



Thames Basin Heaths - A Monitoring Strategy Consultation Draft



John Underhill-Day, Jim White, Durwyn Liley and Joanna Sharp

D R A F T

This is a consultation draft only

Date: 21 May 2008

Recommended citation: Underhill-Day, J., White, J., Liley, D. & Sharp, J. (2008). Thames Basin Heaths-A monitoring Strategy. Consultation Draft. Unpublished report produced by Footprint Ecology for Natural England.

Contents

1. Context for the Monitoring Strategy.....	4
2. Approach to monitoring	7
3. What to monitor.....	9
4. Visitor monitoring: SPA	10
5. Visitor monitoring: SANGs.....	14
6. Wildlife	16
7. Use of Volunteers	18
8. Storage/handling of records.....	19
9. Summary of key principles for the monitoring strategy	21
10. The recommended TBH monitoring programme.....	22
10.1 Visitor Counts - the key questions:	22
10.2 Car counts - the key questions:.....	23
10.3 Visitor Surveys – the key questions:	24
10.4 Household Survey – the key questions:	25
10.5 Monitoring direct site impacts-the key questions	26
10.6 Capacity surveys- The key questions	27
10.7 Bird surveys-The key questions.....	28
10.8 Data handling-The key questions.....	28
11. Summary of recommendations.....	30
12. Costings	31
Appendix 1. Summary of recommended monitoring.....	32
Appendix 2. Determining the capacity of suitable alternative natural greenspace (SANGs) .	33
Introduction	33
What determines capacity?	33
Potential approach to Research.....	35
Total numbers of visitors on sites	35
Effect of changes on sites.....	35
Site-based questionnaires and visitor feedback	36
Wider surveys: e.g. using the web, postal, or door-door	36
References.....	38

1. Context for the Monitoring Strategy

The Thames Basin Heaths (TBH) were classified as a Special Protection Area in 2005 to protect and manage the ecological structure and function of the area to sustain the nationally important populations of Nightjar *Caprimulgus europaeus*, Woodlark *Lullula arborea* and Dartford warbler *Sylvia undata* for which the site was designated. The SPA consists of some 8275 ha, spread across 13 Sites of Special scientific Interest and distributed in three counties (Surrey, Berkshire and Hampshire) and 11 local authorities. About half (ca 4000 ha) is within the Ministry of Defence Training Estate, with the remainder owned and managed by Local Authorities, Conservation NGOs, Forestry Commission and private landowners.

The TBH are also spread across one of the most densely developed parts of southern England with an estimated population in 2006, within the 11 local authorities, of 1,205,000 people, rising by 97,100 to 1,303,000 by 2026¹. Evidence of high levels of visiting to the TBH, and of existing urban effects on heathlands generally in southern England (Haskins, 2000; Liley, 2004; Liley, 2005; Liley & Clarke, 2003; Liley, Jackson & Underhill-Day, 2006c; Mallord, 2005; Murison, 2002; Underhill-Day, 2005; Woodfield & Langston, 2004), led to concerns that additional development would lead to an increase in pressures and a possible adverse effect on the integrity of the SPA.

As a result of these issues, English Nature (referred to as Natural England (NE) henceforth) felt that, in responding to consultations from planning authorities on all new development within a close zone around the SPA, they had no option other than to consider the 'in combination' effects of new development around TBH. This resulted in a resource intensive, case-by-case approach, almost always with planning inspectors upholding NE's objection to further development in the absence of effective mitigation. This led to unmanageable workloads for NE with delays and uncertainties for developers, failures by Local Authorities to deliver their housing allocations and outcomes that were not systematically protecting the SPA.

Following widespread consultation with, among others, Local Authorities and Conservation NGOs, and in an urgent attempt to provide a way forward that would both allow appropriate development to proceed but which also satisfied the stringent requirements of the Habitats Directive, Natural England therefore proposed a generic and strategic mechanism for assessing in-combination effects which was incorporated into a Delivery Plan (DP) for the Thames Basin Heaths SPA²

The DP proposed three broad strands for mitigating the pressures from new development: The provision of alternative open spaces for recreational use (now referred to as Suitable Accessible Natural Greenspaces or SANGS); access management to mitigate the impacts of current and future users of the SPA; and on-site management to bring the SPA into favourable condition.

Aspects of the DP proved controversial, particularly with the development industry, and, as a result, it was subjected to an Examination in Public (EiP) by a Planning Inspector acting as Assessor for the South East Spatial Strategy reporting to the panel for the Draft South East

¹ Taken from the forecast by GOSE figures based on the 2003 population figures and submitted to the Assessor at the EIP in 2006/7

² English Nature. Thames Basin Special Protection Area: mitigation standards for residential development. May 2006

Plan Examination (Burley, 2007). The Assessor accepted the broad thrust of the delivery plan³ but recommended a number of changes to its provisions.

The Draft South East Plan⁴ recommended that the Local Authorities and Natural England further develop the DP to secure the conservation of the SPA through measures to secure appropriate and deliverable mitigation, including alternative open space provision, and the management of habitat. This is being translated into action by a Draft Interim Strategic Delivery Plan (draft ISDP) prepared by the TBH Joint Strategic Partnership Board, made up of SEERA and 14 County, Borough and District Councils, and advised by Natural England and a number of statutory and voluntary bodies. (This draft has just been the subject of wider consultation, with comments to be submitted by 15th February).

The draft ISDP proposes a 400m exclusion zone around each parcel of the SPA for most residential development and a further zone between 400m and 5km from the SPA where at least 8 ha of SANGS is to be provided per 1,000 additional population. Such SANGs should be allocated at a strategic level, and identified for their ability to attract visitors away from the SPA, rather than simply proximity to new development. It is estimated that there will be an additional 20,000 dwellings within the 400m to 5km zone by 2016.

The draft ISDP also proposes that the points of access for strategic SANGs sites be within 7km of the SPA, that sensitive parts of the SPA with significant visitor pressure (provisionally identified in draft report (LDA Design, 2007) should have at least 40 ha of SANGs within 2km; and a maximum distance to an existing SANG for developments of 10 or more houses of 2km. The ISDP also recognises that where existing SANGs are proposed as mitigation, it will be necessary to apply discounts for existing visitors before allowing for the additional capacity such sites may be able to offer. It is proposed that such sites will be at least 15 ha in extent and that SANG provision, after discounting, must be at least 2 ha.

A number of access measures have been proposed in the draft ISDP including the creation of 'honeypots', car parks away from the SPA, siting of notice boards and other educational initiatives, as well as site management to encourage visitors in particular directions, campaigns and programmes, and additional SPA-wide rangers.

The key driver for this report is the requirement for a Monitoring Strategy advanced in the draft ISDP. The ISDP notes that the measures proposed need to be monitored via visitor surveys to determine the effectiveness of SANGs in diverting visitors away from SPAs; the ability of SANGs to deliver the necessary capacity; and a programme of habitat and species surveys to monitor the effectiveness of the measures taken in maintaining or enhancing the populations of Annex I birds.

There is clearly a need to institute a monitoring strategy that will test the effectiveness of SANGs, both in terms of capacity and in offering an alternative to the SPA as a visitor attraction. Indeed, though there is some evidence from visitor surveys and an understanding of the current pattern of access and use of the TBH, that the concept of attracting visitor pressure to alternative, less sensitive sites should work, it is essentially an untried solution. It is felt that the effectiveness of SANGs can depend on putting in place features or facilities that attract visitors (or conversely measures on the SPA that deter them) and that monitoring needs to test these.

³ Report to the panel for the Draft South East Plan examination in public on the Thames Basin Heaths Special Protection Area and Natural England's draft Delivery Plan. Peter Burley. February 2007

⁴ Draft South East Plan. Section EG. Western corridor and Blackwater Valley. Policy WVBV9

At the same time, it will be necessary to monitor the effectiveness of the overall measures in preventing an increase in visitor pressures on the SPA and to determine whether these measures are effective in maintaining and enhancing the populations of Annex I birds, to move constituent parts of the SPA into favourable condition, and to secure favourable conservation status for the critical Annex 1 birds.

Though there has been plenty of criticism of the DP approach, mostly from the development industry but also from some of the LPAs and the EIP assessor, what has been and still is singularly lacking has been any meaningful alternative. Few critics seem to have confronted the reality that without an effective mitigation mechanism, it is highly probable that much of the proposed new housing development in the vicinity of TBH could again be halted or seriously delayed.

The current position of the 11 Borough and District Councils varies, from the production of a technical background paper to a completed Core Strategy (Bracknell), to an Interim Strategy or Mini-plan (Woking, Waverley), to what appears to be a rejection of much of the basis for the draft Delivery Plan and proposed mitigation measures except for larger developments (Rushmoor). Some have established a degree of site monitoring, such as visitor surveys that have been carried out more recently for a number of TBH Local Authorities such as that recently completed for Wokingham Borough Council. What is largely lacking at present, and what is promoted in the ISDP, is strong partnership working under the guidance of a Joint Strategic Partnership Board. This would address an SPA-wide approach to the issues and possible solutions, including establishing and over-seeing a comprehensive monitoring programme.

A comparable process for a very similar area, with a broadly similar SPA with the same Annex 1 species and similar development and recreational pressures, obtains in Dorset. It is useful to consider how the matter is being dealt with there and to take any lessons that may be applicable from that evolving position. Of particular relevance to this report is the recently prepared Monitoring Strategy for the Dorset heaths.

