

Preliminary bat roost survey of St. Denis' Church, East Hatley

Prepared by: Siân Williams, MCIEEM
Checked by: Martin Baker, MCIEEM
Sept 2014



**Bedfordshire
Cambridgeshire
Northamptonshire**

Contents

EXECUTIVE SUMMARY	3
INTRODUCTION	3
Site description.....	3
Aims of survey.....	3
METHODS.....	4
Summary of Methods	4
Initial inspection.....	4
Emergence/re-entry surveys.....	4
Remote recording.....	5
RESULTS	6
Initial inspection.....	6
Emergence/re-entry surveys.....	6
Remote recording.....	6
Species.....	7
Timing of activity	10
Social calls.....	11
ASSESSMENT	13

EXECUTIVE SUMMARY

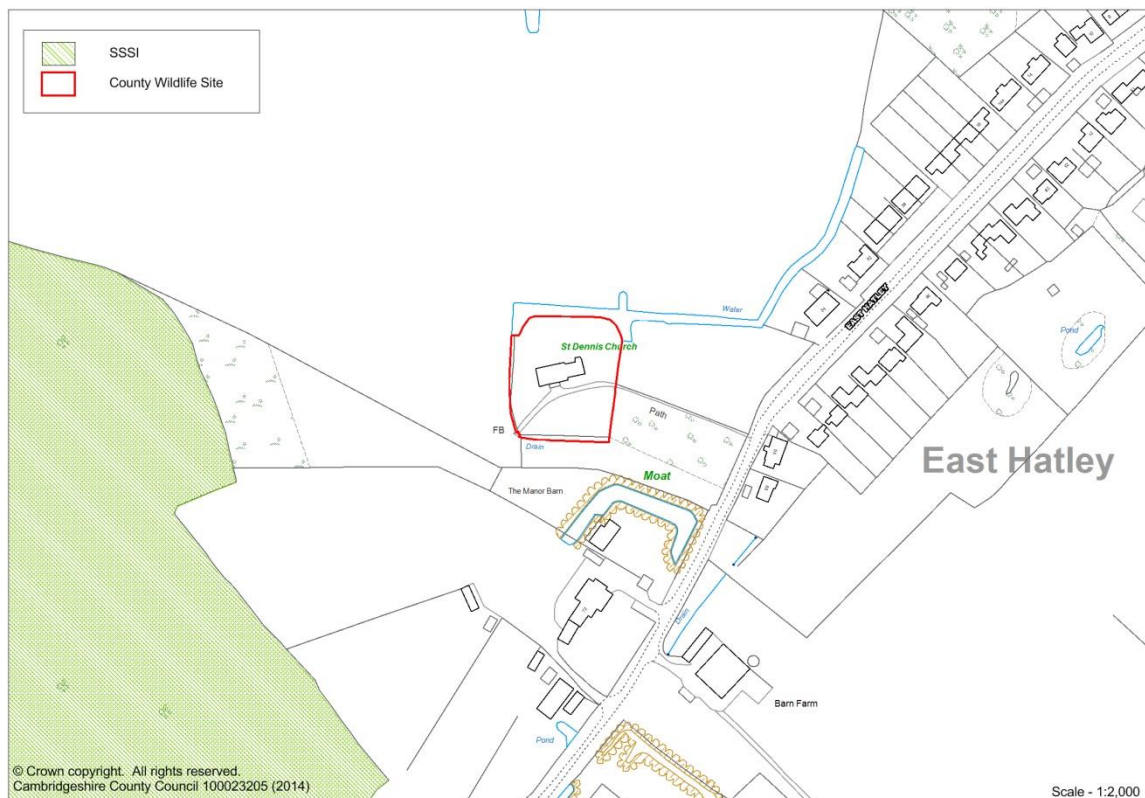
This report presents the results of a preliminary bat survey of St. Denis' church, East Hatley. The purpose of the survey was to determine whether bats are using the church as a roost site, and if so to give some indication of the species present and the levels of use. The surveys found that at least five species of bat use the church in some way, although probably in low numbers. Further surveys are recommended to determine use at other times of year, and to assess in more detail the type of roost, and specific locations and internal features of the building of most importance.

INTRODUCTION

Site description

St. Denis' is a disused church in East Hatley, South Cambridgeshire. The external structure of the building is intact, but very little remains internally. The doors and windows are boarded up, but there are gaps which provide potential access points for bats.

The surrounding churchyard is a Local Nature Reserve and County Wildlife Site, managed to promote grassland and wildflowers by a group of local volunteers. The churchyard is bordered by trees and hedges, and the surrounding land is a mix of private gardens and agricultural land. Buff Wood, an ancient woodland and SSSI, is approximately 150m away. The map below shows the site location.



Aims of survey

The church is currently owned by South Cambridgeshire District Council, but is due to be handed over to the Friends of Friendless Churches. Their long-term intentions are to restore the interior of the church so that it can be occasionally opened up for interested visitors to see the internal features.

Informal observations made in the past have suggested that bats may be using the church building as a roost. If bats are present within the church, the future restoration work will likely require a protected species licence from Natural England. Hence, the aim of this survey was firstly to confirm the use of the church by bats and secondly to provide an initial assessment of the likely level and type of use, and the species of bat present.

