Chleansaid Wind Farm

ESB Asset Development UK Limited

Appendix 8.4: Bats

avianecology

CONTENTS

1 INTRODUCTION

1.1.1 This Technical Appendix has been prepared to accompany **Chapter 8** of the Environmental Impact Assessment Report (EIAR) for the proposed Chleansaid Wind Farm (hereafter 'Proposed Development').

1.1.2 It presents detailed methodologies and results of desk studies and field surveys completed to establish baseline conditions with regards to bat species, in order to inform the design and assessment of the Proposed Development.

1.1.3 It should be read with reference to the following Figures, presented in Volume 3 of the EIAR:

- **Figure 8.1** – Non-Ornithological Statutory Designated Sites for Nature Conservation.
- **Figure 8.7** – Bat Activity Survey Plan.

1.1.4 Throughout this Technical Appendix only common bat species names are given. **Annex 1** provides the scientific names for the bat species.

1.2 Site Overview

1.2.1 The 'site', as shown by the red line boundary in **Figures 8.1** and **8.7**, encompasses the 'turbine area' and 'the access area', and lies 13 km north-east of Lairg, and immediately north of the settlement of Dalnessie, in Sutherland. The site largely comprises open bog, heathland and acid grassland habitats, which continues to the north and east, and is fringed by commercial forestry to the west and south-west. Sròn Leathad Chleansaid is a named hill located along the northern boundary of the turbine area. The Allt nan Con-uisge is a watercourse which flows in the western part of the turbine area. The River Brora marks the south-eastern extent of the turbine area. There are no other waterbodies on-site, although there lochans outside the boundary of the turbine area, with the closest, Loch na Fuaralachd and Loch Beag na Fuaralachd located in forestry to the south-west, and Loch Coire na Bruaiche to the east.

1.2.2 There are no designated sites with bat interest within 10 km of the turbine area.

1.2.3 Full habitat descriptions are provided in **Appendix 8.1** in Volume 2 of the EIAR.

2 METHODOLOGY

2.1.1 The approach to baseline information gathering with regards to bats has been undertaken with reference to current NatureScot guidance (SNH, 2019[1]).

2.1.2 Additional pieces of guidance and peer reviewed literature have also been referred to and are referenced where relevant.

2.1.3 The objectives of the bat surveys were to:

- Assess the habitats within the site to identify features that have the potential to support maternity roosts and significant hibernation roosts.
- Identify species using the site, and temporal and spatial variations in use.
- Assess the level of activity of bats within the site.
- Assess the potential risks to bats in line with NatureScot guidance (SNH, 2019).

2.2 Desk Study

2.2.1 A desk study was undertaken to inform the approach to field survey work and provide context for subsequent assessment.

2.2.2 The desk study has included a review of:

- Aerial imagery and Ordnance Survey (OS) maps to identify any features of potential value to foraging, commuting or roosting bats.
- A review of SiteLink[2] to identify the proximity of the turbine area to any national or internationally designated sites for nature conservation, with bat qualifying interests.
- A review of existing bat records within 10 km of the turbine area, including species and roost records, obtained from the Highland Biological Recording Group (HBRG).
- A review of the site's location in relation to species known ranges in Scotland, with reference to the most recent UK Habitats Directive[3] Article 17 Report[4].
- The location of other wind farm developments, including the number of turbines and their size within 10 km of the turbine area through a review of THC 'Wind Turbine Map'[5].

2.3 Field Surveys

2.3.1 The aims of baseline field surveys for bats were to establish the bat species assemblage using the turbine area, the spatial and temporal distribution of bat activity within the turbine area, the location and extent of commuting and foraging habitat used by bats and, the locations of any maternity roosts and/or any significant hibernation or swarming sites that could potentially be affected by the Proposed Development.

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[1] SNH (2019) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*. https://www.nature.scot/sites/default/files/2021-08/Bats%20and%20onshore%20wind%20turbines%20-%20survey%2C%20assessment%20and%20mitigation_0.pdf (Accessed 19th November 2021).

[2] https://sitelink.nature.scot/home (Accessed 19th November 2021).

[3] Council Directive 92/43/EEC.

[4] https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-terrestrial (Accessed 19th November 2021).

[5] https://highland.maps.arcgis.com/apps/webappviewer/index.html?id=5ec04b13a9b049f798cadbd5055f1787 (Accessed 19th November 2021).

2.3.2 The following surveys have been completed:

- Habitat Assessment.
- Preliminary Roost Assessment.
- Ground-level Static Bat Activity Surveys.

Habitat Assessment

2.3.3 An initial habitat assessment was undertaken on 9th July 2020 to appraise the potential value of habitats within the turbine area for commuting and foraging bats, using the criteria detailed within Bat Conservation Trust (BCT) guidance (Collins, 2016[6]).

2.3.4 The assessment was informed through a review of aerial imagery and comprised a daylight walkover of potentially suitable habitat features within the turbine area. The assessment was undertaken by M. Wood, a suitably competent ecologist with considerable experience of undertaking bat activity surveys for proposed wind farm developments at comparable sites across Scotland.

Preliminary Roost Assessment

2.3.5 Features with the potential to support maternity roosts and significant hibernation and/or swarming sites within a Zone of Influence (ZoI) of the proposed turbine locations, were identified through a review of aerial imagery and the habitat assessment. The ZoI was defined as a buffer of 200 m of the proposed turbine locations, plus the candidate turbine rotor radius (81.5 m) i.e., within a total of 281.5 m from the proposed turbine locations. An assessment was also carried out along the proposed turbine route to turbine area.

2.3.6 A daylight, ground-level preliminary roost assessment in accordance with Collins guidance (2016), was then undertaken on 9th July 2020 and 1st October 2021 by M. Wood an experienced bat surveyor, with extensive experience in undertaking preliminary bat roost assessments. The July 2020 survey covered the turbine area, and the October 2021 survey covered the access area.

2.3.7 Identified trees were externally assessed from ground-level and were not subject to endoscope inspection or aerial inspection of elevated features.

Ground-level Static Surveys

2.3.8 Automated static detectors were deployed within the turbine area in July, September and October 2020 and April and May 2021, sampling the summer, autumn and spring periods (Summer: July, Autumn: September-October, and Spring: April-May) in accordance with NatureScot guidance (SNH, 2019).

2.3.9 The total deployment duration of static monitoring over the summer, autumn and spring sampling periods is detailed in **Table 8.4.1**.

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

2.3.10 A total of 14 static detector locations were deployed to survey the 16 turbine locations. The locations of the static detectors are illustrated in **Figure 8.7** and detailed in **Table 8.4.2**.

2.3.11 Each monitoring location comprised a single SM2, SM4 or SM Mini bat detector, fitted with a single omnidirectional microphone attached to a 1 m high wooden stake or tree. Activity generated was based on a full spectrum or zero-crossing analysis of the captured sound files.

2.3.12 Automated detectors were programmed to commence recording approximately 30 minutes before sunset and finish recording half an hour after sunrise, with all automated detectors set up to record simultaneously, to allow comparison of activity recorded across the turbine area for the same monitoring period.

2.3.13 Automated detectors were deployed for a minimum of consecutive ten nights during each monitoring period at the onset of an appropriate weather window for bat activity i.e. forecast temperatures of >8 °C (at dusk), maximum ground level wind speeds of 5 m/s and no, or only very light, rainfall.

Table 8.4.1: Total duration of static monitoring during each monitoring period.

Monitoring Period	Recording Location	Period Start	Period End	Total Deployment Duration (No. of nights)
Summer	LOC 1 - 14	23/07/2020	20/08/2020	28
Autumn	LOC 1 - 14	24/09/2020	28/10/2020	34
Spring	LOC 1-3, 5 - 14	14/04/2021	29/04/2021	15
	LOC 4*	29/04/2021	13/05/2021	14

*Failed to record during 14/04/21–29/04/21 and so was re-deployed 29/04/2021 to 13/05/2021 instead to cover the spring period.

Table 8.4.2: Monitoring station (MS) recording period summary.

MS Ref.	Grid Ref.	Phase 1 Habitat Classification	Linear Feature within 50 m	Nearest Turbine	Distance from Turbine (m)	Phase 1 Habitat Classification at Nearest Turbine	No. of Successful Recording Nights		
							Summer	Autumn	Spring
LOC 1	NC 60427 18889	Acid grassland/marshy grassland mosaic.	n/a	16	125	Acid grassland/marshy grassland mosaic.	15	14	6
LOC 2	NC 60395 18374	Acid grassland/marshy grassland mosaic.	n/a	10	800	Acid grassland/marshy grassland mosaic.	15	12	6
LOC 3	NC 61293 18617	Acid grassland/marshy grassland mosaic.	n/a	14, 15	14 = 460 15 = 315	14 = Marshy grassland. 15 = Acid grassland/marshy grassland mosaic.	15	14	6
LOC 4	NC 61821 17934	Wet heath/acid grassland mosaic.	n/a	13, 14	13 = 320 14 = 550	13 = Wet heath/acid grassland mosaic. 14 = Marshy grassland.	15	14	3
LOC 5	NC 61261 17657	Wet heath/acid grassland mosaic.	n/a	9	80	Wet heath/acid grassland mosaic.	14	14	6
LOC 6	NC 60601 17362	Blanket bog.	n/a	11	400	Blanket bog.	16	12	6
LOC 7	NC 60959 16854	Blanket bog.	n/a	3, 4	3 = 260 4 = 235	Blanket bog.	16	0	6
LOC 8	NC 61864 17191	Marshy grassland/wet modified bog mosaic.	n/a	7, 8	7 = 320 8 = 240	7 = Marshy grassland/wet modified bog mosaic. 8 = Blanket bog.	16	11	6
LOC 9	NC 62342 17381	Wet heath/acid grassland mosaic.	n/a	12	160	Wet heath/acid grassland mosaic.	16	1	4
LOC 10	NC 63046 17324	Wet modified bog.	n/a	6	715	Wet modified bog.	11	1	6
LOC 11	NC 62676 16804	Marshy grassland/wet modified bog mosaic.	n/a	6	145	Wet modified bog.	1	2	6
LOC 12	NC 62001 16582	Blanket bog.	n/a	5	155	Wet dwarf scrub heath.	16	5	6
LOC 13	NC 61405 16403	Blanket bog.	n/a	2	185	Blanket bog.	13	10	6
LOC 14	NC 61791 16007	Blanket bog.	n/a	1	130	Blanket bog.	16	0	6

2.4 Data Analysis and Assumptions of Bat Activity

2.4.1 Bat sound analysis has been undertaken by A. Hulme BSc, who has over four years' experience conducting sound analysis for wind farm developments across the UK and five years' experience completing bat surveys.

2.4.2 Analysis and interpretation of bat activity has followed the principles presented within Collins (2016) and NatureScot guidance (SNH, 2019)

2.4.3 Digital sonograms were analysed through Kaleidoscope Pro (Wildlife Acoustics) software using AutoID Version 5.1.9g before being uploaded to the *Ecobat Tool* (Lintott *et al.,* 2018[7]) for analysis. All sonograms were manually checked prior to uploading to *Ecobat*, through Kaleidoscope Viewer and Analook (Titley Scientific).

2.4.4 Weather data were also analysed to check for any periods of poor weather which could have affected bat activity. In accordance with NatureScot (SNH, 2019) guidelines, bat surveys should be undertaken in appropriate weather: temperatures of >8 ^{o}C at dusk, maximum ground level wind speed of >5 m/s and no, or only very light rainfall.

2.4.5 Weather data was collected from a NEXUS 35.1075 weather station deployed within the turbine area during the surveys, but due to water damage, on-site weather data was unable to be downloaded and as a result publically available weather data from other local sources was used in the assessment (see ***Limitations*** section 2.4.22).

Assessment of Relative Activity Levels

2.4.6 In accordance with NatureScot guidance (SNH, 2019), *Ecobat* was used to provide an objective interpretation of the relative importance of bat activity levels recorded within the turbine area.

2.4.7 *Ecobat* is a free online tool provided by the Mammal Society. The tool compares baseline bat activity data collected for a site, with a national database (i.e. the 'reference range'), collected from similar areas at the same time of year. It then provides a percentile rank for each species and provides a numerical way of interpreting the results rather than relying on professional judgement alone. The online tool remains limited by the amount of data in the database on a locational basis; and therefore the results should be regarded as indicative rather than conclusive evidence of the importance of a site for bats.

2.4.8 For each night that bat activity is recorded, *Ecobat* reports the percentile and associated confidence limits of the data against the software's reference range. **Table 8.4.3** presents the percentile and bat activity categories, replicated from NatureScot (SNH, 2019) guidance.

[7] Lintott, P.R., Davison, S., van Breda, J., Kubasiewicz, L., Dowse, D., Daisley, J., Haddy, E. and Mathews, F., 2018. *Ecobat*: An online resource to facilitate transparent, evidence-based interpretation of bat activity data. Ecology and evolution, 8(2), pp. 935-941.

Table 8.4.3: Percentile scope and categorised level of bat activity.

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

2.4.9 For the purposes of analysis in *Ecobat*, the following parameters were used to stratify the reference range:

- Only records from within 30 days of the survey date; and
- Only records from within 200 km^2 of the detector locations.

2.4.10 The reference range for each species is given by *Ecobat*, and *Ecobat* recommend a reference range of >200 to be confident in the relative activity level. The reference range for each species is listed below:

- Common pipistrelle – 1,030.
- Noctule – 150.
- Soprano pipistrelle– 249.
- *Myotis* species – 155.
- Brown long-eared – 35.

2.4.11 When data are entered into *Ecobat* for analysis, there is no allowance for entering recording nights where no bat passes were recorded, and so the analysis is carried out only on presence data. For example, the detector may have recorded 200 bat passes over a seven day period; all of these passes were recorded on two nights but the *Ecobat* Medians and Means only consider those two nights in their analysis, not the full seven days. This can act to skew the results and elevate the risk levels of percentile ranks calculated.

2.4.12 *Ecobat* output is therefore regarded as an indicative assessment and to be considered alongside desk study information and professional judgement, rather than conclusive evidence of the importance of a site for bats.

Limitations

2.4.13 Three of the species recorded within the turbine area had a reference range below the *Ecobat* recommended number of 200 (*Myotis* species; 155, noctule; 150 and brown long-eared; 35). The data within the reference range used to compare activity levels between data collected in this survey and other records within 200 km^2 are likely to have been obtained from surveys undertaken at proposed or operational wind farm sites. Thus, most of the records are likely to be from low value habitats (upland, exposed commercial forestry) compared to habitats of greater value (such as those detailed

in Table 3a of NatureScot guidance (SNH, 2019) and listed under 'High'); hence a reference range below 200.

2.4.14 The *Ecobat* tool remains is in its infancy, and naturally there are fewer datasets in the reference range, reducing the confidence in the assigned category. The tool does, however, provide a guide for discussion along with site-specific circumstances (e.g., habitats present, desk study information) and its use is advised in accordance with NatureScot guidance (SNH, 2019).

2.4.15 Occasional detector failures occurred. These are common events and are not considered to affect the overall validity of the data set, particularly as more detectors were deployed than the total of 12 required by NatureScot guidance (SNH, 2019) for a 16-turbine development.

2.4.16 LOC 7, 11 and 14 failed to record during the autumn period (September-October 2020).

2.4.17 Mainly as a result of adverse weather conditions causing many recording nights to be unsuitable, all the detectors during the spring period recorded for fewer than the recommended 10 nights, six were below 10 nights during the autumn period and one was below 10 nights during the summer period.

2.4.18 As a result seven detectors failed to record for a combined 30 nights over the three periods (with the following number of nights recorded for these: LOC 7; 22 nights, LOC 9; 21 nights, LOC 10; 18 nights, LOC 11; 9 nights, LOC 12; 27 nights, LOC 13; 29 nights and LOC 14; 22 nights).

2.4.19 Deployment periods are shown in **Table 8.4.1**.

2.4.20 A total of 42 nights of sampling were excluded from the analysis as they did not meet the criteria for appropriate weather conditions (SNH, 2019) and no bats were recorded. The main weather constraint was temperature during the late autumn and spring periods; with 24 days excluded for having temperature <8 °C. Average monthly temperatures, acquired from Met Office website[8], show that temperatures are likely to be low for this location during October (approximately between 4.5 - 12 °C) April (approximately between 2 - 11 °C) and May (approximately between 4 - 14 °C), and so the low temperatures and associated lack of bat activity are likely to be representative for this locality.

2.4.21 In situations where bat activity was recorded, but in nights where weather conditions did not meet the criteria, these have been included within the analysis. Although it is recognised that poor weather can affect bat activity, excluding these data from the analysis skews the dataset and would remove some high collision risk species (noctule) from the dataset. Subsequently inclusion of these nights represents a precautionary approach.

2.4.22 Due to an unforeseen weather station malfunction (caused by water damage) it was not possible to retrieve the weather data for the three survey periods. Instead, the weather data for each static deployment period were obtained from Scottish Environment Protection Agency (SEPA) and the World Weather Online website[9]. Rain data were obtained from the SEPA Rhian Bridge weather station located approximately 3.7 km west of the turbine area. Weather masts in this locality are very limited with the closest World Weather Online mast being at Altnaharra approximately 12 km north. As a result the temperature and wind speed data may not be totally accurate for the turbine area; however considering that Altnaharra is at lower altitude (approximately 95 m) it is likely that wind speeds and temperatures at higher altitude as those in the turbine area (approximately 215-380 m) will have been higher and cooler respectively. So if the weather was unsuitable at Altnaharra it is likely to have been at least as unsuitable at the turbine area. Also, bats were overall recorded in low numbers and were

[8] https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfkgdgj2j (Accessed 12th October 2021).

[9] https://www.worldweatheronline.com/ (Accessed 12th October 2021).

active during nights deemed as having unsuitable weather (as per the guidance; SNH, 2019), so the lack of site-specific weather data is not considered to represent a significant limitation to the data.

2.4.23 Analysing bat sonograms using Kaleidoscope can clearly identify certain species. However, some genus groups (such as *Myotis* spp.) can be difficult to determine the specific species due to their similar styles of calls. In addition, it can be difficult to determine species or even genus in some circumstances, due to partial calls being heard or due to distortion from, for example passing cars, rain or wind. In cases when it is not possible to identify a bat call to genus, it is labelled as an unknown bat. If the genus can be identified but not the species, the call is labelled by the genus group only.

2.4.24 The detectability of some bat species, such as brown long-eared, is lower than that of, for example, noctule and pipistrelle. The echolocation calls of brown long-eared are comparatively more difficult to detect with bat detectors, and their particular hunting strategies take them into less open habitats. Careful interpretation has therefore been applied when comparing survey results across species.

3 RESULTS

3.1 Desk Study

Statutory Designated Sites for Nature Conservation

3.1.1 In review of Sitelink, the turbine area is not located within 10 km of any national or internationally designated site for nature conservation, with bat qualifying interests.

3.1.2 In consultation with the HBRG, no non-statutory designated sites for nature conservation with bat interest are located within 2 km of the turbine area.

Existing Bat Records

3.1.3 In consultation, the HBRG returned no bat records from within 10 km of the turbine area.

UK Bat Species Range

3.1.4 In review of the UK Habitats Directive Article 17 Report 'Habitats Directive Report 2019: Species Conservation Status Assessments 2019' based on Mathews *et al*. (2018[10]), the turbine area is located within the known UK distribution range for the following bat species:

- Common pipistrelle.
- Soprano pipistrelle.
- Daubenton's bat.
- Brown long-eared bat.

3.1.5 The turbine area is not within the usual range of noctule bat; however noctule were recorded during the bat activity surveys and the *Ecobat* tool also includes noctule records within their reference range for within 200 km of the turbine area, and therefore the species is known to be present within the wider area.

3.2 Field Surveys

Habitat Assessment

3.2.1 The habitats within the turbine area are considered to be of low habitat risk for bats, in accordance with criteria presented in NatureScot guidelines (SNH, 2019).

3.2.2 The predominantly open grassland habitats of the turbine area provide relatively poor foraging opportunities for bat species; however the ditches and burns present within the open habitats offer

[10] Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C.A., McDonald, R.A. and Shore, R.F. (2018). A *Review of the Population and Conservation Status of British Mammals: Technical Summary.* A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.

more suitable foraging opportunities and also connectivity with potentially higher value habitats within the wider area.

Preliminary Roost Assessment of Buildings and Trees

3.2.3 Potential roost features within the turbine area were absent; the turbine area is dominated by open grassland and blanket bog which offers negligible roost opportunities and so is unlikely to support maternity or significant hibernation roosts.

3.2.4 The access area largely follows an existing track, before crossing open grassland/bog to the turbine area. It is flanked by coniferous plantation woodland along much of the route. The trees within the study area did not have potential roost features.

3.2.5 Overall the turbine area and the area are considered to provide negligible bat roosting potential.

Bat Activity Surveys

Summary of Results and Activity Levels

3.2.6 Bats were detected on 28 dates between 23rd July 2020 and 13th May 2021, out of a possible 91 recording dates from 14 static bat detectors. LOC 8 recorded no bats during the three survey seasons.

3.2.7 Species identified are presented in **Table 8.4.4** along with potential collision risk and population vulnerability as described in NatureScot guidance (SNH, 2019).

3.2.8 Overall, a total of 213 bat passes were recorded over a total of 384 survey nights (all 14 detectors combined), as summarised in **Table 8.4.5**.

3.2.9 Total bat passes were very low overall. This is likely due to limited suitable habitat combined with the location and typical weather conditions making the turbine area of low suitability for bats.

3.2.10 The full *Ecobat* output report is included as **Annex 3**.

Table 8.4.4: Bat species recorded, collision risk and population vulnerability.

Species	Collision Risk	Population Vulnerability
Brown long-eared	Low	Low
Common Pipistrelle	High	Medium
Myotis species	Low	Low/Medium
Noctule	High	High
Soprano pipistrelle	High	Medium

Table 8.4.51: Total number of bat passes.

Species	No. of Passes	Percentage of total (%)	Maximum Passes per Night	Mean Passes per Night
Brown long-eared	8	4	3	0.02

Species	No. of Passes	Percentage of total (%)	Maximum Passes per Night	Mean Passes per Night
Common pipistrelle	112	52	22	0.29
Myotis species	11	5	3	0.03
Noctule	61	29	26	0.16
Soprano pipistrelle	21	10	6	0.05
Total	**213**	**100**	**60**	**0.55**

Ecobat Results

3.2.11 **Table 8.4.6** presents the number of nights species activity was recorded at each activity band.

3.2.12 **Table 8.4.7** presents the key metrics of the *Ecobat* output for each species. Data from all monitoring locations are used to provide site-wide averages/medians.

Table 8.4.6: Number of nights recorded bat activity fell into each activity band for each species within the turbine area.

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 species	0	0	1	1	6
Noctule	1	1	3	4	11
Common pipistrelle	0	7	6	6	14
Soprano pipistrelle	0	0	2	4	5
Brown long-eared	0	0	2	0	2

Table 8.6.7: Percentiles for each species within the turbine area.

Species/Species Group	Total Passes	Passes per Night		Median Percentile[11]	95% Cis[12]	Max Percentile[13]	Nights Recorded
		Recorded [14]	Included in *Ecobat*[15]				
Brown long-eared	8	0.02	0.25	22	0 - 0	44	4
Common pipistrelle	112	0.29	3.50	31	52 - 70	79	33
Myotis species	11	0.03	0.34	0	37.5 - 37.5	44	8
Noctule	61	0.16	1.91	0	59 - 59	87	20
Soprano pipistrelle	21	0.05	0.66	31	44.5 - 44.5	58	11

Spatial Distribution

3.2.13 The *Ecobat* output median and mean nightly pass rate (passes per hour, per night) of each species, at each detector for all months is presented in table **Table 8.5.8.** The use of the median value is recognised to provide the more accurate representation of activity, as bat activity levels between nights can be highly variable, and thus the median provides a more reliable value than the mean or maximum (Lintott *et al*., 2018). In addition, the dataset is unlikely to be normally distributed, therefore the median is the most appropriate metric to report.

3.2.14 Data for 'Includes Absences' and 'Excludes Absences' are included in **Table 8.5.8**. 'Includes Absences' takes into account nights when no bats were recorded and therefore lowers the overall medians and means (note, this does not include any nights when no bats of any species were recorded as these are filtered out by *Ecobat* in the initial data upload to the *Ecobat* tool).

3.2.15 When absences are excluded medians and means are higher and show peaks in the data, which is especially useful for sites with low bat activity when peaks can be easily overlooked in large data sets.

3.2.16 Bat activity results for each recorded species are provided in **Table 8.5.9** and **Table 8.5.10**.

[11] A numerical representation of average activity levels relative to the surrounding landscape (within 200 km) for each night of surveying.
[12] An indication of the confidence in the median percentile.
[13] A numerical representation of maximum activity levels on any one night relative to the surrounding landscape (within 200 km) for each night of surveying
[14] Total recorded nights for the survey period is 384.
[15] A total of 32 nights were included in the *Ecobat* analysis. Nights when no bats are recorded are excluded.

Table 8.5.8: Median and Mean bat pass rate per species, per detector.

Species	Detector ID	Total Bat Passes	Median Pass Rate (passes per hour/night)		Mean Pass Rate (passes per hour/night)	
			Incl. Absences	Excl. Absences	Incl. Absences	Excl. Absences
Common pipistrelle	LOC 1	42	0.3	0.8	0.5	0.8
	LOC 11	1	0.1	0.1	0.1	0.1
	LOC 13	21	0	0.2	0.1	0.3
	LOC 2	30	0.1	0.5	0.3	0.4
	LOC 3	3	0	0.2	0.1	0.2
	LOC 4	2	0.1	0.1	0.1	0.1
	LOC 5	4	0.1	0.1	0.1	0.2
	LOC 6	3	0.1	0.1	0.1	0.1
	LOC 7	6	0	0.4	0.1	0.4
Soprano pipistrelle	LOC 1	7	0	0.2	0.1	0.2
	LOC 13	8	0	0.2	0	0.2
	LOC 2	3	0	0.2	0	0.2
	LOC 3	2	0	0.3	0	0.3
	LOC 5	1	0	0.1	0	0.1
Noctule	LOC 1	3	0	0.4	0	0.4
	LOC 12	1	0.1	0.1	0.1	0.1
	LOC 13	18	0	0.2	0.1	0.2
	LOC 2	6	0	0.1	0.1	0.2
	LOC 3	1	0	0.1	0	0.1
	LOC 7	31	0.1	0.1	0.6	0.7
	LOC 8	1	0.1	0.1	0.1	0.1
Brown long-eared	LOC 2	3	0	0.2	0	0.2
	LOC 3	5	0.1	0.1	0.1	0.2

Myotis species	LOC 1	5	0	0.3	0.1	0.3
	LOC 13	1	0	0.1	0	0.1
	LOC 2	2	0	0.1	0	0.1
	LOC 5	1	0	0.1	0	0.1
	LOC 6	1	0	0.1	0	0.1
	LOC 8	1	0.1	0.1	0.1	0.1

Table 8.5.9: Percentiles for each species per detector location for the whole survey period.

Activity Level is based on the median percentile.

Species/Species Group	Detector ID	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
Common pipistrelle	LOC 1	63	31 - 67.5	79	7	Moderate to High
	LOC 11	0	0	0	1	Low
	LOC 13	26	52 - 70	70	6	Low to Moderate
	LOC 2	52	52 - 52	72	9	Moderate
	LOC 3	16	15.5 - 15.5	31	2	Low
	LOC 4	0	0 - 0	0	2	Low
	LOC 5	0	0 - 0	31	3	Low
	LOC 6	16	15.5 - 15.5	31	2	Low
	LOC 7	63	0	63	1	Moderate to High
Myotis species	LOC 1	38	37.5 - 37.5	44	2	Low to Moderate
	LOC 13	0	0	0	1	Low
	LOC 2	0	0 - 0	0	2	Low
	LOC 5	0	0	0	1	Low
	LOC 6	0	0	0	1	Low
	LOC 8	0	0	0	1	Low
Noctule	LOC 1	44	0	44	1	Moderate
	LOC 12	0	0	0	1	Low
	LOC 13	38	31 - 53.5	63	6	Low to Moderate
	LOC 2	0	0 - 0	31	5	Low
	LOC 3	0	0	0	1	Low

	LOC 7	0	59 - 59	87	5	Low
	LOC 8	0	0	0	1	Low
Soprano pipistrelle	LOC 1	16	37.5 - 37.5	44	4	Low to Moderate
	LOC 13	31	44.5 - 44.5	58	3	Low to Moderate
	LOC 2	16	15.5 - 15.5	31	2	Low
	LOC 3	31	0	31	1	Low to Moderate
	LOC 5	0	0	0	1	Low
Brown long-eared	LOC 2	44	0	44	1	Moderate
	LOC 3	0	0 - 0	44	3	Low

Table 8.5.10: The number of nights sampled (detectors were operational for), the number of nights bats were recorded and the total number of bat recorded per monitoring station. Percentage distribution of number of bats is also presented.

