

Nightingale 1999

Title

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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. National Nightingale surveys in 1976 and 1980 located 3230 and 4770 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 5000-6000 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 BTO/RSPB/ JNCC Breeding Bird Survey, 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 1066 birds, with the population estimated to be in the range 1460-1535 pairs. The higher total was thought probably to be due to better coverage than in earlier surveys.

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, eg a reduction in traditional coppice management of woodland, exacerbated by 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.

With this background of continued concern for the future of the species and the lack of an effective national monitoring programme to document any population changes, the BTO undertook a national Nightingale Survey in 1999.

On over 3000 known or potential Nightingale sites surveyed a total of 4498 singing males were located. Fewer were reported in 1999 in 27 of the 32 counties in which singing birds were found in the 1980 survey. Direct comparison between these two surveys showed much lower densities in the western part of the range and in the southern midlands -- decreases of 70% or more were noted in Avon, Buckinghamshire, Hampshire, Hertfordshire, Oxfordshire and Wiltshire; but the numbers reported in the 'core range' -- Essex, Kent, Norfolk, Suffolk and Sussex -- were as high, and in some cases higher, in 1999 than in 1980. More than 77% of the Nightingale population was concentrated into these five counties

compared with 52% in 1980. Numbers at Thorne Moors (South Yorkshire), England's most northerly outpost appeared to be stable with 11 birds reported but the species had become effectively extinct as a breeder in other counties at the edge of the range, such as Nottinghamshire, Shropshire and Devon. The 30% increase in Nightingales reported in Kent between 1980 and 1999 was thought to be due to more effective coverage but the striking 139% increase reported for Suffolk may have reflected local increases there.

The professionals carrying out the Random Tetrad Survey 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 6700 territories is derived (95% confidence limits 5600-9350).

The data suggested there had been a marked shift in habitat use in recent years. Almost half (47%) of the birds located in 1999 were found in scrub cf 28% in 1976 -- the 1980 survey did not record habitat in enough detail. In contrast, mixed woodland (24% to 7%) and active coppice (14% to 8%) were much less important than in 1976; and there was little overall change in the proportion of birds in deciduous woodland or carr.

The median altitude of birds located in 1999 was 31m above sea level (asl) (lower quartile 14m, upper 55m). 80% were found at sites below 60m and none found over 200m asl.

There are no national data from previous surveys with which to make a comparison but data for Kent showed a shift to low-lying areas -- mean of singing birds in Kent in a survey in 1994 was 58.9m asl cf 49.2 m asl in 1999. In east Kent the mean altitude in a full survey in 1985 was 77.3 m asl which reduced to 55.2m by 1999.

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. It was decided that the 1999 Nightingale Survey should adopt 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 Known Sites Survey was, in effect, an attempt to locate all singing Nightingales. 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 been heard between 1988 and 1997 (or 1998 if information was available). Additionally, all sites where Nightingales were located in 1980 were added to the list. The survey was organized through regional organizers, 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 three visits to each Known Site between mid-April and early June 1999 with at least two visits during May and at least two weeks between the first and last. Observers were asked to visit the sites between nightfall (after

dark) and 08:00 hours to count all singing Nightingales at each site, in at least a 1-km radius of the central grid-reference given for the site. The locations of Nightingales were marked on a sketch map and the habitat from which each bird was singing was recorded as one of ten habitat types adapted from the BTO-standard Crick system. In the event over 3000 Known Sites were surveyed.

The Random Tetrad Survey was designed to establish what proportion of the population was missed by the Known Sites Survey within the main range of the species. This part was carried out by professional fieldworkers, partly to reduce the burden of survey work placed on the volunteer network and partly to ensure independence of results. Methods used were the same as for the Known Sites Survey and overall 135 tetrads were surveyed. Casual records were also included as part of the survey to encourage birdwatchers and members of the public to report all the Nightingales that they heard in 1999. There was widespread publicity about the survey in the media and birdwatching press and casual records forms were widely distributed. All records were checked thoroughly to avoid duplication. The majority of birds were proven territory holders, heard on more than one occasion, although some were reported only once. A small number of records may have involved passage migrants, but obvious passage birds, such as those singing for only a day or two at coastal sites, have been excluded from the totals, as in the 1980 survey.

