Vale of Leven Wind Farm

Bat Survey Report

Technical Appendix 6.3

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1 INTRODUCTION

MacArthur Green was commissioned by Vale of Leven Wind Farm Limited ('the applicant') to carry out bat surveys at the proposed Vale of Leven Wind Farm located within the Kilpatrick Hills, West Dunbartonshire, (hereafter referred to as the 'Proposed Development').

Bat surveys included:

- desk study;
- a Preliminary Bat Roost Assessment (PRA); and
- automated activity surveys.

The aim of the surveys was to quantify the Site usage by bats and variation in bat activity levels within the Site, and to inform the ecological impact assessment for the Vale of Leven Wind Farm Environmental Impact Assessment Report (EIAR).

2 THE SITE AND SURVEY AREA

The Site is located approximately 4 km to the east of Alexandria and north-east of Dumbarton within West Dunbartonshire. The Application Boundary (comprising the Site and Site Access) covers an area of approximately 331 hectares (ha) and consists predominantly of upland moorland in the Site area and improved agricultural land along much of the Site Access.

The Application Boundary does not overlap with any statutory designated sites containing bat related qualifying features.

The temporal (Anabat) survey area covered the Site and consisted of 13 Anabat deployment locations, as shown in **Figure 6.6**.

3 BATS AND WIND FARMS

3.1 Policy and Guidance

All bat species are protected under the following legislation:

- The Habitats Directive 92/43/EEC (as amended);
- The Wildlife and Countryside Act 1981 (as amended); and
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

Details pertaining to the legal status of bats are included within **Annex A** and in **Table A-1**.

In the UK and Europe, guidelines have been produced with regards to assessing the ecological impact upon bats from wind farm developments. These guidelines help to inform survey and mitigation strategies.

The following guidance documents have been used in the preparation of this report:

- Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London; and

- NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & the Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

4 METHODS

4.1 Desk-Based Study

A desk-based study was undertaken with regards to the presence of bat species within the Application Boundary and its environs.

A National Biodiversity Network (NBN)[1] Atlas Scotland search was completed to obtain bat records from 2007 to 2022 within 10 km of the Application Boundary.

4.2 Field Survey Methods

4.2.1 Preliminary Bat Roost Assessment (PRA)

The PRA followed the assessment methodology as set out in Collins (2016), to identify any Potential Roost Features (PRFs) in trees, buildings and structures, which could support roosting bats and to search for evidence of roosting bats. Where PRFs were identified, they were assigned a value of low, moderate or high suitability which indicates the likelihood of bats being present and informs the requirement for further survey work, such as a climbing inspection and/or dusk and dawn bat activity surveys. Collins (2016), state the following descriptions for assessing the potential suitability for roosting bats:

- Negligible – Negligible habitat features on site likely to be used by roosting bats.
- Low – A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[2] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation[3]).

  A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential[4].
- Moderate - A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[2] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the

[1] NBN Atlas occurrence download at https://nbnatlas.org accessed on Wed Mar 08 09:18:00 UTC 2023.
[2] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[3] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.
[4] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).

- High - A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[2] and surrounding habitat.

The PRA was carried out within the survey area, as shown in **Figure 6.6**.

4.2.2 Automated Activity Surveys

NatureScot *et al*. (2021) recommends that, "*Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments*."

The Site layout at the time of survey in 2020 included 19 proposed wind turbines[5]. A 19-turbine site would therefore require 13 locations to be sampled. Detectors were placed at potential turbine locations across the Site, deployed seasonally (three deployment periods) from May to September. NatureScot *et al.* (2021) also recommends a minimum of ten consecutive nights of sampling per seasonal deployment. Detector locations are shown in **Figure 6.6**.

Anabat Swift and Express detectors recording full spectrum and zero-crossing files were deployed for a minimum period of fourteen consecutive nights across the Site (i.e. exceeding minimum survey requirements) and were positioned at a height of 2 m. Each detector recorded bats from dusk to dawn with detectors starting 30 minutes before dusk and finishing 30 minutes after dawn. Detector operating times and a description of the habitat type at each location are shown in **Table B-1** of **Annex B**.

Following the publication of new guidance (NatureScot *et al.* 2021[6]) stating that '*full spectrum automatic detectors should be deployed, as a minimum*'. NatureScot (formally SNH) were consulted (21st March 2019) and advised that the use of zero-crossing detectors would be permitted with a transition period towards full spectrum detectors. The full spectrum detector was deployed with the following settings:

- sensitively value of 14;
- minimum frequency of 15 khz;
- maximum frequency of 250 khz;
- maximum file length of 15 s;
- minimum event of -2 ms; and
- sampling rate of 320 kHz.

Data was analysed using Kaleidoscope Pro Auto ID classifier which assigns a species label to a sound file. To ensure that all non-*Pipistrellus* calls (excluding Nathusius' pipistrelle calls) were identified correctly by the software, they were manually reviewed by an appropriately trained ecologist using

[5] The Proposed Development comprises 10 turbines.
[6] This guidance was published in 2019 and further updated in 2021.

Kaleidoscope Viewer and AnalookW software. This method of analysis is in line with current guidelines for data analysis which recommends the manual checking of all non-*Pipistrellus* calls when using automated methods (Collins, 2016). Sound files labelled as noise were also reviewed. Guidance on call parameters was taken from Russ (2012).

For the purpose of this report and for Ecobat analysis, a single bat registration was classed as a single labelled Kaleidoscope file containing a sequence of bat pulses.

In line with NatureScot *et al.* (2021), further analysis of bat data was carried out using the secure online tool Ecobat (Mammal Society, 2017), to gain a measure of relative bat activity at the Site. Ecobat data was then evaluated in accordance with NatureScot *et al.* (2021) guidance to determine the overall site risk level. The Ecobat analysis automatically analyses data per month and not per season. The results are presented based on this analysis per month.

4.3 Methods for Analysing Bat Activity Levels and Risks

NatureScot *et al.* (2021) details the methodology for analysing bat activity levels. This method is summarised below and involves the following steps:

1. Estimating bat activity levels;
2. Categorising collision risk of the relevant species;
3. Identifying population relevant abundance (size of the populations);
4. Categorising the potential vulnerability of bat populations by combining collision risk with population abundance;
5. Categorising the site risk level;
6. Completing the overall risk assessment; and
7. An assessment of significance and mitigation.

The following sections outline the methods used in each step.

4.3.1 Step 1: Bat Activity Levels

A measure of relative bat activity was obtained using the secure online tool Ecobat (Mammal Society, 2017) for automated data. NatureScot *et al.* (2021) explains that, "*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year and in comparable weather conditions…. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*"**. Table 4-1** below, taken from NatureScot *et al.* (2021) shows the five percentile categories for ease of reference. Only static data from automated activity surveys was analysed with the Ecobat tool.

The reference range data set were stratified to include:

- only records from within 30 days of the survey date;
- only records from within 100 km^2 of the survey location; and

- records using any make/model of bat detector.

Table 4-1: Percentile Score and Categorised Level of Bat Activity[7]

Percentile Score	Bat Activity
81 to 100	High
61 to 80	Moderate to High
41 to 60	Moderate
21 to 40	Low to Moderate
0 to 20	Low

4.3.2 Step 2: Vulnerability to Collision

Appendix 3 of NatureScot *et al.* (2021) presents a generic assessment of vulnerability to collision for UK species, based on species behaviour, flight characteristics and casualties in the UK and Europe. **Table 4-2** provides a summary of the vulnerability of each bat species to collision.

Table 4-2: Vulnerability of Bat Species to Turbine Impact in the UK

Risk of Turbine Impact (Collision Risk)		
Low Risk	**Medium Risk**	**High Risk**
Myotis spp.	Serotine	Common pipistrelle
Long-eared bats	Barbastelle	Soprano pipistrelle
Horseshoe bats		Noctule
		Leisler's bat
		Nathusius' pipistrelle

Habitat characteristics at the location of wind turbines can have an important influence on the vulnerability of bat species to collision. For example, proximity to key feeding sites and commuting routes such as water features and woodland edge habitats is known to increase the likelihood of bat collision (NatureScot *et al.* 2021).

4.3.3 Step 3: Population Relative Abundance

NatureScot *et al.* (2021) details the sensitivity of a bat species to impact based on their population's relative abundance in Scotland as detailed in **Table 4-3**. Species with the rarest relative abundance are more susceptible to significant effects.

[7] Table sourced from: NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

Table 4-3: Population Relative Abundance of Bats in Scotland

Relative Abundance	Species
Common	Common pipistrelle (*Pipistrellus pipistrellus*)
	Soprano pipistrelle (*Pipistrellus pygmaeus*)
Rarer	Brown long-eared bat (*Plecotus auritus*)
	Daubenton's bat *(Myotis daubentonii)*
	Natterer's bat (*Myotis nattereri)*
Rarest	Whiskered bat (*Myotis mystacinus*)
	Brandt's bat (*Myotis brandtii*)
	Nathusius' pipistrelle (*Pipistrellus nathusii*)
	Noctule bat (*Nyctalus noctule*)
	Leisler's bat (*Nyctalus leisleri*)

4.3.4 Step 4: Potential Vulnerability of Bat Populations

Table 4-4 below, sourced from NatureScot *et al.* (2021), uses the measure of collision risk, in combination with population relative abundance, to indicate the potential vulnerability of populations of British bat species. The overall potential vulnerability of bat populations is identified as: low (yellow), medium (orange), high (red).

Table 4-4: Level of Potential Vulnerability of Populations of British Bat Species

Relative Abundance of Bats in Scotland	Collision Risk		
	Low collision risk	Medium collision risk	High collision risk
Common species			Common pipistrelle Soprano pipistrelle
Rarer species	Brown long-eared bat Daubenton's bat Natterer's bat		
Rarest species	Whiskered bat Brandt's bat		Nathusius' pipistrelle Noctule bat Leisler's bat

4.3.5 Step 5: Categorise the Site Risk Level

The site risk level is categorised through a combination of habitat risk and project size which is then entered into the table matrix as shown below in

Table 4-5 to calculate the overall site risk level. The full matrix table, as provided within NatureScot *et al.* (2021), is shown in **Annex C** of this report which includes descriptions on how to determine the habitat risk and project size for the Site.

Table 4-5: Initial Site Risk Assessment

Site Risk Level (1-5) *	Project Size			
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Key: Green (1-2) – low/lowest site risk; Amber (3) – medium site risk; Red (4-5) – high/highest site risk

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

4.3.6 Step 6: Risk Assessment

The overall risk assessment is undertaken for high collision risk species identified onsite and involves combining Site risk level (**Section 4.3.5,**

Table 4-5) with the Ecobat activity level (**Section 4.3.1, Table 4-1**). The overall risk assessment matrix is shown in **Table 4-6** below where 'Low' Site risk level (green) is 0-4, 'Medium' Site risk level (amber) is 5-12, and 'High' Site risk level (red) is 15-25.

Table 4-6: Overall Risk Assessment

Ecobat activity category (or equivalent justified categorisation)						
Site Risk Level	Nil (0)	Low (1)	Low-Moderate (2)	Moderate (3)	Moderate-High (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

4.3.7 Step 7: Assessment of Significance and Mitigation

The outputs of the risk assessment detailed in step 6 above are then used to assess the significance of effect within the Ecological Impact Assessment. At this stage, other Site-specific factors should be considered such as habitat characteristics (and how they may change), behaviour of species at the Site, and location of the Site regarding the natural range of the species and how this could affect favourable conservation status.

Mitigation measures as detailed within NatureScot *et al.* (2021) are then considered where appropriate.

5 BAT SURVEY LIMITATIONS

The guidance recommends the minimum level of pre-application survey required for ground level static detectors to be ten nights of recordings in each of spring (April - May), summer (June to mid-August) and autumn (Mid-August to October). In Scotland, due to unfavourable weather conditions and low activity levels for bats in April, ground-level automated activity surveys commenced in May and were completed in September.

Automated activity surveys should capture a sufficient number of nights (minimum of ten nights) with appropriate weather conditions for bat activity (i.e., temperatures on or above of 8°C in Scotland at dusk, maximum ground level wind speed of 5 m/s and no, or only very light, rainfall). To account for the potential limitations of weather on the number of suitable nights recorded, surveys were carried out over longer deployment periods, with a minimum of 14 nights recorded.

The Ecobat analysis automatically analyses data per month and not per season. The results are presented based on this analysis per month.

Due to unforeseen errors with the detectors, microphones or batteries, it was not always possible to achieve 14 consecutive nights of recordings. Only one detector failed to record any data during a deployment period (Location 7 in June). Three detectors failed to record the full 14 nights of data during a deployment period (Location 11 in May, Location 1 in August and Location 13 in August), with these locations recording 7, 6 and 4 nights respectively. As the majority of locations recorded for more than ten nights, with a total of 496 complete nights recorded which is beyond the minimum number of nights (13 Anabats*10 nights*3 seasonal deployments = 390 nights of data) required for a Site of this size, the small loss of data is not considered to have affected the overall assessment of risk. The survey timings can be seen in **Annex B**, **Table B-1**.

Some temporal calls were assigned an unknown value (NoID), due to the recording of a very faint call or an incomplete call that could not be identified to species level on the spectrogram. These were not considered further in the Ecobat analysis.

For some *Myotis* spp. calls it was only possible to identify the call to genus level. It is possible that for *Myotis* spp. these recordings could represent species not identified in the analysis of the recorded data. *Myotis* spp. bats are categorised as low collision risk species.

Anabat detectors are a commonly used bat detector for acoustic monitoring at wind farm sites, however all bat detectors have limitations and will only monitor bat activity within a limited area, which for Anabats is usually around 30 m, depending on a variety of environmental factors. Furthermore, due to passive monitoring methodologies depending on sound reaching the microphone, the detection rate of bat calls varies with a bias towards loud bat calls with quieter calls, namely brown long-eared bats (low collision risk species), potentially being under-recorded.

At location 1/1R, an Anabat Express detector recording zero-crossing files was deployed alongside an Anabat Swift detector set to full spectrum to determine the variability of detectability between a zero-crossing detector (Express) and a full spectrum detector (Swift).

6 SURVEY RESULTS & ANALYSIS

6.1 Desk-Based Study

The NBN Atlas data search[1] returned records of the following bat species within 10 km of the Application Boundary between 2007 - 2022 inclusive:

- brown long-eared bat;
- common pipistrelle;
- Daubenton's bat;
- Natterer's bat; and
- soprano pipistrelle.

Details regarding licences and data providers for these records are included in **Table 6-1** Data Providers for NBN Atlas Scotland Records Used

Table 6-1 Data Providers for NBN Atlas Scotland Records Used

Species	Data Provider (Recorder)	Licence
Brown long-eared bat	Bat Conservation Trust (BCT), SNH & Southern Scotland Bat Survey	OGL[8]
Common pipistrelle	BCT, SNH (Andy Kerr, Beccy Osborn, Helen Lundie, John Haddow), Nocturne Environmental Surveyors Ltd & Southern Scotland Bat Survey	CC-BY[9] & OGL[8]
Daubenton's bat	BCT, SNH (Garry Nixon), Southern Scotland Bat Survey	OGL[8]
Natterer's bat	BCT, SNH & Southern Scotland Bat Survey	OGL[8]
Soprano pipistrelle	BCT, Biological Records Centre (Edmund Wardle), National Trust for Scotland (Natalie Todman, Helen Thompson, Lindsay MacKinlay, Neil Middleton, Neil Miller, Graeme Mark, William Napier, James Stead, Nikki Ould, Geoff Beare, Melissa Simpson, Anna Jennings, Diane Megias), Nocturne Environmental Surveyors Ltd, SNH (Helen Lundie, Andy Kerr) & Southern Scotland Bat Survey	CC-BY[9] & OGL[8]

[8] Open Government Licence (OGL) https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ (Accessed January 2023)
[9] Creative Commons Attribution 4.0 International (https://creativecommons.org/licenses/by/4.0/)

6.2 Preliminary Bat Roost Assessment

The PRA survey of the survey area was undertaken in July 2020 and March 2022. Associated PRF records are shown in **Figure 6.6** with the detailed results (target notes) listed in **Table D-1** and **Table D-2, Annex D.**

There were 42 features recorded with potential suitability for roosting bats, all being tree features. These were assigned classifications of negligible to high roosting suitability.

No key features that could support maternity roosts and significant hibernation and/or swarming sites were recorded within 200 m plus rotor radius of a proposed wind turbine location. The closest feature recorded, with moderate suitability, was approximately 300 m from T4. The closest feature, with high suitability, was around 577 m from T8. Three features with moderate suitability (ID numbers PS29, PS36 and PS40) are within 30 m of the Site Access, with one adjacent the A813 road (PS29) and another by a farm track (PS36). Further pre-construction surveys would be required to determine if these PRFs contain active roosts, however given their locations any roosts would already be subject to vehicular and farm traffic and agricultural disturbances.

Tree inspections were conducted by Wild Surveys (Robbie Smith and Helen Lundie) in November 2022 due to the Site Access passing through woodland with moderate PRFs recorded. No bats or field signs were found on the four trees climbed, with the trees reclassified on closer inspection as one having negligible suitability and three low suitability. Associated records are shown in **Figure 6.6** with the report listed in **Annex G.** 'Soft felling'[10] techniques would be used if the trees are to be removed.

6.3 Automated Activity Surveys

MacArthur Green deployed detectors at 13 locations within the Site from May to September in 2020 over a total period of 42 days and collecting 496 complete recording nights of data, see **Table B-1** of **Annex B** and **Figure 6.6**.

Between May to September, bats were detected on all of the 42 nights. A total of four bat species and two genera were recorded for these locations. The total number of passes recorded for each species across all of the detectors within the Site is shown below in **Table 6-2**.

Table 6-2 Total Number of Bat Passes for Each Species Across all Locations

Species/Species Group	No of Registrations	Percentage of total (%)
Common pipistrelle	1501	46.2
Soprano pipistrelle	1721	53.0
Nyctalus spp.	10	0.3
Brown long-eared bat	1	0.0
Myotis spp.	8	0.2
Daubenton's	7	0.2

[10] BCT (2018). Bats and Trees.

Species/Species Group	No of Registrations	Percentage of total (%)
Total	3248	99.9[11]

The survey results were processed using the Ecobat tool (Mammal Society, 2017) to gain a measure of relative bat activity at the Proposed Development, the full Ecobat Report is appended in **Annex F** below. The summarised results and analysis are presented in Steps 1 – 6 below.

6.3.1 Step 1: Bat Activity Levels

Average Annual Site Activity Levels

Table 6-3 and **Chart 6-1** detail the average annual Site activity levels calculated using the Ecobat tool (Mammal Society, 2017).

The median percentile represents the most frequent activity category and the 'typical' bat activity levels in the Site, the maximum percentile can be used to help interpret if there are unusually high levels or important peaks of bat activity. The reference range is the number of nights for each species that the data was compared to (a reference range of 200+ is recommended to be confident in the relative activity level).

Table 6-3: Average Annual Site Activity Levels (taken from Ecobat Analysis[12])

Species/ Group	Median Percentile	Activity Level	95% CIs*	Max Percentile	Activity Level	Reference Range	Nights Recorded
Myotis spp.	2	Low	2 - 2	2	Low	3535	8
Daubenton's	2	Low	2 - 2	2	Low	398	7
Nyctalus spp.	41	Moderate	56 - 56	56	Moderate	2186	5
Common pipistrelle	56	Moderate	65.5 - 85.5	95	High	7451	207
Soprano pipistrelle	64	Moderate - High	68.5 - 83	95	High	11965	213
Brown long-eared	2	Low	0	2	Low	471	1

*CIs: confidence intervals.

[11] Due to the rounding of percentages per species, the 'Total' percentage may not be exactly 100%.
[12] Taken from Ecobat analysis report created on the 06/07/2021 from static activity data of the Site in 2020.

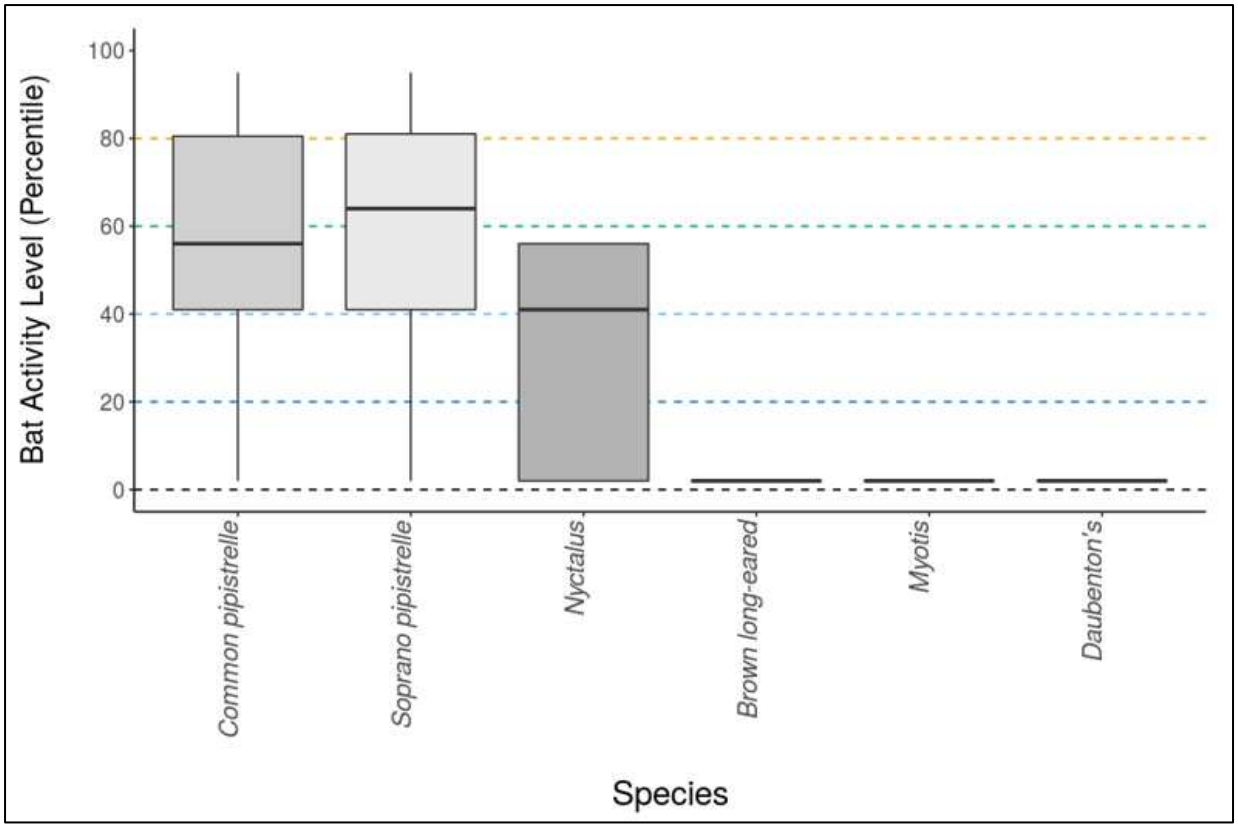

Chart 6-1: Average Annual Site Activity Levels

Monthly Location Specific Activity Levels

Data on the monthly activity levels per location is provided in **Table E-1** of **Annex E.**

6.3.2 Step 2, 3 and 4: Collision Risk, Population Relative Abundance and Potential Vulnerability

Table 6-4 details the collision risk, population relative abundance and potential vulnerability of the bat species recorded within the Site.

Table 6-4: Collision Risk, Population Relative Abundance and Potential Vulnerability

Bat Species	Collision Risk	Population Relative Abundance	Potential Vulnerability
Common pipistrelle	High	Common	Medium
Soprano pipistrelle	High	Common	Medium
Nyctalus spp.	High	Rarest	High
Brown long-eared	Low	Rarer	Low
Myotis spp.	Low	Rarer	Low
Daubenton's	Low	Rarer	Low

6.3.3 Step 5: Categorising Site Risk Level

The Site risk level is determined by project size and habitat risk (see

Table 4-5). The Site consists of ten wind turbines that are over 50 m in height, and so falls within the 'Medium' project size, as shown in

Table 4-5 and **Table C-1** of **Annex C.**

In terms of habitat risk for bats, there are no buildings, structures, or trees with moderate and/or high bat roosting potential within 200 m plus the rotor radius of wind turbines. Foraging habitat quality and connectivity within this buffer area is low with a largely treeless environment and small open upland burns and a fairly homogenous area of open grazed moorland habitat present, resulting in a habitat risk classification of 'Low' as shown in

Table 4-5 and **Table C-1** of **Annex C.**

According to

Table 4-5 above, the 'Medium' project size combined with a 'Low' habitat risk level results in an overall Site risk assessment of 'Low/Lowest' (2).

6.3.4 Step 6: Risk Assessment – High Collision Risk Species Only

The overall risk assessment is undertaken for high collision risk species which were identified within the Site. Low-risk species have a low risk of collision with a turbine blade, so the impact of the Site on the local bat population would likely be negligible.

The overall risk assessment involves multiplying the Site's risk level (**Section 4.3.5**,

Table 4-5) with the median and the maximum Ecobat activity levels (**Section 4.3.1**,**Table 4-1**) to calculate both the typical (median) Site risk level, and the maximum Site risk level.

Table 6-5 combines the seasonal data and summarises the overall risk assessment score for high-risk species based on the median and maximum percentiles for the Site. The overall Site risk scores for all high collision risk species based on the median and maximum percentiles were 'Medium' (6 - 10).

Table 6-5: Site Risk Assessment Scores Based on Median and Maximum Percentiles for High Collision Risk Species

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Max. Percentile
Common pipistrelle	Medium (6)	Medium (10)
Soprano pipistrelle	Medium (8)	Medium (10)

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Max. Percentile
Nyctalus spp.	Medium (6)	Medium (6)

Figures 6.7 to **6.9** illustrate the results of the median monthly risk assessment scores for high collision risk bat species recorded at the Site at each survey location, illustrating how bat activity and risk levels varies within the Site across the year and by species. This data is also presented in **Table E-1** of **Annex E** which includes both the median and maximum monthly risk assessment scores.

No high-risk assessment scores were recorded across the Site per month, with only low to medium scores recorded for high collision risk bat species. To provide an indication of how activity varied across the survey period for high collision risk species, the percentage of locations where a medium risk assessment score was calculated from the median and maximum percentiles.

Table 6-6 shows the percentage of sample locations where a medium risk assessment score was recorded. Using this method, May and August appear to be the months with greater risk for common pipistrelle, July appears to be the month with greater risk for soprano pipistrelle and May and June appear to be the months with slightly greater risk for *Nyctalus* spp., based on median percentiles.

The maximum percentile scores, which can be used to suggest peaks in bat activity, calculated peaks in activity during May and August for common pipistrelle, May and July for soprano pipistrelle and May and June for *Nyctalus* spp., as also summarised in **Table 6-6** below.

Table 6-6: The Percentage of Locations with Medium Risk Assessment Scores based on Monthly Median and Maximum Percentiles for High Collision Risk Species

	Species	May	June	July	August	September
Median Percentile	Common pipistrelle	92.3%	15.4%	7.7%	92.3%	46.2%
	Soprano pipistrelle	92.3%	30.8%	0%	100%	53.8%
	Nyctalus spp.	7.7%	7.7%	0%	0%	0%
Maximum Percentile	Common pipistrelle	92.3%	46.2%	7.7%	92.3%	69.2%
	Soprano pipistrelle	100%	61.5%	0%	100%	53.8%
	Nyctalus spp.	7.7%%	7.7%%	0%	0%	0%

6.4 Proximity of Roost Sites Based on Activity Data

The Ecobat output includes an analysis of bat activity data at Anabat locations, referenced against the known roost emergence times for each high collision risk bat species (Russ, 2012). This indicates whether a roost site may be present in close proximity to an Anabat location.

Bat activity at all locations indicated the potential for nearby roost sites. *Pipistrellus* species were recorded at all locations and *Nyctalus* species recorded at Locations 1 and 10 during their known

emergence time ranges, as detailed in **Table 6-7.** These registrations included one to a maximum of four bat calls each within the maternity roost season (15th June to 30th July).

Table 6-7 Anabat Locations within Proximity to a Roost

Anabat ID	Bat Species	Date	Number of bat calls
Location 1	Common pipistrelle	07-09, 16,19 &20/05/2020	1 - 9
		27/06/2020	1
		26/08/2020	1
	Soprano pipistrelle	07-09 & 19/05/2020	1 - 13
		20, 26, 27/6/2020	1 - 4
		26 & 27/08/2020	1 - 3
	Nyctalus spp.	08 & 09/05/2020	1 - 2
Location 2	Common pipistrelle	07 - 09 & 19/05/2020	1 - 11
		26, 27, 29 - 31/08/2020	1 - 6
	Soprano pipistrelle	06 - 09, 16, 19 & 20/05/2020	1 - 28
		19, 22, 26 & 27/06/2020	1 - 3
		26, 27, 29 - 31/08/2020	1 - 9
Location 3	Common pipistrelle	07 - 09, 14 & 19/05/2020	1 - 8
		20/06/2020	1
		26, 27, 29 - 31/08/2020	1 - 6
	Soprano pipistrelle	07 - 09, 16 & 20/05/2020	1 - 10
		25 - 27/06/2020	1 - 2
		26, 27, 29 - 31/08/2020	1 - 10
Location 4	Common pipistrelle	08, 09, 19/05/2020	1 - 17
		24, 26 & 27/06/2020	1 - 2
		26, 27, 29 & 30/08/2020	1 - 8
		03/09/2020	1
	Soprano pipistrelle	06 - 09 & 19/05/2023	1 - 54
		22, 24, 26, 27 & 30/06/2020	1 - 2
		26, 27, 29 - 31/08/2020	2 - 7
Location 5	Common pipistrelle	07 - 09, 14, 16, 18 - 20 /05/2020	1 - 14
		19 & 20/06/2020	1 - 3
		26, 27, 29 & 30/08/2020	3 - 9
		03, 05, 06/09/2020	2 - 3
	Soprano pipistrelle	07 - 09 & 19/05/2020	2 - 36
		26, 27, 29- 31/08/2020	1 - 14
		03, 05, 06/09/2020	1 - 2
Location 6	Common pipistrelle	07 - 09 & 14/05/2020	1 - 11
		24 & 25/06/2020	1
		01/07/2020	1
		26, 27, 29 & 30/08/2020	1 - 10
		03/09/2020	1

Anabat ID	Bat Species	Date	Number of bat calls
	Soprano pipistrelle	08, 09 & 14/05/2020	1 - 26
		21 & 25/06/2020	1 - 2
		26, 27, 29 & 30/08/2020	2 - 13
		01, 03 & 05/09/2020	1
Location 7	Common pipistrelle	07 - 09, 14 - 17 & 19/05/2020	1 - 8
		26 - 31/08/2020	3 - 44
		03 - 06/09/2020	2 - 11
	Soprano pipistrelle	07 - 09/05/2020	1 - 10
		26 - 31/08/2020	2 - 15
		06/09/2020	2
Location 8	Common pipistrelle	07 - 09 & 19/05/2020	3 - 7
		19 & 24/06/2020	1 - 3
		26 - 30/08/2020	1 - 5
		01, 05 & 06/09/2020	1 - 3
	Soprano pipistrelle	06 - 09 & 19/05/2020	1 - 9
		20, 24 & 27/06/2020	1
		26 - 30/08/2020	1 - 7
Location 9	Common pipistrelle	07 - 09 & 19/05/2020	1 - 10
		19, 21 & 26/06/2020	1 - 2
		26, 29 & 30/08/2020	1 - 9
	Soprano pipistrelle	07 - 09 & 19/05/2020	2 - 6
		24 & 27/06/2020	1
		26, 27 & 29/08/2020	3 - 6
Location 10	Common pipistrelle	06 - 09 & 14/05/2020	1 - 5
		18, 19 & 26/06/2020	1 - 3
		26, 27 & 29 - 31/08/2020	3 - 8
		06/09/2020	1
	Soprano pipistrelle	07 - 10/05/2020	1 - 3
		20, 26 & 27/06/2020	1 - 2
		01/07/2020	1
		26 - 30/08/2020	1 - 16
	Nyctalus spp.	27/06/2020	2
Location 11	Common pipistrelle	07 - 09 & 11/05/2020	1
		19, 26 - 30/06/2020	1 - 2
		01/07/2020	1
		26, 27 & 29 - 30/08/2020	1 - 14
		05 & 06/09/2020	2 - 3
	Soprano pipistrelle	06, 08 & 09/05/2020	1 - 5
		19, 26 & 27/06/2020	1
		26 - 31/08/2020	1 - 10
		05/01/2020	1

Anabat ID	Bat Species	Date	Number of bat calls
Location 12	Common pipistrelle	20, 25 & 26/06/2020	1
		26, 27 & 29 - 30/08/2020	1 - 2
	Soprano pipistrelle	09 & 19/05/2020	1 - 2
		27, 29 & 30/08/2020	1 - 2
Location 13	Common pipistrelle	07 - 09 & 14/05/2020	1 - 5
		18 & 19/06/2020	1
		28/08/2020	1
	Soprano pipistrelle	09/05/2020	1
		26/06/2020	1
		28 & 29/08/2020	2 - 5

7 REFERENCES

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Russ, J. (2012). *British Bat Calls: A Guide to species Identification*. Pelagic Publishing.

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ANNEX A. BATS LEGAL STATUS

All bat species receive protection under the Conservation Regulations (1994) (as amended).

The information contained in this Annex is a summarised version of the legislation and should be read in conjunction with the appropriate legislation.

It is an offence to:

- Deliberately or recklessly to capture, injure or kill a wild animal of a European protected species;
- Deliberately or recklessly:
  - harass a wild animal or group of wild animals of a european protected species;
  - disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;
  - disturb such an animal while it is rearing or otherwise caring for its young;
  - to obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place (i.e. roost sites);
  - to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs; or
  - to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.
- To damage or destroy a breeding site or resting place of such an animal.

Table A-1 Legal and Conservation Status of all UK Bats[13]

Species	Legislation / Convention													
	Bern Convention Appendix II	Bonn Convention Appendix II	WCA	Habitats Directive Annex IV	Habitats Directive Annex II	Habs Regs 1994 (as amended) *Scotland*	Conservation of Habs & Species Regs 2010	Conservation Regs (N Ireland) 1995	CROW Act 2000	NERC Act 2006	Wild Mammals Protection Act	UK BAP Priority species	IUCN Red List*	EUROBATS Agreement
Greater horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Lesser horseshoe bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC	✓
Daubenton's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Natterer's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Whiskered bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brandt's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Bechstein's bat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Alcathoe bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		DD	✓
Noctule	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Leisler's bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Serotine	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Common pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Soprano pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Nathusius' pipistrelle	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Brown long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	LC	✓
Grey long-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓
Barbastelle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NT	✓
Greater mouse-eared bat	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		LC	✓

*IUCN categories: LC is Least Concern, NT is Near Threatened, DD is Data deficient; see www.iucnredlist.org for more details.

[13] Source: Bat Conservation Trust http://www.bats.org.uk/pages/bats_and_the_law.html

ANNEX B. SURVEY TIMINGS & ANABAT LOCATIONS

Table B-1 Description of Anabat Locations and Summary of Temporal Survey Effort

Location	Easting	Northing	Bearing	Habitat	Total Number of Complete Recording Nights		
					Visit 1 19/05/2020 - 06/06/2020	Visit 2 18/06/2020 – 01/07/2020	Visit 3 26/08/2020 – 07/09/2020
1 & 1R	245221	681255	30	Open moorland	14 & 14	14 & 14	6 & 14
2	244135	681310	120	Open moorland. Within 150 meters of Burn.	14	14	13
3	244485	680268	170	Open moorland. Within 180 meters of Burn.	14	14	13
4	244006	680362	40	Open moorland	14	14	13
5	243702	680774	80	Open moorland	14	14	13
6	243138	680700	20	Open moorland	14	14	13
7	242849	680118	272	Open moorland. Within 75 meters of forestry edge.	14	0	13
8	242865	679552	272	Open moorland	14	14	13
9	243172	679041	245	Open moorland	14	14	13
10	243947	679851	256	Open moorland	14	14	13
11	244257	679507	8	Open moorland	7	14	13
12	244330	679002	346	Open moorland	14	14	13
13	244025	678349	284	Open moorland	14	14	4
Total					**496***		

* Location 1R is not included in the total number of nights as this detector was at the same location as Location 1 and was used as a reference detector to determine the variability of detectability between a zero-crossing detector (Express) and a full spectrum detector (Swift).

ANNEX C. INITIAL SITE RISK ASSESSMENT

Table C-1 Initial Site Risk Assessment[14].

Site Risk Level (1-5)15	Project Size			
Habitat Risk		Small	Medium	Large
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5
Key: Green (1-2) – low/lowest site risk; Amber (3) – medium site risk; Red (4-5) – high/highest site risk				

Habitat Risk	Description
Low	Small number of potential roost features, of low quality. Low-quality foraging habitats that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and or an important flyway. Close to key roost and /or swarming.
Project Size	**Description**
Small	Small scale development (<10 turbines). No other wind energy developments within 10 km. Comprising turbines <50 m in height.
Medium	Larger developments (between 10 and 40). May have some other wind development within 5 km. Comprising turbines 50 – 100 m in height.
Large	Largest developments (>40 turbines) with other wind energy developments within 5 km. Comprising turbines >100 m in height.

[14] Sourced from: NatureScot, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT). (2021). *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.

