



**The Savernake Forest
Barbastelle Bat Project**

2019

Report to Back from the Brink

December 2019

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Wiltshire Bat Group**

Acknowledgements

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Biological records

All biological records derived from this study will be shared with the Wiltshire & Swindon Biological Records Centre and Forestry England.

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1. Introduction

1.1 Background to these surveys

Wiltshire Bat Group (WBG) has conducted bat survey and monitoring in and around the Savernake Forest since the early 1990's, initiated by Steve Laurence and latterly coordinated by Lisa Wade and Gareth Harris. This includes monitoring of Barbastelle bats and other woodland bats using bat boxes at two core areas in the Forest. Bat box monitoring shows continued use of boxes by a barbastelle maternity group, as well as a large Natterer's bat maternity group, with smaller numbers of regular long-eared bats and Noctule bats.

Steve Laurence undertook radiotracking studies of Barbastelle bats throughout the early 2000s, locating a maternity group in the south of the Forest (which allowed the targeting of bat boxes) and indicating foraging areas to the south of the Savernake Forest (along the Bourne corridor and around the Kennet & Avon Canal) and to the west (using the Kennet corridor, and commuting as far as Avebury, indicating bats foraged over the chalk downs).

Moving forwards, the bat group is looking to consolidate works undertaken to date. We wish to update our knowledge of Barbastelle bats in the Savernake Forest for a number of reasons. Firstly, to further to build upon our works so far. Secondly, wood pasture restoration plans in the Savernake Forest require a greater understanding of favoured roosting areas of Barbastelle bat, as well as their foraging areas and commuting routes in order to consider potential impacts of these works. Thirdly, understanding how Barbastelle bats are using the Forest, can feed into Forestry Commission's own management plans. And finally, an understanding of how the Barbastelle bats of the Savernake Forest utilise the surrounding landscape is of the utmost importance, feeding into local development control processes and agri-environment scheme provision.

1.2 Aims & objectives of this work

Studies during 2019 had the following aims:

1. To undertake trapping surveys with a view to catching and applying radio-tags to four bats, targeting Barbastelle bat, Noctule bat and small Myotis bats (in that order of priority), in order to:
 - a. Locate roosting sites,
 - b. Conduct emergence surveys of roosting sites to estimate colony size,
 - c. Identify commuting routes and extent of foraging areas of tagged bats,
2. Two trapping sessions would be undertaken, with the aim of tagging 2 bats in each session, during late May or July (albeit dependent upon the availability of radiotracking team and upon prevailing weather conditions).
3. All Barbastelle and Bechstein's bat would be ringed in line with other WBG studies
4. All bats tagged with radiotags would be of sufficient weight and health, ensuring the tag is no more than 5% of the bat's weight.
5. Four nights of radiotracking will be delivered to locate foraging areas and commuting routes, with additional radiotracking (up to an additional 3 days) to locate roosting sites, where logistics allow.

Outputs will include:

- Trapping data, including species, age, sex, breeding condition and ringing data
- Radiotracking data:
 - Fixes of foraging/commuting bats in Excel

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- Fixes of roosting bats in Excel
 - Emergence counts of roost trees (where possible)

All data will be shared with Forestry England (as per the consent to access Savernake Forest) and Bat Conservation Trust/Buglife. All data will be made available to the Wiltshire & Swindon Biological Records Centre (WSBRC as part of the data sharing agreement in place between WSBRC and Wiltshire Bat Group.

This project will increase the skill and knowledge base within Wiltshire's bat worker community to promote and enable further woodland bat study in Wiltshire, ensuring ongoing project sustainability.

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2. Methodology

2.1 Personnel

The project was managed by Gareth Harris (county recorder for Bats in Wiltshire and licensed bat worker), who has extensive experience of advanced survey techniques for bats including mist netting, harp trapping, use of acoustic lures and radiotracking of species including Bechstein's bat and Barbastelle bat.

2.2 Licensing from Natural England

This project was delivered under the terms and conditions of a project-specific licence held by Dr Fiona Mathews, University of Sussex and Wiltshire Bat Group member. All activities relating to this project have been discussed and agreed with Dr Fiona Mathews.

