Knepp Nightingales

18 May 2013

Contents

An Extract from
The impacts on bird diversity of re-wilding an intensive farm - a focus on the nightingale Luscinia megarhynchos by Olivia Hicks

A total of 45 nightingale territories were found, 34 territories on the extensively managed Knepp Estate ... Based on BTO estimates of the UK population size in 1999 (5600-9350 males in 1999) and an annual decline of 3% (Robinson, 2005) the current population is expected to be 3769-6293 males. This therefore indicates that the extensively managed area (Knepp) contains 0.54-0.90% of the UK population.

Nightingales: Olivia Hicks masters thesis investigating The Knepp Castle Estate nightingale population and their habitat preferences.

Nightingales are migratory songbirds that breed in the south east of Britain. Famous for their vibrant song that can be heard at night as well as during the day, nightingales used to be a common feature of the British countryside. The British population however has now declined by over 90%. This is mostly due to loss of suitable woodland and scrub habitat and they are now of serious conservation concern.

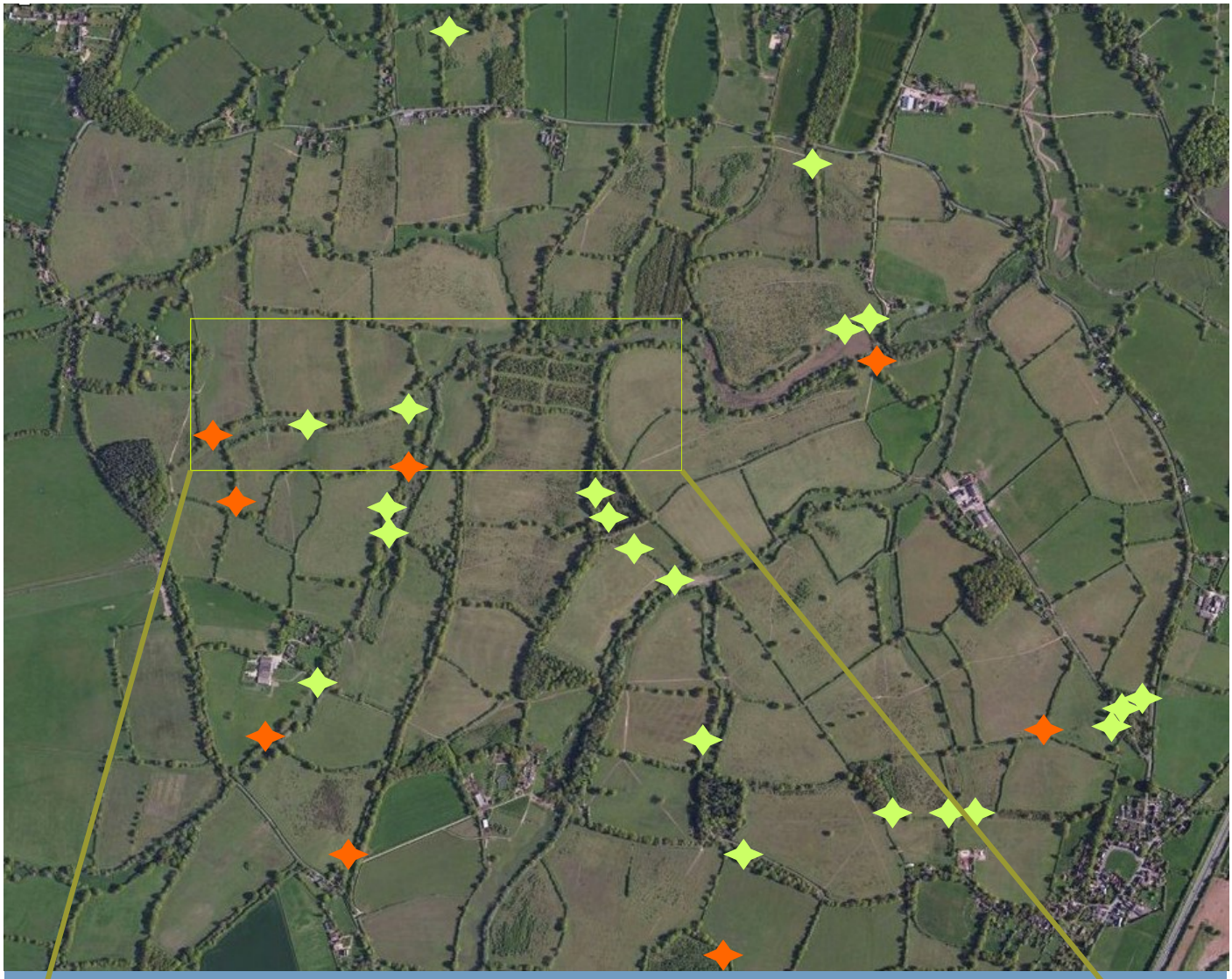
Through developments in the Wildland project, extensive farming techniques have caused the landscape and vegetation at Knepp to change, providing a suitable habitat for several red listed birds including the common nightingale *Luscinia megarhynchos*. 2012 saw the first national scale BTO nightingale survey in 13 years. I joined them in having a closer look at how the nightingale population on the Knepp Estate has been affected by the changes in management and grazing regime.

Throughout the breeding season we surveyed the estate thoroughly for nightingale territories and searched for paired males by listening for their call at night (towards the end of the breeding season any males that continue to advertise for a mate by singing at night are unpaired). As a comparison we also surveyed a similar area of farmland that is managed as The Knepp Estate was prior to the Wildland project.