2. Approach to monitoring

There are many aspects of site use that could be monitored; realistically, it is time and resources that must limit the choices. What is essential, for an SPA-wide appreciation of the scale of impacts from people, and also to gauge how well mitigation measures are performing, is a co-ordinated strategy that maximises the value of any data collection. To meet this objective any monitoring programme should be strategically and comprehensively applied; the methods used should be standardised and readily repeatable on the target site and at other sites, to reveal changes and allow valid comparison; and the design of individual monitoring opportunities, or the summation of different data sets should allow for collection of the most robust evidence of response. Finally, the data gathered is a valuable resource that needs to be stored securely; but it must also be accessible and readily available to the widest audience, from site practitioners, to the public and not least the Joint Strategic Partnership Board.

Various surveys have been conducted already, usually directed at answering specific questions about a site or collection of sites within a given area. Thus, some TBH local authorities have commissioned visitor surveys to test the appropriateness of sites to function as SANGs. In order for this information to be of most value in comparison with other situations in other parts of TBH, or to be repeated and for results to be capable of comparison over time, it is most desirable that the type of survey and methodology follow the same standard format. Other important data sets have a much longer history, such as the long-term monitoring of Annex 1 bird numbers and distribution. Again, in order to be able to derive the maximum benefit from these surveys, and for the method to be repeatable, perhaps by different surveyors or volunteers, and to be available for statistical comparison, a common methodology must be followed.

There is a tension between waiting until a methodology is available and agreed, with the need often to establish as swiftly as possible a baseline from which future comparisons can be drawn; for instance the changes that might follow in the nearby SPA heathland from the establishment of a SANG site, or the introduction of access control measures. The desire to forge ahead may be particularly the case in TBH as the speed of implementation of the Delivery Plan varies widely across the different authority areas. There will be some value in monitoring individual sites and circumstances but a much greater value is likely to ensue if methods and results gathered in one area can be applied and compared across all of the others.

It is also critically important that initiatives in one area do not, unwittingly perhaps, cause adverse impacts elsewhere within the SPA. Thus access management measures such as restrictions on a car park in one authority area could have beneficial outcomes locally. These might be detected by monitoring, but have merely shifted the problem to another part of the SPA, in another authority. There is a real and urgent need for comprehensive and strategic implementation of the Delivery Plan. The early establishment of a single, SPA-wide approach to monitoring and the storage of data is very strongly advocated.

The effectiveness, or otherwise, of the DP approach will be revealed by monitoring. On the success of the DP hangs the future of new development in TBH, if the statutory requirements of the SPA are to be adequately met. To be sure that the DP solution is in practice effective, monitoring must be in place across all authority areas in TBH. If this fails to materialise in a comprehensive way for whatever reason, the need for a new strategic

authority to commission and oversee implementation of the ISDP, including in particular monitoring, becomes very pressing.

Strategic, comprehensive, SPA-wide application of monitoring

Standardised, repeatable methodologies

3. What to monitor

In very broad terms the features that need to be monitored can be categorised under two topics: Visitor impacts and Wildlife. Within each of these there will be various elements, such as the numbers of people, their behaviour on site, the fabric of the site and the range of species and their performance; and these will be applicable, to varying degrees both within the SPA and SANGs. The approaches to monitoring these features, and the rationale and pitfalls, are described in more detail in the following paragraphs.

A key question to be able to answer, in assessing the success or otherwise of the Delivery Plan, hinges on the number of people visiting the SPA; is this static, rising or falling? Crucially, there is an urgent need for this information – a reliable figure for the number of visitors – as a baseline, across the SPA. But there is also the need to determine and monitor the origin of visitors as this can inform mitigation provision such as the best location for SANGs. And beyond basic numbers there is a key area to test and that is behaviour of visitors. For instance, a continuing increase or static level of visitors may not present such an impact on the SPA if the activity and practices of those visitors is modified. So, markedly fewer people allowing their dogs to run loose, even if the total number of people remained the same (or even increased a little), may in effect represent an improvement. Such an improvement could be revealed in the performance of the Annex 1 birds – demonstrating the often inter-related nature of the monitoring avenues.

Further considerations to apply are those around methodologies. There will be choices to be made, not only about what must be monitored but also about the method of data collection. Comprehensiveness, robustness of evidence, application of statistical tests, economy, and ease of repeating the method are all important, but in order for results not to be unduly influenced and distorted, the method of collection of information also needs careful attention.

Thus, a survey to monitor behaviour of visitors must be sufficiently discrete that normal patterns of behaviour are not deliberately modified and the results compromised. Surveys involving interviewing people with a questionnaire must not prompt or lead as again that would be likely to influence the answers and could give a false picture. In short the design of any monitoring is a crucial phase and careful planning here, about the type of questions to be answered and the way these are addressed, will always be essential.

It is also important to understand that each of the monitoring techniques described below answers slightly different questions; they are not substitutes for one-another. Thus, interview methods (including the postal survey) provide substantial amounts of information about attitudes and behaviour and also catchment/distance travelled to SPA/SANG; car park counts (with calibration to establish an average car occupancy rate) reveal numbers of visitors – and is the quickest and cheapest, but most information-limited sampling; and automatic counter (pressure pad) methods reveal long-term trends in use of SPA/SANG but are unlikely ever to be comprehensive enough to reveal total visitor numbers.

Establish key baseline information – on visitor impacts; and birds

Careful design of targeted monitoring – robust, repeatable, long-term

4. Visitor monitoring: SPA

As indicated above, a key question to address, to be able to gauge the level of current impact and how this may change with alternative provisions (eg SANGs) is that of the number of visitors to the TBH SPA. There is already a substantial body of information (in Liley et al) and this was derived from actual counts of people visiting the SPA. In this study, a total of 26 access points across the SPA were observed and all visitors counted at each point, at eight 2-hour periods throughout several days during August 2005. A total of 2856 people were counted in this survey, from which it was possible to extrapolate a yearly total of visitors for the whole SPA. That has given an estimate, albeit crude, that can be used to measure change.

This survey should be repeated, to precisely the same format and at the same locations, at intervals, to assess any long-term trends. But the survey, though it has provided the best information to hand on the level of use of the SPA – and it yielded much more valuable information than the basic head count - had limitations: It only sampled 26 access points (there are perhaps nearly 700 SPA access points in total); and it was conducted only during August with an assumption made, to compute the overall annual visitor total, that the level of use remains constant throughout the year.

Whilst the single survey could be exactly repeated at intervals of several years, as a meaningful sample, it would be more difficult and time consuming to repeat the methodology to test visitor numbers throughout the year. There are significant cost implications, even in a straightforward repeat of the original survey. Such an exercise at just 26 points, on at least 2 days (weekday and weekend), together with the essential analysis might cost in the order of £16k. A somewhat wider survey, with random sampling of say 15 points across 3 classes of access, classified on scale of pressure, again for a couple of days each and conducted in winter and summer periods, and again with analysis costs included, could cost in the order of £45k.

Another approach, perhaps best targeted on the most heavily used sites in order to be likely to record a majority of visitors, would be the use of automated counters, such as pressure pads buried beneath paths or access points. These devices have become increasingly reliable and sophisticated and once installed could provide a simple and cost-effective long-term means of monitoring visitor numbers. There is of course an initial outlay for the purchase of the counters, and a number would be needed to sample a number of access points, but the long-term costs would be less.

Using information derived from the previous access patterns study, together with the knowledge of field staff and rangers, it would be simple to compile a list of the most heavily used sites in the SPA and within these, the most appropriate points for sampling using pressure pads. In order to detect as far as possible all visitors, recorded by loggers linked to the buried pads, the positioning of the pads is most suitable at gateways or narrow points on paths, where all foot traffic would be expected to step. Clearly an access point onto the heath will be the most likely to record all visitors passing but if this is not narrow enough and the pad might be avoided, a path nearby, or out on the heath could be a suitable alternative location for the pressure pad.

The burial of these pads and the siting of the loggers would need to be carried out carefully and discretely, to avoid vandalism or attract deliberate misuse. But the simplicity and continuous monitoring capacity, on numerous sites over a long period, has much to

commend this method. It could reveal gradual or subtle changes in the degree or patterns of use over time, or reflecting seasonal or diurnal variation, or the relative use of different parts of the SPA with the changing population.

The use of automated counters then, such as pressure pads, could be a valuable tool for monitoring the pattern of visitors to the SPA and SANGs, over time. The individual site records would help to detect any change in use on a particular component of the SPA, for instance following the commissioning of a SANG or the implementation of access management measures, such as changes to a car park. But they will only record numbers; to determine behaviour on site or to derive further information about where visitors have come from or why they choose to visit the SPA, more direct monitoring, by observation or interview is necessary.

The 2005 TBH survey (Liley et al) counted numbers of people visiting the SPA. But the observations also enabled much more information to be collected, such as numbers of people accompanied by dogs. The use of interviews on this survey also provided the best information available for TBH on the purpose of visits, the distances travelled and means of travel, frequency of visits and whether other sites are routinely visited. Though there is a far greater investment in staff resources to conduct interviewing, whether direct labour, volunteers or contractors, there is no substitute for the detail and breadth of information that can be captured by this approach. But, partly because of the resource implications and also to avoid interview fatigue by visitors, especially at a time and place where they might not be sympathetic to questioning (perhaps leading to the risk of false information being given), care must be taken not to over-use the interview technique at least.

