Manor Woods Valley Local Nature Reserve and Surrounding Area

Bat Report

2022

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Manor Woods Valley Group

MANOR WOODS VALLEY GROUP

1. Introduction and Methodology

Manor Woods Valley Group member, Peter Loy-Hancocks, undertook a static bat detector-based survey of seven locations around and near to Manor Woods Valley Local Nature Reserve, plus and eighth more distant site, during the late summer of 2022. This was the first known formal surveys of bats at this location, although records from occasional ‘bat walks’ in earlier years and detailed bat surveys of nearby sites are referenced in this report.

Online records of bats in, and in the vicinity of, Manor Woods Valley were obtained from the Bristol Regional Environmental Records (BRERC), the National Biodiversity Network (NBN) and the online identification and reporting app, iNaturalist.

Bats navigate and detect the insects on which they feed by emitting ultrasonic (high frequency) sound pulses through their mouth or nose and listening to the echo. With this echo, the bat can determine the size, shape and texture of objects in its environment. Bats also emit social calls, which they use to communicate with each other rather than to navigate or detect prey items. A bat detector receives these ultrasonic calls and can either reduce them to a frequency that can be heard by the human ear or recorded them for later analysis. The current survey utilised a ‘Song Meter Mini Bat’ bat detector. The detector is set up using a configuration app on a mobile phone.

The detector was positioned in elevated positions, in six gardens that back onto Manor Woods Valley (Locations 1 to 6), directed towards the site, and another garden (Location 7) 140m west of the southwest end of the site (see Figure 1). Locations 1 and 4 overlooked a parkland setting, Locations 2 and 3 overlooked dense scrub, Locations 5 and 7 were in garden settings and Location 6 overlooked woodland canopy.

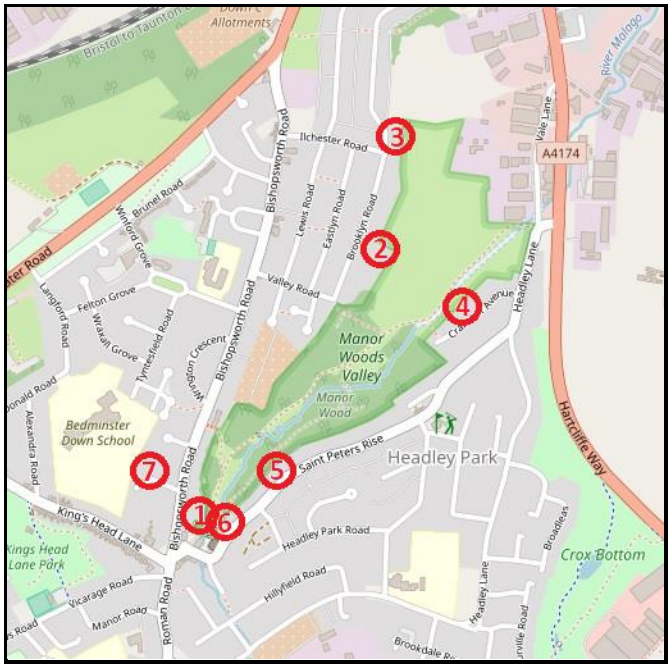

Figure 1: Bat survey locations on the edges of Manor Woods Valley

Static bat detector-based surveys also took place in an eighth garden (Location 8), situated c850m south-southwest of the site, and a ninth garden (Location 9), situated c220m west of the site (see Figure 2). The latter two sites acted as suburban garden-based controls, at some distance from Manor Woods Valley. As they are not representative of Manor Woods Valley, records from Locations 8, 9 and 10 were not used in any of the calculations contained in this report, but instead are used as a comparison and discussion point.

Location 8 was surveyed as part of the current survey and Location 9 as part of a University of the West of England student project. Location 10 represents Bedminster Down Allotment C site which was surveyed by Kelly Sheldrick in June 2022 using the same static bat detector as used in the current survey of Manor Woods Valley.

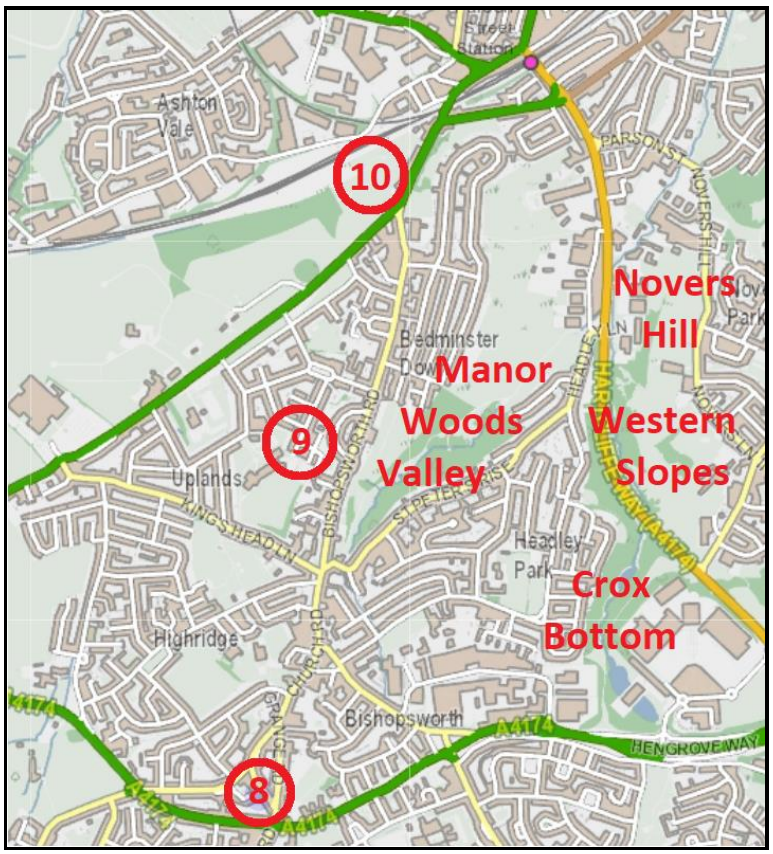

Figure 2: Map showing additional sites in relation to Manor Woods Valley

At each of Locations 1 to 8, and 10, the detector was left recording for several nights at a time. The duration of recording varied, mainly due to the memory card within the detector frequently reaching its data capacity.

The recorded files for Locations 1 to 8, and 10, were downloaded onto a laptop computer, then uploaded to the BTO Acoustic Pipeline. The latter analysed the recordings to identify bats and other nocturnal wildlife, and return the results back to the computer via a removable memory card. At the time of the survey the Pipeline could identify 34 species of European bat, and the ultrasonic sounds emitted by 14 small mammal species, 18 bush-cricket species and 2

moth species. Recordings of most of the non-bat species will be considered in other reports.

The Pipeline has its limitations, such that the results that it returns need to be manually verified. In this case professional ecologist and experienced and knowledgeable bat worker, Kelly Sheldrick, verified a sample of the recording of each species attributed by the Pipeline, for each Location. The need for manual verification was demonstrated when the Pipeline attributed several recordings to Barbastelle. These would have been very remarkable records, however on verification, none proved to be correct attributions.

