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# New Forest Woodlark 2014 Survey Report

Higher Level Stewardship Agreement

The Verderers of the New Forest

AG00300016

December 2014



Department  
for Environment  
Food & Rural Affairs



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## NEW FOREST NATIONAL PARK SURVEY OF WOODLARK 2014

December 2014

**Our Ref: JPP3208-R-001c**

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## QUALITY MANAGEMENT

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To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

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## EXECUTIVE SUMMARY

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- RPS was commissioned by the New Forest National Park Authority on behalf of its partners within the New Forest Higher Level Stewardship (HLS) Scheme to undertake a survey of breeding Woodlark on land covered by the New Forest HLS Scheme and New Forest Crown Lands outside the scheme managed by the Forestry Commission.
- Areas within the defined survey area containing habitat with the potential to support Woodlark were identified using GIS data layers of vegetation classification from various sources. Once these areas had been identified, a fieldwork programme was designed, following the criteria and methods set in out in previous national surveys.
- Once the programme of fieldwork had been completed, data were analysed to determine the number of individual territories present.
- The analysis produced a breeding population estimate of 134 Woodlark territories within the area surveyed in the New Forest in 2014.
- Comparisons with previous surveys would indicate that the breeding population of Woodlark within the New Forest continues to decline which reflects the trend within the New Forest recorded in the previous two national surveys in 2006 and 1997.
- The dataset compiled provides:
  - a robust baseline of the current breeding population of Woodlark in the New Forest;
  - the appropriate detail to inform future surveys of Woodlark within the New Forest; and
  - a basis upon which to further assess factors influencing the breeding population and distribution of Woodlark within the New Forest.

# 1 INTRODUCTION

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## **Background to the study and the HLS**

- 1.1 The Higher Level Stewardship Scheme (HLS) awarded to the New Forest in February 2010 is unique. Normally this scheme is granted by the Department for Environment, Food and Rural Affairs (Defra) through Natural England to a single landowner. In the case of the New Forest, whilst the Crown Lands are managed by the Forestry Commission (FC), the Verderers have statutory rights conferred under the New Forest Acts to administer the grazing rights. The scheme entitled the New Forest HLSV was awarded in 10 February 2010 by Natural England to a single signatory, The Verderers of the New Forest.
- 1.2 The Verderers are legally and financially accountable for the delivery of the scheme, but on the proviso that a formal Partnership was established with the Forestry Commission and National Park Authority to deliver the scheme. This was set up through a Memorandum of Agreement (MoA) signed on the 22<sup>nd</sup> February 2010.
- 1.3 The delivery of the agreement is overseen by a Board drawn from the chief executives of the Partners as well as representatives from key stakeholders.
- 1.4 As part of the HLS agreement there is a requirement to undertake surveys for bird species for which the New Forest SPA is designated. The HLS Board identified the requirement for delivery of a comprehensive survey of Woodlark *Lullula arborea* in 2014 in accordance with the methodology used in the national surveys of this species.
- 1.5 RPS was commissioned by the New Forest National Park Authority (NFNPA) on behalf of its partners within the New Forest HLS scheme to undertake a survey of breeding Woodlark on land covered by the HLS scheme. In addition survey was also required to cover suitable habitat outside the HLS area but forming part of the Crown Lands managed by the Forestry Commission. Costs of work associated with these areas were paid for by the Forestry Commission. Where additional habitat was surveyed this was achieved without additional cost to the HLS scheme.
- 1.6 Natural England assisted the delivery of this contract by making available previous survey data for Woodlark which were obtained during national census work carried out by Natural England's predecessor body in partnership with the British Trust for Ornithology.

## **Approach to the contract**

- 1.7 This document provides a detailed account of the methods used to determine the extent of habitat considered suitable for supporting breeding Woodlark within the New Forest and reports on and evaluates the findings of the surveys. Accordingly, this document provides the following:
- a detailed account of the methods employed to determine the areas which are suitable to support breeding Woodlark;
  - the survey method used based on the national survey methodology;
  - an estimate of the breeding population of Woodlark within the target area;

- an analysis of the survey information including the status of the population compared to previous local and national studies; and
- a preliminary analysis of the potential factors which may be affecting the distribution of Woodlark within the study area.

