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# **Lesser Horseshoe Roost Monitoring**

## **Northern Quarter**

## **Cinderford**

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2019

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## 1 Introduction

- 1.1 AEWCLtd. was commissioned by the Forest of Dean Council to conduct monthly monitoring surveys of all buildings present at the Northern Quarter site from January 2018 to through to December 2018.
- 1.2 These surveys are a continuation of monthly surveys conducted at the site by AEWCLtd. from July 2013 and by other consultancies prior to this.
- 1.3 This report provides the results of the surveys conducted to date at the site by AEWCLtd since January 2018 to December 2018. The results of this monitoring are intended to be used to inform for any proposed development of the site and to be used with licence applications for this site.

## 2 Method

- 2.1 There are 5 existing historical structures that are surveyed each month by licenced ecologists, the bath house, canteen building, office building, woodland shed and artificial roost. The same survey methodology has been used by AEWCLtd surveys since July 2013 to ensure consistency of data gathered.
- 2.2 Surveys are conducted once each month with all buildings surveyed on the same day to ensure accuracy of surveys and no bats move between buildings and are consequently re-counted.
- 2.3 Each month internal surveys are conducted on the bath house, canteen building, office building and woodland shed, the artificial roost is only surveyed internally during colder months from October to April due to the high levels of disturbance this would cause to the main maternity roost colony during summer months and inaccuracy of using this survey method with high numbers of active bats present.
- 2.4 During summer months from April to October emergence surveys were conducted using night vision cameras and IR illuminators to enable the visual identification of bats emerging from the building in low light and dark conditions which are otherwise impossible to count the bats present.
- 2.5 Following on from years of data collected at the bath house and office building, where repeated low counts were identified using these buildings. These two buildings were counted during daytime internal surveys, and the artificial roost was counted by emergence survey. If numbers were identified to increase in the office or bath house and an internal survey could not get an accurate count then these would also have emergence surveys conducted.
- 2.6 Since June 2017 the two new replacement roosts, Nelson and Birch Wood have also been surveyed monthly to count the number of bats present, check and monitor the building and identify any new evidence.

### 3 Results

- 3.1 During 2017 there were a number of changes at the artificial roost, repairing heaters and roost modification to create an additional access point for the larger colony and to provide an alternate access to reduce the risk to the colony from the single access available. The counts during this time were variable, some months recording the highest recorded, by a notable number, and other months lower than the previous year.
- 3.2 Trapping surveys at the roost sites in 2013 did identify that there were unusually high proportions of male bats present using the roost sites, and how the males may move between this and other sites is unknown. However, these surveys conducted in 2017 cannot identify the sex of bats present to identify if this has continued into recent years, or if the proportion of the sexes changes throughout the year.
- 3.3 The 2018 survey data provides a second year of data following these changes to identify if activity and use has remained consistent.

#### **Monthly observations**

**January 18<sup>th</sup> 2018** – The Winter hibernation counts in 2018 were noted to be lower than usual, however, the previous month had been a period of poor weather and heavy rain, as such ground water levels rose notably to where there was standing water present inside the artificial roost, the first time this had been observed. This was the lowest January count recorded.

No bats were found in the bath house, canteen, office or the woodland shed buildings.

The artificial roost had only 10 bats present, all were found in the large ground floor room.

The Nelson roost had no bats present, however the Birch wood roost had a single LHB present in the far end of the basement.

**February 12<sup>th</sup> 2018** – The Winter hibernation counts in 2018 were noted to be again low, similar to the previous year. It had again been wet and cold, more so than usual with recent snow and again there was standing water in the floor of the artificial roost. A total of 13 LHB were present in the artificial roost, 8 in the large room of which 2 were in the well.

No bats were found in the Bath house, Canteen, Office or the woodland shed buildings.

The Nelson roost had no bats present, however the Birch wood roost again had a single LHB present in the far end of the basement.

**March 9<sup>th</sup> 2018** – The weather conditions had remained cold into March, with again recent snow and generally very cold and wet conditions with some standing water still present in the ground floor of the artificial roost.

No bats were found in the Bath house, Canteen, Office or the woodland shed buildings.

The artificial roost had 22 LHB present, mostly downstairs with 10 in large room, 5 in small room and only 1 in the hot box. This was notably lower than the previous year, however this is not unsurprising given the recent continued cold weather conditions where bats are notably less likely to have come out of hibernation.

