Bat Emergence Survey Report At Tintern View, Brockweir, Gloucestershire

Commissioned by: Mr. Steven Richards

Author: Ashley Butler MSc

Version: Final

Date: 2/7/21

Grid Reference: SO539018

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Executive summary

NewWays Ecology undertook a bat scoping assessment of a house, stone barn and a series of sheds at Tintern View in February 2021. The house was assessed as having a 'medium to high potential' to support roosting bats, based on the presence of gaps under roof tiles, in the boxed in barge boards and around the chimney. The stone barn directly adjacent to the house was confirmed as a roost by the presence of a Serotine bat within the rafters.

Based on the above assessment and in line with Bat Conservation Trust Guidelines, three bat emergence survey visits were carried out between May 2021 and June 2021 to determine the presence of roosting bats and evaluate the conservation importance of the site for bats. The purpose of this survey work was to determine presence of roosting bats and provide advice to inform a planning application for the demolition of the house, potential changes to the stone barns and construction of a larger new dwelling on a different area of the site at Tintern View.

Over the three emergence visits, no bats were seen or heard emerging from the house. During the first visit two serotines were observed leaving the stone barn. Serotines, Common Pipistrelle, Soprano Pipistrelle, Brown Long eared bat and Lesser Horseshoe bats were seen and heard foraging across the site across the three surveys.

The survey evidence gathered suggests that serotine bats roost within the stone barns, with evidence suggesting it is a hibernation roost. During the time of the survey no bats were using the house as a roost site. The survey evidence also suggests the site lies on a critical flight line for lesser horseshoe bats.

The demolition of the house at Tintern View is unlikely to result in the disturbance, modification and destruction of any bat roosts. Any modifications to the stone barn adjacent to the house could result in the disturbance, modification and destruction of bat roosts. Therefore, if any modifications to the barns are planned, it is essential that a European Protected Species (EPS) disturbance licence is obtained from Natural England for the development to legally proceed.

Should the site be sold it is the current owner's responsibility to make any potential buyers aware of the restrictions placed on the stone barns and the requirement for an EPS licence in order to carry out any work.

Mitigation is proposed at the site to ensure that the conservation status of the bat species present is preserved. This includes a strict controls on artificial light to ensure that bat behaviour is not altered.

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1. Introduction

1.1. Background

In relation to a proposed development at Tintern View, NewWays Ecology carried out a bat scoping assessment of the existing buildings in February 2021 during which several features were identified that were suitable to support roosting bats around the site and a hibernating Serotine bat was found in the barn.

The proposed development involves the demolition of the house, construction of a new larger house on a different alignment of the site, removal of numerous sheds around the site and potential modifications to a stone barn adjacent to the existing house at Tintern View, Brockweir, Gloucestershire.

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Overall, the house was assessed as having 'moderate potential' to support roosting bats and the stone barn was identified as a hibernation roost for a Serotine bat and in accordance with current best practice guidelines, a minimum of three emergence surveys were recommended to determine the presence of roosting bats and evaluate the conservation importance of the site for bats.

In accordance with these recommendations, this report presents the results of three bat emergence surveys carried out between May 2021 and June 2021. These were led by Ashley Butler MSc (licenced under class license 2016-20666-CLS-CLS (Mr. Steven Wadley)). The grid reference for this site is SO539018.

The purpose of this survey work was to determine presence of roosting bats and where necessary prescribe further surveys and/or appropriate mitigation advice to inform the planning application for the proposed development at the site.

This survey and report was carried out at the request of Mr S. Richards.

1.2. Site description

The site is located to the western edge of the settlement of Brockweir, Gloucestershire (OS Grid Reference SO539018). The site is approximately 0.8 acres in area and comprises of a detached farm house with a stone barn complex and numerous sheds. The house is surrounded by gardens with an orchard paddock to the north. The location of the site is shown in Figure 1 and the extent of the site boundary is shown in Figure 2. The buildings surveyed are shown in Figure 3.

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Figure 1: Site Location

Figure 2: Site boundary

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Figure 3: Buildings to be included in survey- Farmhouse and stone barns

The buildings surveyed comprise of a two storey residential dwelling, and a single storey stone barn complex.