### **Designations and Conservation Importance of the New Forest**

- 1.8 The New Forest is one of the largest tracts of semi-natural vegetation in the country and consequently holds three international wildlife site designations.
- 1.9 The New Forest is recognised as an internationally important site for its breeding and overwintering bird species and is classified as a Special Protection Area (SPA) in accordance with the European Birds Directive (Directive 2009/147/EC on the conservation of wild birds [codified version]). The New Forest qualifies and has been classified as an SPA under Article 4.1 of the Birds Directive by supporting internationally important populations of the following species during the breeding season:
- Dartford Warbler *Sylvia undata*
  - Nightjar *Caprimulgus europaeus*
  - Woodlark *Lullula arborea*
  - Honey Buzzard *Pernis apivorus*
- 1.10 The site also qualifies and is classified under Article 4.1 by supporting overwintering populations of Hen Harrier *Circus cyaneus*; and is classified under Article 4.2 for supporting significant breeding populations of both Hobby *Falco subbuteo* and Wood Warbler *Phylloscopus sibilatrix*.
- 1.11 The New Forest is also designated as Special Area of Conservation (SAC) for its habitats and non-avian species of European importance, in accordance with the European Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).
- 1.12 The requirements of both European directives, ensuring the protecting of European wildlife sites, are transposed into UK law by the Conservation of Habitats and Species Regulations 2010. The New Forest Site of Special Scientific Interest (SSSI) is the national wildlife designation underpinning the European site designations and recognises the wider national scientific and biodiversity value of the New Forest.
- 1.13 The New Forest is also listed as a Ramsar site, under the Ramsar Convention. This recognises the importance of the site as a wetland, supporting wetland flora and fauna of international importance.

### **Woodlark populations nationally and in the New Forest**

- 1.14 National surveys of the British breeding population of Woodlark were undertaken in 1986, 1997 and 2006. The sampling methodology and data recording has varied slightly between years.

Fearnley *et al.* (2012) provide a summary of New Forest populations in the context of national populations recorded during national surveys.

- 1.15 Following a dramatic decline in breeding numbers and contraction of range nationally during the latter half of the 20<sup>th</sup> century, the numbers of breeding Woodlark have steadily increased since the 1986 national survey. The most recent national survey, undertaken in 2006, showed an overall increase in the population size and range for the whole of Britain, and a total population estimate of 3,064 territorial males.
- 1.16 The New Forest was surveyed as part of the national survey in 2006, although a change in the sampling method from the previous survey meant that a small number of territories which had been identified in the 1997 national survey were not included in the 2006 sample. As a result, complete survey coverage of the New Forest cannot be assumed (Fearnley *et al.*, 2012).
- 1.17 The 2006 national Woodlark survey recorded 143 breeding pairs in the New Forest which represented a decrease since the previous national survey in 1997 which recorded 182 breeding pairs. This contradicted the national trend in the same period which saw an increase in the breeding population.

#### **Woodlark ecology**

- 1.18 In Britain, Woodlark principally breed on lowland heathland and within young conifer plantations where suitable habitat is generated as consequence of the rotational clear-felling of trees. Studies have shown that nesting generally occurs in clumps of vegetation, especially grass and heather, and the species requires short, sparse vegetation, less than 5cm high, combined with areas of bare ground for foraging (Langston *et al.*, 2007).
- 1.19 The main threats to the species are considered to be:
- a reduction in the area of lowland heathland due to habitat loss;
  - changes in forestry practice that do not recognise the importance of clear-felled and replanted forests; and
  - disturbance by walkers and dogs, particularly when birds are incubating their eggs (Langston *et al.*, 2007).

