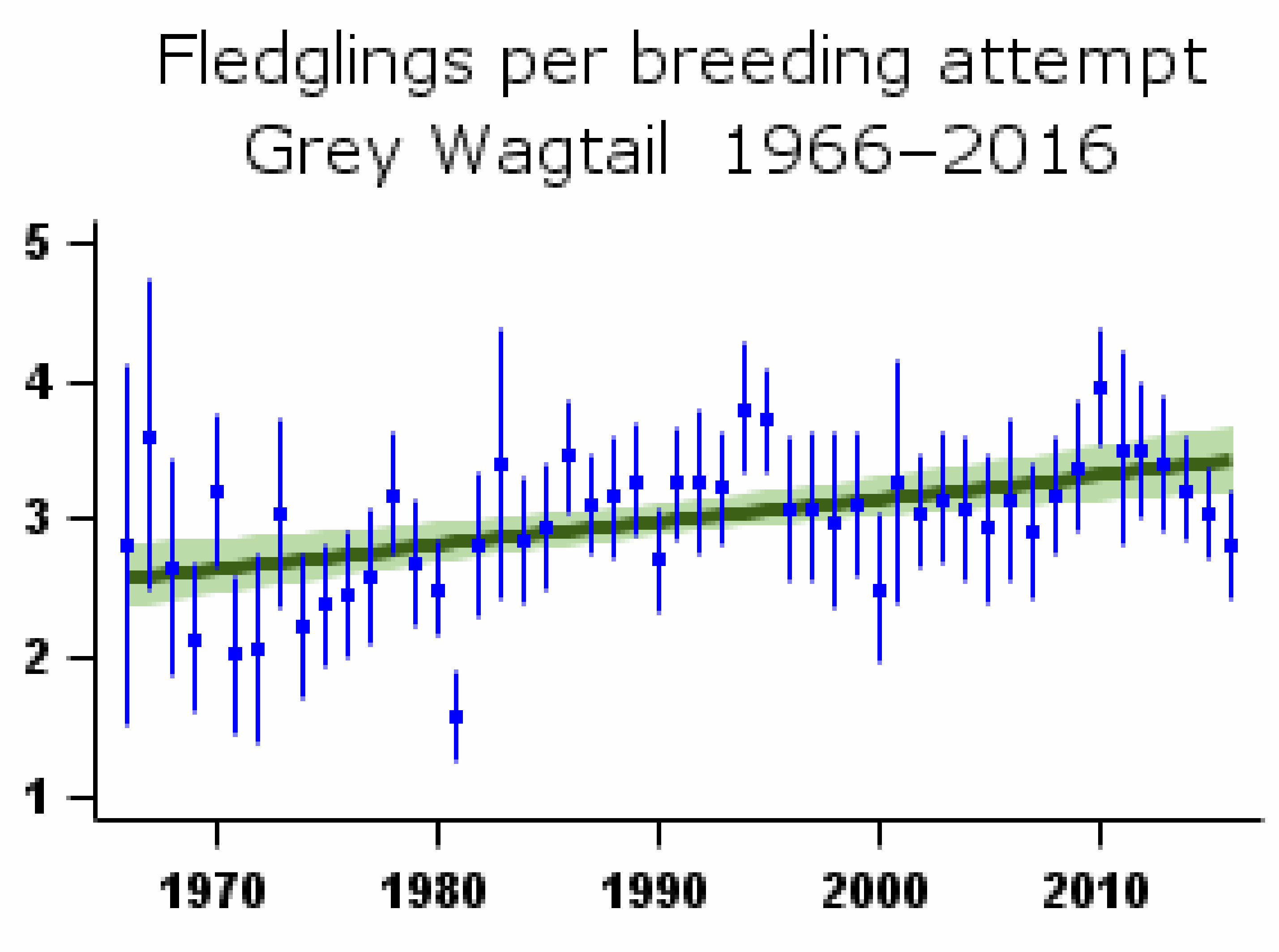


BBS England graph

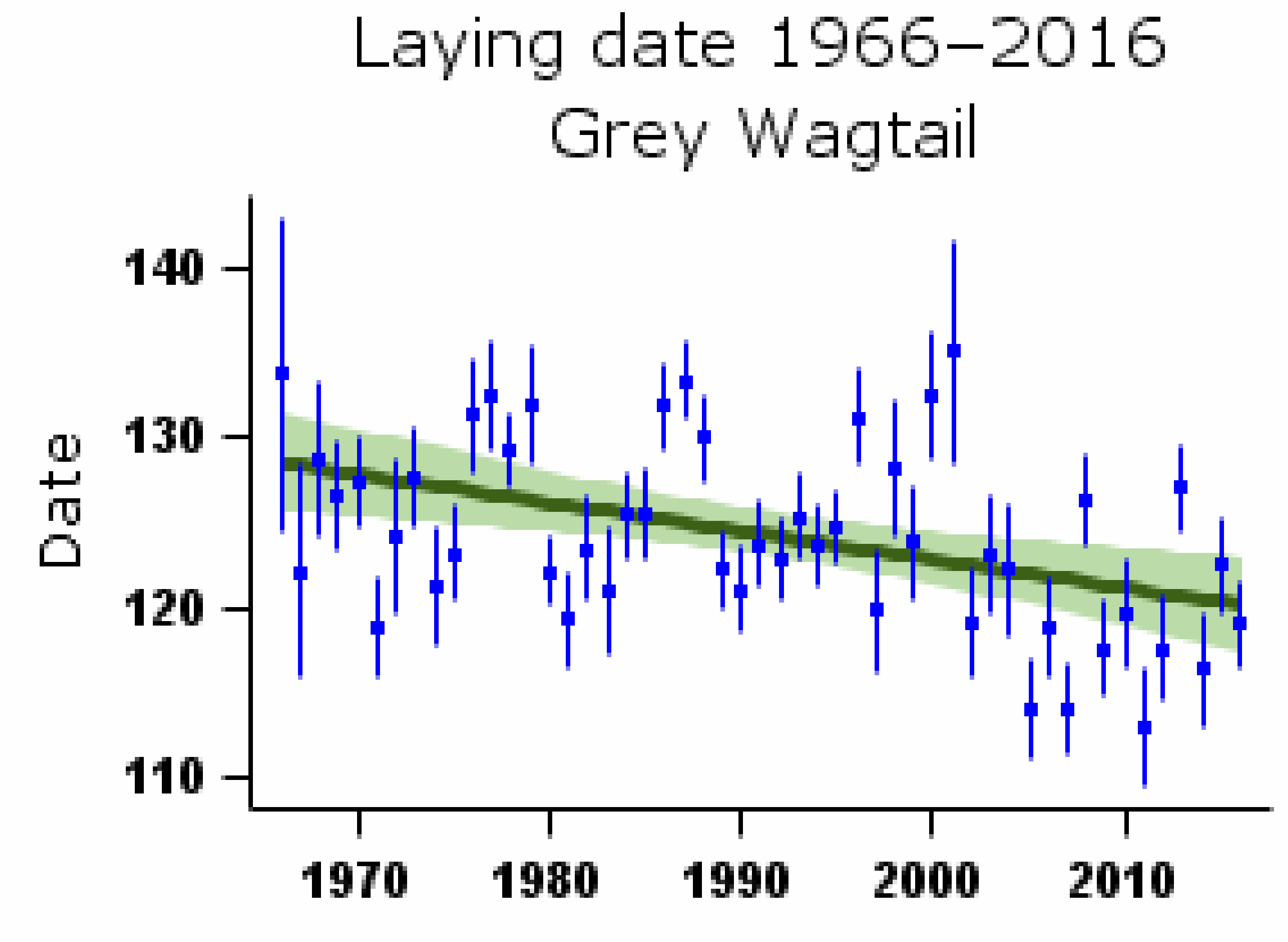


BBS Scotland graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

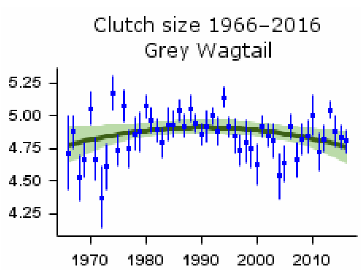


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

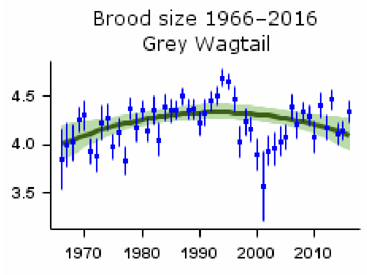
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	55	Linear increase	2.60 fledglings	3.40 fledglings	30.8%		
Clutch size	48	1967-2015	39	Curvilinear	4.78 eggs	4.77 eggs	-0.3%		
Brood size	48	1967-2015	82	Curvilinear	4.03 chicks	4.13 chicks	2.3%		
Nest failure rate at egg stage	48	1967-2015	59	Linear decline	1.76% nests/day	0.95% nests/day	-46.0%		
Nest failure rate at chick stage	48	1967-2015	58	Linear decline	2.17% nests/day	0.73% nests/day	-66.4%		
Laying date	48	1967-2015	62	Linear decline	May 8	Apr 30	-8 days		

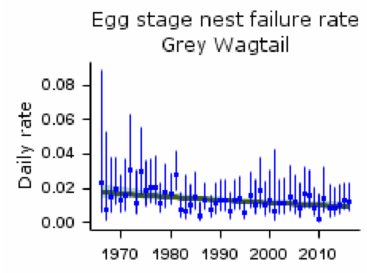
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



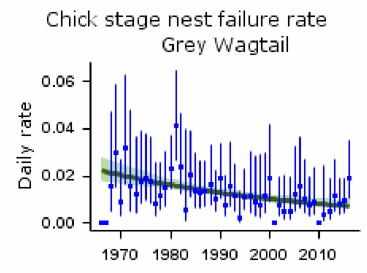
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Causes of population decline and fluctuation may be related to survival rates of juveniles or adults. At present there are not enough data to investigate this idea and more targeted studies, for example RAS projects or analyses to relate survival to weather variables, are needed.

Change factor	Primary driver	Secondary driver
Demographic	Overwinter survival	
Ecological	Unknown	

Further information on causes of change

Research has focused on the possible effects of water quality on this species. No correlation was found between Grey Wagtail breeding density and pH of streams in Scotland (Vickery 1991), a result supported by other authors who established that river acidity was less important than stream width, area of riffle and presence of bankside trees in influencing Grey Wagtail presence (Ormerod & Tyler 1987a). Laying date was three weeks later in acidic rivers than elsewhere in Wales, however, although clutch size, hatching success and brood size did not vary (Ormerod & Tyler 1991).

The species can feed in a range of habitats adjacent to rivers (Vickery 1991, Ormerod & Tyler 1987b) and do not rely on aquatic food sources (Ormerod & Tyler 1991): this may explain why they are less influenced by acidity of rivers, which has been associated with lower invertebrate abundance but not with Grey Wagtail abundance (Ormerod & Tyler 1991). Unhatched eggs collected over two years in Wales, Scotland and southwest Ireland did not contain toxic level of PCBs (Ormerod & Tyler 1992).

Causes of population decline and fluctuation appear to be related to survival rates. Targeted studies, for example RAS projects or analyses to relate survival to weather variables, have the potential to shed light on the population changes of this species.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Pied/White Wagtail

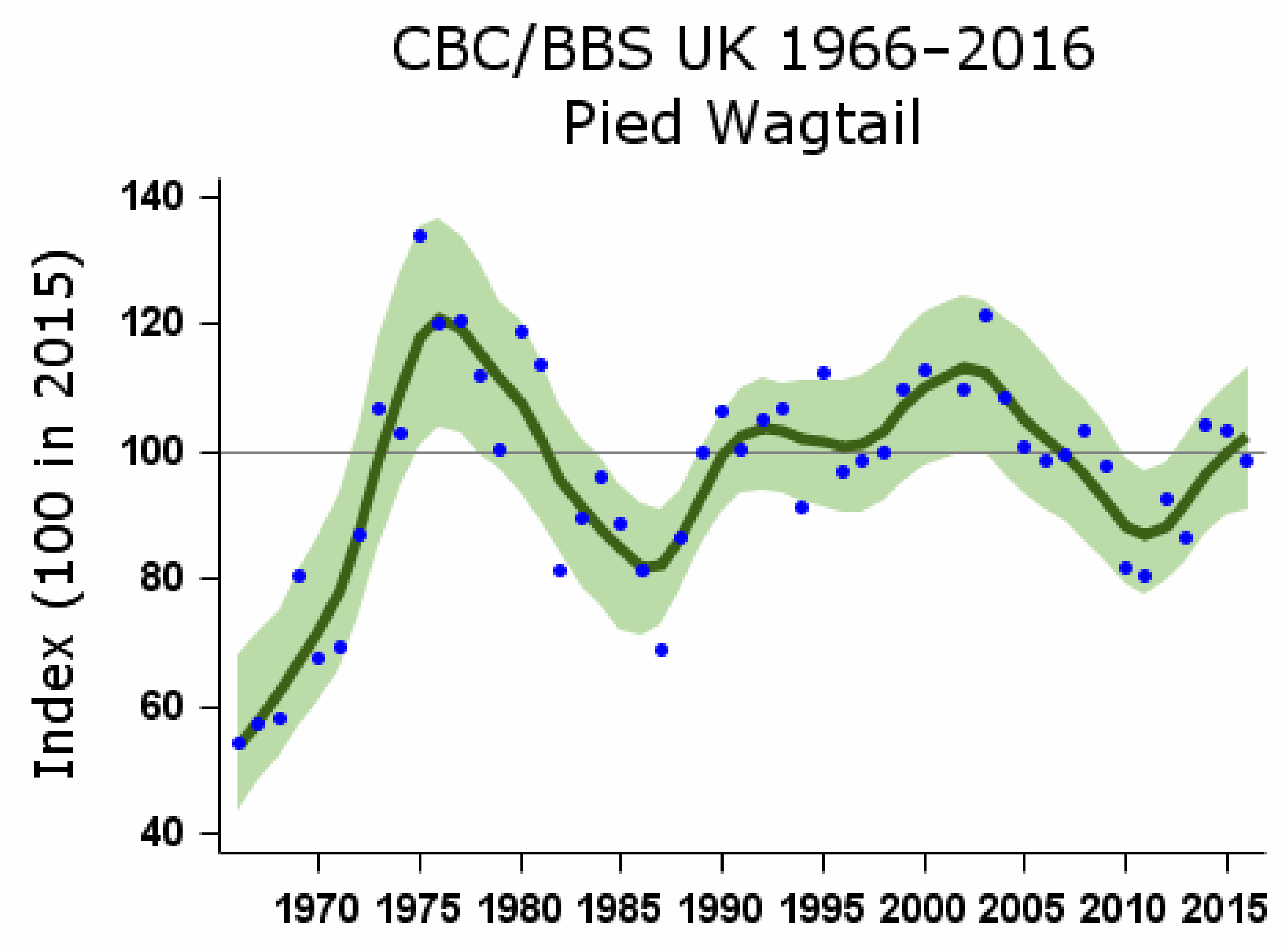
Motacilla alba

Key facts

Conservation listings:	Global: green; at race level, yarrellii and alba amber; current RBBP species (race alba only)
Long-term trend:	UK: uncertain
Population size:	470,000 (410,000-520,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Britain and Ireland together hold almost the entire world population of the distinctive dark-backed race yarrellii (Pied Wagtail), and for this reason population changes in the UK are of global conservation significance. The CBC shows that a strong increase occurred up to the mid 1970s, such that populations have shown shallow increase overall since 1967. Since 1974, however, the results of monitoring have been somewhat conflicting: CBC/BBS and WBS/WBBS trends fluctuate in parallel but, whereas little overall change is evident in the CBC/BBS index, WBS/WBBS has shown a rapid decline, suggesting a strong influence of factors specific to linear waterways. The BBS Siriwardena et al. 1998a). Average clutch and brood sizes have declined a little, but this has been counteracted by a large fall in nest failure rates. The number of fledglings per breeding attempt has shown a strong linear increase. The European long-term trend, which includes the nominate race of the species (White Wagtail), has shown a moderate decline since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

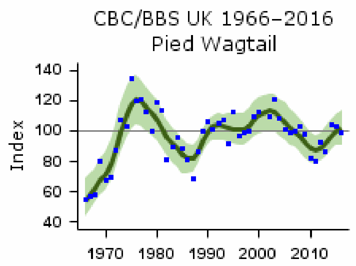
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	626	73	26	136		
	25	1990-2015	1123	1	-10	15		
	10	2005-2015	1546	-5	-11	2		
	5	2010-2015	1506	13	7	19		

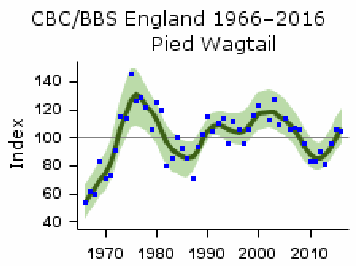
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	478	69	29	141		
	25	1990-2015	852	-5	-17	12		
	10	2005-2015	1171	-11	-15	-6		
	5	2010-2015	1124	13	8	18		
WBS/WBBS waterways	40	1975-2015	118	-61	-71	-54	>50	
	25	1990-2015	149	-31	-46	-21	>25	
	10	2005-2015	183	-11	-23	1		
	5	2010-2015	162	14	0	26		
BBS UK	20	1995-2015	1330	0	-7	6		
	10	2005-2015	1546	-5	-11	2		
	5	2010-2015	1506	13	8	19		
BBS England	20	1995-2015	1007	-2	-8	6		
	10	2005-2015	1171	-11	-15	-7		
	5	2010-2015	1124	13	9	18		
BBS Scotland	20	1995-2015	148	-4	-17	9		
	10	2005-2015	170	1	-15	18		
	5	2010-2015	172	10	-1	24		
BBS Wales	20	1995-2015	125	8	-8	29		
	10	2005-2015	143	-10	-20	5		
	5	2010-2015	149	17	5	32		
BBS N.Ireland	20	1995-2015	47	66	.	.		
	10	2005-2015	58	30	.	.		
	5	2010-2015	57	34	.	.		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

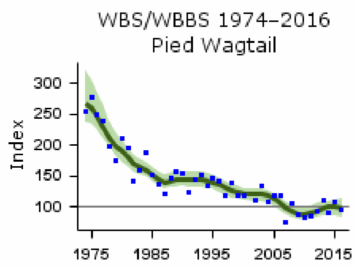
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



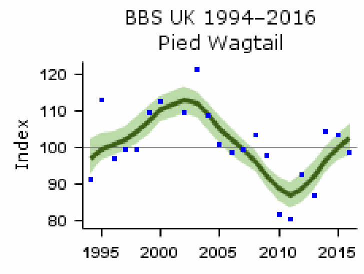
CBC/BBS UK graph



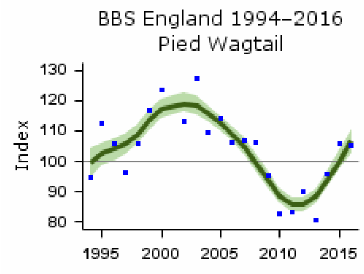
CBC/BBS England graph



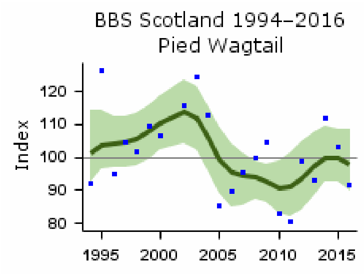
WBS/WBBS waterways graph



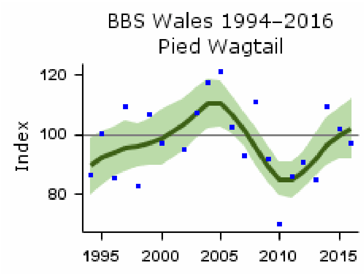
BBS UK graph



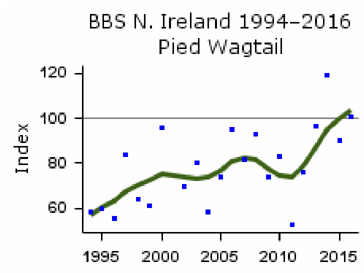
BBS England graph



BBS Scotland graph

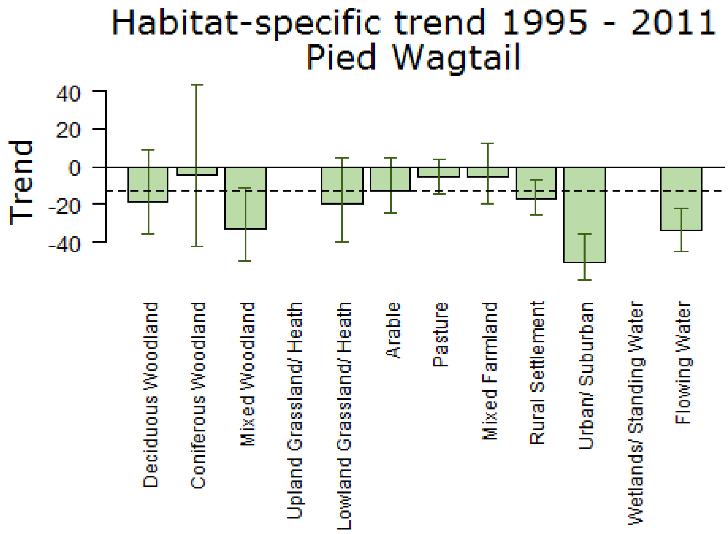


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



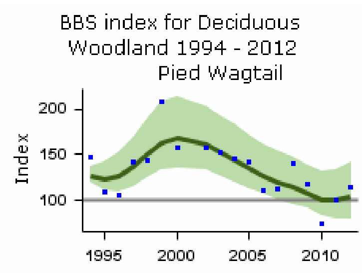
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

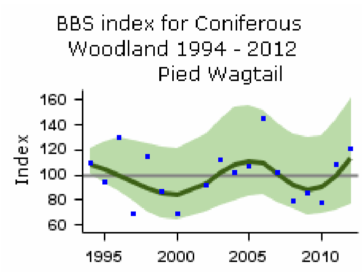
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	113	-19	-36	9
Coniferous Woodland	16	1995-2011	30	-4	-42	43
Mixed Woodland	16	1995-2011	55	-33	-50	-11
Lowland Grassland/ Heath	16	1995-2011	45	-20	-40	5
Arable	16	1995-2011	183	-12	-24	5
Pasture	16	1995-2011	504	-5	-14	4
Mixed Farmland	16	1995-2011	197	-5	-20	12
Rural Settlement	16	1995-2011	328	-17	-26	-7
Urban/ Suburban	16	1995-2011	117	-51	-60	-35
Flowing Water	16	1995-2011	133	-34	-45	-22

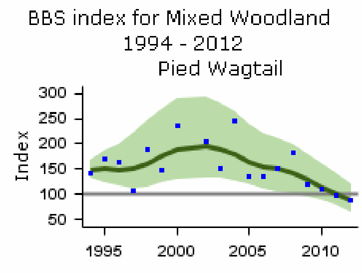
Further information on habitat-specific trends, please follow link here.



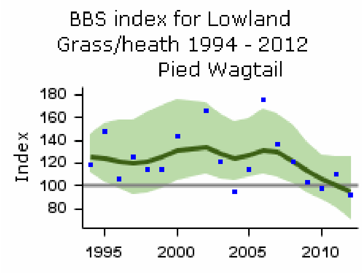
Habitat graph



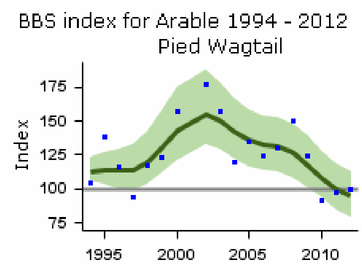
Habitat graph



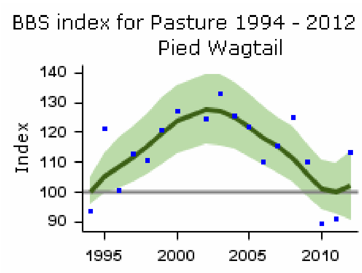
Habitat graph



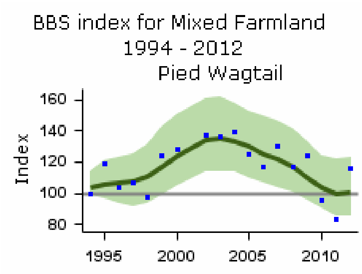
Habitat graph



Habitat graph



Habitat graph



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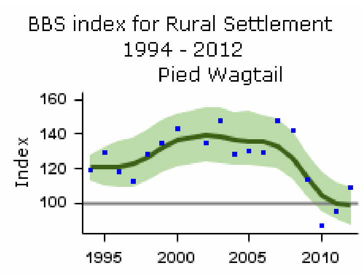
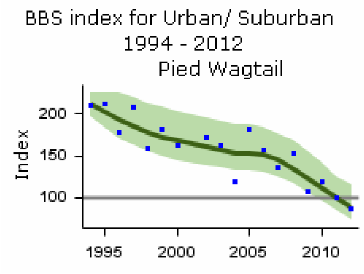
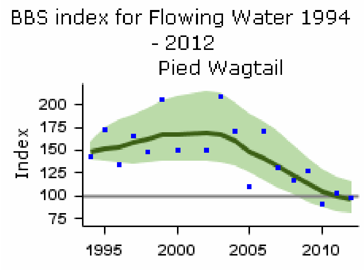


Habitat graph

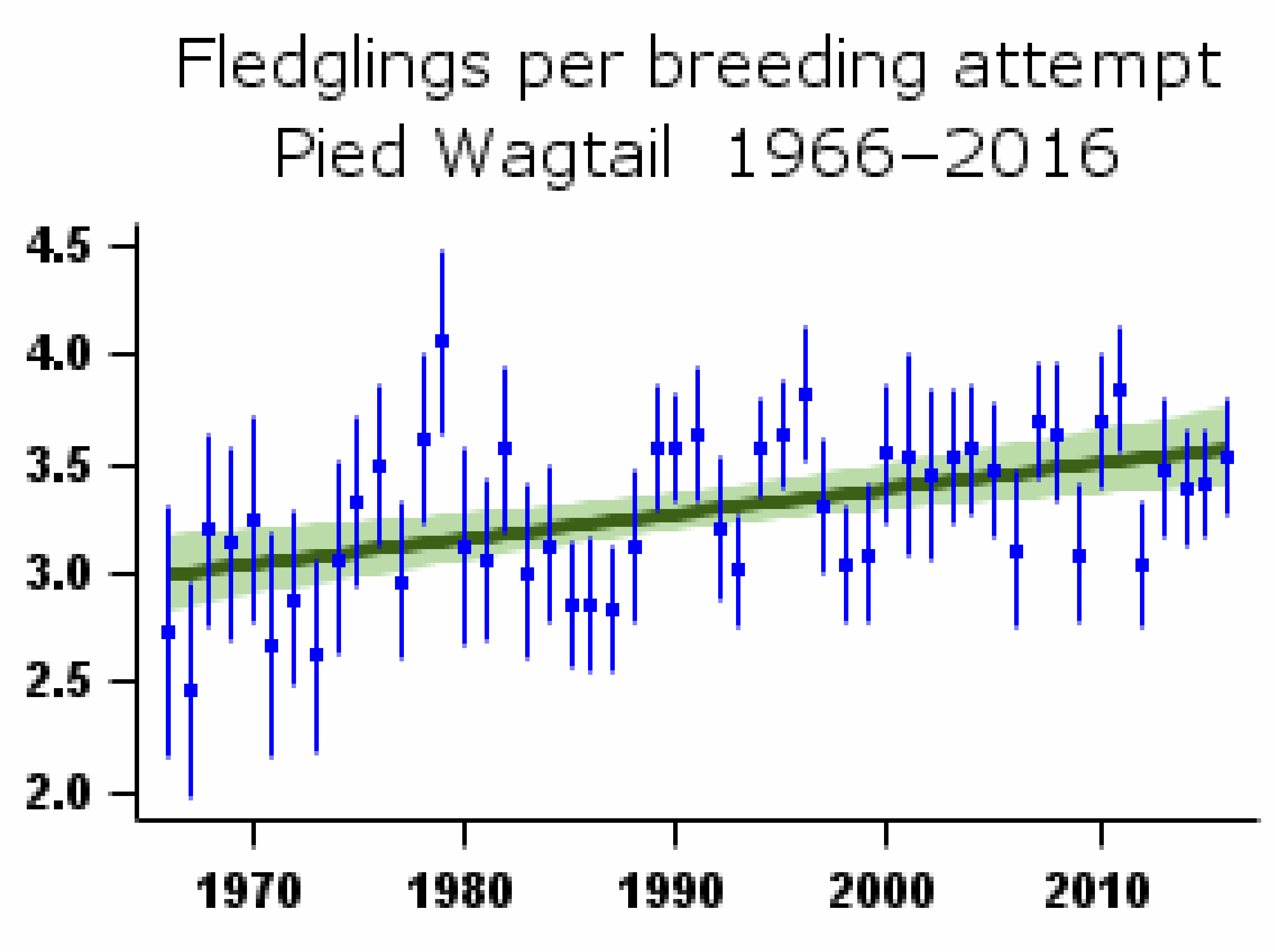


Habitat graph

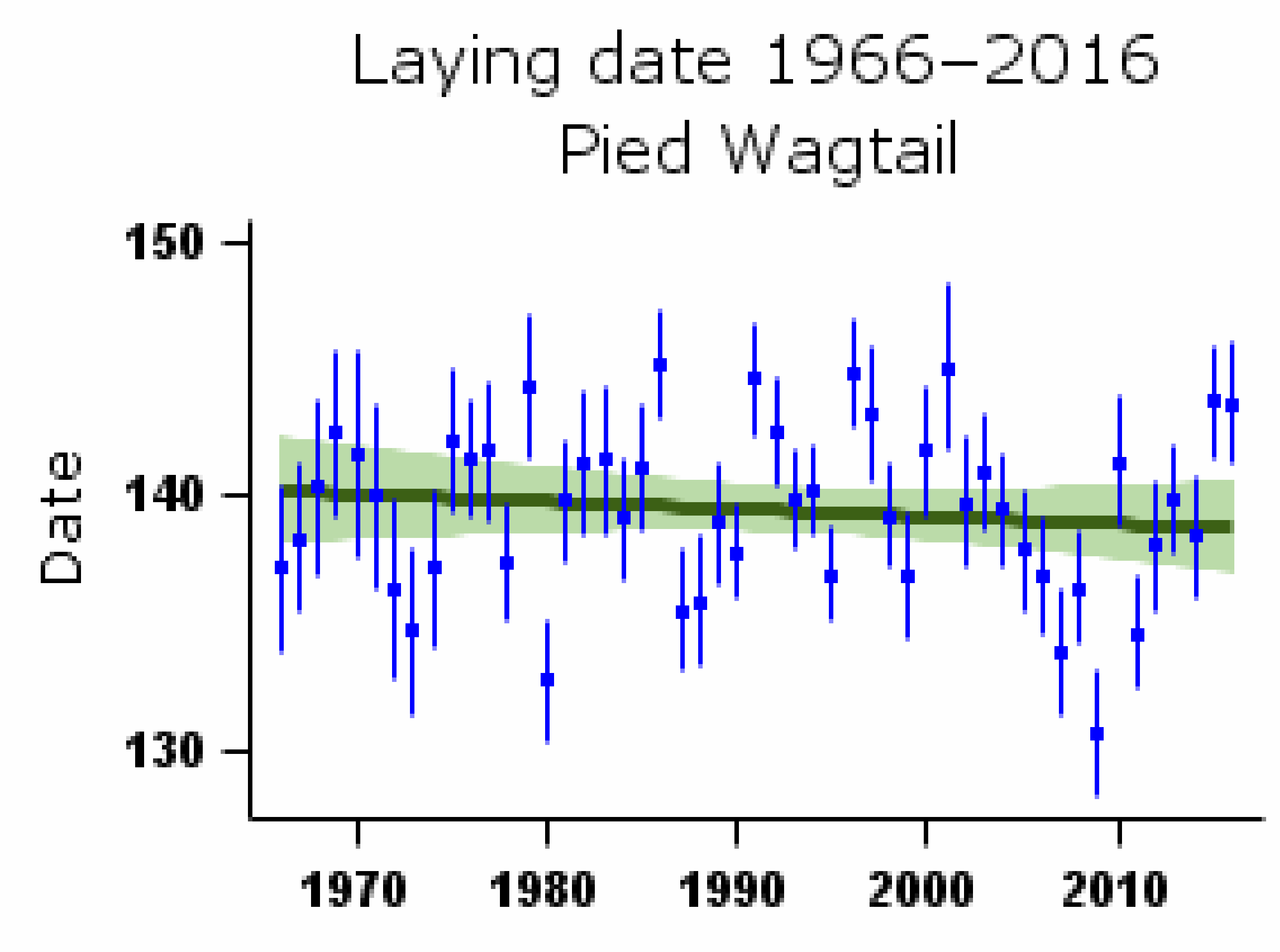


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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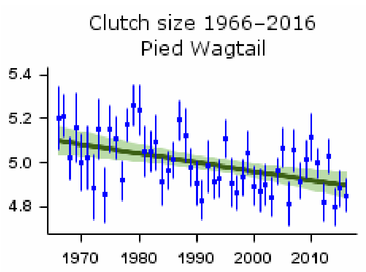
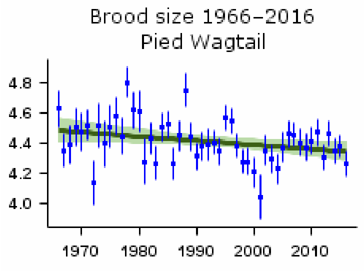
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	90	Linear increase	3.01 fledglings	3.56 fledglings	18.3%		
Clutch size	48	1967-2015	67	Linear decline	5.10 eggs	4.91 eggs	-3.8%		
Brood size	48	1967-2015	138	Linear decline	4.49 chicks	4.35 chicks	-3.0%		
Nest failure rate at egg stage	48	1967-2015	91	Linear decline	1.80% nests/day	0.67% nests/day	-62.8%		
Nest failure rate at chick stage	48	1967-2015	100	None					
Laying date	48	1967-2015	91	None			0 days		

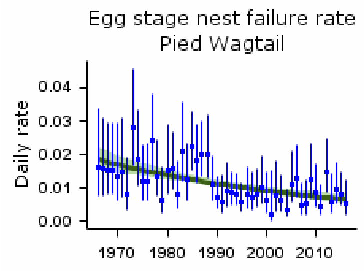
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



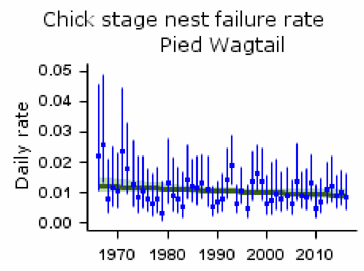
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Tree Pipit

Anthus trivialis

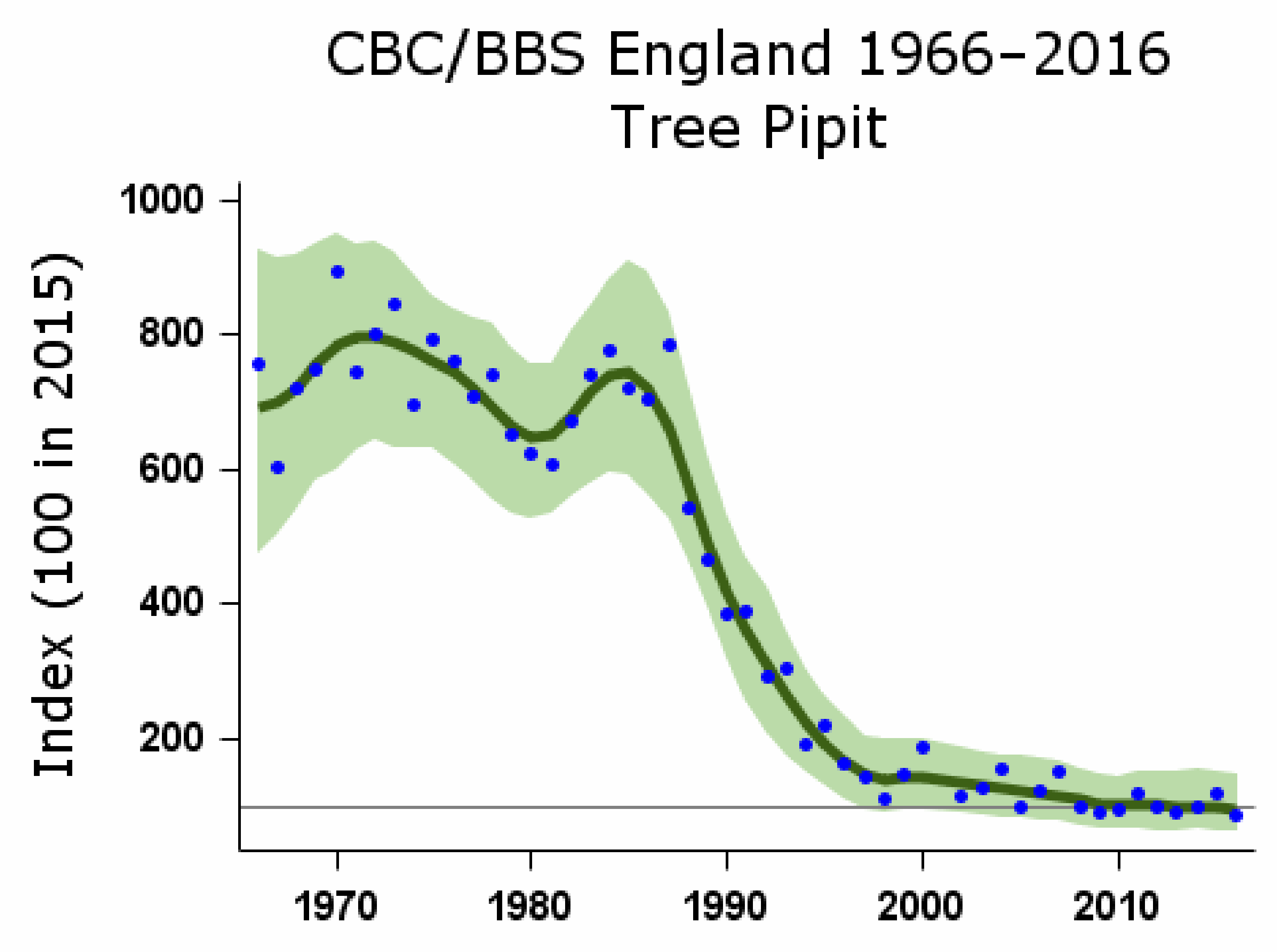
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	88,000 (55,000-121,000) pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Migrant status:	Long-distance migrant
Nesting habitat:	Ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Animal

Status summary

Tree Pipits occur in greatest abundance in Wales, northern England and Scotland, and thus the marked CBC decline between the first two atlas periods may reflect the range contraction that occurred then in central and southeastern England (Gibbons et al. 1993). Since 1994, CBC/BBS data for the species have shown a further severe decrease, especially in England. Recent atlas data show further losses of range, especially in eastern England (Balmer et al. 2013). There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a). The species was moved from the green to the amber list of UK Birds of Conservation Concern in 2002, and in 2009 to red, on the strength of its UK population decline (Eaton et al. 2009). It is among a suite of species that winter in the humid zone of West Africa and correspondingly are showing the strongest population declines among our migrant species (Ockendon et al. 2012, 2014). Brood size has increased since 1966 but nest losses have also increased. Laying dates have shifted earlier by approximately one week.