Detector ID	No. Nights Sampled	No. of nights Bats were Recorded	Percentage of Nights Bats were Recorded	Total No. Bats recorded	Percentage Distribution of No. Bats
LOC 1	35	10	28.6%	57	26.76%
LOC 11	9	1	11.1%	1	0.47%
LOC 12	27	1	3.7%	1	0.47%
LOC 13	29	14	48.3%	48	22.54%
LOC 2	33	12	36.4%	44	20.66%
LOC 3	35	6	17.1%	11	5.16%
LOC 4	32	2	6.3%	2	0.94%
LOC 5	34	4	11.8%	6	2.82%
LOC 6	34	3	8.8%	4	1.88%
LOC 7	22	6	27.3%	37	17.37%
LOC 8	33	1	3.0%	2	0.94%

Temporal Activity

3.2.17 Activity levels were calculated by *Ecobat* per species (or species group) per month to allow for temporal variations in bat activity, as presented in **Table 5.11** Median and maximum percentiles and corresponding activity levels are presented.

Table 8.5.11: Percentiles for each species each month within the turbine area.
Activity Level is based on the median percentile.

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
Myotis species	Apr	0	0	0	2	Low
	Aug	22	37.5 - 37.5	44	2	Low to Moderate
	Sep	16	37.5 - 37.5	31	2	Low to Moderate
	Oct	0	0 - 0	0	2	Low
Noctule	Apr	87	59 - 59	87	1	High
	Jul	0	59 - 59	44	5	Low
	Aug	0	59 - 59	31	6	Low
	Oct	31	31 - 53.5	63	8	Low to Moderate
Common pipistrelle	Apr	0	15.5 - 15.5	0	2	Low
	Jul	0	52 - 70	52	9	Low
	Aug	52	52 - 70	79	16	Moderate
	Oct	42	52 - 70	70	6	Moderate
Soprano pipistrelle	Jul	0	44.5 - 44.5	0	3	Low
	Aug	31	37.5 - 37.5	31	4	Low to Moderate
	Oct	38	44.5 - 44.5	58	4	Low to Moderate
Brown long-eared	Jul	44	0 - 0	44	1	Moderate
	Aug	0	0 - 0	0	2	Low
	Sep	44	0	44	1	Moderate

Potential bat roosts within or close to the turbine area

3.2.18 *Ecobat* analysis showed that activity was recorded within the species-specific emergence time for three monitoring locations. This is detailed in **Table 8.5.12**.

Table 8.5.12: Bat activity recorded within the species-specific emergence time.

Detector ID	Species/Species Group	Nights Recorded	Peak Count	Month of Peak Count
LOC 2	Noctule	1	1	August
LOC 7	Noctule	2	1	August / April
LOC 1	*Myotis* species	1	2	August

3.2.19 Based on the *Ecobat* analysis above, it is possible that day roosts for low numbers of Noctule and *Myotis* spp. may be present somewhere in proximity to the turbine area.

Weather Conditions

3.2.20 Where nights were recorded in weather conditions which did not meet the criteria, but bat activity was still recorded, these have been included within the analysis. Whilst it is recognised that poor weather can affect bat activity, excluding these data from the analysis skews the dataset and would remove some higher collision risk species (noctule) from the dataset.

3.2.21 The majority of survey nights were undertaken in suitable weather conditions (49 out of 91) and the surveying period was extended beyond the requirements of NatureScot guidance (2019). Subsequently the bat survey data recorded are considered to be representative for the turbine area.

3.2.22 Weather data are presented in **Annex 2**.

4 ASSESSMENT OF THE POTENTIAL RISKS TO BATS

4.1 Stage 1 – Initial Site Risk Assessment

4.1.1 In accordance with NatureScot guidance (SNH, 2019) an assessment of the potential risk level of the site of the Proposed Development, has been undertaken based on a consideration of habitat and development-related features detailed in Table 3a of the NatureScot guidance (SNH, 2019).

4.1.2 The values and classification criteria provided within Table 3a of NatureScot guidance (SNH, 2019) are intended to be taken as a guide, with habitat and development-related features at proposed wind farm sites rarely matching rigid descriptions. Professional judgement has therefore been applied to interpret and assign risk categories and conclude on the overall risk level for the site.

4.1.3 The turbine area has been assessed as having an overall 'Site Risk' of **2**, represent a **Low/Lowest Site Risk**:

- The turbine area 'Habitat Risk' is classified as **Low**.
- The turbine area 'Project Size' is classified as being **Medium**, comprising a development of 16-turbines of up to 200 m tip height, with one other wind farm development (Strath Tirry Wind Farm, currently in planning) located within approximately 5 km of the turbine area.

4.2 Stage 2 – Overall Risk Assessment

4.2.1 In accordance with NatureScot guidance (SNH, 2019), Stage 2 should be carried out separately for all high collision risk species recorded, which includes the following species recorded during bat activity surveys for the Proposed Development:

- Noctule bat.
- Common pipistrelle.
- Soprano pipistrelle.

4.2.2 In order to derive an 'Overall Risk Assessment' the determined Bat Activity Category derived from the *Ecobat* Tool Output Report is compared against the turbine area Risk Level (Stage 1) using the matrix presented in Table 3b in the NatureScot guidance (SNH, 2019) to determine the level of overall risk.

4.2.3 The calculated 'Overall Risk Assessment' per species, both temporally and spatially is presented in **Table 8.5.13**. The Overall Risk Category provided is concluded on the basis of the determined *Ecobat* conclusion and professional judgement on the basis of all available information and in recognition of the limitations of *Ecobat*.

4.2.4 As outlined, the *Ecobat* tool is in its infancy and given current limitations in available bat survey data on the database, definitive bat activity for regions are not generated and bat activity representations are instead indicative for each region.

4.2.5 In summary, the Overall Risk Assessment for common pipistrelle and noctule is considered to fall under "Low/Medium Site Risk" and under "Low Site Risk" for soprano pipistrelle.

4.2.6 In recognition of the limitations associated with the *Ecobat* tool, the output of Stage 2 should be treated with caution.

Table 8.5.13: Overall Risk Assessment (Table 3b from SNH (2019) guidance). Key: green = Low, Amber = Medium, Red = High.

Species / species group	I.D	Median Percentile	Percentile Category	Overall Risk Assessment (Stage 2)
Common pipistrelle	LOC 1	63	Moderate to High	Medium (8)
	LOC 11	0	Low	Low (2)
	LOC 13	26	Low to Moderate	Low (4)
	LOC 2	52	Moderate	Medium (6)
	LOC 3	16	Low	Low (2)
	LOC 4	0	Low	Low (2)
	LOC 5	0	Low	Low (2)
	LOC 6	16	Low	Low (2)
	LOC 7	63	Moderate to High	Medium (8)
Myotis species	LOC 1	38	Low to Moderate	Low (4)
	LOC 13	0	Low	Low (2)
	LOC 2	0	Low	Low (2)
	LOC 5	0	Low	Low (2)
	LOC 6	0	Low	Low (2)
	LOC 8	0	Low	Low (2)
Noctule	LOC 1	44	Moderate	Medium (6)
	LOC 12	0	Low	Low (2)
	LOC 13	38	Low to Moderate	Low (4)
	LOC 2	0	Low	Low (2)
	LOC 3	0	Low	Low (2)
	LOC 7	0	Low	Low (2)

Species / species group	Month	Median Percentile	Percentile Category	Overall Risk Assessment (Stage 2)
Myotis species	Apr	0	Low	Low (2)
	Aug	22	Low to Moderate	Low (4)
	Sep	16	Low	Low (2)
	Oct	0	Low	Low (2)
Noctule	Apr	87	High	Medium (10)
	Jul	0	Low	Low (2)
	Aug	0	Low	Low (2)
	Oct	31	Low to Moderate	Low (4)
Common pipistrelle	Apr	0	Low	Low (2)
	Jul	0	Low	Low (2)
	Aug	52	Moderate	Medium (6)
	Oct	42	Moderate	Medium (6)
Soprano pipistrelle	Jul	0	Low	Low (2)
	Aug	31	Low to Moderate	Low (4)
	Oct	38	Low to Moderate	Low (4)
Brown long-eared	Jul	44	Moderate	Medium (6)
	Aug	0	Low	Low (2)
	Sep	44	Moderate	Medium (6)

	LOC 8	0	Low	Low (2)		
Soprano pipistrelle	LOC 1	16	Low	Low (2)		
	LOC 13	31	Low to Moderate	Low (4)		
	LOC 2	16	Low	Low (2)		
	LOC 3	31	Low to Moderate	Low (4)		
	LOC 5	0	Low	Low (2)		
Brown long-eared	LOC 2	44	Moderate	Medium (6)		
	LOC 3	0	Low	Low (2)		

5 REFERENCES

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ANNEX 1 - SCIENTIFIC BAT NAMES

Table A1.1 provides common and scientific names of bat species regarded in this Technical Appendix.

Table A1.1: Bat details.

Common Name	**Scientific Name**
Common pipistrelle	*Pipistrellus pipistrellus*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Noctule	*Nyctalus noctula*
Myotis	*Myotis*
Brown long-eared	*Plecotus auritus*
Daubenton's bat	*Myotis daubentonii*

ANNEX 2 - WEATHER CONDITIONS

Table A2.1 provides weather conditions for bat activity survey periods.

Table A2.1: Weather conditions.

Date	Temperature at Dusk (°C)	Rainfall	Maximum Wind Speed (m/s)
23/07/2020	12	Light	1.11
24/07/2020	11	0	1.39
25/07/2020	10	0	0.83
26/07/2020	9	Light	6.11
27/07/2020	9	0	2.78
28/07/2020	10	Light	10.83
29/07/2020	8	0	1.94
30/07/2020	11	Light	2.50
31/07/2020	15	Light	0.83
01/08/2020	11	Light	0.56
02/08/2020	9	0	4.17
03/08/2020	9	Light	2.50
04/08/2020	5	Moderate	3.33
05/08/2020	10	0	1.67
06/08/2020	14	0	3.33
07/08/2020	14	Light	3.61
08/08/2020	11	Light	1.11
09/08/2020	12	0	1.94
10/08/2020	13	0	0.56
11/08/2020	14	0	1.67
12/08/2020	14	0	1.39
13/08/2020	10	0	1.11
14/08/2020	14	0	1.67
15/08/2020	12	0	1.11
16/08/2020	12	0	1.67
17/08/2020	13	Light	1.11
18/08/2020	14	Light	1.11
19/08/2020	13	0	1.94
24/09/2020	6	Light	1.67
25/09/2020	6	Light	7.22
26/09/2020	5	Light	2.78
27/09/2020	7	0	1.94
28/09/2020	9	Light	2.78

Date	Temperature at Dusk (°C)	Rainfall	Maximum Wind Speed (m/s)
29/09/2020	8	Light	1.94
30/09/2020	9	Heavy	1.94
01/10/2020	7	Moderate	2.50
02/10/2020	8	Light	1.67
03/10/2020	8	Heavy	2.22
04/10/2020	10	Moderate	4.44
05/10/2020	9	Light	2.22
06/10/2020	9	Light	2.50
07/10/2020	8	Moderate	8.33
08/10/2020	5	Heavy	3.33
09/10/2020	6	Light	2.22
10/10/2020	8	Light	4.72
11/10/2020	7	Moderate	1.11
12/10/2020	8	Light	5.28
13/10/2020	6	Light	5.83
14/10/2020	7	0	2.22
15/10/2020	7	0	1.39
16/10/2020	7	Light	1.94
17/10/2020	6	Light	2.22
18/10/2020	6	Light	1.11
19/10/2020	7	Heavy	1.67
20/10/2020	8	Heavy	0.83
21/10/2020	6	Light	4.44
22/10/2020	6	Light	1.39
23/10/2020	5	Light	5.00
24/10/2020	5	0	3.89
25/10/2020	5	Light	3.89
26/10/2020	6	Light	1.39
27/10/2020	6	Moderate	3.33
14/04/2021	4	0	0.83
15/04/2021	5	0	1.39
16/04/2021	7	0	0.00
17/04/2021	9	0	5.28
18/04/2021	7	0	1.39
19/04/2021	7	Heavy	1.39
20/04/2021	3	Light	3.06
21/04/2021	3	0	0.28

Date	Temperature at Dusk (°C)	Rainfall	Maximum Wind Speed (m/s)
22/04/2021	4	0	1.11
23/04/2021	7	0	0.83
24/04/2021	8	0	1.67
25/04/2021	9	Light	1.67
26/04/2021	-2	Light	6.39
27/04/2021	2	0	2.50
28/04/2021	3	Light	1.67
29/04/2021	3	Light	1.94
30/04/2021	6	Light	3.06
01/05/2021	4	Light	1.39
02/05/2021	4	Light	1.11
03/05/2021	2	Light	5.56
04/05/2021	2	Moderate	4.44
05/05/2021	2	Heavy	8.89
06/05/2021	4	Light	1.94
07/05/2021	3	Light	0.83
08/05/2021	3	Moderate	7.22
09/05/2021	8	0	1.11
10/05/2021	8	Light	1.11
11/05/2021	6	Moderate	2.50
12/05/2021	7	Moderate	3.89

ANNEX 3 - ECOBAT TOOL OUTPUT REPORT

Bat Activity Analysis

Site Name: Chleansaid

Author: Andrew Hulme

16/09/2021

1 SUMMARY

Bats were detected on **32** nights between **2020-07-23** and **2021-04-24**, using **11** static bat detectors. Throughout this period **5** species were recorded. **Table 1.** Detectors were placed at the following locations:

Detector ID	Latitude	Longitude
LOC 6	58.12318	-4.368377
LOC 1	58.13683	-4.372239
LOC 2	58.13220	-4.372475
LOC 8	58.12204	-4.346853
LOC 13	58.11483	-4.354172
LOC 5	58.12603	-4.357357
LOC 3	58.13466	-4.357384
LOC 7	58.11873	-4.362003
LOC 12	58.11662	-4.344171
LOC 4	58.12869	-4.348022
LOC 11	58.11882	-4.332854

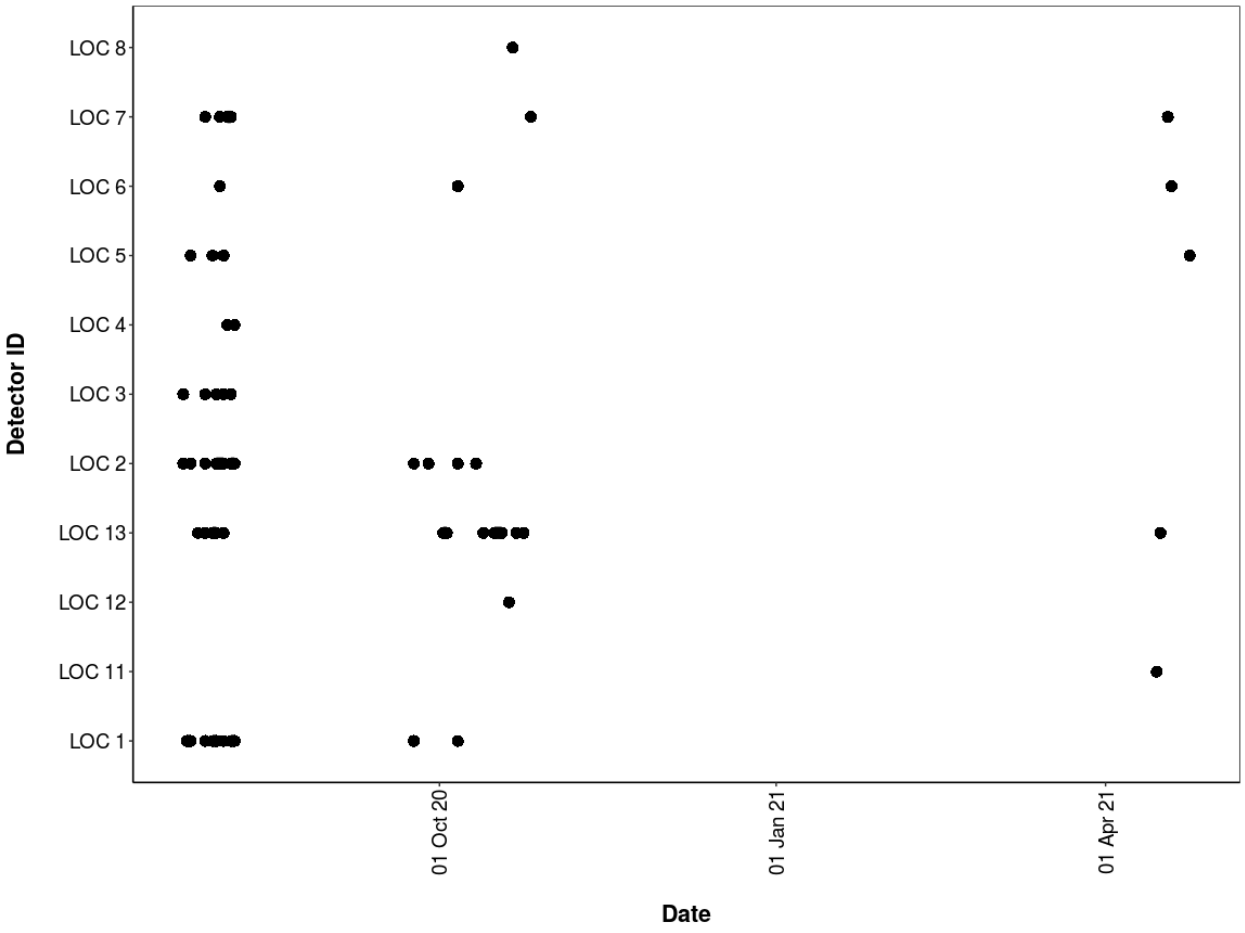
2 SURVEY NIGHTS

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
LOC 1	10
LOC 11	1
LOC 12	1
LOC 13	14
LOC 2	12
LOC 3	6
LOC 4	2
LOC 5	4
LOC 6	3
LOC 7	6
LOC 8	1

3 SURVEY NIGHTS

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



3.1 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 200km radius of the survey location.

3.2 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
LOC 1	*Myotis*	0	0	1	1	0
LOC 1	*Nyctalus noctula*	0	0	1	0	0
LOC 1	*Pipistrellus pipistrellus*	0	4	0	3	0
LOC 1	*Pipistrellus pygmaeus*	0	0	1	1	2
LOC 11	*Pipistrellus pipistrellus*	0	0	0	0	1
LOC 12	*Nyctalus noctula*	0	0	0	0	1
LOC 13	*Myotis*	0	0	0	0	1
LOC 13	*Nyctalus noctula*	0	1	2	2	1
LOC 13	*Pipistrellus pipistrellus*	0	1	2	0	3
LOC 13	*Pipistrellus pygmaeus*	0	0	1	1	1
LOC 2	*Myotis*	0	0	0	0	2
LOC 2	*Nyctalus noctula*	0	0	0	1	4
LOC 2	*Pipistrellus pipistrellus*	0	1	4	0	4
LOC 2	*Pipistrellus pygmaeus*	0	0	0	1	1
LOC 2	*Plecotus auritus*	0	0	1	0	0
LOC 3	*Nyctalus noctula*	0	0	0	0	1

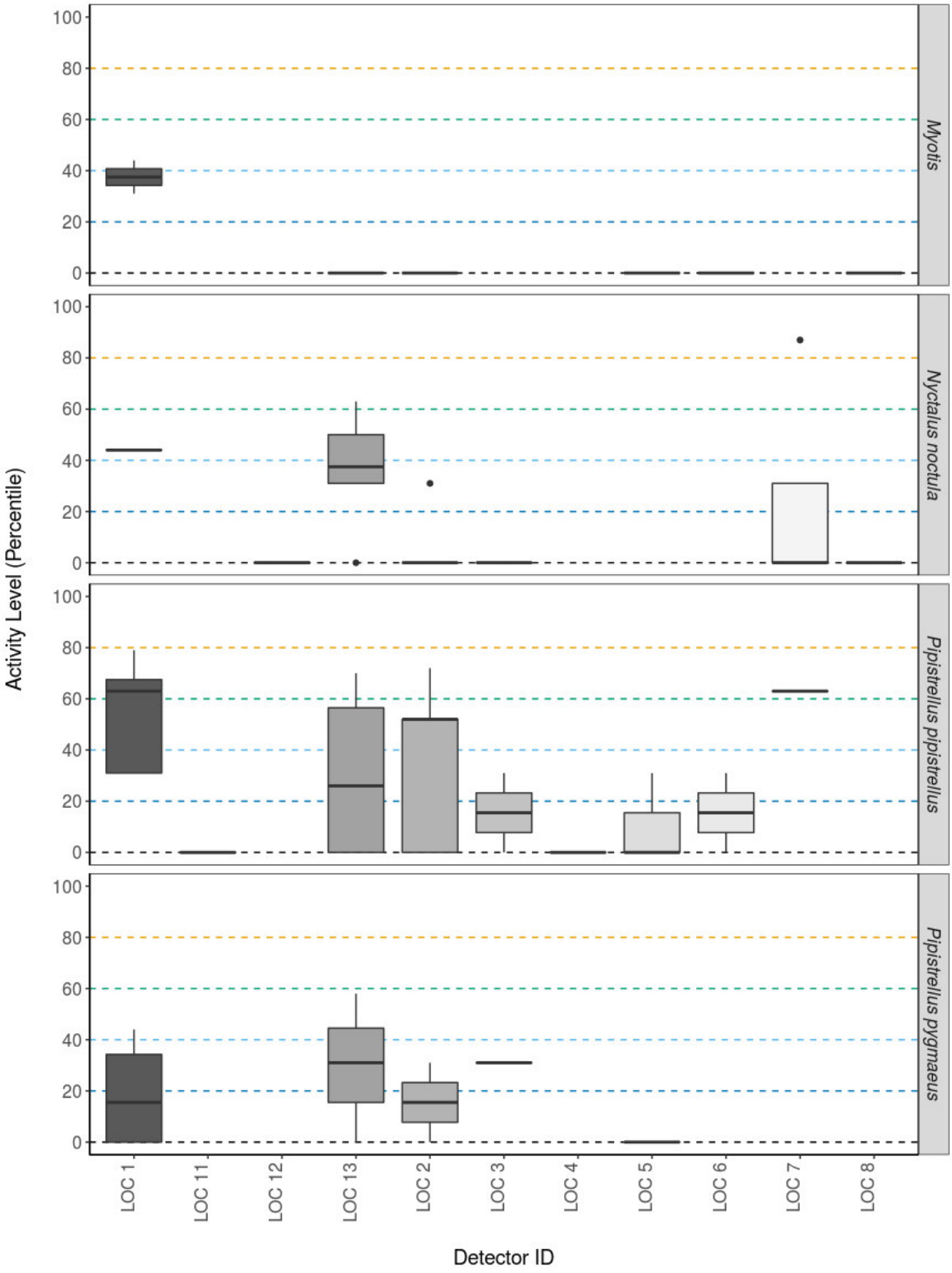
LOC 3	*Pipistrellus pipistrellus*	0	0	0	1	1
LOC 3	*Pipistrellus pygmaeus*	0	0	0	1	0
LOC 3	*Plecotus auritus*	0	0	1	0	2
LOC 4	*Pipistrellus pipistrellus*	0	0	0	0	2
LOC 5	*Myotis*	0	0	0	0	1
LOC 5	*Pipistrellus pipistrellus*	0	0	0	1	2
LOC 5	*Pipistrellus pygmaeus*	0	0	0	0	1
LOC 6	*Myotis*	0	0	0	0	1
LOC 6	*Pipistrellus pipistrellus*	0	0	0	1	1
LOC 7	*Nyctalus noctula*	1	0	0	1	3
LOC 7	*Pipistrellus pipistrellus*	0	1	0	0	0
LOC 8	*Myotis*	0	0	0	0	1
LOC 8	*Nyctalus noctula*	0	0	0	0	1

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
LOC 1	*Myotis*	38	37.5 - 37.5	44	2	155
LOC 1	*Nyctalus noctula*	44	0	44	1	150
LOC 1	*Pipistrellus pipistrellus*	63	31 - 67.5	79	7	1030
LOC 1	*Pipistrellus pygmaeus*	16	37.5 - 37.5	44	4	249
LOC 11	*Pipistrellus pipistrellus*	0	0	0	1	1030
LOC 12	*Nyctalus noctula*	0	0	0	1	150
LOC 13	*Myotis*	0	0	0	1	155
LOC 13	*Nyctalus noctula*	38	31 - 53.5	63	6	150
LOC 13	*Pipistrellus pipistrellus*	26	52 - 70	70	6	1030
LOC 13	*Pipistrellus pygmaeus*	31	44.5 - 44.5	58	3	249

LOC 2	*Myotis*	0	0 - 0	0	2	155
LOC 2	*Nyctalus noctula*	0	0 - 0	31	5	150
LOC 2	*Pipistrellus pipistrellus*	52	52 - 52	72	9	1030
LOC 2	*Pipistrellus pygmaeus*	16	15.5 - 15.5	31	2	249
LOC 2	*Plecotus auritus*	44	0	44	1	35
LOC 3	*Nyctalus noctula*	0	0	0	1	150
LOC 3	*Pipistrellus pipistrellus*	16	15.5 - 15.5	31	2	1030
LOC 3	*Pipistrellus pygmaeus*	31	0	31	1	249
LOC 3	*Plecotus auritus*	0	0 - 0	44	3	35
LOC 4	*Pipistrellus pipistrellus*	0	0 - 0	0	2	1030
LOC 5	*Myotis*	0	0	0	1	155
LOC 5	*Pipistrellus pipistrellus*	0	0 - 0	31	3	1030
LOC 5	*Pipistrellus pygmaeus*	0	0	0	1	249
LOC 6	*Myotis*	0	0	0	1	155
LOC 6	*Pipistrellus pipistrellus*	16	15.5 - 15.5	31	2	1030
LOC 7	*Nyctalus noctula*	0	59 - 59	87	5	150
LOC 7	*Pipistrellus pipistrellus*	63	0	63	1	1030
LOC 8	*Myotis*	0	0	0	1	155
LOC 8	*Nyctalus noctula*	0	0	0	1	150

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
Nyctalus noctula
Pipistrellus pipistrellus
Pipistrellus pygmaeus
LOC 1
LOC 11
LOC 12
LOC 13
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
Detector ID

