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**Preliminary BBS-based habitat-specific indicators for wild bird populations: 1994-2002**

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## EXECUTIVE SUMMARY

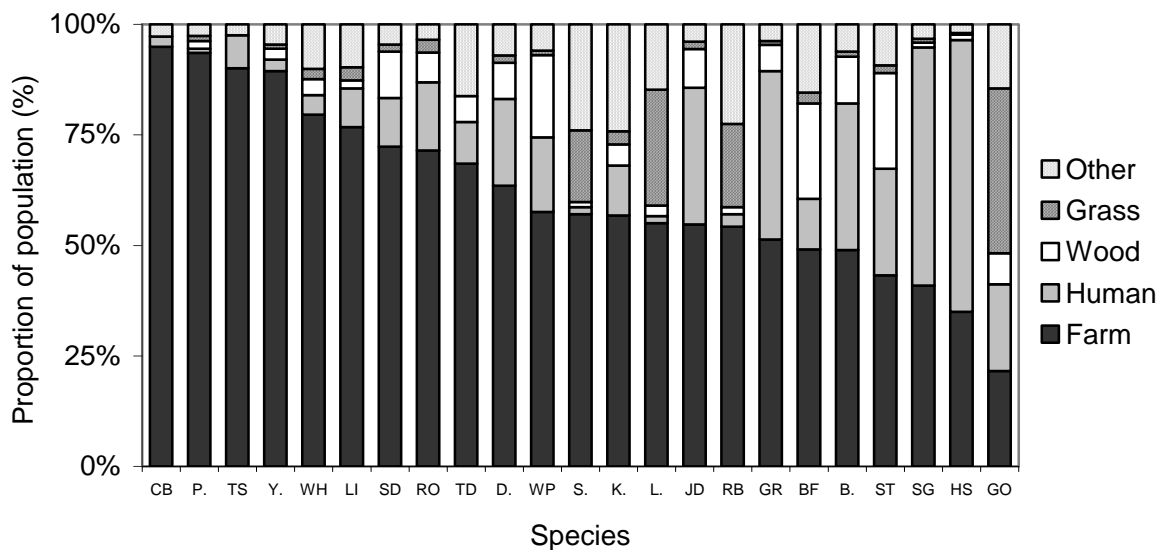
1. Data from the Breeding Bird Survey were analyzed at the transect section level of resolution to generate series of habitat-specific annual indices for each species. The results presented here are derived from all species that occurred in a given habitat in at least 20 squares per year.
2. A habitat-specific farmland bird indicator (based on farmland species on farmland) was almost identical to the QOL farmland bird indicator (based on the same 19 farmland species in all habitats) – both declining by 5% between 1994 and 2002. This was also true for farmland specialists (declining by 7 %) and farmland generalists (declining by 1 %).
3. An alternative indicator (based on farmland-specific trends for all species recorded on farmland) differed from the versions above, exhibiting a positive trend of between 6 % and 7 %.
4. Trends for farmland species in semi-natural grassland dominated habitats were slightly more negative than those for those species on farmland.
5. A habitat-specific woodland indicator (based on woodland species in woodland) was quite similar (declining by 5 %) to the QOL woodland bird indicator based on woodland bird trends in all habitats (which declined by 7 %). Woodland specialists declined slightly more in ‘all’ habitats (-10 %) than in woodland (-7 %).
6. The alternative indicator (based on woodland-specific trends for all species recorded in woodland) showed less of a decline (-1 %), exactly the same as for woodland generalists in woodland, and in all habitats.
7. Urban-specific indicators based on trends of (i) common town and garden species, (ii) farmland species, and (iii) woodland species, in human-dominated landscapes were generally positive, except for farmland specialists.
8. Waterbody-specific indicators based on trends of ‘water and wetland’ species (defined jointly in the England Biodiversity Strategy) were less positive (+10 %) solely on wetland sites than across all habitats (+22 %).
9. Upland indicators based on trends of upland species surveyed in heath and bog habitats showed a 1 % decline, whereas trends for the same upland species across all habitats showed a 4 % increase.
10. Trends for woodland species, particularly for woodland specialists, in scrubland were more positive than in woodland, but were based on a smaller suite of more common species. Most woodland species show similar trends for woodland and scrubland habitats.
11. The habitat-specific indicators produced by these methods show that both the habitat in which birds were recorded and overall features of the species are important. Habitat-specific indicators were very similar to the QOL indicators for those species groups, but indicators based on all species in farmland or woodland habitat were more difficult to interpret. For the latter, the pattern for all species in woodland habitats was similar to those for woodland generalists in woodland or all habitats, but the pattern for all species in farmland habitats was significantly more positive than other farmland indicators.
12. The all species habitat-specific indicators presented herein are novel, with examples presented for two habitats only. They suggest that in some cases this approach may produce considerably different indicator trends to those of the existing indicators for the same habitats.



# 1. INTRODUCTION

Wild bird indicators were first produced in the UK in 1999, using data from the Common Bird Census, the Breeding Bird Atlases, the Seabird Monitoring Programme and other data sources. Since then, a number of slightly different versions of the wild bird indicators have been developed for different purposes, including the smoothed Farmland Bird Index which has been adopted as the measure of progress towards the farmland bird PSA target by the government. A common feature of all of these versions is that bird species are assigned to the indicator for a given landscape according to their main habitat preference, but then data from all habitats for these species are used in generating the specific trends. In this report, we explore alternative approaches, using count data from particular habitats to generate habitat-specific trends for each species, and then assembling habitat-specific indicators.

Whilst all wild bird species in Britain show some level of habitat preference, very few species are so specialized that they occur in a single habitat only. To illustrate, we show the estimated proportions of the total British populations of the 18 farmland species included in the farmland indicator and for 5 additional species occurring within five major habitat classes (Figure 1; Table 1). This figure was mainly derived from Newson *et al.* (in press) and from Gregory (1999) and calculated from BBS data for 1998 and 1996 respectively. Estimates that correct for differences in detectability between habitats were not available for two farmland indicator species, Rook and Stock Dove, and for these species we present the proportions observed in the raw BBS data for 1998 as an approximate estimate of occurrence within the broad habitat classes.



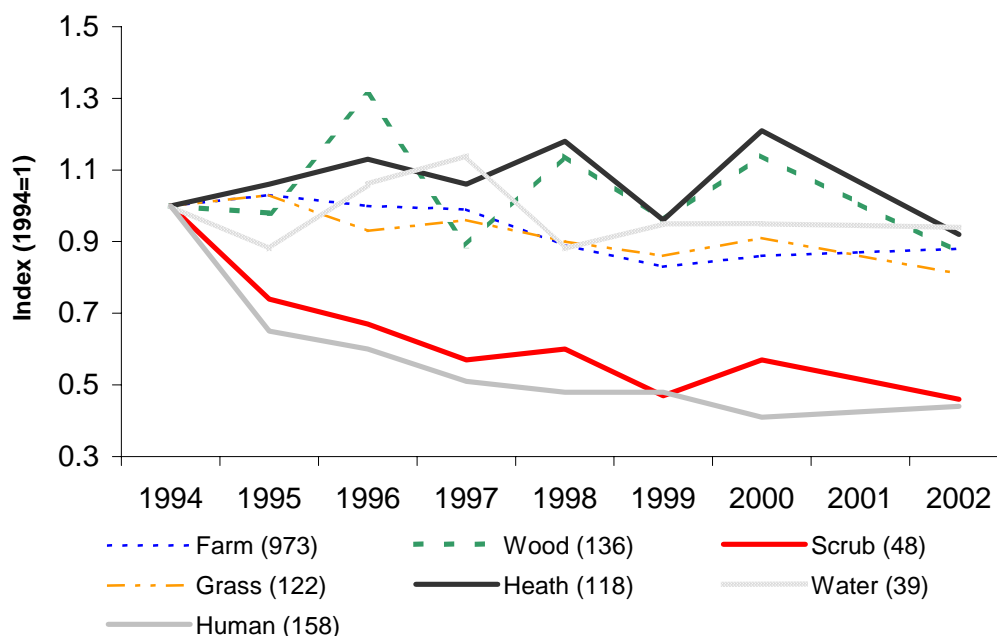
**Figure 1.** Estimated proportions of the total British populations of twenty-three species occurring within five major habitat classes. Species codes are translated in Table 1. ‘Other’ habitat here includes scrubland, heathland and bogs, waterbodies, coastal, inland rock and unclassified habitat. For species codes, see Table 1.

**Table 1.** Species code and indicator with which twenty-three British wild bird species are associated.

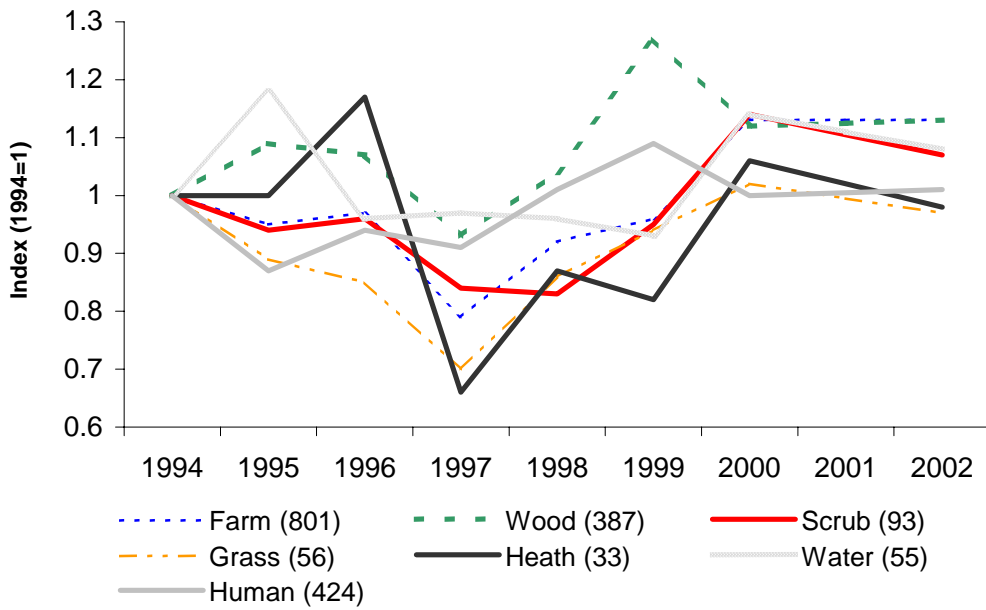
Species	Code	Indicator	Species	Code	Indicator
Kestrel	K.	Farmland	Starling	SG	Farmland
Grey Partridge	P.	Farmland	Dunnock	D.	Woodland
Lapwing	L.	Farmland	House Sparrow	HS	Urban
Wood Pigeon	WP	Farmland	Tree Sparrow	TS	Farmland
Stock Dove	SD	Farmland	Greenfinch	GR	Farmland
Turtle Dove	TD	Farmland	Goldfinch	GO	Farmland
Skylark	S.	Farmland	Linnet	LI	Farmland
Blackbird	B.	Woodland	Bullfinch	BF	Woodland
Song Thrush	ST	Woodland	Yellowhammer	Y.	Farmland
Whitethroat	WH	Farmland	Reed Bunting	RB	Farmland
Jackdaw	JD	Farmland	Corn Bunting	CB	Farmland
Rook	RO	Farmland			

As a result wild bird indicators, produced using trends for species classified according to the predominant habitat in which they are believed to occur (e.g. ‘farmland’ or ‘woodland’ species), may not necessarily reflect trends occurring within that habitat, if population change within a secondary habitat(s) are driving population change. Indicators compiled from habitat-specific trends may better reflect population change within a habitat of interest. To first illustrate how trends may differ between different habitats we present habitat-specific trends produced from BBS data for three example species, Skylark, Song Thrush and Carrion Crow (Figure 2). Although the trends for Song Thrush are quite similar, Skylarks have declined more rapidly in scrub and human dominated landscapes than in other habitats such as farmland. Trends for the Carrion Crow vary widely according to habitat.

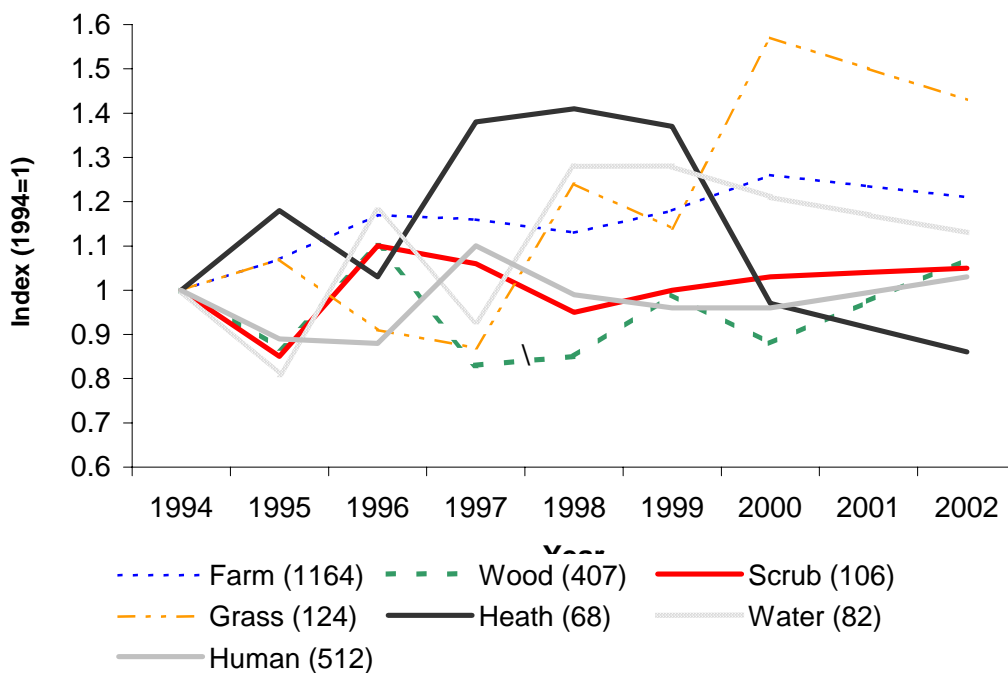
a) Skylark



b) Song Thrush



c) Carrion Crow



**Figure 2.** Habitat-specific BBS trends for three example species, Skylark, Song Thrush and Carrion Crow which occur within a range of different habitat classes as defined in Table 2 and calculated according to the methodology in section 2.1.



## 2. METHODS

During their visits to each BBS square, observers record the habitat within each of the ten 200 m transect sections within each 1 square km BBS square according to a hierarchical coding system (Crick 1992). Because bird and habitat information is recorded at the 200 m transect level, it makes sense to examine the production of habitat-specific trends using data at this level. In these analyses we trial the production of habitat-specific trends at the primary habitat level. In total there are nine primary habitat classes, a description of these is given in Table 2.

**Table 2.** Primary habitat classes recorded by BBS observers. Habitat classes are based on Crick (1992).

Name	Description
Woodland	Broadleaved, coniferous and mixed woodland
Scrubland	Young regenerated woodland, downland scrub, heath scrub, young coppice, young plantation and clear-felled woodland (< 5m in height)
Grassland	Dry and wet semi-natural grassland (Chalk downland, grass moor (unenclosed), grass moor mixed with heather and other dry grassland, Machair, water meadow, grazing marsh, reed swamp, saltmarsh and other open marsh)
Heathland & bogs	Dry heath, wet heath, mixed heath and breckland, bog, drained bog and bare peat
Farmland	Improved and unimproved farmland, mixed grass/tilled farmland and tilled farmland
Human sites	Urban, suburban and rural human sites
Waterbodies	Freshwater pond, lake, reservoir, stream, river, canal and ditch
Coastal	Marine open shore, inlet, cove, loch, estuary, brackish lagoon and open sea
Inland rock	Cliff, scree/boulder slope, limestone pavement, other rock outcrop, quarry, mine spoil/slag heap and cave

### 2.1 Analytical methods

A complexity in producing habitat-specific trends based on information at a 200 m transect section level is that transect sections within BBS squares are not independent of one another and cannot be treated as separate sites. However, if BBS squares are treated as sites, some sites may record more birds, simply because they have more transect sections of the habitat of interest. We control for this in the analyses by including the log of the number of transect sections of habitat of interest within each BBS square as an offset variable (see Stokes *et al.* 2003 for a further discussion of offsets).

As with the production of the existing national indicators, habitat-specific indicators were calculated as an average index of population trends taken across all species. The geometric mean of the indices was used because of the skewed nature of the distribution of index values (i.e. so that a doubling is equivalent to a halving). In this trial, for inclusion of a BBS trend in the habitat-specific indicators we included those species occurring on a mean of 20 or more sites (with one or more 200 m transects of the habitat of interest) surveyed annually, although we examine here the inclusion and exclusion of species occurring on 10 or more sites. In this exploratory study, we examine the potential for producing habitat-specific indicators for the UK.

### 2.2 Groupings of species prior to index calculation

Prior to generating any previous across-species indices, a decision was made as to how best to group species to produce the most meaningful indicators. In the '*Generation of the headline indicator of wild bird populations*', Gregory *et al.* (1999) chose to group species by habitat according to the classification in the *New Atlas* (Gibbons *et al.* 1993, p479). This allocates to each species of bird one of seven habitat categories: **FA** farmland, **WO** woodland, **LW** wetland, **CO** coastal **UR**, urban, **UP**

upland, and NC not classified. This classification has been used in the production of all subsequent wild bird indicators.