The Nelson roost had no bats present; however the Birch wood roost again had a single LHB present in the far end of the basement.

**April 13<sup>th</sup> 2017** - Numbers had increased in the artificial roost, although still lower than the previous April with still colder and wetter weather than average for the time of the year. The local area was still very wet, and some standing water was still present in the artificial roost.

The artificial roost had 147 LHB present, mostly in the large room with 128 present, 1 in a box and 2 were roosting on the wall looking less favourable. In total 3 bats were ringed. The small room had 15, two of which were in boxes.

The office had a BLEB in the main roof, and a total of 14 bats, 11 in the drying room and 3 in the rear roof.

The canteen had two LHB present, both in the toilet area.

The bath house had 5 bats present, 3 in the main cupboard and 2 in the rear (eastern) hall entrance.

The Nelson roost had no bats present; however the Birch wood roost again had a single LHB present in the far end of the basement.

**May 14<sup>th</sup> 2018** – the Artificial roost had good numbers of bats present, although down on last year likely due to the cold spring and recent cold wet weather, approximately half the bats were still in torpor. The emergence survey showed that most bats emerged from the new emergence location demonstrating that this is not only well used, but preferred.

The office had only a single bat present, with no bats in the canteen or bath house.

The Nelson artificial roost had the very first droppings identified present, with only a couple present under the central ridge, and Birchwood artificial roost had its peak count of 3 LHB.

**June 18<sup>th</sup> 2018** – The Artificial roost again had very good numbers of bats present for June. An internal survey was not conducted as there were high numbers present and bats will be pregnant,. In total 447 bats were found present, the highest recorded in June.

The office had a high number of bats present, which is a pattern of finding them in these areas during prolonged periods of good warm dry weather. A total of 48 bats were present which was last recorded in August 2016. The canteen had one natterers inside the crevices around pipework in the main roof. The bath house had 13 LHB bats present, the highest June count since 2014. Additionally a single natterers was found roosting behind paint in the large southern room, the first time a bat has been found roosting in this room.

The Birch wood roost had one active LHB present, and a number of fresh droppings in various places and one bat in each bat box, the Nelson roost had no bats present.

**July 13<sup>th</sup> 2018** – The Artificial roost had notably lower numbers of bats present compared to the same time the previous year (409 compared to 587). However, this is likely to be weather related with high numbers present in the bath house and Office. The number of adults was only 281 the lowest number of adults ever recorded in July using this building, however over 200 were present in other buildings.

The office had a notably high number of bats present, this has been a pattern of finding increased numbers during periods of prolonged hot and dry weather, and with the exceptionally warm good weather over the previous month there was a record count present in the office of 101 LHB. This was the highest recorded (By AEWC) since surveys started the previous high was 51 in June 2014.

The bath house additionally had a high number of bats present, with a peak count of 112. 66LHB were present in the main cupboard and 41 in the east small cupboard. One natterers bat was present in the large south room under peeling paint. This was also the highest number recorded in the Bath house since we started surveys, the previous high was 32 in July 2014.

The very high temperatures mean that the artificial heat in the artificial roost does not make a difference to the roost temperatures in buildings across the site which are exposed to the sun throughout the day.

The Birch wood roost had one active LHB present, and a notable number of fresh droppings at locations throughout the building, with obvious evidence that bats had been roosting in areas, including along timbers attached to the ceiling. However, this was all indicative of night roosting behaviour and no bats were present using any of these roosts during the survey. One single LHB was present in the loft area.

The Nelson roost had a small increase in the number of droppings present, this was the first time this building has been seen to appear completely dry and the first LHB was found roosting within the loft area.

**16<sup>th</sup> August 2018** – Birch wood – 3 common pips were identified present in the southern bat box, none in the eastern one. The rear room had one LHB present, a juvenile in a roost box. There was additionally another in a roost box in the main building, and two active LHB upstairs.

Nelson – the first record of a Pipistrelle was in the east bat box. One single LHB was present in the loft area and notably increased numbers of droppings.

The artificial roost had a lower than normal count this month, possibly a result of bats breeding early and dispersing early this year, which has been observed before (2014) August had become reasonably cold, especially after the notably hot July.

The office and bath house had a lower number of bats compared to the previous month, likely as the heat wave had ended and we were in a period of cooler more changeable weather. There were 41 in the office and 19 in the bathhouse. Almost exactly the same, as the same time the previous year.

The Bechstein's was not found in the Bath house, although droppings (unconfirmed species) were present in the same location that this bat was always found roosting.

