

# Nightingale 2012

## Title

Nightingale 2012

## Description and Summary of Results

The Nightingale *Luscinia megarhynchos* has been in decline in Britain for much of the 20th Century and it has been lost completely, as a breeding bird, in some counties. There was also a marked contraction in range between the 1968-1972 and the 1988-1991 Breeding Atlases, with Nightingales lost from nearly 30% of 10-km squares between those periods. The 2007-11 breeding Atlas results showed that further range losses had occurred since 1988-91.

National Nightingale surveys in 1976 and 1980 located 3,230 and 4,770 singing males respectively, although poor coverage in some areas resulted in many birds being missed in these surveys, especially in 1976. At the time of the 1988-1991 Breeding Atlas the population was estimated at 5,000-6,000 pairs but there was little published information on population size or trends since this estimate and the species had become too scarce and locally distributed to be monitored effectively by national bird monitoring schemes such as the Common Birds Census or Constant Effort Site ringing. County bird reports and avifaunas for counties across the Nightingale's range had reported continuing decreases and local range contractions since the early 1990s, but in contrast, a survey of Kent in 1994 located a record county total of 1,066 birds, with the population estimated to be in the range 1,460-1,535 pairs. The higher total was thought probably to be due to better coverage than in earlier surveys.

A national Nightingale Survey in 1999 found a total of 4,498 singing males on over 3,000 known or potential Nightingale sites. Fewer were reported in 1999 in 27 of the 32 counties in which singing birds were found in the 1980 survey (see Nightingale 1999 project summary sheet for further details of the 1999 survey results).

The professionals carrying out the Random Tetrad Survey in 1999 found 205 Nightingale territories in 135 tetrads whereas only 138 were found by volunteers at known sites within these same tetrads. From this the 'Known Sites' survey was estimated to locate 67.3% of Nightingales, from which a total population estimate of approximately 6,700 territories was derived (95% confidence limits 5,600-9,350).

The decline in Britain might be linked to changes in climate on its breeding grounds but, as it is a trans-Saharan migrant, climate or habitat changes on its wintering grounds or on its migration routes could also be contributory factors. There have been changes in habitat on the British breeding grounds, e.g. a reduction in traditional coppice management of woodland, and increased grazing pressure from deer populations. And although the abandonment of coppicing may have contributed to declines in the 19th Century, reductions in numbers during the second half of the 20th Century occurred during a period

when there was probably relatively little change in the amount of actively worked coppice, partly at least because of a modest revival often associated with nature conservation. Furthermore, it is unclear exactly how beneficial coppicing is to Nightingales because many apparently suitable coppiced woods do not support the species.

Another full survey of breeding Nightingales across Britain was carried out in 2012. The main aim was to estimate the number and distribution of Nightingales throughout Britain, and compare their distribution with the previous 1999 Nightingale Survey. A completely new element of the 2012 survey was to investigate how many males are singing at night later in the spring. This follows new research (Amrhein *et al.*) which suggests that only unpaired males continue to sing during the darkest hours of the night, whereas all territorial males sing in the daytime (especially at dawn and dusk). The BTO therefore hoped to discover whether the proportion of night singers varies systematically, for example with Nightingale density, with habitat, or with distance from the edge of the range.

The analyses of the 2012 survey data compared population estimates produced from 12 different analytical methods. Three different statistical methods were used to account for detectability, estimating that 55%–65% of the national population was detected during surveys. The estimated UK population from the 12 analytical methods ranged between 5,094 and 5,938 territorial males, and the confidence intervals ranged from 4,764 to 6,534.

### **Methods of Data Capture**

Designing a national volunteer-based survey for scarce species such as the Nightingale is problematic because random square surveys such as those adopted for more widespread species would be unlikely to yield sufficient data with which to produce even the most basic population estimate; and such a survey design would result in only a small proportion of the survey volunteers finding the target species. Conversely, Nightingales are too numerous and widely distributed for an accurate count of all birds to be carried out annually, although this approach was attempted in the 1976 and 1980 surveys.

The 1999 Nightingale Survey had adopted a three-tier structure:

1) a survey of all known recent sites (the Known Sites Survey); 2) a random survey of tetrads (2 x 2-km squares) (the Random Tetrad Survey); 3) casual records (all records away from Known Sites).