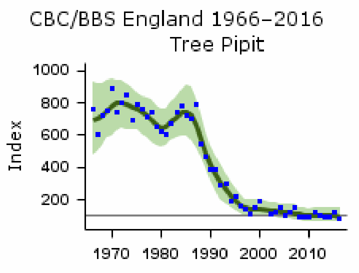
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

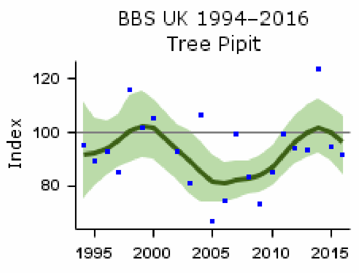
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	52	-86	-93	-73	>50	
	25	1990-2015	69	-76	-86	-62	>50	Small CBC sample
	10	2005-2015	84	-19	-36	2		
	5	2010-2015	81	-1	-20	23		
BBS UK	20	1995-2015	147	8	-14	33		
	10	2005-2015	168	22	1	49		
	5	2010-2015	169	15	-1	30		
BBS England	20	1995-2015	76	-46	-64	-24	>25	
	10	2005-2015	84	-19	-37	2		
	5	2010-2015	81	-2	-23	18		
BBS Scotland	20	1995-2015	36	100	40	158		
	10	2005-2015	45	61	14	124		
	5	2010-2015	45	24	-3	66		
BBS Wales	20	1995-2015	35	-12	-37	27		
	10	2005-2015	39	-1	-25	33		
	5	2010-2015	44	9	-15	28		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

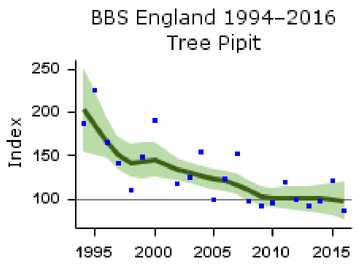
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



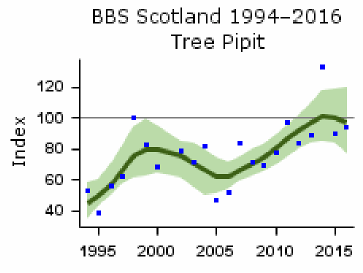
CBC/BBS England graph



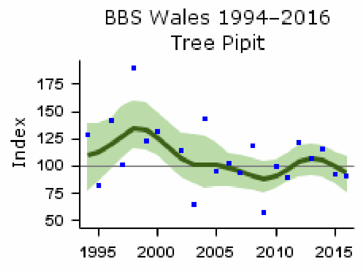
BBS UK graph



BBS England graph

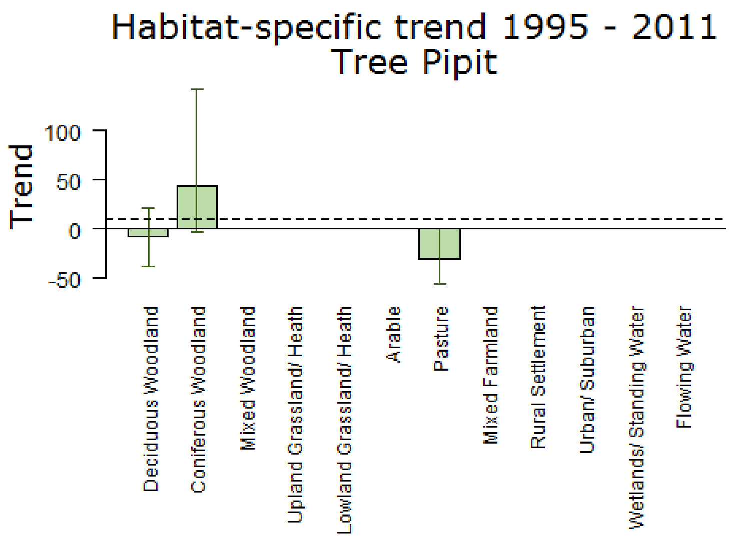


BBS Scotland graph



BBS Wales graph

Population trends by habitat



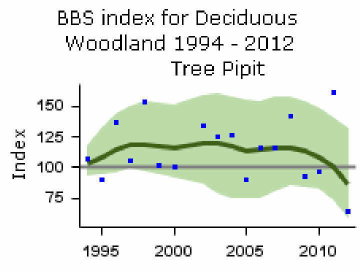
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

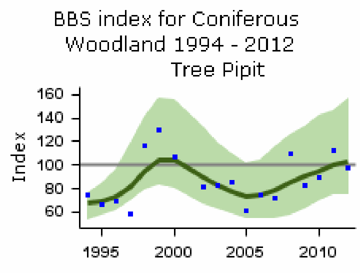
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	30	-8	-37	21
Coniferous Woodland	16	1995-2011	37	44	-2	142
Pasture	16	1995-2011	36	-31	-55	0

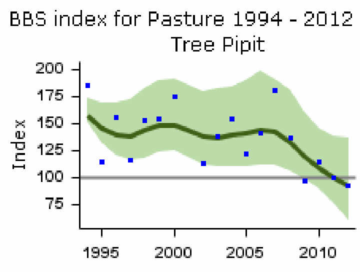
Further information on habitat-specific trends, please follow link here.



Habitat graph

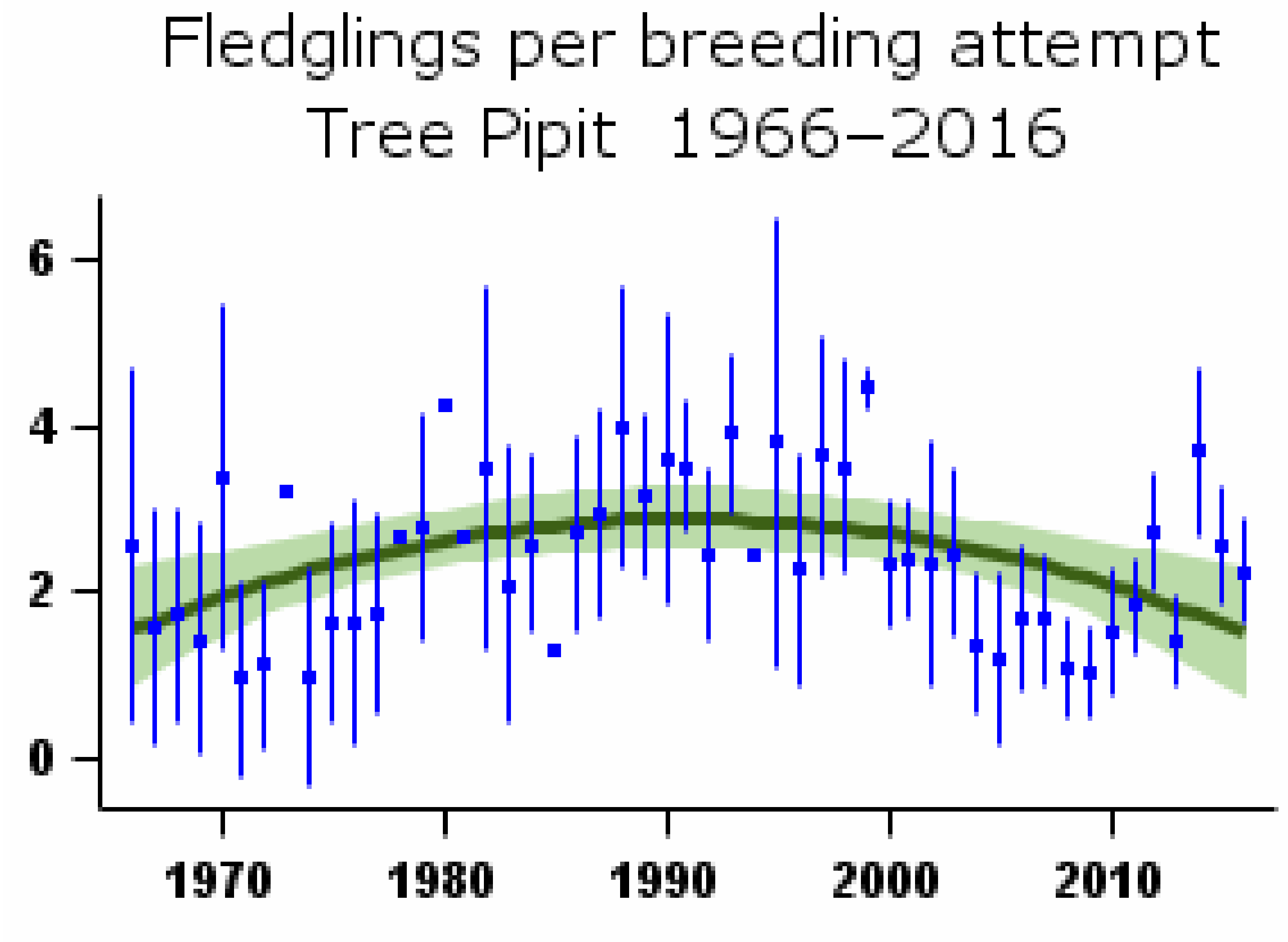


Habitat graph

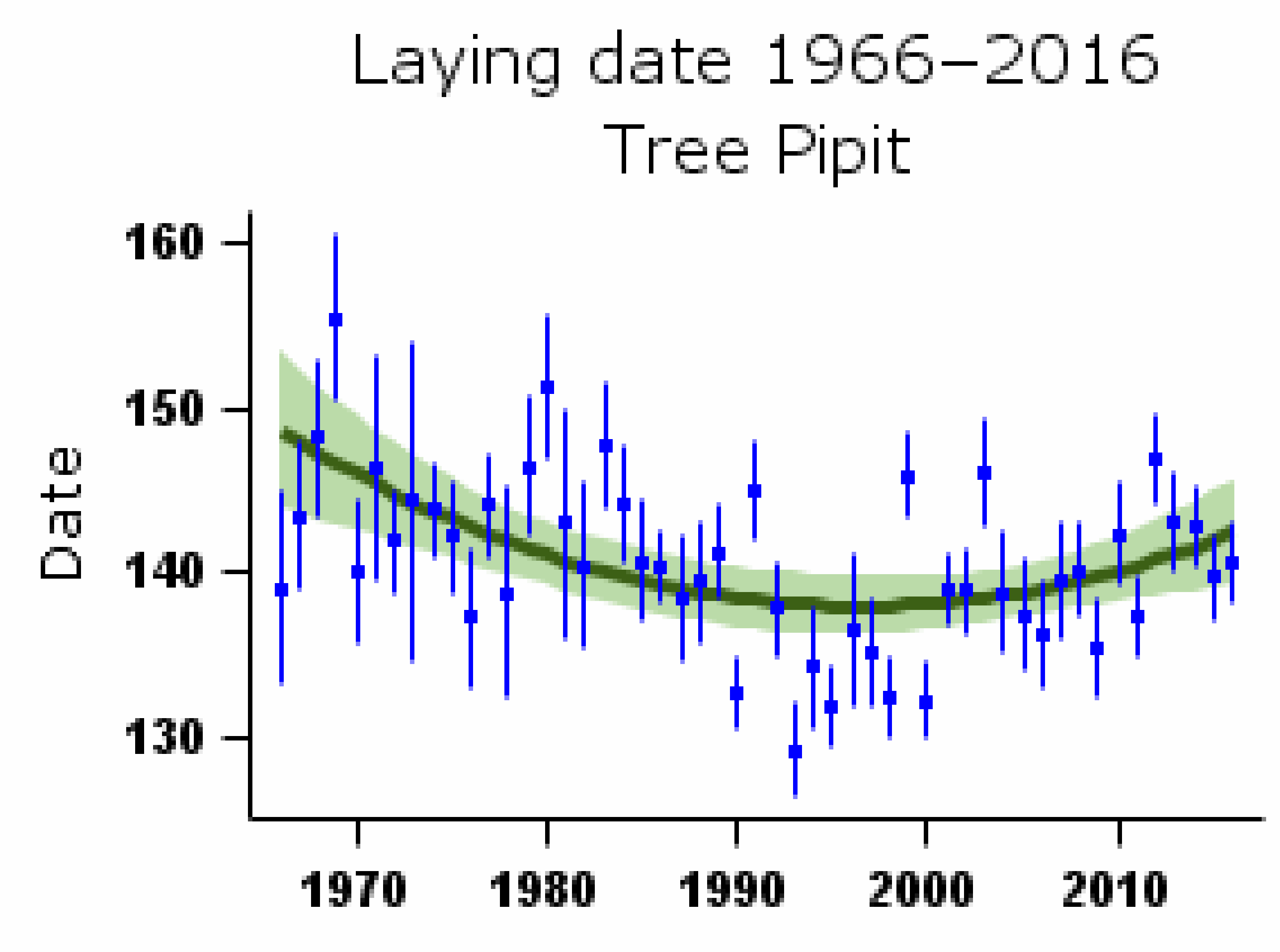


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

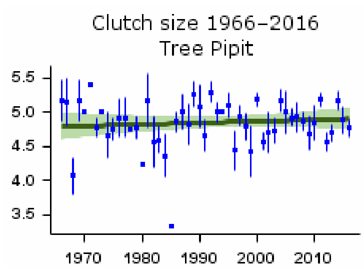


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

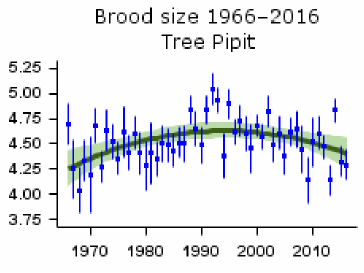
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	15	Curvilinear	1.65 fledglings	1.62 fledglings	-2.2%		
Clutch size	48	1967-2015	12	None					Small sample
Brood size	48	1967-2015	31	Curvilinear	4.28 chicks	4.42 chicks	3.3%		
Nest failure rate at egg stage	48	1967-2015	15	Curvilinear	4.64% nests/day	3.96% nests/day	-14.7%		Small sample
Nest failure rate at chick stage	48	1967-2015	24	None					Small sample
Laying date	48	1967-2015	22	Curvilinear	May 28	May 22	-6 days		Small sample

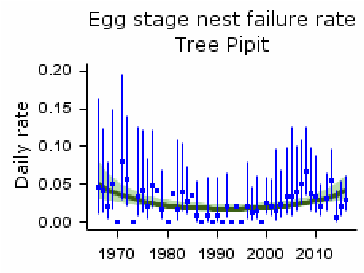
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



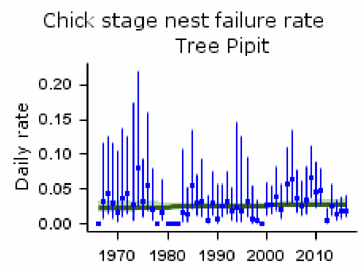
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

The availability of suitably structured habitat is important and lack of this may have contributed to the decline, possibly through a decrease in nest survival, although evidence for this is based largely on one site, and analysis of data from six other areas concluded that changes in woodland structure were unlikely to be the main driver of population change. This species being a long-distance migrant, problems on its wintering grounds should not be ruled out.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	
Ecological	Changes in woodland	

Further information on causes of change

A detailed, eight-year study in Thetford Forest conducted by Burton (2009) provides good evidence that there was a significant decrease in daily nest survival during the chick stage and that overall nesting success was lowest in clearfells and recently planted stands. Overall nesting success appeared to be determined at the habitat scale, and Burton suggested that this may have been because the broad differences in cover between habitats affected the likelihood of nest predation (the main cause of nest failure). Charman et al. (2009) also found that Tree Pipits have high failure rates at the chick stage and implicate predation. It should be noted that records from Thetford Forest, in southeast England, probably contribute over half the nest records for this species each year; thus these trends may not be representative of the UK as a whole. Research by Mallord et al. (2016) found no evidence that changes in woodland structure affected populations in six study areas in the west of the UK.

This species prefers open ground within woodlands and upland grazed woods lacking understorey, and also occupies clearfells, restocks, new plantations, heaths and commons where trees provide songposts (Fuller 1995, Burton 2007, Charman et al. 2009). The species' decline has been greatest in lowland England, particularly in the wider countryside in woodland and common land (Gibbons et al. 1993) and, accordingly, several authors have proposed that the population decline may be linked to the changing forest structure as new plantations mature, and the reduced management of lowland woods (Fuller et al. 2005, Amar et al. 2006, Charman et al. 2009). Data provided by the Repeat Woodland Bird Survey (RWBS) gives reliable evidence that sub-canopy vegetation increased markedly in almost all regions covered between the 1980s and the early 2000s and analyses found that declines of Tree Pipit occurred in woods with higher maximum tree height and increased foliage (Amar et al. 2006, Smart et al. 2007). Fuller & Moreton (1987) and Burton (2007) provide evidence, respectively, for associations with young coppice and, within coniferous plantations, for young restocks, and a disassociation with closed-canopy woodlands. Amar et al. (2006) state that the lack of new plantations and restocks in southern Britain may have contributed to the decline of this species, although specific analyses providing evidence for this were lacking. They also found that Tree Pipit declined more in sites with more tracks, suggesting disturbance can be an issue (Amar et al. 2006, Smart et al. 2007). Burgess et al. (2015) agree that declining availability of young coniferous woodland contributed to Tree Pipit population decline in England. Targeted management, such as the provision of large blocks of habitat and the retention of mature trees for use as songposts, was found to be beneficial (Burton 2007).

In upland habitats, Fuller et al. (2006) provided evidence showing that both overgrazing and agricultural abandonment of marginal habitats may have detrimental effects on Tree Pipits.

Hewson et al. (2007) analysed the Repeat Woodland Bird Survey and BBS/CBC data and found declines in all of the seven long-distance migrant species considered, including Tree Pipit. Thus, although specific evidence relating to factors operating on the wintering grounds is lacking, these cannot be ruled out as causes of population decline.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Meadow Pipit

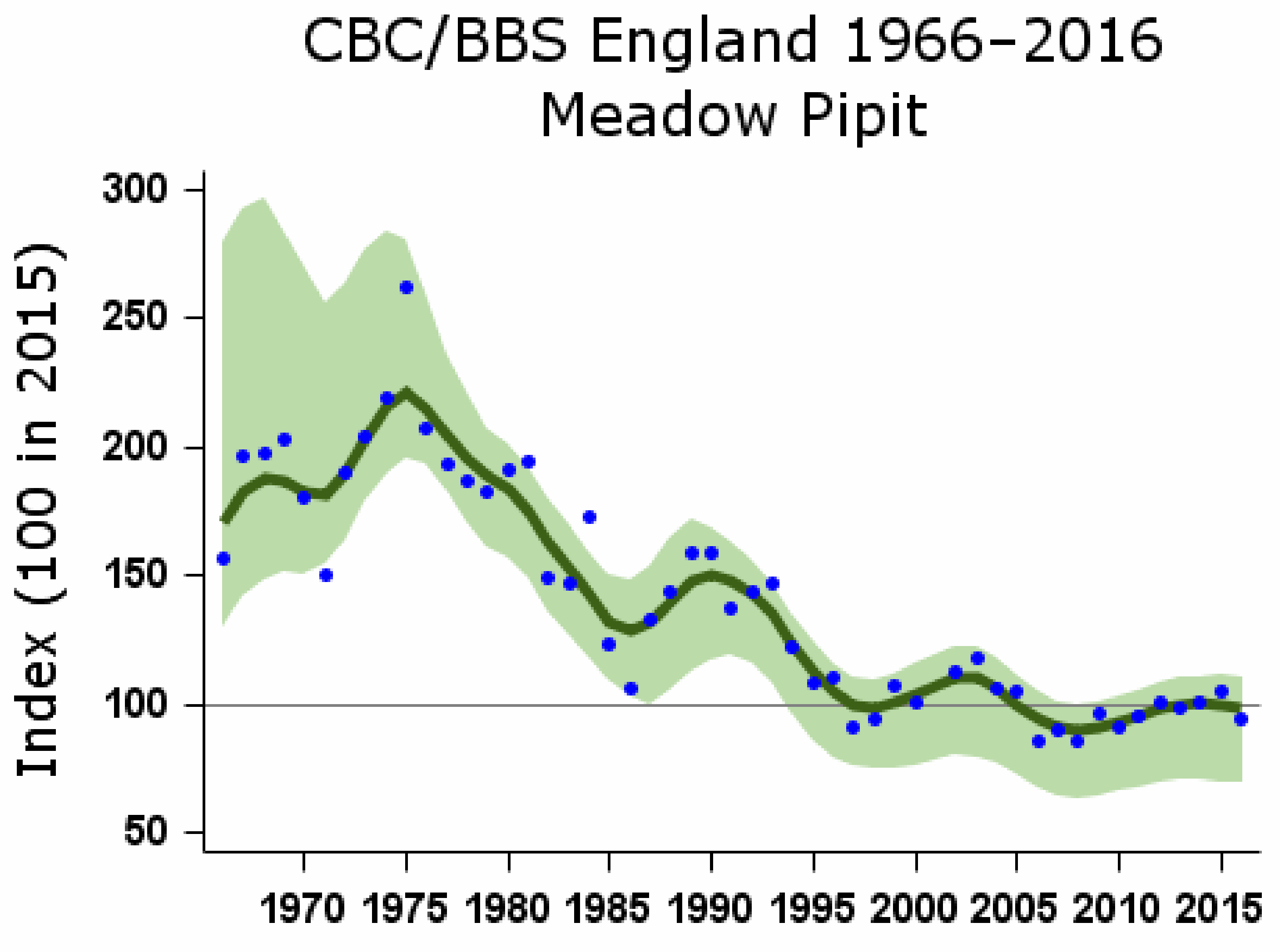
Anthus pratensis

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	England: moderate decline
Population size:	2.0 (1.8-2.3) million pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

The CBC/BBS trend has been downward since the mid 1970s. Moorland, the key Meadow Pipit habitat, was not covered well by the CBC, leading to some doubt about the significance of the early results for this species, but BBS now provides more representative monitoring that, in England at least, confirms the picture presented by CBC, although BBS shows shallow increases have occurred in all four UK countries over the most recent five year period. As a result of the declines, the species has accordingly been moved from the green to the amber list. The BBS Gibbons et al. 1993). Experiments in central Scotland have indicated that Meadow Pipit breeding abundance can be improved by reduced grazing intensity and by mixing cattle and sheep (Evans et al. 2006). Nest failure rates during the chick stage have declined, which may reflect the loss of birds from suboptimal habitat. The number of fledglings per breeding attempt increased during the 1990s but has since fallen to slightly below the 1968 rate. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a); see also Lehikoinen et al. 2014).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

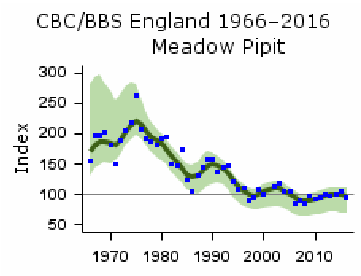
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	219	-45	-75	-23	>25	
	25	1990-2015	388	-34	-51	-16	>25	
	10	2005-2015	565	0	-8	7		
	5	2010-2015	531	7	2	14		

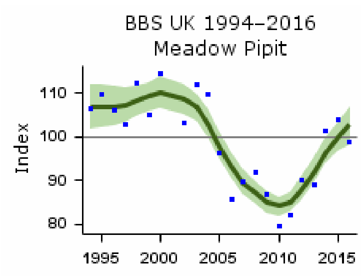
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	844	-7	-13	0		
	10	2005-2015	991	2	-4	8		
	5	2010-2015	959	19	14	25		
BBS England	20	1995-2015	458	-9	-18	0		
	10	2005-2015	565	0	-8	7		
	5	2010-2015	531	7	1	14		
BBS Scotland	20	1995-2015	223	-10	-20	-1		
	10	2005-2015	245	7	-2	16		
	5	2010-2015	248	21	12	30		
BBS Wales	20	1995-2015	94	7	-11	33		
	10	2005-2015	106	-5	-24	16		
	5	2010-2015	111	21	2	40		
BBS N.Ireland	20	1995-2015	64	22	-2	64		
	10	2005-2015	69	-16	-26	1		
	5	2010-2015	62	53	36	76		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

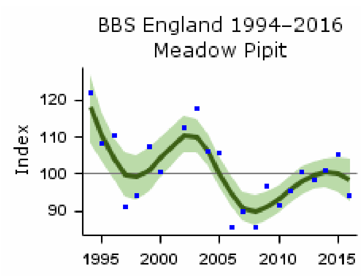
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



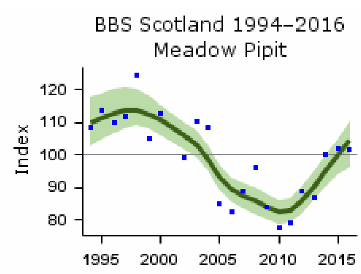
CBC/BBS England graph



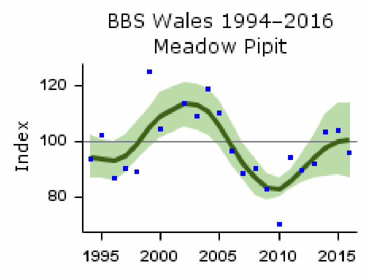
BBS UK graph



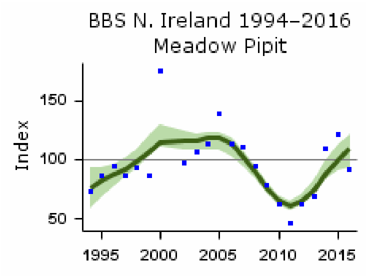
BBS England graph



BBS Scotland graph

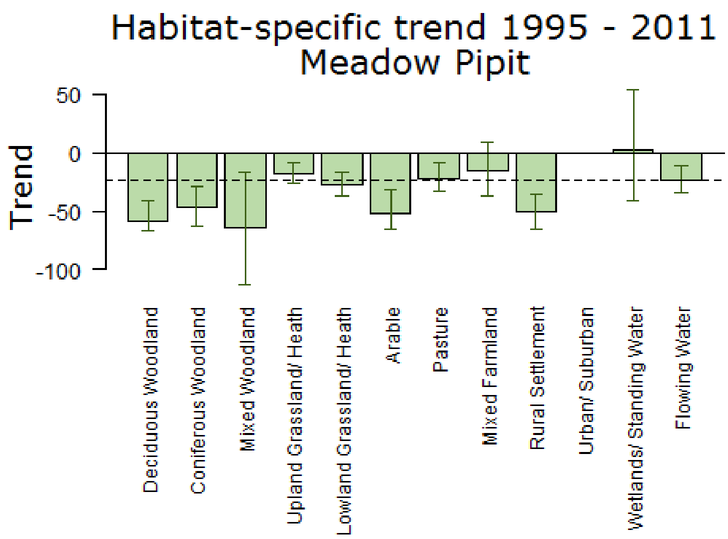


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

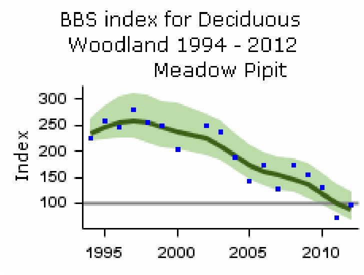
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

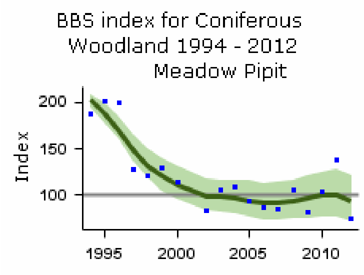
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	66	-59	-67	-42
Coniferous Woodland	16	1995-2011	76	-47	-62	-29
Mixed Woodland	16	1995-2011	32	-65	-113	-17
Upland Grassland/ Heath	16	1995-2011	134	-18	-26	-9
Lowland Grassland/ Heath	16	1995-2011	158	-27	-37	-16
Arable	16	1995-2011	73	-52	-66	-32
Pasture	16	1995-2011	299	-23	-34	-8
Mixed Farmland	16	1995-2011	73	-16	-37	9

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Rural Settlement	16	1995-2011	73	-51	-66	-36
Wetlands/ Standing Water	16	1995-2011	32	3	-41	54
Flowing Water	16	1995-2011	132	-23	-34	-11

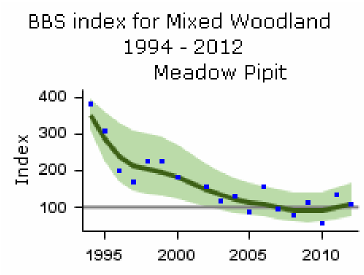
Further information on habitat-specific trends, please follow link here.



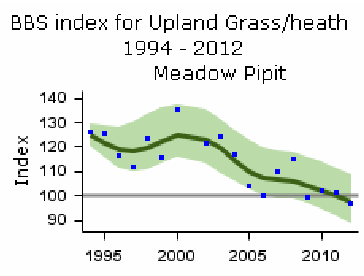
Habitat graph



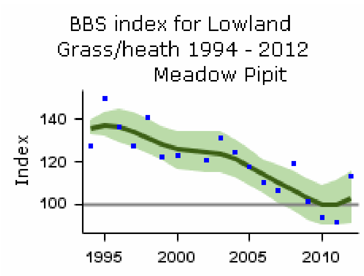
Habitat graph



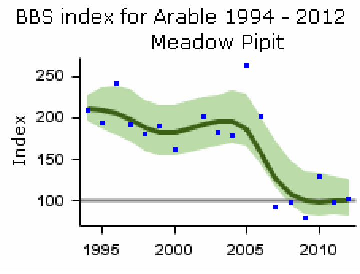
Habitat graph



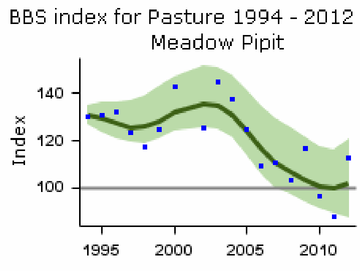
Habitat graph



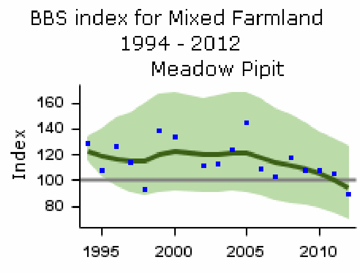
Habitat graph



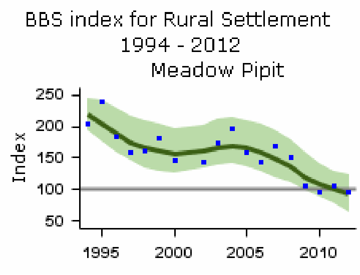
Habitat graph



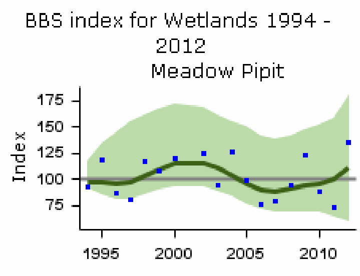
Habitat graph



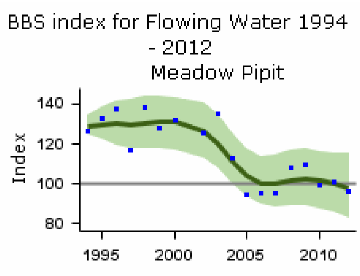
Habitat graph



Habitat graph

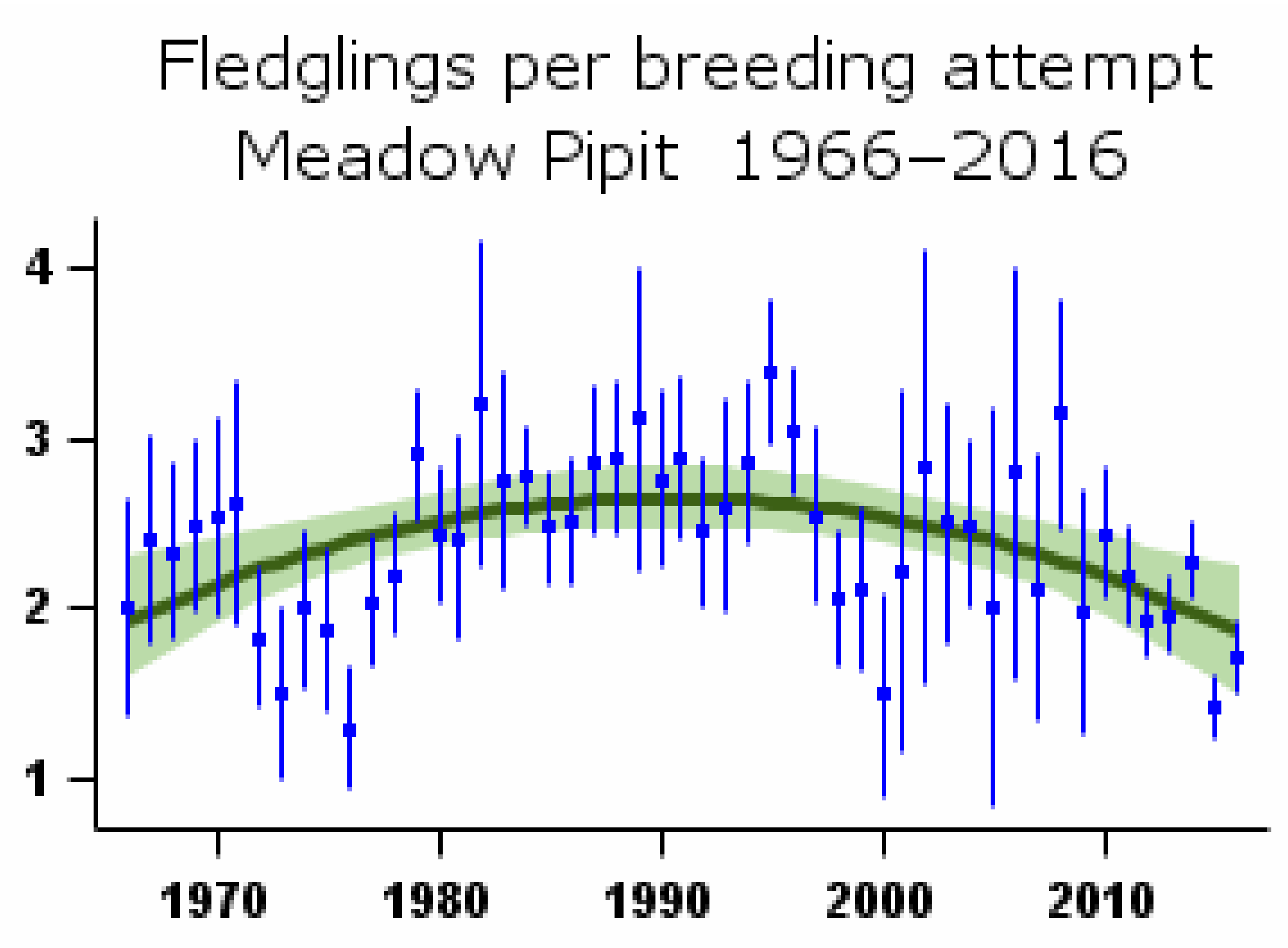


Habitat graph

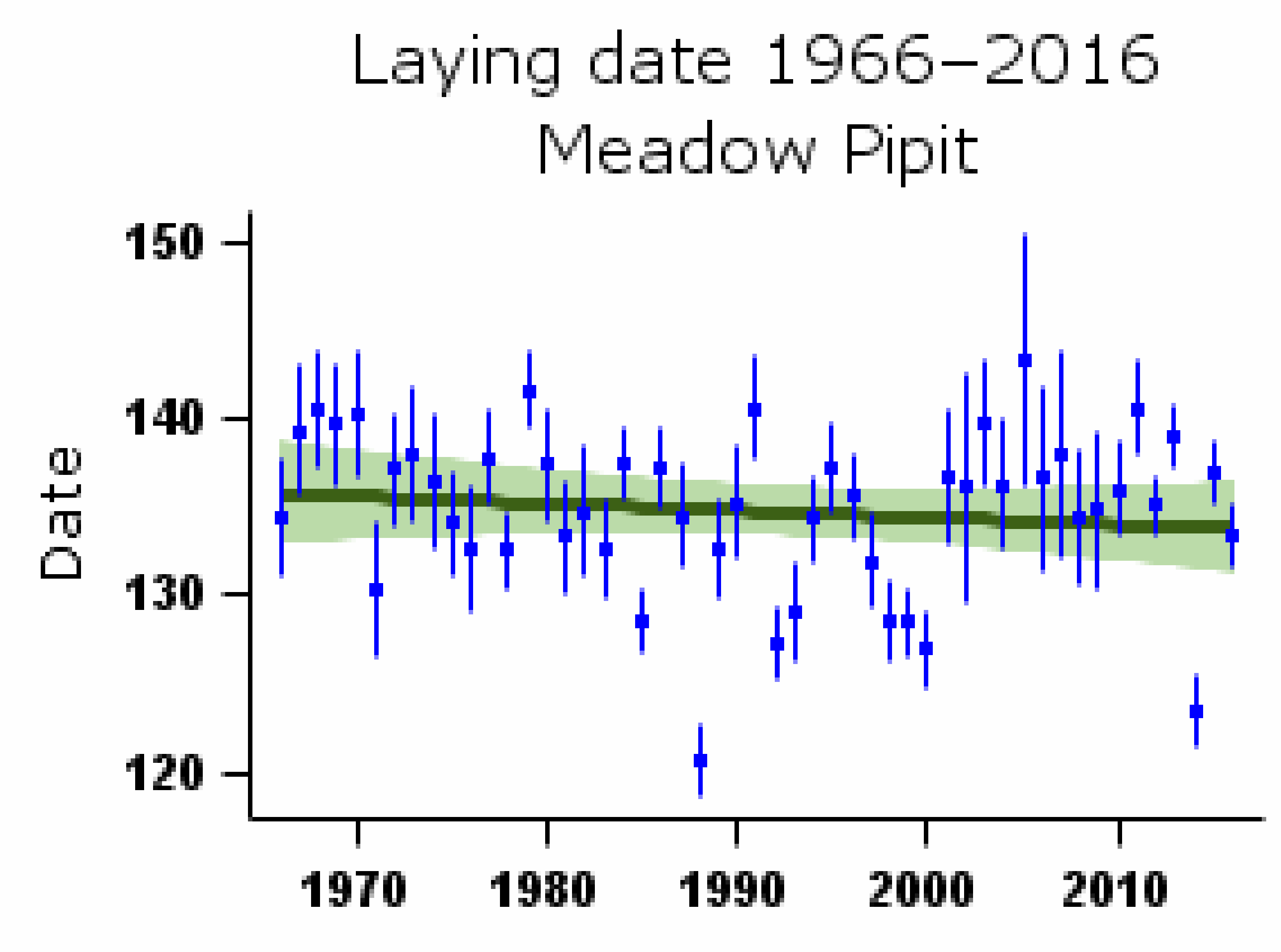


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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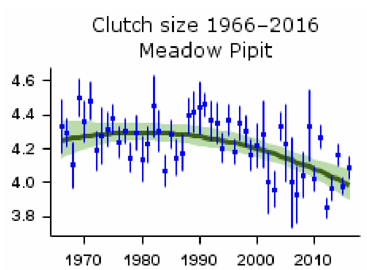
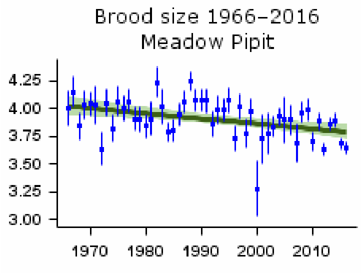
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	52	Curvilinear	2.00 fledglings	1.93 fledglings	-3.3%		
Clutch size	48	1967-2015	42	Curvilinear	4.26 eggs	4.00 eggs	-6.0%		
Brood size	48	1967-2015	86	Linear decline	4.01 chicks	3.79 chicks	-5.5%		
Nest failure rate at egg stage	48	1967-2015	53	Curvilinear	2.18% nests/day	2.87% nests/day	31.7%		
Nest failure rate at chick stage	48	1967-2015	75	Curvilinear	3.43% nests/day	2.59% nests/day	-24.5%		
Laying date	48	1967-2015	45	None			0 days		