METHODS

Summary of Methods

The survey consisted of an initial inspection of the building in daylight, an evening emergence survey, a dawn re-entry survey, and deployment of remote recorders for a week within the church building, all carried out in July/August 2014.

All surveys were carried out by Siân Williams, MCIEEM – not a Natural England licence holder, but with 3 years of experience carrying out non-intrusive bat surveys with remote detectors. Assistance was provided by Rob Mungovan, MCIEEM and Barnaby Leigh. Surveys were designed with reference to the Bat Conservation Trust's best practice guidelines.

No detailed desktop study was deemed to be necessary however Cambridgeshire and Peterborough Environmental Records Centre were consulted but hold no records of bats within the County Wildlife Site. Various species of bat have been recorded in the wider area by the Cambridgeshire Bat Group and by the Wildlife Trust. Common pipistrelle and Natterer's bat have been recorded in Buff Wood.

The survey methods were chosen to give an idea of level of use and the species present at this time of year. However, they cannot assess the exact numbers of bats present, or specific roost type. Due to the timing, this survey has also not assessed potential use of the church as a maternity or hibernation roost.

Initial inspection

This consisted of an external and internal walkover to assess the features of the building potentially used by bats and search for any current signs of use by bats. These included possible entry points, features suitable for roosting bats, and signs of bats such as droppings. The initial inspection was carried out on 30th July, during daylight hours.

Emergence/re-entry surveys

An evening emergence survey was carried out on the 5th August, with surveyors on site from half an hour before sunset to 2 hours afterwards. Weather conditions were warm and partly cloudy.

Three surveyors were positioned to be able to see all sides of the building, with particular views of the two entrance doors/likely access points for bats. Surveyors used handheld heterodyne bat detectors to listen for bat activity, and identified bats to species where possible. One surveyor also carried an EM3 recorder to make recordings of bats seen to help confirm species identifications later. One surveyor also had nightvision binoculars to enable bat activity to be observed. All bats heard or seen were noted, with the time of each sighting and any details of the type of bat activity recorded.

The dawn survey used the same methods and the same surveyors in the same positions from 1.5 hours before sunrise, to 15 minutes after. Due to weather conditions being unsuitable earlier, the dawn survey was carried out on the 19th August. Conditions on the 19th were cool, but clear.

Remote recording

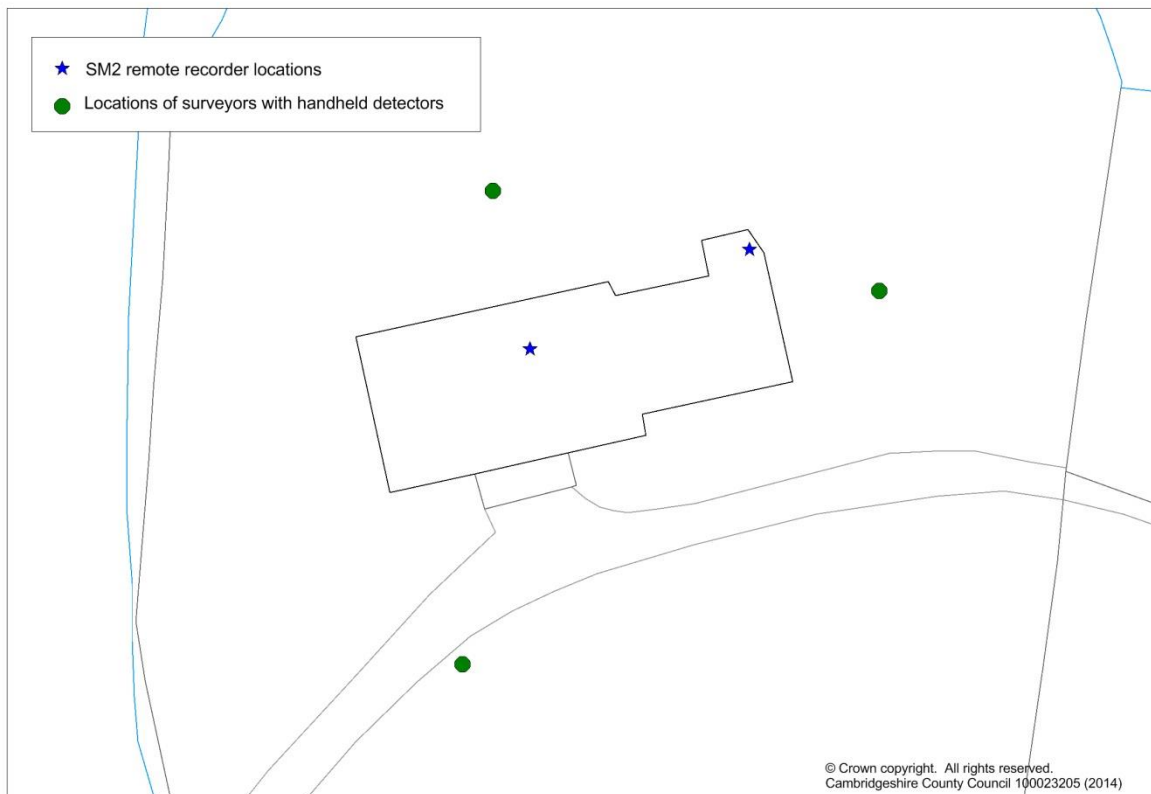
In order to assess bat activity within the church, two SM2 remote recorders were deployed, one within the main area of church which had sufficient range to record any bats within the building, and one within the north porch, across from the most likely point of entry, to attempt to record bats entering and exiting the building. The detectors were left on site for a week, between 30th July and 6th August, recording overnight.