[15] Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

ANNEX D. PRELIMINARY BAT ROOST ASSESSMENT

Table D-1 Preliminary Bat Roost Assessment Target Notes 2020

PRF_ID	Feature	Notes	PRF Category	Grid Reference
R1	Tree	Alder woodland with PRFs	Moderate	NS 44912 81911
R10	Tree	Hollow beech tree with potential as a bat roost	Moderate	NS 41323 77853
R11	Tree	Oak and beech dominant mature woodland on steep sided valley. Many of the older trees with PRF's	Moderate	NS 41300 78000
R12	Tree	Mature oak woodland (85%) with at least half of the oak trees being high PRF value.	Moderate	NS 41400 77900
R13	Tree	Old gnarled oak	High	NS 41513 78405
R14	Tree	Woodland growing in stream gullies, too steep to access, most of area dangerous. Some oaks with moderate PRF's. Good foraging area.	Moderate	NS 41650 78380
R15	Tree	Three ash trees	Moderate	NS 41817 78896
R16	Tree	Single ash tree	Moderate	NS 41801 78875
R17	Tree	Single mature oak on steep slope	Moderate	NS 41837 78892
R18	Tree	Single hawthorn tree on moor	Moderate	NS 42191 77189
R19	Tree	Multi-stemmed coppice mature rowan	Moderate	NS 43016 78479
R2	Tree	Area of woodland along burns with mature trees (alder, birch, oak) with numerous PRFs present	High	NS 44659 82717
R20	Tree	Glen with small copse and small trees; hazel, rowan, willow	Moderate	NS 43010 78460
R21	Tree	Canopy dominated by birch and oak in steep sided valley. Many mature damaged trees	High	NS 42906 78078
R22	Tree	Small area of open woodland, PRF's mostly in birch trees	High	NS 42317 79580
R23	Tree	Single rowan tree	Moderate	NS 42437 79713
R24	Tree	Small rowan	Moderate	NS 45102 79770
R25	Tree	Small copse of rowan and birch along upper reaches of Knockupple Burn	Moderate	NS 45102 79771
R26	Tree	Small single rowan	Moderate	NS 44676 80128
R27	Tree	Single hawthorn and two rowans at confluence of streams	Moderate	NS 45184 80249
R28	Tree	Around 20 birch/rowan trees in small copse located at bottom of cliff	Moderate	NS 45363 80690
R29	Tree	Birch dominant woodland with many old trees (difficult access)	High	NS 45600 80700
R3	Tree	Area of woodland in small gully with mature oak trees with numerous PRFs	High	NS 44538 82677
R30	Tree	Riparian woodland (located west of Ishneich Waterfall, east of Merkins Muir) difficult to access/survey well due to steep banks and dense bracken.	High	NS 45205 81668
R4	Tree	Broadleaved woodland along watercourses with PRFs. Suitable roosting and foraging habitat for bats.	High	NS 45017 81755
R5	Tree	Mature ash in mixed hedge	Moderate	NS 40300 77138
R6	Tree	Sycamore with ivy covered trunk	Moderate	NS 40878 77096
R7	Tree	Four semi-mature oak with cracks and fissures in bark	Moderate	NS 41338 77420
R8	Tree	Semi-mature oak with splits, fissures in bark, scars on trunk	Moderate	NS 41387 77433
R9	Tree	Hollow beech tree that looked to be unoccupied at time of survey with cobwebs; classified as Moderate. Resurveyed 22/03/2022: huge tearout at base with cavity leading up into trunk. Rotted wood with holes; classified as High. Tree climbing survey November 2022 (Wild Surveys): Basal cavity west facing open 2m from ground then extends 0.75m. Small off shoot extends 0.5m. Reclassified as Low Suitability.	Low	NS 41178 77753

Table D-2 Preliminary Bat Roost Assessment Target Notes 2022

PRF_ID	Feature	Notes	PRF Category	Grid Reference
PS26	Tree	Knot holes, tear out, holes at base, peeling bark, dead wood	Moderate	NS 40311 77356
PS27	Tree	Young trees with few features	Low	NS 40390 77440
PS29	Tree	Knot holes, broken branches, large old tree	Moderate	NS 40098 77327
PS30	Tree	Unions, breaks, hollow branches, cracks in bark, near linear hedge features	Moderate	NS 40172 77398
PS31	Tree	Split, raised bark, dead wood, on burn at field edge	Moderate	NS 40269 77325
PS34	Tree	Large old tree, ivy covered, likely to have features	Moderate	NS 40659 77490
PS36	Tree	Large old tree in hedgerow, some broken branches visible, lots of ivy, likely to have multiple features	Moderate	NS 40736 77488
PS38	Tree	Large ash on hedge line, breaks and knot holes	Moderate	NS 40965 77609
PS40	Tree	More mature trees on steep slope in valley - dead wood, splits and broken branches	Moderate	NS 41016 77760
PS41	Tree	Within group of low to moderate trees. Broken branches, hazard beams	Moderate	NS 41127 77798
PS42	Tree	Between groups of trees on slope and belt at end of track area. Pine, knot holes, broken branches. Classified as Moderate. Tree climbing survey November 2022 (Wild Surveys): Multiple broken branches, mostly lower down facing west.1 x cavity 12 m southeast facing (no depth). 1x cavity beneath protruding limb west facing (no significant depth tuck up at best). Reclassified as Negligible suitability.	Negligible	NS 41134 77789
PS43	Tree	Beech trees along fence lines (double layer) with some birch between. Double leaders, knot holes, unions, splits at base. Classified as Moderate. Tree climbing survey November 2022 (Wild Surveys): Tree 1, Decay on main stem small cavity east facing 3 m, approx. 10 cm in length. Tree 2, Cavity 1 m in length, east facing, 2 cm wide narrows at top. Reclassified as Low suitability.	Low	NS 41157 77750

ANNEX E. MONTHLY LOCATION SPECIFIC DATA

Table E-1 Monthly Location Specific Data for High Collision Risk Species

Location ID	Species	Month	Median Percentile	Median Activity Category (Taken from Table 4-1)	Maximum Percentile	Maximum Activity Category (Taken from Table 4-1)	Site Risk (Taken from Table 4-5)	Overall Median Site Risk Score (Taken from Table 4-6)	Overall Median Site Risk Category	Overall Maximum Site Risk Score (Taken from Table 4-6)	Overall Maximum Site Risk Category
1	*Myotis daubentonii*	May	2	Low	2	Low	2	2	Low	2	Low
1	*Nyctalus*	May	56	Moderate	56	Moderate	2	6	Medium	6	Medium
1	*Pipistrellus pipistrellus*	May	60	Moderate	83	High	2	6	Medium	10	Medium
1	*Pipistrellus pipistrellus*	Jun	2	Low	2	Low	2	2	Low	2	Low
1	*Pipistrellus pipistrellus*	Aug	2	Low	2	Low	2	2	Low	2	Low
1	*Pipistrellus pygmaeus*	May	84	High	88	High	2	10	Medium	10	Medium
1	*Pipistrellus pygmaeus*	Jun	56	Moderate	64	Moderate-High	2	6	Medium	8	Medium
1	*Pipistrellus pygmaeus*	Aug	69	Moderate-High	69	Moderate-High	2	8	Medium	8	Medium
10	*Myotis daubentonii*	Aug	2	Low	2	Low	2	2	Low	2	Low
10	*Nyctalus*	Jun	41	Moderate	41	Moderate	2	6	Medium	6	Medium
10	*Pipistrellus pipistrellus*	May	64	Moderate-High	81	High	2	8	Medium	10	Medium
10	*Pipistrellus pipistrellus*	Jun	2	Low	56	Moderate	2	2	Low	6	Medium
10	*Pipistrellus pipistrellus*	Aug	80	Moderate-High	87	High	2	8	Medium	10	Medium
10	*Pipistrellus pipistrellus*	Sep	56	Moderate	56	Moderate	2	6	Medium	6	Medium
10	*Pipistrellus pygmaeus*	May	64	Moderate-High	64	Moderate-High	2	8	Medium	8	Medium
10	*Pipistrellus pygmaeus*	Jun	41	Moderate	41	Moderate	2	6	Medium	6	Medium
10	*Pipistrellus pygmaeus*	Jul	2	Low	2	Low	2	2	Low	2	Low
10	*Pipistrellus pygmaeus*	Aug	86	High	92	High	2	10	Medium	10	Medium
11	*Pipistrellus pipistrellus*	May	63	Moderate-High	69	Moderate-High	2	8	Medium	8	Medium
11	*Pipistrellus pipistrellus*	Jun	41	Moderate	56	Moderate	2	6	Medium	6	Medium
11	*Pipistrellus pipistrellus*	Jul	41	Moderate	41	Moderate	2	6	Medium	6	Medium
11	*Pipistrellus pipistrellus*	Aug	78	Moderate-High	88	High	2	8	Medium	10	Medium
11	*Pipistrellus pipistrellus*	Sep	73	Moderate-High	73	Moderate-High	2	8	Medium	8	Medium
11	*Pipistrellus pygmaeus*	May	74	Moderate-High	78	Moderate-High	2	8	Medium	8	Medium
11	*Pipistrellus pygmaeus*	Jun	2	Low	41	Moderate	2	2	Low	6	Medium
11	*Pipistrellus pygmaeus*	Aug	64	Moderate-High	89	High	2	8	Medium	10	Medium
11	*Pipistrellus pygmaeus*	Sep	41	Moderate	41	Moderate	2	6	Medium	6	Medium
12	*Pipistrellus pipistrellus*	May	2	Low	2	Low	2	2	Low	2	Low
12	*Pipistrellus pipistrellus*	Jun	2	Low	2	Low	2	2	Low	2	Low
12	*Pipistrellus pipistrellus*	Aug	41	Moderate	41	Moderate	2	6	Medium	6	Medium
12	*Pipistrellus pipistrellus*	Sep	2	Low	2	Low	2	2	Low	2	Low
12	*Pipistrellus pygmaeus*	May	22	Low-Moderate	41	Moderate	2	4	Low	6	Medium
12	*Pipistrellus pygmaeus*	Aug	64	Moderate-High	69	Moderate-High	2	8	Medium	8	Medium
13	*Pipistrellus pipistrellus*	May	41	Moderate	69	Moderate-High	2	6	Medium	8	Medium
13	*Pipistrellus pipistrellus*	Jun	2	Low	2	Low	2	2	Low	2	Low
13	*Pipistrellus pipistrellus*	Aug	41	Moderate	41	Moderate	2	6	Medium	6	Medium

Location ID	Species	Month	Median Percentile	Median Activity Category (Taken from Table 4-1)	Maximum Percentile	Maximum Activity Category (Taken from Table 4-1)	Site Risk (Taken from Table 4-5)	Overall Median Site Risk Score (Taken from Table 4-6)	Overall Median Site Risk Category	Overall Maximum Site Risk Score (Taken from Table 4-6)	Overall Maximum Site Risk Category
13	*Pipistrellus pygmaeus*	May	41	Moderate	41	Moderate	2	6	Medium	6	Medium
13	*Pipistrellus pygmaeus*	Jun	2	Low	2	Low	2	2	Low	2	Low
13	*Pipistrellus pygmaeus*	Aug	83	High	83	High	2	10	Medium	10	Medium
2	*Myotis daubentonii*	Aug	2	Low	2	Low	2	2	Low	2	Low
2	*Nyctalus*	May	2	Low	2	Low	2	2	Low	2	Low
2	*Pipistrellus pipistrellus*	May	80	Moderate-High	86	High	2	8	Medium	10	Medium
2	*Pipistrellus pipistrellus*	Aug	64	Moderate-High	78	Moderate-High	2	8	Medium	8	Medium
2	*Pipistrellus pipistrellus*	Sep	2	Low	41	Moderate	2	2	Low	6	Medium
2	*Pipistrellus pygmaeus*	May	76	Moderate-High	93	High	2	8	Medium	10	Medium
2	*Pipistrellus pygmaeus*	Jun	38	Low-Moderate	73	Moderate-High	2	4	Low	8	Medium
2	*Pipistrellus pygmaeus*	Aug	69	Moderate-High	84	High	2	8	Medium	10	Medium
2	*Pipistrellus pygmaeus*	Sep	41	Moderate	41	Moderate	2	6	Medium	6	Medium
2	*Plecotus auritus*	Sep	2	Low	2	Low	2	2	Low	2	Low
3	*Myotis*	Jun	2	Low	2	Low	2	2	Low	2	Low
3	*Myotis*	Aug	2	Low	2	Low	2	2	Low	2	Low
3	*Pipistrellus pipistrellus*	May	68	Moderate-High	86	High	2	8	Medium	10	Medium
3	*Pipistrellus pipistrellus*	Jun	2	Low	2	Low	2	2	Low	2	Low
3	*Pipistrellus pipistrellus*	Aug	69	Moderate-High	81	High	2	8	Medium	10	Medium
3	*Pipistrellus pipistrellus*	Sep	2	Low	2	Low	2	2	Low	2	Low
3	*Pipistrellus pygmaeus*	May	56	Moderate	82	High	2	6	Medium	10	Medium
3	*Pipistrellus pygmaeus*	Jun	41	Moderate	41	Moderate	2	6	Medium	6	Medium
3	*Pipistrellus pygmaeus*	Aug	81	High	84	High	2	10	Medium	10	Medium
3	*Pipistrellus pygmaeus*	Sep	2	Low	2	Low	2	2	Low	2	Low
4	*Pipistrellus pipistrellus*	May	88	High	89	High	2	10	Medium	10	Medium
4	*Pipistrellus pipistrellus*	Jun	2	Low	41	Moderate	2	2	Low	6	Medium
4	*Pipistrellus pipistrellus*	Aug	78	Moderate-High	85	High	2	8	Medium	10	Medium
4	*Pipistrellus pipistrellus*	Sep	33	Low-Moderate	64	Moderate-High	2	4	Low	8	Medium
4	*Pipistrellus pygmaeus*	May	88	High	95	High	2	10	Medium	10	Medium
4	*Pipistrellus pygmaeus*	Jun	2	Low	56	Moderate	2	2	Low	6	Medium
4	*Pipistrellus pygmaeus*	Aug	80	Moderate-High	88	High	2	8	Medium	10	Medium
4	*Pipistrellus pygmaeus*	Sep	56	Moderate	56	Moderate	2	6	Medium	6	Medium
5	*Myotis*	May	2	Low	2	Low	2	2	Low	2	Low
5	*Myotis*	Sep	2	Low	2	Low	2	2	Low	2	Low
5	*Myotis daubentonii*	Aug	2	Low	2	Low	2	2	Low	2	Low
5	*Pipistrellus pipistrellus*	May	64	Moderate-High	92	High	2	8	Medium	10	Medium
5	*Pipistrellus pipistrellus*	Jun	2	Low	56	Moderate	2	2	Low	6	Medium
5	*Pipistrellus pipistrellus*	Aug	78	Moderate-High	88	High	2	8	Medium	10	Medium
5	*Pipistrellus pipistrellus*	Sep	65	Moderate-High	82	High	2	8	Medium	10	Medium
5	*Pipistrellus pygmaeus*	May	81	High	94	High	2	10	Medium	10	Medium
5	*Pipistrellus pygmaeus*	Aug	88	High	89	High	2	10	Medium	10	Medium

Location ID	Species	Month	Median Percentile	Median Activity Category (Taken from Table 4-1)	Maximum Percentile	Maximum Activity Category (Taken from Table 4-1)	Site Risk (Taken from Table 4-5)	Overall Median Site Risk Score (Taken from Table 4-6)	Overall Median Site Risk Category	Overall Maximum Site Risk Score (Taken from Table 4-6)	Overall Maximum Site Risk Category
5	*Pipistrellus pygmaeus*	Sep	73	Moderate-High	78	Moderate-High	2	8	Medium	8	Medium
6	*Nyctalus*	Jun	2	Low	2	Low	2	2	Low	2	Low
6	*Pipistrellus pipistrellus*	May	85	High	87	High	2	10	Medium	10	Medium
6	*Pipistrellus pipistrellus*	Jun	2	Low	2	Low	2	2	Low	2	Low
6	*Pipistrellus pipistrellus*	Jul	2	Low	2	Low	2	2	Low	2	Low
6	*Pipistrellus pipistrellus*	Aug	67	Moderate-High	89	High	2	8	Medium	10	Medium
6	*Pipistrellus pipistrellus*	Sep	22	Low-Moderate	41	Moderate	2	4	Low	6	Medium
6	*Pipistrellus pygmaeus*	May	86	High	92	High	2	10	Medium	10	Medium
6	*Pipistrellus pygmaeus*	Jun	56	Moderate	56	Moderate	2	6	Medium	6	Medium
6	*Pipistrellus pygmaeus*	Aug	87	High	89	High	2	10	Medium	10	Medium
6	*Pipistrellus pygmaeus*	Sep	41	Moderate	56	Moderate	2	6	Medium	6	Medium
7	*Myotis*	May	2	Low	2	Low	2	2	Low	2	Low
7	*Myotis*	Sep	2	Low	2	Low	2	2	Low	2	Low
7	*Myotis daubentonii*	May	2	Low	2	Low	2	2	Low	2	Low
7	*Myotis daubentonii*	Sep	2	Low	2	Low	2	2	Low	2	Low
7	*Pipistrellus pipistrellus*	May	65	Moderate-High	81	High	2	8	Medium	10	Medium
7	*Pipistrellus pipistrellus*	Aug	92	High	95	High	2	10	Medium	10	Medium
7	*Pipistrellus pipistrellus*	Sep	82	High	90	High	2	10	Medium	10	Medium
7	*Pipistrellus pygmaeus*	May	80	Moderate-High	83	High	2	8	Medium	10	Medium
7	*Pipistrellus pygmaeus*	Aug	78	Moderate-High	90	High	2	8	Medium	10	Medium
7	*Pipistrellus pygmaeus*	Sep	56	Moderate	69	Moderate-High	2	6	Medium	8	Medium
8	*Myotis*	Aug	2	Low	2	Low	2	2	Low	2	Low
8	*Myotis daubentonii*	Aug	2	Low	2	Low	2	2	Low	2	Low
8	*Pipistrellus pipistrellus*	May	76	Moderate-High	78	Moderate-High	2	8	Medium	8	Medium
8	*Pipistrellus pipistrellus*	Jun	29	Low-Moderate	56	Moderate	2	4	Low	6	Medium
8	*Pipistrellus pipistrellus*	Aug	80	Moderate-High	80	Moderate-High	2	8	Medium	8	Medium
8	*Pipistrellus pipistrellus*	Sep	56	Moderate	56	Moderate	2	6	Medium	6	Medium
8	*Pipistrellus pygmaeus*	May	75	Moderate-High	81	High	2	8	Medium	10	Medium
8	*Pipistrellus pygmaeus*	Jun	2	Low	2	Low	2	2	Low	2	Low
8	*Pipistrellus pygmaeus*	Aug	78	Moderate-High	80	Moderate-High	2	8	Medium	8	Medium
8	*Pipistrellus pygmaeus*	Sep	69	Moderate-High	69	Moderate-High	2	8	Medium	8	Medium
9	*Myotis*	Aug	2	Low	2	Low	2	2	Low	2	Low
9	*Pipistrellus pipistrellus*	May	69	Moderate-High	87	High	2	8	Medium	10	Medium
9	*Pipistrellus pipistrellus*	Jun	41	Moderate	41	Moderate	2	6	Medium	6	Medium
9	*Pipistrellus pipistrellus*	Aug	80	Moderate-High	84	High	2	8	Medium	10	Medium
9	*Pipistrellus pipistrellus*	Sep	64	Moderate-High	64	Moderate-High	2	8	Medium	8	Medium
9	*Pipistrellus pygmaeus*	May	64	Moderate-High	76	Moderate-High	2	8	Medium	8	Medium
9	*Pipistrellus pygmaeus*	Jun	2	Low	41	Moderate	2	2	Low	6	Medium
9	*Pipistrellus pygmaeus*	Aug	69	Moderate-High	84	High	2	8	Medium	10	Medium

ANNEX F. ECOBAT REPORT

This report was produced free of charge by the Mammal Society to support evidence-based conservation of bats.

The following analyses are based on data supplied by the user to the Mammal Society's Ecobat website. The outputs are designed to assist decision-making, but do not replace expert interpretation by the user. The creation of the Ecobat tool was supported by the Natural Environment Research Council (NERC).

Bat Activity Analysis

Site Name: Vale of Leven

Author: MacArthur Green

06/07/2021

Summary

Bats were detected on **42** nights between **2020-05-05** and **2020-09-08**, using **13** static bat detectors. Throughout this period **6** species were recorded. **Table 1.** Detectors were placed at the following locations:

Detector ID	Latitude	Longitude
5	55.99437	-4.507494
7	55.98820	-4.520774
3	55.99009	-4.494651
8	55.98313	-4.520178
9	55.97865	-4.514975
1	55.99918	-4.483447
10	55.98617	-4.503036
2	55.99932	-4.500863
6	55.99352	-4.516487
11	55.98318	-4.497862
13	55.97271	-4.500913
4	55.99077	-4.502384
12	55.97868	-4.496411

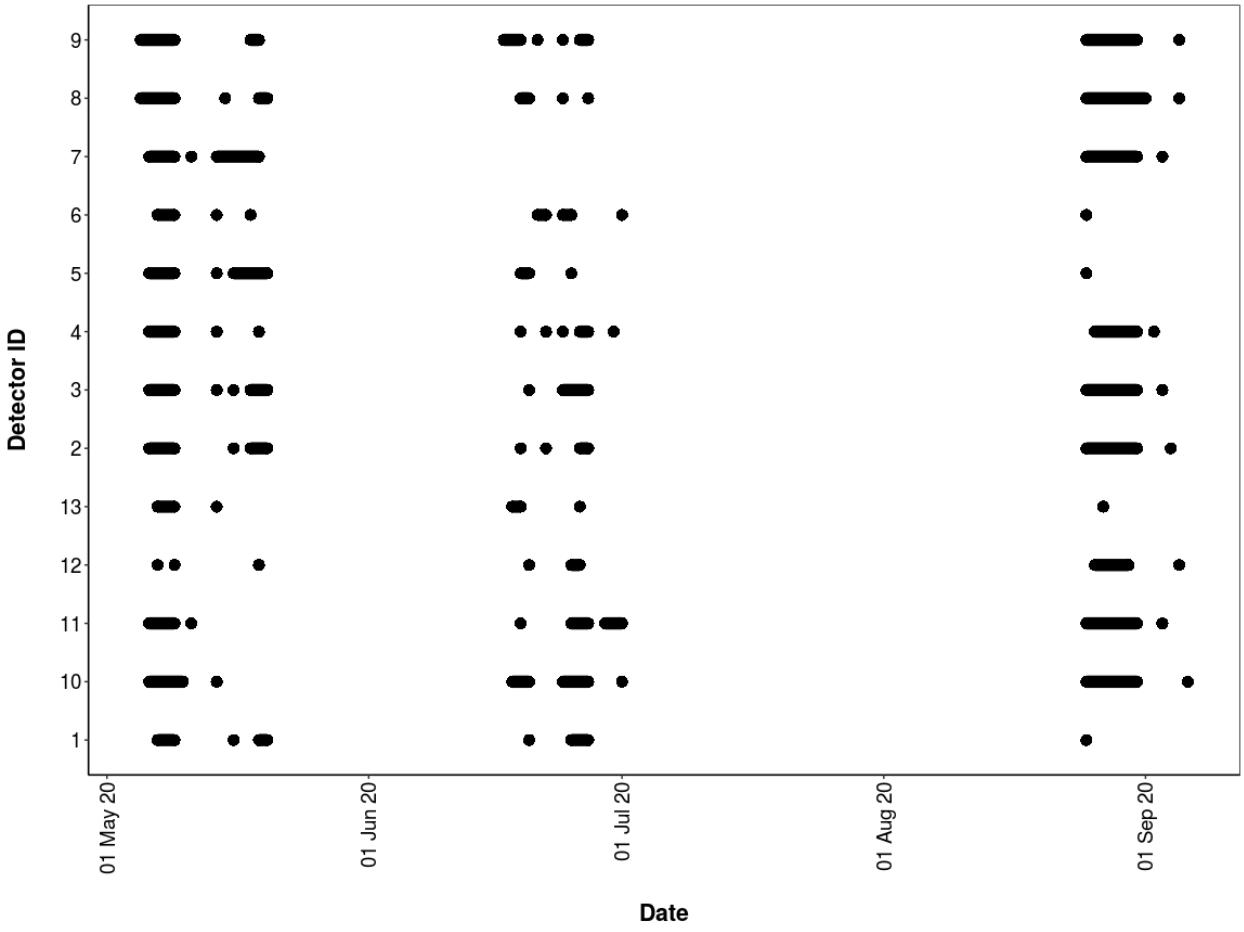
Survey Nights

Table 2. The number of nights that bats were detected on each recorder. This is not the same as the number of nights that detectors were active if there were nights when no bats were detected.

Detector ID	No. of nights
1	13
2	23
3	24
4	23
5	28
6	23
7	24
8	22
9	23
10	22
11	23
12	12
13	10

Survey Nights

Figure 1. Horizontal bars show nights when acoustic detectors recorded bats.



PART 1: Percentiles Analysis

This first part of the analysis looks at the relative activity levels of the bats you recorded. We take your value for the total bat passes each night for each species, and compare this to the values in our reference database. We tell you what percentile your data falls at, and therefore what the relative activity level is. For example, if the reference database has values of 5, 10, 15, 20 and you submit a value of 18, this will be the 80th percentile, and be classed as high activity.

The reference range dataset was stratified to include:

- Only records from within 30 days of the survey date.
- Only records from within 100km radius of the survey location.
- Records using any make of bat detector.

PER DETECTOR

Table 3. Summary table showing the number of nights recorded bat activity fell into each activity band for each species.

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
1	*Myotis daubentonii*	0	0	0	0	1
1	*Nyctalus*	0	0	2	0	0
1	*Pipistrellus pipistrellus*	2	1	2	0	4
1	*Pipistrellus pygmaeus*	2	4	2	0	2
10	*Myotis daubentonii*	0	0	0	0	1
10	*Nyctalus*	0	0	1	0	0
10	*Pipistrellus pipistrellus*	5	3	5	0	3
10	*Pipistrellus pygmaeus*	4	6	5	0	3
11	*Pipistrellus pipistrellus*	3	8	8	0	2
11	*Pipistrellus pygmaeus*	3	3	4	0	7
12	*Pipistrellus pipistrellus*	0	0	3	0	5
12	*Pipistrellus pygmaeus*	0	3	3	0	1
13	*Pipistrellus pipistrellus*	0	1	4	0	3
13	*Pipistrellus pygmaeus*	2	1	2	0	2
2	*Myotis daubentonii*	0	0	0	0	1
2	*Nyctalus*	0	0	0	0	1
2	*Pipistrellus pipistrellus*	2	7	3	0	2

2	*Pipistrellus pygmaeus*	5	9	4	0	2
2	*Plecotus auritus*	0	0	0	0	1
3	*Myotis*	0	0	0	0	2
3	*Pipistrellus pipistrellus*	4	2	3	0	4
3	*Pipistrellus pygmaeus*	8	1	7	0	5
4	*Pipistrellus pipistrellus*	5	4	2	0	6
4	*Pipistrellus pygmaeus*	6	3	5	0	7
5	*Myotis*	0	0	0	0	2
5	*Myotis daubentonii*	0	0	0	0	1
5	*Pipistrellus pipistrellus*	9	6	7	0	5
5	*Pipistrellus pygmaeus*	8	10	1	0	1
6	*Nyctalus*	0	0	0	0	1
6	*Pipistrellus pipistrellus*	5	1	4	0	7
6	*Pipistrellus pygmaeus*	8	0	6	0	5
7	*Myotis*	0	0	0	0	2
7	*Myotis daubentonii*	0	0	0	0	2
7	*Pipistrellus pipistrellus*	13	3	6	0	1
7	*Pipistrellus pygmaeus*	4	7	6	0	0
8	*Myotis*	0	0	0	0	1
8	*Myotis daubentonii*	0	0	0	0	1
8	*Pipistrellus pipistrellus*	0	8	5	0	4
8	*Pipistrellus pygmaeus*	2	10	1	0	5
9	*Myotis*	0	0	0	0	1

9	*Pipistrellus pipistrellus*	4	6	3	0	4
9	*Pipistrellus pygmaeus*	2	8	3	0	5

Table 4. Summary table showing key metrics for each species recorded. The reference range is the number of nights for each species that your data were compared to. We recommend a Reference Range of 200+ to be confident in the relative activity level.

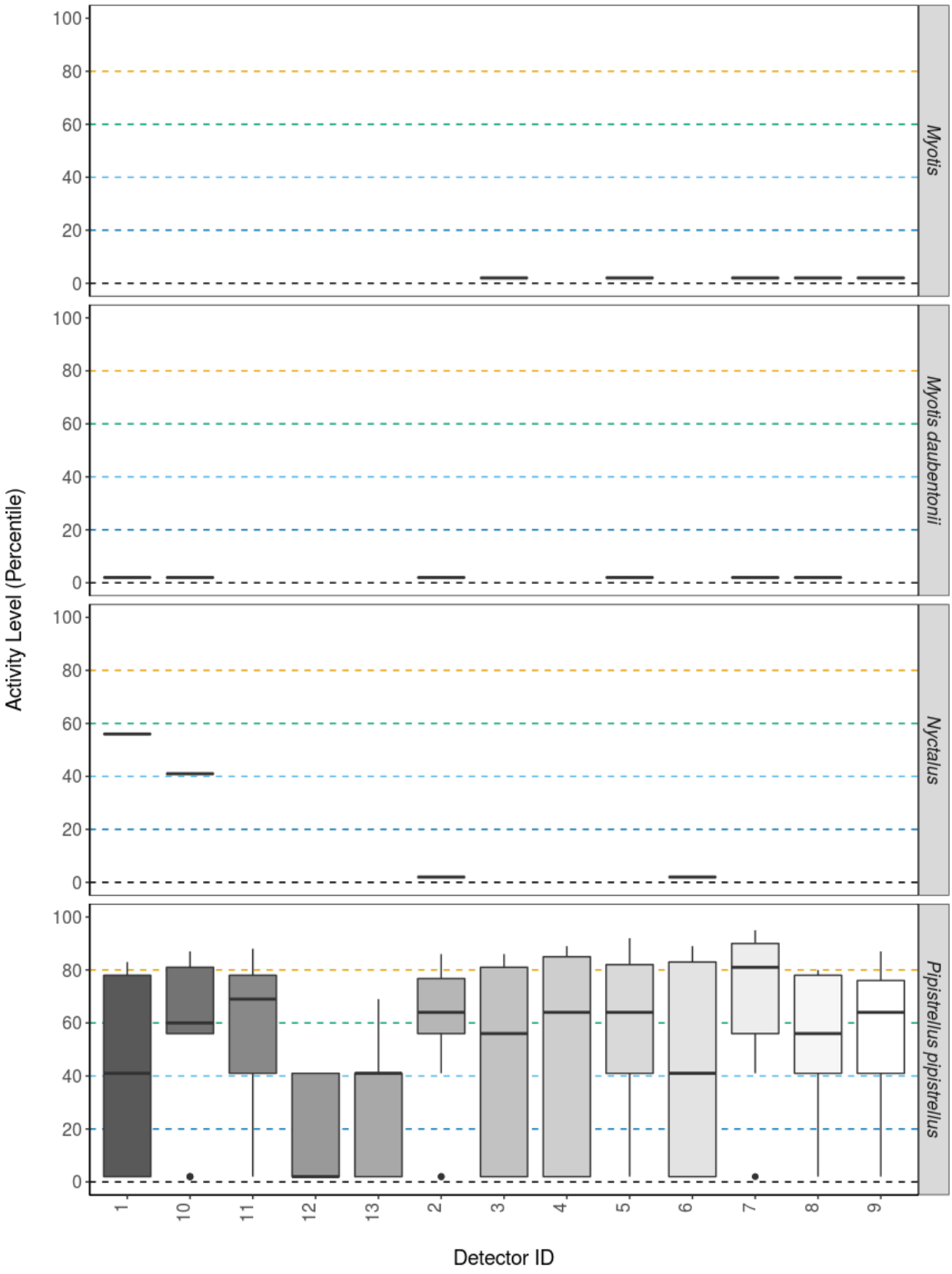
Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
1	*Myotis daubentonii*	2	0	2	1	398
1	*Nyctalus*	56	56 - 56	56	2	2186
1	*Pipistrellus pipistrellus*	41	2 - 62	83	9	7451
1	*Pipistrellus pygmaeus*	67	33 - 78.5	88	10	11965
10	*Myotis daubentonii*	2	0	2	1	398
10	*Nyctalus*	41	0	41	1	2186
10	*Pipistrellus pipistrellus*	60	41 - 75.5	87	16	7451
10	*Pipistrellus pygmaeus*	64	41 - 71	92	18	11965
11	*Pipistrellus pipistrellus*	69	48.5 - 72	88	21	7451
11	*Pipistrellus pygmaeus*	41	21.5 - 59.5	89	17	11965
12	*Pipistrellus pipistrellus*	2	2 - 21.5	41	8	7451
12	*Pipistrellus pygmaeus*	56	21.5 - 66.5	69	7	11965
13	*Pipistrellus pipistrellus*	41	2 - 55	69	8	7451
13	*Pipistrellus pygmaeus*	41	21.5 - 73.5	83	7	11965
2	*Myotis daubentonii*	2	0	2	1	398
2	*Nyctalus*	2	0	2	1	2186
2	*Pipistrellus pipistrellus*	64	40 - 75	86	14	7451
2	*Pipistrellus pygmaeus*	73	55 - 76.5	93	20	11965

2	*Plecotus auritus*	2	0	2	1	471
3	*Myotis*	2	2 - 2	2	2	3535
3	*Pipistrellus pipistrellus*	56	29 - 75	86	13	7451
3	*Pipistrellus pygmaeus*	41	41 - 62.5	84	21	11965
4	*Pipistrellus pipistrellus*	64	33 - 74.5	89	17	7451
4	*Pipistrellus pygmaeus*	56	29 - 72	95	21	11965
5	*Myotis*	2	2 - 2	2	2	3535
5	*Myotis daubentonii*	2	0	2	1	398
5	*Pipistrellus pipistrellus*	64	44 - 73.5	92	27	7451
5	*Pipistrellus pygmaeus*	77	68.5 - 83	94	20	11965
6	*Nyctalus*	2	0	2	1	2186
6	*Pipistrellus pipistrellus*	41	21.5 - 64	89	17	7451
6	*Pipistrellus pygmaeus*	56	42 - 72.5	92	19	11965
7	*Myotis*	2	2 - 2	2	2	3535
7	*Myotis daubentonii*	2	2 - 2	2	2	398
7	*Pipistrellus pipistrellus*	81	65.5 - 85.5	95	23	7451
7	*Pipistrellus pygmaeus*	69	62.5 - 78	90	17	11965
8	*Myotis*	2	0	2	1	3535
8	*Myotis daubentonii*	2	0	2	1	398
8	*Pipistrellus pipistrellus*	56	39 - 72.5	80	17	7451
8	*Pipistrellus pygmaeus*	69	35.5 - 74.5	81	18	11965
9	*Myotis*	2	0	2	1	3535
9	*Pipistrellus pipistrellus*	64	35.5 - 74	87	17	7451

9	*Pipistrellus pygmaeus*	64	33 - 66.5	84	18	11965

###Figures

Figure 2. The recorded activity of bats during the survey. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity)


Activity Level (Percentile)
100
80
60
40
20
0
Myotis
Myotis daubentonii
Nyctalus
Pipistrellus pipistrellus
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID