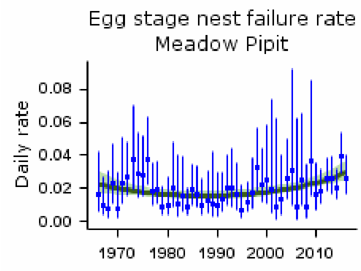
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



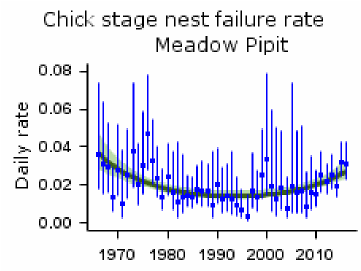
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

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Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Chaffinch

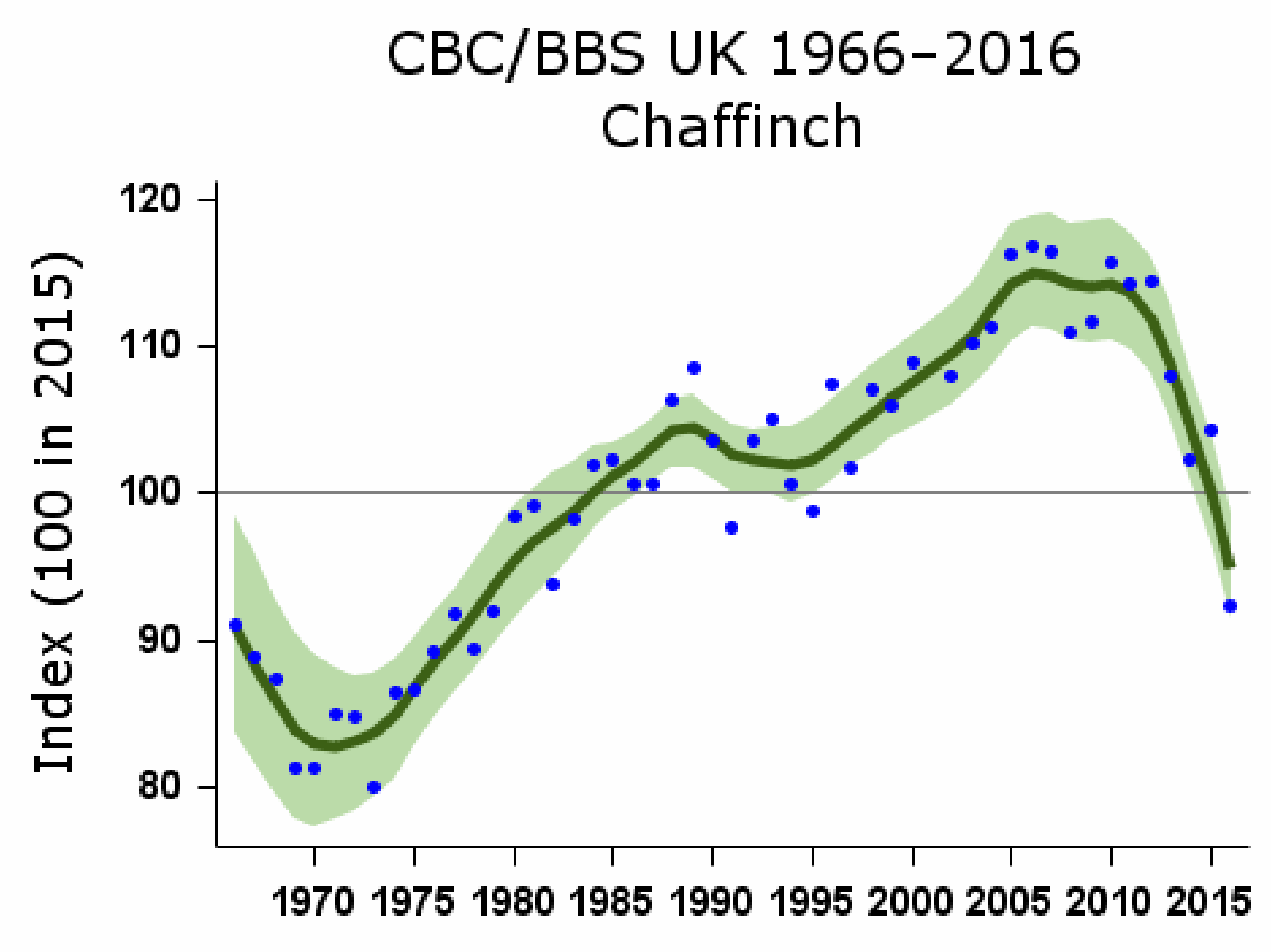
Fringilla coelebs

Key facts

Conservation listings:	Global: green; at race level, gengleri amber, coelebs green
Long-term trend:	UK, England: shallow increase
Population size:	6.2 million territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Chaffinch increased rapidly from the early 1970s until 2006, according to CBC/BBS and CES, but numbers seemed to stabilise for a period during the 1990s. This relative stability was associated with a reduction in annual survival, which could be density-dependent (Siriwardena et al. 1999). There was also some evidence of improved breeding performance during the early years of population increase, with larger broods, fewer egg-stage nest failures, and more fledglings per breeding attempt, but these trends are now either cancelled out or reversed. Changes in adult survival now seem to be a greater contributor to annual population change (Robinson et al. 2014). The BBS Robinson et al. 2010b). The trend towards earlier laying is at least partly explained by recent climate change (Crick & Sparks 1999). Chaffinches are well adapted to suburban and garden habitats, as well as to highly fragmented woodland and hedgerows, occurring less in the open-field, arable habitats that have been affected most by agricultural intensification, so it is possible that they have benefited by environmental changes from which other seed-eating passerines have suffered. There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

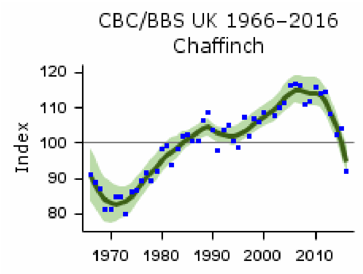
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	1280	13	0	28		
	25	1990-2015	2260	-4	-8	1		
	10	2005-2015	3180	-12	-14	-10		

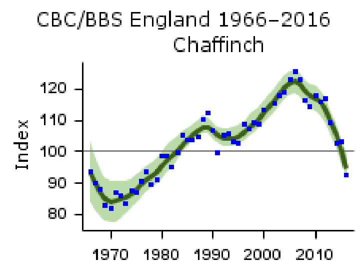
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	3233	-12	-14	-10		
CBC/BBS England	48	1967-2015	1010	11	-3	27		
	25	1990-2015	1771	-6	-11	-2		
	10	2005-2015	2495	-18	-20	-16		
	5	2010-2015	2538	-14	-16	-13		
CES adults	31	1984-2015	77	-20	-56	38		
	25	1990-2015	84	-31	-53	-4	>25	
	10	2005-2015	79	-40	-50	-33	>25	
	5	2010-2015	76	-23	-33	-15		
CES juveniles	31	1984-2015	60	7	-60	104		
	25	1990-2015	66	-22	-63	40		
	10	2005-2015	63	-34	-55	-23	>25	
	5	2010-2015	61	-41	-52	-27	>25	
BBS UK	20	1995-2015	2642	-2	-4	3		
	10	2005-2015	3180	-12	-14	-10		
	5	2010-2015	3233	-12	-14	-10		
BBS England	20	1995-2015	2061	-4	-8	0		
	10	2005-2015	2495	-18	-20	-16		
	5	2010-2015	2538	-15	-16	-13		
BBS Scotland	20	1995-2015	261	4	-5	16		
	10	2005-2015	312	-3	-8	4		
	5	2010-2015	319	-13	-17	-7		
BBS Wales	20	1995-2015	212	-13	-22	-3		
	10	2005-2015	245	-12	-19	-4		
	5	2010-2015	250	-8	-15	-1		
BBS N.Ireland	20	1995-2015	93	50	20	64		
	10	2005-2015	108	3	-5	12		
	5	2010-2015	106	4	-2	9		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

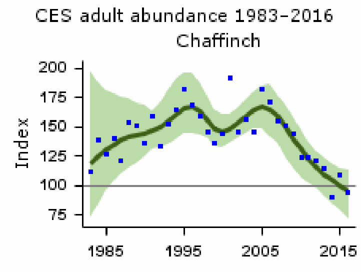
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



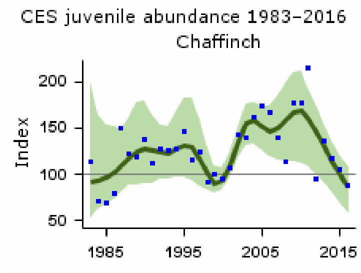
CBC/BBS UK graph



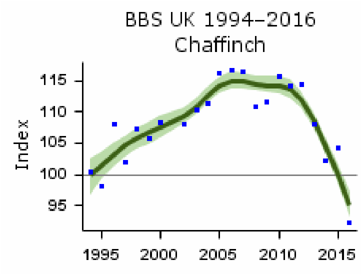
CBC/BBS England graph



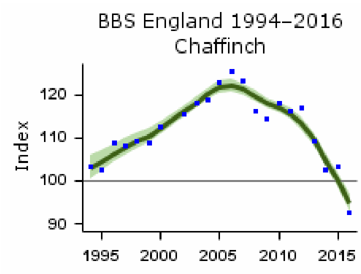
CES adults graph



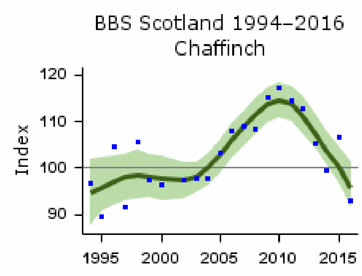
CES juveniles graph



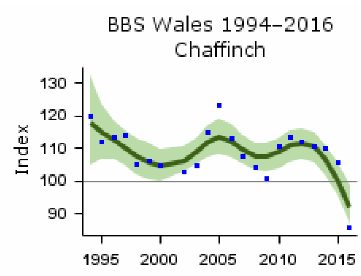
BBS UK graph



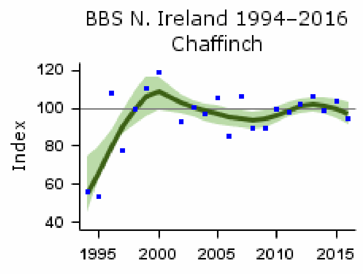
BBS England graph



BBS Scotland graph

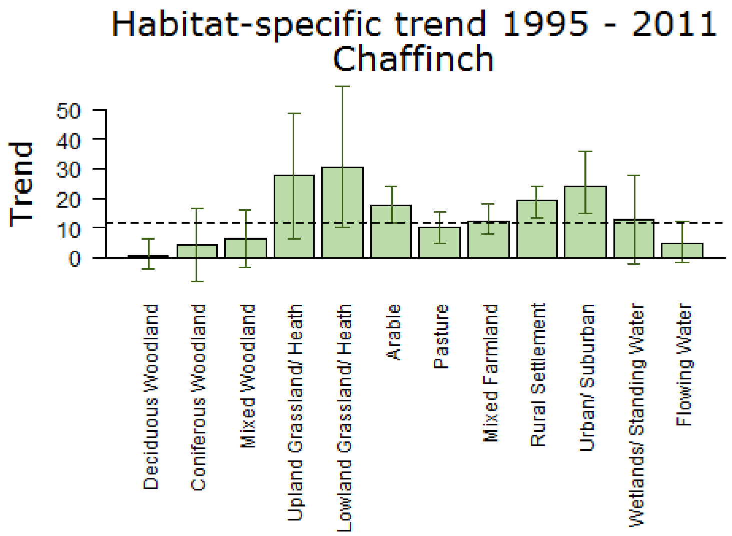


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



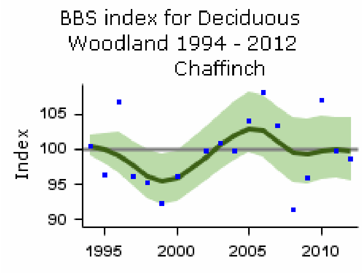
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

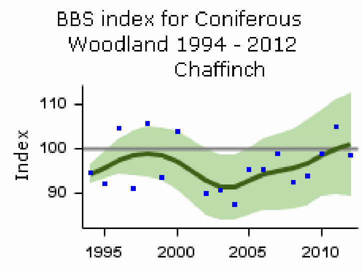
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	950	0	-4	6
Coniferous Woodland	16	1995-2011	289	4	-8	16
Mixed Woodland	16	1995-2011	532	6	-3	16
Upland Grassland/ Heath	16	1995-2011	64	28	6	49
Lowland Grassland/ Heath	16	1995-2011	218	31	10	58
Arable	16	1995-2011	868	17	12	24
Pasture	16	1995-2011	1445	10	5	15
Mixed Farmland	16	1995-2011	832	12	8	18
Rural Settlement	16	1995-2011	948	19	13	24
Urban/ Suburban	16	1995-2011	394	24	15	36
Wetlands/ Standing Water	16	1995-2011	108	13	-3	28
Flowing Water	16	1995-2011	582	5	-2	12

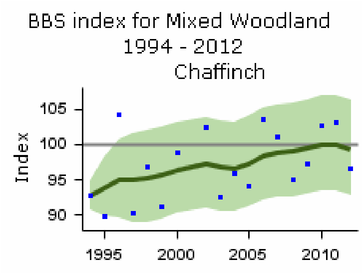
Further information on habitat-specific trends, please follow link here.



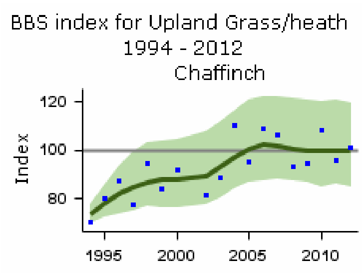
Habitat graph



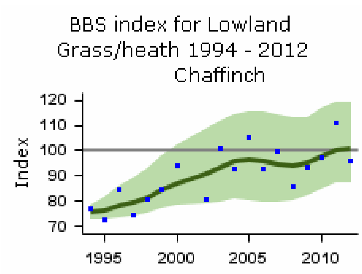
Habitat graph



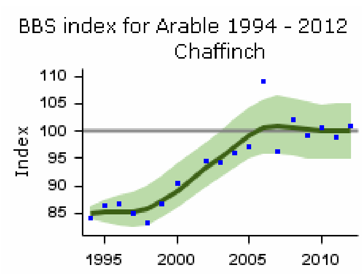
Habitat graph



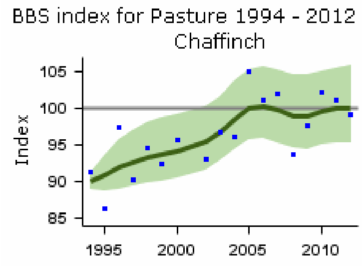
Habitat graph



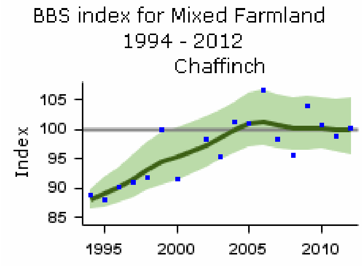
Habitat graph



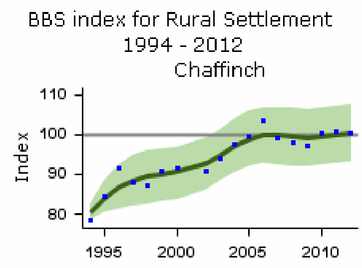
Habitat graph



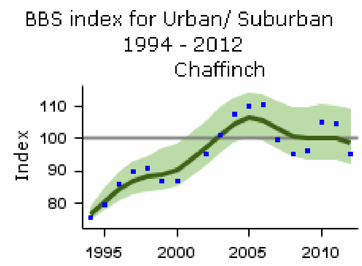
Habitat graph



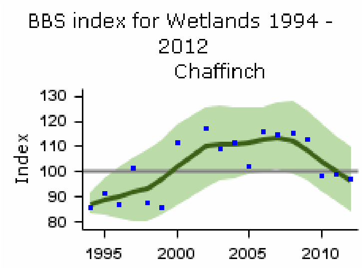
Habitat graph



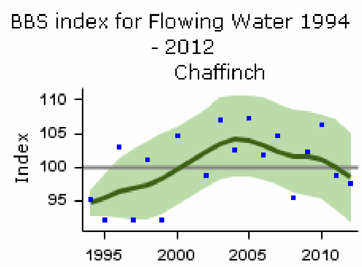
Habitat graph



Habitat graph

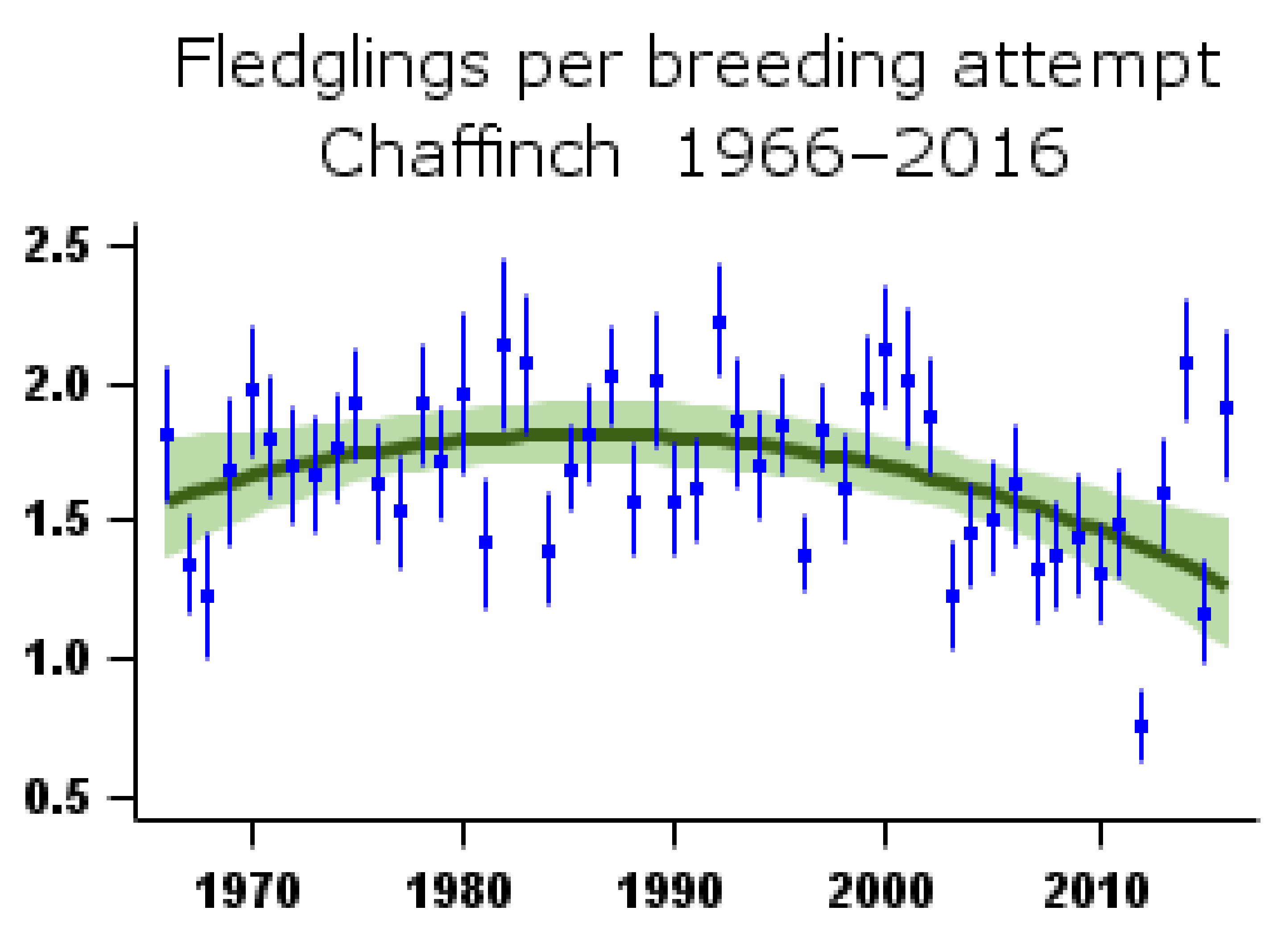


Habitat graph

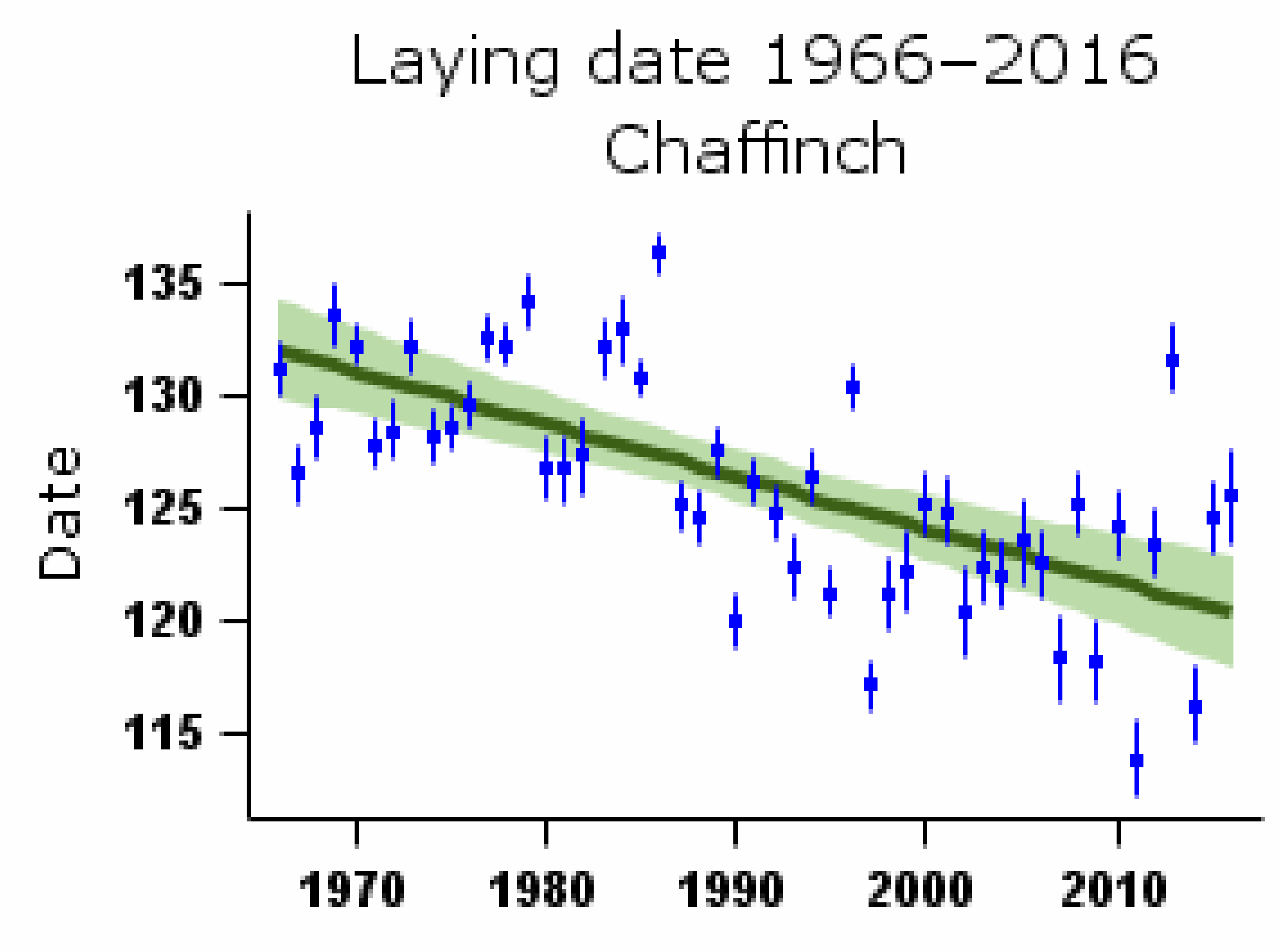


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

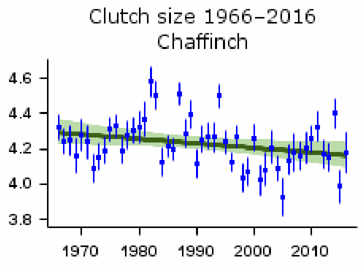


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

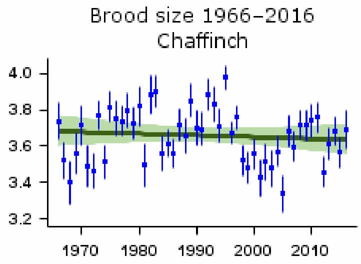
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	127	Curvilinear	1.60 fledglings	1.31 fledglings	-18.1%		
Clutch size	48	1967-2015	99	Linear decline	4.29 eggs	4.16 eggs	-2.9%		
Brood size	48	1967-2015	159	None					
Nest failure rate at egg stage	48	1967-2015	187	Curvilinear	2.98% nests/day	4.37% nests/day	46.6%		
Nest failure rate at chick stage	48	1967-2015	127	Curvilinear	2.99% nests/day	3.28% nests/day	9.7%		
Laying date	48	1967-2015	119	Linear decline	May 12	May 1	-11 days		
Juvenile to Adult ratio (CES)	31	1984-2015	84	Smoothed trend	64 Index value	100 Index value	56%		
Juvenile to Adult ratio (CES)	25	1990-2015	92	Smoothed trend	112 Index value	100 Index value	-11%		
Juvenile to Adult ratio (CES)	10	2005-2015	88	Smoothed trend	110 Index value	100 Index value	-9%		
Juvenile to Adult ratio (CES)	5	2010-2015	85	Smoothed trend	129 Index value	100 Index value	-23%		

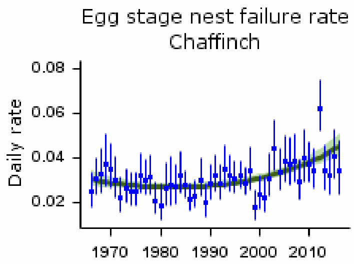
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



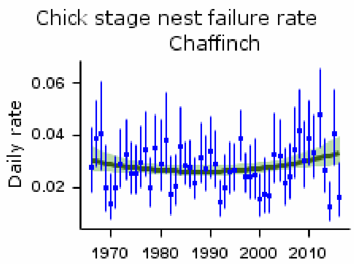
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



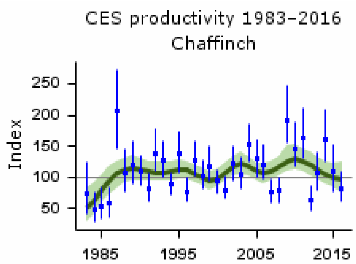
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



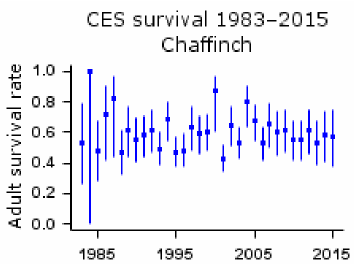
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Bullfinch

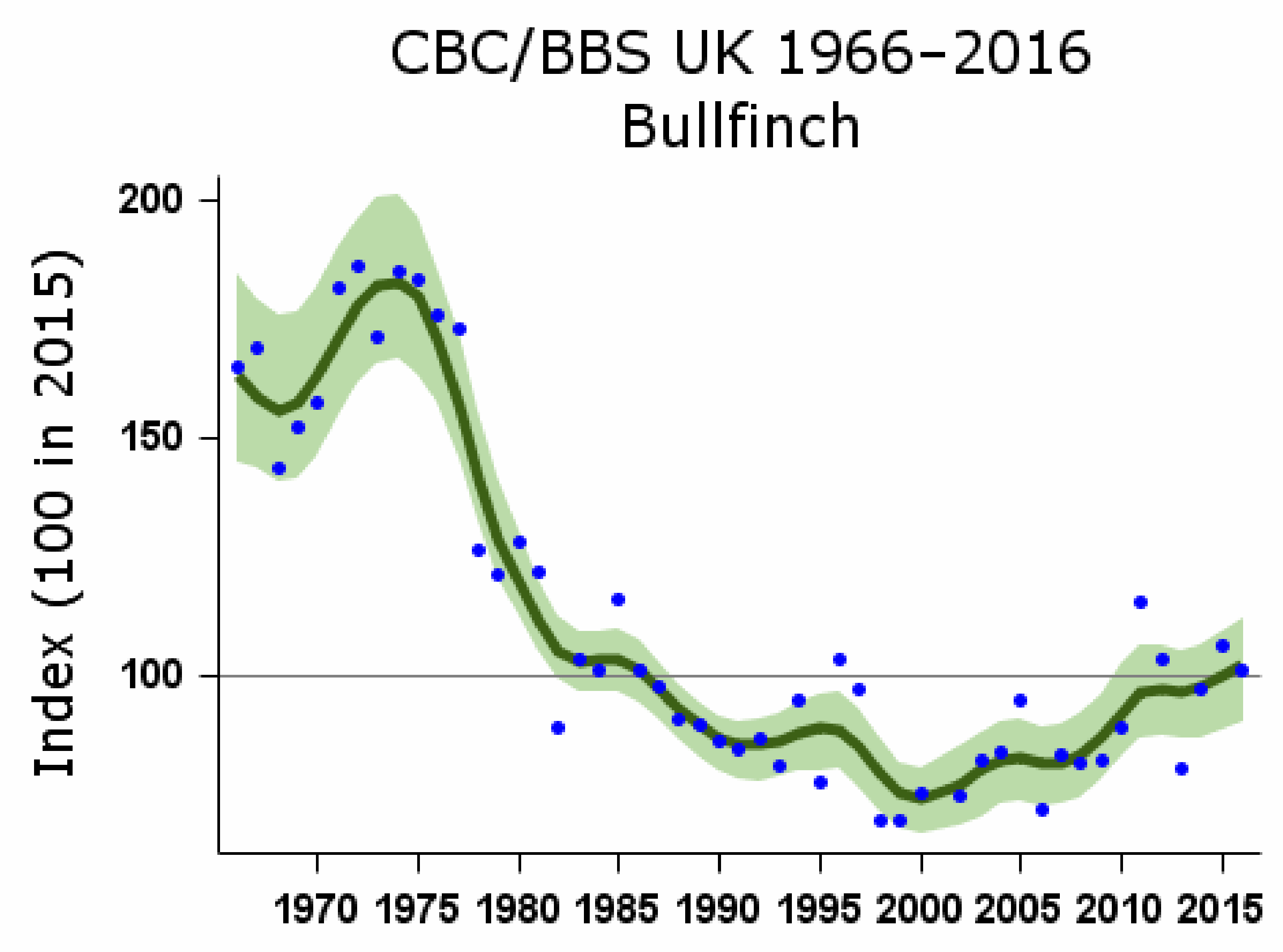
Pyrrhula pyrrhula

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK, England: moderate decline
Population size:	220,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

The UK Bullfinch population entered a long period of decline in the mid 1970s, following a period of relative stability. The decline was initially very steep, and more so in farmland than in wooded habitats, but became shallower and eventually ended around 2000, since when there has been some increase. CES and CBC/BBS both suggest there are large annual fluctuations around the overall long-term trend. The BBS Siriwardena et al. 1999, 2000b, 2001a), although a more recent study suggests that changes in adult survival may be important (Robinson et al. 2014). Agricultural intensification and a reduction in the structural and floristic diversity of woodland are suspected to have played a part through losses of food resources and nesting cover (Fuller et al. 2005). Alongside these factors, Proffitt et al. (2004) and Marquiss (2007) mention the constraints on survival outside the breeding season and the possible role of higher PECBMS 2016a). The UK conservation listing was downgraded from red to amber in 2009 (Eaton et al. 2009).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

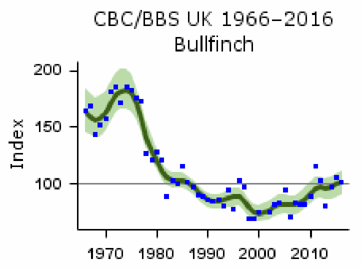
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	373	-37	-50	-23	>25	
	25	1990-2015	585	15	2	28		
	10	2005-2015	790	21	13	30		
	5	2010-2015	847	8	1	15		

