The BTO/GWCT survey of breeding Woodcock in 2013: numbers and distribution in Sussex

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Introduction

In 2013 the British Trust for Ornithology (BTO), funded by and in collaboration with the Game and Wildlife Conservation Trust (GWCT), conducted a national survey of breeding Woodcock *Scolopax rusticola*. The main aim of the survey at a national level was to measure the change in the breeding population since the first baseline population estimate was calculated from the results of a survey conducted in 2003 by the BTO and the GWCT (Hoodless *et al.* 2009). The Bird Atlas 2007-11 results had indicated a significant reduction in breeding distribution since previous breeding atlas fieldwork in 1968-1972 and in 1988-92 (Balmer *et al.* 2013), so quantifying the reduction in the breeding population was a priority. Secondary aims of the 2013 survey were to obtain more detailed information about breeding distribution and abundance changes, and to investigate how these are related to woodland habitat characteristics and land use in habitats adjoining woodland.

The breeding distribution of Woodcock covers much of Britain and Ireland, but the nocturnal habits and cryptic nature of this species make it difficult to monitor the breeding population using traditional survey methods such as the BTO Breeding Bird Survey (BBS). A special survey method was devised for the national survey in 2003, using counts of the territorial roding flights undertaken by males at dusk and dawn to estimate the numbers of males present at individual sites (Hoodless *et al.* 2008). The 2013 survey used the same method of counting territorial roding flights.

This article presents the results of the BTO survey in Sussex in 2013, in relation to numbers and distribution. These results are compared with those obtained from previous surveys in Sussex, including the results for Sussex obtained from the previous national survey in 2003 which have not previously been published, although unfortunately the 2003 results were not sufficient to allow the calculation of a baseline county population estimate. Bird Atlas 2007-11 fieldwork in Sussex (Newnham and Crabtree 2012, Thomas 2014) revealed that the Woodcock breeding range had reduced significantly since the previous breeding atlas in 1988-1992 (James 1996), with the species largely having been lost from areas of the High Weald and the western South Downs and also from some areas of the West Sussex commons. In this context a county population estimate for 2013 is attempted and recommendations for future surveys are made.

Survey methods

The sites surveyed were 1x1-km squares which had mostly been randomly selected from within the known breeding range and which were known to contain some woodland. In Sussex, 108 squares were initially selected to be surveyed. Of these, 52 squares were designated as high-priority sites because they had been previously surveyed in 2003. Some of the remaining 56 squares had been randomly selected in 2003 but not surveyed, and some squares were newly selected in 2013. Significantly, none of the high-priority sites were within the Ashdown Forest area because unfortunately no surveys were undertaken there in 2003. The selected squares were allocated to volunteers where possible. Volunteers were also able to opt to conduct surveys in squares not on the original list but where Woodcock were likely to occur; nationally the results of these surveys at additional observer-chosen sites would not be used in calculating population estimates although information collected about habitat characteristics would be valuable.

All squares were surveyed from fixed points. Volunteers allocated high-priority sites were asked to use the same fixed points as were used in the 2003 survey and were provided with the 6-figure grid references of these points. Volunteers allocated low-priority sites or selecting sites themselves were asked to select their own count points. These volunteers were asked to locate the largest area of mature woodland within the survey square, and to then select a count point within this woodland (ideally at least 100 m from the woodland edge) but within a glade or ride or felled area such that roding Woodcock would be visible against the sky rather than obscured by a closed canopy. A count point could be located up to 400 m outside a selected square if no suitable count point could be found within the square.

Volunteers were first asked to make a reconnaissance visit to each of their allocated sites in April, to locate the count point in high-priority squares and to select a suitable count point in low-priority and additional squares. Volunteers were then asked to make three evening survey visits to each of their allocated sites during the period 1 May to 30 Jun, with at least one week between visits. On each visit, volunteers were required to observe from the selected fixed point for a total duration of 75 mins, beginning 15 mins before sunset (although subsequently only observations during the first 60 mins were used in the analysis). Each time that a roding Woodcock was seen or heard during this 75-min period, this was noted as an individual registration on the recording form, with the time noted to the nearest minute. If two or more birds were seen or heard passing the count point together, this was counted as one registration and the number of birds was noted. If no roding birds were recorded during two evening visits, it was essential that visit details were returned although subsequent visits were not required.

