New Bat Survey Guidelines

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At the end of January 2016, a revision of the Bat Conservation Trust (BCT) *Bat Survey Guidelines* was issued. Following previous versions in 2007 and 2012, this is the third edition of this guidance, which aims to provide a good practice framework for designing and undertaking professional bat surveys, analysing the data collected and writing survey reports.

This article provides a chapter-by-chapter guide to the key messages from the 2016 edition and gives readers an overview of the main changes.

Chapter 1: Background

Who are these guidelines for?

They are now unequivocally for professional ecologists. Whilst they may be *useful* for developers, planners and those policy-makers responsible for reviewing and assessing the implications of professional bat surveys, BCT is clear that the guidelines are *not* directly intended for such other professions.

What is a bat survey?

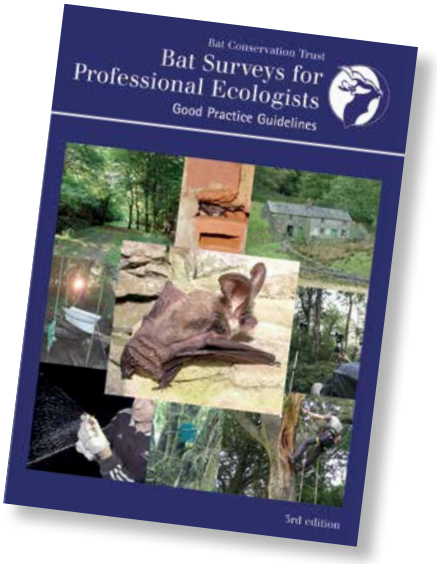
We should know the answer to this, but do we? A bat survey is defined by BCT as *"a sampling activity in which a wide range of variables are measured to describe a site or an area"*. The guidelines relate to professional bat surveys carried out to assess how proposed activities may impact bats. They do not provide recommendations for the survey effort required for monitoring, such as to quantify change or measure mitigation success, or for research purposes.

How should these guidelines be used?

They provide *descriptive* rather than *prescriptive* good practice guidance intended to raise professional standards and increase consistency. That means that they do not aim to either override or replace knowledge and experience and it is acknowledged that there may be departures from the recommendations. In these instances, the ecological rationale should be clearly documented, as well as the expertise of the person making any such judgment. We are also reminded that someone with no prior knowledge or experience of professional bat surveys should not expect to read this document and then be able to design, carry out, interpret the results of, or report on professional bat surveys competently.

Overall, BCT intends this guidance for use within the framework of *British Standard 42020: Biodiversity – Code of practice for planning and development* (British Standards Institution, 2013) and alongside the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2016). Chapter 1 also provides important information on the legislative and planning policy contexts regarding bats and bat surveys, as well as on licensing.

Note that this document is not intended to replace the English Nature *Bat Mitigation Guidelines* (Mitchell-Jones, 2004) or the *Bat Workers Manual*, 3rd Edition (Mitchell-Jones and McLeish, 2004).



Chapter 2: Considerations for bat surveys

Bat surveys should only be undertaken where there are possible impacts upon bats and their habitats. This seems obvious but BCT reminds us that unwarranted, speculative surveys are costly and cause reputational damage to the ecological profession. Ultimately, this could also undermine conservation efforts for these protected species.

Proportionality and good survey design are therefore important principles underpinning this chapter. Where bat surveys are required, they should be carefully tailored to address the likely impacts of

Brandt's Bat

Lesser Horseshoe Bat © John Black

the proposed activity, which will vary between different projects. As such, early engagement with a bat ecologist is strongly recommended for all projects where bats may be a consideration, and potentially also with the Local Planning Authority or licensing body. The aims and objectives of a suite of bat surveys should be established at the outset, but there should always be scope for change, as one stage of surveys informs the next. The final report should demonstrate this iterative process and how aims and objectives have been met. Where bats are present on a project, the overall aims and objectives should be to use robust survey results to devise an appropriate strategy for bats based on the standard mitigation hierarchy (i.e. impacts should be avoided in the first instance but, where they cannot be avoided, they should be adequately mitigated or, as a last resort, compensated for).

Chapter 2 also includes recommendations on taking into account survey limitations, such as those relating to sub-optimal weather, old survey data, and access restrictions. Of course, ideally, such survey limitations are avoided. BCT therefore recommends that bat surveys should be undertaken in weather that is conducive for bat activity: temperatures at 10˚C or above at dusk and with no strong winds or rain. This is particularly pertinent on a single survey visit. For survey data, BCT recommends that planning or licence applications are ideally submitted on data from the last survey season. Where older survey data must be used, its validity should be assessed on a case-by-case basis. Overall, BCT recommends that any survey limitations should be documented. Note that a lack of appropriate equipment is not a reasonable survey limitation.