Weather over the week was mostly dry and clear, with temperatures averaging around 13C overnight.

The resulting sonogram recordings were reviewed by an experienced surveyor, and identified to species where possible, with external expert advice sought where a few were difficult to identify. Sonograms were labelled with bat species names. Where bat social calls were identified, these were also labelled.

When totalling the numbers of labelled calls, it is important to remember that this represents “bat passes” not individual bats, as there is no way to tell if several calls in a row are made by the same bat passing the detector several times, or by several different bats. Therefore, the recordings cannot be used to make any detailed assessment of the number of bats present.

The map below shows locations of surveyor monitoring points for the emergence and re-entry survey and positions of remote recorders.



RESULTS

Initial inspection

St Denis' church is a grade II listed building, dating from 1217 with the majority of the surviving structure dating from the 13th century. It was substantially restored in 1874. It was last used for worship in 1959. Restoration to remove ivy from the building was done in 2003. The roof tiles were replaced and some stone and timber repair work carried out to make the building safe externally in 2005 (information thanks to <http://www.hatley.info>).

The interior of the building is a shell, with no furniture, no floorboards, and the roof beams exposed. The windows and doorways are all boarded up. The north porch door is blocked by a board with a small (approximately 2x6 inch) gap at the top. This gap is a likely entry point for bats. A close inspection showed that the board beneath this gap was clean and the gap clear of cobwebs, indicating it is potentially kept clear by bats passing through it.

Within the building features such as the exposed roof beams and cracked plaster provide possible roosting sites. The large open roof space is a feature preferred by some species, such as brown long-eared bats. The lack of disturbance also means the site should be suitable for roosting bats.

A visual inspection revealed bat droppings scattered on the floor of the church throughout the building. There were no large obvious piles, and no concentrations on vertical surfaces. Since the church is not in use it is not regularly cleaned, hence the droppings found represent an accumulation over some time. The low numbers of scattered droppings therefore indicate that the church is unlikely to be used by large numbers of bats.

Peacock and small tortoiseshell butterflies were roosting in the church and a few butterfly wings were scattered on the floor. The butterflies are a potential food source for bats and the wings potential remains from bat feeding activity. Again, these were only found in small numbers.

No bats were observed during the daytime inspection of the building, however a detailed search involving disturbance via light or endoscopes was not made.

Emergence/re-entry surveys

No bats were observed emerging from the church during the emergence survey. The first bat was recorded at 9pm (official sunset time was 8:44). With handheld detectors, the surveyors each recorded between 22 and 25 bat passes, and identified common and soprano pipistrelles, and a larger bat. The EM3 recordings confirmed soprano and common pipistrelle and a serotine bat. Most of the bats seen were foraging above the trees surrounding the churchyard. A few flew near the church, but were not seen to enter it.

During the re-entry survey, the first bat was recorded at 4:40 (official sunrise time was 5:50am). The two surveyors to the south and east of the church recorded 7 and 8 bat passes, while the surveyor stationed north of the church (near the probable entry point) recorded 19 bat passes. Bats were identified as pipistrelles and larger bats by eye. 5 larger bats were confirmed entering the church through the gap above the north porch door. None of the pipistrelles were observed entering the church, but some were flying near to it. EM3 recordings confirmed the presence of common pipistrelles and brown long-eared bats.