Natural England has produced an Access Monitoring Toolkit that has much useful accompanying guidance for interviewers on the methodologies and approach. However, this toolkit is designed specifically for deriving information about open access land and is thus not entirely applicable to the TBH SPA requirements. It is recommended therefore that the precise 2005 TBH methodology and survey points should be used in any repeat count/interview monitoring, not only because it is specifically targeted at the precise information needed but also because there is huge value in being able to compare results over time with an exactly repeatable format.

An element of the 2005 TBH questionnaire, subsequently used in comparable surveys on Dorset Heaths SPA, was the use of visitors' home postcodes to provide a basis for calculating the travel distances of visitors to the heath. This was more reliable than asking distance travelled since many people may not have an accurate idea of their journey distance. It also gives a much more revealing picture of the catchment profile of the SPA component and this could be used to guide the most suitable location for SANG provision. In any interview-based monitoring, this element of information should be routinely included.

A variation to the on-site interview approach is that of contacting a sample (as large as feasible) at home. This could be achieved by telephone, face-to-face, email or post. Probably the most economic in terms of staff resource, ability to target (for instance to reflect any variable density of population or housing type across TBH area) and the least likely to antagonise recipients would be a postal survey. This technique could be especially useful to gauge the use of different sites and countryside facilities by the sample. This in turn could inform the strategy for SANG provision, both in terms of location and site characteristics. Repeating this survey, to the same addresses, at some future date(s) would reveal any changes in visiting patterns. The addition of a question in the postal survey, to elicit the

acceptability of a follow-up telephone interview would provide for a focus on a particular group of users, to pursue gathering more detailed information.

In Dorset, in Borough of Poole, a postal survey has just been completed that can inform the Dorset Heaths Interim Planning Framework (though it was commissioned especially to garner information for the Borough's Development Plan Documents). A random sample of 5000 addresses was contacted with the questionnaire and a return of some 1200 has been achieved – a remarkably high return rate. If such a survey were to be conducted across the TBH SPA (or at least over more than one LPA), some weighting would need to be applied to equalise the different housing densities within the TBH boroughs and districts.

It would also be possible to include questions about the progress of the Development Plan approach by asking about people's awareness of the SPA and the mitigation strategy. This would in the first instance provide a baseline but repeated, to the same respondents, could usefully reveal changes in attitudes and awareness over time. This could be a useful method of assessing the effectiveness of SPA-wide educational initiatives. Care would be needed though not to overload a single questionnaire mailing with too many questions that could result in failure to return the sample. If that became likely then the questions about people's awareness should be dealt with in a separate approach, to a different sample of respondents.

In order for valid comparisons to be made, between sites and/or over time, survey information must be collected in a repeatable way, using the same questions. There may well be the need to add new questions or target a survey on a specific site, for instance following new access measures, or significant habitat restoration; but such new information gathering must be additional and not a substitute for the standard questionnaire, across the SPA.

The surveys in the Dorset Heaths area have been referred to above. Because the SPA here is so similar, with the same Annex 1 birds and very similar urban pressures, there is the potential to combine and compare many of the survey results. This applies to questionnaire data and also car park counts as long as the methodology is exactly the same and in the case of the car park counts, for car-borne visitor numbers, they are conducted at the same time. As well as providing an informative comparison between the two SPAs, the combined data set would be much larger and lend itself to more statistical analysis.

Car park counts could provide a very simple and potentially comprehensive monitoring of SPA visitors arriving by car. To avoid double counting or missing sites or visitors, such a count – simply of the numbers of cars in all or a sub-set of site car parks – should be co-ordinated and made at every parking spot at the same time. To capture different patterns of use (eg early morning visitors), the counts should be conducted at several set times and days of the week. The information gathered is limited, since no measure of numbers of people in each car is recorded, or whether dogs or cycles are being brought onto site, or necessarily those visitors who do not travel by car, but such a survey would be very rapid and easily repeated. It can also be accomplished to some extent in the course of routine patrols. It would reveal changes in patterns of use over time or season and if calibrated, with more detailed observations of actual numbers of people, taken at some of the sites at the same time, could be used to act as a rapid surrogate for people counts.

Car park monitoring of course is every bit as valid in checking the use of SANGs; indeed sampling both types of sites in this way could be done both simultaneously and separately,

to assess whether the sum of the 2 site types equates with total single figures. This could reveal if SANGS are attracting a different, additional clientele from the SPA or if they are indeed providing a counter attraction.

A further range of monitoring desirable for the SPA revolves around site fabric, such as the deterioration (or improvement) of paths through erosion, or enrichment by dogs; and the recording of incidents such as fire, rubbish dumping, vandalism and positive habitat management. All of these have direct relevance to the heathland and its species and some at least might additionally lead to changes in the patterns of use by people. Habitat management for instance could lead to an increase in the capacity of the site to attract people that might be revealed by linking such information to regular counts of visitors.

By recording as accurately and comprehensively as possible all of the one-off incidents over time, a log of the condition of the whole SPA and its component parts will be built up. This would be useful in revealing changing attitudes, perhaps over the life of the Development Plan, such as fewer fires or vandalism events as a result of long-term education and awareness initiatives.

The detailed recording of the state of a sample of paths, again repeated with the same methods and at the same locations would reveal whether impacts were increasing or being reversed. The data collected could include fixed-point photographs and some simple measurements such as path width, depth of erosion, and amount of bare ground or vegetation composition. Information gathered at the same time on soil enrichment, especially relevant in a naturally nutrient-poor system like heathland, could be a powerful data set to help confront the unacceptable practice of dog fouling. At a basic level this could involve the regular counting of dog mess at set points (say distances from an access); and if there was the resource, analysis of soil samples for phosphate and ammonium nitrate to show the degree to which such fouling modifies the soil and thus vegetation.

Repeat at 5-year intervals, 2005 interview of all visitors at key SPA access points, and add winter period

At key locations, install automatic counters for long-term visitor trends

Regular simultaneous car park counts for basic visitor numbers

Postal survey (questionnaire) of sample households for visiting patterns/change

Establish comprehensive site fabric and incident log

5. Visitor monitoring: SANGs

For the most part the features and activities that should be monitored on SANGs mirror the monitoring requirements on the SPA heaths. The essential question to be able to answer is whether the SANGs are working effectively to help mitigate pressures on the SPA. On this hinges the most significant test of the Delivery Plan. For this, the same information about numbers of visitors and their behaviour must be gathered and monitored over time. It is probably not that important to monitor site fabric, incidents or wildlife on SANGs, unless there are specific concerns or issues at particular sites.

A key difference between the SPA heaths and SANGs is the likely variable establishment of SANGs. Whereas all of the SPA sites are in place and can be monitored from the start, both for baseline information and to record change, the speed with which SANGs will come into being may be extended over some time. Moreover some, perhaps most, will have some degree of existing access so that detecting any incremental change in use as SANG provisions and access management initiatives come into play will be more challenging. Farnham Park for example, in Waverley Borough is reckoned to have only some 25% additional capacity to function as SANG.

Given that many of the potential SANGs will have some access and visitor use already, and at this stage all are in the control of local authorities, there may exist already some knowledge of their current (pre-SANG) use. An example exists in Wokingham Borough where a recent Visitor Survey has been completed (October 2007) of the eight sites so far identified with potential to function as SANGs. The methodology used for these surveys follows that recommended for SPA-wide adoption. If any of the eight Wokingham sites do proceed as SANGs, good baseline information on current visitor numbers is already in place. But in general, information on current visitor numbers is likely to have been collected in different ways and with variable methodologies across authority areas. It will be essential, once a potential SANG site has been selected, that it is surveyed to establish the current level of use; and that the same practice and methodology is used across all authorities in TBH.

The same basic level of counting visitor numbers is recommended, as for the SPA sites. Thus, a standardised count should be conducted of all visitors arriving at or leaving the site through the principal access points, at set periods throughout the day, spread across both weekday and weekend periods and at the same periods of the year. This should be undertaken as soon as the SANG comes into operation and then repeated at intervals, along with the SPA monitoring of the same type. The opportunity should be used, with personnel on site to carry out the counts, to interview SANG users too, to determine the purpose of the visit and if their visit has been as an alternative to the SPA. As with all of the monitoring techniques, it is essential to follow the same standard format to allow for repeatable surveys and direct comparison across the SPA in different authority areas, and over time. Additional information can be sought for individual SANGs but this must not be instead of the basic information collection. Similarly, the simple car park counts should be instigated, on the same frequency as for SPA monitoring, at all significant parking places.

Automated counters should be established at appropriate points at the main SANG sites at least, from the start of the time they start to function as SANGs. This will enable the collection of a valuable long-term data set, to observe trends in the use of the SANG and also to compare with other SANGs and the SPA sites.

The use of a postal survey and repeat monitoring, as recommended for SPA information, will automatically apply equally to SANG and SPA visitors since by its nature such a technique is not aimed at the users of any particular type of site. It may also be possible and instructive to additionally target the occupants of all new dwellings with such a postal questionnaire to seek to establish from the outset of the new occupancy what countryside recreational activities the new population is pursuing. It might be expected for instance, without an established pattern of use of SPA heathland, that new occupants may choose more readily to visit a SANG. Such a survey would depend on information of the spatial distribution of new dwellings, from each authority, perhaps gathered and followed up as an annual exercise.