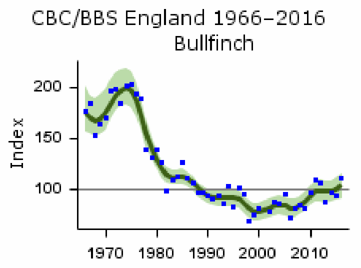
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	298	-41	-56	-27	>25	
	25	1990-2015	456	6	-6	18		
	10	2005-2015	608	20	11	28		
	5	2010-2015	658	6	0	11		
CES adults	31	1984-2015	82	-4	-27	23		
	25	1990-2015	88	-5	-25	13		
	10	2005-2015	85	18	3	34		
	5	2010-2015	88	5	-4	13		
CES juveniles	31	1984-2015	66	37	-10	139		
	25	1990-2015	71	53	7	102		
	10	2005-2015	70	52	20	89		
	5	2010-2015	73	14	-6	33		
BBS UK	20	1995-2015	650	10	0	19		
	10	2005-2015	790	21	12	29		
	5	2010-2015	847	9	1	14		
BBS England	20	1995-2015	501	6	-5	14		
	10	2005-2015	608	20	12	29		
	5	2010-2015	658	7	0	12		
BBS Scotland	20	1995-2015	46	46	1	84		
	10	2005-2015	59	46	23	93		
	5	2010-2015	62	14	-10	38		
BBS Wales	20	1995-2015	67	2	-16	24		
	10	2005-2015	77	-1	-19	14		
	5	2010-2015	80	13	-2	32		
BBS N.Ireland	20	1995-2015	34	31	-21	56		
	10	2005-2015	43	25	-4	67		
	5	2010-2015	44	5	-18	36		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

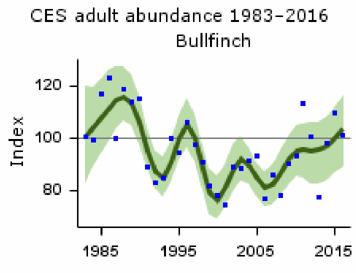
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



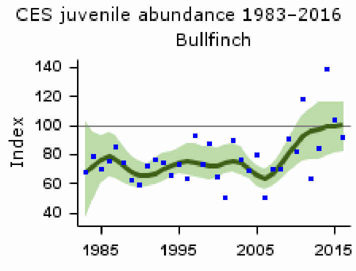
CBC/BBS UK graph



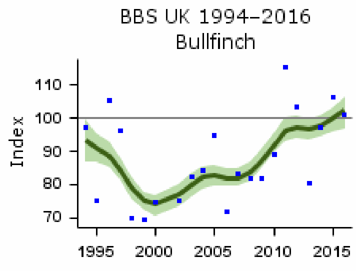
CBC/BBS England graph



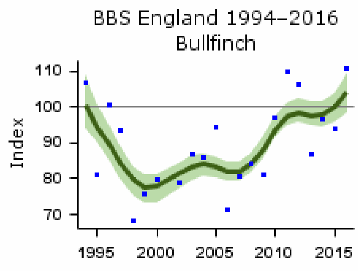
CES adults graph



CES juveniles graph



BBS UK graph



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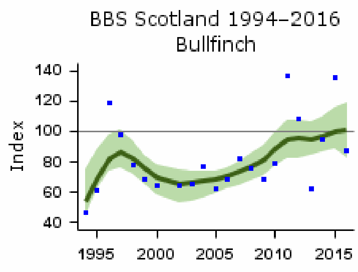
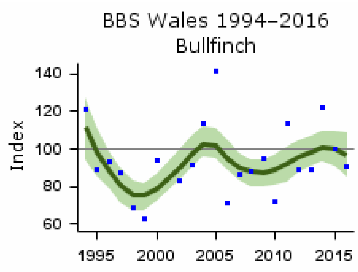
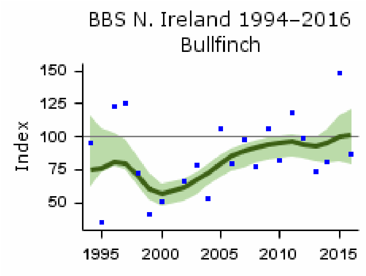


BBS Scotland graph

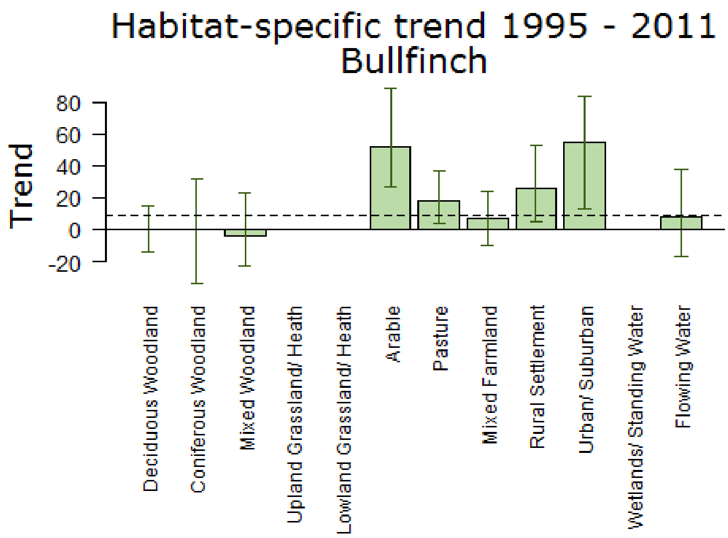


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



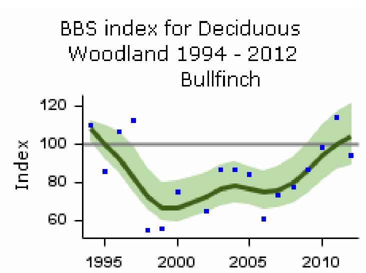
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

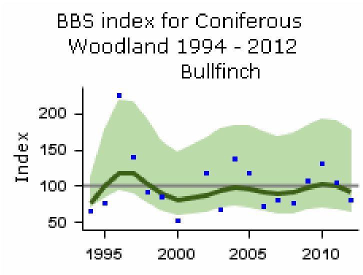
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	148	0	-14	15
Coniferous Woodland	16	1995-2011	33	0	-34	32
Mixed Woodland	16	1995-2011	76	-4	-23	23
Arable	16	1995-2011	94	52	27	89
Pasture	16	1995-2011	221	18	4	37
Mixed Farmland	16	1995-2011	77	7	-10	24
Rural Settlement	16	1995-2011	121	26	4	53
Urban/ Suburban	16	1995-2011	48	55	13	84
Flowing Water	16	1995-2011	64	8	-17	38

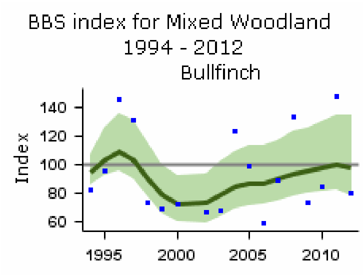
Further information on habitat-specific trends, please follow link here.



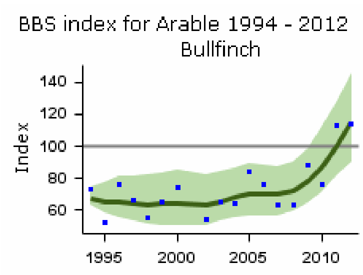
Habitat graph



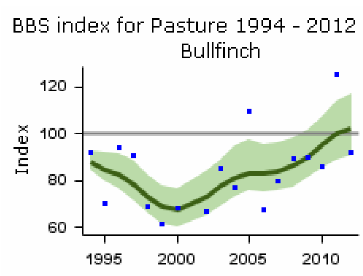
Habitat graph



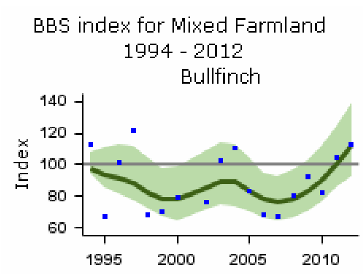
Habitat graph



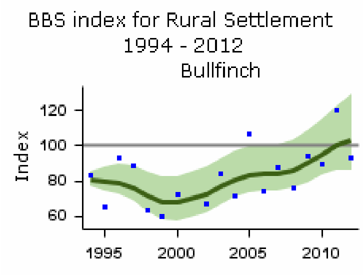
Habitat graph



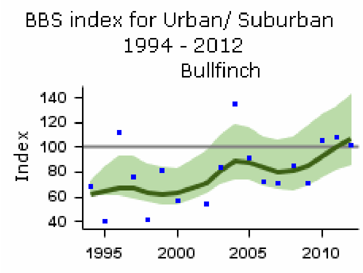
Habitat graph



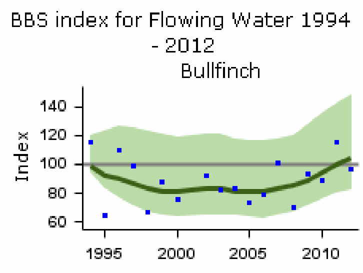
Habitat graph



Habitat graph

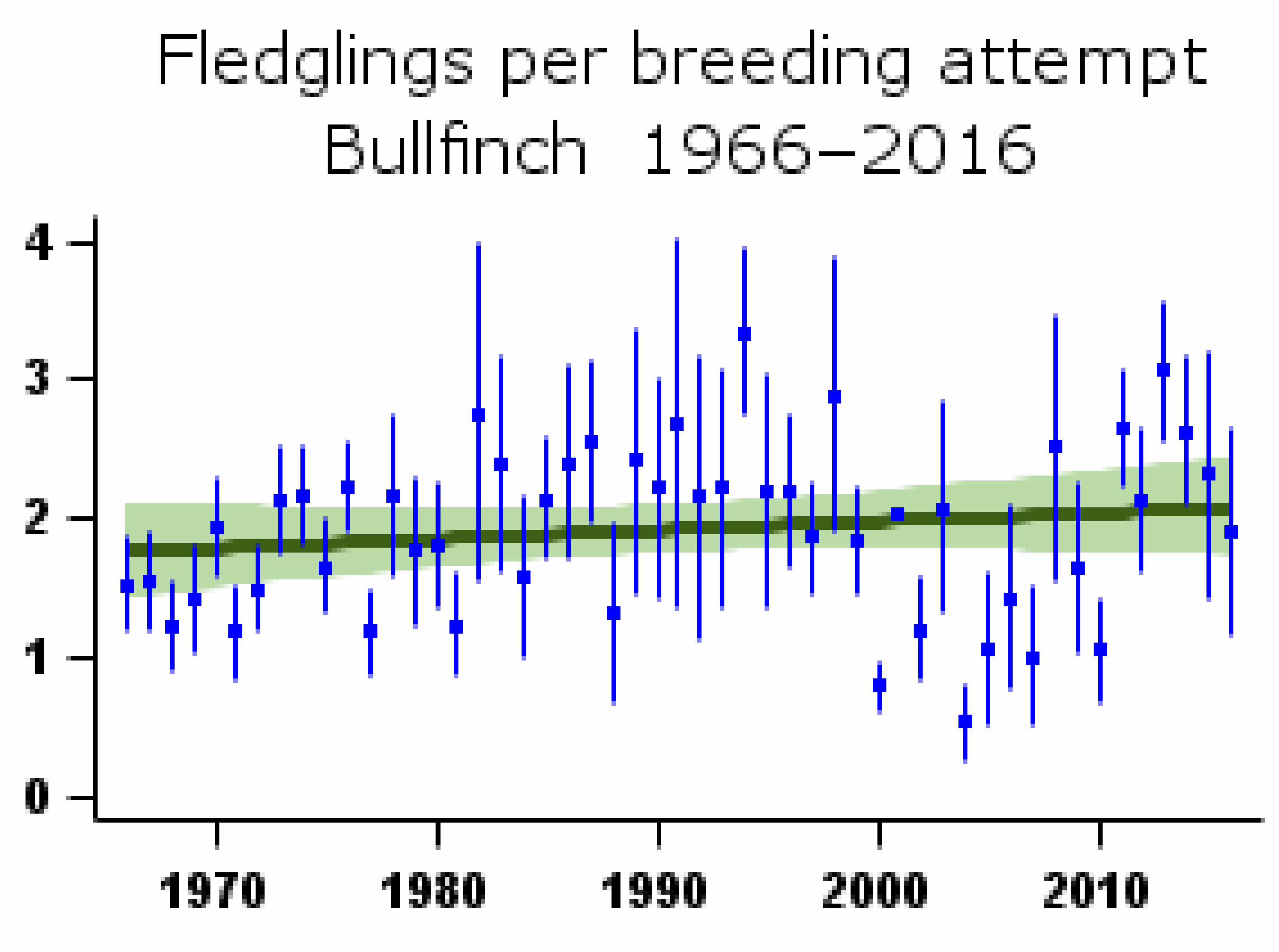


Habitat graph

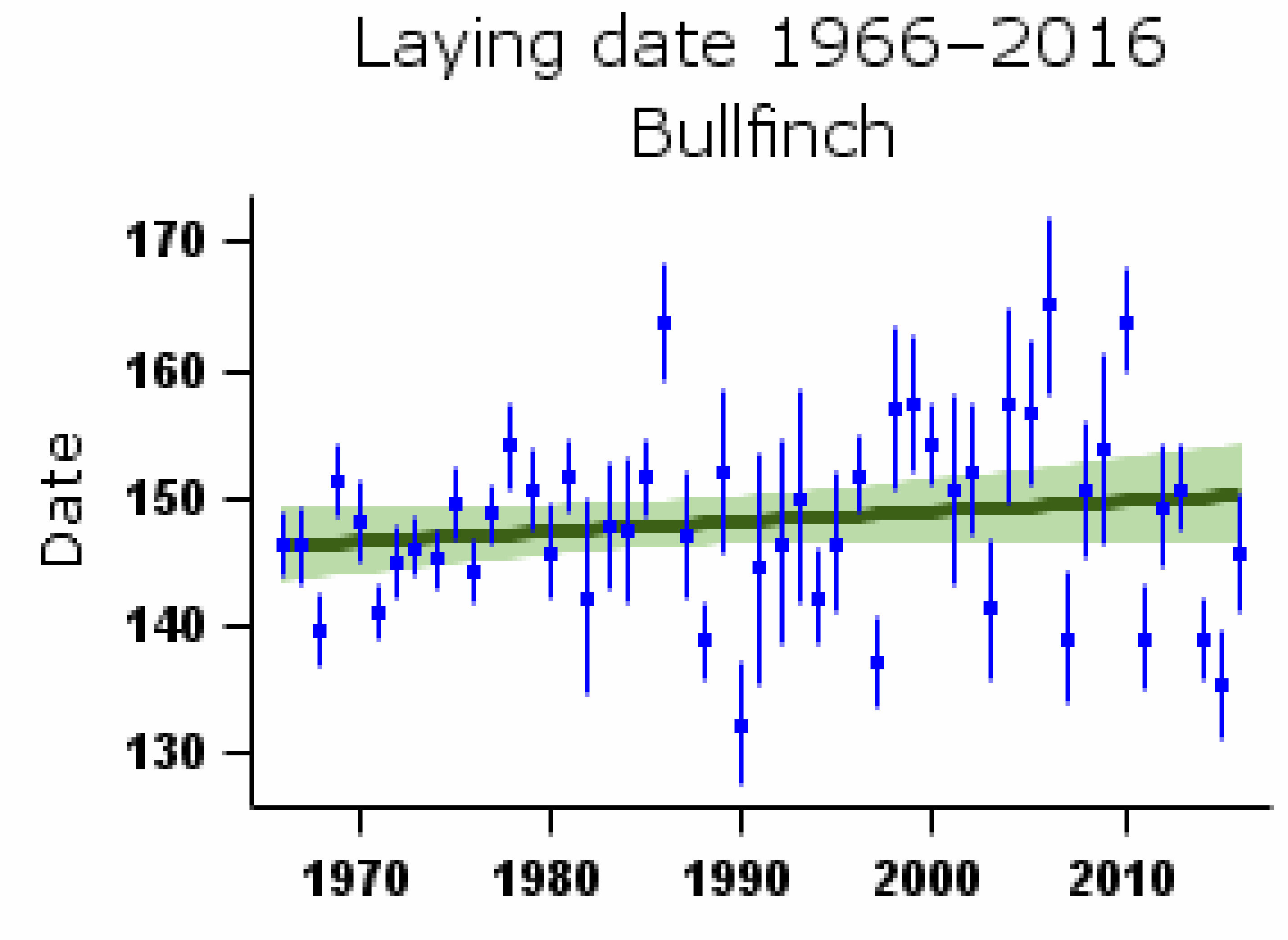


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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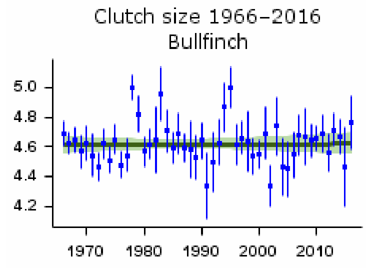
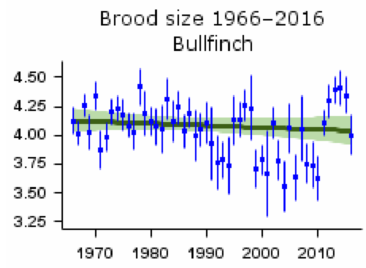
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	33	None					
Clutch size	48	1967-2015	35	None					
Brood size	48	1967-2015	37	None					
Nest failure rate at egg stage	48	1967-2015	50	None					
Nest failure rate at chick stage	48	1967-2015	34	None					
Laying date	48	1967-2015	33	None			0 days		
Juvenile to Adult ratio (CES)	31	1984-2015	86	Smoothed trend	87 Index value	100 Index value	15%		
Juvenile to Adult ratio (CES)	25	1990-2015	93	Smoothed trend	61 Index value	100 Index value	63%		
Juvenile to Adult ratio (CES)	10	2005-2015	89	Smoothed trend	83 Index value	100 Index value	20%		
Juvenile to Adult ratio (CES)	5	2010-2015	92	Smoothed trend	87 Index value	100 Index value	16%		

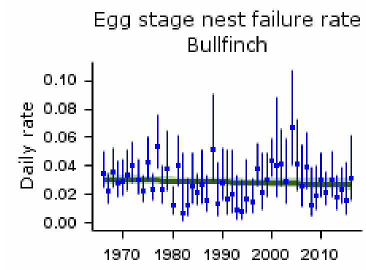
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



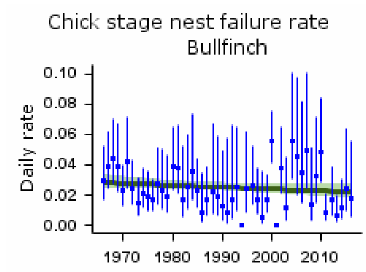
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



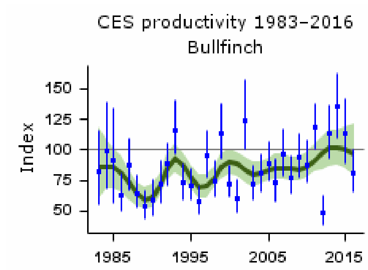
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



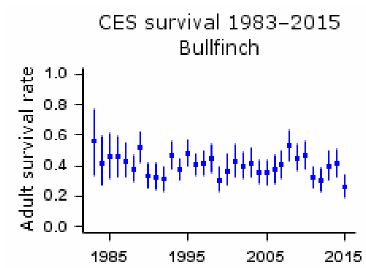
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Greenfinch

Chloris chloris

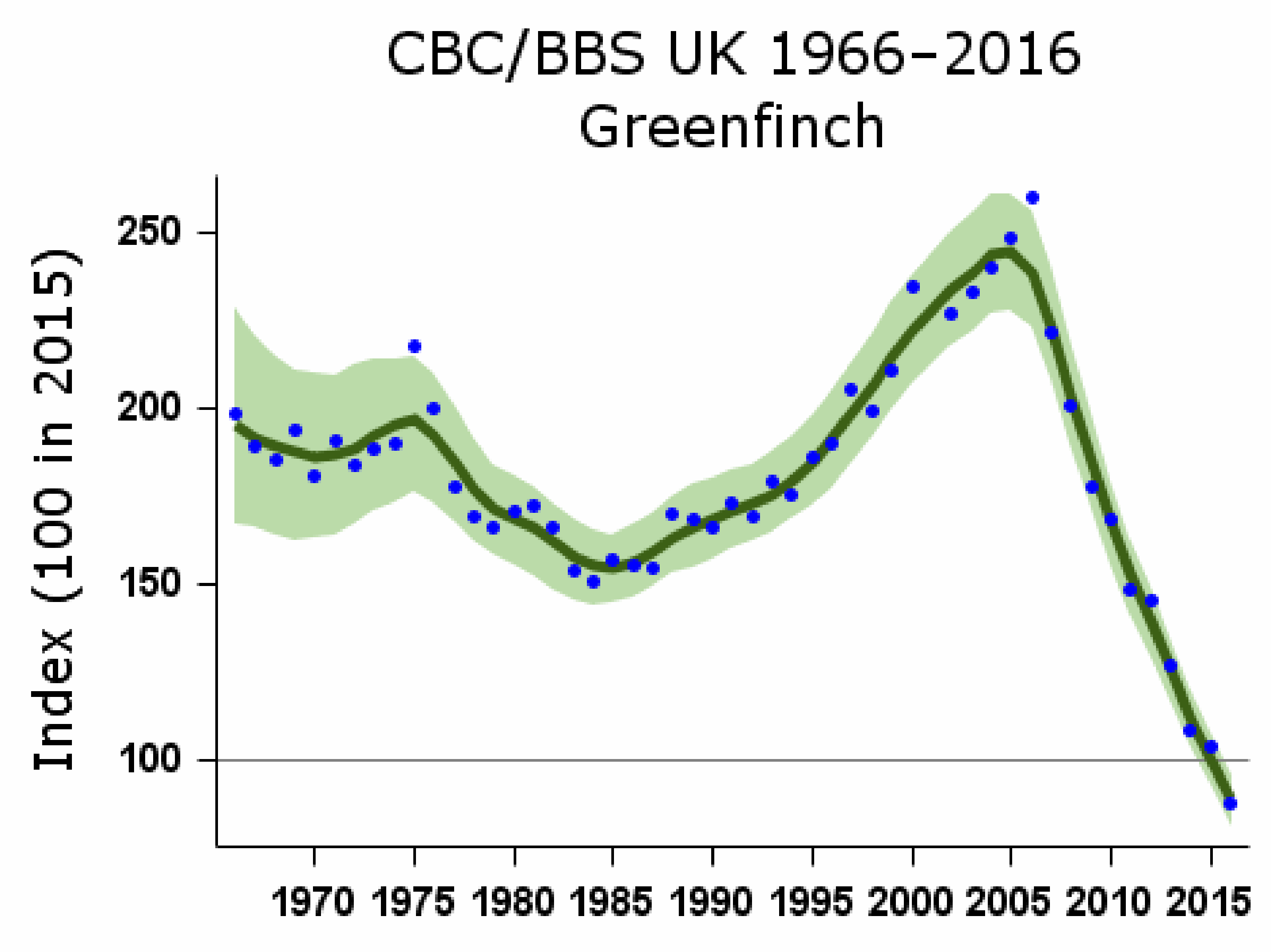
Key facts

Conservation listings:	Global: green; at race level, harrisoni red, chloris green
Long-term trend:	UK, England: moderate decline
Population size:	1.7 (1.6-1.8) million pairs in 2009 (APEP13: distance sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Greenfinch abundance fluctuated somewhat up to the mid 1990s, but there was little change in either survival or breeding performance during this period (Siriwardena et al. 1998b, 2000b). More recent CBC/BBS data indicate population increases widely across the UK, followed by a sudden sharp fall induced by a widespread and severe outbreak of trichomonosis, which affects the upper digestive tract, that began in 2005 (Robinson et al. 2010b, Lawson et al. 2012b). Although Greenfinch is currently still green listed in the UK, based on the trend at the time of the last review (Eaton et al. 2015), the current decline would raise an amber listing and caused it to be rated as 'Endangered' in a recent assessment of UK species which followed IUCN criteria and categories (Stanbury et al. 2017). Integrated population modelling shows that changes in survival have indeed been the strongest contributor to annual population change (Robinson et al. 2014).

The BBS Crick & Sparks 1999). Numbers across Europe have been broadly stable since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

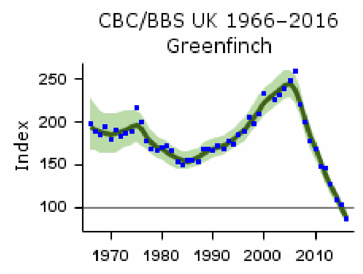
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	892	-48	-58	-33	>25	
	25	1990-2015	1578	-41	-47	-33	>25	
	10	2005-2015	2181	-59	-61	-57	>50	

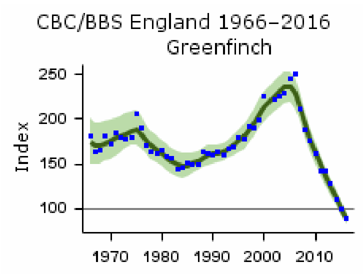
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	5	2010-2015	2059	-40	-43	-38	>25	
CBC/BBS England	48	1967-2015	755	-41	-54	-28	>25	
	25	1990-2015	1333	-38	-46	-29	>25	
	10	2005-2015	1843	-58	-59	-56	>50	
	5	2010-2015	1752	-38	-40	-36	>25	
CES adults	31	1984-2015	40	-21	-60	94		
	25	1990-2015	44	-50	-69	-12	>50	
	10	2005-2015	43	-59	-70	-46	>50	
	5	2010-2015	37	-38	-52	-19	>25	
CES juveniles	31	1984-2015	30	-75	-86	-28	>50	
	25	1990-2015	34	-77	-87	-41	>50	
	10	2005-2015	38	-47	-63	-26	>25	
	5	2010-2015	36	-61	-70	-45	>50	
BBS UK	20	1995-2015	1856	-46	-48	-42	>25	
	10	2005-2015	2181	-59	-61	-57	>50	
	5	2010-2015	2059	-40	-42	-39	>25	
BBS England	20	1995-2015	1565	-43	-46	-40	>25	
	10	2005-2015	1843	-58	-59	-55	>50	
	5	2010-2015	1752	-38	-41	-36	>25	
BBS Scotland	20	1995-2015	111	-55	-68	-40	>50	
	10	2005-2015	130	-59	-67	-50	>50	
	5	2010-2015	117	-47	-57	-39	>25	
BBS Wales	20	1995-2015	117	-52	-64	-40	>50	
	10	2005-2015	133	-66	-71	-60	>50	
	5	2010-2015	124	-50	-59	-42	>50	
BBS N.Ireland	20	1995-2015	49	-52	-72	-19	>50	
	10	2005-2015	57	-75	-80	-68	>50	
	5	2010-2015	46	-50	-60	-38	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

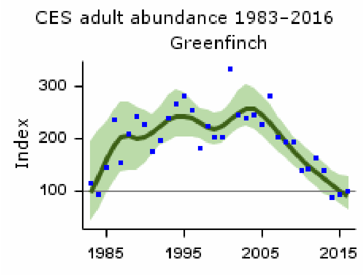
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



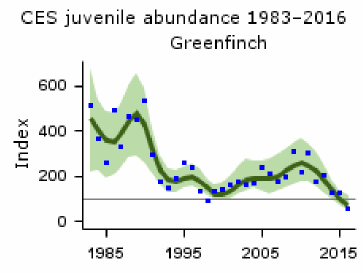
CBC/BBS UK graph



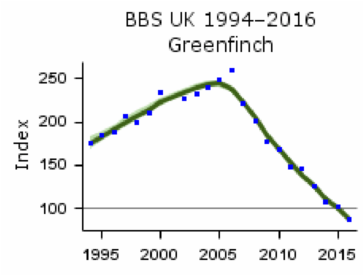
CBC/BBS England graph



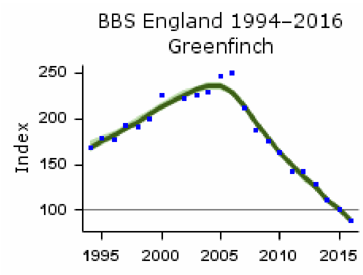
CES adults graph



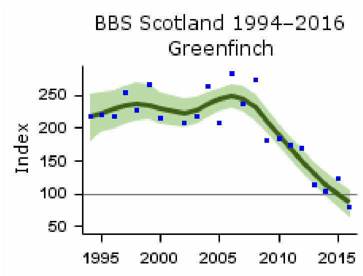
CES juveniles graph



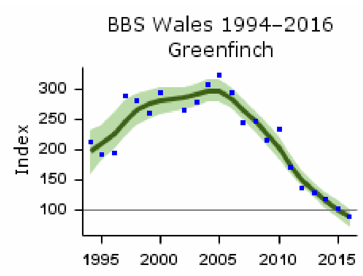
BBS UK graph



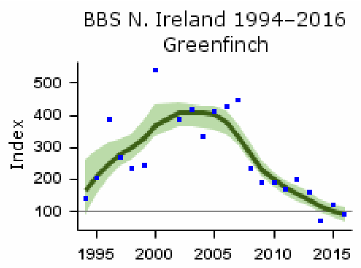
BBS England graph



BBS Scotland graph

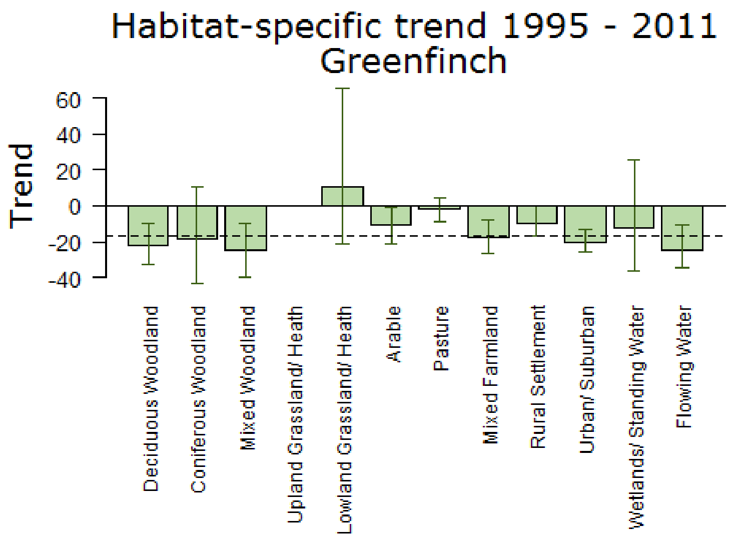


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



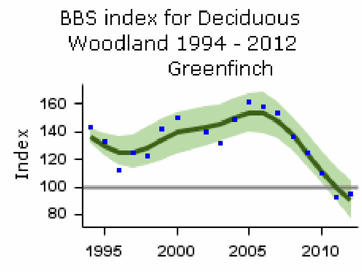
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

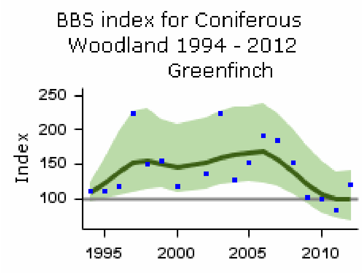
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	353	-23	-33	-10
Coniferous Woodland	16	1995-2011	48	-18	-43	11
Mixed Woodland	16	1995-2011	153	-25	-40	-9
Lowland Grassland/ Heath	16	1995-2011	58	10	-21	66
Arable	16	1995-2011	468	-10	-21	-1
Pasture	16	1995-2011	843	-2	-9	5
Mixed Farmland	16	1995-2011	437	-18	-27	-8
Rural Settlement	16	1995-2011	698	-10	-17	0
Urban/ Suburban	16	1995-2011	377	-21	-26	-13
Wetlands/ Standing Water	16	1995-2011	49	-12	-37	26
Flowing Water	16	1995-2011	252	-25	-35	-11

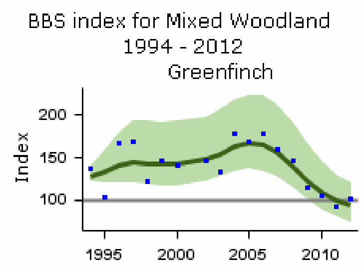
Further information on habitat-specific trends, please follow link here.