For the production of habitat-specific indicators, we retain this classification and produce farmland and woodland-specific indicators using farmland and woodland-only trends for species in the two *New Atlas* habitat categories. In a similar vein, it was decided to produce waterbody-specific indicators for 'lowland wetland' species and heathland & bog-specific indicators for 'upland' species. For 'scrubland' species, we examine two possible approaches. The first is to produce separate scrubland-specific trends for 'woodland' species and the second approach is to combine data for scrubland and woodland within a single indicator.

Because the *New Atlas* classification for urban species only includes four wild bird species routinely monitored by the BBS (Collared Dove, Swift, House Martin and House Sparrow), we use here the England Biodiversity Strategy (EBS) 'urban' species classification, which includes trends for 10 'urban' species. These include Blackbird, Blue Tit, Carrion Crow, Collared Dove, Greenfinch, House Sparrow, Magpie, Robin, Song Thrush and Starling. There is also no *New Atlas* species classification for 'semi-natural grassland', so we examine here the production of grassland-specific trends for both 'farmland' and 'woodland' species. Because there were very few BBS squares containing coastal and inland rock habitat, the production of indicators for these habitats was not pursued.

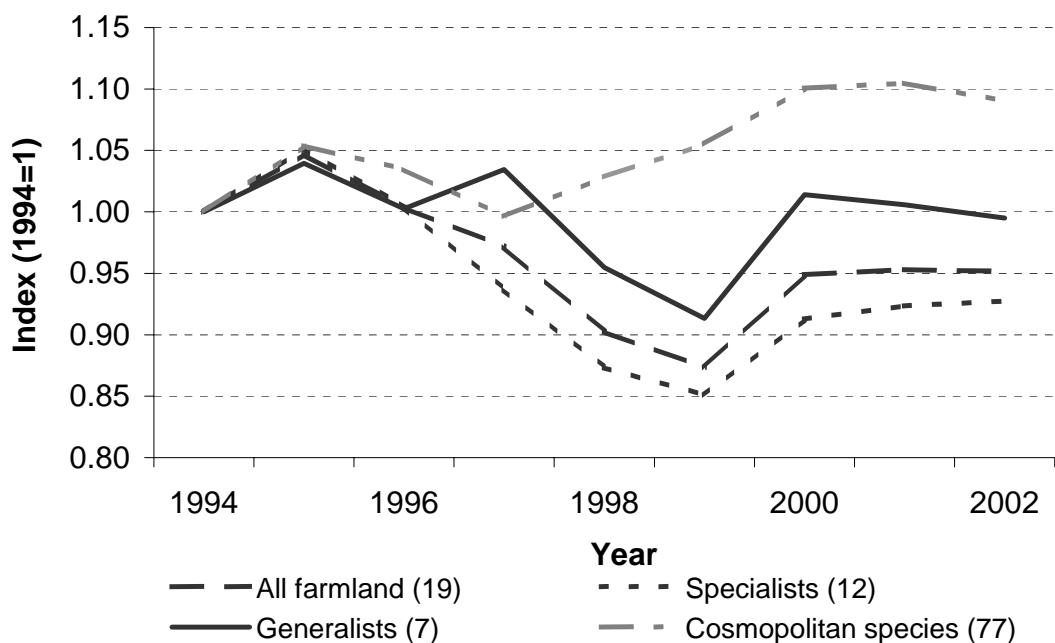
Finally, we have presented an alternative approach where the species composition of indicators is not constrained by a priori classifications. Rather, habitat-specific trends are included for all species that occur in a habitat (above a certain minimum threshold) in the indicator for that habitat regardless of whether it is their primary habitat.

### 3. RESULTS AND DISCUSSION

#### 3.1 Farmland - specific farmland indicator

This UK farmland-specific indicator for 'farmland' species is based on single-species trends from farmland transects for all 19 species included in the QOL farmland indicator and is shown in Figure 3 for all farmland species, separately for farmland specialists and farmland generalists and for cosmopolitan species defined here as all species for which farmland-specific trends can be produced (mean of 20 or more squares) excluding the 19 farmland species.

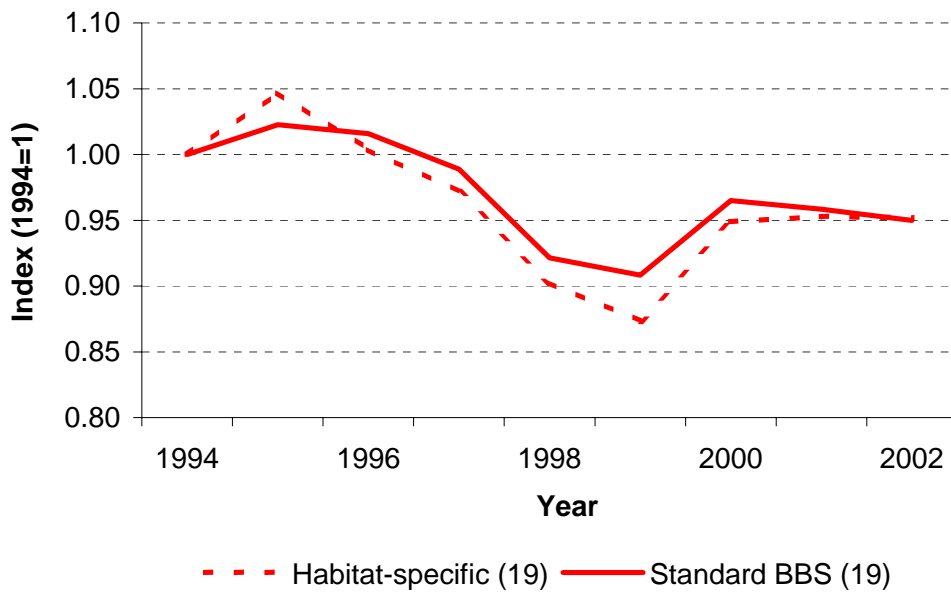
The all species farmland-specific indicator declines from 1994 to 1999, but shows some sign of recovery in 2000 after which the indicator has remained relatively stable. The same pattern is mimicked in separate farmland-specific indicators for farmland specialists and generalists, but the decline is most extreme in farmland specialists. Cosmopolitan species, which are not specifically linked to farmland show an increase on farmland during this period. The single species trends for the 19 species that make up the indicator are given in Table 3, Appendix 1.



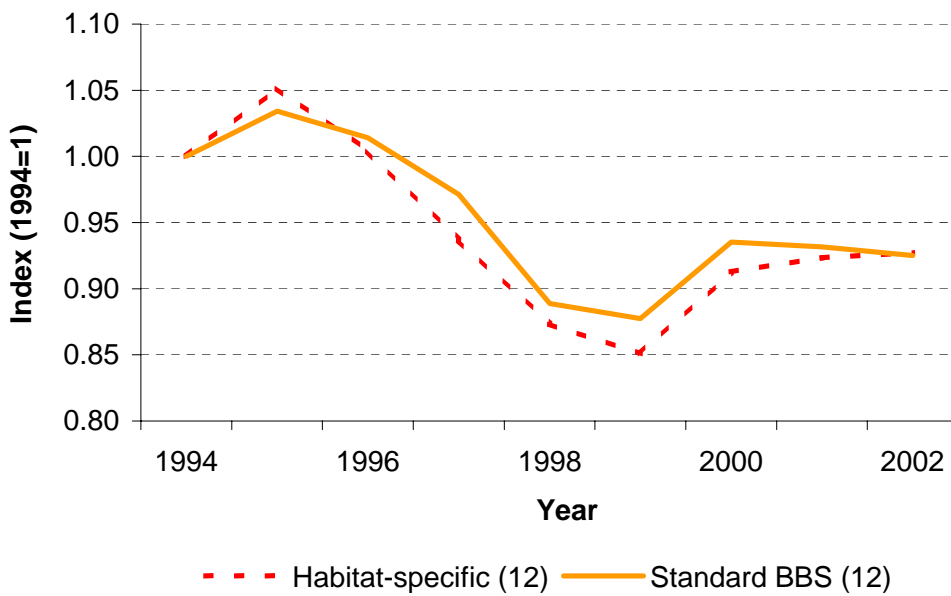
**Figure 3.** Farmland-specific indicators for 'farmland' species. The number of species included in each indicator is shown in brackets.

In Figures 4 a-c, we compare the farmland-specific indicators above with the farmland bird indicators produced using standard BBS trends for 'farmland' species irrespective of the habitat in which the individuals were recorded. The number of species included in each single species trend is shown in brackets. Because farmland specialists mainly occur on farmland habitat, producing a farmland-specific indicator for this sub-set of species using data from farmland transects only, results in an indicator which is almost identical to the farmland indicator produced using standard BBS trends for farmland specialists. As might be expected, the farmland-specific indicator for farmland generalists is less similar to the standard farmland generalist indicator, presumably because a larger proportion of the populations of these species are being surveyed in habitats other than farmland.

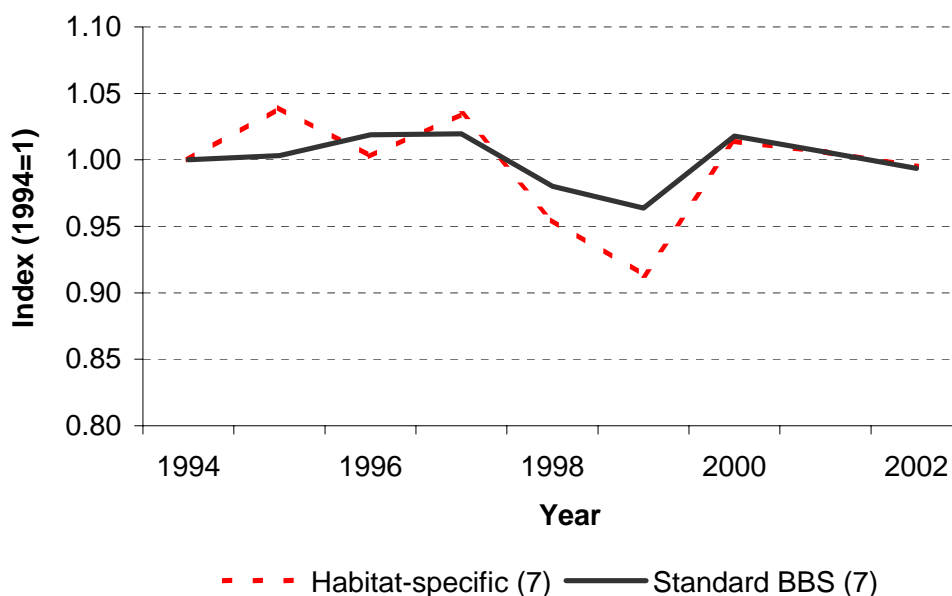
a) All farmland species



b) Farmland specialists



### c) Farmland generalists

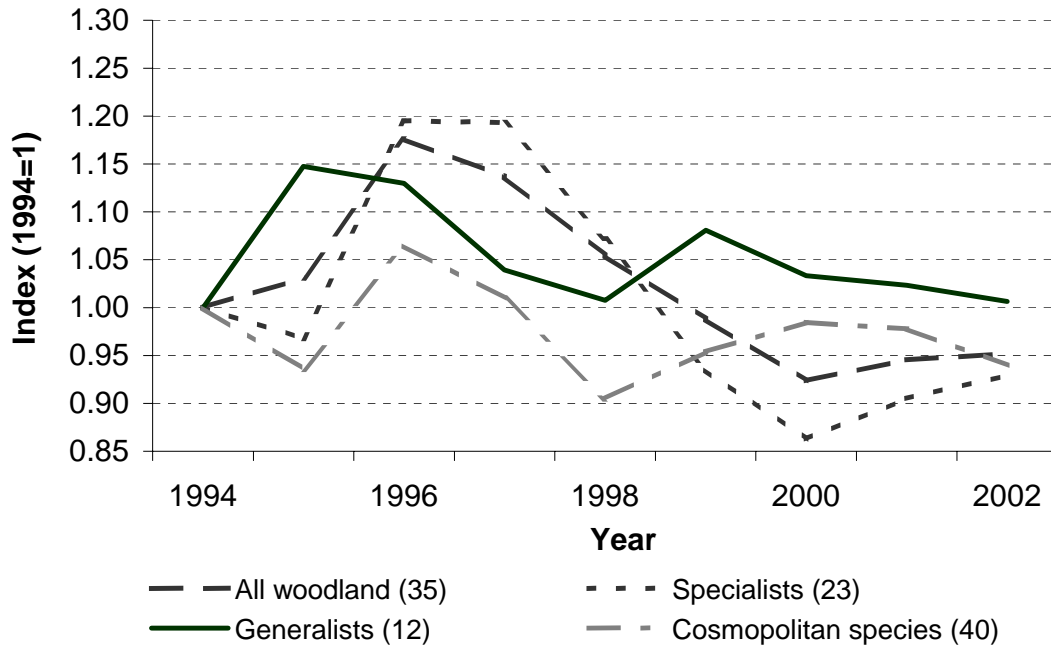


**Figure 4.** Comparison of farmland-specific indicators with standard BBS farmland indicator using count data from all habitats. The number of species included in each indicator is shown in brackets.

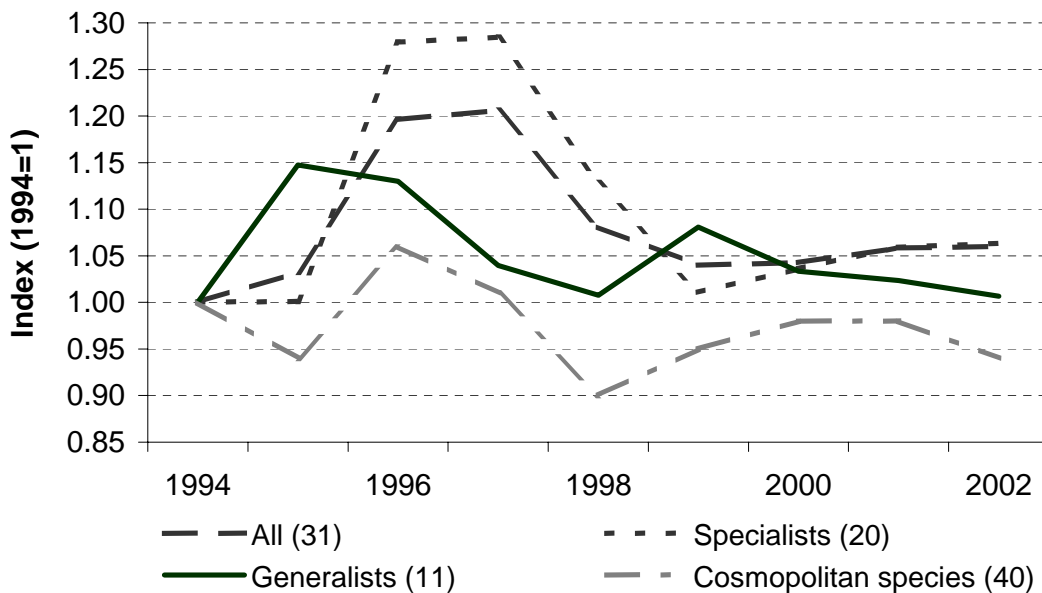
### 3.2 Woodland - specific woodland indicator

This woodland-specific indicator for ‘woodland’ species is based on single-species trends on woodland transects for 31 of the 33 species included in the UK QOL woodland indicator (excludes Hawfinch and Nightingale for which data were insufficient to produce reliable trends from the Breeding Bird Survey). Additional woodland species included in the BBS-based woodland specific indicator here include Wood Warbler, Pied Flycatcher, Crossbill and Siskin. The woodland-specific indicator includes four species recorded on a mean of 20 or fewer BBS squares over the period 1994-2002: Willow Tit (17 BBS squares), Lesser Spotted Woodpecker (8 BBS squares), Lesser Whitethroat (12 BBS squares) and Pied Flycatcher (18 BBS squares). In Figures 5 and 6 we present two sets of indicators. The first includes all species regardless of sample size and the second excludes species recorded on 20 or fewer BBS squares. The specific trends for species included in the indicators are present in Table 4, Appendix 1.

A comparison of indicators produced including and excluding the four rarer species shows that inclusion of these species results in a declining indicator because three of these ‘rarer’ species have shown large declines over the period 1994-2002. However, if these species are excluded on the grounds of small sample size, the indicator is relatively stable over the period 1994-2002.



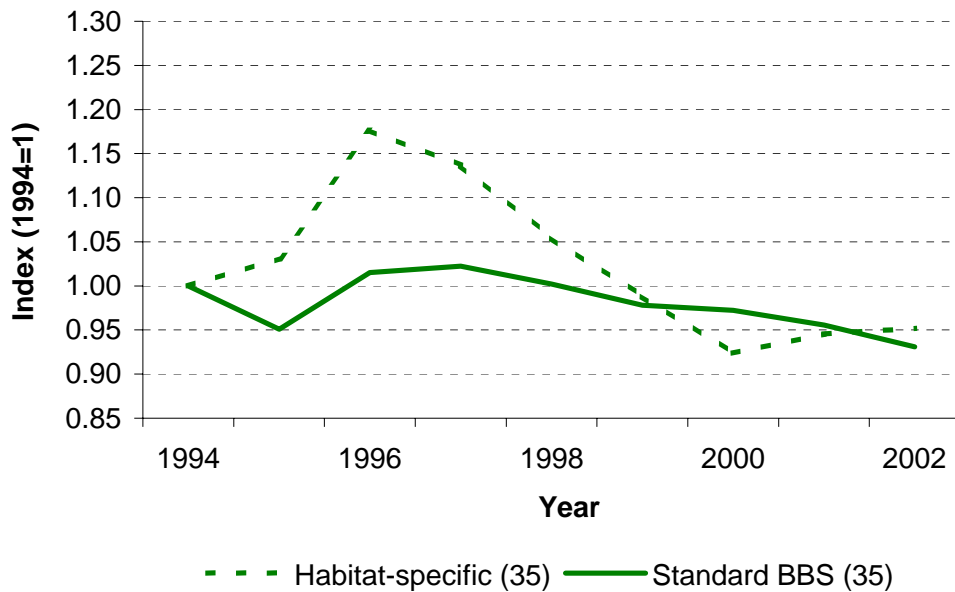
**Figure 5.** Woodland-specific indicator for ‘woodland’ species. The number of species included in each indicator is shown in brackets.