2.3 Catching bats

A combination of Faunatech AustBat harp-traps and Avinet / Ecotone mist nets (including a triple high net system) with acoustic lures were used to catch bats. Acoustic lures included two Sussex Autobat (Mark I and Mark II) (Hill and Greenaway 2005). The Autobats were broadcasting a series of woodland bat calls, including Bechstein's and Barbastelle bat social calls, as well as a variety of other *Myotis* species, pipistrelle social calls, Leisler's social calls, long-eared bat social calls etc.

During each trapping survey a large team was deployed to assist with dusk to dawn surveys, to enable additional traps to be deployed safely and to enable radiotracking to commence if bats were trapped and tagged. Bat workers supervised nets and traps at all times.

All bats trapped were promptly and safely extracted from mist nets and harp traps by experienced fieldworkers. All bats were identified, sexed, biometrics taken and breeding condition recorded. All data was recorded on field pro formas, digitised and shared with the local records centre and relevant land managers.

2.4 Study area

The Back from the Brink Project, *The Ancients*, required the study of the Cheval Bottom area of Savernake Forest. This related to ongoing works in this part of the Forest, including thinning of conifers and *veteranisation* of mature trees, contributing to the programme of wood pasture restoration.

2.5 Fitting of rings and radio-tags

All Bechstein's and Barbastelle bats showing good body condition were ringed using approved rings issued by the Mammal Society, (3.5-mm aluminium rings, Porzana Ltd, Icklesham, East Sussex, United Kingdom). The absence of any injury which could be exacerbated by the application of a ring was also a requirement. In line with other schemes on vespertilionid bats, males were ringed on the right arm and females on the left arm.

The Radio-tag model selected was the Pico Pip11 0.4g transmitter (Biotrack Ltd, Wareham, Dorset, United Kingdom) with an integral reed switch (started by the removal of a magnet). These were fitted by Gareth Harris.

Animals selected for tracking were those for which the weight of the tag represented no more than 5% of the animal's body weight, i.e. 8.0g minimum. Only healthy and apparently unstressed animals were tagged. Any animals with obvious injury, overall poor body condition and/or high parasite loadings, as well as pregnant individuals, were not tagged.

The adhesive used was Torbot Ostomy Skin Bonding Adhesive Cement Glue12. This is a latex-based adhesive ordinarily used in medical and veterinary applications.

2.6 Radiotracking

Bats were followed using the Titley Australis 26k Scanning Receiver (Titley Scientific UK Ltd) and a 3-element Yagi antenna (Titley Scientific UK Ltd and Biotrack Ltd, United Kingdom). Three sets of equipment were available to the team.

The Australis receivers were capable of scanning for all frequencies programmed into their memory banks enabling more than one bat to be tracked at one time.

Radiotracking was undertaken by up to 3 teams of volunteers which included experienced radio-trackers training novices in this field technique. Location and routes of bats were recorded continuously and as accurately as possible, using Ordnance Survey maps, compass, two-way radio communication and global positioning system (GPS; Garmin eTrex, Garmin Ltd., Romsey, UK) to generate "Location Fixes". Where possible the location of bats was calculated by triangulating between two teams, or using the close approach method.

Each bat would be radiotracked for up to 7 nights, after which daytime tracking only was undertaken to assess daytime roosting sites. Tag lifespan was dependent upon battery life and full electronic functionality, as well as behaviour of the bat (e.g. grooming and roosting in tight spaces which may result in tags being detached).

During data analyses and mapping of location fixes, and using field notes collected during the radiotracking, a margin of error was attributed to each location fix.

2.7 Timetable

It was originally planned that the first trapping surveys would be undertaken in late May (pre-maternity), but this was not possible; trapping and application of radiotags was therefore undertaken during the week following the birth of juveniles.

3. Results

3.1 Trapping surveys & a bat box survey

Two trapping surveys were undertaken, on the 5th and 6th July 2019. Details of survey timings, weather conditions and equipment deployed are detailed in Table 1.