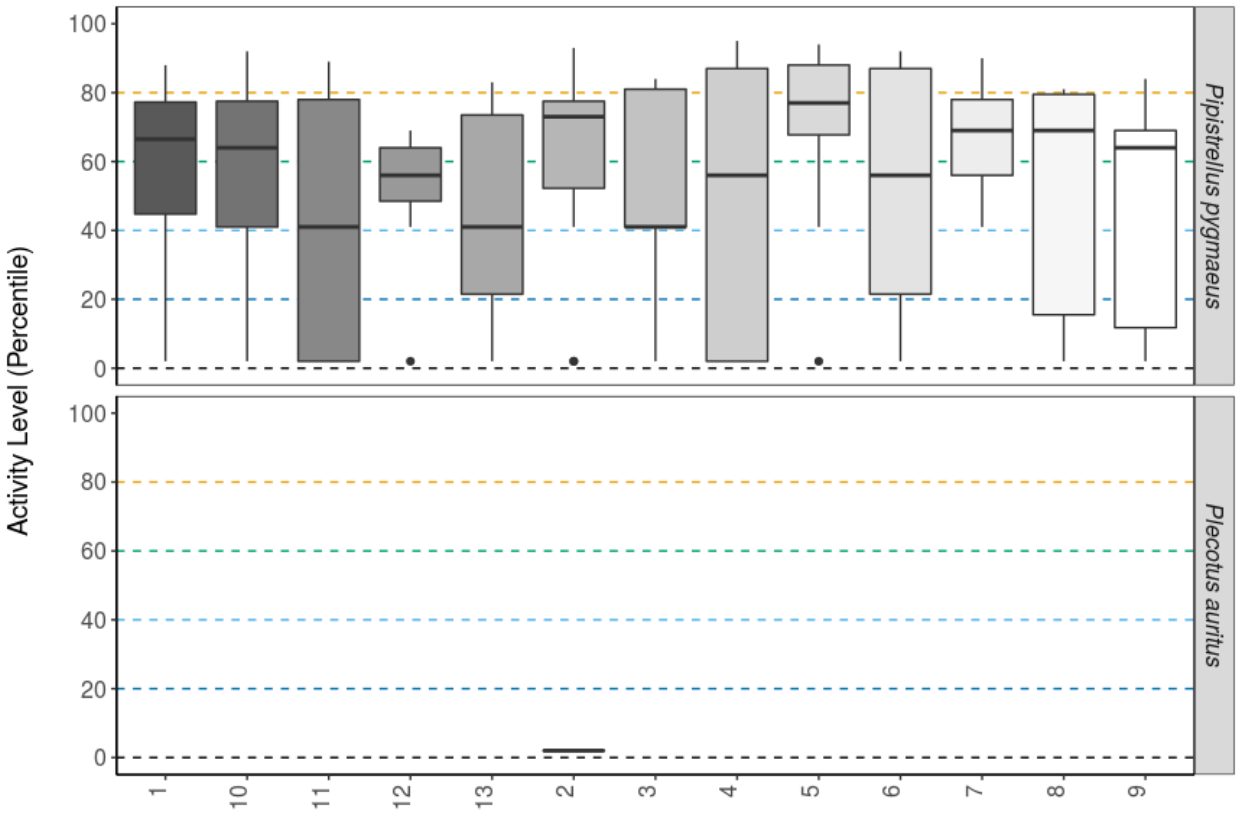
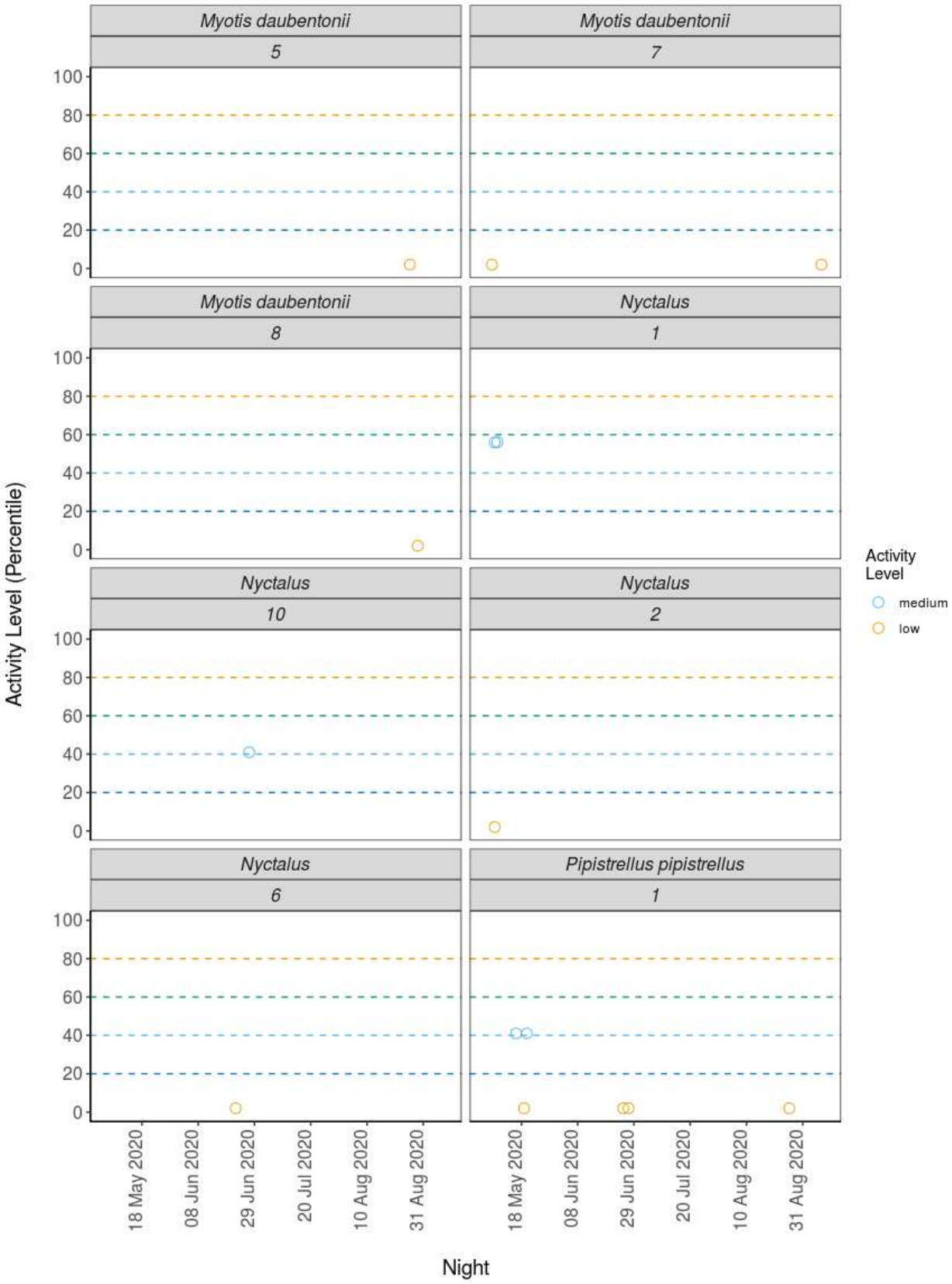
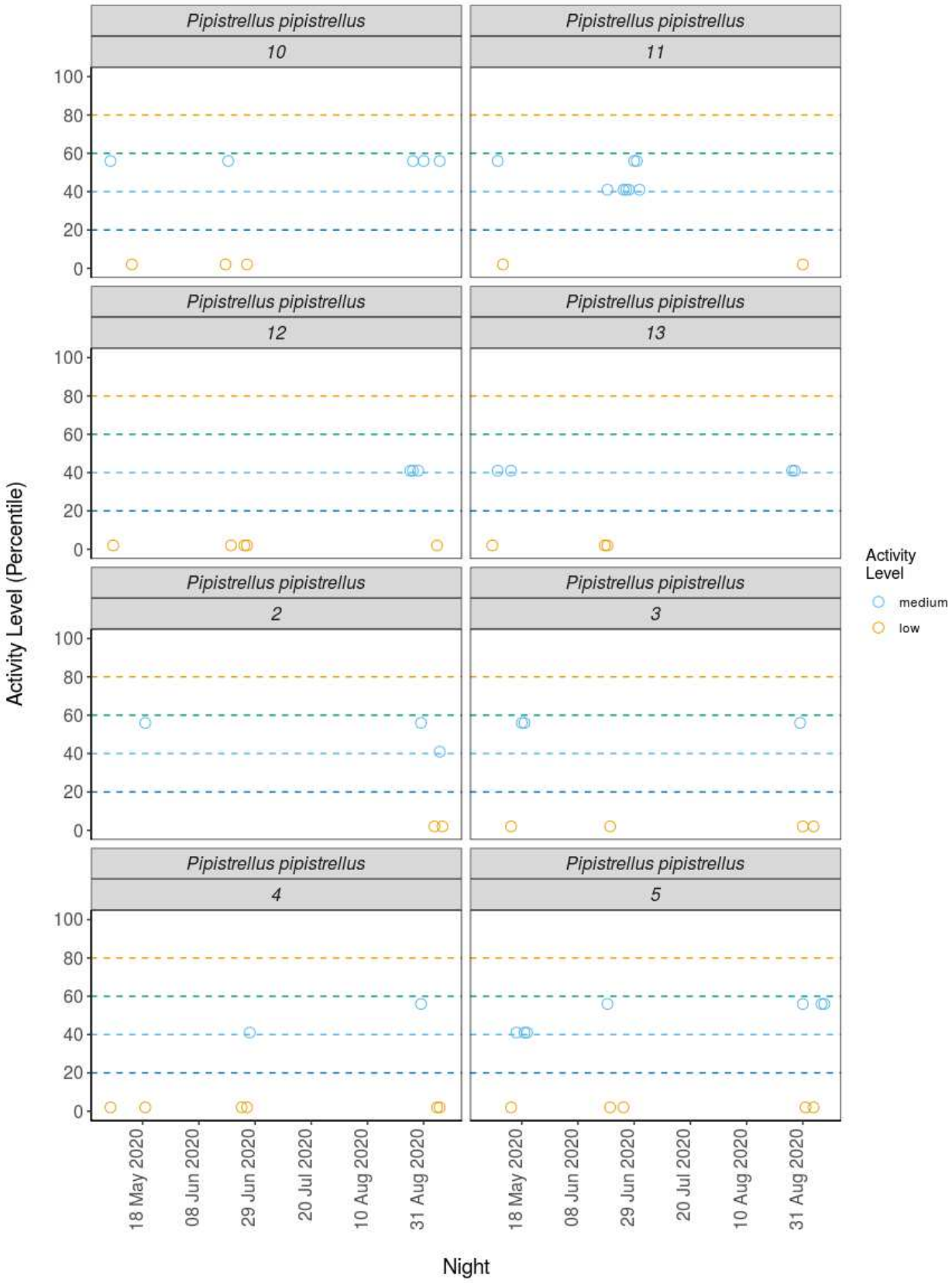
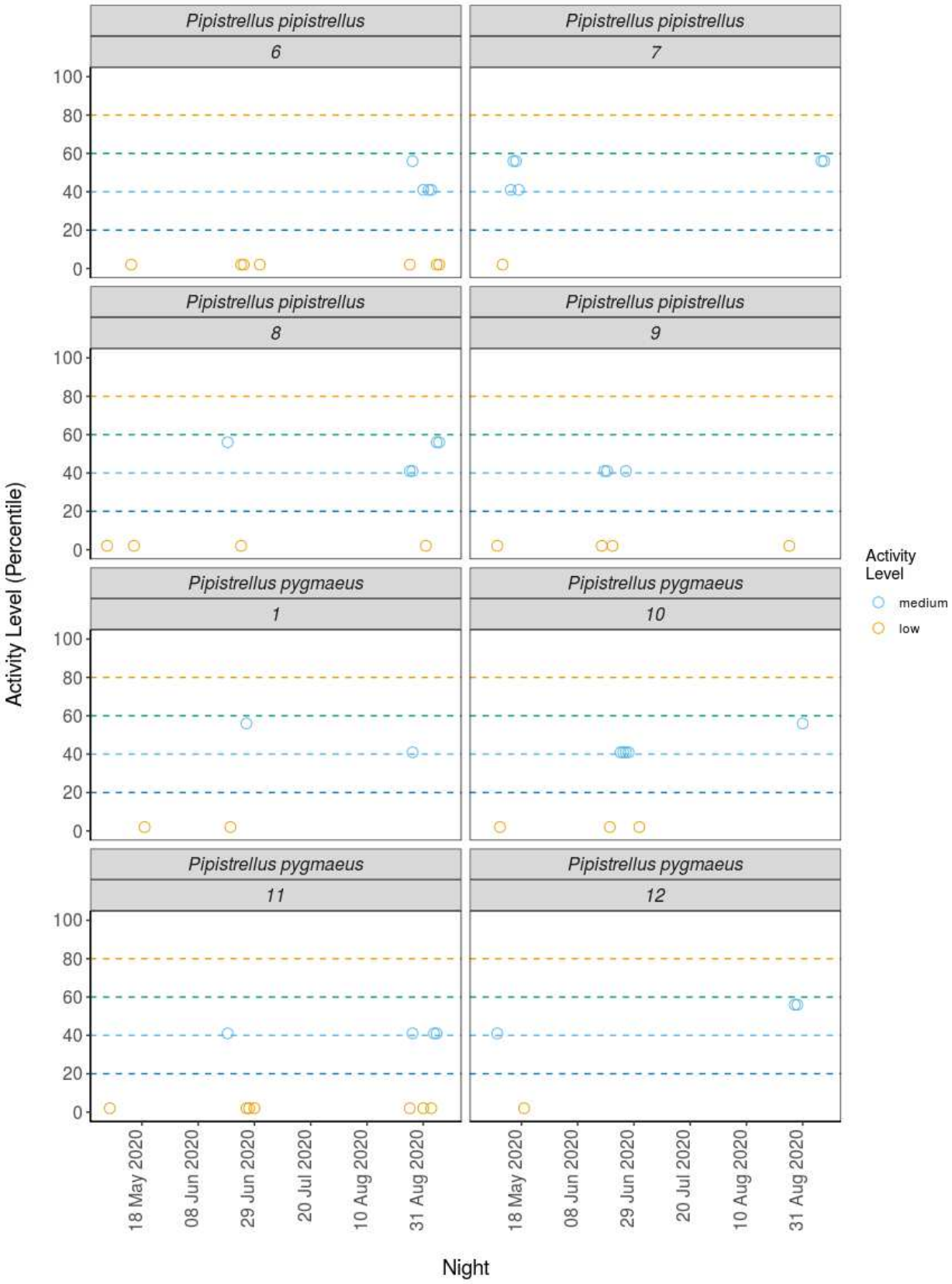
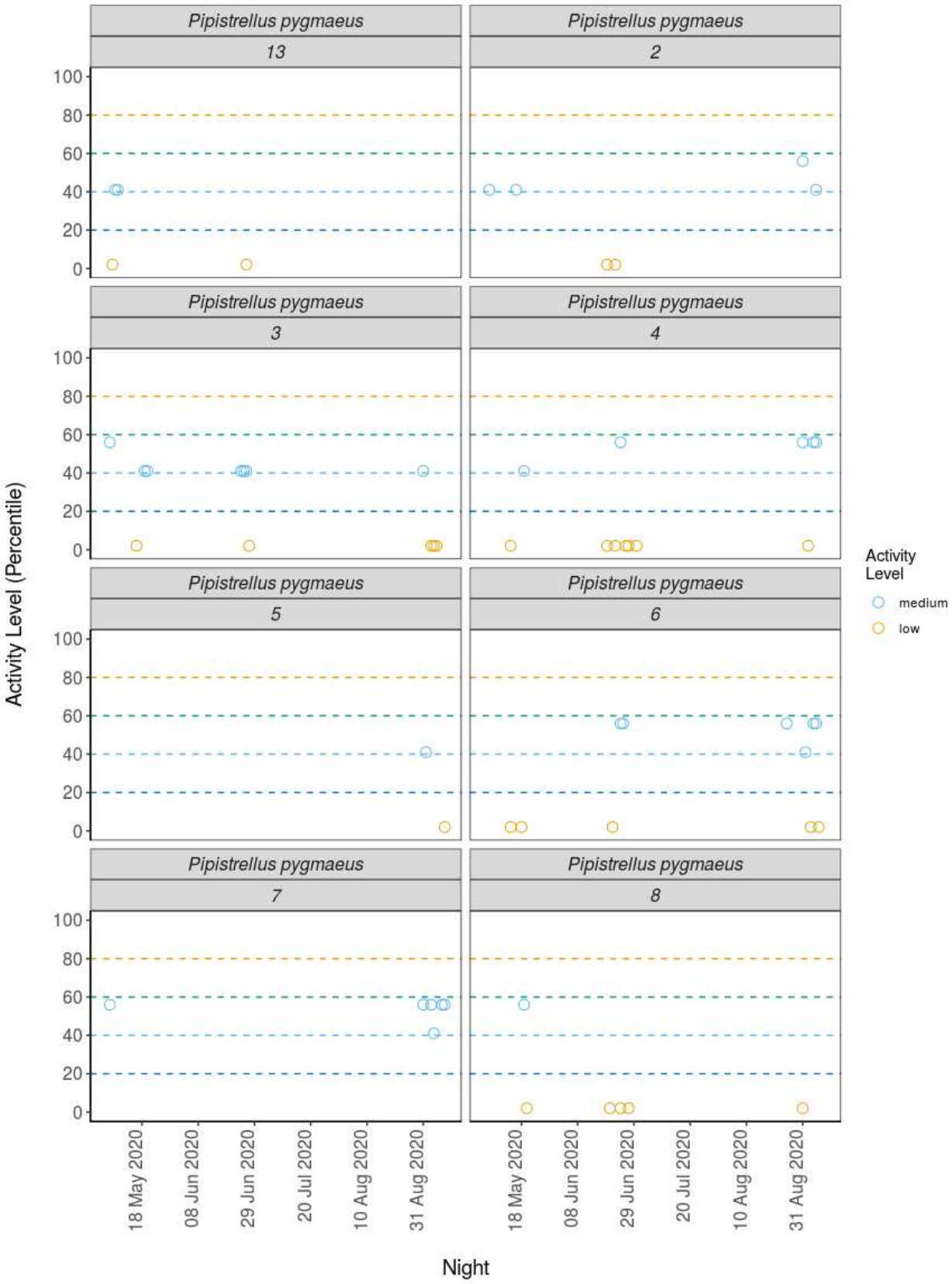

Activity Level (Percentile)
100
80
60
40
20
0
Pipistrellus pygmaeus
Plecotus auritus
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID

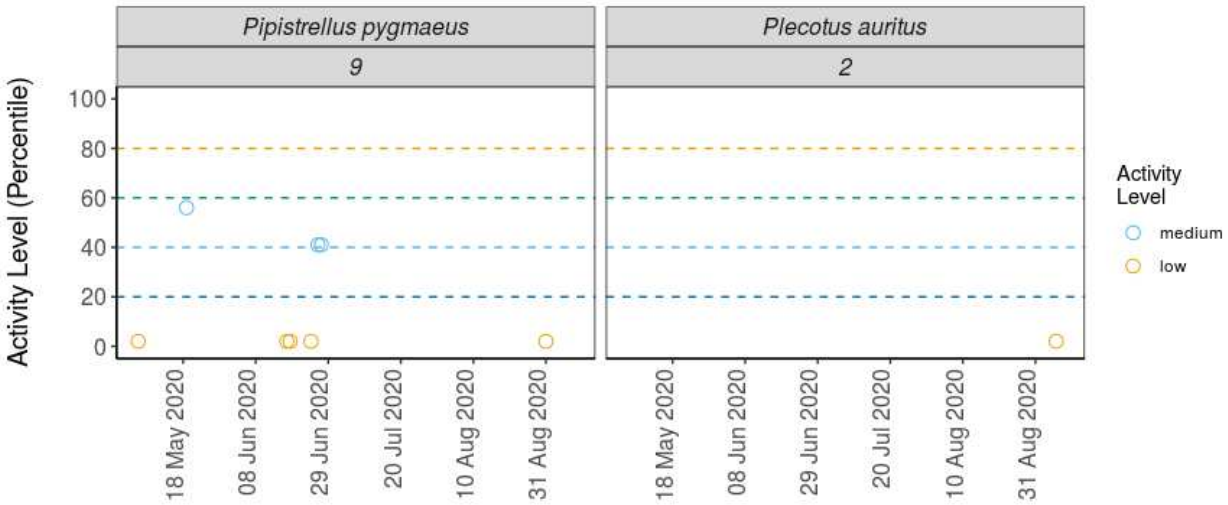
Figure 3. The activity level (percentile) of bats recorded across each night of the bat survey.


Myotis daubentonii
5
Myotis daubentonii
7
Myotis daubentonii
8
Nyctalus
1
Nyctalus
10
Nyctalus
2
Nyctalus
6
Pipistrellus pipistrellus
1
Activity Level (Percentile)
100
80
60
40
20
0
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Night
Activity Level
medium
low


Pipistrellus pipistrellus
10
11
12
13
2
3
4
5
Activity Level (Percentile)
100
80
60
40
20
0
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Night
Activity Level
medium
low


Pipistrellus pipistrellus
6
Pipistrellus pipistrellus
7
Pipistrellus pipistrellus
8
Pipistrellus pipistrellus
9
Pipistrellus pygmaeus
1
Pipistrellus pygmaeus
10
Pipistrellus pygmaeus
11
Pipistrellus pygmaeus
12
Activity Level (Percentile)
0
20
40
60
80
100
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Night
Activity Level
medium
low


Pipistrellus pygmaeus
13
2
3
4
5
6
7
8
Activity Level (Percentile)
0
20
40
60
80
100
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Night
Activity Level
medium
low


Pipistrellus pygmaeus
9
Plecotus auritus
2
Activity Level (Percentile)
100
80
60
40
20
0
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Activity Level
medium
low

Night

PER DETECTOR, PER MONTH

Table 5. Summary table showing the number of nights recorded bat activity fell into each activity band for each species at each detector during each month.

Detector ID	Species/Species Group	Month	Nights of High Activity	Nights of Moderate / High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
1	*Myotis daubentonii*	May	0	0	0	0	1
1	*Nyctalus*	May	0	0	2	0	0
1	*Pipistrellus pipistrellus*	May	2	1	2	0	1
1	*Pipistrellus pipistrellus*	Jun	0	0	0	0	2
1	*Pipistrellus pipistrellus*	Aug	0	0	0	0	1
1	*Pipistrellus pygmaeus*	May	2	1	0	0	1
1	*Pipistrellus pygmaeus*	Jun	0	1	1	0	1
1	*Pipistrellus pygmaeus*	Aug	0	2	1	0	0
10	*Myotis daubentonii*	Aug	0	0	0	0	1
10	*Nyctalus*	Jun	0	0	1	0	0
10	*Pipistrellus pipistrellus*	May	2	1	1	0	1
10	*Pipistrellus pipistrellus*	Jun	0	0	1	0	2
10	*Pipistrellus pipistrellus*	Aug	3	2	2	0	0
10	*Pipistrellus pipistrellus*	Sep	0	0	1	0	0
10	*Pipistrellus pygmaeus*	May	0	4	0	0	1
10	*Pipistrellus pygmaeus*	Jun	0	0	4	0	1

10	*Pipistrellus pygmaeus*	Jul	0	0	0	0	1
10	*Pipistrellus pygmaeus*	Aug	4	2	1	0	0
11	*Pipistrellus pipistrellus*	May	0	2	1	0	1
11	*Pipistrellus pipistrellus*	Jun	0	0	6	0	0
11	*Pipistrellus pipistrellus*	Jul	0	0	1	0	0
11	*Pipistrellus pipistrellus*	Aug	3	3	0	0	1
11	*Pipistrellus pipistrellus*	Sep	0	3	0	0	0
11	*Pipistrellus pygmaeus*	May	0	3	0	0	1
11	*Pipistrellus pygmaeus*	Jun	0	0	1	0	3
11	*Pipistrellus pygmaeus*	Aug	3	0	1	0	2
11	*Pipistrellus pygmaeus*	Sep	0	0	2	0	1
12	*Pipistrellus pipistrellus*	May	0	0	0	0	1
12	*Pipistrellus pipistrellus*	Jun	0	0	0	0	3
12	*Pipistrellus pipistrellus*	Aug	0	0	3	0	0
12	*Pipistrellus pipistrellus*	Sep	0	0	0	0	1
12	*Pipistrellus pygmaeus*	May	0	0	1	0	1
12	*Pipistrellus pygmaeus*	Aug	0	3	2	0	0
13	*Pipistrellus pipistrellus*	May	0	1	2	0	1
13	*Pipistrellus pipistrellus*	Jun	0	0	0	0	2
13	*Pipistrellus pipistrellus*	Aug	0	0	2	0	0

13	*Pipistrellus pygmaeus*	May	0	0	2	0	1
13	*Pipistrellus pygmaeus*	Jun	0	0	0	0	1
13	*Pipistrellus pygmaeus*	Aug	2	1	0	0	0
2	*Myotis daubentonii*	Aug	0	0	0	0	1
2	*Nyctalus*	May	0	0	0	0	1
2	*Pipistrellus pipistrellus*	May	2	1	1	0	0
2	*Pipistrellus pipistrellus*	Aug	0	6	1	0	0
2	*Pipistrellus pipistrellus*	Sep	0	0	1	0	2
2	*Pipistrellus pygmaeus*	May	3	3	2	0	0
2	*Pipistrellus pygmaeus*	Jun	0	2	0	0	2
2	*Pipistrellus pygmaeus*	Aug	2	4	1	0	0
2	*Pipistrellus pygmaeus*	Sep	0	0	1	0	0
2	*Plecotus auritus*	Sep	0	0	0	0	1
3	*Myotis*	Jun	0	0	0	0	1
3	*Myotis*	Aug	0	0	0	0	1
3	*Pipistrellus pipistrellus*	May	2	1	2	0	1
3	*Pipistrellus pipistrellus*	Jun	0	0	0	0	1
3	*Pipistrellus pipistrellus*	Aug	2	1	1	0	1
3	*Pipistrellus pipistrellus*	Sep	0	0	0	0	1
3	*Pipistrellus pygmaeus*	May	3	0	3	0	1
3	*Pipistrellus pygmaeus*	Jun	0	0	3	0	1

3	*Pipistrellus pygmaeus*	Aug	5	1	1	0	0
3	*Pipistrellus pygmaeus*	Sep	0	0	0	0	3
4	*Pipistrellus pipistrellus*	May	3	0	0	0	2
4	*Pipistrellus pipistrellus*	Jun	0	0	1	0	2
4	*Pipistrellus pipistrellus*	Aug	2	2	1	0	0
4	*Pipistrellus pipistrellus*	Sep	0	2	0	0	2
4	*Pipistrellus pygmaeus*	May	4	0	1	0	1
4	*Pipistrellus pygmaeus*	Jun	0	0	1	0	5
4	*Pipistrellus pygmaeus*	Aug	2	3	1	0	0
4	*Pipistrellus pygmaeus*	Sep	0	0	2	0	1
5	*Myotis*	May	0	0	0	0	1
5	*Myotis*	Sep	0	0	0	0	1
5	*Myotis daubentonii*	Aug	0	0	0	0	1
5	*Pipistrellus pipistrellus*	May	3	2	3	0	1
5	*Pipistrellus pipistrellus*	Jun	0	0	1	0	2
5	*Pipistrellus pipistrellus*	Aug	3	3	1	0	0
5	*Pipistrellus pipistrellus*	Sep	3	1	2	0	2
5	*Pipistrellus pygmaeus*	May	3	3	0	0	0
5	*Pipistrellus pygmaeus*	Aug	5	2	0	0	0
5	*Pipistrellus pygmaeus*	Sep	0	5	1	0	1
6	*Nyctalus*	Jun	0	0	0	0	1

6	*Pipistrellus pipistrellus*	May	3	0	0	0	1
6	*Pipistrellus pipistrellus*	Jun	0	0	0	0	2
6	*Pipistrellus pipistrellus*	Jul	0	0	0	0	1
6	*Pipistrellus pipistrellus*	Aug	2	1	2	0	1
6	*Pipistrellus pipistrellus*	Sep	0	0	2	0	2
6	*Pipistrellus pygmaeus*	May	3	0	0	0	2
6	*Pipistrellus pygmaeus*	Jun	0	0	2	0	1
6	*Pipistrellus pygmaeus*	Aug	5	0	1	0	0
6	*Pipistrellus pygmaeus*	Sep	0	0	3	0	2
7	*Myotis*	May	0	0	0	0	1
7	*Myotis*	Sep	0	0	0	0	1
7	*Myotis daubentonii*	May	0	0	0	0	1
7	*Myotis daubentonii*	Sep	0	0	0	0	1
7	*Pipistrellus pipistrellus*	May	3	2	4	0	1
7	*Pipistrellus pipistrellus*	Aug	7	0	0	0	0
7	*Pipistrellus pipistrellus*	Sep	3	1	2	0	0
7	*Pipistrellus pygmaeus*	May	2	1	1	0	0
7	*Pipistrellus pygmaeus*	Aug	2	4	1	0	0
7	*Pipistrellus pygmaeus*	Sep	0	2	4	0	0
8	*Myotis*	Aug	0	0	0	0	1
8	*Myotis daubentonii*	Aug	0	0	0	0	1

8	*Pipistrellus pipistrellus*	May	0	5	0	0	2
8	*Pipistrellus pipistrellus*	Jun	0	0	1	0	1
8	*Pipistrellus pipistrellus*	Aug	0	3	2	0	0
8	*Pipistrellus pipistrellus*	Sep	0	0	2	0	1
8	*Pipistrellus pygmaeus*	May	2	2	1	0	1
8	*Pipistrellus pygmaeus*	Jun	0	0	0	0	3
8	*Pipistrellus pygmaeus*	Aug	0	6	0	0	1
8	*Pipistrellus pygmaeus*	Sep	0	2	0	0	0
9	*Myotis*	Aug	0	0	0	0	1
9	*Pipistrellus pipistrellus*	May	2	3	0	0	1
9	*Pipistrellus pipistrellus*	Jun	0	0	3	0	2
9	*Pipistrellus pipistrellus*	Aug	2	1	0	0	1
9	*Pipistrellus pipistrellus*	Sep	0	2	0	0	0
9	*Pipistrellus pygmaeus*	May	0	4	1	0	1
9	*Pipistrellus pygmaeus*	Jun	0	0	2	0	3
9	*Pipistrellus pygmaeus*	Aug	2	4	0	0	1

Table 6. Summary table showing key metrics for each species recorded per month. Please note that we cannot split the reference range by month, hence this column is not shown in this table.

Detector ID	Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
1	*Myotis daubentonii*	May	2	0	2	1
1	*Nyctalus*	May	56	56 - 56	56	2
1	*Pipistrellus pipistrellus*	May	60	2 - 62	83	6
1	*Pipistrellus pipistrellus*	Jun	2	2 - 62	2	2
1	*Pipistrellus pipistrellus*	Aug	2	2 - 62	2	1
1	*Pipistrellus pygmaeus*	May	84	33 - 78.5	88	4
1	*Pipistrellus pygmaeus*	Jun	56	33 - 78.5	64	3
1	*Pipistrellus pygmaeus*	Aug	69	33 - 78.5	69	3
10	*Myotis daubentonii*	Aug	2	0	2	1
10	*Nyctalus*	Jun	41	0	41	1
10	*Pipistrellus pipistrellus*	May	64	41 - 75.5	81	5
10	*Pipistrellus pipistrellus*	Jun	2	41 - 75.5	56	3
10	*Pipistrellus pipistrellus*	Aug	80	41 - 75.5	87	7
10	*Pipistrellus pipistrellus*	Sep	56	41 - 75.5	56	1
10	*Pipistrellus pygmaeus*	May	64	41 - 71	64	5
10	*Pipistrellus pygmaeus*	Jun	41	41 - 71	41	5
10	*Pipistrellus pygmaeus*	Jul	2	41 - 71	2	1

10	*Pipistrellus pygmaeus*	Aug	86	41 - 71	92	7
11	*Pipistrellus pipistrellus*	May	63	48.5 - 72	69	4
11	*Pipistrellus pipistrellus*	Jun	41	48.5 - 72	56	6
11	*Pipistrellus pipistrellus*	Jul	41	48.5 - 72	41	1
11	*Pipistrellus pipistrellus*	Aug	78	48.5 - 72	88	7
11	*Pipistrellus pipistrellus*	Sep	73	48.5 - 72	73	3
11	*Pipistrellus pygmaeus*	May	74	21.5 - 59.5	78	4
11	*Pipistrellus pygmaeus*	Jun	2	21.5 - 59.5	41	4
11	*Pipistrellus pygmaeus*	Aug	64	21.5 - 59.5	89	6
11	*Pipistrellus pygmaeus*	Sep	41	21.5 - 59.5	41	3
12	*Pipistrellus pipistrellus*	May	2	2 - 21.5	2	1
12	*Pipistrellus pipistrellus*	Jun	2	2 - 21.5	2	3
12	*Pipistrellus pipistrellus*	Aug	41	2 - 21.5	41	3
12	*Pipistrellus pipistrellus*	Sep	2	2 - 21.5	2	1
12	*Pipistrellus pygmaeus*	May	22	21.5 - 66.5	41	2
12	*Pipistrellus pygmaeus*	Aug	64	21.5 - 66.5	69	5
13	*Pipistrellus pipistrellus*	May	41	2 - 55	69	4
13	*Pipistrellus pipistrellus*	Jun	2	2 - 55	2	2
13	*Pipistrellus pipistrellus*	Aug	41	2 - 55	41	2
13	*Pipistrellus pygmaeus*	May	41	21.5 - 73.5	41	3

13	*Pipistrellus pygmaeus*	Jun	2	21.5 - 73.5	2	1
13	*Pipistrellus pygmaeus*	Aug	83	21.5 - 73.5	83	3
2	*Myotis daubentonii*	Aug	2	0	2	1
2	*Nyctalus*	May	2	0	2	1
2	*Pipistrellus pipistrellus*	May	80	40 - 75	86	4
2	*Pipistrellus pipistrellus*	Aug	64	40 - 75	78	7
2	*Pipistrellus pipistrellus*	Sep	2	40 - 75	41	3
2	*Pipistrellus pygmaeus*	May	76	55 - 76.5	93	8
2	*Pipistrellus pygmaeus*	Jun	38	55 - 76.5	73	4
2	*Pipistrellus pygmaeus*	Aug	69	55 - 76.5	84	7
2	*Pipistrellus pygmaeus*	Sep	41	55 - 76.5	41	1
2	*Plecotus auritus*	Sep	2	0	2	1
3	*Myotis*	Jun	2	2 - 2	2	1
3	*Myotis*	Aug	2	2 - 2	2	1
3	*Pipistrellus pipistrellus*	May	68	29 - 75	86	6
3	*Pipistrellus pipistrellus*	Jun	2	29 - 75	2	1
3	*Pipistrellus pipistrellus*	Aug	69	29 - 75	81	5
3	*Pipistrellus pipistrellus*	Sep	2	29 - 75	2	1
3	*Pipistrellus pygmaeus*	May	56	41 - 62.5	82	7
3	*Pipistrellus pygmaeus*	Jun	41	41 - 62.5	41	4
3	*Pipistrellus pygmaeus*	Aug	81	41 - 62.5	84	7
3	*Pipistrellus pygmaeus*	Sep	2	41 - 62.5	2	3

4	*Pipistrellus pipistrellus*	May	88	33 - 74.5	89	5
4	*Pipistrellus pipistrellus*	Jun	2	33 - 74.5	41	3
4	*Pipistrellus pipistrellus*	Aug	78	33 - 74.5	85	5
4	*Pipistrellus pipistrellus*	Sep	33	33 - 74.5	64	4
4	*Pipistrellus pygmaeus*	May	88	29 - 72	95	6
4	*Pipistrellus pygmaeus*	Jun	2	29 - 72	56	6
4	*Pipistrellus pygmaeus*	Aug	80	29 - 72	88	6
4	*Pipistrellus pygmaeus*	Sep	56	29 - 72	56	3
5	*Myotis*	May	2	2 - 2	2	1
5	*Myotis*	Sep	2	2 - 2	2	1
5	*Myotis daubentonii*	Aug	2	0	2	1
5	*Pipistrellus pipistrellus*	May	64	44 - 73.5	92	9
5	*Pipistrellus pipistrellus*	Jun	2	44 - 73.5	56	3
5	*Pipistrellus pipistrellus*	Aug	78	44 - 73.5	88	7
5	*Pipistrellus pipistrellus*	Sep	65	44 - 73.5	82	8
5	*Pipistrellus pygmaeus*	May	81	68.5 - 83	94	6
5	*Pipistrellus pygmaeus*	Aug	88	68.5 - 83	89	7
5	*Pipistrellus pygmaeus*	Sep	73	68.5 - 83	78	7
6	*Nyctalus*	Jun	2	0	2	1
6	*Pipistrellus pipistrellus*	May	85	21.5 - 64	87	4
6	*Pipistrellus pipistrellus*	Jun	2	21.5 - 64	2	2

6	*Pipistrellus pipistrellus*	Jul	2	21.5 - 64	2	1
6	*Pipistrellus pipistrellus*	Aug	67	21.5 - 64	89	6
6	*Pipistrellus pipistrellus*	Sep	22	21.5 - 64	41	4
6	*Pipistrellus pygmaeus*	May	86	42 - 72.5	92	5
6	*Pipistrellus pygmaeus*	Jun	56	42 - 72.5	56	3
6	*Pipistrellus pygmaeus*	Aug	87	42 - 72.5	89	6
6	*Pipistrellus pygmaeus*	Sep	41	42 - 72.5	56	5
7	*Myotis*	May	2	2 - 2	2	1
7	*Myotis*	Sep	2	2 - 2	2	1
7	*Myotis daubentonii*	May	2	2 - 2	2	1
7	*Myotis daubentonii*	Sep	2	2 - 2	2	1
7	*Pipistrellus pipistrellus*	May	65	65.5 - 85.5	81	10
7	*Pipistrellus pipistrellus*	Aug	92	65.5 - 85.5	95	7
7	*Pipistrellus pipistrellus*	Sep	82	65.5 - 85.5	90	6
7	*Pipistrellus pygmaeus*	May	80	62.5 - 78	83	4
7	*Pipistrellus pygmaeus*	Aug	78	62.5 - 78	90	7
7	*Pipistrellus pygmaeus*	Sep	56	62.5 - 78	69	6
8	*Myotis*	Aug	2	0	2	1
8	*Myotis daubentonii*	Aug	2	0	2	1
8	*Pipistrellus pipistrellus*	May	76	39 - 72.5	78	7
8	*Pipistrellus pipistrellus*	Jun	29	39 - 72.5	56	2

8	*Pipistrellus pipistrellus*	Aug	80	39 - 72.5	80	5
8	*Pipistrellus pipistrellus*	Sep	56	39 - 72.5	56	3
8	*Pipistrellus pygmaeus*	May	75	35.5 - 74.5	81	6
8	*Pipistrellus pygmaeus*	Jun	2	35.5 - 74.5	2	3
8	*Pipistrellus pygmaeus*	Aug	78	35.5 - 74.5	80	7
8	*Pipistrellus pygmaeus*	Sep	69	35.5 - 74.5	69	2
9	*Myotis*	Aug	2	0	2	1
9	*Pipistrellus pipistrellus*	May	69	35.5 - 74	87	6
9	*Pipistrellus pipistrellus*	Jun	41	35.5 - 74	41	5
9	*Pipistrellus pipistrellus*	Aug	80	35.5 - 74	84	4
9	*Pipistrellus pipistrellus*	Sep	64	35.5 - 74	64	2
9	*Pipistrellus pygmaeus*	May	64	33 - 66.5	76	6
9	*Pipistrellus pygmaeus*	Jun	2	33 - 66.5	41	5
9	*Pipistrellus pygmaeus*	Aug	69	33 - 66.5	84	7

PER SITE

In this 'Per Site' section of the analysis, all values are taken from across all of the detectors to provide site-wide averages/medians.

Table 7. Summary table showing the number of nights recorded bat activity fell into each activity band for each species.

Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
Myotis	0	0	0	0	8
Myotis daubentonii	0	0	0	0	7
Nyctalus	0	0	3	0	2
Pipistrellus pipistrellus	52	50	55	0	50
Pipistrellus pygmaeus	54	65	49	0	45
Plecotus auritus	0	0	0	0	1

Table 8. Summary table showing key metrics for each species recorded.

Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	2	2 - 2	2	8
Myotis daubentonii	2	2 - 2	2	7
Nyctalus	41	56 - 56	56	5
Pipistrellus pipistrellus	56	65.5 - 85.5	95	207
Pipistrellus pygmaeus	64	68.5 - 83	95	213
Plecotus auritus	2	0	2	1

###Figures

Figure 4. The activity level (percentile) of bats recorded across each night of the bat survey for the **entire site**.