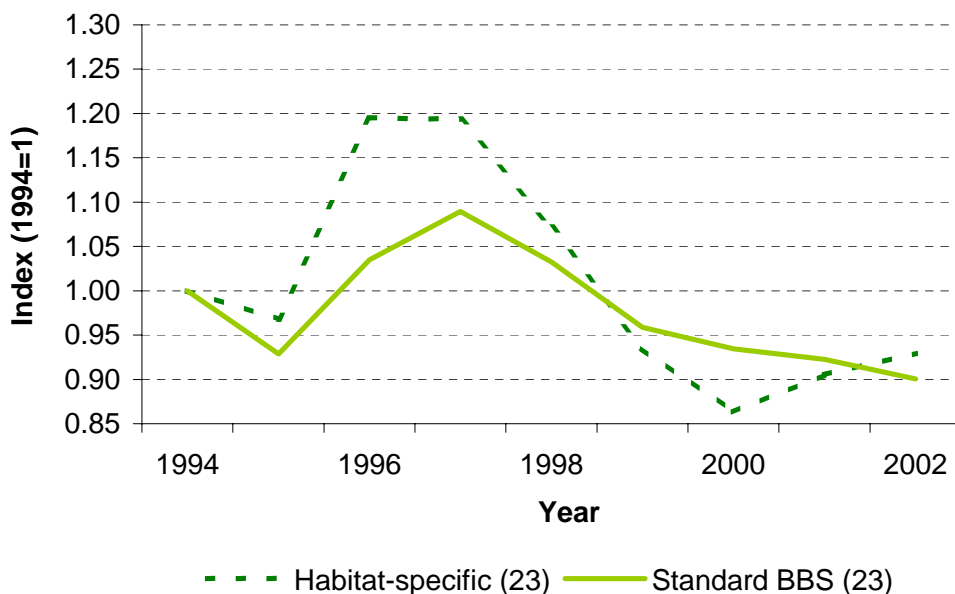
**Figure 6.** Woodland-specific indicator for ‘woodland’ species excluding Willow Tit, Lesser Spotted Woodpecker, Lesser Whitethroat and Pied Flycatcher recorded on a mean of 20 or fewer BBS squares over the period 1994-2002. The number of species included in each trend is shown in brackets.

In Figures 7 a-c, we compare the woodland-specific indicators above with standard woodland indicators for all woodland species (including the four species recorded on 20 or fewer BBS squares). The number of species included in each trend is shown in brackets. Examination of the list of woodland specialists suggests that they are perhaps not specialist as the farmland specialists, with some species commonly found on farmland and in towns and gardens. This may explain why a comparison of the two alternative approaches for producing indicators for woodland specialists is less similar than the 'farmland' specialist comparison above. Woodland generalist indicators by the two approaches are slightly more dissimilar than for woodland specialists.

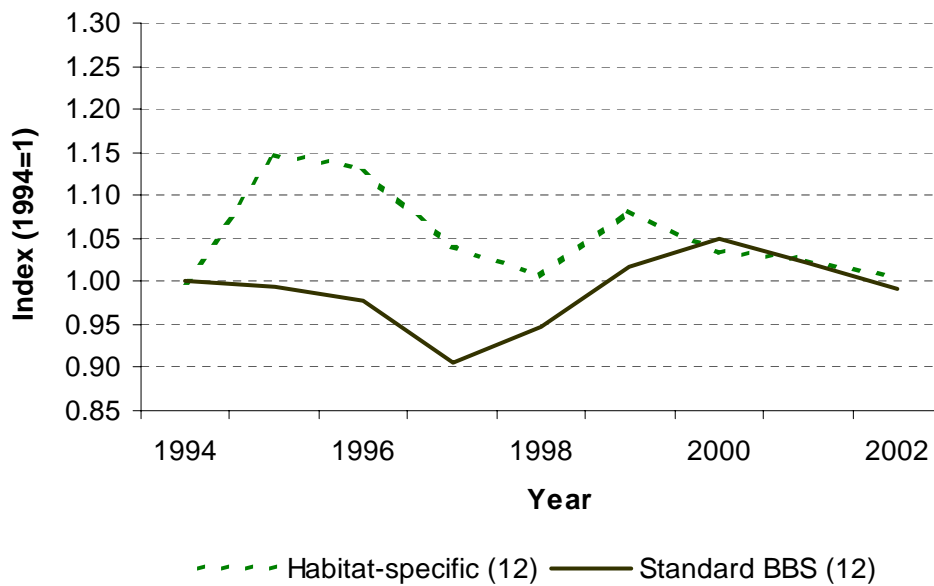
a) All woodland species



b) Specialist woodland species



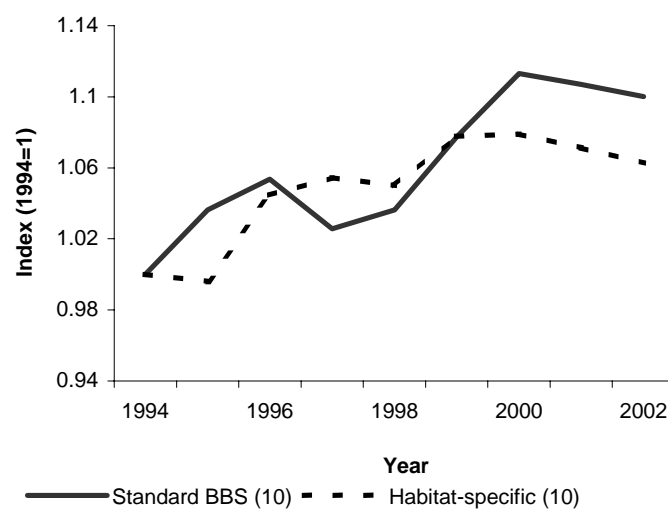
c) Generalist woodland species



**Figure 7.** Comparison of woodland -specific indicators with standard BBS woodland indicator using count data from all habitats. The number of species included in each indicator, (exactly the same suite) is shown in brackets.

### 3.3 Urban habitat-specific indicator

For this indicator we include trends for ten species included in the EBS ‘town and garden’ indicator: Blackbird, Blue Tit, Carrion Crow, Collared Dove, Greenfinch, House Sparrow, Magpie, Robin, Song Thrush and Starling. In Figure 8 we show the ‘urban’ indicator in comparison with an indicator based on standard BBS data from all habitats - for the same ten species. Table 5, Appendix 1 gives the urban-specific species indices and standard BBS trends for the ten species included in these indicators.

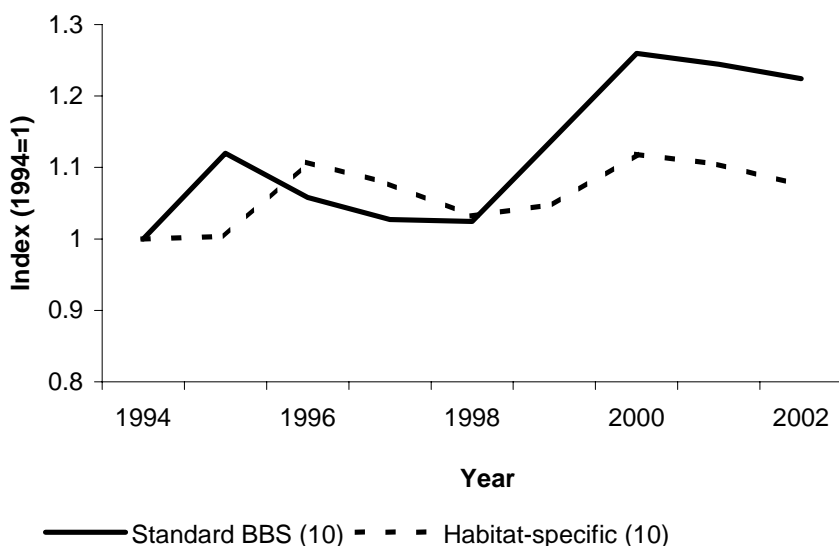


**Figure 8.** Comparison of the urban-specific indicator with standard BBS urban indicator using count data from all habitats. The number of species included in each indicator, (exactly the same suite) is shown in brackets.

A comparison of these two versions of 'urban-specific' indicators shows that both indicators increase over the period 1994-2002. The increase is slightly greater on an indicator based on standard BBS data, but despite the larger differences in areas and habitat covered, the trends are remarkably similar. By comparing the species trends in Table 5, Appendix 1, it can be seen that this can be explained by a larger increase (or smaller decline) in the abundance of Carrion Crow, Collared Dove, Greenfinch, House Sparrow and Song Thrush than when using BBS count data from all habitats.

### 3.4 Waterbody-specific indicator for wetland species

For this indicator we include trends for ten species classified as lowland wetland species in the *New Atlas*, for which we have sufficient BBS data. This includes Coot, Grey Heron, Lapwing, Mallard, Moorhen, Mute Swan, Pied Wagtail, Reed Bunting, Sedge Warbler and Tufted Duck. In Figure 9 we show the waterbody-specific indicator in comparison with an indicator based on standard BBS data. Table 6 shows the single species waterbody-specific and standard BBS trends for species included in these indicators.



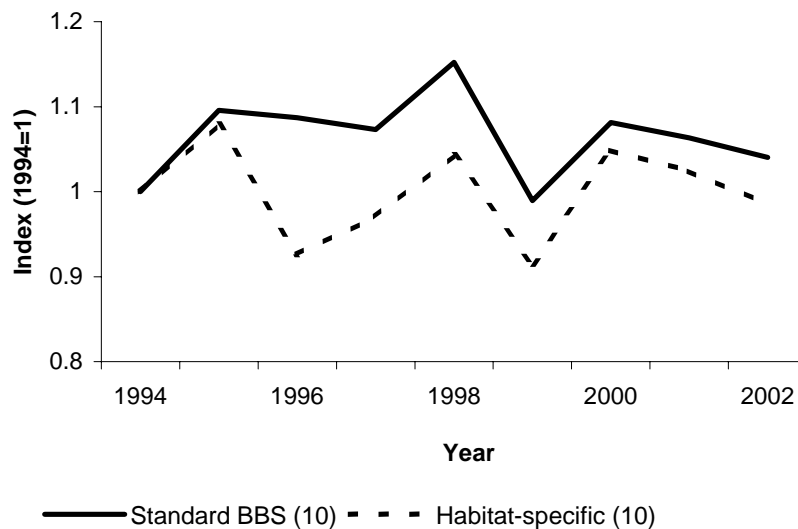
**Figure 9.** Comparison of the water-specific indicator with standard BBS wetland indicator using count data from all habitats. The number of species included in each indicator is shown in brackets.

Both versions of the wetland indicator increased over the period 1994-2002. However, the increase is greater in the indicator based on BBS data from all habitats. Although waterbody-specific trends for Tufted Duck and Coot increased more than standard BBS trends for these species, standard BBS trends for all other species showed a greater population growth, which explains the more rapid increase in the BBS wetland indicator based on all habitats (see Table 6, Appendix 1).

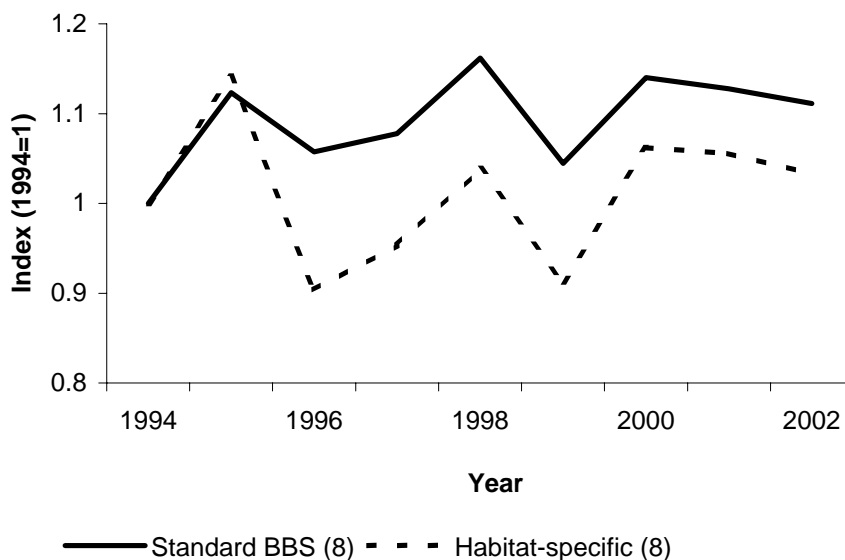
### 3.5 Heathland and bog-specific indicator for upland species

We include trends for 10 species classified as 'upland' species in the *New Atlas*. The broad BTO habitat class of heath & bog covers much of the habitat considered as upland. However, it does not include data for 'upland' species occurring on pastoral land or on semi-natural grassland. In this indicator we include Buzzard, Red Grouse, Golden Plover, Snipe, Curlew, Meadow Pipit, Wheatear, Raven, Whinchat and Common Sandpiper. It is important to note that Common Sandpiper and

Whinchat are recorded on only 18 and 15 BBS squares respectively. Figure 10 presents the upland indicator in comparison with an indicator for the same species based on standard BBS data. In Figure 11 we present the same indicator excluding trends for Common Sandpiper and Whinchat. The single species habitat-specific and standard BBS trends for species included in the indicators are shown in Table 7, Appendix 1.



**Figure 10.** Comparison of heathland & bog-specific indicator with standard BBS heathland and bog indicator. The number of species included in each indicator is shown in brackets.



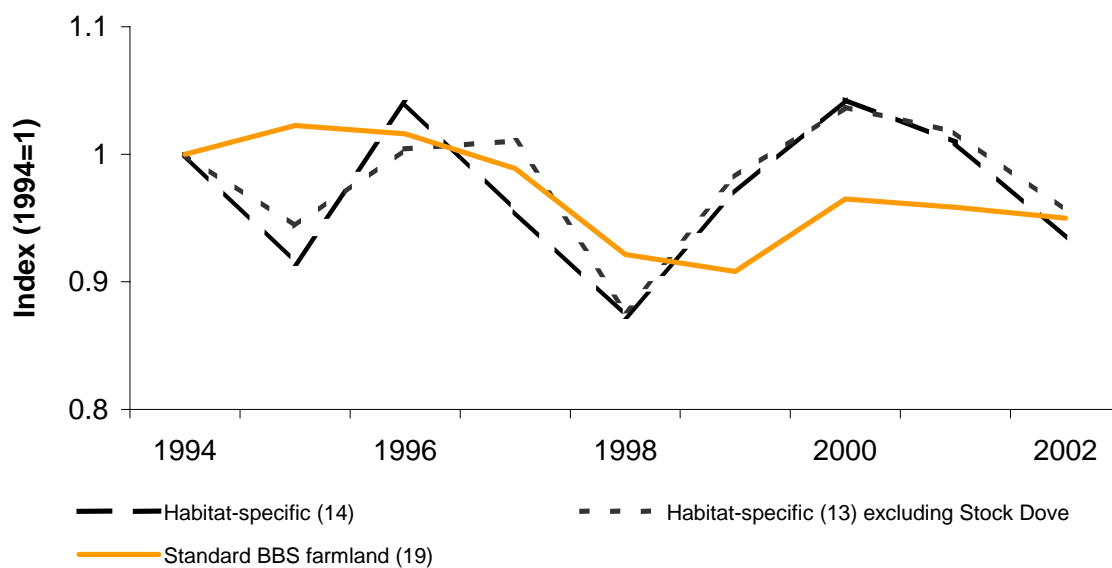
**Figure 11.** Comparison of heathland & bog-specific indicator with standard BBS heathland & bog indicator excluding Common Sandpiper and Whinchat which occur on a mean of less than 20 BBS squares. The number of species included in each indicator is shown in brackets.

Both sets of indicator above (habitat-specific and standard BBS indicators) show very similar (and fluctuating) trends. This similarity is explained by comparing the single-species trends in Table 7, Appendix 1.