Juveniles were identified in all buildings, but no pups were found present as expected with the early breeding this year.

**17<sup>th</sup> September 2018** – Birch wood – 2 pips were identified present in the southern bat box, one in the eastern one. The rear room had no bats present, but a lot more fresh droppings. Inside only a single LHB was present inside a hot box.

Nelson – one pip was present in the east bat box, and a single LHB present in the hot box in the loft area.

The artificial roost had a normal count for the month of 368, slightly higher than last year, however September is a variable month. This accounted for approximately 93% of all LHB on the site.

The office has a slightly higher number of LHB for the time of the year with 24 LHB present.

The canteen had one LHB present in the store room.

The bath house had only 5 LHB present, one in the main large room, 3 in the main cupboard and 1 in the east cupboard. Additionally, the Bechstein's was present, however this was in the electrics side room, and again free hanging from the middle of the ceiling.

**15<sup>th</sup> October 2018** - Birch wood – 3 common pips were identified present in the southern bat box, none in the eastern one. No LHB were found present on this survey.

Nelson – no bats in the east bat box, a single LHB was present in the downstairs small room corner wall box.

The office had 14 bats present, mostly in the drying room with 10 in this area. The bath house had only 3 bats present, two in the main cupboard, and one in the asbestos room, the first time one has been found here. The canteen had one bat present in the electrics room.

The artificial roost still had a high number of bats present with a total of 315, and the vast majority in the large downstairs room with 244. One bat ring was identified as L3271 – an adult female that was radio tagged as part of researching the site on 17<sup>th</sup> August 2013.

### **19<sup>th</sup> November 2018**

Birch wood – only 1 LHB was identified in the basement. No other bats were present in the building or bat boxes.

Nelson –No bats identified inside the building or the bat box.

The artificial roost had again a high number of bats present with 184, these were mostly in the large ground floor room with 119 presents, but a good number were still upstairs with 53 in total, 20 in the hot box and 20 in the still warmer area behind the hot box.

The office had only a single bat present, and the canteen only one natterer present inside the hole in roof. The Bath house had three LHB, with a first one recorded in the side electrics room where a GHB had been recorded in previous years.

**14<sup>th</sup> December 2018** - With the onset of colder weather most bats had now left the site with lower numbers found in all areas.

No bats were identified in Birchwood or Nelson roost

Only a single bat was identified in the Office, in the store room, and a single bat in the Bath house, a Brown long eared.

The artificial roost had 81 bats present, mostly in the large ground floor room with 65 and the rear of the hot box with 12. While this is much higher than last winter, this is likely due to the exceptionally cold weather, snow fall, experienced last December.

- 3.4 The results of the internal counts are shown in table 1-2. Note that the Artificial roost was not internally counted on all months due to the very high number of bats present during this time, which would be very disturbing, as well as the inaccuracy of this survey method with such high numbers of active bats present. Therefore for these months there is no total. The emergence survey results are shown in table 3.



Table 1 – 2018 internal counts existing buildings

| Building         | Area              | January<br>18th | February<br>12th | March<br>9th | April<br>12th | May<br>14th | June<br>18th | July<br>13th | August<br>16th | September<br>17th | October<br>15th | November<br>19th | December<br>14th |
|------------------|-------------------|-----------------|------------------|--------------|---------------|-------------|--------------|--------------|----------------|-------------------|-----------------|------------------|------------------|
| Artificial roost | small room+stairs | 0               | 2                | 5            | 15            | 3           | NA           | NA           | NA             | NA                | 14              | 12               | 3                |
|                  | large ground      | 10              | 8                | 10           | 128           | 104         | NA           | NA           | NA             | NA                | 244             | 119              | 65               |
|                  | upstairs          | 0               | 3                | 7            | 4             | ??          | NA           | NA           | NA             | NA                | 57              | 53               | 13               |
| Shed opposite    | Artificial roost  | 0               | 0                | 0            | 0             | 0           | 0            | 0            | 0              | 0                 | 0               | 0                | 0                |
| Office           | main roof         | 0               | 0                | 0            | 1 BLEB        | 0           | 19           | 5            | 12             | 12                | 1               | 0                | 0                |
|                  | second roof       | 0               | 0                | 0            | 3             | 0           | 27           | 92           | 19             | 9                 | 3               | 0                | 0                |
|                  | storage room      | 0               | 0                | 0            | 11            | 1           | 2            | 4            | 10             | 3                 | 10              | 1                | 1                |
| Canteen          |                   | 0               | 0                | 0            | 2             | 0           | M.n          | 0            | 0              | 1                 | 1               | M.n              | 0                |
| Bath house       |                   | 0               | 0                | 0            | 5             | 0           | 13+M.n       | 112          | 19             | 5+M.b             | 3               | 3                | BLEB             |
| <b>Total LHB</b> |                   | <b>10</b>       | <b>13</b>        | <b>22</b>    | <b>168</b>    | <b>NA</b>   | <b>NA</b>    | <b>NA</b>    | <b>NA</b>      | <b>NA</b>         | <b>333</b>      | <b>189</b>       | <b>83</b>        |

