

BCT Special Edition Bat Group Bulletin No. 3: Research Projects 27th March 2014

This is a special edition of the Bat Group Bulletin to provide a final update on some research projects that began in 2011, supported by the Bat Conservation Trust. The background to each of these projects was given previously in the BCT Special Edition Research Bulletin 28th July 2011 (that bulletin and subsequent research specific bulletins are available on the BCT website at:

http://www.bats.org.uk/pages/back_issues_of_special_research_bulletins.html).

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1. Introduction

The three applied research studies were established by University of Bristol, and supported by the Bat Conservation Trust as part of BCT's strategy to ensure bat conservation is underpinned by sound evidence. Each of the projects aims to understand better the ecology of the species concerned with a particular focus on improving the practices used when people consider bats to be a problem.

2. Impact of exclusion of bats from roosts in houses

Background

Roost owners are sometimes affected severely by the presence of a bat roost, e.g. in the case of genuine phobias. In exceptional circumstances, exclusion of bats from domestic properties can be licenced and this is without provision of alternative roosting sites. A key requirement of current legislation is that licensed activities will not be detrimental to the population concerned, but in reality very little is known about the actual impact of exclusions on bat colonies and the effect it has on local population status. In 2011 Defra commissioned the University of Bristol, with BCT and the British Trust for Ornithology (for their population modelling expertise) as subcontractors, to assess the impact of roost exclusion on soprano pipistrelles, when alternative roosts are not provided. BCT saw a clear need to determine whether bats excluded from houses were able to find suitable alternative roosts and to determine the impacts on local populations in terms of their integrity and dynamics, as this evidence could enable Natural England and BCT guidance to be updated.

Update on work undertaken in 2013

Studies to assess how soprano pipistrelles respond to exclusion were planned to take place in spring 2012 and 2013 at three roost sites in each year (a total of six sites). In each preceding summer, householder exclusion applications to the National Bat Helpline were scrutinised to identify sites that were potentially suitable for participation in the study, and BCT also appealed directly to volunteer bat-workers for information. In 2012, one of the colonies failed to return in the spring so only two sites were studied. Five sites, from which to recruit up to four roosts, were identified for potential study in spring 2013. In each case the householder had applied for and Natural England was expected to grant an exclusion licence. The householders concerned agreed to postpone the exclusions until April/May soon after the bats had returned, so that radio-tags could be fitted to a sample of bats from each roost to track foraging and roosting behaviour before and after each colony was excluded. We thank all the bat-workers who provided information on roosts and other help to the study. Despite significant effort to ensure sufficient recruitment of sites where exclusions were already planned via the National Bat Helpline, only two of the five sites identified could be studied in spring 2013 because bat colonies failed to return to roosts, or because the exclusion required was found to be too complicated. The exclusions were completed successfully at these sites, and we thank the local bat-workers who provided special support. As a last resort, to

ensure the overall integrity of the study, a site in Dorset was recruited for a temporary exclusion in spring 2013. This site was chosen because some history of the colony was known, and the National Trust, who owned the site, guaranteed that the roost would be made accessible to the bats again as soon as the study had been completed. During the two years, BCT worked with Natural England, the University of Bristol and volunteer bat-workers to ensure the research minimised the impact on bats and bat roost owners and took into account the interests of the wider community of bat workers and roost visitors. At each site, the University of Bristol researchers checked roosts for the presence of pups or heavily pregnant female bats, only proceeding with the exclusion and study if no evidence of pups or heavily pregnant bats was found.

Summary of study findings

Over the two years, four permanent and one temporary exclusion were conducted successfully and studied at sites in Cheshire, Yorkshire, Surrey, Staffordshire and Dorset. Across the five sites, 120 bats were radio-tagged and their foraging grounds and alternative roosts located. Over 700 day roost fixes (a fix was where a stationary radio-tagged bat was located) were observed from 114 bats and 89 alternative roosts located. The behaviour of soprano pipistrelle bats was similar at all sites. The bats formed “fission-fusion societies”, in which individual bats moved between one or two main roosts (hosting 100-300 bats) and a much larger number of alternative roosts (typically hosting one to around 30 bats). The alternative roosts were located up to 5km from the main roost, and usually within a few hundred metres of foraging habitat in a variety of structures including dwellings, uninhabited and industrial buildings and trees. 110 of 120 tagged bats used at least one alternative roost in a four to five day period of study.