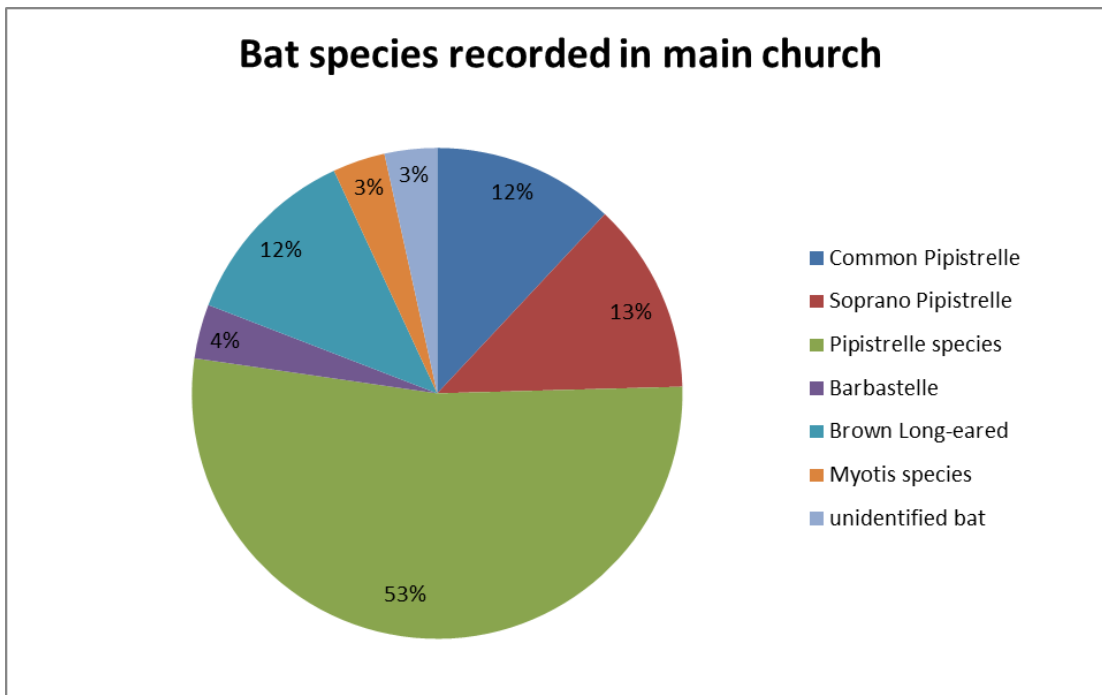
Remote recording

Bats were recorded within the church on each night of remote recording. The average number of bat passes per night was 115, with the range between 56 and 220. This could represent quite a small number of actual bats.

Species

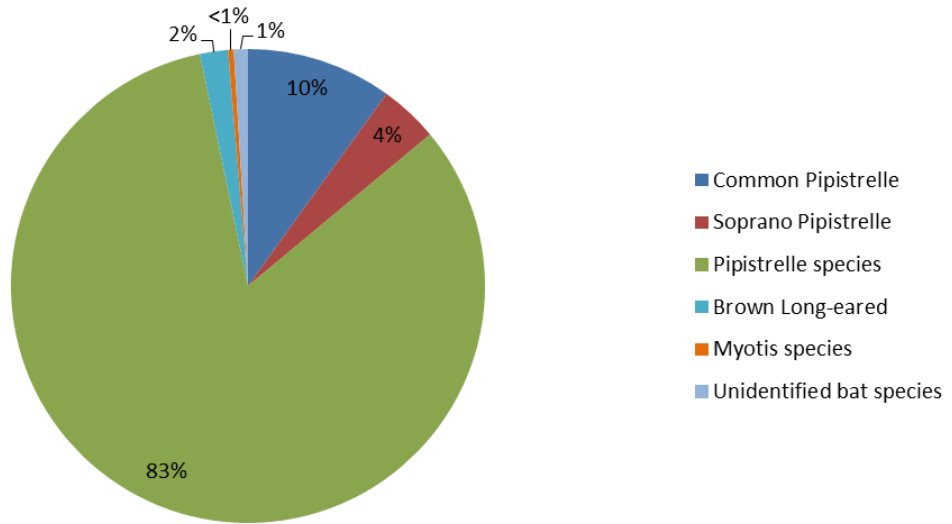
At least five bat species were present within the church. Myotis bats could not be identified to species, so there could have been one or more Myotis species. Some of the calls showed characteristics of Natterer's bat calls and social calls (based on consultation with external experts), so this species is likely, but not confirmed. A few of the sonograms appeared to be bat calls, but could not be positively identified as any species. The majority of bats recorded were pipistrelles. Unfortunately a large number of these could not be identified to species either, as the recordings of most had a peak frequency of 50kHz, which is between the peaks for common pipistrelle (45kHz) and soprano pipistrelle (55kHz).

The figure below shows the percentage of bat passes identified as each species within the main church. Pipistrelles are by far the most frequently labelled species, at 78% of the total recordings. This is not surprising, as pipistrelles are the UK's most common bats. Brown long-eared bats are the next most commonly labelled species.