The Pipeline can have problems correctly identifying calls produced by the large bats - Noctule, Leisler's Bat and Serotine - and Myotis species i.e., Daubenton's, Brandt's and Whiskered Bats.

Whilst the Pipeline can struggle with identifying some bat species from the recorded calls, even manual identification of the recordings of the three large bats, particularly in cluttered environments or during feeding can be difficult as the calls can look similar in these situations. Fortunately, the current survey produced social calls for the large bats making identification possible.

Similarly, manual identification of Myotis bats to species levels can be difficult as there is some overlap of wavelengths and calls can therefore look similar, particularly those of Whiskered and Brandt's Bats. Daubenton's and Natterer's Bats are a little easier to identify as long as one has good, clear calls, or social calls, as the latter are often species specific.

There is also an overlap in call frequency for the Nathusius' and Common Pipistrelles. It is therefore possibly more of the former were present than were confirmed by the Pipeline or manual identifications.

The data collected by the bat detector also gives a measure of relative abundance of different bat species and their use of the location. The number of 'records', however, does not represent a direct count of bats as, for example, a bat flying around in circles whilst foraging in front of the detector would contribute a high number of records compared with a bat flying across the detector's 'field of view' whilst commuting between two points. The large number of records in some Locations did, however, probably 'level out' some these effects and allow further analysis of the data.

The Pipeline gives an indication of the level of certainty (probability) of the recordings that it identifies. For the purpose of this report, only recordings, of verified species relating to Locations 1 to 8, with a probability of more than 50%, have been included in the count of recordings.

During 2019 an environmental consultancy company, AECOM, conducted a detailed bat survey, including surveys of buildings and trees, as well as activity surveys, of the Western Slopes site. This site is situated only 100m, at its closest point, to the to the east of Manor Woods Valley. Hartcliffe Way arterial road separates the two sites.

Environmental planning consultants Ethos conducted detailed bat surveys of the Novers Hill proposed development site during 2020. This site is to the north of, and adjoining the Western Slopes site. It too is c100m from Manor Woods Valley.

Results from the two aforementioned surveys were used to draw comparisons with Manor Woods Valley and help place this site in to a wider context.

Observations gathered during evening ‘bat walks’ on the Northern Slopes in August 2013, the Western Slopes in September 2021 and Crox Bottom in October 2022 are referenced in this report. The walks involve the use of handheld bat detectors, that sometimes don’t record the fleeting observations and take place over very limited evening periods. They therefore don’t constitute detailed surveys, but instead are aimed at establishing if bats use a site and of engaging members of the public with bats in their neighbourhood.

2. Results

Pre-existing information

In 1999 an Avon Bat Group led ‘bat walk' revealed that ‘Pipistrelles’, Noctules and, over the pond which existed at that time, Daubenton's Bats, were using the site. A bat walk in August 2007 recorded the same range of species.

The BRERC Online Recording data set does not contain any records of bats having been reported in, or in the immediate vicinity of, Manor Woods Valley.

The NBN contains three records of bats in Manor Woods Valley. A Common Pipistrelle was reported in 1999. This record possibly this refers to the aforementioned Avon Bat Group walk of this year. As Common and Soprano Pipistrelles were only described as different species in 1999, the precise species identification within this record is suspect. These two Pipistrelle species were however both recorded in Manor Woods Valley in 2009.

iNaturalist, contains a record of a dead bat found near Valley Heights steps, in Manor Woods Valley in 2020. This was a small bat of undetermined species.

The 2019 detailed survey work associated with the Western Slopes revealed no evidence of roosting bats. Lesser Horseshoe Bats recordings comprised 0.2% of the static detector returns. Myotis species comprised 0.47% of the static detector returns. Serotine comprised 1.73% of the returns, Leisler’s Bat 0.04% and Noctule 5.3%. Foraging and commuting Common Pipistrelle were recorded throughout the site, comprising 91.49% of the static detector returns. Soprano Pipistrelle activity levels were low, comprising 0.51% of the static detector surveys. Long-eared Bat species comprised 0.16% of the static detector surveys. It is presumed that the identifications are all correct.

The bat walk on the Western Slopes, conducted in September 2021, recorded Common Pipistrelles foraging over the field and Serotines commuting overhead.

The detailed bat surveys of the Novers Hill, conducted in 2020, revealed that the proportion of static bat detector records comprised Lesser and Greater Horseshoe Bats were 1.0% and 0.1% respectively, Daubenton's, Brandt's and Natterer's Bats, 0.1%, 0.2% and <0.1% respectively, Serotine 2.0%, Leisler's Bat 3.9%, Noctule 9.9%, Common, Soprano and Nathusius' Pipistrelles 80.2%, 0.3% and 2.3% respectively, and Brown Long-eared Bat 0.1%. Again, the veracity of the records is presumed.

The veracity of the results for Location 9, which was surveyed between 7th and 14th August 2022, could not be established; however, the percentage occurrence of 'calls' was calculated from the claimed identifications. These records comprised Serotine 0.3%, Myotis species 1.2%, Leisler's Bat 3.3%, Common Pipistrelle 94.7% and Soprano Pipistrelle 0.5%.

The bat walk conducted on the Northern Slopes in August 2013 detected Common and Soprano Pipistrelles, and possibly Greater Horseshoe Bat. A possible Barbastelle is likely to be an erroneous attribution.

The Crox bottom bat walk of October 2022 recorded Daubenton's Bat, unidentified Myotis sp., Leisler's Bat, Noctule, Common Pipistrelle and Soprano Pipistrelle Bat, including social calls of the latter species.

Bedminster Down Allotment Site C (Location 10) yielded recordings of Greater Horseshoe and Lesser Horseshoe Bat, Serotine, Leisler's Bat, Noctule, Common and Soprano Pipistrelle, and potentially, Nathusius' Pipistrelle too.

Current Survey

Following verification, the following bat species were confirmed or potentially present (with the number of 50%+ probability records) in Manor Woods Valley and nearby. The survey durations at each location and dates of the surveys are also noted.

Location 1(see Photo 1): Ten species; Lesser Horseshoe Bat (3), Daubenton's Bat (25), Serotine (654), Leisler's Bat (29), Noctule (18), Common Pipistrelle (1906), Soprano Pipistrelle (43) and Brown Long-eared Bat (33) confirmed, with likely Brandt's Bat or Whiskered Bat (42), and potentially Natterer's Bat (10). Survey periods, 1 full night, 15th-16th July; 1 evening, 23rd July and 5 full nights, 13th-17th September 2022.

Photo 1: View towards Location 1

Location 2 (see Photo 2): Seven species; Lesser Horseshoe Bat (1), Leisler's Bat (7), Myotis sp. (5), Serotine (2), Noctule (10), Common Pipistrelle (564) and Soprano Pipistrelle (4). Survey period, 3 full nights, 28th-31st July 2022.

Photo 2: Location 2

Location 3 (see Photo 3): Four species; Noctule (11), Common Pipistrelle (164) and Soprano Pipistrelle (7) confirmed, and likely Leisler's Bat (1). Survey period, 2 full nights, 2nd-4th September 2022.