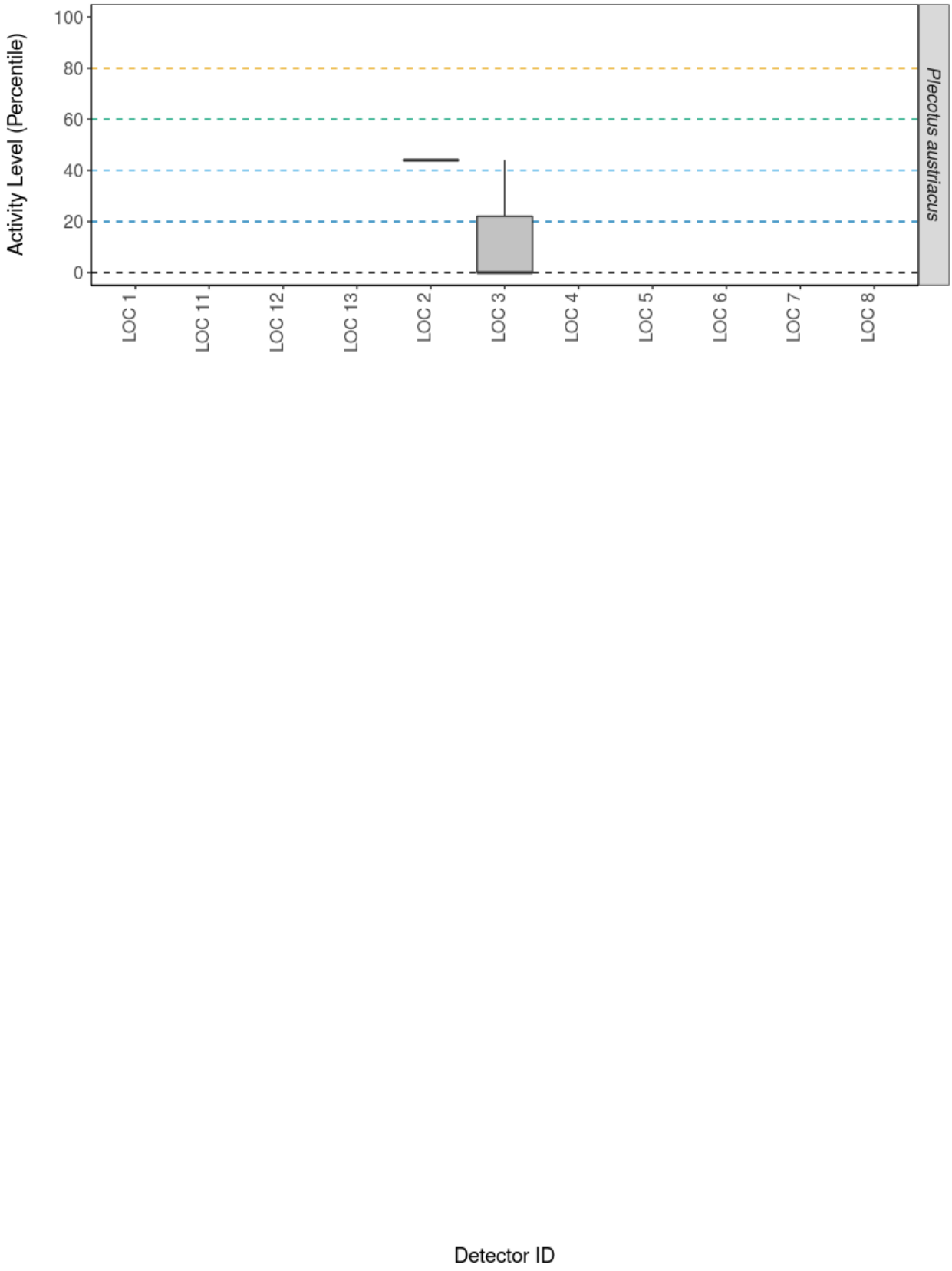
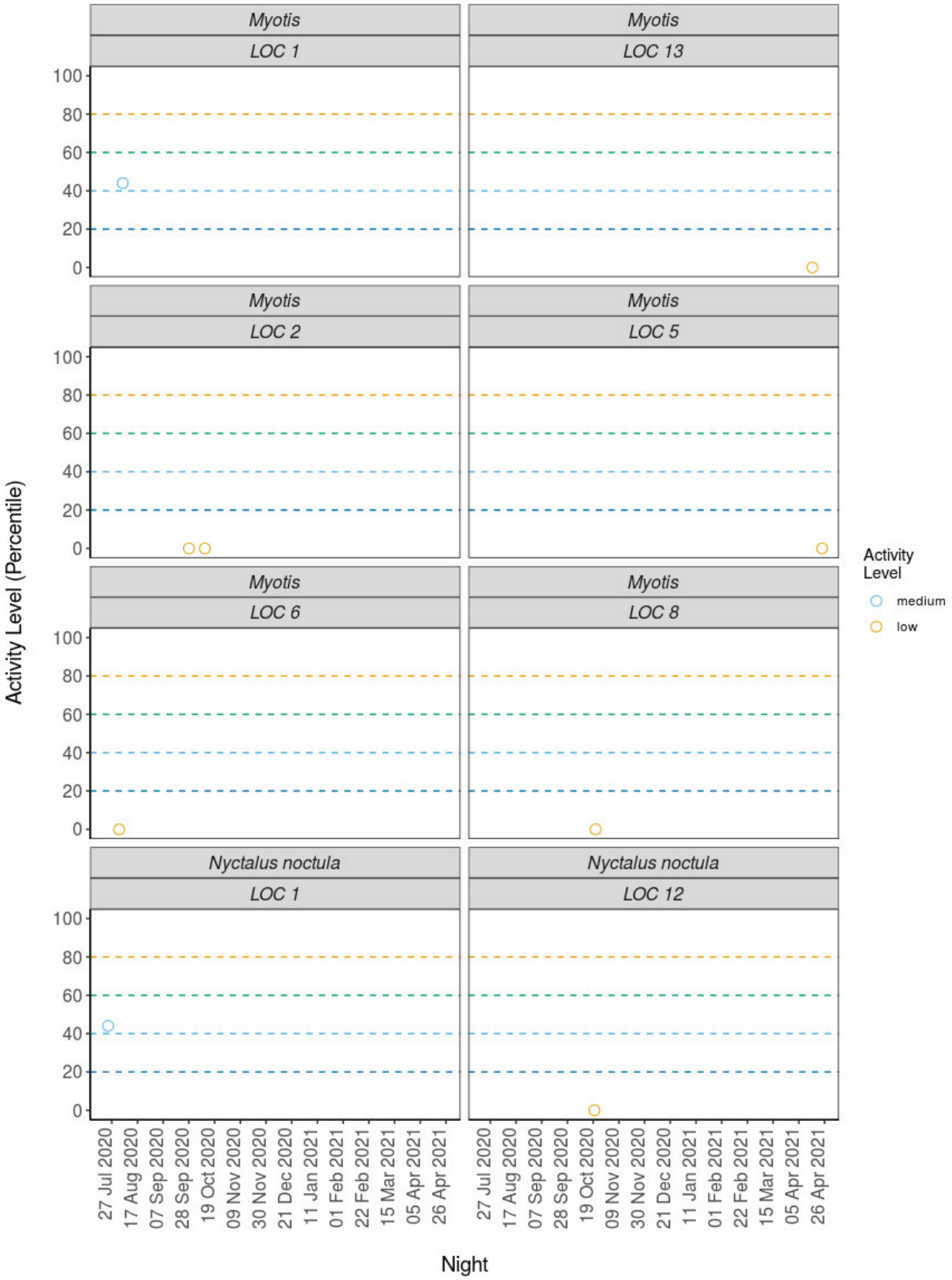
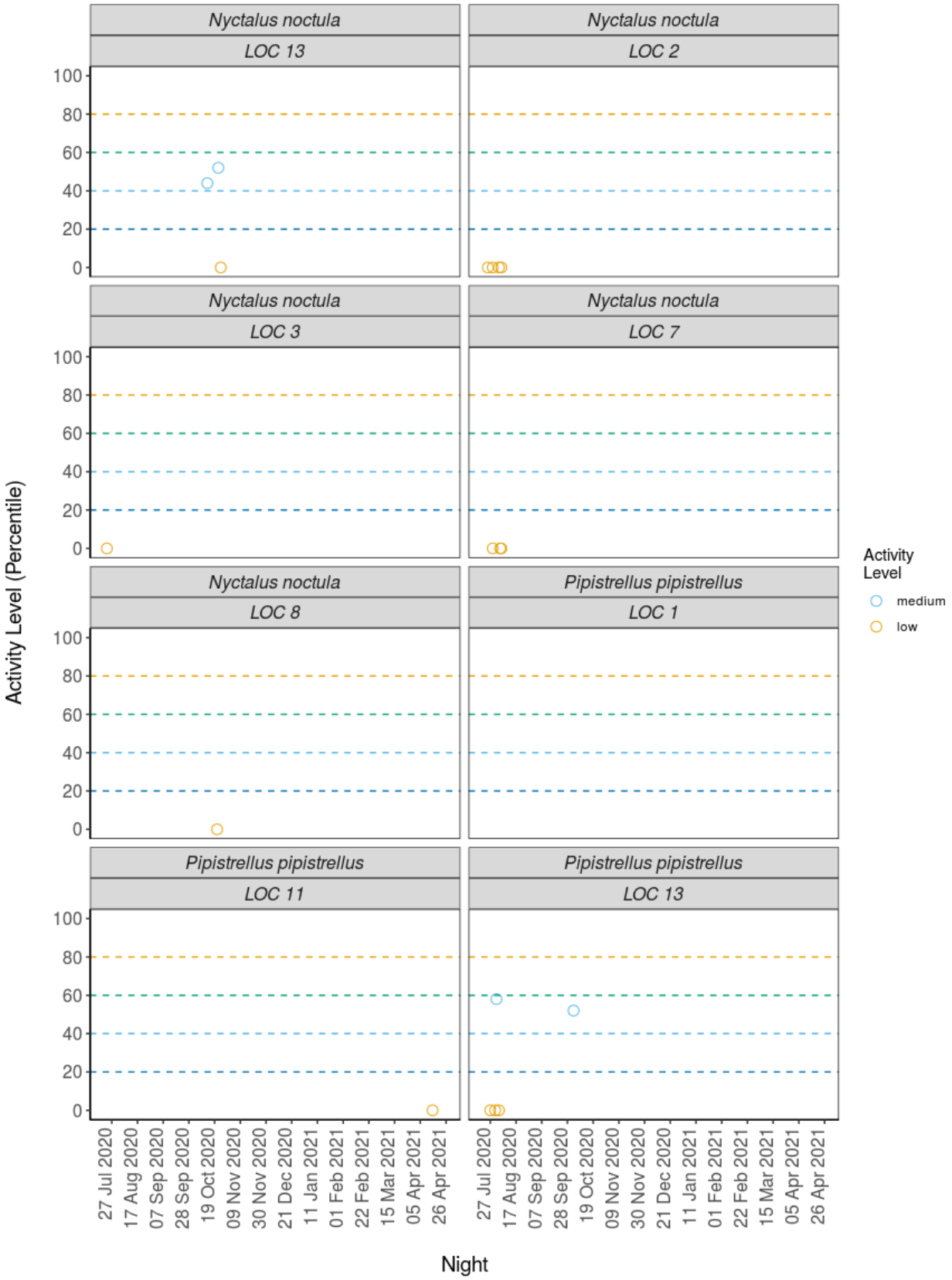
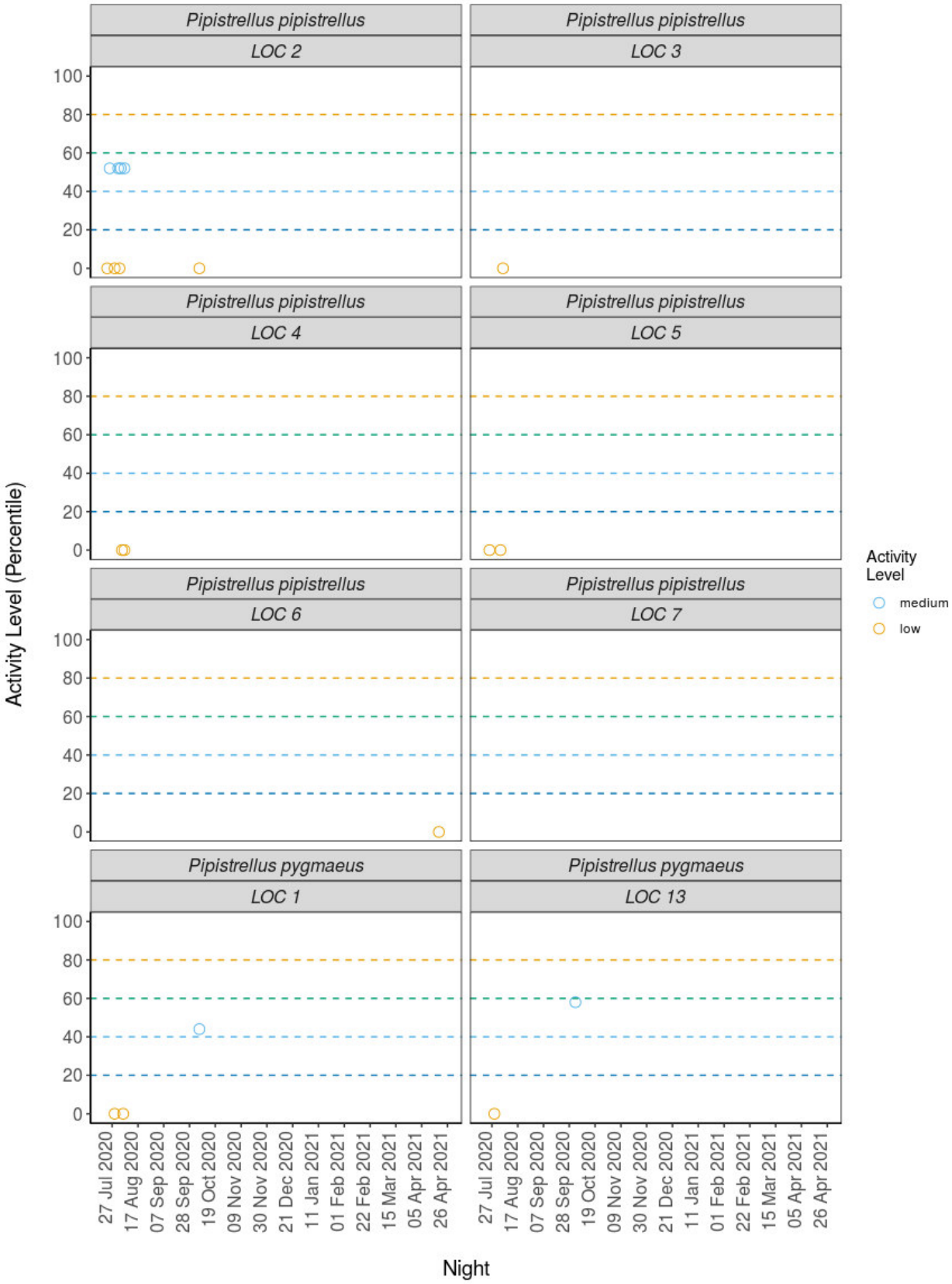
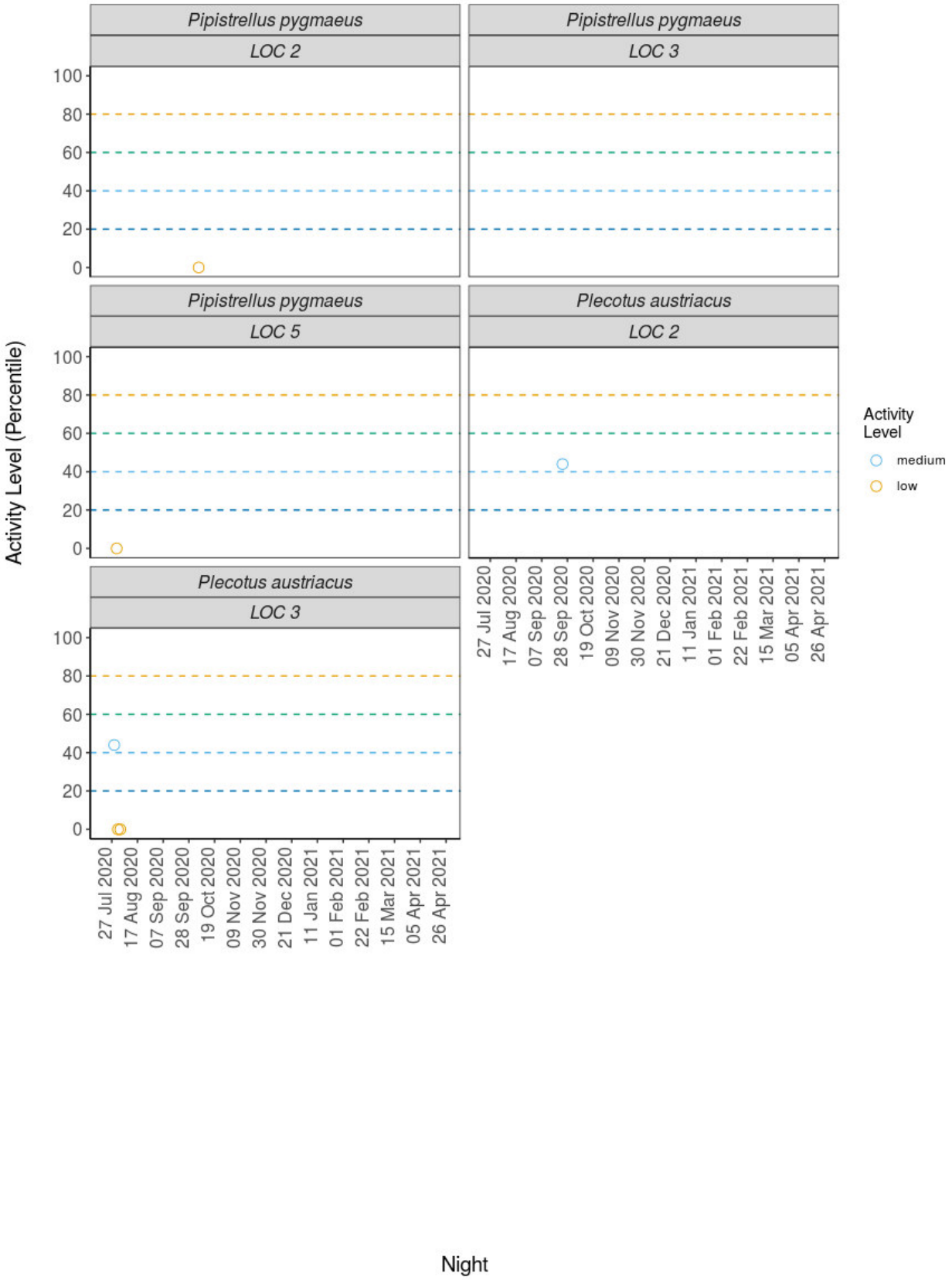


Figure 3. The activity level (percentile) of bats recorded across each night of the bat survey.


Myotis
LOC 1
Myotis
LOC 13
Myotis
LOC 2
Myotis
LOC 5
Myotis
LOC 6
Myotis
LOC 8
Nyctalus noctula
LOC 1
Nyctalus noctula
LOC 12
Activity Level (Percentile)
0
20
40
60
80
100
27 Jul 2020
17 Aug 2020
07 Sep 2020
28 Sep 2020
19 Oct 2020
09 Nov 2020
30 Nov 2020
21 Dec 2020
11 Jan 2021
01 Feb 2021
22 Feb 2021
15 Mar 2021
05 Apr 2021
26 Apr 2021
Night
Activity Level
medium
low


Nyctalus noctula
LOC 13
Nyctalus noctula
LOC 2
Nyctalus noctula
LOC 3
Nyctalus noctula
LOC 7
Nyctalus noctula
LOC 8
Pipistrellus pipistrellus
LOC 1
Pipistrellus pipistrellus
LOC 11
Pipistrellus pipistrellus
LOC 13
Activity Level (Percentile)
100
80
60
40
20
0
27 Jul 2020
17 Aug 2020
07 Sep 2020
28 Sep 2020
19 Oct 2020
09 Nov 2020
30 Nov 2020
21 Dec 2020
11 Jan 2021
01 Feb 2021
22 Feb 2021
15 Mar 2021
05 Apr 2021
26 Apr 2021
Night
Activity Level
medium
low


Pipistrellus pipistrellus
LOC 2
Pipistrellus pipistrellus
LOC 3
Pipistrellus pipistrellus
LOC 4
Pipistrellus pipistrellus
LOC 5
Pipistrellus pipistrellus
LOC 6
Pipistrellus pipistrellus
LOC 7
Pipistrellus pygmaeus
LOC 1
Pipistrellus pygmaeus
LOC 13
Activity Level (Percentile)
0
20
40
60
80
100
27 Jul 2020
17 Aug 2020
07 Sep 2020
28 Sep 2020
19 Oct 2020
09 Nov 2020
30 Nov 2020
21 Dec 2020
11 Jan 2021
01 Feb 2021
22 Feb 2021
15 Mar 2021
05 Apr 2021
26 Apr 2021
Night
Activity Level
medium
low



3.3 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
LOC 1	*Myotis*	Aug	0	0	1	0	0
LOC 1	*Myotis*	Sep	0	0	0	1	0
LOC 1	*Nyctalus noctula*	Jul	0	0	1	0	0
LOC 1	*Pipistrellus pipistrellus*	Jul	0	0	0	2	0
LOC 1	*Pipistrellus pipistrellus*	Aug	0	4	0	0	0
LOC 1	*Pipistrellus pipistrellus*	Oct	0	0	0	1	0
LOC 1	*Pipistrellus pygmaeus*	Jul	0	0	0	0	1
LOC 1	*Pipistrellus pygmaeus*	Aug	0	0	0	1	1
LOC 1	*Pipistrellus pygmaeus*	Oct	0	0	1	0	0
LOC 11	*Pipistrellus pipistrellus*	Apr	0	0	0	0	1
LOC 12	*Nyctalus noctula*	Oct	0	0	0	0	1
LOC 13	*Myotis*	Apr	0	0	0	0	1
LOC 13	*Nyctalus noctula*	Oct	0	1	2	2	1
LOC 13	*Pipistrellus pipistrellus*	Jul	0	0	0	0	2
LOC 13	*Pipistrellus pipistrellus*	Aug	0	0	1	0	1
LOC 13	*Pipistrellus pipistrellus*	Oct	0	1	1	0	0
LOC 13	*Pipistrellus pygmaeus*	Jul	0	0	0	0	1
LOC 13	*Pipistrellus pygmaeus*	Oct	0	0	1	1	0
LOC 2	*Myotis*	Sep	0	0	0	0	1
LOC 2	*Myotis*	Oct	0	0	0	0	1
LOC 2	*Nyctalus noctula*	Jul	0	0	0	0	2
LOC 2	*Nyctalus noctula*	Aug	0	0	0	1	2

LOC 2	*Pipistrellus pipistrellus*	Jul	0	0	1	0	2
LOC 2	*Pipistrellus pipistrellus*	Aug	0	1	3	0	1
LOC 2	*Pipistrellus pipistrellus*	Oct	0	0	0	0	1
LOC 2	*Pipistrellus pygmaeus*	Aug	0	0	0	1	0
LOC 2	*Pipistrellus pygmaeus*	Oct	0	0	0	0	1
LOC 2	*Plecotus auritus*	Sep	0	0	1	0	0
LOC 3	*Nyctalus noctula*	Jul	0	0	0	0	1
LOC 3	*Pipistrellus pipistrellus*	Aug	0	0	0	1	1
LOC 3	*Pipistrellus pygmaeus*	Aug	0	0	0	1	0
LOC 3	*Plecotus auritus*	Jul	0	0	1	0	0
LOC 3	*Plecotus auritus*	Aug	0	0	0	0	2
LOC 4	*Pipistrellus pipistrellus*	Aug	0	0	0	0	2
LOC 5	*Myotis*	Apr	0	0	0	0	1
LOC 5	*Pipistrellus pipistrellus*	Jul	0	0	0	1	1
LOC 5	*Pipistrellus pipistrellus*	Aug	0	0	0	0	1
LOC 5	*Pipistrellus pygmaeus*	Jul	0	0	0	0	1
LOC 6	*Myotis*	Aug	0	0	0	0	1
LOC 6	*Pipistrellus pipistrellus*	Apr	0	0	0	0	1
LOC 6	*Pipistrellus pipistrellus*	Oct	0	0	0	1	0
LOC 7	*Nyctalus noctula*	Apr	1	0	0	0	0
LOC 7	*Nyctalus noctula*	Jul	0	0	0	0	1
LOC 7	*Nyctalus noctula*	Aug	0	0	0	1	2
LOC 7	*Pipistrellus pipistrellus*	Oct	0	1	0	0	0
LOC 8	*Myotis*	Oct	0	0	0	0	1

LOC 8	*Nyctalus noctula*	Oct	0	0	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
LOC 1	*Myotis*	Aug	44	37.5 - 37.5	44	1
LOC 1	*Myotis*	Sep	31	37.5 - 37.5	31	1
LOC 1	*Nyctalus noctula*	Jul	44	0	44	1
LOC 1	*Pipistrellus pipistrellus*	Jul	31	31 - 67.5	31	2
LOC 1	*Pipistrellus pipistrellus*	Aug	68	31 - 67.5	79	4
LOC 1	*Pipistrellus pipistrellus*	Oct	31	31 - 67.5	31	1
LOC 1	*Pipistrellus pygmaeus*	Jul	0	37.5 - 37.5	0	1
LOC 1	*Pipistrellus pygmaeus*	Aug	16	37.5 - 37.5	31	2
LOC 1	*Pipistrellus pygmaeus*	Oct	44	37.5 - 37.5	44	1
LOC 11	*Pipistrellus pipistrellus*	Apr	0	0	0	1
LOC 12	*Nyctalus noctula*	Oct	0	0	0	1
LOC 13	*Myotis*	Apr	0	0	0	1
LOC 13	*Nyctalus noctula*	Oct	38	31 - 53.5	63	6
LOC 13	*Pipistrellus pipistrellus*	Jul	0	52 - 70	0	2
LOC 13	*Pipistrellus pipistrellus*	Aug	29	52 - 70	58	2
LOC 13	*Pipistrellus pipistrellus*	Oct	61	52 - 70	70	2
LOC 13	*Pipistrellus pygmaeus*	Jul	0	44.5 - 44.5	0	1
LOC 13	*Pipistrellus pygmaeus*	Oct	45	44.5 - 44.5	58	2
LOC 2	*Myotis*	Sep	0	0 - 0	0	1
LOC 2	*Myotis*	Oct	0	0 - 0	0	1
LOC 2	*Nyctalus noctula*	Jul	0	0 - 0	0	2

LOC 2	*Nyctalus noctula*	Aug	0	0 - 0	31	3
LOC 2	*Pipistrellus pipistrellus*	Jul	0	52 - 52	52	3
LOC 2	*Pipistrellus pipistrellus*	Aug	52	52 - 52	72	5
LOC 2	*Pipistrellus pipistrellus*	Oct	0	52 - 52	0	1
LOC 2	*Pipistrellus pygmaeus*	Aug	31	15.5 - 15.5	31	1
LOC 2	*Pipistrellus pygmaeus*	Oct	0	15.5 - 15.5	0	1
LOC 2	*Plecotus auritus*	Sep	44	0	44	1
LOC 3	*Nyctalus noctula*	Jul	0	0	0	1
LOC 3	*Pipistrellus pipistrellus*	Aug	16	15.5 - 15.5	31	2
LOC 3	*Pipistrellus pygmaeus*	Aug	31	0	31	1
LOC 3	*Plecotus auritus*	Jul	44	0 - 0	44	1
LOC 3	*Plecotus auritus*	Aug	0	0 - 0	0	2
LOC 4	*Pipistrellus pipistrellus*	Aug	0	0 - 0	0	2
LOC 5	*Myotis*	Apr	0	0	0	1
LOC 5	*Pipistrellus pipistrellus*	Jul	16	0 - 0	31	2
LOC 5	*Pipistrellus pipistrellus*	Aug	0	0 - 0	0	1
LOC 5	*Pipistrellus pygmaeus*	Jul	0	0	0	1
LOC 6	*Myotis*	Aug	0	0	0	1
LOC 6	*Pipistrellus pipistrellus*	Apr	0	15.5 - 15.5	0	1
LOC 6	*Pipistrellus pipistrellus*	Oct	31	15.5 - 15.5	31	1
LOC 7	*Nyctalus noctula*	Apr	87	59 - 59	87	1
LOC 7	*Nyctalus noctula*	Jul	0	59 - 59	0	1
LOC 7	*Nyctalus noctula*	Aug	0	59 - 59	31	3
LOC 7	*Pipistrellus pipistrellus*	Oct	63	0	63	1
LOC 8	*Myotis*	Oct	0	0	0	1
LOC 8	*Nyctalus noctula*	Oct	0	0	0	1

3.4 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	1	1	6
Nyctalus noctula	1	1	3	4	11
Pipistrellus pipistrellus	0	7	6	6	14
Pipistrellus pygmaeus	0	0	2	4	5
Plecotus auritus	0	0	2	0	2

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

Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	0	37.5 - 37.5	44	8
Nyctalus noctula	0	59 - 59	87	20
Pipistrellus pipistrellus	31	52 - 70	79	33
Pipistrellus pygmaeus	31	44.5 - 44.5	58	11
Plecotus austriacus	22	0 - 0	44	4