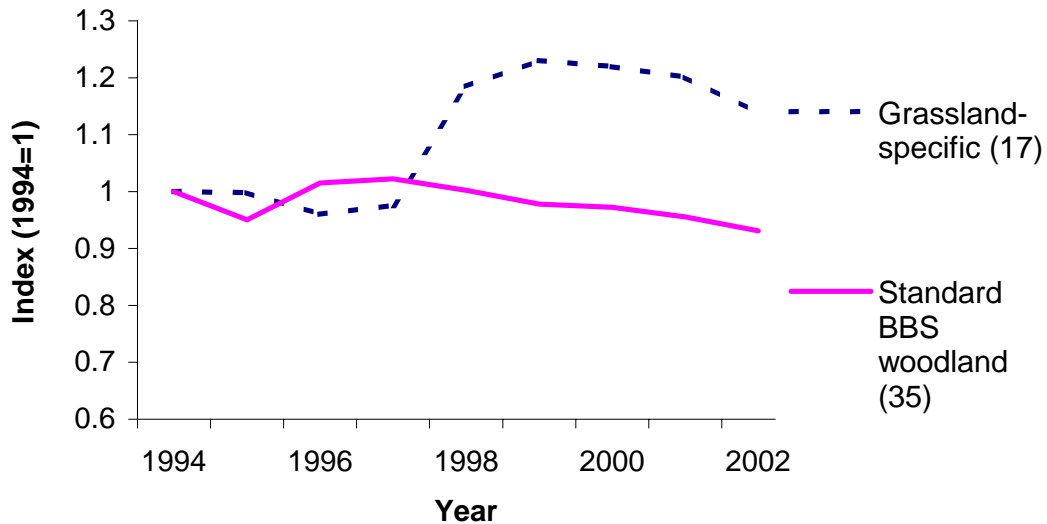
### 3.6 Grassland-specific indicator for ‘farmland’ species

There is no a priori group of bird species defined as ‘grassland’ species. In this context, ‘grassland’ refers to the broad BTO habitat class labeled semi-natural grassland. However, as Table 8, Appendix 1 shows, this habitat contains a large proportion of ‘farmland’ species (as defined in the *New Atlas*), so we produced a grassland indicator for farmland species. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded. A grassland specific indicator for farmland species is shown in Figure 12. Because the trend for Stock Dove, for which the sample size was small, does not increase or decline to a great extent, and the grassland-specific indicator includes nine other species, the inclusion/exclusion of Stock Dove has little impact on the overall indicator.

For completeness, we also examine the production of a grassland-specific indicator for woodland species. Trends can be produced for less than half of the species classified as woodland species (table 9 Appendix 1). A grassland-specific indicator for woodland species is shown in Figure 13.



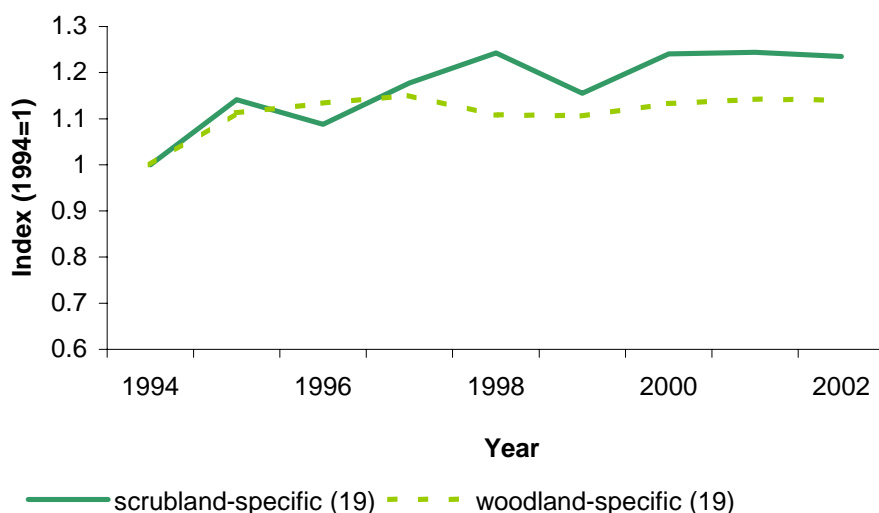
**Figure 12.** Comparison of grassland-specific indicator for ‘farmland’ species (including and excluding Stock Dove) with standard BBS farmland indicator. The number of species included in each indicator is shown in brackets.



**Figure 13.** Comparison of grassland-specific indicator for ‘woodland’ species against standard BBS woodland indicator. The number of species included in each indicator is shown in brackets.

### 3.7 Scrubland-specific indicator

Because there is no group of species defined a priori as scrubland birds in the Breeding Bird Atlas, there is no obvious species grouping from which to produce a scrubland-specific indicator. According to the description of scrubland habitat in Table 1, this habitat mainly consists of young woodland. For this reason, there are two main approaches that could be adopted. The first would be to produce a scrubland-specific indicator for ‘woodland’ species and the second approach would be to combine data for woodland and scrubland to produce a single woodland and scrubland indicator. To justify the combination of data from the two primary habitat classes, single-species trends within these two habitat classes should not be significantly different. For this reason, we compare single species woodland-specific and scrubland-specific trends for 19 ‘woodland’ species for which it was possible to produce trends from both habitats (see Tables 10 & 11 Appendix 1; Appendix 2). Although we do not provide a formal test of the difference between single-species trends, we examine here whether the 95% confidence intervals overlap. Visual examination of these trends suggests that trends for most species are similar, although confidence intervals for four species (Coal Tit, Goldcrest, Jay and Willow Warbler) do not overlap. This suggests that it would, in principle, be possible to assemble an indicator using counts from both woodland and scrub habitat classes. In Figure 14 we compare woodland indicators produced using scrubland-specific and woodland-specific trends.

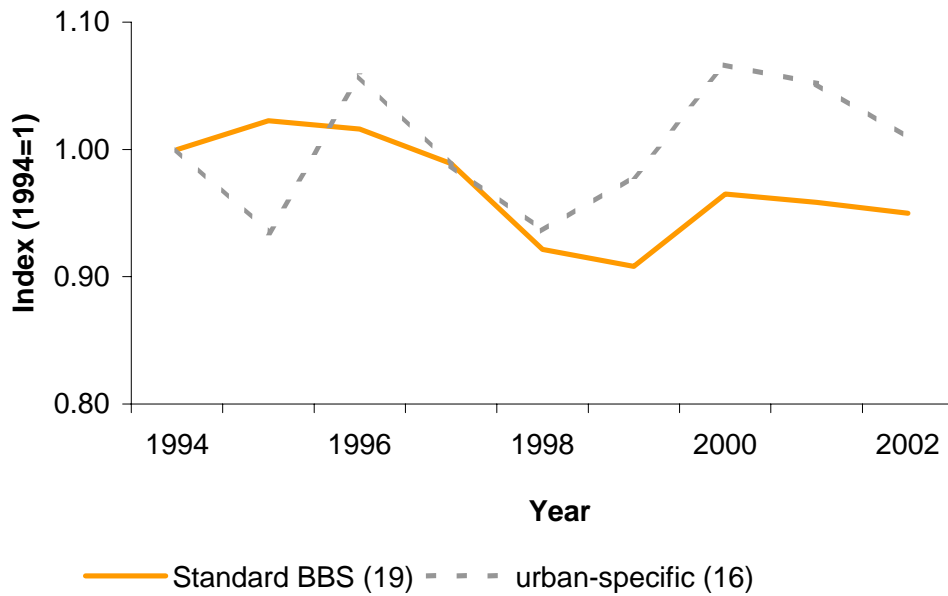


**Figure 14.** Comparison of woodland-specific and scrubland-specific indicators for ‘woodland’ species for the same 19 species for which single-species trends can be produced. The number of species included in each indicator is shown in brackets.

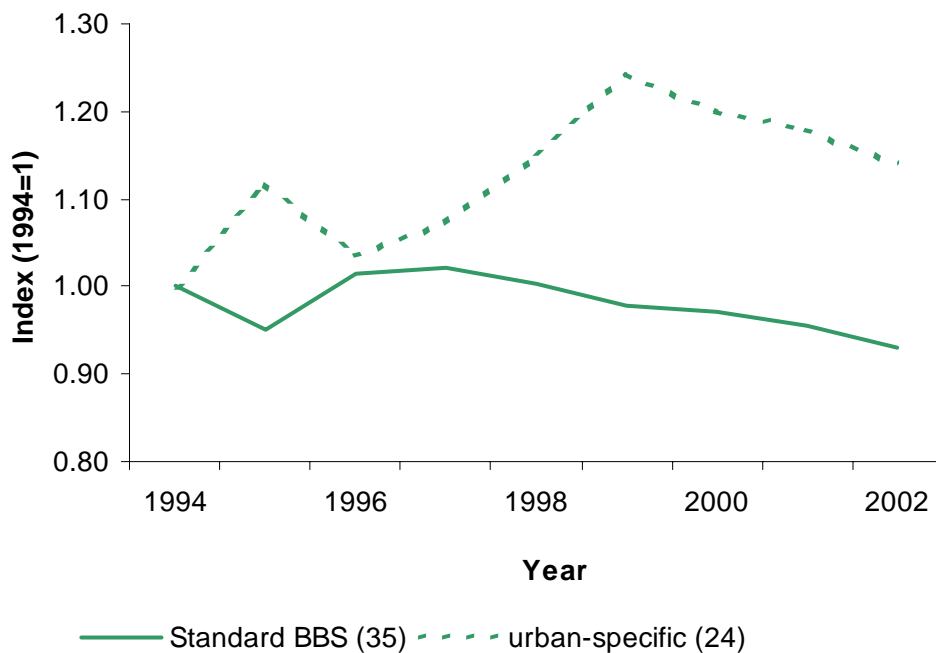
### 3.8 Indicators based on non-preferred habitats

In order to help assess the value of habitat-specific indicators – in relation to indicators based on species categorizations – it could be useful to examine habitat-specific indicators for species groups for which a particular habitat is not considered the primary habitat, but is where a large proportion of the population is recorded. An example are the urban-specific trends for ‘farmland’ species such as Starling and ‘woodland’ species such as Blue Tit. We present the single species trends and resulting indicators in Figures 15-18 and Tables 12-15 (Appendix 1). Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded.

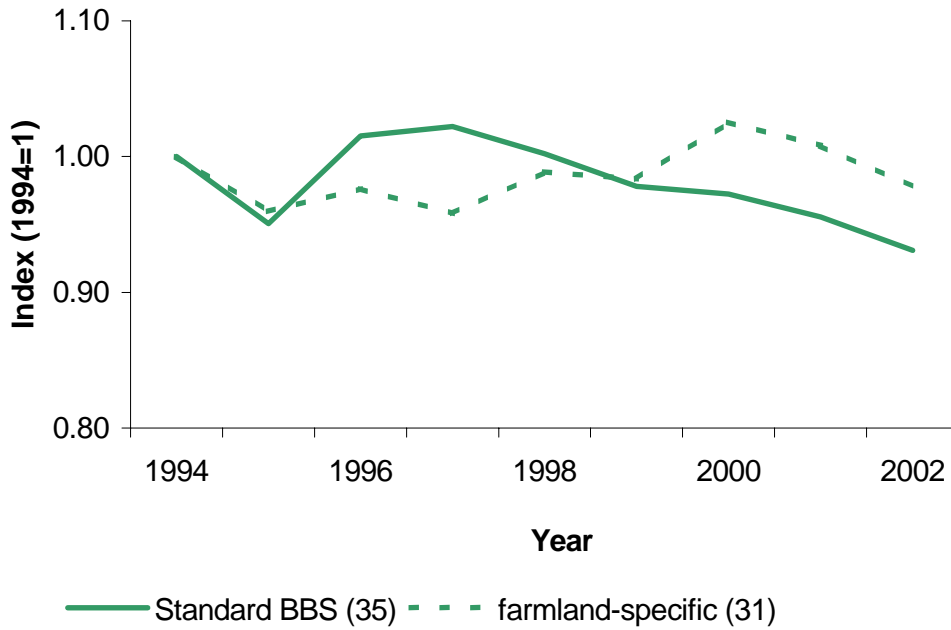
These tables suggest that ‘farmland’ species have remained relatively stable in human dominated habitats (Table 12, Figure 15), whilst ‘woodland species’ have increased in this same habitat over the same period, by about 14% between 1994-2002 (Table 13, Figure 16). Whilst ‘woodland’ species remained stable in farmland habitat (Table 14, Figure 17), ‘farmland’ species declined by about 20% in woodland between 1994 and 2002 (Table 15, Figure 18).



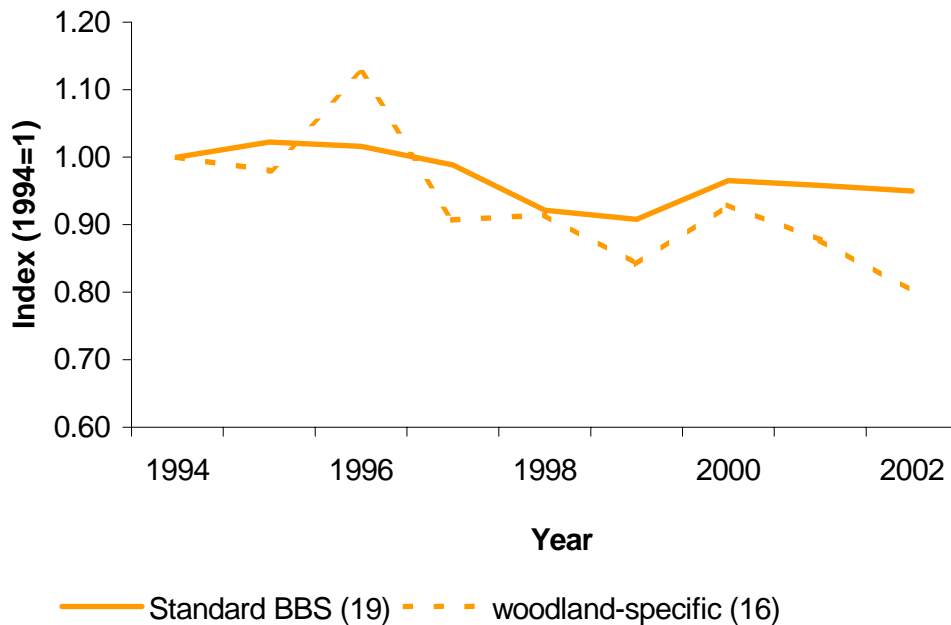
**Figure 15.** Comparison of urban-specific trends for species classified as ‘farmland species’ with standard farmland BBS indicator. The number of species included in each indicator is shown in brackets.



**Figure 16.** Comparison of urban-specific trends for species classified as ‘woodland species’ with standard woodland BBS indicator. The number of species included in each indicator is shown in brackets.



**Figure 17.** Comparison of farmland-specific trends for species classified as ‘woodland species’ with standard woodland BBS indicator. The number of species included in each indicator is shown in brackets.



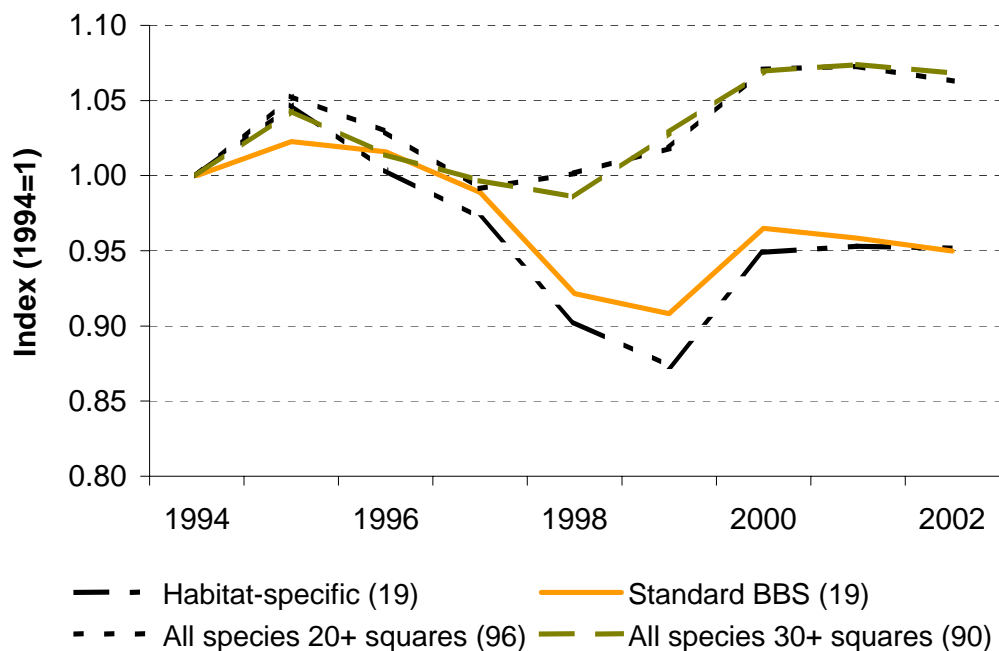
**Figure 18.** Comparison of woodland-specific trends for species classified as ‘farmland species’ with standard woodland BBS indicator. The number of species included in each indicator is shown in brackets.