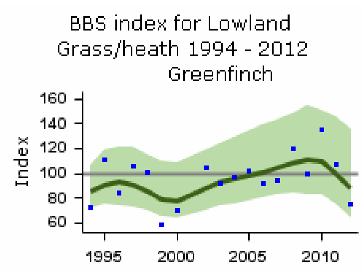
Habitat graph



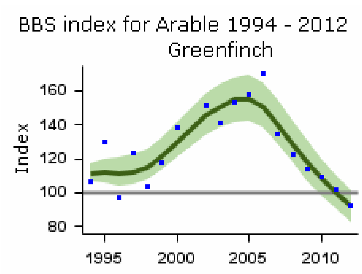
Habitat graph



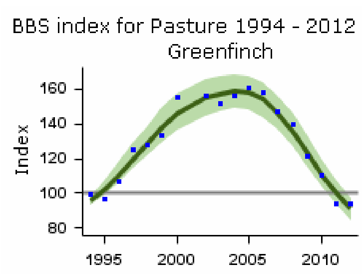
Habitat graph



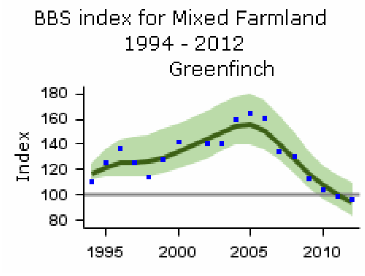
Habitat graph



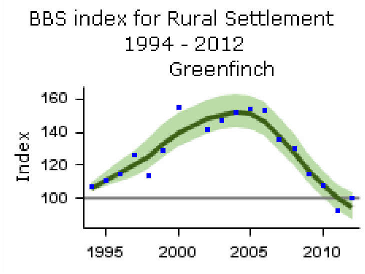
Habitat graph



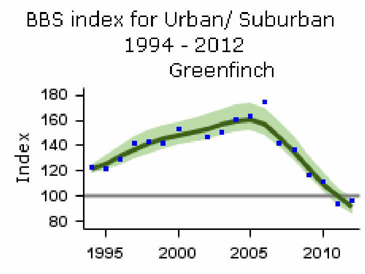
Habitat graph



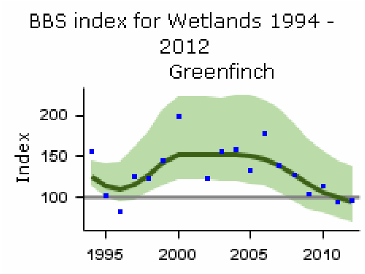
Habitat graph



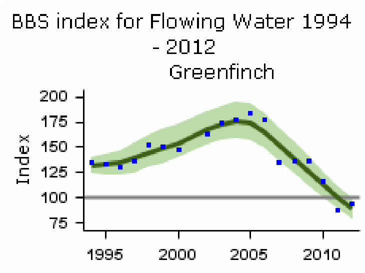
Habitat graph



Habitat graph

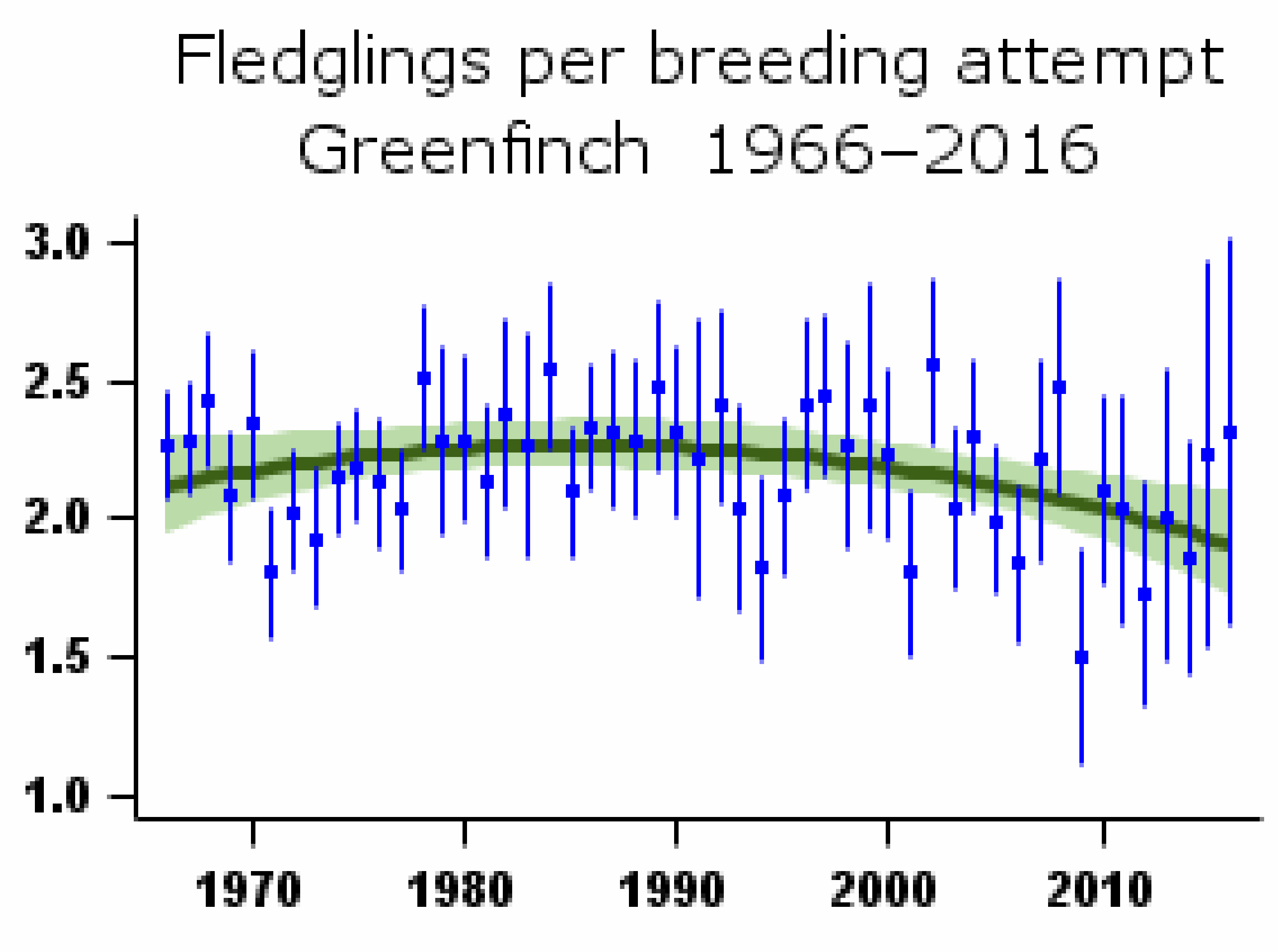


Habitat graph

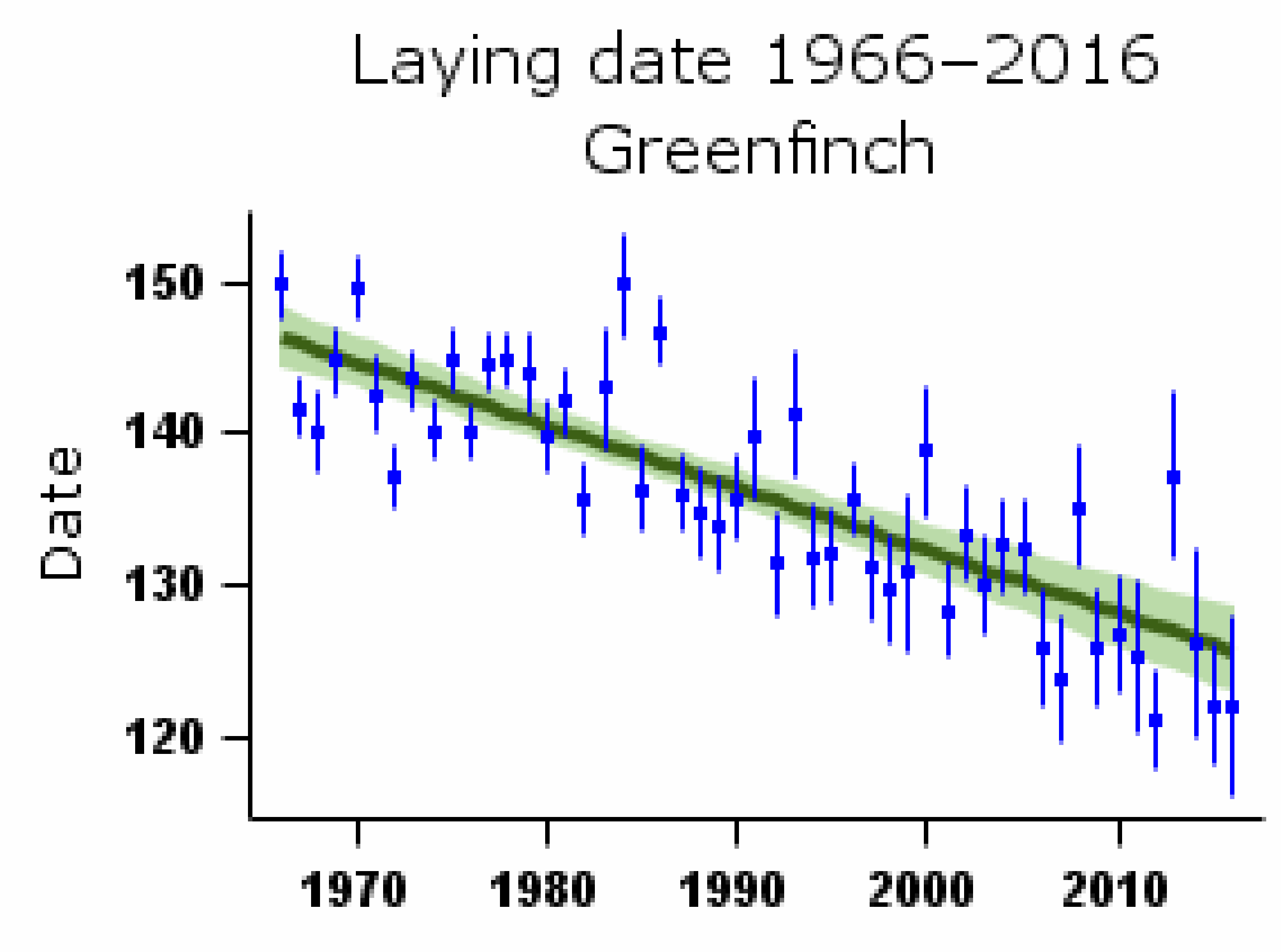


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

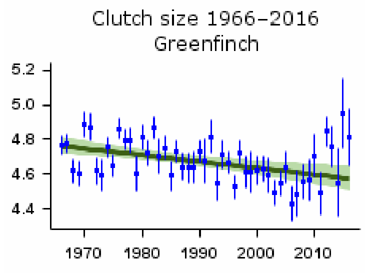


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

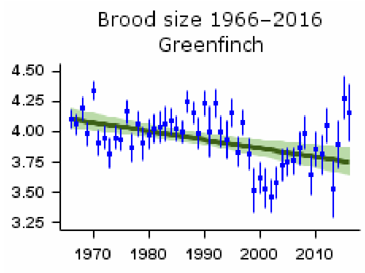
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	86	Curvilinear	2.14 fledglings	1.93 fledglings	-9.5%		
Clutch size	48	1967-2015	84	Linear decline	4.76 eggs	4.58 eggs	-3.7%		
Brood size	48	1967-2015	104	Linear decline	4.10 chicks	3.76 chicks	-8.3%		
Nest failure rate at egg stage	48	1967-2015	117	Curvilinear	2.74% nests/day	2.60% nests/day	-5.1%		
Nest failure rate at chick stage	48	1967-2015	86	None					
Laying date	48	1967-2015	86	Linear decline	May 26	May 6	-20 days		
Juvenile to Adult ratio (CES)	31	1984-2015	46	Smoothed trend	140 Index value	100 Index value	-29%		
Juvenile to Adult ratio (CES)	25	1990-2015	51	Smoothed trend	189 Index value	100 Index value	-47%	>25	
Juvenile to Adult ratio (CES)	10	2005-2015	52	Smoothed trend	84 Index value	100 Index value	19%		
Juvenile to Adult ratio (CES)	5	2010-2015	47	Smoothed trend	118 Index value	100 Index value	-15%		

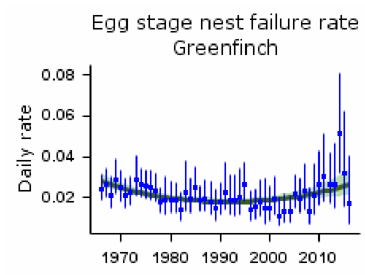
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



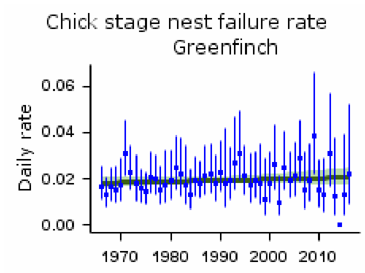
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



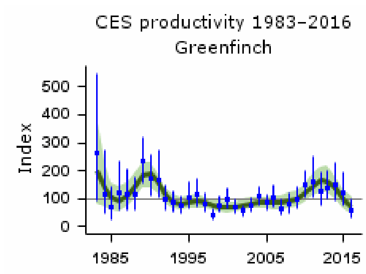
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



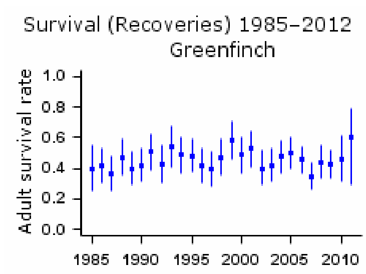
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year based on dead recoveries of ringed birds - error bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Linnet

Linaria cannabina

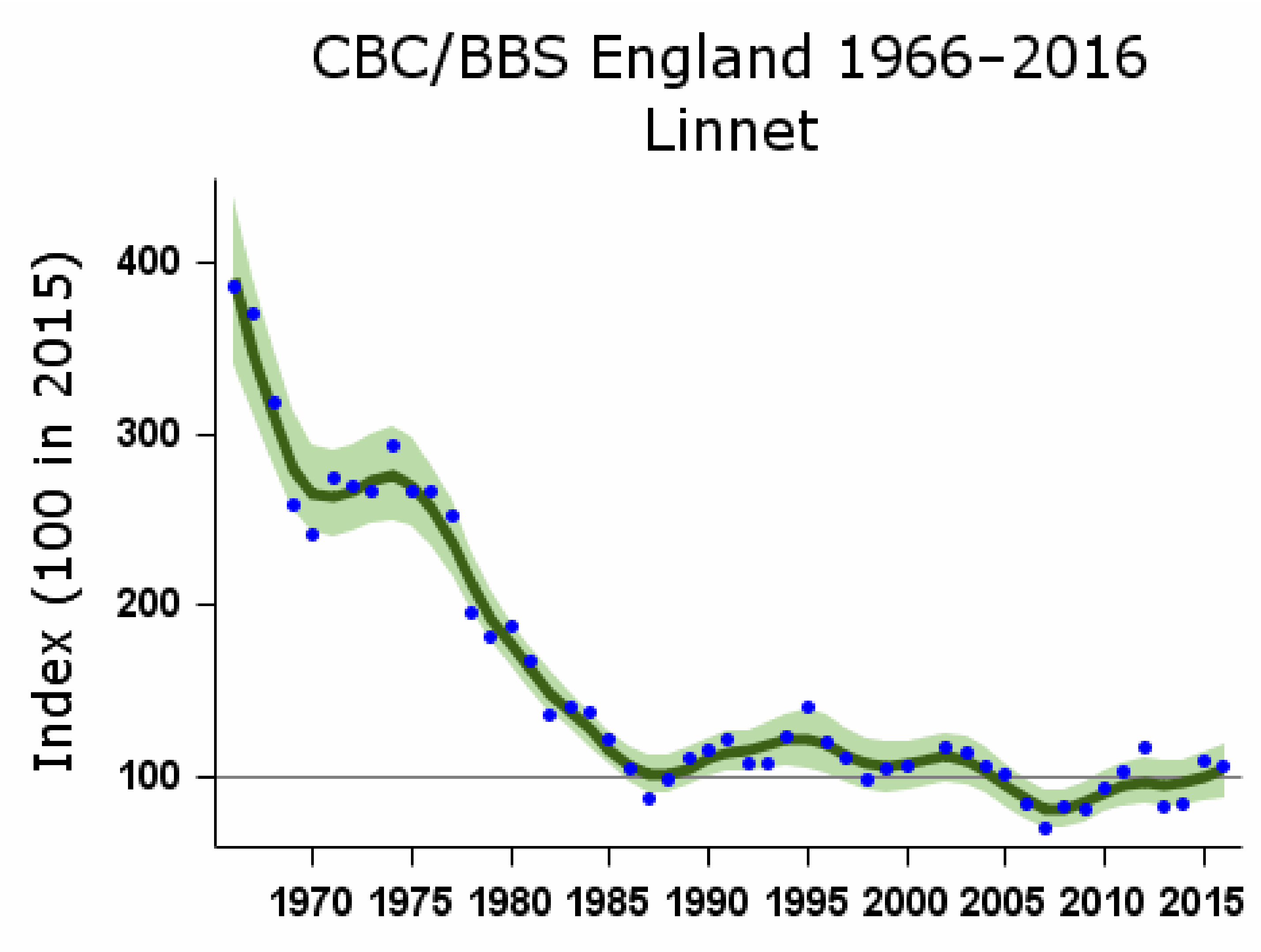
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	430,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend for England)

Migrant status:	Short-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Vegetation
Winter diet:	Vegetation

Status summary

Linnet abundance fell rapidly in the UK in the late 1960s, and again between the mid 1970s and mid 1980s, but decrease has been followed by a long period of relative stability. Numbers have fallen further since the start of BBS in 1994. The BBS PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

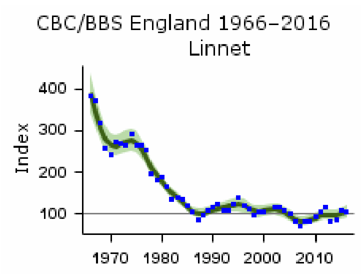
Population changes in detail

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

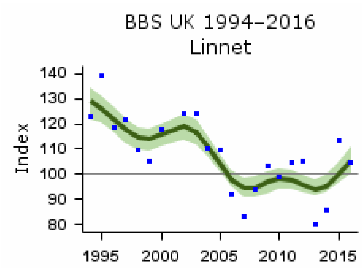
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	515	-71	-79	-63	>50	
	25	1990-2015	882	-9	-24	8		
	10	2005-2015	1130	5	-1	11		
	5	2010-2015	1183	11	5	16		
BBS UK	20	1995-2015	1259	-21	-27	-13		
	10	2005-2015	1399	-4	-10	2		
	5	2010-2015	1448	2	-4	9		
BBS England	20	1995-2015	1020	-20	-26	-13		
	10	2005-2015	1130	6	-1	12		
	5	2010-2015	1183	11	5	16		
BBS Scotland	20	1995-2015	96	-20	-38	3		
	10	2005-2015	108	-25	-38	-10	>25	
	5	2010-2015	103	-21	-37	-5		
BBS Wales	20	1995-2015	98	-9	-28	16		
	10	2005-2015	107	-5	-22	18		
	5	2010-2015	111	32	10	69		
BBS N.Ireland	20	1995-2015	37	-4	-40	36		
	10	2005-2015	43	-37	-56	-18	>25	
	5	2010-2015	40	-40	-61	-25	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

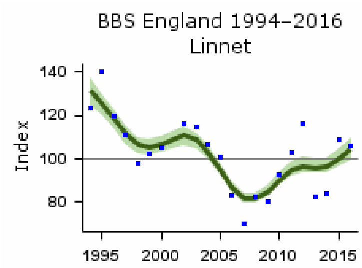
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



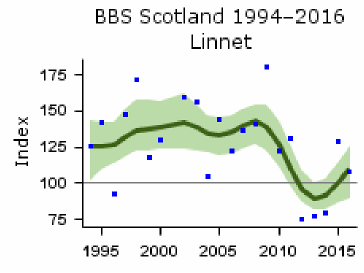
CBC/BBS England graph



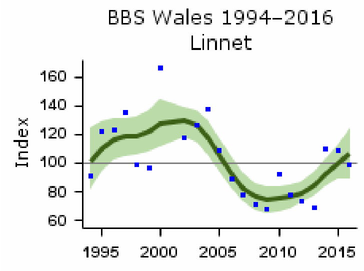
BBS UK graph



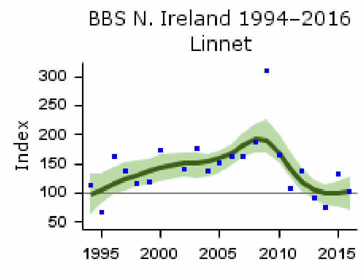
BBS England graph



BBS Scotland graph

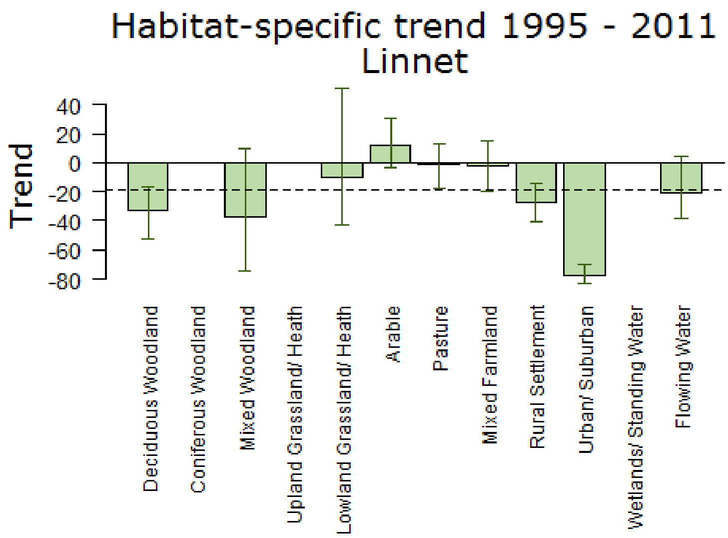


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

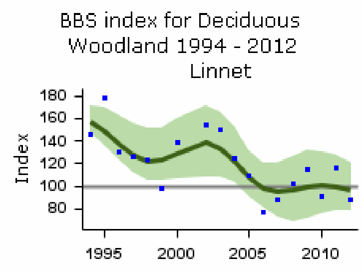
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

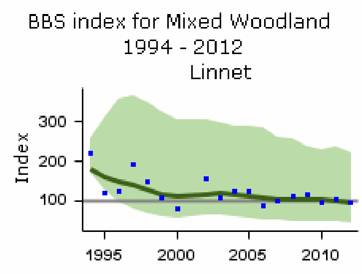
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	119	-33	-53	-16

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Mixed Woodland	16	1995-2011	46	-37	-75	10
Lowland Grassland/ Heath	16	1995-2011	71	-10	-43	51
Arable	16	1995-2011	313	12	-3	30
Pasture	16	1995-2011	468	-1	-18	13
Mixed Farmland	16	1995-2011	252	-2	-19	15
Rural Settlement	16	1995-2011	244	-28	-40	-14
Urban/ Suburban	16	1995-2011	65	-78	-83	-70
Flowing Water	16	1995-2011	93	-21	-38	4

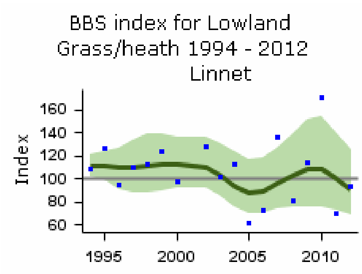
Further information on habitat-specific trends, please follow link here.



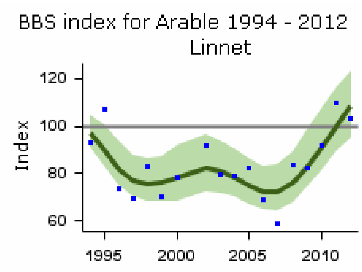
Habitat graph



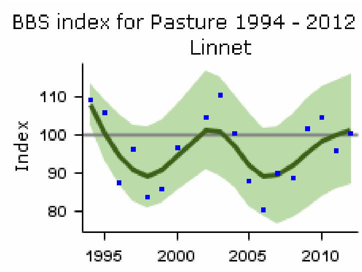
Habitat graph



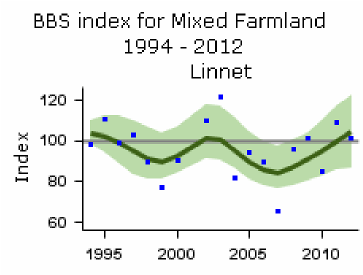
Habitat graph



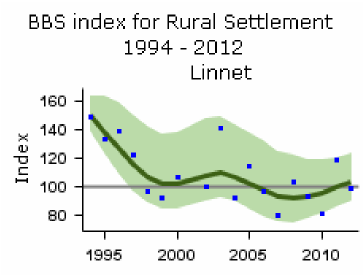
Habitat graph



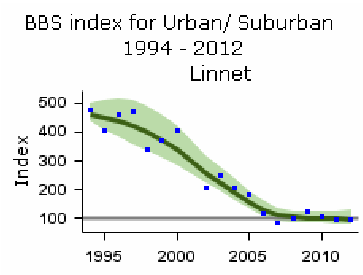
Habitat graph



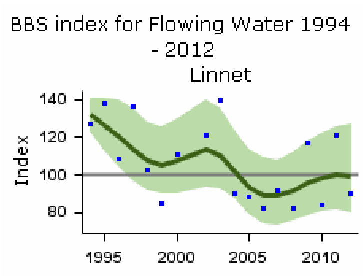
Habitat graph



Habitat graph

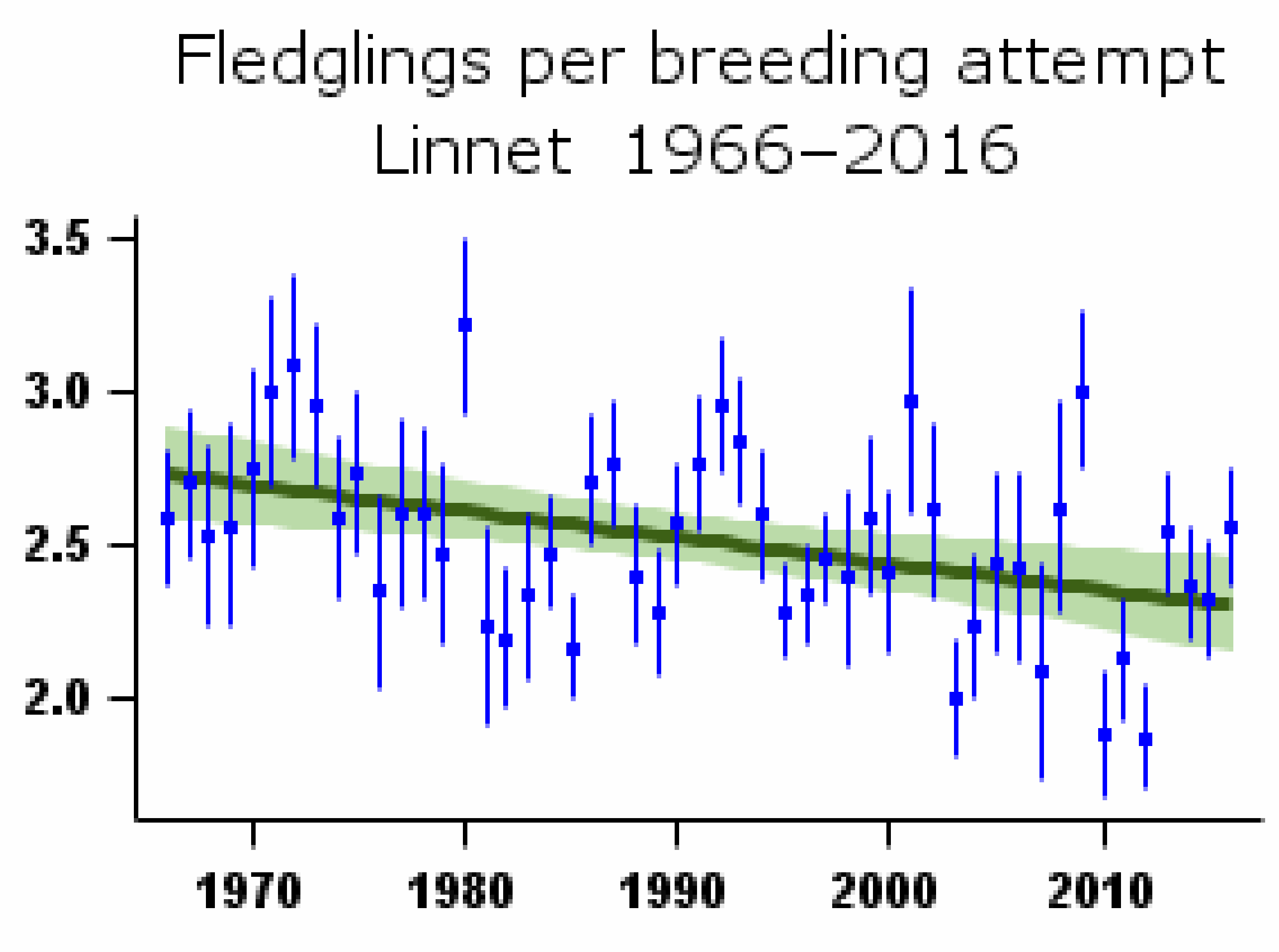


Habitat graph

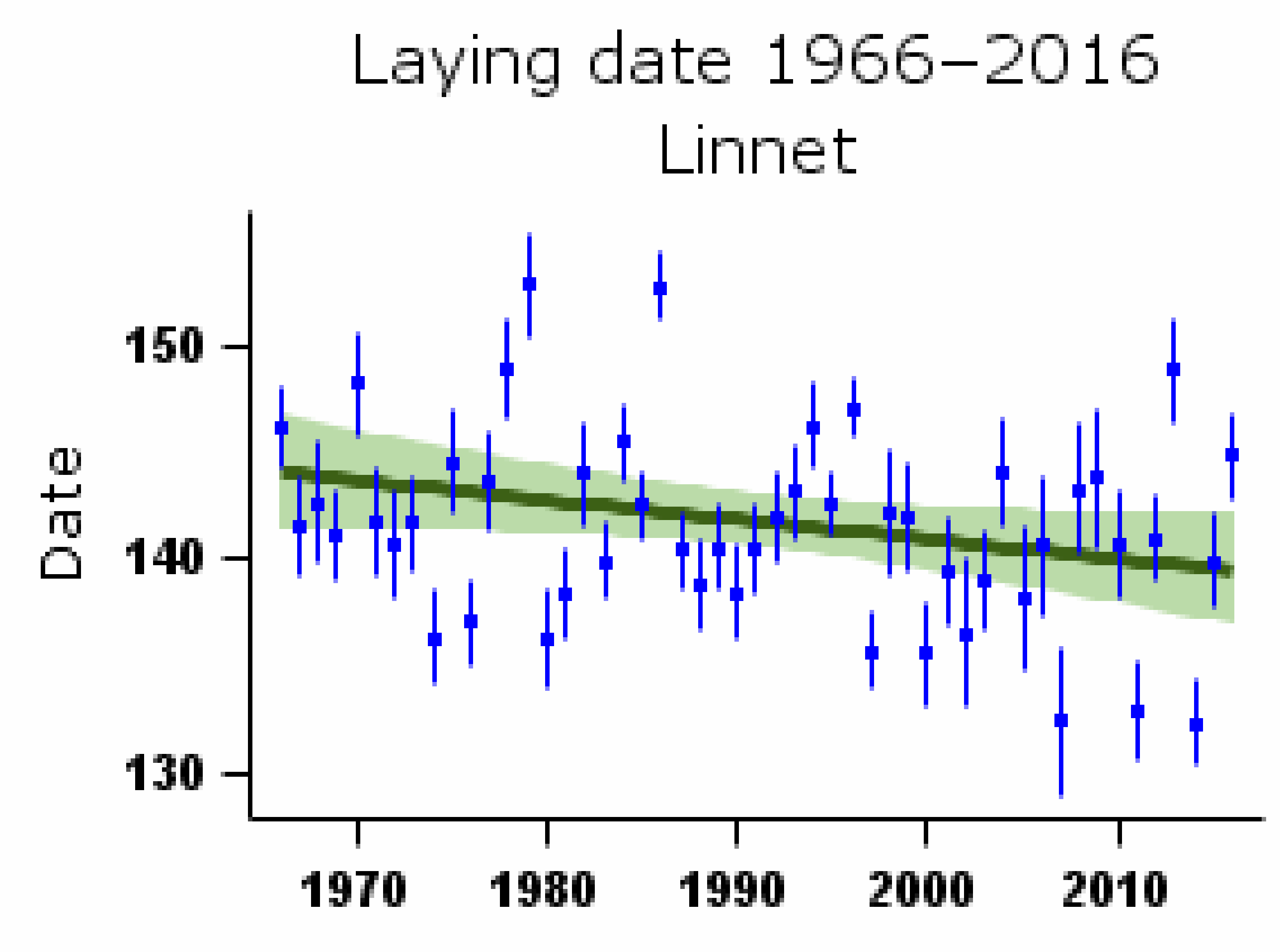


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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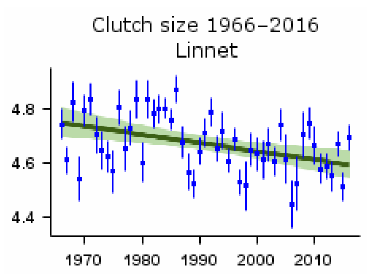
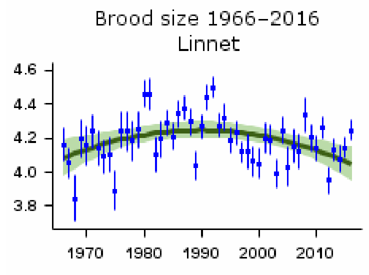
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	126	Linear decline	2.72 fledglings	2.31 fledglings	-15.2%		
Clutch size	48	1967-2015	127	Linear decline	4.75 eggs	4.60 eggs	-3.1%		
Brood size	48	1967-2015	145	Curvilinear	4.09 chicks	4.06 chicks	-0.9%		
Nest failure rate at egg stage	48	1967-2015	176	Linear increase	1.84% nests/day	2.38% nests/day	29.3%		
Nest failure rate at chick stage	48	1967-2015	126	Linear increase	1.53% nests/day	2.31% nests/day	51.0%		
Laying date	48	1967-2015	128	None			0 days		

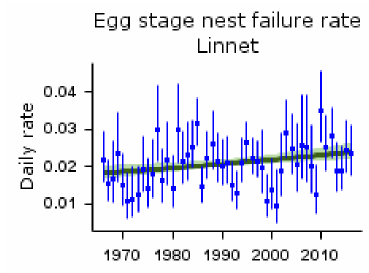
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



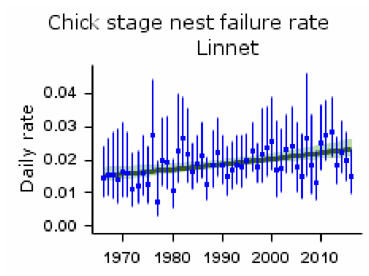
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



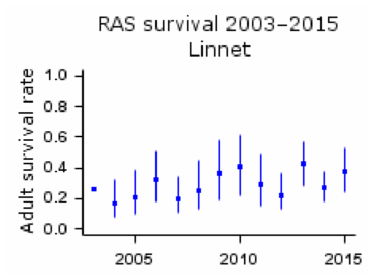
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of adult birds surviving to following year - error bars represent 95% confidence limits

Causes of change

There is convincing evidence that nest failure rates rose during the principal period of population decline and this represents the most likely demographic mechanism driving the observed decreases in abundance. The most likely ecological driver of this pattern is habitat impoverishment due to agricultural intensification.

Change factor	Primary driver	Secondary driver
Demographic	Decreased breeding success	
Ecological	Agricultural intensification	

Further information on causes of change

Siriwardena et al. (1999, 2000b) provide convincing evidence that nest failure rates at the egg stage rose during the principal period of population decline and this represents the most likely demographic mechanism driving the observed decrease in abundance. They found an obvious change in the egg-stage failure rate of Linnet nests after 1975 and this was detectable in the total fledglings produced, suggesting that the deterioration in breeding performance had an important role in driving the species' concurrent decline in abundance (Siriwardena et al. 2000b). Moorcroft & Wilson (2000) concur that the severe decline during the 1970s and 1980s occurred via a reduction in breeding success, attributing this to a reduction in the availability of breeding-season food supplies on arable farmland caused by agricultural intensification. However, they state that the precise demographic mechanism involved is unclear: instead of breeding performance per attempt, they suggest reductions in the number of nesting attempts being made by individual females or a reduction in immediate post-fledging survival due to resource limitations as more likely, although these hypotheses were not tested. BTO monitoring data do not permit analysis of these parameters but it is plausible that such effects occurred in parallel with the breeding success effects indicated by NRS results. Nevertheless, all these patterns are consistent with the results of Siriwardena et al. (1999), who reported that index change was not significantly correlated with adult and first-year survival. They found no significant trend-specific difference in survival, and survival rates in periods of decline were higher than those in periods of increase.

After 1986, egg-stage nest survival increased and this led to a slight increase in breeding performance, although, as with the earlier decline, greater numbers of breeding attempts or increased post-fledging survival may also have contributed to the ending of population decline (Siriwardena et al. 2000b, Wilson et al. 1996, Moorcroft et al. 1997). Increases in the crop area of oilseed rape are thought to have improved Linnet breeding success by compensating for the herbicide-mediated decline in many farmland weeds that were traditionally important in this species' summer diet (Moorcroft et al. 1997). Both the number of breeding attempts possible in a season and post-fledging survival could have increased in response to this improvement in food supplies, as could chick survival. Oddly, Siriwardena et al. (2001b) identified a significant negative effect of rape on breeding performance through the egg-stage daily nest failure rate and no positive effect on success through the nestling stage in a further analysis of nest record data. This is clearly inconsistent with the results of intensive work on Linnets (Wilson et al. 1996, Moorcroft et al. 1997), perhaps reflecting the different geographical biases affecting nest records and this particular intensive study. Nevertheless, it suggests that environmental effects on Linnet breeding success show complex spatial variation and that the knock-on effects on trends in abundance could also be difficult to characterise.

The current long-term pattern, spanning the Linnet's periods of decrease and relative stability, is of linear increase in nest failure rates and linear decline in the number of fledglings per breeding attempt.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Lesser Redpoll

Acanthis cabaret

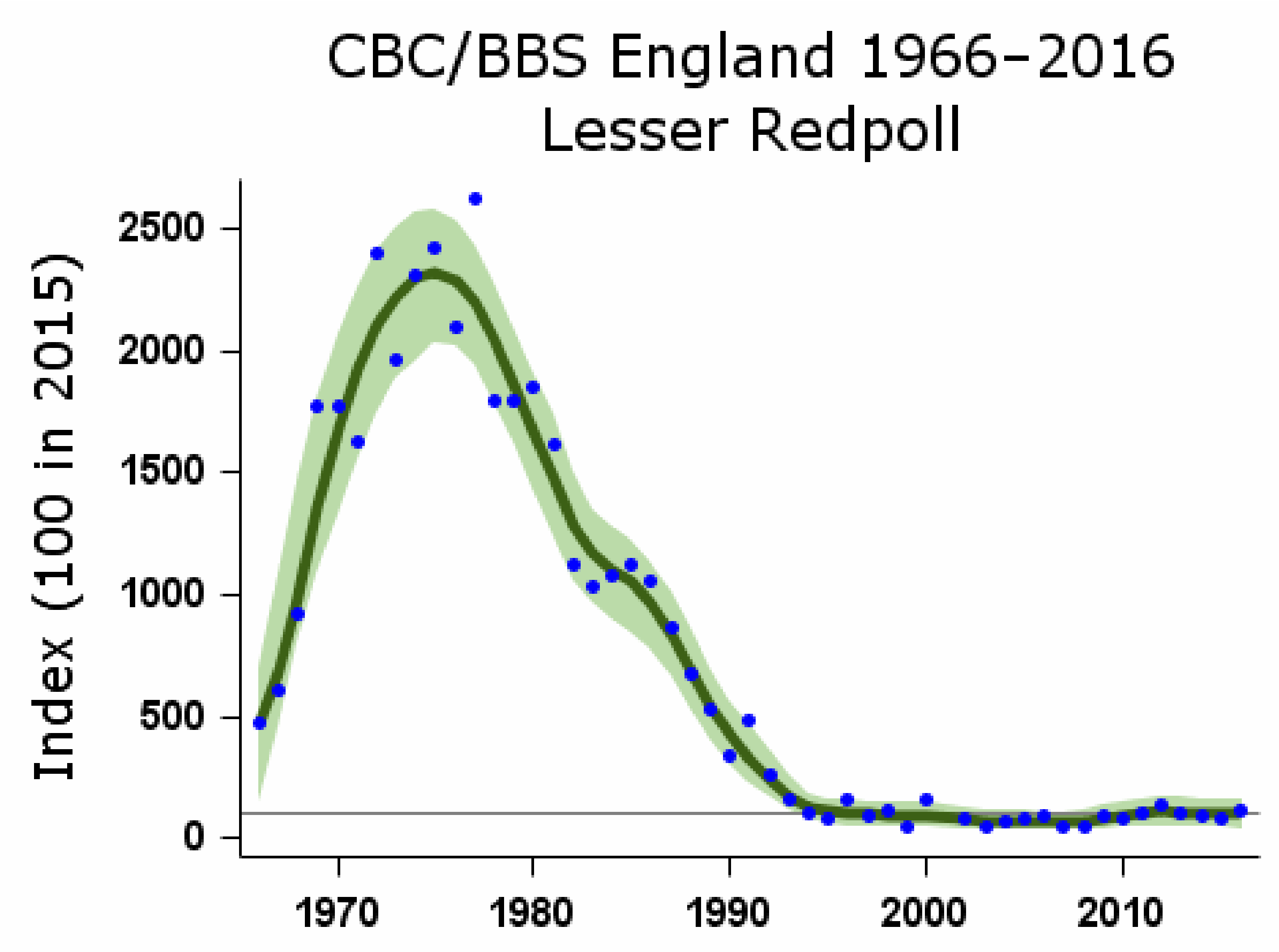
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	England: rapid decline
Population size:	220,000 pairs in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Short-distance migrant
Nesting habitat:	Above-ground nester
Primary breeding habitat:	Woodland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Lesser Redpolls were abundant and widespread in lowland Britain in the 1970s, and frequent then on CBC and CES plots, but, concurrent with a sustained period of severe decline, have withdrawn completely as breeding birds from large areas of lowland England (Balmer et al. 2013). Uncertainty about the representativeness of the monitoring data prior to the establishment of BBS initially denied the species a place among birds of conservation concern, since it was thought possible that the populatior may have withdrawn from the lowlands to northern and western UK regions, where monitoring prior to 1994 was less effective. Since a range contraction of 11% between 1968-72 and 1988-91 was evident in all parts of the UK (Gibbons et al. 1993), however, it is perhaps more likely that decrease was general. Accordingly the species was moved from green to amber in 2002 and in 2009 to the red list. Since Acanthis cabaret is currently treated by BOU as a separate species from the Common Redpoll A. flammea, and has a restricted range that lies wholly within western Europe, it arguably warrants a European conservation listing at the next review. The taxonomic status o cabaret remains controversial, however (Stoddart 2013). Recent UK data show a shallow increase although, especially in lowland areas, the population remains very severely depleted. A rapid increase has been recorded in the Republic of Ireland since 1998 (Crowe 2012). The European trend for cabaret and flammea together is of moderate decline since 1980 (PECBMS 2016a).



