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MERLIN STUDY REPORT

Introduction

The third national Merlin *Falco columbarius* survey of the UK in 2008 revealed an estimated UK population of 1162[1] breeding pairs, of which 301 pairs were estimated for England. This species breeds in upland habitats and can occur at particularly high densities in heather moorland (Ewing, 2008).

To investigate the relationship between the distribution of breeding Merlin records and Keepered Grouse Moor (KGM) managed by Moorland Association members in England, PAA was commissioned to carry out desk based mapping and analysis of records using data from published BTO Atlases[2]. This short report sets out the study methods, results and discussion.

Methods

Data on the distribution of breeding Merlin were obtained from the BTO Atlases available from the BTO website[2] for the periods 1968-72 and 1988-91 and the recently published Bird Atlas 2007-2011, which is sourced from the third national Merlin survey (Ewing, 2008). These maps present a summary of Merlin records, including breeding records, by 10km square, or tetrad. The data were manually draped over a 10km tetrad grid of the UK using GIS, and records of breeding Merlin digitised. For the most recent dataset only 'confirmed' breeding records were digitised. The digitised breeding Merlin data were overlaid to the KGM dataset. The resulting maps are presented as Figures 1, 2 and 3.

Summary analyses were derived from the Figures in GIS to show the percentage (%) of Merlin records falling within and outwith KGM nationally, and within Northumbria, North York Moors and South Pennine Moors where the third national Merlin survey results suggests that numbers of breeding pairs have declined since the last national survey in 1993/94.

The breeding records for Northumbria and North York Moors have a clear geographical distribution, which can easily be seen in Figures 1, 2 and 3. The extent of records falling within the South Pennines Moors is less clear, and in this case the South Pennines Moors Special Protection Area (SPA) boundary has been used to determine the number of records falling within this area.

Where a 10km tetrad containing a breeding Merlin record falls partially within an area of KGM, the record is counted as being within KGM, which could generate a form of bias.

The results of the analyses are presented as graphs to illustrate how the distribution of breeding Merlin records has changed in relation to KGM over time (see Figures 4, 5 and 6).

It should be noted that the 1968-72 and 1988-91 datasets obtained from the BTO website do not contain information on survey coverage. Both datasets pre-date the first and second national Merlin surveys undertaken in 1983-84 and 1993-94, respectively, for which information on

[1] 95% CI: 891 - 1462 (Source: Ewing *et al*, 2008)
[2] Source: www.bto.org

survey coverage is presented in Ewing (2008). It is therefore possible that the survey coverage of the earlier datasets used in this study is not directly comparable to the most recent national survey data. Nevertheless, the results provide an indication of the relative change in distribution of breeding records in relation to KGM. Additionally, whilst the survey coverage for earlier data sets may not be complete, the third national survey is based on complete coverage for Northumbria, North York Moors and South Pennine Moors (Ewing, 2011).

Results

The overall change in distribution of breeding Merlin records in 10km squares falling (wholly or partially) within KGM and outside KGM is shown in Figure 4. This suggests that the overall distribution of Merlin has increased within KGM over time. Conversely, the distribution of Merlin in areas outwith KGM shows an apparent decrease between 1988-91 and 2008.

Figure 5 shows the relative change in distribution of breeding records (wholly or partially) within KGM in England, Northumbria, North York Moors and South Pennine Moors. The results suggest an increased distribution in England as a whole as well as Northumbria and South Pennines, but a slight decrease for the North York Moors.

Conversely, Figure 6 indicates that whilst the distribution of breeding Merlin outside of KGM has decreased across England as whole and in Northumbria and the South Pennine Moors, the distribution in the North York Moors shows an apparent increase outside of KGM.