### 3.9 An alternative approach: indicators based on all species recorded in the habitat

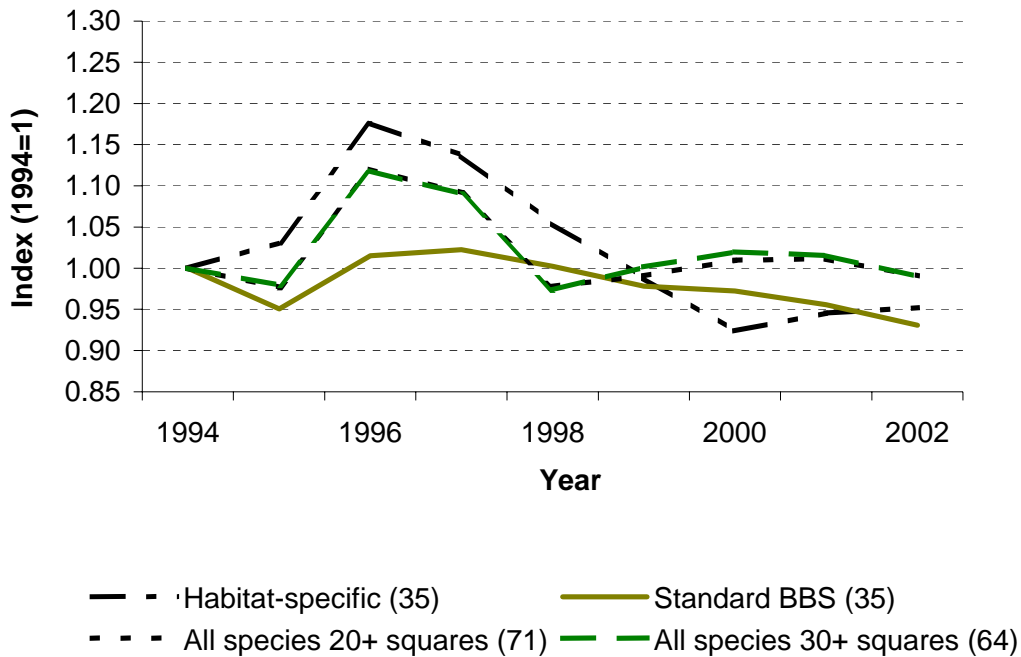
An alternative approach that should perhaps be considered is to avoid restricting the species included in the indicator to predefined species groups, e.g. the 19 ‘farmland’ species or 35 ‘woodland’ species. An indicator – for farmland for example - could be produced using all species occurring on farmland in a sufficiently large sample size to be indexed. Choosing a minimum of 20 or 30 sites recording the species would reduce the probability of a species which is not associated with the habitat of interest being included, although further restrictions could also be applied, for example to exclude flying birds which were not considered to be using the habitat. It might also be possible to devise a preference index based on the proportion of counts in different habitats and use this as a filter for inclusion in the species list for a particular habitat.

To illustrate this approach, we produced versions of farmland and woodland habitat-specific indicators for all species occurring on either farmland or woodland using two minimum thresholds of 20 and 30 BBS squares (Figures 19 and 20 and Tables 16 and 17). The farmland-specific indicator for all species increased by 6% if species occurring on 20 or more squares are included, and by 7% if species occurring on 30 or more squares are included. Interestingly, this increase contrasts with the overall decline over this period recorded if only the 19 ‘farmland species’ are included in the indicator. The existing indicator methodology shows that farmland generalists have declined by less than specialists (Figure 4), so it might be expected that a further set of species for which farmland use is less important would be produce an indicator with a less negative (or indeed positive) trend.

However, the woodland habitat-specific indicator for all species declined by 1% (whether a threshold of at least 20 or 30 squares is used), which is reasonably similar to the woodland-specific indicator produced for the 35 ‘woodland species’. The greater similarities in woodland-specific indicators in comparison to farmland-specific indicators is probably a reflection of the greater similarity in the species contained in the different woodland indicators compared to between those for farmland.



**Figure 19.** Comparison of farmland-specific indicators for all species occurring on a mean of 20 and 30 or more squares with habitat-specific farmland indicators for the 19 ‘farmland species’ and a standard habitat non-specific BBS farmland indicator for the 19 ‘farmland species’. The number of species included in each indicator is shown in brackets.



**Figure 20.** Comparison of woodland-specific indicators for all species occurring on a mean of 20 and 30 or more squares with habitat-specific woodland indicators for the 19 ‘woodland species’ and a standard habitat non-specific BBS woodland indicator for the 19 ‘woodland species’. The number of species included in each indicator is shown in brackets.

### 3.10 Summary

The overall change in the different versions of all of the indicators produced for this report are summarized in Table 18. Comparing trends across species groups and across habitats reveals some interesting patterns although caution is needed in interpreting differences where the trends are based on different suites of species. Nevertheless, it appears that species trends in farmland and woodland are slightly negative whereas trends in human-dominated landscapes and associated with waterbodies are largely positive. At the same time, trends in all species, perhaps because of the inclusion of increasing wetland or generalist species (e.g. Cormorant, Carrion Crow) tend to be similar to those in woodland species and more positive than trends in farmland species, in the same habitats. These results suggest that habitat-specific indicators restricted to species groups (e.g. farmland birds in farmland habitat) show the same patterns as the farmland/woodland bird trends previously reported. However, trends based on all species found in a particular habitat may differ because of the inclusion of species experiencing overall population increases, including in the non-preferred habitats. Moreover, counts of species recorded in a particular transect section of a particular habitat type may be strongly influenced by conditions in the surrounding habitat as well as the secondary habitat in the section. Further work is planned under the BBS work program to assess methods of generating habitat-specific trends, and the influence of habitat variables other than the primary habitat.

**Table 18.** Percent change in indicators produced in this report from 1994-2002. The number of species included in each indicator is shown in brackets.

Indicator	Habitat-specific trends (% change)							Standard BBS all habitats (% change)
	Farmland	Grassland	Woodland	Scrubland	Human sites	Heath / Bog	Water & Wetland	
Farmland	-5 (19)	-7 (14)	-20 (16)	-	+1 (16)	-	-	-5 (19)
Specialists	-7 (12)	-12 (8)	-14 (10)	-	-8 (10)	-	-	-7 (12)
Generalists	-1 (7)	-2 (6)	-29 (6)	-	+18 (6)	-	-	-1 (7)
Woodland species	-2 (31)	+14 (17)	-5 (35)	+24 (19)	+14 (24)	-	-	-7 (35)
Specialists	-3 (20)	-1 (8)	-7 (23)	+34 (9)	+29 (13)	-	-	-10 (23)
Generalists	-4 (11)	+29 (9)	-1 (12)	+15 (10)	+2 (11)	-	-	-1 (12)
Urban	-	-	-	-	+6 (10)	-	-	+10 (10)
Upland	-	-	-	-	-	-1 (10)	-	+4 (10)
Water & Wetland	-	-	-	-	-	-	+8 (10)	+22 (10)
All species (20 or more squares)	+6 (96)	-	-1 (71)	-	-	-	-	-
All species (30 or more squares)	+7 (90)	-	-1 (64)	-	-	-	-	-

## ACKNOWLEDGEMENTS

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## REFERENCES

- Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. & Thomas, L.** (2001). *Introduction to Distance Sampling: Estimating Abundance of Biological Populations*. Oxford University Press.
- Crick, H.Q.P.** (1992). A bird-habitat coding system for use in Britain and Ireland incorporating aspects of land management and human activity. *Bird Study* **39**: 1-12.
- Gibbons, D.W., Reid, W.J.B. & Chapman, R.A.** (1993). *The New Atlas of Breeding Birds in Britain and Ireland: 1988-91*. Poyser, London.
- Gregory, R.D.** (1999). Broad-scale habitat use of sparrows, finches and buntings in Britain. *Vogelwelt* **120**, Suppl.: 163-173.
- Newson, S.E., Woodburn, R.J.W., Noble, D.G., Baillie, S.R., Gregory, R.D.** (in press). Evaluating the Breeding Bird Survey for producing national population size and density estimates. *Bird Study*.
- Stokes, M.E., Davis, C.S. & Koch, G.G.** (2003). *Categorical Data Analysis Using the SAS System*, Second Edition. Cary, NC: SAS Institute Inc.



## APPENDIX 1: table referred to in main text

**Table 3.** Farmland-specific single-species trends for ‘farmland’ species. N = the number of squares containing 1 or more 200 m transect sections of farmland. Single-species trends are measured relative to 1994, which is set to 1.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Kestrel	Generalist	283	1	0.79	0.77	0.79	0.70	0.61	0.80	0.73	0.66
Woodpigeon	Generalist	1296	1	0.92	0.95	0.98	1.02	1.00	1.05	1.05	1.04
Yellow wagtail	Generalist	124	1	1.23	1.41	1.34	0.95	0.77	0.95	0.94	0.93
Jackdaw	Generalist	802	1	0.94	0.96	1.01	1.01	1.05	1.09	1.04	0.98
Rook	Generalist	726	1	1.14	1.08	1.07	1.16	1.01	1.04	1.05	1.06
Greenfinch	Generalist	854	1	1.15	1.12	1.27	1.11	1.12	1.40	1.40	1.40
Reed bunting	Generalist	197	1	1.19	0.85	0.89	0.82	0.95	0.87	0.96	1.04
Grey partridge	Specialist	164	1	1.01	1.30	1.10	1.00	0.54	0.74	0.78	0.82
Lapwing	Specialist	376	1	1.14	0.93	0.83	0.65	0.88	0.91	0.94	0.97
Stock dove	Specialist	400	1	1.02	1.02	0.98	1.15	1.11	1.15	1.22	1.28
Turtle dove	Specialist	124	1	1.15	0.95	0.85	0.80	0.75	0.71	0.61	0.51
Skylark	Specialist	973	1	1.03	1.00	0.99	0.89	0.83	0.86	0.87	0.88
Whitethroat	Specialist	696	1	1.07	1.24	1.17	1.14	1.11	1.25	1.26	1.27
Starling	Specialist	983	1	1.10	0.89	0.87	0.85	0.96	0.95	0.85	0.75
Tree sparrow	Specialist	101	1	1.04	1.10	0.82	0.83	0.89	1.09	1.34	1.58
Goldfinch	Specialist	645	1	1.01	1.09	1.06	0.93	1.00	1.16	1.19	1.21
Linnet	Specialist	707	1	1.15	0.90	0.92	0.84	0.80	0.92	0.93	0.94
Yellowhammer	Specialist	787	1	0.98	0.97	0.91	0.88	0.88	0.93	0.93	0.93
Corn bunting	Specialist	117	1	0.96	0.83	0.82	0.64	0.77	0.66	0.66	0.65
	<b>Specialist (12)</b>	<b>Mean</b>	1	1.05	1.00	0.94	0.87	0.85	0.91	0.92	0.93
	<b>Generalist (7)</b>	<b>Mean</b>	1	1.04	1.00	1.03	0.95	0.91	1.01	1.01	0.99
	<b>All (19)</b>	<b>Mean</b>	1	1.05	1.00	0.97	0.90	0.87	0.95	0.95	0.95

**Table 4.** Woodland-specific single-species trends for ‘woodland’ species. N = the number of squares containing 1 or more 200 m transect section of woodland. Species occurring on a mean of 10-20 BBS squares are highlighted in red.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	Generalist	536	1	1.14	1.13	0.95	1.03	1.13	1.07	1.09	1.11
Bullfinch	Generalist	100	1	0.91	1.37	1.41	0.6	0.77	0.65	0.74	0.82
Blue Tit	Generalist	503	1	1.14	1.14	1.2	0.97	0.99	0.95	0.98	1
Chaffinch	Generalist	569	1	0.95	1.1	0.94	1	0.94	1.01	1.00	0.99
Duncock	Generalist	252	1	1.14	0.96	1.09	1.01	1.06	0.96	1.05	1.13
Great tit	Generalist	438	1	1.07	1.22	1.25	1.2	1.14	1.13	1.15	1.17
Long-tailed tit	Generalist	156	1	1.46	1.13	2	1.07	1.51	1.37	1.44	1.5
Robin	Generalist	552	1	1.07	1.02	0.86	1.12	1.09	1.21	1.13	1.05
Song thrush	Generalist	387	1	1.09	1.07	0.93	1.04	1.27	1.12	1.13	1.13
Tawny owl	Generalist	27	1	0.93	0.85	0.74	0.95	1.01	1.02	0.89	0.76
Wren	Generalist	552	1	1.22	0.79	0.92	1.15	1.31	1.32	1.21	1.1
Willow warbler	Specialist	335	1	1.15	1.34	1.14	1.26	1.14	1.08	0.96	0.83
Lesser whitethroat	Generalist	12	1	1.97	2.3	0.71	1.11	0.94	0.82	0.72	0.61
Blackcap	Specialist	352	1	1.1	1.1	1.12	1.41	1.35	1.37	1.38	1.38
Chiffchaff	Specialist	343	1	1.22	1.08	1.27	1.4	0.99	1.02	1.13	1.23
Crossbill	Specialist	22	1	0.22	1.02	1.03	1.13	0.67	0.23	0.33	0.43
Coal tit	Specialist	248	1	1.03	1.26	1.36	1.21	1.01	1.06	1.14	1.21
Green woodpecker	Specialist	147	1	0.93	1.03	0.93	1.17	1.1	1.25	1.24	1.23
Goldcrest	Specialist	236	1	1.38	1.11	1.43	1.49	1.25	1.56	1.53	1.49

G. s. woodpecker	Specialist	183	1	1.12	1.31	1.36	1.29	1.26	1.53	1.65	1.76
Garden warbler	Specialist	111	1	1.07	1.16	1.05	0.87	0.87	0.86	0.80	0.74
Jay	Specialist	175	1	1.1	1.41	1.13	1.15	1.09	1.47	1.38	1.29
Lesser redpoll	Specialist	36	1	1.2	1.62	1.98	1.07	0.47	1.56	1.52	1.47
Marsh tit	Specialist	55	1	1.7	1.79	1.34	1.52	1.34	1.36	1.48	1.6
Nuthatch	Specialist	126	1	1.29	1.74	1.47	1.49	1.1	1.25	1.25	1.24
Redstart	Specialist	35	1	1.71	2.36	3.59	1.63	2.04	1.76	1.94	2.11
S. flycatcher	Specialist	40	1	0.79	1.27	0.98	0.64	0.86	0.97	0.73	0.48
Sparrowhawk	Specialist	38	1	1.33	1.28	0.91	1.1	0.96	0.6	0.79	0.98
Siskin	Specialist	56	1	0.57	1.74	1.8	0.86	1.01	0.95	0.84	0.73
Treecreeper	Specialist	115	1	1.29	1.33	1.33	1.21	1.31	1.04	1.06	1.08
Tree pipit	Specialist	41	1	0.84	1.04	1.09	1.21	0.97	1.16	1.30	1.44
Wood warbler	Specialist	31	1	0.59	0.59	0.94	0.42	0.49	0.47	0.47	0.46
Pied Flycatcher	Specialist	18	1	1.46	1.35	1.69	1.02	0.82	0.72	1.04	1.36
Willow tit	Specialist	17	1	0.75	0.93	0.65	0.92	0.67	0.18	0.18	0.17
L. s. woodpecker	Specialist	8	1	0.5	0.39	0.34	0.55	0.38	0.16	0.19	0.21
	<b>Specialist (23)</b>	<b>Mean</b>	1.00	1.03	1.01	0.97	0.89	0.88	0.94	0.93	0.93
	<b>Generalist (12)</b>	<b>Mean</b>	1.00	1.00	1.02	1.02	0.98	0.96	1.02	1.01	0.99
	<b>All (35)</b>	<b>Mean</b>	1.00	1.02	1.02	0.99	0.92	0.91	0.96	0.96	0.95

**Table 5.** Single-species trends for ‘urban’ species. N = the number of BBS squares.

a) Human site-specific trends

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	668	1	0.98	1.01	1.03	1.11	1.16	1.18	1.17	1.15
Blue tit	589	1	1.01	1.19	1.14	1.11	1.17	1.16	1.11	1.05
Carrion crow	512	1	0.89	0.88	1.10	0.99	0.96	0.96	1.00	1.03
Collared dove	476	1	0.95	1.09	1.04	1.15	1.18	1.09	1.14	1.18
Greenfinch	521	1	0.99	1.17	1.15	1.07	1.20	1.24	1.21	1.18
House sparrow	569	1	1.03	1.03	0.97	0.92	0.87	0.83	0.83	0.83
Magpie	467	1	1.10	1.15	1.26	1.20	1.15	1.38	1.32	1.26
Robin	576	1	1.11	1.03	0.97	1.07	1.13	1.21	1.21	1.21
Starling	591	1	1.06	1.00	1.02	0.91	0.93	0.87	0.85	0.83
Song thrush	424	1	0.87	0.94	0.91	1.01	1.09	1.00	1.01	1.01
<b>INDICATOR (10)</b>		1	1.00	1.04	1.05	1.05	1.08	1.08	1.07	1.06

b) Standard BBS trends

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	1803	1	1.00	1.02	0.95	1.04	1.12	1.14	1.15	1.16
Blue tit	1681	1	1.06	1.18	1.19	1.06	1.06	1.03	1.06	1.09
Carrion crow	1712	1	0.99	1.08	1.08	1.10	1.14	1.17	1.16	1.15
Collared dove	988	1	1.03	1.11	1.12	1.19	1.21	1.20	1.23	1.26
Greenfinch	1301	1	1.07	1.09	1.18	1.12	1.18	1.33	1.32	1.31
House sparrow	1227	1	1.02	1.03	0.98	0.93	0.92	0.94	0.94	0.93
Magpie	1401	1	1.03	1.03	1.09	1.05	1.06	1.11	1.07	1.02
Robin	1721	1	1.11	1.02	0.89	1.05	1.10	1.20	1.18	1.16
Starling	1465	1	1.07	0.98	1.00	0.87	0.95	0.95	0.91	0.87
Song thrush	1394	1	0.99	1.01	0.84	0.99	1.07	1.12	1.13	1.13
<b>INDICATOR (10)</b>		1	1.04	1.05	1.03	1.04	1.08	1.11	1.11	1.10

**Table 6.** Single-species trends for ‘water and wetland’ species. N = the number of BBS squares.

a) Waterbodies-specific trends for species classified as water and wetland species in the EBS indicator

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Coot	40	1	1.06	1.6	1.38	1.28	1.7	1.82	1.75	1.68
Grey heron	40	1	0.78	1.01	0.89	0.92	1.29	1.05	1.08	1.10
Lapwing	20	1	0.72	0.49	0.81	0.4	0.38	0.66	0.63	0.60
Mallard	90	1	1.22	1.12	1.1	0.97	1.07	1.11	1.25	1.39
Moorhen	56	1	0.93	0.96	0.85	0.84	0.91	0.83	0.91	0.99
Mute swan	37	1	0.58	0.92	0.88	0.83	0.88	1.02	0.94	0.85
Pied wagtail	33	1	1.07	0.88	0.92	0.74	1.28	0.88	0.79	0.69
Reed bunting	25	1	0.95	0.82	1.04	1.16	0.67	0.79	0.66	0.52
Sedge warbler	28	1	1.05	1.33	1.28	1.12	1.08	1.73	1.48	1.23
Tufted duck	25	1	2.29	2.82	2.42	3.58	2.72	2.58	2.93	3.28
<b>INDICATOR (10)</b>		1	1.00	1.11	1.08	1.03	1.05	1.12	1.10	1.08

b) Standard BBS trends for species classified as water and wetland species in the EBS urban indicator. N = the number of BBS squares.