The residential dwelling is of solid stone wall construction coated with render. The building has a pitched roof clad with traditional clay roof and ridge tiles. The western elevation has a flat roof extension. The northern elevation has a lean to stone built store room with an un-rendered stone wall on the north face. The eaves of the building are sealed with timber soffits and barge boards.

The barn complex to the south of the house is stone built with a pitched and hipped roof clad with traditional clay roof, hip and ridge tiles.

The sheds on site were assessed as having low potential for bat roosting due to their construction and open nature.

Several potential bat access and roosting features were recorded during the initial building inspection. These included slipped roof tiles and gaps in the soffits on the residential dwelling and missing tiles, gaps in the stone work, broken windows and large gaps in door frames in the stone barns.

The roof void in the stone barns comprised of timber rafters with unlined roof tiles.

A single serotine bat was found within the rafters of the stone barn during the initial inspection.

The site is set within a rural area with small hedge lined pastoral fields and lanes and large residential gardens surrounding the site. Wider landscape comprises of the densely wooded Wye Valley and large area of established and ancient woodland forming the Forest of Dean.

The site is 660m from Sylvan House Barn SSSI (a unit of the Wye Valley and Forest of Dean Bat Sites SAC). The site is notified for its nationally significant breeding population of lesser horseshoe bats and supports one fifth of the known Gloucestershire breeding population.

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1.3. Development proposals

The proposed development comprises the demolition of the original residential dwelling and the removal of the sheds. A new residential dwelling will be erected within the orchard field to the north on a larger footprint and different orientation and a garage will be erected. The stone barns are not included in the current plans however due to their close proximity to the building to be demolished have been included in the survey area.

2. Legal Protection

Details of legislation and legal protection afforded to all species of bats are given in Appendix 1.

The results of this survey will be used to determine the need for appropriate mitigation strategy to ensure compliance with UK and EU wildlife legislation.

3. Methodology

3.1. Emergence surveys

Three emergence surveys were undertaken on the 17th May, 3rd June and 14th June 2021. The surveys were led by Ashley Butler MSc (licensed under class license 2016-20666-CLS-CLS (Mr. Steven Wadley)) in appropriate weather conditions using the methodology set out in the best practice guidelines prepared by the Bat Conservation Trust.

The survey focused upon the features of interest upon the external faces of the house and the stone barn, identified during the initial bat scoping survey, with a particular focus upon the potential bat entry/exit points upon the house, such as gaps under the roof tiles and within the soffits. The surveyors positioned themselves accordingly, at an appropriate vantage point in view of these interest features, and the locations of these are indicated in Figure 4. The dusk emergence survey commenced approximately 30 minutes before sunset and lasted approximately 2 hours, the optimum time for bats to emerge from a roost, in order to record any bats that may emerge from the building.

The surveyors recorded any bat activity on or around the potential roosting entry/exit features identified during the scoping survey, using full spectrum real time hand held bat detectors (Batlogger Elekton and Echo Meter Touch) to identify species through call frequencies.

All bat passes were noted, and all bats identified to species level where possible. Echolocation calls were recorded by the detectors in-built sound cards and subsequently analysed using BatExplorer and Echo Meter software which facilitates species identification. Where possible additional notes on size, flight height, type of flight (such as commuting, foraging, fast or slow) and direction of flight were also recorded.

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Figure 4: An aerial image of the site, showing the positions of surveyors (red dots) on the surveys. Images produced courtesy of Google maps (Map data ©2021 Google).

3.2. Limitations of emergence surveys

In accordance with best practice guidelines, three survey visits were undertaken, and all survey visits were undertaken in accordance with best practice guidelines, during the peak period in bat activity and during good weather conditions. The results presented here are therefore considered to be an accurate representation of the general use of the property by roosting bats.

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Nevertheless, bats can use roosting features intermittently throughout the year and may be present in larger or smaller numbers depending on their breeding cycle, weather conditions, and in response to disturbance. These surveys record the emergence of bats at the time of the survey visits and therefore only provide a snapshot of bat roosting activity at the site at that time. Bats may be present at other times and the results should therefore be viewed with caution.