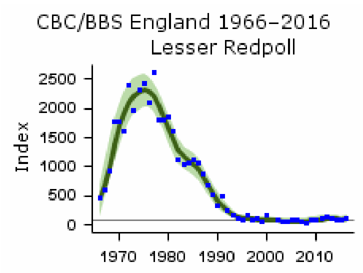
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

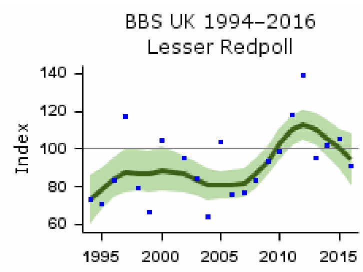
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	51	-85	-95	-68	>50	
	25	1990-2015	60	-77	-92	-57	>50	Small CBC sample
	10	2005-2015	84	47	5	89		
	5	2010-2015	89	14	-23	53		
BBS UK	20	1995-2015	177	27	1	60		
	10	2005-2015	218	24	4	49		
	5	2010-2015	231	-2	-16	17		
BBS England	20	1995-2015	69	-3	-34	46		
	10	2005-2015	84	48	4	94		
	5	2010-2015	89	15	-15	47		
BBS Scotland	20	1995-2015	52	40	-5	103		
	10	2005-2015	65	48	6	96		
	5	2010-2015	67	9	-15	34		
BBS N.Ireland	20	1995-2015	31	9	.	.		
	10	2005-2015	38	-32	.	.	>25	
	5	2010-2015	36	-42	.	.	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

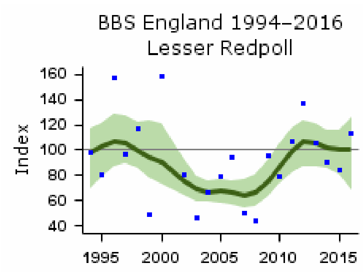
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



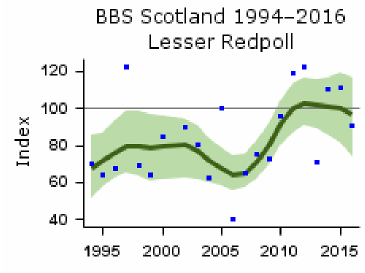
CBC/BBS England graph



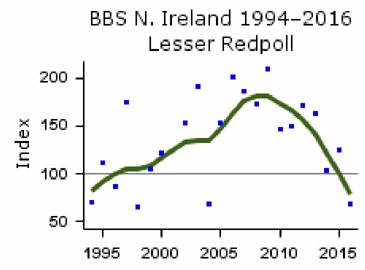
BBS UK graph



BBS England graph



BBS Scotland graph



BBS N.Ireland graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Causes of change

Although sample sizes are small, declines in both survival and productivity appear to have led to the Lesser Redpoll decline. Evidence for the ecological drivers behind this is largely circumstantial but they are thought to include maturation of woodland and a reduction in birch seed food supplies.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival	Decreased breeding success
Ecological	Changes in woodland	

Further information on causes of change

Though samples are too small to continue presenting a trend, CES data indicated a rapid long-term decline in productivity and there is evidence that survival rates have fallen (Siriwardena et al. 1998).

There is very little evidence available regarding the ecological drivers behind the decline of this species. In southern Britain, at least, the decrease may be attributable to a reduction in the amount of suitable young forest growth (Fuller et al. 2005, Burgess et al. 2015). Amar et al. (2006) and Smart et al. (2007) both found relationships with lichen and bracken cover, although these studies were limited to broadleaved woodlands. Evans (1966) and Cramp & Perrins (1994) point to the importance of birch to the species, which could potentially explain the relationships found by Amar et al. (2006) and Smart et al. (2007). Birch seeds are an important component of this species' diet. Amar et al. (2006) state that birch has declined in many woodlands as they have matured, and this could raise the possibility of winter food as a factor in the species decline, although this evidence is circumstantial and given that species with similar winter diet, such as Siskin, are faring better, may be unlikely.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Common Crossbill

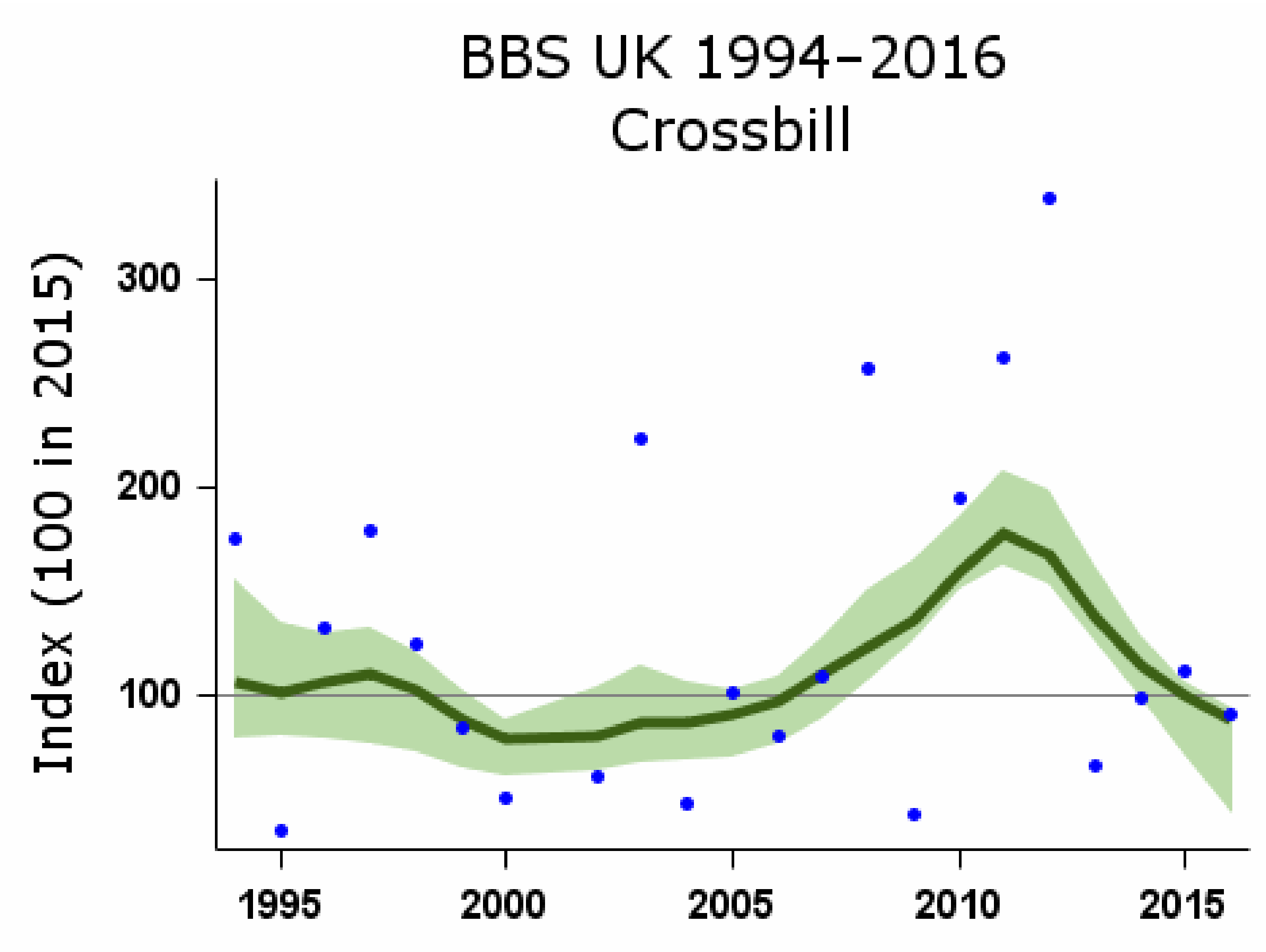
Loxia curvirostra

Key facts

Conservation listings:	Global: green
Long-term trend:	UK: fluctuating, with no long-term trend
Population size:	40,000 (31,000-53,000) pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

The UK breeding population of Crossbills is difficult to assess in any one season, even by special survey, and is exceptionally variable between years. The core of the population lies in the taiga forests across Eurasia, from where birds periodically erupt westwards and southwards in search of better feeding conditions. After the irregular arrivals into Britain, many thousands of birds may stay to breed, perhaps for a few years, before survivors and their offspring return to the Continent (Newton 2006). The spur to eruptive movements is a failure of the cone crop, especially of Norway spruce Picea abies, which is this species' main food (Summers 1999). Crossbills begin breeding in January, sometimes even earlier, and by the start of the BBS period in April most sightings are of highly mobile family parties. In irruption years, BBS sightings may include many birds from the Continent, which often begin to arrive in late May or during June. The BBS trend therefore reflects post-breeding rather than breeding numbers, and on a wider geographical scale than just the UK. Atlas data for 2008-11 confirm that Crossbills are currently at a high level of abundance (Balmer et al. 2013) but it is not clear whether recent increase is part of any long-term trend.



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
BBS UK	20	1995-2015	60	-2	-43	28		
	10	2005-2015	77	10	-23	37		
	5	2010-2015	80	-37	-61	-31	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

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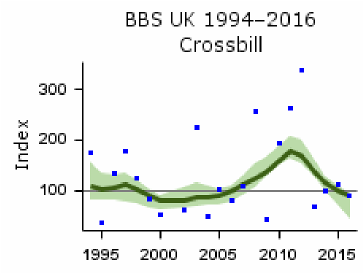


BBS UK graph

Demographic trends

Productivity and survival trends for this species are not currently produced by BTO

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Goldfinch

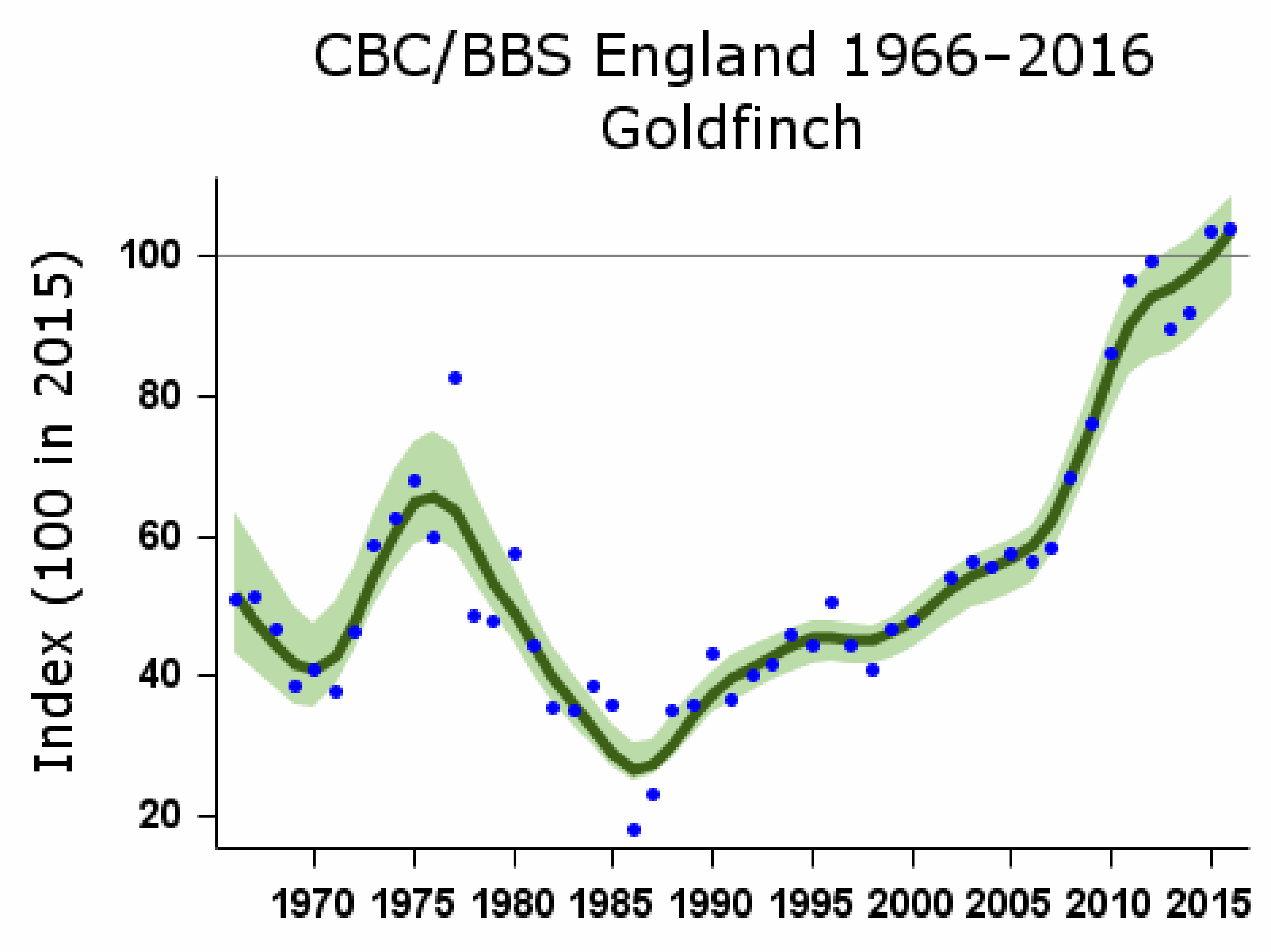
Carduelis carduelis

Key facts

Conservation listings:	Global: green; at race level, britannica amber
Long-term trend:	England: rapid increase
Population size:	1.2 (1.1-1.3) million pairs in 2009 (APEP13: distance-sampling estimate for 2006 (Newson et al. 2008) updated using BBS trend)

Status summary

Goldfinch abundance fell sharply from the mid 1970s until the mid 1980s, but the decline was both preceded and followed by significant population increases. The current upturn has lifted the species from the amber list of conservation concern into the green category, and has been accompanied by an increase in its use of gardens for winter feeding. The BBS Siriwardena et al. 1999). There have been no clear changes in productivity as measured by NRS and CES. The recent severe losses of Crick & Sparks 1999). There has been widespread moderate increase across Europe since 1980 (PECBMS 2016a). A strong increase has been recorded in the Republic of Ireland since 1998 (Crowe 2012).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	683	109	58	158		
	25	1990-2015	1233	167	126	196		
	10	2005-2015	1889	76	70	85		
	5	2010-2015	2056	19	15	22		
CES adults	31	1984-2015	34	62	13	212		

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
	25	1990-2015	39	12	-34	118		
	10	2005-2015	46	50	15	94		
	5	2010-2015	52	6	-11	31		
CES juveniles	31	1984-2015	24	-14	-54	125		
	25	1990-2015	27	20	-23	124		
	10	2005-2015	32	171	85	352		
	5	2010-2015	38	9	-16	44		
BBS UK	20	1995-2015	1779	122	109	136		
	10	2005-2015	2289	65	59	74		
	5	2010-2015	2486	16	12	18		
BBS England	20	1995-2015	1465	118	106	130		
	10	2005-2015	1889	76	70	84		
	5	2010-2015	2056	20	15	22		
BBS Scotland	20	1995-2015	110	180	111	264		
	10	2005-2015	144	62	38	93		
	5	2010-2015	160	11	-2	27		
BBS Wales	20	1995-2015	141	76	47	109		
	10	2005-2015	169	7	-13	32		
	5	2010-2015	179	2	-9	16		
BBS N.Ireland	20	1995-2015	52	722	.	.		
	10	2005-2015	72	48	.	.		
	5	2010-2015	74	-8	.	.		

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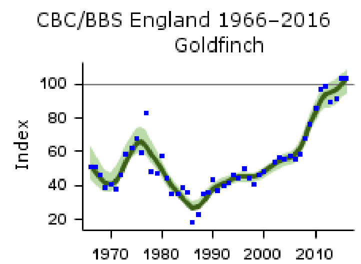
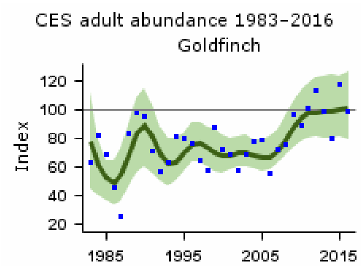
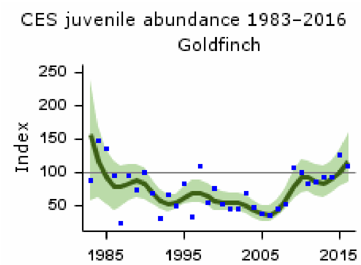


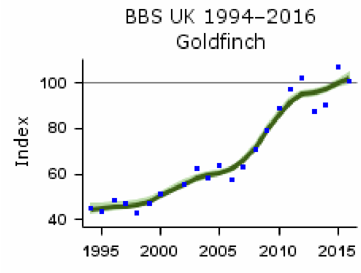
CBC/BBS England graph



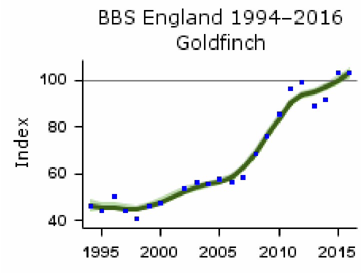
CES adults graph



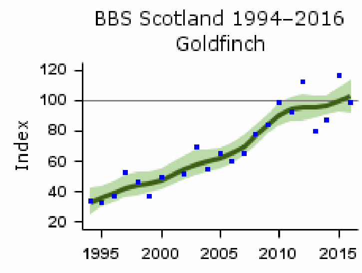
CES juveniles graph



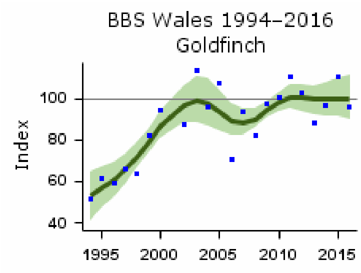
BBS UK graph



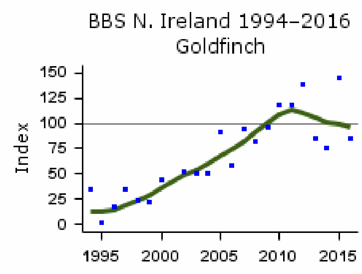
BBS England graph



BBS Scotland graph

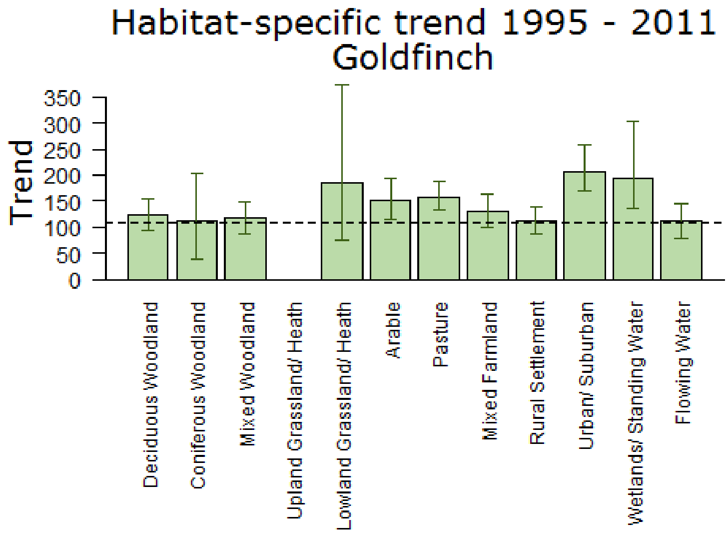


BBS Wales graph



BBS N.Ireland graph

Population trends by habitat



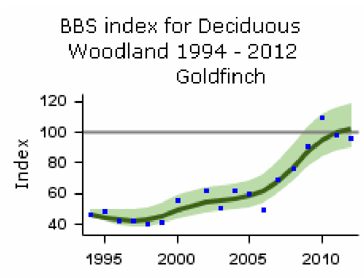
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

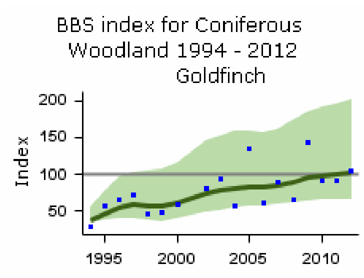
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	218	124	92	153
Coniferous Woodland	16	1995-2011	33	113	40	203
Mixed Woodland	16	1995-2011	95	119	89	150
Lowland Grassland/ Heath	16	1995-2011	41	185	75	373
Arable	16	1995-2011	297	150	114	195
Pasture	16	1995-2011	650	158	133	187
Mixed Farmland	16	1995-2011	297	129	98	164
Rural Settlement	16	1995-2011	491	112	87	139
Urban/ Suburban	16	1995-2011	237	206	170	257
Wetlands/ Standing Water	16	1995-2011	40	193	136	303
Flowing Water	16	1995-2011	186	111	78	147

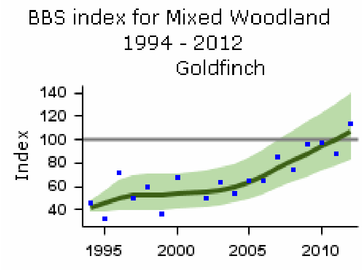
Further information on habitat-specific trends, please follow link here.



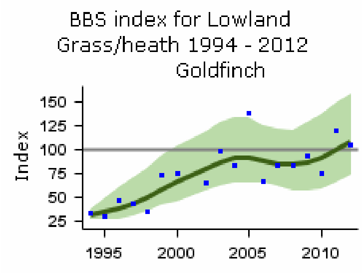
Habitat graph



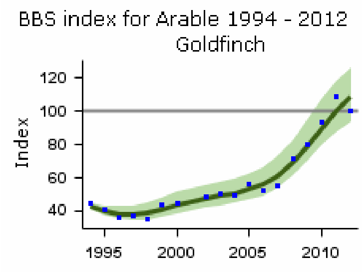
Habitat graph



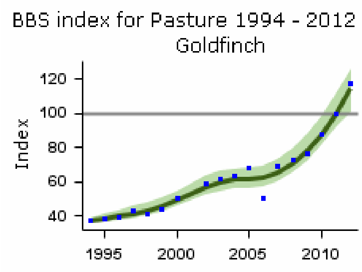
Habitat graph



Habitat graph



Habitat graph



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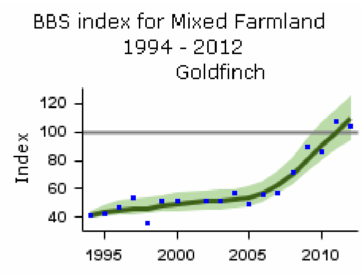
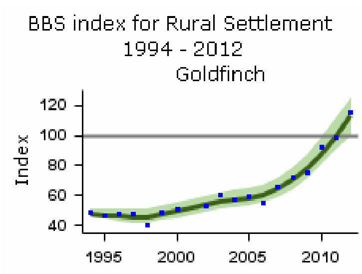
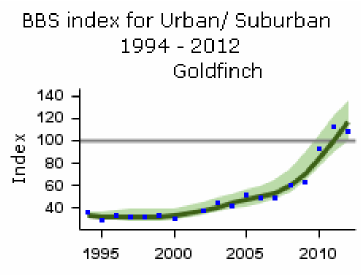


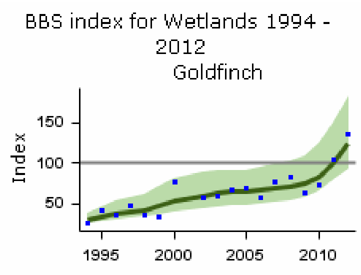
Habitat graph



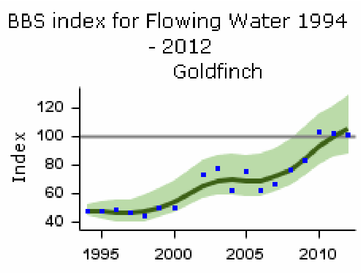
Habitat graph



Habitat graph

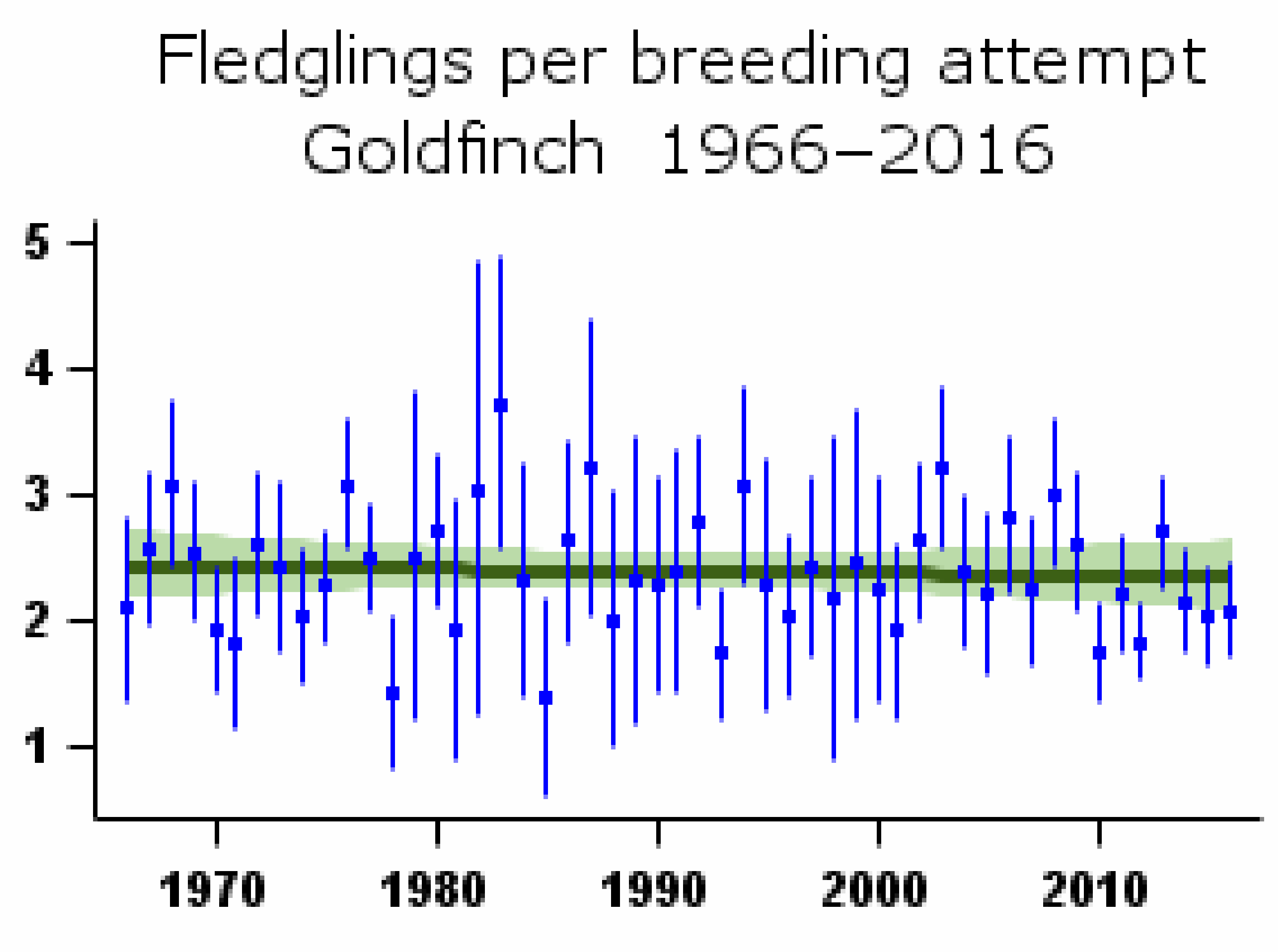


Habitat graph

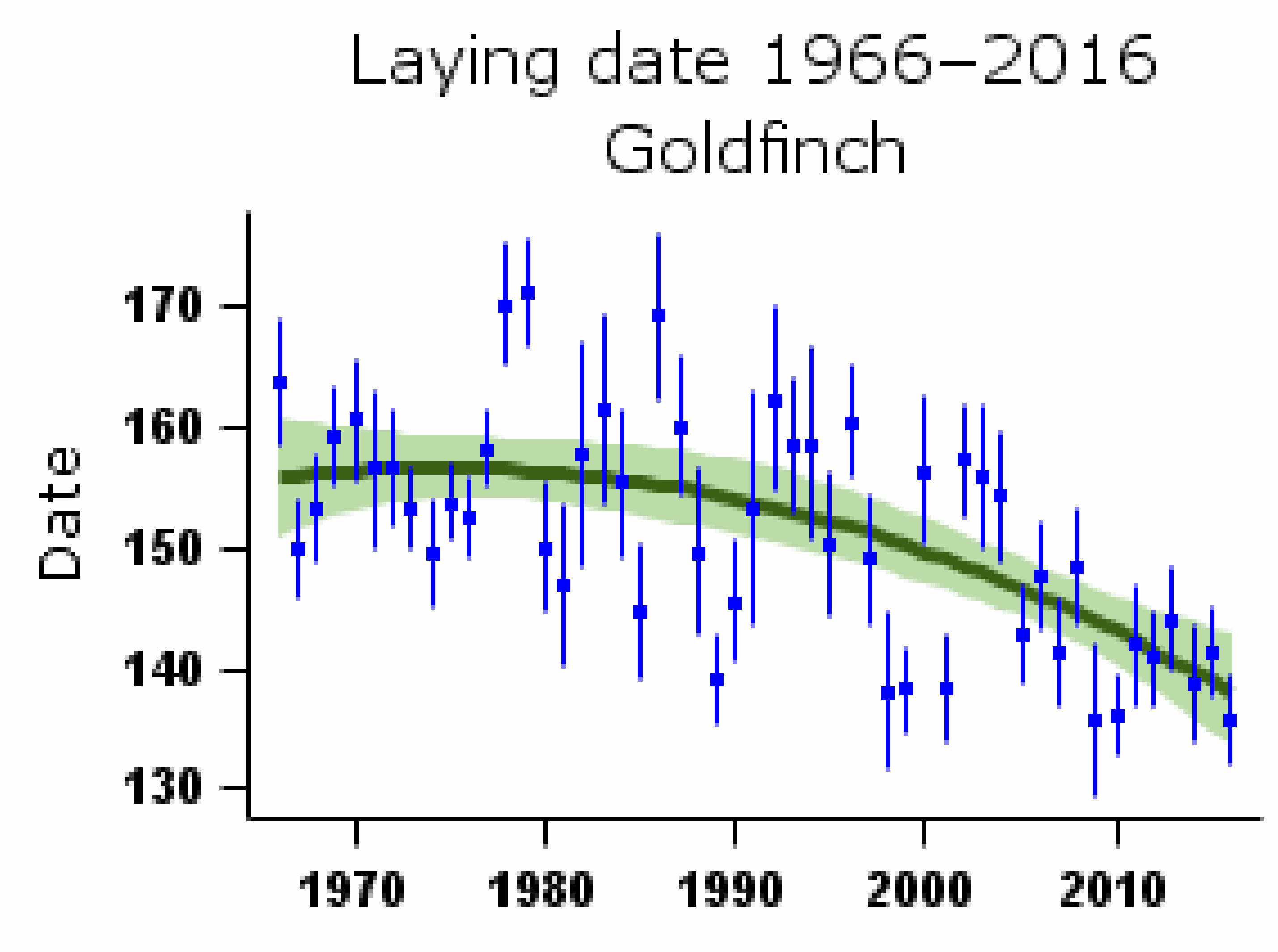


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

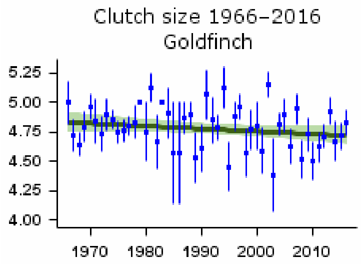


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

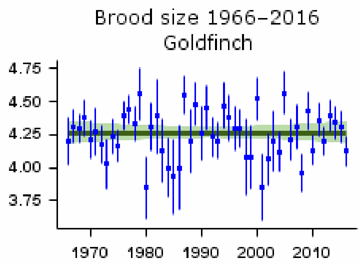
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	31	None					
Clutch size	48	1967-2015	23	None					Small sample
Brood size	48	1967-2015	37	None					
Nest failure rate at egg stage	48	1967-2015	40	Linear increase	1.91% nests/day	2.83% nests/day	48.2%		
Nest failure rate at chick stage	48	1967-2015	31	None					
Laying date	48	1967-2015	26	Curvilinear	Jun 5	May 19	-17 days		Small sample
Juvenile to Adult ratio (CES)	31	1984-2015	40	Smoothed trend	244 Index value	100 Index value	-59%		
Juvenile to Adult ratio (CES)	25	1990-2015	45	Smoothed trend	156 Index value	100 Index value	-36%		
Juvenile to Adult ratio (CES)	10	2005-2015	52	Smoothed trend	77 Index value	100 Index value	29%		
Juvenile to Adult ratio (CES)	5	2010-2015	59	Smoothed trend	91 Index value	100 Index value	10%		

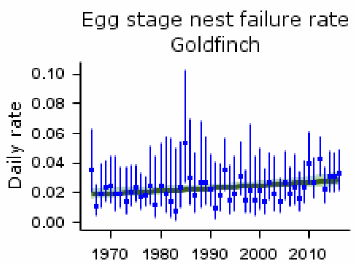
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



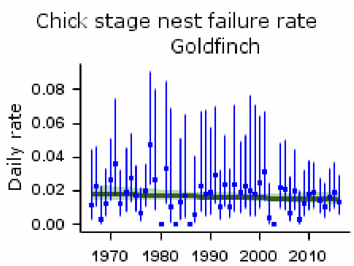
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



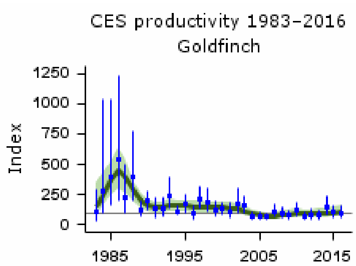
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Yellowhammer