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Coot	191	1	1.30	1.25	1.13	1.19	1.44	1.57	1.54	1.51
Grey heron	477	1	1.18	1.00	1.06	1.00	1.18	1.20	1.26	1.32
Lapwing	533	1	1.07	0.96	0.87	0.83	0.81	0.87	0.85	0.82
Mallard	926	1	1.09	1.04	1.02	1.05	1.23	1.23	1.31	1.39
Moorhen	503	1	1.16	1.06	0.93	1.00	1.19	1.19	1.21	1.22
Mute swan	170	1	0.88	0.91	0.98	1.09	1.14	1.18	1.20	1.22
Pied wagtail	959	1	1.28	1.14	1.12	1.13	1.22	1.27	1.25	1.23
Reed bunting	329	1	1.07	0.97	0.93	0.92	1.00	0.98	1.01	1.03
Sedge warbler	242	1	1.06	1.17	1.01	0.96	1.06	1.57	1.44	1.30
Tufted duck	122	1	1.17	1.13	1.28	1.13	1.27	1.82	1.59	1.36
<b>INDICATOR (10)</b>		1	1.12	1.06	1.03	1.02	1.14	1.26	1.24	1.22

**Table 7.** Single-species trends for ‘upland’ species. N = the number of BBS squares. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded.

a) Heathland & bog-specific trends for species classified as upland species. N = the number of BBS squares. Species occurring on a mean of 10-20 BBS squares are highlighted in red.

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Buzzard	30	1	0.99	1.09	0.86	0.90	0.95	1.17	1.35	1.52
Red grouse	66	1	1.01	0.81	1.00	1.12	1.00	1.01	1.00	0.99
Golden plover	47	1	0.90	0.64	1.11	0.79	0.94	2.81	1.76	0.70
Snipe	44	1	1.13	0.73	0.88	0.93	1.16	1.19	1.22	1.25
Curlew	68	1	1.02	0.88	0.87	0.88	0.86	0.93	0.81	0.69
Meadow pipit	172	1	1.08	0.98	0.93	1.09	0.97	1.03	1.01	0.98
Wheatear	54	1	1.46	1.24	1.33	1.37	0.83	0.81	1.01	1.20
Raven	31	1	1.31	0.68	0.90	1.08	0.70	1.50	1.26	1.01
Whinchat	18	1	0.73	1.29	0.94	1.16	1.07	0.91	0.87	0.82
Common sandpiper	15	1	1.02	0.81	1.16	0.97	0.80	1.09	0.95	0.81
	<b>INDICATOR (10)</b>	1	1.08	0.93	0.97	1.04	0.92	1.05	1.02	0.99
Excluding CS & WC	<b>INDICATOR (8)</b>	1	1.14	0.90	0.95	1.04	0.91	1.06	1.06	1.03

b) Standard BBS trends for species classified as upland species

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Buzzard	475	1	1.09	1.09	1.18	1.25	1.26	1.41	1.46	1.51
Red grouse	101	1	1.07	1.05	1.21	1.43	1.38	1.20	1.13	1.05
Golden plover	75	1	0.98	0.87	0.99	1.01	0.77	0.87	0.81	0.74
Snipe	117	1	1.13	0.93	1.07	1.02	1.15	1.33	1.43	1.52
Curlew	429	1	1.06	0.98	0.91	0.88	0.84	0.88	0.84	0.80
Meadow pipit	619	1	1.04	1.00	0.94	1.04	0.93	1.04	1.00	0.95
Wheatear	237	1	1.33	1.41	1.28	1.45	1.08	0.96	1.03	1.10
Raven	165	1	1.34	1.22	1.10	1.36	1.09	1.66	1.61	1.56
Whinchat	78	1	1.09	1.39	1.11	1.18	0.87	0.75	0.80	0.85
Common sandpiper	61	1	0.90	1.06	1.00	1.05	0.73	1.02	0.89	0.75
	<b>INDICATOR (10)</b>	1	1.10	1.09	1.07	1.15	0.99	1.08	1.06	1.04
Excluding CS & WC	<b>INDICATOR (8)</b>	1	1.12	1.06	1.08	1.16	1.04	1.14	1.13	1.11

**Table 8.** Grassland-specific trends for species classified as ‘farmland’ species. N = the number of BBS squares. Species occurring on a mean of 10-20 BBS squares are highlighted in red.

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Kestrel	28	1	0.68	0.74	0.79	0.63	0.60	1.97	1.28	0.58
Woodpigeon	110	1	0.98	0.96	1.15	1.17	1.27	1.23	1.21	1.18
Yellow wagtail	-	-	-	-	-	-	-	-	-	-
Jackdaw	50	1	1.15	1.24	1.49	1.74	1.78	1.81	1.67	1.52
Rook	52	1	0.96	0.92	0.89	0.79	1.21	1.06	0.97	0.87
Greenfinch	32	1	0.87	0.71	0.90	0.71	0.81	0.95	0.81	0.66
Reed bunting	39	1	0.90	0.76	0.76	0.73	0.90	0.72	0.75	0.78
Grey partridge	-	-	-	-	-	-	-	-	-	-
Lapwing	49	1	0.78	0.92	0.70	0.76	0.84	0.67	0.77	0.87
Stock dove	18	1	0.61	1.65	0.46	0.82	0.82	1.12	0.91	0.70
Turtle dove	-	-	-	-	-	-	-	-	-	-
Skylark	122	1	1.03	0.93	0.96	0.9	0.86	0.91	0.86	0.81
Whitethroat	32	1	1.47	1.94	1.64	1.52	1.65	2.36	2.02	1.68
Starling	67	1	1.47	2.10	1.8	1.03	1.60	0.89	1.23	1.56
Tree sparrow	-	-	-	-	-	-	-	-	-	-
Goldfinch	27	1	0.89	1.05	1.21	0.82	0.92	1.32	1.35	1.37
Linnet	46	1	0.60	0.71	0.89	0.55	0.54	0.46	0.51	0.56
Yellowhammer	30	1	0.88	0.93	0.65	0.72	0.7	0.65	0.75	0.84
Corn bunting	-	-	-	-	-	-	-	-	-	-
<b>ALL (14)</b>		1	0.91	1.04	0.96	0.87	0.97	1.04	1.01	0.93
<b>SPECIALIST (8)</b>		1	0.91	0.87	0.97	0.90	1.03	1.21	1.07	0.88
<b>GENERALIST (6)</b>		1	0.92	1.19	0.95	0.85	0.93	0.9	0.97	0.98
Excluding SD	<b>INDICATOR (13)</b>	1	0.94	1.00	1.01	0.88	0.98	1.04	1.02	0.96

**Table 9.** Single species grassland-specific trends for ‘woodland’ species. N = the number of BBS squares. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded.

Species	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	96	1	0.91	0.97	0.89	0.96	1.23	1.35	1.38	1.4
Bullfinch	-	-	-	-	-	-	-	-	-	-
Blue Tit	69	1	0.87	0.99	1.17	1.1	1.16	1.15	1.20	1.25
Chaffinch	116	1	1.19	1.13	1.26	1.28	1.31	1.43	1.48	1.52
Dunnock	46	1	1.76	1.58	1.55	2.01	1.87	1.51	1.67	1.83
Great tit	54	1	0.97	1.11	1.17	0.98	1.26	1.17	1.20	1.22
Long-tailed tit	16	1	1.34	0.38	0.32	0.93	0.89	1.99	1.37	0.74
Robin	84	1	1.7	1.08	1.02	1.13	1.57	1.55	1.48	1.4
Song thrush	56	1	0.89	0.85	0.7	0.86	0.94	1.02	1.00	0.97
Tawny owl	-	-	-	-	-	-	-	-	-	-
Wren	108	1	1.37	0.8	0.93	1.23	1.48	1.45	1.54	1.63
Willow warbler	87	1	0.99	0.91	1.17	1.19	1.14	1.09	0.95	0.8
Lesser whitethroat	-	-	-	-	-	-	-	-	-	-
Blackcap	33	1	0.71	0.87	1.03	1.29	1.47	1.18	1.10	1.02
Chiffchaff	29	1	0.92	0.91	1.27	1.81	1.33	1.73	1.61	1.48
Crossbill	-	-	-	-	-	-	-	-	-	-
Coal tit	-	-	-	-	-	-	-	-	-	-
Green woodpecker	20	1	0.48	0.56	0.99	1.24	0.72	1.22	1.09	0.96
Goldcrest	-	-	-	-	-	-	-	-	-	-
Great spotted woodpecker	-	-	-	-	-	-	-	-	-	-

Garden warbler	10	1	2.86	3.33	1.96	2.96	2.44	2.01	1.64	1.27
Jay	13	1	0.26	0.39	0.42	0.44	0.64	0.25	0.45	0.65
Lesser redpoll	-	-	-	-	-	-	-	-	-	-
Marsh tit	-	-	-	-	-	-	-	-	-	-
Nuthatch	-	-	-	-	-	-	-	-	-	-
Redstart	12	1	1.15	1.55	1.86	1.55	1.74	1.66	1.55	1.44
S. flycatcher	-	-	-	-	-	-	-	-	-	-
Sparrowhawk	-	-	-	-	-	-	-	-	-	-
Siskin	-	-	-	-	-	-	-	-	-	-
Treecreeper	-	-	-	-	-	-	-	-	-	-
Tree pipit	14	1	0.82	1.16	0.56	0.87	0.91	0.72	0.70	0.67
Wood warbler	-	-	-	-	-	-	-	-	-	-
Pied Flycatcher	-	-	-	-	-	-	-	-	-	-
Willow tit	-	-	-	-	-	-	-	-	-	-
Lesser spotted woodpecker	-	-	-	-	-	-	-	-	-	-
<b>ALL (17)</b>		1	1.00	0.96	0.98	1.18	1.23	1.22	1.20	1.14
<b>SPECIALISTS (8)</b>		1	0.83	0.99	1.03	1.25	1.19	1.06	1.05	0.99
<b>GENERALISTS (9)</b>		1	1.18	0.93	0.93	1.13	1.27	1.38	1.35	1.29

**Table 10.** Scrubland-specific trends for species classified as ‘woodland’ species. N = the number of BBS squares.

Species	Woodland Classif.	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	Generalist	144	1	0.92	1.01	1.07	0.90	0.92	0.95	0.96	0.97
Bullfinch	Generalist	30	1	1.35	1.95	1.47	1.70	1.34	1.46	1.25	1.03
Blue Tit	Generalist	116	1	1.06	1.25	1.04	1.10	1.02	0.99	0.99	0.99
Chaffinch	Generalist	153	1	0.99	1.06	1.02	1.12	1.08	1.10	1.12	1.14
Dunnock	Generalist	85	1	1.00	0.92	1.06	0.89	1.03	1.04	1.04	1.03
Great tit	Generalist	94	1	1.08	1.32	1.25	1.48	1.30	1.25	1.42	1.59
Long-tailed tit	Generalist	29	1	2.18	0.91	2.59	1.50	1.27	1.89	1.60	1.30
Robin	Generalist	142	1	1.40	1.25	1.19	1.17	1.26	1.24	1.26	1.28
Song thrush	Generalist	93	1	0.94	0.96	0.84	0.83	0.95	1.14	1.11	1.07
Wren	Generalist	156	1	1.14	0.75	0.90	1.08	1.16	1.30	1.25	1.20
Blackcap	Specialist	75	1	1.05	0.80	1.05	1.46	1.31	1.40	1.38	1.35
Chiffchaff	Specialist	75	1	1.03	1.05	1.13	1.36	0.93	1.04	1.18	1.32
Coal tit	Specialist	39	1	1.37	1.70	1.72	2.36	1.63	1.82	1.69	1.56
Green woodpecker	Specialist	25	1	0.98	1.00	0.98	0.95	0.89	1.23	1.25	1.27
Goldcrest	Specialist	35	1	2.53	0.76	1.73	2.01	2.46	2.02	1.82	1.62
Great s woodpecker	Specialist	25	1	1.08	1.62	1.61	2.07	2.09	1.83	2.10	2.37
Garden warbler	Specialist	30	1	0.70	0.89	0.85	0.91	0.78	0.66	0.79	0.92
Jay	Specialist	30	1	0.72	0.90	0.59	0.59	0.50	0.72	0.81	0.89
Willow warbler	Specialist	131	1	1.34	1.36	1.55	1.60	1.37	1.54	1.40	1.26
<b>ALL (19)</b>			1	1.14	1.09	1.18	1.24	1.16	1.24	1.24	1.24
<b>SPECIALISTS (9)</b>			1	1.12	1.07	1.18	1.36	1.19	1.27	1.32	1.34
<b>GENERALISTS (10)</b>			1	1.16	1.10	1.18	1.15	1.12	1.21	1.19	1.15

**Table 11.** Woodland-specific trends for species classified as ‘woodland’ species and for which scrubland specific trends could be produced. N = the number of BBS squares.

Species	Woodland Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	Generalist	536	1	1.14	1.13	0.95	1.03	1.13	1.07	1.09	1.11
Bullfinch	Generalist	100	1	0.91	1.37	1.41	0.60	0.77	0.65	0.74	0.82
Blue Tit	Generalist	503	1	1.14	1.14	1.20	0.97	0.99	0.95	0.98	1.00
Chaffinch	Generalist	569	1	0.95	1.10	0.94	1.00	0.94	1.01	1.00	0.99
Dunnock	Generalist	252	1	1.14	0.96	1.09	1.01	1.06	0.96	1.05	1.13
Great tit	Generalist	438	1	1.07	1.22	1.25	1.20	1.14	1.13	1.15	1.17
Long-tailed tit	Generalist	156	1	1.46	1.13	2.00	1.07	1.51	1.37	1.44	1.50
Robin	Generalist	552	1	1.07	1.02	0.86	1.12	1.09	1.21	1.13	1.05
Song thrush	Generalist	387	1	1.09	1.07	0.93	1.04	1.27	1.12	1.13	1.13
Wren	Generalist	552	1	1.22	0.79	0.92	1.15	1.31	1.32	1.21	1.10
Blackcap	Specialist	352	1	1.10	1.10	1.12	1.41	1.35	1.37	1.38	1.38
Chiffchaff	Specialist	343	1	1.22	1.08	1.27	1.40	0.99	1.02	1.13	1.23
Coal tit	Specialist	248	1	1.03	1.26	1.36	1.21	1.01	1.06	1.14	1.21
Green woodpecker	Specialist	147	1	0.93	1.03	0.93	1.17	1.10	1.25	1.24	1.23
Goldcrest	Specialist	236	1	1.38	1.11	1.43	1.49	1.25	1.56	1.53	1.49
G s woodpecker	Specialist	183	1	1.12	1.31	1.36	1.29	1.26	1.53	1.65	1.76
Garden warbler	Specialist	111	1	1.07	1.16	1.05	0.87	0.87	0.86	0.80	0.74
Jay	Specialist	175	1	1.10	1.41	1.13	1.15	1.09	1.47	1.38	1.29
Willow warbler	Specialist	335	1	1.15	1.34	1.14	1.26	1.14	1.08	0.96	0.83
<b>INDICATOR (19)</b>			<b>1</b>	<b>1.11</b>	<b>1.13</b>	<b>1.15</b>	<b>1.11</b>	<b>1.11</b>	<b>1.13</b>	<b>1.14</b>	<b>1.14</b>

**Table 12.** Urban-specific trends for species classified as ‘farmland species’. N = the number of BBS squares. At the bottom of the table we present the indicator. Species occurring on a mean of 10-20 BBS squares are highlighted in red.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Kestrel	Generalist	66	1	0.93	0.51	0.48	0.85	0.49	0.61	0.53	0.44
Woodpigeon	Generalist	618	1	0.96	1.25	1.26	1.36	1.28	1.40	1.47	1.53
Yellow wagtail	Generalist	-	-	-	-	-	-	-	-	-	-
Jackdaw	Generalist	350	1	1.13	1.23	1.21	1.19	1.54	1.17	1.25	1.32
Rook	Generalist	220	1	1.37	0.95	1.19	1.18	1.37	1.01	1.08	1.15
Greenfinch	Generalist	521	1	0.99	1.17	1.15	1.07	1.20	1.24	1.21	1.18
Reed bunting	Generalist	<b>16</b>	<b>1</b>	<b>0.97</b>	<b>2.37</b>	<b>2.30</b>	<b>1.94</b>	<b>1.58</b>	<b>1.90</b>	<b>2.08</b>	<b>2.25</b>
Grey partridge	Specialist	-	-	-	-	-	-	-	-	-	-
Lapwing	Specialist	36	1	0.84	0.83	0.35	0.22	0.45	0.82	0.55	0.27
Stock dove	Specialist	80	1	0.85	1.26	0.97	0.99	0.94	0.92	1.01	1.10
Turtle dove	Specialist	24	1	0.98	1.02	0.80	0.73	0.45	0.72	0.67	0.62
Skylark	Specialist	158	1	0.65	0.60	0.51	0.48	0.48	0.41	0.43	0.44
Whitethroat	Specialist	142	1	1.71	2.06	1.72	1.84	1.56	2.87	2.60	2.33
Starling	Specialist	591	1	1.06	1.00	1.02	0.91	0.93	0.87	0.85	0.83
Tree sparrow	Specialist	<b>14</b>	<b>1</b>	<b>0.58</b>	<b>1.27</b>	<b>2.08</b>	<b>1.53</b>	<b>3.86</b>	<b>4.71</b>	<b>5.69</b>	<b>6.66</b>
Goldfinch	Specialist	314	1	0.78	1.00	0.91	0.86	0.82	0.83	0.92	1.01
Linnet	Specialist	185	1	1.01	0.97	0.98	0.72	0.67	0.83	0.70	0.57
Yellowhammer	Specialist	96	1	0.68	0.73	0.79	0.85	1.01	0.65	0.68	0.71
Corn bunting	Specialist	-	-	-	-	-	-	-	-	-	-
<b>ALL (16)</b>			<b>1</b>	<b>0.93</b>	<b>1.06</b>	<b>0.99</b>	<b>0.94</b>	<b>0.98</b>	<b>1.07</b>	<b>1.05</b>	<b>1.01</b>
<b>SPECIALIST (10)</b>			<b>1</b>	<b>0.87</b>	<b>1.02</b>	<b>0.90</b>	<b>0.80</b>	<b>0.88</b>	<b>1.02</b>	<b>0.99</b>	<b>0.92</b>
<b>GENERALIST (6)</b>			<b>1</b>	<b>1.05</b>	<b>1.13</b>	<b>1.15</b>	<b>1.22</b>	<b>1.17</b>	<b>1.16</b>	<b>1.17</b>	<b>1.18</b>

**Table 13.** Urban-specific trends for species classified as ‘woodland’ species. N = the number of BBS squares. The resulting indicator is presented at the bottom of the table. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded.