4. Results

4.1. Bat emergence surveys

4.1.1. Survey conditions

The dates, times, weather conditions, temperature and personnel for each survey visit is presented in Table 1 below:

Date	Survey start/end time	Temp (°C), weather conditions	Surveyors
17/5/21	Start: 2030 End: 2206 Sunset: 2100	Max temp: 13°C Min temp: 10°C Wind: 0-1 BFS Cloud: 20%	Ashley Butler MSc Rui de Sousa Stayton Hamish Lawson Tom Scott BSc
3/6/21	Start: 2055 End: 2230 Sunset: 2123	Max temp: 15°C Min temp: 13°C Wind: 0 BFS Cloud: 80%	Ashley Butler MSc Rui de Sousa Stayton Hamish Lawson Tom Scott BSc
14/6/21	Start: 2110 End: 2255 Sunset: 2130	Max temp: 22°C Min temp: 18°C Wind: 0 BFS Cloud: 10%	Ashley Butler MSc Rui de Sousa Stayton Hamish Lawson Tom Scott BSc

Table 1

4.1.2. Bat emergence results

17th May 2021

From 20:58 until 21:53 there was a low level of foraging by soprano pipistrelle (*Pipistrellus pygmaeus*), and common pipistrelle (*Pipistrellus pipistrellus)* along the vegetation within east and southern boundaries of the site.

At 21:15 a single soprano pipistrelle emerged from around the northern side of the house. It could not be confirmed if it had emerged from the building or flown around it.

At 21:27 a single soprano pipistrelle emerged from the western face of the stone barns before heading north east over site. This is shown in Figure 5 and highlighted by a green arrow.

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At 21:50 a single serotine (*Eptesicus serotinus)* emerged from a gap in the tiles on the western face of the stone barn roof before heading north along the eastern boundary of the site. This is shown in Figure 5 and highlighted by a blue arrow.
At 21:56 a serotine was recorded foraging over the field to the north of the house.