#### **The New Forest National Park boundaries**

- 1.20 Figure 1.1 shows the New Forest HLS Scheme and Crown Lands Study Area.

## 2 METHODS

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### Identification of the area to be surveyed and design of the survey programme

- 2.1 This section of the report provides a detailed account of the process undertaken to establish the extent of the habitats to be surveyed as part of the contract.
- 2.2 The areas of the National Park containing habitat with the potential to support Woodlark were identified using GIS data layers obtained from the New Forest National Park Authority, Forestry Commission and Natural England. This included the following sources:
- map layers supplied by the HLS partners showing the boundaries of the HLS and Crown Land areas;
  - map layers from the Lowland Heathland Inventory showing lowland heathland habitat (and other habitats) within the National Park (obtained from Natural England);
  - map layers from the Inventory of Trees and Woodlands showing the woodland types within the National Park (obtained from the Forestry Commission); and
  - map layers from the Forest Design Plans database showing sub-compartment management and age and species composition, as well as working areas within the current year (obtained from the Forestry Commission).
- 2.3 The habitats / land use types identified in the map layers listed above and considered suitable for Woodlark followed those identified in previous national surveys for the species (Wotton & Gillings, 2000; Conway *et al.*, 2009) and were classified as falling into the following broad habitat types:
- lowland heathland;
  - coniferous woodland less than seven years old; and
  - coniferous plantations consisting of unplanted blocks, bare ground and clear-fell areas.
- 2.4 The design of the fieldwork programme was based on the criteria and methods set out in the national surveys (Wotton & Gillings, 2000; Conway *et al.*, 2009). The following criteria were followed when designing the survey programme:
- a minimum of two visits, one within each of the periods 15<sup>th</sup> February – 31<sup>st</sup> March and 1<sup>st</sup> April – 31<sup>st</sup> May, ideally at least three weeks apart;
  - visits should be undertaken before midday and on mild clear, dry days with little wind; and
  - all suitable habitat should be walked to within 100m to maximise detection of territorial individuals.
- 2.5 Once the extent of the area to be surveyed had been identified from the available GIS data and the above methodological criteria had been considered, a process of identifying survey units centred upon a suitable route was undertaken. This involved defining approximately 150 ha

survey units within the identified suitable habitat ensuring as near to complete coverage as possible. Based on previous work within the New Forest, 150 ha was considered an appropriate size to survey within the standard methodology's parameters, i.e. 3 hours. Through each survey unit a route was determined which allowed, where feasible, all suitable habitat to be approached within approximately 100m. Where possible, survey units were determined to allow observers to follow a route which could be walked in conjunction with another observer covering an adjacent survey unit. This was important as it enabled observers to maintain contact and ensure that birds were not double counted. The routes were established using aerial photographs, ordnance survey maps and ground truthing.

- 2.6 Once the survey units and routes had been finalised they were recorded in GIS format. This then enabled a survey programme to be drawn up to ensure that the surveyor resource was allocated in the most efficient manner and to ensure full coverage of the identified survey units in the allotted time frames.
- 2.7 The extent of the area identified as being potentially suitable to support breeding Woodlark and surveyed during 2014 is shown in Figure 2.1.