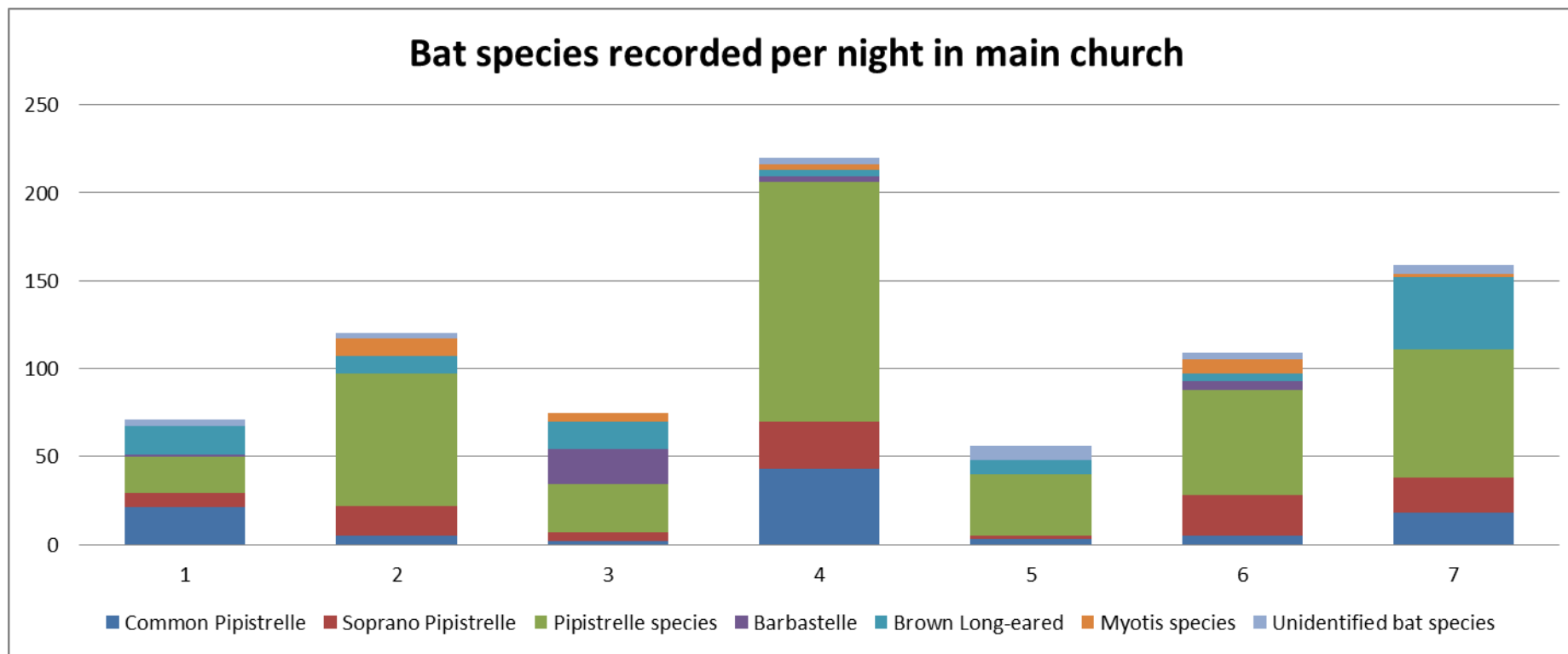


The figure below shows the same breakdown, but for calls recorded in the porch. Overall, fewer calls were recorded in the porch, and the length of the recordings was on average much shorter. This could be explained by bats entering through the porch and immediately flying into the main church. Quieter species, such as brown long-eared bats, were not identified as frequently in the porch.

Bat species recorded in porch



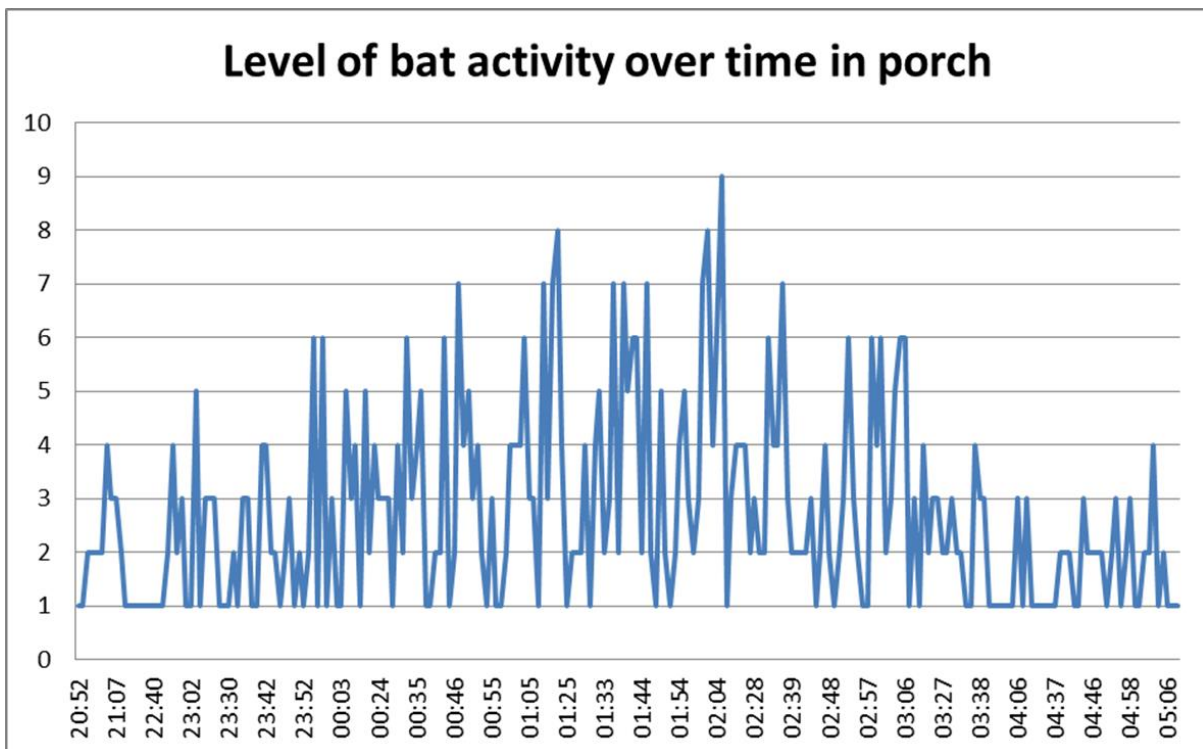
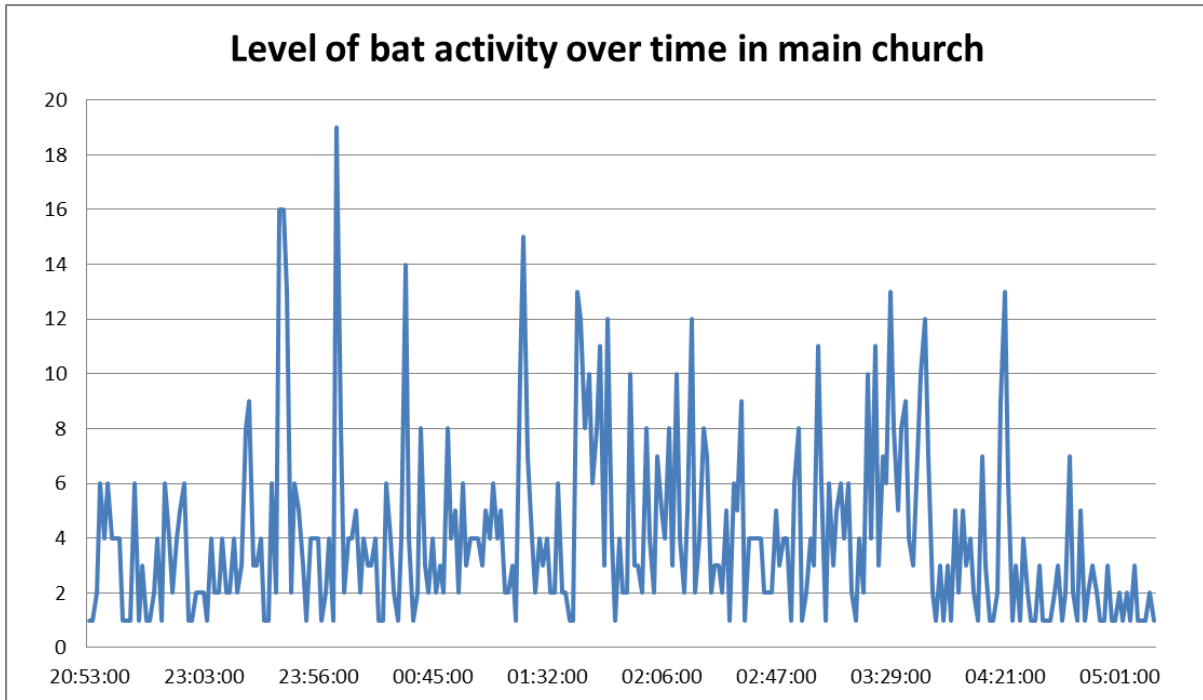
The number of bat passes recorded each night varied slightly, but bats were using the church each night of recording. The species present varied only slightly from night to night. Pipistrelles were recorded each night as were brown long-eared bats, so can be considered regular users of the church. Barbastelles and Myotis bats were recorded with enough frequency (4 and 5 out of 7 nights) to also be likely regular users. See the figure below for a breakdown of species labelled in the recordings for each night in the main church. The species recorded in the porch were dominated by pipistrelles each night, so have not been graphed separately.



