

## Annual breeding woodcock surveys: results from 10 years of roding counts

The joint GWCT-BTO Woodcock Survey in 2003 provided the first population estimate derived from a species-specific survey for breeding woodcock in Britain. The survey method was based on a GWCT study in the early 2000s which demonstrated a relationship between roding activity (number of passes of a displaying bird) and the number of individual males at a site. Recent evidence from the BTO/BirdWatch Ireland/SOC *Bird Atlas 2007-11* suggests continued range contraction for breeding woodcock since 1988-91 and hence we plan to repeat the national survey in 2013 to quantify the change in numbers of roding males. These are snapshot surveys, however, and annual counts are valuable in enabling us to examine the magnitude of annual variation in roding male abundance. 2012 marked the tenth year of annual roding woodcock counts by a dedicated band of enthusiasts, to whom we are extremely grateful. With another five or more years' worth of counts, we will be able to see the effects of woodland management at individual sites and the influence of weather on annual fluctuations in woodcock numbers.

Counts have been made in at least two years during 2003-2012 at a total of 67 sites across 24 counties (Table 1). At 23 of these sites, counts have been undertaken in at least seven years (hereafter referred to as 'long-term sites'). Counts were made at an average of 33 sites per year. Most sites were not randomly selected but chosen by observers because breeding woodcock were known to be present and hence 93% of sites had roding woodcock in at least one year. The mean and maximum of three counts made at each site each year between 1 May and 30 June were highly correlated and hence the maximum count has been used in analysis of the data. The maximum number of passes per site per year averaged 12.8.

Table 1. Number of sites by county at which woodcock counts have been made in at least two years during 2003-2012. Long-term sites are sites where counts have been undertaken in at least seven years.

County	Total sites	Long-term sites	County	Total sites	Long-term sites
Aberdeenshire	1		Shropshire	1	
Inverness	2	1	Norfolk	3	
Highland	1		Cambridgeshire	2	1
Fife	4		Hertfordshire	1	
Borders	1		Oxfordshire	1	1
Northumberland	2		Berkshire	1	1
Durham	1		Surrey	2	
North Yorkshire	6		Kent	2	2
Lancashire	4	2	West Sussex	1	1
Derbyshire	4	2	Hampshire	19	7
Nottinghamshire	2	2	Wiltshire	1	1
Lincolnshire	2	1	Dorset	3	1

The trend in the count data appears stable until 2008, with an apparent decline in numbers of passes thereafter (Figure 1). The trends for all sites and long-term sites alone are very similar. There is a statistically significant negative overall trend in counts over time. There is no difference in the slope of the trend between northern England + Scotland and southern England + Wales (based on a dividing line from the Humber to the Mersey).

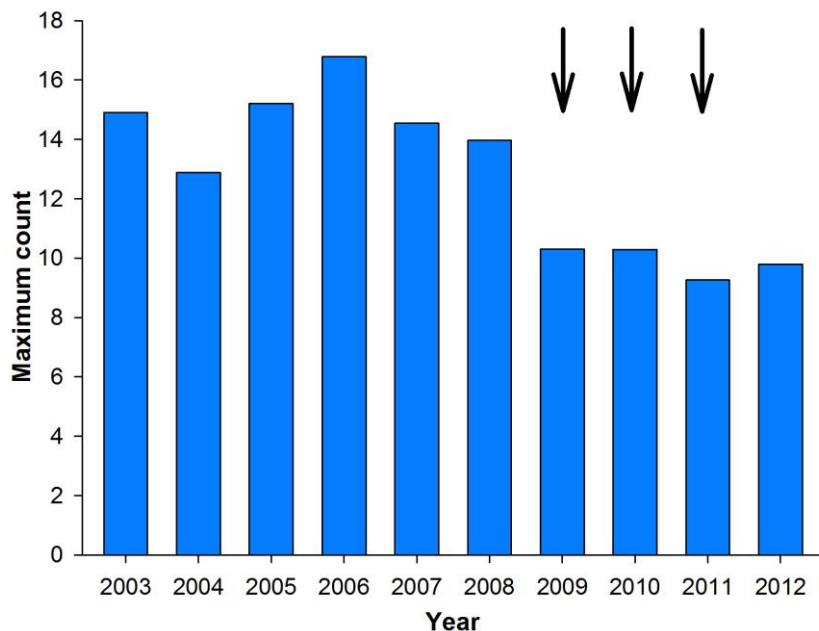


Figure 1. Trend in annual woodcock roding counts. Values are means of the maximum count per site. Arrows denote cold winters.

It is plausible that variation in weather conditions has an important influence on annual fluctuations in woodcock numbers. Heavy rain and low temperatures at the time of peak chick hatch in late April/early May might result in higher chick mortality, but conversely wetter weather in June and July is likely to increase the availability of earthworms for near full-grown and recently fledged young at the time of year when food is least accessible. In winter, low temperatures and particularly lying snow will reduce the accessibility of food and could increase woodcock mortality. Although a longer run of years would be preferable for investigating such effects, we were interested in conducting a crude preliminary analysis. We determined total June + July rainfall and mean December-February temperature from UK monthly summaries provided on the Met Office website. We then tested for trends in June + July rainfall and winter temperature over time and tested for relationships between counts of woodcock passes and the values of these two weather variables during the previous summer or winter.

There was no trend in June + July rainfall or December-February temperature over the period 2002-2011. There was no relationship between the mean number of woodcock passes and June + July rainfall the previous year, but there was a weak positive relationship between the mean number of woodcock passes and December-February temperature. Average winter temperature varied between 1.6°C in 2009/10 and 5.5°C in 2006/7, with an overall mean of 3.9°C for 2002/3-2011/12. The effect on woodcock counts of the three winters with below average temperatures (2008/9, 2009/10, 2010/11) can be seen in Figure 1. This is suggestive that the effects of weather on breeding woodcock numbers would merit further detailed investigation in the future when we have more data. The analysis could be refined by obtaining data from weather stations located close to woodcock survey sites.