For any survey site the number of observations of roding birds can be used to estimate the number of individual males present, using the results of research by Hoodless *et al.* (2008) which sought to establish a reliable survey method for this species. Counts of roding males can be difficult to interpret because it is impossible for an observer to distinguish between different individual birds, and because a few dominant males may rode for long periods whilst other males may only rode for short periods. In order to enable the use of counts of roding males as measures of abundance, Hoodless *et al.* (2008) sought to establish the relationship between numbers of individual males and numbers of observations, and investigated differences between habitats. The calls of roding males at several different sites were recorded and analysed so that individual males at each site could be recognised by their sonograms. The number of different individuals at each site was then plotted against the number of roding observations at each site; this showed a logarithmic relationship which was not found to be affected by habitat or woodland type (see Figure 1).

Using this established relationship, the numbers of roding observations obtained in the current survey were used to estimate the numbers of individual males present. Allowance was made for the fact that in the current survey roding observations were counted during a 75-min period on each visit, while the observation period in 2003 was only 60 mins; only observations during the first 60 mins for each visit in 2013 were used in the analysis. For each site, the maximum number of roding observations during the first 60 mins of any visit was used to estimate the number of males present (Hoodless *et al.* 2008). The estimated number of individual males present at each survey point can be assumed to be equivalent to the number in the 1-km survey square because the mean roding area has been shown to be 88 hectares (Hirons 1980), sufficiently close for the purposes of the survey to the 1-km square area.

Volunteers were also asked to undertake habitat recording during the period 15 May to 15 Jun, to characterize the woodland surrounding each count point (within 200 m). This habitat recording involved selecting woodland types and dominant ground vegetation types from lists

provided, and also indicating the level of grazing activity at the site by deer and livestock. Habitat data collected in Sussex is complex and relates to an insufficient number of sites for any detailed analysis, so this aspect of the survey is only discussed very generally here.



Figure 1. Relationship between the numbers of roding male Woodcock known to be present at each site from analysis of their calls and the maximum numbers of roding observations in a 60-min period (taken from Hoodless et al. 2008).

Survey results

The required surveys were conducted at a total of 99 sites in Sussex in 2013; these comprised 47 high-priority sites (which had also been surveyed in 2003), 32 low-priority randomly-selected sites and 20 additional sites selected by the observers. At 73 of the 99 surveyed sites, no roding Woodcock were seen or heard at all by the observers during at least two evening visits. For the 26 sites where roding Woodcock were encountered, the maximum numbers of observations were used to estimate the numbers of individual males present using the method described above, and the results are given in Figure 2.

Combining the estimated numbers at all of the sites, a total of 64 individual roding males were estimated to be present. Most of the sites where roding Woodcock were encountered were in heathland areas, either on the West Sussex commons or in the Ashdown Forest area. Of the 26 sites, six were on the West Sussex commons and nine were in the Ashdown Forest area, with the highest numbers of individual males recorded at Stanley Common, Ambersham Common, Lavington Common and Duncton Common in West Sussex and the Chelwood, Broadstone and Misbourne areas of the Ashdown Forest. Woodcock were also recorded at Broadwater Warren, a heathland site in the north-east of the county. The other ten sites where Woodcock were encountered were in large areas of woodland, with the highest numbers recorded in Westdean Woods and Rewell Wood.



Figure 2. The numbers of individual male Woodcock estimated to be present at each of the sites surveyed in 2013, applying the relationship demonstrated by Hoodless et al. (2008) to the maximum numbers of observations of roding birds. Sites were 1-km squares but are mapped here for clarity at tetrad level and there may be more than one site within one tetrad.