#### **Delivery of the survey programme**

- 2.8 The survey for Woodlark was carried out in accordance with the national survey methodology (Conway *et al.*, 2009).
- 2.9 An initial visit to each survey unit was carried out to assess the survey route and identify any on-site issues. This ensured that issues regarding the survey route or access to the route were determined before the survey commenced. Any adjustments to survey routes were mapped to ensure that the route could be following on the subsequent visit.
- 2.10 Two visits to each of the survey units were undertaken; commencing at dawn and finishing before midday.
- 2.11 The visits were undertaken between the 15<sup>th</sup> February and the 31<sup>st</sup> May, with at least three weeks between visits to a survey unit. The visits were carried out between the following dates:
- visit one; 15<sup>th</sup> February 2014 – 31<sup>st</sup> March 2014
  - visit two; 1<sup>st</sup> April 2014 – 31<sup>st</sup> May 2014
- 2.12 Surveys were only carried out on mild, clear, dry days with little wind. Surveys were not undertaken if the day time (pre-midday) temperature had remained below 5°C for more than 3 days previously, as this is considered likely to depress Woodlark activity (Conway *et al.*, 2009).
- 2.13 The locations of all Woodlark were recorded, with special attention given to those showing territorial behaviour such as singing or alarm calling and in particular simultaneously singing males. All other observations of calling birds (both males and females) or birds seen flying were also recorded.
- 2.14 All data were recorded in the field directly onto an ArcGIS base map using ESRI software on hand-held PDA devices. Data were then transferred to a central database and all data went through an internal verification process.

## Data analysis

### *Definition of a territory*

2.15 The definition of a territory followed that used in the national survey (Conway *et al.*, 2009). A territory was defined as such if it contained the following:

- a singing male;
- a pair exhibiting breeding activity (nest, mating, displaying, etc.);
- individuals present on more than one occasion; and / or
- two individuals present.

### *Determination of territories*

2.16 On completion of the surveys individual territories were determined by replicating the analysis used in Conway *et al.* (2009) and use of generic territory mapping techniques given in Bibby *et al.*, (2000). This involved analysing the data recorded from the two survey visits and applying the following process to bird registrations to determine the individual number of territories.

- Data were firstly filtered by visit number (1 or 2) and then, where observers were able to identify different individuals such as those recorded as simultaneously singing males, these were marked as such. Registrations of singing males which were not specifically recorded as representing different individuals in the field where considered to be such if the registrations were over 400m apart or separated by known topographical or structural features (barriers such as a hill ridge or forest block).
- The consolidated maps for both visits were then combined and clusters of registrations (i.e. two singing males from the sequential visits) indicating the presence of distinct groupings of registrations were identified as being indicative of discrete territories.
- A territory centre point was then allocated to each of these discrete territories based on the distribution of the registrations considered to represent this territory.

## Limitations

2.17 Whilst it is acknowledged that the methods described above do not strictly conform with the 1km square sampling approach used in the previous national survey in 2006, the area covered by the survey in 2014 is the same. The method used and described in this document ensured complete coverage of all suitable habitat occurring within the national park.

2.18 The weather conditions preceding the start of the Woodlark survey period in mid-February saw a succession of stormy, unsettled and wet weather, with heavy rainfall resulting in extensive flooding in the south of England. Temperatures were generally mild though, and there were no significant spells of frost or low night time temperatures. As we progressed into March the weather became more settled and there were prolonged spells of calm, warm and sunny weather ([www.metoffice.gov.uk](http://www.metoffice.gov.uk)). The result of this was that whilst the weather was conducive to early season settlement by Woodlark, the extensively waterlogged Forest meant that birds were unable to settle into the majority of existing territories and many areas of suitable habitat were

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devoid of Woodlark in the early stages of the survey. Whether this suppressed the overall numbers of pairs attempting to breed throughout the remainder of the breeding season is unclear, as later visits to the same sites, once water levels had dropped, recorded birds as being present.

## 3 RESULTS

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### **Survey coverage and delivery**

- 3.1 Observers managed to survey the entirety of the suitable habitat, as identified in paragraphs 2.1-2.3 and shown in Figure 2.1. This included a small number of additional heathland and forestry areas outside of the agreed HLS and Crown Land boundaries, which were included as they formed continuous tracts of heathland and forestry with areas included in the survey and were incorporated for completeness. This did not affect the survey programme. Surveys were undertaken twice within the required timeframes and in appropriate weather conditions ensuring confidence in the completeness and accuracy of the results presented here.