BLEB-Brown Long-eared bats, M.n – Natterers bat, Bat – unidentified species, pup – juvenile lesser horseshoe

Table 2 – Total bats found in Birchwood and Nelson

| Building   | Area         | January<br>18th | February<br>12th | March<br>9th | April<br>12th | May<br>14th | June<br>18th | July<br>13th | August<br>16th | September<br>17th | October<br>15th | November<br>19th | December<br>14th |
|------------|--------------|-----------------|------------------|--------------|---------------|-------------|--------------|--------------|----------------|-------------------|-----------------|------------------|------------------|
| Birch Wood | Loft         | 0               | 0                | 0            | 0             | 0           | 1            | 1            | 2              | 1                 | 0               | 0                | 0                |
|            | Ground Floor | 0               | 0                | 0            | 0             | 1           | 0            | 0            | 1              | 0                 | 0               | 0                | 0                |
|            | Basement     | 1               | 1                | 1            | 1             | 1           | 0            | 0            | 0              | 0                 | 0               | 1                | 0                |
|            | Small room   | 0               | 0                | 0            | 0             | 1           | 0            | 0            | 1              | 0                 | 0               | 0                | 0                |
|            | South Box    | 0               | 0                | 0            | 3             | 5cp         | 1cp          | 3cp          | 2p             | 2p                | 3pip            | 0                | 0                |
|            | East Box     | 0               | 0                | 0            | 1             | 0           | 1sp          | 0            | 0              | 3                 | 0               | 0                | 0                |
| Nelson     | Loft         | 0               | 0                | 0            | 0             | 0           | 0            | 1            | 1              | 1                 | 0               | 0                | 0                |
|            | Ground Floor | 0               | 0                | 0            | 0             | 0           | 0            | 0            | 0              | 0                 | 1               | 0                | 0                |
|            | Bat Boxes    | 0               | 0                | 0            | 0             | 0           | 0            | 0            | 1p             | 1p                | 0               | 0                | 0                |

- 3.5 During 2018, the emergence surveys were conducted from April to September as there were a high active number of bats present in April and an internal count was not accurate.
- 3.6 During 2018, emergence surveys were not conducted of the Bath House or office. The surveys during the previous years had only ever identified low numbers of bats present within the bath house and as such the internal counts were considered accurate, and more accurate to count the bats during the daytime than emergence surveys when not all emergence points were visible. However, a notably high population was found using these buildings during July. While there were many more bats present than normal, many were in torpor and spread out making an accurate count easier than in a building like the artificial roost.
- 3.7 The total peak counts of Lesser Horseshoe bats using each building and the total for the site is shown in table 3. Generally, the number of bats present using the Northern United buildings is low, especially during the hibernation period where there is only the very odd individuals present. The bottom of table three shows the percentages of the number of bats identified each month using the two main buildings on the Northern United site, the Office and the Bath House, and the two new artificial roosts, Nelson and Birchwood.

Table 2

|                  | January | February | March | April | May | June | July | August | September | October | November | December |
|------------------|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| Artificial roost | 10      | 13       | 22    | 147   | 231 | 447  | 410  | 409    | 368       | 315     | 184      | 81       |
| Shed oposite     | 0       | 0        | 0     | 0     | 0   | 0    | 0    | 0      | 0         | 0       | 0        | 0        |
| Office           | 0       | 0        | 0     | 14    | 1   | 48   | 101  | 41     | 24        | 14      | 1        | 0        |
| Canteen          | 0       | 0        | 0     | 2     | 0   | 0    | 0    | 0      | 1         | 1       | 0        | 0        |
| Bath House       | 0       | 0        | 0     | 5     | 0   | 13   | 112  | 19     | 5         | 3       | 3        | 0        |
| Nelson           | 0       | 0        | 0     | 0     | 0   | 0    | 1    | 1      | 1         | 0       | 0        | 0        |
| Birch Wood       | 1       | 1        | 1     | 1     | 0   | 0    | 1    | 4      | 1         | 1       | 1        | 0        |
| Peak Total       | 11      | 14       | 23    | 169   | 232 | 508  | 625  | 474    | 400       | 334     | 189      | 81       |