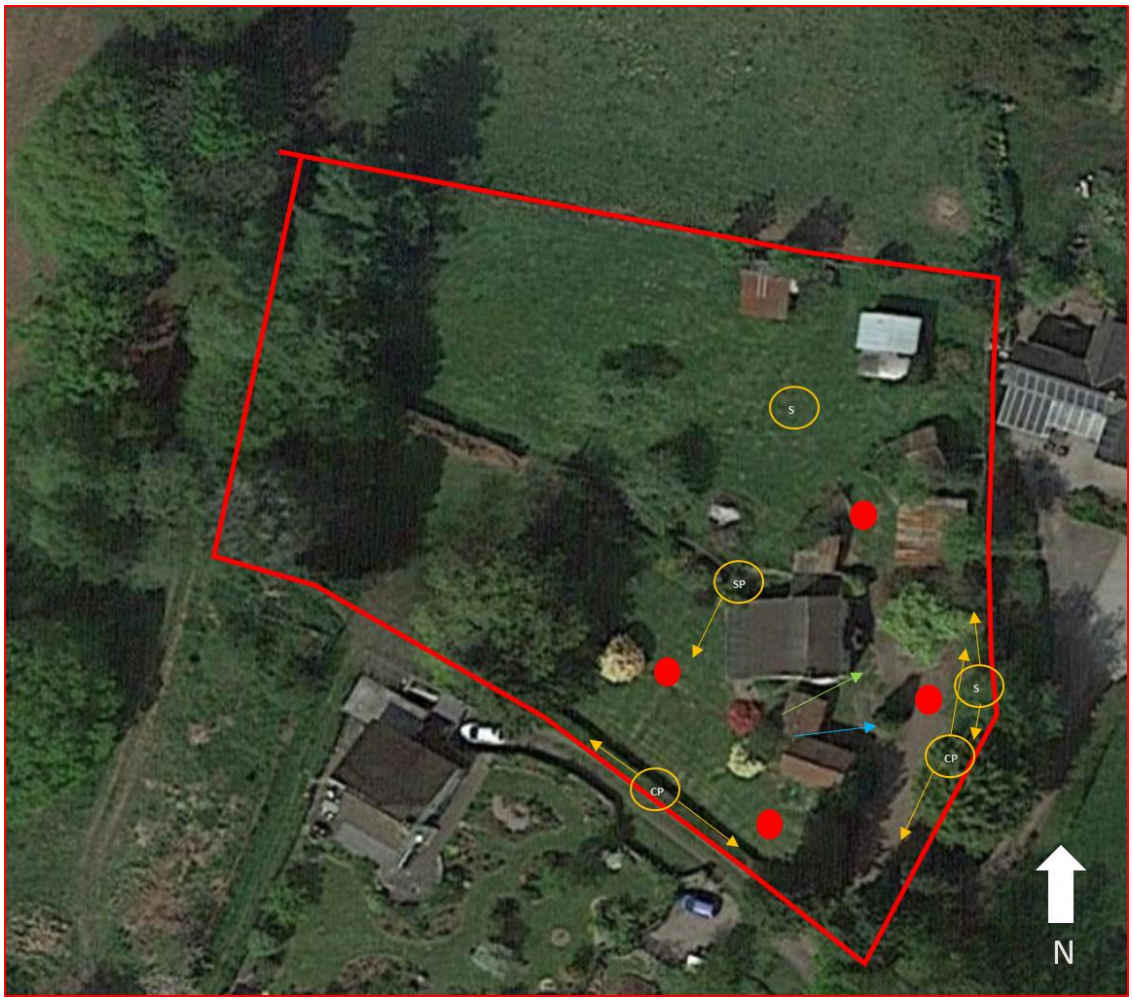

Figure 5: Survey 1 results

3rd June 2021

From 21:35 until 22:30 there was a high level of foraging by soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus),* along the eastern boundary and within the trees to the west of the site and a low level of foraging by serotine (*Eptesicus serotinus)* within the trees to the west of the site. There was also a low level of foraging along the eastern boundary by lesser horseshoe bats *(Rhinolophus hipposideros).*

From 21:48 until 22:20 there were numerous records of lesser horseshoe bats *(Rhinolophus hipposideros)* commuting along the hedgerow along the southern boundary.

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At 22:14 a brown long eared bat (*Plecotus auritus)* was observed emerging from the open tin shed to the north of the house before foraging within the other open sheds and the field to the north between 22:14 and 22:23. This is shown in Figure 6 and highlighted by a pink arrow.

At 22:15 a single soprano pipistrelle emerged from around the northern side of the house. It could not be confirmed if it had emerged from the building or flown around it.

Figure 6: Survey 2 results

14th June 2021

Due to lack of activity from the stone barn in survey 2 and the uncertainty about a soprano pipistrelle emerging from the northern face of the house and a brown long eared bat using the shed to the north of the house surveyor 4 was moved. Inspection of the tin shed before sun set confirmed it was likely the brown long eared bat seen in survey 2 had entered the shed via a missing panel on the southern side before exiting the shed via the door way on the eastern side.

From 2147 until 2242 there was a high level of foraging by soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus)* along the southern and eastern boundaries, across the field to the north of the house and in the trees to the west of the house.

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From 22:08 to 22:38 there was a low level of foraging by serotine (*Eptesicus serotinus)* within the garden to the west of the house and the field to the north.

Confirmed the soprano pipistrelle seen emerging from around the northern end of the house in surveys 1 and 2 did not originate from the house but was one of several foraging around the sheds and field.