After the colonies had been excluded from their original roost, they quickly settled at an alternative roost within 1.5km of their original location. Sometimes bats relocated to a neighbouring property. The radio-tracking studies showed the soprano pipistrelle colonies used the same foraging areas and habitats before and after they were excluded, with no discernible impact on foraging behaviour. The single temporary exclusion site was reoccupied by the bat colony within days of access being made available to the bats again. The findings are interpreted as evidence that the impact of a single exclusion on the survival of an individual soprano pipistrelle colony is likely to be low, at least in the short term, because using a large number of alternative roosts helps the bats to overcome the loss of a roost. The study was not able to investigate whether the bats went on to breed at these new roosts or whether breeding success was affected. The longer term impact of exclusions on survival and productivity is therefore unknown and would require further investigation. Evidence from population models developed during the project by the British Trust for Ornithology suggests that while any reduction in productivity resulting from exclusion is predicted to have little impact on populations any reduction in survival could impact negatively on population growth. The research team concluded that without information on the long-term impact on survival and productivity we cannot be certain whether exclusion affects the Favourable Conservation Status of soprano pipistrelles. Although the small number of licensed domestic exclusions licensed each year is predicted to have low impact, the more frequent loss of roosts to development may be of greater concern.

How will the findings be used?

The study findings provide some reassurance for SNCO's that the small number of domestic exclusions currently licensed each year is unlikely to result in the loss of colonies or an impact on the conservation status of this species in conflict with the implementation of the Habitats Directive. The findings showed that each colony makes use of a large number of alternative roosts and nearly half (46%) of these alternative roosts were considered to be suitable for supporting colonies equivalent in size to those excluded. However the consequences of exclusion for longer term survival or productivity are currently unknown. Protection of bat roosts helps to maintain the

availability of potential roosts in an area, and is also important to reduce the possibility of repeated exclusions having a detrimental effect on a colony or population. The findings are specific to soprano pipistrelles and should not be extrapolated to other species which may have different roosting behaviour.

3. Bats and Churches

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

This project is funded by SITA Trust and Natural England for three years to study soprano pipistrelles in East Anglian churches. During 2013, her final season of fieldwork, Madeline Ryan undertook further surveys of churches across East Anglia to determine occupancy by bats, continued microclimate and activity studies at a small number of study churches and studied colonies in Essex and Cambridgeshire using radio-tracking. Maddy is currently analysing the large amounts of data obtained and will be writing her PhD thesis during the spring. Maddy will present the results at the National Bat Conference in September (she will also be speaking at the East of England conference on March 29th).

ii. Mitigation of the impacts of Natterer's bats in churches

Natterer's bats sometimes form large maternity colonies in churches, especially in East Anglia where they can cause severe problems for church users as well as damaging historic fabric and artefacts. Since 2011 Defra has been funding research to examine the issue, led by the University of Bristol, with BCT and Philip Parker Associates as sub-contractors. BCT's role has been to collate Natural England helpline data on church enquiries, organise focus group consultations of key stakeholders to understand attitudes to bats in churches, help locate study sites, participate in Project Advisory Group meetings which steer the project and communicate about the study with churches involved and with bat workers. A key aspect of the project has been the manipulation of environmental conditions to encourage bats to relocate to alternative, less sensitive areas of churches, including the use of deterrents and provision of alternative roosting areas within and outside of churches. A fuller description of the project aims and methods can be found on the project website www.batsandchurches.org.uk.

Update on work undertaken in 2013

The work in 2013 focused on extending the length of trials of acoustic deterrents, and investigating the use of deterrents not tested during the previous trials in 2012. The trials investigated the use of two types of acoustic deterrent to encourage the relocation of bat roosts from sensitive to less sensitive locations, and directed lighting (with lights positioned away from roosts) to restrict the area of flight, and consequently dropping deposition, within the church. The use of bat boxes that were installed as potential alternative roosts within and outside the churches was also monitored.

At three churches, the studies used an acoustic deterrent designed in the USA for deterring bats from approaching wind turbines. The research team investigated whether bats habituated to the deterrent; remained within the church but roosted in less sensitive areas; or whether longer term-exposure resulted in bats being excluded from the church. Bats were studied using radio-tracking and emergence counts with bat detectors and night vision equipment. This deterrent had previously been studied in short nine-day trials in 2012 and the extended trials in 2013 spread over several weeks, with the acoustic deterrent in operation for 14 days. At a further two churches, a prototype acoustic deterrent in development developed in the UK specifically for use in churches was tested during nine-day trials.