As with the SPA, there will frequently be the need to monitor individual SANGs to detect any change in use or behaviour following the introduction of specific measures, such as the closure or opening of a car park. Such monitoring need not apply across TBH, though it is very important to cast the net wide enough to pick up the spread of the ripples; closing a car park at a site in one authority area may have repercussions beyond that authority's boundaries. What is essential in all such monitoring though is that a standardised method is used so that any information can be compared more widely and be readily repeated.

Repeat at 5-year intervals, interview of all visitors at key SANG access points, and add winter period

At key locations, install automatic counters for long-term visitor trends

Regular simultaneous car park counts for basic visitor numbers

Postal survey (questionnaire) of sample households for visiting patterns/change

6. Wildlife

It is with the biological resource of the SPA that there is probably already the widest range of existing information, on various species and in the case of some data sets, probably extending back over many decades. Much of this will have been collected by volunteers and amateur naturalists and though it is likely to be highly reliable, the methods of survey and the locations are probably much more variable. Some more recent information, especially targeted at habitat condition with some key indicator species, will exist as a result of Natural England's SSSI condition monitoring. This monitoring is designed to be repeated regularly though up until now has tended not to focus particularly on the impacts of recreational activity. It will be important to reconcile the outcome of SSSI condition monitoring with the data derived from this monitoring strategy, to avoid conflicting results. That may also require a more frequent or responsive condition monitoring cycle to apply on the TBH SPA.

The range of subjects with potential for biological monitoring is vast but the focus for the purpose of this strategy can be restricted to the reason for the SPA designation, namely the Annex 1 birds: woodlark, nightjar and Dartford warbler.

It is likely, given the interest of local naturalists, that some sites will receive frequent attention, perhaps even annual monitoring for some of these species. It would be helpful to establish a clear picture of the extent of existing information on the 3 key bird species and if this does not already pertain, to bring this register together in one place. Even if such information does, patchily, exist it may be variable in its quality and may not have been gathered in a standardised way.

Each of the 3 bird species is the subject of national monitoring on a 10-year basis and this is perhaps the most consistent data set available. Such a survey has just been completed and the results, on a national and county basis are available for the most recent counts for each species (2004, nightjar; 2006 Dartford warbler & woodlark). Though this is a most valuable resource, with a pattern extending back a couple of decades, the time interval between these national surveys is too great to allow rapid detection of changes or trends.

Each component of the SPA should be monitored for breeding woodlark, nightjar and Dartford warbler on an annual basis, and this may already apply for many or even most sites. This should reveal long-term trends in the populations and continues an already valuable data run. There should be particular encouragement to include additional surveys on those sites where there may be more likelihood of change, either because of known additional pressures or the forthcoming adoption of significant SANG land. Similarly, significant habitat management or incidents may result in changes in the Annex 1 bird numbers and this would need to be cross-referenced to the comprehensive record of all site events that is also recommended.

The critical requirement, as with all of the monitoring suggested, is that the same standard methods are used. For the birds, this pattern is well established and widely understood, though because much of the information has been and may well always be, collected by volunteers, it is essential to stress that adherence to the format and protocol is required.

Because of their differing breeding behaviour, in terms of start/finish times, numbers of broods and diurnal activity, different procedures for survey are required for each species. These are well known to ornithologists, who are most likely to be the surveyors, but familiarity should not be assumed and the precise instructions for each species survey

should be issued to all participants, in order that the results can be readily compared and analysed statistically.

The numbers of each species holding territory is an essential set of information. But not all territories may be successful and some of the failures may well be due to visitor impacts, in particular disturbance. There is strong evidence for all, especially perhaps nightjar, this is happening. In the case of nightjar, a relatively long-lived species, it would be possible that the same bird returns in successive years and holds the same territory, but each time fails to raise young. Occupation of the territory would be recorded and thus appear to be a measure of success, but failure to raise young, especially if due to visitor impacts would not be registered by a simple territory count.

Additionally therefore, it would be desirable to establish, on a few sample sites at least, some measure of breeding success. Given the particular sensitivity of nightjars to disturbance and to some extent the behaviour patterns of the birds, this species would be the most suitable for this additional monitoring. It would be best to carry out this more detailed observation on a range of sites, subject to different degrees of visitor pressure and also perhaps before and after access/ habitat management works have been implemented, to detect any change in success rate.

For disturbance-related failure, it would be desirable to monitor the same (few) sites over time, to establish if possible the cause of failure. This might be the close or frequent passage of walkers or dogs running loose, in both cases causing the bird to be flushed from the nest in daytime, exposing its eggs or young to predators. Detecting such a cause is now feasible, if resources allow, using modern surveillance equipment such as miniature cameras and video recorders. These are tiny and discrete and can record continuously for long periods or only when movement occurs. This would pick up the reason for a bird leaving its nest, say because of a dog approaching, and also the fate of the exposed nest and nature of any predator.

It would never be possible to apply this level of monitoring widely, but 2 or 3 examples of highly vulnerable nest sites might be selected; and for comparison of course, a couple that are more remote from disturbance.

At least 5-yearly nesting survey of all SPA for Annex 1 birds – ideally annual

Breeding success of nightjar at a few key nest sites

Enhanced cycle of SSSI condition monitoring

7. Use of Volunteers

As suggested above, there may be some areas of the monitoring task already quite familiar to volunteers such as wildlife recording. Other work required as part of this strategy may also lend itself to volunteer help. The practice is to be encouraged and supported, at the same time ensuring that the standard of recording and the methodologies are properly adhered to and results made swiftly available to the agreed data handling facility.

There are many advantages to using volunteers and these are not only about saving money. A larger available workforce could be of great value if much information has to be collected in a short timescale or at the same time slots, such as visitor or most especially car park counts. Involvement of a wider section of the local population to help in this way, either for occasional specific monitoring tasks, or as part of a longer-term commitment with a “Friends” or local support group, will help to foster ownership of the Delivery Plan strategy and build pride and care for the SPA. There will usually be a need for training to be provided, especially for instance with the use of volunteers in any direct engagement with visitors, as in interviews. The Access Monitoring Toolkit is a useful guide to the skills and techniques that will be needed.

As well as providing training as appropriate and support in the form of equipment, perhaps protective clothing, contacts for emergency assistance and of course the refunding of legitimate expenses, a community of volunteers would be strengthened with frequent feedback. Thus, as information is gathered and analysed, it should be shared with the volunteers and friends groups through workshops and presentations. Opportunities may arise for volunteers to expand the amount of information gathered, beyond the basic needs of the monitoring strategy, though this essential basic requirement must always be secured before further projects are pursued.

Encourage and grow local volunteer or Friends groups

Train & support volunteers and involve in surveys & workshops

8. Storage/handling of records

Monitoring is an absolute requirement of the Delivery Plan approach in order to show that the effective mitigation of impacts on the SPA is in place. Such monitoring needs strategic application, with total consistency and standardisation of methods, across the entire TBH. It is hard to see how this can successfully be accomplished, over the long term, without a dedicated SPA-wide team to co-ordinate and manage the activity. Moreover, many of the monitoring actions will themselves best be achieved through an adequately resourced ranger service, either operating with direct action or through the managing of contractors and/or the galvanising of volunteers. (The addition of many of the access management and educational requirements of the DP adds considerable emphasis to the need for such a strategic team, to work in concert with the existing site-based rangers).

The process of monitoring itself is an expensive investment so the data collected represents a valuable asset that must be stored safely in a reliable and fail-safe way. Results must be capable of being accumulated over a considerable period and be widely and readily accessible. The reliable storage of monitoring data is therefore a key consideration.

The most cost effective solution would be to utilise an existing data handling facility if such exists, such as a Records Centre. So a LRC in one of the partner Councils, prepared and able, on behalf of all of the partner bodies, to house and make available the monitoring results from each of the TBH authorities, would represent the best answer. It may alternatively be possible to contract out this service to another LRC elsewhere; or to use a similar facility managed by another agency or perhaps an academic institution, but the remoteness of the data – and the additional costs – would make these less attractive solutions.

Whilst secure storage of raw data is essential, the results of monitoring, to be of real and immediate value to all of the partners, the Strategic Board and indeed the widest audience, need skilful, impartial analysis. This will include the application of rigorous statistical testing and that will almost certainly require professional input. Such professional skills need to be available both for the analysis exercise and also in the design and supervision of monitoring methods, to ensure that results collected are valid and capable of such manipulation and ultimately to stand peer review.

A further value from the data collected would be added by sharing and discussing the results, within the TBH partnership and with others affected by the strategy, through regular workshops and conferences. This would be even more valuable if the comparable situation and results of monitoring the SPA in Dorset were to be included, with occasional joint workshops involving both areas.

Each of these elements of effective data storage and handling is manageable but they have cost implications that must be considered realistically from the outset. Ultimately the computation of the mitigation tariff on new development must take into account not only the direct cost of providing the mitigation and its application, for instance through a dedicated strategic team, but also the full requirements for long term monitoring.

The monitoring process for the Delivery Plan approach itself will evolve through the life of the RSS and more immediately the suggested ten-year ISDP. It would be wise to build in a frequent review of monitoring, to ensure that lessons are learned and methods and techniques honed. So, some degree of ongoing review is suggested at the end of each year with a major review and reporting at 5-year intervals.