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

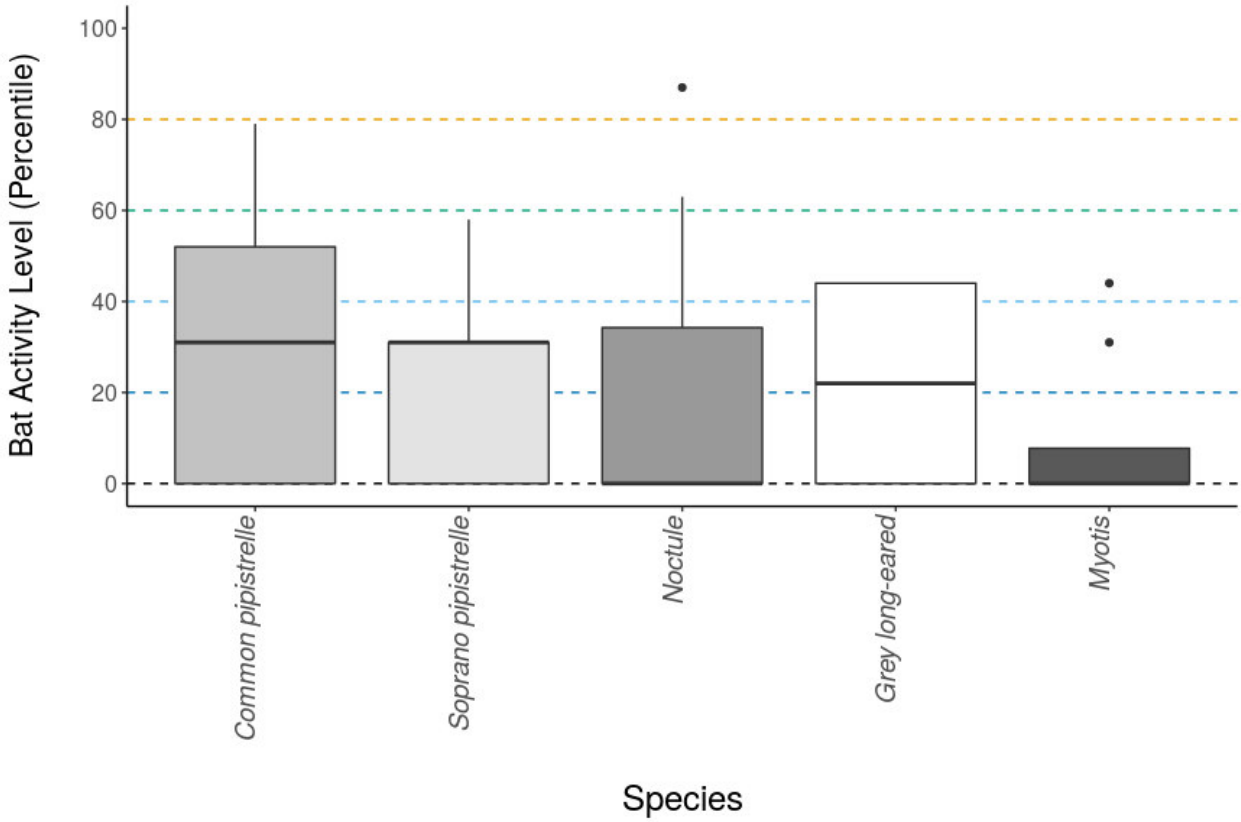
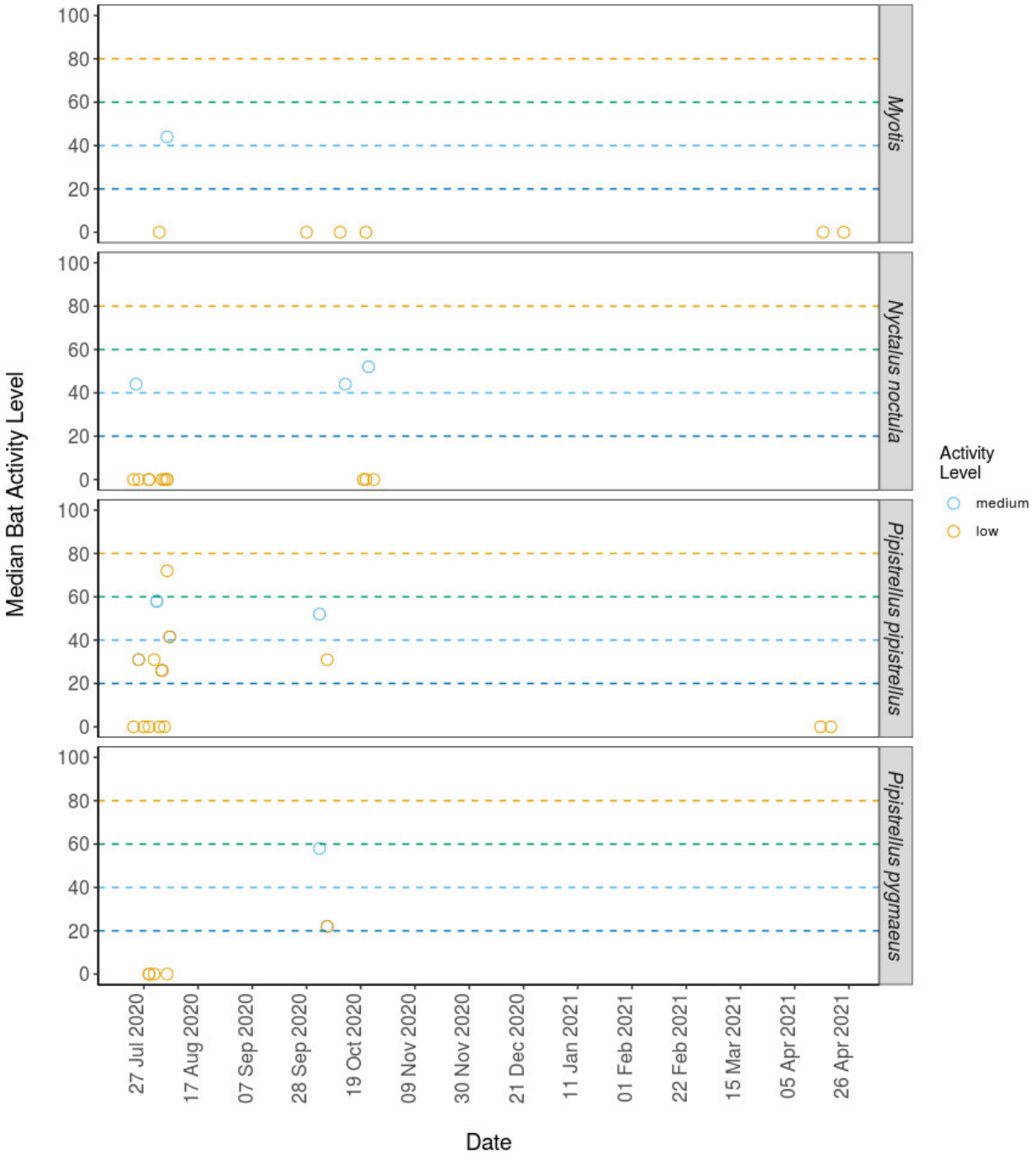
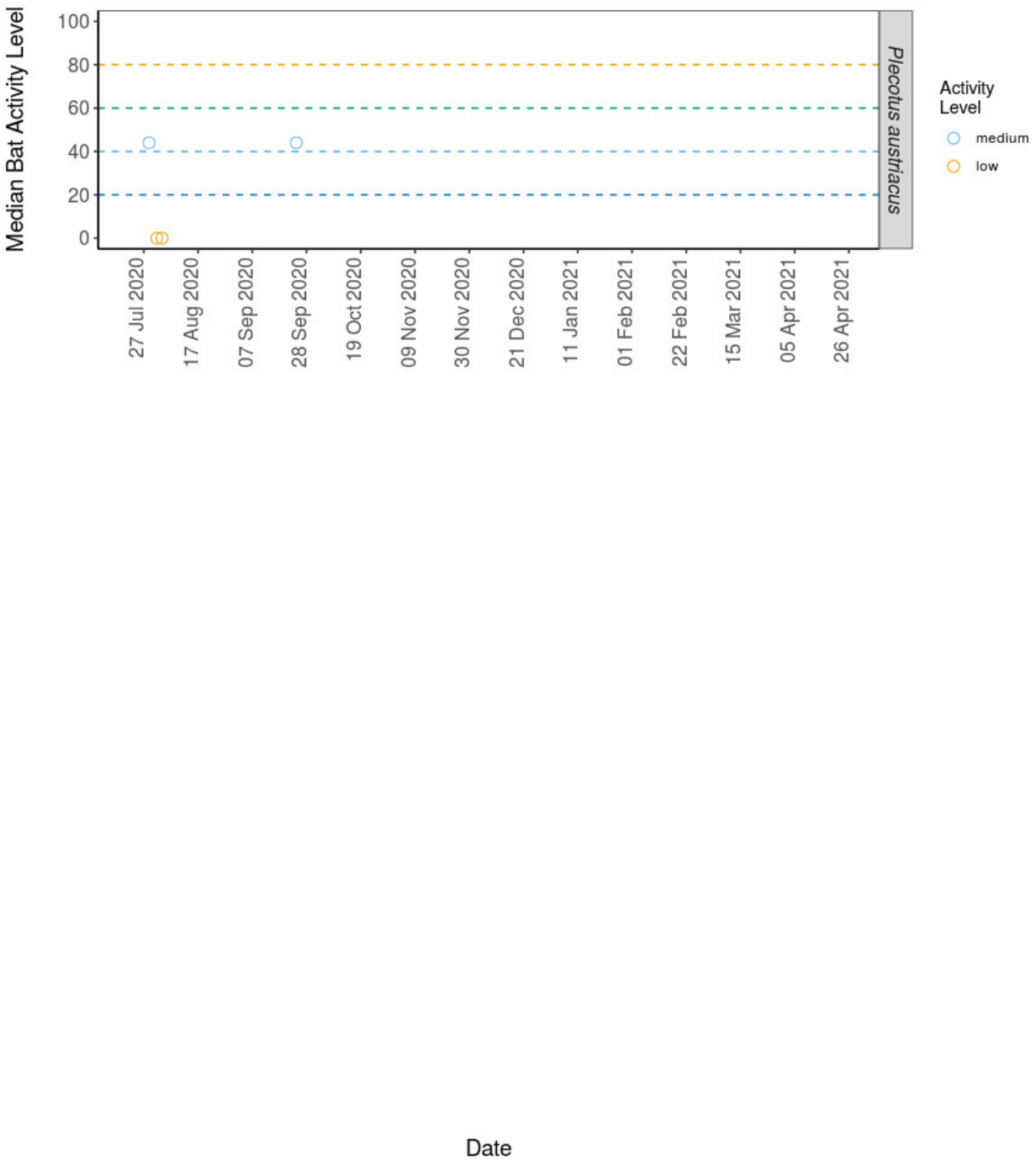


Figure 5. The median activity levels of bats recorded across all detectors each night.


Median Bat Activity Level
100
80
60
40
20
0
Myotis
Nyctalus noctula
Pipistrellus pipistrellus
Pipistrellus pygmaeus
27 Jul 2020
17 Aug 2020
07 Sep 2020
28 Sep 2020
19 Oct 2020
09 Nov 2020
30 Nov 2020
21 Dec 2020
11 Jan 2021
01 Feb 2021
22 Feb 2021
15 Mar 2021
05 Apr 2021
26 Apr 2021
Date
Activity Level
medium
low



3.5 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	Apr	0	0	0	0	2
Myotis	Aug	0	0	1	0	1
Myotis	Sep	0	0	0	1	1
Myotis	Oct	0	0	0	0	2

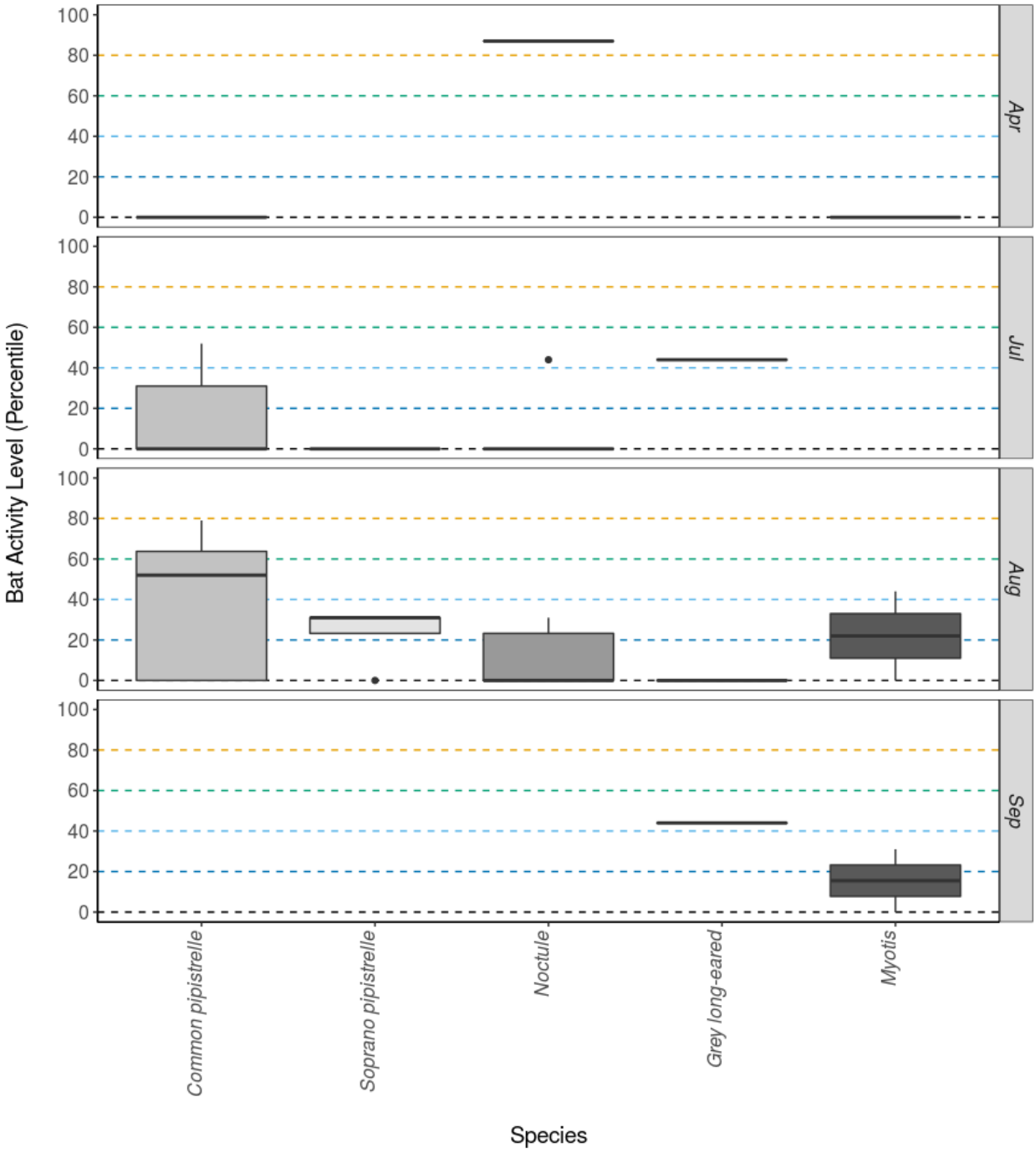
Nyctalus noctula	Apr	1	0	0	0	0
Nyctalus noctula	Jul	0	0	1	0	4
Nyctalus noctula	Aug	0	0	0	2	4
Nyctalus noctula	Oct	0	1	2	2	3
Pipistrellus pipistrellus	Apr	0	0	0	0	2
Pipistrellus pipistrellus	Jul	0	0	1	3	5
Pipistrellus pipistrellus	Aug	0	5	4	1	6
Pipistrellus pipistrellus	Oct	0	2	1	2	1
Pipistrellus pygmaeus	Jul	0	0	0	0	3
Pipistrellus pygmaeus	Aug	0	0	0	3	1
Pipistrellus pygmaeus	Oct	0	0	2	1	1
Plecotus auritus	Jul	0	0	1	0	0
Plecotus auritus	Aug	0	0	0	0	2
Plecotus auritus	Sep	0	0	1	0	0

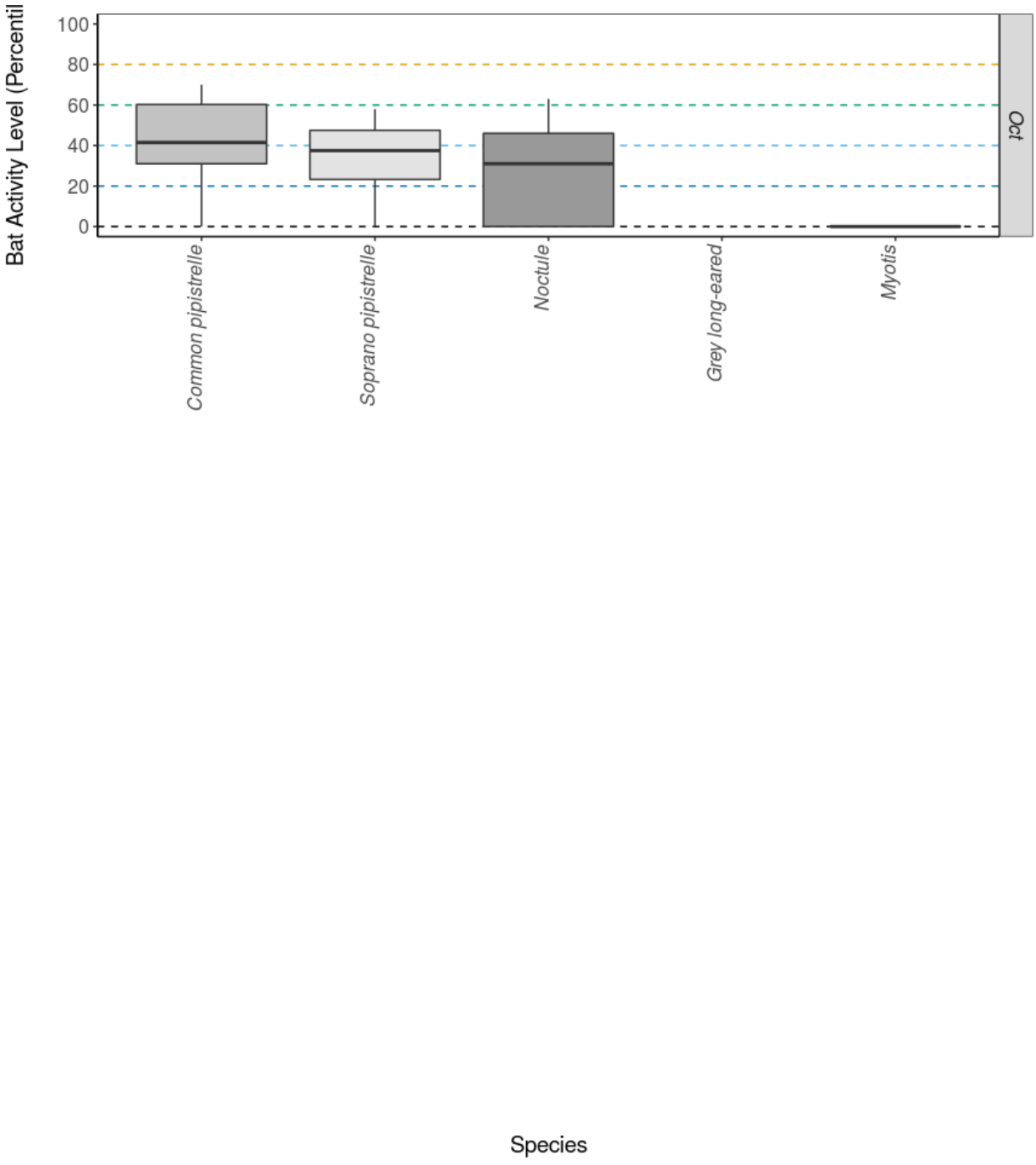
Table 10. Summary table showing key metrics for each species recorded per month.

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	Apr	0	0	0	2
Myotis	Aug	22	37.5 - 37.5	44	2
Myotis	Sep	16	37.5 - 37.5	31	2
Myotis	Oct	0	0 - 0	0	2
Nyctalus noctula	Apr	87	59 - 59	87	1
Nyctalus noctula	Jul	0	59 - 59	44	5
Nyctalus noctula	Aug	0	59 - 59	31	6
Nyctalus noctula	Oct	31	31 - 53.5	63	8
Pipistrellus pipistrellus	Apr	0	15.5 - 15.5	0	2
Pipistrellus pipistrellus	Jul	0	52 - 70	52	9
Pipistrellus pipistrellus	Aug	52	52 - 70	79	16
Pipistrellus pipistrellus	Oct	42	52 - 70	70	6

Pipistrellus pygmaeus	Jul	0	44.5 - 44.5	0	3
Pipistrellus pygmaeus	Aug	31	37.5 - 37.5	31	4
Pipistrellus pygmaeus	Oct	38	44.5 - 44.5	58	4
Plecotus auritus	Jul	44	0 - 0	44	1
Plecotus auritus	Aug	0	0 - 0	0	2
Plecotus auritus	Sep	44	0	44	1

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
Apr
Jul
Aug
Sep
Common pipistrelle
Soprano pipistrelle
Noctule
Grey long-eared
Myotis
Species



4 ENTIRE SURVEY PERIOD

4.1 Sunrise and Sunset Times

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

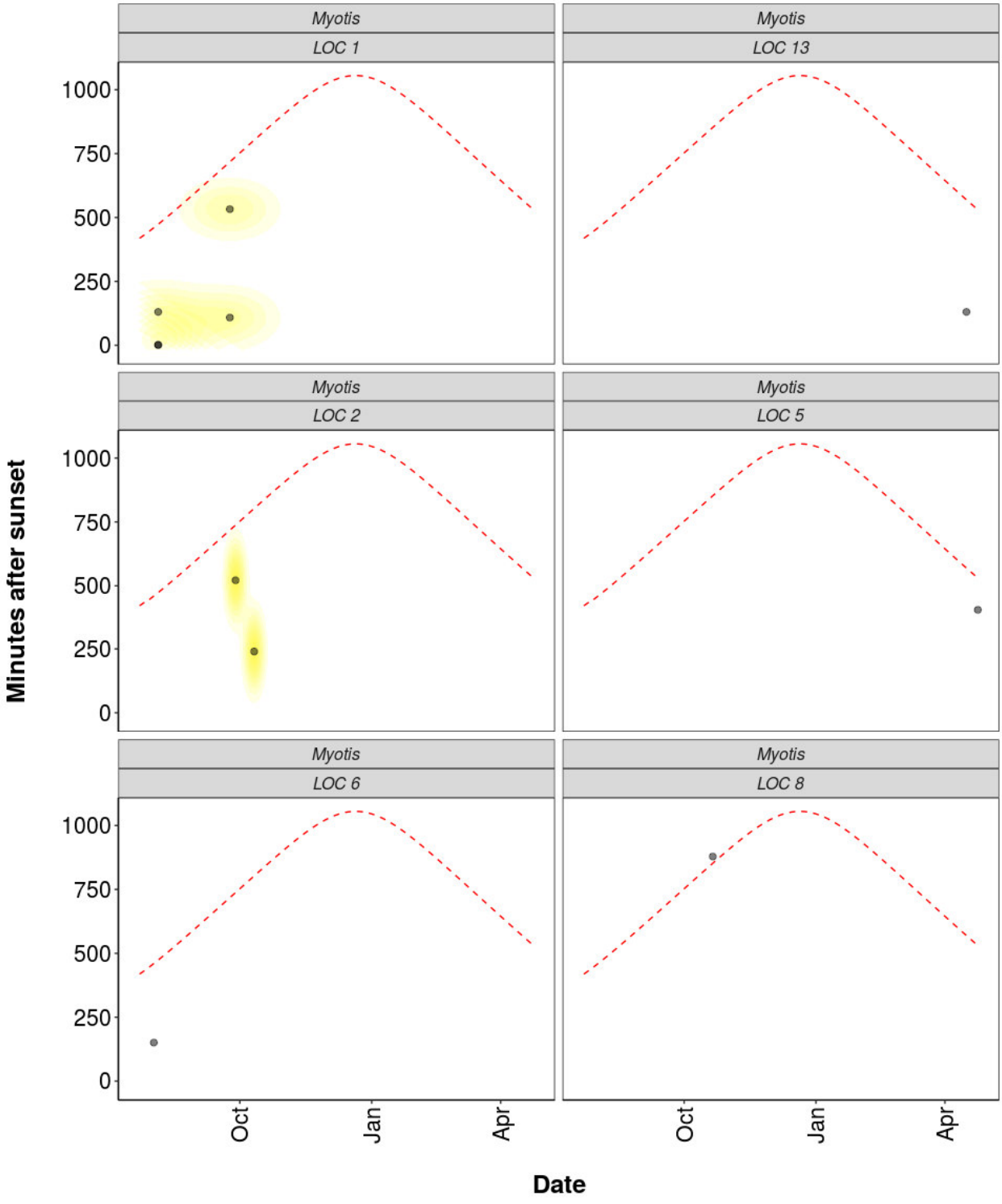
Night (y-m-d)	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
2020-07-23	21:56	04:55	7.0
2020-07-24	21:54	04:57	7.0
2020-07-25	21:52	04:59	7.1
2020-07-27	21:48	05:03	7.2

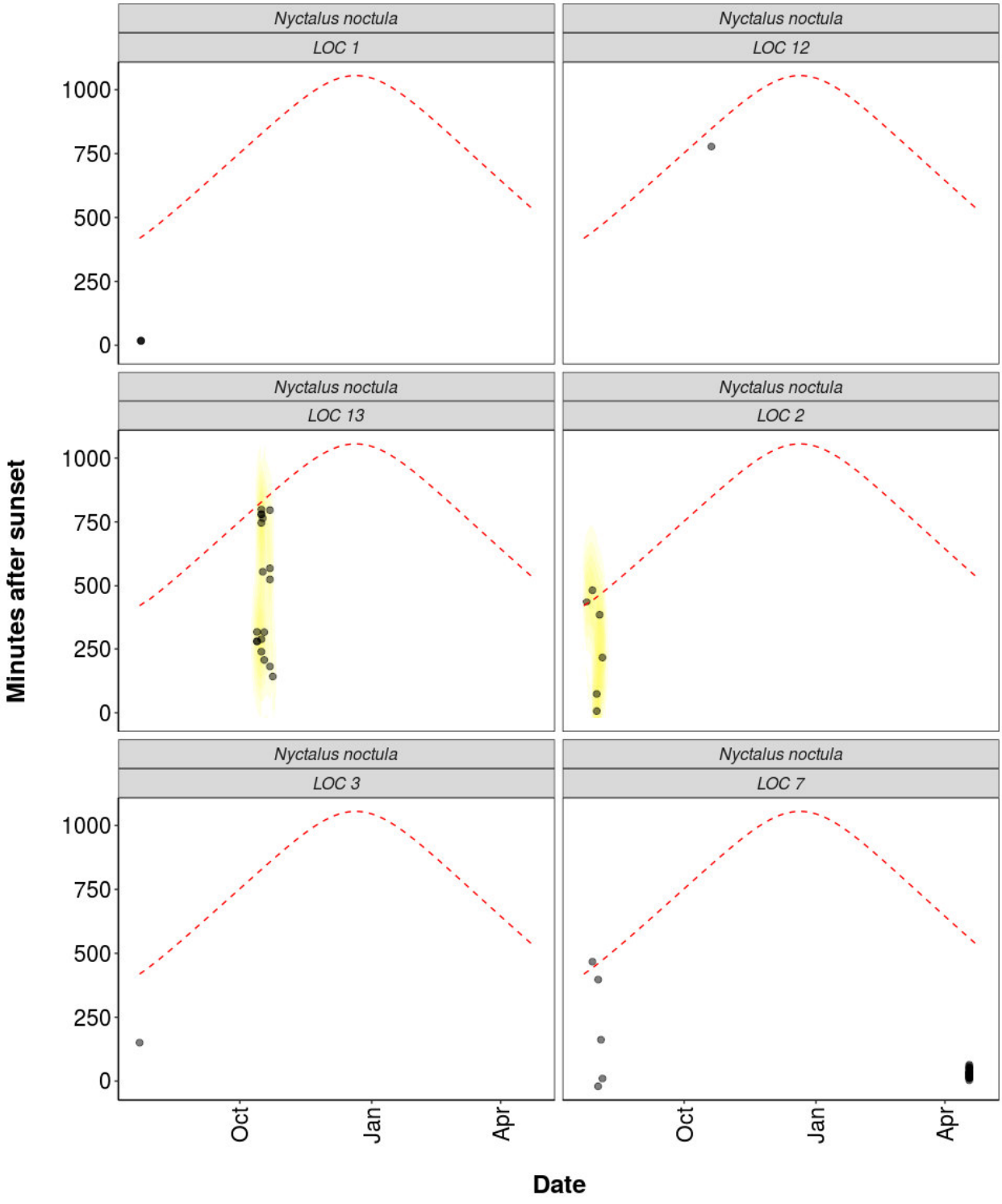
2020-07-29	21:44	05:07	7.4
2020-07-31	21:40	05:11	7.5
2020-08-01	21:38	05:13	7.6
2020-08-02	21:35	05:16	7.7
2020-08-03	21:33	05:18	7.7
2020-08-04	21:31	05:20	7.8
2020-08-05	21:29	05:22	7.9
2020-08-06	21:26	05:24	8.0
2020-09-24	19:12	07:10	12.0
2020-09-28	19:01	07:19	12.3
2020-10-02	18:50	07:27	12.6
2020-10-03	18:47	07:30	12.7
2020-10-06	18:38	07:36	13.0
2020-10-11	18:25	07:47	13.4
2020-10-13	18:19	07:52	13.5
2020-10-16	18:11	07:59	13.8
2020-10-17	18:08	08:01	13.9
2020-10-18	18:06	08:03	14.0
2020-10-20	18:00	08:08	14.1
2020-10-21	17:58	08:10	14.2
2020-10-22	17:55	08:12	14.3
2020-10-24	17:50	07:17	14.5
2020-10-26	16:45	07:22	14.6
2021-04-15	20:29	06:04	9.6
2021-04-16	20:32	06:01	9.5
2021-04-18	20:36	05:56	9.3
2021-04-19	20:38	05:53	9.2
2021-04-24	20:50	05:40	8.8