Location	Cheval Bottom, Savernake Forest	Cheval Bottom, Savernake Forest
Date	05/07/2019	06/07/2019
Weather conditions	17C, 7/8 cloud cover, no precipitation, still/slight breeze. Cool later.	18C, 8/8 cloud cover, no precipitation, still/slight breeze
Sunset:	21:26	21:25
Survey period:	21:20 – 01:30	21:20 – 03:00
Equipment	1x Triple High Net System (6m) 2x large Harp Trap with Sussex Autobat lures 1x 9m mist net 2x 6m mist net	1x Triple High Net System (6m) 3x large Harp Trap with Sussex Autobat lures 1x 9m mist net 1x 6m mist net
Bats trapped	3 bats trapped	12 bats trapped

Table 1 - Summary of survey conditions

The first trapping survey was undertaken on the 5th July 2019, at Cheval Bottom, Savernake Forest. Weather conditions were favourable (still, warm and dry). A triple high net system was erected across a woodland ride adjacent to Cheval Bottom, whilst two harp traps with Sussex Autobats were deployed to the north-west of Cheval Bottom and to the south-east of Cheval Bottom, each placed within woodland in dense clutter. Additional mist nets were deployed across woodland rides.

Despite optimal survey conditions, bat activity was incredibly low – only occasional passes of soprano pipistrelle, common pipistrelle, Myotis species and Barbastelle were noted during the night. The broadcasting calls of acoustic lures were varied at regular intervals (as well as using pre-programmed sequences of calls played on loops) and lures were moved from harp traps to mist nets. Only three bats were trapped. Of these, an adult male Barbastelle bat was trapped, ringed (with H5621) but not radiotagged at this time (as the focus for radiotracking was breeding females).

Species	Age/sex	Comment
Barbastelle Bat	1 adult male	Ringed but not radiotagged
Natterer's Bat	1 adult female	Post-lactating
Common Pipistrelle Bat	1 adult male	

Table 2 Bats trapped on the 5th July 2019, Cheval Bottom, Savernake Forest

The second trapping survey was undertaken on the following night; on the 6th July 2019, weather conditions were broadly similar to the night before, remaining warm, still and overcast. Bat activity was markedly higher however, with frequent passes of commuting and foraging bats including Common pipistrelle bat, Soprano Pipistrelle Bat, Myotis species, Noctule bat, Barbastelle bat and long-eared bats.

The same kit was deployed on the 6th July, with an additional harp trap and Sussex Autobat acoustic lure deployed; this extra harp trap was deployed further south along Cheval Bottom.

A total of 12 bats were trapped, detailed in Table 3.

Species	Age/sex	Comment
Barbastelle Bat	5 adult male 1 adult female	5 Males ringed– but none tagged Female was lactating; ringed and tagged FREQ 173.9873
Whiskered Bat	1 adult male 1 adult female	Female was lactating. Both bats too light to apply radiotags.
Soprano Pipistrelle Bat	1 adult male 1 adult female	Female has bred previously but considered non-breeding in 2019.
Brown long-eared bat	2 adult male	-

Table 3. Bats trapped on the 6th July 2019, Cheval Bottom, Savernake Forest

It is worth noting, with hindsight and having completed the radiotracking, that most of the Barbastelle bats were caught in harp traps in Cheval Bottom, within a short distance of the maternity roost found by radiotracking the female. It is therefore interesting that no other breeding females were trapped here despite the close proximity of a maternity colony, and interesting that the catch was skewed to male captures.

Noctule bats were also a target species for radiotracking, however, very few passes were noted during these surveys; this was surprising given that this species is normally frequently recorded foraging over the Forest. On Sunday 7th July, therefore, we conducted a check of bat boxes in the centre of the Forest, where Noctule bats are sometimes recorded (albeit, in the autumn, when they lek here). Unfortunately, only brown long-eared bats and soprano pipistrelle bats were encountered in small numbers.

In summary therefore, a single lactating female Barbastelle bat was tagged with a radio-transmitter on the 6th July. She was released in the early hours of the 7th July. Radiotracking commenced on the 7th July 2019.

