

24th October 2006

**Thames Basin Heaths Special
Protection Area (SPA) Study**

Final Report

by

**Environmental Dimension
Partnership (EDP)**

On Behalf of

**Thames Valley New Homes
Coalition (TVNHC)**

and

**Home Builders Federation
(HBF)**

Volume I - Text

Rep_215_02_MJL_RR_AW_RT_hkl
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Approved
Checked

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Executive Summary

THAMES BASIN HEATHS SPECIAL PROTECTION AREA

ENVIRONMENTAL DIMENSION PARTNERSHIP (EDP) SUMMARY OF STUDY FINDINGS

On behalf of Thames Valley New Homes Coalition & Home Builders' Federation

1. In Spring 2006 EDP was commissioned by Thames Valley New Homes Coalition and the Home Builders' Federation to undertake a review of the Thames Basin Heaths Special Protection Area (SPA) – particularly in relation to the English Nature (EN as was at the time, but now Natural England [NE]) Draft Delivery Plan¹ and the stance being adopted by both Natural England and, upon their advice, Local Planning Authorities (LPAs), about development within 5km of the SPA. These include projects:-
 - (a) considered likely to have a significant effect on the integrity of the SPA and where such projects had not been assessed, to determine whether there would be an adverse effect; or
 - (b) which had been assessed and it cannot be concluded that there will be no adverse effect on the integrity of the SPA.
2. Through the Draft Delivery Plan and subsequent Supplementary Planning Document Template², NE provided advice to LPAs that, with very few exceptions, any development likely to add to the residential stock within 5km of the SPA should be refused planning permission in the absence of suitable avoidance or mitigation measures; the Delivery Plan identified a three-part approach to mitigation of the anticipated adverse recreational impacts from additional housing. This three-part approach includes:-
 - (a) off-site avoidance measures in the form of Suitable Alternative Natural Green Space (SANGS) for recreation;
 - (b) on-site access management within the SPA;
 - (c) on-site habitat management to bring the SPA into favourable condition.
3. NE acknowledge at Paragraph 2.2.4 of the May 2006 draft of the Delivery Plan that ***“it is also important to note that all three approaches are required in parallel to safeguard the SPA from recreational impact that may arise from new housing development.”*** However in 2006, in most cases it has only been the requirement for off-site recreational mitigation, in the form of enhanced or new recreational sites, that has been linked to planning applications and refusals.
4. In treating any increase in residential development as a proxy for an assumed increase in adverse recreational pressure on the SPA, NE rely substantially upon work by Liley and Clarke (pub. 2005) which ***“...found that the density of nightjar on heathland sites***

¹ The latest draft (26th May 2006) incorporating the Delivery Plan is now titled 'Thames Basin Heaths Special Protection Area: Mitigation Standards for Residential Development'

² Thames Basin Heaths Supplementary Planning Document (English Nature, April 2006)

in Dorset was directly related to the amount of surrounding development; sites surrounded by a higher amount of development supported fewer nightjars.”

5. The EDP study on the Thames Basin Heaths SPA undertaken between May and September 2006 initially sought to replicate the Liley and Clarke study but with additional analysis of woodlark and Dartford warbler figures to just that of nightjar. In respect of physical attributes and summary data, the study firstly identified the following similarities and differences between the Thames Basin Heaths and the Dorset Heaths:-
 - (a) The Thames Basin Heaths SPA is made up of fewer, larger and less fragmented sites;
 - (b) They contain marginally less heathland and significantly more developed land and woodland on the periphery;
 - (c) As with the Dorset study, the Thames Basin Heaths SPA study (with comparable densities of nightjar based on summary figures) found a strong significant relationship between the area of heathland on the SPA and the density of nightjar.

6. The EDP study does not just rely on a comparison of the summary nightjar findings from the Dorset study. It has further included all three Annex 1 protected birds and examined the possible relationships between bird territories, habitats and recreational routes within the area. Specific to the Thames Basin Heaths SPA, EDP study findings identified that:-
 - i) There is no significant correlation between nightjar, woodlark or Dartford warbler numbers and the amount of developed land around the SPA sites;
 - ii) There is no statistically significant relationship between woodland within the periphery and nightjar or Dartford warbler density;
 - iii) Main conclusions reached by Liley and Clarke are therefore not applicable to the Thames Basins Heaths SPA;
 - iv) The assumptions made between urban density and recreational effects on key bird species require further investigation.

7. In addition to the study findings over the whole of the Thames Basins Heaths SPA (as a comparable study to the Liley and Clarke Dorset study) EDP undertook an extensive literature review and an extended study in the field, of five of the thirteen component SSSI areas³. Those five areas were selected in relation to a wide range of factors to do with size, habitat, surrounding development etc; the study investigated the relationship between bird numbers and the additional factors of:-
 - i) Habitat make up and distribution;
 - ii) Access and recreation;
 - iii) Species distribution.

8. Findings from the further EDP study were as follows:-
 - i) Mature woodland is negatively associated with territory presence;

³ Five SSSI study areas comprised: Bourley & Long Valley, Eelmoor Marsh, Broadmoor to Bahgshot Woods and Heaths, Sandhurst to Owlsmoor Bogs and Heath, Ockham and Wisley Commons.

- ii) Young woodland, heathland, tussocky grassland, gorse, bracken and other open habitats were most favoured;
 - iii) No negative correlation was found between footpath density and territory. However in some cases, higher footpath density was positively related to species' territory. (This is contrary to the expectation that recreational activities associated with recreational routes might affect species presence but might be explained by paths being located in more open parts of the SPA, with more suitable ecological conditions);
 - iv) A significant correlation was found between the presence of species and the distance from the site boundary; this could be due to the effects of disturbance, or the preference for larger territories within the centre of the site. The size of the site is a significant factor in species success and, it is assumed, with larger sites less susceptible to adverse 'edge' effects.
9. It is strongly suggested by the research that habitat management to increase the area and quality of habitats described in (ii) would have significant beneficial effects for the Annex 1 bird species.

Recommendations

10. Given that there is not a statistically significant correlation between bird numbers and area of surrounding development (and therefore presumed recreational effects) within the Thames Basins Heaths SPA, EDP's main recommendations are that:-
- i) SPA habitat and management should be addressed and prioritised to deliver the benefits of greatest significance for nightjar, woodlark and Dartford warbler;
 - ii) SPA access management priorities should also be identified and related to survey information on the distribution of the ground-nesting birds.
11. As appears to have been acknowledged by the Dorset interim strategy model put forward by NE, it is likely that any SPA policies to be worked through the local development framework of all LPAs will take at least 2-3 years. An interim period of 3-5 years may well be more realistic for establishing the full implementation of SPA policy objectives.
12. The dwelling constrained private household population forecast work undertaken on behalf of the Thames Valley New Homes Coalition and the Home Builders' Federation⁴ has shown that taking the whole of the LPA areas within the 15 authorities surrounding the Thames Basin Heaths SPA, then the percentage population change over 20 years (i.e. 2006-2026) is forecast at an increase of 6.7% over the current population; for the five-year period 2006-2011, the figure is 1.8%. This equates to an increase of 0.34 - 0.36% per annum.
13. Assuming that, overall, any proportionate increase in recreational use is in ratio to any population increase, this figure of less than 2% for the next 5-year period must be considered *de minimis* when considered alongside the existing estimated visitor

⁴ Barton Willmore commissioned research by the Population & Housing Research Group, Anglia Ruskin University (2006)

numbers to the SPA of over 5 million visits per annum. In other words, any interim strategy adopted for the next 3-5 years is extremely unlikely to be leaving the SPA vulnerable to any significant additional pressures from associated new development. The interim period will provide opportunity for more detailed survey and monitoring to be undertaken.

14. Having taken account of the Dorset interim strategy model that has been promoted by NE (but given that in Dorset the Liley and Clarke findings showed correlation between quantum of development and nightjar numbers), there would appear little justification for SPA avoidance or mitigation measures in the general area of the Thames Basins Heaths Special Protection Area – other than perhaps for larger developments, in close proximity to the SPA and where there has been an identified vulnerability or ‘threshold’ of visitor levels related to bird numbers, derived from actual survey information considered on a case by case basis.
15. To an extent, the effects of recreational pressure can be compared to the NE published Habitat Condition Survey of each of the 13 component SSSI areas, where unfavourable habitat condition is evidentially far more linked to such matters as military use, inappropriate weed and scrub control, under grazing and forestry / woodland management practices than to the percentage area of the SSSI identified as being affected by public disturbance – just 0.15% of the total SPA classified land in the Thames Basin Heaths.
16. Were an SPA Steering Group to be established for the entirety of the Thames Basins Heaths SPA to consider potential for mitigation or enhancement measures, in appropriate cases, a range of measures could be considered and selected from:-
 - i) On-site works within the SPA components;
 - ii) Off-site works to provide new or enhanced access and recreation;
 - iii) Research into the relationship between urban development and the ecological interest of the SPA;
 - iv) Monitoring (both of habitats, birds and recreational use);
 - v) Land acquisition;
 - vi) Wardening services;
 - vii) Provision of new access facilities (e.g. car parks, signage, way marking); and
 - viii) Education of residents and recreational users (e.g. leaflets, access / recreation strategies).
17. The above suggestions, however, would only be appropriate and relevant to schemes which were identified as potentially likely to cause a significant adverse effect on the SPA. Schemes would not simply be identified as likely to have significant effects automatically on account of dwelling or population increase *per se* – for which the best available evidence simply does not support the stance adopted by NE.

Section 1

Introduction and Background Information

Instruction

- 1.1 EDP has been instructed jointly by Thames Valley New Homes Coalition (TVNHC) and Home Builders Federation (HBF) to undertake a study of the Thames Basin Heaths (TBH) Special Protection Area (SPA). The final scope of this study was determined following a workshop held on 14th June with these groups and their representatives (**EDP Volume II Appendix 1: Finalised Scope of Study**).
- 1.2 Pertinent field work and desk based studies have been undertaken between May and October 2006 and have been timed to feed into the South East Plan Examination in Public's (EIP) consideration of technical issues related to the TBH SPA. This report will therefore be submitted to the EIP as part of the HBF and EDP representations.
- 1.3 In undertaking this study, EDP's main emphasis has been to examine ecological and recreational impact and potential avoidance or mitigation issues. The importance of an integrated and strategic approach for such matters is acknowledged within the relevant planning, legal and housing delivery framework as these relate to both the TBH SPA (and protection of key Annex 1 bird species), alongside the delivery of new homes (houses and flats) within the Thames valley.

Circumstances giving rise to the study

- 1.4 The TBH SPA was classified on 9th March 2005 by the Secretary of State of the Department for Environment, Food and Rural Affairs (DEFRA). The SPA follows the European Directive on the Conservation of Wild Birds (Council Directive 2/4/79 on the Conservation of Wild Birds – 79/409/EEC). The Directive requires member states to identify, classify, protect and manage those sites which are of most importance for the conservation of certain bird populations. The protection of SPAs is covered, in England, by the Conservation (Natural Habitats, &c.) Regulations 1994.
- 1.5 The TBH SPA is made up of 13 identified groups of heathland sites, each of which is designated as a Site of Special Scientific Interest (SSSI), and which together total 8,317ha.
- 1.6 The TBH have been designated as an SPA because they support internationally important populations of three Directive Annex 1 bird species, namely the woodlark, the nightjar and the Dartford warbler. Of the total British population the TBH are recorded as supporting:-
 - 27.8% of Dartford warblers (2nd largest concentration in the UK)
 - 9.9% of woodlarks (3rd largest concentration)
 - 7.8% of nightjars (4th largest concentration)
- 1.7 In December 2005 English Nature (EN, now Natural England (NE)) produced a draft document: 'Thames Basin Heaths Special Protection Area: Mitigation Standards for

Residential Development'. Commonly known as the 'Thames Basin Heaths Delivery Plan', the document was introduced as part of the overall EN TBH Project. A revised version of the draft Delivery Plan (DDP) was issued as on 26th May 2006 but remains a draft document pending review through the EIP. However, in April 2006 EN issued a template for a Thames Basin Heaths Supplementary Planning Document to each of the 15 relevant Local Planning Authorities (LPAs) within 5km of the SPA (A revised version correcting errors was issued by EN in June 2006). Some of these LPAs are now in the initial stages of integrating the content of that template into their own Supplementary Planning Documents or Development Plan Documents⁵.

- 1.8 Section 2 of this report addresses in more detail the main implications and issues contained within the DDP and the Supplementary Planning Document template (SPDt). However, from the outset of the consultation on the Delivery Plan, significant concerns have been expressed by the LPAs, the house building industry and public sector bodies, including GOSE, SEERA and the Planning Inspectorate.
- 1.9 In particular, concerns related to the EN stance that any residential development proposal was likely to have a significant adverse impact on the integrity of the SPA, together with subsequent required levels of 'avoidance' or 'mitigation' for new or enhanced open space provision, as identified for any development, according to proximity to the SPA, within two out of three zones:-
- Zone A: 0 – 400m
 - Zone B: 400m – 2km
 - Zone C: 2km – 5km
- 1.10 Serious concerns about the EN stance and the DDP standards still remain; especially as the evidence base for these has been acknowledged between the Government Office for the South East and EN as 'scant'⁶. Testing questions remain unanswered as to both the need for, and feasibility of, the Delivery Plan standards, as well as whether they are achievable or capable of implementation – at least in the short term.

Study Objectives

- 1.11 As set out within the finalised Scope of Study (**EDP Volume II Appendix EDP 1**), the objectives of the study are:-
- (i) To review and critique the basis and rationale for the EN Draft Delivery Plan and approach set out within that document, as related to residential development within 5km of the TBH SPA, endorsing the approach to the Delivery Plan where appropriate; and
 - (ii) To make recommendations for an alternative approach and mechanism by which statutory obligations under the Habitats Regulations can be fulfilled,

⁵ For example, the October 2006 Submission Consultation Report to the 'Thames Basin Heaths SPA Technical Background Document to the Core Strategy DPD' produced by Bracknell Forest (paragraphs 5.3, 6.6).

⁶ Darren Richards, Government Office for the South East letter to Alan Law, English Nature of 18th May 2006.

while also enabling the delivery of appropriate residential development within 5km of the TBH.

1.12 The manner in which the study objectives were proposed to be delivered is set out in the Scope of Study, Sections 3.1-3.6. Whilst ecological and recreational considerations are addressed separately in this study, it has been anticipated that short and medium term solutions will involve a combination of one or more of the following:-

- i) Access management within the SPA;
- ii) Habitat provision / management within the SPA;
- iii) Outwith the SPA, enhanced or new recreational access provision, where appropriate, as an alternative recreational resource to the SPA.

1.13 It is also acknowledged that the priority of the above may change from short-term measures through to longer-term measures. For example, access management could be implemented in the short term, while the provision of enhanced or new recreational access, as an alternative to the SPA, may be a longer-term solution in certain areas. Similarly, achieving improved habitat within the SPA is likely to take a number of years.

EN STANCE AS SET OUT WITHIN THE DRAFT DELIVERY PLAN AND SPD TEMPLATE

Potential Impact from Development

1.14 The most succinct statement related to potential impact of residential development on the TBH SPA is set out at paragraph 2.1.1 of the DDP:-

“Thames Basin Heaths comprises 13 SSSIs, the key relict fragments of a former heathland expanse, which affect 15 Local Planning Authorities, and three counties. Based on the results of research outlined in this document it is on the assumption that any residential development proposal within 5km of the Thames Basin Heaths SPA (the ‘Thames Basin Heaths Planning Zone’) has the potential to have a significant effect on the SPA, irrespective of the size of the development proposed, as a result of the additional residential accommodation that would be provided. This is because:

- a) research demonstrates that the activities of people have an adverse effect upon the SPA birds and their habitats;***
- b) an increase in the number of people that could live near to the SPA is likely to increase the adverse effects on the SPA;***
- c) additional residential accommodation will be likely to increase the number of people who could live closer to the SPA; and so***

d) any residential development close to the SPA has the potential to have a significant adverse effect on the SPA."

- 1.15 The EN assumption is that any development will increase population and that, in turn, will increase adverse impact on the SPA. The wording of the above quoted paragraph does not seem to tie in with Habitat Regulations and Circular 06/2005 requirements as related to likelihood of a significant adverse effect on the integrity of the SPA (see Circular 06/2005 paragraphs 13-16, 20-21 and footnote 26 of the Circular related to Regulation 48(6)).
- 1.16 It is not EDP's expertise, nor the purpose of this study, to provide further commentary on legal interpretation – though, from the outset, it has been a firm EDP recommendation that informed legal opinion should be obtained on these and related matters.
- 1.17 As summarised within the SPDt, EN are seeking avoidance measures based on combining three approaches to avoid / reduce impacts on the SPA from population increases resulting from new development.
- 1.18 The SPDt, at para 4.6 states:-

"The reason why three approaches are necessary is because the different effects of development, described in Part 2 above, need to be addressed in different ways. The first two approaches are necessary, in any event, to improve management of the SPA. The three approaches involve:-

- (i) On site habitat management, where the habitat on which the three SPA bird species rely must be managed to ensure that it remains in good condition;***
- (ii) On site access management so that people can continue to be able to enjoy visiting the SPA for open air recreation in ways that do not damage the heathland wildlife and habitats; aiming to reduce unauthorised activity, guide and educate visitors to reduce preventable disturbance and to focus on protection of the most sensitive areas, and at the most sensitive times of year;***
- (iii) Planning restrictions on development close to the SPA combined with off site avoidance measures via the provision of new or upgraded suitable natural green space as an alternative to the SPA, which enables people to undertake all the activities currently enjoyed on the SPA heathlands whilst not increasing the number of visits made to the SPA.***

- 1.19 Whereas EN have said little about current or planned measures for the first and second of these approaches, the DDP proposals for planning restrictions and off-site avoidance measures have already been treated as the basis for EN representations or objections to development proposals – and indeed as the supposed basis for EN 'acceptance' of such schemes as Queen Elizabeth II Barracks, Bracknell Town Centre

and Franklands Drive, Runnymede (as referenced at SPDt section 5.25 and Table 1 - Summary of Cases). A review of these cases is given in Section 3 of this report.

1.20 EN has identified from research that a generic zoned approach is appropriate for the TBH. The proposed zones, A, B and C are defined as follows:-

ZONE A Up to 400m from the SPA boundary within which EN consider it unlikely that avoidance measures or mitigation would be effective

ZONE B Between 400m – 2km

ZONE C Between 2km – 5km

1.21 Within Zones B and C, EN propose the provision of Suitable Alternative Natural Green Space (SANGS) as either new or upgraded open space. It is intended that these areas would be accessible for public recreation and able to meet the requirements of visitors who would otherwise use the SPA.

