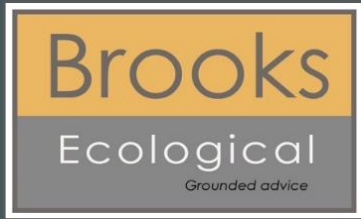


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Horn Crag Quarry, Silsden



Bat Hibernation Report

02/02/2023

ER-5064-11



Report reference	ER-5064-11
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Authorised	Sam Kitching BSc (Hons) MCIEEM Principal Ecologist
Date	02/02/2023
Report duration	In accordance with CIEEM (2019), unless otherwise stated the findings of this report remain valid for a period of 18 months. After this period advice should be sought on the scope of any updating work required.



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Summary Statement

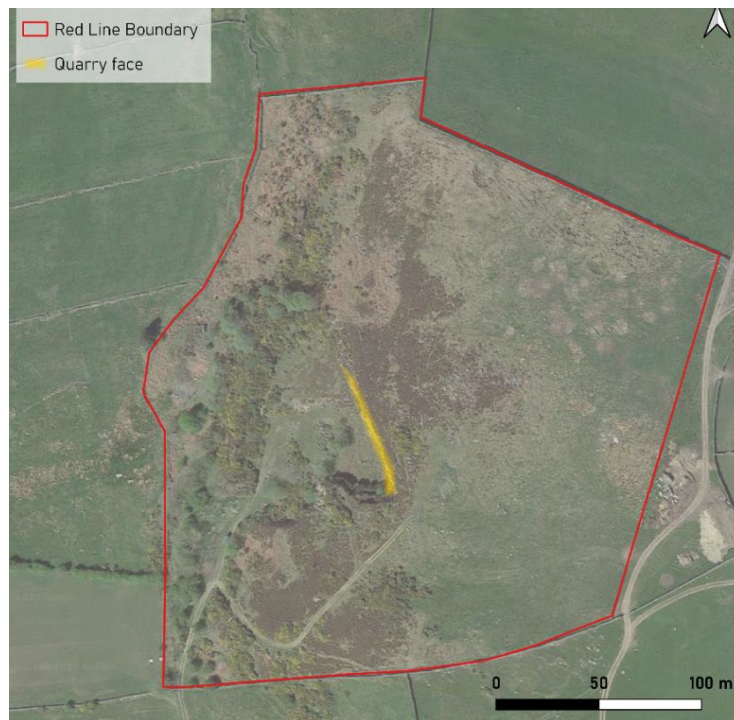
A programme of static monitoring has demonstrated a likely absence of roosting bats within the quarry during the winter period.

No evidence was recorded of bats approaching or exiting the quarry face. A total of only 11 registrations were returned across both monitoring stations over a period of two months. The vast majority of these were recorded at the station away from the rock face.

Introduction

1. Brooks Ecological was commissioned by A. D. Calvert Architectural Stone Supplies Ltd to undertake a detailed Bat Hibernation Study at the proposed quarry Site at Horn Crag Quarry, Silsden.
2. This study was required to ascertain whether potential roost features (PRFs) present within the existing, inactive quarry face (grid reference SE 0529 4797) are currently being used for hibernation by local bat populations. The information collected will form part of that required to devise an appropriate mitigation and enhancement strategy for bats, in conjunction with the Bat Activity Report (ER-5064-05) and Bat Emergence Report (ER-5064-06).
3. The scope of the survey has been devised based on an assessment of the habitats present, in accordance with current best practice guidelines (BCT, 2016).

Figure 1 Site location plan (red line boundary); quarry face highlighted.



Method

4. Survey and assessment was directed by Sam Kitching. Sam has over 10 years' experience undertaking bat surveys in a professional capacity, is registered to use the Bat Survey Class Licence (Level 2), and is a member of the West Yorkshire Bat Group.
5. The objective of the survey was to collect up-to-date information on the Site's use by local bat populations during the winter hibernation period, so that an accurate assessment of the potential impacts of development could be made.
6. Due to the unstable nature of the sandstone quarry face, it was judged unsafe for a physical torchlight inspection to be conducted. A remote monitoring survey was therefore carried out to collect the following data (Bat Conservation Trust, 2016):
 - The assemblage of bat species using the site;
 - The relative frequency with which the site is used by different species;
 - The nature of activity for different bat species, for example foraging, commuting and roosting.