3.2 Radiotracking

Roosting sites & emergence surveys

The female was radiotracked for 2.5 nights, from the 7th July to the 9th July inclusive. The tag apparently detached from the bat at around 23:46 on the 9th July and ceased functioning entirely by sunrise.

Three roosting sites were described, as detailed in Table 4 below.

Date	Roost#	Comment/description	Emergence Survey outcome
7 th July 2019 (Dusk emergence)	Roost#1 (Tree ref: ChevBtm_001)	Mature oak close to trackside of Cheval Bottom. Bats roosting in a vertical hazard beam on major limb, approx. 8.5m above ground.	8 bats counted emerging using infra-red cameras. Emergence 2200-2210 (sunset at 2124).
8 th July 2019 (Dusk emergence)	Roost#1 (Tree ref: ChevBtm_001)	Mature oak close to trackside of Cheval Bottom. Bats roosting in a vertical hazard beam on major limb, approx. 8.5m above ground.	20 adults. Infra-red video equipment used to support count. First emergence 19:54. (Sunset 2123). (Tree ref: ChevBtm_001)

9 th July 2019 (dawn re-entry)	Roost#2 (Tree ref: ChevBtm_002)	Mature oak tree, east of roost#1, dead with multiple sheets of lifting bark. During the night of the 9 th July, bats were noted to move from roost#1 to roost#2, presumably relocating the pups. Disturbance at the end of the night, resulted in some adults relocating to another nearby tree (roost#3).	5+. Radio-tagged bat seen entering this tree (roost#2) with other bats before relocating to nearby tree (roost#3). (During the night of the 8 th July, but in the early hours of 9 th July). Pups were moved from roost 1 to roost 2, before adults moved to roost 3, likely due to disturbance.
9 th July 2019 (dawn re-entry)	Roost#3 (Tree ref: ChevBtm_003)	Mature oak tree, east of roost#1. Bats roosting behind lifting bark. Not inspected in order to minimise disturbance.	
9 th July 2019 (Dusk emergence)	Roost#2 & Roost#3	No emergence undertaken at dusk on the 9 th July – to minimise disturbance as because no infra-red kit available.	Unknown

Table 4. Roosts found by radiotracking

Details of these three roosting sites were submitted to the [Bat Tree Habitat Key](#).

Infra-red equipment (video and stills) was employed on the nights of the 7th and 8th July 2019, enabling an accurate count to be made on both occasions. Our thanks to Paul Colley, wildlife photographer, for supporting this work with his time, equipment and expertise.

As may be expected, the number of adult bats using the feature varied, from 8 on the 7th July, to 20 on the 8th July. Barbastelle bats are well known for fission-fusion dynamics between maternity groups and the rest of the colony.

Of note, during the early hours of the 9th July, it appeared that the female bats moved their pups from roost#1 to roost#2; at the beginning of the evening, they suckled their bats at roost#1 but this transferred to roost#2. At dawn on the 9th July, however, possible but unintentional disturbance of bats at roost#2 resulted in some adult bats flushing from the roost (lifted bark plates) and relocating to roost#3. This disturbance was a result of trying to navigate through bracken, bramble and leaf litter whilst radiotracking bats. On the evening of the 9th July, bats were seen to be returning to roost#2 presumably to suckle their pups. Weather conditions during this time were warm and dry and it not considered likely that this disadvantaged the bats significantly, especially since only a small number of adults were seen to relocate – other adults likely remained with the pups to roost with them.

Foraging area

The female Barbastelle was radiotracked, following her release, for the remainder of the night of the 6th July, the nights of the 7th and 8th July, and on the 9th July prior to the tag failing. Two to three radiotracking teams were active each night, from dusk until dawn, enabling her foraging area to be fully described. It also enabled us to confirm as and when she entered, and left, the roosting sites.

6th July 2019

Following her release during the early hours of the 7th July, at 01:45, she foraged in the wider Cheval Bottom area, favouring the higher ground on the south-eastern side of Cheval Bottom.