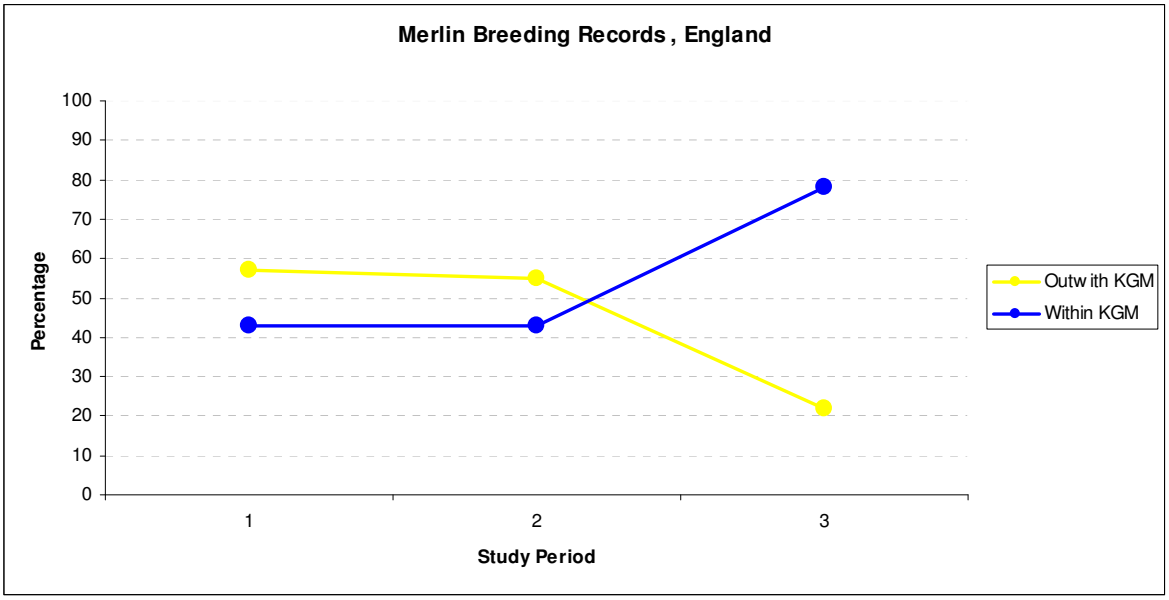

Figure 4: Percentage of 10km squares containing breeding Merlin records in England within and outwith KGM

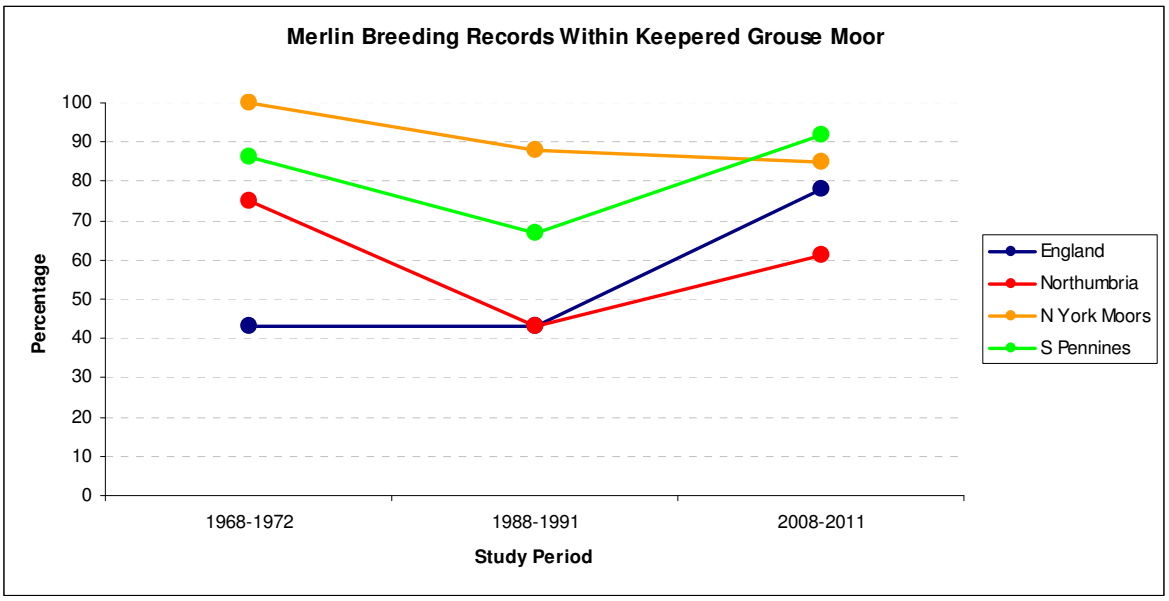

Figure 5: Percentage of 10km squares containing breeding Merlin records in England, Northumbria, North York Moors and South Pennine Moors falling wholly or partially within KGM.