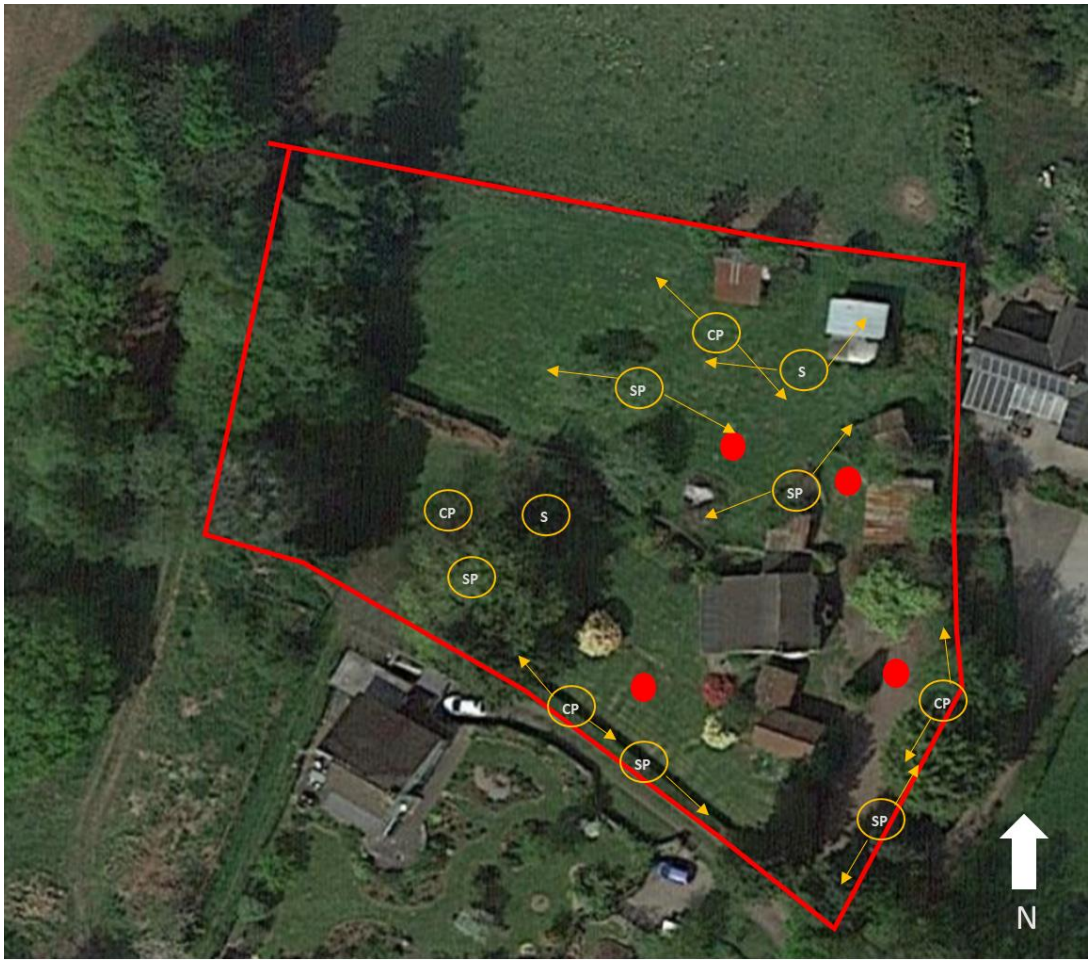

Figure 7: Survey 7 results

5. Evaluation

All species of bat present in the UK receive full protection under The Conservation of Habitats and Species Regulations 2010, and the Wildlife and Countryside Act 1981 (as amended).

The initial bat building assessment recorded no evidence of bats within the farm house but did identify a number of external structural features with the potential to support roosting bats on the roof of the building, along with the adjacent stone barns having confirmed presence of bats and the sites location 660m from Sylvan House Barn SSSI. The building was therefore considered to have moderate potential to support roosting bats and dusk emergence surveys were recommended to ascertain whether bats are currently roosting within the building.

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Three dusk bat emergence surveys did not reveal any bats emerging from the farm house. It is therefore considered unlikely that bats are currently roosting within the building. However, a high level of foraging activity was recorded around the eastern and southern boundaries of the site and within trees to the west of the garden and the orchard field to the north indicating this habitat is an important resource for foraging bats. The southern boundary hosted a high level of commuting lesser horseshoe bats. This can be considered a potential critical flight line from Sylvan House Barn SSSI to Core Sustenance Zones (CSZ).