7th July 2019

Daytime radiotracking by three teams enabled us to quickly converge on the roosting site, a mature oak with a vertical hazard beam at the southern end of Cheval Bottom (the area of Cheval Bottom not impacted by recent felling or thinning works, but not far, further south).

We returned at dusk for an emergence survey; Paul Colley deployed his IR photography set-up and we were able to count 8 bats emerging; they emerged in quick succession from 22:00 (starting 35 minutes after sunset).

Once the tagged bat emerged, a few minutes after 22:00, two tracking teams followed the bat; it spent the next few hours foraging between Cheval Bottom and The Column, and towards the Grand Avenue along Three Oak Hill Drive. This foraging area is around 1.1km across (west to east) by 900m (north to south). Multiple location fixes were made of this bat whilst foraging and she frequently covered considerable ground, very quickly, feeding in a wide arc, sometimes along the avenues, but sometimes through open woodland.

She returned to the roost at 00:45, presumably to suckle her pup and remained here until 01:15 before departing to forage. She returned once again at 02:25 and remained here until 03:12. She returned for a final time at 04:20; during this time dawn swarming activity was noted as bats returned to their day roost (thus confirming use of roost#1 for a second evening).

8th July 2019

Having radiotracked the bat to roost#1 at dawn, earlier in the day, we returned to this roost at dusk. Emergence from the roost commenced at 21:54 (sunset 21:24) with the tagged bat exiting at 22:01. Foraging locally for a short time, she made wide sweeping arcs over several hundred metres, foraging to the north-east of the roosting site, over The Gallops and Grand Avenue and Three Oak Hill Drive, making wide sweeps along the drives, as well as through open woodland. Foraging closer to roost#1, she then re-entered the roost at 23:01 and emerged again at 23:18, then foraging along Cheval Bottom south of the roost. She then moved directly and rapidly north, to the junction of Drury Lane and Three Oak Hill Drive, foraging widely once again in this area of The Gallops and Grand Avenue, along open rides and within the woodland. At 00:02 she returned to roost#1, emerged once again at 00:06, flying locally around the roost, and then along Cheval Bottom. Once again, she flew rapidly north-east for around 1km to forage around the junction of Drury Lane and Three Oak Hill Drive, again making wide sweeping arcs through the woodland. At 00:30 she began moving closer to the southern end of Cheval Bottom, and the roosting site, foraging close to the roost at 00:31, moving away and returning again at 00:37. At 00:40 she entered roost#1, but left almost straight away, remaining mobile nearby. During 00:43-00:45 she foraged/flew along Cheval Bottom, before entered roost#1 at 00:50.

[At this stage, it should be noted that Paul Colley was observing the roosting site, roost#1, using infra-red (and otherwise in darkness and silence), and throughout the night, until around midnight, he had observed multiple bats leaving and returning to the roost, presumably representing females returning to suckle their young. This behaviour abruptly stopped around midnight. In addition, he was able to record footage, albeit low quality, of a mother carrying – and nearly dropping – her pup, leaving the roost#1. This would support the observations of the tracking team that the females were relocating their pups to a new roosting nearby].

She remained in roost#1 until 01:05, emerging and moving northwards, presumably along Cheval Bottom, before arcing eastwards. She re-joined the corridors along Three Oak Hill Drive, moving south-west along the drive, to forage in an area between the drive/The Column and roost#1. We were able to roughly triangulate her position between two tracking teams.

At 01:28 she re-entered roost#1 and then emerged again at 01:30; the signal became stationary at this point, 50m from roost#1, until 01:43, whereupon she continued foraging, and was tracking over Three Oak Hill Drive at 01:48, around The Column at 01:50, before flying south/south-east down Column Drive, whereupon she was lost! A search by car to the south-east of the Forest (in the direction of Tottenham Park) and around Durley village, re-found her (at 02:45) foraging to the west/north-west of Durley, only within 200-300m of where she was last recorded, but downslope from the previous position (hence the signal was lost). Once re-found, she moved north-west and returned to the area around the Column.