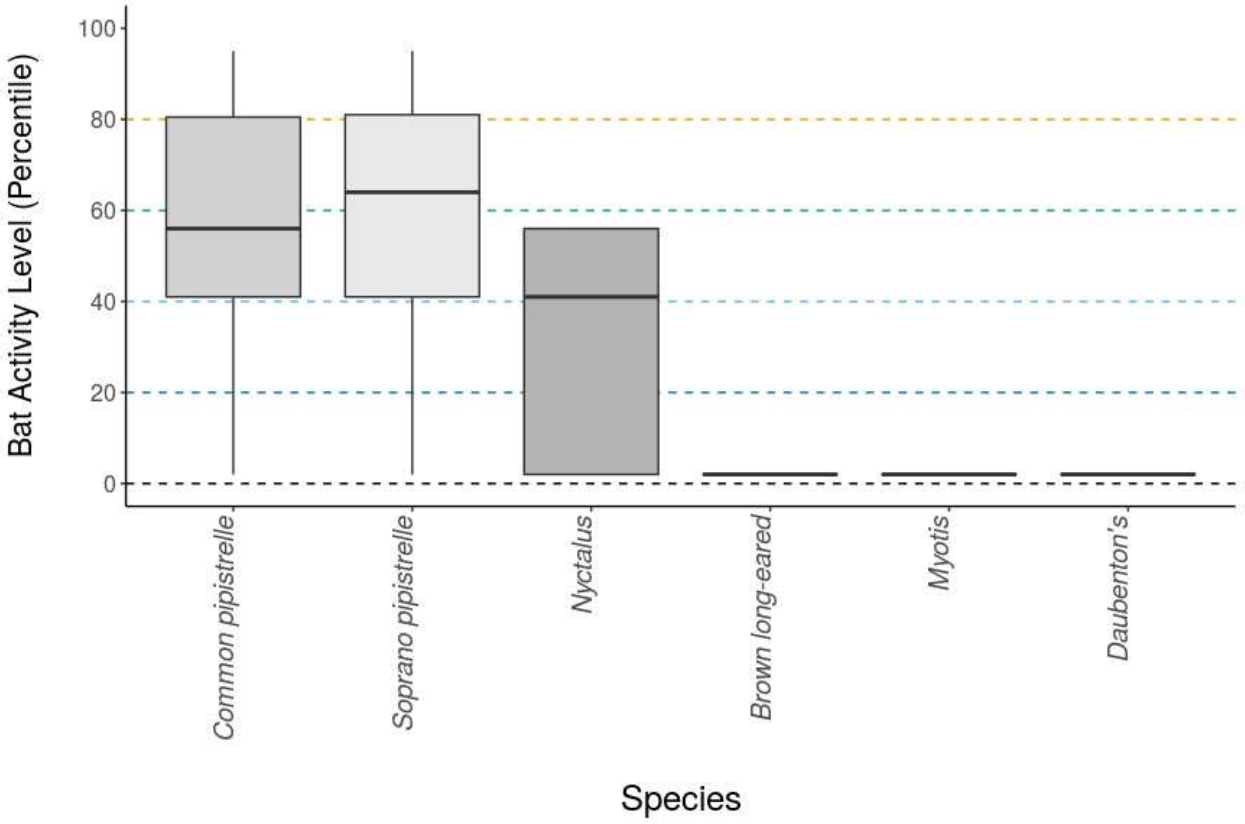
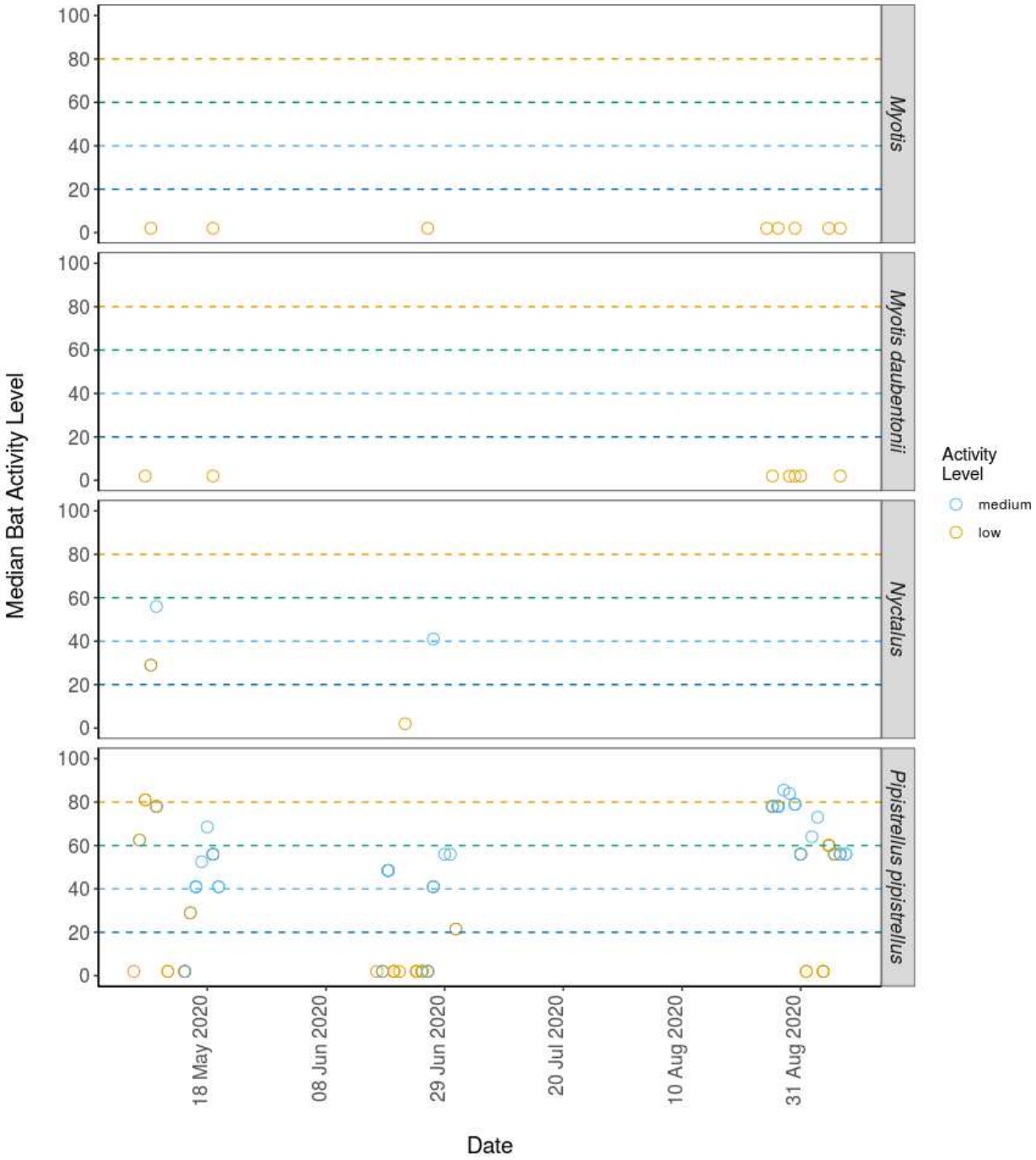
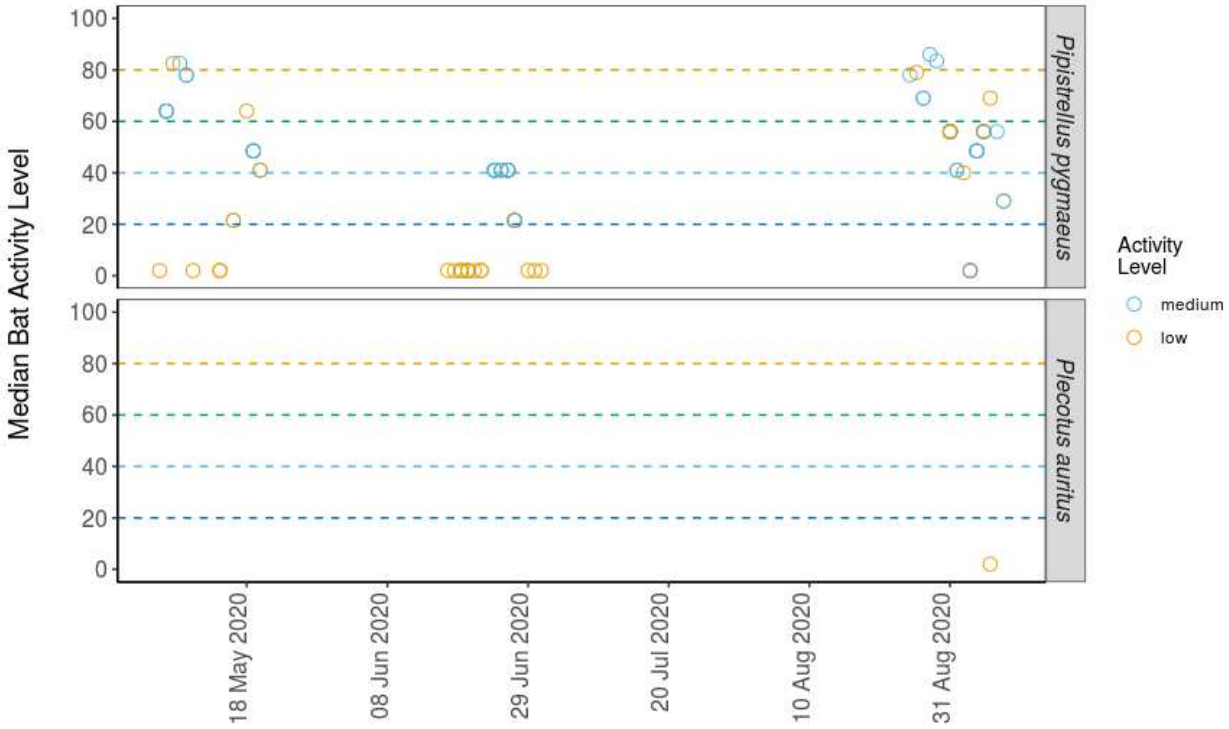


Figure 5. The median activity levels of bats recorded across all detectors each night.


Median Bat Activity Level
100
80
60
40
20
0
Myotis
Myotis daubentonii
Nyctalus
Pipistrellus pipistrellus
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Date
Activity Level
medium
low


Median Bat Activity Level
100
80
60
40
20
0
Pipistrellus pygmaeus
Plecotus auritus
18 May 2020
08 Jun 2020
29 Jun 2020
20 Jul 2020
10 Aug 2020
31 Aug 2020
Activity Level
medium
low

Date

PER SITE, PER MONTH

Table 9. Summary table showing the number of nights recorded bat activity fell into each activity band for each species during each month.

Species/Species Group	Month	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
Myotis	May	0	0	0	0	2
Myotis	Jun	0	0	0	0	1
Myotis	Aug	0	0	0	0	3
Myotis	Sep	0	0	0	0	2
Myotis daubentonii	May	0	0	0	0	2
Myotis daubentonii	Aug	0	0	0	0	4
Myotis daubentonii	Sep	0	0	0	0	1
Nyctalus	May	0	0	2	0	1
Nyctalus	Jun	0	0	1	0	1
Pipistrellus pipistrellus	May	22	19	16	0	14
Pipistrellus pipistrellus	Jun	0	0	13	0	19
Pipistrellus pipistrellus	Jul	0	0	1	0	1
Pipistrellus pipistrellus	Aug	24	22	15	0	5
Pipistrellus pipistrellus	Sep	6	9	10	0	11
Pipistrellus pygmaeus	May	22	21	12	0	11
Pipistrellus pygmaeus	Jun	0	3	14	0	21
Pipistrellus pygmaeus	Jul	0	0	0	0	1
Pipistrellus pygmaeus	Aug	32	32	10	0	4

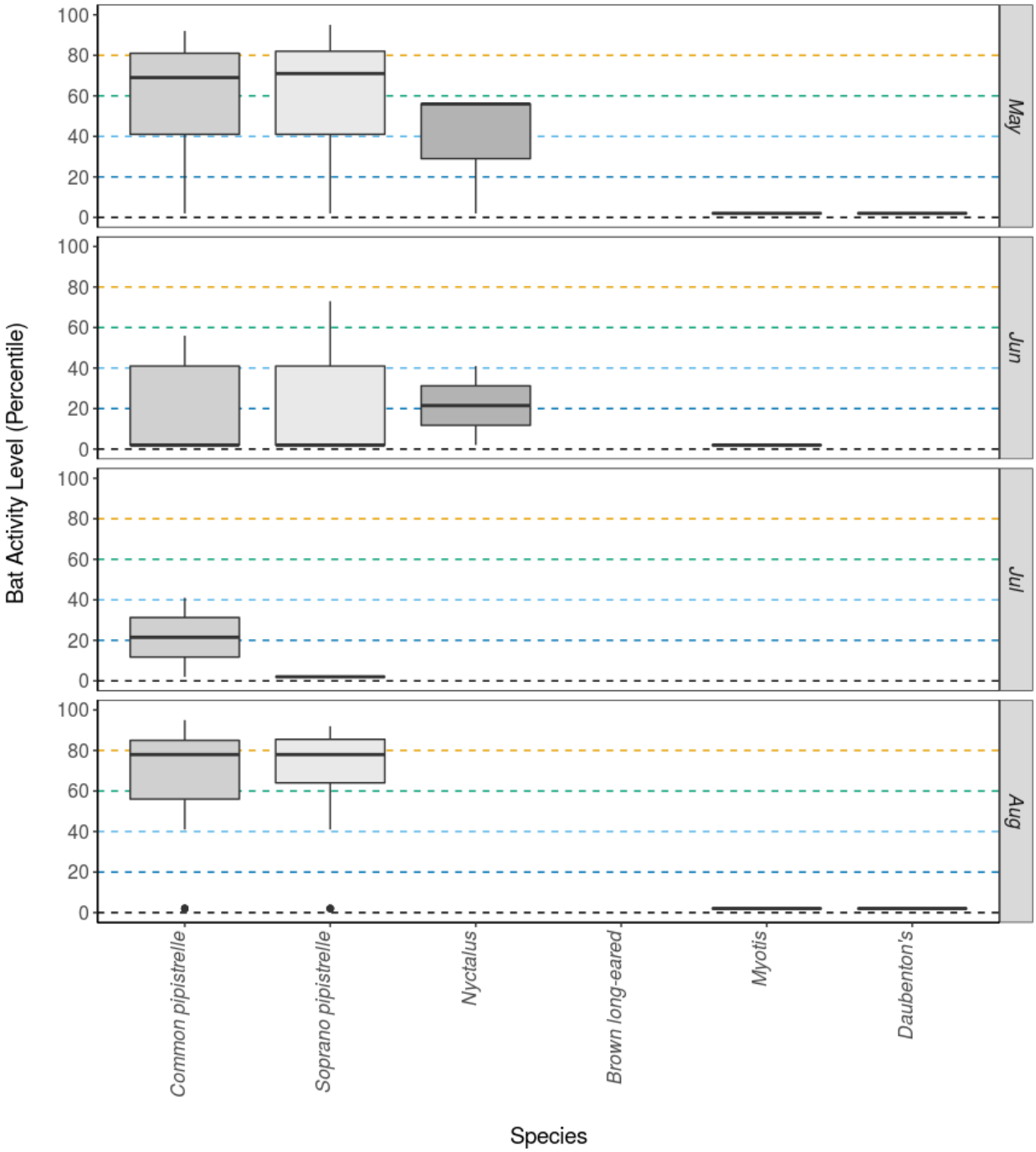
Pipistrellus pygmaeus	Sep	0	9	13	0	8
Plecotus auritus	Sep	0	0	0	0	1

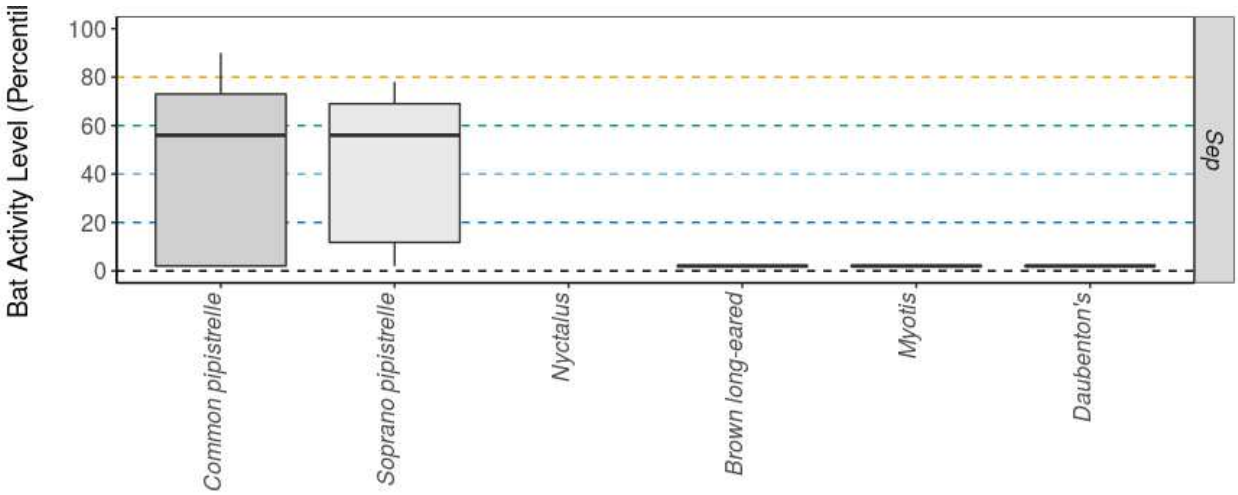
Table 10. Summary table showing key metrics for each species recorded per month.

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	May	2	2 - 2	2	2
Myotis	Jun	2	2 - 2	2	1
Myotis	Aug	2	2 - 2	2	3
Myotis	Sep	2	2 - 2	2	2
Myotis daubentonii	May	2	2 - 2	2	2
Myotis daubentonii	Aug	2	0	2	4
Myotis daubentonii	Sep	2	2 - 2	2	1
Nyctalus	May	56	56 - 56	56	3
Nyctalus	Jun	22	0	41	2
Pipistrellus pipistrellus	May	69	65.5 - 85.5	92	71
Pipistrellus pipistrellus	Jun	2	48.5 - 72	56	32
Pipistrellus pipistrellus	Jul	22	48.5 - 72	41	2
Pipistrellus pipistrellus	Aug	78	65.5 - 85.5	95	66
Pipistrellus pipistrellus	Sep	56	65.5 - 85.5	90	36
Pipistrellus pygmaeus	May	71	68.5 - 83	95	66
Pipistrellus pygmaeus	Jun	2	55 - 76.5	73	38
Pipistrellus pygmaeus	Jul	2	41 - 71	2	1
Pipistrellus pygmaeus	Aug	78	68.5 - 83	92	78
Pipistrellus pygmaeus	Sep	56	68.5 - 83	78	30
Plecotus auritus	Sep	2	0	2	1

###Figures

Figure 6. The activity level (percentile) of bats recorded across each night of the bat survey for the entire site, split between months.


Bat Activity Level (Percentile)
100
80
60
40
20
0
May
Jun
Jul
Aug
Common pipistrelle
Soprano pipistrelle
Nyctalus
Brown long-eared
Myotis
Daubenton's
Species


Bat Activity Level (Percentil
100
80
60
40
20
0
Sep
Common pipistrelle
Soprano pipistrelle
Nyctalus
Brown long-eared
Myotis
Daubenton's

Species

PART 2: Nightly Analysis

ENTIRE SURVEY PERIOD

Sunrise and Sunset Times

Table 11. The times of sunset and sunrise the following morning for surveys beginning on the date shown.

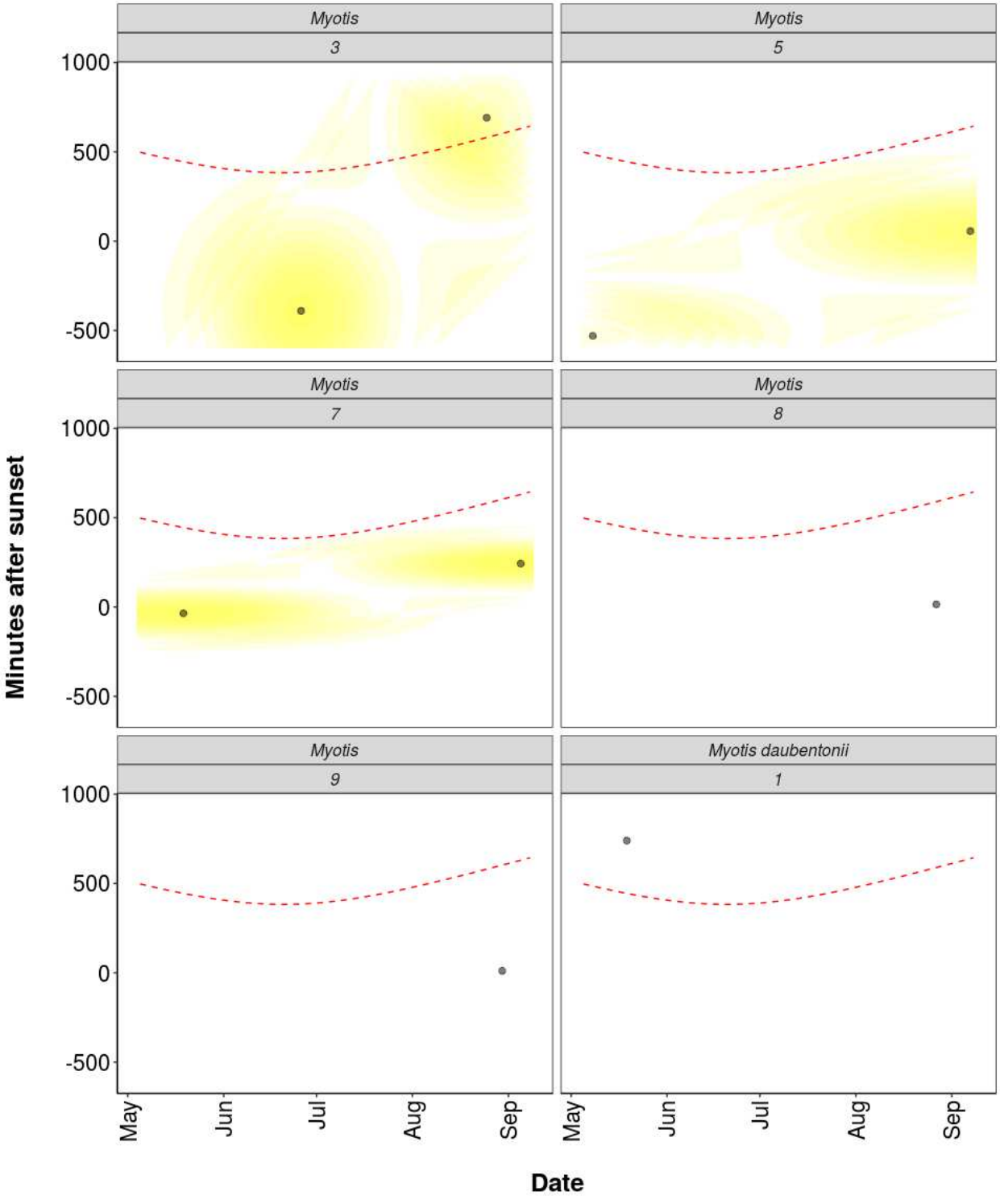
Night (y-m-d)	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
2020-05-05	21:06	05:23	8.3
2020-05-06	21:08	05:21	8.2
2020-05-07	21:10	05:19	8.2
2020-05-08	21:12	05:17	8.1
2020-05-09	21:14	05:15	8.0
2020-05-10	21:16	05:13	8.0
2020-05-11	21:17	05:11	7.9
2020-05-14	21:23	05:05	7.7
2020-05-15	21:25	05:04	7.6
2020-05-16	21:27	05:02	7.6
2020-05-17	21:29	05:00	7.5
2020-05-18	21:31	04:58	7.5
2020-05-19	21:32	04:57	7.4
2020-05-20	21:34	04:55	7.3
2020-06-17	22:08	04:32	6.4
2020-06-18	22:08	04:32	6.4
2020-06-19	22:09	04:32	6.4
2020-06-20	22:09	04:32	6.4
2020-06-21	22:09	04:32	6.4
2020-06-22	22:09	04:33	6.4
2020-06-24	22:09	04:34	6.4
2020-06-25	22:09	04:34	6.4
2020-06-26	22:09	04:35	6.4
2020-06-27	22:09	04:35	6.4
2020-06-29	22:09	04:37	6.5
2020-06-30	22:08	04:37	6.5
2020-07-01	22:08	04:38	6.5

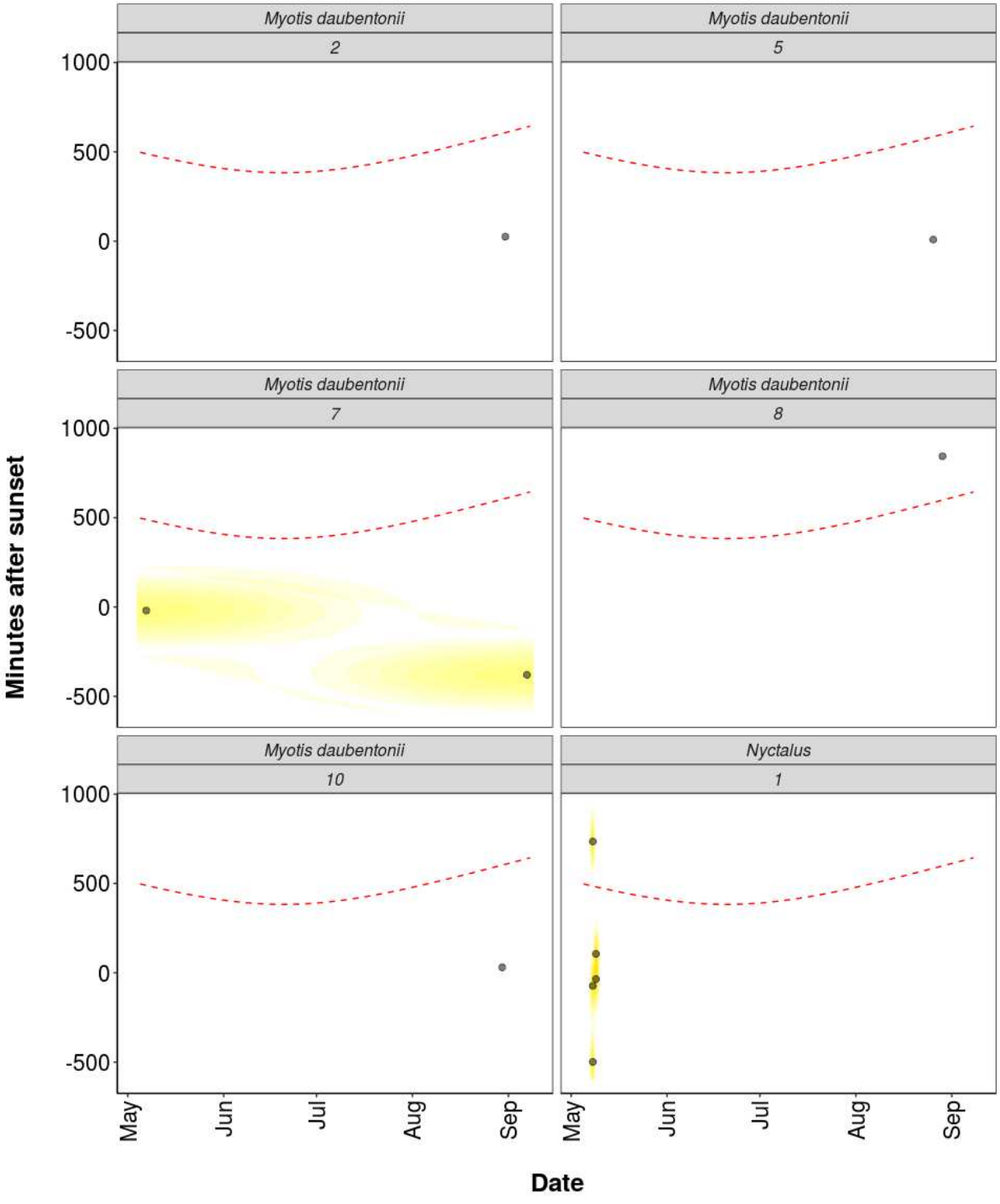
2020-08-25	20:32	06:12	9.7
2020-08-26	20:29	06:14	9.7
2020-08-27	20:27	06:16	9.8
2020-08-28	20:24	06:18	9.9
2020-08-29	20:22	06:20	10.0
2020-08-30	20:19	06:22	10.0
2020-08-31	20:17	06:24	10.1
2020-09-01	20:14	06:26	10.2
2020-09-02	20:11	06:28	10.3
2020-09-03	20:09	06:30	10.3
2020-09-04	20:06	06:32	10.4
2020-09-05	20:04	06:34	10.5
2020-09-06	20:01	06:36	10.6
2020-09-07	19:58	06:37	10.7
2020-09-08	19:56	06:39	10.7

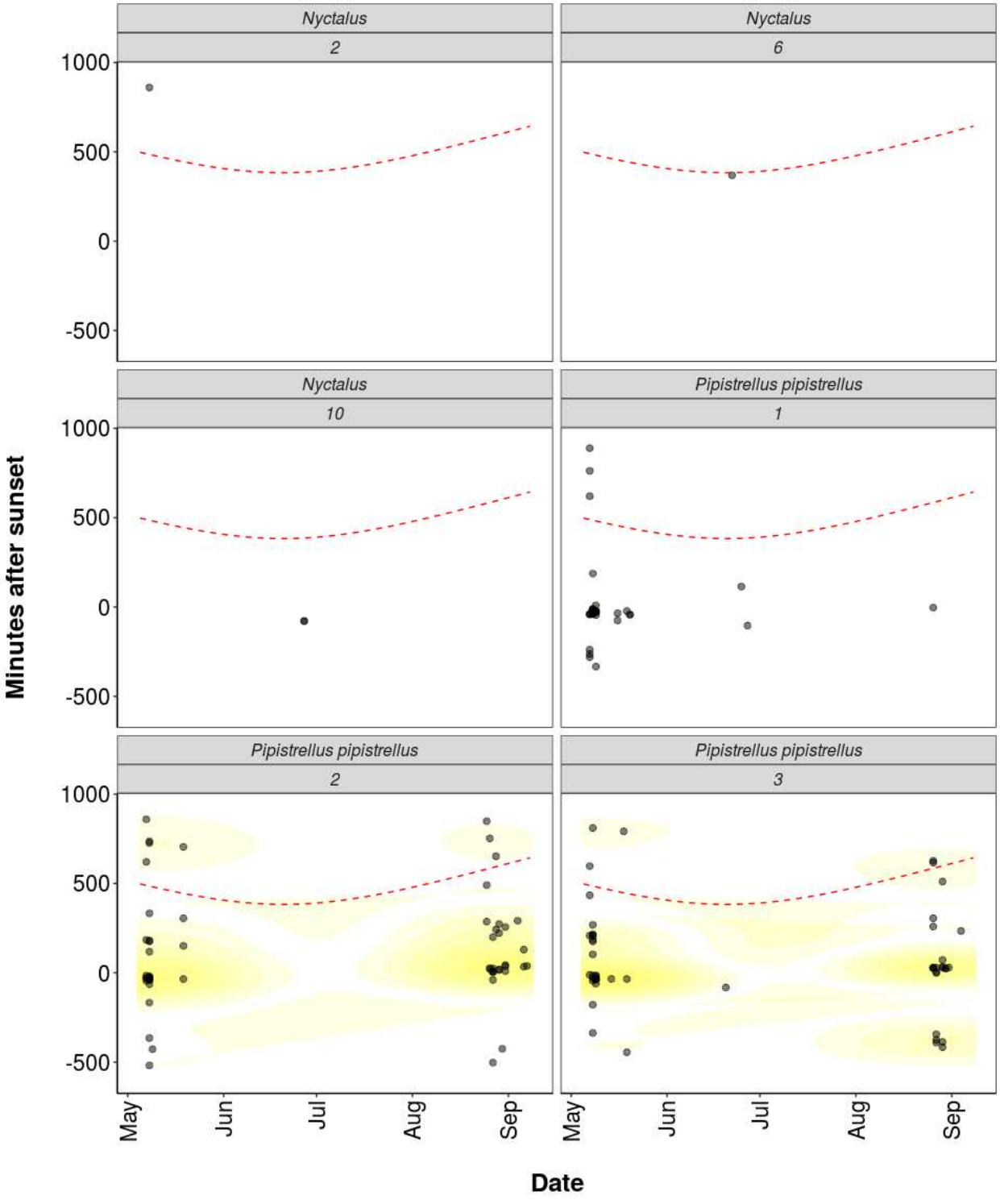
Distribution of Bat Activity Across the Night through Time

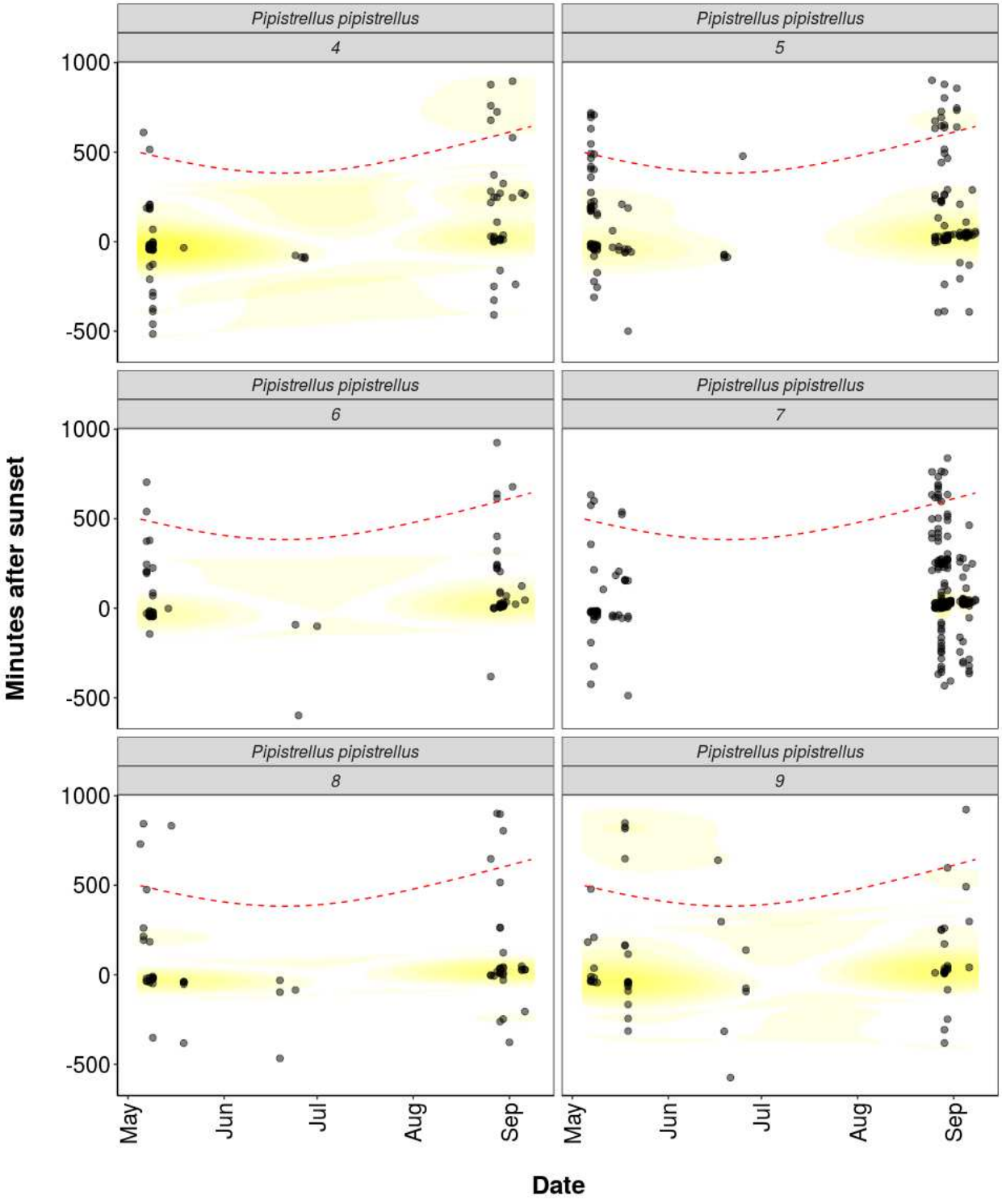
Per Detector

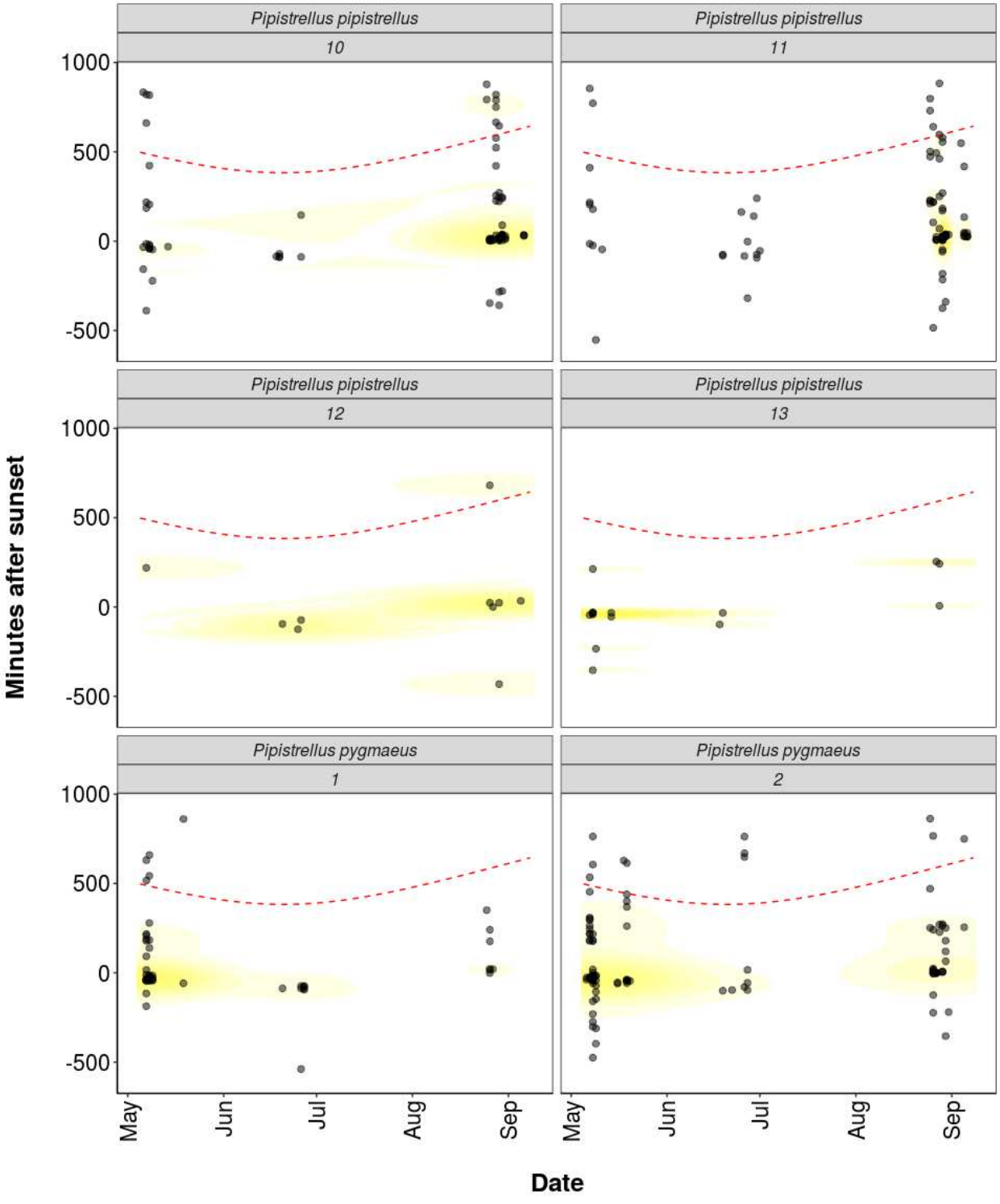
Figure 7. Timing of bat calls plotted as minutes before/after sunset, whereby 0 on the y axis represents sunset. Sunrise throughout the survey period is depicted as the red dashed line. Colours indicate kernel densities, with darkest colours showing peaks of activity. These colours are comparative only within each plot, and do not account for overall activity.