In addition to this the first dusk bat emergence survey confirmed the presence of serotine and soprano pipistrelle bats roosting in the stone barns. Due to the results of the initial bat building survey, the conditions early in the survey season (the start of the 2021 survey season was delayed by unseasonably cold and wet weather) and no further emergence during the second or third dusk surveys it is likely the stone barns are used by individuals as a hibernation roost.

The proposed development requires the demolition of the farm house and erection of a new property in the orchard field to the north of the site with an associated garage on the eastern boundary. The development as it is currently proposed is not likely to disturb bat roosts and no further bat surveys are necessary at this time.

However should plans change to incorporate any changes to the stone barns which have been confirmed as a bat roost during surveys in March and May an application for a European Protected Species Disturbance Licence from Natural England will be required and additional mitigations considered.

If the property is to be sold with planning permission it is the current owners obligation to make any potential buyers aware of the restrictions around the stone barns and the need for an EPS licence to carry out any changes to them.

6. Conclusion and recommendations

6.1 Conclusion

The dusk bat emergence surveys indicated that bats are not currently roosting within the farmhouse. Therefore, the proposed development is not considered to be constrained by the presence of bats.

However, due to the presence of a confirmed serotine hibernation roost in the neighbouring barns, the presence of high bat foraging activity in the vicinity of the building and the presence of structural features with the potential to support roosting bats on the roof of the building it is recommended that a precautionary approach to the proposed works is adopted.

6.2 Recommendations

Due to the legal protection afforded bats in the UK, if any bats are unexpectedly discovered prior to works commencing or during works, all works to that area should immediately cease and the advice of NewWays Ecology, the Bat Conservation Trust or Natural England sought.

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Under the National Planning Policy Guidance document, it is a requirement for the planning system to minimise the impacts on biodiversity and provide net gains where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. In order to conserve and enhance the natural environment the following provisions must be provided:

- Bat boxes to be installed on buildings and mature trees on site, a minimum of three integrated bat boxes, such as the 2FR bat tube, incorporated into the plans for the new property on south, south-west or south-east facing walls, five woodcrete boxes such as the 2F, 2FN and the 1FS bat boxes produced by Schwegler installed in the mature trees along the western boundary of the site;
- Bat access tiles to be incorporated on the new garage roof to provide roosting opportunities for crevice dwelling bats such as common and soprano pipistrelle bats;
- A variety of bird boxes to be installed around the site such as the free hanging Schwegler nest box type 2GR within trees and hedgerows and under eaves bird boxes suitable for species such as house martins and swallows should be incorporated within plans for the new house and garage. The Schwegler Swallow nest box No. 10 is a suitable option. A droppings board could also be included under each nest box to minimise mess.

New external lighting around the site must follow advice laid out in Bats and artificial lighting in the UK: Guidance note 08/18 (Institute of Lighting Professionals 2018).

Due to the high level of foraging around the site, the critical flight line along the southern boundary for lesser horseshoe bats and the proximity to a hibernation roost site within the stone barns works must be limited to daylight hours, at least 15 minutes after sunrise and no later than 15 minutes before sunset, thus ensuring that there will be no requirement for any additional artificial lighting around the site, particularly between April and October (inclusive) to limit additional light spill on potential bat foraging or commuting routes.

The stone barns must be protected during demolition and construction works with all access and storage associated with the development excluded in particular during the hibernation months (November to May).

7. References

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Mitchell-Jones A.J. (2004) *Bat Mitigation Guidelines*. English Nature

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UK Government. 2017. *Conservation of Habitats and Species Regulations*

Appendix 1 – Legislation and Policy

All species of British bat are fully protected under the Wildlife and Countryside Act 1981 as amended through inclusion in Schedule V. All bat species in the UK are also included in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("EC Habitats Directive") which defines European protected species of animals.

Bat species are afforded further protection by the Natural Environment and Rural Communities Act

2006. Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- deliberate disturbance in such a way as to be likely to impair their ability to:
    - survive, to breed or reproduce, or to rear or nurture their young; or
    - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
    - to affect significantly the local distribution or abundance of the species to which they belong;
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case of all species of British bat there is also protection under Schedule 6 of The Wildlife and Countryside Act 1981 (as amended) relating specifically to trapping and direct pursuit of these species.