Appointment of strategic/SPA-wide team to co-ordinate monitoring

Long-term, secure data storage at appropriate Records Centre

Professional analysis of data

Share results at workshops & conferences

Regular review of monitoring

9. Summary of key principles for the monitoring strategy

Co-ordinated, strategic, SPA-wide

Standardised, repeatable methodology

Least intrusive method, to avoid influencing behaviours

Applied to both SPA and SANGs (except birds – SPA only)

Secure, accessible data storage

Professional data analysis

From this wider analysis and rationale for monitoring the TBH SPA and associated SANGs, and to determine as cost-effectively as possible whether the ISDP is being effective at mitigating or avoiding adverse effects from additional housing, we have derived the following programme. This is recommended as a complete package the components of which are all essential and none is a direct substitute for other parts.

This programme also serves as a distillation and summary of the foregoing review.

There is also, as an appendix, a short discussion on the subject of Carrying Capacity. Though not directly part of the Monitoring Strategy, this has particular relevance to the identification and provision of SANGs.

10. The recommended TBH monitoring programme

We have defined the purpose of a monitoring programme as:

To monitor the effectiveness of SANGS and access management in mitigating or avoiding impacts from the additional visitors resulting from an increase in housing provision, on the interest features of the Thames Basin Heaths SPA.

This requirement has several strands:

- To determine the effectiveness of SANGS in diverting visitors away from the SPA
- To determine whether SANGS can offer sufficient capacity
- To determine the effectiveness of SANGS and access management measures in maintaining and enhancing the populations of Annex I birds on the SPA

In order to be effective the monitoring strategy will need to include the following elements:

- Baseline surveys against which future changes can be measured
- A monitoring programme which is directly relevant to the questions asked
- Monitoring methods which are amenable to robust analysis
- Methodology which is consistent within and between sites and years
- Each phase of the work undertaken by people with appropriate skills
- Fieldwork carried out in accordance with agreed methodology
- Collection of data independently supervised to maintain quality control
- Data submitted promptly and properly collated and stored
- The data rigorously, comprehensively and independently analysed
- The results disseminated to all relevant stakeholders

The two measures proposed to mitigate or avoid an increase (and possibly reduce) the impacts of people on the SPA are the provision of alternative open spaces and a range of measures on the SPA to change the numbers, distribution and behaviour of visitors (access measures).

It will therefore be necessary to monitor the trends in the populations and distribution of birds and relate these to the trends in visitor numbers and behaviour on the SPA and to the visitor numbers on SANGS. All these elements will need to be linked as part of an overall monitoring strategy.

10.1 Visitor Counts - the key questions:

Are the numbers of visitors to the SPA and SANGS stable, increasing or decreasing overall, and are any sites or groups of sites different from the rest?

The first concern of monitoring is to obtain a continuous and comparative measure of the numbers of people visiting the SPA and alternative sites (as these become available as SANGS or prior to their improvement), so as to be able to measure changes in visitor numbers over time. It is not necessary in this context to obtain total numbers of visitors but rather an adequate and repeatable sample that can be used to monitor changes. Such data will give us an understanding not only of any changes in visitor trends across the SPA and SANGS area, but will help us highlight anomalies and indicate where SANGS are more or less effective. The best way to do this is to put in place a simple, long term monitoring programme giving continuous, easily collected data.

The siting of the sampling points will need to include:

- A range of sites across the TBH area both on SPAs and SANGS
- A range of locations including both access points into sites and points on path systems within sites
- Consideration of the relative positions of parts of the SPA and SANGS, one to another
- The possible location of additional SANGS
- Any data on particular points from previous surveys

There is a number of ways to automatically measure visitor numbers using remote sensors including magnet kits to detect gate opening, infra red sensors which operate on body heat, pressure pads which record weight, and beam and loop sensors which are broken by the passage of people or vehicles.

We have considered the advantages and disadvantages of all these in the light of the need for ease of installation and operation, reliability, consistency and vulnerability to theft and vandalism and are recommending the use of pressure pads. These are placed underground, with the loggers and batteries also hidden below ground, they can be adjusted to the ground conditions, the memory cubes in the loggers need to be replaced and downloaded at 1-6 month intervals and the batteries will last 8 months or longer. They are relatively immune to theft and vandalism, will record the times of visits as well as numbers. A disadvantage is that they record dogs as well as people without differentiating between the two. This is not important providing the ratio of dogs to people remains constant over the recording period, and it would be necessary to check this from time to time (see later). Existing visitor surveys suggest that this ratio can vary substantially from site to site and so would need to be sampled across a range of sites to ensure reliability.

On this basis, we anticipate a total of between 60 and 80 monitoring points would be necessary to monitor visitor trends on a sample of SPA sites and SANGS sites, and would anticipate that these would be in place for at least five years (we have allowed for 80 in the provisional costings). The precise locations of the pressure pads should be decided strategically after discussion with local site managers and landowners. This is because while local site managers and landowners will have local knowledge on which locations are best on their sites, it is also necessary to make sure that the locations are spread across the SPA and sample the full range of access points and path networks. For example, recording points will need to sample car parks of different sizes rather than just the large or medium car parks.

Where there is a need for monitoring visitor numbers for a particular purpose at a site, a new visitor information facility for example, then the most appropriate type of sensor should be used, but if this is of a different type to pressure mats then the results will not be consistent with, or be able to be incorporated into, this wider scheme.

10.2 Car counts - the key questions:

What is the best estimate of the total number of visitors to the SPA and SANGS and is the distribution and number of parked cars changing over time?

In order to monitor the use of cars and the capacity of car parks as well as getting some estimates of the total number of car users across the SPA and SANGS, we suggest co-ordinated simultaneous car park counts, carried out by volunteers up to six times a year,

together with estimates of car occupancy rates. Together with estimates of the proportion of visitors who arrive by car compared with those who arrive by other means (see later), these data will allow comparatively accurate estimates to be made of the total number of visitors to the SPA and SANGS.

10.3 Visitor Surveys – the key questions:

Where do visitors come from, who are they and how do they arrive; why do they come and how often; how long do they stay and how far do they go; where else do they go?

Visitor surveys are usually made up of two parts, observations and a questionnaire. Observations allow data to be collected on a range of observed characteristics and behaviour including different modes of arrival, proportion of people with dogs (see visitor counts), whether dogs are on leads/under control, whether owners pick up mess after their dogs, car occupancy levels (see car counts), group size and proportion of children, ratios of those arriving in cars to those on foot/cycle/horseback etc (see car counts) and so on. For some issues such as proportion who pick up after their dogs, observations can be more accurate than questionnaires. (Usually observational data is collected by the same people conducting the questionnaire surveys, as part of the same operation).

Questionnaire surveys ask people a range of questions, and can involve locations at access points and out on site, as not all people, and especially walkers from adjoining houses, access sites from car parks. At access points, it is usual to ask people questions when they leave rather than when they arrive, as this enables them to be questioned on what routes they have taken.

Questionnaire surveys can ask a vast range of questions but will usually include questions on where they have come from (preferably post codes), what transport was used, why they have come, where they have been and what they have been doing. It will be particularly important to obtain information on visitors post codes and on the other sites they visit off the SPA. This will enable significant switches from SPA to SANGS to be identified. Such a survey can also set base lines for visitor's knowledge of, and attitudes towards, the SPA, and these can be subsequently monitored in the light of education and information initiatives both on and off site, which are difficult to measure individually. This could include the attitudes and behaviour of dog owners and their control of their pets. They can also be asked about what they like/dislike about the site, where else they go (and the what/why/where and how questions asked again), as well as more personal questions about age, housing, employment etc. Both on the SPA and on SANGS these surveys would seek to clarify the reasons that people chose these over other sites and the factors that might persuade them to switch.

Visitor questionnaires have to be well designed, targeted and relatively short, and the questions presented in a way that does not suggest answers and is amenable to rigorous analysis of results. Count methodology also has to be consistent and comprehensive, such that all questioners are asking the same questions in the same way and within the same time periods.

A number of earlier surveys have been carried out in TBH both across the SPA, on individual SPA sites and on individual and groups of SANGS. These surveys vary widely in their depth of questioning and degree of analysis, with a small number standing out as well conducted and analysed.

The only survey carried out across the SPA was in August 2005 across 26 access points, and although comprehensively conducted and rigorously analysed, the sample of sites chosen was not ideal as a base-line for the whole SPA.

It is recommended that a larger and more representative base-line visitor survey be carried out on the SPA and distributed across the range of sites, and including both car and foot access points and within-site locations. It is recommended that to achieve a comprehensive coverage, 50 locations should be surveyed. A proportion of these locations could include a number of the 26 sites included in the original survey to allow some comparisons.

A base-line visitor survey should be undertaken on SANG sites to enable future monitoring of visitor attitudes and behaviour on SANGS. Given the limited number of SANGS, it is believed that some 30 locations might be available.

Surveys should be conducted over two days at each location, a weekday and a weekend day and should use tried and tested methodology based on two hour periods. It is recommended that an initial survey be repeated after five years and depending on results, at five or ten year periods thereafter.

10.4 Household Survey – the key questions:

Where do people go from different parts of the SPA area and what proportion visit SPA, SANGS other open spaces or none of these? Where are residents from new developments likely to go, and how will visitor patterns vary between those with different accommodation, employment, age and other factors?