1.22 At Section 7 of the Delivery Plan a summary of zones and avoidance standards is provided:-

Zone	Standard	Maximum distances for SANGS location from the development	Minimum SANGS size	Proportion of total SANGS provision by area
A	No effective avoidance or mitigation possible	No effective avoidance or mitigation possible	No effective avoidance or mitigation possible	No effective avoidance or mitigation possible
B	16ha per 1000 new population	400m from development	2-4 hectares	Max 5% all sites <4ha
		2km from development	4-12 hectares	Max 20% all sites <12ha
		4km from development	12-20 hectares	Max 25% all sites <20ha
		5km from development	20-40 hectares	Min 75% all sites >20ha
		5km from development	40+ hectares	Min 25% all sites >40ha
C	8ha per 1000 new population	4km from development	12-20 hectares	Max 25% all sites <20ha
		5km from development	20-40 hectares	Min 75% all sites >20ha
		5km from development	40+ hectares	Min 25% all sites >40ha

TABLE EDP1: Summary of Zones and Avoidance Standards as set out in the DDP (page 49)

1.23 The basis and rationale of the required SANGS has yet to be explained by EN, let alone any assessment as to the timing or implementation of such areas. In fact the uncertainty over SANGS areas being delivered, at least in certain LPAs, led SEERA to commission further detailed research into the issue by LUC⁷.

⁷ Land Use Consultants (July 2006) Thames Basin Heaths SPA: Audit & Assessment of Land to Mitigate Effects of Housing Development

- 1.24 Leaving aside for one moment the need for, or justification of, SANGS, the ability for such areas to be brought forward in a timely way to match new homes provision has been questioned by both the house building industry and the LPAs. The results of the SEERA commissioned LUC study will require careful analysis and review of likelihood of success and potential timescales before any such SANGS might become available; costs and the mechanism for delivery, rather than just potential, will also need critical review.
- 1.25 A further RPS 'peer review' commissioned by the DCLG believed to analyse the foundations of the DDP is said to have reported in draft but with the timing of the final report understood to be progressing for the end of October 2006, so as to inform the EIP.

PUBLIC SECTOR CONTACTS AND INITIATIVES

Meetings

- 1.26 Many meetings, involving TVNHC, HBF and/or EDP have been held with EN, GOSE, SEERA and DCLG in the months March – August. These include:
- 03.05.06 - GOSE / SEERA meeting, Guildford (briefing note included at **EDP Volume II Appendix 4**;
 - 19.05.06 - TVNHC meeting, Marlow;
 - 23.05.06 - HBF / SEERA / TVNHC workshop, Guildford;
 - 14.06.06 - EDP study workshop at Barton Willmore, Reading;
 - 28.06.06 - HBF / SEERA / TVNHC workshop, Guildford;
 - 30.06.06 - EN / GOSE / DCLG / SEERA meeting re: concurrent research;
 - 18.07.06 - GOSE meeting, Guildford; and
 - 01.08.06 - SEERA meeting.
- 1.27 At meetings hosted by GOSE or SEERA there have also been other stakeholder attendees from LPAs, the Planning Inspectorate, the development industry, landowners, wildlife trusts etc.
- 1.28 The meetings have enabled all parties to express and share views, whilst raising the understanding between stakeholders of key issues and concerns.
- 1.29 Arising from the above, the following initiatives have been progressed:-
- (i) EN commissioned Study on Access Management;

- (ii) SEERA commissioned study by LUC on SANGS;
 - (iii) DCLG commissioned Review by RPS on Evidence Underpinning the EN DDP.
- 1.30 The SEERA commissioned study by LUC on SANGS has now reported (see footnote 3 above). However, it has been left to individual LPAs or developers to progress the identified potential of any individual SANGS.
- 1.31 Along with others at TVNHC and HBF, EDP has established a good link with these initiatives, as well as close contact with PINS (Ben Linscott) and continued progression of further research topics being considered with EN, GOSE, DCLG (see **EDP Volume II Appendix 7** for 21st July 2006 letter to Lesley Creedon and Alison Williamson's notes from 30th June 2006 meetings regarding Research Topics and Key SPA issues).

Preparation for South East Plan Examination In Public (EIP)

- 1.32 No doubt all of the above, to a greater or lesser extent, will feed into the EIP and the findings of this study will therefore be but one consideration alongside those other initiatives. It is believed, however, that the EDP study is the only piece of research to bring forward new information and study findings from the TBH SPA.

Inquiry Decisions

- 1.33 Inquiry decisions are now emerging which will need legal comparison with the claimed precedents set by the cases included within the EN Publication No. 622: *'Urban impacts on Dorset heaths: A review of authoritative planning and related decisions'* (January 2005). However in recent weeks, a number of decisions have indicated the willingness of Inspectors to make judgements about the likelihood of significant adverse effects on the SPA, rather than automatically siding with EN on their interpretation and application of the Precautionary Principle⁸. This aspect of the SPA issue is especially important when taking account of a correct legal interpretation of the Habitats Regulations and the way in which EN have related this to the objectives of the DDP.

⁸ A recent example being Appeal Ref: APP/U1240/A/05/1179690 in which the Inspector accepted that effective management restrictions could ensure that the proposal, within 400m of the Dorset Heaths SPA, would not contribute to adverse effects as the result of cats or dogs.

Section 2 Ecological Review

Introduction

- 2.1 As part of the EDP study, the ecological basis of the DDP approach and its scientific foundation have been reviewed. In doing so, EDP has also taken the opportunity to review key parts of the sequential test that development proposals are required to consider as defined in Regulation 48 of the Conservation (Natural Habitats &c.) Regulations 1994.

Review of Ecological Basis of Delivery Plan Approach

- 2.2 The most recent draft of the DDP has been reviewed, namely the draft of 26th May 2006. It should be noted that the document has no statutory status, with EN's declared intention for it to be reviewed through the EIP, commencing November 2006.
- 2.3 EN considers that (paragraph 1.1.5 of DDP):

"The proposed increases in residential development have the potential to impact the SPA habitats and their associated fauna in a number of ways including:

- ***Habitat loss and fragmentation;***
- ***Habitat damage (increased trampling of habitat and bird or reptile eggs; increased fire risk);***
- ***Disturbance (from increased number and proximity of people and dogs, noise, predation from pets, dogs flushing birds);***
- ***Pollution (atmospheric, aquatic and direct to land);***
- ***Nutrient enrichment (atmospheric, aquatic and direct to land); and***
- ***Disruption to hydrology (diversion of pre-existing water sources, and/or rapid run-off onto heaths from urban areas)".***

- 2.4 EN refers to a "full list of urban impacts" included as Table 1, Appendix 4 of the DDP. This list is derived from research undertaken from the main urban effects on lowland heaths in Dorset and based on literature by Molenaar (1998)⁹; Haskins (2000)¹⁰ and Underhill-Day (2005)¹¹. In addition, a table is included within Appendix 4, which catalogues the effects of disturbance recorded, as related to different species from a variety of studies. All, bar one, of these studies is in relation to species other than nightjar, woodlark or Dartford warbler, and although of general interest, the findings are not considered to be directly applicable or transferable to the approach adopted within the DDP.

⁹ de Molenaar, H.J.G. (1998) On-the-spot appraisal of the Dorset heathland (United Kingdom): report and recommendations. Report No. T-PVS (98) 29, Council of Europe, Strasbourg.

¹⁰ Haskins, L. (2000) Heathlands in an urban setting: effects of urban development on heathlands of south-east Dorset. British Wildlife 11: 229-237.

¹¹ Underhill-Day (2005). A literature review of urban effects on lowland heaths and their wildlife. English Nature Research Report, Peterborough.

- 2.5 Despite generic impacts being derived from Dorset Heath research and further afield, the assumption is made within the DDP that these impacts, wholly or partially, are applicable and transferable to the Thames valley with the heathland fragments therein. The list at Appendix 1 takes no account of the ecology of these species or the context of their habitat and their tolerance to disturbance.
- 2.6 EN states that awareness was raised of the likely effects of urban development on heathlands in a report prepared by the RSPB (1988)¹², while recreational pressure was highlighted in a series of EN Research Reports¹³ and a peer-reviewed scientific paper¹⁴. Also cited is the literature review by the RSPB and EN (Underhill-Day 2005), which is stated as providing "*a summary of the evidence for the impacts of urbanisation of surrounding land on the lowland heathland with particular reference to heathland birds.*"
- 2.7 All of the literature referred to by EN is either based on information relating to the Dorset Heaths, concerns the ecology of other species, or is generic and non-specific to the TBH.
- 2.8 With respect to recreational disturbance, EN refers to the publications by Liley and Clarke (2002 and 2003), which found that the density of nightjar on heathland sites in Dorset was directly related to the amount of surrounding development and that sites surrounded by a higher amount of development supported fewer nightjars (paragraph 1.4.2 of DDP). Likewise, reference is made to the findings of Murison (2002) and Mallord (2005)¹⁵, the latter in relation to woodlark. Again the DDP appears to assume that the findings of this Dorset Heaths research are directly transferable and applicable to the TBH SPA. No research has been undertaken by EN to qualify this important assumption.
- 2.9 Overall, the ecological basis of the DDP appears to rely on ecological research not undertaken on the TBH SPA and not in relation to the ecology of nightjar, woodlark or Dartford warbler. Whilst the DDP itself recognises that the Dorset Heaths are in certain fundamental aspects different to the TBH, it provides an evidence base derived from primarily the Dorset Heaths as the justification for the DDP approach. Such an approach is plainly a fundamental vulnerability to the robustness and suitability of the DDP and its application in the Thames valley.

¹² Royal Society for the Protection of Birds (1988) Lowland heathland: a habitat under threat: a background paper. Royal Society for the Protection of Birds, Sandy

¹³ Liley D. and Clarke R.T. (2002). Urban development adjacent to heathland sites in Dorset: the effect on the density and settlement patterns of Annex 1 bird species. English Nature Research Report 463, Peterborough.

Murison G. (2002). The impact of human disturbance on the breeding success of nightjar *Caprimulgus europaeus* on heathlands in south Dorset, England English Research Report 483, Peterborough.

Land Use Consultants (2005). Going, going gone? The Nature cumulative impact of land development on biodiversity in England. English Research Report 626, Peterborough

Rose R.J. & Clarke R.T. (2005). Urban impacts on Dorset Heathlands: Analysis of the heathland visitor questionnaire survey and heathland fires incidence data sets. English Nature Research Report 624, Peterborough.

Tydesley D. and associates (2005). Urban impacts on Dorset heaths A review of authoritative planning and related decisions. English Nature Research Report 622, Peterborough.

¹⁴ Liley D and Clarke R.T. (2003). The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation* 114, 219-230.

¹⁵ Mallord, J.W. (2005). Predicting the consequences of human disturbance, urbanisation and fragmentation for a woodlark *Lullula arborea* population. School of Biological Sciences. Norwich, UEA. PhD

Assessing Impact of Development on the Thames Basin Heaths SPA

2.10 Any development with the potential to impact on the designated interest of the TBH SPA will need to be considered in accordance with Regulation 48 of the Conservation (Natural Habitats &c.) Regulations. The approach to be adopted is set out in Figure 1 of Circular 06/05, which accompanies Planning Policy Statement 9 – *Biodiversity and Geological Conservation*¹⁶. The approach sets out a sequential series of tests that need to be considered with respect to development proposals with the potential to impact on the SPA. Some of the key tests with respect to consideration of development are discussed below:

Is the proposal likely to have a significant effect on the internationally important interest features of the site, alone or in combination with other plans or projects?

2.11 It is clear that any particular development proposal needs to be considered against the internationally important interest features of the site. In the case of the TBH SPA, this relates to the populations of nightjar, woodlark and Dartford warbler.

2.12 With respect to 'significant effect', it is considered that there is a lack of clarity provide by EN regarding:

(i) What is, or is not, a significant effect; and

(ii) Against what threshold does an effect become significant or insignificant?

2.13 In relation to the threshold, it is understood that the Conservation (Natural Habitats &c.) Regulations require that the internationally important features of the SPA are maintained. Furthermore, it is understood from EN that the SPA was designated on the basis of the 1997 to 1999 bird territory mean included in the bird territory summaries provided by EN at previous Public Inquiries (**EDP Volume II Appendix 8**).

2.14 It is therefore considered right that the significance 'threshold' should be directly related to the mean bird territory numbers for nightjar, woodlark and Dartford warbler on the TBH SPA as recorded between 1997 to 1999. Therefore, it is considered that whether a development is likely to have a significant effect on the internationally important interest features of the site or not should be considered alongside an assessment of whether the development is likely to result in the number of bird territories of nightjar, woodlark and Dartford warbler falling below the 1997 to 1999 mean.

2.15 As this study goes on to discuss, any presumed effects relating to recreational activities on the heathland must be seen in the context of all other factors with the potential to affect those key species and their distribution. This includes existing land uses and management practices and the degree to which these have been identified as having an adverse effect on the heathland.

¹⁶ See Figure 1 of PPS9 'Consideration of development proposals affecting Internationally Designated Nature Conservation Sites'

2.16 It is also important to consider what are the recent trends in the population of nightjar, woodlark and Dartford warbler on the TBH, together with the trend in human population within the vicinity of the SPA. The mean changes in bird territories is summarised in **Table EDP 2**, below:

	1997 to 1999 Mean¹⁷	2003 to 2005 Mean¹⁸	% Change
Nightjar	251	264	+5.18%
Woodlark	145	136	- 6.21%
Dartford Warbler	443	526	+18.74%

Table EDP2: Mean changes in bird territories

2.17 With respect to human population it has been estimated that for the districts within 5km of the TBH, there has been an increase in population from 1,630,613 to 1,657,772 between 2001 and 2006, a increase of 1.67% or an annual increase of 0.33% per annum (**EDP Table 13**). Hence, in the case of nightjar and Dartford warbler, and based on the best available data, there has been an average population increase within the TBH SPA despite coinciding with increasing levels of human population. Only in the case of woodlark, again based on the best available data, has there been an average decline in population which has coincided with increasing levels of human population.

2.18 However, based on this information, there is no certainty of a link between bird population trends and urban development, while the trends could be attributed to several other factors related to climate and SPA management. It is considered that in order to ensure clarity in being able to address confidently this test it will be necessary for the following to be undertaken:

- (i) Natural England must clarify the threshold against which development will need to be considered for development control purposes and on what basis it will be considered to have a significant or insignificant effects; and
- (ii) Further research to understand better the ecology of the TBH and to identify whether there is a proven link between increasing population within 5km of the SPA and a detrimental impact on the designated interest (i.e. bird populations) of the SPA.

Assessing the implications of the effects of the proposal for the site's conservation objectives, consulting English Nature and, if appropriate, the public

2.19 With respect to this test, there is a need to define the conservation objectives of the TBH SPA. Based on recent EN evidence submitted in relation to appeal inquiries, it is understood that no conservation objectives have been formulated separately for the SPA, except those devised in relation to the individual SSSI designations, namely:

¹⁷ Information based on summary tables provided by English Nature, included at **Appendix EDP 8**

¹⁸ Information based on data supplied by 2Js Ecology, included at **Appendix 9**

"To maintain, in favourable condition, the habitats for the populations of Annex 1 bird species of European importance, with particular reference to lowland heathland."

- 2.20 It is considered unacceptable that there should be no definitive conservation objectives for TBH SPA. It is considered that those objectives relating to the constituent SSSIs are inappropriate to the level of protection and maintenance inferred by the Conservation (Natural Habitats &c.) Regulations; that they are unacceptably non specific and ill-fit the wider requirements of the fragmented heathland within the Thames valley.
- 2.21 Therefore, it is considered that in order to seek clarity on this issue, NE must provide clear definition and thresholds in relation to the favourable condition of the TBH SPA. In the absence of definitive and measurable conservation objectives for the SPA the lack of guidance from the responsible authority makes testing a development proposal against the SPA's conservation objectives difficult, if not impossible.

Can it be ascertained that the proposal will not adversely affect the integrity of the site?

- 2.22 Integrity is defined in Circular 06/05¹⁹ as:

"The coherence of its ecological structure and function, across its whole area, that enables it sustain the habitat, complex of habitats and/or the levels of populations of the species for which it is classified"

- 2.23 The EU Habitats Directive²⁰ clearly demonstrates that the conservation objectives of the SPA are inherently linked to the integrity of the SPA. Hence, it is only as a result of a development adversely affecting the defined conservation objective(s) of the SPA that an adverse affect to the integrity of the SPA can occur. Unless there are definitive and measurable conservation objectives for the SPA, the certainty (and not likelihood) that a development will not adversely affect the integrity of the SPA is difficult, if not impossible, to ascertain. Due to the current lack of clarity, it is considered that this test is impossible to satisfy and therefore, a question remains over the legality of this test and its application.

¹⁹ Circular 06/05: Biodiversity and Geographical Conservation - Statutory Obligations and Their Impact Within the Planning System

²⁰ Council Directive of 21/5/92 on the conservation of natural habitats and of wild fauna and flora (92/43/EEC). Article 6.3

Section 3 Recreational Review

Introduction

- 3.1 This section reviews the basis of linkages identified in the DDP between recreational activities and impacts on the Annex 1 bird species for which the TBH is designated. Attention is drawn to studies relied upon for the DDP approach and the wider conclusions in respect of the TBH, as compared to the Dorset heaths upon which much of the research is based,
- 3.2 Population figures are analysed so as to quantify the nature of increased recreational pressure resulting from potential further development within 5km of the TBH SPA. Finally, a review is made of the mitigation/ avoidance standards proposed through the DDP and their relationship to the recreational pressures identified by EN.
- 3.3 The DDP states that recreational pressure can have a significant adverse impact on the Annex 1 bird species (paragraph 1.4.1) since woodlark and nightjar are ground nesting, and Dartford Warblers nest close to the ground. Disturbance is cited to be as follows:-
- (i) Through nest predation by natural predators when adult birds are flushed away (reluctance to return to the nest due to the presence of people and dogs is also important);
 - (ii) Eggs and chicks dying of exposure during flushing incidents;
 - (iii) Accidental trampling of nests by people;
 - (iv) Predation of chicks and eggs by domestic dogs; and
 - (v) Increasing stress levels in adult birds.

Literature Review of Recreational Basis of the EN Delivery Plan

- 3.4 The following papers²¹ are referenced in the DDP as all highlighting recreational pressure on the SPA:
- (i) Liley and Clarke (2002)
 - (ii) Liley and Clarke (2003)
 - (iii) Liley and Clarke (2005)²²
 - (iv) Underhill-Day (2005)
 - (v) Liley, Jackson and Underhill-Day (2005)²³
 - (vi) Taylor, Anderson, Taylor, Longden and Fisher (2005)²⁴
 - (vii) Mallord (2005)
 - (viii) Murison (2002)

²¹ The majority of which are fully referenced at the beginning of Section 2 and in **EDP Volume II Appendix 2**.

²² Liley D. and Clarke R.T. (2002). A summary of the evidence base for disturbance effects to Annex 1 bird species on the TBH and Research on human access patterns to heathlands in southern England. Footprint Ecology, Dorset.

²³ Liley D, Jackson D, and Underhill-Day J. (2005) Visitor Access Patterns on the Thames Basin Heaths. English Nature Research Report (noted as being currently in press), English Nature, Peterborough.

²⁴ Taylor K, Anderson P, Taylor R, Longden K, Fisher P (2005) Dogs, access and nature conservation. English Nature Research Report 649, Peterborough.