Species	Classif.	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	Generalist	668	1	0.98	1.01	1.03	1.11	1.16	1.18	1.17	1.15
Bullfinch	Generalist	69	1	0.69	1.31	1.01	0.69	0.94	0.87	0.86	0.84
Blue Tit	Generalist	589	1	1.01	1.19	1.14	1.11	1.17	1.16	1.11	1.05
Chaffinch	Generalist	576	1	1.04	1.20	1.17	1.23	1.12	1.12	1.15	1.18
Dunnock	Generalist	468	1	0.99	1.03	1.01	1.06	1.05	1.16	1.12	1.07
Great tit	Generalist	460	1	1.13	1.14	1.00	1.24	1.28	1.26	1.26	1.25
Long-tailed tit	Generalist	109	1	1.32	0.78	0.99	1.22	1.36	1.41	1.16	0.91
Robin	Generalist	576	1	1.11	1.03	0.97	1.07	1.13	1.21	1.21	1.21
Song thrush	Generalist	424	1	0.87	0.94	0.91	1.01	1.09	1.00	1.01	1.01
Tawny owl	Generalist	2	-	-	-	-	-	-	-	-	-
Wren	Generalist	568	1	1.13	0.92	0.88	1.03	1.21	1.26	1.25	1.23
Lesser whitethroat	Specialist	28	1	0.74	0.56	0.65	0.47	0.57	0.94	0.74	0.54
Willow warbler	Generalist	200	1	1.47	1.53	1.46	1.13	1.24	1.17	1.08	0.98
Blackcap	Specialist	239	1	1.12	1.27	1.19	1.48	1.46	1.39	1.43	1.46
Chiffchaff	Specialist	198	1	1.17	0.95	0.89	1.33	0.95	1.27	1.24	1.21
Crossbill	Specialist	1	-	-	-	-	-	-	-	-	-
Coal tit	Specialist	76	1	0.84	1.20	1.84	1.54	1.11	1.26	1.48	1.69
Green woodpecker	Specialist	103	1	1.57	1.15	1.31	1.62	1.70	1.94	1.85	1.76
Goldcrest	Specialist	99	1	2.38	2.55	2.25	3.10	3.82	2.48	2.88	3.27
G. s. woodpecker	Specialist	97	1	1.61	1.25	1.60	2.03	1.86	2.41	2.36	2.30
Garden warbler	Specialist	36	1	1.23	0.77	0.96	1.24	0.90	0.71	0.75	0.78
Jay	Specialist	90	1	1.57	1.23	1.67	1.58	2.41	1.48	1.50	1.52
Lesser redpoll	Specialist	0	-	-	-	-	-	-	-	-	-
Marsh tit	Specialist	7	-	-	-	-	-	-	-	-	-
Nuthatch	Specialist	51	1	2.15	1.27	0.81	1.22	1.11	1.27	1.65	2.03
Redstart	Specialist	3	-	-	-	-	-	-	-	-	-
S. flycatcher	Specialist	40	1	0.83	0.77	0.57	0.91	0.86	0.51	0.47	0.42
Sparrowhawk	Specialist	44	1	0.85	0.48	1.10	0.81	1.09	0.90	0.96	1.01
Siskin	Specialist	4	-	-	-	-	-	-	-	-	-
Treecreeper	Specialist	18	1	0.59	0.73	0.73	0.53	1.63	1.07	0.79	0.51
Tree pipit	Specialist	2	-	-	-	-	-	-	-	-	-
Wood warbler	Specialist	1	-	-	-	-	-	-	-	-	-
Pied Flycatcher	Specialist	1	-	-	-	-	-	-	-	-	-
Willow tit	Specialist	2	-	-	-	-	-	-	-	-	-
L. s. woodpecker	Specialist	3	-	-	-	-	-	-	-	-	-
<b>ALL (24)</b>			<b>1</b>	<b>1.12</b>	<b>1.03</b>	<b>1.07</b>	<b>1.15</b>	<b>1.24</b>	<b>1.20</b>	<b>1.18</b>	<b>1.14</b>
<b>SPECIALIST (13)</b>			<b>1</b>	<b>1.23</b>	<b>1.05</b>	<b>1.15</b>	<b>1.32</b>	<b>1.42</b>	<b>1.27</b>	<b>1.29</b>	<b>1.29</b>
<b>GENERALIST (11)</b>			<b>1</b>	<b>0.99</b>	<b>0.99</b>	<b>0.97</b>	<b>0.99</b>	<b>1.08</b>	<b>1.13</b>	<b>1.08</b>	<b>1.02</b>

**Table 14.** Farmland-specific trends for species classified as ‘woodland’ species. N = the number of BBS squares. The resulting indicator is presented at the bottom of the table. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than 10 BBS squares are excluded.

Species	Classific.	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	Generalist	1268	1	0.99	1.03	0.93	1.01	1.08	1.13	1.14	1.15
Bullfinch	Generalist	211	1	0.68	0.85	0.81	0.69	0.66	0.69	0.65	0.60
Blue Tit	Generalist	1144	1	1.07	1.18	1.24	1.08	1.05	0.99	1.07	1.14
Chaffinch	Generalist	1272	1	0.97	1.02	0.95	0.97	0.98	1.00	1.01	1.01
Dunnock	Generalist	982	1	1.04	1.01	0.90	1.00	1.04	1.06	1.08	1.09
Great tit	Generalist	1002	1	1.07	1.05	1.13	1.16	1.11	1.23	1.21	1.19
Long-tailed tit	Generalist	316	1	1.04	0.84	0.92	0.74	0.95	1.00	0.91	0.81
Robin	Generalist	1130	1	1.09	1.00	0.83	0.96	1.03	1.15	1.15	1.15
Song thrush	Generalist	801	1	0.95	0.97	0.79	0.92	0.96	1.13	1.13	1.13
Tawny owl	Generalist	30	1	0.67	0.85	0.73	0.64	1.16	0.85	0.71	0.56
Wren	Generalist	1178	1	1.15	0.80	0.75	0.95	1.08	1.15	1.12	1.08
Willow warbler	Specialist	698	1	0.99	0.99	0.93	1.03	0.95	1.01	0.89	0.77
Blackcap	Specialist	606	1	1.04	0.92	1.13	1.30	1.45	1.49	1.45	1.41
Chiffchaff	Specialist	535	1	1.01	1.14	1.12	1.29	0.90	1.11	1.12	1.13
Crossbill	Specialist	-	-	-	-	-	-	-	-	-	-
Coal tit	Specialist	196	1	1.13	1.06	1.15	0.99	1.10	0.83	1.07	1.31
Green woodpecker	Specialist	302	1	0.89	0.88	0.91	1.15	1.15	1.18	1.17	1.15
Goldcrest	Specialist	186	1	1.28	1.02	1.01	0.84	1.32	1.32	1.34	1.36
G s woodpecker	Specialist	306	1	0.92	1.16	1.21	1.27	1.42	1.31	1.41	1.51
Garden warbler	Specialist	177	1	1.12	1.18	1.35	1.02	1.13	0.94	0.86	0.78
Jay	Specialist	215	1	0.68	0.81	0.82	0.69	0.78	0.92	0.96	1.00
Lesser redpoll	Specialist	38	1	0.86	0.71	0.83	1.47	0.76	0.88	0.94	0.99
Marsh tit	Specialist	47	1	1.40	0.94	1.20	0.85	0.85	1.40	1.24	1.08
Nuthatch	Specialist	127	1	1.06	1.36	1.74	1.47	1.27	1.21	1.47	1.72
Redstart	Specialist	77	1	1.14	1.41	1.25	1.54	1.21	1.44	1.39	1.33
Spotted flycatcher	Specialist	88	1	0.61	0.86	0.84	0.83	0.83	0.85	0.73	0.60
Sparrowhawk	Specialist	131	1	0.90	0.76	0.87	0.84	0.89	0.92	0.90	0.88
Siskin	Specialist	28	1	1.10	0.65	0.36	0.77	0.47	0.63	0.78	0.92
Treecreeper	Specialist	98	1	1.39	1.77	1.47	1.46	1.90	1.43	1.42	1.41
Tree pipit	Specialist	35	1	0.53	0.98	0.72	0.91	0.68	0.83	0.68	0.52
Willow tit	Specialist	23	1	0.74	0.76	0.92	0.71	0.53	0.54	0.42	0.30
L s woodpecker	Specialist	-	-	-	-	-	-	-	-	-	-
<b>Wood warbler</b>	Specialist	<b>17</b>	<b>1</b>	<b>1.08</b>	<b>0.45</b>	<b>1.10</b>	<b>0.86</b>	<b>0.45</b>	<b>0.83</b>	<b>0.53</b>	<b>0.23</b>
<b>ALL (31)</b>			<b>1</b>	<b>0.96</b>	<b>0.98</b>	<b>0.96</b>	<b>0.99</b>	<b>0.98</b>	<b>1.03</b>	<b>1.01</b>	<b>0.98</b>
<b>SPECIALIST (20)</b>			<b>1</b>	<b>0.95</b>	<b>0.98</b>	<b>0.99</b>	<b>1.01</b>	<b>0.96</b>	<b>1.00</b>	<b>1.00</b>	<b>0.97</b>
<b>GENERALIST (11)</b>			<b>1</b>	<b>0.96</b>	<b>0.96</b>	<b>0.90</b>	<b>0.91</b>	<b>1.00</b>	<b>1.02</b>	<b>1.00</b>	<b>0.96</b>

**Table 15.** Woodland-specific trends for ‘farmland’ species. N = the number of BBS squares. The resulting indicator is presented at the bottom of the table. Species occurring on a mean of 10-20 BBS squares are highlighted in red and species trends based on less than a mean of 10 BBS squares are excluded.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Kestrel	Generalist	38	1	0.56	0.87	0.67	0.45	0.79	0.55	0.60	0.65
Woodpigeon	Generalist	562	1	0.81	0.99	0.86	0.93	0.98	0.89	0.99	1.08
Yellow wagtail	Generalist	2	-	-	-	-	-	-	-	-	-
Jackdaw	Generalist	207	1	0.87	0.98	1.06	1.07	1.19	1.16	1.09	1.02
Rook	Generalist	141	1	0.61	0.73	0.92	0.64	1.03	0.84	0.68	0.52
Greenfinch	Generalist	163	1	1.12	1.09	1.23	1.2	1.31	1.09	1.12	1.14
Reed bunting	Generalist	10	1	0.89	2.12	0.18	0.21	0.17	0.49	0.40	0.31
Grey partridge	Specialist	9	1	5.67	3.91	5.13	5.16	2.83	5.98	3.92	1.86
Lapwing	Specialist	35	1	1.02	0.93	0.90	0.73	0.69	0.70	0.68	0.65
Stock dove	Specialist	75	1	1.02	1.14	1.44	1.66	1.00	0.86	0.89	0.92
Turtle dove	Specialist	26	1	0.81	1.07	0.76	0.93	0.97	0.85	0.78	0.71
Skylark	Specialist	136	1	0.98	1.31	0.89	1.14	0.96	1.14	1.01	0.87
Whitethroat	Specialist	95	1	1.11	1.03	1.25	0.87	0.73	0.89	0.96	1.03
Starling	Specialist	159	1	0.95	1.15	0.68	0.64	0.85	0.75	0.72	0.69
Tree sparrow	Specialist	6	-	-	-	-	-	-	-	-	-
Goldfinch	Specialist	87	1	0.68	1.33	0.91	1.17	0.92	1.31	1.31	1.30
Linnet	Specialist	63	1	1.06	0.64	0.57	1.01	0.41	0.58	0.61	0.64
Yellowhammer	Specialist	93	1	0.85	0.79	0.85	0.76	0.7	0.69	0.62	0.54
Corn bunting	Specialist	2	-	-	-	-	-	-	-	-	-
<b>ALL (16)</b>			<b>1</b>	<b>0.98</b>	<b>1.13</b>	<b>0.91</b>	<b>0.91</b>	<b>0.84</b>	<b>0.93</b>	<b>0.88</b>	<b>0.80</b>
<b>SPECIALIST (10)</b>			<b>1</b>	<b>1.12</b>	<b>1.17</b>	<b>1.05</b>	<b>1.13</b>	<b>0.89</b>	<b>1.02</b>	<b>0.95</b>	<b>0.86</b>
<b>GENERALIST (6)</b>			<b>1</b>	<b>0.79</b>	<b>1.06</b>	<b>0.71</b>	<b>0.65</b>	<b>0.77</b>	<b>0.80</b>	<b>0.76</b>	<b>0.71</b>

**Table 16.** Farmland-specific trends for all species occurring on a mean 20 or 30 or more squares. N = the number of BBS squares. Species occurring less than 20-29 BBS squares are highlighted in red and species trends based on less than a mean of 10 BBS squares are excluded.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	FA	1268	1	0.99	1.03	0.93	1.01	1.08	1.13	1.14	1.15
Blackcap	FA	606	1	1.04	0.92	1.13	1.30	1.45	1.49	1.45	1.41
Bullfinch	FA	211	1	0.68	0.85	0.81	0.69	0.66	0.69	0.65	0.60
Black H Gull	FA	234	1	0.70	0.43	0.42	0.38	0.48	0.56	0.50	0.44
Blue Tit	FA	1144	1	1.07	1.18	1.24	1.08	1.05	0.99	1.07	1.14
Buzzard	FA	282	1	1.09	1.00	0.99	1.05	1.03	1.26	1.25	1.23
Carrion Crow	FA	1164	1	1.07	1.17	1.16	1.13	1.18	1.26	1.24	1.21
Cormorant	FA	68	1	1.93	0.77	0.70	1.22	1.07	1.46	1.76	2.06
Corn Bunting	FA	117	1	0.96	0.83	0.82	0.64	0.77	0.66	0.66	0.65
Chiffchaff	FA	535	1	1.01	1.14	1.12	1.29	0.90	1.11	1.12	1.13
Collared Dove	FA	546	1	1.08	1.08	1.12	1.29	1.21	1.25	1.26	1.26
Canada Goose	FA	152	1	1.30	1.32	0.97	1.19	1.20	1.49	1.68	1.86
Chaffinch	FA	1272	1	0.97	1.02	0.95	0.97	0.98	1.00	1.01	1.01
Cuckoo	FA	427	1	1.03	0.95	0.88	0.83	0.81	0.78	0.77	0.76
Common Gull	FA	65	1	0.78	0.67	0.84	1.23	0.88	1.07	0.93	0.78
Coot	FA	76	1	1.27	0.84	0.70	0.91	0.85	0.79	0.83	0.87
Coal Tit	FA	196	1	1.13	1.06	1.15	0.99	1.10	0.83	1.07	1.31
Curlew	FA	249	1	1.03	1.07	1.05	0.86	0.93	0.89	0.87	0.85
Duncock	FA	982	1	1.04	1.01	0.90	1.00	1.04	1.06	1.08	1.09

