

7 steps for monitoring Nightingales

The rapid decline in Nightingales has changed the sound of the British countryside. Senior Research Ecologist **Chris Hewson** explains what it takes to figure out how many of these elusive birds remain, and the next step in their conservation.

The 2012 Nightingale survey was a periodic survey undertaken to supplement ongoing annual monitoring programmes. Scarce species with restricted ranges are poorly monitored by the regular schemes such as the Breeding Bird Survey (BBS), creating a need for single-species surveys.

Estimation of the number of birds present within the country is important for several purposes. To achieve this with any certainty requires much planning and analysis, not to mention many thousands of hours of fieldwork undertaken by BTO's extensive network of volunteer citizen scientists. But how exactly do we estimate an entire population of birds?

1 BUILDING ON ADVANCING KNOWLEDGE

Single-species surveys allow us to account for variability in how easily detectable a species is. This is especially important for a species like the Nightingale as almost all registrations are of singing birds. However, song output varies according to time of day, season and even the pairing status of males, making this a potentially biased way of estimating numbers. Using the results of recent studies undertaken by the University of Basel, we were able to target survey effort to those times when all males should be singing. Although the species is famed for the quality of its song, it is also known for its night-time singing. Research has shown that night-time song serves to attract a mate and stops once a male is paired. Nocturnal song is therefore

much reduced soon after females arrive and is then restricted mainly to those males which remain unpaired. Twilight and morning songs, in contrast, have a territorial function and are given by all territorial males but at greater frequency early in the season. Surveys undertaken around or soon after dawn in the first two or three weeks after the birds arrive will have the best chance of detecting all the males present.

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male Nightingales. This amounted to thousands of hours of fieldwork, added to all the planning by BTO staff and the regional teams. The data were sent to BTO HQ where they were checked, checked again, digitised and tabulated ready for analysis – a painstaking and time-consuming process to ensure the highest quality of results. This would not have been possible without the help of Maria Knight, amongst others.

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4 CRUNCHING THE NUMBERS

Unfortunately, even for a survey planned with the best possible background information and carried out by an army of volunteers, estimating the number of birds present is not as simple as adding up the number recorded in each tetrad. Not all birds present are detected, and we also need to estimate the number of birds in places that were not surveyed. This requires that we make certain assumptions. Although we make these assumptions as realistic as possible, it isn't possible to know which are in fact most realistic, so it is necessary to use alternatives and assess the impact they have on the final result. The new methods meant that we were able to use some advanced and novel methods to estimate the number of birds missed in surveys, the number of birds in survey tetrads that weren't covered, and the number in the remaining wider countryside.

5 THE BOTTOM LINE

The various combinations of these assumptions resulted in 12 estimates, ranging from 5,094 to 5,938 singing males with confidence intervals ranging from 4,764 to 6,534. The average of the estimates was 5,543, representing our best estimate of the population size. It seems very likely that the true figure lies somewhere within the range of the 12 estimates.

6 WHY DO WE NEED TO KNOW?

Conservation prioritisation often involves assessing sites against critical

thresholds of importance, with those holding 1% or more of the national population being considered important. We were able to identify the most important sites for Nightingales in the UK and identified one site in particular – Lodge Hill in Kent – as being of clear national importance. This was instrumental in the notification of this area as the Chattenden Woods and Lodge Hill Site of Special Scientific Interest (SSSI). The SSSI notification has impacted on subsequent planning applications for residential development on the site. This is a testament to the impact that single-species surveys and derived population estimates can have.

7 THE FUTURE

The next step is to look in detail at how the Nightingale's range and habitat distribution has changed over recent decades, although direct comparisons are not straightforward due to changes in methodology since the earlier surveys.

This survey estimated the number of singing males rather than breeding pairs. The number of breeding females will, however, limit productivity and population growth. By asking volunteers to undertake two surveys between midnight and 03:00, later in the season, when only unpaired males should be singing, we are able to estimate how many males become paired. We are currently analysing these data to estimate the size of the actual breeding population. We will also examine how the proportion of males that are paired varies with respect to local density, habitat and position within the range, which could provide some insight into the causes of population decline. ■

Publication

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▲ The Nightingale's secretive nature means its song is one of the most reliable ways to detect it.

2 SELECTING SURVEY SITES

In the UK, we are blessed with detailed knowledge of the distribution of our birds from extensive surveys such as *Bird Atlas 2007–11* and the less structured data goldmine of BirdTrack. We used this to direct surveyors to those 2,433 tetrads known to have recently held Nightingales. We also added sites where Nightingale hadn't been recorded – including those most likely to hold the species according to the models used to create the map for the atlas – to estimate the numbers present outside the known range.

3 CARRYING OUT THE SURVEY

A total of 1,281 volunteers surveyed 2,356 tetrads on at least two occasions between 21 April and 14 May, mapping the locations of singing

▶ The Nightingale survey was funded by BTO members and volunteers through the Nightingale Appeal.