(ix) Land Use Consultants (2005)

- 3.5 From this list, Underhill and Day (2005) is given great consideration in the DDP as this review summarises the evidence for the impacts of urbanisation on surrounding land on the heaths, with specific reference to heathland birds and recreational effects. The following section provides a summary and critique of the main papers which make direct reference to recreational pressure on bird species, heathland and the SPA.
- 3.6 The DDP (at paragraph 1.4.2) cites work by Liley and Clarke (2002 and 2003) which found that the density of nightjar on the Dorset Heaths was directly related to built development surrounding the heath. Fewer nightjars were found where heaths were surrounded by a high proportion of development.
- 3.7 Murison (2002) noted that nightjar breeding success was lower on heavily visited heathland sites. There was also a strong correlation between nest failure and proximity of paths. A correlation was also identified with higher corvid numbers found where there was higher nightjar disturbance, and that this related directly to high predation rates of nightjar nests.
- 3.8 The DDP also references (at paragraph 1.4.4) a study by Mallord (2005) in Liley and Clarke (2005), which studied 16 heathland sites in southern England. This found a correlation between decreasing density of woodlarks and increasing disturbance levels. He concluded that if there was no disturbance on any of the sites, 34% more chicks would be raised. Fewer woodlarks were found on isolated sites and those surrounded by development due to reduction in colonisation success, reduction in foraging habitat, and particularly, recreational disturbance.
- 3.9 The literature review within the DDP cites Underhill-Day(2005), and a number of studies within that paper which examine the impact of walkers with and without dogs, on the populations of the Annex 1 birds. Overall, walkers with dogs stimulated a greater behavioural response from birds (paragraph 1.4.6), causing birds to flush more readily, more frequently and at greater distances.
- 3.10 At paragraph 1.4.8 of the DDP, EN indicate that through various visitor surveys, they had established **"...that people would travel relatively long distances to use such sites. As a result, the impacts from developments up to several kilometres away from the SPA must be considered alone and in combination. Currently there is no standard method for assessing the in combination impact of increased recreation pressure from developments around the SPA."**
- 3.11 In Liley, Jackson and Underhill-Day (2005), the findings (page 15, Figure 4) demonstrate that by far the greatest number of heath visits relate to dog walking (59%), followed by walking (32%). The study found that that 81% of people arrive at the heaths by car or van, 13% on foot, 4% by bicycle and 1% on horse back. In terms of distance travelled and mode of travel, the study found that:
- (i) Approximately 80% of those travelling by foot came from within 1km;

- (ii) Approximately 80% of those travelling by bicycle came from within 3.3km; and
 - (iii) Approximately 80% of those travelling by car or van came from within 7 km.
- 3.12 In the EN publication 'Dogs, Access and Nature Conservation', Taylor, Anderson, Taylor, Longden and Fisher (2005) address the issue of dogs and birds – with heathland species covered in the research summaries for nightjar, woodlark and Dartford warbler. Various research projects have indicated, based on Dorset Heath research, that there is a potential for up to a 20% increase in breeding population (assuming appropriate habitat quality) without urban influences; amongst the factors that could be affecting numbers, visitor disturbance, predation by crows, cats, foxes and the problem of summer fires were all cited. Such research findings related to a comparison of heathland areas with or without urban influences, and are not considered to be directly relevant to the TBH, where the proportion of developed land surrounding the component SSSI areas is significantly higher – and, according to EN²⁵, with an estimated 288,000 residential properties already within the 5km zone of the various SPA boundaries.
- 3.13 The above noted research has indicated a strong negative relationship between location of nests related to paths and vegetative cover and notes (on page 45):
- “This series of research investigations suggest that dogs off leads and running around off paths are implicated in affecting the success of nightjar nests at the egg stage. The increased predation levels by corvids as a result of visitor and dog combined disturbance fits with findings for a number of waders, as described above and for woodlark presented below.”***
- 3.14 Research on woodlark undertaken by Mallord (2005) found that the probability of a suitable habitat being colonised by woodlark **“...was reduced to less than 50% at around only eight disturbance events per hour within sites with visitor use...”** Mallord calculated that there was a reduction of 34% in overall productivity because of lack of birds compared with sites with no disturbance. Mallord put it that if human based disturbance were removed altogether there could be a 30%-48% increase in woodlark population size, depending on the density of the territory. However, Mallord had found that the numbers of woodlark, at any particular site, depended on a number of variables, including the numbers of people and their spatial distribution. However, it was concluded that increases in visitor numbers above existing levels were unlikely in themselves to lead to a corresponding increase in impact upon the bird species due to the sensitivity of the species.
- 3.15 The NE approach that any additional people will automatically cause adverse impact is therefore certainly not supported by research findings. It is clear that if urban development took place adjacent or close to the SPA where previously there was no urban development or recreational use of the SPA – then such development and increase in local population would be likely to impact on the SPA. However, given that much of the TBH already comprises major conurbations around the SPA, it is the recreational activity and its management of that extra population which is more likely to be key – especially taking account of whether any extra recreational activity

²⁵ Liley, Jackson and Underhill-Day (2005)

associated with new development is likely to lead to significant additional adverse impacts, over and above the activities of the existing population using or impacting upon the SPA.

- 3.16 Concerning the Dartford warbler, Liley and Clarke (2003) did not find any correlation between the breeding population and urban influences on Dorset heaths, but van den Berg (2001), reported in Taylor, Anderson, Taylor, Longden and Fisher (2005), did note a possible negative relationship with proximity to urban areas, and attributed this tentatively to disturbance.

Population Growth and Recreational Pressure

- 3.17 In Liley, Jackson and Underhill-Day (2005), EN estimate of the total number of visits per year to the SPA is estimated to be around 5.36million (page 30). It is acknowledged that this figure may be an over-estimate; however, it illustrates that such visitor levels place the TBH on a par with some English National Parks (such as The Broads at 5.4 million and Dartmoor 3.8 million).
- 3.18 Within the DDP, there is much reference to the projected increase in population in the coming years. At paragraph 1.3.2 of the DDP, EN cite a forecast by Land Use Consultants that at least 35,170 houses will need to be built around the TBH (based on current housing projections to 2016) with further increases projected through the Regional Spatial Strategy allocations. Furthermore, at paragraph 5.4 of the DDP, EN have used the household size of 2.4 people per dwelling to estimate the average occupancy. Thus, whilst not stated, using ENs rough figures, it would be likely that there would be an additional 84,408 people within the 11 LPAs bordering or containing SSSI sites comprising the TBH SPA.
- 3.19 Barton Willmore Planning Partnership have commissioned specialist research from the Population and Housing Research Group, Anglia Ruskin University to provide population forecasts for the period until 2026, based on the constraints by Policy H1 Housing Provision levels for each District as set out in The South East Plan Core Document: Draft Plan for Submission to Government (March 2006).
- 3.20 The resulting figures are set out within **Table EDP3** overleaf. The table provides population data for 2001 for the 15 District Las within 5km of the TBH SPA, and also population predictions for 2006, 2011, 2016, 2021, and 2026. For the period 2006 – 2016, which closely resembles the period covered by the LUC's housing figures, it is notable that the percentage changes in population are generally small, and in some cases, are actually predicted to fall. Overall, the changes for the study period are forecast to amount to a population increase of:
- (i) 1.8% between 2006 and 2011;
 - (ii) 3.4% between 2006 and 2016; and
 - (iii) 6.7% between 2006 and 2026.
- 3.21 Although it is estimated that only about 20% of the total area of these 15 districts lies within the 5km boundary, developed area and major settlements are spread

throughout the Thames Valley. In the absence of detailed analysis being available, the percentage growth figures are considered to apply to the 5km zone. This research therefore suggests a 0.335% population increase on current figures per year across the 15 Districts within 5km of the TBH, over the next 20 years.

Dwelling Constrained Private Household Population Forecast (2006 - 2026)											
District	2001	2006	2011	% change (2006-2011)	2016	2006-2016	% change (2006-2016)	2021	2026	2006-2026	% change (2006-2026)
Bracknell	107,019	107,778	112,441	4.3	116,537	8,759	8.1	120,387	124,498	16,720	15.5
Elmbridge	121,012	128,203	127,513	-0.5	126,802	-1,401	-1.1	126,281	126,068	-2,135	-1.7
Guildford	124,184	127,868	127,913	0.0	127,928	60	0.0	128,380	129,546	1,678	1.3
Hart	82,035	84,498	85,146	0.8	84,593	95	0.1	83,107	81,327	-3,171	-3.8
Runnymede	74,233	75,470	76,015	0.7	76,464	994	1.3	77,168	78,310	2,840	3.8
Rushmoor	88,662	86,333	88,819	2.9	90,480	4,147	4.8	91,977	93,731	7,398	8.6
Surrey Heath	78,678	79,533	79,946	0.5	80,224	691	0.9	80,639	81,272	1,739	2.2
Waverley	111,540	112,085	115,415	3.0	118,087	6,002	5.4	120,071	121,695	9,610	8.6
Windsor & Maidenhead	129,735	132,114	135,414	2.5	139,013	6,899	5.2	142,901	146,585	14,471	11.0
Woking	88,950	90,228	90,252	0.0	90,326	98	0.1	90,816	91,333	1,105	1.2
Wokingham	146,287	148,817	152,846	2.7	156,790	7,973	5.4	161,455	166,950	18,133	12.2
Mole Valley	78,640	79,995	80,739	0.9	81,436	1,441	1.8	82,140	83,090	3,095	3.9
Basingstoke	151,793	155,257	159,546	2.8	163,863	8,606	5.5	168,373	173,316	18,059	11.6
East Hampshire	106,341	107,946	109,340	1.3	110,348	2,402	2.2	110,083	110,003	2,057	1.9
West Berkshire	141,504	141,647	146,260	3.3	150,812	9,165	6.5	155,589	161,085	19,438	13.7
Total - all districts	1,630,613	1,657,772	1,687,605	1.8	1,713,703	55,931	3.4	1,739,367	1,768,809	111,037	6.7
Note:	Projections provided by Population and Housing Research Group, Anglia Ruskin University controlled to Policy H1 Housing Provision levels for each District for the period 2006 to 2026 as set out in The South East Plan Core Document: Draft Plan for Submission to Government (March 2006)										

Table EDP3: Dwelling Constrained Private Household Population Forecast (2006-2026)

3.22 The lesser level of population growth predicted by the Anglia Ruskin University relates to a number of factors, which include changes in the age structure of the population, in and out migration and changes in the structure of individual households, with a trend towards smaller household units. In other words, the study does not assume that new residences automatically result in higher population growth by immigration or vice-versa, but that a number of the 'new' dwellings will be occupied by individuals re-distributing within the district.

3.23 Using housing figures provided by EN in Liley, Jackson and Underhill-Day (2005) and average household sizes for the south east region²⁶ (also used by EN) the following calculation is made regarding the existing population size within the 5km zone

$$288,000 \text{ existing properties} \times 2.4 \text{ persons per household} \\ = 691,200 \text{ individuals living within 5km of the TBH}$$

3.24 Based on the projected growth rates identified through the Anglia Ruskin University study, the following approximate population increases are expected within the 5km zone (based on estimated 2006 levels):

- (i) 12,442 more individuals by 2011;
- (ii) 23,501 more individuals by 2016; and
- (iii) 46,310 more individuals by 2026.

3.25 It is noted that the housing figure promoted by EN in the DDP is some 50% more than the 2006 to 2016 figure calculated above, suggesting an over-estimate by EN of housing pressure facing the SPA.

3.26 Given that these percentage growth figures apply to the wider area, they can also be applied to figures concerning recreational pressure. It has been indicated by EN that up to 5.36 million people currently visit the heaths each year. Liley, Jackson and Underhill-Day (2005) have analysed the mode in which people travel to the heath as well as the distance they travel using those modes²⁷. The following calculation can therefore be made in order to identify approximately what proportion of the 5.36 million visits are attributable to those living within the 5km zone.

83% of visitors arrive by car or van	= 4,448,800
13% of visitors arrive on foot	= 696,800
4% of visitors arrive by bicycle	= 214,400
Totals	5,360,000 visitors annually visiting TBH SPA

70% of those travelling by car or van come from within 5000m of the SPA	= 3,114,160
100% of those travelling on foot come from within 5000m of the SPA	= 696,800
93% of those travelling by bicycle come from within 5000m of the SPA	= 199,392
Totals	4,010,352 visitors currently originating from within 5km zone (= 74.82% of those visiting the SPA come from within 5km zone)

²⁶ National and regional statistics obtained from www.statistics.gov

²⁷ See text and figures on pages 16-17 and page 19. Although a 1% figure is given for individuals arriving by horse, the totals are in excess of 100% and so this factor has been disregarded for expediency.

- 3.27 Therefore, it is estimated that each resident living within 5km of the SPA makes, on average, 5.8 visits per year (visits originating from within 5km zone divided by number of residents living in that zone). It is subsequently calculated that the forecast population increases from estimated 2006 levels within the 5km would, for the whole of the SPA, result in:
- (i) 198 more visits per day by 2011;
 - (ii) 374 more visits per day by 2016; and
 - (iii) 736 more visits per day by 2026.
- 3.28 If assumed to be spread equally over the 13 sites, it is therefore calculated that the forecast population increases (on estimated 2006 levels) within the 5km would result in:
- (i) 15 more visits per day by 2011;
 - (ii) 29 more visits per day by 2016; and
 - (iii) 57 more visits per day by 2026.
- 3.29 The data to 2006 suggests that each year, the current trends in population growth around the TBH SPA would lead to an approximate increase of 37 extra visits per day spread over the whole of the SPA (736 more visits divided by 20 years).
- 3.30 This 0.335% increase per year (or 6.7% increase over 20 years) must be put in the context of the SPA as it currently exists within the Thames Valley and which has remained materially unchanged since the time of SPA designation.
- 3.31 Of particular relevance to this figure are the conclusions of Mallord (2005) in commentary regarding the effect of increased visitor numbers on sites which are already subject to recreational pressure **"....if the visitor numbers doubled but disturbance was evenly spread throughout the site then this would have a major negative effect on the population, but if disturbance remained patchy and path-based with the same pattern as that measured during his study, doubling of visitor numbers have little effect as the existing disturbance was already affecting territory distributions."**
- 3.32 There is no reason to believe that visitor patterns will change significantly over the lifetime of the EIP subject to variations outside the influence of planning control. The effect of forecast population increases is therefore considered to be likely to be *de minimis*, if of any significance, in the context of current uses and existing pressures affecting the SPA.

Draft Delivery Plan Mitigation Proposals

- 3.33 The DDP states (at paragraph 2.1.1) that based on the results of the research outlined in the DDP, any residential development within 5km of the SPA has the potential to have a significant effect on the SPA, irrespective of the size of the development proposed. This is stated to be because:-

- (a) ***“research demonstrates that the activities of people have an adverse effect upon the SPA birds and their habitats;***
- (b) ***an increase in the number of people that could live near to the SPA is likely to increase the adverse effects on the SPA;***
- (c) ***additional residential accommodation will be likely to increase the number of people who could live close to the SPA;***
- (d) ***any residential development close to the SPA has the potential to have a significant adverse effect on the SPA.”***

3.34 In order to mitigate for the potential effects of development within 5km of the SPA, EN have suggested (through the DDP) that off-site avoidance through the provision of SANGS is based upon a number of factors, including:-

- (i) The proximity of the development to the SPA;
- (ii) Quantity of open space to be an effective avoidance measure;
- (iii) Distance from the open space to the development;
- (iv) Quality of the open space.

3.35 EN conclude that 76% of visitors travel no more than 5km to the TBH. Further, that the majority of visits to the heaths are for dog walking, with walking being second most popular. EN also concluded that dogs ***“...have a wide area of effect as over half leave the main tracks.”*** (paragraph 3.3.4.1).

3.36 Despite the assertion above – apparently drawing a very distinct difference between a walker with, and a walker without, a dog - EN conclude at paragraph 5.7, that based on current research, ***“...although dog walkers are one of the key issues affecting Annex 1 birds, walkers without dogs also have a disturbing effect, which based on current research, cannot be confidently separated from walkers with dogs. Without clear data the precautionary principle must apply and dog walkers and walkers treated alike.”***

3.37 EN indicate that the use of the SPA is a function of the distance people live from it, the transport links and the facilities and experience at the heath; especially for dog walkers and walkers. On this basis, EN have adopted the zoned approach to mitigation, thus, as the crow flies (EN are taking a precautionary basis).

Zone A, <400 metres

3.38 Despite the differences between the TBH and Dorset data regarding travel distances on foot to the SPA, and that EN acknowledge (at paragraph 3.4.8.1) that the results do not reference any analysis of the amount of urban development adjacent to the access points surveyed; they conclude that ***“...the selection of 400m would provide a reasonable generic figure that captures a significant proportion of potential visitors on foot and is generally accepted within open space design as representing an easy walking distance.”*** (para 3.4.8.1). This distance also corresponds to the identified ranges of cat movement and thus cat predation, as well as the area most likely to suffer from fires, garden extensions, and waste dumping.

- 3.39 Within this zone, EN has determined that it would be unlikely that avoidance or mitigation measures could be effective, and therefore, generally, development is not appropriate.

Zone B, 400m to 2km, and Zone C, 2km to 5km

- 3.40 EN conclude from the visitor survey results that most drivers come from more than 400m away from any particular site, and that 5km provides a suitable outer boundary since this captures about 76% of drivers. EN consider large scale developments outside this zone may need to be considered on a case by case basis, but that access management on the SPA will off-set any effects of additional visitors beyond 5km. In response to the effect of distance in reducing use of the SPA for recreation, EN thus dictate that mitigation or avoidance measures proposed within Zone C will be half those defined for Zone B.
- 3.41 These conclusions on 'appropriate' zoning distances appear to have been devised on the basis that the visitor survey data, drawn largely from the Dorset Heaths, is applicable to the TBH. This despite known differences in the sizes, fragmentation effects and distribution of the Dorset Heaths, and without any consideration of other factors which may apply in Dorset and not in the TBH, such as the proximity of the coast and the New Forest National Park.
- 3.42 In order to determine the mitigation required for Zones B and C, the DDP reports on examination of visitor surveys to identify what people valued about the heaths, and what made them choose to visit them over other areas. The main items identified in the DDP were:
- (i) Attractive scenery and countryside;
 - (ii) Peace and quiet;
 - (iii) Ease of access;
 - (iv) Living locally;
 - (v) Good paths;
 - (vi) Wildlife interest;
 - (vii) Ability to let dog off lead;
 - (viii) No requirement to clean up dog fouling;
 - (ix) No livestock;
 - (x) A safe environment;
 - (xi) Ease of parking.
- 3.43 Specifically, SPA visitors preferred a more semi-natural environment, with informal paths and convenient car access and parking.
- 3.44 A study by Liley, Mallord and Lobley (2005)²⁸ of the TBH asked visitors to identify how their 'ideal' site might look. The responses of SPA and non SPA users were quite different, with SPA visitors choosing sites with a more natural appearance, and specifically, with ***"...visual interest and variety within a small area..."***

²⁸ Liley, D, Mallord, J. & Lobley, M. J. (2005). The "Quality" of Green Space, features that attract people to open spaces in the Thames Basin Heaths area. English Nature Research Report (unpublished). English Nature, Peterborough.

(paragraph 4.10 of the DDP). EN also concluded from the studies that a walk route of 2.1km to 2.5km was required for walkers/ dog walkers.