The remaining sections of this chapter cover human resources for bat surveys, such as surveyor competencies and equipment requirements. They also introduce pertinent considerations regarding data collection, survey timings, risks and hazards associated with bat work. These are covered in more depth in later chapters and the appendices.

Chapter 3. Ecological considerations for bat surveys

Rather than being distributed across several chapters as in the second edition, a single chapter now covers ecological considerations for bat surveys. This includes essential information on species' ecology including their roosting preferences, and also references the roost types used by Natural England for licensing purposes. Importantly, there remains a section on species-specific considerations for Annex II and quiet-echolocating bats, which are difficult to survey for. Primarily, this recommends the careful deployment of full-spectrum bat detectors, advanced bat survey techniques and/or night-vision and infrared cameras for these species.

Chapter 3 now also includes information on BCT's Core Sustenance Zones (CSZs). CSZs use existing research, such as from radio-tracking studies, to identify *"the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost"* (i.e. where proposed development could have potentially adverse impacts on this colony or roost including upon their commuting and foraging habitats). CSZs should therefore be accounted for when

undertaking desk studies and designing survey strategies. Table 3.5 (p30) shows the level of confidence in each CSZ for most UK bat species, based upon the number of bats and number of studies used to inform the calculation.

Chapter 4. Preliminary ecological appraisals for bats

Perhaps of most note in this chapter is Table 4.1 (p35), which seeks to provide a more consistent approach for assessing the potential suitability of a 'site' for bats based on a preliminary ecological appraisal. This single table consolidates three separate sets of assessment categories from the second edition of the guidelines: the bat roost potential of structures and buildings; of trees; and the habitat suitability of a wider site for bats. It is therefore regularly referred to elsewhere in the new guidance. This chapter also provides guidance on undertaking and interpreting desk studies to inform this appraisal.

Chapter 5. Bat roost inspection surveys – buildings, built structures and underground sites

This chapter was previously covered in Chapter 8 (roost surveys). However, most of the information on bat ecology is now upfront in Chapter 3 (see above) and bat roost inspections of trees are now covered separately (see below). The key message from Chapter 5 remains that further surveys of a site are required if the likely absence of bats cannot adequately be determined by a preliminary (daytime) survey, or are usually necessary to characterise a roost where the presence of bats has been determined. This chapter describes the survey methods and provides guidance on which additional surveys might then be appropriate – a useful flow chart is provided on page 38 (Figure 5.1) to help with this.

Chapter 6. Bat roost inspection surveys – trees

Chapter 6 recommends that tree inspections for bat roosts are appropriate where trees are to be subject to *direct* impacts (e.g. felling, lopping, etc.), but also where they may be subject to *indirect* impacts (e.g. increased light, noise, nearby vegetation removal). Another useful flow chart is provided on page 45 (Figure 6.1) to help determine the best course of action for further bat surveys of trees following initial inspections – this chapter acknowledges the difficulties of inspecting trees for bats, given that bat usage of tree roosts is often transient (within a wider woodland resource) and that signs of bat roosts in tree features can quickly disappear.

Note that neither Chapter 5 nor 6 now provide a table for categorising bat roost potential (i.e. negligible, low, moderate, high). Instead, they both now make reference to the aforementioned Table 4.1 (p35) for assessing the suitability of a site for bats. Also note that although chapters 5 and 6 provide guidance on undertaking 'daytime' surveys, they remind us that professional ecological consultants should hold an appropriate licence on *any* survey where disturbance to bats is possible.

Chapter 7. Emergence /re-entry surveys

Three tables in Chapter 7 are likely to be referenced regularly by users of these new guidelines: Tables 7.1 and 7.2 (p51) provide guidance on the timings and duration of emergence/re-entry surveys, and Table 7.3 (p52) on the recommended number of survey visits in relation to the potential suitability of the 'site' for bats (see above – Table 4.1, p35).

Essentially, the recommendations are for:

- appropriately timed surveys (with the optimal period usually May to August, although this may extend into September);
- adequate time between survey visits (at least two weeks, preferably more);
- accounting for different species' ecology (starting surveys earlier for typically early-emerging species and continuing longer for typically late-emerging species);
- accounting for different roost types (e.g. surveys in April and September/October for 'transitional' roosts or from mid/late summer for mating roosts);
- the appropriate use of pre-dawn re-entry surveys, particularly where two or more survey visits are required (but potentially also on a single survey visit for quiet-echolocating or typically late-emerging bats); and
- the consideration of prevailing weather and site-specific conditions.

Generally, the above is the preferred approach for nocturnal surveys. However, as above, BCT states that there can be flexibility in an approach, providing this can be justified by expert opinion. As such, it is good practice for nocturnal surveys to be designed and carried out, or at least led, by experienced, licensed bat ecologists.