Photo 3: Location 3

Location 4 (see Photo 4): Eight species; Serotine (3), Leisler's (3), Noctule (3), Common Pipistrelle (931), Soprano Pipistrelle (23) and Brown Long-eared Bat

(1) confirmed, with likely Whiskered Bat or Brandt's Bat (16), and potentially Daubenton's Bat (1). Survey period, 2½ nights, 3rd-6th August 2022.

Photo 4: View from Location 4

Location 5 (see Photo 5): Nine species; Lesser Horseshoe Bat (1), Leisler's Bat (28), Serotine (17), Noctule (42), Common Pipistrelle (608), Soprano Pipistrelle (68) and Brown Long-eared Bat (11) confirmed, with potential Daubenton's Bat (1) and other Myotis sp. Survey period, 7 nights, 23rd-30th August 2022.

Location 6 (see Photo 6): Nine species; Lesser Horseshoe Bat (1), Daubenton's Bat (1), other Myotis species (12), Serotine (13), Leisler's Bat (42), Noctule (19), Common Pipistrelle (2517), Soprano Pipistrelle (152) and Brown Long-eared Bat (2) confirmed. The Noctule calls included some social calls. In many of the calls there were multiple species of bats present at the same time, indicating that there is good commuting or foraging ground nearby. Survey period, 2½ nights, 15th-17th August 2022.

Photo 5: Location 5

Photo 6: Location 6

Location 7: Nine species; Greater Horseshoe bat (2), Daubenton's Bat (102), other Myotis sp. (maybe Whiskered Bat or a Brandt's Bat) (373), Serotine (1), Leisler's Bat (1), Noctule (11), Common Pipistrelle (631), Soprano Pipistrelle (28) and Nathusius' Pipistrelle (2). Survey period, 3 full nights, 24th to 27th September 2022.

In locations 1 to 7, there were 8936 recordings of 50% or greater probability of correct identification (as determined by BTO Acoustic Pipeline), attributed to verified species present (see Table 1).

Location	1	2	3	4	5	6	7	Total	Total sites
Survey Duration (nights)	5	3	2	2.5	7	2.5	3	25	7
Greater Horseshoe Bat	0	0	0	0	0	0	2	2	1
Lesser Horseshoe Bat	3	1	0	0	1	1	0	6	4
Daubenton's Bat	25	0	0	1	1	1	102	130	5
Brandt's/Whiskered Bat	42	5	0	16	0	12	373	448	5
Natterer's Bat	10	0	0	0	0	0	0	10	1
Serotine	354	2	0	3	17	13	1	390	6
Leisler's Bat	69	7	1	3	28	42	1	151	7
Noctule	18	10	11	3	42	19	1	104	7
Common Pipistrelle	1906	564	164	931	608	2517	631	7321	7
Soprano Pipistrelle	43	4	7	23	68	152	28	325	7
Nathusius' Pipistrelle	0	0	0	0	0	0	2	2	1
Brown Long-eared Bat	33	0	0	1	11	2	0	47	4
Total bat recordings	2503	593	183	981	776	2759	1141	8936	
Total bat species	10	7	4	8	9	9	9	12	

Table 1: Number of recordings, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), attributed to verified species present at each site

Location 8: Five species; Daubenton's Bat (1), Leisler's Bat (16), Noctule (14), Common Pipistrelle (157) and Soprano Pipistrelle (4) (see Table 2). Survey period, one evening, 12th September and 1½ nights, 30th September to 1st October. This date is compared with, but not included in any of the following calculations relating to Manor Woods Valley.

Survey Duration (nights)	2.5
Common Pipistrelle	157
Daubenton's Bat	3
Leisler's Bat	16
Noctule	14
Soprano Pipistrelle	4
Total	194

Table 2: Number of recordings, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), attributed to verified species present at Location 8

3. Analysis and Discussion

Manor Woods Valley

The UK has 17 species of breeding bats; two of which, namely Alcathoe Bat and Grey Long-eared Bat, have not been recorded in the Bristol area. Of the remaining species, 12, with a possible 13th, were detected in or near Manor Woods Valley during the current survey. Bechstein's and Barbastelle Bats, that occur rarely in the local area, were not recorded during the current survey.

The various proportions of different species recorded are striking. Common Pipistrelles make up 82% of all the bat recordings (see Figure 3).

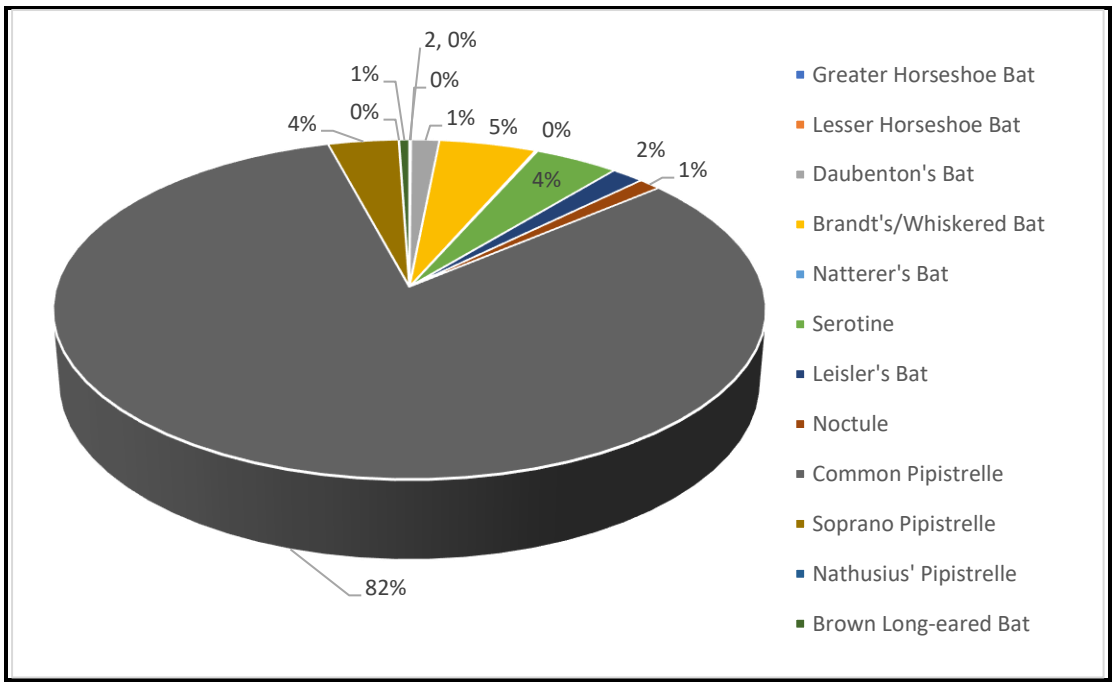

Figure 3: Proportion of bat recordings attributed to specific species (0% = <1%)

Re-working the number of recordings (see Table 1) to factor in the duration of the recording period, produces a relative abundance of recordings per night across the seven Manor Woods Valley related sites (see Table 3).

