

BCT Special Edition Bat Group Bulletin No. 5: Bats and Churches 30th June 2015

This special edition of the Bat Group Bulletin aims to provide information on two research projects about bats and churches.

The first is an English Heritage (now Historic England) funded pilot project on managing bats in churches. A bulletin outlining the work planned within this project was sent to bat groups on [4th August 2014](#). This edition shares the results of the project. The full report is available [here](#).

The second project is a SITA Trust and Natural England funded PhD project between BCT and University of Bristol, about 'Bats, churches and the landscape: sustainable conservation of bats in the East of England'. This project was first introduced in a bulletin on [28th July 2011](#), with updates included in subsequent bulletins. The study is due to complete later this year, and this edition summarises the interim findings of the study.

1) Management of Bats in Churches – a Pilot

Background

A significant proportion of medieval churches are home to bats, with a minority of these hosting large and important maternity roosts. Where large numbers of bats are present, this can impact upon the church, disrupting use for worship and community events, causing damage to objects and materials of heritage and religious value, increasing the cleaning burden and giving rise to perceived health risks. Balancing the needs of these protected species with the preservation and use of churches is challenging.

A Defra-funded research project ([WM0322](#)) 'Improving mitigation success where bats occupy houses and historic buildings, particularly churches' led by the University of Bristol and completed in 2014 has advanced understanding in this area. The project concluded that Natterer's bats were very dependent on the churches they were present in. The bats did not use any other sites away from the church as maternity roosts, suggesting that total exclusion from a church could harm the conservation status of a colony. Each colony used a number of roosts within each church. The Defra study also found that deterrents (acoustic deterrents and lighting in areas of the church where bats were not roosting to create "no-fly zones") showed promise as a means to encourage bats to move away from the most sensitive locations to alternative roosts in the building.

The Bat Conservation Trust supported this research and the English Heritage pilot as part of our strategy to ensure that bat conservation is underpinned by sound scientific evidence. We believe that the solutions for this challenging issue lie in achieving a better understanding of the ecology of the species concerned and in engaging directly with the communities affected.

Purpose of this project

This pilot project applies and builds upon the results of Defra project WM0322, researching, developing and refining management techniques to enable churches severely affected by bats to implement cost effective measures to protect heritage (some of national and international significance) in ways which will cause no long-term detrimental impact on the local bat population (or the Favourable Conservation Status of the bats). In addition, this pilot study addresses knowledge gaps remaining from project WM0322, in which the impacts of deterrents on Natterer's bats were investigated in churches in late summer but

not in spring/early summer when bats are pregnant and sensitive to disturbance. Furthermore, the effectiveness of deterrent techniques on another species which can form large roosts in churches, the soprano pipistrelle, needed to be investigated.

The specific project objectives were:

1. Adapt and apply the findings of the Defra research at five churches (four in Norfolk, one in Northamptonshire) during spring and summer 2014 to alleviate the problems they are experiencing while ensuring no significant impact on the bat populations concerned;
2. Address research gaps that could not be covered in the Defra research by:
 - i. evaluating the impacts and effectiveness of the deterrents when applied in the spring/early summer before the bats breed (at this time the bats are pregnant and more vulnerable to disturbance);
 - ii. testing the use of the deterrent approaches on soprano pipistrelles (the trials in the Defra research were focused on Natterer's bats) in the church in Northamptonshire;
3. Develop a policy and licensing framework with which to manage the subsequent use of such approaches at other churches in the future.
4. Develop a "toolkit" covering practical guidance aimed at churches, bat workers, environmental consultants and licensing authorities on (i) safe and effective operation of the techniques, (ii) training and standards requirements, (iii) policy and (iv) licensing to inform case by case future decisions regarding use at other sites.

The practical research for objectives 1 and 2 is now complete and the results are summarised in this bulletin and the full report is [here](#). Appendix 3 of this report provides draft guidance on the use of these techniques. Objectives 3 and 4 are in progress by Defra and Natural England, and it is hoped that a licence will be ready to trial by the end of 2015.