By 02:50 she had returned to the area close to roost#1, between roost#1 and Three Oak Hill Drive. She remained here, stationary until 03:33. From 03:33 she was mobile again, foraging in a clearing close to her new roost until 03:37 when she was lost. At 04:22 she was once again foraging close to roost#1 and the surrounding area.

Radiotracking in this part of the Forest was challenging – and dense bramble and bracken made it difficult to move quietly. And so unfortunately, one of the tracking teams would appear to have gotten too close to the new roosting site, and 1-2 bats were flushed from lifted bark plates, including the tagged female (roost#2). They moved northwards into the woodland – the tracking team retreated, with the intention of returning in daylight, once the bats were more settled and in torpor.

9th July 2019

Daytime radiotracking confirmed that the tagged bat was roosting behind a lifted bark plate on another dead oak tree (roost#3), not too far from roost#1 and roost#2. No inspection of roosting sites was made on either tree at this time, given the risk of disturbing adults and their young.

At dusk, the tagged bat emerged from roost#3 at 21:44 (earlier than previously), and foraged nearby until 21:52, whereupon she may have returned to the roost (perhaps to suckle?) because she remained stationary in this area until 22:05, whereupon she emerged from the roost, and moved to Cheval Bottom to forage on the eastern side of the valley. She returned to the roost at 22:11 and re-emerged at 22:14, foraging nearby, before re-entering the roost at 22:20.

At this stage the signal from the tag became more erratic, variable in signal strength and pulse rate. It is suspected that at around 22:30 the tag was shed by the bat – it continued to pulse and be audible, but the signal fluctuated greatly when other bats were seen entering the roost.

The radiotracking team remained in place until sunrise – the tag's signal remained erratic, but it did not leave the roosting site again. By sunrise it failed. The tag was checked for signal later in the day, and no further signal was recorded.

4. Conclusions

Over the course of two trapping surveys, a total of 15 bats were trapped, including a number of our target species for radio-tagging; 7 Barbastelle bats and 2 Whiskered bats. Only one of the Barbastelle bats was an adult female and she was lactating; the remaining Barbastelle bats were adult males and so only the adult female was prioritised for radio-tagging and radiotracking. The adult males were not tagged at this time since we wished to ascertain the foraging areas of lactating female bats. Furthermore, at this time of year, male Barbastelle bats were likely to be roosting alone, so we did not consider that tagging an adult male during the maternity period would yield data of sufficient quality or relevance to justify the impact of tagging upon the bat.

Of the two Whiskered bats, an adult male, and adult female, neither bat was of sufficient weight to enable radio-tagging.

Given the surprising lack of activity of Noctule bats during two nights of trapping survey, *impromptu* bat box checks at the nearest group of bat boxes in the Savernake Forest were conducted; Noctule bats are sometimes encountered using these bat boxes, particularly later in the year. Unfortunately, no Noctule bats (or Barbastelle bats or small Myotis bats) were found during this check.

Disappointingly therefore we applied only one radio-tag to a target species. And whilst there are only limited conclusions that be drawn from one bat, in relation to the maternity group, the tagged female did yield some fascinating information.

During the radiotracking period, her preferred foraging area was approximately 1.5 square kilometres (or 158.7ha), covering an area roughly 1.5km x 1.5km, although the majority of her time was spent in a smaller area than this, 1.07 square kilometres (107.5ha). This figure is smaller than that quoted in other studies; Zeale et al (2012), for example, demonstrated that non-breeding and post-lactating females travelled further to foraging areas (mean = 8.6km) than pregnant / lactating females (mean = 4.1km) although care is required in concluding too much from a single bat radiotracked for a limited time period.

This work however does support the findings of other projects, whereby lactating female Barbastelle bats foraged in close proximity to their roosting sites, presumably remaining in close proximity to their pups to enable frequent periods of suckling. It seems reasonable to therefore assume that the habitat these bats utilise at this time of year is therefore of high quality; indeed, given it is sustaining them during the lactation period, it's a crucially important part of their home range. Other studies, such as Zeale et al (2012) noted that once postlactating, they would forage further afield, often considerably so.