ENGLISH NAME	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
Survey nights	5	3	2	2.5	7	2.5	3
Greater Horseshoe Bat	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Lesser Horseshoe Bat	0.6	0.3	0.0	0.0	0.1	0.4	0.0
Daubenton's Bat	5.0	0.0	0.0	0.4	0.1	0.4	34.0
Brandt's/Whiskered Bat	8.4	1.7	0.0	6.4	0.0	4.8	124.3
Natterer's Bat	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Serotine	70.8	0.7	0.0	1.2	2.4	5.2	0.3
Leisler's Bat	13.8	2.3	0.5	1.2	4.0	16.8	0.3
Noctule	3.6	3.3	5.5	1.2	6.0	7.6	0.3
Common Pipistrelle	381.2	188.0	82.0	372.4	86.9	1006.8	210.3
Soprano Pipistrelle	8.6	1.3	3.5	9.2	9.7	60.8	9.3
Nathusius' Pipistrelle	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Brown Long-eared Bat	6.6	0.0	0.0	0.4	1.6	0.8	0.0
Total	500.6	197.7	91.5	392.4	110.9	1103.6	380.3

Table 3: Average number of recordings per night, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), attributed to verified species present at each site

Of these per-night records, 40% are attributable to site 6 (see Figure 4)

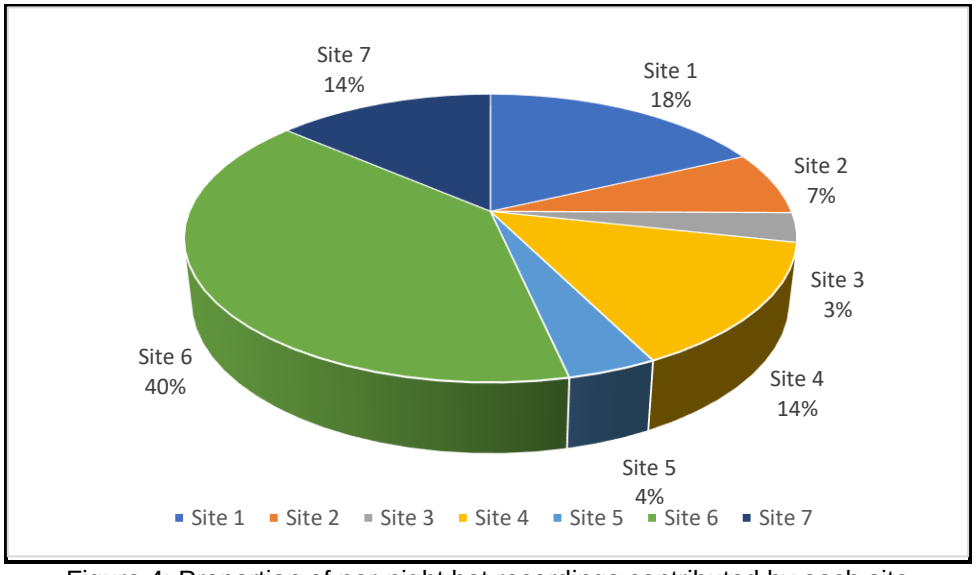

Figure 4: Proportion of per-night bat recordings contributed by each site

Locations 1 and 4 overlooked a parkland setting, locations 2 and 3 overlooked dense scrub, locations 5 and 7 were in garden settings and location 6 overlooked woodland canopy. Comparing the bats/per night recordings across habitat types reveals that woodland appeared to be twice as attractive to bats as parkland, which in turn was twice as attractive as gardens. Scrub was the least attractive habitat (see Table 4). This could be related to the 'complexity' of the different habitats; the more complex i.e., varied, the habitat, the more attractive it is to bats, or rather the invertebrates on which they feed. Scrub should be attractive to invertebrates and hence bats, however the nature of this

habitat at Locations 2 and 3 was dense and relatively homogeneous (of the same kind), therefore cover for bats was limited and perhaps the range of invertebrates was limited. It should also be noted that Location 3, which had the lowest recorded usage by bats, was in a relatively exposed position overlooking a large expanse of dense scrub at the northern end of Manor Woods Valley.

Site	Habitat	Bat recordings/ night	Average
Site 6	Wood	1103.6	1103.6
Site 1	Park	500.6	446.5
Site 4	Park	392.4	
Site 5	Garden	110.9	246.3
Site 7	Garden	381.6	
Site 2	Scrub	197.7	144.6
Site 3	Scrub	91.5	

Table 4: Average number of recordings per night, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), attributed to habitat types.

The large number of recordings from some Locations allowed the timings of bat activity to be analysed.

During its first survey occasion in mid-July, Location 1 had a very large number and proportion of Serotine records (there were very few on the second survey date on mid-September). These records were strongly associated with the hour before dawn (see Figure 5). This may be dawn swarming activity. This is observed in many bat species, including Serotines (Ref: Daniel Hargreaves – see https://www.youtube.com/watch?v=hqVeOPmeEFo), before they re-enter their roosts. It is suggested that this behaviour plays a role in transferring information about the roost position. In a study of a Leisler's Bat maternity roost, swarming activity occurred for more than two hours prior to sunrise, with individual flybys in front of the roost entrance predominating, followed by landings and leaps, which preceded the final entering of the roost (Ref: Dawn Swarming in Tree-Dwelling Bats — An Unexplored Behaviour, December 2013, Acta Chiropterologica 15(2))

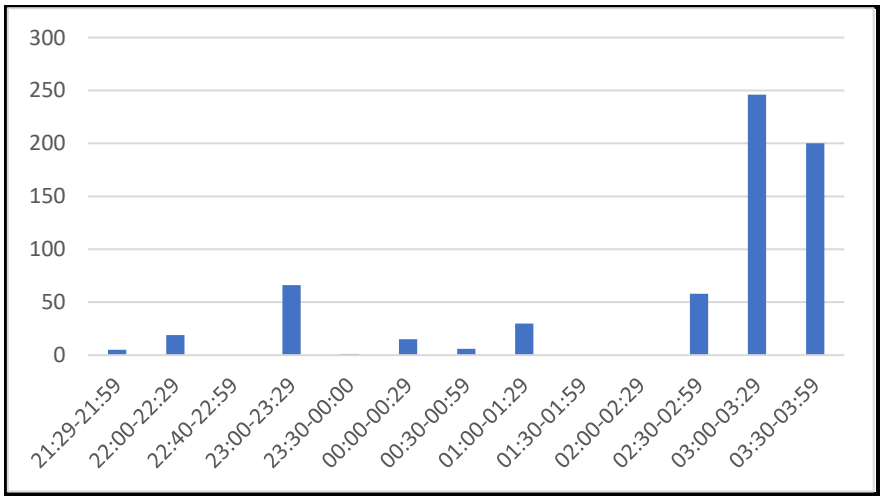

Figure 5: Number of Serotine recordings per night, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), occurring during 30-minute windows at Location 1

Location 1 also had a high number of Common Pipistrelle recordings, so again the temporal (time based) distribution of bat activity could be tested. The large number of recordings on both survey occasions allowed for a comparison between the dates. Analysing the 801 records of higher than 50% probability of correct identification recordings made in mid-July, showed that there appeared to be a peak activity for the two hours after dusk, with lower activity during the night, before a rise towards dawn (see Figure 6). This might indicate the presence of a maternity roost, where young of the year are born, very nearby. Young bats first fly at about three weeks old, so this activity could be associated with young bats honing their flying skills in the vicinity of the roosts whilst their mothers are away foraging.

