

# Bat Conservation Trust



## **Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys**

**Bat Conservation Trust, May 2022**

This Interim Guidance Note aims to provide clarification regarding the role of night vision, infrared and thermal imaging cameras (night vision aids or NVAs) in bat emergence surveys, pending the publication of Bat Surveys for Professional Ecologists Good Practice Guidelines 4<sup>th</sup> edition, now predicted to be in summer 2022. This note supersedes the 3<sup>rd</sup> edition (Collins, 2016). The text has been prepared by Bat Conservation Trust (BCT), discussed and agreed with the Statutory Nature Conservation Body (SNCB) mammal specialists and the Technical Review Board for the 4th edition of the survey guidelines have also been given the opportunity to comment.

Separate, more technical guidance on the use of infrared cameras for bat surveys is also in preparation, the final content of which has not been reviewed by BCT or the SNCBs at this time, however for further information see Richard Crompton's presentation delivered at the National Bat Conference in 2021 (found here: <https://battraining.info/betterbat>).

### *Existing publications*

Bat Surveys for Professional Ecologists Good Practice Guidelines 3<sup>rd</sup> edition (Collins, 2016) advise the use of NVAs as a complementary method to increase precision during emergence surveys, particularly where there is potential for late-emerging species and in dark conditions. However, the current edition of the guidelines states that, whilst this equipment is useful as a complementary technique, *it shouldn't be used to replace surveyors to any significant degree.*

The Thermal Imaging Guidelines (Fawcett-Williams, 2021) state that *cameras can be used to replace one or more surveyors providing the right equipment is deployed correctly by suitably trained personnel.*

The beta version of the Bat Mitigation Guidelines (CIEEM, 2021) states that *the use of visual aids such as infrared or thermal imaging cameras is strongly recommended for tree emergence surveys.*

### *Available research*

Recent research (Davidson-Watts, 2021) reviewed the results of emergence surveys of 74 known roosts in trees (found by radio tracking) comparing those carried out by sight by surveyors and those supported by infrared cameras. The study found that surveyors could not see potential roost features (PRFs) on average 20 minutes after sunset in woodlands and 29 minutes after sunset outside of woodlands. When all the data was pooled, *bats emerged on average 8 minutes after PRFs could no longer be seen by surveyors*, meaning that bats were not seen in 78% of these surveys. Although surveys saw some bats emerging in conditions light enough for surveyors to see them in the remaining 22%, this finding was species-specific, with a much higher probability of observing the emergence of noctule and soprano pipistrelle than any of the other species recorded (note that common pipistrelle wasn't present in the study).

NVAs have become much more accessible and affordable, and the above research demonstrates their efficacy. Similar research is not available for buildings, however where potential bat access points on buildings are shaded, and the species involved emerge late and call quietly, similar results are anticipated.

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## *Use of NVAs and the guidelines*

For these reasons, the 4<sup>th</sup> edition of the survey guidelines will shift the emphasis to using NVAs as a standard protocol rather than as an optional or complementary method for both building and tree emergence surveys. There will be a move towards NVAs *being used on all emergence surveys*, with justification required in consultant's reports as to *why they have not been used*, if this is the case.

This requires high-quality cameras paired with recording bat detectors, operated by trained and experienced surveyors. There are limitations to different camera set-ups and weaker units may only be useful for a single small entry or exit point at very close range, which may be adequate for roost characterisation surveys but is less useful for presence/absence, which requires a higher specification camera and better illumination in order to view a larger area, such as one elevation of a building. Cameras need to be set up appropriately and footage should be recorded for analysis back at the office. Reports should describe the equipment used, relevant specifications, how the equipment was deployed and monitored in the field, and the approach used to analyse the videos. They should also include a screenshot from the camera from the darkest point of the survey to illustrate the field of view and visibility.

## *Can NVAs replace surveyors?*

On the topic of whether or not infrared or thermal imaging cameras can replace surveyors, this depends on each individual scenario and the equipment used. The survey guidelines and technical guidance on the use of infrared cameras will cover this topic in more detail.

## *Cost and training*

It is recognised that NVAs can be costly to buy and maintain, and use of them requires training and experience. Therefore this approach, as the basis for good practice, will be phased in over a period of two years starting with the publication of this interim guidance note.

## *Dawn surveys*

Radio tracking studies show that dawn return times are significantly variable both between and within species (Andrews & Pearson, 2022 provides a detailed review of the literature). The average return times quoted in the study are more than two hours before sunrise (the timing advised for dawn surveys in the current guidelines) for many species (Andrews & Pearson, 2022). Froidevaux *et al.* (2020) found that bat detection probability was not affected by whether a survey was carried out at dusk or dawn<sup>1</sup>.

The research outlined above creates questions about the efficacy of dawn surveys for determining the presence or likely absence of bats and the value of these over dusk surveys for this specific purpose. Alongside this are health and safety concerns relating to dawn surveys, which can arise from sleep deprivation, particularly if carried out in conjunction with dusk/evening surveys on the same night.

The use of NVAs has the potential to improve the quality of dusk surveys, providing clarity on exact emergence points and bat counts that might not otherwise be available because of the limitations of

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<sup>1</sup> This result should be viewed with caution, however, as there were few dawn surveys in the sample and this was not the aim of this research. More research is needed to determine the value of dawn surveys.

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the human eye. Whilst dawn surveys can reward surveyors with displays of dawn swarming behaviour, there is a concern that bats that have returned early will be missed. Of course, where dawn surveys are carried out they can be similarly improved through using NVAs but this does not address the risk of missing bats that have already returned.

The 4<sup>th</sup> edition of the survey guidelines will therefore transition away from the standard use of dawn surveys, particularly as a method for presence/absence surveys, in favour of dusk surveys supported by NVAs. This does not mean that dawn surveys will become obsolete – it is recognised that they can provide useful information (on entrance points, which are sometimes different from the exit points in complex buildings and for some species) for a known roost or in very specific situations. As always, methods selected by professional ecologists should be based on sound ecological reasoning and in consideration of published evidence which should be stated within the survey reports methods section.

## Bibliography

Andrews & Pearson (2022) Review of empirical data in respect of emergence and return times reported for the UK's native bat species Version 6. Available here:

<https://drive.google.com/file/d/1DeGHx9r9-p5XH6R6CRismquVD188WY8/view>

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Fawcett Williams (2021) Thermal Imaging Bat Survey Guidelines. Available here: <https://www.bats.org.uk/resources/guidance-for-professionals/thermal-imaging-bat-survey-guidelines>

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Froidevaux, J. S. P., Boughey, K.L., Hawkins, C.L., Jones, G. & Collins, J. (2020) Evaluating survey methods for bat roost detection in ecological impact assessment. *Animal Conservation* 23 597–606. Available here: <https://zslpublications.onlinelibrary.wiley.com/doi/epdf/10.1111/acv.12574>