Project team and Steering group

The team undertaking this contract was again led by the University of Bristol, and supported by Philip Parker Associates, Bat Conservation Trust, Natural England and Defra. The Bristol University research team consisted of Professor Gareth Jones (Principal Investigator), Professor Stephen Harris (Co-investigator), and Researchers/Co-investigators Dr. Matt Zeale and Dr. Charlotte Packman.

The project was overseen by a steering group bringing expertise from the church, heritage and nature conservation sectors. The role of the steering group was to ensure that the work was in the interests of both churches and bat conservation; addressed the concerns of all stakeholders; and was undertaken with the highest regard for the needs of church users and heritage, and the welfare and ecological requirements of bats. BCT's role was to provide advice on the development of the toolkit and licensing policy and to communicate the aims, progress and outcome of the project.

Methods used

Field research took place from May – September 2014 at the four churches in Norfolk, which the previous Defra study identified to be impacted by the presence of Natterer's bat roosts, and the one church in Northamptonshire which is home to a large soprano pipistrelle colony.

Bats were counted on emergence, to assess numbers present and identify roost exit points. Bats were then caught and radio tagged, to study their behaviour and locations during a trial of the acoustic and lighting deterrents. Acoustic deterrents were used to encourage bats to roost away from sensitive areas in the church whilst lighting deterrents were used in areas where bats were not roosting to create “no-fly zones”. The roosting behavior of the radio-tagged bats was investigated before the deterrents were applied, during their operation and after deterrents were switched off.

During the next phase of work, different deterrent measures were implemented at each church depending on the evolving situation and responses of bats to deterrents in the initial trial. At each church the project team discussed with the Churchwardens which areas are most in need of protection. These discussions informed the development of plans to progressively move the resident bat colonies away from the sensitive locations to the agreed less sensitive areas. The project team used the deterrent approaches that were considered suitable for each individual building and colony (e.g. acoustic deterrent alone, acoustic deterrent and lighting etc.). In addition, alternative roosts and “boxing in” of existing roosts within church buildings were trialled, where appropriate, to restrict the areas where bats were active and limit the spread of their droppings and urine.

The impacts of these techniques on the bats, and on deposition of droppings and urine, were monitored throughout the study. To avoid impacting on the young when they could not fly, the study started in spring, then radio-tracking and deterrent trials were paused while the bats gave birth, and work recommenced in the late summer. The project team performed weekly counts of bats emerging from the churches in order to determine if the colonies using them had maintained their original size. Droppings and roost locations (determined from dropping accumulations and audible bat social calls) in response to deterrents/bespoke measures, were mapped daily. Additional targeted emergence surveys (concentrating on a specific area of a church/exit point) and dawn surveys were used to gain further information on how the bats were using each church and responding to deterrents/bespoke measures.

Summary of results

The use of the methods piloted in four Norfolk churches reduced the negative impact that Natterer’s bats were having on all four churches, with a varying degree of impact reduction achieved between churches. Acoustic deterrents were effective in moving Natterer’s bats away from sensitive areas of the church in both spring and early summer.

In the Northamptonshire church, the majority of soprano pipistrelle bats sought alternative roosts within the church upon first use of acoustic deterrents. However, on longer term use of the acoustic deterrents, the bats habituated. Roosts quickly reformed after acclimatisation, showing that at least in this church acoustic deterrents were not as successful at moving soprano pipistrelle roosts as they are with Natterer’s bat roosts.

Light deterrents had limited use and carried significant risk when used on bat roosts. At dusk, light deterrents can trap both Natterer’s bats and soprano pipistrelles in roosts, posing a severe risk to their welfare.