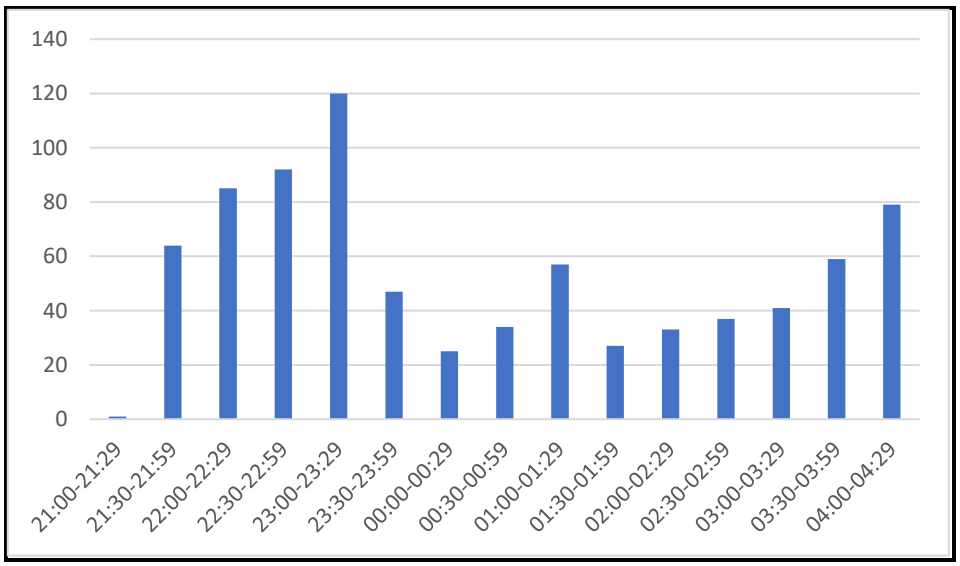

Figure 6: Number of Common Pipistrelle recordings per night, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), occurring during 30-minute windows in mid-July at Location 1

The mid-September pattern of activity for 1115 Common Pipistrelles recordings at Location 1 was similar to the mid-July pattern, but had a more pronounced peak of activity in the three-hour period after dusk and in the half hour before dawn (see Figure 7). This may again be associated with a nearby roost. Maternity colonies often disperse by September. The observed activity may therefore by due to juveniles from a maternity roost that haven't dispersed yet, or perhaps indicate the presence of a mating roost in the vicinity.

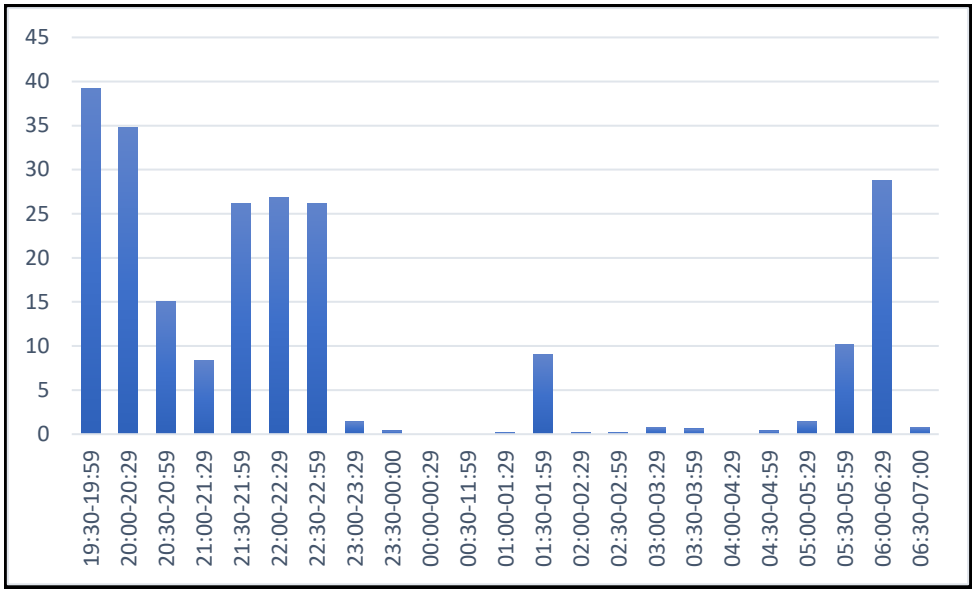

Figure 7: Number of Common Pipistrelle recordings per night, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), occurring during 30-minute windows in mid-September at Location 1

In this case the prolonged activity in the evening could be due to young bats practicing their new-found flying ability near to the roost site. In this case the peak of activity at dawn would be due to adult female bats returning to the roost.

There were also a very high number (over 1000) of Common Pipistrelle recordings per night at Location 6. This is only c50m from, and directly opposite, Location 1, across the extreme southwest end of Manor Woods Valley. The activity pattern however was very different from that at Location 1, with a distinct peak of activity in the middle of the night (see Figure 8). This would tend to indicate that the bats were not leaving or entering a roost, but rather were commuting to Location 6 as a favoured foraging area. Common Pipistrelles, tend not to travel too far to their foraging grounds (perhaps a couple of kilometres), so the bats using Location 6 are likely roosting nearby – perhaps nearer to Location 1?

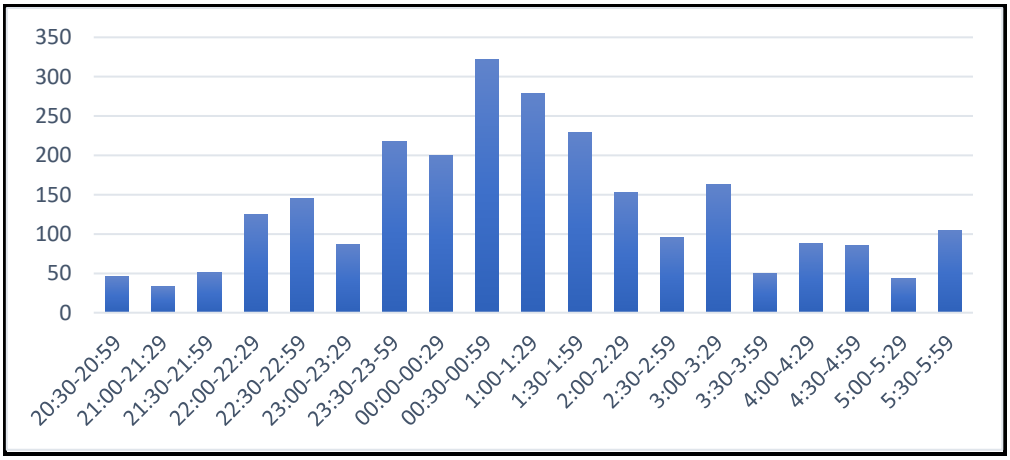

Figure 8: Total number of Common Pipistrelle recordings, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), occurring during 30-minute windows at Location 6

Location 4 was at the northern end of Manor Woods Valley, situated adjacent to relatively open parkland with scattered amenity trees. There were enough Common Pipistrelle recordings to analyse the usage of the site throughout a single night (see Table 9). The usage pattern is similar to that at Location 6, which again would tend to indicate that there is no roost in the immediate vicinity, but that this is a favoured foraging area in the middle of the night.

