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Changes in the distributions of breeding birds in England, Scotland and Wales: 1968-72 to 1988-91

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SUMMARY

1.This report summarises information on changes in the distribution of all species of bird breeding in England, Scotland and Wales. Absolute changes in the number of occupied 10-km squares between the two Breeding Bird Atlas periods (1968-72 and 1988-91) and percentage range changes are given for each species in each of the three countries.

2. It has been suggested that for certain species, range changes may have been markedly different in lowland and upland areas. Consequently, a second table treats upland and lowland 10-km squares separately.

3.Further tables are presented listing the 30 species in each country showing the greatest increases in range and the 30 species showing the greatest declines, both in terms of changes in the absolute number of occupied squares and in terms of percentage range changes.

4. Both methods identified a high proportion of introduced exotic species and diurnal raptors amongst the species to have exhibited the greatest increases in range and a high proportion of farmland birds and long-distance migrants amongst those to have suffered the greatest declines.

INTRODUCTION AND METHODS

There have been two atlases of breeding birds in Britain and Ireland. Fieldwork for the first, organised by the British Trust for Ornithology (BTO) and the Irish Wildbird Conservancy (IWC), was carried out between 1968 and 1972. The results were published in Sharrock (1976). The second, organised by the BTO, the IWC and the Scottish Ornithologist's Club (SOC), was carried out between 1988 and 1991. Results are given in Gibbons *et al.* (1993). Virtually all 10-km squares in Britain and Ireland were covered in each Atlas. Full details of methodology are given in Gibbons *et al.* (1993).

The second Atlas provided summary statistics on changes in the number of 10-km squares occupied by each species in Britain and Ireland but did not give changes in England, Scotland and Wales separately. Such figures are potentially useful in attaching conservation priority to each species at a country level. This report provides data on changes in the numbers of occupied 10-km squares in each country at the species level. Because of a suspicion that some species had declined more in lowland squares, data are also given on changes in upland and lowland areas separately in each country.

In comparing changes in distribution, it was necessary to remove from the analyses the small number of 10-km squares which were covered during only one of the Atlas periods. This left a total of 2,822 10-km squares in Britain (excluding the Isle of Man and the Channel Islands). 10-km squares falling on national borders were assigned to the country holding most of the land area in that square. Presence/absence data for all breeding species were avalable from each Atlas period for 1,415 10-km squares in England (1,260 lowland, 155 upland), 1176 in Scotland (360 lowland, 816 upland) and 231 in Wales (135 lowland, 96 upland). It was not possible to estimate changes in the numbers of each species in each 10-km square between Atlas periods since the first Atlas collected no measures of species abundance. The interpretation of measures of distributional change is discussed in the final section of this report.

Squares were classified into upland or lowland categories using data extracted from the Institute of Terrestrial Ecology's land classification scheme (Bunce *et al.* 1983). This scheme allocated every 1-km grid square in Britain into one of 32 land classes based upon details of climate, geology, vegetation and topography. 10-km squares containing more than 50% upland (or marginal upland) 1-km squares were classified as upland, all others as lowland. This follows the method of Gibbons *et al.* (1995). Altitude was only one of the factors involved in determining whether a square was classified as upland or lowland. In northern Britain, upland vegetation is found nearer sea-level, so many squares in this region classified as upland were at low altitudes.

Two measures of change were calculated for each species: absolute changes in the number of occupied 10-km squares and percentage range changes (i.e. % changes in the number of occupied squares). These figures were not necessarily correlated - for example a widespread species might occupy a very large number of new 10-km squares between the two Atlas periods but this might represent a range expansion of only a few percent. Conversely, a restricted species might appear in a very small number of new squares but this might represent a significant range expansion in terms of percentage increase.

The results are presented in tabular form. The number of occupied 10-km squares in each Atlas, the absolute change in occupied 10-km squares and the percentage range change are given with upland and lowland 10-km squares treated together and separately. Further tables list the 30 species which showed the greatest range declines and increases both in terms of percentage change and changes in the absolute numbers of occupied squares. In order to avoid extreme percentage changes caused by relatively small changes in the low numbers of 10-km squares occupied by very rare species, only species which were recorded in at least 25 10-km squares in one or other Atlas were included in these tables. Only species known to have bred in Britain are included in these tables. Thus species for which records refer only to non-breeding summering individuals are not included.