A requirement of the funding in 2019 was that studies should focus upon Cheval Bottom, an area of the Forest subject to thinning of conifers and other works associated with the wood pasture restoration project. In particular, it was hoped that trapping effort could focus upon the area of Cheval Bottom subject to conifer thinning; this raised a few problems, notably relating to difficulties in catching bats in such open areas following such disturbing events.

It is therefore interesting to note that low numbers of bats were caught in these areas during the trapping surveys; the majority of bats trapped were adult males whether caught to lures or in mist nets across commuting routes. Breeding females are often found to forage in areas of richer foraging,

whilst males and non-breeding females are less constrained. Does our catch therefore reflect habitat quality following the thinning works – and are these temporary or long-term effects?

It is also interesting to note that the only female Barbastelle was trapped in a harp trap which was only 200m from roost#1; i.e. with 20 breeding females roosting here, why was only one caught given the close proximity of the harp trap and lure? And finally, it is interesting to note that Cheval Bottom appeared to comprise the northern boundary of this female's preferred foraging area. Although she sometimes foraged along Cheval Bottom, she typically favoured the area to the south, east, and north-east. She spent little or no time within the areas where conifers were recently thinned. (Which of course, isn't to say, that the other females didn't forage here – other studies have noted that female Barbastelle bats have non-overlapping foraging patches).

These observations, however, may suggest that the recently managed areas of Cheval Bottom were likely not to be favoured by the females of this maternity group, despite the proximity to their roosting area.

Furthermore, I would worry that further thinning and management in the southern section of Cheval Bottom may also render this area less suitable for foraging lactating Barbastelle bats, at least in the short term. Such works should be spread over a long time period to minimise the impacts in the longer term.

5. Further work

Study of Barbastelle bats in the Savernake Forest, initially coordinated by Steve Laurence (mid 1990s to 2014) and latterly coordinated by Lisa Wade & Gareth Harris (2015-present) has typically highlighted use of the southern part of the Forest by Barbastelle bats, leading to a focus upon the area around Bittern Pond & Charcoal Burners Road (where a maternity group is regularly encountered in bat boxes, facilitating a ringing study). These bats were encountered again in 2019 (both pre-maternity, and again post-maternity) enabling ringing of all adults present on each occasion and their young.

The radiotracking study in Cheval Bottom in 2019 enabled discovery of a second maternity group a few hundred metres to the east of Bittern Pond. No ringed bats were retrapped during the trapping surveys in early July which might have indicated linkage between these two maternity groups. However, given the close proximity of these groups, it seems reasonable to assume that they are related and likely exchange individuals (as part of the colony-wide fission-fusion dynamics).

Further work is therefore desirable to clarify the extent of the home ranges of bats in these colonies and to assess if home ranges between the colonies overlap.

Radiotracking studies in early-mid July will clarify the importance of foraging areas during lactation whilst extending these studies into August will highlight important foraging grounds and commuting routes beyond the Forest boundary.

Given the discovery of a new maternity group in Cheval Bottom, further work to support this group is desirable. Deployment of 1FF Schweglar “flat” bat boxes and other similar designs would provide additional roosting sites for these bats, as well as enabling monitoring by bat workers. Clearly, the Forest and its many mature and veteran trees, offers an abundance of natural roosting sites, but monitoring of these on a regular basis would be time-consuming and potential disturbing (e.g. if reliant upon tree-climbing or endoscopy of roosting features).

Consideration should be given to habitat measures to safeguard and enhance those habitats identified used by Barbastelle bats, in particular at critical times of the life cycle, such as during lactation.

6. References

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Appendix 1 – Volunteer time

The total time expended by all project personnel in the completion of this work (excluding project management time).

Numbers relate to volunteer days, i.e. the number of volunteers on each day. Each trapping survey or radiotracking period equates to one day (although is typically more).

Category	Volunteer days						Reporting	Total (by category)
	Fri 5th July	Sat 6th July	Sun 7th July	Mon 8th July	Tues 9th July			
Professional	3	3	2	2	2	1.5		13.5
Skilled	9	10	4	5	4			32
Unskilled	2	8						10
Total (by day)	14	21	6	7	6	1.5		55.5