- 3.45 From this analysis, the DDP concluded that alternative greenspace sites should include the following characteristics:
- (i) Convenient vehicular access and parking on short and straightforward journeys from population centres;
 - (ii) Semi-natural and 'wilder' areas;
 - (iii) Varied character with woodland, small ponds and undulating topography;
 - (iv) Good path network with informal substrate (such as gravel);
 - (v) Dogs permitted off-lead;
 - (vi) Should allow for a 2.1 to 2.3 km walk;
 - (vii) Lack of livestock;
 - (viii) Peace and quiet.
- 3.46 In terms of the site size for selecting SANGS, there is no evidential basis for identifying mitigation land per 1,000 population. The DDP states at paragraph 5.10: ***"There is little definitive causal and effect evidence to select a size standard per 1000 population for the provision of alternative greenspace as mitigation. In the absence of this, the pre-cautionary principle has been used, along with data from the visitor surveys on user behaviour on the heathlands, and is illustrated by two examples of recent proposed developments adjacent to the Thames Basin Heaths SPA, where open space will be provided as a condition of development."***
- 3.47 The two recent development proposal examples are QEII Barracks, Fleet and Lorraine Road, Camberley.
- QEII Barracks, Fleet**
- 3.48 Although refused planning permission for other reasons, a former QEII Barracks scheme has previously been considered by EN to have met the requirements of the Habitat Regulations. This scheme is used in the DDP (paragraph 5.10) as an example of new open space being provided, together with other measures, at an area ratio of 18ha of SANGS per thousand people.
- 3.49 The SANGS land offered as part of the scheme also comprises MoD land adjoining the proposed development area and was brought forward as a package of land, as available. It is understood that on behalf of the developer / landowner interests, further explanation is to be provided to the EIP but that the development proposal was not intended by the developer to be a role model for other development proposals as related to the SPA.
- Lorraine Road, Camberley**
- 3.50 At Lorraine Road, EN reported that a total of 317 residential units were proposed. As part of the mitigation package, the developers proposed improvements to Diamond Ridge Woods. This included the upgrading of 26ha of open space which

the LPA determined could accommodate the 748 people generated by the development. This gave a area ratio of 35ha per thousand people.

- 3.51 However, the DDP also notes that ***“No assessments of the current usage and carrying capacity of the open space at Diamond Ridge Woods were carried out. It is hard, therefore, to determine with certainty whether improvements to the open space will absorb all of the new residents, or whether the increased use of open space may cause existing and new occupants to start using the heath, where the experience may be quieter and less formal.”*** (paragraph 5.11.3 of the DDP)
- 3.52 Therefore, without any justification for determining what constitutes an appropriate example of developer mitigation, without any reference to the definition of recreational carrying capacity and how it should be applied to recreational sites, and yet further, without any knowledge of how additional users may affect the existing recreational use of that site, EN have suggested that the Diamond Ridge Wood site provides appropriate mitigation. Not only have they suggested that this mitigation is appropriate to off set development at Lorraine Road, but that it should be held as exemplary for the way in which appropriate mitigation can be devised for avoidance of impact on the SPA.
- 3.53 In respect of the two schemes, EN concludes that (at paragraph 5.12.1 of the DDP), ***“The visitor surveys provide appropriate though limited data for setting generic standards across the SPA, while the above examples although illustrative cannot be considered at this stage to provide a precedent; they do however, combined with the precautionary principle, provide the basis for making some preliminary judgements to inform a more comprehensive and considered solution for developments affecting the SPA.”*** .
- 3.54 These assumptions are clearly far reaching. Questions are unanswered in respect of how the EN feels able to determine the quantum and nature of recreational mitigation on the evidence of visitor surveys on heath sites in Dorset and ***“...in the absence of comprehensive data for the [Thames Basin Heaths]”?***
- 3.55 EN go on to state (at paragraph 5.12.2 of the DDP), ***“Reflecting the visitor surveys and the precautionary principle, we propose that a) a greenspace standard of 16 ha per 1000 new population is adopted as the minimum required to provide an effective avoidance measure in Zone B, and b) that comparable visitor management considerations (on-site and off-site) need to be adopted through strategic planning (i.e. not necessarily linked to specific developments) in parallel with offsite greenspace delivery.”***
- 3.56 According to EN, informal greenspace provision under PPG17 may be regarded as contributing towards the avoidance standard –depending on its quality. Upgrading of existing greenspace is also considered as possible, but EN state that such upgrading can only be counted once. This, however, is without any clear assessment of how recreational carrying capacity is to be measured – be that for an existing site already being used for recreation, or for a new site of recreational provision.

- 3.57 As identified above, it is perverse for NE on the one hand to refer to recreational carrying capacity (which has not in any way been described, justified, or explained) as being a potential limiting factor in the Lorraine Road example, and yet, also suggest that for any existing recreational sites **"...upgrading may only be 'counted' once!"** (paragraph 2.12.6 of the DDP). The upgrading of a site could potentially add huge attraction value for visitors, particularly if its poor condition and current management excludes access to large parts of the site. It is not considered credible that NE should suggest that a site could only be counted once for mitigation, without considering its carrying capacity and the sum effect of the mitigation/avoidance measures proposed.
- 3.58 With regard to the minimum site size of a SANG, the DDP states that there is **"...an absence of strong biological or social evidence to define minimum site sizes..."**. Yet despite this, EN defines (at paragraph 6.12 and 6.15 of the DDP) specific site areas appropriate at specific distances from new development, and further, suggest 'appropriate' proportions of total SANGS provision which can be accommodated within each zone. The areas specified, particularly for Zones B and C, in some cases include sizes of more than 40ha, well in excess of the 16ha/1,000 population previously indicated. The justification EN provide for this relates to their conclusions that the main SPA users, namely walkers and dog walkers, need sites of this size to achieve the longer walks they currently undertake on the heath sites, and hence provide a viable alternative to the heaths for walking.

Section 4

Thames Basin Heaths SPA Research

Introduction

- 4.1 Based on the reviews above, it is clear that the basis of the DDP approach is not founded on any specific ecological research regarding the potential impact of increasing urban development around the TBH (as opposed to the Dorset Heaths); nor associated increases in the number of residents and their pets on populations of nightjar, woodlark and Dartford warbler. It is further clear that there has not been proper consideration of recreational effects in the context of existing levels of use.
- 4.2 The key aims of the TBH SPA research undertaken by EDP were therefore intended to address the following questions:
- (i) Is the Dorset Heaths SPA research applicable and transferable to the Thames Basin Heaths SPA?; and
 - (ii) Using the best available information, is there any evidence of a link between urban development, habitats and the populations of nightjar, woodlark and Dartford warbler on the TBH?
- 4.3 The following report sections set out the methodology, analysis and findings of the research undertaken by EDP to address these questions.

Methodology

- 4.4 The research undertaken by EDP has been split broadly into three strands, namely:-
- (i) To compare the key similarities and differences between the TBH SPA and the Dorset Heaths SPA;
 - (ii) Broad replication and expansion of Liley and Clarke (2003) for the TBH SPA; and
 - (iii) To expand this research using the best available data to examine the relationship between the distribution of nightjar, woodlark and Dartford warbler territories and habitat distribution, recreational opportunities and urban development adjacent to the TBH SPA.

Comparison of Key Attributes of Thames Basin Heaths and Dorset Heaths SPA

- 4.5 With respect to the first of these strands, the majority of the scientific reports and papers formerly cited by EN as providing the ecological basis for the DDP approach are based on ecological information collated for Dorset Heaths SPA. Hence, EDP initially undertook a comparison of the key attributes of the TBH SPA and the Dorset Heaths SPA. These attributes included:

- (i) Area of SPA (ha): For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003). For the TBH SPA, area measurements were taken from digitised Ordnance Survey plans overlaid with the SPA boundaries downloaded from EN's website;
- (ii) Number of Components for each SPA: For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003), while for the TBH this information was derived from EN's website;
- (iii) Area of each component part (SSSI) for each SPA (ha): For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003), while for the TBH SPA, area measurements were taken from digitised Ordnance Survey plans overlaid with the SSSI boundaries downloaded from EN's website;
- (iv) Area of developed land within 500m of the SPA boundary for each component: For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003), while for the TBH SPA, area measurements were taken from digitised Ordnance Survey plans, marked with a 500 zone around the SPA boundary and the area of developed land within that zone identified. The area of developed land within 500m of each SPA component is illustrated on individual plans in **EDP Volume III Plans: TBH Study**;
- (v) Area of woodland within 500m of the SPA boundary for each component (ha): For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003), while for the TBH SPA, area measurements were taken from digitised Ordnance Survey plans, marked with a 500 zone around the SPA boundary and the area of woodland within that zone identified to an overall area of woodland. The area of woodland within 500m of each SPA component is illustrated on individual plans in **EDP Volume III Plans: TBH Study**;
- (vi) Percentage heathland within SPA (%) for each patch: For the Dorset Heaths SPA, this was taken from published figures set out in Liley and Clarke (2003), while for the TBH SPA this was taken from mapping areas of heathland from detailed digital aerial photography; the best available method to calculate such areas within the timescales of the project. The definition of heathland set out in Liley and Clarke (2003) is given as "all Calluna and Erica-dominated vegetation communities on dry and humid heath together with areas of wet heath and peatland, gorse and other scrub and recently burnt areas of known heathland".

4.6 With respect to statistical analysis, a simple analysis was undertaken involving the calculation of a mean, median and range for each of the key attributes defined above.

Replication and Expansion of Liley and Clarke (2003) Paper for the Thames Basin Heaths SPA

- 4.7 It appears that the strongest ecological basis related to the need for, and justification of, the DDP approach is based on the findings of the only peer-reviewed scientific paper directly cited in the DDP, Liley and Clarke (2003)²⁹. This paper investigated the impact of urban development and human disturbance on numbers of nightjar on heathlands in Dorset. It was concluded that the number of nightjars present on each particular element (SSSI) of the Dorset Heaths SPA is influenced by the extent of surrounding woodland and developed land. It was suggested that impacts on species densities might result from human presence on the heathlands and subsequent disturbance to that species (although recreational activities and associated disturbance effects were not directly studied in this research).
- 4.8 The aim of the research undertaken by EDP was broadly to replicate, using the best available data and within the timeframes of the EIP, the methodology of the Liley and Clarke (2003) nightjar research for the TBH SPA. However, the study was also expanded by EDP to investigate the impact of urban development and human disturbance on Dartford warbler and woodlark.

Data Collection

- 4.9 The complete data set collected to replicate and expand upon the Liley and Clarke (2003) research is set out in **EDP Volume II Appendix 10**. The method for collation and sources of existing data is described below:
- (i) Area of SPA component part (SSSI) (ha). See paragraph 4.5, bullet point (iii) above regarding how these figures were calculated for the TBH;
 - (ii) Area of land within 500m of SPA boundary for each component (ha). Area measurements were taken from digitised Ordnance Survey plans, marked with a 500 buffer area around the SPA boundary downloaded from EN's website;
 - (iii) Total area of land within 500m of the SPA boundary for each component including the area of SPA (ha). Calculated as a sum of (i) and (ii).
 - (iv) Area of developed land within 500m of the SPA boundary for each component (ha). See paragraph 4.5, bullet point (iv) above regarding how these figures were calculated for the TBH;
 - (v) Developed land as a percentage of area of land within 500m of the SPA boundary for each component (ha). Calculated as a sum of $((iv)/(ii) \times 100)$;
 - (vi) Developed land as a percentage of total area of land within 500m of the SPA boundary including the area of the SPA for each component (ha). Calculated as a sum of $((iv)/(iii) \times 100)$;

²⁹ Liley D and Clarke R.T. (2003). The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation* 114, 219-230.

- (vii) Area of woodland within 500m of the SPA boundary for each component (ha). See paragraph 4.5, bullet point (v) above regarding how these figures were calculated for the TBH;
 - (viii) Woodland within 500m of the SPA boundary as a percentage of area of land within 500m of the SPA boundary for each component (ha). Calculated as a sum of $((vii)/(ii) \times 100)$;
 - (ix) Woodland within 500m of the SPA boundary as a percentage of total area of land within 500m of the SPA boundary including the area of the SPA for each component (ha). Calculated as a sum of $((vii)/(iii) \times 100)$;
 - (x) Area of woodland within the SPA boundary for each component (ha). This was taken from mapping areas of woodland from detailed digital aerial photography; the best available method to calculate such areas within the timescales of the project;
 - (xi) Area of woodland within the SPA boundary as a percentage of the SPA area for each component (ha). This was calculated as a sum of $((x)/(i) \times 100)$;
 - (xii) Area of heathland within the SPA boundary for each component (ha). See paragraph 4.5, bullet point (vi) above regarding how these figures were calculated for the TBH;
 - (xiii) Area of heathland within the SPA boundary as a percentage of the SPA area for each component (ha). Calculates as a sum of $((xii)/(i) \times 100)$;
 - (xiv) Nightjar territory numbers;
 - (xv) Woodlark territory numbers; and
 - (xvi) Dartford warbler territory numbers.
- 4.10 With respect to territory numbers for nightjar, woodlark and Dartford warbler, it was originally proposed to use summary information supplied by EN at various appeal inquires, (included at **EDP Volume II Appendix 8**). This information sets out for each component of the TBH SPA:
- (i) The 1997 to 1999 mean territory numbers for nightjar, woodlark and Dartford warbler, which EDP understand is the population basis for the designation of the SPA; together with
 - (ii) Annual figures regarding the number of territories of nightjar, woodlark and Dartford warbler up to 2005.
- 4.11 EN was unable, or unwilling, to supply EDP with the background data of this summary information. EDP was referred by EN to their source of this information, namely John Eyre at 2Js Ecology. As a result of EN not supplying the background

data to support their summary tables, EDP was required to purchase from 2Js Ecology all territory records for nightjar, woodlark and Dartford warbler for each of the thirteen components of the TBH SPA.

- 4.12 It was presumed that since 2Js Ecology had supplied EN with the information summarised in the above referenced table, there would be consistency between the summary data tabled by EN and that derived from the data supplied by 2Js Ecology. However, this was not the case with several discrepancies between the information supplied by 2Js Ecology and EN. The comparison between the EN summary and a summary of the data supplied by 2Js Ecology is included as **EDP Volume II Appendix 9**. EDP attempted to investigate possible reasons for these discrepancies with EN, however no response has been received from either EN or its successor, Natural England at the time of finalising this report text.
- 4.13 Therefore, for the purposes of the investigations undertaken by EDP it is considered that the raw territory data for nightjar, woodlark and Dartford warbler received from 2Js Ecology is the most comprehensive and best available data set available for these species within the TBH SPA. Following a thorough review of the available data, this view was confirmed by 2Js Ecology.
- 4.14 In relation to the territory information used for this investigation, the most recent³⁰ and comprehensive³¹ data sets were used for analysis. With respect to nightjar, the most comprehensive recent data set was from 2004, which coincided with the last national nightjar survey. With respect to woodlark and Dartford warbler, the most comprehensive recent data sets were from 2003.

Statistical Analysis

- 4.15 The approach to statistical analysis was similar to that adopted by Liley and Clarke (2003). This was considered to be appropriate because it allowed the findings of the present analysis to be compared and contrasted with those of the study of the Dorset Heaths. The analysis involved the following:
- i) The relationship between nightjar density and urban development around the SPA components was assessed through dividing nightjar numbers by area of heathland on each SPA component and plotting the density figure so derived against the percentage cover of urban land within the surrounding 500m buffer zone;
 - ii) The relationship between nightjar density and woodland cover in the buffer zone similarly calculated by dividing nightjar numbers by area of heathland on each SPA component and plotting the density figure against the percentage cover of woodland within the surrounding 500m buffer zone;
 - iii) The relationship between nightjar numbers and heathland patch area was investigated by plotting the natural logarithm of the nightjar numbers +1

³⁰ It is understood from 2Js Ecology that territory numbers post-2003 were more comprehensive and were collated using a standard methodology.

³¹ During some years, certain components of the SPA were not surveyed or only surveyed partially.

against the natural logarithm of the area of heathland in each SPA component;

- iv) Having investigated individually the relationship between nightjar density or numbers and the factors described above, a Generalized Linear Model was fitted that included heathland area in each SPA component, percentage urban development in the buffer zone and percentage woodland in the buffer zone as predictors.
- 4.16 The fitting of the Generalized Linear Model followed a similar approach to that of Liley and Clarke although detailed analysis of the Thames Basin data indicated that unweighted multiple linear regression was an appropriate means of analysis since there was no evidence of heteroscedacity and the residuals were normally distributed (see e.g. Chatterjee & Price 1977)³². This contrasts with the different form of Generalized Linear Model used by Liley and Clarke which treated the data as having a Poisson (rather than a normal) distribution. As a further check, a model assuming a Poisson distribution was also attempted in the present case but resulted in a worse fit and was therefore not pursued further.
- 4.17 Once a statistical model has been fitted to a given data set, the model may be used to predict the situation under a different set of circumstances. Liley and Clarke (2003) did this (p.227) when they estimated that nightjar territories would be some 20% greater in number if there were no development within 500 m of any of the Dorset study sites. Indeed it is implicit in NE's continued stance that the findings of the Dorset model *do* apply to the Thames Valley. The Liley and Clarke model (their equation 2, p. 224) was therefore fitted with the data from the Thames Valley SPA components and the correlation between the fits from the model and the actual nightjar numbers was investigated.
- 4.18 An identical approach to that for nightjars was also then adopted for data on woodlark and Dartford warbler to investigate the relationship between numbers and densities of those species and heathland area within each SPA component plus the percentage of urban development and woodland cover within a 500m buffer zone around the SPA components.

Investigation of Relationships between Bird Populations and Distributions to Habitat Type and Distribution and Recreational Use of Thames Basin Heaths SPA

- 4.19 The majority of the ecological basis to justify the need of the DDP approach is based on scientific research undertaken for the Dorset Heaths SPA. No specific ecological research by NE is included within the DDP for the TBH SPA. Hence, having replicated and expanded the Liley and Clarke (2003) research for the entirety of the SPA components, EDP has then undertaken detailed research and analysis for a sample of the SPA components within the SPA. The aim of the detailed research was to investigate whether there was evidence for a link between bird population and distribution, habitat and recreation within these components of the TBH SPA.

³² Chatterjee, S. & Price, B (1977). Regression Analysis by Example. John Wiley & Sons, New York.

4.20 The SSSI components of the SPA subject to detailed analysis were:

- (i) Bourley and Long Valley;
- (ii) Eelmoor Marsh;
- (iii) Broadmoor to Bagshot Woods and Heaths;
- (iv) Sandhurst to Owlsmoor Bogs and Heaths; and
- (v) Ockham and Wisley Common.

4.21 These five components of the SPA account for an area of 2,874 ha of a total TBH SPA area of 8,318 ha, or 35% of the entire TBH SPA.

Data Collation

4.22 For each of the above components, information was collated in relation to attributes related to species, habitats and recreation. These attributes are discussed in detail below.

Species

4.23 Information in relation to the territory numbers and distribution of nightjar, woodlark and Dartford warbler for each of the five components of the SPA was purchased from 2Js Ecology. Only data from 2003, 2004 and 2005 was used for this investigation for the following reasons:

- (i) It is understood that it is the best available data set for the three bird species within the TBH;
- (ii) It is understood that a broadly consistent methodology has been used to collated the information; and
- (iii) It provides the most comprehensive data set for the components of the SPA subject to detailed investigation.

4.24 The data was supplied by 2Js Ecology in a format which meant that it could be used in a Geographical Information System (GIS).