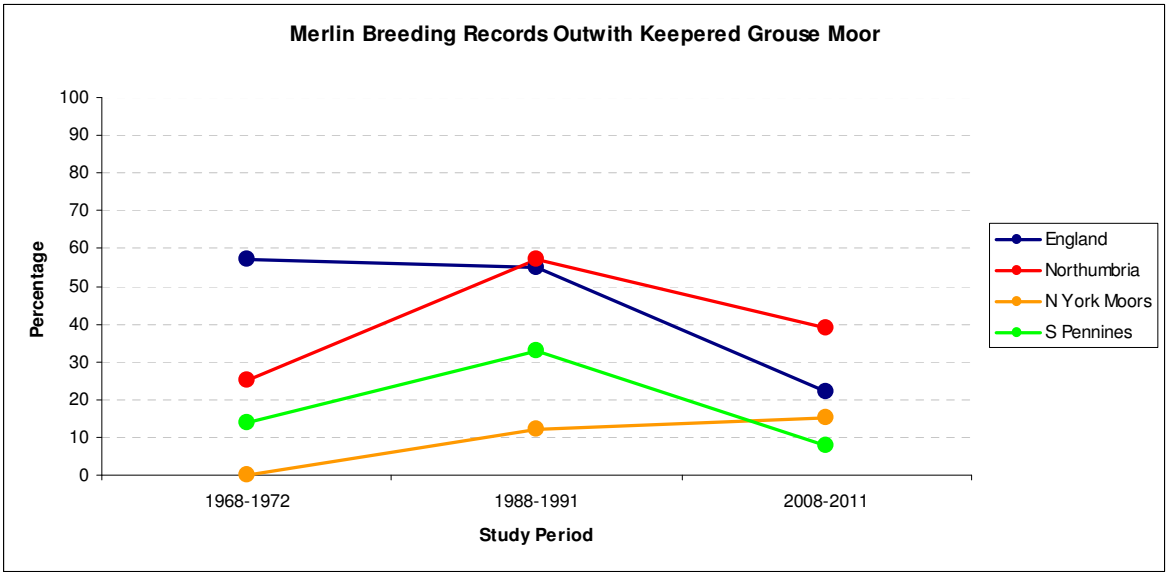

Figure 6: Percentage of 10km squares containing breeding Merlin records in England, Northumbria, North York Moors and South Pennine Moors falling wholly outside KGM.

Discussion

This study of the relationship between the distribution of breeding Merlin records in relation to KGM in England suggests that the number of 10km squares containing records for breeding Merlin has increased within KGM since 1988-91 across England as a whole and within Northumbria and the South Pennine Moors, with a corresponding decrease in distribution outwith KGM areas. Indeed, in England as a whole, almost 80% of 10km squares with breeding Merlin records from the 2008 third national Merlin survey are located within KGM areas. It is clear that where breeding Merlin occur, a high proportion of the breeding records are located within KGM areas.

Figure 4 suggests that in the UK as whole the percentage of breeding records within KGM has increased from around 40% to 80% between 1988-91 and 2008. Over the same 20 year period, Figure 4 shows a corresponding decrease in the percentage of records outside KGM from around 55% to 20%, indicating that the importance of KGM for Merlin may have increased substantially since 1988-91. Overall, there are now around four times more breeding Merlin records[3] falling within KGM, than outside of keepered areas highlighting the importance of these areas for the Merlin population.

Whilst the distribution of breeding Merlin records may have increased, Ewing (2008) reports an apparent decline in the number of breeding pairs in some regions of the UK. The reasons for this apparent decline in the number of pairs of breeding Merlin, which exists in the UK at the southern limits of its European distribution, are not well understood. The high percentage of Merlin records falling within keepered areas and the apparent decline in percentage of records falling outside KGM suggests that any decline in the numbers of actual pairs could be linked to non-keepered areas rather than keepered moors. This could be confirmed through analysis of more detailed data on the location of breeding pairs in relation to KGM.

Importantly, in England and the UK as whole, the third national survey confirms that any decline is not statistically significant, with Merlin remaining on the 'Amber' list of species of conservation concern. Nevertheless the Moorland Association has a key role to play in the continued conservation management of this species in areas of KGM.

Sacha Rogers
Managing Director
24th February 2014

[3] Breeding Merlin records does not correspond to actual numbers of pairs, rather it refers to the number of 10km squares containing breeding records