### **Breeding population in 2014**

- 3.2 The breeding population of Woodlark recorded from the entire New Forest National Park area surveyed in 2014 was 134.
- 3.3 The survey recorded 105 territories on land within the HLS Scheme area and 3 territories within forestry inclosures which lie outside the HLS Scheme area. Nearly all the Scheme area lies within the Crown Lands which are under the management of the FC. Some of the inclosures (forestry plantations) are excluded from the HLS Scheme because they are not open to grazing. A further 26 territories were recorded on National Trust owned land outside of these boundaries but within the New Forestry National Park.
- 3.4 The location of all territories recorded during the survey of breeding Woodlark in 2014 is provided in Figure 3.1. The location details for each territory are provided in Appendix A.

## 4 EVALUATION AND DISCUSSION

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### Trends in the breeding population

- 4.1 For the purpose of this evaluation the breeding population includes all the territories derived from the 2014 survey, irrespective of land landownership/management boundaries, as this is considered to most accurately reflect the extent of the area covered in previous surveys.
- 4.2 Fearnley *et al.* (2012) considered the breeding population within the current survey area at the time of the previous national surveys in 1997 and 2006 to be 182 and 143, respectively.
- 4.3 It is considered that the breeding population of 134 territories recorded in 2014 indicates a decrease of 6% in the population since the previous survey in 2006. This represents an annual decrease of 0.7% during that period. When compared with the change in population observed between 1997 and 2006 (a decrease of 22% and annual decrease of 2.4%), then whilst the trend appears to show a continued decline in the population of Woodlark in the New Forest, the rate of decline would appear to be slowing.
- 4.4 The UK breeding population of Woodlark based on the last national survey for the species in 2006 is considered to consist of 3,064 territories. The breeding population recorded in the surveyed area of the New Forest National Park in 2014, therefore, represents 4% of the UK breeding population.

### Densities of territorial Woodlark within the New Forest

- 4.5 Fearnley *et al.*, (2012) considered the density of breeding Woodlark occurring within the New Forest SPA to be relatively low when compared with other heathland SPAs in southern England. Based on the 2014 survey data the density of breeding Woodlark per hectare for the whole of the New Forest area covered within the survey boundary (irrespective of habitat suitability) is 0.005 (based on a survey area of 25,345 ha). When compared with densities based on the 2006 national survey from the Dorset Heaths SPA (0.009) and the Thames Basin Heaths SPA (0.02) the density occurring in the New Forest remains relatively low, although it would appear that there are similar factors potentially influencing density on the Dorset Heaths. It should be noted that this calculation is based on total SPA area and that large tracts of habitat within the New Forest SPA (as well as the Dorset Heaths and Thames Basin Heaths SPAs) are not suitable for breeding Woodlark.
- 4.6 This apparent lower density of Woodlark has previously been highlighted (Sharp *et al.*, 2008), although it remains unclear as to the mechanisms causing this. The New Forest National Park is subject to various pressures and it is likely that a combination of these is responsible for these apparent low densities. The New Forest is unique in terms of its size and the extent of management practices which occur; the Forest also has a continuous history of grazing, which has greatly influenced the structure and distribution of certain habitats.

### Territory distribution and habitat relationship

4.7 Woodlark territories within the New Forest National Park are aggregated around the main areas of heathland and dry acid grassland (Table 4.1), predominantly in the western half of the Forest and particularly in the North West corner (Figure 3.1). Other habitats are less often used, with other heathland types and young conifer plantations / clearfell the next most important habitats utilised within the New Forest. Table 4.1 shows the number of territories recorded per habitat type and the density of territories occurring within these habitats.