Habitats

4.25 Habitat information for each of the five components of the SPA was collated and verified by undertaking the following stages of work:

- (i) Following an initial site visit, the broad habitats of each SSSI were classified in accordance with key structural and compositional attributes. The hierarchy of classification used, together with a description of each habitat class is set out in **EDP Volume II Appendix 5**. It was considered that developing a bespoke classification system enabled targeted and specific habitat types to be identified that were likely to provide more meaningful information to bird territories than using existing habitat classification methodologies such as National Vegetation Classification (NVC);

- (ii) Detailed aerial photography was initially used to broadly map and identify the main habitat patches and their potential classification;
- (iii) Once the areas had been broadly mapped from aerial photography, each of the five components of the SPA were visited and walked to ground truth the aerial photography interpretation and to confirm the main habitat type of each patch. In the majority of cases this was relatively straight forward; however there were occasions where more than one class was mixed within a single patch. In those cases, the dominant habitat class was assigned to the patch. With respect to woodland, the exterior of an area was frequently deceptive of the internal structure (e.g. conifer woodland fringed with broadleaf woodland); in such cases the patches were viewed from different angles both from the exterior and interior;
- (iv) Once the areas had been ground truthed, the information was used to produce a definitive habitat map for each of the five components of the SPA. The maps were inputted into a GIS and are reproduced at **EDP Volume III Plans: Detailed Study**.

4.26 Stage (ii) and (iii) were undertaken as a rolling programme of work between late-June and early-September 2006. In order to ensure that a consistent approach was employed to collate and verify this information, a single surveyor was used to undertake the above stages of work.

Recreation and access

- 4.27 Recreational information for each of the five components of the SPA was collated and verified by undertaking the following stages of work:
- (i) Following an initial site visit, a system of path categorisation was devised to define different path types. The system was then 'tested' in the field for effectiveness before being implemented; the classification being specific to the heaths, and enabling clear mapping to reflect on-site conditions within the limitations of the fieldwork. The main purpose of the system was to categorise routes based on a combination of type and use (as set out at **EDP Volume II Appendix 6**).
 - (ii) Prior to field survey, paths were initially identified and mapped using aerial photography and Ordnance Survey mapping. All routes identified through aerial photography were then walked for each of the five components of the SPA, and any additional routes marked.
 - (iii) In addition to the categorisation of the routes, a system of symbols was used to define where barriers, stiles/gates, way markers and fingerposts were located.
 - (iv) Once the field data was gathered, it was then used to produce a series of maps of paths for each of the five components of the SPA. The maps were

then transferred into GIS and are reproduced at **EDP Volume III Plans: Detailed Study**.

- 4.28 Again, in order to ensure that a consistent approach was employed to collate and verify this information, a single surveyor was used to undertake the above stages of work³³.

Analysis

- 4.29 In order to undertake a detailed statistical analysis of the information collated, each of the five SSSI components of the SPA were divided by a 200m by 200m grid. Each grid square was assigned a unique ID number. For each grid square the following information (presented at **EDP Volume II Appendix 10**) was collected:
- (i) Area of SPA (ha). See paragraph 2.29, bullet point (iii) above regarding how these figures were calculated for the TBH;
 - (ii) Area of Grid Square (ha) as a percentage of the component SPA area (ha). This would differ as a result of the size of the SSSI, for instance, for larger SPA components such as Broadmoor to Bagshot Woods and Heaths the grid square only accounted for a small percentage of the overall area (e.g. 0.5%), while for smaller SPA components such as Sandhurst to Owlsmoor Bogs and Heaths the grid square accounted for a higher percentage of the overall area (e.g. 4.7%). With respect to grid squares that straddle the boundary of the SPA, only the proportion of the grid square within the SPA was counted, hence a percentage of less than 0.5% in the case of Broadmoor to Bagshot Woods and Heaths.
 - (iii) Proximity of Grid Square to SPA Boundary (m). Since the information was in GIS format, it was possible to calculate this distance with a reasonably high degree of accuracy. The measurement was taken from the centre of each grid square to the closest boundary of the SPA.
 - (iv) Numbers of nightjar, woodlark and Dartford warbler territories. For each grid square, these were manually counted and the number was a mean value of 2003, 2004 and 2005 territory numbers obtained from John Eyre.
 - (v) Habitat Type and Amount (ha). For each grid square the area of each habitat type within that square was calculated.
 - (vi) Right of Way Type and Length (m). For each grid square the length of each footpath type together with total footpath length was calculated.
- 4.30 Having collated the above information for each grid square, the data set was subject to statistical analysis as described below. An initial attempt was made to disclose better the underlying structure of the habitat data using principal components

³³ The only exception being a small section of the north eastern corner of Bourley and Long Valley, which was undertaken by a different surveyor in mid September 2006.

analysis (see Krzanowski 1988)³⁴. However, it was found that the complex data set was only slightly simplified by means of this technique (the first two axes accounted for only around 30% of the variance in the dataset, even after several of the columns had been combined) and it was not pursued further.

- 4.31 The most practical approach to the habitat data was therefore judged to be a series of univariate tests, comparing habitat data for 200 x 200 m squares that supported territories of the target species with squares that did not. For this part of the analysis, the 24 columns relating to conifer, broad-leaved and mixed woodland (8 columns for each of the 3 habitat types) were amalgamated into 2 columns for each habitat:
- (i) a total figure for mature plus semi-mature woodland (combining penetrable and impenetrable types); and
 - (ii) a total figure for immature plus pioneer woodland (again combining penetrable and impenetrable).
- 4.32 Path length was also compared for squares supporting territories of the target species and those not supporting them. The dataset was sparse for several of the path types and the six path categories were therefore amalgamated into two;
- (i) types A+, A and B; and
 - (ii) types C, D and E.
- 4.33 The habitat and path length data were not normally distributed and were therefore compared using the Mann-Whitney test.
- 4.34 The distribution of squares supporting territories of nightjar, woodlark and Dartford warbler was also investigated in relation to the distance to the SPA boundary. For each of the three species, the distance between the square and the SPA boundary was calculated and compared with an identical number of randomly selected squares. Again, the data were not normally distributed and were compared using the Mann-Whitney test.
- 4.35 All statistical tests were performed using MINITAB v. 12.2.

Results

- 4.36 The following section sets out the results of the analysis undertaken for EDP's investigations.

Comparison of Key Attributes of Thames Basin Heaths and Dorset Heaths SPA

- 4.37 The Dorset Heaths SPA covers an area of approximately 10,304ha compared to the TBH SPA which covers an area of approximately 8,317ha. Whilst they are broadly

³⁴ Principles of Multivariate Analysis. Oxford University Press.

similar in overall area, the Dorset Heaths SPA consists of 36 component SSSIs, compared to the 13 component SSSIs of the TBH SPA.

4.38 EDP has undertaken some simple statistics on the key attributes of the Dorset Heaths SPA and TBH SPA, which are presented in **Table EDP 4**, below.

Variable	Location	Mean (ha)	Median (ha)	Range (ha)
Component Area	Dorset	286.2	86.0	24 - 1396
	Thames Basin	640.0	657.0	63 - 1696
Area of Heathland within Component	Dorset	174.6	38.9	10.3 - 990.0
	Thames Basin	292.6	188.7	34.6 - 871.5
Area of Developed Land within 500 m of Component Boundary	Dorset	82.1	38.3	0.0 - 369.0
	Thames Basin	208.6	157.6	15.4 - 579.0
Area of Woodland within 500 m of Component Boundary	Dorset	136.9	80.0	0.8 - 702.8
	Thames Basin	241.4	295.3	42.1 - 464.7

TABLE EDP 4: Comparison of Dorset Heath SPA components and Thames Basin Heaths SPA components in terms of area (ha).

4.39 From these figures it can be seen that the TBH SPA components tend to be larger than the Dorset Heaths SPA components (mean value approximately 2.2 times as great, median value approximately 7.5 times as great). As a result of this:

- (i) Individual components of the TBH SPA tend to contain correspondingly more heathland (mean approximately 1.7 times as great, median approximately 4.9 times as great) than the Dorset Heaths SPA;
- (ii) The TBH SPA components have correspondingly more developed land (mean approximately 2.5 times as great, median approximately 4.1 times as great) within the 500m buffer around their margins; and
- (iii) The TBH SPA components have correspondingly more woodland (mean approximately 1.8 times as great, median approximately 3.7 times as great) within the 500 m buffer around their margins.

4.40 Although the absolute amount of heathland tends to be greater in the case of the TBH SPA components, the proportion of heathland within them tends to be slightly less (mean value approximately 0.9 times as great, median value approximately 0.7 times as great) than is the case for the Dorset Heaths SPA components, although the Thames Basin figure spans a slightly greater range. This is presented in **Table EDP 5**, below.

Variable	Location	Mean (%)	Median (%)	Range (%)
Percentage Heathland within SPA Components	Dorset	52.9	53.9	31.3 - 73
	Thames Valley	45.4	40.3	24.1 - 77.4

TABLE EDP 5: Comparison of Dorset Heaths SPA components and Thames Basin Heaths SPA components in terms of percentage heathland cover within them (%).

- 4.41 Considered in percentage terms rather than in terms of absolute area (Table 3), the Thames Basin Heath SPA components tend on average to have a greater proportion of developed land around them than the Dorset Heaths SPA components (mean value approximately 1.7 times as great, median value approximately 3.3 times as great), although the more extreme sites in both locations have similar proportions of development (ranging from none or almost none to around 63%). This is illustrated in **Table EDP 6**, below.
- 4.42 In terms of woodland cover, the Thames Basin Heath SPA components on average also have a greater proportion of woodland around them than the Dorset Heaths SPA components (mean value approximately 1.5 times as great, median value approximately 2 times as great). This is illustrated in **Table EDP 5**, below.

Variable	Location	Mean (%)	Median (%)	Range (%)
Percentage Urban Development in 500 m Buffer of SPA Component	Dorset	14.6	6.0	0.0 - 62.8
	Thames Valley	24.1	19.9	3.3 - 63.5
Percentage Woodland in 500 m Buffer of SPA Component	Dorset	17.9	14.5	0.23 - 59.7
	Thames Valley	26.1	28.6	12.4 - 37.5

TABLE EDP 6: Comparison of Dorset Heaths SPA and Thames Basin Heaths SPA in terms of percentage urban and woodland cover in surrounding 500 m buffer areas (%) of each component.

- 4.43 Review of the Dorset and Thames Valley SPA components indicates that they are comparable in terms of the density of nightjars they support (**Table EDP 7**, below). A statistical comparison (Mann-Whitney test) shows no suggestion that the density values come from different statistical populations ($p = 0.78$).

Variable	Location	Mean	Median	Range
Nightjar density	Dorset	0.1024	0.0840	0.0000 - 0.3190
	Thames Valley	0.0886	0.0742	0.0307 - 0.2248

TABLE EDP 7: Comparison of Dorset Heaths SPA and Thames Basin Heaths SPA in terms of nightjar density (number of territories per hectare heathland)

- 4.44 From the preceding tables it can be seen that the Dorset Heaths SPA components and TBH SPA components are similar in some regards but different in others. In particular, the TBH SPA components tend to be larger, less fragmented and have a greater proportion of developed land around them. But they are comparable in terms of their nightjar densities.

Replication and Expansion of Liley and Clarke (2003) Paper for the Thames Basin Heaths SPA

Nightjar data

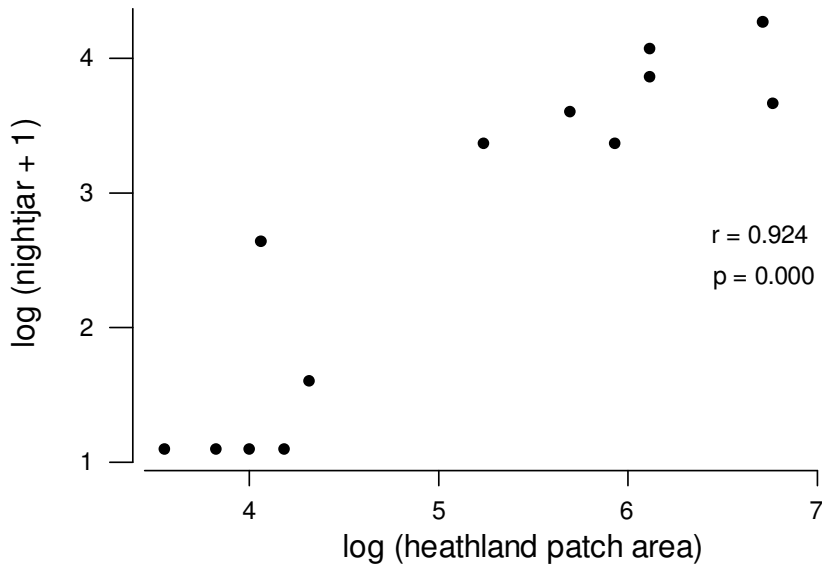


FIGURE EDP1: Relationship between \log_{10} number of nightjars (+1) and \log_{10} heathland area of each SPA component.

4.45 **Figure EDP 1** (above) shows the relationship between nightjar numbers (\log (nightjar numbers + 1)) and heathland area (\log (heathland patch area)). The correlation is positive and statistically highly significant ($p < 0.001$).

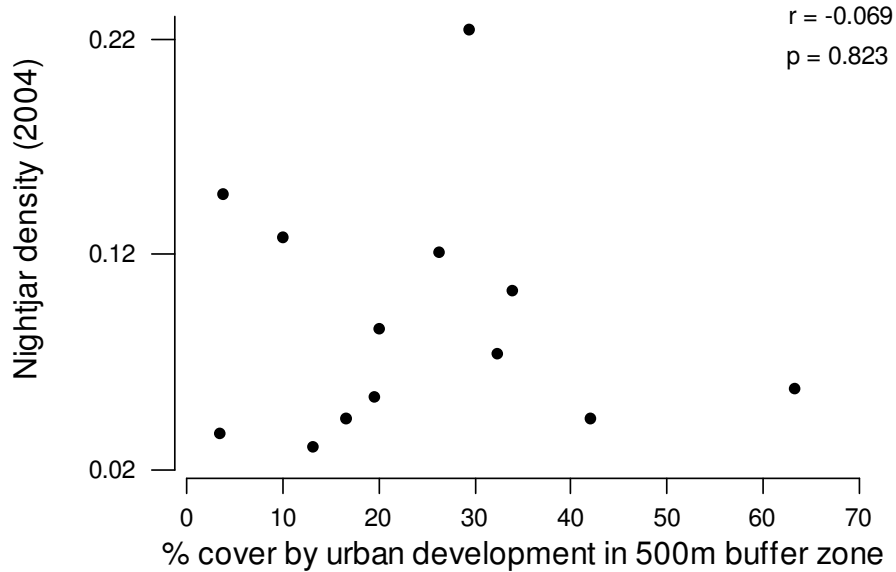


Figure EDP2: Relationship between nightjar density (number of nightjar territories per hectare of heathland within each site) and percentage cover by urban development within 500 m buffer zone.

4.46 **Figure EDP 2** (above) shows the relationship between nightjar density (per hectare heathland on each SPA component) and percentage cover of urban development within the 500m buffer zone of each SPA component. There is no statistically significant correlation between the two variables.

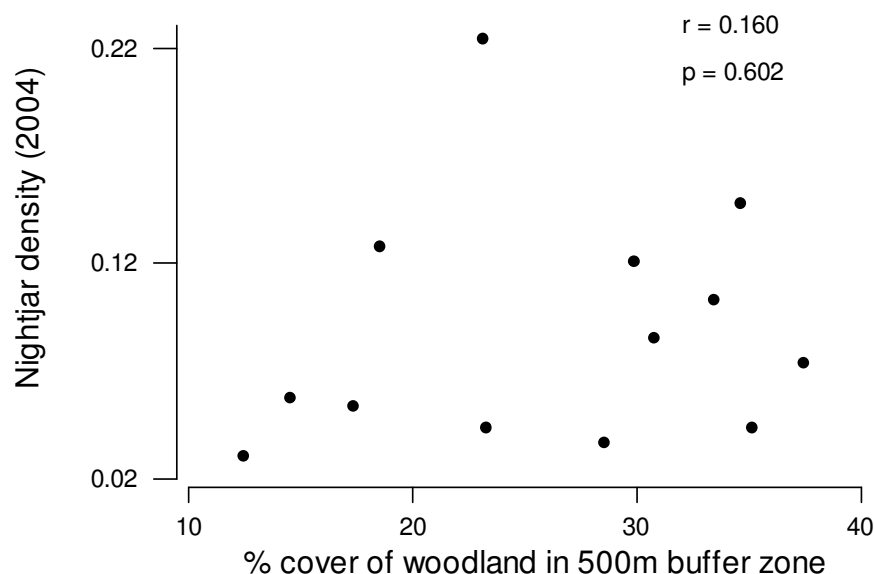


Figure EDP 3. Relationship between nightjar density (number of nightjar territories per hectare of heathland within each site) and percentage cover by woodland within 500 m buffer zone.

4.47 Figure EDP 3 (above) shows the relationship between nightjar density (per hectare heathland on each SPA component) and percentage cover of woodland within the 500m buffer zone of each SPA component. There is no statistically significant correlation between the two variables.

4.48 In contrast with the findings of Liley & Clarke (2003), no significant relationship was found between nightjar density and (log) SPA component size ($r = 0.196$, $p = 0.521$).

4.49 A regression model was fitted, using:

- (i) the logarithm of heathland area;
- (ii) the percentage urban development within the buffer zone; and
- (iii) the percentage of woodland within the buffer zone as predictors of (log) nightjar numbers.

4.50 The model is shown in the box below; the result being consistent with the findings above. The model revealed a highly significant and positive relationship between heathland area and nightjar numbers, but no effect associated with the amount of woodland or urban development in the surrounding buffer. Examination of the fitted values revealed Horsell Common to be an outlier with an unexpectedly high

nightjar numbers. Omission of the Horsell Common data from the model did not, however, lead to any significant differences in the conclusions.

Investigation of Relationships between Bird Populations and Distributions to Habitat Type and Distribution and Recreational Use of Thames Basin Heaths SPA

Regression Analysis					
The regression equation is					
ln(nightjar) = - 3.53 + 1.11 ln(heathland) + 0.0008 Urban as % buffer					
+ 0.0139 Woodland as % buffer					
Predictor	Coef	StDev	T	P	
Constant	-3.5282	0.9665	-3.65	0.005	
ln(heath	1.1084	0.1742	6.36	0.000	
Urban as	0.00075	0.01170	0.06	0.950	
Woodland	0.01392	0.02469	0.56	0.587	
S = 0.6564 R-Sq = 84.8% R-Sq(adj) = 79.7%					
Analysis of Variance					
Source	DF	SS	MS	F	P
Regression	3	21.6376	7.2125	16.74	0.001
Residual Error	9	3.8779	0.4309		
Total	12	25.5154			
Source	DF	Seq SS			
ln(heath	1	21.4984			
Urban as	1	0.0022			
Woodland	1	0.1370			

TABLE EDP8: Summary of regression model

4.51 The model developed by Liley and Clarke (their Eqn.2) should be able to be used for predicting nightjar numbers elsewhere, given appropriate data on heathland area and the percentage urban development and woodland in the adjacent 500 m buffer. Indeed, the above findings indicate a very strong and significant correlation between the natural logarithm of predicted (using the Liley and Clarke model) and actual nightjar numbers ($r = 0.876$, $p < 0.001$) for the Thames Basin SPA components sites (this may not be considered surprising given the overwhelming effect of heathland area on nightjar numbers). Furthermore, if the terms associated with percentage urban land and woodland within the buffer are simply removed from the Liley and Clarke model, the correlation between actual and predicted numbers is stronger still ($r = 0.918$, $p < 0.001$).