In one church, a combination of acoustic deterrents and a method of ‘boxing-in’ large suitable roosting areas around entry points, showed great potential to significantly reduce or even completely remove previously severe impacts, whilst still enabling the Natterer’s bats to roost at the church. However, the impacts of ‘boxing-in’ was not assessed at the time of birth or pup rearing, so this would need careful consideration, implementation and

monitoring. 'Boxing-in' solutions will require Faculty permissions (within Church of England churches), installation by professional builders and have significant cost implications, so the use of 'boxing-in' will need to be explored on a site-by-site basis.

Key findings

Key research findings of this study are:

- Acoustic deterrents were an effective tool in reducing the impact of Natterer's bats on churches.
- Natterer's bat and soprano pipistrelle roost locations could be manipulated with acoustic deterrents in spring/early summer. This technique was not studied and should not be used during the period when bats are giving birth and before pups are able to fly.
- Soprano pipistrelles habituated to acoustic deterrents at one site.
- Light deterrents adversely affect bat emergence behaviour and can trap bats within their roosts.
- 'Boxing-in' roosting areas around bats' entry points into a church was found to provide a promising solution, retaining roosting space for the bats but preventing access (and therefore deposition of droppings and urine) to the rest of the church interior.
- Bespoke approaches using a combination of methods will be required in some cases in order to maximise effectiveness of addressing the issues of Natterer's bats in churches. This may involve the use of deterrents alongside methods such as 'boxing-in' large, suitable roosting areas.

What is happening next?

[The report](#) summarises some promising results and provides draft guidance (appendix 3), all of which is now being used to develop a toolkit that can be applied in churches where Natterer's and soprano pipistrelle bats are having a significant impact. The report includes specific suggestions for the five churches in the study. Natural England and Defra are developing a licencing framework for these techniques to be used more widely in churches. Use of this licencing framework will require the input of specialist advice and the creation of long term management plans. Implementing management plans in churches will carry significant cost, and opportunities for funding this are being explored.

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2. Bats, churches and the landscape: sustainable conservation of bats in the East of England

Background

SITA Trust and Natural England funded BCT and the University of Bristol to conduct a PhD research study, by Madeleine Ryan, supervised by Professor Gareth Jones, on soprano pipistrelle bats in churches in eastern England. The project focused eastern England because of the high proportion of enquiries to the Bat Helpline from churches in this region. Soprano pipistrelles (together with common pipistrelles) are one of the species of bats about which churches most commonly seek advice from the National Bat Helpline. They can form large summer maternity roosts in churches.

The study aimed to reduce the impacts of bats and safeguard long term conservation of bats and built heritage. The project sought to understand why soprano pipistrelle bats select certain churches and how they use the interior of the church and the surrounding habitat throughout the year. . The research aimed to answer the following specific questions:

1. Do church-roosting soprano pipistrelles make use of other summer roosts?
2. Where in the landscape surrounding church roosts do soprano pipistrelles forage at night. What habitats do they select to feed in and what are their commuting distances?
3. How does the weather, time of night and time of year influence patterns of soprano bat activity at churches.
4. How does habitat configuration around churches affect the presence of soprano pipistrelle summer roosts within them?
5. How do aspect and crevice temperature affect the location of soprano pipistrelle roosts within churches?

A regional survey was undertaken to establish the occurrence of bats in relation to church and habitat data. Detailed research was then carried out, involving radio-tracking bats at two medieval and one Victorian church, and studies of roost microclimate conditions and bat activity throughout the year. Bat boxes were also trialled as an approach to mitigate the impact of the roosting bats on the church community.

Summary of interim results

Alternative roosts: Bats from three soprano pipistrelle colonies in churches in Essex, Norfolk and Peterborough were radio tracked. These bats used several alternative day roosts in a variety of structures across large areas surrounding the church maternity roost. However, although some individual bats switched roosts, the church maternity roosts were always occupied during the radio-tracking periods. In total, for all three colonies, only four alternative communal roosts were located, three of which were in domestic houses and the fourth in a garage attached to a domestic house.