Purpose of Data Capture

To establish the current status of the Nightingale in Britain and explore causes for any changes.

Geographic Coverage

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

Temporal Coverage

The breeding season of 1999 with the request for at least three nocturnal visits between mid-April and early June 1999, two of which should be in May and with at least two weeks between the first and last.

Other Interested parties

The survey was funded by a specific donation from the Esmée Fairburn Charitable Trust and the BTO Nightingale Appeal which was in turn supported mainly by individual birdwatchers. The professional fieldworkers (Chris Watts, Richard Fuller, Ian Hodgson, Andrew Plumb and Martin Sutherland) doing the Random Tetrad Survey were funded by the Garfield Weston Foundation.

Organiser(s)

Andy Wilson and Rob Fuller

Current Staff Contact

archives@bto.org

Publications

The main report of the survey is:

Wilson, A.M., Henderson, A.C.B. & Fuller, R.J. 2002. Status of the Nightingale *Luscinia megarhynchos* in Britain at the end of the 20th Century with particular reference to climate change. *Bird Study* 49: 193-204.

The survey was noticed in *BTO News* numbers 215, 220, 227 and 234.

Available from NBN?

No.

Computer data -- location

BTO Windows network central area.

Computer data -- outline contents

The files called SITETOTALS1999.xls (and for the 1980 survey SITETOTALS1980.xls) are the most complete and usable files containing the numbers of birds found. The files list Site Name, County, central 6 figure Grid Reference and number of males. Other files in this directory contain sites, names of people covering them and visit dates.

Computer data -- description of contents

The subdirectories contain:

Survey Data -- the data files from both 1999 and 1980 surveys. SITETOTALS1999.xls (and SITETOTALS1980.xls) contain total numbers of birds on each site. Other files contain such as who surveyed and when.

county summaries -- reports for different counties and some summary data files for these

Directories containing images, electronic copies of the paper and reports, some powerpoint talks, various analysis programs and files on 2 specific studies carried out in the Fens and on Thorne Moors.

Information held in BTO Archives

2 Archive boxes contain the data cards, and 1 Transfer Case contains various analyses and reports. All have been scanned.

Notes on Access and Use

Other information needed

Notes on Survey Design

The sampling strategy for the Random Tetrad Survey was based on that adopted for the Key Squares Survey done as part of the 1988-1991 Breeding Atlas, in which one in every nine 10-km squares on a regular grid was surveyed. With the resources available, it was estimated that nine tetrads in each of 16 10-km squares could be covered. The number of Nightingales found in each of the Key Square Survey 10-km squares in the 1980 survey was calculated and the 16 with the highest number of Nightingales were chosen to maximize the chances of obtaining a reasonable sample size of tetrads holding Nightingales. Nine tetrads were selected randomly from each of these 10-km squares. The 16 10-km squares chosen in this way were representative of the current range of the Nightingale and likely to produce a representative range of results. In practice, the results of one of the 16 10-km squares were not used since volunteer survey data were not received (TR03 in Kent). The failure to attain volunteer coverage in an entire 10-km square was a problem unique to TR03. In the event 135 random tetrads were surveyed.

Specific Issues for Analysis

The estimated population size of the Nightingale was calculated by comparing the counts made by volunteers in the random tetrads (combining counts at Known Sites and casual records from other areas within the random tetrads) against the total number of birds found in each of the 135 tetrads during the Random Tetrad Survey. This gave an estimate of what proportion of the population was found by volunteers. The inverse of this was then multiplied by the number of birds found by volunteers across the whole country to give a population estimate. 95% confidence limits for the population estimate were calculated using 999 bootstrap samples, with replacement, from the 135 tetrads surveyed. To investigate recent population changes further, counts of singing Nightingales at over 70 sites or areas where the species has been counted in several successive years were extracted from annual county bird reports for 1981 to 1998. These included some important Nightingale concentrations (eg Minsmere in Suffolk, and the Church Woods complex in Kent) plus totals for a few whole counties to give a sample that was representative of the species' range.