**Table 4.1. The number and density of Woodlark per habitat type in the New Forest in 2014, compared with the previous survey (2006) and those on the Dorset Heaths and Thames Basin Heaths (Sharp *et al.*, 2008)**

| Habitat                            | Number of Woodlark territories |                 |               |                     | Woodlark density (per ha)    |                 |               |                     |
|------------------------------------|--------------------------------|-----------------|---------------|---------------------|------------------------------|-----------------|---------------|---------------------|
|                                    | New Forest 2014 <sup>1</sup>   | New Forest 2006 | Dorset Heaths | Thames Basin Heaths | New Forest 2014 <sup>2</sup> | New Forest 2006 | Dorset Heaths | Thames Basin Heaths |
| Dry Heathland                      | 49                             | 55              | 18            | 84                  | 0.007                        | 0.008           | 0.008         | 0.04                |
| Young Conifer Plantation/clearfell | 10                             | 18              | 23            | 57                  | 0.003                        | 0.003           | 0.006         | 0.01                |
| Wet Heath                          | 20                             | 15              | 11            | 5                   | 0.005                        | 0.004           | 0.007         | 0.03                |
| Deciduous woodland/scrub           | 6                              | 23              | 0             | 0                   | <0.001                       | 0.002           | 0             | 0                   |
| Grassland                          | 23                             | 35              | 4             | 4                   | 0.007                        | 0.002           | 0.009         | 0.03                |
| Farmland/other                     | 0                              | 2               | 0             | 6                   | 0                            | <0.001          | 0             | 0.04                |
| Total                              | 108                            | 148             | 56            | 156                 |                              |                 |               |                     |

Notes on Table 4.1:

1. The 2014 territories presented are only those recorded from within the HLS/Crown Lands survey area and do not include the additional 26 recorded outside this area, for which the detailed habitat data were not available.

2. The habitat area used to calculate density for the 2014 data is based on the habitat present within the survey area; this does not necessarily represent the equivalent area of habitat identified in 2006 – this has been based on the entirety of National Park boundary.

4.8 The Woodlark density per hectare is compared to that occurring on both the Dorset Heaths and Thames Basin Heaths (Table 4.1). For all habitat types the density recorded in the New Forest is lower than that of the respective habitat within the other two southern lowland heathlands, and considerably so compared with the Thames Basin Heaths. The density per habitat type recorded in the New Forest in the 2014 survey is comparable with that reported based on the 2006 national survey data, with slight changes in densities in the dominant habitats reflecting the reduced breeding population recorded in 2014. It should be noted that the density occurring in the 'grassland' habitat category is a reflection of the smaller area of this habitat included within the survey area in 2014, than that included within the 2006 survey when the entirety of the National Park boundary (i.e. areas out with the HLS boundary and including large tracts of farmland and other grassland habitats) was covered and included in the analysis.

4.9 Each territory centre was buffered by 100 m, in line with other studies (Clarke, Sharp and Liley, 2010), to account for the fact that whilst the territory centre may fall outside of the dry heath, that habitat may still form an important component of the territory area. Table 4.2 shows the number of territory centres occurring within 100 m of dry heathland both within the 2014 survey and previous national surveys. The majority of Woodlark records (70%) were located on, or

within 100m of, dry heath. This figure is the same as that observed in 1997, but higher than the previous survey in 2006 (65%). This may reflect differences in habitat data rather than actual increase in the use of dry heath. Notwithstanding this, it is clear that dry heath accounts for the largest proportion of Woodlark territories within the New Forest.

**Table 4.2. The number of Woodlark territory centres from the 2014 survey on, or within 100m of, dry heathland in the New Forest compared with those from previous surveys (Fearnley *et al.*, 2012)**

| Year | Total records | Number of territory centres on dry heath | Territory centres on and within 100m of dry heath |
|------|---------------|--|---|
| 1997 | 182           | 51                                       | 128   |
| 2006 | 143           | 38                                       | 93  |
| 2014 | 108           | 42                                       | 76  |