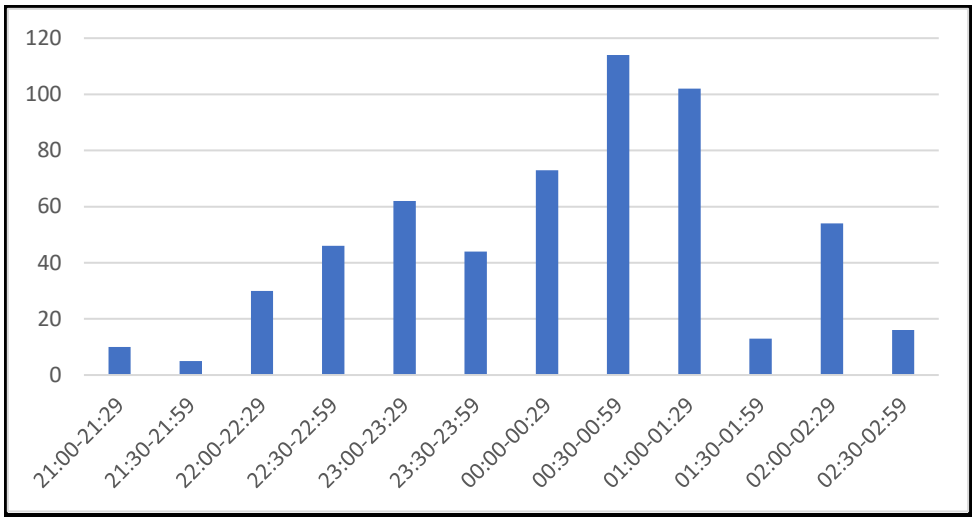

Figure 9: Total number of Common Pipistrelle recordings, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), occurring during one-night, at 30-minute windows at Location 4

The slightly off-site garden, Location 7, had a remarkable concentration of Common Pipistrelle recordings in the three hours after dusk during its later September survey period (see Table 10). This could represent activity associated with a mating roost in the very nearby vicinity.

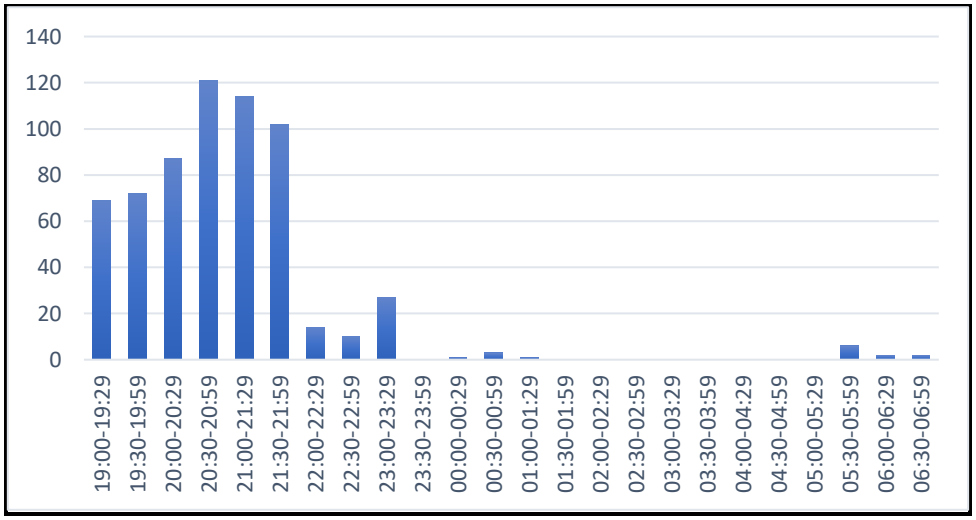

Figure 10: Total number of Common Pipistrelle recordings, of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline), at 30-minute windows at Location 7

Comparisons with other local sites

The surveys conducted on Novers Hill and the Western Slopes, in 2019 and 2020 respectively, used comparable static bat detector techniques to that employed in Manor Woods Valley during the current survey. It is therefore possible to compare the results, in particular the proportion (% of recordings) of species to each other (see Table 5). A static bat detector was also used at Bedminster Down Allotments, but only presence of absence information has been established in this case.

	Manor Woods Valley	Novers Hill 2019	Western Slopes 2020	Bedminster Down Allotments 2022
Greater Horseshoe Bat	0.02	0.12	0.20	Y
Lesser Horseshoe Bat	0.05	0.97	0.00	Y
Myotis sp. bats	6.57	0.33	0.47	
Serotine	2.90	1.98	1.37	Y
Leisler's Bat	1.40	3.89	0.04	Y
Noctule	0.99	9.86	5.30	Y
Common Pipistrelle	83.82	80.21	91.49	Y
Soprano Pipistrelle	3.69	0.31	0.51	Y
Nathusius' Pipistrelle	0.02	2.25	0.00	(Y)
Brown Long-eared Bat	0.34	0.08	0.16	

Table 5: Comparison of relative abundance (%) of bat recordings (of 50%+ probability of correct identification (as determined by BTO Acoustic Pipeline) in the case of Manor Woods Valley) and presence only at Bedminster Down Allotments

Of the confirmed species present, Lesser Horseshoe Bats and Nathusius' Pipistrelle were not recorded on the Western Slopes compared with the other three sites, and Myotis species bats and Brown Long-eared Bat were not recorded at Bedminster Down Allotments.

It's clear from these results that Common Pipistrelle recordings predominate in Manor Woods Valley, Novers Hill and the Western Slopes., with all proportion results being of a similar order of magnitude. The Western Slopes is the most 'open' site which might account for the slightly higher proportion of this species there.

Soprano Pipistrelles associated with wetland habitats, therefore their relative abundance, by a factor of about ten, in Manor Woods Valley, through which the Malago passes, compared with the two nearby 'dry' sites is to be expected. There is a suggestion from the data that Daubenton's Bats, which are also usually associated with water, were significantly more common in Manor Woods Valley; however, this species is difficult to distinguish from the other Myotis bats on the basis of their sonograms.

Brandt's, Whiskered and Natterer's Bats (all Myotis species), and Brown Long-eared Bats, tend to favour woodlands. Again, their higher level of occurrence in

Manor Woods Valley is likely to be associated with the presence of this habitat. Long-eared Bats usually don't commute far to their foraging grounds (up to 2-3km), spending most of their time within 500m of their roost (Ref: 'Bats of Britain & Europe', Christian Dietz & Andreas Keeper). One Brown Long-eared Bat recording is thought to be a mating social call. As it was recorded during the mating season, this could indicate that there is a mating roost in Manor Woods Valley. The absence of these 'woodland species' from Bedminster Down Allotments probably reflects the relatively exposed nature of this site.

The presence of Horseshoe Bats on all four sites is notable. Both Horseshoe species are mainly restricted to Southwest England and to Wales. In England there are as few as 20,000 and 10,000 individuals of Lesser and Great Horseshoes respectively (compared with 1.9 million and 3 million respectively of Common and Soprano Pipistrelles). Both Horseshoe Bat species generally avoid flying in open or well-lit areas, however they must cross well-lit roads to reach all of these sites. The higher proportions on Novers Hill and the Western Slopes maybe associated with more extensive dark areas on these sites and/or the presence of horse grazed pastures. The latter are likely to encourage dung beetles, on which Greater Horseshoe Bats in particular feed, but which are also consumed by Serotine and Leisler's Bats.