In most cases, records from 10-km squares where birds were simply seen, as well as those in which breeding was confirmed, were used in the calculation of range changes. The exception to this was a number of seabirds, where only 10-km squares in which breeding was confirmed were used. The reasons for this are that seabird colonies tend to be long-established and well known, that non-breeding seabirds are seen well away from these colonies and that seabird breeding distribution is well known from the JNCC/Seabird Group Seabird Colony Register. This follows the method used in the second Breeding Bird Atlas to calculate range changes. The following species are dealt with in this manner: Fulmar, Manx Shearwater, Storm Petrel, Leach's Petrel, Gannet, Cormorant, Shag, Arctic Skua, Great Skua, Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull, Great Black-backed Gull, Kittiwake, Sandwich Tern, Roseate Tern, Common Tern, Arctic Tern, Little Tern, Guillemot, Razorbill, Black Guillemot and Puffin.

INTERPRETATION OF RESULTS

Whilst a contraction in the range of a particular species is generally indicative of a decline in the population of that species, it is important to stress that the two measurements are unlikely to be correlated linearly and will vary greatly between species and regions. This should be carefully considered when assessing the importance of the range changes presented in this report, particularly when using them to identify species of conservation importance. For example, the British breeding range of the Corn Bunting declined by 32% between the two Atlas periods yet its population fell by nearly 70% (Marchant *et al.* 1990). Rates of range decline were found to be higher in areas where the species was more patchily distributed and hence, presumably, less common (Donald *et al.* 1994). Population densities in occupied squares in these regions were lower than those in regions where there was less distributional decline (Donald & Evans in press).

The absence of a marked contraction in the range of abundant and widespread species does not necessarily imply that there has been no population decline. For example, the Common Birds Census (CBC) recorded a population decline of Skylarks on farmland of over 50% between the mid-1970s and the early 1990s, yet over the same period the range of the species in Britain declined by less than 2%.

For a species whose population densities are fairly even throughout most of its range, a population decline of 50% would be likely to result in a range contraction of far less than 50% (assuming the rate of decline to be even throughout the species' range). On the other hand, a species which is heavily concentrated in a small part of its range, with low densities elsewhere, would be likely to show a rate of distributional decline nearer to that of the population decline.

Occasionally, range and population changes might be in opposite directions. For example, the British range of the Nightjar declined by over 50% between the two Breeding Bird Atlas periods yet its population in Britain increased by 50% between 1982 and 1991 (Morris *et al.* 1994). This was largely the result of a loss of many dispersed traditional heathland sites being compensated for by an increased area of clear-fell sites in a few commercially managed forests. Such examples are likely to be rare, however, and range decline is generally a good indication of population decline.

Two different criteria were used to select the species which have increased or declined most in range - percentage changes in range and changes in the overall number of occupied 10-km squares. The methods tended to identify different species - for example only 14 out of the 30 species to have shown the greatest increases in range in England were selected by both methods. The reasons for this are obvious - a species with a small range which doubles between the two Atlas periods is very likely to appear on the percentage change list but most unlikely to be selected by the absolute change method. Similarly, a very widespread species which occupies 200 new 10-km squares is likely to be selected by the absolute change method but this gain is likely to represent only a small percentage increase in range. The decision as to which method is better at isolating species of conservation priority will be based largely on subjective assessments of the aims of conservation, but clearly any species appearing on both the percentage range decline and absolute range decline lists would merit serious consideration.

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Fieldwork for both Breeding Bird Atlases was carried out by literally thousands of volunteers thoughout Britain and Ireland. Were it not for their commitment and dedication, the data presented in this report would not exist.

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Notes on the tables

The results of the analyses are presented in Tables 1 to 15. The following codes are used in the tables:

New sp. A species recorded by the second Atlas but not the first. All records, not just those of confirmed breeding, are included so this code does not necessarily imply colonisation by breeding birds

1 No records of confirmed breeding - all records relate to non-breeding .... summering birds.

2 Seabirds for which only confirmed records of breeding are included in the tables.

3 Majority of records considered to relate to escapes from collections but feral .... populations not yet established.

4 Crossbills: the first Atlas did not collect information on Scottish Crossbills as the species was not recognised at the time. The second Atlas did differentiate between Common and Scottish Crossbills and the figures are given separately for each species in the tables. The tables do not include the small number of records of crossbills not identified to species.

5 Quail: the second Atlas fieldwork period included a year (1989) in which the largest ever invasion of this species into Britain was recorded. The large increases suggested by the tables should therefore be regarded critically.