### Management of New Forest National Park

- 4.10 The nature of the New Forest is unique and subsequently so are the management processes. The heathland habitat is managed by the Forestry Commission through burning, cutting, mowing, bale and flail. The area of heathland managed annually across the New Forest is not consistent, with Fearnley *et al.* (2012) giving a median figure of 123.9 ha per year (data from 1991-2006). Burning is the dominant management technique with more than seven times as much heath burned than cut in the review period (Fearnley *et al.*, 2012).
- 4.11 Since 2004 the Forestry Commission continue to create areas of open habitat through its Forest Design Plans which has led to a greater increase in areas of woodland edge habitat and open habitat itself.
- 4.12 In investigating whether the management of dry heathland could have an impact on the distribution and densities of Woodlark territories, Fearnley *et al.* (2012) concluded that although Woodlark tend to favour early successional habitats there appears to be little indication of any relationship between management of dry heath and distribution of Woodlark territories. Further work is suggested using both the 2006 and 2014 datasets to investigate the impacts of management techniques at a finer scale and especially the resultant mosaics of habitat that arise.

## 5 CONCLUSIONS

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- 5.1 A full survey of breeding Woodlark was successfully undertaken in 2014 on land within the New Forest HLS Scheme and Crown Lands. All habitat potentially suitable for breeding Woodlark was identified and visited twice during the periods defined in the national survey methods (Conway *et al.*, 2009).
- 5.2 The analysis of the survey data identified a total of 134 Woodlark territories within the area surveyed.
- 5.3 Comparisons with previous surveys would indicate that the breeding population of Woodlark within the New Forest appears to show a decrease which reflects the trend within the New Forest recorded in the previous two national surveys in 2006 and 1997.
- 5.4 The dataset compiled provides:
- a robust baseline of the current breeding population of Woodlark in the New Forest;
  - the appropriate detail to inform future surveys of Woodlark within the New Forest; and
  - a basis upon which to further assess factors influencing the breeding population and distribution of Woodlark within the New Forest.
- 5.5 The survey of breeding Woodlark in 2014 fulfils the commitment of the HLS Board, under the agreement for the HLS scheme, for providing accurate and current population information on Woodlark; one of the species for which the New Forest SPA is designated.

## 6 REFERENCES

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# FIGURES

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Figure 1.1. The New Forest HLS Scheme and Crown Land Study Area.

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**Figure 2.1. The extent of the area identified as being potentially suitable to support breeding Woodlark and surveyed in 2014.**

**Figure 3.1. The location of all Woodlark territories recorded in 2014.**

# APPENDICES

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## Appendix A. Location data for all Woodlark territories recorded in 2014.

Territories within the HLS survey area

| <b>Ordnance Survey Easting (m)</b> | <b>Ordnance Survey Northing (m)</b> |
|------------------------------------|-------------------------------------|
| 417962                             | 114674                              |
| 418508                             | 116039                              |
| 418764                             | 116741                              |
| 418892                             | 111314                              |
| 418915                             | 112417                              |
| 419124                             | 112338                              |
| 419176                             | 100798                              |
| 419218                             | 114692                              |
| 419473                             | 115327                              |
| 419692                             | 116802                              |
| 419768                             | 102153                              |
| 419867                             | 105780                              |
| 419893                             | 103018                              |
| 420007                             | 110234                              |
| 420018                             | 113947                              |
| 420207                             | 108137                              |
| 420240                             | 117682                              |
| 420302                             | 110421                              |
| 420313                             | 117177                              |
| 420458                             | 100560                              |
| 420652                             | 117767                              |
| 420756                             | 117444                              |
| 420762                             | 117900                              |
| 421493                             | 110592                              |
| 421500                             | 102200                              |
| 421903                             | 112679                              |
| 421905                             | 113127                              |
| 422004                             | 112791                              |
| 422209                             | 112523                              |
| 422271                             | 113326                              |
| 422392                             | 101409                              |
| 422495                             | 104046                              |
| 422513                             | 116245                              |
| 422654                             | 113157                              |
| 422657                             | 113785                              |
| 422681                             | 110326                              |
| 422693                             | 112026                              |
| 422726                             | 112853                              |
| 422779                             | 110335                              |
| 422845                             | 113823                              |
| 422872                             | 113315                              |