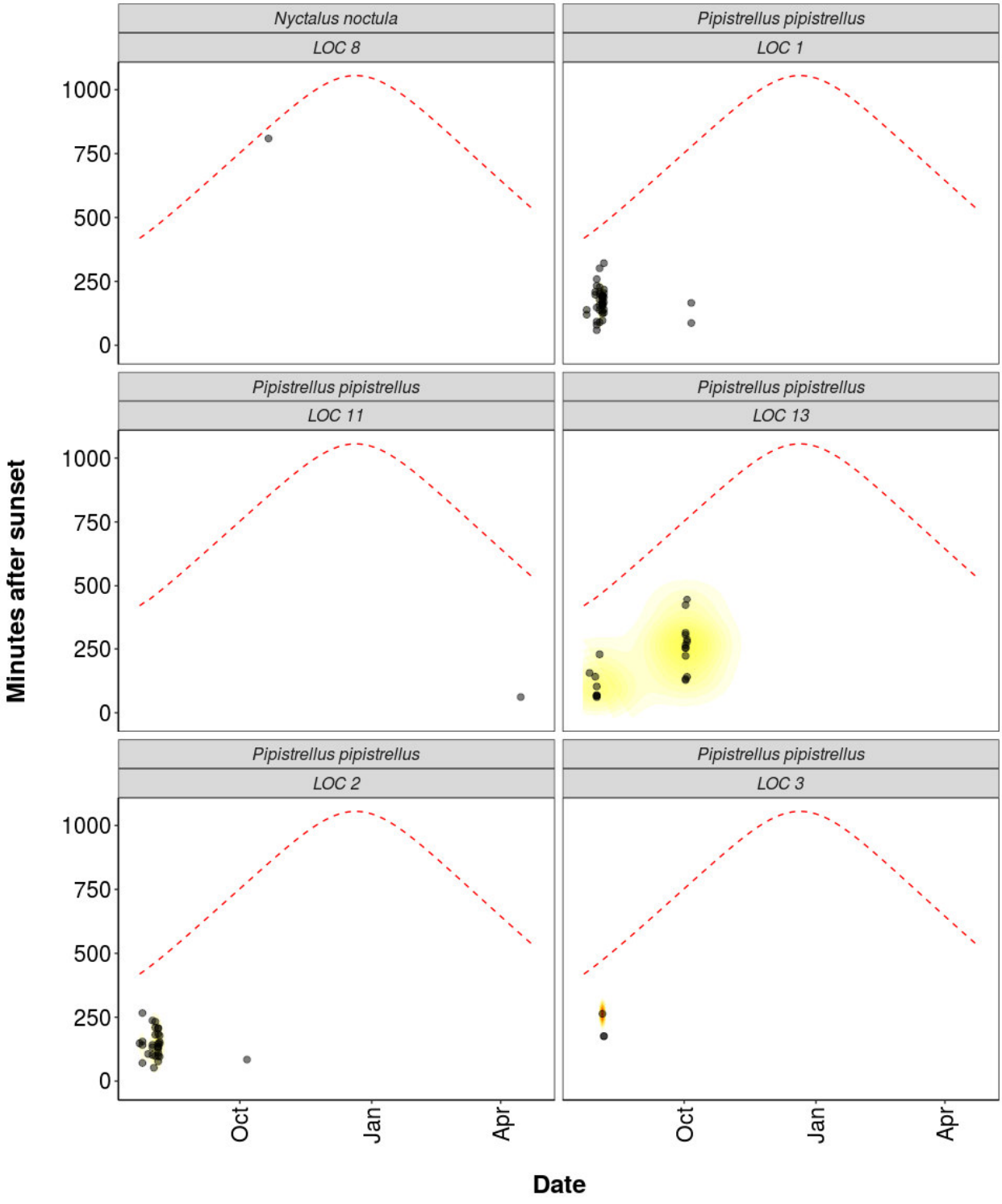
5 DISTRIBUTION OF BAT ACTIVITY ACROSS THE NIGHT THROUGH TIME

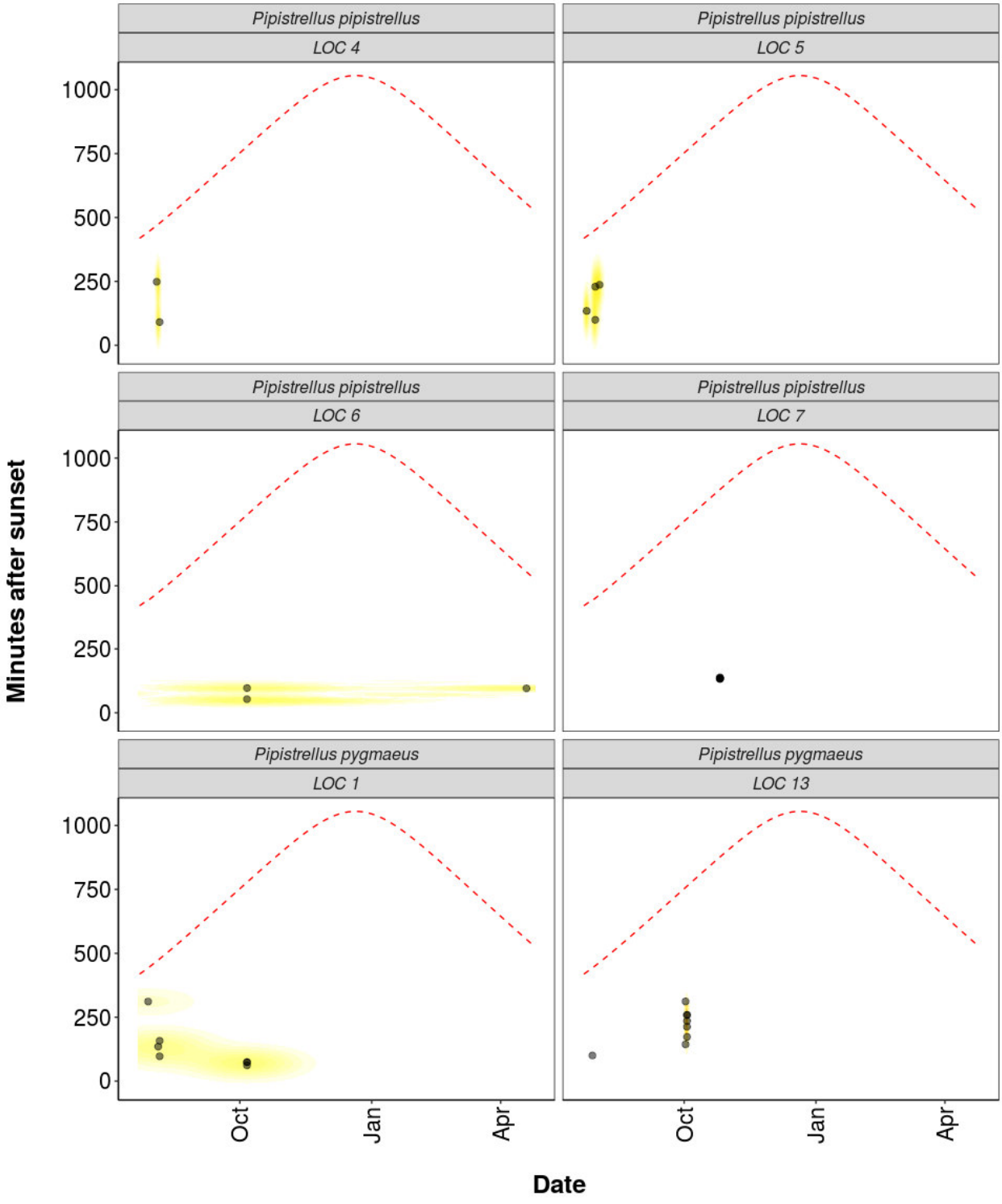
5.1 Per Detector

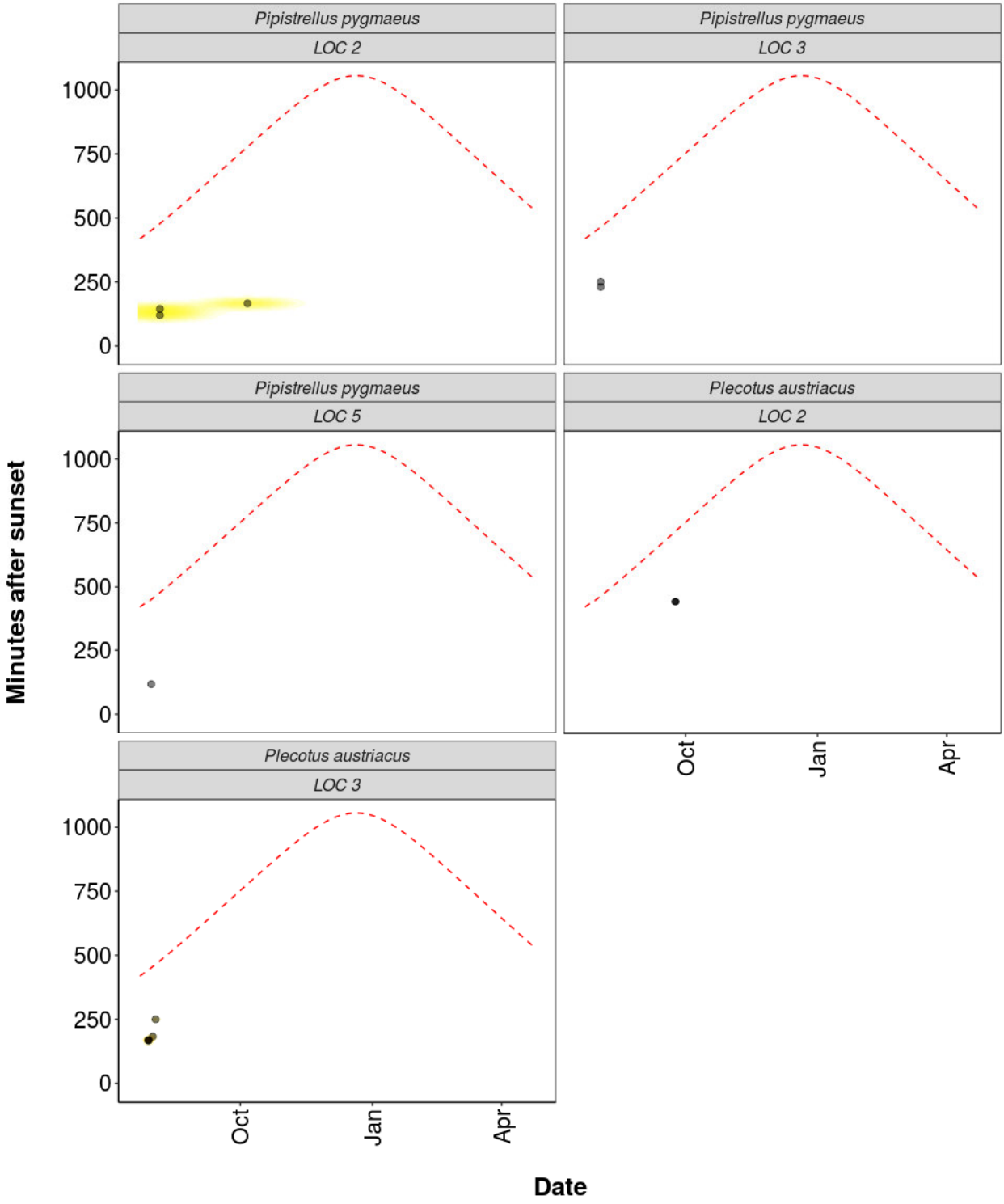
Figure 7. Timing of bat calls plotted as minutes before/after sunset, whereby 0 on the y axis represents sunset. Sunrise throughout the survey period is depicted as the red dashed line. Colours indicate kernel densities, with darkest colours showing peaks of activity. These colours are comparative only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


Myotis
LOC 1
Myotis
LOC 13
Myotis
LOC 2
Myotis
LOC 5
Myotis
LOC 6
Myotis
LOC 8
1000
750
500
250
0
Minutes after sunset
Oct
Jan
Apr
Date


Nyctalus noctula
LOC 1
Nyctalus noctula
LOC 12
Nyctalus noctula
LOC 13
Nyctalus noctula
LOC 2
Nyctalus noctula
LOC 3
Nyctalus noctula
LOC 7
Minutes after sunset
1000
750
500
250
0
Oct
Jan
Apr
Date


Nyctalus noctula
LOC 8
Pipistrellus pipistrellus
LOC 1
Pipistrellus pipistrellus
LOC 11
Pipistrellus pipistrellus
LOC 13
Pipistrellus pipistrellus
LOC 2
Pipistrellus pipistrellus
LOC 3
Minutes after sunset
1000
750
500
250
0
Oct
Jan
Apr
Date


Pipistrellus pipistrellus
LOC 4
Pipistrellus pipistrellus
LOC 5
Pipistrellus pipistrellus
LOC 6
Pipistrellus pipistrellus
LOC 7
Pipistrellus pygmaeus
LOC 1
Pipistrellus pygmaeus
LOC 13
Minutes after sunset
1000
750
500
250
0
Oct
Jan
Apr
Date



6 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/

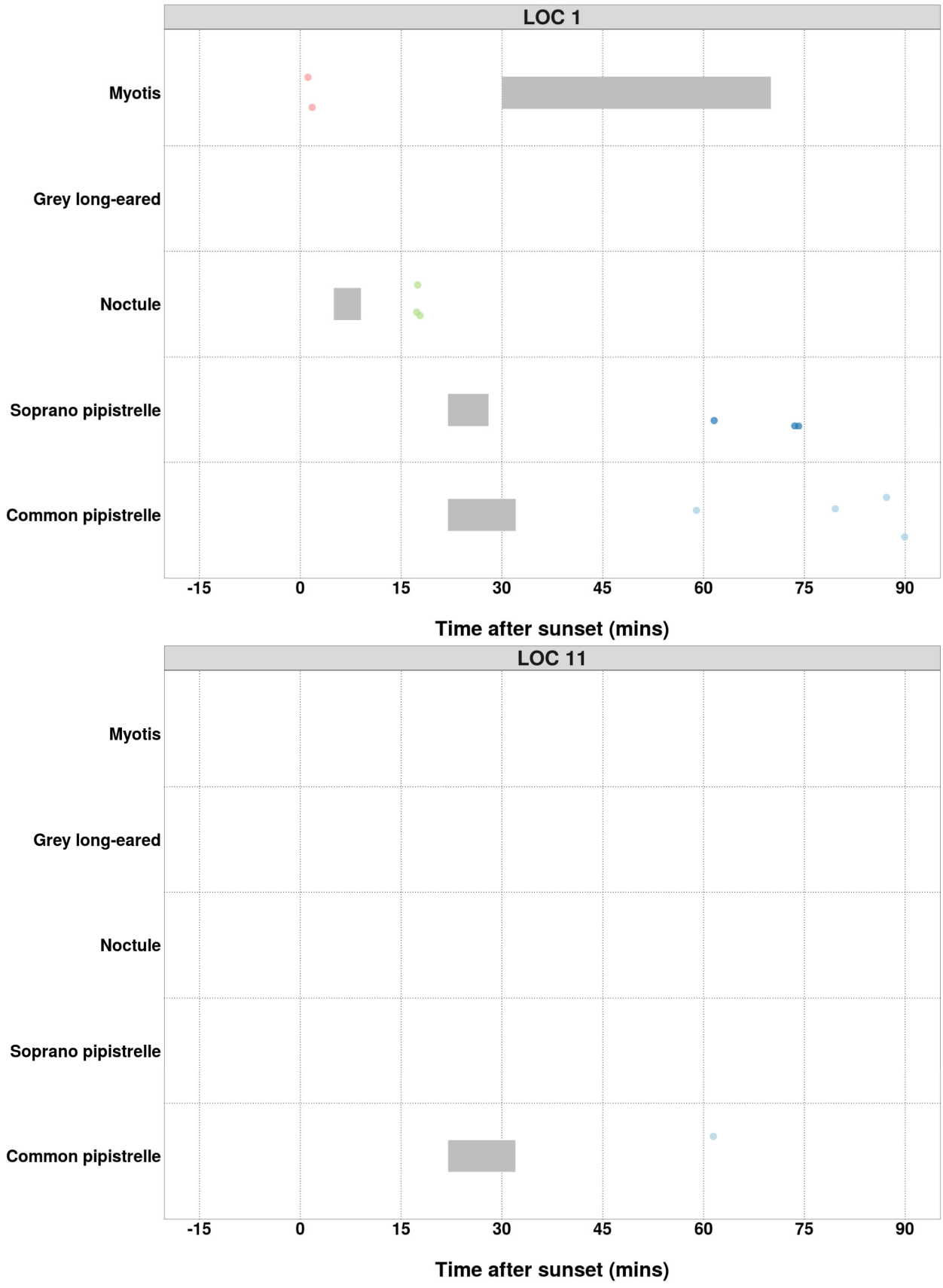
6.1 Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012) - Table

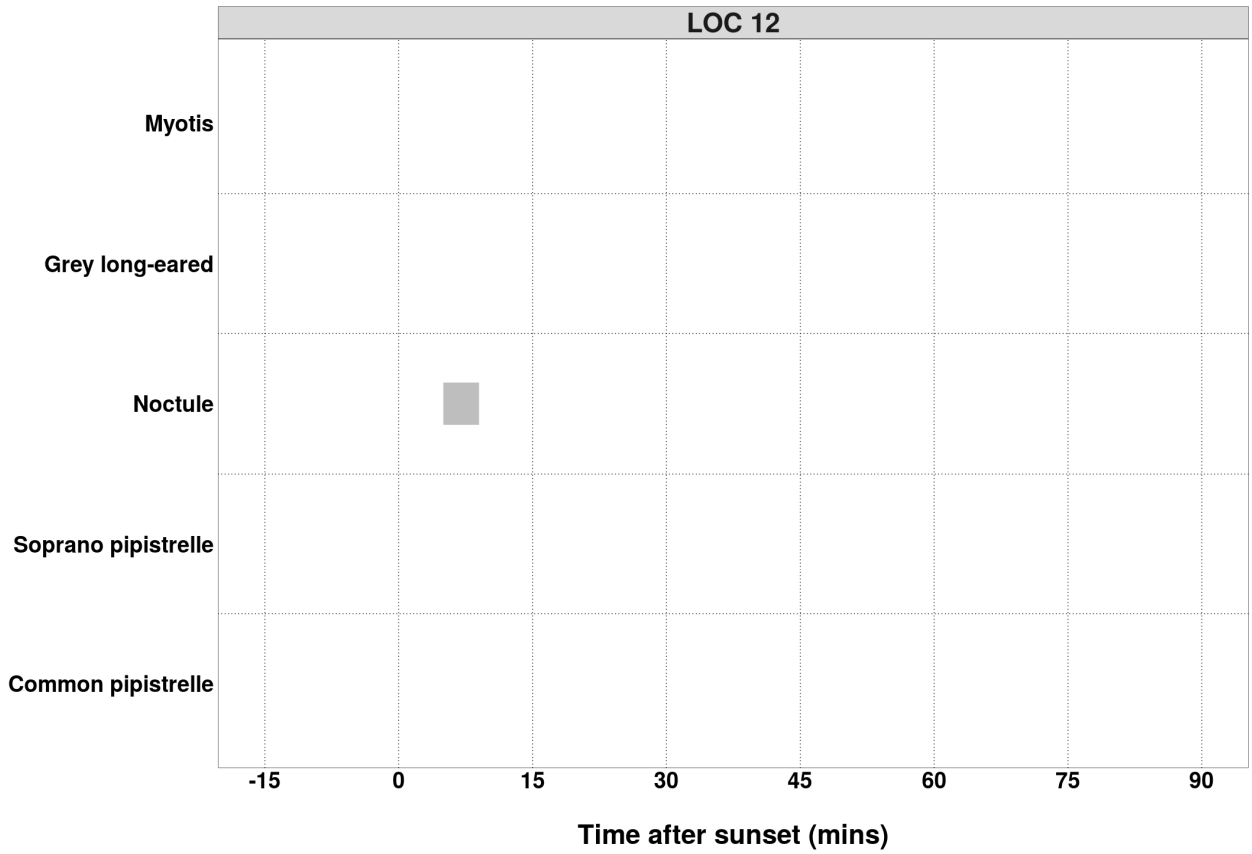
Table 12. Number of bat calls recorded before the upper time of the species-specific emergence time range, and which therefore may potentially indicate the presence of a nearby roost.

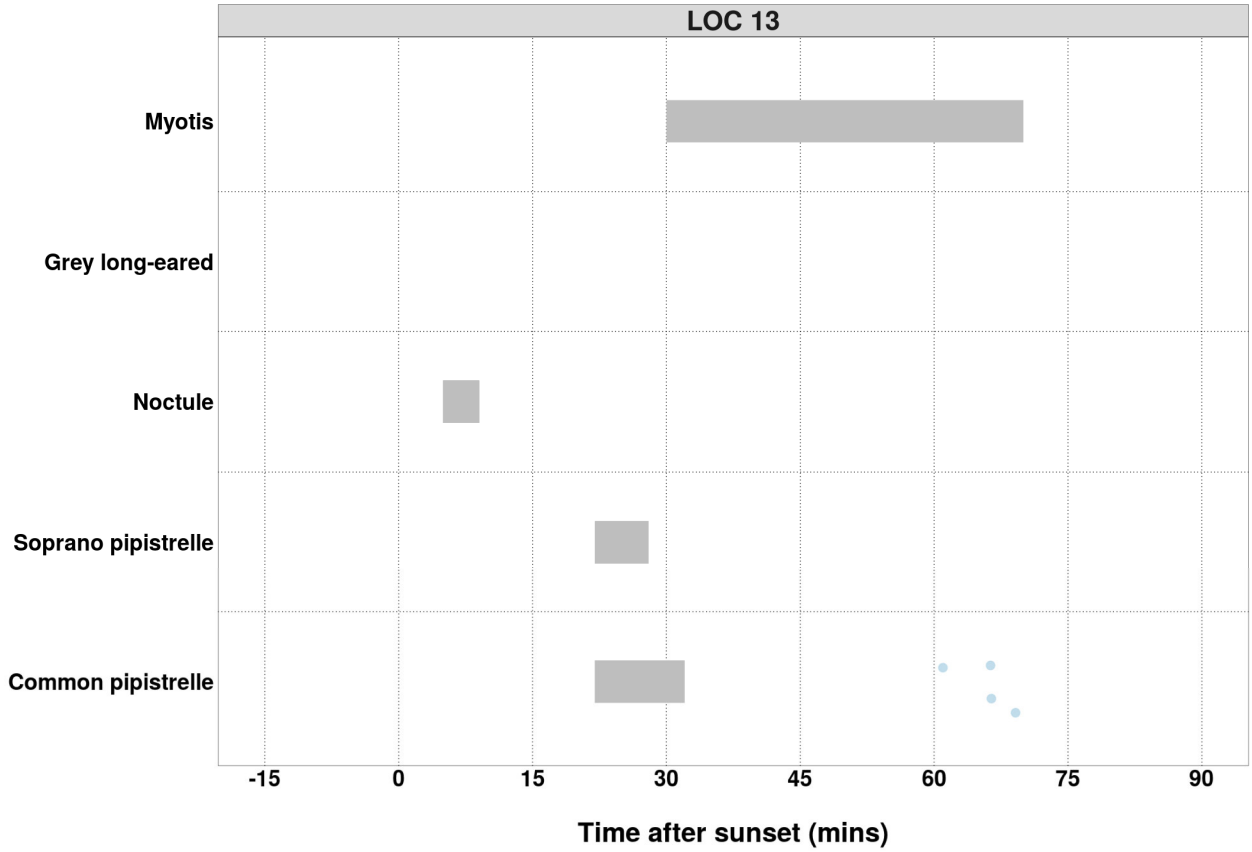
Species	Detector ID	2020-08-01	2020-08-02	2020-08-05	2021-04-18
Noctule	LOC 2	1	0	0	0
Noctule	LOC 7	0	1	0	1
Myotis	LOC 1	0	0	2	0

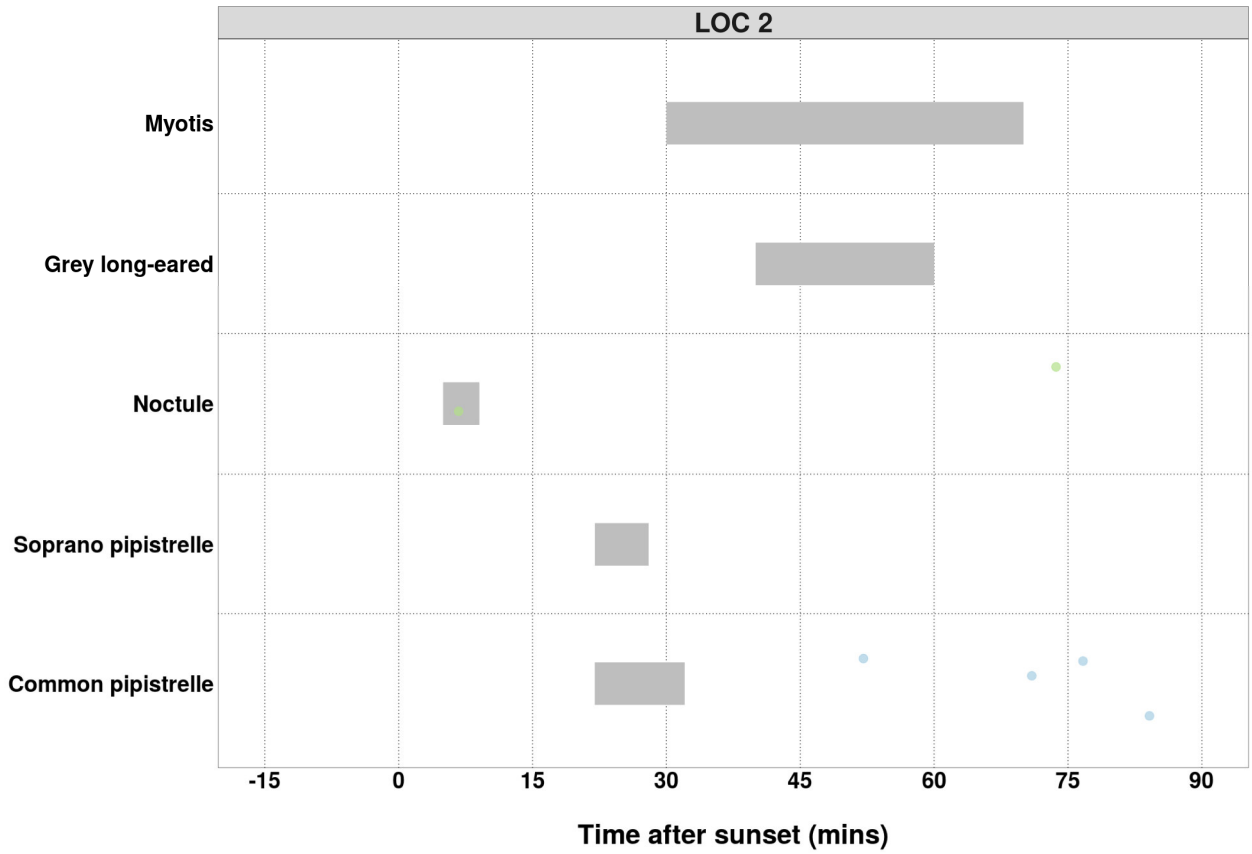
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012) - Figures

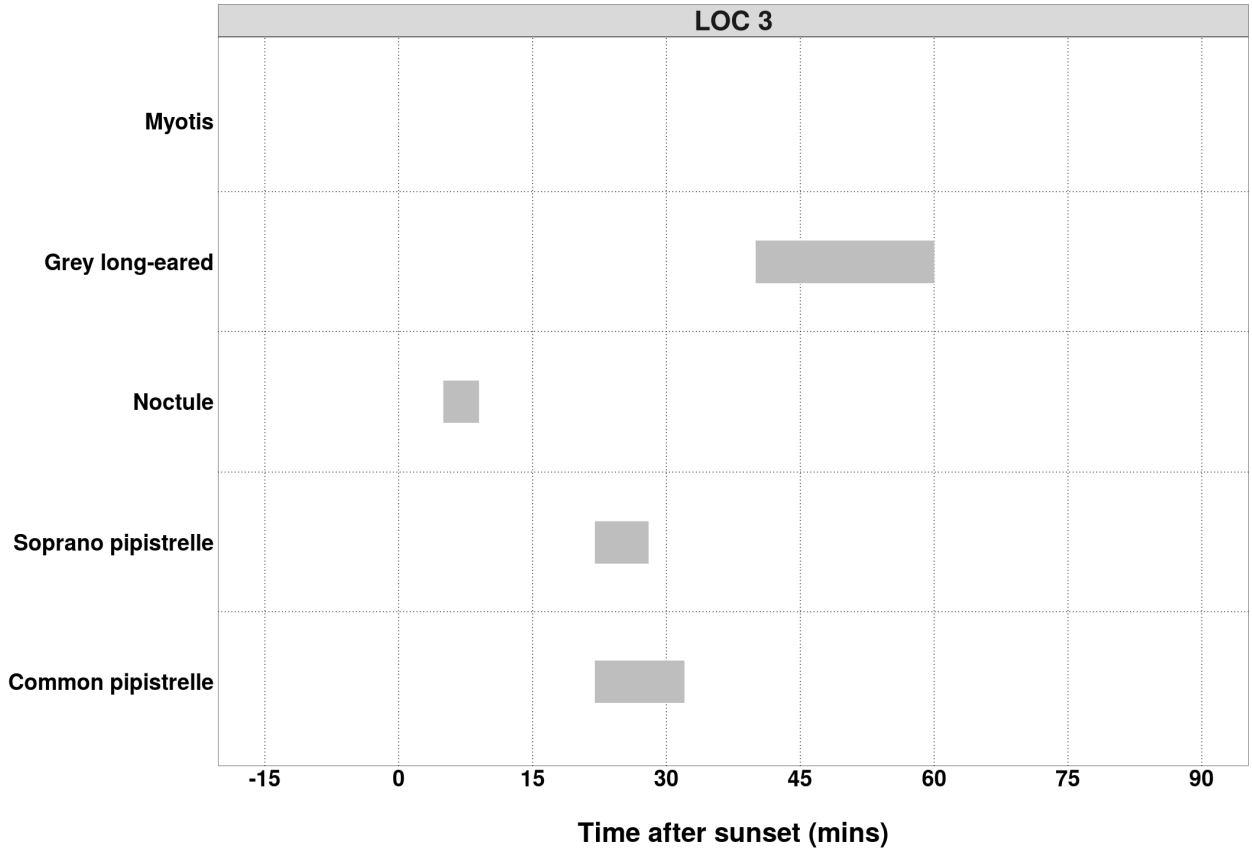
Figure 8. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occuring earlier than this time range, may potentially indicate the presence of a nearby roost.