A European Protected Species Mitigation License (EPSM) is required from Natural England for any work that would result in an otherwise unlawful activity (e.g. damage to a bat roost). A license can

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only be issued to permit otherwise prohibited acts if Natural England are satisfied that all of the following three tests are met:

- The proposal is for 'preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- There is no satisfactory alternative; and
- The action authorised by the license will not be detrimental to the maintenance of bat populations at a favourable conservation status in their natural range.

A bat roost is defined as "any structure or place, which any wild bat uses for shelter or protection." Bats tend to re-use the same roosts; therefore, legal opinion is guided by recent case law precedents, that a roost is protected whether or not the bats are present at the time. This can include all summer roosts, used for breeding, resting or sheltering and all winter roosts used for hibernating.

Appendix 2 – Examples of bespoke bat roosting features

Left to right, the 2F, 2FN and the 1FS bat boxes produced by Schwegler. These and other brands are available at many on-line wildlife stores. These are constructed of 'woodcrete' (a mixture of cement and woodchip) and are designed to be durable and replicate the stable thermal properties of trees and buildings. They may be attached to trees or buildings.

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Examples of integral bespoke bat roosting features that may be incorporated into buildings during construction/renovation. From left to right:

1. an example of bat access tile into loft space. 2.
2. The 2FR bat tube;
3. An example of 2FR bat tubes installed into a house wall in a series of three.

Other brands and designs are available.

Appendix 3 – Artificial lighting and wildlife

Interim Guidance: Recommendations to help minimise the impact of artificial lighting – produced by The Bat Conservation Trust.

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

Overview of impacts

Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter. Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

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It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.

Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation.

However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season3. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.

Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take

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advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.
Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross5. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

Recommendations

Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice guides 7. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

8. When is obtrusive light / light pollution relevant to planning?
9. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
10. What factors are relevant when considering where light shines?
11. What factors are relevant when considering how much the light shines?
12. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans. In instances lacking classification, it may be necessary to request a Baseline Lighting

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Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject the EIA process, the following should be considered and relayed to applicants:

- ***Ecological consultants should confirm the presence of any sensitive fauna and flora,*** advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- ***Ecological consultants should consider the need for quantitative lighting measurements.*** In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- ***Where appropriate, professional lighting designers should be consulted*** to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- ***Reports submitted should outline the impacts of lighting in relation to ecology,*** making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- **Post –installation checks and sign off upon commissioning should be carried out** by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

Principles and design considerations

Do not:

- ***Provide excessive lighting*****.** Use only the minimum amount of light needed for the task.
- ***directly illuminate bat roosts*** or important areas for nesting birds

Avoid

- ***Installing lighting in ecologically sensitive areas*** such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- ***Using reflective surfaces under lights.***

Do

- ***consider employing a competent lighting designer*** who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.

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- ***minimise the spread of light*** to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- ***consider the height of lighting columns***. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light spill or require more columns.
- ***consider no lighting solutions where possible*** such as white lining, good signage and LED cats eyes. These options can also be effective. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times;
- ***use temporary close-boarded fencing until vegetation matures***, to shield sensitive areas from lighting;
- ***limit the times that lights are on to provide some dark periods***. The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

Technological specifications

Research from the Netherlands has shown that spectral composition does impact biodiversity.

- ***Use narrow spectrum light sources*** to lower the range of species affected by lighting.
- ***Use light sources that emit minimal ultra-violet light***
- ***Lights should peak higher than 550 nm***
- ***Avoid white and blue wavelengths of the light spectrum*** to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.

Further guidance on the spectral composition of artificial lighting will be made available following the publication of research from the Netherlands.

Further reading:

- A review of the impact of artificial light on invertebrates. Buglife. 2011
- Royal Commission on Environmental Pollution. 2009. Artificial light in the environment. London, HMSO
- The Ecological Consequences of Artificial Night Lighting" edited by Longcore and Rich
- Shedding Light: A survey of local authority approaches to lighting in England. CPRE 2014

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