Monitoring

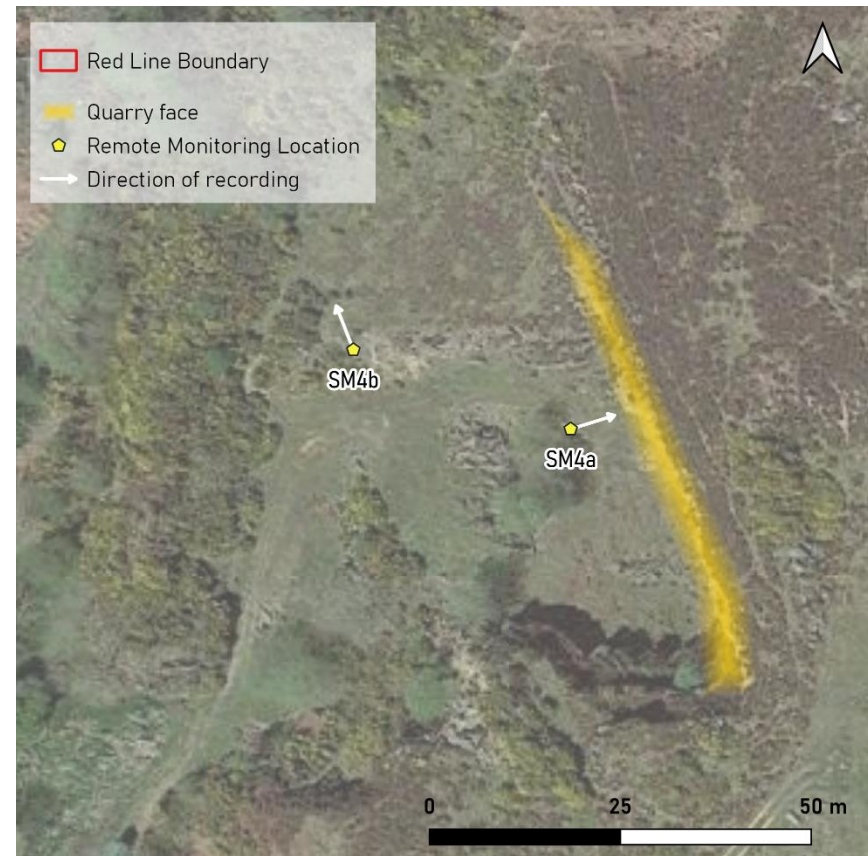
7. Two remote monitoring devices (Wildlife Acoustics SM4) were deployed in strategic locations on 5th December 2022 and left to run until late January, with visits made periodically to retrieve data and replace batteries.
8. SM4a was placed at the base of the cliff, with the microphone facing the quarry face; SM4b was placed on a mound c. 25m NE, with the microphone facing away from the quarry face (Figure 2, overleaf). The intention was for SM4a to record bats close to the cliff, including any entering or exiting it; while SM4b would record bats using and passing through the wider site.
9. Data collected through December 2022 and January 2023 was run through Kaleidoscope Pro software, which can identify bat calls to species level. Identification is generally correct when using this software; however, results are double checked to ensure accurate data analysis.
10. Every effort is made to split up *Myotis* spp. calls down to species level. This is done by analysing calls on Analook software and analysing parameters such as inter-pulse interval, call duration, slope, and maximum/minimum/peak call frequency. However, this can often be difficult when registrations are short in duration, faint or distorted by cluttered environments.

11. Data were only compared for nights on which both detectors recorded. This spanned three periods: 5th-14th December 2022, 20th-28th December 2022, and 10th-21st January 2023.

Limitations

12. Static monitoring can only reliably provide information on what species of bat are regularly making use of a site. More detailed information on bat activity, such as number of bats and nature of activity (foraging, commuting, flight path), can only be gleaned through direct observation. However, due to the very sporadic nature with which bats typically emerge from hibernation in winter, such an approach was deemed infeasible.
13. Hibernation study would generally include an element of direct observation, looking for bats in crevices using equipment such as an endoscope. In this instance, due to instability of the rock face, this was not deemed safe.

Figure 2 Location of static monitoring detectors.