The 2012 survey also included a tier 1 element from 1999: i.e. surveying recently occupied tetrads (known sites). However, there was a greater emphasis on the random tetrad element than in 1999 with a larger and more carefully selected random sample, selected using predicted abundance from the Atlas models. As in 1999, casual records were also requested in 2012.

The Known Sites Survey was, in effect, an attempt to locate as many Nightingales as possible. A list of known Nightingale sites was drawn up by trawling county bird reports and bird databases from county bird clubs and societies for all sites where singing Nightingales had recently been heard. Additionally, squares that were occupied in 1999 were added to the sample. The survey was organized through regional organisers, mainly the BTO's Regional Representatives, and the fieldwork carried out by BTO members and other voluntary fieldworkers.

Volunteer observers were asked to make at least two visits to each of the selected 2x2 km squares during the early spring (21st April to 20 May) to cover all suitable Nightingale habitat within the tetrad in the early morning and map any singing Nightingales. Basic habitat information was requested for any Nightingale territories found. Observers were encouraged to make optional nocturnal visits to occupied tetrads (ideally at least two during 18 May to 4 June), in order to discover whether singing birds, already detected by the daytime surveys, are in song later in the season (when females would be incubating) during the hours of midnight to 03:00, which would be indicative of unpaired individuals. A total of 1,281 volunteers surveyed 2,356 tetrads on at least two occasions between 21<sup>st</sup> April and 14<sup>th</sup> May.

### **Purpose of Data Capture**

To establish the overall population size of the Nightingale in Britain, compare distribution change since the last survey conducted in 1999, and to gather new information on the distribution across different habitats. A secondary aim was to assess the pairing status of individual Nightingales. No previous survey of a breeding bird species in Britain, and possibly in Europe, had attempted to estimate what proportion of the territorial population might be paired.

### **Geographic Coverage**

Great Britain, primarily southern and eastern England, ie the range of the species.

### **Temporal Coverage**

The breeding season of 2012 with the request for at least two early morning visits between 21 April and 20 May and, where territories are located, optional nocturnal visits (at least two visits between 18 May and 3 June to record birds singing between midnight and 03:00). Some additional survey work also took place in 2013 to fill gaps in coverage.

### **Other Interested parties**

The survey was funded by the BTO Nightingale Appeal, with support from the Nightingale Supporters' Group, sales of the CD "Nightingales: A celebration", Anglian Water and 18 charitable trusts.

### **Organiser(s)**

John Marchant and Greg Conway

### **Current Staff Contact**

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## **Publications**

The main report of the survey is:

Hewson, C.M., Miller, M., Johnston, A., Conway, G.J., Saunders, R., Marchant, J.H. & Fuller, R.J. 2018. Estimating national population sizes: Methodological challenges and applications illustrated in the common nightingale, a declining songbird in the UK. *Journal of Applied Ecology* 55: 2008-2018. <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2664.13120>. A summary of these results can be viewed at: <https://www.bto.org/our-science/publications/peer-reviewed-papers/estimating-national-population-sizes-methodological>

The survey results were also summarised in *BTO News* in summer 2018

(<https://www.bto.org/sites/default/files/nightingales-summer-2018-bto-news.pdf>).

An article in the Annual Review 2013 provided some initial information about the 2012 survey and explained why the survey had been carried over into 2013.

## **Available from NBN?**

No.

## **Computer data -- location**

The data are stored in the project folder on the BTO shared drives.

## **Computer data -- outline contents**

## **Computer data -- description of contents**

## **Information held in BTO Archives**

## **Notes on Access and Use**

Data may be available on request (<https://www.bto.org/our-science/data/data-request-system>).

## **Other information needed**

## **Notes on Survey Design**

## **Specific Issues for Analysis**

The analyses aimed to take into account the detectability of birds present at a site, which may vary according to the timing of a visit (e.g. whilst a greater proportion of birds are likely to be singing at twilight, only unpaired birds will usually be singing at night). The analyses also needed to make certain assumptions about the number of birds in places that were not surveyed, using data from randomly selected squares which were added to the sample. Methods to account for birds in areas which were not known to hold the species contributed to the greatest variability in the results, due to the difficulty in surveying a sufficiently large sample of random sites. The main report of the survey (Hewson *et al.* 2018) specifically investigates the methodological challenges that need to be considered when attempting to make national population estimates, using the nightingale as a model species and making recommendations for study design.