Timing of activity

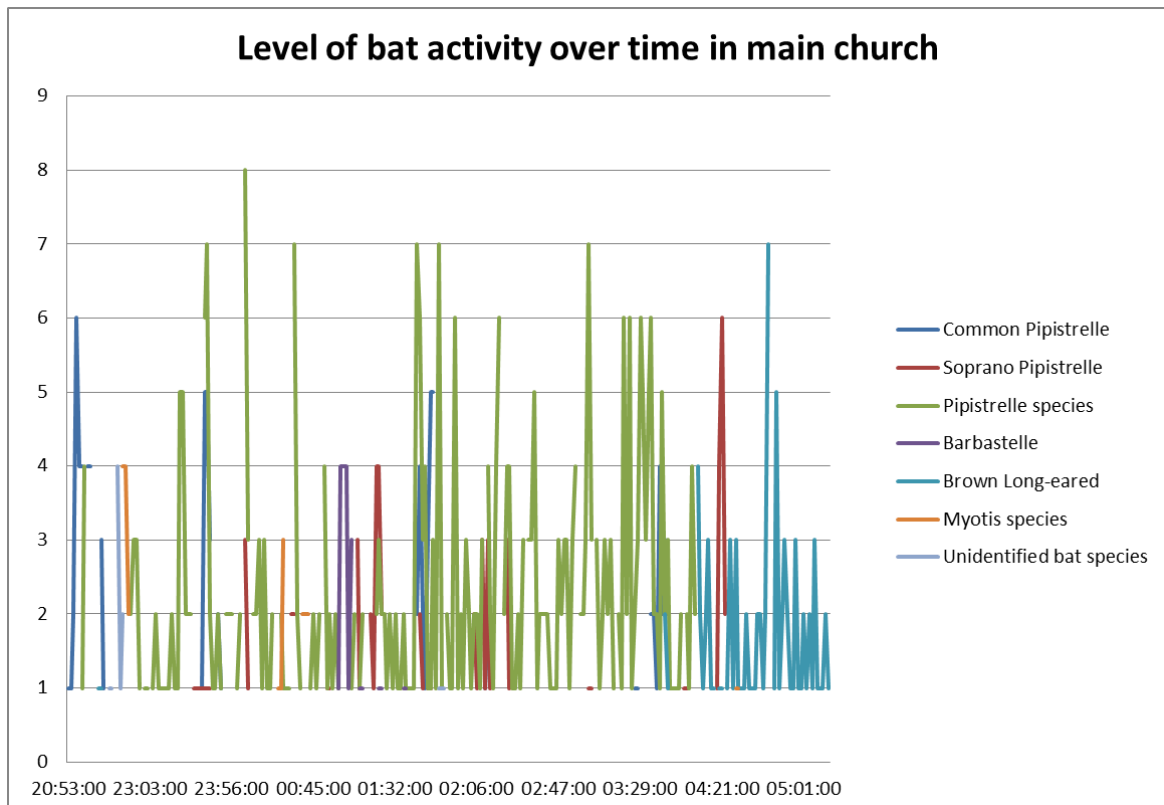
Bat calls were recorded throughout the night in both the main church and the porch. This suggests that bats may be entering and exiting the church throughout the night, and may be using it for different roosting purposes (e.g. a feeding roost and a day roost). Although there appears to be slightly less activity at the beginning and end of the night, there were no significant peaks or troughs in number of calls labelled.