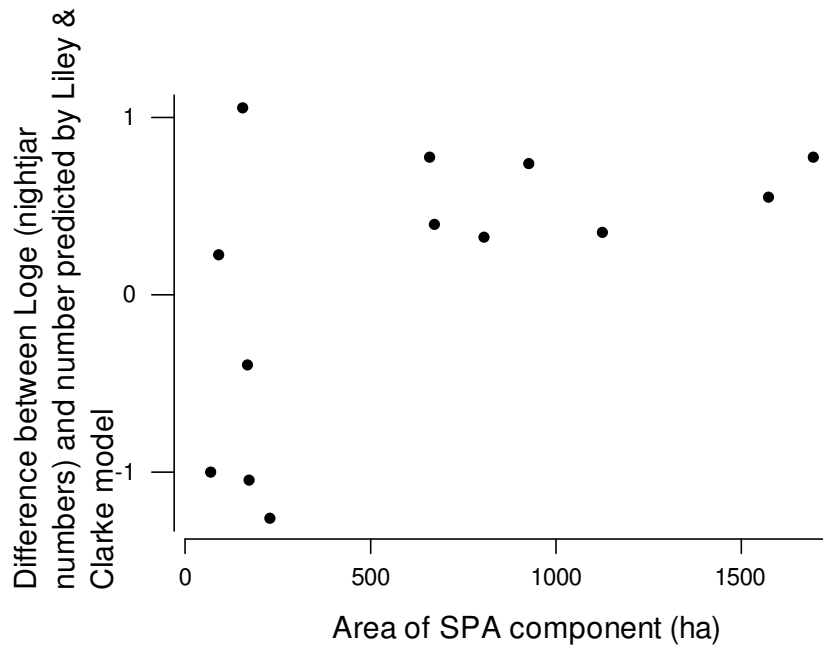


FIGURE EDP4: Difference between the logarithm of the actual number of nightjar territories and the number predicted by the Liley & Clarke model, plotted against area of the SPA component.

4.52 Figure EDP 4 shows the difference between the logarithm of the number of nightjar territories predicted by the Liley & Clarke model and the actual number, plotted against area of the SPA component. There is a positive and statistically significant correlation between the two ($r = 0.557$, $p = 0.048$).

Woodlark Data

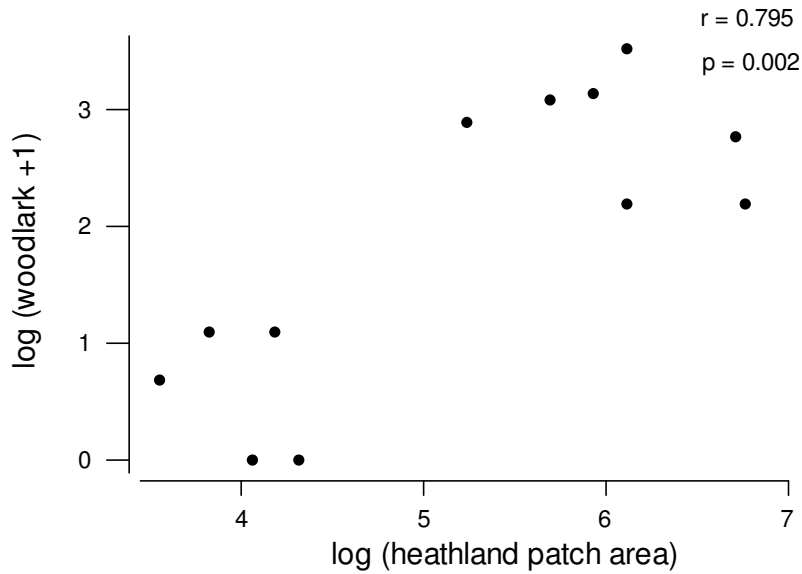


FIGURE EDP5: Relationship between \log_e number of woodlarks (+1) and \log_e heathland area of each SPA component.

4.53 **Figure EDP5** (above) shows the relationship between woodlark numbers (\log woodlark numbers + 1) and heathland area (\log (heathland patch area)). As with the nightjar data, the correlation is positive and statistically highly significant ($p = 0.002$)

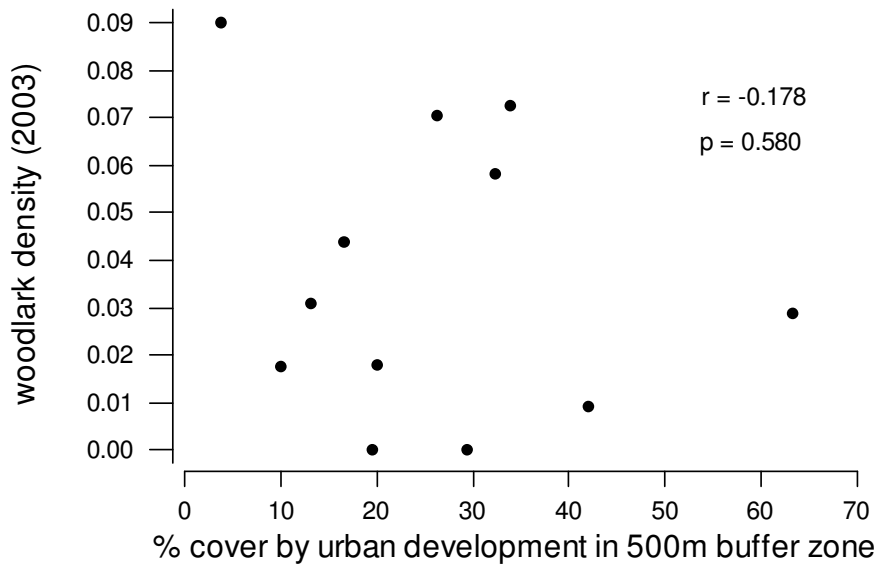


Figure EDP6: Relationship between woodlark density (number of woodlark territories per hectare of heathland within each site) and percentage cover by urban development within 500 m buffer zone.

4.54 **Figure EDP6** (above) shows the relationship between woodlark density (per hectare heathland on each SPA component) and percentage cover of urban development within the 500m buffer zone of each SPA component. There is no statistically significant correlation between the two variables.

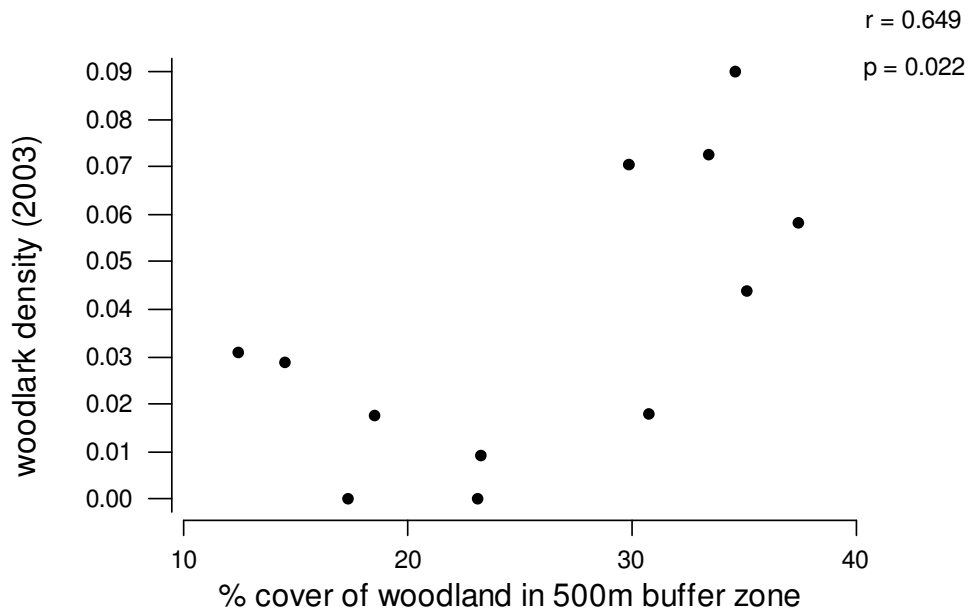


Figure EDP7: Relationship between woodlark density (number of woodlark territories per hectare of heathland within each site) and percentage cover by woodland within 500 m buffer zone.

- 4.55 Figure EDP7 (above) shows the relationship between woodlark density (per hectare heathland on each SPA component) and percentage cover of woodland within the 500m buffer zone of each SPA component. There is a statistically significant positive correlation ($p = 0.022$) between the two variables.
- 4.56 A regression model was developed for woodlark in a similar way to that developed for nightjar. Only (log) heathland area was statistically significant as a predictor.

Dartford Warbler Data

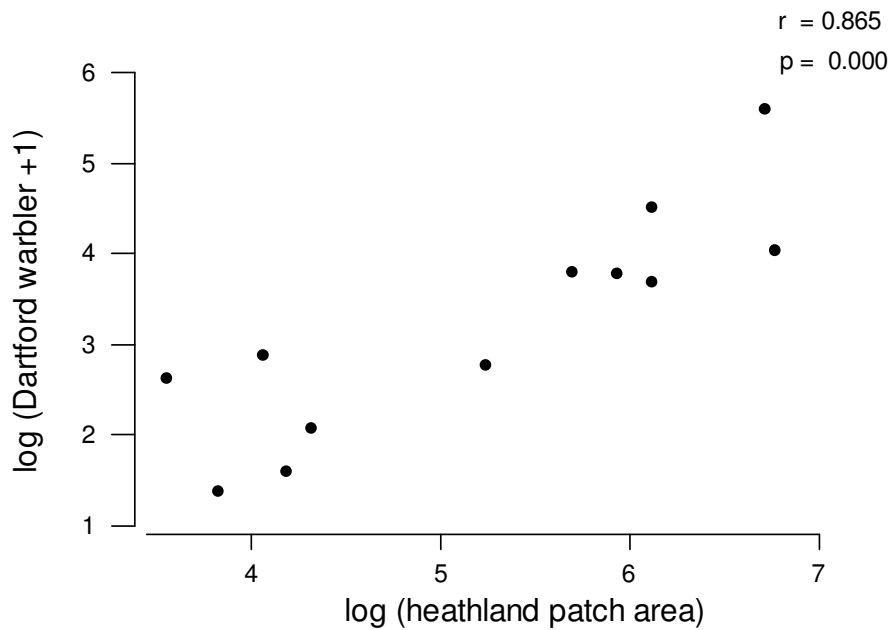


FIGURE EDP8: Relationship between \log_e number of Dartford warblers (+1) and \log_e heathland area of each SPA component.

- 4.57 **Figure EDP8** (above) shows the relationship between Dartford warbler numbers (\log (Dartford warbler numbers + 1)) and heathland area (\log (heathland patch area)). As with the nightjar and woodlark data, the correlation is positive and statistically highly significant ($p < 0.001$).

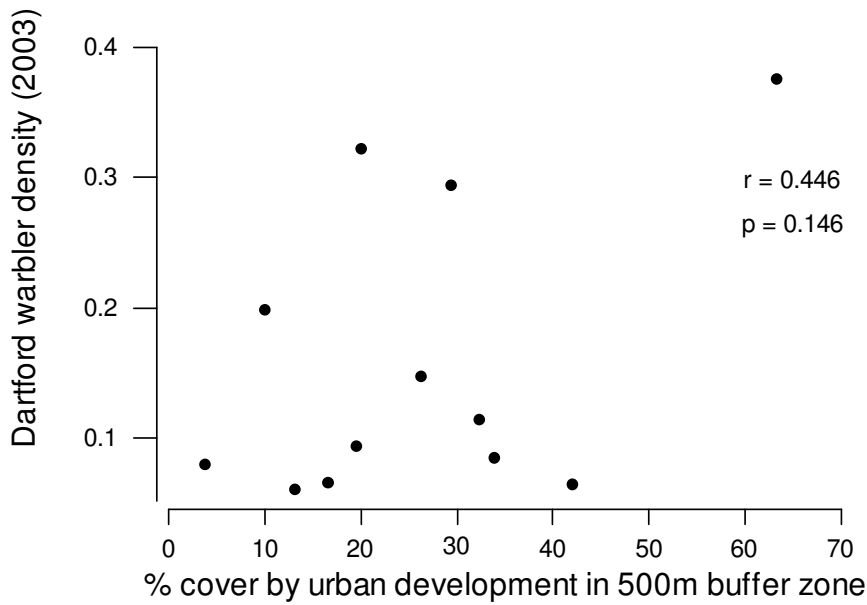


Figure EDP9: Relationship between Dartford warbler density (number of Dartford warbler territories per hectare of heathland within each site) and percentage cover by urban development within 500 m buffer zone.

4.58 **Figure EDP9** (above) shows the relationship between Dartford warbler density (per hectare heathland on each SPA component) and percentage cover of urban development within the 500m buffer zone of each SPA component. There is no statistically significant correlation between the two variables.

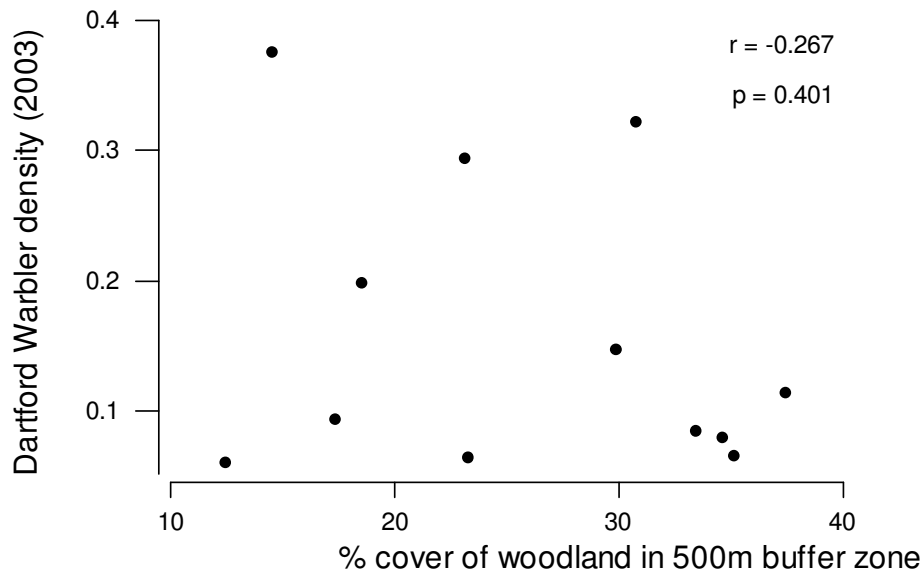


Figure EDP10: Relationship between Dartford warbler density (number of Dartford warbler territories per hectare of heathland within each site) and percentage cover by woodland within 500 m buffer zone.

- 4.59 **Figure EDP10** (above) shows the relationship between Dartford warbler density (per hectare heathland on each SPA component) and percentage cover of woodland within the 500m buffer zone of each SPA component. There is no statistically significant correlation between the two variables.
- 4.60 A regression model was developed for Dartford warbler in a similar way to that developed for nightjar. Only (log) heathland area was statistically significant as a predictor.

Investigation of Relationships between Bird Populations and Distributions to Habitat Type and Distribution and Recreational Use of Thames Basin Heaths SPA

Habitat	Nightjar present (n=141)	Nightjar absent (n=758)	p
Mature and semi-mature conifer woodland	14.54	24.94	<0.001
Immature and pioneer conifer woodland	3.74	3.34	ns
Mature and semi-mature broadleaved woodland	3.10	3.55	ns
Immature and pioneer broadleaved woodland	0.56	1.08	ns
Mature and semi-mature mixed woodland	9.45	16.20	<0.05
Immature and pioneer mixed woodland	7.63	3.23	<0.001
Heather/heathland	12.72	3.19	<0.001
Tussocky grassland	12.85	4.34	<0.001
Short grassland	1.48	1.52	ns
Gorse	1.82	0.36	<0.01
Bracken	9.57	4.54	<0.001
Clearfell	7.57	2.93	<0.05
Bare ground	3.22	1.39	<0.01
Early colonizing vegetation	0.05	0.13	ns
Hardstanding	0.23	0.21	ns
Water	0.20	0.43	ns

TABLE EDP 9: Comparison of habitat data for 200 x 200 m squares where nightjars are present and absent. The figures in the columns are the mean percentages of the total square area occupied by each habitat type (rather than the absolute area occupied by each habitat type) to allow for the fact that some squares fall partly outside the SPA boundary and therefore occupy less than the full 4 ha total area. Median values are not shown because they are mostly zero. Statistical significance has been tested using the Mann-Whitney test (adjusted for tied values) owing to non-normality of the data, with probability being shown in the final column. ns = not significant

4.61 **Table EDP9** (above) compares the habitats between 200 x 200 m squares where nightjars are present and absent. Squares with nightjar territories tend to have a significantly lesser proportion of mature/semi-mature conifer woodland and mature/semi-mature mixed woodland and greater proportions of:

- (i) Immature and pioneer mixed woodland;
- (ii) Heather/heathland;
- (iii) Tussocky grassland ;
- (iv) Gorse;
- (v) Bracken;
- (vi) Clearfell; and
- (vii) Bare ground.

Habitat	Woodlark present (n=127)	Woodlark absent (n=767)	p
Mature and semi-mature conifer woodland	20.48	23.80	ns
Immature and pioneer conifer woodland	4.69	3.22	<0.05
Mature and semi-mature broadleaved woodland	1.79	3.76	<0.05
Immature and pioneer broadleaved woodland	0.55	1.07	ns
Mature and semi-mature mixed woodland	8.78	16.09	<0.05
Immature and pioneer mixed woodland	3.87	3.95	ns
Heather/heathland	11.01	3.75	<0.001
Tussocky grassland	14.36	4.34	<0.001
Short grassland	2.51	1.37	<0.001
Gorse	2.47	0.31	<0.001
Bracken	6.78	5.13	ns
Clearfell	6.00	3.17	ns
Bare ground	5.65	1.08	<0.001
Early colonizing vegetation	0.48	0.05	<0.001
Hardstanding	0.23	0.21	ns
Water	0.18	0.43	ns

TABLE EDP 10: Comparison of habitat data for 200 x 200 m squares where woodlark are present and absent. The figures in the columns are the mean percentages of the total square area occupied by each habitat type (rather than the absolute area occupied by each habitat type) to allow for the fact that some squares fall partly outside the SPA boundary and therefore occupy less than the full 4 ha total area. Median values are not shown because they are mostly zero. Statistical significance has been tested using the Mann-Whitney test (adjusted for tied values) owing to non-normality of the data, with probability being shown in the final column. ns = not significant. NB total sample size is slightly smaller than for nightjar and Dartford warbler, owing to an absence of woodlark data for four squares.

4.62 **Table EDP10** (above) compares the habitats between 200 x 200 m squares where woodlark are present and absent. Squares with woodlark territories tend to have a significantly lesser proportion of mature/semi-mature broadleaved woodland and mature/semi-mature mixed woodland and greater proportions of:

- (i) Immature and pioneer conifer woodland;
- (ii) Heather/heathland;
- (iii) Tussocky grassland ;
- (iv) Short grassland;
- (v) Gorse;
- (vi) Bare ground; and
- (vii) Early colonising vegetation.