During the current survey, Nathusius' Pipistrelles were recorded twice, from site 7 only. This is a garden 150m from southwest end of Manor Woods Valley. This species was also recorded from Novers Hill in 2019 and possibly from Bedminster Down Allotments in 2022. At Novers Hill this species made up a significant proportion of the 'other' species, other than Common Pipistrelle that is. Nathusius' Pipistrelles appear to be relatively rare with a scattered distribution in the UK, but it is likely that they are actually under-recorded. National bat surveys indicate that there appears to be a discrete sub-population in North Somerset and the Greater Bristol area. The bats recorded near Manor Woods Valley and on Novers Hill are no doubt part of this group.

Some Nathusius' Pipistrelles are migratory (although there are resident individuals too). The record obtained during the current survey could be those of a migrating individual or a resident. This species is often associated with wetland areas, which could account for the presence in the vicinity of Manor Woods Valley during the autumn migration period.

Two, more distant suburb-setting garden sites, Locations 8 and 9, situated 850m and 220m respectively from Manor Woods Valley form interesting comparison sites with the latter and other two large sites (see Table 6).

	Location 8	Location 9
Daubenton's Bat/Myotis sp.	2	1
Serotine	0	1
Leisler's Bat	8	3
Noctule	7	0
Common Pipistrelle	81	94
Soprano Pipistrelle	2	1

Table 6: % occurrence of bat recordings at 'off-site' Locations 8 & 9

Common Pipistrelles recordings predominate at both sites, at similar levels to Manor Woods Valley, the Western Slopes and Novers Hill. The results from Location 8 & 9 contrast with the latter three sites in their relative paucity of bat species. The presence of Leisler's Bat in the outlying garden sites is notable. Social calls of this species were recorded. This call is thought to relate to bats in flight over a foraging area, when at least two bats are in the same air space. The calls are also associated with mating behaviour, which considering when they were recorded, could indicate a mating roost nearby. There is known to be a Leisler's Bat roost in Bristol, so we do tend to get more than other counties, however nationally they are less frequently recorded.

4. Conclusions

The current survey has demonstrated, for the first time, that Manor Woods Valley and its immediate environs are an important area for bats. All of the bat species, except two very rare ones (Barbastelle and Bechstein's Bat), that occur in the Bristol area, were recorded in or very near to, Manor Woods Valley (see Table 7).

UK Bat Species	**Recorded in or in environs of MWV**	Occur in Bristol Region	Habitats Directive Annex II species	UK Red List Species	UK BAP Species	Bristol LBAP Species
Greater Horseshoe Bat	**Y**	Y	Y		Y	Y
Lesser Horseshoe Bat	**Y**	Y	Y		Y	Y
Barbastelle		Y	Y	Y	Y	Y
Bechstein's Bat		Y	Y		Y	Y
Daubenton's Bat	**Y**	Y				
Brandt's/Whiskered Bat	**Y**	Y		Y		
Alcathoe Bat				Y		
Natterer's Bat	**Y**	Y				
Serotine	**Y**	Y		Y		
Leisler's Bat	**Y**	Y		Y		Y
Noctule	**Y**	Y			Y	Y
Common Pipistrelle	**Y**	Y				
Soprano Pipistrelle	**Y**	Y			Y	Y
Nathusius' Pipistrelle	**Y**	Y		Y		
Brown Long-eared Bat	**Y**	Y			Y	Y
Grey Long-eared Bat				Y		

Table 7: Occurrence of bat species in or near Manor Woods Valley compared with the Bristol region, and the legislative and conservation status of bat species

In Britain all bats and their roosts are legally protected by both domestic and international legislation. This means it is an offence to deliberately take, injure or kill a wild bat; intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats; damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time); possess or advertise/sell/exchange a bat of a species found in the wild

in the EU (dead or alive) or any part of a bat; or intentionally or recklessly obstruct access to a bat roost.

Greater and Lesser Horseshoe Bats are Habitats Directive Annex II species. Core areas of habitat for Annex II species must be protected and the sites managed in accordance with the ecological requirements of the species. Both Horseshoe species have been shown to occur in Manor Woods Valley and Novers Hill, and Greater Horseshoe Bats only on the Western Slopes.

Five UK Biodiversity Action Plan (BAP) bat species, namely Greater and Lesser Horseshoe Bats, Noctule, Soprano Pipistrelle and Brown Long-eared Bat occur in Manor Woods Valley and the nearby sites. In addition to the aforementioned species, Leisler's Bat, which occurs in all of the sites mentioned, including the outlying gardens, is included in the Bristol Local BAP (LBAP).

Serotines are listed as vulnerable on England's red list for mammals, along with Nathusius' Pipistrelle bat and Leisler's Bat as near threatened (see https://www.mammal.org.uk/wp-content/uploads/2020/07/MS_RL20_England.pdf)

The confirmed presence of the relatively rarely identified Nathusius' Pipistrelle in close proximity to Manor Woods Valley is notable. As there are both migratory and sedentary individuals, further survey work in the area, carried out at different times during the activity season might determine the nature of use of the site by Nathusius' Pipistrelles, and other species.

The similarity of bat species composition between Manor Woods Valley, the Western Slopes and Novers Hill, no doubt indicates an association of populations, with bats moving between the sites. The Western Slopes were recently threatened with housing development, but have since been reprieved, Novers Hill is currently subject to a planning application for development. The current survey work suggests that the three aforementioned greenfield sites should be considered as a single entity in so far as the local bat populations, with their high mobility, are concerned. The loss of one of the sites is therefore likely to adversely impact the bats associated with the remaining sites.

The relative importance of woodland and wetland habitats to bats is demonstrated by the higher proportions of bats in Manor Woods Valley that favour these habitats.

The survey data has revealed the potential presence of Serotine and Common Pipistrelle maternity roosts and a Brown Long-eared Bat mating roosts in the vicinity of the southwest end of Manor Woods Valley. Identifying the locations of these roosts would help to ensure their survival.

There are some obvious gaps in the South Bristol detailed bat data, that is for Bedminster Down (open-space portion), Crox Bottom and the Northern Slopes (see Figure 11).