In the last national BTO nightingale survey in 1999 (prior to re-wilding) 9 nightingale territories were found within the Estate. In this year's survey 34 territories were located within the Estate. 79% of these territories were paired birds that were potentially breeding. Only 9 territories were found on neighbouring farms of which 2 were paired. Statistically, significantly more paired nightingales were found on the Knepp estate than on neighbouring farms and more than three times as many territories were found on Knepp since the start of the re-wilding.

Thanks to its re-wilding project The Knepp Castle Estate now provides an improved nightingale habitat. Lower intensity grazing provides larger areas of scrub and broader hedges, which create larger areas for foraging and predation cover. It was found that wider hedges positively influence nightingale distribution. In particular no nightingale territory on or off the Estate was found in hedgerow or scrub of less than 8 meters in width.

As well as these results being very exciting for the bird life of Knepp, it's hoped that these farming techniques could also be used to aid the nightingale conservation effort to save a charismatic British breeding bird whose population is in rapid decline.



A July 2012 Aerial photo of only the Southern Block - breeding nightingale territories.
Green star represent territories in which nightingales were found paired
Orange star represent nightingales territories in which bids were un-paired

Knepp's ecology is driven by grazing - we are not sure what the future for the nightingale habitat will be - nightingales do not choose habitat to breed in that has a low browse line - as they nest up to a foot above the ground - they choose hedges and scrub that is more than 8m wide and are more successful at pairing in blackthorn in the hedge mix

Hedgerow width was found to positively affect nightingale distribution with territories only found in vegetation of 8 metres or more in width

Within the territories, paired nightingales had a preference for blackthorn

further work on the ecology of the nightingale habitat starts in 2013

this year (2013) - 4 imperial collage masters students are looking at pig rootling, earth worms, birds and invertebrates to add to the surveys already carried out

Knepp Southern Block over the last 21 years - Recovery of the soil in the arable fields - work is being done on the soil and its invertebrates - note the willow block (labelled) this is were Mathew Oates found his purple emperors

A provisional population estimate from the 2012 Nightingale survey

Raw survey counts were corrected for survey inefficiency (i.e. birds missed during surveys of sites that were covered) using detectability modelling. This estimates the probability of territories being detected on a tetrad by tetrad basis, using the number of times individual territories were found or missed during repeated surveys, together with the effects of the date, time of day and duration of each visit across surveys of all tetrads[1].

Based on the dataset as currently available, and after correcting for detectability as outlined above, the total number of territorial Nightingales in tetrads surveyed in the 2012 survey was close to 4000 territorial birds.

The number of Nightingales likely to be present in 'known Nightingale tetrads' that were not covered in the survey was estimated by interpolation in two ways: (1) by using the relationship between the detectability-corrected counts in tetrads covered in 2012 and the predicted abundance from the model used to generate the map of abundance for the 2007-11 Atlas; and (2) by using the change in abundance between the 1999 Nightingale survey and the 2012 survey in tetrads covered in both surveys. Method 1 (Atlas interpolation) estimates approximately 1100 and method 2 (interpolation using change since 1999) estimates approximately 1400 Nightingales in these un-surveyed 'known Nightingale tetrads'. Method 1 may have under-estimated the number present for a few high density tetrads but overall the method is likely to have over-estimated numbers because the regression predicted some Nightingales to be present even in tetrads with very low predicted suitability according to the Atlas model. Method 2 is likely to have over-estimated numbers because those 'known Nightingale tetrads' that were surveyed in both years are likely to have been better locations for Nightingales than tetrads that were not surveyed in 2012 or in either year.

The detectability-corrected total number of Nightingales in both surveyed and un-surveyed 'known Nightingale tetrads' was therefore around 5100 or 5400 territorial birds depending on which method is used to interpolate for un-surveyed squares.

The number of Nightingales present in tetrads not known to hold Nightingales was estimated using the rate at which Nightingales were detected in a sample of randomly-selected tetrads which had been incorporated into the 2012 Nightingale survey. These were tetrads not known to hold Nightingales that were embedded within landscapes predicted to be occupied by Nightingales. In these 197 tetrads, 28 Nightingales were estimated to be present once detectability was taken into account. The correction (28/197)*number of tetrads was applied only for tetrads within 10-km squares known to be occupied by Nightingales according to Atlas 2007-11 data and 2012 Nightingale survey data. This estimated that around 1150 Nightingales had been missed in tetrads not known to contain the species. In practice, this is likely to have over-estimated the number in these tetrads as, according to the Atlas predictions, the random tetrads were, on average, considerably more suitable for Nightingales than tetrads for which the correction was applied. This potential source of over-estimation is likely to be the major source of error in the population estimate and will lead to an over-estimate.

The total number of Nightingales throughout the British range was therefore estimated to be around 6250-6550 territorial birds. This is likely to be an over-estimate due to the methods used to interpolate for un-surveyed tetrads.

We stress that this is the best estimate that we are able to produce at the present time. Further refinements to this estimate will include: a) using a more complete and thoroughly checked database – this is unlikely to make a significant difference because un-input data were accounted for in the above calculations; b) removing, via GIS, possible duplicates of territories recorded at the boundary of more than one tetrad – likely to be a very small number; c) adding casual records of around 600 territories – we do not expect that these will greatly affect the population estimate as they will either duplicate birds recorded in surveys of 'known Nightingale tetrads' or will not increase the count for a tetrad beyond the current detectability-corrected or interpolated counts; d) some of the 'known Nightingale tetrads' not surveyed in 2012 will probably be surveyed in 2013. As the interpolations that have been applied for currently 'missing' sites may well have over-estimated numbers in many tetrads, these additional surveys are unlikely to have significant impact on the population estimate.

Chris Hewson & Rob Fuller

British Trust for Ornithology

30.01.13