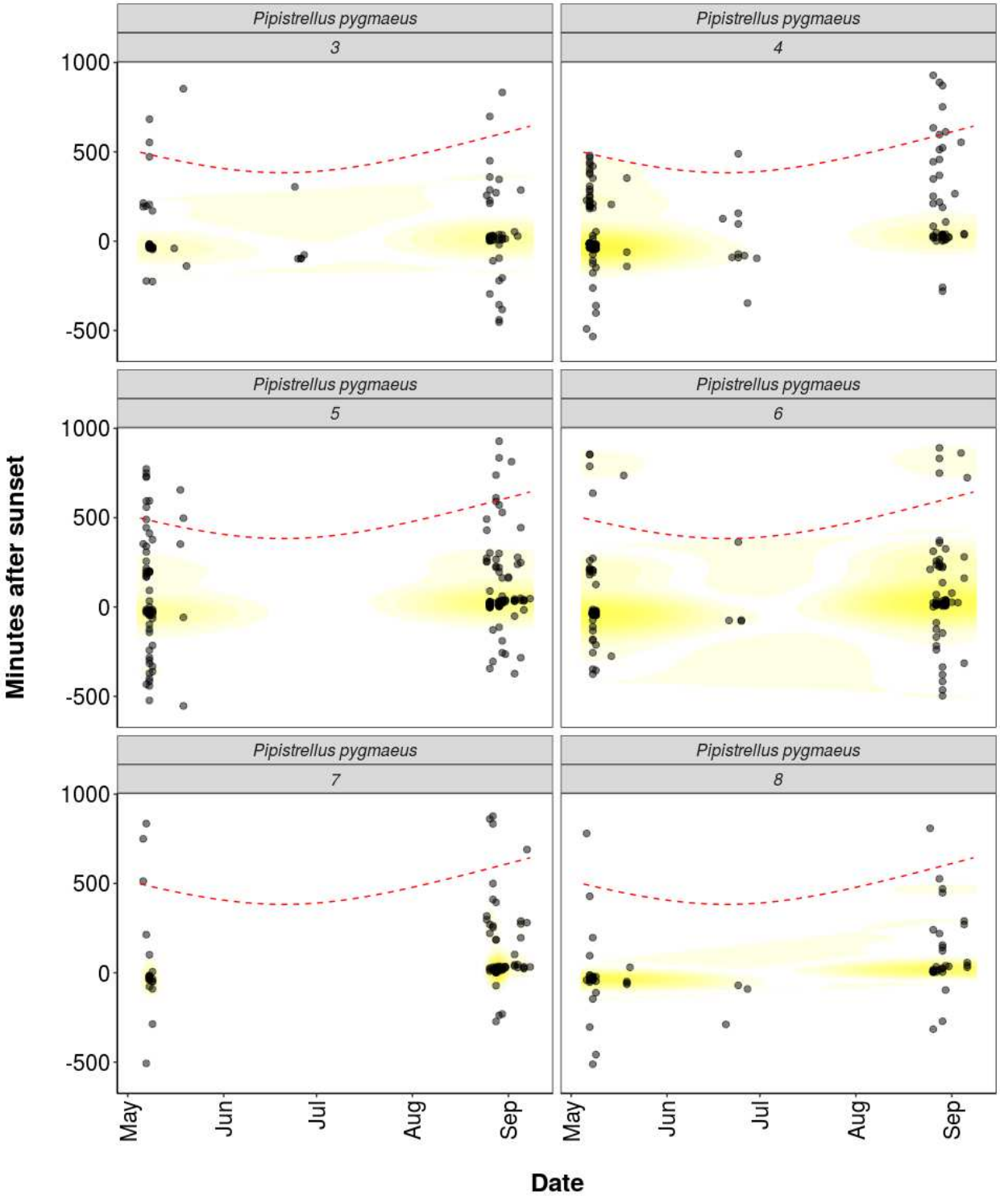

Myotis
3
Myotis
5
Myotis
7
Myotis
8
Myotis
9
Myotis daubentonii
1
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date

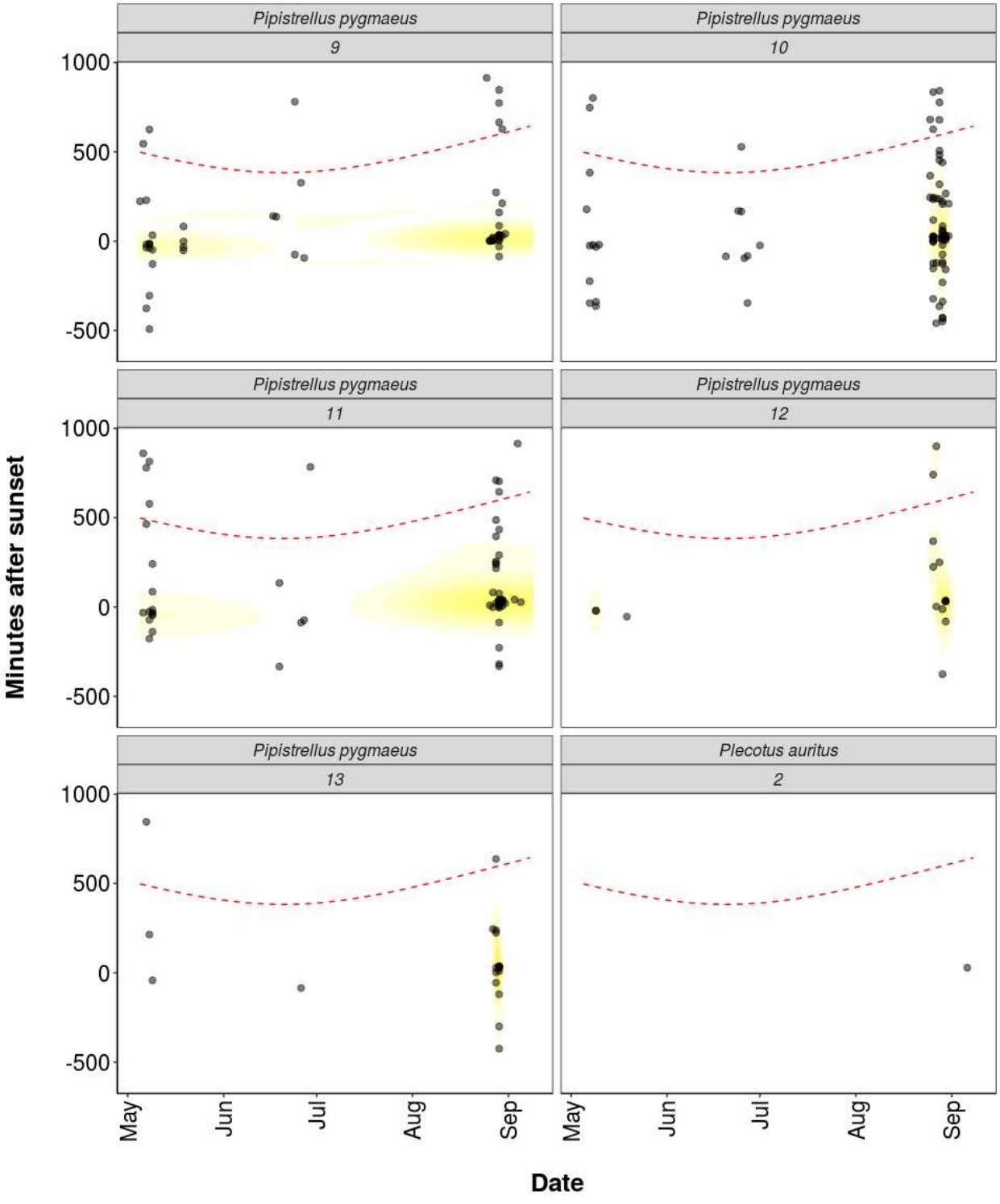

Myotis daubentonii
2
Myotis daubentonii
5
Myotis daubentonii
7
Myotis daubentonii
8
Myotis daubentonii
10
Nyctalus
1
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date


Nyctalus
2
Nyctalus
6
Nyctalus
10
Pipistrellus pipistrellus
1
Pipistrellus pipistrellus
2
Pipistrellus pipistrellus
3
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date


Pipistrellus pipistrellus
4
5
6
7
8
9
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date


Pipistrellus pipistrellus
10
Pipistrellus pipistrellus
11
Pipistrellus pipistrellus
12
Pipistrellus pipistrellus
13
Pipistrellus pygmaeus
1
Pipistrellus pygmaeus
2
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date


Pipistrellus pygmaeus
3
4
5
6
7
8
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date


Pipistrellus pygmaeus
9
Pipistrellus pygmaeus
10
Pipistrellus pygmaeus
11
Pipistrellus pygmaeus
12
Pipistrellus pygmaeus
13
Plecotus auritus
2
1000
500
0
-500
Minutes after sunset
May
Jun
Jul
Aug
Sep
Date

Roost Emergence Time and Bat Observation

Based on: *Russ, Jon. 2012. British Bat Calls a Guide to species Identification. Pelagic Publishing.*

For more information see https://rbats-blog.updog.co/2018/05/29/bat-emergence/

Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012) - Table

Table 12. Number of bat calls recorded before the upper time of the species-specific emergence time range, and which therefore may potentially indicate the presence of a nearby roost.

Table continues below

Species	Detector ID	2020-05-06	2020-05-07	2020-05-08	2020-05-09	2020-05-10
Common pipistrelle	1	0	6	9	7	0
Common pipistrelle	2	0	4	11	1	0
Common pipistrelle	3	0	1	5	8	0
Common pipistrelle	4	0	0	17	16	0
Common pipistrelle	5	0	5	14	7	0
Common pipistrelle	6	0	1	11	8	0
Common pipistrelle	7	0	6	7	8	0
Common pipistrelle	8	0	3	3	7	0
Common pipistrelle	9	0	4	2	1	0
Common pipistrelle	10	2	2	5	2	0
Common pipistrelle	11	0	1	1	1	0
Common pipistrelle	12	0	0	0	0	0

Common pipistrelle	13	0	1	5	1	0
Soprano pipistrelle	1	0	10	13	5	0
Soprano pipistrelle	2	2	5	28	8	0
Soprano pipistrelle	3	0	1	10	6	0
Soprano pipistrelle	4	1	20	54	12	0
Soprano pipistrelle	5	0	5	36	9	0
Soprano pipistrelle	6	0	0	26	11	0
Soprano pipistrelle	7	0	1	10	6	0
Soprano pipistrelle	8	1	7	9	4	0
Soprano pipistrelle	9	0	3	6	2	0
Soprano pipistrelle	10	0	3	1	3	1
Soprano pipistrelle	11	1	0	3	5	0
Soprano pipistrelle	12	0	0	0	2	0
Soprano pipistrelle	13	0	0	0	1	0
Nyctalus	1	0	0	2	1	0
Nyctalus	10	0	0	0	0	0
Brown long-eared	2	0	0	0	0	0
Myotis	3	0	0	0	0	0
Myotis	5	0	0	1	0	0
Myotis	7	0	0	0	0	0
Myotis	8	0	0	0	0	0
Myotis	9	0	0	0	0	0
Daubenton’s	2	0	0	0	0	0
Daubenton’s	5	0	0	0	0	0

Daubenton's	7	0	1	0	0	0
Daubenton's	10	0	0	0	0	0

Table continues below

2020-05-11	2020-05-14	2020-05-15	2020-05-16	2020-05-17	2020-05-18	2020-05-19
0	0	0	2	0	0	1
0	0	0	0	0	0	1
0	1	0	0	0	0	2
0	0	0	0	0	0	1
0	1	0	2	0	3	2
0	1	0	0	0	0	0
0	2	1	1	1	0	3
0	0	0	0	0	0	5
0	0	0	0	0	0	10
0	1	0	0	0	0	0
1	0	0	0	0	0	0
0	0	0	0	0	0	0
0	2	0	0	0	0	0
0	0	0	0	0	0	1
0	0	0	2	0	0	6
0	0	0	1	0	0	0
0	0	0	0	0	0	2
0	0	0	0	0	0	2
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	3
0	0	0	0	0	0	3
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

0	0	0	0	0	0	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Table continues below

2020-05-20	2020-06-18	2020-06-19	2020-06-20	2020-06-21	2020-06-22	2020-06-24
2	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	0	0	0	0	1
1	0	3	1	0	0	0
0	0	0	0	0	0	1
0	0	0	0	0	0	0
0	0	3	0	0	0	1
0	0	1	0	1	0	0
0	1	3	0	0	0	0
0	0	2	0	0	0	0
0	0	0	1	0	0	0
0	1	1	0	0	0	0
0	0	0	1	0	0	0
1	0	1	0	0	1	0
1	0	0	0	0	0	0
0	0	0	0	0	1	2
0	0	0	0	0	0	0
0	0	0	0	1	0	0
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	0	0	0	0	1
0	0	0	1	0	0	0
0	0	1	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Table continues below

2020-06-25	2020-06-26	2020-06-27	2020-06-30	2020-07-01	2020-08-26	2020-08-27
0	0	1	0	0	1	0
0	0	0	0	0	2	6
0	0	0	0	0	3	6
0	1	2	0	0	1	8
0	0	0	0	0	4	3
1	0	0	0	1	1	3
0	0	0	0	0	7	3
0	0	0	0	0	2	1
0	2	0	0	0	1	0
0	1	0	0	0	7	3
0	1	2	2	1	1	4
1	1	0	0	0	1	1
0	0	0	0	0	0	0
0	3	4	0	0	3	1
0	1	3	0	0	9	5
1	2	1	0	0	10	6
0	1	1	1	0	2	2
0	0	0	0	0	14	3
2	0	0	0	0	2	13
0	0	0	0	0	3	2
0	0	1	0	0	7	2

0	0	1	0	0	3	5
0	1	2	0	1	11	3
0	1	1	0	0	1	1
0	0	0	0	0	0	1
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	2	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	1	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Table continues below

2020-08-28	2020-08-29	2020-08-30	2020-08-31	2020-09-01	2020-09-03	2020-09-04
0	0	0	0	0	0	0
0	2	1	1	0	0	0
0	3	2	1	0	0	0
0	5	1	0	0	1	0
0	9	7	0	0	3	0
0	10	7	0	0	1	0
44	19	5	5	0	2	9
1	5	4	0	1	0	0
0	9	4	0	0	0	0
0	8	3	3	0	0	0
0	14	8	0	0	0	0
0	2	0	0	0	0	0
1	0	0	0	0	0	0
0	0	0	0	0	0	0
0	3	1	1	0	0	0
0	8	4	1	0	0	0

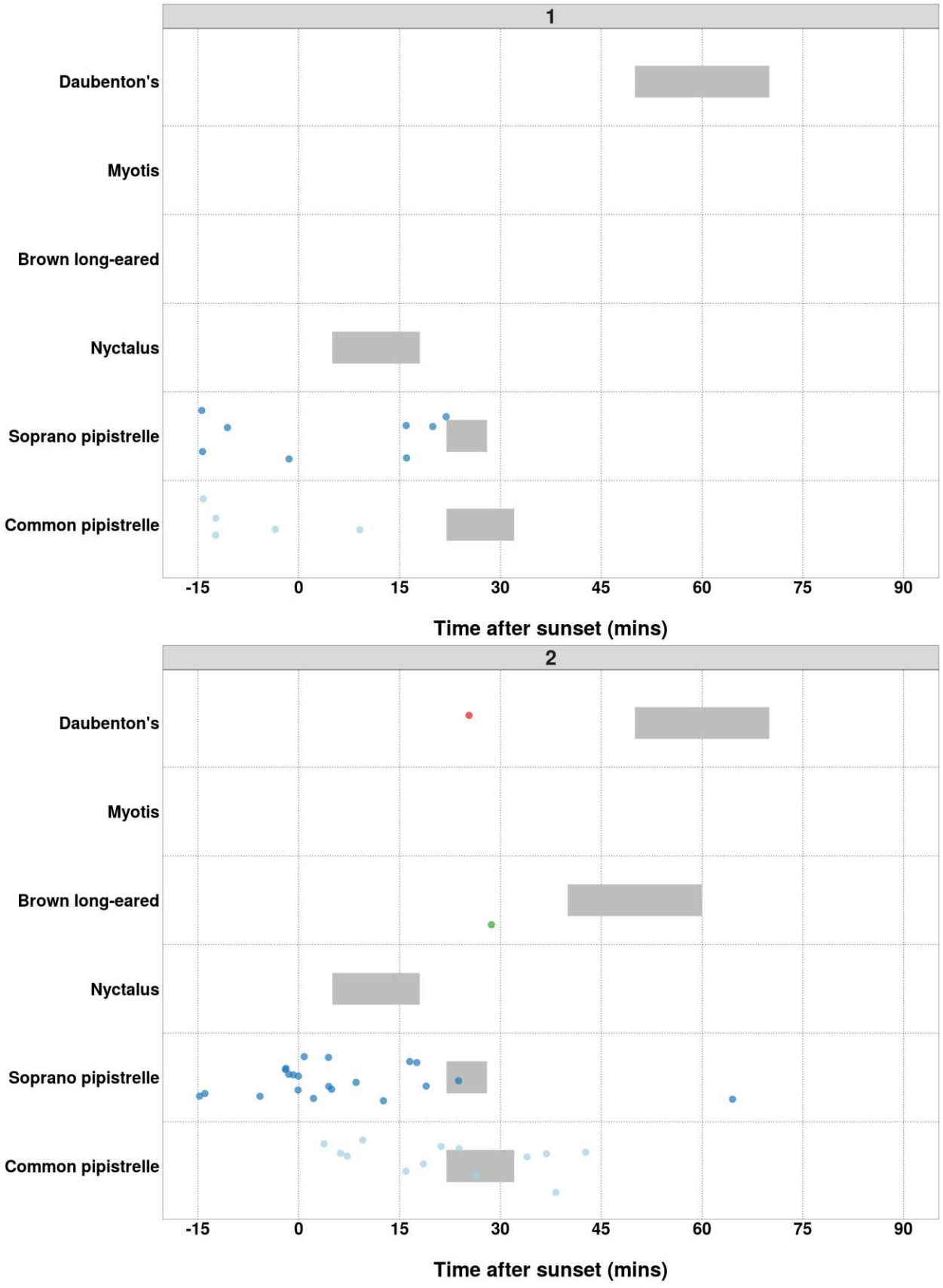
0	7	2	2	0	0	0
0	9	6	1	0	2	0
0	11	6	0	1	1	0
15	5	6	1	0	0	0
1	4	1	0	0	0	0
0	6	0	0	0	0	0
1	16	5	0	0	0	0
1	10	2	1	0	0	0
0	2	1	0	0	0	0
2	5	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	0	0	1	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	0	0	0

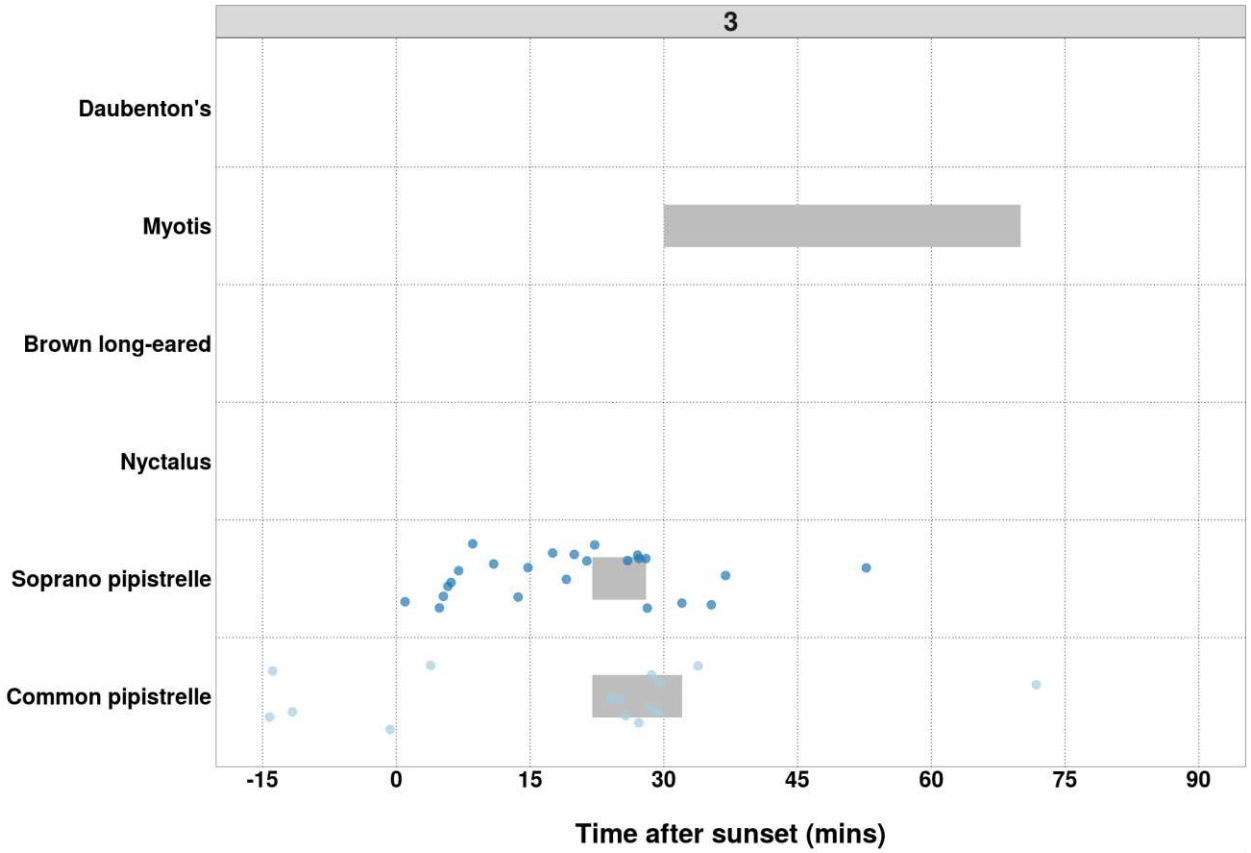
2020-09-05	2020-09-06	2020-09-07
0	0	0
0	0	0
0	0	0
0	0	0
2	2	0
0	0	0
4	11	0
2	3	0
0	0	0
0	1	0
2	3	0
0	0	0

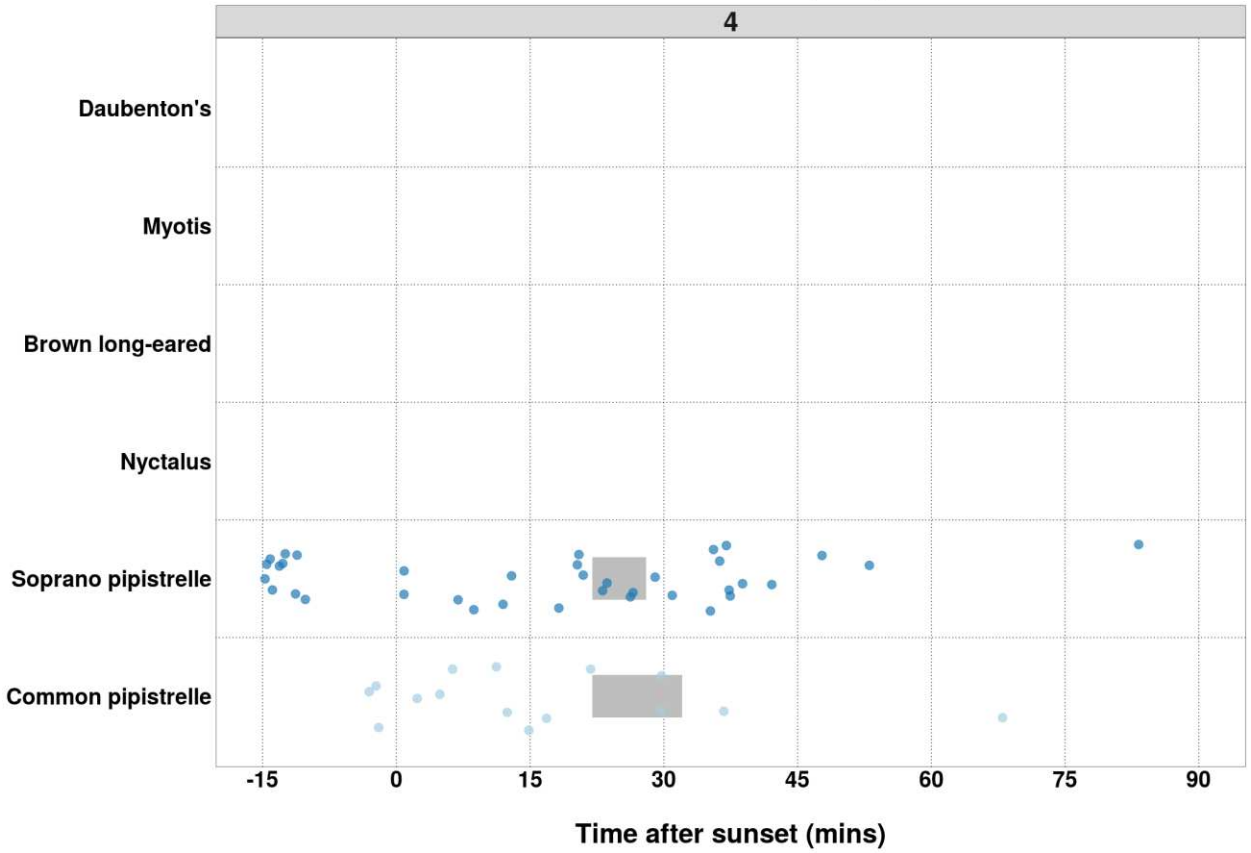
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
1	1	0
1	0	0
0	2	0
0	0	0
0	0	0
0	0	0
1	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	1	0
0	0	0
0	0	1
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	1
0	0	0

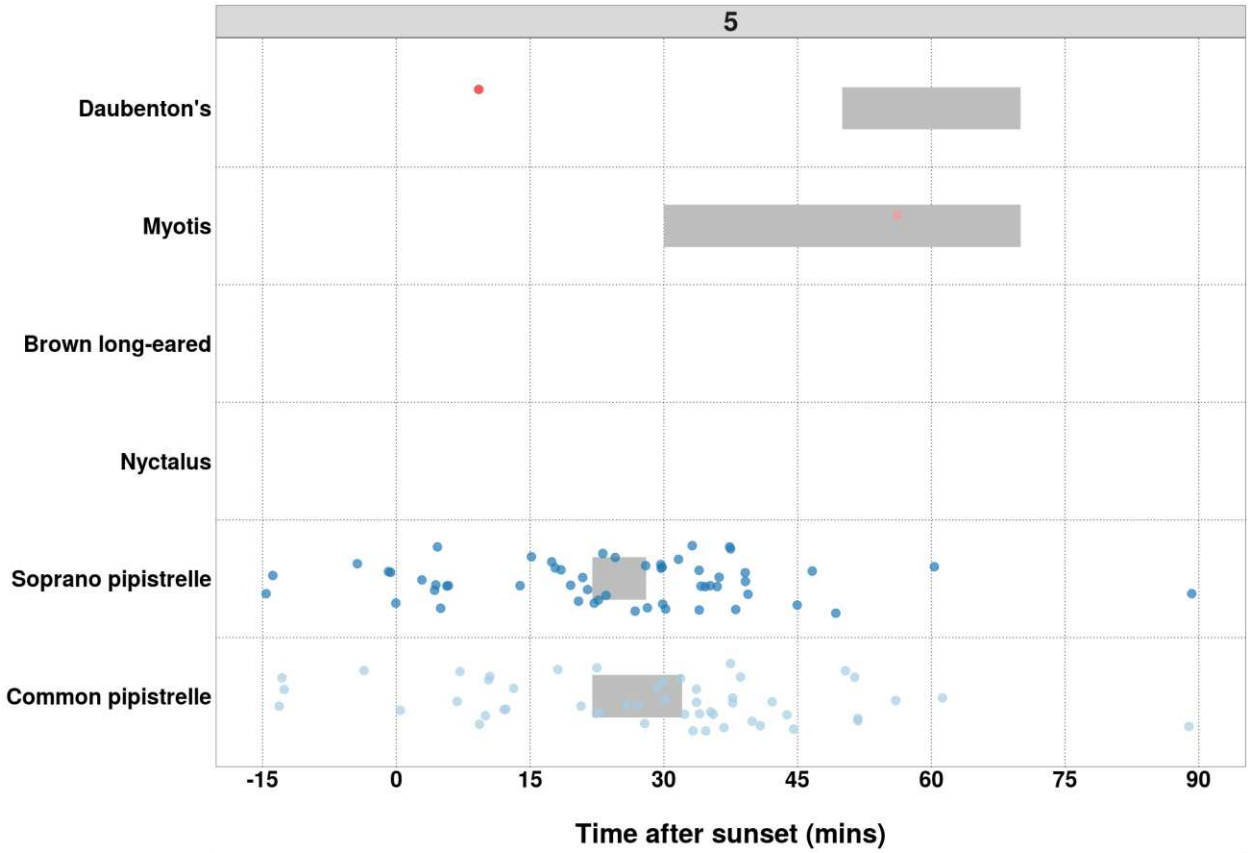
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012) - Figures

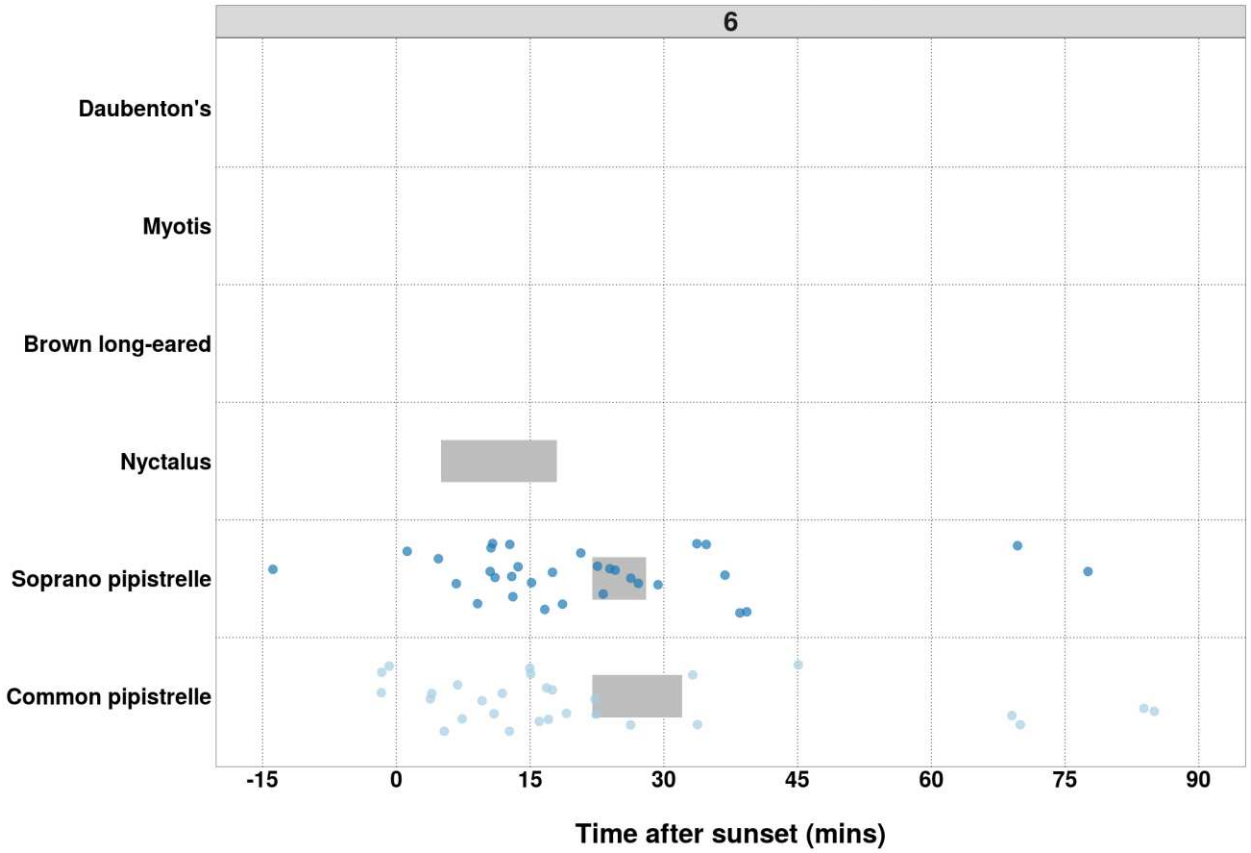
Figure 8. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occuring earlier than this time range, may potentially indicate the presence of a nearby roost.