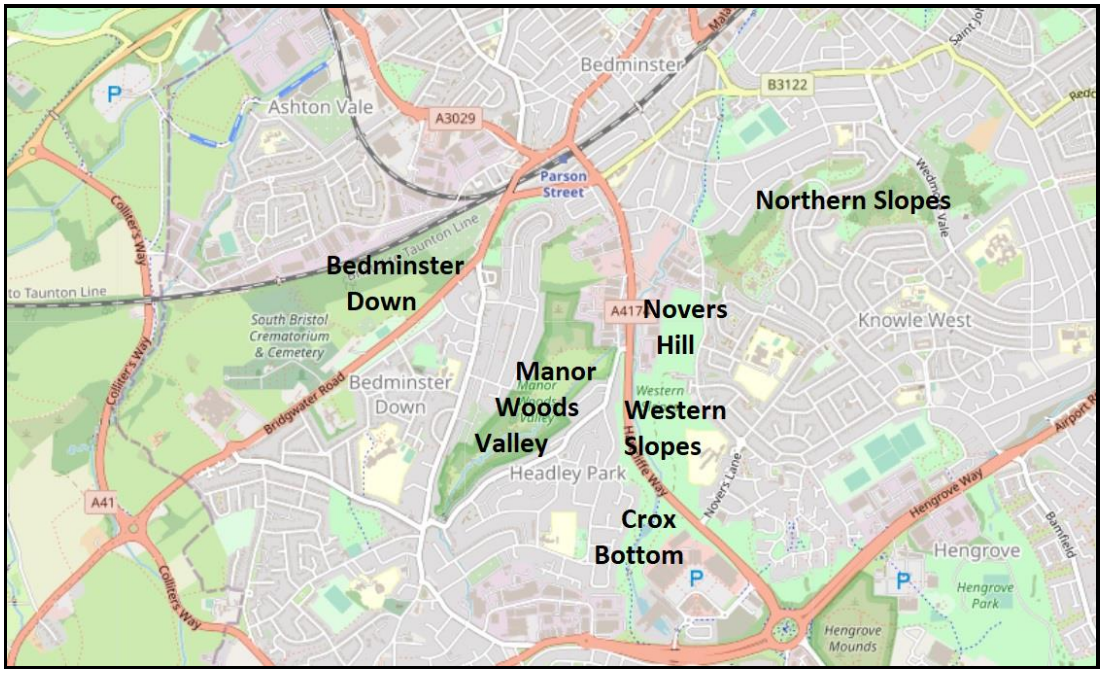

Figure 11: Local sites in relation to each other

In addition to the allotment site at its north-eastern end, Bedminster Down is an area of amenity grassland and trees, rough grassland, scrub and woodland. It is contiguous with farmland to the west and therefore very likely forms an important ecological corridor between suburban Bristol and the countryside to the southwest, and maybe even further afield than Bristol if migratory Nathusius' Pipistrelles are present.

With its woodland areas and Pigeonhouse Stream that is similar to the Malago, Crox Bottom is considered to be a 'sister site' to Manor Woods Valley. It is very likely to be equally as important to bats as Manor Woods Valley, the Western Slopes and Novers Hill. The site may form a commuting route to and from the greenspaces to the south of Bristol.

Northern Slopes is a Local Nature Reserve consisting of three distinct sections. It is situated to the northeast of the Novers Hill site. It has a similar range of habitats to the latter site and the Western Slopes. It is therefore likely to host a similar range of bat species to all of the local sites that have been surveyed in detail.

Based on the locations and natures of the local greenspaces that have been surveyed, and the known bat species assemblages at all four of them, one can conjecture where there might be bat commuting routes between them (see Figure 12). Conducting bat activity surveys along these conjectured routes would be an interesting and valuable exercise.

It is important to maintain or increasing these connections between sites. The loss of any one of these routes, or sites which themselves act as commuting routes, for example Novers Hill, which is under immediate threat of

development, could impact on the bat population using any or all of the remaining sites.

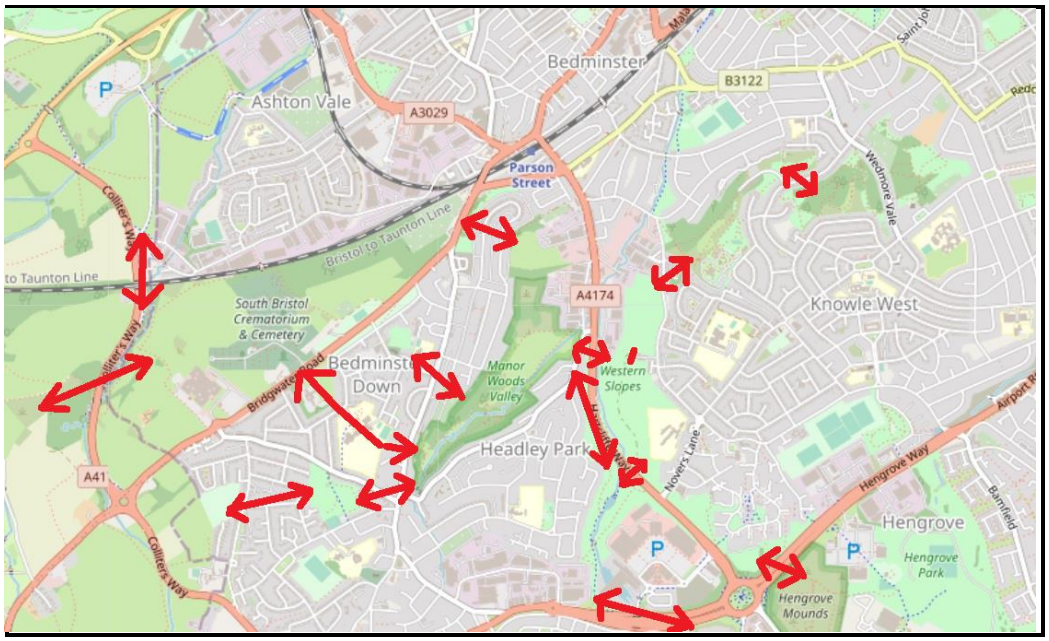

Figure 12: Conjectured bat commuting routes between sites

None of the aforementioned sites are managed specifically for bats. It could be advantageous to review the management of these sites in this respect. For highly mobile species such as bats (and insects and birds), neighbouring and nearby gardens are also important habitat. If these gardens were managed with bats, and other wildlife, in mind, especially those in the immediate vicinity of the sites, they would effectively increase the size of the latter and/or improve the ecological connectivity between them.

There is much guidance available to landowners and home-owners with regards to bats, their needs and how to improve areas for them. For landowners there is a JNCC publication 'Habitat management for bats A guide for land managers, land owners and their advisors' - https://data.jncc.gov.uk/data/23745574-3756-40ef-81cd-e6fea30decc0/habitat-management-for-bats.pdf and Bat Conservation Trust (BCT) guidelines at https://www.bats.org.uk/our-work/landscapes-for-bats

For householders interested in increasing the value of their gardens for bats there's 'Stars of the Night' which is produced by a collaboration of the BCT, The Wildlife Trusts and the RHS, as part of their Wild About Gardens initiative. The very informative, colourful and readable leaflet is at https://cdn.bats.org.uk/uploads/pdf/Resources/Stars_of_the_Night.pdf?

It is hoped that this survey and report will encourage additional bat survey work in South Bristol, and also encourage people to consider bats when they are gardening or join locally bat walks when they see them advertised.

5. Acknowledgments

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Bat expert and professional ecologist, Kelly Sheldrick, manages the bat detector used in the current survey and kindly lent it to the Manor Woods Valley Group for much of the summer survey season. Kelly gave guidance on its use and spent many hours verifying records. The Bedminster Down Allotments data referenced in this report is used courtesy of Kelly. Kelly kindly cast a critical eye over early drafts of this report, making constructive comments and edits. Thank you, Kelly.