  

|                     |      |      |      |      |      |      |       |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|-------|------|------|------|------|------|
| % LHB in Bath House | 0.0% | 0.0% | 0.0% | 3.0% | 0.0% | 2.6% | 17.9% | 4.0% | 1.3% | 0.9% | 1.6% | 0.0% |
| % LHB in Office     | 0.0% | 0.0% | 0.0% | 8.3% | 0.4% | 9.4% | 16.2% | 8.6% | 6.0% | 4.2% | 0.5% | 0.0% |

  

|                     |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| % LHB in Nelson     | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.16% | 0.21% | 0.25% | 0.00% | 0.00% | 0.00% |
| % LHB in Birch Wood | 9.09% | 7.14% | 4.35% | 0.59% | 0.00% | 0.00% | 0.16% | 0.84% | 0.25% | 0.30% | 0.53% | 0.00% |

## 4 Constraints/Limitations

- 4.1 The bat numbers on the site fluctuate notably, not only throughout the seasons but can change notably from one month to the next, and, it is believed from one day to the next. Each survey only acts as a snapshot in time and gives an indication of the numbers of bats using the site, however, numbers present may fluctuate daily with bats moving to, or between, other sites.
- 4.2 Weather conditions notably change the level of bat activity on the site, and especially changes in weather across the season, with warmer summer resulting in not only higher breeding success, but earlier breeding can therefore result in the population present notably fluctuating from one month to the next, and months cannot always be directly compared with the same month in previous years.

## 5 Discussion

- 5.1 The counts in summer of 2018 are again high with a peak of 625 individuals in July, the highest recorded to date.
- 5.2 Notably June and July both also had high counts of bats present, with a total of 508 and 625 respectively. However, the July count includes a now present population of Pups, with 130 counted. The count in August was much lower, down to 474, down by 151 individuals from a month previously. This may be due to bats having bred earlier this year, and then dispersing from the roost earlier than normal.
- 6.1 The number of bats using all the Northern United buildings has remained notably low over the 2018 season, all with the exception of July. July 2018 was a period of heatwave period with a prolonged period of very hot dry weather. This hot weather made the Northern United buildings as warm as the artificial roost would be, and as such, as suitable to be used by bats which then spread out across the buildings. As soon as the weather changed the bat activity returned to most bats being within the main artificial roost.
- 6.2 During the hibernation period, Jan-March 2018 numbers were low, however there were no bats found using the Bath House or Office during this period.
- 6.3 The use of the bath house has remained mostly low. There were only three months where more than 10 bats were present, June, July and August, the hottest months of the year, with notably higher numbers present in July, and the only month where more than 10% of the colony was using this building. Although there was a higher than normal presence in July, the average occupancy is only 2.6% of the colony. The bath house has continued to be used by other species with Brown long-eared identified, and for the first time a Natterers bat was identified present in June. The Bechstein's bat that was found to use the building every summer previously, but was not present in 2018, was present in the building in September 2018.

- 6.4 The office is used by a higher number of bats, and like the Bath House was found to be used by a notably higher number than average during July 2018 and the heatwave period at this time. The office had a peak of 101 in July representing 16.2% of the colony. Proportionally the number of bats using the building isn't high on average with an average of 4.5% of the colony.
- 6.5 The canteen and office building have regularly been identified as being used by other species, with a natterers bat and Brown long eared identified present.
- 6.6 Surveys of the Birch Wood and Nelson new artificial roosts were conducted throughout the year. These roosts are still very new and considered stabilising with modifications being made to improve conditions and monitoring ongoing, notably at Nelson to reduce the damp, but also installing covers to entrances at both roosts to prevent use by predatory birds.
- 6.7 The surveys have identified that both buildings have been used by bats, with Lesser Horseshoe bat in both buildings. The Nelson roost had a single bat present after modifications were made. The Birch wood site had a lesser horseshoe bat present on 9 of the 12 surveys, and a peak of 4 bats in August 2018.