Discussion

With a relatively small number of sites surveyed in Sussex in 2013 and with roding Woodcock recorded at only 26 sites, arriving at a population estimate for the county is difficult. An estimated 64 individual males were recorded across the 26 sites, but if at any site the number of individual males is considered to be possibly one more or less than the estimated number (although not zero), then the total number of males recorded in the county falls in the range 48-90 individuals. This is clearly a minimum limit for the estimated number of roding males actually present in the county.

Figure 3 shows the breeding distribution map for Woodcock resulting from the Bird Atlas 2007-11 fieldwork in Sussex (Newnham and Crabtree 2012, Thomas 2014).



Figure 3. Woodcock breeding distribution in Sussex during 2008-2011 inclusive.

Direct comparison of this map with the distribution map resulting from the current survey (Figure 2) is difficult because of the relatively small number of sites surveyed in 2013 and because the atlas distribution map was plotted using records gathered during four breeding seasons (2008-2011 inclusive) and therefore possibly shows a wider distribution. Another factor which makes it difficult to compare the current distribution map with the atlas distribution map is that, although all tetrads in Sussex were surveyed at least once in the years 2008-2011 inclusive. atlas volunteers were not asked to make visits at dusk and therefore some sites would have been missed where in fact roding Woodcock were present. However, the two distribution maps are broadly similar, with the most important areas being the West Sussex commons and the Ashdown Forest. The atlas distribution map indicates that Woodcock were recorded in the breeding season in 73 tetrads in the years 2008-2011 (regardless of the level of breeding evidence established). If it is assumed that there is one 1-km square area of suitable breeding habitat within each tetrad, and that the suitability of this habitat has not changed significantly between 2008-2011 and 2013, then the results of the current survey can be extrapolated across the breeding range shown by the atlas distribution map. If between two and four individual males are assumed to have been present in each of the 38 tetrads on the West Sussex commons and in the Ashdown Forest area. which is a very conservative estimate based on the results of the current survey (see Figure 2). and if one roding male is assumed to have been present in each of the other 35 tetrads, then a county population estimate of about 110-180 roding males can be calculated. Actually there are larger areas of suitable habitat in some of these tetrads, particularly in the Ashdown Forest area and in some of the larger woodlands, and as explained above some suitable sites will be missing from the atlas distribution map, so a less conservative estimate might be 200-300 roding males in the county. On the other hand, the national population of this species has been shown to have decreased dramatically over recent decades (Fuller et al. 2005, Balmer et al. 2013), and the breeding range in Sussex reduced significantly between 1988-1992 and 2008-2011 (Thomas 2014), particularly on the West Sussex commons although less so in the Ashdown Forest area. The assumption that the breeding distribution in Sussex in 2013 was the same as that found in 2008-2011 may be justified, if Woodcock populations have stabilised in favoured areas, but equally this assumption may be optimistic and a population estimate of 150-220 roding males in 2013 may be more sensible.

Figure 4 shows the sites visited in Sussex for the national survey conducted in 2003 by the BTO and the GWCT (Hoodless *et al.* 2009). Sites were 1-km squares as in the current survey, and the maximum numbers of observations have again been used to estimate the numbers of individual males present at each site. It is unfortunate that no surveys at all were conducted in 2003 in the Ashdown Forest area, which as already discussed is one of the most important breeding areas for Woodcock in Sussex, and few surveys were conducted on the West Sussex commons. The reasons for this are unclear, but it means that it is difficult to compare the results of the 2003 survey in Sussex with the results of the current survey. Combining the estimated numbers at all of the 18 sites where Woodcock were encountered in 2003, a total of 50 individual roding males were estimated to be present.

With numbers missing for the Ashdown Forest this total is fairly meaningless although it can be compared with the 39 individual males estimated to be present at the 17 sites not in the Ashdown Forest area where Woodcock were encountered in 2013. The two sites where it is estimated that more than five individual males were present in 2003 both held fewer birds in 2013 and other sites with more than one or two males present in 2003 either held reduced numbers in 2013 or were not surveyed in 2013, but really the number of sites and the amount of data involved here are too small (with only 47 sites surveyed in both 2003 and 2013) to allow for any conclusions about population changes or any estimate of the county population of roding male Woodcock in 2003.