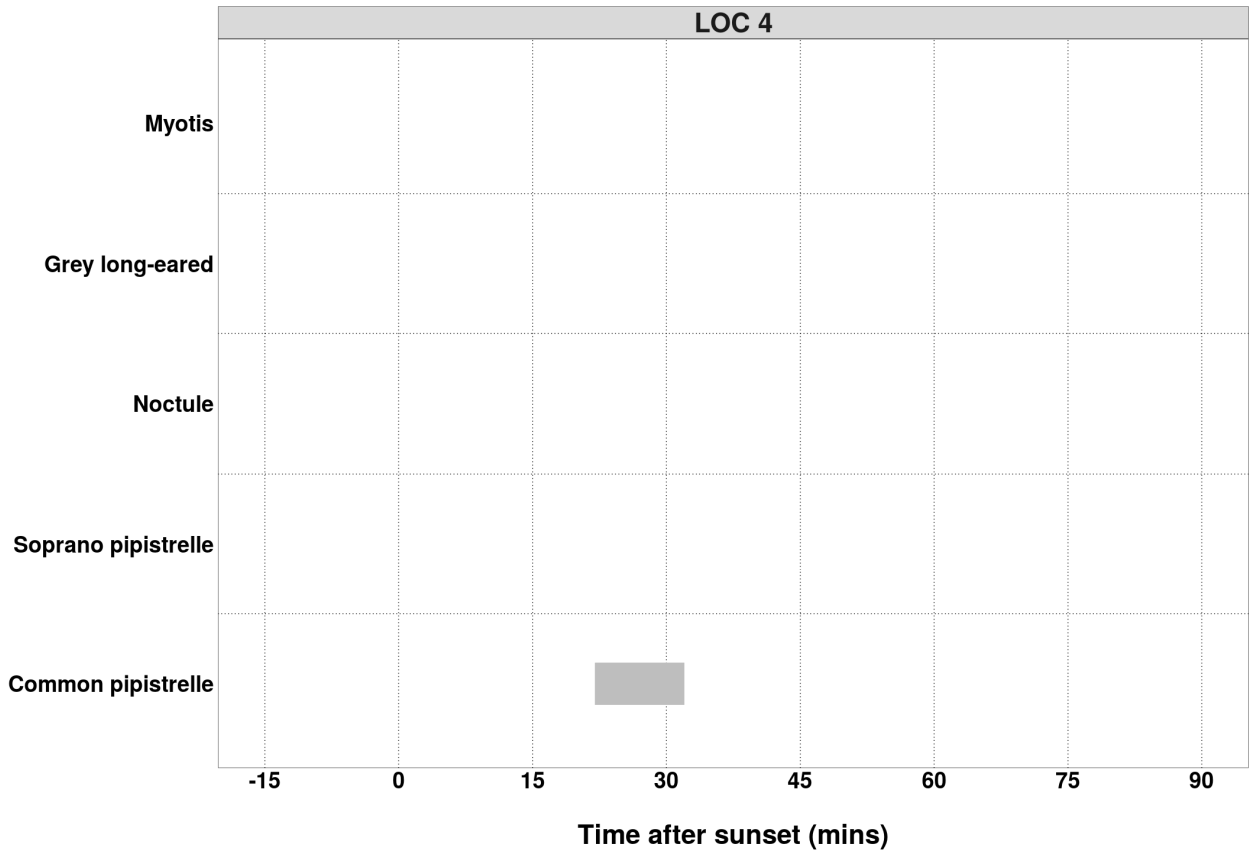

LOC 1
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)
LOC 11
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

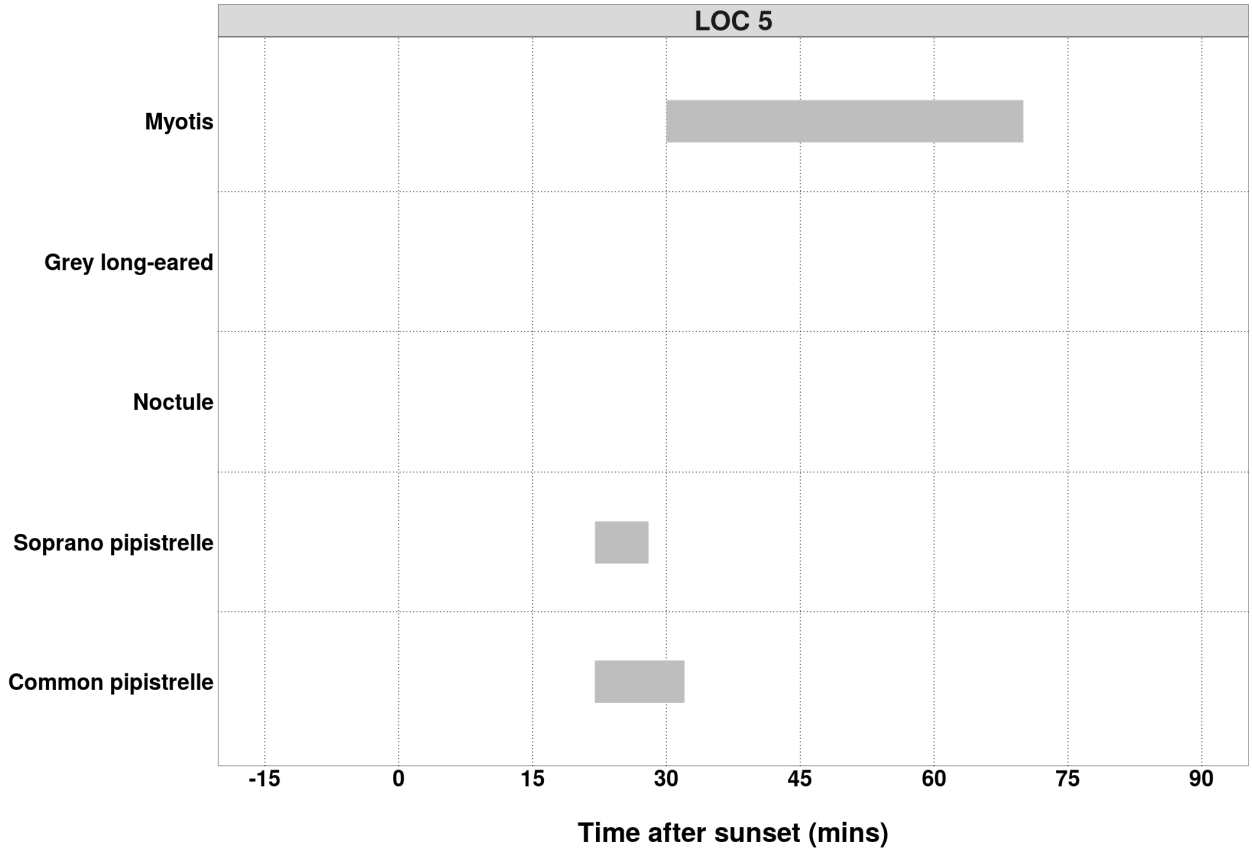

LOC 12
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

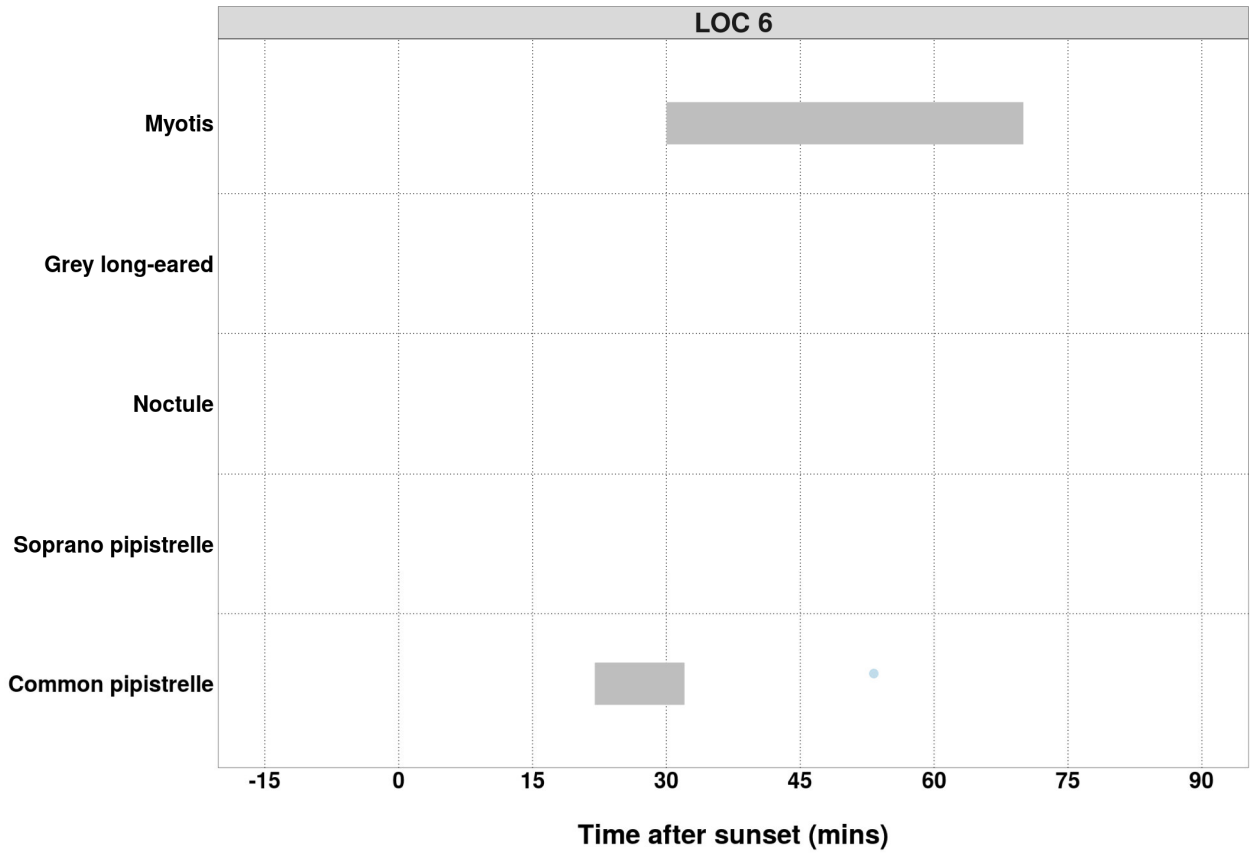

LOC 13
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

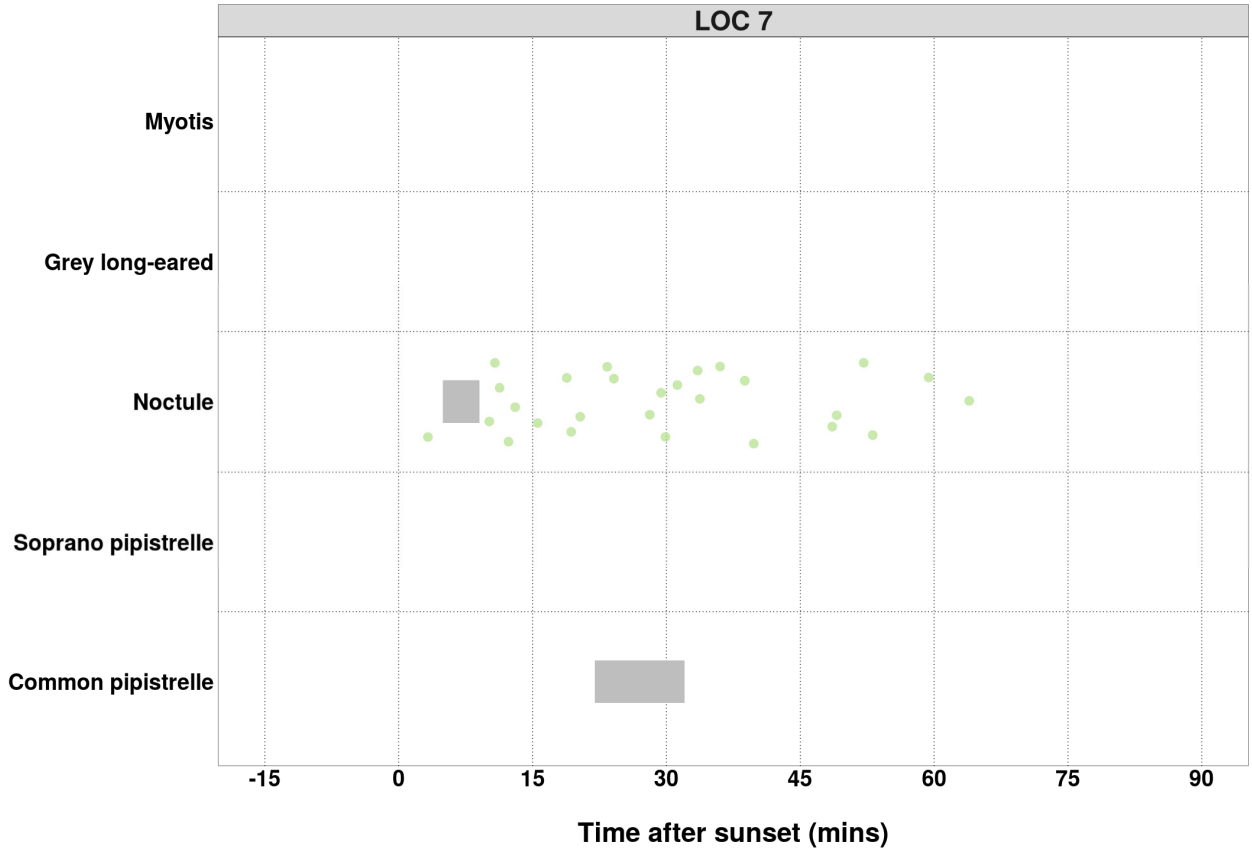

LOC 2
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

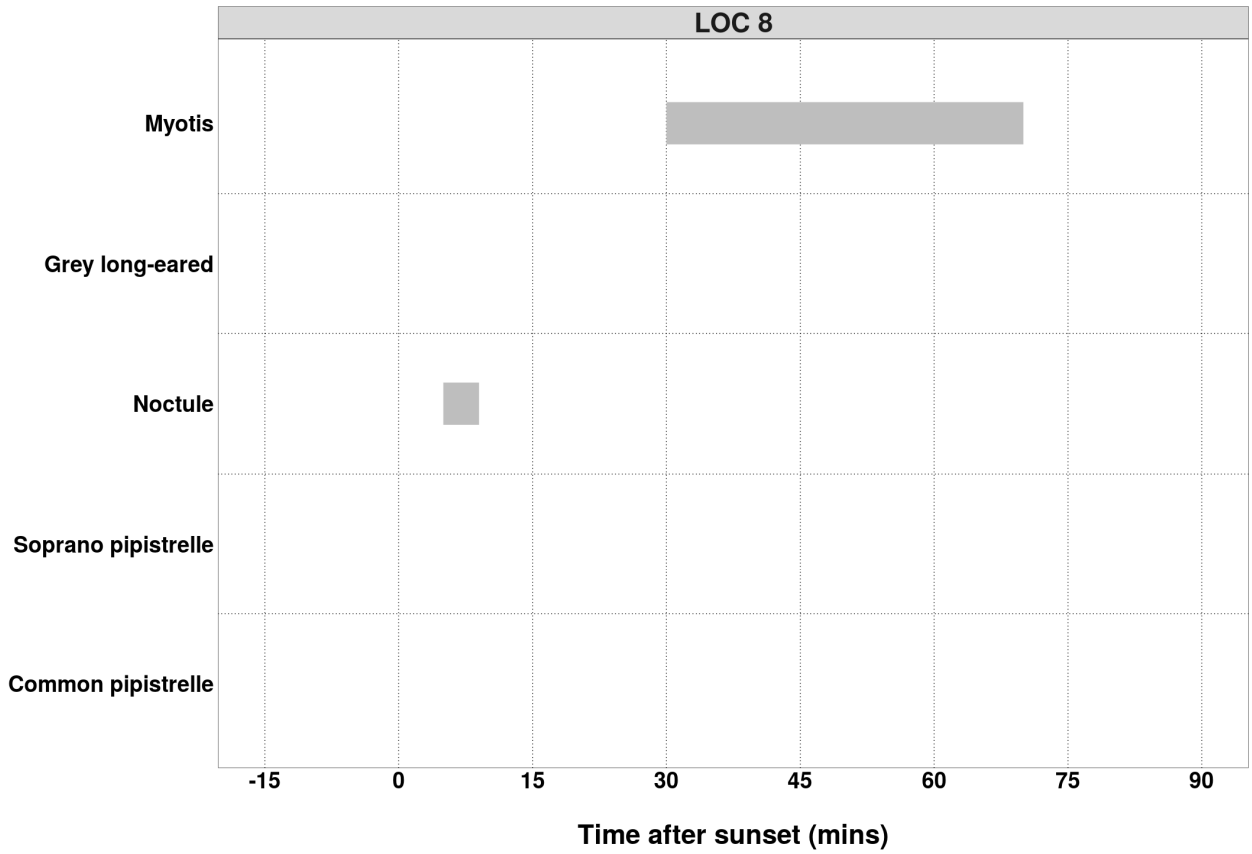

LOC 3
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 4
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 5
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 6
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 7
Myotis
Grey long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)



7 COUNTS OF BAT PASSES

7.1 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	112	52.6
Soprano pipistrelle	21	9.9
Noctule	61	28.6
Brown long-eared	8	3.8
Myotis	11	5.2
Total	213	100.1

8 COUNTS OF BAT PASSES

8.1 Per Detector

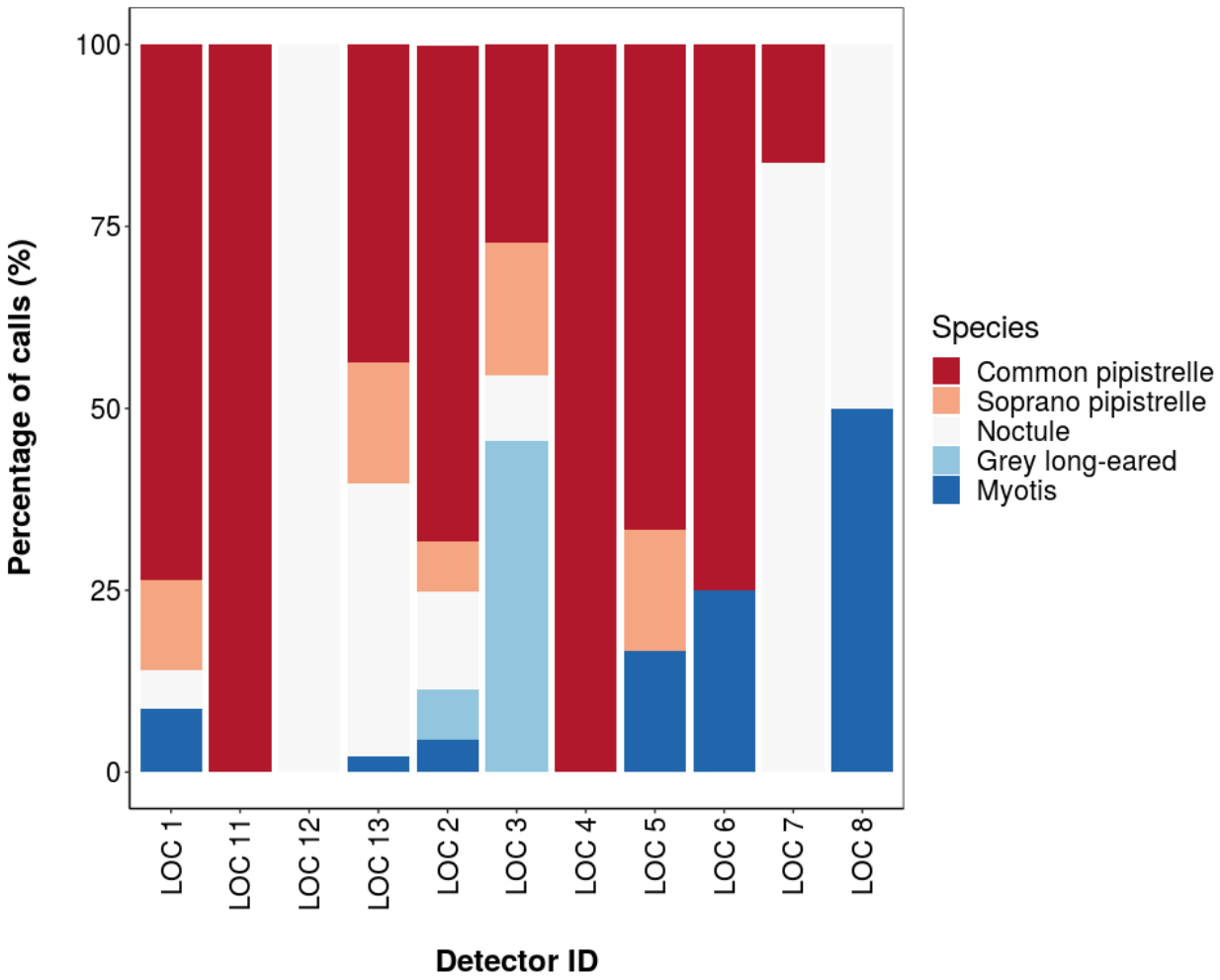
Table 15. The number of passes recorded for each species at each detector.

Species	Detector ID	Count (No)	Percentage by Detector (%)
Common pipistrelle	LOC 1	42	73.7
Common pipistrelle	LOC 11	1	100.0
Common pipistrelle	LOC 13	21	43.8

Common pipistrelle	LOC 2	30	68.2
Common pipistrelle	LOC 3	3	27.3
Common pipistrelle	LOC 4	2	100.0
Common pipistrelle	LOC 5	4	66.7
Common pipistrelle	LOC 6	3	75.0
Common pipistrelle	LOC 7	6	16.2
Soprano pipistrelle	LOC 1	7	12.3
Soprano pipistrelle	LOC 13	8	16.7
Soprano pipistrelle	LOC 2	3	6.8
Soprano pipistrelle	LOC 3	2	18.2
Soprano pipistrelle	LOC 5	1	16.7
Noctule	LOC 1	3	5.3
Noctule	LOC 12	1	100.0
Noctule	LOC 13	18	37.5
Noctule	LOC 2	6	13.6
Noctule	LOC 3	1	9.1
Noctule	LOC 7	31	83.8
Noctule	LOC 8	1	50.0
Brown long-eared	LOC 2	3	6.8
Brown long-eared	LOC 3	5	45.5
Myotis	LOC 1	5	8.8
Myotis	LOC 13	1	2.1
Myotis	LOC 2	2	4.5
Myotis	LOC 5	1	16.7
Myotis	LOC 6	1	25.0
Myotis	LOC 8	1	50.0

9 SPECIES COMPOSITION

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



9.1 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.

9.2 Nightly Bat Pass Rate (Bat passes per hour)

10 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	LOC 1	0.8
Common pipistrelle	LOC 11	0.1
Common pipistrelle	LOC 13	0.2

Common pipistrelle	LOC 2	0.5
Common pipistrelle	LOC 3	0.2
Common pipistrelle	LOC 4	0.1
Common pipistrelle	LOC 5	0.1
Common pipistrelle	LOC 6	0.1
Common pipistrelle	LOC 7	0.4
Soprano pipistrelle	LOC 1	0.2
Soprano pipistrelle	LOC 13	0.2
Soprano pipistrelle	LOC 2	0.2
Soprano pipistrelle	LOC 3	0.3
Soprano pipistrelle	LOC 5	0.1
Noctule	LOC 1	0.4
Noctule	LOC 12	0.1
Noctule	LOC 13	0.2
Noctule	LOC 2	0.1
Noctule	LOC 3	0.1
Noctule	LOC 7	0.1
Noctule	LOC 8	0.1
Brown long-eared	LOC 2	0.2
Brown long-eared	LOC 3	0.1
Myotis	LOC 1	0.3
Myotis	LOC 13	0.1
Myotis	LOC 2	0.1
Myotis	LOC 5	0.1
Myotis	LOC 6	0.1
Myotis	LOC 8	0.1

10.1 Nightly Bat Pass Rate (Bat passes per hour)

11 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.

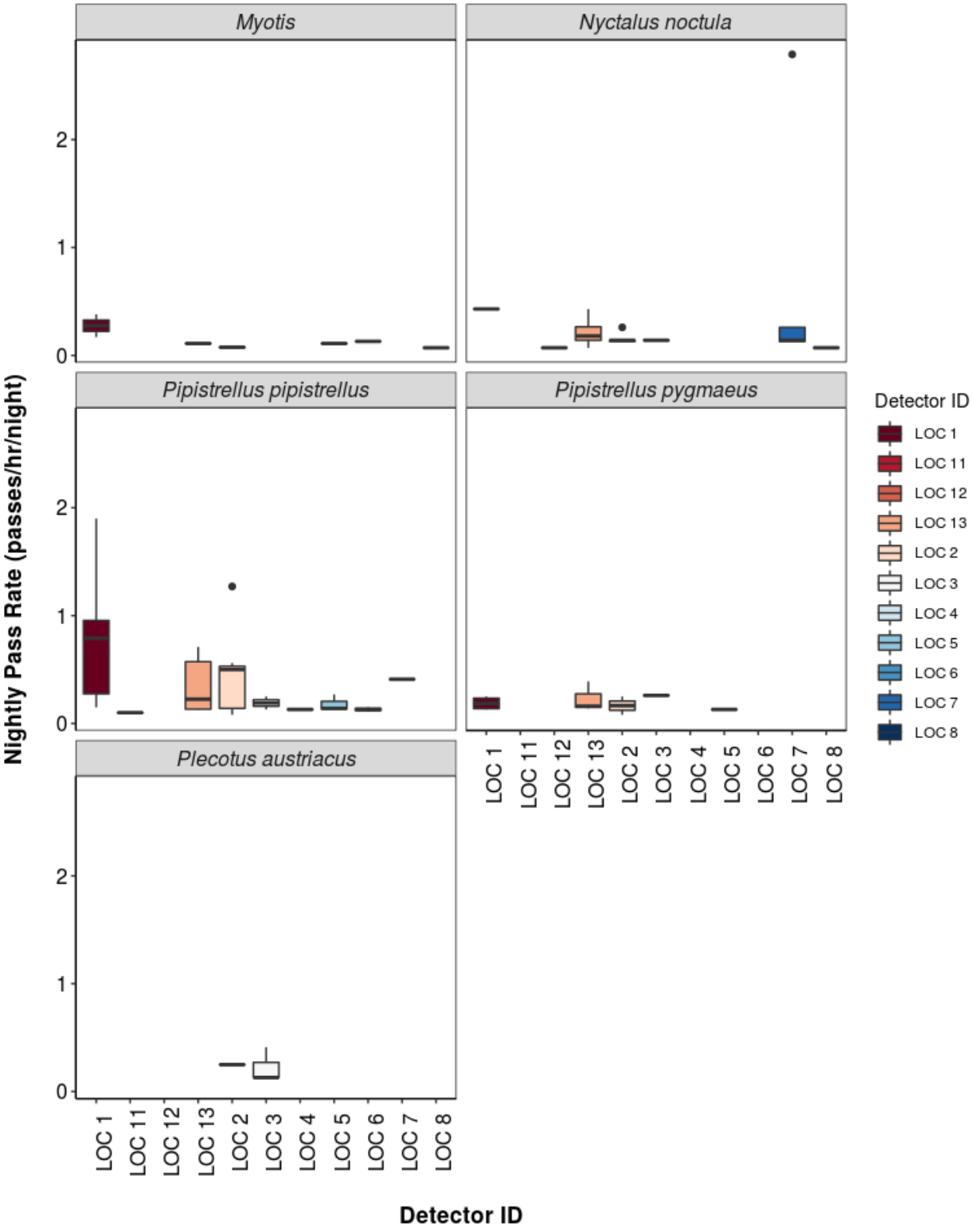
Species	Detector ID	Mean Pass Rate
Common pipistrelle	LOC 1	0.8
Common pipistrelle	LOC 11	0.1
Common pipistrelle	LOC 13	0.3
Common pipistrelle	LOC 2	0.4
Common pipistrelle	LOC 3	0.2

Common pipistrelle	LOC 4	0.1
Common pipistrelle	LOC 5	0.2
Common pipistrelle	LOC 6	0.1
Common pipistrelle	LOC 7	0.4
Soprano pipistrelle	LOC 1	0.2
Soprano pipistrelle	LOC 13	0.2
Soprano pipistrelle	LOC 2	0.2
Soprano pipistrelle	LOC 3	0.3
Soprano pipistrelle	LOC 5	0.1
Noctule	LOC 1	0.4
Noctule	LOC 12	0.1
Noctule	LOC 13	0.2
Noctule	LOC 2	0.2
Noctule	LOC 3	0.1
Noctule	LOC 7	0.7
Noctule	LOC 8	0.1
Brown long-eared	LOC 2	0.2
Brown long-eared	LOC 3	0.2
Myotis	LOC 1	0.3
Myotis	LOC 13	0.1
Myotis	LOC 2	0.1
Myotis	LOC 5	0.1
Myotis	LOC 6	0.1
Myotis	LOC 8	0.1

12 NIGHTLY BAT PASSES (BAT PASSES PER HOUR)

12.1 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.