The figures below show the levels of bat activity at both recording sites.



There was a difference in timing of labelled calls between species. Pipistrelles were recorded throughout the night, however peak calling of brown long-eared bats was towards dawn. This suggests that the brown long-eared bats are more likely using the church as a daytime roost, and these calls were recorded as they returned to the roost towards dawn. Both barbastelles and Myotis bats seemed to be labelled most frequently towards the middle of the night, so may be more likely using the church as a night-time roost, however, numbers of both were too low to confirm this with certainty.

The figure below shows bat calls labelled by species throughout the night within the main church. Data from the porch again reflected similar trends.

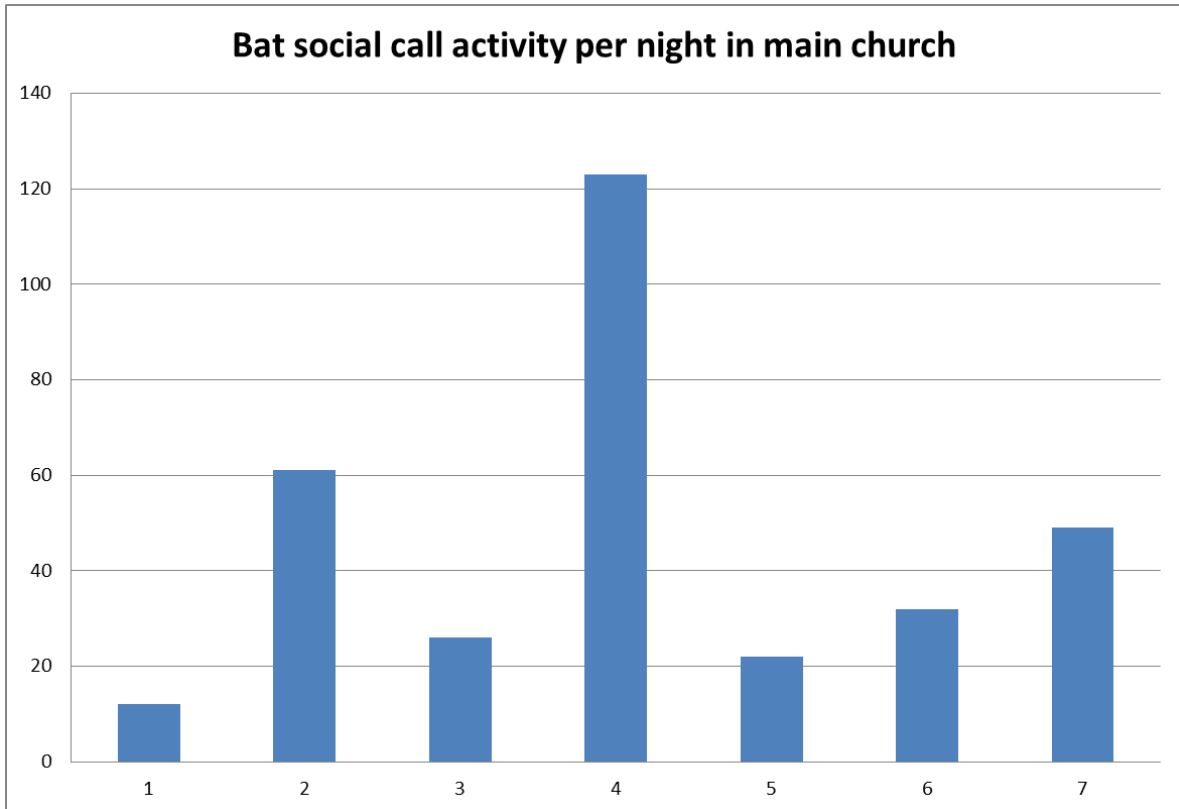


Social calls

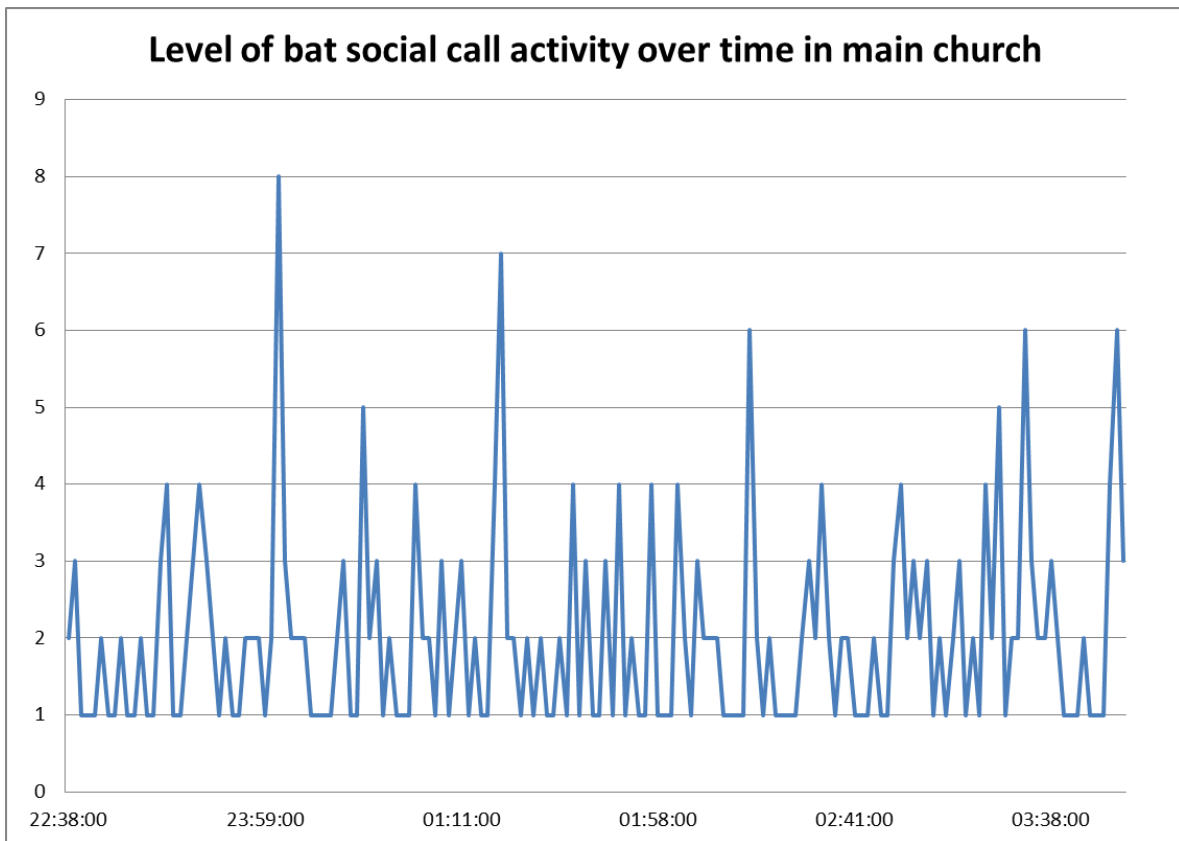
Social calls were recorded during each night. The majority of these were recorded from within the main church, which is to be expected if bats are just passing through the porch area. Bats use social calls to communicate with each other and are more likely to produce these calls in certain situations, such as at roost sites and during mating displays. Social calls being consistently recorded here provide evidence for the church being used as a roost site, and also evidence of more than one bat being present at the same time.

Social calls tend to be interspersed with regular echolocation calls, so can be identified with a particular species of bat. The majority of social calls recorded in this survey were pipistrelle calls, with a few Myotis social calls as well.

The figure below shows the number of social calls labelled each night in the main church.



The timing of social calls was associated with the timing of pipistrelle calls in general, i.e. towards the middle of the night, rather than close to dusk or dawn (see figure below).



ASSESSMENT

The results of this survey suggest that St. Denis church is being used as a roost site by several different species of bat. It may be important as a day, night, and/or feeding roost. Species of interest are common and soprano pipistrelle, barbastelle, one or more myotis species, and brown long-eared bats. The brown long-eared bats are most likely using the church as a daytime roost.

The numbers of bats using the church at this time of year are likely small. However, the timing of the survey did not allow an assessment of other roosting possibilities such as a maternity or hibernation roost.

All species of bat are protected under UK law. The results of this survey show that bats will need to be considered when planning future restoration work to the church. Restoration work may require a Natural England licence to disturb bats. In order to inform this, we recommend that prior to restoration, a further roost characterisation survey be carried out by a licensed bat worker. This should include a full inspection of the church interior to identify precise roosting locations, and measure such characteristics as aspect, orientation, temperature, and humidity of perching points in order to fully assess the impacts of proposed changes.

Further surveys are required in order to draw final conclusions but based on this initial investigation, it should be possible to do some structural restoration of the church and allow limited visits by people in future while still retaining suitable features for the roosting bats. Only restoration work that is likely to disturb bats, or damage a roost, would require a Natural England licence. Ecological advice should be sought if any person is unsure as to what constitutes damage or disturbance to a bat roost.

Due to its location within a Local Nature Reserve and the foraging opportunities present in the nearby landscape, the church provides a valuable resource for different bat species, and should be maintained in a state where bats can continue to use it in future. This will require informed and careful restoration work, based on an accurate and up-to-date detailed survey of where and how bats are using the space within the church.

Hibernation and spring surveys to a similar methodology are recommended in order to gain more knowledge on the bats' use of the church.