Figure 4. The numbers of individual male Woodcock estimated to be present at each of the sites surveyed in 2003 (not previously published), applying the relationship demonstrated by Hoodless et al. (2008) to the maximum numbers of observations of roding birds. Sites were 1-km squares but are mapped here for clarity at tetrad level and there may be more than one site within one tetrad.

As already stated, most of the sites where roding Woodcock were encountered in Sussex in 2013 were in heathland areas, either on the West Sussex commons or in the Ashdown Forest area. Some sites were in the larger wooded areas in the county such as Westdean Woods and Rewell Wood. Woodcock have specific habitat requirements, particularly during the breeding season. They are generally associated with woodland, and breed in both deciduous and coniferous woodlands, but need large areas of damp, undisturbed, open woodland with some dense ground vegetation (Hirons and Johnson 1987). There is some evidence to suggest that Woodcock do not breed in woods that are smaller in area than 10 hectares, and some studies have suggested that Woodcock were more widely distributed in many of the wooded areas of Sussex (James 1996) than has been found subsequently, and although roding males can still be found in some of the larger woods, it is in the heathland habitats that roding birds can now most easily and reliably be found.

The West Sussex commons and the Ashdown Forest area both comprise a patchwork of woodland and heathland areas that is unique to the south-east of England, and the overall habitat is very similar to that found in the much larger New Forest in Hampshire. Woodcock are undoubtedly using the woodland in these areas, but clearly the presence of the more open heathland habitats is important. The New Forest Woodcock Group found in an intensive survey of roding birds in the New Forest in 2013 and 2014 that Woodcock could be found in areas with comparatively small amounts of woodland coverage, that not all areas with high proportions of woodland had Woodcock present, and that really there was little correlation between the proportion of woodland in an area and the number of roding Woodcock observed (New Forest Woodcock Group 2014). This suggests that in these mixed heathland and woodland habitats the Woodcock can utilise smaller areas of woodland than in other parts of the UK, with the open heathland areas adjacent to the woodland perhaps providing favourable feeding conditions (New Forest Woodcock Group 2014). Elsewhere in the UK there may be less suitable agricultural and other types of habitat adjacent to woodlands, such that larger areas of woodland coverage are required.

Conclusions

A survey conducted in 2013 of breeding Woodcock at 99 potentially suitable sites in Sussex found roding males at 26 sites; most of these sites where roding Woodcock were encountered were in heathland areas, either on the West Sussex commons or in the Ashdown Forest area. The estimated total number of males recorded in the county was in the range 48-90 individuals, and using the breeding distribution found in 2008-2011 to extrapolate these results it is estimated very conservatively that the county breeding population in 2013 was 150-220 roding males.

This is the first time that Woodcock have been fully surveyed in Sussex using an established method that is repeatable, and the first time that a population estimate has been attempted from survey results. Although the survey in 2003 used the established method and yielded some useful information, no sites in the Ashdown Forest area were surveyed using the established method, and without data from this important area the results of this survey were fairly meaningless. Despite the more thorough coverage of the 2013 survey, the number of sites surveyed was still relatively small and the population estimate is therefore extremely tentative. However, having established this baseline, a future repeat survey of the sites surveyed in 2013, using exactly the same methods, will have a good chance of measuring any changes in the Woodcock breeding population in the county.

The results of this survey have also underlined the importance of heathland areas for breeding Woodcock in Sussex. A much more detailed survey of roding Woodcock in the Ashdown Forest area, using exactly the same methods as used in the current survey and similar to a detailed study conducted in Hampshire in 2013-2014 by the New Forest Woodcock Group, would better establish the breeding density of Woodcock in this area and could improve our understanding of the use of heathland by this species in the breeding season.

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