Information on where people go for their open-air recreation can be obtained from questionnaires based on doorstep calls, phone calls or postal surveys. It is recommended that a postal survey is undertaken as this is cost effective, less intrusive than the other methods, and can be followed up if desirable, by telephone calls to those who have indicated a willingness to be contacted.

A major difference between an on-site visitor survey and a postal survey, is that an on-site survey has to be fairly short because people usually have limited time, and in fact a reason often given for refusal to take part is that the person is in a hurry.

By contrast, a postal survey allows people to give more time and careful consideration to their answers, although of course, usually only a small proportion of those contacted will reply. This proportion can be substantially increased, however, if local authorities cooperate in allowing their letter heading to be used in a covering letter. The current population within the 11 core Authorities around the TBH is around 1.2 million with a projected increase of just under 100,000 by 2026. There are some 288,000 houses within 5k of the SPA within the TBH area. Interviews from 3000 houses would be just under 1% of these and would provide a reasonable sample.

With local Authority co-operation, a return rate of 20% might be achieved so an initial post out of 15,000 questionnaires would be needed. Costs might be reduced if this was included with other local authority mail outs.

A postal survey would give information on:

Where people across the whole local population typically go to visit all the different types of green space, including SPAs, SANGS and other open spaces. (some of which will be potential SANGS)-comprehensive picture.

Potential visitor patterns from new development best predicted by where existing populations go-either from existing settlement footprint or major new development.

Allow the collection of more comprehensive data on social matters eg.collection of data on housing, family size, pets etc.

Obtain more detailed information on why people visit certain sites and what features might encourage them to visit or dissuade them from visiting new SANGS, including site characteristics, access provision, ease of travel etc.

Collect suggestions from people about potential alternative locations that might meet their recreational needs

Allows a repeat survey to monitor changes in attitude and behaviour as access management and SANGS programmes progress.

This survey would provide a different perspective on visitor behaviour and preferences to that obtained from on site visitor surveys. It is recommended that an initial postal survey be repeated every ten years.

10.5 Monitoring direct site impacts-the key questions

How many and where have wild fires occurred, and is their number and distribution changing? What proportion of dog owners are picking up after their dogs and have their dogs under control? Can new initiatives change this?

What level of flushing rates of nesting nightjars is caused by dogs and can initiatives with dog owners change these. Where and in what numbers are undesirable incidents occurring on TBH and can these be changed by new and targeted initiatives? What else should be recorded?

A number of direct impacts from visitors on the SPA can be measured which will allow monitoring of the effectiveness of on-site measures. These include fires, disturbance by dogs, dog fouling and the frequency and distribution of other incidents..

The incidence of fires is a direct result of human activities on heathland as most fires are started either accidentally or deliberately by people. Accurate recording of the number of fires using a standard recording proforma and the location and extent of fires (using GPS to measure the extent of those over 10m²) is a straightforward measure of human impacts of heathland. Collecting this information on a standard format will allow monitoring of the frequency and distribution of fires, and will help in targeting education or preventative measures, and allow the effectiveness of these in turn, to be monitored.

Dog fouling and picking up by owners, and dogs not under proper control can be easily monitored using volunteers. These are problems where simple monitoring programmes can test a range of initiatives to change people's behaviour, and where such changes will have real benefits in terms of the conservation of wildlife, public health, the enjoyment and safety of other users.

One study on the TBH suggests that only about 10% of people pick up after their dogs even when notices ask them to do so. This is an area that lends itself to testing a range of initiatives and carrying out simple and effective monitoring.

It is known that dogs can visit nightjar nests and flush the sitting bird and it is suspected that this is the cause of exposed nests being predated by crows or magpies. Flushing rates on a sample of nightjar nests would measure the effect of uncontrolled dogs if the incidences are recorded. Normally, the main problem with this approach would be finding the nightjar nests as experience has shown this can be very time consuming, but the existing team of bird recorders on TBH already finds 20-30 nests each year. Some straightforward measurements around each nest and nest cameras placed to record the causes and frequencies of flushing incubating nightjars would provide a rigorous and repeatable measure of direct disturbance.

There is a wide range of effects from less desirable visitors both to SPA and SANGS including vandalism, theft, dumping (including dumping and burning out cars), and introduction of alien species. Wherever sites are wardened these incidents should be recorded on a standard form and input into a database. This will, over time provide an indication of trends and of the distribution of incidents that could help to frame counter measures. This type of monitoring can help to target appropriate responses and then monitor how effective these are.

A range of other activities could affect bird numbers and distribution on the SPA. These include major habitat management for nature conservation (which could include tree and scrub clearance, mowing or cutting regimes, turf stripping and the introduction of grazing), or significant changes in management for visitors or users (introduction of a ranger service, change in numbers of army personnel for example) or substantial commercial management (such as forestry felling or planting).

It will be important that such major changes are notified to the monitoring organisers and are fully recorded. This will provide context to the monitoring programme, help to account for unexplained changes in visitor behaviour or bird numbers and help to guide future monitoring methods or locations.

Mitigation measures and other initiatives to educate, control or enforce compliance with desirable behavioural norms will need to be brought into the monitoring programme and their effectiveness assessed using before and after monitoring methods to achieve this. These could range from monitoring the effects of a leaflet drop to adjoining owners about dumping garden waste over garden fences, to the introduction of warden patrols, initiatives to encourage visitors to pick up after their dogs, to enforcement of bylaws to keep dogs under control, or a video to be shown to local schools on the consequences of starting heath fires. In each case, the initiative should be monitored to assess its success and lessons learned absorbed and passed onto others.

10.6 Capacity surveys- The key questions

How can the capacity of SANGS sites be measured?

Assessing site capacity is extremely difficult as it depends on a whole range of physical and perceptual factors. Physical factors include car park capacity, site size, site habitat, path characteristics and facilities such as seats, toilets or a café.

Perceptual features include such things as landscape, views, topography, tranquillity, and personal security. While it is possible to measure elements of the first category it is difficult to measure the second except by systems of scoring.

It will be possible to incorporate questions into both visitor and postal surveys relating to people's perceptions of what they like about sites they visit and what puts them off visiting other sites. Using calculations of visitor numbers from visitor surveys and a site's physical characteristics and the most frequent reasons given for liking or not liking sites, and using multiple regression techniques, it should be possible to predict the likely capacity of new SANGS based on the mix of characteristics which best explains the numbers of people visiting existing sites. This method will need to be iterative in order to improve and refine its predictive accuracy, and should take advantage of any change in circumstances which may increase or reduce a site's capacity, such as changes in car park size, the installation of better facilities, all weather path surfaces for example, or the attractiveness of a site such as the removal of eyesores or creation of ponds or opening up of views.

The introduction of new SANGS will need to be notified to allow baseline monitoring to be set up before visiting is initiated or increased.

10.7 Bird surveys-The key questions

What are the numbers and distribution of the Annex I bird species breeding on the THB SPA and how are these changing over time?

Currently, virtually the whole of the SPA is surveyed every year using a network of knowledgeable volunteers to count and map the territories of the three Annex I species, nightjar, woodlark and Dartford warbler. This system works very well in providing an annual estimate of numbers of breeding pairs and their distribution across the SPA. This activity should be encouraged through the use of funding for training, travel expenses and an annual workshop to disseminate and discuss methods and results.

10.8 Data handling-The key questions

What is the best way of handling, storing and analysing data from the TBH monitoring project?

All data from a monitoring scheme will need to be collected promptly, checked and properly stored before collation and long-term storage. It will also need to be analysed as soon as possible after collection and the results disseminated.

If a monitoring strategy is put in place that incorporates the programme outlined in this report, then it is strongly recommended that dedicated staff be appointed to manage it. There will be a need to organise the installation and servicing of pressure pads and nest cameras, to make sure that data is properly downloaded and stored, to liaise with landowners land managers, Local Authorities, the organisers of the bird monitoring and others, to organise volunteers, to collect or organise the collection of data on fires and incidents and to coordinate visitor surveys and other initiatives across the TBH area.

Without this input, any monitoring programme is likely to be inconsistent, irregular and sporadic and will not provide the results which the Joint Strategic Partnership Board, Conservation Bodies, Local Authorities and developers are looking for, to measure the effectiveness of the mitigation and avoidance measures, the provision of benefits to local communities and their value for money.

It is recommended that a full time post will be needed year round, with a six month full time assistant during the April-Sept period.

We anticipate that a representative monitoring steering group will be needed; and that some elements of training and supervision and the data storage and analysis will need to be done by outside professionals.