| <b>Ordnance Survey Easting (m)</b> | <b>Ordnance Survey Northing (m)</b> |
|------------------------------------|-------------------------------------|
| 422986                             | 115565                              |
| 423012                             | 113794                              |
| 423146                             | 110286                              |
| 423247                             | 110217                              |
| 423249                             | 110420                              |
| 423306                             | 115654                              |
| 423393                             | 114792                              |
| 423437                             | 115985                              |
| 423828                             | 109398                              |
| 423911                             | 109374                              |
| 424047                             | 115210                              |
| 424138                             | 109887                              |
| 424306                             | 112249                              |
| 424423                             | 109904                              |
| 424423                             | 115724                              |
| 424486                             | 112558                              |
| 424663                             | 116116                              |
| 424839                             | 116494                              |
| 424889                             | 112837                              |
| 424918                             | 110934                              |
| 424962                             | 112165                              |
| 425676                             | 111772                              |
| 425676                             | 111951                              |
| 426064                             | 106431                              |
| 426097                             | 102655                              |
| 426297                             | 102984                              |
| 426368                             | 112199                              |
| 426773                             | 109189                              |
| 427449                             | 108812                              |
| 427974                             | 103924                              |
| 428361                             | 104628                              |
| 432784                             | 107112                              |
| 433468                             | 100358                              |
| 433554                             | 108419                              |
| 433708                             | 108077                              |
| 434253                             | 101476                              |
| 434523                             | 98309                               |
| 434582                             | 97937                               |
| 434717                             | 97896                               |
| 434758                             | 108476                              |
| 434918                             | 108226                              |
| 434935                             | 105351                              |
| 435081                             | 98770                               |
| 435093                             | 108694                              |
| 435320                             | 99290                               |
| 435383                             | 108531                              |
| 435478                             | 104690                              |
| 435606                             | 104088                              |

| <b>Ordnance Survey Easting (m)</b> | <b>Ordnance Survey Northing (m)</b> |
|------------------------------------|-------------------------------------|
| 435937                             | 99072                               |
| 435998                             | 102085                              |
| 436129                             | 98628                               |
| 436148                             | 104804                              |
| 436405                             | 98328                               |
| 436418                             | 102445                              |
| 436570                             | 105331                              |
| 437841                             | 104786                              |
| 438195                             | 105284                              |
| 438297                             | 104869                              |
| 439694                             | 104969                              |
| 441514                             | 102768                              |
| 441537                             | 104798                              |
| 441919                             | 104833                              |
| 443359                             | 101849                              |
| 443526                             | 101672                              |

Territories within the Forestry Commission Crown Lands

| <b>Ordnance Survey Easting (m)</b> | <b>Ordnance Survey Northing (m)</b> |
|------------------------------------|-------------------------------------|
| 424714                             | 114889                              |
| 427541                             | 104525                              |
| 435266                             | 104068                              |

Territories outside of the HLS/FC Crown Land survey boundary

| <b>Ordnance Survey Easting (m)</b> | <b>Ordnance Survey Northing (m)</b> |
|------------------------------------|-------------------------------------|
| 417098                             | 110680                              |
| 417120                             | 109816                              |
| 417204                             | 108442                              |
| 417498                             | 110774                              |
| 417513                             | 108159                              |
| 417624                             | 110190                              |
| 417790                             | 110652                              |
| 417831                             | 108205                              |
| 417898                             | 110934                              |
| 418143                             | 110457                              |
| 419694                             | 118065                              |
| 420191                             | 118176                              |
| 420293                             | 118636                              |
| 427615                             | 117504                              |
| 427708                             | 117382                              |
| 428267                             | 118526                              |
| 428628                             | 115375                              |
| 428947                             | 115786                              |
| 429428                             | 116098                              |

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|        |        |
|--------|--------|
| 429569 | 117042 |
| 429801 | 116659 |
| 429860 | 116247 |
| 429893 | 117424 |
| 430109 | 117241 |
| 430160 | 117686 |
| 430173 | 116999 |