13 SPLIT BY MONTH

14 TOTAL BAT PASSES PER DETECTOR, EACH MONTH

14.1 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	Apr	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	0	4	36	0	2
Common pipistrelle	LOC 11	1	0	0	0	0
Common pipistrelle	LOC 13	0	2	6	0	13
Common pipistrelle	LOC 2	0	6	23	0	1
Common pipistrelle	LOC 3	0	0	3	0	0
Common pipistrelle	LOC 4	0	0	2	0	0
Common pipistrelle	LOC 5	0	3	1	0	0
Common pipistrelle	LOC 6	1	0	0	0	2
Common pipistrelle	LOC 7	0	0	0	0	6
Soprano pipistrelle	LOC 1	0	1	3	0	3
Soprano pipistrelle	LOC 13	0	1	0	0	7
Soprano pipistrelle	LOC 2	0	0	2	0	1
Soprano pipistrelle	LOC 3	0	0	2	0	0
Soprano pipistrelle	LOC 5	0	1	0	0	0
Noctule	LOC 1	0	3	0	0	0
Noctule	LOC 12	0	0	0	0	1
Noctule	LOC 13	0	0	0	0	18
Noctule	LOC 2	0	2	4	0	0
Noctule	LOC 3	0	1	0	0	0
Noctule	LOC 7	26	1	4	0	0
Noctule	LOC 8	0	0	0	0	1
Brown long-eared	LOC 2	0	0	0	3	0
Brown long-eared	LOC 3	0	3	2	0	0
Myotis	LOC 1	0	0	3	2	0
Myotis	LOC 13	1	0	0	0	0
Myotis	LOC 2	0	0	0	1	1
Myotis	LOC 5	1	0	0	0	0
Myotis	LOC 6	0	0	1	0	0
Myotis	LOC 8	0	0	0	0	1

15 SURVEY EFFORT

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

Month	Detector ID	No. of Survey Nights
Apr	LOC 11	1
Apr	LOC 13	1
Apr	LOC 5	1

Apr	LOC 6	1
Apr	LOC 7	1
Jul	LOC 1	4
Jul	LOC 13	3
Jul	LOC 2	3
Jul	LOC 3	2
Jul	LOC 5	2
Jul	LOC 7	1
Aug	LOC 1	4
Aug	LOC 13	2
Aug	LOC 2	5
Aug	LOC 3	4
Aug	LOC 4	2
Aug	LOC 5	1
Aug	LOC 6	1
Aug	LOC 7	3
Sep	LOC 1	1
Sep	LOC 2	2
Oct	LOC 1	1
Oct	LOC 12	1
Oct	LOC 13	8
Oct	LOC 2	2
Oct	LOC 6	1
Oct	LOC 7	1
Oct	LOC 8	1

15.1 Nightly Bat Pass Rate for each Month

16 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	Apr	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	NA	0.3	1.0	NA	0.2
Common pipistrelle	LOC 11	0.1	NA	NA	NA	NA
Common pipistrelle	LOC 13	NA	0.1	0.4	NA	0.5
Common pipistrelle	LOC 2	NA	0.1	0.5	NA	0.1

Common pipistrelle	LOC 3	NA	NA	0.2	NA	NA
Common pipistrelle	LOC 4	NA	NA	0.1	NA	NA
Common pipistrelle	LOC 5	NA	0.2	0.1	NA	NA
Common pipistrelle	LOC 6	0.1	NA	NA	NA	0.2
Common pipistrelle	LOC 7	NA	NA	NA	NA	0.4
Soprano pipistrelle	LOC 1	NA	0.1	0.2	NA	0.2
Soprano pipistrelle	LOC 13	NA	0.1	NA	NA	0.3
Soprano pipistrelle	LOC 2	NA	NA	0.2	NA	0.1
Soprano pipistrelle	LOC 3	NA	NA	0.3	NA	NA
Soprano pipistrelle	LOC 5	NA	0.1	NA	NA	NA
Noctule	LOC 1	NA	0.4	NA	NA	NA
Noctule	LOC 12	NA	NA	NA	NA	0.1
Noctule	LOC 13	NA	NA	NA	NA	0.2
Noctule	LOC 2	NA	0.1	0.1	NA	NA
Noctule	LOC 3	NA	0.1	NA	NA	NA
Noctule	LOC 7	2.8	0.1	0.1	NA	NA
Noctule	LOC 8	NA	NA	NA	NA	0.1
Brown long-eared	LOC 2	NA	NA	NA	0.2	NA
Brown long-eared	LOC 3	NA	0.4	0.1	NA	NA
Myotis	LOC 1	NA	NA	0.4	0.2	NA
Myotis	LOC 13	0.1	NA	NA	NA	NA
Myotis	LOC 2	NA	NA	NA	0.1	0.1
Myotis	LOC 5	0.1	NA	NA	NA	NA
Myotis	LOC 6	NA	NA	0.1	NA	NA
Myotis	LOC 8	NA	NA	NA	NA	0.1

16.1 Nightly Bat Pass Rate for each Month

17 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.

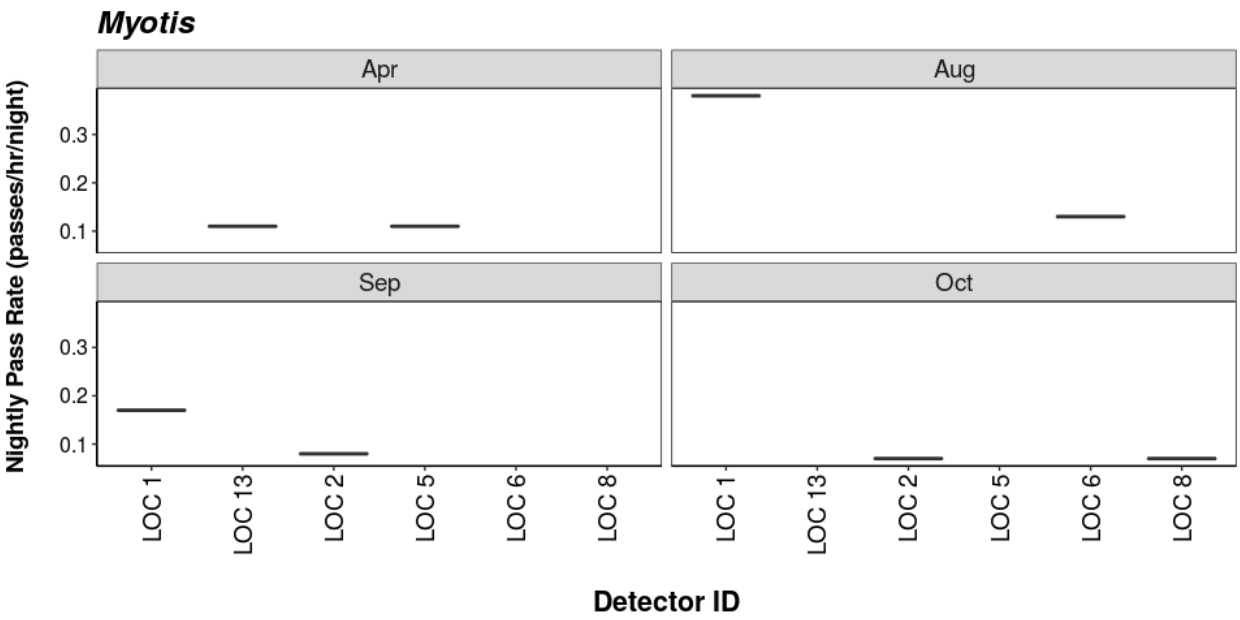
Species	Detector ID	Apr	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	NA	0.3	1.1	NA	0.2
Common pipistrelle	LOC 11	0.1	NA	NA	NA	NA
Common pipistrelle	LOC 13	NA	0.1	0.4	NA	0.5
Common pipistrelle	LOC 2	NA	0.3	0.6	NA	0.1
Common pipistrelle	LOC 3	NA	NA	0.2	NA	NA
Common pipistrelle	LOC 4	NA	NA	0.1	NA	NA

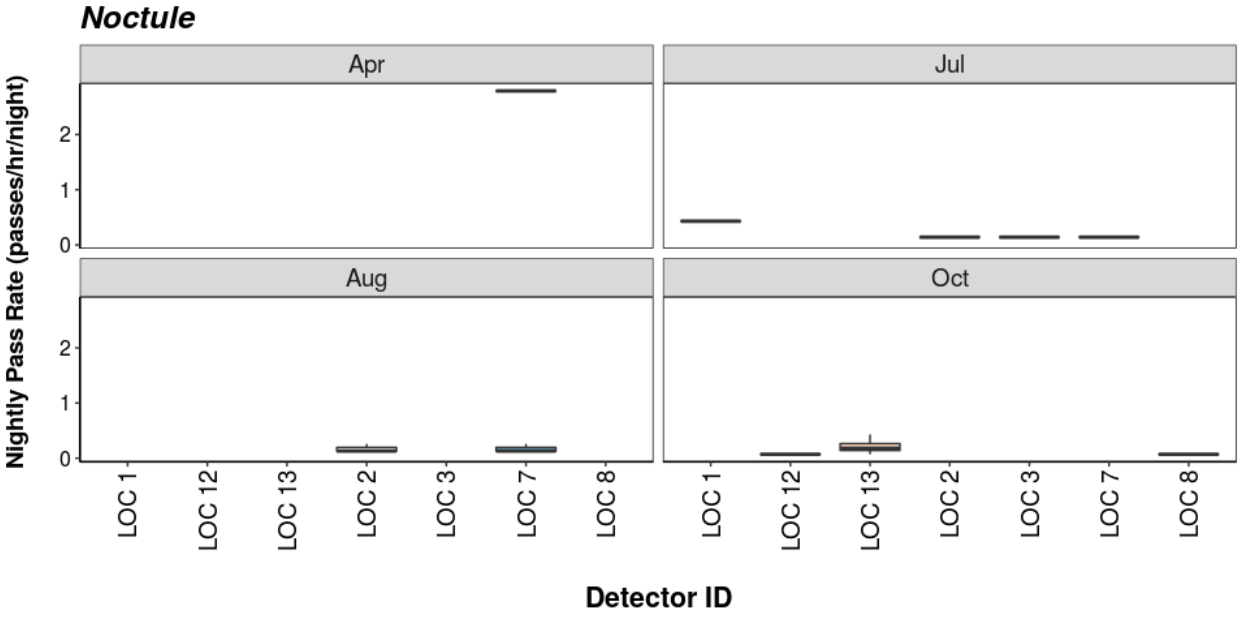
Common pipistrelle	LOC 5	NA	0.2	0.1	NA	NA
Common pipistrelle	LOC 6	0.1	NA	NA	NA	0.2
Common pipistrelle	LOC 7	NA	NA	NA	NA	0.4
Soprano pipistrelle	LOC 1	NA	0.1	0.2	NA	0.2
Soprano pipistrelle	LOC 13	NA	0.1	NA	NA	0.3
Soprano pipistrelle	LOC 2	NA	NA	0.2	NA	0.1
Soprano pipistrelle	LOC 3	NA	NA	0.3	NA	NA
Soprano pipistrelle	LOC 5	NA	0.1	NA	NA	NA
Noctule	LOC 1	NA	0.4	NA	NA	NA
Noctule	LOC 12	NA	NA	NA	NA	0.1
Noctule	LOC 13	NA	NA	NA	NA	0.2
Noctule	LOC 2	NA	0.1	0.2	NA	NA
Noctule	LOC 3	NA	0.1	NA	NA	NA
Noctule	LOC 7	2.8	0.1	0.2	NA	NA
Noctule	LOC 8	NA	NA	NA	NA	0.1
Brown long-eared	LOC 2	NA	NA	NA	0.2	NA
Brown long-eared	LOC 3	NA	0.4	0.1	NA	NA
Myotis	LOC 1	NA	NA	0.4	0.2	NA
Myotis	LOC 13	0.1	NA	NA	NA	NA
Myotis	LOC 2	NA	NA	NA	0.1	0.1
Myotis	LOC 5	0.1	NA	NA	NA	NA
Myotis	LOC 6	NA	NA	0.1	NA	NA
Myotis	LOC 8	NA	NA	NA	NA	0.1

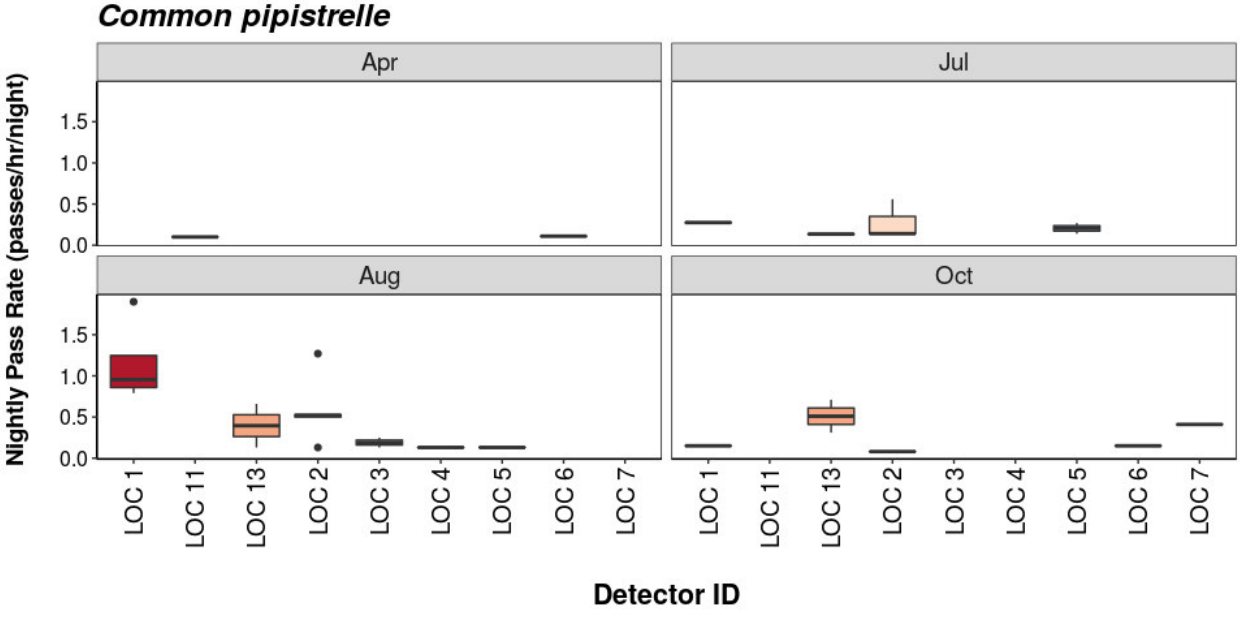
17.1 Nightly Bat Pass Rate for each Month

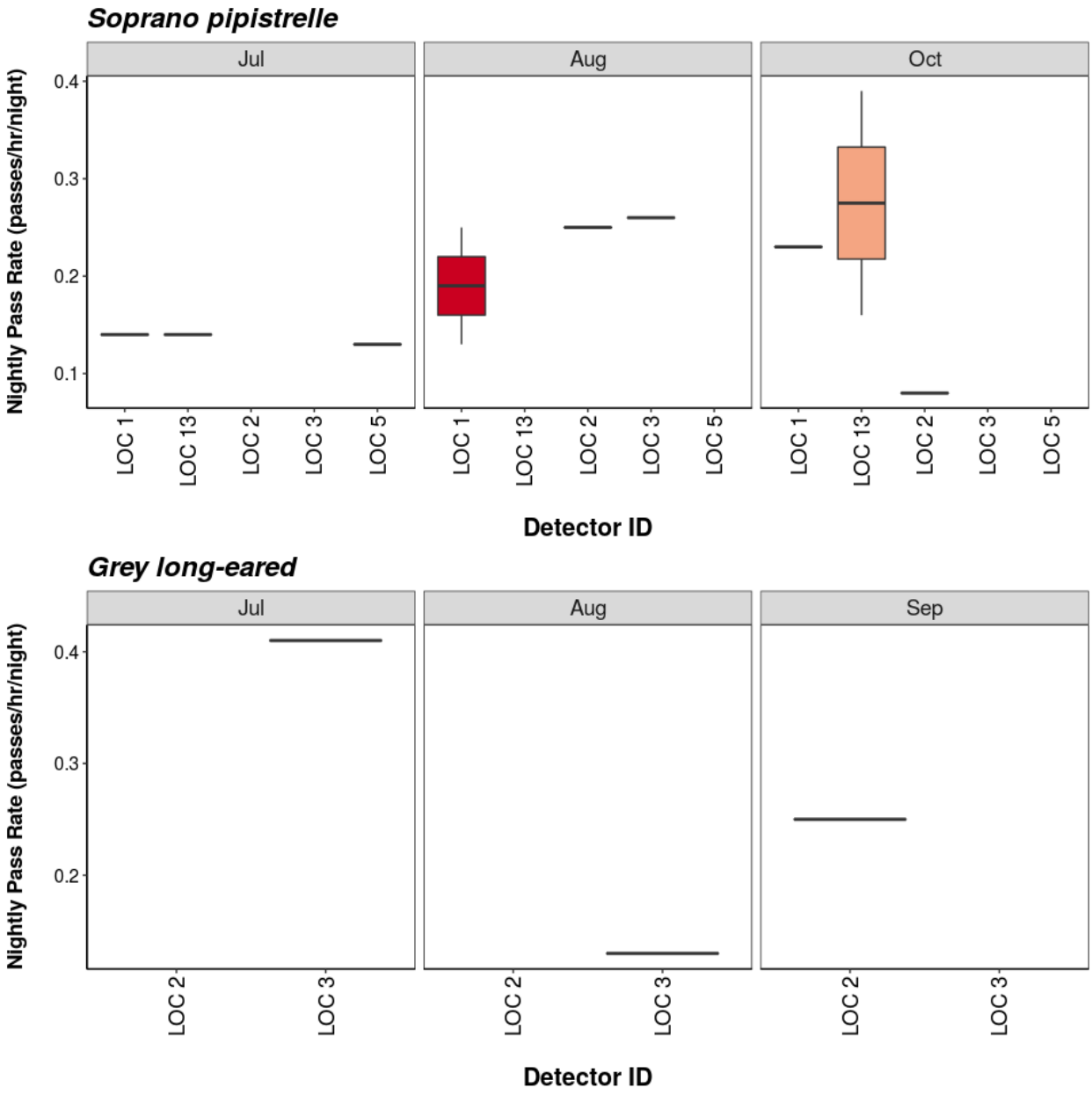
17.2 Per Detector - Figures

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.


Myotis
Apr
Aug
Sep
Oct
Nightly Pass Rate (passes/hr/night)
0.3
0.2
0.1
LOC 1
LOC 13
LOC 2
LOC 5
LOC 6
LOC 8
Detector ID


Noctule
Apr
Jul
Aug
Oct
Nightly Pass Rate (passes/hr/night)
2
1
0
LOC 1
LOC 12
LOC 13
LOC 2
LOC 3
LOC 7
LOC 8
Detector ID


Common pipistrelle
Apr
Jul
Aug
Oct
Nightly Pass Rate (passes/hr/night)
1.5
1.0
0.5
0.0
LOC 1
LOC 11
LOC 13
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
Detector ID



18 BAT ACTIVITY PER DETECTOR LOCATION

Figure 13. Detector ID reference:

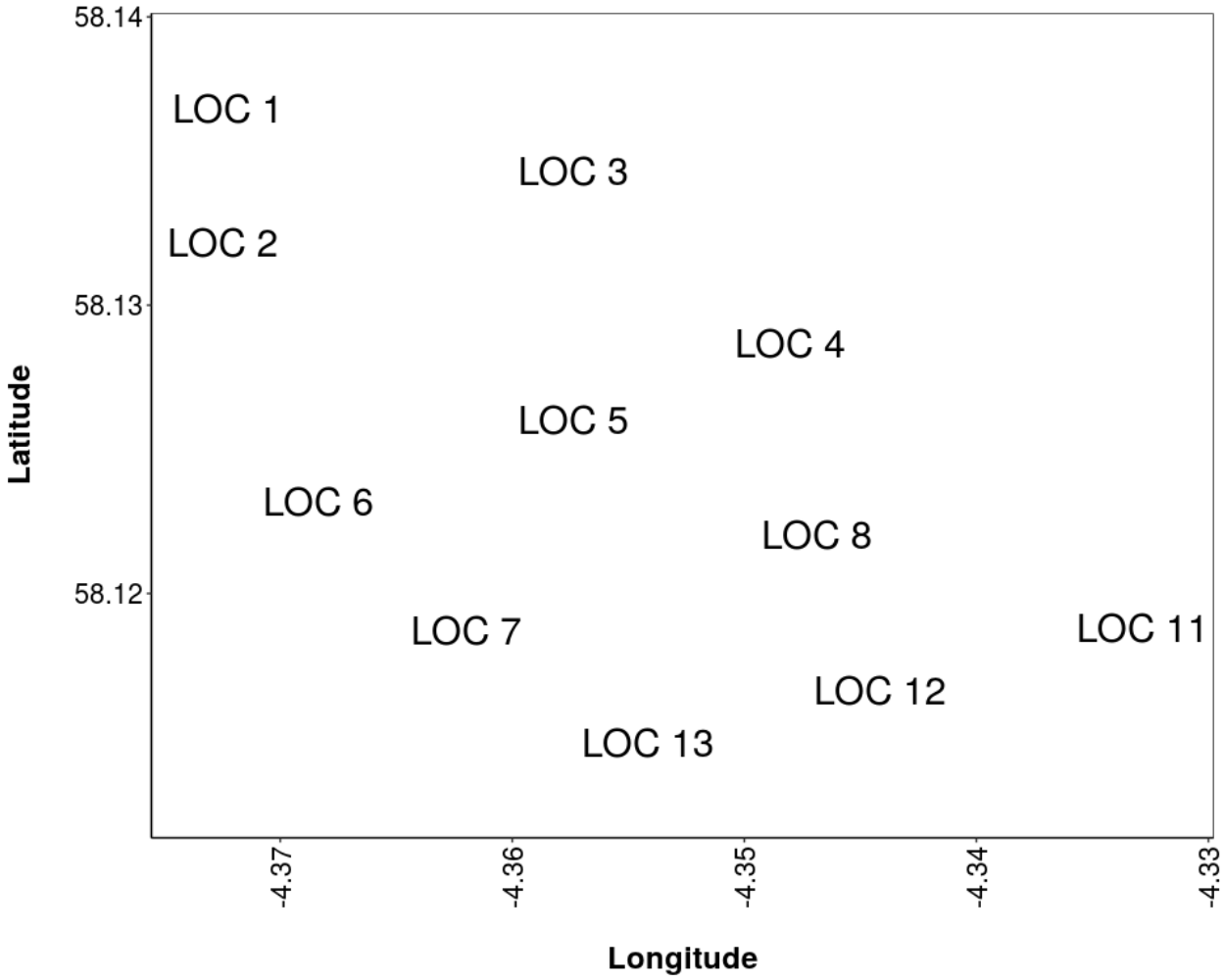


Figure 14. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

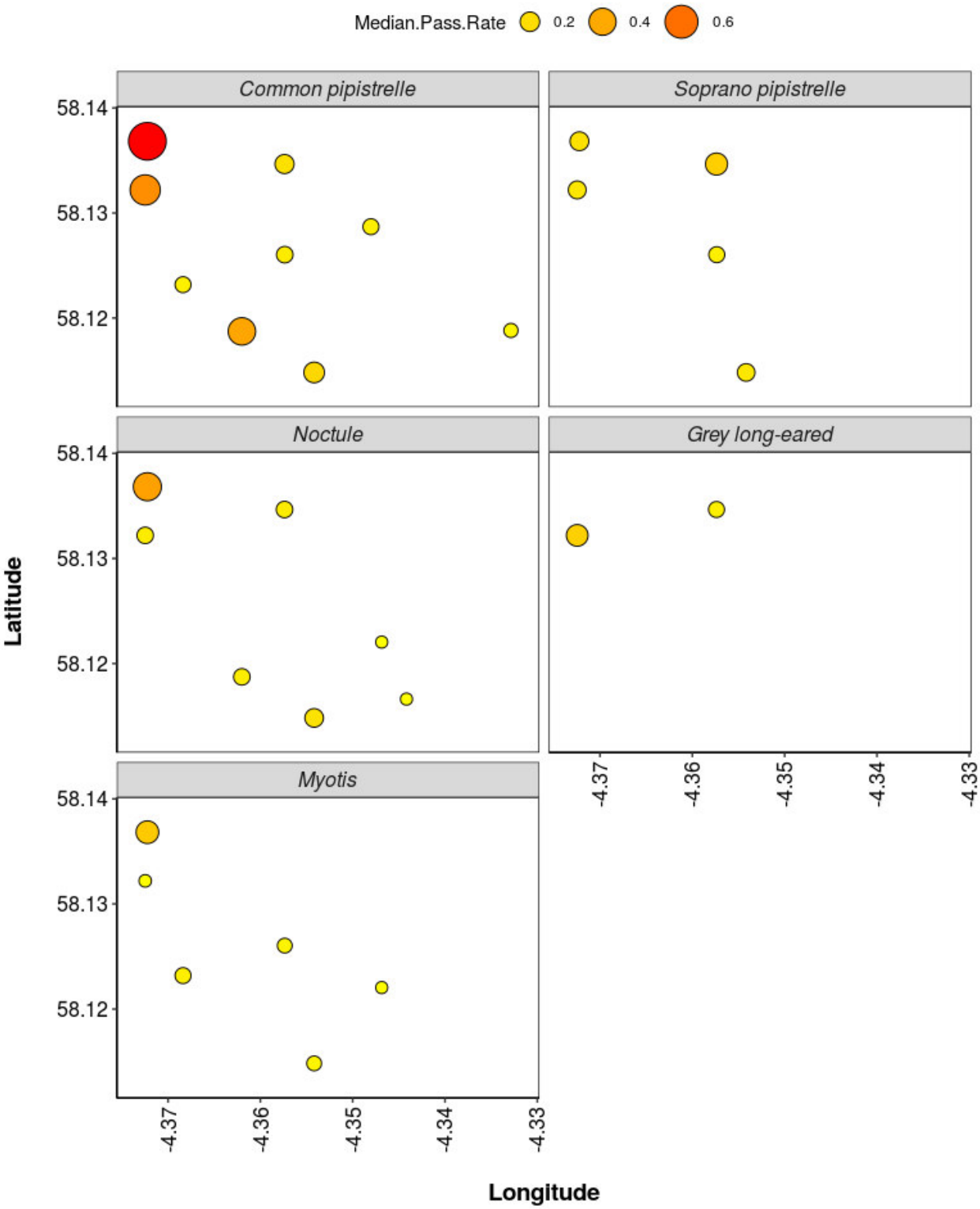
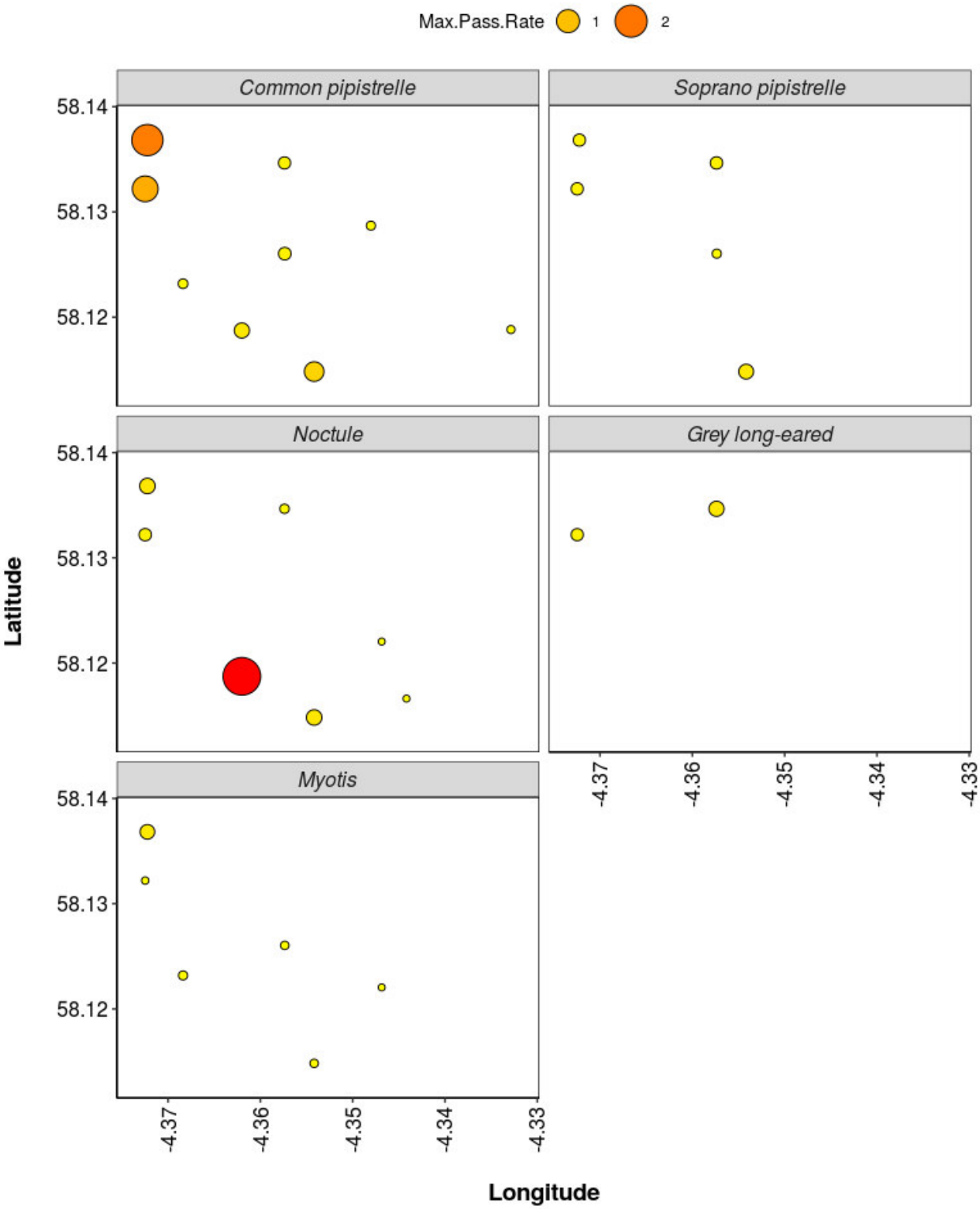


Figure 15. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



18.1 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.