Emberiza citrinella

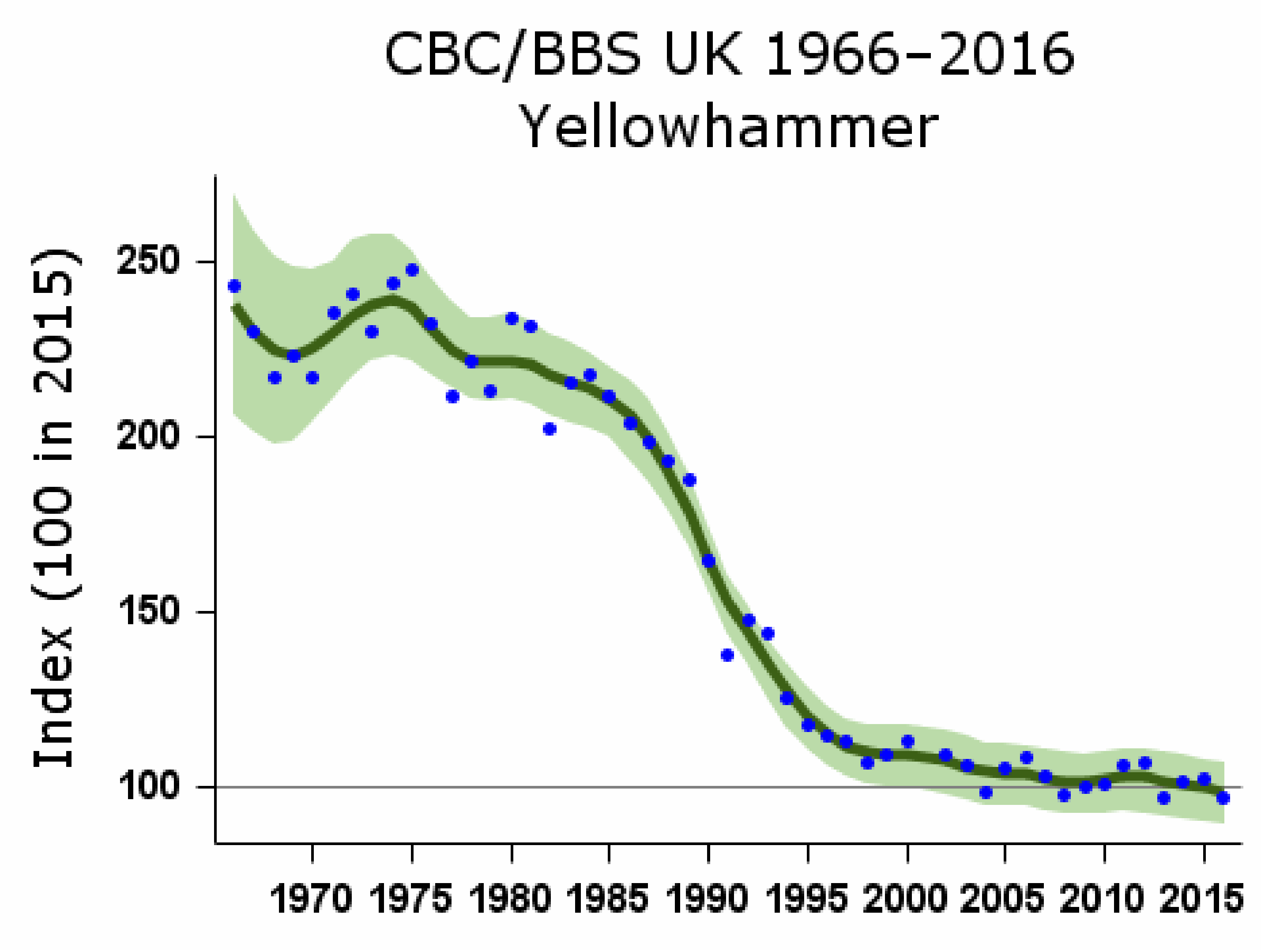
Key facts

Conservation listings:	Global: red (breeding population decline)
Long-term trend:	UK, England: rapid decline
Population size:	710,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Yellowhammer abundance began to decline on farmland in the mid 1980s. The downward trend has continued, although with substantial increase in Scotland since 2003. The BBS Balmer et al. 2013). The species, listed as green in 1996, has been red listed since 2002. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



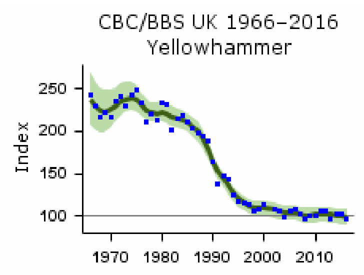
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

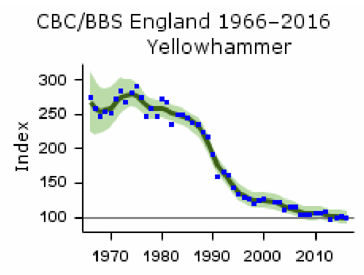
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	622	-56	-66	-46	>50	
	25	1990-2015	1063	-39	-46	-34	>25	
	10	2005-2015	1384	-4	-8	0		
	5	2010-2015	1385	-2	-6	2		
CBC/BBS England	48	1967-2015	541	-61	-70	-47	>50	
	25	1990-2015	924	-48	-54	-42	>25	
	10	2005-2015	1199	-12	-15	-8		
	5	2010-2015	1195	-5	-9	-2		
BBS UK	20	1995-2015	1230	-16	-21	-10		
	10	2005-2015	1384	-4	-8	0		
	5	2010-2015	1385	-2	-5	2		
BBS England	20	1995-2015	1068	-26	-30	-22	>25	
	10	2005-2015	1199	-12	-16	-9		
	5	2010-2015	1195	-5	-8	-2		
BBS Scotland	20	1995-2015	119	37	15	60		
	10	2005-2015	143	30	14	45		
	5	2010-2015	154	7	-3	19		
BBS Wales	20	1995-2015	34	-57	-70	-41	>50	
	10	2005-2015	31	-36	-52	-15	>25	

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

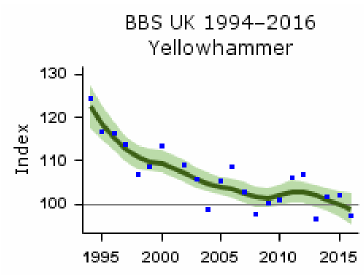
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



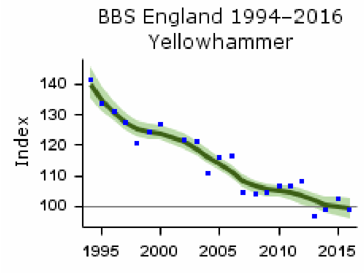
CBC/BBS UK graph



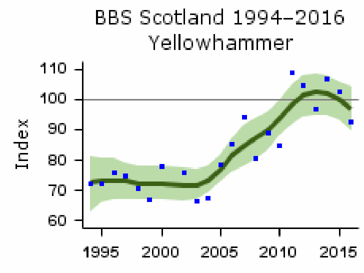
CBC/BBS England graph



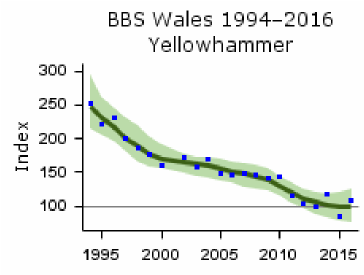
BBS UK graph



BBS England graph

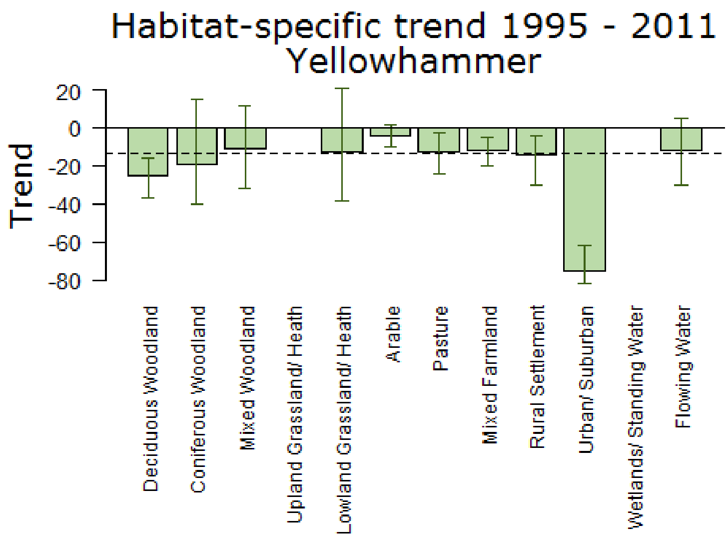


BBS Scotland graph



BBS Wales graph

Population trends by habitat



Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

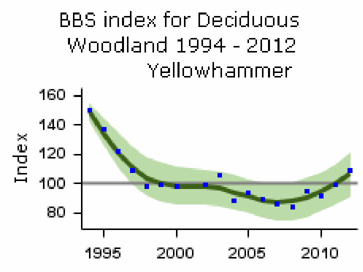
Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

More on habitat trends

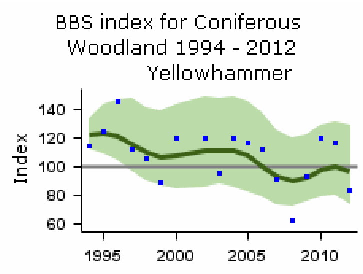
Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	240	-25	-37	-16

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Coniferous Woodland	16	1995-2011	43	-19	-40	15
Mixed Woodland	16	1995-2011	105	-11	-32	11
Lowland Grassland/ Heath	16	1995-2011	53	-12	-39	21
Arable	16	1995-2011	553	-4	-10	2
Pasture	16	1995-2011	564	-13	-24	-3
Mixed Farmland	16	1995-2011	445	-12	-20	-5
Rural Settlement	16	1995-2011	277	-15	-30	-4
Urban/ Suburban	16	1995-2011	31	-75	-82	-62
Flowing Water	16	1995-2011	139	-12	-31	5

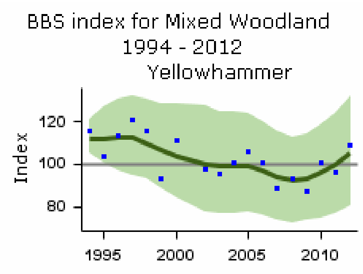
Further information on habitat-specific trends, please follow link here.



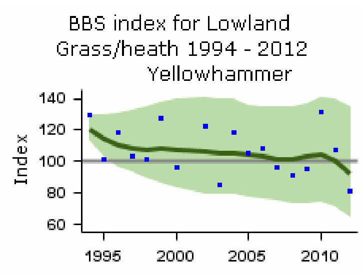
Habitat graph



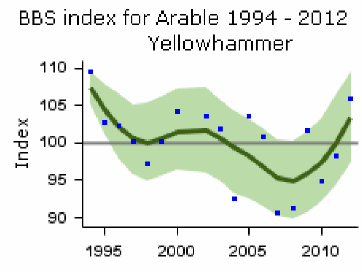
Habitat graph



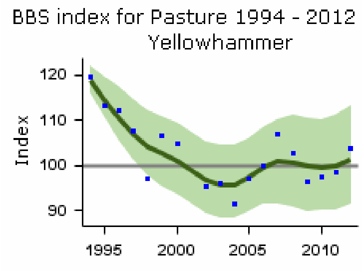
Habitat graph



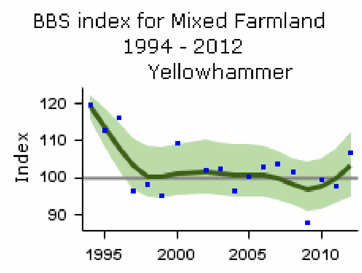
Habitat graph



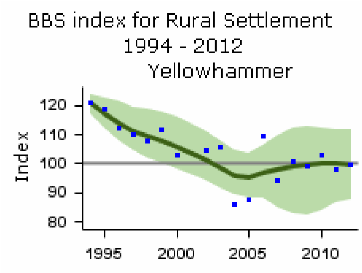
Habitat graph



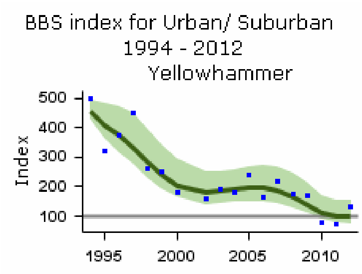
Habitat graph



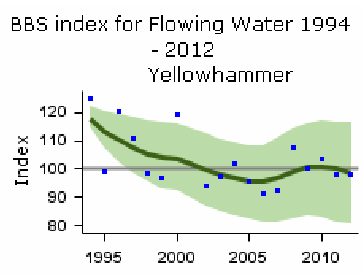
Habitat graph



Habitat graph

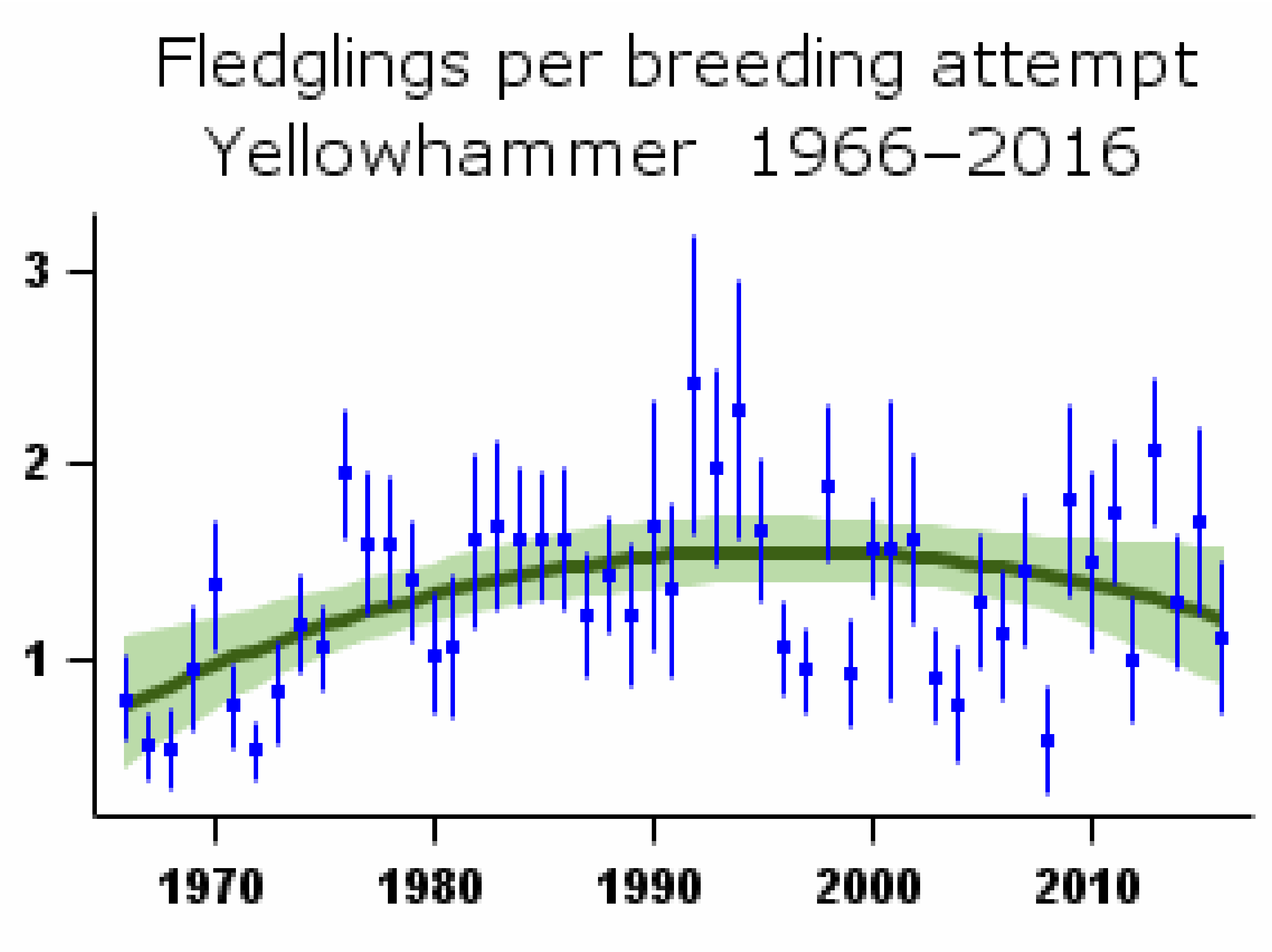


Habitat graph

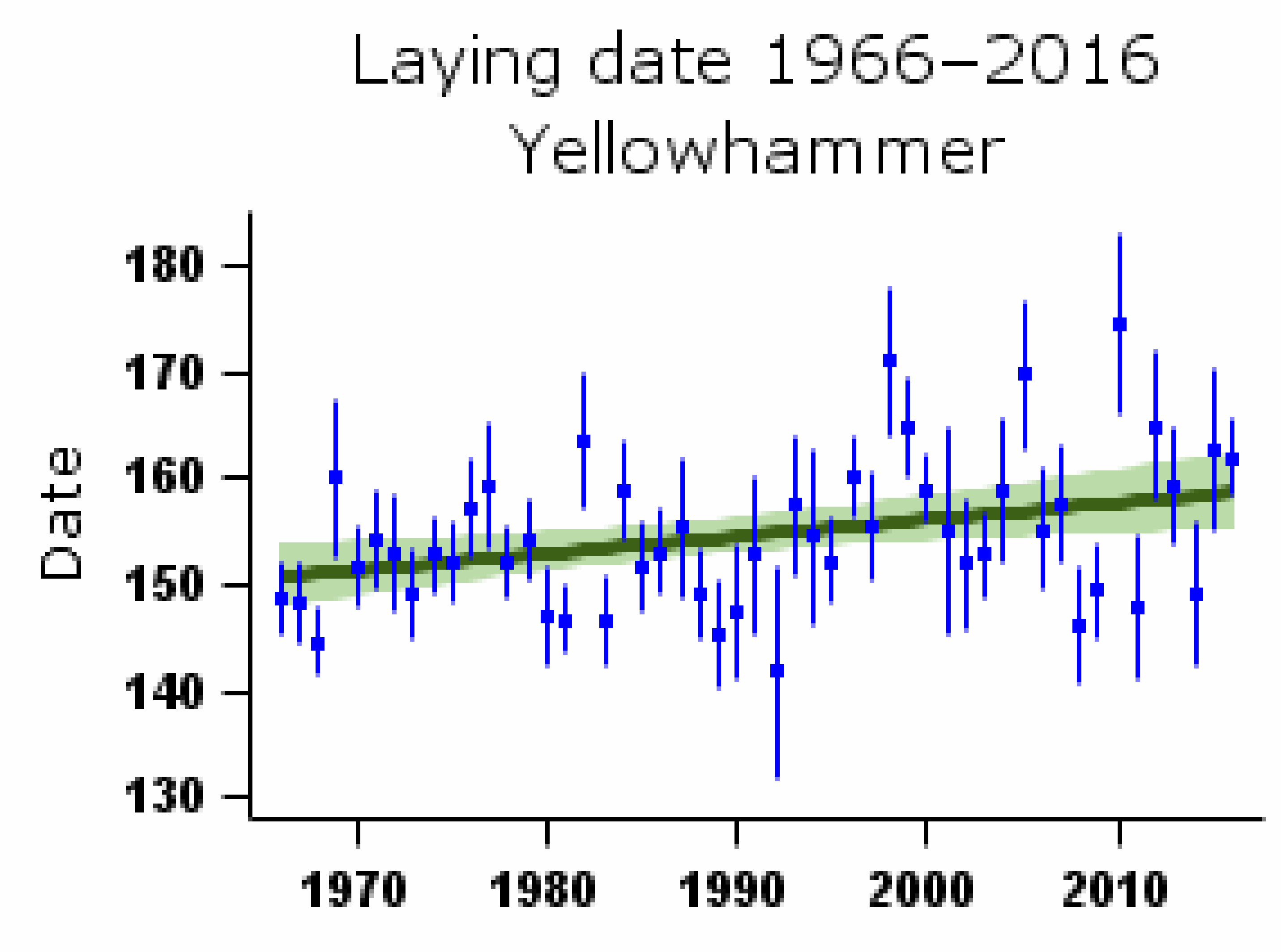


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

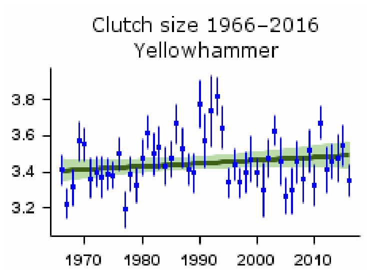


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

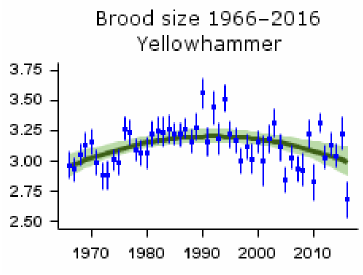
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	48	Curvilinear	0.83 fledglings	1.26 fledglings	51.0%		
Clutch size	48	1967-2015	43	None					
Brood size	48	1967-2015	65	Curvilinear	2.97 chicks	3.01 chicks	1.2%		
Nest failure rate at egg stage	48	1967-2015	62	Curvilinear	5.13% nests/day	3.13% nests/day	-39.0%		
Nest failure rate at chick stage	48	1967-2015	50	Linear decline	3.82% nests/day	2.80% nests/day	-26.7%		
Laying date	48	1967-2015	25	Linear increase	May 31	Jun 7	7 days		Small sample

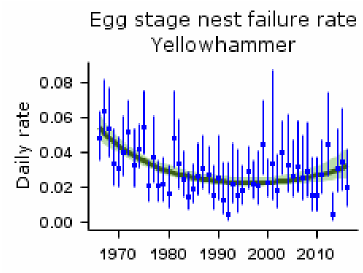
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



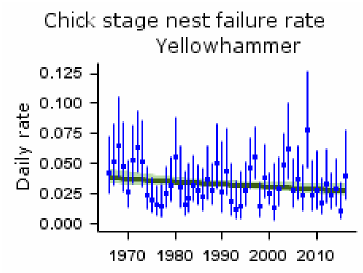
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Declines in annual survival have been proposed as the demographic mechanism for decline, due to winter resource limitation, although ring-recovery data are sparse and so most evidence for this is indirect.

Change factor	Primary driver	Secondary driver
Demographic	Decreased survival	
Ecological	Agricultural intensification	

Further information on causes of change

Yellowhammer is unique among farmland birds in that its population was stable until the mid 1980s, followed by a decline, suggesting that it alone was affected by some change that occurred in the 1980s (Siriwardena et al. 1998a). There is some evidence that survival rates decreased during the initial period of decline (Siriwardenæt al. 1998b, 2000a, Kyrkos 1997), and that breeding performance tended to improve (Siriwardena et al. 2000b). Long-term demographic trends presented here (see above) show that nest failure rate at the egg stage decreased during the decline and the breeding improvement consequently improved.

Best estimates of the variation in adult and first-year Yellowhammer survival (from ring recoveries) suggest that it has been sufficient to explain the species' decline (Kyrkos 1997). Reductions in winter seed availability as a result of agricultural intensification (for example, the loss of winter stubbles and a reduction in weed densities) are widely believed to have contributed to the population decline, presumably through impacts on survival rates. Siriwardena et al. (2007), found that Yellowhammer declines were less steep in areas where the species received more overwinter provisioning, providing experimental evidence for winter resource limitation. Food availability (and therefore, as a conservation measure, supplementary feeding) in late winter appears to be particularly important because demand for seed food is greatest at this time and this is also when the food supply resulting from agri-environment conservation measures is at its lowest (Siriwardena et al. 2007). Further evidence comes from Gillings et al. (2005), who used two complementary extensive bird surveys undertaken at the same localities in summer and winter to show that the areas of extensive stubble in winter were correlated with better population performance, presumably because overwinter survival is relatively high. This is supported by another study, in Oxfordshire (Wilson et al. 1996), which found that the only habitat type for which a clear preference was displayed in winter was stubble.

In terms of changes to habitat, Kyrkos et al. (1998) found that Yellowhammer breeding density decreased with increasing proportion of farmland under grassland. It may be that modern improved grassland has neither the weed density required by adult Yellowhammers nor sufficient invertebrate prey for birds feeding nestlings. The dense sward structure of highly fertilised leys may also reduce access to invertebrate prey (Perkins et al. 2000). This is supported by the results of Douglaset al. (2010a) who found that foraging in grass margins was increased by experimental mowing, showing that access to prey in dense vegetation limits feeding activity. Siriwardena et al. (2000b, 2000c) provide further evidence that grazing supported the lowest breeding performance, although the best breeding performance was associated with mixed farmland, suggesting that loss of heterogeneity in the landscape may be a factor in the decline, although they state that this is unlikely to be the main mechanism behind the declines. Bradbury & Stoate (2000) further suggest that loss or degradation of hedges and field margins, loss of stubbles and intensification of grassland management may have reduced nest-site and food availability for farmland Yellowhammers.

Increased use of pesticides may have also played a role in decreasing breeding success. Boatmanet al. (2004) used an experimental set-up to look at the effect of pesticides on breeding performance, and further evidence was provided by Morris et al. (2005), who showed that increased use of pesticides results in reduced invertebrate abundance, lower brood production and fewer chicks fledging. Hart et al. (2006) also demonstrated how insecticide applications can depress Yellowhammer breeding productivity. Whittingham et al. (2005) found that the local availability of rotational set-aside was a good predictor of sites chosen for breeding territories, which could reflect the benefits of both sparse vegetation (access to bare ground for foraging) and lack of pesticide use. Similarly, McHugh et al. (2016b) found that territories were preferentially located close to enhanced field margins, and suggested that the more open sward structure in these margins may increase prey availability.

Dunn et al. (2015) warn that, while land management can promote high densities, breeding success can be reduced by density-dependent effects on provisioning rates, thereby creating an ecological trap.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Reed Bunting

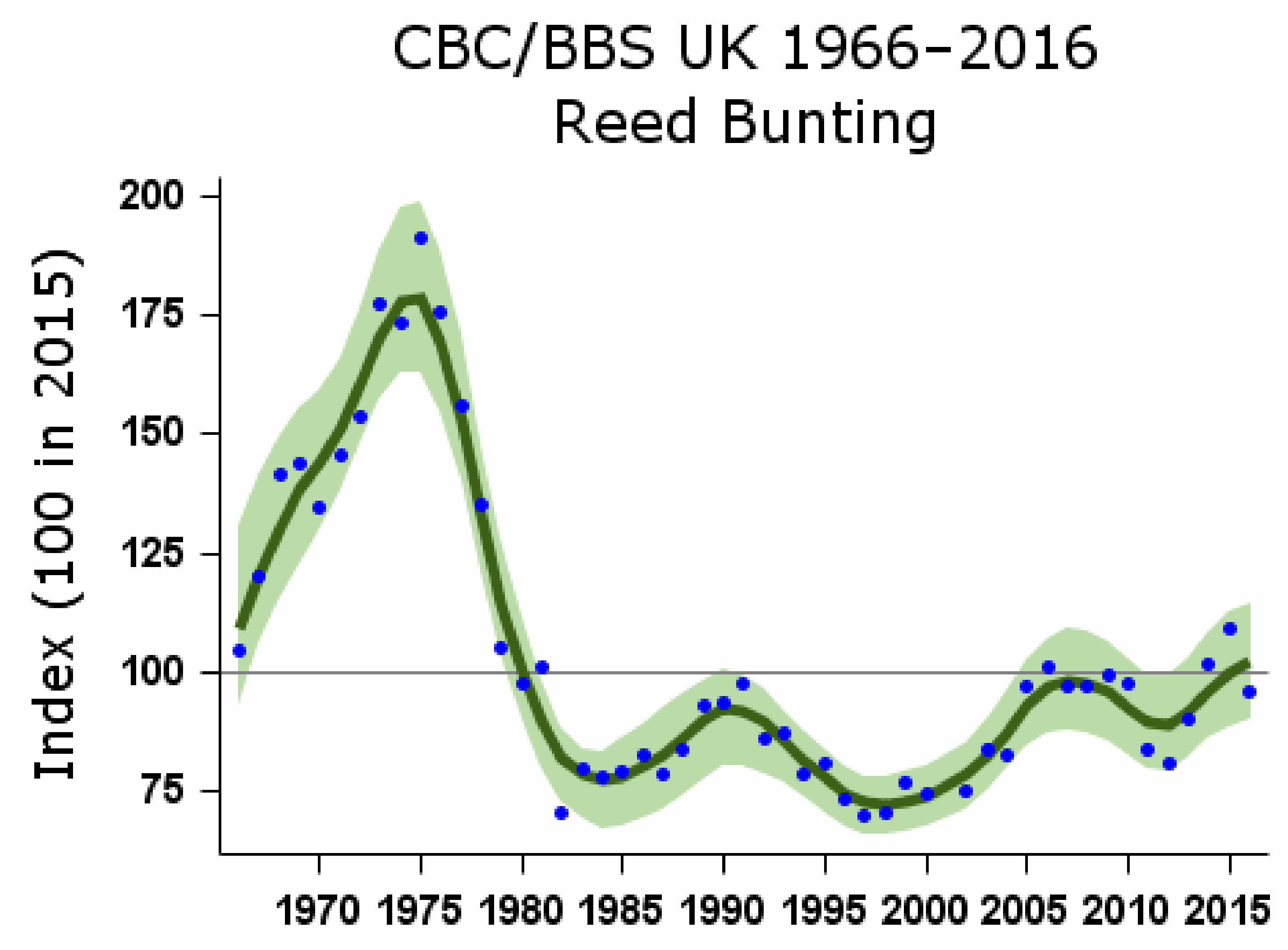
Emberiza schoeniclus

Key facts

Conservation listings:	Global: amber (breeding population decline)
Long-term trend:	UK, England: fluctuating, with no long-term trend
Population size:	250,000 territories in 2009 (APEP13: 1988-91 Atlas estimate updated using CBC/BBS trend)

Status summary

Both CBC/BBS and WBS/WBBS indices declined rapidly during the 1970s, after an earlier increase, but Reed Bunting abundance has fluctuated without a clear trend since the 1980s. Since 1994, results from BBS indicate significant population increase, though with a downturn from around 2008 to 2012. The BBS Peach et al. 1999). This is supported by a moderate decline in CES productivity and by a major increase in failure rates at the egg stage, and a consequent fall in the number of fledglings per breeding attempt. Farmland densities are four times higher in oilseed rape than in cereals or setaside and this crop is crucial in reducing the dependency of the species on wetlands (Gruar et al. 2006). The initial decline placed Reed Bunting on the red list but in 2009, with evidence from BBS of some recovery in numbers, the species was moved from red to amber. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a).



Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

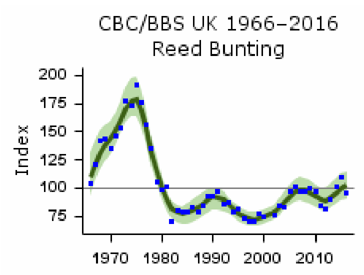
Population changes in detail

Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	285	-17	-39	9		
	25	1990-2015	460	8	-6	36		
	10	2005-2015	667	8	0	17		
	5	2010-2015	662	8	2	14		

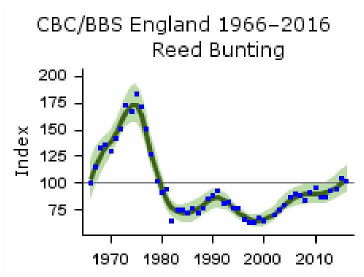
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS England	48	1967-2015	222	-13	-33	18		
	25	1990-2015	351	16	2	41		
	10	2005-2015	506	18	10	27		
	5	2010-2015	509	10	3	19		
WBS/WBBS waterways	40	1975-2015	89	-63	-74	-48	>50	
	25	1990-2015	113	-8	-29	19		
	10	2005-2015	136	-10	-18	-3		
	5	2010-2015	125	-8	-14	-2		
CES adults	31	1984-2015	60	-60	-71	-48	>50	
	25	1990-2015	65	-50	-65	-34	>25	
	10	2005-2015	66	-24	-34	-13		
	5	2010-2015	67	5	-9	20		
CES juveniles	31	1984-2015	45	-80	-89	-63	>50	
	25	1990-2015	48	-74	-83	-61	>50	
	10	2005-2015	48	-31	-44	-10	>25	
	5	2010-2015	50	-30	-44	-10	>25	
BBS UK	20	1995-2015	531	31	17	47		
	10	2005-2015	667	8	-1	16		
	5	2010-2015	662	8	1	15		
BBS England	20	1995-2015	400	39	21	55		
	10	2005-2015	506	18	9	27		
	5	2010-2015	509	10	2	18		
BBS Scotland	20	1995-2015	66	41	9	84		
	10	2005-2015	84	-4	-20	19		
	5	2010-2015	79	7	-9	20		
BBS N.Ireland	20	1995-2015	33	-14	-40	50		
	10	2005-2015	39	-22	-41	-2		
	5	2010-2015	36	4	-18	31		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

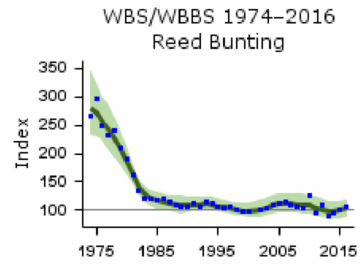
BTO JNCC rspb The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



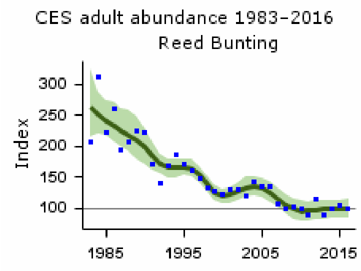
CBC/BBS UK graph



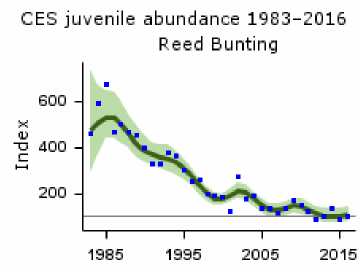
CBC/BBS England graph



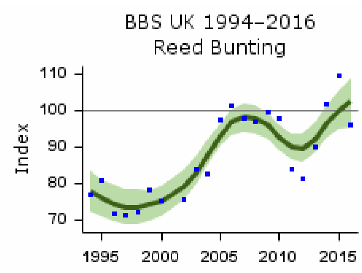
WBS/WBBS waterways graph



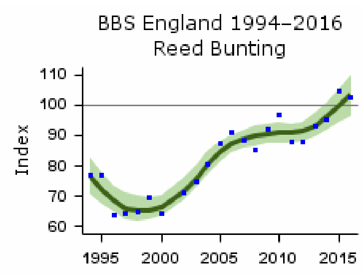
CES adults graph



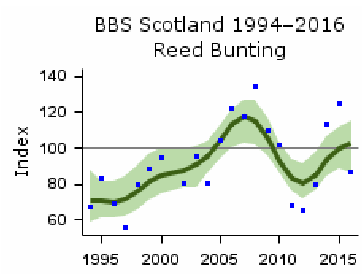
CES juveniles graph



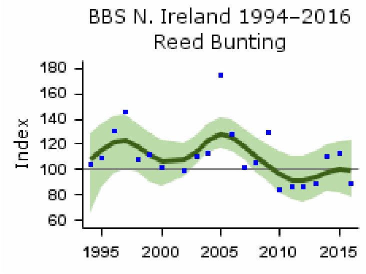
BBS UK graph



BBS England graph

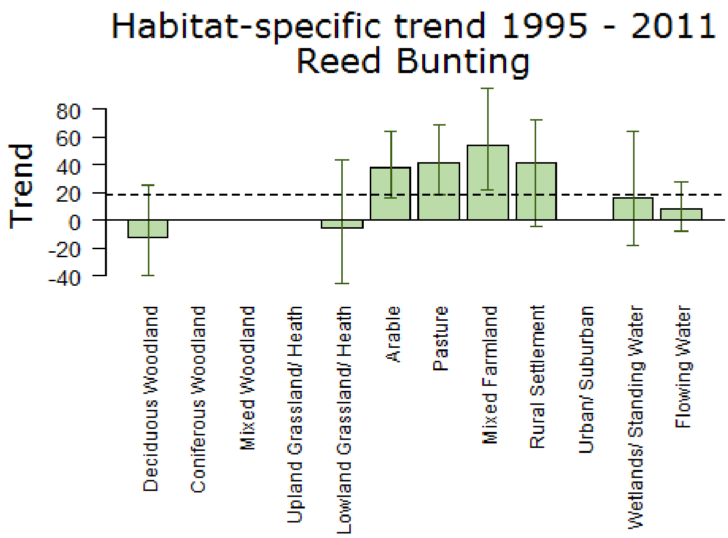


BBS Scotland graph



BBS N.Ireland graph

Population trends by habitat



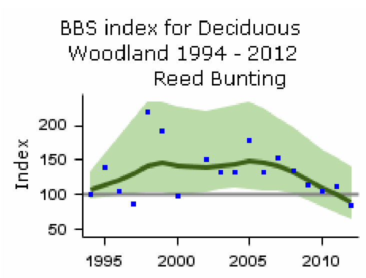
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

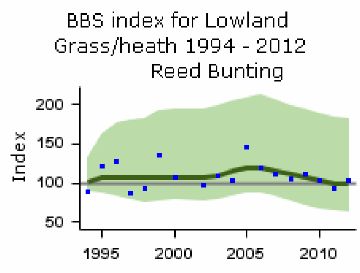
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Deciduous Woodland	16	1995-2011	43	-12	-40	26
Lowland Grassland/ Heath	16	1995-2011	40	-6	-45	44
Arable	16	1995-2011	126	38	17	64
Pasture	16	1995-2011	177	42	19	69
Mixed Farmland	16	1995-2011	69	55	22	95
Rural Settlement	16	1995-2011	46	42	-4	72
Wetlands/ Standing Water	16	1995-2011	48	16	-18	65
Flowing Water	16	1995-2011	121	8	-8	28

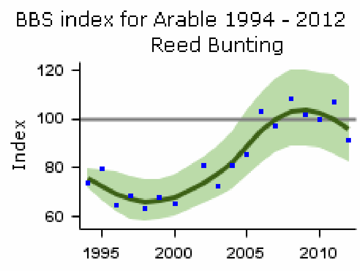
Further information on habitat-specific trends, please follow link here.