Surrounding habitat: Soprano pipistrelles are known to preferentially feed on insects in wetland and woodland habitats but this study found that the species is more mobile than previously thought. The average maximum nightly commuting distance was 4.46 km. This means that it is important to retain wetland, woodland and other trees in the landscape in areas surrounding soprano pipistrelle roosts and where opportunities arise, to recreate these habitats, to compensate for historic and ongoing losses.

Bats use churches throughout the year: Soprano pipistrelles were present all year-round in the three churches monitored over 12 months. Activity peaked in mid-July, which coincided with the time juveniles were starting to fly. This indicates that without survey work to suggest otherwise, it should generally be assumed that where soprano pipistrelle bats are known to use a church in summer they may hibernate there too. The likely year-round use of churches should be taken into account during building repair work (e.g. by consideration of whether a licence is needed and the timing of such work) and any mitigation should include provision to replace lost hibernation habitat as well as maternity roosting habitat.

Numbers of churches with pipistrelle bats: Surveys of churches with previous records of common or soprano pipistrelle bat roosts, some of which were maternity colonies, indicated that although almost all of the visited churches still had evidence of these species, relatively few had obvious communal or maternity roosts present. These surveys highlighted that church doors are frequently used for common or soprano pipistrelle species for their access into and out of churches, and that access over doors is sometimes threatened by draught exclusion and by restoration work. A national survey would allow a better understanding of the scale of issues caused by bats in churches.

Roost selection in churches: Within churches, soprano pipistrelle maternity and communal roosts are more likely to be situated in south-facing rather than north-facing areas, with south-facing areas being significantly warmer than north-facing areas. To encourage bats to use less sensitive areas of the church building, it is important to identify other areas within the church with similar aspect and environmental conditions available for roosting.

Churches provide a range of temperature conditions for roosting during summer and winter. This is likely to explain in part why they are used so frequently by bats.

Can soprano pipistrelle bats be excluded from churches? The preliminary findings show that:

- Soprano pipistrelles may have access to some alternative roosts (four communal alternative roosts were used in the three church colonies studied by radio-tracking) and may be generalists with respect to roosting habitat. However, some individual bats remain very faithful to their church roost and did not use alternative roosts during the observed study period (up to one week per bat radio tagged).
- Churches provide a range of temperatures and roosting conditions which may be important to bats and may not be straightforward to replace.
- Churches may also be used all year-round and used by more than one bat species.

All of these elements, along with practical difficulties, make whole-building exclusion from churches complex, compared to exclusions from domestic houses.

Bat Boxes

Electrically heated bat boxes can provide warm and stable temperature conditions throughout the day and night. However, for heated bat boxes installed in cool locations, such as church towers, the temperature regime will be unsuitable for soprano pipistrelle maternity roosts if the heating unit stops working (e.g. is accidentally turned off or blows a fuse).

Non-heated bat boxes in sunny positions outside a church can provide suitably warm daytime roosting conditions which mimic existing roost crevices, but they don't provide the

same amelioration of outside conditions (e.g. at night), that church buildings as a whole provide.

The installed heated and non-heated bat boxes were not used by bats within the first year after installation. It was difficult to find sites to install heated bat boxes, for a variety of reasons:

- Lack of electricity supply at some churches.
- Some church wardens were not convinced it would work and had concerns about their operation, running costs and insurance restrictions.

A longer time is needed to test whether soprano pipistrelle bats 'voluntarily' take up heated or non-heated bat boxes in the absence of exclusion. The existing research suggests that heated bat boxes are not a 'quick fix'. A fundamental concern would be how to guarantee the necessary maintenance and running costs required to keep a box in good working order for several decades. A more practical solution may be to 'box in' roosting areas around bat access points, in situations where there are a limited number of access points.

What is happening next?

Madeleine is currently writing up her PhD. The final results of her work will be published in due course.

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