Feral Pigeon	FA	262	1	1.12	1.15	1.08	1.47	1.34	1.20	1.17	1.13
Green Woodpecker	FA	302	1	0.89	0.88	0.91	1.15	1.15	1.18	1.17	1.15
Great B.b Gull	FA	42	1	0.88	2.15	2.13	1.21	1.13	1.44	1.31	1.17
Goldcrest	FA	186	1	1.28	1.02	1.01	0.84	1.32	1.32	1.34	1.36
Greylag Goose	FA	41	1	0.70	0.75	0.83	1.32	1.33	0.76	1.08	1.40
Grey Wagtail	FA	62	1	1.54	0.90	0.76	1.04	1.68	1.50	1.70	1.90
Goldfinch	FA	645	1	1.01	1.09	1.06	0.93	1.00	1.16	1.19	1.21
Greenfinch	FA	854	1	1.15	1.12	1.27	1.11	1.12	1.40	1.40	1.40
G s Woodpecker	FA	306	1	0.92	1.16	1.21	1.27	1.42	1.31	1.41	1.51
Great Tit	FA	1002	1	1.07	1.05	1.13	1.16	1.11	1.23	1.21	1.19
Garden Warbler	FA	177	1	1.12	1.18	1.35	1.02	1.13	0.94	0.86	0.78
Grey Heron	FA	256	1	1.09	0.96	0.93	0.86	0.96	0.89	0.99	1.08
Hooded Crow	FA	49	1	0.96	0.69	0.64	0.59	0.75	0.71	0.67	0.63
Herring Gull	FA	267	1	0.98	1.13	1.10	1.13	0.89	1.05	1.32	1.59
House Martin	FA	409	1	1.07	1.17	1.14	1.07	1.44	1.46	1.37	1.28
House Sparrow	FA	752	1	1.02	1.05	1.05	1.03	1.05	1.23	1.21	1.18
Jay	FA	215	1	0.68	0.81	0.82	0.69	0.78	0.92	0.96	1.00
Jackdaw	FA	802	1	0.94	0.96	1.01	1.01	1.05	1.09	1.04	0.98
Kestrel	FA	283	1	0.79	0.77	0.79	0.70	0.61	0.8	0.73	0.66
Lapwing	FA	376	1	1.14	0.93	0.83	0.65	0.88	0.91	0.94	0.97
Lesser B.b Gull	FA	244	1	0.78	0.95	1.31	1.44	1.72	1.18	1.04	0.90
Linnet	FA	707	1	1.15	0.90	0.92	0.84	0.8	0.92	0.93	0.94
Little Owl	FA	64	1	0.94	0.99	1.21	0.82	0.96	1.11	1.20	1.29
Lesser Redpoll	FA	38	1	0.86	0.71	0.83	1.47	0.76	0.88	0.94	0.99
Long-tailed Tit	FA	316	1	1.04	0.84	0.92	0.74	0.95	1.00	0.91	0.81
Lesser Whitethroat	FA	134	1	0.94	0.79	0.51	0.58	0.69	0.77	0.73	0.68
Mistle Thrush	FA	510	1	0.91	0.83	0.87	0.97	0.86	0.89	0.91	0.93
Mallard	FA	547	1	1.08	0.99	0.89	0.92	1.17	1.09	1.25	1.40
Magpie	FA	937	1	0.99	0.97	1.03	1.00	0.99	1.00	0.97	0.93
Moorhen	FA	270	1	1.18	1.01	0.87	0.93	1.20	1.16	1.20	1.23
Meadow Pipit	FA	303	1	0.94	1.09	1.04	0.89	0.95	1.06	1.00	0.93
Mute Swan	FA	68	1	0.71	0.71	1.47	1.81	2.89	1.84	2.03	2.21
Marsh tit	FA	47	1	1.40	0.94	1.20	0.85	0.85	1.40	1.24	1.08
Nuthatch	FA	127	1	1.06	1.36	1.74	1.47	1.27	1.21	1.47	1.72
Oystercatcher	FA	143	1	0.60	0.54	0.37	0.35	0.43	0.32	0.30	0.28
Grey Partridge	FA	164	1	1.01	1.30	1.10	1.00	0.54	0.74	0.78	0.82
Pheasant	FA	915	1	1.02	1.05	0.98	0.97	1.02	1.12	1.13	1.14
Pied Wagtail	FA	584	1	1.45	1.26	1.19	1.15	1.24	1.44	1.41	1.37
Robin	FA	1130	1	1.09	1.00	0.83	0.96	1.03	1.15	1.15	1.15
Reed Bunting	FA	197	1	1.19	0.85	0.89	0.82	0.95	0.87	0.96	1.04
Redshank	FA	31	1	1.28	0.60	0.78	0.50	0.52	1.15	1.03	0.90
Red-l Partridge	FA	296	1	1.26	1.28	1.32	1.21	1.17	1.27	1.28	1.28
Raven	FA	69	1	1.12	1.52	1.32	1.45	1.51	1.62	1.87	2.11
Rook	FA	726	1	1.14	1.08	1.07	1.16	1.01	1.04	1.05	1.06
Redstart	FA	77	1	1.14	1.41	1.25	1.54	1.21	1.44	1.39	1.33
Reed Warbler	FA	42	1	1.07	1.02	0.99	1.17	1.1	1.15	1.18	1.20
Skylark	FA	973	1	1.03	1.00	0.99	0.89	0.83	0.86	0.87	0.88
Stock Dove	FA	400	1	1.02	1.02	0.98	1.15	1.11	1.15	1.22	1.28
Spotted Flycatcher	FA	88	1	0.61	0.86	0.84	0.83	0.83	0.85	0.73	0.60
Starling	FA	983	1	1.10	0.89	0.87	0.85	0.96	0.95	0.85	0.75
Sparrowhawk	FA	131	1	0.90	0.76	0.87	0.84	0.89	0.92	0.90	0.88
Swift	FA	448	1	1.09	0.87	0.84	0.86	0.84	0.79	0.78	0.77
Swallow	FA	1001	1	0.91	1.02	1.09	1.09	1.13	1.23	1.17	1.11
Sand Martin	FA	51	1	2.97	3.70	2.15	1.66	2.35	2.57	2.51	2.44
Snipe	FA	36	1	1.19	1.27	1.44	0.89	1.25	1.19	1.46	1.72
Song Thrush	FA	801	1	0.95	0.97	0.79	0.92	0.96	1.13	1.13	1.13
Shelduck	FA	64	1	1.05	0.93	0.86	0.76	0.89	0.62	0.70	0.78
Sedge Warbler	FA	142	1	1.11	1.24	1.29	1.07	1.38	1.94	1.97	2.00
Treecreeper	FA	98	1	1.39	1.77	1.47	1.46	1.90	1.43	1.42	1.41
Turtle Dove	FA	124	1	1.15	0.95	0.85	0.80	0.75	0.71	0.61	0.51

Tawny Owl	FA	30	1	0.67	0.85	0.73	0.64	1.16	0.85	0.71	0.56
Tree Pipit	FA	35	1	0.53	0.98	0.72	0.91	0.68	0.83	0.68	0.52
Tree Sparrow	FA	101	1	1.04	1.10	0.82	0.83	0.89	1.09	1.34	1.58
Tufted Duck	FA	51	1	3.37	2.15	3.10	2.03	3.96	2.91	2.48	2.04
Wheatear	FA	102	1	1.50	1.55	1.40	1.79	1.25	1.44	1.54	1.63
Whitethroat	FA	696	1	1.07	1.24	1.17	1.14	1.11	1.25	1.26	1.27
Wood Pigeon	FA	1296	1	0.92	0.95	0.98	1.02	1.00	1.05	1.05	1.04
Wren	FA	1178	1	1.15	0.80	0.75	0.95	1.08	1.15	1.12	1.08
Willow Warbler	FA	698	1	0.99	0.99	0.93	1.03	0.95	1.01	0.89	0.77
Yellowhammer	FA	787	1	0.98	0.97	0.91	0.88	0.88	0.93	0.93	0.93
Yellow Wagtail	FA	124	1	1.23	1.41	1.34	0.95	0.77	0.95	0.94	0.93
Grasshopper Warbler	FA	26	1	1.65	1.57	1.56	2.07	1.07	1.39	1.14	0.89
Pied Flycatcher	FA	21	1	0.83	1.71	1.03	1.33	1.16	1.10	1.00	0.89
Stonechat	FA	22	1	2.54	2.37	0.82	1.97	1.61	2.92	3.26	3.60
Siskin	FA	28	1	1.10	0.65	0.36	0.77	0.47	0.63	0.78	0.92
Whinchat	FA	24	1	1.10	1.47	1.35	1.42	0.88	1.10	1.14	1.17
Willow Tit	FA	23	1	0.74	0.76	0.92	0.71	0.53	0.54	0.42	0.30
20 or more squares	INDICATOR	Mean	1	1.05	1.03	0.99	1.00	1.02	1.07	1.07	1.06
30 or more squares	INDICATOR	Mean	1	1.04	1.01	1.00	0.99	1.03	1.07	1.07	1.07

**Table 17.** Woodland-specific trends for all species occurring on a mean 20 or 30 or more squares. N = the number of BBS squares. Species occurring less than 20-29 BBS squares are highlighted in red and species trends based on less than a mean of 10 BBS squares are excluded.

Species	Classification	N	1994	1995	1996	1997	1998	1999	2000	2001	2002
Blackbird	WO	536	1	1.14	1.13	0.95	1.03	1.13	1.07	1.09	1.11
Blackcap	WO	352	1	1.10	1.10	1.12	1.41	1.35	1.37	1.38	1.38
Bullfinch	WO	100	1	0.91	1.37	1.41	0.6	0.77	0.65	0.74	0.82
Black h Gull	WO	39	1	1.16	4.04	2.32	0.99	1.76	2.09	1.98	1.87
Blue Tit	WO	503	1	1.14	1.14	1.20	0.97	0.99	0.95	0.98	1.00
Buzzard	WO	98	1	0.79	1.26	1.32	1.15	1.30	1.30	1.32	1.34
Carrion Crow	WO	407	1	0.87	1.10	0.83	0.85	0.99	0.88	0.98	1.07
Chiffchaff	WO	343	1	1.22	1.08	1.27	1.4	0.99	1.02	1.13	1.23
Collared Dove	WO	82	1	0.79	1.02	0.78	0.8	1.06	0.79	0.87	0.94
Canada Goose	WO	36	1	0.81	1.12	1.27	0.96	1.37	1.33	1.23	1.12
Chaffinch	WO	569	1	0.95	1.10	0.94	1.00	0.94	1.01	1.00	0.99
Cuckoo	WO	120	1	0.96	1.15	0.74	0.71	0.65	0.96	0.83	0.70
Coal Tit	WO	248	1	1.03	1.26	1.36	1.21	1.01	1.06	1.14	1.21
Curlew	WO	44	1	1.23	1.29	1.03	1.34	1.26	0.95	0.93	0.90
Dunnock	WO	252	1	1.14	0.96	1.09	1.01	1.06	0.96	1.05	1.13
Feral Pigeon	WO	32	1	0.89	0.30	0.31	0.24	0.38	0.30	0.40	0.50
Green Woodpecker	WO	147	1	0.93	1.03	0.93	1.17	1.10	1.25	1.24	1.23
Goldcrest	WO	236	1	1.38	1.11	1.43	1.49	1.25	1.56	1.53	1.49
Goldfinch	WO	87	1	0.68	1.33	0.91	1.17	0.92	1.31	1.31	1.30
Greenfinch	WO	163	1	1.12	1.09	1.23	1.20	1.31	1.09	1.12	1.14
G s Woodpecker	WO	183	1	1.12	1.31	1.36	1.29	1.26	1.53	1.65	1.76
Great Tit	WO	438	1	1.07	1.22	1.25	1.20	1.14	1.13	1.15	1.17
Garden Warbler	WO	111	1	1.07	1.16	1.05	0.87	0.87	0.86	0.8	0.74
Grey Heron	WO	42	1	0.82	0.72	0.94	0.90	0.88	0.99	1.06	1.13
Herring Gull	WO	44	1	0.99	1.35	1.56	1.38	0.88	0.89	0.84	0.79
House Martin	WO	50	1	1.82	1.24	2.02	2.14	3.40	2.52	2.77	3.02
House Sparrow	WO	73	1	0.29	0.69	0.47	0.35	0.33	0.53	0.51	0.49
Jay	WO	175	1	1.10	1.41	1.13	1.15	1.09	1.47	1.38	1.29
Jackdaw	WO	207	1	0.87	0.98	1.06	1.07	1.19	1.16	1.09	1.02
Kestrel	WO	38	1	0.56	0.87	0.67	0.45	0.79	0.55	0.6	0.65

Lapwing	WO	35	1	1.09	0.77	1.74	0.57	0.55	2.32	1.42	0.51
Lesser B.b Gull	WO	32	1	1.02	2.47	1.44	1.13	1.72	1.94	1.47	0.99
Linnet	WO	63	1	1.06	0.64	0.57	1.01	0.41	0.58	0.61	0.64
Lesser Redpoll	WO	36	1	1.20	1.62	1.98	1.07	0.47	1.56	1.52	1.47
Long-tailed tit	WO	156	1	1.46	1.13	2.00	1.07	1.51	1.37	1.44	1.50
Mistle Thrush	WO	181	1	1.04	1.20	0.83	1.16	0.99	1.14	1.18	1.21
Mallard	WO	102	1	1.23	1.10	1.03	1.40	1.50	1.22	1.51	1.79
Magpie	WO	247	1	0.90	0.96	0.88	0.79	0.91	0.9	0.87	0.83
Moorhen	WO	59	1	0.88	1.12	1.04	0.9	1.15	0.91	0.93	0.95
Meadow Pipit	WO	50	1	0.85	1.02	0.85	0.65	0.69	0.49	0.40	0.31
Marsh Tit	WO	55	1	1.70	1.79	1.34	1.52	1.34	1.36	1.48	1.60
Nuthatch	WO	126	1	1.29	1.74	1.47	1.49	1.10	1.25	1.25	1.24
Pheasant	WO	299	1	0.99	1.22	1.07	1.05	1.00	1.08	1.13	1.18
Pied Wagtail	WO	61	1	0.80	0.94	0.96	0.86	1.12	0.85	1.04	1.23
Robin	WO	552	1	1.07	1.02	0.86	1.12	1.09	1.21	1.13	1.05
Rook	WO	141	1	0.61	0.73	0.92	0.64	1.03	0.84	0.68	0.52
Redstart	WO	35	1	1.71	2.36	3.59	1.63	2.04	1.76	1.94	2.11
Skylark	WO	136	1	0.98	1.31	0.89	1.14	0.96	1.14	1.01	0.87
Stock Dove	WO	75	1	1.02	1.14	1.44	1.66	1.00	0.86	0.89	0.92
Spotted Flycatcher	WO	40	1	0.79	1.27	0.98	0.64	0.86	0.97	0.73	0.48
Starling	WO	159	1	0.95	1.15	0.68	0.64	0.85	0.75	0.72	0.69
Sparrowhawk	WO	38	1	1.33	1.28	0.91	1.10	0.96	0.60	0.79	0.98
Swift	WO	72	1	0.81	0.63	1.02	0.91	0.99	0.59	0.50	0.40
Siskin	WO	56	1	0.57	1.74	1.80	0.86	1.01	0.95	0.84	0.73
Swallow	WO	146	1	0.81	1.14	1.18	0.85	1.12	1.13	1.28	1.43
Song Thrush	WO	387	1	1.09	1.07	0.93	1.04	1.27	1.12	1.13	1.13
Treecreeper	WO	115	1	1.29	1.33	1.33	1.21	1.31	1.04	1.06	1.08
Tree Pipit	WO	41	1	0.84	1.04	1.09	1.21	0.97	1.16	1.30	1.44
Whitethroat	WO	95	1	1.11	1.03	1.25	0.87	0.73	0.89	0.96	1.03
Wood Warbler	WO	31	1	0.59	0.59	0.94	0.42	0.49	0.47	0.47	0.46
Wood Pigeon	WO	562	1	0.81	0.99	0.86	0.93	0.98	0.89	0.99	1.08
Wren	WO	552	1	1.22	0.79	0.92	1.15	1.31	1.32	1.21	1.10
Willow Warbler	WO	335	1	1.15	1.34	1.14	1.26	1.14	1.08	0.96	0.83
Yellowhammer	WO	93	1	0.85	0.79	0.85	0.76	0.70	0.69	0.62	0.54
Coot	WO	26	1	1.57	1.64	1.94	1.39	1.42	1.72	1.54	1.35
Common Crossbill	WO	22	1	0.22	1.02	1.03	1.13	0.67	0.23	0.33	0.43
Oystercatcher	WO	22	1	1.23	0.98	1.15	0.61	0.65	0.95	1.11	1.27
Red-l Partridge	WO	27	1	1.25	0.96	1.3	0.92	1.09	0.87	1.07	1.26
Raven	WO	25	1	1.78	1.71	1.19	1.45	0.71	2.01	1.97	1.92
Turtle Dove	WO	26	1	0.81	1.07	0.76	0.93	0.97	0.85	0.78	0.71
Tawny Owl	WO	27	1	0.93	0.85	0.74	0.95	1.01	1.02	0.89	0.76
20 or more squares	INDICATOR	Mean	1	0.98	1.12	1.09	0.98	0.99	1.01	1.01	0.99
30 or more squares	INDICATOR	Mean	1	0.98	1.12	1.09	0.97	1.00	1.02	1.02	0.99