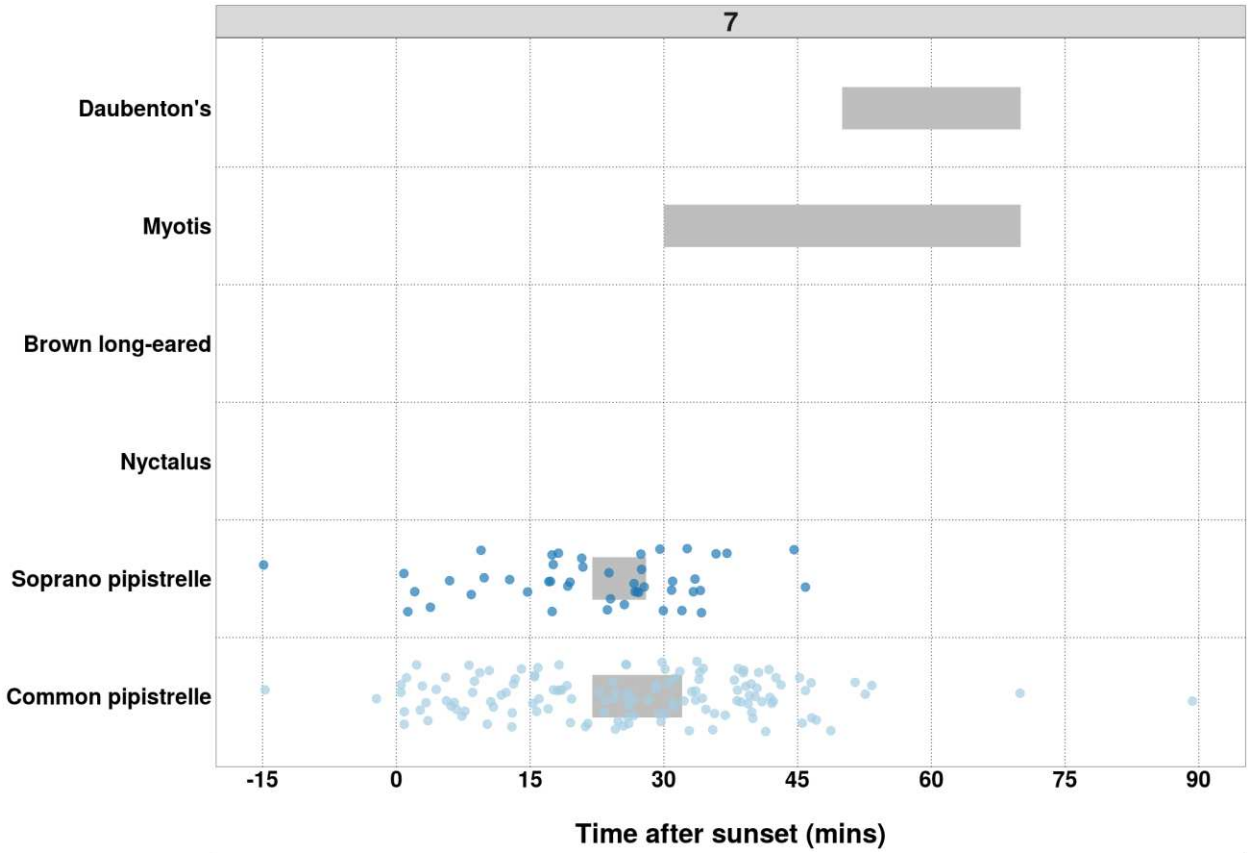

1
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)
2
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

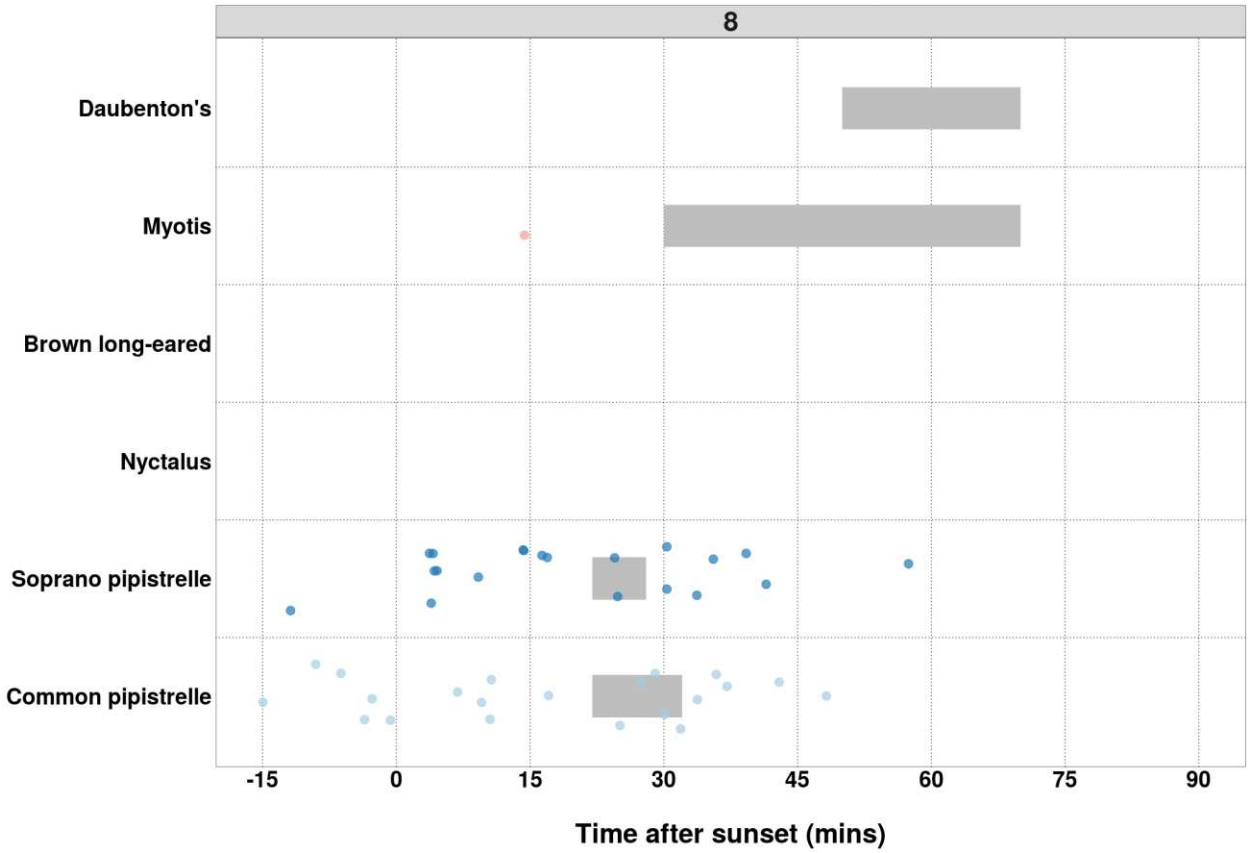

3
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

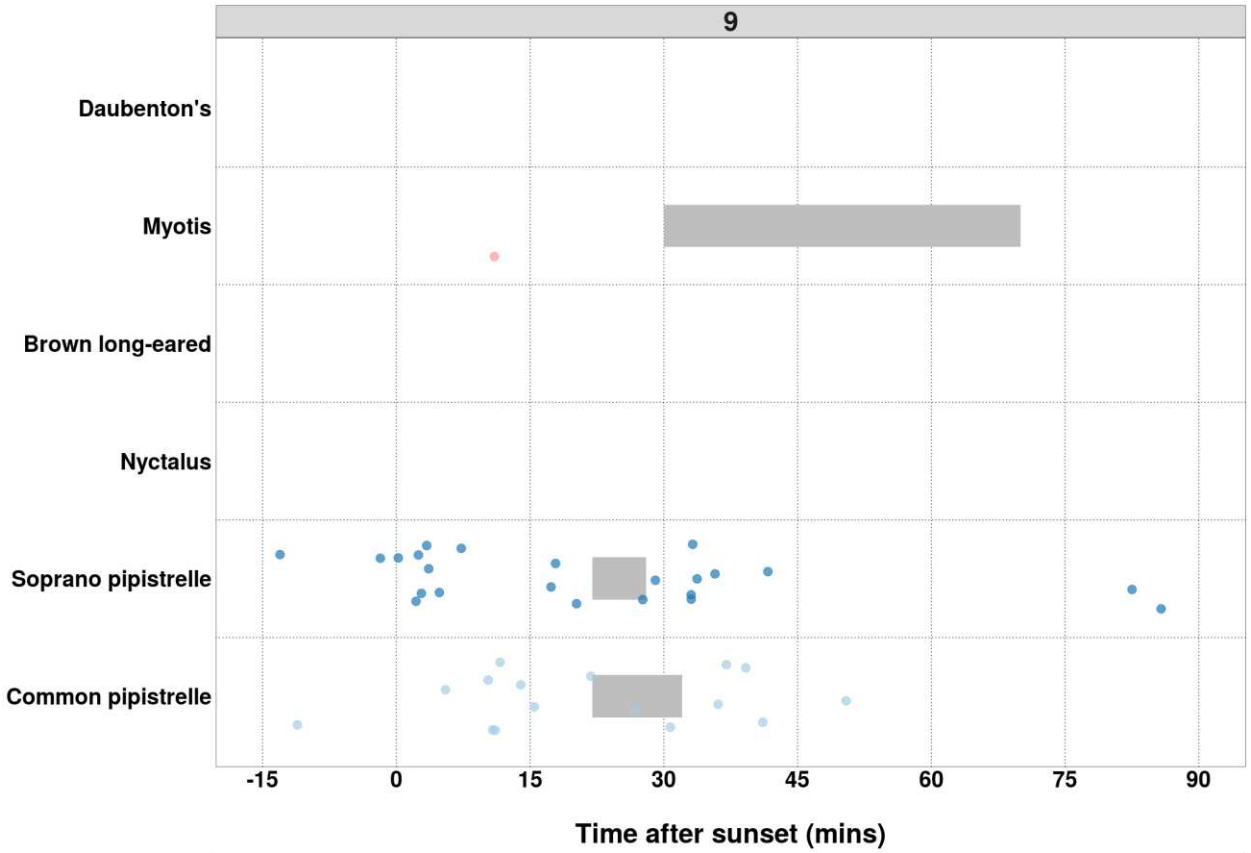

4
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

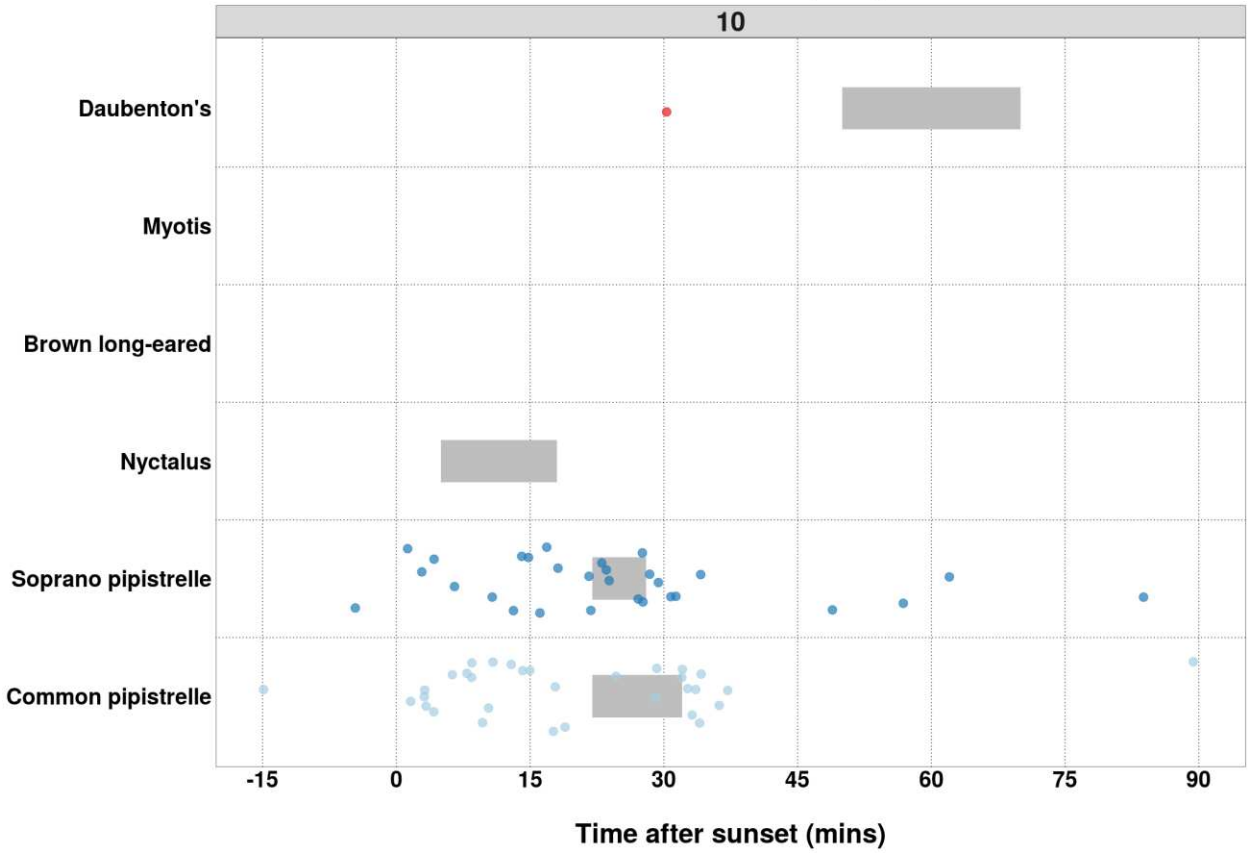

5
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

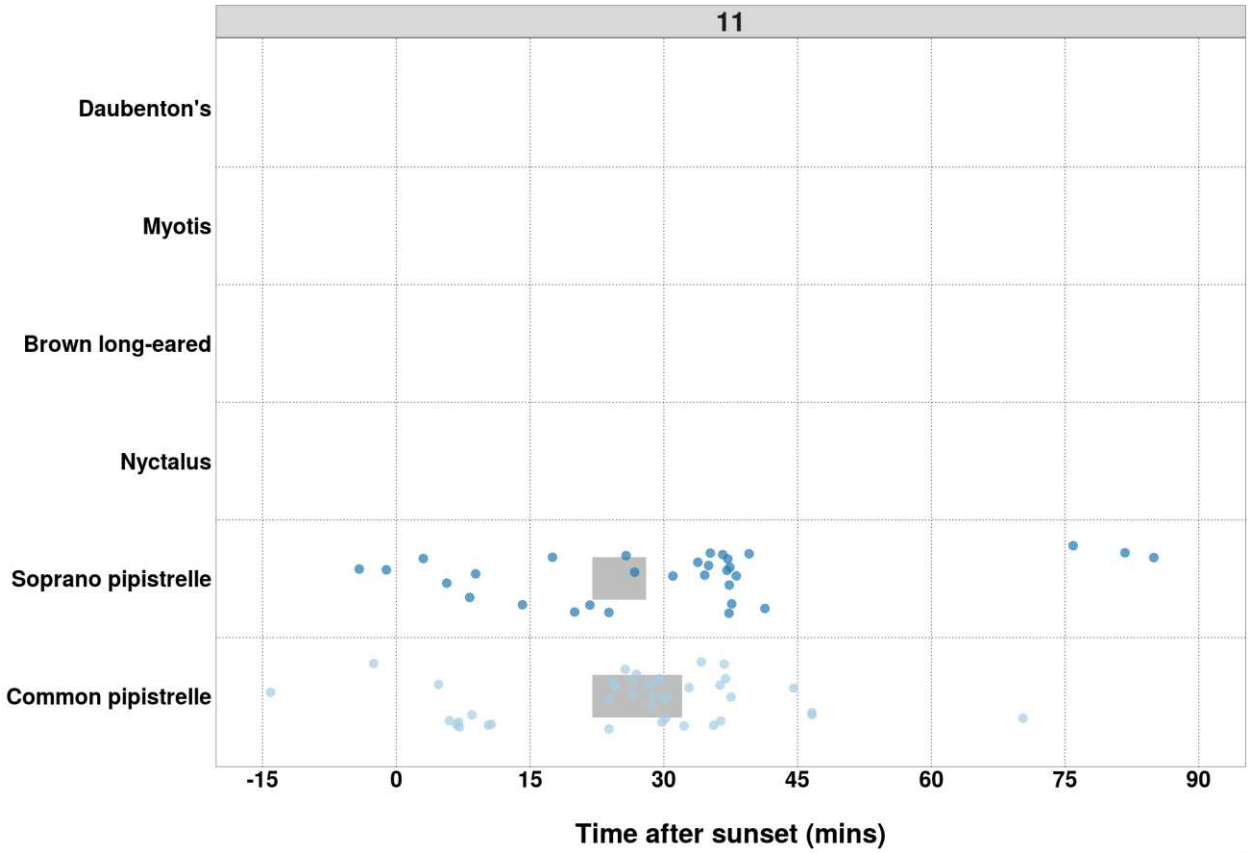

6
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

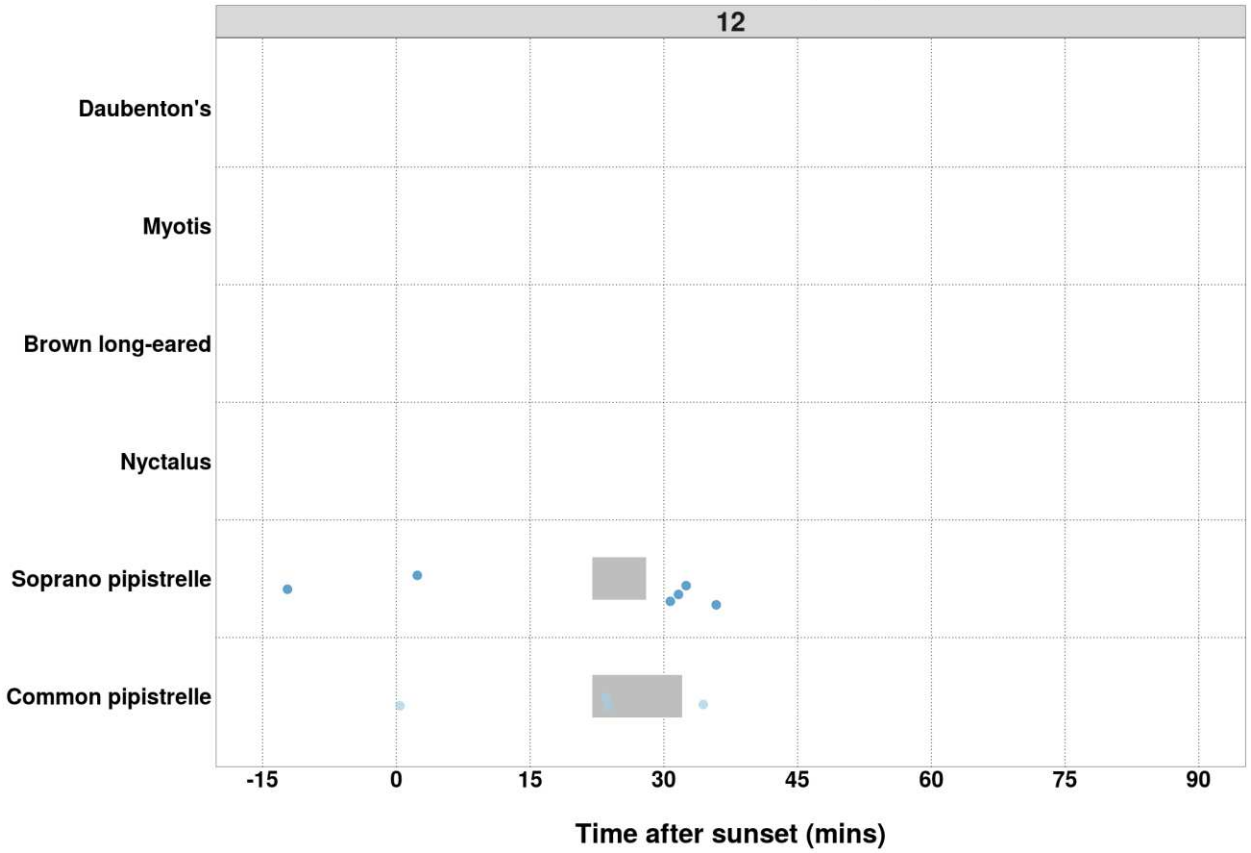

7
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

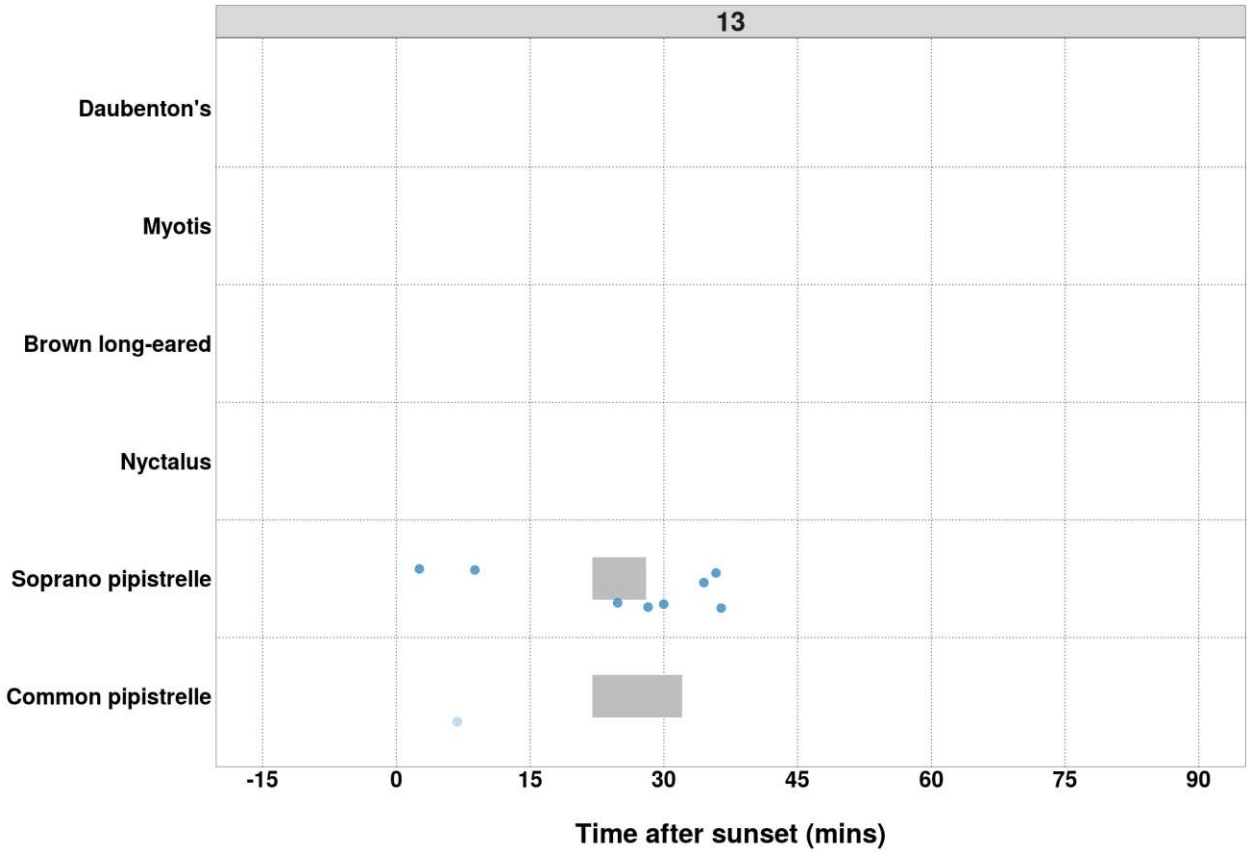

8
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


9
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


10
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


11
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


12
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


13
Daubenton's
Myotis
Brown long-eared
Nyctalus
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

Counts of Bat Passes

All detectors

Table 14. The total number of passes recorded for each species across all of the detectors. The 'Total' percentage may not be exactly 100% due to rounding of the percentages per species.

Species	Passes (No.)	Percentage of total (%)
Common pipistrelle	1501	46.2
Soprano pipistrelle	1721	53.0
Nyctalus	10	0.3
Brown long-eared	1	0.0
Myotis	8	0.2
Daubenton's	7	0.2
Total	3248	99.9

Counts of Bat Passes

Per Detector

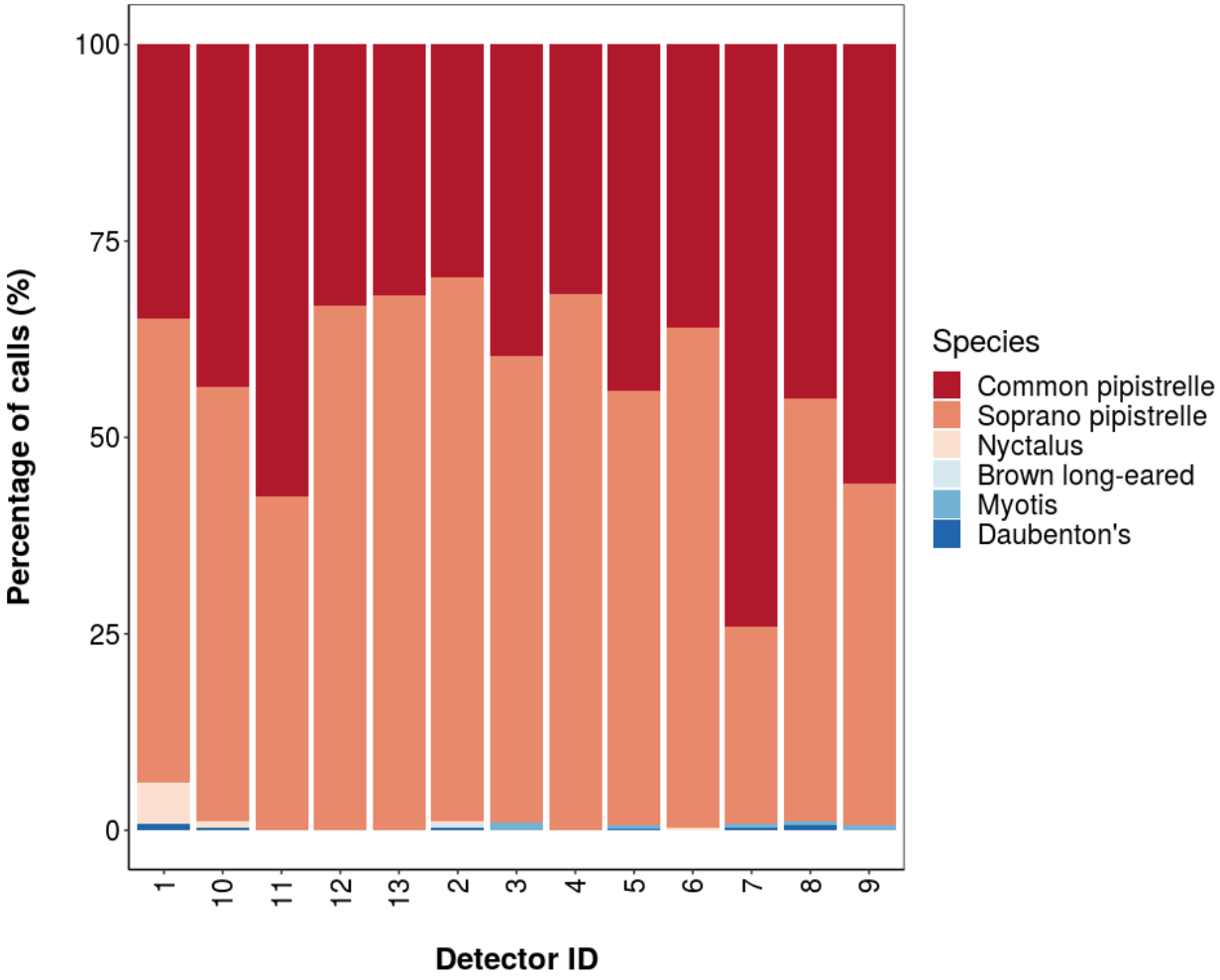
Table 15. The number of passes recorded for each species at each detector.

Species	Detector ID	Count (No)	Percentage by Detector (%)
Common pipistrelle	1	40	34.8
Common pipistrelle	10	110	43.7
Common pipistrelle	11	131	57.5
Common pipistrelle	12	11	33.3
Common pipistrelle	13	16	32.0
Common pipistrelle	2	79	29.8
Common pipistrelle	3	77	39.7
Common pipistrelle	4	126	31.7
Common pipistrelle	5	226	44.1
Common pipistrelle	6	116	36.1
Common pipistrelle	7	390	74.0
Common pipistrelle	8	79	45.1
Common pipistrelle	9	100	55.9
Soprano pipistrelle	1	68	59.1
Soprano pipistrelle	10	139	55.2
Soprano pipistrelle	11	97	42.5
Soprano pipistrelle	12	22	66.7
Soprano pipistrelle	13	34	68.0
Soprano pipistrelle	2	183	69.1
Soprano pipistrelle	3	115	59.3
Soprano pipistrelle	4	271	68.3
Soprano pipistrelle	5	283	55.3
Soprano pipistrelle	6	204	63.6
Soprano pipistrelle	7	133	25.2
Soprano pipistrelle	8	94	53.7
Soprano pipistrelle	9	78	43.6
Nyctalus	1	6	5.2
Nyctalus	10	2	0.8
Nyctalus	2	1	0.4

Nyctalus	6	1	0.3
Brown long-eared	2	1	0.4
Myotis	3	2	1.0
Myotis	5	2	0.4
Myotis	7	2	0.4
Myotis	8	1	0.6
Myotis	9	1	0.6
Daubenton’s	1	1	0.9
Daubenton’s	10	1	0.4
Daubenton’s	2	1	0.4
Daubenton’s	5	1	0.2
Daubenton’s	7	2	0.4
Daubenton’s	8	1	0.6

Species Composition

Figure 10. Percentage species composition of passes at each detector.



PART 2a: Presence Only

THE NEXT SECTION OF THE REPORT FEATURES THE RAW DATA SUPPLIED TO ECOBAT AND ONLY TAKES INTO ACCOUNT THE PRESENCE, AND NOT THE ABSENCE, OF EACH BAT SPECIES. FOR EACH NIGHT, THERE IS NO 'ZERO DATA' FOR WHEN SPECIES WERE NOT DETECTED.

Nightly Bat Pass Rate (Bat passes per hour)

Median Per Detector

Table 16. The median Nightly Pass Rate (bat passes per hour, per night) of each species. If NA, then no bat passes.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean. For further information see: *Lintott, P. R., & Mathews, F. (2018). Basic mathematical errors may make ecological assessments unreliable. Biodiversity and Conservation, 27(1), 265-267.* https://doi.org/10.1007/s10531-017-1418-5

Species	Detector ID	Median Pass Rate
Common pipistrelle	1	0.3
Common pipistrelle	10	0.5
Common pipistrelle	11	0.5
Common pipistrelle	12	0.2
Common pipistrelle	13	0.2
Common pipistrelle	2	0.4
Common pipistrelle	3	0.4
Common pipistrelle	4	0.4
Common pipistrelle	5	0.5
Common pipistrelle	6	0.2
Common pipistrelle	7	1.2
Common pipistrelle	8	0.5
Common pipistrelle	9	0.4
Soprano pipistrelle	1	0.5
Soprano pipistrelle	10	0.5
Soprano pipistrelle	11	0.2
Soprano pipistrelle	12	0.3
Soprano pipistrelle	13	0.2
Soprano pipistrelle	2	0.7
Soprano pipistrelle	3	0.3
Soprano pipistrelle	4	0.3
Soprano pipistrelle	5	0.8
Soprano pipistrelle	6	0.5

Soprano pipistrelle	7	0.5
Soprano pipistrelle	8	0.5
Soprano pipistrelle	9	0.4
Nyctalus	1	0.4
Nyctalus	10	0.3
Nyctalus	2	0.1
Nyctalus	6	0.2
Brown long-eared	2	0.1
Myotis	3	0.1
Myotis	5	0.1
Myotis	7	0.1
Myotis	8	0.1
Myotis	9	0.1
Daubenton’s	1	0.1
Daubenton’s	10	0.1
Daubenton’s	2	0.1
Daubenton’s	5	0.1
Daubenton’s	7	0.1
Daubenton’s	8	0.1

Nightly Bat Pass Rate (Bat passes per hour)

Mean per Detector

Table 17. The mean Nightly Pass Rate (bat passes per hour, per night) of each species at each detector. Values are given to 1 decimal place.

We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

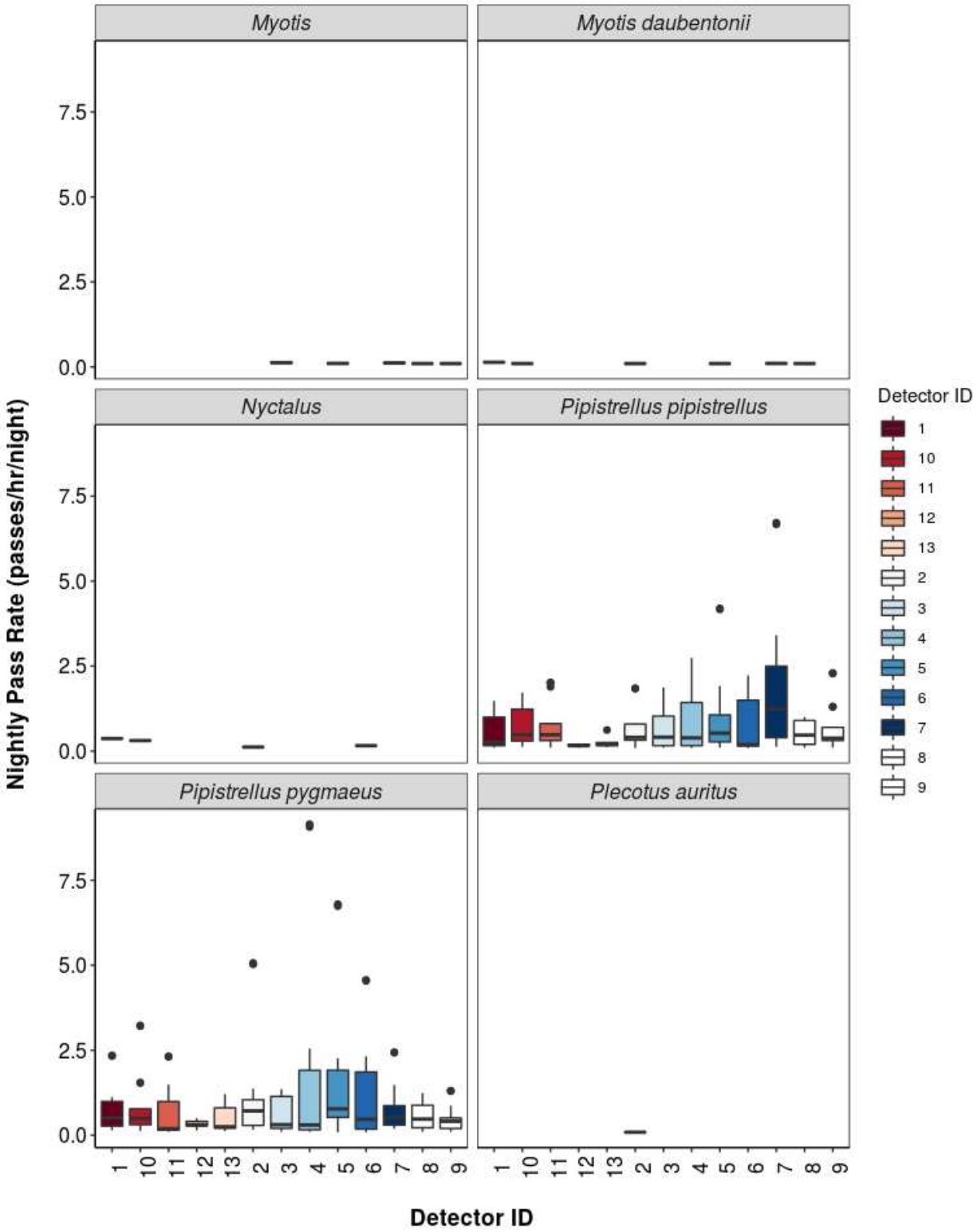
Species	Detector ID	Mean Pass Rate
Common pipistrelle	1	0.6
Common pipistrelle	10	0.8
Common pipistrelle	11	0.7
Common pipistrelle	12	0.2
Common pipistrelle	13	0.2
Common pipistrelle	2	0.6
Common pipistrelle	3	0.7
Common pipistrelle	4	0.8
Common pipistrelle	5	0.9
Common pipistrelle	6	0.8
Common pipistrelle	7	1.8
Common pipistrelle	8	0.5
Common pipistrelle	9	0.7
Soprano pipistrelle	1	0.8
Soprano pipistrelle	10	0.8
Soprano pipistrelle	11	0.6
Soprano pipistrelle	12	0.3
Soprano pipistrelle	13	0.5
Soprano pipistrelle	2	1.1
Soprano pipistrelle	3	0.6
Soprano pipistrelle	4	1.5
Soprano pipistrelle	5	1.6
Soprano pipistrelle	6	1.2
Soprano pipistrelle	7	0.8
Soprano pipistrelle	8	0.6
Soprano pipistrelle	9	0.5

Nyctalus	1	0.4
Nyctalus	10	0.3
Nyctalus	2	0.1
Nyctalus	6	0.2
Brown long-eared	2	0.1
Myotis	3	0.1
Myotis	5	0.1
Myotis	7	0.1
Myotis	8	0.1
Myotis	9	0.1
Daubenton’s	1	0.1
Daubenton’s	10	0.1
Daubenton’s	2	0.1
Daubenton’s	5	0.1
Daubenton’s	7	0.1
Daubenton’s	8	0.1

Nightly Bat Passes (Bat passes per hour)

Per Detector - Figures

Figure 11. Boxplots for the number of bat passes per hour each night, for each detector. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.


Myotis
Myotis daubentonii
Nyctalus
Pipistrellus pipistrellus
Pipistrellus pygmaeus
Plecotus auritus
Nightly Pass Rate (passes/hr/night)
0.0
2.5
5.0
7.5
Detector ID
1
10
11
12
13
2
3
4
5
6
7
8
9

SPLIT BY MONTH

Total Bat Passes per Detector, each Month

Per Detector

Table 18. The total number of bat passes of each species in each month at each detector. This table simply tells you how many bats of each species were recorded passing each detector during each month. These numbers are not standardised by the night length, or how many nights each detector was active for during each month.

Species	Detector ID	May	Jun	Jul	Aug	Sep
Common pipistrelle	1	37	2	0	1	0
Common pipistrelle	10	28	5	0	74	3
Common pipistrelle	11	14	14	2	84	17
Common pipistrelle	12	1	3	0	6	1
Common pipistrelle	13	10	2	0	4	0
Common pipistrelle	2	39	0	0	36	4
Common pipistrelle	3	46	1	0	29	1
Common pipistrelle	4	65	4	0	47	10
Common pipistrelle	5	96	5	0	78	47
Common pipistrelle	6	49	2	1	58	6
Common pipistrelle	7	53	0	0	258	79
Common pipistrelle	8	37	4	0	31	7
Common pipistrelle	9	50	8	0	34	8
Soprano pipistrelle	1	48	8	0	12	0
Soprano pipistrelle	10	17	9	1	112	0
Soprano pipistrelle	11	22	5	0	65	5
Soprano pipistrelle	12	3	0	0	19	0
Soprano pipistrelle	13	5	1	0	28	0
Soprano pipistrelle	2	117	14	0	50	2
Soprano pipistrelle	3	40	7	0	65	3
Soprano pipistrelle	4	190	8	0	66	7
Soprano pipistrelle	5	139	0	0	108	36
Soprano pipistrelle	6	91	7	0	96	10
Soprano pipistrelle	7	34	0	0	78	21

Soprano pipistrelle	8	38	3	0	43	10
Soprano pipistrelle	9	26	7	0	45	0
Nyctalus	1	6	0	0	0	0
Nyctalus	10	0	2	0	0	0
Nyctalus	2	1	0	0	0	0
Nyctalus	6	0	1	0	0	0
Brown long-eared	2	0	0	0	0	1
Myotis	3	0	1	0	1	0
Myotis	5	1	0	0	0	1
Myotis	7	1	0	0	0	1
Myotis	8	0	0	0	1	0
Myotis	9	0	0	0	1	0
Daubenton’s	1	1	0	0	0	0
Daubenton’s	10	0	0	0	1	0
Daubenton’s	2	0	0	0	1	0
Daubenton’s	5	0	0	0	1	0
Daubenton’s	7	1	0	0	0	1
Daubenton’s	8	0	0	0	1	0

Survey Effort

Table 19. The number of survey nights per month per detector.