Note that BCT now overtly advocates the use of night-vision/infrared and thermal technologies to augment nocturnal surveys of some structures and trees. In particular, such technologies may be applicable where structures are large, features are poorly illuminated by twilight or are difficult to see, or where quiet-calling or typically late-emerging bats may be present.

Chapter 8. Bat activity and back-tracking surveys

Chapter 8 proposes that using a suite of bat activity and back-tracking surveys should facilitate the collection of robust data that can answer both the generic questions about a site (e.g. are bats present and if so, which species?) as well as questions that are more project-specific. The survey strategy should also be mindful of the scope and limitations of the sampling methods and ensure ecologists are well prepared before heading into the dark! As above, BCT recommends that bat activity and back-tracking surveys are therefore best designed and led by experienced, licensed bat ecologists.

Table 8.3 on page 58 of this chapter provides the framework for bat activity survey effort at a given site, which is based upon an assessment of the overall habitat suitability, again in reference to Table 4.1 (p35). The key recommendations in Chapter 8 are as follows:

- both walked transects and automated static bat detectors should be employed unless there is sound justification not to;
- more bat activity surveys should be undertaken on sites with more favourable habitat for bats;
- surveys should extend from May through to August as a minimum, but include April, September and October in favourable weather and/or dependent upon geographic location; and
- static detectors should always now be deployed for a minimum of five consecutive nights, in favourable weather.

This chapter also now includes guidance on acoustic surveys at 'autumn swarming' sites, which usually refers to surveys for *Myotis*, long-eared and barbastelle bats at underground sites, but may also now apply to Pipistrelle species and large structures in urban environments following recent research by Korsten *et al*. (2015).

Chapter 9. Advanced licensed bat survey techniques

Usually, acoustic surveys are sufficiently effective to answer most questions about bat activity on a site if undertaken properly. However, sometimes it may be necessary to catch bats (using mist nets, harp traps, and sometimes acoustic lures) to enable a better understanding of the assemblages present. Radio-tagging and radio-tracking bats can then also allow us to understand how they use a site. A new chapter in the third edition of the guidelines therefore covers these advanced licensed bat survey techniques (ALBST).

Examples of where catching bats could be appropriate are:

- where it is important to understand the sex, age class and breeding status of bats using a site;
- to identify the presence (or likely absence) and status of scarce, sensitive and strictly protected bat populations such as Bechstein's, barbastelle, grey long-eared or Horseshoe bats (most of which are also very difficult to detect and/or identify acoustically); and
- where there are important species or colonies in a regional context deemed at high risk from a particular development.

Radio-tracking, if appropriate, can then identify important spatial information such as roost sites, key flight-lines and core foraging areas, and the associated temporal data can identify patterns of activity.

Chapter 10. Data analysis and interpretation

Perhaps the primary message from Chapter 10 is the importance of defining 'bat pass' criteria and being consistent with this across data analyses and reporting. Further very important considerations are then as follows:

- Any analyses and reporting should be mindful that the number of 'bat passes' represents an index of bat activity (where the detector is) and is not a measure of bat abundance.
- Comparisons of activity levels between different bat species and genera should be strongly caveated – or ideally avoided – because of the variance in detectability between different bat species and different equipment.
- Call parameters used to identify different bat species (or genera if this is not possible) should be consistent and clearly stated.
- Any automated species identification should always be followed by manual checks by experienced ecologists.

Appendices 7 and 8 then provide information on which statistical analyses may be applicable to the bat data collected, which will vary between projects.

Chapter 11. Writing bat reports

The final chapter provides guidance (and a useful template) on bat survey reports submitted in the context of development proposals. In relation to the applicable bat population(s) and proposals, BCT states that reports should always:

- show what is there and its value and significance;
- how it will be impacted by the development;
- how these impacts can be mitigated; and
- how the development will result in no net loss (and where possible a net gain – particularly for planning purposes).

Generally, reports should always be accurate, clear, accessible to the intended reader(s), and peer reviewed before issue and should also satisfy recent CIEEM *Guidelines for Ecological Report Writing* (CIEEM, 2015).

Other changes

Finally, there are two chapters from the 2012 guidelines omitted in 2016: on surveying major infrastructure projects and onshore wind turbine schemes. For the former, where this is not covered by chapters 6 to 9, we are referred to recent Defra-funded research on bats and linear transport infrastructure undertaken by the University of Leeds (Berthinussen and Altringham, 2015). For the latter, it is understood that this was due to delays with Exeter University's National Bats and Wind Turbines Project report, which is expected soon.

Otherwise, the remaining appendices (not mentioned above) now include several other useful references, such as a table of potential hazards and risks associated with bat survey work (Appendix 3), best practice for collecting bat droppings for DNA analysis (Appendix 4), and on ALBST equipment (Appendices 5 and 6).

To conclude then, the significant effort that BCT has put into the third edition of these guidelines is apparent, including the improved format and enhanced evidence-base. By the time you read this, they should be in widespread use…

References

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