Habitat	Dartford warbler present (n=94)	Dartford warbler absent (n=805)	p
Mature and semi-mature conifer woodland	5.10	25.45	<0.001
Immature and pioneer conifer woodland	1.53	3.62	ns
Mature and semi-mature broadleaved woodland	3.61	3.46	ns
Immature and pioneer broadleaved woodland	3.36	0.72	<0.001
Mature and semi-mature mixed woodland	6.73	16.12	<0.01
Immature and pioneer mixed woodland	7.25	3.53	<0.001
Heather/heathland	22.37	2.62	<0.001
Tussocky grassland	15.05	4.58	<0.001
Short grassland	1.30	1.54	ns
Gorse	3.45	0.26	<0.001
Bracken	13.79	4.33	<0.001
Clearfell	7.11	3.25	ns
Bare ground	0.78	1.79	ns
Early colonizing vegetation	0.00	0.12	<0.01
Hardstanding	0.32	0.20	ns
Water	0.09	0.43	ns

TABLE EDP11: Comparison of habitat data for 200 x 200 m squares where Dartford warbler are present and absent. The figures in the columns are the mean percentages of the total square area occupied by each habitat type (rather than the absolute area occupied by each habitat type) to allow for the fact that some squares fall partly outside the SPA boundary and therefore occupy less than the full 4 ha total area. Median values are not shown because they are mostly zero. Statistical significance has been tested using the Mann-Whitney test (adjusted for tied values) owing to non-normality of the data, with probability being shown in the final column. ns = not significant.

4.63 **Table EDP11** (above) compares the habitats between 200 x 200 m squares where Dartford warbler are present and absent. Squares with Dartford warbler territories tend to have a significantly lesser proportion of mature/semi-mature conifer woodland, mature/semi-mature mixed woodland and early colonizing vegetation and greater proportions of:

- (i) Immature and pioneer broadleaved woodland;
- (ii) Immature and pioneer mixed woodland;
- (iii) Heather/ heathland;
- (iv) Tussocky grassland ;
- (v) Gorse; and
- (vi) Bracken.

		Median distance (m)	Mean distance (m)	p
Nightjar (n=141)	Present	350	442.3	<0.001
	Random squares	230	324.3	
Woodlark (n=127)	Present	490	529.2	<0.001
	Random squares	160	304.2	
Dartford warbler (n=94)	Present	380	445.6	<0.01
	Random squares	210	328.5	

TABLE EDP12: Mean/median distance between SPA perimeter and squares supporting territories of the three bird species, compared with an identical number of randomly selected squares. Statistical significance has been tested using the Mann-Whitney test (adjusted for tied values) owing to non-normality of the data.

4.64 **Table EDP12** (above) compares the mean and median distances from the SPA perimeter of squares supporting territories of nightjar, woodlark and Dartford warbler with identical numbers of randomly selected squares within the SPA components. For each species, squares supporting bird territories are significantly further from the SPA perimeter than would be expected by chance.

Species	Presence/absence	Total length of A+, A and B paths (m)			Total length of C, D and E paths (m)		
		Median	Mean	p	Median	Mean	p
Nightjar	Present	279	285.4	<0.001	0	34.7	ns
	Absent	185.5	211.7		0	30.6	
Woodlark	Present	279	295.2	<0.001	0	22.4	ns
	Absent	189	211.6		0	32.9	
Dartford warbler	Present	274	264.6	ns	0	57.8	<0.05
	Absent	191.5	218.5		0	28.12	

TABLE EDP13: Comparison of path lengths for two combined path categories (A+, A and B vs C, D and E) for squares where the three species are present and absent. Statistical significance has been tested using the Mann-Whitney test (adjusted for tied values) owing to non-normality of the data.

4.65 **Table EDP13** (above) compares path length within squares supporting territories of nightjar, woodlark and Dartford warbler with squares not supporting territories of the three species. For path types A+, A and B combined, squares supporting territories of nightjar and woodlark are characterized by a significantly greater path length than squares where territories are absent. For path types C, D and E, there is no significant difference in path length between squares where nightjar, woodlark

and Dartford warbler are present or absent. But squares where Dartford warbler territories are present are characterized by a greater path length than squares where Dartford warblers are absent. If all path types are combined into a single figure for total path length, there is a statistically significant tendency for all three species to occur in squares where path length is greater ($p < 0.01$ in all cases).

Analysis

- 4.66 The ecological basis of EN's Draft Delivery Plan for the Thames Basin SPA is derived largely from studies undertaken on Dorset Heaths and not on studies of the Thames Basin SPA itself. In adopting this approach, EN has assumed that the results of the Dorset work are applicable and transferable to the situation in the Thames Basin, but no detailed scrutiny of this assumption has previously been made. The studies undertaken by EDP and reported here were conducted in order to examine this assumption.
- 4.67 In terms of their characteristics, there are similarities and differences between the Dorset Heaths and Thames Basin SPA components. Specifically, the overall SPA areas are similar but the Thames Basin SPA is composed of fewer components which tend to be correspondingly larger and less fragmented. As a result of their greater size, they tend to contain correspondingly more heathland and have correspondingly more developed land and woodland around their periphery. Although the absolute amount of heathland tends to be greater in the case of the Thames Basin sites, the proportion of heathland within them tends to be slightly less than is the case for the Dorset sites.
- 4.68 Considered in percentage terms rather than in terms of absolute area, the Thames Valley sites tend on average to have a greater proportion of developed land around them than the Dorset sites. In terms of woodland cover, the Thames Valley sites on average also have a greater proportion of woodland around them than the Dorset sites.
- 4.69 Comparison of the Dorset and Thames Valley SPA components indicates that they are similar in terms of the density of nightjars they support.
- 4.70 When drawing conclusions about the potential effects of further development in the vicinity of the Thames Basin SPA, particular emphasis has been placed by EN on the findings of a paper (Liley & Clarke, 2003) that showed a significant positive relationship between nightjar numbers and both site area and percentage woodland cover in a 500 m buffer around the margin of each site. This paper also found a significant negative relationship between nightjar numbers and percentage cover of urban development in a 500 m buffer around the margin of each site.
- 4.71 Specifically, the discovery of this significant negative relationship between nightjar numbers and percentage cover of urban development around heathland sites in Dorset has been used to make inferences about the acceptability of new development around the Thames Basin SPA components which support populations of nightjar in addition to woodlark and Dartford warbler. The reliability of those

inferences depends, of course, on there being an underlying similarity in the situation prevailing at the two different study areas.

- 4.72 A comparison of the Liley and Clarke (2003) study with a comparable one undertaken and described in this report on the Thames Basin SPA components shows similarities and differences. The relationship between nightjar numbers and heathland area was found to be positive in both cases. The differences between the findings from the two studies are, however, more important in light of the DDP approach. Liley & Clarke (p. 222 and their Fig. 3) found a '*...strong [and statistically very significant] negative correlation between nightjar density per hectare of heathland per patch and percentage cover by urban development within the 500 m buffer zone....*'. Analysis of the TBH SPA components shows no significant correlation. In other words, for the Thames Valley sites, no evidence was found of reduced breeding density in SPA components that have a greater amount of development around them.
- 4.73 Liley and Clarke also investigated the relationship between nightjar density and percentage woodland cover in the adjacent buffer zone (their Fig. 5). They identified a positive and statistically significant correlation. A similar examination of the Thames Valley sites shows no significant correlation. For the TBH, this present study therefore provides no evidence of increased breeding density in nightjars for sites that have a greater amount of woodland around them.
- 4.74 Liley and Clarke examined the effects of heathland area and the proportion of woodland and urban land within the surrounding 500m buffer in a single model. They found that, even taking account of heathland area of patch, the inclusion of percentage urban development and percentage woodland cover in the buffer zones yielded significant improvements to the model (their equation 2, p. 224). This finding was consistent with the idea that increased residential development around the sites tends to suppress nightjar numbers, and that increasing the amount of woodland around the sites tends to increase nightjar numbers over and above the effects of increased site area *per se*. In the TBH, however, it was found that the inclusion of data on the amount of woodland and urban land in the surrounding buffer did not yield a better model. This result is consistent with the findings above that there was no significant relationship between the amount of woodland or urban development in the surrounding buffer and the density of breeding nightjars.
- 4.75 The model developed by Liley and Clarke (their Eqn. 2) was used here to predict nightjar numbers in the Thames Basin SPA components. A very strong and significant positive correlation was found between predicted and actual values. This result is not surprising given the overwhelming effect of heathland area on nightjar numbers. It is, however, noteworthy that if the terms associated with percentage urban land and woodland within the buffer are simply removed from the Liley and Clarke model, the correlation between actual and predicted numbers is slightly stronger still. It was found that the full Liley and Clarke model tended to over-predict nightjar numbers for the smaller Thames Basin SPA components, but under-predicted them for the larger sites.

- 4.76 Taken together, these pieces of evidence show that nightjar numbers are strongly influenced by the area of heathland on a site. As far as can be judged by studies on only two groups of sites (Dorset and Thames Basin), the finding is of general applicability and is one that is entirely to be expected. Bigger areas of suitable habitat tend to support more birds. A comparison of the two studies in terms of the effect of urban development and woodland cover in a 500m buffer on nightjar numbers, however, does not reveal a consistent picture. Specifically in connection with the effects of development, the negative relationship between surrounding urban development and nightjar numbers that was found in the Dorset study was not found in the TBH study.
- 4.77 The results of observational studies such as these (in contrast with replicated and randomized experiments) need to be interpreted with care since the variable of interest (here, nightjar numbers or density) may be affected by many unknown factors that cannot be controlled. In the present case, it must also be recognized that neither study investigates directly the factor of primary interest to the investigation – namely disturbance. Instead, the amount of development around the sites (or SPA components) is used as a proxy since it is more easily quantified. The exact relationship between disturbance and amount of urban development remains unknown. But, to the extent that such studies are relevant in assessing the likely effects of additional development around the TBH, the findings of the present study have the benefit of being derived from data that relate to the Thames Valley itself rather than sites in a different area that have some similarities to the Thames Valley but which are also marked by differences.
- 4.78 When the present study was extended to include an assessment of woodlark and Dartford warbler numbers, the findings were broadly similar. In both cases, larger areas of heathland tended to support more birds and for neither species was there any evidence that the extent of urban development around the SPA components had an influence on bird numbers or density. Woodlark density was, however, found to increase with a greater proportion of woodland in the adjacent 500m buffer.
- 4.79 Presence and absence of nightjar, woodlark and Dartford warbler territories was investigated in relation to percentage cover of different habitat types within 200 x 200 m squares. The findings varied according to species, but, broadly speaking, mature woodland tended to be negatively associated with territory presence whilst young woodland, heathland, tussocky grassland, gorse, bracken and some other open habitats tended to be positively associated with territory presence.
- 4.80 This evidence, in combination with the established link between heathland area and Annex 1 bird species presence, strongly supports the notion that habitat management is the key factor in achieving the conservation objectives for the SPA and the success of Annex 1 species; that being as related to the condition status of the SSSI components. From a separate analysis of all 13 SSSI areas and the 148 component units, the pie charts below (**Figures EDP 11 and 12**) are compiled from published EN data to illustrate the proportion of sites subject to the Governments’

Public Service Agreement³⁵ target for SSSIs; or, in simple terms, those identified as being in real need of works to improve their conservation status.

4.81 **Figure EDP11** shows the area and percentage by area of SSSI units attributed to the 6 categories of condition status awarded by EN. 38% of designated land is considered to be 'unfavourable declining', 'unfavourable no change' or 'part destroyed' (the remainder being 'favourable' or 'unfavourable recovering').

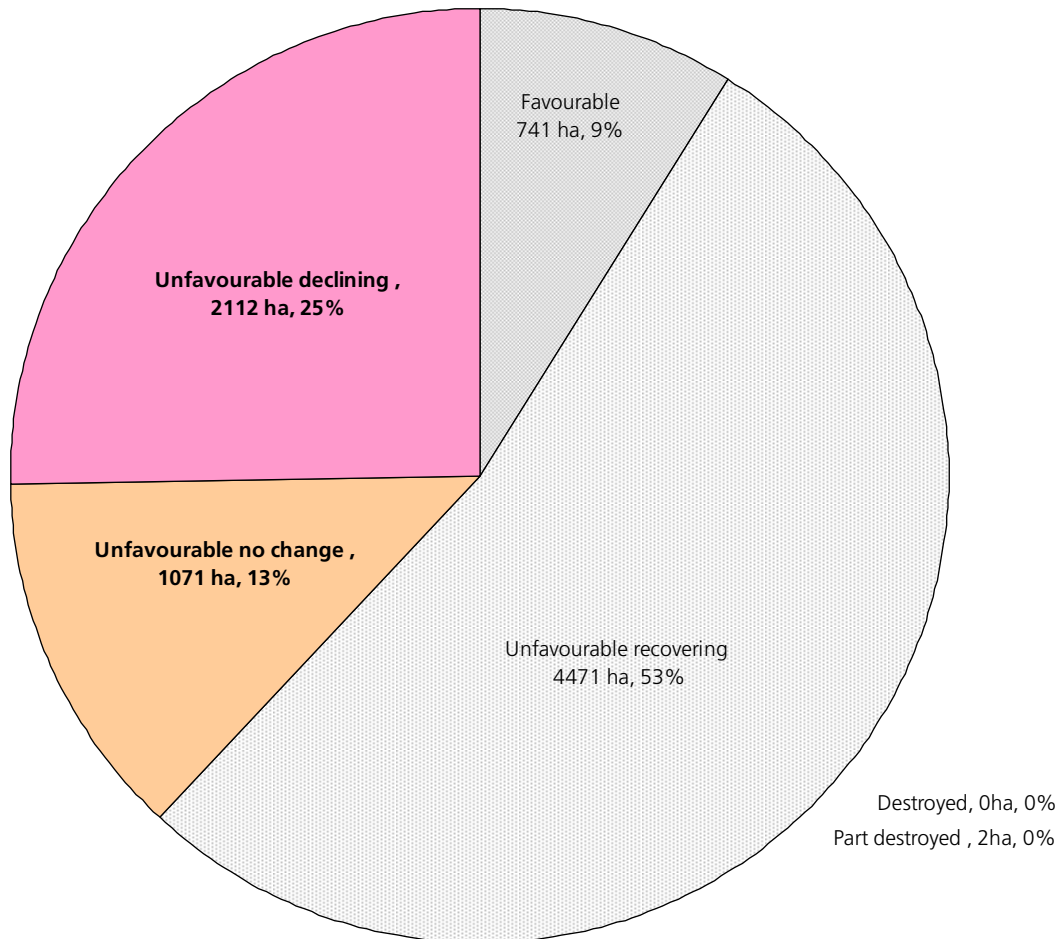


Figure EDP11: Condition status of 13 SSSIs covered by TBH SPA (by area). To be read in conjunction with **Table EDP14**. All data obtained from EN Website 1st May 2006.

³⁵ The Government's Public Service Agreement (PSA) target to have 95% of the SSSI area in favourable or recovering condition by 2010.

Status	% of TBH SSSI's
Favourable	8.83%
Unfavourable recovering	53.25%
Unfavourable no change	12.75%
Unfavourable declining	25.15%
Part destroyed	0.02%
Destroyed	0.00%

TABLE EDP14: Condition status of 13 SSSIs covered by TBH SPA by percentage of total area. Data obtained from EN Website 1st May 2006

4.82 Of the areas classified 'unfavourable no change' and below (those falling within the Governments PSA target for improvement), a separate analysis was conducted to examine the reasons given for adverse status. Reasons were grouped in respect of land uses and management practices concerned. **Figure EDP 12** and **Table EDP 15** show the proportion of land (%) of adverse status divided by of reasons given.

4.83 From these figures it can be seen that public disturbance is very rarely noted as a causal factor of adverse condition (0.36%), particularly when compared with such factors as military use, inappropriate weed and scrub control and under grazing. Fire, which may or may not be associated with urban development on the periphery or increased use of the heathland, is similarly attributed to a very small proportion of the harm identified as affecting the condition status of the SSSI be EN.

Reason noted for adverse status	% area affected
Fertiliser Use/ Water Pollution - Agriculture / Run Off/ Siltation	0.27%
Forestry and Woodland Management	10.28%
Inappropriate Cutting / Mowing/ Scrub control/ Weed Control	29.86%
Public Disturbance	0.36%
Invasive Freshwater Species	0.07%
Undergrazing	10.45%
Fire	0.80%
Military	24.48%
Other	23.43%

TABLE EDP15: Reasons given for adverse status of SSSIs units classified as 'unfavourable declining', 'unfavourable no change' or 'part destroyed' by percentage of area of adverse status. Data obtained from EN Website 1st May 2006.

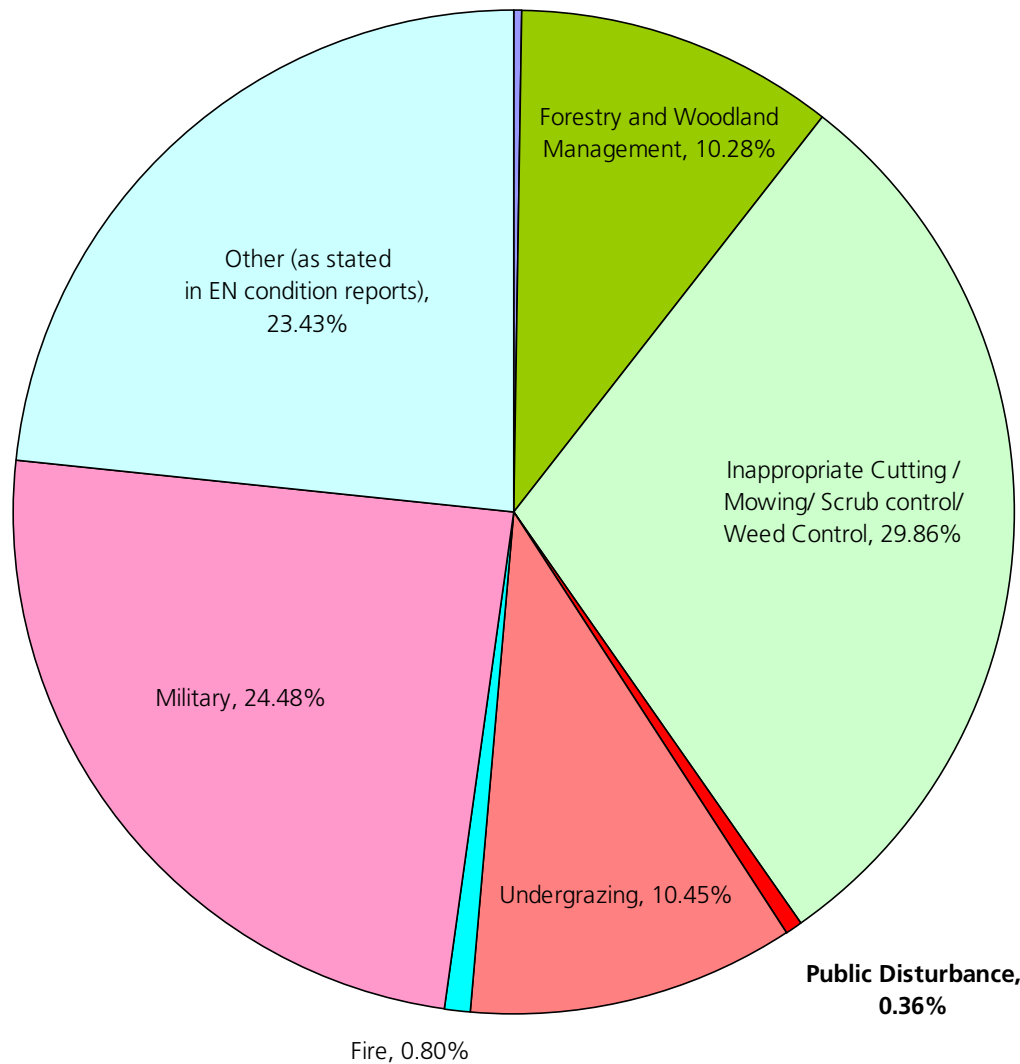


Figure EDP12: Reasons given for adverse status of SSSIs units classified as 'unfavourable declining', 'unfavourable no change' or 'part destroyed' by percentage of area of adverse status. To be read in conjunction with **Table EDP15**. All data obtained from EN Website 1st May 2006.