11. Summary of recommendations

- Pressure mats to estimate visitor trends over time across 60-80 points on the SPA and SANGS
- A simultaneous count by volunteers across the SPA and SANGS car parks 4-6 times a year to check numbers, distribution and trends in car users
- A baseline visitor survey of 50 locations across the SPA
- A baseline survey of 30 locations across the SANGS over two days,
- A postal survey of 15,000 residences (3,000 returns) across the TBH area
- Camera survey of flushing rates of nightjar
- Recording fires
- Dog fouling study
- Using information from sites and visitor/postal surveys to calculate capacities for SANGS including updating and refining
- Funding support for bird surveys
- A full time post and summer assistant with transport and office facilities and other support costs

12. Costings

An approximate level of likely costs for the recommended monitoring programme is given below:

Type of Monitoring	Provisional Costing (£000)	Total cost 2009-2026
Capital item/initial costs		
Installation of 80 pressure mat counters	55	55
Purchase of nest cameras for nightjar flushing survey	8	8
Site capacities initial survey and analysis	13	13
Yearly costs (averaged over 17 years)		
Annual maintenance of pressure counters	3	51
Fire recording, collation and storage	2	34
Dog fouling and behaviour monitoring	2	34
Estimating capacities of new SANGS (5 pa 5 years, 3 pa for 5 years and 2 pa for 7 years)	3.2	54
Collation and storage of records	12	204
Funding support for bird surveys	5	85
One full time organiser plus summer assistant and support costs	50	850
External support for monitoring design, training, analysis and feedback	15	255
Car park counts	2	34
Five yearly costs		
Visitor survey with analysis across the SPA/SANGS	50	150
Nightjar flushing, data collection	2	6
Ten yearly costs		
Household postal survey	40	120
Total costs over 17 years		1953

Appendix 1. Summary of recommended monitoring

R - Rangers; V - Volunteers; C – Contractors

Objective	Purpose	Method	Priority	Agency
Visitor numbers	-Repeatable assay of total visitor numbers to SPA/SANG -Long-term info on visitor trends on key sites -Total car-borne visitor numbers -Calibration to relate cars to visitor number	-Head count of people at key access points, set range of times, winter/summer -Automatic continuous counter – pressure pads -Simultaneous car counts at main car parks -Car occupancy	1	R/C
			1	R/C
			1	R/V
			1	R/V
Visitor patterns	-Reason for visit; frequency; use of alternative sites or SANGS; distance walked on site; dog numbers -Origin/distance to site	-Questionnaires/interviews on site/postal -Post code data	1	C/R/V
			1	C
Visitor pressures	-Number/frequency of fires; area burnt; season -Log vandalism; rubbish; motor cycles; dogs -Site fabric – erosion; soil nutrients; new paths	-Record of all fire events -Record of all site incidents -Measure sample path width/condition; dog mess; aerial photos	1	R
			1	R
			2	R/C
Visitor attitudes	-Reaction to initiatives – education; signs; leaflets; school visits	Questionnaires/interviews on site/postal	2	C/R
Visitor behaviour	-Changes after on-site events – habitat mgt; new car park charges; new dog bins; wardening	-Observation on site -Interviews	1	R/V
			2	R/V/C
Birds	-Number of Annex 1 birds -Breeding success of key spp	-Annual surveys of breeding Annex 1 birds on some SPA sites; 5-yearly survey on all SPA -Photo monitoring of ca 4 nightjar nests	1	V/R
			2	R/C
SSSI/SPA condition	-Relate habitat condition to management and strategy initiatives	-As standard NE SSSI cycle, but more frequent to check progress more closely	1	NE

Appendix 2. Determining the capacity of suitable alternative natural greenspace (SANGs)

Introduction

The recreational carrying capacity of a managed area has been defined as ‘the amount of recreational use allowable by an area’s management objectives’ (The Market Research Group, 2007). While deliberately vague, this definition does not adequately indicate the complexity of determining the carrying capacity of a site and the large number of factors that can have an influence. Carrying capacity is, in fact, a difficult and much criticised term, originally applied to food resource and pastoral pressure (Hausser, Travis & Finger, 2006).

There is a difference between the maximum visitors a site can support and the actual number of visitors attracted to a site. For the purpose of this report we use the term capacity in terms of the actual number of people that a site has the potential to attract and not the maximum number of people that a site can accommodate. Given that SANGs within the Thames Basin Heaths (TBH) region have the primary function of providing an alternative greenspace to the TBH SPA for local residents, and the projected increase in housing with associated increase in population whose impacts on the TBH SPA need to be mitigated, it is reasonable to assume that one of the primary management objectives of SANGs is to maximise their capacity and therefore the number of site users.

Currently it is assumed that mitigation of 8ha of additional greenspace is necessary for every 1000 additional people associated with new housing. This figure is untested. Here we recommend a means of determining the level of greenspace necessary to mitigate for the additional visitor pressure created by a given volume of new housing.

What determines capacity?

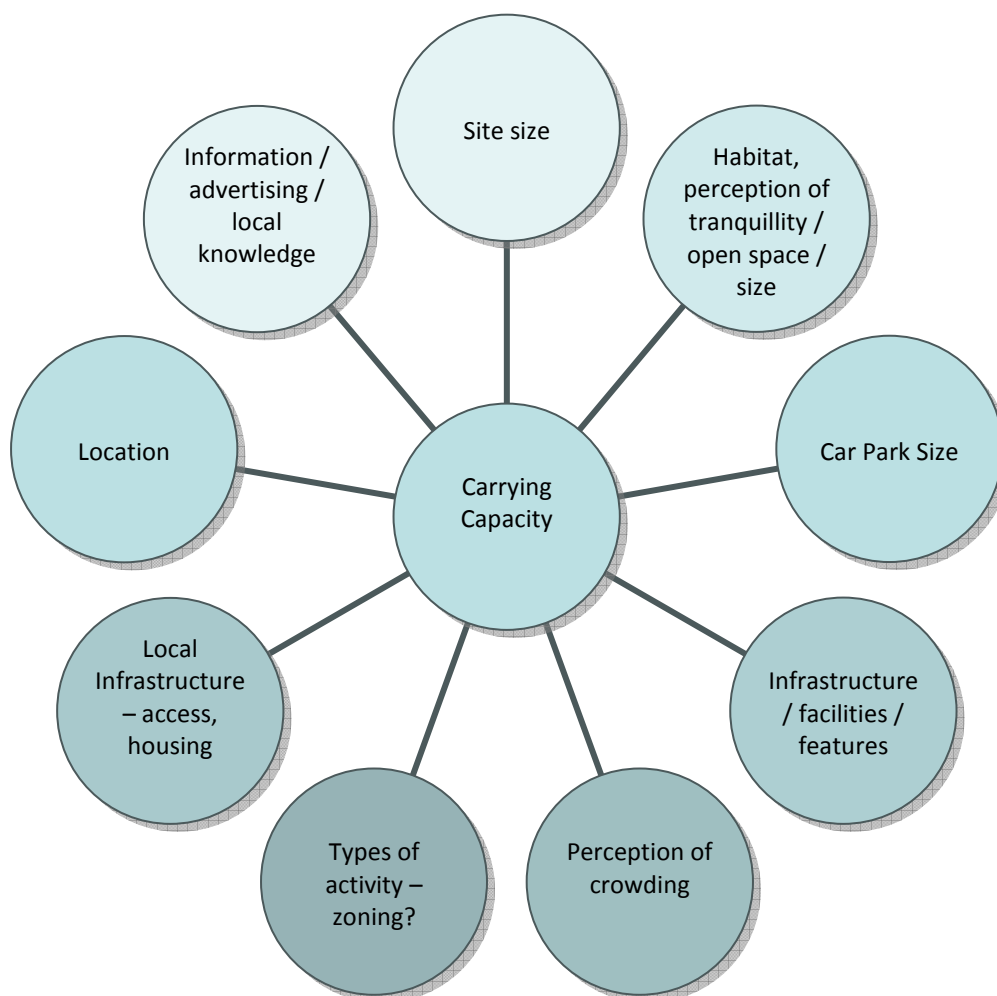
The main factors which influence the capacity of a potential SANG can be loosely divided into two categories: Those factors which relate to the physical attributes of the site such as size, access, infrastructure, paths, car parks and facilities; and those factors which relate to the attractiveness and perceptions of a site by people, and therefore the “draw” of a site, especially as an alternative to other natural green spaces, such as the TBH SPA. These categories are not mutually exclusive and often factors relating to a site’s infrastructure can have great influence over the attractiveness of that site and therefore the number of people that will visit.

Unsurprisingly large sites are able to accommodate greater numbers of visitors than smaller sites; however there is the need for supporting infrastructure. Car park size is a significant predictor of visitor numbers (Liley *et al.*, 2006a; Liley *et al.*, 2006b), therefore sites with adequate parking have greater capacity than those with limited parking for a given size of site. The location and ease of access, i.e. surrounding road network, of a site also influences the number of site users. For example, a site may be large and have more than adequate parking, however if it is too far away from the population of the area which the SANG is serving, the location can limit visitor numbers. In addition good paths, in terms of quality surface, variety of routes and number of interest features along the path may also influence the carrying capacity. For example, well maintained paths that do not waterlog after rain will increase the number of users a site can support and will also raise the attractiveness for regular users, especially dog walkers.

Intuitively, the size of a SANG exerts the greatest influence on the number of visitors who will use the site: Generally large sites have a greater carrying capacity than small sites, however the quality and variety of habitat within a site also plays a key role. For example extensive, thick scrub can limit the carrying capacity of a site by limiting the area through which visitors can move. The perception of the habitat of a site by the site users also plays an important role in carrying capacity. In the example of thick scrub, site users may feel unsafe walking along paths lined with scrub where they are not able to see the path ahead of them, decreasing the carrying capacity, however use of scrub for screening unattractive features such as roads, buildings can be of benefit. Conversely open spaces with attractive features, such as a lake or a view of the sea, may give the perception of tranquillity and increased site size, and as a consequence more people want to visit, increasing the carrying capacity. This is associated with site users' perception of crowding. One of the main reasons for visiting a natural greenspace as opposed to other greenspaces may be the perception of getting away from the noise and crowding of urban areas.

Clearly there a range of different elements (Figure 1) that determine capacity, and any one of these, regardless of the others, could determine how many people visit a site.