Results

14. In total, over 62,000 recordings were made between the two detectors, with almost two-thirds (63%) from SM4b, facing away from the quarry face.
15. The majority of these recordings were noise generated by wind, rain, or rustling leaves. Most biogenic recordings were the result of birdsong, and concentrated in the hour before sunrise.
16. Overall, only 11 recordings were found to contain bat registrations, all of which related to noctule (*Nyctalus noctula*). Registrations were logged on only 5 of the 31 nights (16%), with an average of 2.2 registrations per night. This is likely to amount to single bats flying briefly past the detectors, typical of bats having briefly risen from a state of torpor.
17. Nine noctule recordings were made by SM4b on the nights of the 7th, 11th, and 22nd December 2022, and 15th January 2023. Where multiple recordings were collected on the same night, registrations are only a few seconds apart, and may therefore represent the same individual calling repeatedly.
18. The remaining two noctule recordings, from SM4a, were made on the night of 24th December 2022, the first shortly after sunset and the second about two hours before sunrise. In both cases the calls, likely social calls, are highly fragmented and indistinct, and it is likely that the detector recorded echoes of bat calls bouncing off the quarry face, rather than direct calls from bats in front of the microphone.
19. These data are presented in tabulated form in Appendix I of this report.

Conclusions

20. A remote monitoring study undertaken across the core winter months has found no evidence of bat hibernation on-Site.
21. SM4a, pointed at the quarry face, recorded only two contacts from bats. Both are faint and seem to represent echoes, rather than direct calls, from bats behind the detector and away from the quarry face. No evidence has been collected, therefore, that would be indicative of bats approaching the cliff face or using any of the PRFs within. It is generally accepted that bats wake from hibernation every 10 - 15 days to feed or expel waste, as such, returned registrations in close proximity to the rock face would be expected over this extending monitoring period.
22. In comparison, SM4b, pointed away from the quarry face, recorded 9 registration, on 4 separate days across the monitoring period. This indicates that bats (in this case, noctules) fly over the Site, most likely for commuting based on the spread of registrations, on an infrequent but regular basis during the winter hibernation period.
23. Noctules are typically considered to be a woodland specialist species and usually roost in trees (Bat Conservation Trust, 2010). Although occasionally recorded using caves or rock faces as hibernation roosts it is considered unlikely that this species would be using the quarry face for roosting, as supported by the findings of static monitoring.
24. Trees on-Site have been assessed as providing negligible bat roosting suitability (ER-5064-01; Brooks Ecological, 2021), and it is more likely that the noctules recorded are roosting off-Site in one of the nearby woodlands.
25. Typically, crevice-dwelling species which may use the quarry's PRFs, such as common pipistrelle, were not recorded during the monitoring period, and are likely absent from the Site during winter.
26. The data collected during this, and previous survey effort, do not point to the Site being of any significant importance to any local bat populations.

Recommendations

27. Based on the information collected, the proposed development is unlikely to impact significantly on local hibernating bat populations.
28. To minimise the impact of development of this group further, the following mitigation is recommended:
 - A sensitive lighting plan should be designed to show how light spill from the active quarrying area will be minimised/avoided on habitats favoured by bats.
 - Retained and created habitats should be enhanced to maximise their value to bats and other local wildlife.
 - Bat boxes should be mounted on retained trees large enough to support them, in sheltered locations at least 4m from the ground.

References

- BS:42020 2013. Biodiversity - Code of practice for planning development. BSI.
- Bat Conservation Trust (2010) Species Factsheet: Noctule bat.
- Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists - Good Practice Guidelines.
- Conservation of Habitats and Species Regulations 2010
<http://www.legislation.gov.uk/ukxi/2010/490/contents/made>
- CIEEM (2019) Advice Note - On the Lifespan of Ecological Reports and Surveys
- English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough.
- Institute of Lighting Professionals (2018) Bats and artificial lighting in the UK. Bat Conservation Trust Guidance Note 08/18.
<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>
- JNCC (2004) The Bat Workers Manual. 3rd Edition.
- ODPM circular 06/05 (2005) Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within the Planning System
<http://www.communities.gov.uk/publications/planningandbuilding/circularbiodiversity>
- Wray S, Wells D, Long E, Mitchell-Jones T (2010) Valuing Bats in Ecological Impact Assessment. CIEEM In Practice.

Appendix I

Tables 1-3 Data recorded by SM4a and SM4b over the three recording periods, December 2022–January 2023.

Recording period 1										
Date	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec
SM4a	0	0	0	0	0	0	0	0	0	0
SM4b	0	0	4	0	0	0	2	0	0	0
Total	0	0	4	0	0	0	2	0	0	0

Recording period 2									
Date	20-Dec	21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec
SM4a	0	0	0	0	2	0	0	0	0
SM4b	0	0	1	0	0	0	0	0	0
Total	0	0	1	0	2	0	0	0	0

Recording period 3												
Date	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan	21-Jan
SM4a	0	0	0	0	0	0	0	0	0	0	0	0
SM4b	0	0	0	0	0	2	0	0	0	0	0	0
Total	0	0	0	0	0	2	0	0	0	0	0	0