The trial of lighting took place in four churches and examined the potential use of directed lighting to create “no fly zones” within each church. Lighting trials lasted nine days and used static detectors, video recording, and examination of dropping deposition patterns to assess behaviour during three lit nights preceded and followed by control periods of three unlit nights. Although the research has focused on Natterer’s bats, at the four churches where a lighting deterrent was trialled additional species were present, so data were also collected on the behaviour of common and soprano pipistrelles where these occurred.

All trials took place between July and September after the main breeding period, and the research team checked for signs of dependent, non-flying juveniles before beginning the trials. Ensuring bat welfare was paramount and safeguards included plans to delay or terminate the trials where risks to bat welfare were deemed too high.

Summary of study findings

The radio-tracking studies of Natterer’s bats which were undertaken throughout the research project have shown that the colonies studied were highly dependent on their church roosts, with little use of alternative roosts observed.

At the churches which operated the extended trials of the acoustic deterrents designed for use at wind-farms, the bats quickly relocated to alternative roosting locations within the church when the deterrents were operated. There was no evidence that the bats habituated to the deterrents during their 14-day operation. The use of the deterrents did not appear to result in the exclusion of bats from the churches over the period, with similar numbers of bats present throughout the trial, but they roosted in different locations.

The prototype UK model acoustic deterrents were considered to show promise but further development would be required.

The use of directed artificial lighting substantially reduced bat flight activity in lit areas of churches. The flight activity of all species was reduced, and the response of Natterer’s bats was particularly strong. The response of bats to the lighting varied among the churches, most likely to do with how reflected light impacted the remaining “dark” areas within each church. However as well as changes to flight activity within the church, the lighting was also observed to change the emergence and nocturnal activity of Natterer’s bats. Time of emergence became more variable and the length of time the bats spent foraging outside the church was reduced. Potentially the use of lighting over extended periods may be detrimental to bat welfare.

There was little evidence that bat boxes installed inside and outside the churches had been used by bats during the study’s experimental periods but there has been evidence subsequently to suggest the boxes have been used. It has been observed in other mitigation studies that it may take a number of years before artificial enhancements such as boxes are used. Within churches bats may chose to use other alternative known roosting locations in preference to these newly installed features.

How will the findings be used?

The research has shown the importance of churches to some Natterer’s bat colonies; at each of the churches studied Natterer’s bats were found to be highly dependent on their church roost, in contrast to the soprano pipistrelles which used many alternative roosts. This demonstrates the importance of understanding the use an individual bat colony makes of a church, when attempting to manipulate its behaviour to reduce negative impacts on a church community.

Tailored use of deterrents to change the behaviour of bats inside churches, to reduce their impact on congregations, may be an option for some churches that experience extreme problems with bats. It was envisaged that acoustic and lighting deterrents might be used in combination to relocate a roost from a sensitive to less sensitive area of a church and to limit dropping deposition around the church. The techniques tested were successful in changing bat behaviour to reduce impact of the bats on church communities, but some approaches also have tangible risks to the welfare or status of the colonies which are not fully understood. In particular, the deterrent approaches have not been trialled in early summer when bats are most vulnerable and when the impact of breeding roosts on church communities is most severe.

It is expected that the results of the research will inform pilot use in 2014 at a small number of churches where church communities experience severe problems. The pilot would tailor their operation to the needs of individual churches, monitor impact on the bats to ensure they can be used without impacting adversely on bat welfare, and develop and test the licensing and operational framework needed for practical application. Bat colonies in churches will continue to be protected by law, and use of any of the approaches trialled would need to be strictly licensed and subject to the usual tests under the Habitats Regulations. Churches experiencing problems with bats should continue to seek advice from the National Bat Helpline or Statutory Nature Conservation Organisation (SNCO) as well as from their Diocesan Advisory Committee for the Care of Churches (or equivalent in other denominations), and consider all the options appropriate for their situation.

4. Keeping up to date

The research report can be viewed in full on the Defra website

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17863&FromSearch=Y&Publisher=1&SearchText=wm0322&SortString=ProjectCode&SortOrder=Asc&Paging=10%23Description> . The research team expect to publish papers in peer reviewed journals on these studies. There will be further opportunities to discuss the results of the research projects, and their potential application at the National Bat Conference in September. BCT continues to regard the support of churches to enable long-term conservation of church bat populations as a priority. Further information on research and other initiatives will appear via bat group bulletins or the BCT website as available. In case of further queries contact Matt.Zeale@bristol.ac.uk or karen.haysom@bats.org.uk .