Figure 1: Different elements of capacity



Potential approach to Research

In order to determine the capacity of greenspace it is necessary to determine the relative importance of each element (see Figure 1) that may determine visitor capacity.

We recommend a number of different approaches, which if adopted together, should provide a means of determining the relevant importance of each element and would form a piece of research to identify how capacity might be predicted for a given site.

Total numbers of visitors on sites

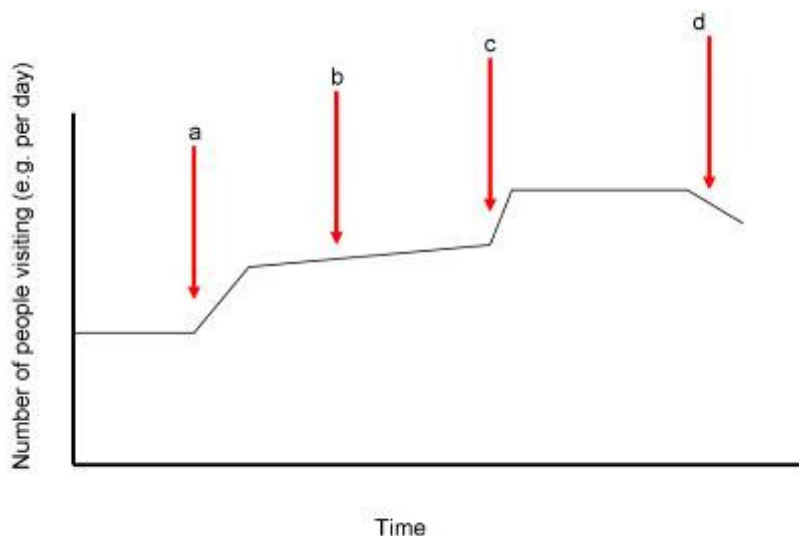
Total numbers of visitors for different sites will be available from the monitoring data collected as part of the monitoring strategy. There may also be data for other sites (for example possibly extracted from the different visitor surveys conducted within the area and further a-field). For each site where comparable count data can be obtained, it should also be possible to identify factors about the site (number of parking spaces, site size, habitat etc). It would then be possible, through multiple regression, to determine the relationship between visitor numbers and different features of the site. It may be necessary to try these analyses for different habitats. This approach has been applied to sites within the Thames Basin Heaths SPA, but not for those outside the SPA (Liley *et al.*, 2006c).

Effect of changes on sites

Where visitor monitoring has been conducted before and after any site changes (such as increasing car-park size), it should be possible to test the result of the change, i.e. do visitor numbers increase as a result of change? It may be that local authorities do hold data (for example car-park counts / tickets etc).

It may be difficult to achieve the sample sizes for this approach, in which case it may be possible to manipulate particular aspects across a range of sites to determine the effect on visitor numbers.

The graph in Figure 2 shows hypothetical changes in visitor numbers to a site over time. Changes in visitor numbers have occurred on four occasions (a-d). A fairly sharp increase such as a) or c) might be expected where new facilities are put in place, for example a new car-park or visitor attraction. Slower increases, such as b) may occur as a result of a gradual increase in housing within the local area. Reductions in visitor numbers (d) may occur when a new SANG is opened in the area, or perhaps where car-park charges are introduced. It may be possible to find examples of sites where such data exists and where changes in visitor numbers can be attributed to a particular cause.

Figure 2. Changes in visitor numbers over time

Site-based questionnaires and visitor feedback

Carefully designed questionnaires, conducted with visitors to SANGS, should be able to identify which other sites they visit; how they choose which site to go to; and what would make them go elsewhere. It should also be possible to identify which factors cause them to switch sites and which factors they consider determine when a site is full.

The design of the questionnaire and subsequent analysis should address choice of site and the relative importance of different factors. There are various market research approaches such as discrete choice analysis or conjoint which would be appropriate for these kind of questions.

Wider surveys: e.g. using the web, postal, or door-door

If a random sample of people from a given geographic area can be interviewed and asked which sites they visit and how often, it should be possible to calculate visitor rates to different sites. With the inclusion of information on where people live (home postcodes) it will be possible to include distance in this analysis.

Such an approach – essentially looking across the population of an area – can be conducted in various ways. Questionnaires can be made available on line, questionnaires can be posted to a random sample of addresses, face-to-face interviews can be conducted (door-to-door or at shopping centres or similar), or interviews conducted by telephone. Each approach has different merits. For example the use of the web allows interactive maps to be used for people to highlight where they go. Face-to-face or telephone interviews allow particular interview techniques to be used, etc.

In Dorset, a postal survey approach has been used, sent out at random to 5000 properties (Footprint Ecology / Poole Borough Council in prep). The advantage of such postal surveys is that they allow large numbers of people to be contacted, either targeted or at random, at relatively low cost. If properly designed, the sample can be statistically accurate and a

further advantage is that respondents can fill out the questionnaire in their own time, which may lead to more considered responses.

The critical problem associated with postal surveys is that there is little control over who fills in the questionnaire so results may not be representative. Those people with busy lives (parents, those in full time employment etc) may be less likely to complete the form. There also tends often to be a low response rate, sometimes as low as five per cent.

If large enough sample sizes are achieved, this approach should be able to show visitor rates to different sites and therefore highlight which sites receive fewer visitors than expected. With a knowledge of the features of these sites (car-park size etc) it should then be possible to determine a visitor rate (i.e. capacity) for sites with particular sets of characteristics (such as semi-natural sites with large car-parks).

Combining

Given the complexity and range of issues associated with carrying capacity, it is perhaps too simplistic to state a standard level of provision that will be able to absorb or mitigate additional visitor pressure. Instead it may be necessary to develop a means of predicting visitor numbers to a site based on its individual characteristics. Using the approaches outlined above the potential is there to determine the relative influence of different factors and how these might determine capacity.

A standard system could then be developed which would allow capacity to be calculated for a given site, based on the individual characteristics of the site. This system could be a spreadsheet or similar that asked key questions (such as site size, car-park capacity, habitat type, etc). The exact questions would be informed by the research. Consider a large, attractive area of mixed woodland and open heath of say 75ha, with little or no housing nearby and with no parking. If this were proposed as a SANG then the capacity of the site would be limited by the availability of car-parking spaces. If parking were introduced, then a 75ha site would be expected to have a large capacity. However, if a car-park of 1000 spaces was introduced it is unlikely that the car-park would ever be full and some other factor – such as the size of the site – would then be limiting capacity.

A spreadsheet system or similar would allow the different factors of a site to be listed and for any given configuration, the capacity of the site determined.

References

- Burley, P. (2007) Report to the panel for the draft south east plan examination in public on the Thames Basin Heaths Special Protection Area and Natural England's Draft Delivery Plan (ed P. Inspectorate).
- Haskins, L.E. (2000) Heathlands in an urban setting - effects of urban development on heathlands of south-east Dorset. *British Wildlife*, **4**, 229-237.
- Hausser, Y., Travis, T., & Finger (2006) Beyond Carrying Capacity in Recreational Management: In Search of Alternatives. In Exploring the Nature of Management. Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas (eds D. Siegrist, C. Clivaz, M. Hunziker & S. Iten), University of Applied Sciences Rapperswil, Switzerland.
- LDA Design (2007). Thames Basin Heaths SPA: Access Management. Part 2. Draft Access Management Plans. LDA Design Ltd, London, UK.
- Liley, D. (2004). Human impacts on the Castle Bottom to Yateley Common and Hawley Commons SSSI, Hampshire. . RSPB.
- Liley, D. (2005). A summary of the evidence base for disturbance effects to Annex 1 bird species on the Thames Basin Heaths & research on human access patterns to heathlands in southern England. Footprint Ecology / English Nature.
- Liley, D. & 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.
- Liley, D., Clarke, R.T., Mallord, J.W., & Bullock, J.M. (2006a). The effect of urban development and human disturbance on the distribution and abundance of nightjars on the Thames Basin and Dorset Heaths. Natural England / Footprint Ecology.
- Liley, D., Clarke, R.T., Underhill-Day, J., & Tyldesley, D.T. (2006b). Evidence to support the Appropriate Assessment of development plans and projects in south-east Dorset. Footprint Ecology / Dorset County Council.
- Liley, D., Jackson, D.B., & Underhill-Day, J.C. (2006c). Visitor Access Patterns on the Thames Basin Heaths, Rep. No. ENRR 682. English Nature, Peterborough.
- Mallord, J.W. (2005) *Predicting the consequences of human disturbance, urbanisation and fragmentation for a woodlark *Lullula arborea* population*. Doctorate, UEA, Norwich.
- Murison, G. (2002). The impact of human disturbance on the breeding success of nightjar *Caprimulgus europaeus* on heathlands in south Dorset, England, Rep. No. English Nature Research Report 483. English Nature, Peterborough.
- The Market Research Group (2007). The Purbeck Section of the Dorset & East Devon World Heritage Site Carrying Capacity Evaluation Report. The Market Research Group, Bournemouth University, on behalf of the World Heritage Steering Group, the Purbeck Heritage Committee and the Dorset AONB.
- Underhill-Day, J.C. (2005). A literature review of urban effects on lowland heaths and their wildlife, Rep. No. 624. English Nature, Peterborough.
- Woodfield, E. & Langston, R.H. (2004). A study of the effects on breeding nightjars of access on foot to heathland. English Nature Peterborough.