Month	Detector ID	No. of Survey Nights
May	1	6
May	2	8
May	3	9
May	4	6
May	5	10
May	6	5
May	7	11
May	8	8
May	9	7
May	10	6
May	11	5
May	12	3
May	13	4
Jun	1	4
Jun	2	4
Jun	3	5
Jun	4	6
Jun	5	3
Jun	6	4
Jun	8	4
Jun	9	7
Jun	10	7
Jun	11	6
Jun	12	3
Jun	13	3
Jul	6	1
Jul	10	1
Jul	11	1
Aug	1	3
Aug	2	7
Aug	3	7

Aug	4	6
Aug	5	7
Aug	6	7
Aug	7	7
Aug	8	7
Aug	9	7
Aug	10	7
Aug	11	7
Aug	12	5
Aug	13	3
Sep	2	4
Sep	3	3
Sep	4	5
Sep	5	8
Sep	6	6
Sep	7	6
Sep	8	3
Sep	9	2
Sep	10	1
Sep	11	4
Sep	12	1

Nightly Bat Pass Rate for each Month

Median Per Detector

Table 20. The median Nightly Pass Rate (bat passes per hour, per night) of each species throughout each month. If NA, then no bat passes.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean. For further information see: *Lintott, P. R., & Mathews, F. (2018). Basic mathematical errors may make ecological assessments unreliable. Biodiversity and Conservation, 27(1), 265-267.* https://doi.org/10.1007/s10531-017-1418-5

Species	Detector ID	May	Jun	Jul	Aug	Sep
Common pipistrelle	1	0.6	0.2	NA	0.1	NA
Common pipistrelle	10	0.5	0.2	NA	0.9	0.3
Common pipistrelle	11	0.5	0.3	0.3	0.8	0.6
Common pipistrelle	12	0.1	0.2	NA	0.2	0.1
Common pipistrelle	13	0.3	0.2	NA	0.2	NA
Common pipistrelle	2	1.3	NA	NA	0.4	0.1
Common pipistrelle	3	0.8	0.2	NA	0.5	0.1
Common pipistrelle	4	2.3	0.2	NA	0.8	0.2
Common pipistrelle	5	0.5	0.2	NA	0.8	0.4
Common pipistrelle	6	1.9	0.2	0.2	0.6	0.1
Common pipistrelle	7	0.6	NA	NA	3.3	1.0
Common pipistrelle	8	0.8	0.3	NA	0.9	0.3
Common pipistrelle	9	0.6	0.3	NA	1.0	0.4
Soprano pipistrelle	1	1.7	0.5	NA	0.5	NA
Soprano pipistrelle	10	0.5	0.3	0.2	1.5	NA
Soprano pipistrelle	11	0.8	0.2	NA	0.8	0.2
Soprano pipistrelle	12	0.2	NA	NA	0.4	NA
Soprano pipistrelle	13	0.2	0.2	NA	1.2	NA
Soprano pipistrelle	2	0.9	0.5	NA	0.5	0.2
Soprano pipistrelle	3	0.4	0.3	NA	1.0	0.1
Soprano pipistrelle	4	2.4	0.2	NA	0.9	0.3
Soprano pipistrelle	5	1.3	NA	NA	1.9	0.6
Soprano pipistrelle	6	1.9	0.5	NA	1.8	0.2

Soprano pipistrelle	7	1.2	NA	NA	0.8	0.3
Soprano pipistrelle	8	0.9	0.2	NA	0.8	0.5
Soprano pipistrelle	9	0.5	0.2	NA	0.5	NA
Nyctalus	1	0.4	NA	NA	NA	NA
Nyctalus	10	NA	0.3	NA	NA	NA
Nyctalus	2	0.1	NA	NA	NA	NA
Nyctalus	6	NA	0.2	NA	NA	NA
Brown long-eared	2	NA	NA	NA	NA	0.1
Myotis	3	NA	0.2	NA	0.1	NA
Myotis	5	0.1	NA	NA	NA	0.1
Myotis	7	0.1	NA	NA	NA	0.1
Myotis	8	NA	NA	NA	0.1	NA
Myotis	9	NA	NA	NA	0.1	NA
Daubenton’s	1	0.1	NA	NA	NA	NA
Daubenton’s	10	NA	NA	NA	0.1	NA
Daubenton’s	2	NA	NA	NA	0.1	NA
Daubenton’s	5	NA	NA	NA	0.1	NA
Daubenton’s	7	0.1	NA	NA	NA	0.1
Daubenton’s	8	NA	NA	NA	0.1	NA

Nightly Bat Pass Rate for each Month

Mean per Detector

Table 21: The mean Nightly Pass Rate (bat passes per hour, per night) of each species throughout each month. Values are given to 1 decimal place.

We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

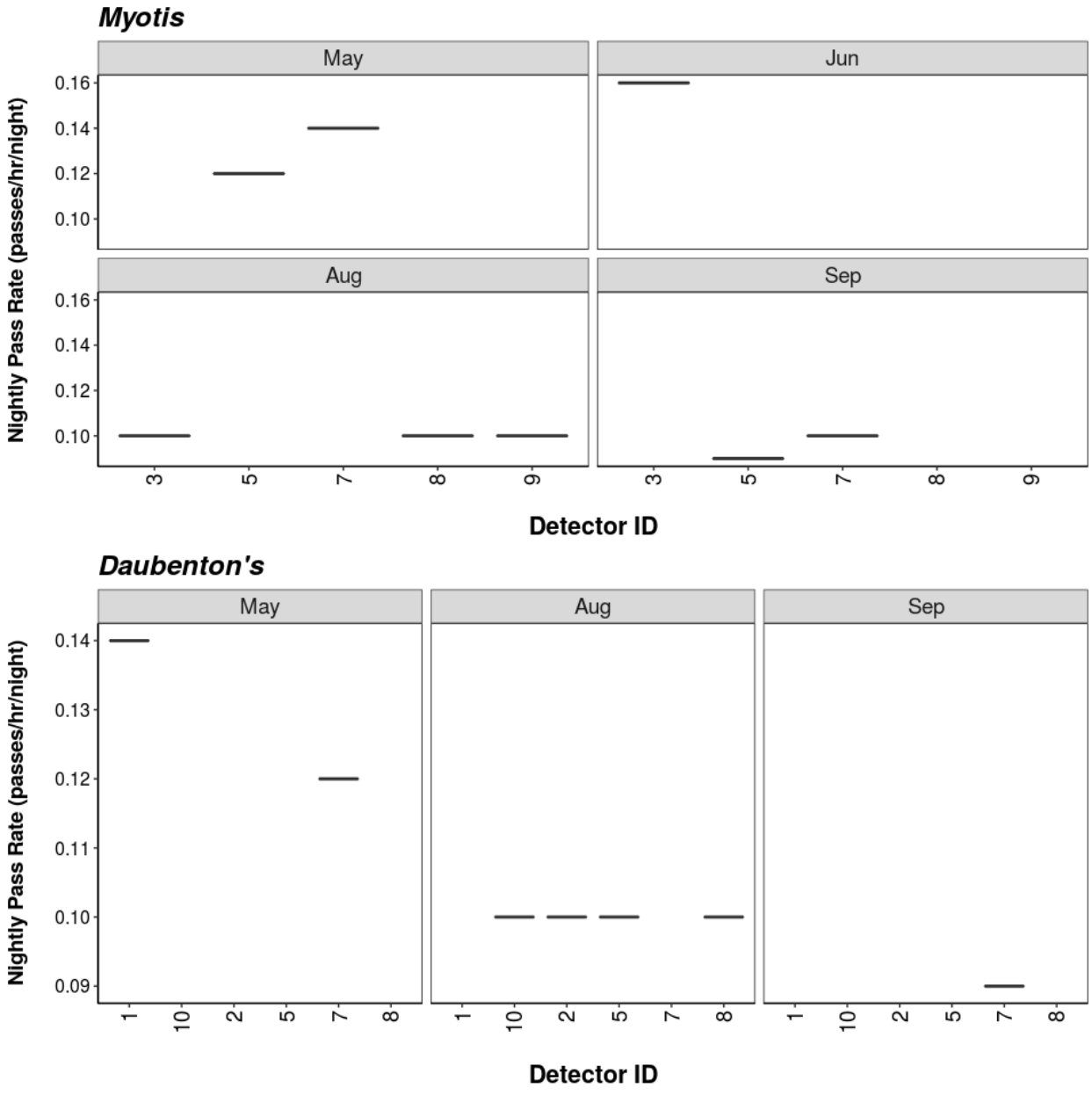
Species	Detector ID	May	Jun	Jul	Aug	Sep
Common pipistrelle	1	0.8	0.2	NA	0.1	NA
Common pipistrelle	10	0.7	0.3	NA	1.1	0.3
Common pipistrelle	11	0.4	0.4	0.3	1.2	0.5
Common pipistrelle	12	0.1	0.2	NA	0.2	0.1
Common pipistrelle	13	0.3	0.2	NA	0.2	NA
Common pipistrelle	2	1.2	NA	NA	0.5	0.1
Common pipistrelle	3	1.0	0.2	NA	0.6	0.1
Common pipistrelle	4	1.6	0.2	NA	1.0	0.2
Common pipistrelle	5	1.3	0.3	NA	1.1	0.6
Common pipistrelle	6	1.5	0.2	0.2	1.0	0.1
Common pipistrelle	7	0.7	NA	NA	3.7	1.3
Common pipistrelle	8	0.7	0.3	NA	0.6	0.2
Common pipistrelle	9	1.1	0.2	NA	0.9	0.4
Soprano pipistrelle	1	1.5	0.4	NA	0.4	NA
Soprano pipistrelle	10	0.4	0.3	0.2	1.6	NA
Soprano pipistrelle	11	0.7	0.2	NA	1.1	0.2
Soprano pipistrelle	12	0.2	NA	NA	0.4	NA
Soprano pipistrelle	13	0.2	0.2	NA	0.9	NA
Soprano pipistrelle	2	1.8	0.5	NA	0.7	0.2
Soprano pipistrelle	3	0.7	0.3	NA	0.9	0.1
Soprano pipistrelle	4	3.9	0.2	NA	1.1	0.2
Soprano pipistrelle	5	2.9	NA	NA	1.6	0.5
Soprano pipistrelle	6	2.2	0.4	NA	1.6	0.2
Soprano pipistrelle	7	1.0	NA	NA	1.1	0.3
Soprano pipistrelle	8	0.8	0.2	NA	0.6	0.5
Soprano pipistrelle	9	0.5	0.2	NA	0.6	NA

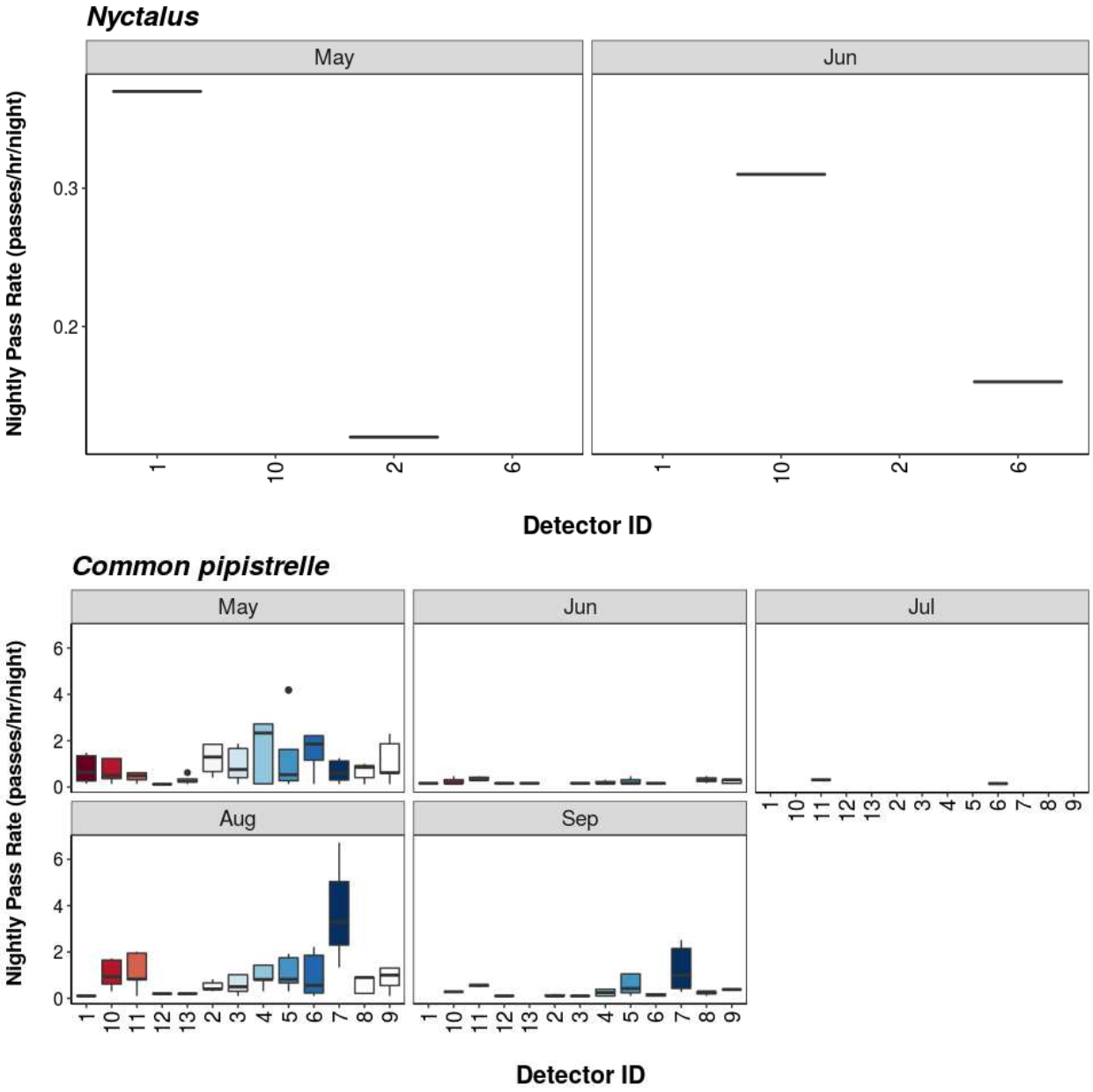
Nyctalus	1	0.4	NA	NA	NA	NA
Nyctalus	10	NA	0.3	NA	NA	NA
Nyctalus	2	0.1	NA	NA	NA	NA
Nyctalus	6	NA	0.2	NA	NA	NA
Brown long-eared	2	NA	NA	NA	NA	0.1
Myotis	3	NA	0.2	NA	0.1	NA
Myotis	5	0.1	NA	NA	NA	0.1
Myotis	7	0.1	NA	NA	NA	0.1
Myotis	8	NA	NA	NA	0.1	NA
Myotis	9	NA	NA	NA	0.1	NA
Daubenton’s	1	0.1	NA	NA	NA	NA
Daubenton’s	10	NA	NA	NA	0.1	NA
Daubenton’s	2	NA	NA	NA	0.1	NA
Daubenton’s	5	NA	NA	NA	0.1	NA
Daubenton’s	7	0.1	NA	NA	NA	0.1
Daubenton’s	8	NA	NA	NA	0.1	NA

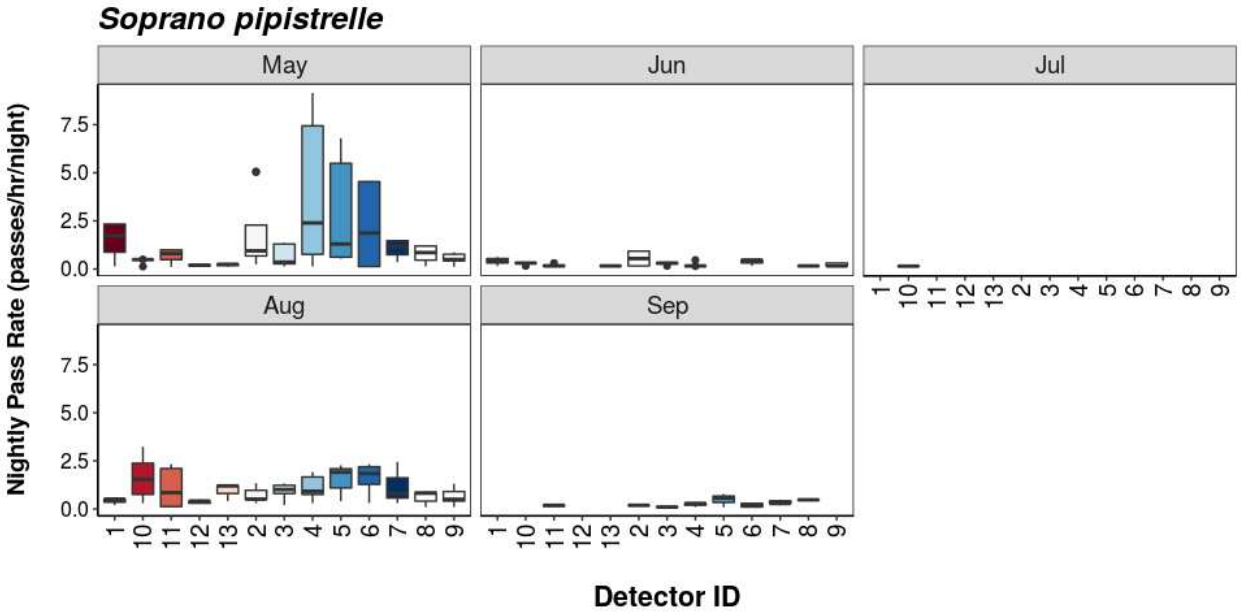
Nightly Bat Pass Rate for each Month

Per Detector - Figures

Figure 12. Figures show boxplots for the number of bat passes per hour by detector, for each month. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.




Nyctalus
May
Jun
Nightly Pass Rate (passes/hr/night)
0.3
0.2
1
10
2
6
Detector ID
Common pipistrelle
May
Jun
Jul
Aug
Sep
Nightly Pass Rate (passes/hr/night)
0
2
4
6
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID


Soprano pipistrelle
May
Jun
Jul
Aug
Sep
Nightly Pass Rate (passes/hr/night)
0.0
2.5
5.0
7.5
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID


Brown long-eared
Sep
Nightly Pass Rate (passes/hr/night)
0.04
0.06
0.08
0.10
0.12
0.14
2
Detector ID

Bat Activity per Detector Location

Figure 13. Detector ID reference:

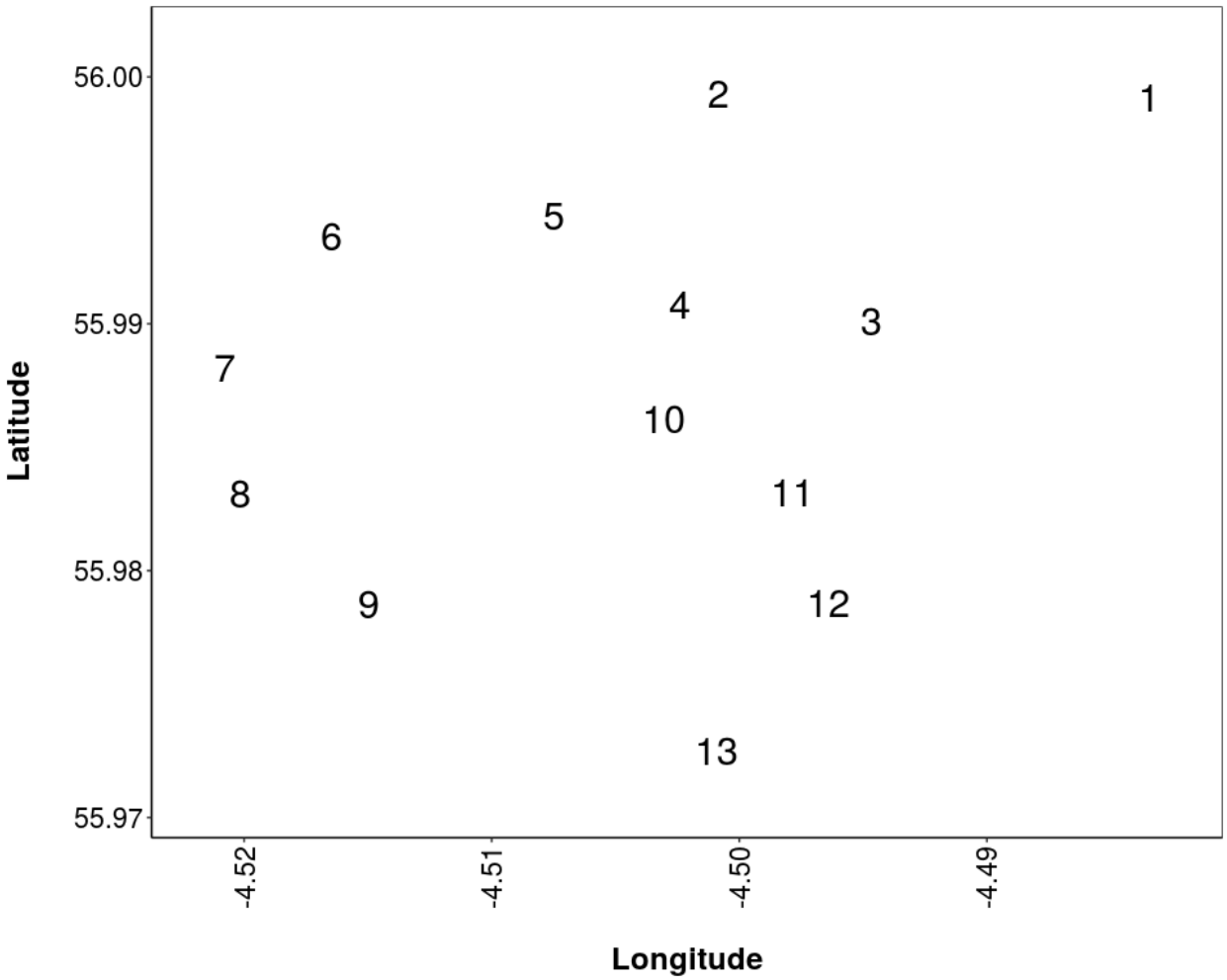


Figure 14. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

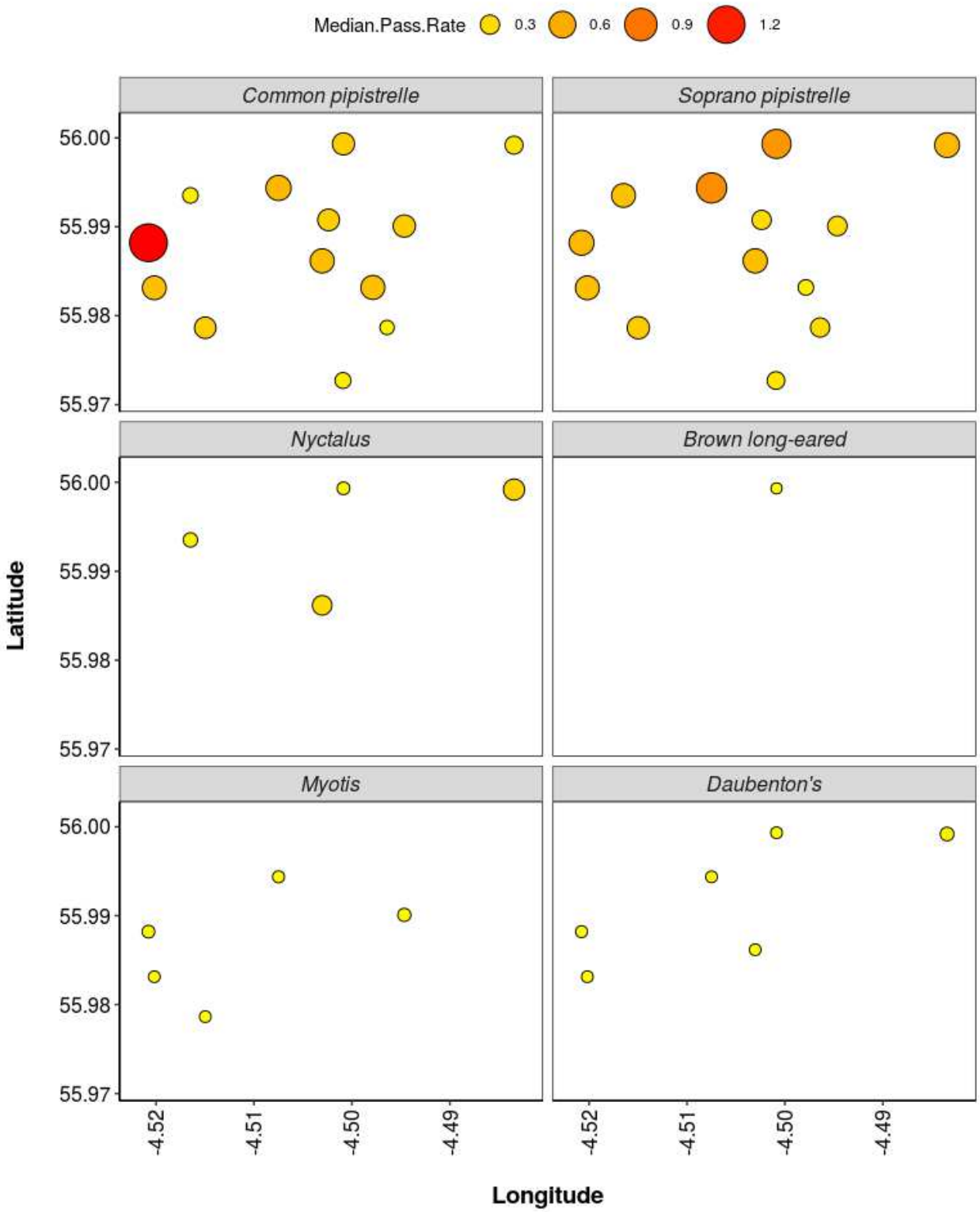
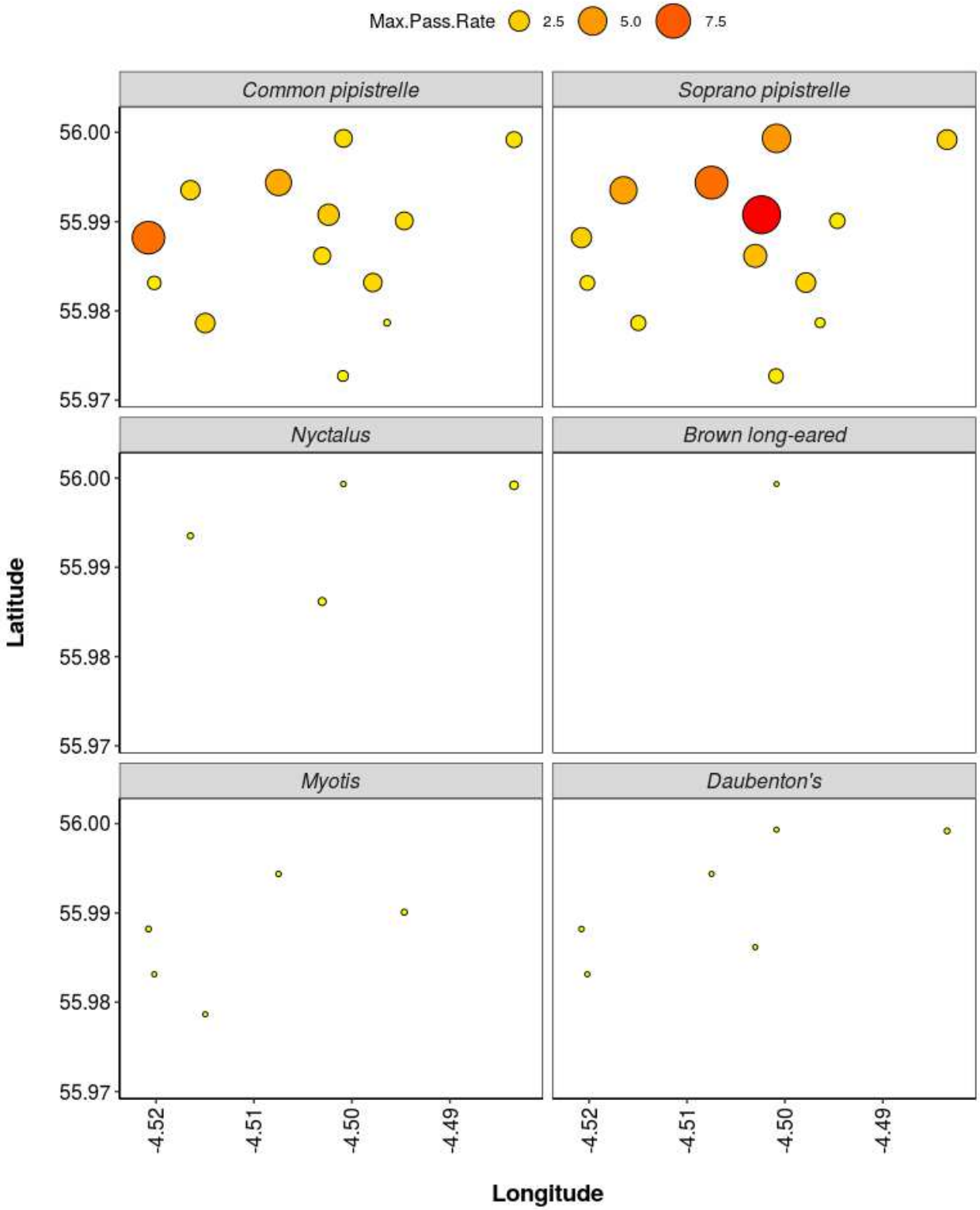


Figure 15. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



PART 2B: Includes absences

THE NEXT SECTION OF THE REPORT FEATURES THE DATA SUPPLIED TO ECOBAT BUT TAKES INTO ACCOUNT SPECIES ABSENCES, AND THEREFORE INCLUDES 'ZERO DATA' FOR WHEN SPECIES WERE NOT DETECTED AT EACH DETECTOR ON A NIGHT. THIS DRAMATICALLY LOWERS THE MEANS AND MEDIANS OF THE DATA PRESENTED.

Nightly Bat Pass Rate (Bat passes per hour)

Median Per Detector

Table 22. The median Nightly Pass Rate (bat passes per hour, per night) of each species. If NA, then no bat passes.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean. For further information see: *Lintott, P. R., & Mathews, F. (2018). Basic mathematical errors may make ecological assessments unreliable. Biodiversity and Conservation, 27(1), 265-267.* https://doi.org/10.1007/s10531-017-1418-5

Species	Detector ID	Median Pass Rate
Brown long-eared	1	0.0
Brown long-eared	10	0.0
Brown long-eared	11	0.0
Brown long-eared	12	0.0
Brown long-eared	13	0.0
Brown long-eared	2	0.0
Brown long-eared	3	0.0
Brown long-eared	4	0.0
Brown long-eared	5	0.0
Brown long-eared	6	0.0
Brown long-eared	7	0.0
Brown long-eared	8	0.0
Brown long-eared	9	0.0
Common pipistrelle	1	0.2
Common pipistrelle	10	0.3
Common pipistrelle	11	0.5
Common pipistrelle	12	0.1
Common pipistrelle	13	0.2
Common pipistrelle	2	0.2
Common pipistrelle	3	0.1
Common pipistrelle	4	0.2
Common pipistrelle	5	0.5
Common pipistrelle	6	0.2

Common pipistrelle	7	1.2
Common pipistrelle	8	0.2
Common pipistrelle	9	0.3
Daubenton's	1	0.0
Daubenton's	10	0.0
Daubenton's	11	0.0
Daubenton's	12	0.0
Daubenton's	13	0.0
Daubenton's	2	0.0
Daubenton's	3	0.0
Daubenton's	4	0.0
Daubenton's	5	0.0
Daubenton's	6	0.0
Daubenton's	7	0.0
Daubenton's	8	0.0
Daubenton's	9	0.0
Myotis	1	0.0
Myotis	10	0.0
Myotis	11	0.0
Myotis	12	0.0
Myotis	13	0.0
Myotis	2	0.0
Myotis	3	0.0
Myotis	4	0.0
Myotis	5	0.0
Myotis	6	0.0
Myotis	7	0.0
Myotis	8	0.0
Myotis	9	0.0
Nyctalus	1	0.0
Nyctalus	10	0.0
Nyctalus	11	0.0
Nyctalus	12	0.0
Nyctalus	13	0.0
Nyctalus	2	0.0
Nyctalus	3	0.0

Nyctalus	4	0.0
Nyctalus	5	0.0
Nyctalus	6	0.0
Nyctalus	7	0.0
Nyctalus	8	0.0
Nyctalus	9	0.0
Soprano pipistrelle	1	0.5
Soprano pipistrelle	10	0.3
Soprano pipistrelle	11	0.2
Soprano pipistrelle	12	0.2
Soprano pipistrelle	13	0.2
Soprano pipistrelle	2	0.5
Soprano pipistrelle	3	0.3
Soprano pipistrelle	4	0.3
Soprano pipistrelle	5	0.5
Soprano pipistrelle	6	0.3
Soprano pipistrelle	7	0.3
Soprano pipistrelle	8	0.4
Soprano pipistrelle	9	0.3

Nightly Bat Pass Rate (Bat passes per hour)

Mean per Detector

Table 23. The mean Nightly Pass Rate (bat passes per hour, per night) of each species at each detector. Values are given to 1 decimal place.

We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

Species	Detector ID	Mean Pass Rate
Brown long-eared	1	0.0
Brown long-eared	10	0.0
Brown long-eared	11	0.0
Brown long-eared	12	0.0
Brown long-eared	13	0.0
Brown long-eared	2	0.0
Brown long-eared	3	0.0
Brown long-eared	4	0.0
Brown long-eared	5	0.0
Brown long-eared	6	0.0
Brown long-eared	7	0.0
Brown long-eared	8	0.0
Brown long-eared	9	0.0
Common pipistrelle	1	0.4
Common pipistrelle	10	0.5
Common pipistrelle	11	0.6
Common pipistrelle	12	0.1
Common pipistrelle	13	0.2
Common pipistrelle	2	0.4
Common pipistrelle	3	0.4
Common pipistrelle	4	0.6
Common pipistrelle	5	0.9
Common pipistrelle	6	0.6
Common pipistrelle	7	1.7
Common pipistrelle	8	0.4
Common pipistrelle	9	0.5

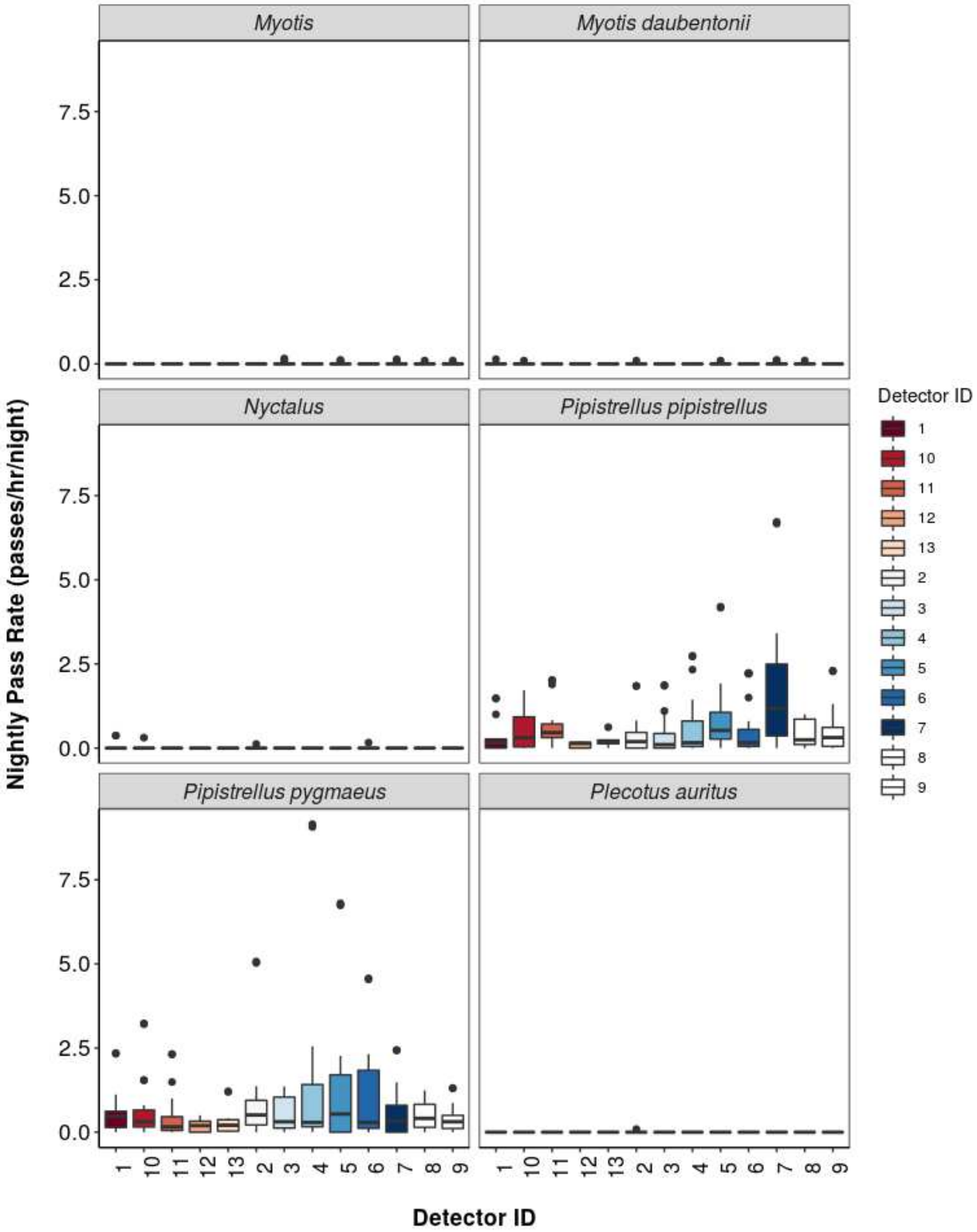
Daubenton’s	1	0.0
Daubenton’s	10	0.0
Daubenton’s	11	0.0
Daubenton’s	12	0.0
Daubenton’s	13	0.0
Daubenton’s	2	0.0
Daubenton’s	3	0.0
Daubenton’s	4	0.0
Daubenton’s	5	0.0
Daubenton’s	6	0.0
Daubenton’s	7	0.0
Daubenton’s	8	0.0
Daubenton’s	9	0.0
Myotis	1	0.0
Myotis	10	0.0
Myotis	11	0.0
Myotis	12	0.0
Myotis	13	0.0
Myotis	2	0.0
Myotis	3	0.0
Myotis	4	0.0
Myotis	5	0.0
Myotis	6	0.0
Myotis	7	0.0
Myotis	8	0.0
Myotis	9	0.0
Nyctalus	1	0.1
Nyctalus	10	0.0
Nyctalus	11	0.0
Nyctalus	12	0.0
Nyctalus	13	0.0
Nyctalus	2	0.0
Nyctalus	3	0.0
Nyctalus	4	0.0
Nyctalus	5	0.0
Nyctalus	6	0.0

Nyctalus	7	0.0
Nyctalus	8	0.0
Nyctalus	9	0.0
Soprano pipistrelle	1	0.6
Soprano pipistrelle	10	0.7
Soprano pipistrelle	11	0.5
Soprano pipistrelle	12	0.2
Soprano pipistrelle	13	0.4
Soprano pipistrelle	2	1.0
Soprano pipistrelle	3	0.5
Soprano pipistrelle	4	1.4
Soprano pipistrelle	5	1.1
Soprano pipistrelle	6	1.0
Soprano pipistrelle	7	0.6
Soprano pipistrelle	8	0.5
Soprano pipistrelle	9	0.4

Nightly Bat Passes (Bat passes per hour)

Per Detector - Figures

Figure 16. Figures show boxplots for the number of bat passes per hour each night, for each detector. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.


Myotis
Myotis daubentonii
Nyctalus
Pipistrellus pipistrellus
Pipistrellus pygmaeus
Plecotus auritus
Nightly Pass Rate (passes/hr/night)
0.0
2.5
5.0
7.5
Detector ID
1
10
11
12
13
2
3
4
5
6
7
8
9

Survey Effort

Table 24. The number of nights bats were detected per month per detector.