- 4.84 The relationship between territory presence/absence and length of pathway within the square was also investigated. It was conjectured that, if the three bird species were particularly sensitive to disturbance, territories would tend to occur in squares having lesser amounts of pathway within them. The relationship was, however, found either to be positive or not significant, depending on the species and classes of pathway being considered.. The explanation for this may be that most pathways tend to occur in the more open habitats that are favoured by the three bird species.
- 4.85 When the distances between the SPA boundary and squares supporting territories of nightjar, woodlark and Dartford warbler were compared with equal numbers of randomly chosen squares, the squares containing bird territories were found to be significantly further from the site margins than would be expected by chance. This

finding is consistent with an interpretation that involves disturbance as a cause, with the site margins being perhaps more heavily used by people and being avoided by the three bird species as a consequence. It is, however, also consistent with other explanations that do not involve disturbance. Probably the most plausible of these is that any bird occupying a territory on the edge of the SPA would have a less compact territory owing to the amount of unsuitable adjacent 'off-site' habitat. It would therefore have to travel further from the territory centre in order to cover an equivalent amount of suitable habitat compared with a territory that was situated within an area of suitable habitat that extended indefinitely far in all directions.

- 4.86 The failure to detect a significant negative relationship between numbers of all three species and the percentage of developed land in the 500 m buffer may seem counter-intuitive, given the published findings of Liley & Clarke (2003) for nightjar in the Dorset study. It is, however, noteworthy that in a separate publication for EN, Liley and Clarke (2002) reported a similar study that also included woodlark and Dartford warbler and which found no effects of the percentage urban development on those species.
- 4.87 There seems no reason to suppose that the relationship between the amount of disturbance and bird numbers must necessarily be a linear one over the full range of disturbance levels that may be experienced on heathlands in England. Indeed, one might imagine that the effects of a given increase in disturbance could be less if added to a background of high disturbance (such as the Thames Valley) compared with a situation where disturbance is low (as is the case in Dorset). If this were the case and if the percentage development within 500 m of the SPA components were a good predictor of disturbance, it would offer one explanation of why no significant relationship between urban development and nightjar numbers was found. The Thames Basin heaths are more heavily used and have, on average, a greater proportion of urban development around them. Under this particular combination of circumstances it may therefore be that the exact amount of urban development around the SPA components has little effect on bird numbers. More detailed study of the relationship between disturbance levels and bird numbers would be needed before it is possible to come to a more definite conclusion on this point.

Section 5 Conclusions

Ecological Factors

- 5.1 The ecological basis of EN's Draft Delivery Plan for the TBH SPA appears to be derived largely from studies undertaken on Dorset Heaths - it being assumed by NE that the results of the Dorset work are applicable and transferable to the situation in the Thames Valley. The studies by EDP here were undertaken in order to test that assumption.
- 5.2 In terms of their characteristics, there are similarities and differences between the Dorset Heaths and TBH SPA components. Specifically, the overall SPA areas are similar but the TBH is made up of fewer components which tend to be correspondingly larger and less fragmented. As a result of their greater size, they tend to contain more heathland, developed land and woodland around their periphery. Although the absolute amount of heathland tends to be greater in the case of the TBH sites, the proportion of heathland within them tends to be slightly less than is the case for the Dorset sites. The TBH sites also tend, on average, to have a greater percentage of developed and wooded land around them than the Dorset sites. Comparison of the Dorset and Thames Valley heathland SPA components indicates that they are analogous in terms of the density of nightjars they support.
- 5.3 When drawing its conclusions about the Thames Basin SPA, particular emphasis has been placed by EN on the findings of a peer reviewed paper (Liley & Clarke, 2003) that showed a statistically significant positive relationship between nightjar numbers and both site area and percentage woodland cover in a 500 m buffer around the margin of each site and a statistically significant negative relationship between nightjar numbers and percentage cover of urban development in the same 500 m buffer. The discovery of a significant negative relationship between nightjar numbers and percentage cover of urban development around heathland sites in Dorset has been used to make inferences about the acceptability of new development around the Thames Basin SPA components which supports populations of nightjar in addition to woodlark and Dartford warbler. The reliability of those inferences depends, of course, on there being an underlying similarity in the situation prevailing at the two different study areas.
- 5.4 This report comments on the findings of a study on the Thames Basin SPA components intended to provide a comparison of the Liley and Clarke study. Similarities and differences were again identified. For both the Dorset Heaths and the TBH areas, nightjar numbers are strongly influenced by the area of heathland within the component site. As expected, bigger areas of suitable heathland habitat tended to support more birds, reinforcing the findings of Liley and Clarke as a predictor for species occurrence on heathland. However, a comparison of the two studies in terms of the effect of urban development and woodland cover within a 500m buffer on nightjar numbers does not reveal a consistent picture. The significant negative relationship between surrounding urban development and

nightjar numbers found in the Dorset study was not found in the Thames Basin study.

- 5.5 When the present study was extended to include an assessment of woodlark and Dartford warbler numbers, the findings were broadly similar. In both cases, larger areas of heathland tended to support more birds but for neither species was there any evidence that the extent of urban development around the SPA components had an influence on bird numbers or density. Woodlark density was, however, found to increase in line with proportion of woodland in the adjacent 500m buffer, in line with the Liley and Clark model.
- 5.6 Presence and absence of nightjar, woodlark and Dartford warbler territories were also investigated in relation to percentage cover of different habitat types within 200 x 200 m squares in five selected study areas covering some 35% of the TBH SPA. The findings varied according to species, but, broadly speaking, mature woodland tended to be negatively associated with territory presence whilst young woodland, heathland, tussocky grassland, gorse, bracken and some other open habitats tended to be positively associated with territory presence.
- 5.7 The relationship between territory presence/absence and length of pathway within the square was also investigated. It was conjectured that, if the three bird species were particularly sensitive to disturbance, territories would tend to occur in squares having lesser amounts of pathway within them. The relationship was, however, found either to be positive (four out of six cases) or not significant. The explanation for this may be that most pathways tend to occur in the more open habitats that are favoured by the three bird species.
- 5.8 When the distances between the SPA boundary and squares supporting territories of nightjar, woodlark and Dartford warbler were compared with equal numbers of randomly chosen squares, the squares containing bird territories were found to be significantly further from the site margins than would be expected by chance. This finding is consistent with an interpretation that involves disturbance as a cause, with the site margins being perhaps more heavily used by people and being avoided by the three bird species as a consequence. It is, however, also consistent with other explanations that do not involve disturbance. Probably the most plausible of these is that any bird occupying a territory on the edge of the SPA would have a less compact territory owing to the amount of unsuitable adjacent 'off-site' habitat.

Population Forecasts and Anticipated Recreational Use

- 5.9 If it is assumed that recreational use might increase in proportion to any population growth, then an increase in recreational usage of between 5-7% over 20 years is hardly likely to cause a significant adverse effect on the integrity of the SPA, if the existing population has not caused such an adverse impact over the last 5-10 years with, in fact, a growth in ground-nesting bird populations recorded in some of those years. The facts are supported by the findings of EN's own research papers which have suggested such findings.

- 5.10 Given that there is no evidence of recreational usage within the SPA having reached a threshold level beyond which recreational usage would be deleterious to habitat and / or species, there is no evidence of a likelihood that increased residential development will, in itself, result in adverse impact on the integrity of the SPA as a whole – be that in relation to habitat or bird species.

Measures Proposed Within EN Delivery Plan

- 5.11 On the above noted basis, the measures proposed by EN within their Delivery Plan are on the false premise of a direct relationship between relative development density, as a proxy for SPA visitor pressure, and the number of ground-nesting birds.
- 5.12 Even beyond that false premise, the EN proposals for mitigation standards are not based on any proven research or examples of any such given recreational area meeting the needs of, and absorbing, a stated level of population growth. In the absence of such evidence, there would appear no justification, even for adopting the EN precautionary principle, unless to prevent actions that were known, as a generality, to be adverse for the SPA heathland interests. This is not the case and nor has any such conclusion been based on any TBH research findings to date.

Section 6 Proposed Strategy

Is there a Need for a Strategic Approach?

- 6.1 On the basis of the EDP study findings within the TBH SPA, that there is no direct correlation between numbers of ground-nesting birds and the surrounding area of urban development; the need for a strategic approach to the control of new dwellings, and or associated mitigation is called into question.
- 6.2 The findings of this report, which relate to the current populations of both people and ground-nesting birds, also need to be related to the private household population forecast figures. For the 20 year period 2006-2026 these findings indicate a population growth of just over 0.33% per annum. If it is assumed that the level of recreational user grows proportionately to the population and associated number of dwellings, then the overall potential increase of recreational use is likely to be at a similar level.
- 6.3 If there were a reliable and identified need for 'avoidance' or 'mitigation' measures related to the SPA and population growth, then EDP shares the EN view that such measures should be selected from one or more elements, namely:-
- i) Access management control within the SPA;
 - ii) Habitat management and enhancement within the SPA;
 - iii) Off-site measures to influence recreational patterns and use – so as to remove pressure from the SPA and replace it with new or enhanced facilities outwith the SPA.
- 6.4 The conclusions of this report differ significantly from the EN stance in that, with the indication of heathland area being the primary factor related to numbers of ground-nesting birds, it surely is a priority to concentrate on the SPA itself both for habitat and access management. This approach is certainly more rational than the DDP approach, which will unduly restrict a comparatively very small proportion of new residential development within the SPA 5km catchment without addressing the issue of assessment of management measures required within the SPA. As an alternative to the DDP approach, therefore, EDP recommends that a concentrated emphasis should be given to management measures within the SPA. Concurrently, further research must be undertaken into the relationship between recreation activities resulting from new development and any possible effect this might have on existing bird populations over and above existing use of the SPA by existing residents.

The Dorset Model

- 6.5 EDP recently met with EN's Dorset Team to discuss the approach currently being promoted by that local EN team to address the potential impact of recreational pressure generated by residents in new residential development on the designated interest of the Dorset Heaths SPA. In the case of the Dorset Heaths, a number of the component SSSIs are also designated as Special Areas of Conservation (SAC) for their habitat and species interest.

- 6.6 The approach being developed and promoted by EN's Dorset Team, as of the 22nd September 2006, is summarised as follows:
- (i) EN is currently developing an "Interim Strategy" that, if adopted by the Local Planning Authorities (LPAs) within 5km of the Dorset Heaths SPA, will enable development within 400m and 5km to be permitted without EN objection on the SPA issue, subject to the principles of the Strategy being implemented.
 - (ii) It is envisaged that the Interim Strategy would be adopted for a period of three to five years until the various Local Development Frameworks (LDFs) have been adopted.
 - (iii) The Interim Strategy will not allow development within a direct line 400m distance of the SPA boundary due to available research on cat foraging distances and predation, excluding areas segregated by significant physical barriers to cat movement such as major roads. It is understood that EN's Dorset Team is currently preparing definitive plans showing the areas that fall within the 400m of the Dorset Heaths SPA Boundary.
 - (iv) For development proposals between 400m to 5km of the SPA boundary, developers will be expected to contribute, on a proportional basis to the scale of the development, a sum of money into a central fund held at County level. The level of contribution and how it is to be calculated is yet to be defined.
 - (v) The central fund will then be spent by a Steering Group on providing measures to mitigate the potential for residents of new residential development on the interest of the Dorset Heaths SPA through the provision of new or enhanced access and recreations facilities, land acquisition, wardening and ecological research. The spending will be at a strategic SPA level.

6.7 It is considered that, for the next 3-5 years, a similar model should be adopted and adapted for the TBH SPA. The potential model is illustrated in **EDP Volume II Appendix 11**, which should be read in conjunction with the description set out below.

Stage 1 – SPA Strategy

- 6.8 An outline of the key measures of the proposed SPA strategy is set out below:
- (i) Initially, no development that would lead to a net increase the number of residents within 400m of the SPA boundary would be permitted due to the likely impact of pets (particularly cats) on nightjar, woodlark and Dartford warbler. This would be reviewed and possibly revised depending on research undertaken on the following:
 - The applied practicalities of enforcing a "no pets" legal covenant; and

- The relationship between cat territories and predation within the TBH.

Development within 400m that would lead to a net reduction in the number of residents or would result in a certainty that the new residents would be less mobile and unlikely to use the SPA for recreational purposes would be permitted. Other local circumstances which may, to a significant degree, reduce or eliminate the potential for pets to gain access to the SPA should be considered in certain circumstances.

The 400m zone will be illustrated on definitive plans and will take account of significant barriers to the movement of predators such as cats.

- (ii) Development between 400m and 5km of the SPA that would result in a net increase in residents would be permitted subject to a developer contribution secured through a Section 106 agreement. The contribution would be proportional to the potential net increase in residents likely to occupy the site and the nature and extent of mitigation identified.

The potential net increase in residents would be calculated on an average number of residents per room of 0.45, based on the findings of the General Household Survey conducted in 2003. For example, a development that would replace one existing property with ten rooms (4.5 residents) and replaced with a development with thirty rooms (13.5 residents) would be considered to have the potential net increase of nine residents.

The contribution would be based on the potential net increase of residents and hence proportional to the scale of the proposed development. With respect to the level of contribution, it is considered that this would be based on per head of net increase in residents.

If this payment strategy was adopted, developer contributions have the potential to yield substantial funds to be used in achieving the conservation objectives for the TBH between 2006 to 2026.

- (iii) The Strategy would include a commitment to monitoring, review and, where necessary, modification depending on the findings of the research and monitoring set out at Stage 6, below.

Stage 2 – Role of Local Planning Authorities

- 6.9 The role of the Local Planning Authorities would be to secure the developer contribution into the SPA Developer Contribution Fund set out in Stage 3, below, and in line with the SPA strategy set out above.

Stage 3 – SPA Developer Contribution Fund

- 6.10 The Interim Strategy being developed by EN's Dorset team would see developer contributions being paid into a central fund held by Dorset County Council. It is

understood that this fund is already in place as part of the Urban Heaths Project LIFE Project.

- 6.11 It is considered that a similar SPA Developer Contributions Fund could be established for the TBH SPA, into which the developer contributions secured through the various local planning authorities could be paid.
- 6.12 Given the strategic nature of the SPA designation, it is considered that it would be preferable that the proposed SPA Developer Contribution Fund is held centrally to ensure that the fund is spent strategically, such as by the Government Office for the South East (GOSE) or the South East of England Regional Assembly (SEERA). However, it is envisaged alternatively that three separate funds could be established for each of the three Counties of Berkshire, Hampshire and Surrey. It is not considered that a separate fund should be held at local authority level since it is not considered that this would facilitate the strategic approach to the delivery of measures by the Fund.

Stage 4 – SPA Steering Group

- 6.13 The management, spending and auditing of the SPA Developer Contributions Fund should be undertaken by a newly established SPA Steering Group. It is considered that the Steering Group should consist of the following organisations:
- (i) GOSE/SEERA;
 - (ii) EN/NE;
 - (iii) Local Planning Authority Representatives (e.g. District Council Ecologists);
 - (iv) Major Public Landholders (e.g. Forestry Commission, Ministry of Defence);
 - (v) Wildlife Trusts;
 - (vi) Royal Society for the Protection of Birds;
 - (vii) Developer Representatives (e.g. HBF, TVNHC);

Stage 5 – SPA Works

- 6.14 The SPA Steering Group would identify and implement measures at a strategic level to be funded by the through the SPA Developers Contribution Fund, to include:
- (i) On-site works within the SPA Components;
 - (ii) Off-site works to provide new or enhanced access and recreation opportunities, to include strategic rights of way as well as sites; and
 - (iii) Research into the relationship between urban development and the ecological interest of the SPA (e.g. see paragraph [ADD], above); and
 - (iv) Monitoring – Is the strategy effective?
- 6.15 It is envisaged that the types of measures that could be identified and implements could include:
- (i) Land acquisition;
 - (ii) Wardening service;

- (iii) Provision of new access facilities (e.g. car parks, signage, way marking); and
- (iv) Education of new residents (e.g. leaflets, access/recreation strategies).

Stage 6 – SPA Strategy Review

- 6.16 It is considered vital that the SPA works delivered by the strategy should be subject to a monitoring programme to review their effectiveness. The findings of the monitoring and research should be used to inform the review of the SPA strategy. It is considered that the review should be undertaken at five year intervals by the SPA Steering Group.

Development and Implementation of the Strategy

- 6.17 In terms of the implementation of this strategy, it is considered that the following measures will need to be undertaken to ensure that this strategy is developed and implemented including:
- (i) Preparation of the detailed SPA strategy;
 - (ii) Consultation of detailed SPA strategy with Local Planning Authorities;
 - (iii) Adoption of SPA strategy by Local Planning Authorities;
 - (iv) Establish central SPA Developers Contribution Fund; and
 - (v) Establish SPA Steering Group.

Is a strategic approach required?

- 6.18 Unlike Dorset, where there is a correlation demonstrated between heathland bird numbers and surrounding areas of development, the lack of any such correlation within the TBH SPA area calls into question the need for, or justification of, a package of measures as outlined above. An alternative approach might be to set a threshold on size of development proposal as related to the condition status of the nearest SSSI component of the SPA and the extent to which such area was meeting, or scheduled to meet, the PSA target.
- 6.19 The above noted approach would therefore be more specifically targeted on the type and scale of any individual development as related to the sensitivity of the nearest SPA area and, also, any threshold of recreational user or other human activity that might be impinging on the condition of the component SSSI unit and any reason for adverse condition.
- 6.20 Given, however, that it is habitat which has been found as the strongest determinant, or correlation factor, for ground-nesting birds, then any alternative approach to be adopted should be directed towards prioritised actions related to SPA habitats.
- 6.21 Of course, just because a unit of an SSSI, or even the whole SSSI itself, is in favourable condition, that will not in itself guarantee that breeding birds will not be disturbed. If, however, habitat condition and management are addressed to the fullest degree in combination with appropriate site and access management, ranger

services, education and monitoring, that will surely achieve the highest likelihood of success for Annex 1 ground-nesting bird species given the existing level of recreational user within the TBH SPA and the comparatively small percentage increase in population that has been forecast for the next 20 years.

- 6.22 The extent to which one or more of the measures identified in this section of the report are to be adopted will also depend on the overall assessment related to ground-nesting bird numbers from the time of the SPA classification – and maintaining such numbers as related to the extent that they are determined by site management and recreational user.