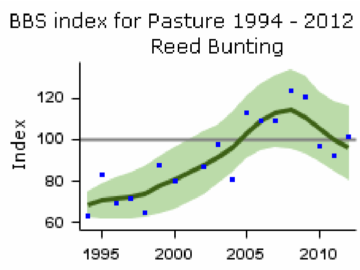
Habitat graph



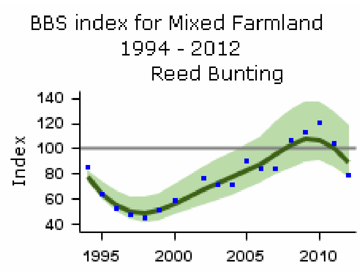
Habitat graph



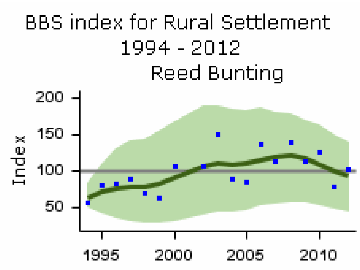
Habitat graph



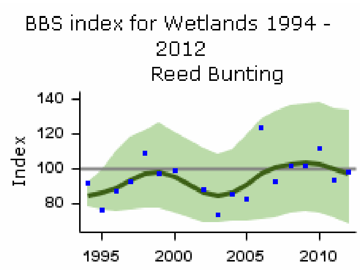
Habitat graph



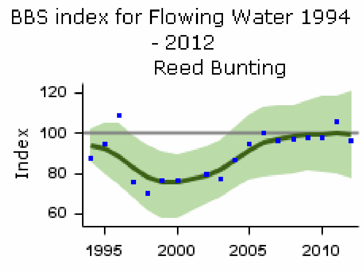
Habitat graph



Habitat graph

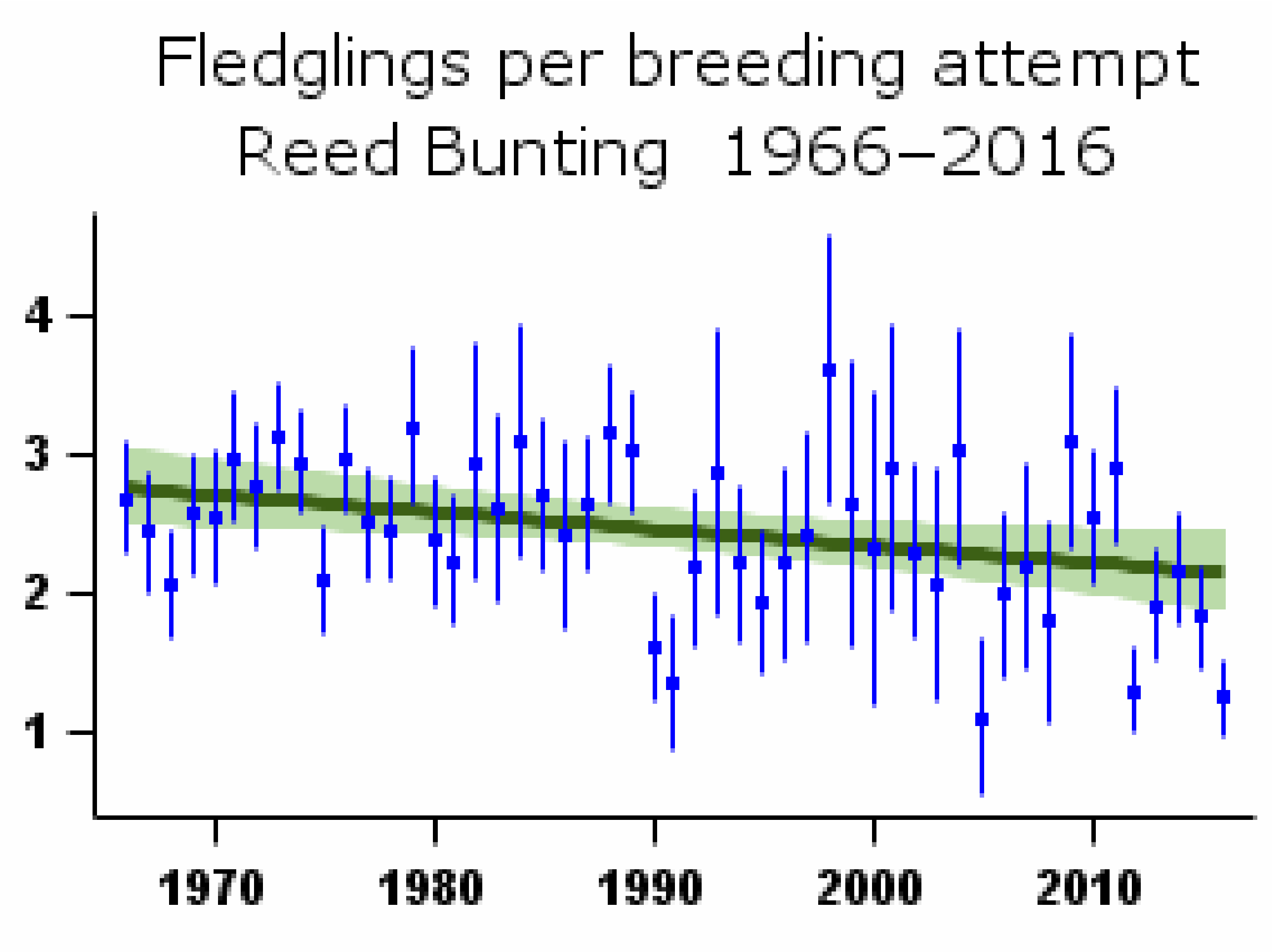


Habitat graph

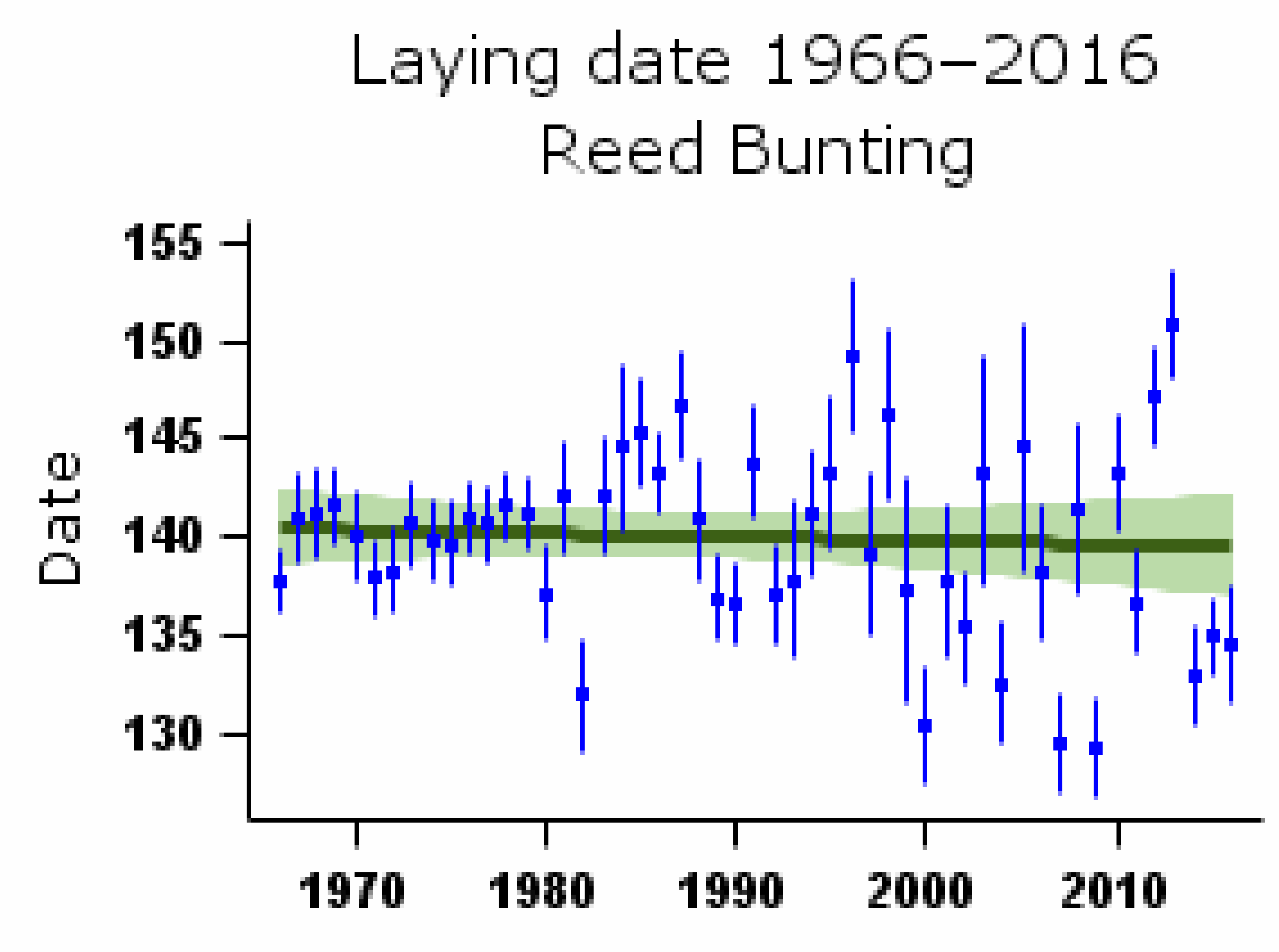


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend



Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

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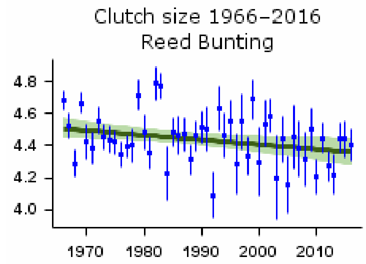
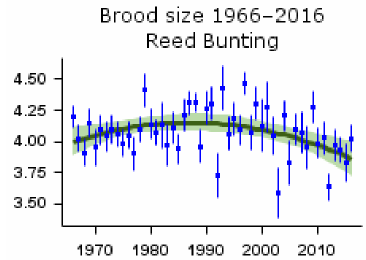
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	48	Linear decline	2.74 fledglings	2.16 fledglings	-21.4%		
Clutch size	48	1967-2015	44	Linear decline	4.51 eggs	4.37 eggs	-3.1%		
Brood size	48	1967-2015	62	Curvilinear	4.01 chicks	3.89 chicks	-3.2%		
Nest failure rate at egg stage	48	1967-2015	52	Linear increase	0.76% nests/day	2.58% nests/day	239.5%		
Nest failure rate at chick stage	48	1967-2015	52	None					
Laying date	48	1967-2015	48	None			0 days		
Juvenile to Adult ratio (CES)	31	1984-2015	63	Smoothed trend	224 Index value	100 Index value	-55%	>50	
Juvenile to Adult ratio (CES)	25	1990-2015	69	Smoothed trend	239 Index value	100 Index value	-58%	>50	
Juvenile to Adult ratio (CES)	10	2005-2015	69	Smoothed trend	113 Index value	100 Index value	-11%		
Juvenile to Adult ratio (CES)	5	2010-2015	70	Smoothed trend	122 Index value	100 Index value	-18%		

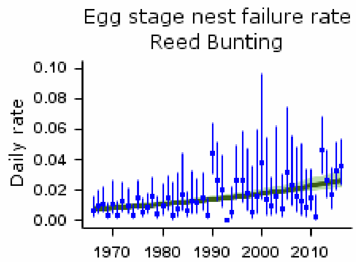
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



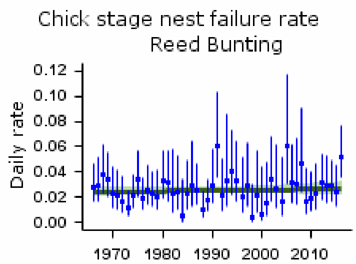
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



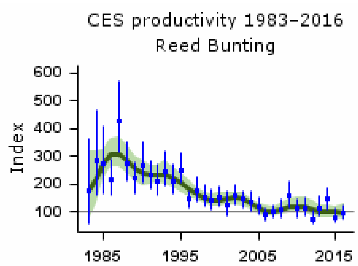
Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



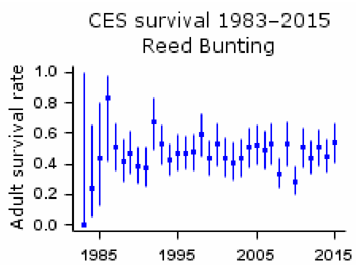
Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Smoothed long-term trend in ratio of juvenile:adult birds caught - green lines indicate 85% confidence limits



Proportion of adult birds surviving to following year - green bars represent 95% confidence limits

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Corn Bunting

Emberiza calandra

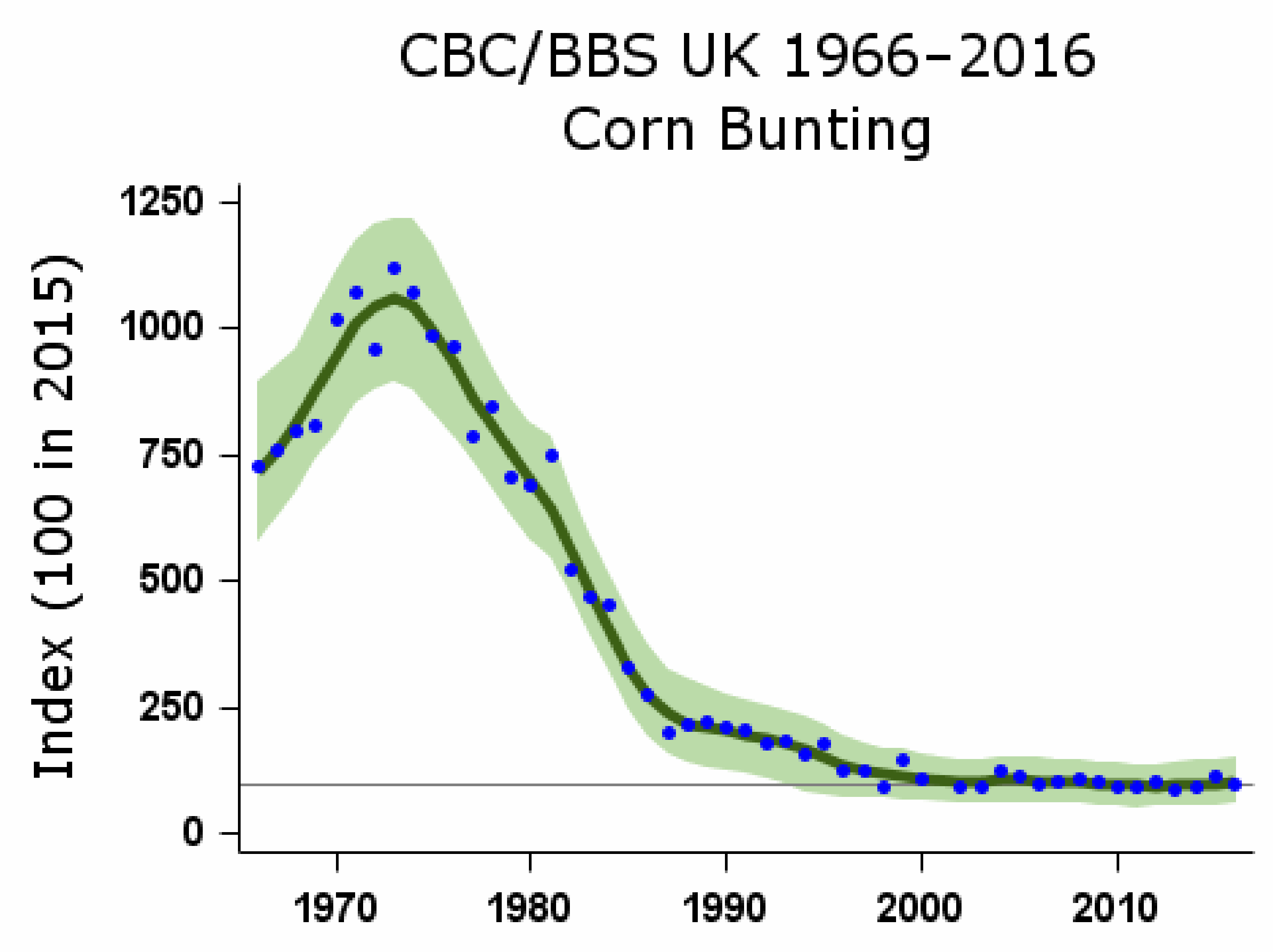
Key facts

Conservation listings:	Global: red (historical decline; breeding population & range declines)
Long-term trend:	UK, England: rapid decline
Population size:	11,000 (9,000-13,000) territories in 2009 (APEP13: 1993 estimate (Donald & Evans 1995) updated using CBC/BBS trend)

Migrant status:	Resident
Nesting habitat:	Ground nester
Primary breeding habitat:	Farmland
Secondary breeding habitat:	
Breeding diet:	Animal
Winter diet:	Vegetation

Status summary

Following an earlier, historical decrease, Corn Buntings declined very steeply between the mid 1970s and mid 1980s, with local extinctions across large sections of their former range. Subsequently the decline has continued, but at a reduced rate. There has been widespread moderate decline across Europe since 1980 (PECBMS 2016a), and the species has recently declined to extinction in Ireland (Taylor & O'Halloran 2002). Studies of the now isolated eastern Scottish population stress the importance of providing uncut or late-cut grasses or cereals, 30-100 cm tall, with a dense ground layer of weeds or crop vegetation, as nesting habitat (Perkins et al. 2015).



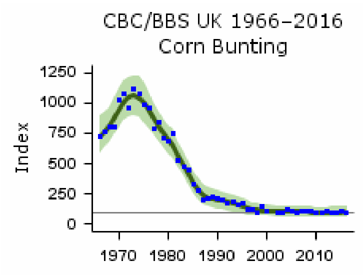
Smoothed population index, relative to an arbitrary 100 in the year given, with 85% confidence limits in green

Population changes in detail

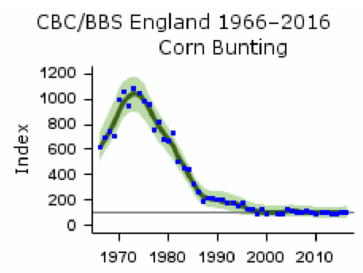
Source	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit	Alert	Comment
CBC/BBS UK	48	1967-2015	80	-87	-94	-76	>50	
	25	1990-2015	127	-51	-69	-28	>50	Small CBC sample
	10	2005-2015	150	-7	-21	13		
	5	2010-2015	146	4	-8	20		
CBC/BBS England	48	1967-2015	76	-85	-93	-73	>50	
	25	1990-2015	122	-50	-68	-26	>25	Small CBC sample
	10	2005-2015	142	-10	-28	13		
	5	2010-2015	138	-1	-13	14		
BBS UK	20	1995-2015	144	-34	-48	-20	>25	
	10	2005-2015	150	-6	-24	10		
	5	2010-2015	146	3	-10	18		
BBS England	20	1995-2015	137	-33	-45	-17	>25	
	10	2005-2015	142	-10	-27	11		
	5	2010-2015	138	-1	-13	14		

Tables show changes with their 90% confidence limits. Alerts are flagged for significant changes only. See here for more information.

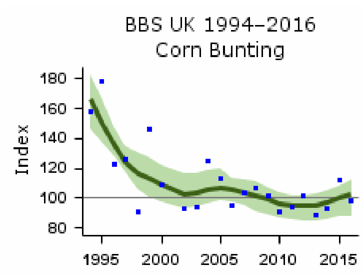
The Breeding Bird Survey is jointly funded by the BTO, JNCC & RSPB



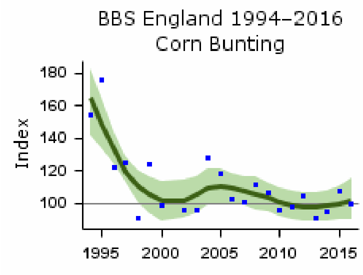
CBC/BBS UK graph



CBC/BBS England graph

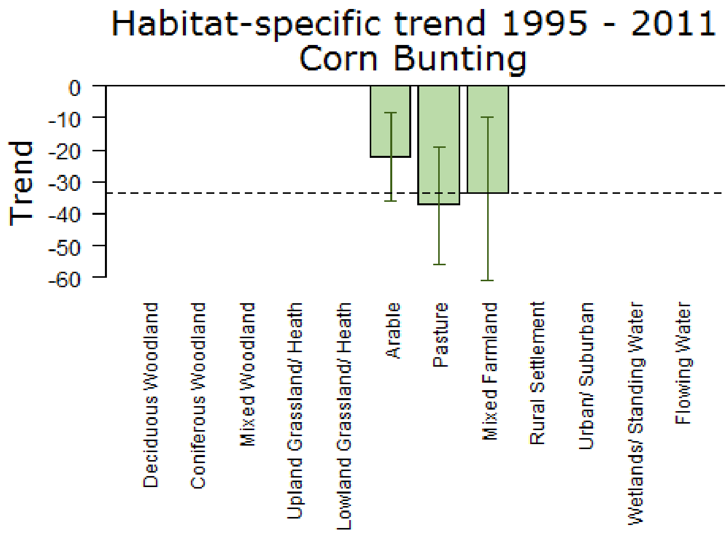


BBS UK graph



BBS England graph

Population trends by habitat



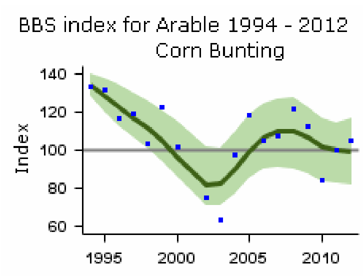
Population trend, with error bars showing 95% confidence intervals. The dashed line shows the national BBS trend over the same period.

Note that habitat trend graphs are not updated every year. Trends are not reported here or in more detail for habitats where the species was recorded in fewer than 30 plots per year.

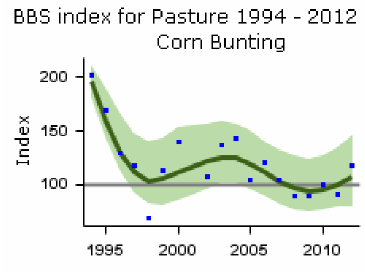
More on habitat trends

Habitat	Period (yrs)	Years	Plots (n)	Change (%)	Lower limit	Upper limit
Arable	16	1995-2011	85	-22	-36	-9
Pasture	16	1995-2011	42	-37	-56	-19
Mixed Farmland	16	1995-2011	37	-34	-61	-10

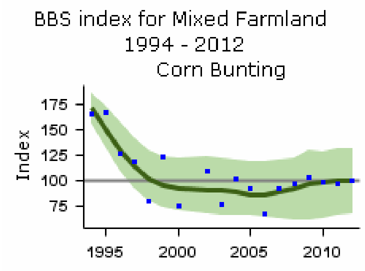
Further information on habitat-specific trends, please follow link here.



Habitat graph

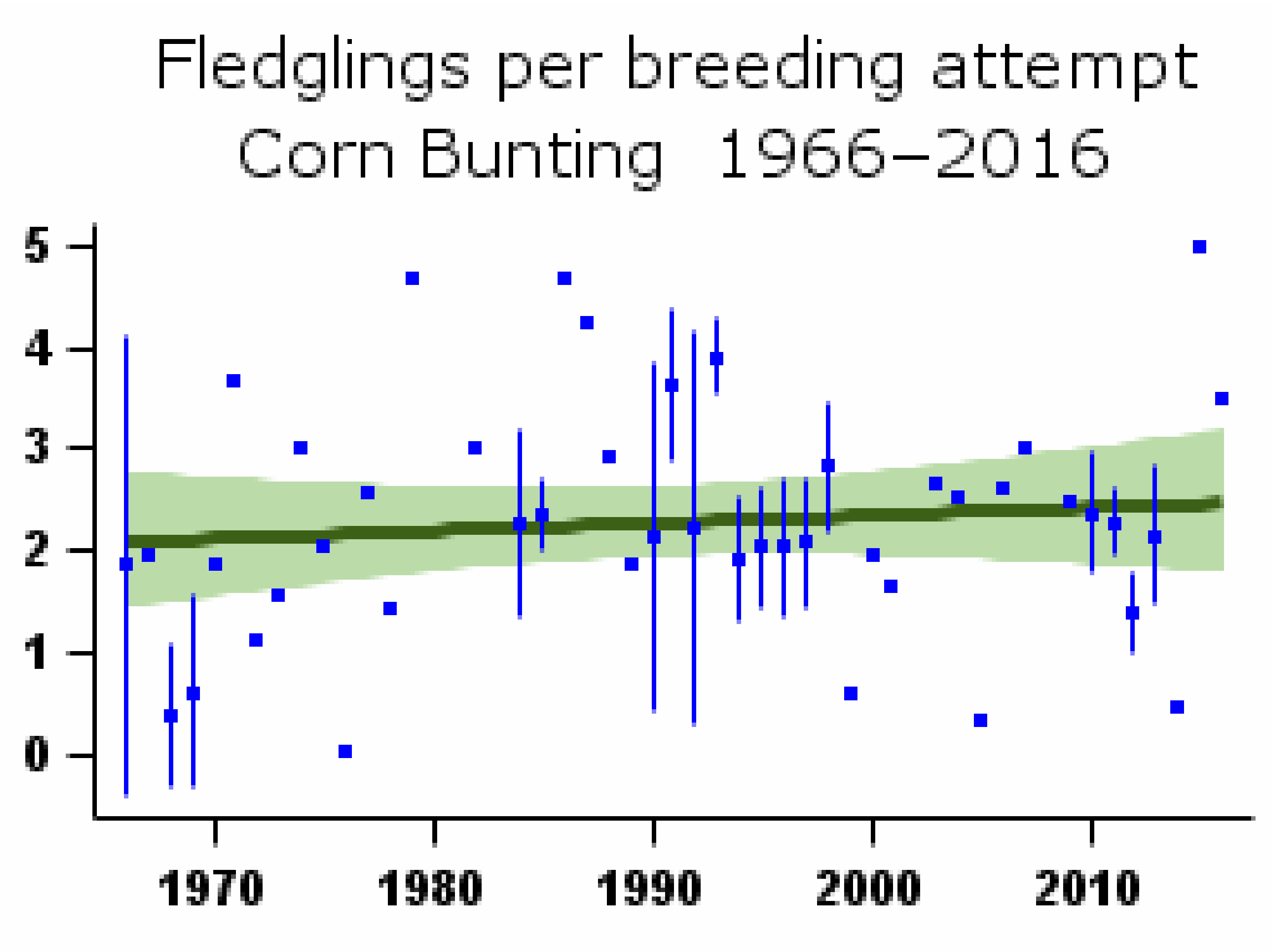


Habitat graph

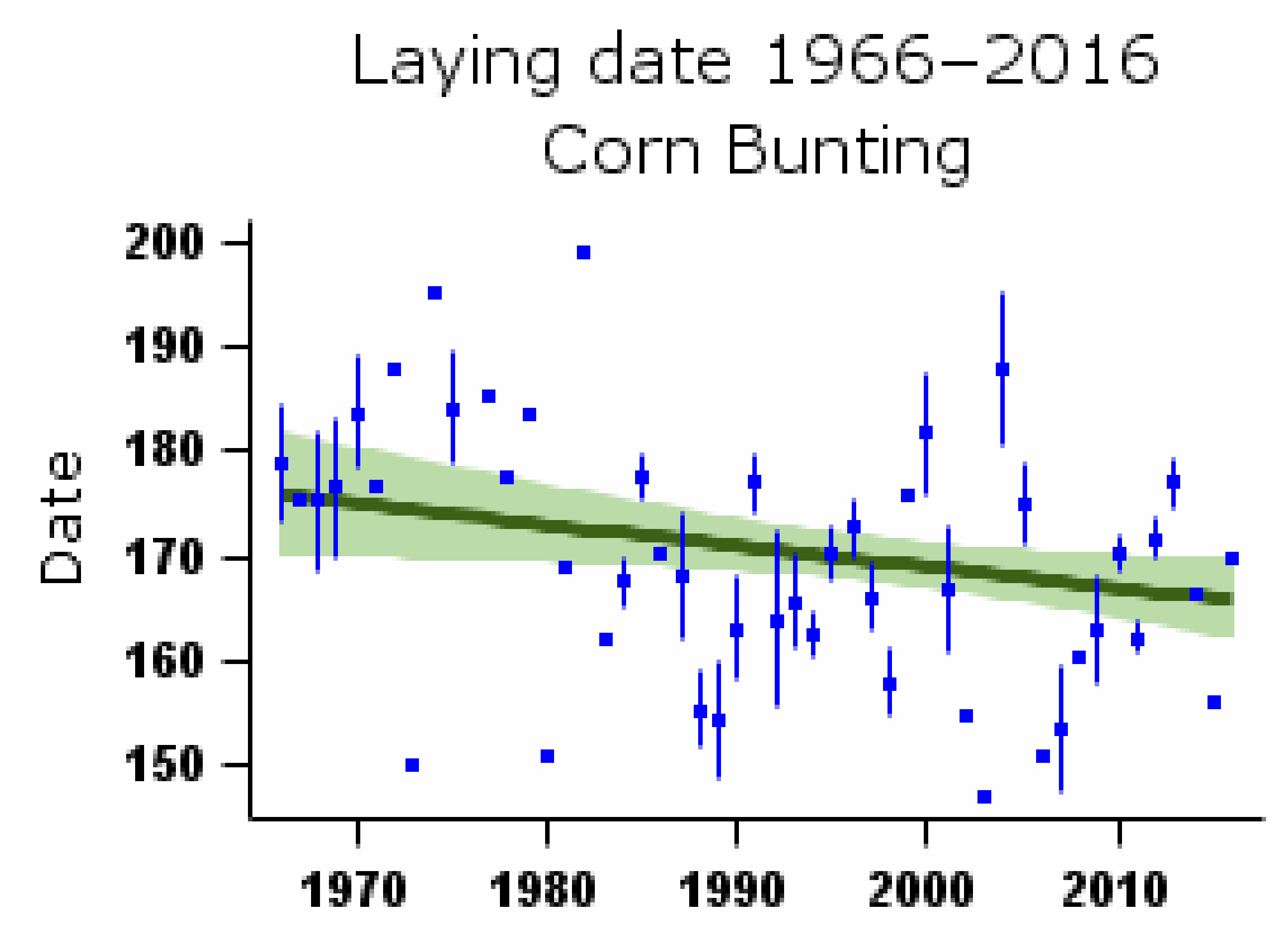


Habitat graph

Demographic trends



Mean number of fledglings produced per nest - green bars represent standard error and black line shows long-term trend

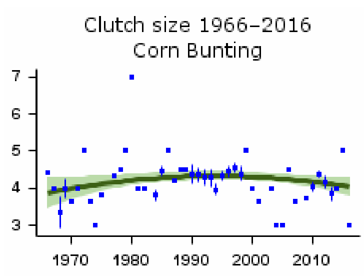


Mean laying date in Julian days (1st April = Day 90) - green bars represent standard error and black line shows long-term trend

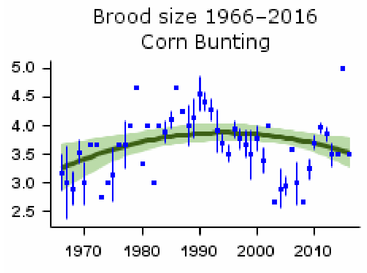
More on demographic trends

Variable	Period (yrs)	Years	Mean annual sample	Trend	Modelled in first year	Modelled in 2015	Change	Alert	Comment
Fledglings per breeding attempt	48	1967-2015	10	None					
Clutch size	48	1967-2015	10	Curvilinear	3.90 eggs	4.06 eggs	4.2%		Small sample
Brood size	48	1967-2015	14	Curvilinear	3.30 chicks	3.55 chicks	7.7%		Small sample
Nest failure rate at egg stage	48	1967-2015	12	None					Small sample
Nest failure rate at chick stage	48	1967-2015	15	Curvilinear	5.13% nests/day	4.32% nests/day	-15.8%		Small sample
Laying date	48	1967-2015	17	Linear decline	Jun 25	Jun 15	-10 days		Small sample

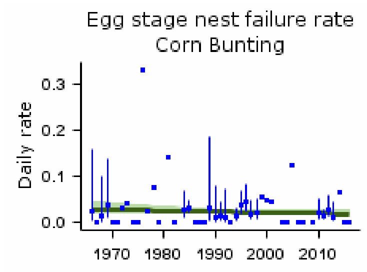
For details of analytical methods for the Nest Record Scheme, the Constant Effort Sites (CES) and the Retrapping Adults for Survival (RAS) scheme, please follow links here.



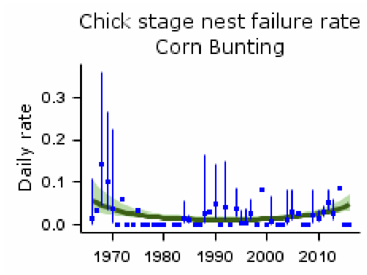
Mean number of eggs per nest - green bars represent standard error and black line shows long-term trend



Mean number of chicks per nest - green bars represent standard error and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend



Proportion of nests failing per day during incubation - green bars represent 95% confidence limits and black line shows long-term trend

Causes of change

Changes in farming practice are believed to have been responsible for declines, through impacts on reduced seed and/or invertebrate abundance. The demographic causes are unclear and there is conflicting evidence as to whether breeding or wintering effects have been the primary driver.

Change factor	Primary driver	Secondary driver
Demographic	Unknown	
Ecological	Agricultural intensification	

Further information on causes of change

National-scale evidence gives no indication of a historical role for breeding success, but there are contemporary local correlations between agricultural practices and breeding success, including a notable effect on numbers of breeding attempts. Causes of change may be different in different populations, as some of this species' breeding habitats are completely different and isolated from each other. There is no way to test for effects of survival. Conversely, it is easy to test for effects on breeding success, especially locally and with respect to contemporary as opposed to historical land-use. This leads to a big imbalance in the evidence available.

Breeding performance per nesting attempt increased considerably while population numbers were declining (Crick 1997, Siriwardenaet al. 2000a), but it is also reported that fewer birds now raise a second brood, thus reducing productivity overall (Brickle & Harper 2002). More recent demographic data show a curvilinear trend to nest failure at the chick stage to clutch and brood sizes, but no trend in productivity per nesting attempt (see above). Ring-recovery sample sizes do not permit an analysis of survival rates, meaning that it is impossible to test for effects of survival (Siriwardena et al. 1998b, 2000a). Any decrease there has been in survival rates is probably a result of the reduction in winter seed availability that has followed from agricultural intensification (Donald 1997, Wilson et al. 2007). Donald & Evans (1994) found that 60% of Corn Buntings fed on winter stubbles, which were the only field type for which a consistent preference was detected.

Spring-sown cereals have been found to be a particularly important habitat for Corn Bunting (Brickle & Harper 2000, Fox & Heldbjerg 2008), and hence its reduction may have contributed to declines, as they provide long-lasting stubbles during the winter and abundant food in the form of surface grain when first sown. In the breeding season, spring cereals were among the most frequently used habitats for nesting and for collecting chick food; territory associations with overhead wires (for songposts) and fallow (positive in early summer, negative in late summer) became stronger in later years as the population declined (Perkins et al. 2012). A study in Germany, suggested that territories with mixed farming, including at least 10% fallow, and with song-posts, were favoured (Altewischeret al. 2016). Siriwardena et al. (2000b) provide evidence that mixed farming at the territory scale supported better breeding performance. However, Donald & Forrest (1995) found little evidence for breeding-season effects in their study using CBC data and suggest that numbers are more likely to have declined due to reduced winter food supplies resulting particularly from the loss of spring tillage, increased pesticide usage and improved harvesting and storage techniques.

A reduction in food availability has been implicated in the declines of this species. In arable-dominated areas in Scotland, Perkins et al. (2011) provide evidence showing that AES management (agri-environment schemes) that increased food availability reversed population declines. However, where a high proportion of Corn Buntings nested in grasslands, an additional AES option that delayed mowing was essential to achieving population increase. Setchfield et al. (2012) have further demonstrated that AES management of cereals can boost productivity and emphasise the importance of delayed harvest to the number and success of late nests. In a subsequent re-survey by Perkins et al. (2017), the study population remained stable, but a link between AES schemes and population trends could no longer be found; however one potential explanation for this was that positive effects of AES had affected a wider area including birds breeding on non-scheme farms.

As part of a PhD study, Brickle (1999) modelled the population dynamics of Corn Buntings in Sussex, concluding that productivity was the most likely cause of decline in the South Downs, also finding evidence of indirect effects of pesticides. Brickle & Harper (1999) identified the main food items of chicks, most of which have declined in abundance on lowland farmland (Campbell et al. 1997). Boatman et al. (2004) further analysed the data from Brickle et al. (2000) and found that arthropod abundance in the vicinity of the nest had a significant effect on the survival of broods, although this was based only on two years' data, whilst Ewald et al. (2002) found that densities of Corn Bunting were higher where the number of pesticide applications was low. Brickle et al. (2000) found that chick weight and nest survival at the nestling stage were respectively positively and negatively correlated with invertebrate food availability, and chick food abundance was negatively correlated with the number of insecticide applications to cereal fields. However, the authors state that the contribution of this reduction in breeding performance to the Corn Bunting's decline depends on the mortality rates for fledged chicks and older birds, information on which is sparse.

An experimental study by Setchfield & Peach (2016) found that nest site selection was influenced by crop density and that a disproportionate numbers of nests were close to field edges where regular seed sowing overlaps creating a denser sward. Nests close to the field edge are subject to high predation rates so they suggest that patches of denser sward should be deliberately created away from crop edges by double-drilling during sowing. Brickle & Harper (2002) found that, although predation accounted for the majority of nest failures in their Corn Bunting study population, there was a seasonal decline in the nest survival rate during incubation, which was largely due to increased losses through farming operations. Furthermore, they speculated that harvesting of cereal crops may reduce the availability of suitable breeding habitat late in the season, thus curtailing the length of the breeding season, and preventing double-brooding. A reduction in fecundity via these mechanisms provides one explanation for the collapse of the Corn Bunting population (Donald 1997, Brickle & Harper 2002).

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. (2017) BirdTrends 2017: trends in numbers, breeding success and survival for UK breeding birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

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