Month	Detector ID	No of Survey Nights
May	1	6
May	2	8
May	3	9
May	4	6
May	5	10
May	6	5
May	7	11
May	8	8
May	9	7
May	10	6
May	11	5
May	12	3
May	13	4
Jun	1	4
Jun	2	4
Jun	3	5
Jun	4	6
Jun	5	3
Jun	6	4
Jun	8	4
Jun	9	7
Jun	10	7
Jun	11	6
Jun	12	3
Jun	13	3
Jul	6	1
Jul	10	1
Jul	11	1
Aug	1	3
Aug	2	7
Aug	3	7

Aug	4	6
Aug	5	7
Aug	6	7
Aug	7	7
Aug	8	7
Aug	9	7
Aug	10	7
Aug	11	7
Aug	12	5
Aug	13	3
Sep	2	4
Sep	3	3
Sep	4	5
Sep	5	8
Sep	6	6
Sep	7	6
Sep	8	3
Sep	9	2
Sep	10	1
Sep	11	4
Sep	12	1

Nightly Bat Pass Rate for each Month

Median Per Detector

Table 25. The median Nightly Pass Rate (bat passes per hour, per night) of each species throughout each month. If NA, then no bat passes.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean. For further information see: *Lintott, P. R., & Mathews, F. (2018). Basic mathematical errors may make ecological assessments unreliable. Biodiversity and Conservation, 27(1), 265-267.* https://doi.org/10.1007/s10531-017-1418-5

Species	Detector ID	Aug	Jul	Jun	May	Sep
Brown long-eared	1	0.0	NA	0.0	0.0	NA
Brown long-eared	10	0.0	0.0	0.0	0.0	0.0
Brown long-eared	11	0.0	0.0	0.0	0.0	0.0
Brown long-eared	12	0.0	NA	0.0	0.0	0.0
Brown long-eared	13	0.0	NA	0.0	0.0	NA
Brown long-eared	2	0.0	NA	0.0	0.0	0.0
Brown long-eared	3	0.0	NA	0.0	0.0	0.0
Brown long-eared	4	0.0	NA	0.0	0.0	0.0
Brown long-eared	5	0.0	NA	0.0	0.0	0.0
Brown long-eared	6	0.0	0.0	0.0	0.0	0.0
Brown long-eared	7	0.0	NA	NA	0.0	0.0
Brown long-eared	8	0.0	NA	0.0	0.0	0.0
Brown long-eared	9	0.0	NA	0.0	0.0	0.0
Common pipistrelle	1	0.0	NA	0.1	0.6	NA
Common pipistrelle	10	0.9	0.0	0.0	0.4	0.3
Common pipistrelle	11	0.8	0.3	0.3	0.4	0.5
Common pipistrelle	12	0.2	NA	0.2	0.0	0.1
Common pipistrelle	13	0.2	NA	0.2	0.3	NA
Common pipistrelle	2	0.4	NA	0.0	0.2	0.1
Common pipistrelle	3	0.3	NA	0.0	0.4	0.0
Common pipistrelle	4	0.8	NA	0.1	1.2	0.1
Common pipistrelle	5	0.8	NA	0.2	0.4	0.4
Common pipistrelle	6	0.3	0.2	0.1	1.5	0.1

Common pipistrelle	7	3.3	NA	NA	0.4	1.0
Common pipistrelle	8	0.2	NA	0.1	0.8	0.3
Common pipistrelle	9	0.1	NA	0.2	0.6	0.4
Daubenton's	1	0.0	NA	0.0	0.0	NA
Daubenton's	10	0.0	0.0	0.0	0.0	0.0
Daubenton's	11	0.0	0.0	0.0	0.0	0.0
Daubenton's	12	0.0	NA	0.0	0.0	0.0
Daubenton's	13	0.0	NA	0.0	0.0	NA
Daubenton's	2	0.0	NA	0.0	0.0	0.0
Daubenton's	3	0.0	NA	0.0	0.0	0.0
Daubenton's	4	0.0	NA	0.0	0.0	0.0
Daubenton's	5	0.0	NA	0.0	0.0	0.0
Daubenton's	6	0.0	0.0	0.0	0.0	0.0
Daubenton's	7	0.0	NA	NA	0.0	0.0
Daubenton's	8	0.0	NA	0.0	0.0	0.0
Daubenton's	9	0.0	NA	0.0	0.0	0.0
Myotis	1	0.0	NA	0.0	0.0	NA
Myotis	10	0.0	0.0	0.0	0.0	0.0
Myotis	11	0.0	0.0	0.0	0.0	0.0
Myotis	12	0.0	NA	0.0	0.0	0.0
Myotis	13	0.0	NA	0.0	0.0	NA
Myotis	2	0.0	NA	0.0	0.0	0.0
Myotis	3	0.0	NA	0.0	0.0	0.0
Myotis	4	0.0	NA	0.0	0.0	0.0
Myotis	5	0.0	NA	0.0	0.0	0.0
Myotis	6	0.0	0.0	0.0	0.0	0.0
Myotis	7	0.0	NA	NA	0.0	0.0
Myotis	8	0.0	NA	0.0	0.0	0.0
Myotis	9	0.0	NA	0.0	0.0	0.0
Nyctalus	1	0.0	NA	0.0	0.0	NA
Nyctalus	10	0.0	0.0	0.0	0.0	0.0
Nyctalus	11	0.0	0.0	0.0	0.0	0.0
Nyctalus	12	0.0	NA	0.0	0.0	0.0
Nyctalus	13	0.0	NA	0.0	0.0	NA
Nyctalus	2	0.0	NA	0.0	0.0	0.0
Nyctalus	3	0.0	NA	0.0	0.0	0.0

Nyctalus	4	0.0	NA	0.0	0.0	0.0
Nyctalus	5	0.0	NA	0.0	0.0	0.0
Nyctalus	6	0.0	0.0	0.0	0.0	0.0
Nyctalus	7	0.0	NA	NA	0.0	0.0
Nyctalus	8	0.0	NA	0.0	0.0	0.0
Nyctalus	9	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	1	0.5	NA	0.3	0.6	NA
Soprano pipistrelle	10	1.5	0.2	0.3	0.5	0.0
Soprano pipistrelle	11	0.2	0.0	0.2	0.6	0.1
Soprano pipistrelle	12	0.4	NA	0.0	0.1	0.0
Soprano pipistrelle	13	1.2	NA	0.0	0.2	NA
Soprano pipistrelle	2	0.5	NA	0.5	0.9	0.0
Soprano pipistrelle	3	1.0	NA	0.3	0.3	0.1
Soprano pipistrelle	4	0.9	NA	0.2	2.4	0.1
Soprano pipistrelle	5	1.9	NA	0.0	0.5	0.5
Soprano pipistrelle	6	1.8	0.0	0.3	1.9	0.2
Soprano pipistrelle	7	0.8	NA	NA	0.0	0.3
Soprano pipistrelle	8	0.8	NA	0.2	0.5	0.5
Soprano pipistrelle	9	0.5	NA	0.2	0.5	0.0

Nightly Bat Pass Rate for each Month

Mean per Detector

Table 26. The mean Nightly Pass Rate (bat passes per hour, per night) of each species throughout each month. Values are given to 1 decimal place.

We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

Species	Detector ID	Aug	Jul	Jun	May	Sep
Brown long-eared	1	0.0	NA	0.0	0.0	NA
Brown long-eared	10	0.0	0.0	0.0	0.0	0.0
Brown long-eared	11	0.0	0.0	0.0	0.0	0.0
Brown long-eared	12	0.0	NA	0.0	0.0	0.0
Brown long-eared	13	0.0	NA	0.0	0.0	NA
Brown long-eared	2	0.0	NA	0.0	0.0	0.0
Brown long-eared	3	0.0	NA	0.0	0.0	0.0
Brown long-eared	4	0.0	NA	0.0	0.0	0.0
Brown long-eared	5	0.0	NA	0.0	0.0	0.0
Brown long-eared	6	0.0	0.0	0.0	0.0	0.0
Brown long-eared	7	0.0	NA	NA	0.0	0.0
Brown long-eared	8	0.0	NA	0.0	0.0	0.0
Brown long-eared	9	0.0	NA	0.0	0.0	0.0
Common pipistrelle	1	0.0	NA	0.1	0.8	NA
Common pipistrelle	10	1.1	0.0	0.1	0.6	0.3
Common pipistrelle	11	1.2	0.3	0.4	0.3	0.4
Common pipistrelle	12	0.1	NA	0.2	0.0	0.1
Common pipistrelle	13	0.1	NA	0.1	0.3	NA
Common pipistrelle	2	0.5	NA	0.0	0.6	0.1
Common pipistrelle	3	0.4	NA	0.0	0.6	0.0
Common pipistrelle	4	0.8	NA	0.1	1.3	0.2
Common pipistrelle	5	1.1	NA	0.3	1.2	0.6
Common pipistrelle	6	0.8	0.2	0.1	1.2	0.1
Common pipistrelle	7	3.7	NA	NA	0.6	1.3
Common pipistrelle	8	0.4	NA	0.2	0.6	0.2
Common pipistrelle	9	0.5	NA	0.2	0.9	0.4

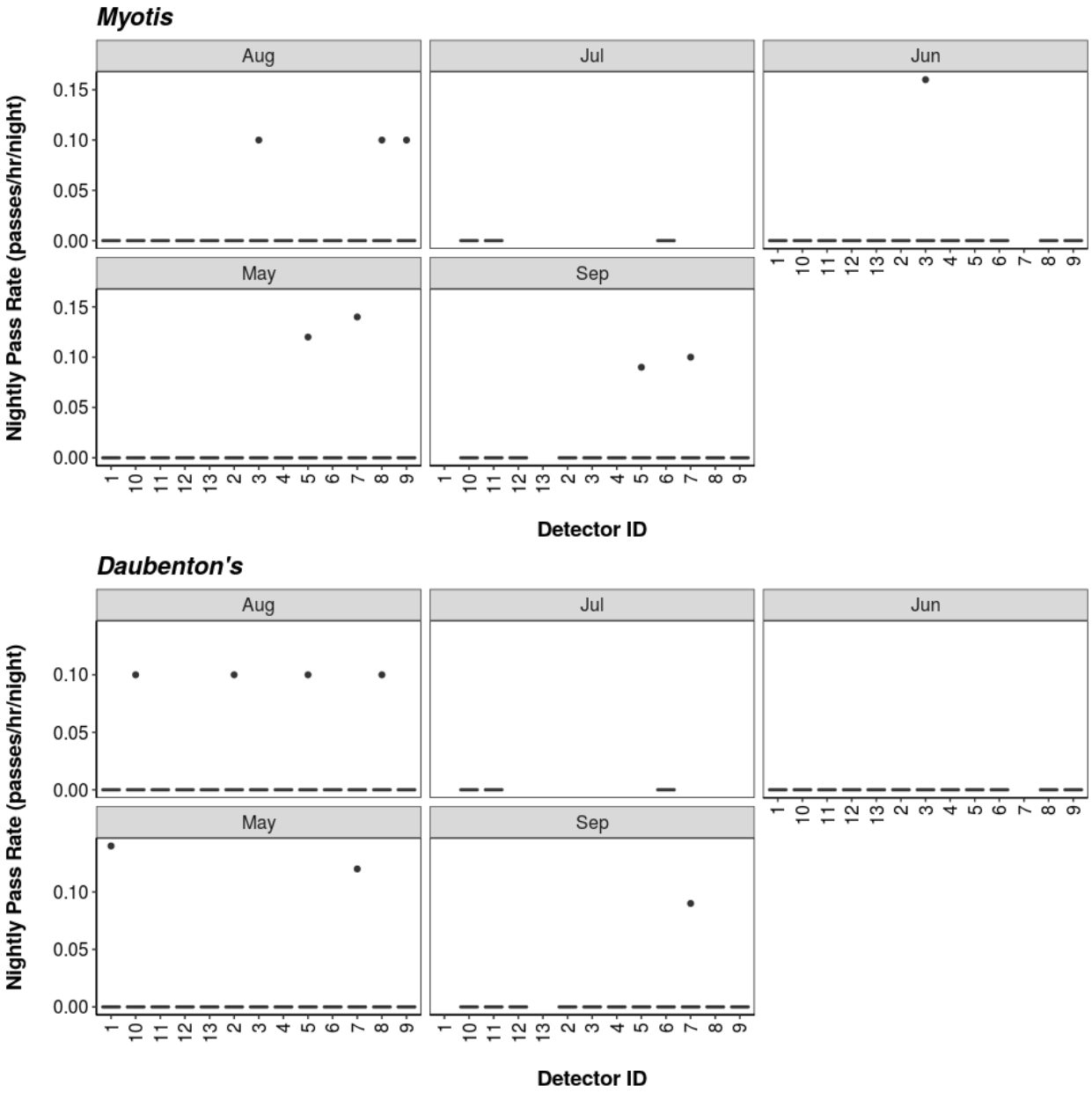
Daubenton’s	1	0.0	NA	0.0	0.0	NA
Daubenton’s	10	0.0	0.0	0.0	0.0	0.0
Daubenton’s	11	0.0	0.0	0.0	0.0	0.0
Daubenton’s	12	0.0	NA	0.0	0.0	0.0
Daubenton’s	13	0.0	NA	0.0	0.0	NA
Daubenton’s	2	0.0	NA	0.0	0.0	0.0
Daubenton’s	3	0.0	NA	0.0	0.0	0.0
Daubenton’s	4	0.0	NA	0.0	0.0	0.0
Daubenton’s	5	0.0	NA	0.0	0.0	0.0
Daubenton’s	6	0.0	0.0	0.0	0.0	0.0
Daubenton’s	7	0.0	NA	NA	0.0	0.0
Daubenton’s	8	0.0	NA	0.0	0.0	0.0
Daubenton’s	9	0.0	NA	0.0	0.0	0.0
Myotis	1	0.0	NA	0.0	0.0	NA
Myotis	10	0.0	0.0	0.0	0.0	0.0
Myotis	11	0.0	0.0	0.0	0.0	0.0
Myotis	12	0.0	NA	0.0	0.0	0.0
Myotis	13	0.0	NA	0.0	0.0	NA
Myotis	2	0.0	NA	0.0	0.0	0.0
Myotis	3	0.0	NA	0.0	0.0	0.0
Myotis	4	0.0	NA	0.0	0.0	0.0
Myotis	5	0.0	NA	0.0	0.0	0.0
Myotis	6	0.0	0.0	0.0	0.0	0.0
Myotis	7	0.0	NA	NA	0.0	0.0
Myotis	8	0.0	NA	0.0	0.0	0.0
Myotis	9	0.0	NA	0.0	0.0	0.0
Nyctalus	1	0.0	NA	0.0	0.1	NA
Nyctalus	10	0.0	0.0	0.0	0.0	0.0
Nyctalus	11	0.0	0.0	0.0	0.0	0.0
Nyctalus	12	0.0	NA	0.0	0.0	0.0
Nyctalus	13	0.0	NA	0.0	0.0	NA
Nyctalus	2	0.0	NA	0.0	0.0	0.0
Nyctalus	3	0.0	NA	0.0	0.0	0.0
Nyctalus	4	0.0	NA	0.0	0.0	0.0
Nyctalus	5	0.0	NA	0.0	0.0	0.0
Nyctalus	6	0.0	0.0	0.0	0.0	0.0

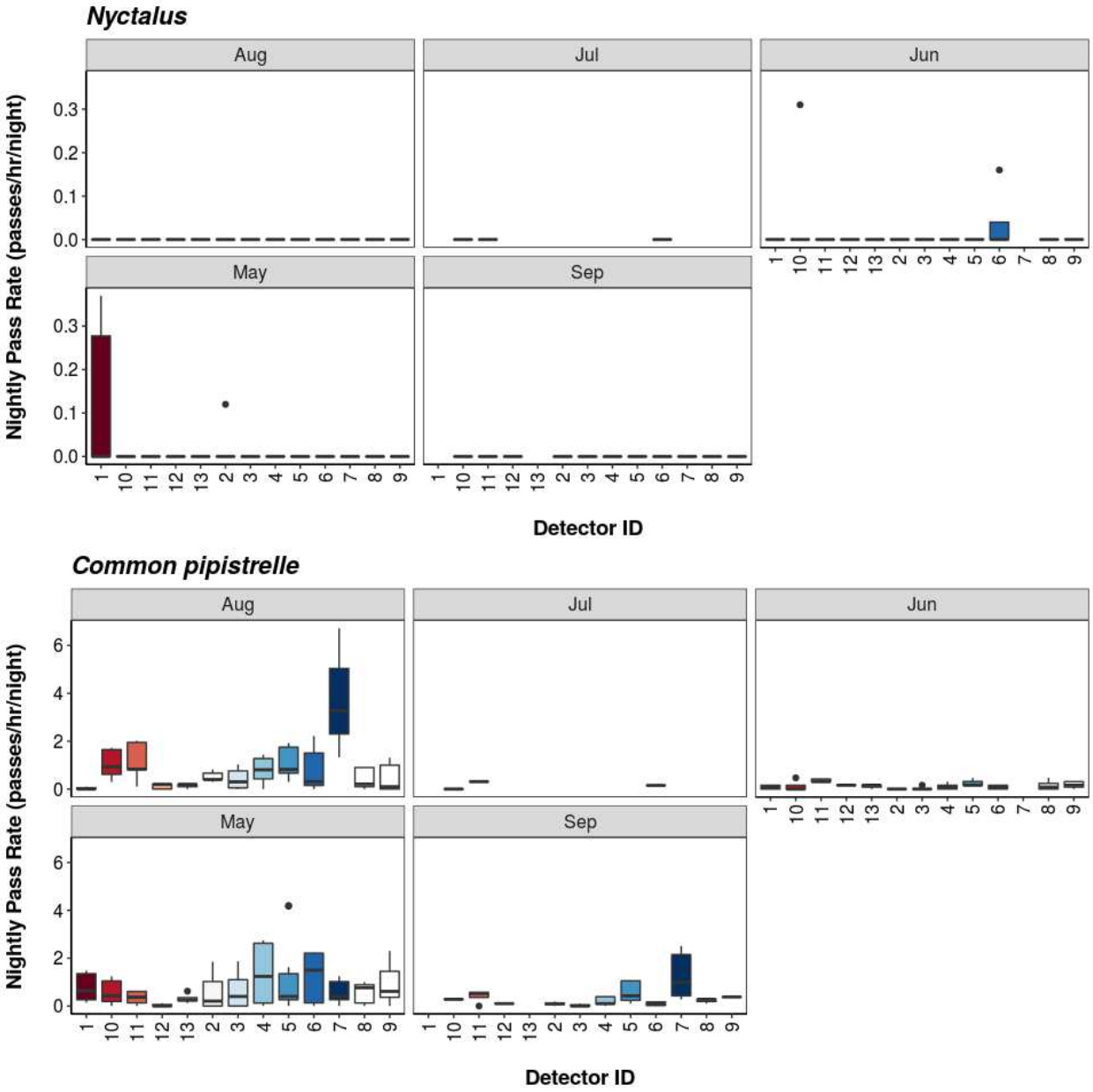
Nyctalus	7	0.0	NA	NA	0.0	0.0
Nyctalus	8	0.0	NA	0.0	0.0	0.0
Nyctalus	9	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	1	0.4	NA	0.3	1.0	NA
Soprano pipistrelle	10	1.6	0.2	0.2	0.4	0.0
Soprano pipistrelle	11	0.9	0.0	0.1	0.5	0.1
Soprano pipistrelle	12	0.4	NA	0.0	0.1	0.0
Soprano pipistrelle	13	0.9	NA	0.1	0.2	NA
Soprano pipistrelle	2	0.7	NA	0.5	1.8	0.0
Soprano pipistrelle	3	0.9	NA	0.2	0.6	0.1
Soprano pipistrelle	4	1.1	NA	0.2	3.9	0.1
Soprano pipistrelle	5	1.6	NA	0.0	1.7	0.4
Soprano pipistrelle	6	1.4	0.0	0.3	2.2	0.2
Soprano pipistrelle	7	1.1	NA	NA	0.4	0.3
Soprano pipistrelle	8	0.6	NA	0.1	0.6	0.3
Soprano pipistrelle	9	0.6	NA	0.2	0.5	0.0

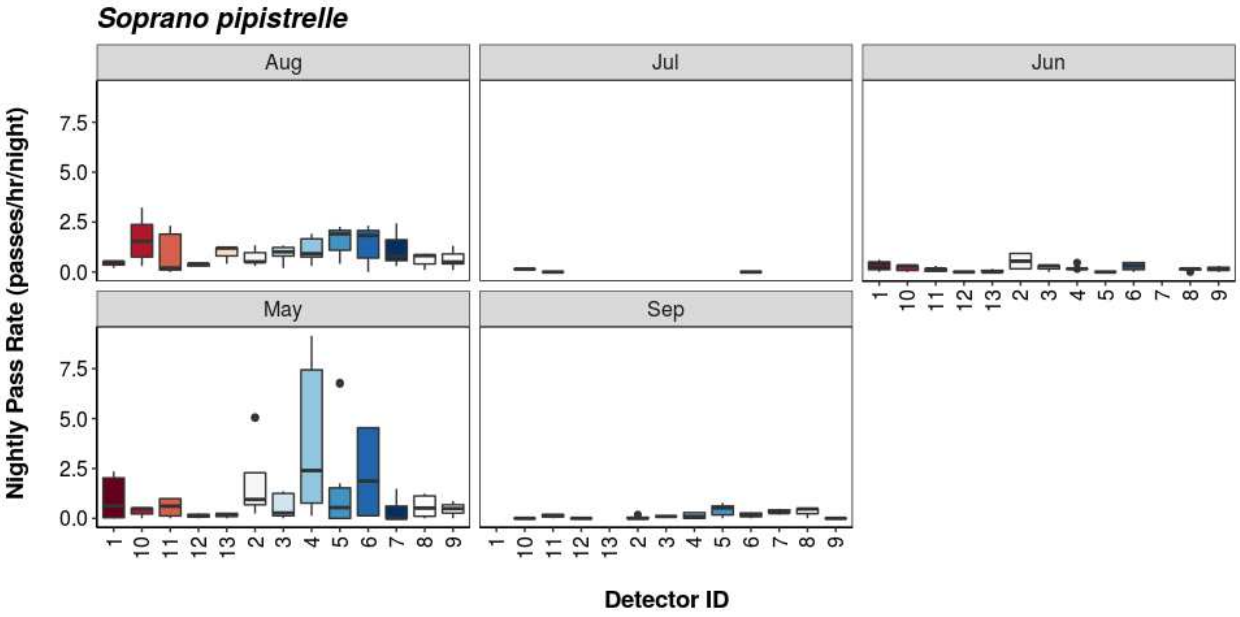
Nightly Bat Pass Rate for each Month

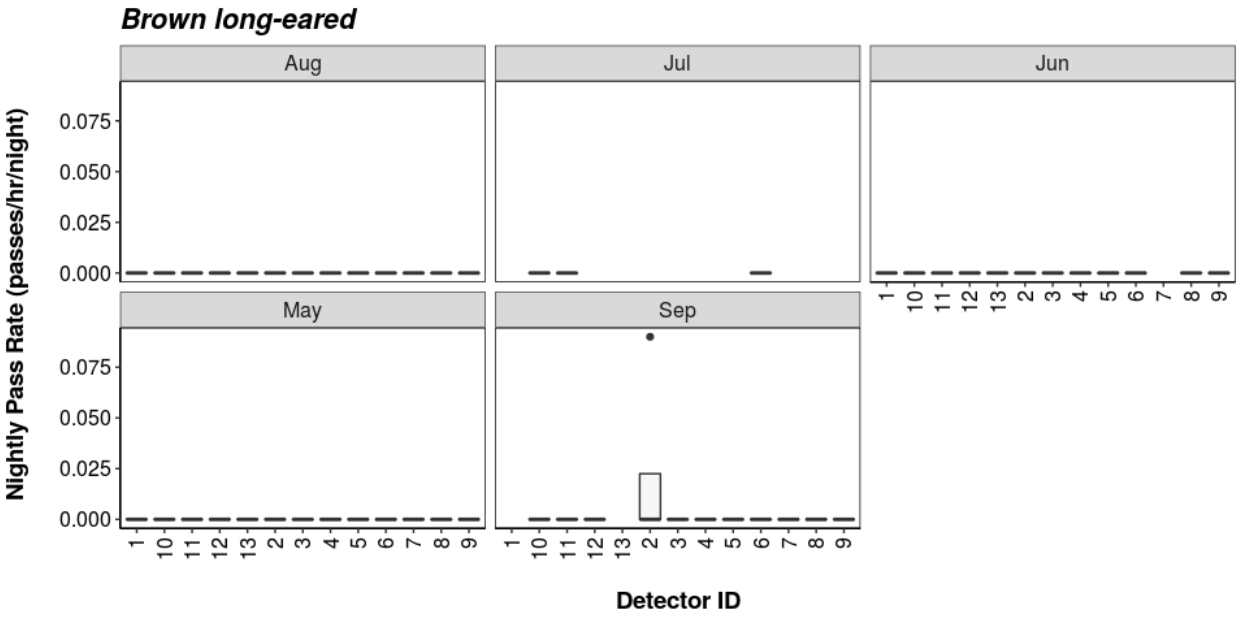
Per Detector - Figures

Figure 17. Figures show boxplots for the number of bat passes per hour by detector, for each month. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.




Nyctalus
Aug
Jul
Jun
May
Sep
Nightly Pass Rate (passes/hr/night)
0.0
0.1
0.2
0.3
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID
Common pipistrelle
Aug
Jul
Jun
May
Sep
Nightly Pass Rate (passes/hr/night)
0
2
4
6
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID


Soprano pipistrelle
Aug
Jul
Jun
May
Sep
Nightly Pass Rate (passes/hr/night)
7.5
5.0
2.5
0.0
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID


Brown long-eared
Aug
Jul
Jun
May
Sep
Nightly Pass Rate (passes/hr/night)
0.075
0.050
0.025
0.000
1
10
11
12
13
2
3
4
5
6
7
8
9
Detector ID

Bat Activity per Detector Location

Figure 18. Detector ID reference:

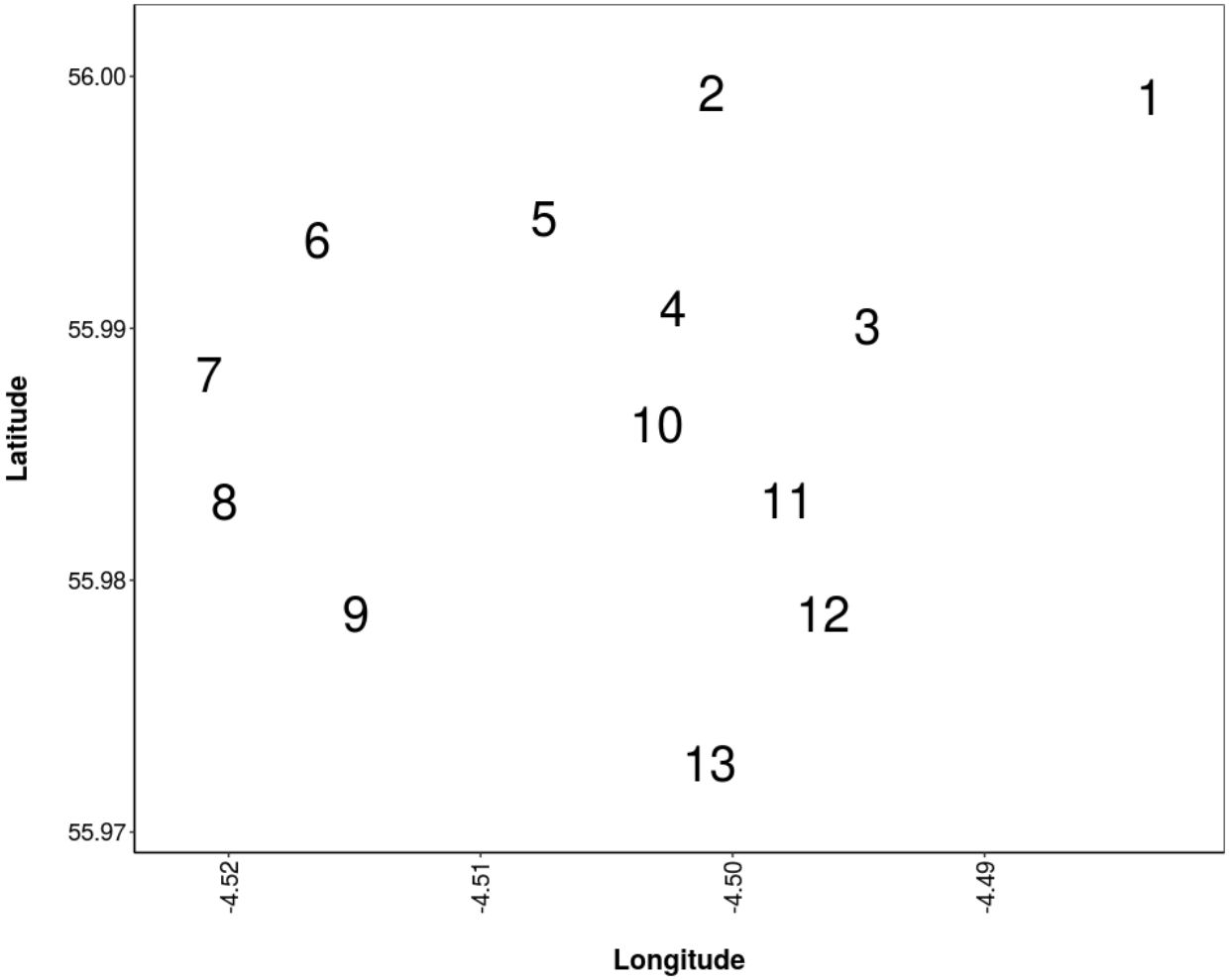


Figure 19. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

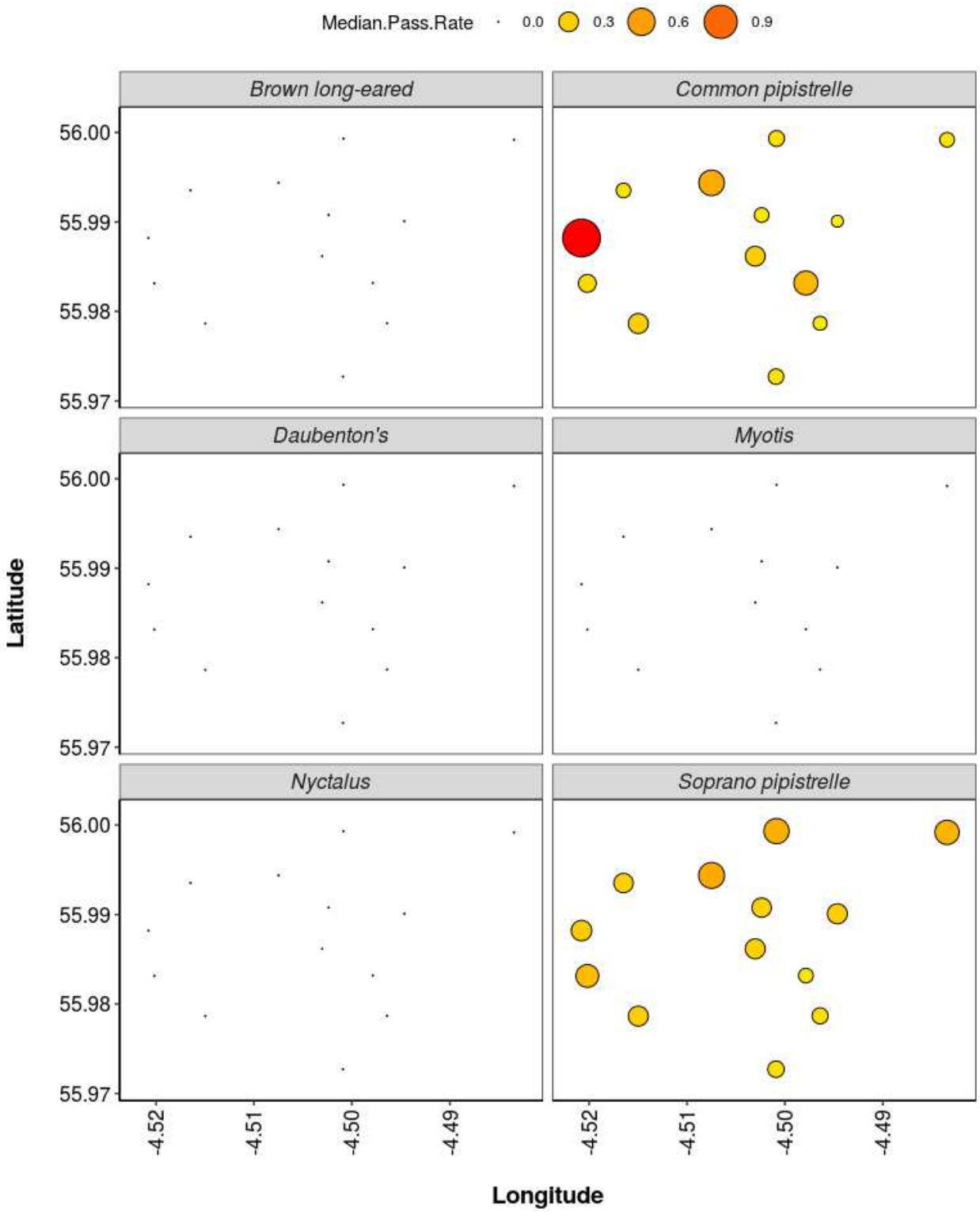
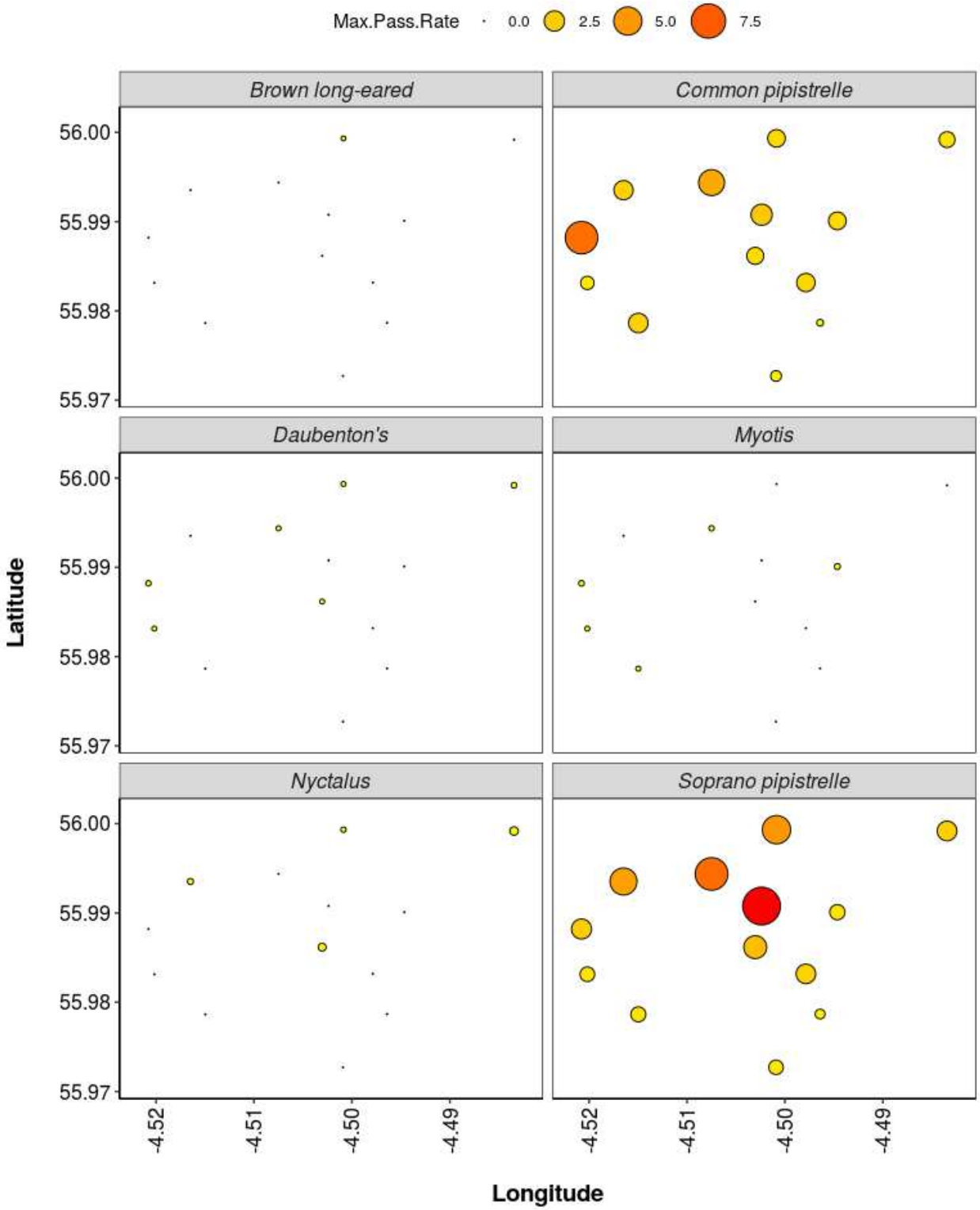


Figure 20. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



Thank you for using Ecobat! If you have any questions please email info@themammalsociety.org.uk

ANNEX G. WILD SURVEYS TREE INSPECTION REPORT

PRF ID	Grid Reference	Tree Species	Feature(s)	BCT Category	Evidence of Bats	Recommendations	Date Surveyed
PS42	NS4113477789	Scots pine	Multiple broken branches, mostly lower down facing west.1 x cavity 12 m southeast facing (no depth). 1x cavity beneath protruding limb west facing (no significant depth tuck up at best)	Negligible	No bats or field signs present	No further survey for bats required	18/11/2022
R9	NS4118077752	Beech	Basal cavity west facing open 2 m from ground then extends 0.75 m. Small off shoot extends 0.5 m	Low	No bats or field signs present	Further inspection for bats required if the tree is to be removed	18/11/2022
PS43	NS4115777750	2 x Beech trees	**Tree 1**, Decay on main stem small cavity east facing 3 m, approx. 10 cm in length. **Tree 2,** Cavity 1 m in length, east facing, 2 cm wide narrows at top	Low	No bats or field signs present	Further inspection for bats required if the trees are to be removed	18/22/2022

Photo 1: Scots pine

Photo 2: Single beech tree

Photo 3: Small cavity in single beech

Photo 4: 2 x Beech trees