18.2 Nightly Bat Pass Rate (Bat passes per hour)

19 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
Common pipistrelle	LOC 1	0.3
Common pipistrelle	LOC 11	0.1
Common pipistrelle	LOC 12	0.0
Common pipistrelle	LOC 13	0.0
Common pipistrelle	LOC 2	0.1
Common pipistrelle	LOC 3	0.0
Common pipistrelle	LOC 4	0.1
Common pipistrelle	LOC 5	0.1
Common pipistrelle	LOC 6	0.1
Common pipistrelle	LOC 7	0.0
Common pipistrelle	LOC 8	0.0
Brown long-eared	LOC 1	0.0
Brown long-eared	LOC 11	0.0
Brown long-eared	LOC 12	0.0
Brown long-eared	LOC 13	0.0
Brown long-eared	LOC 2	0.0
Brown long-eared	LOC 3	0.1
Brown long-eared	LOC 4	0.0
Brown long-eared	LOC 5	0.0
Brown long-eared	LOC 6	0.0
Brown long-eared	LOC 7	0.0
Brown long-eared	LOC 8	0.0
Myotis	LOC 1	0.0
Myotis	LOC 11	0.0
Myotis	LOC 12	0.0
Myotis	LOC 13	0.0
Myotis	LOC 2	0.0
Myotis	LOC 3	0.0
Myotis	LOC 4	0.0

Myotis	LOC 5	0.0
Myotis	LOC 6	0.0
Myotis	LOC 7	0.0
Myotis	LOC 8	0.1
Noctule	LOC 1	0.0
Noctule	LOC 11	0.0
Noctule	LOC 12	0.1
Noctule	LOC 13	0.0
Noctule	LOC 2	0.0
Noctule	LOC 3	0.0
Noctule	LOC 4	0.0
Noctule	LOC 5	0.0
Noctule	LOC 6	0.0
Noctule	LOC 7	0.1
Noctule	LOC 8	0.1
Soprano pipistrelle	LOC 1	0.0
Soprano pipistrelle	LOC 11	0.0
Soprano pipistrelle	LOC 12	0.0
Soprano pipistrelle	LOC 13	0.0
Soprano pipistrelle	LOC 2	0.0
Soprano pipistrelle	LOC 3	0.0
Soprano pipistrelle	LOC 4	0.0
Soprano pipistrelle	LOC 5	0.0
Soprano pipistrelle	LOC 6	0.0
Soprano pipistrelle	LOC 7	0.0
Soprano pipistrelle	LOC 8	0.0

19.1 Nightly Bat Pass Rate (Bat passes per hour)

20 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
Common pipistrelle	LOC 1	0.5
Common pipistrelle	LOC 11	0.1
Common pipistrelle	LOC 12	0.0
Common pipistrelle	LOC 13	0.1
Common pipistrelle	LOC 2	0.3

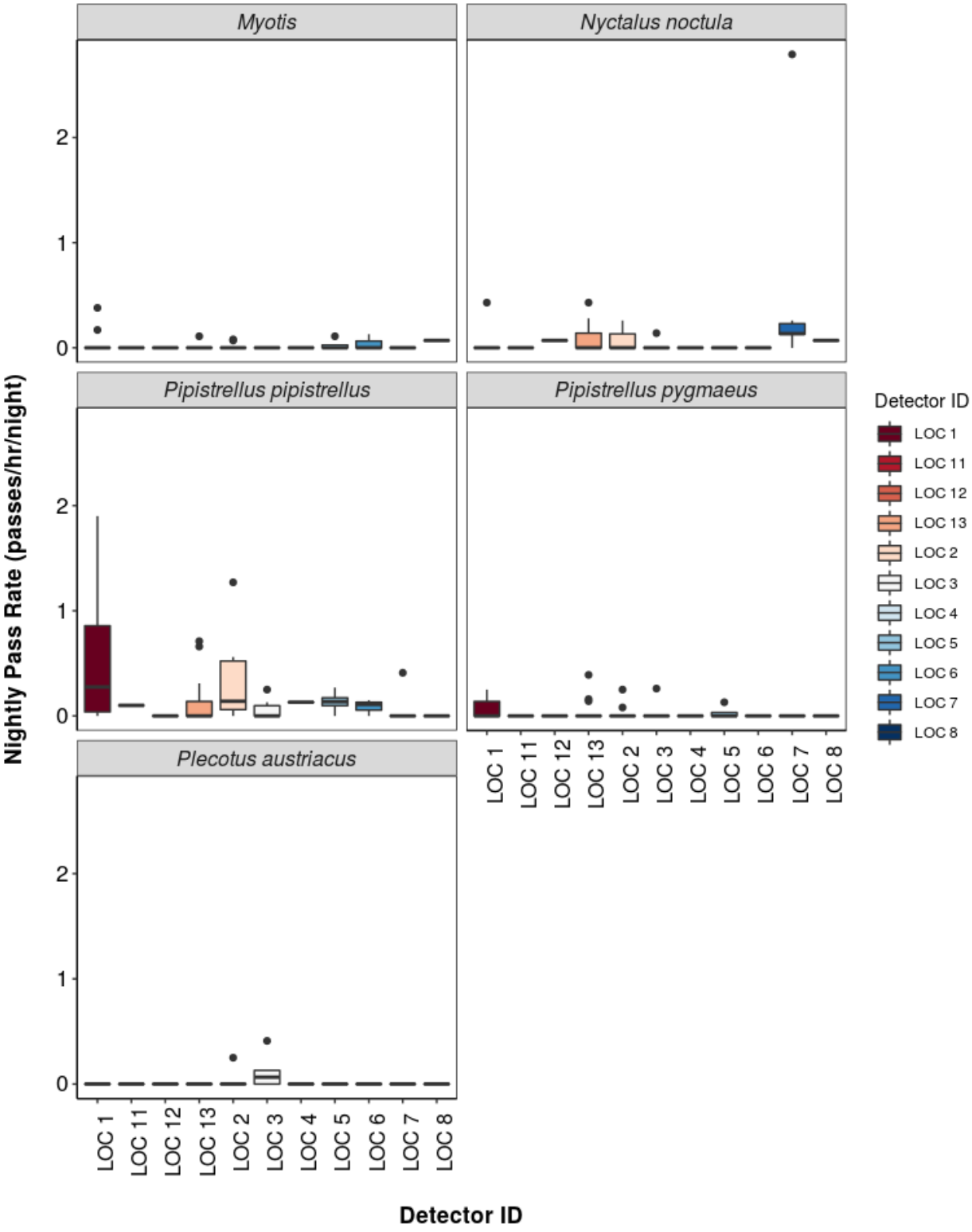
Common pipistrelle	LOC 3	0.1
Common pipistrelle	LOC 4	0.1
Common pipistrelle	LOC 5	0.1
Common pipistrelle	LOC 6	0.1
Common pipistrelle	LOC 7	0.1
Common pipistrelle	LOC 8	0.0
Brown long-eared	LOC 1	0.0
Brown long-eared	LOC 11	0.0
Brown long-eared	LOC 12	0.0
Brown long-eared	LOC 13	0.0
Brown long-eared	LOC 2	0.0
Brown long-eared	LOC 3	0.1
Brown long-eared	LOC 4	0.0
Brown long-eared	LOC 5	0.0
Brown long-eared	LOC 6	0.0
Brown long-eared	LOC 7	0.0
Brown long-eared	LOC 8	0.0
Myotis	LOC 1	0.1
Myotis	LOC 11	0.0
Myotis	LOC 12	0.0
Myotis	LOC 13	0.0
Myotis	LOC 2	0.0
Myotis	LOC 3	0.0
Myotis	LOC 4	0.0
Myotis	LOC 5	0.0
Myotis	LOC 6	0.0
Myotis	LOC 7	0.0
Myotis	LOC 8	0.1
Noctule	LOC 1	0.0
Noctule	LOC 11	0.0
Noctule	LOC 12	0.1
Noctule	LOC 13	0.1
Noctule	LOC 2	0.1
Noctule	LOC 3	0.0
Noctule	LOC 4	0.0
Noctule	LOC 5	0.0
Noctule	LOC 6	0.0
Noctule	LOC 7	0.6
Noctule	LOC 8	0.1
Soprano pipistrelle	LOC 1	0.1

Soprano pipistrelle	LOC 11	0.0
Soprano pipistrelle	LOC 12	0.0
Soprano pipistrelle	LOC 13	0.0
Soprano pipistrelle	LOC 2	0.0
Soprano pipistrelle	LOC 3	0.0
Soprano pipistrelle	LOC 4	0.0
Soprano pipistrelle	LOC 5	0.0
Soprano pipistrelle	LOC 6	0.0
Soprano pipistrelle	LOC 7	0.0
Soprano pipistrelle	LOC 8	0.0

21 NIGHTLY BAT PASSES (BAT PASSES PER HOUR)

21.1 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.



22 SURVEY EFFORT

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

Month	Detector ID	No of Survey Nights
Apr	LOC 11	1
Apr	LOC 13	1
Apr	LOC 5	1

Apr	LOC 6	1
Apr	LOC 7	1
Jul	LOC 1	4
Jul	LOC 13	3
Jul	LOC 2	3
Jul	LOC 3	2
Jul	LOC 5	2
Jul	LOC 7	1
Aug	LOC 1	4
Aug	LOC 13	2
Aug	LOC 2	5
Aug	LOC 3	4
Aug	LOC 4	2
Aug	LOC 5	1
Aug	LOC 6	1
Aug	LOC 7	3
Sep	LOC 1	1
Sep	LOC 2	2
Oct	LOC 1	1
Oct	LOC 12	1
Oct	LOC 13	8
Oct	LOC 2	2
Oct	LOC 6	1
Oct	LOC 7	1
Oct	LOC 8	1

22.1 Nightly Bat Pass Rate for each Month

23 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	Apr	Aug	Jul	Oct	Sep
Common pipistrelle	LOC 1	NA	1.0	0.1	0.2	0.0
Common pipistrelle	LOC 11	0.1	NA	NA	NA	NA
Common pipistrelle	LOC 12	NA	NA	NA	0.0	NA
Common pipistrelle	LOC 13	0.0	0.4	0.1	0.0	NA

Common pipistrelle	LOC 2	NA	0.5	0.1	0.0	0.0
Common pipistrelle	LOC 3	NA	0.1	0.0	NA	NA
Common pipistrelle	LOC 4	NA	0.1	NA	NA	NA
Common pipistrelle	LOC 5	0.0	0.1	0.2	NA	NA
Common pipistrelle	LOC 6	0.1	0.0	NA	0.2	NA
Common pipistrelle	LOC 7	0.0	0.0	0.0	0.4	NA
Common pipistrelle	LOC 8	NA	NA	NA	0.0	NA
Brown long-eared	LOC 1	NA	0.0	0.0	0.0	0.0
Brown long-eared	LOC 11	0.0	NA	NA	NA	NA
Brown long-eared	LOC 12	NA	NA	NA	0.0	NA
Brown long-eared	LOC 13	0.0	0.0	0.0	0.0	NA
Brown long-eared	LOC 2	NA	0.0	0.0	0.0	0.1
Brown long-eared	LOC 3	NA	0.1	0.2	NA	NA
Brown long-eared	LOC 4	NA	0.0	NA	NA	NA
Brown long-eared	LOC 5	0.0	0.0	0.0	NA	NA
Brown long-eared	LOC 6	0.0	0.0	NA	0.0	NA
Brown long-eared	LOC 7	0.0	0.0	0.0	0.0	NA
Brown long-eared	LOC 8	NA	NA	NA	0.0	NA
Myotis	LOC 1	NA	0.0	0.0	0.0	0.2
Myotis	LOC 11	0.0	NA	NA	NA	NA
Myotis	LOC 12	NA	NA	NA	0.0	NA
Myotis	LOC 13	0.1	0.0	0.0	0.0	NA
Myotis	LOC 2	NA	0.0	0.0	0.0	0.0
Myotis	LOC 3	NA	0.0	0.0	NA	NA
Myotis	LOC 4	NA	0.0	NA	NA	NA
Myotis	LOC 5	0.1	0.0	0.0	NA	NA
Myotis	LOC 6	0.0	0.1	NA	0.0	NA
Myotis	LOC 7	0.0	0.0	0.0	0.0	NA
Myotis	LOC 8	NA	NA	NA	0.1	NA
Noctule	LOC 1	NA	0.0	0.0	0.0	0.0
Noctule	LOC 11	0.0	NA	NA	NA	NA
Noctule	LOC 12	NA	NA	NA	0.1	NA
Noctule	LOC 13	0.0	0.0	0.0	0.1	NA
Noctule	LOC 2	NA	0.1	0.1	0.0	0.0
Noctule	LOC 3	NA	0.0	0.1	NA	NA
Noctule	LOC 4	NA	0.0	NA	NA	NA
Noctule	LOC 5	0.0	0.0	0.0	NA	NA
Noctule	LOC 6	0.0	0.0	NA	0.0	NA
Noctule	LOC 7	2.8	0.1	0.1	0.0	NA
Noctule	LOC 8	NA	NA	NA	0.1	NA

Soprano pipistrelle	LOC 1	NA	0.1	0.0	0.2	0.0
Soprano pipistrelle	LOC 11	0.0	NA	NA	NA	NA
Soprano pipistrelle	LOC 12	NA	NA	NA	0.0	NA
Soprano pipistrelle	LOC 13	0.0	0.0	0.0	0.0	NA
Soprano pipistrelle	LOC 2	NA	0.0	0.0	0.0	0.0
Soprano pipistrelle	LOC 3	NA	0.0	0.0	NA	NA
Soprano pipistrelle	LOC 4	NA	0.0	NA	NA	NA
Soprano pipistrelle	LOC 5	0.0	0.0	0.1	NA	NA
Soprano pipistrelle	LOC 6	0.0	0.0	NA	0.0	NA
Soprano pipistrelle	LOC 7	0.0	0.0	0.0	0.0	NA
Soprano pipistrelle	LOC 8	NA	NA	NA	0.0	NA

23.1 Nightly Bat Pass Rate for each Month

24 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	Apr	Aug	Jul	Oct	Sep
Common pipistrelle	LOC 1	NA	1.1	0.1	0.2	0.0
Common pipistrelle	LOC 11	0.1	NA	NA	NA	NA
Common pipistrelle	LOC 12	NA	NA	NA	0.0	NA
Common pipistrelle	LOC 13	0.0	0.4	0.1	0.1	NA
Common pipistrelle	LOC 2	NA	0.6	0.3	0.0	0.0
Common pipistrelle	LOC 3	NA	0.1	0.0	NA	NA
Common pipistrelle	LOC 4	NA	0.1	NA	NA	NA
Common pipistrelle	LOC 5	0.0	0.1	0.2	NA	NA
Common pipistrelle	LOC 6	0.1	0.0	NA	0.2	NA
Common pipistrelle	LOC 7	0.0	0.0	0.0	0.4	NA
Common pipistrelle	LOC 8	NA	NA	NA	0.0	NA
Brown long-eared	LOC 1	NA	0.0	0.0	0.0	0.0
Brown long-eared	LOC 11	0.0	NA	NA	NA	NA
Brown long-eared	LOC 12	NA	NA	NA	0.0	NA
Brown long-eared	LOC 13	0.0	0.0	0.0	0.0	NA
Brown long-eared	LOC 2	NA	0.0	0.0	0.0	0.1
Brown long-eared	LOC 3	NA	0.1	0.2	NA	NA
Brown long-eared	LOC 4	NA	0.0	NA	NA	NA
Brown long-eared	LOC 5	0.0	0.0	0.0	NA	NA
Brown long-eared	LOC 6	0.0	0.0	NA	0.0	NA

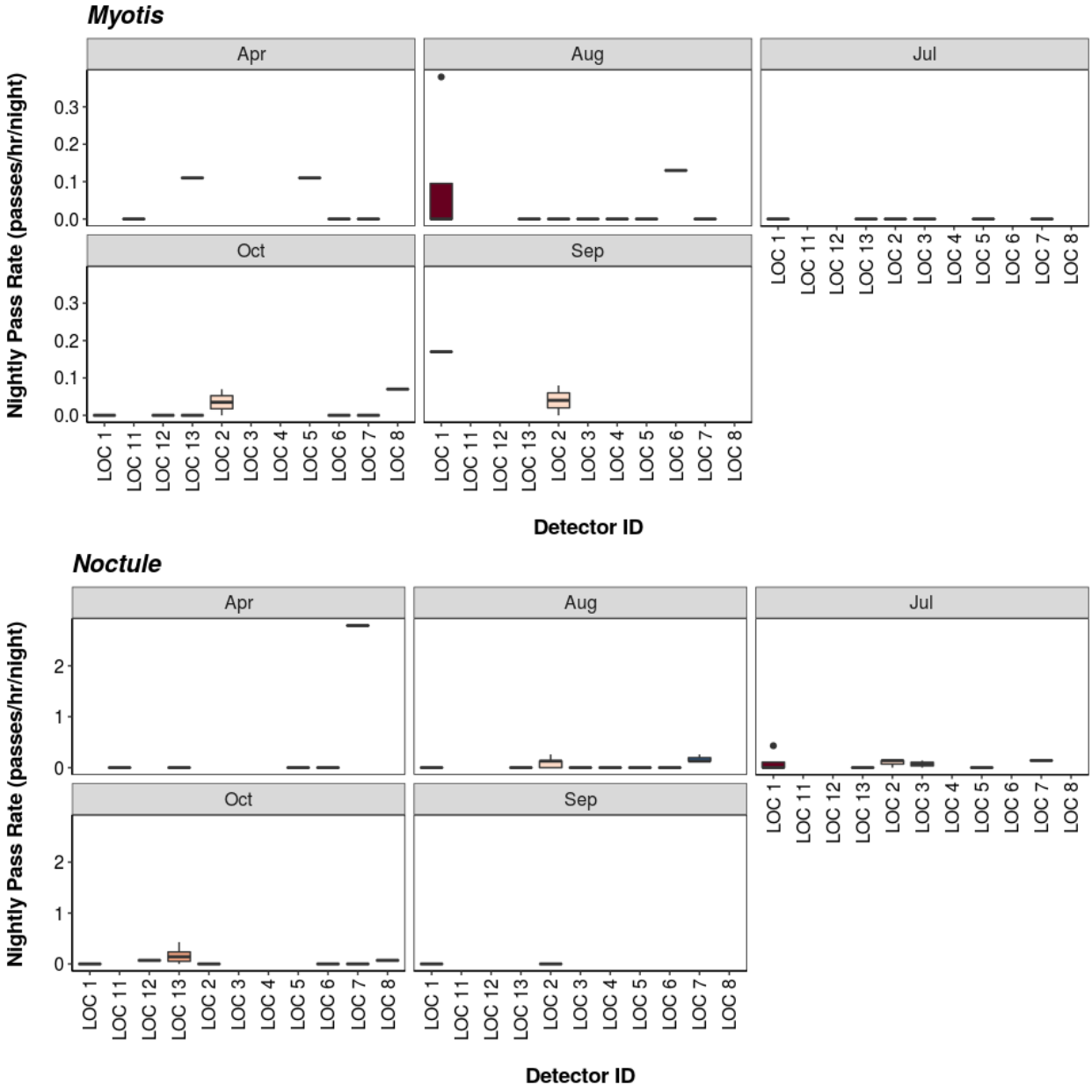
Brown long-eared	LOC 7	0.0	0.0	0.0	0.0	NA
Brown long-eared	LOC 8	NA	NA	NA	0.0	NA
Myotis	LOC 1	NA	0.1	0.0	0.0	0.2
Myotis	LOC 11	0.0	NA	NA	NA	NA
Myotis	LOC 12	NA	NA	NA	0.0	NA
Myotis	LOC 13	0.1	0.0	0.0	0.0	NA
Myotis	LOC 2	NA	0.0	0.0	0.0	0.0
Myotis	LOC 3	NA	0.0	0.0	NA	NA
Myotis	LOC 4	NA	0.0	NA	NA	NA
Myotis	LOC 5	0.1	0.0	0.0	NA	NA
Myotis	LOC 6	0.0	0.1	NA	0.0	NA
Myotis	LOC 7	0.0	0.0	0.0	0.0	NA
Myotis	LOC 8	NA	NA	NA	0.1	NA
Noctule	LOC 1	NA	0.0	0.1	0.0	0.0
Noctule	LOC 11	0.0	NA	NA	NA	NA
Noctule	LOC 12	NA	NA	NA	0.1	NA
Noctule	LOC 13	0.0	0.0	0.0	0.2	NA
Noctule	LOC 2	NA	0.1	0.1	0.0	0.0
Noctule	LOC 3	NA	0.0	0.1	NA	NA
Noctule	LOC 4	NA	0.0	NA	NA	NA
Noctule	LOC 5	0.0	0.0	0.0	NA	NA
Noctule	LOC 6	0.0	0.0	NA	0.0	NA
Noctule	LOC 7	2.8	0.2	0.1	0.0	NA
Noctule	LOC 8	NA	NA	NA	0.1	NA
Soprano pipistrelle	LOC 1	NA	0.1	0.0	0.2	0.0
Soprano pipistrelle	LOC 11	0.0	NA	NA	NA	NA
Soprano pipistrelle	LOC 12	NA	NA	NA	0.0	NA
Soprano pipistrelle	LOC 13	0.0	0.0	0.0	0.1	NA
Soprano pipistrelle	LOC 2	NA	0.0	0.0	0.0	0.0
Soprano pipistrelle	LOC 3	NA	0.1	0.0	NA	NA
Soprano pipistrelle	LOC 4	NA	0.0	NA	NA	NA
Soprano pipistrelle	LOC 5	0.0	0.0	0.1	NA	NA
Soprano pipistrelle	LOC 6	0.0	0.0	NA	0.0	NA
Soprano pipistrelle	LOC 7	0.0	0.0	0.0	0.0	NA
Soprano pipistrelle	LOC 8	NA	NA	NA	0.0	NA

24.1 Nightly Bat Pass Rate for each Month

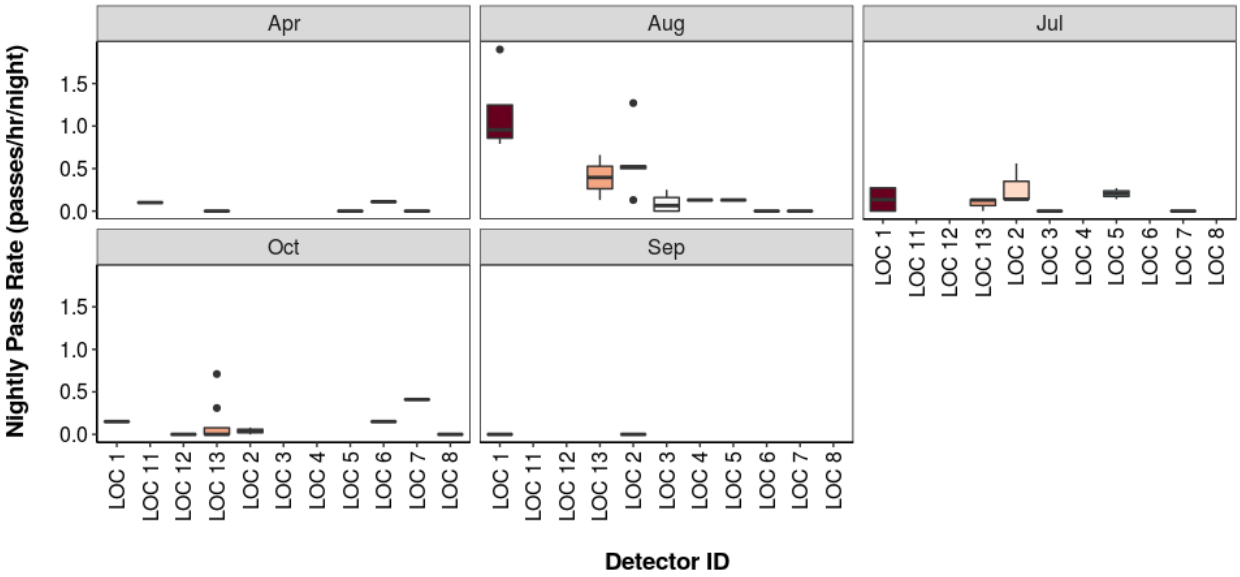
24.2 Per Detector - Figures

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

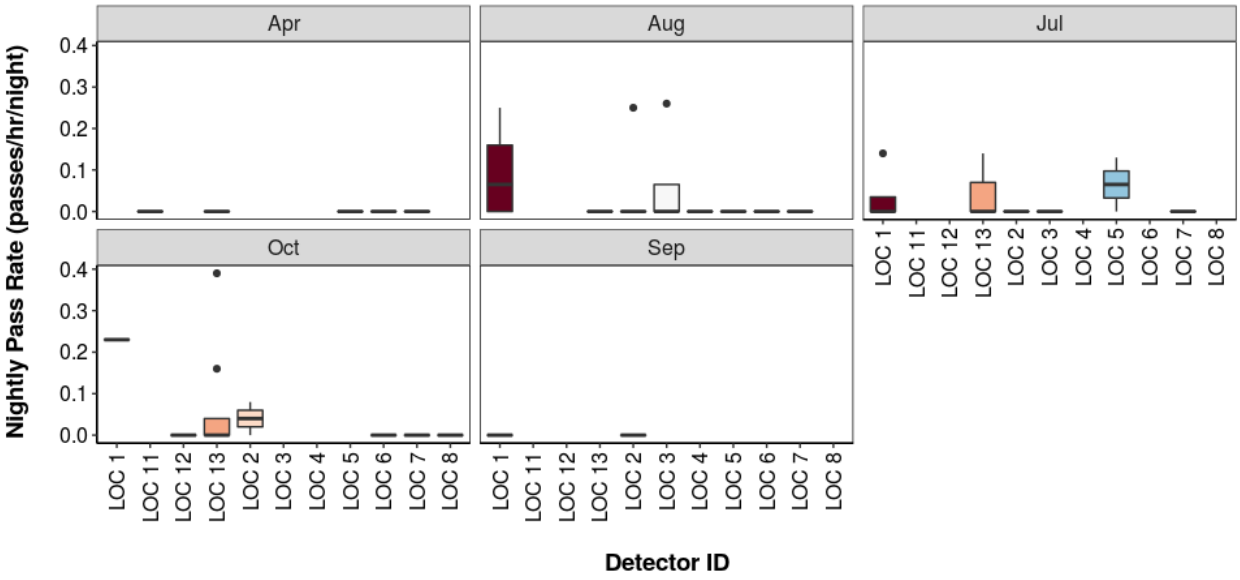
line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. 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.



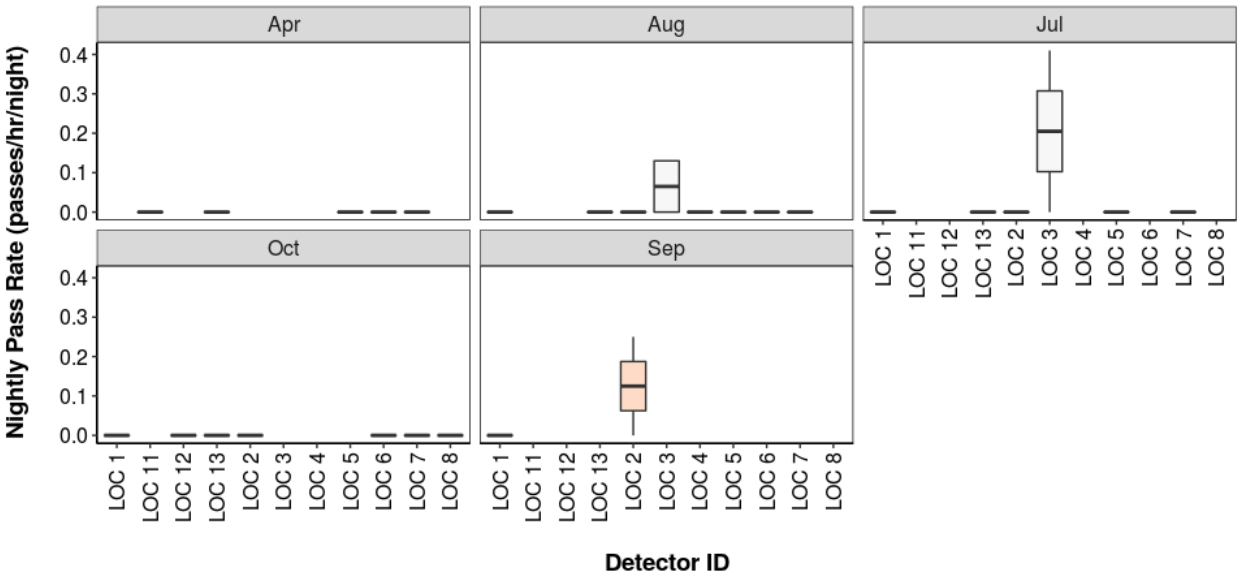
Common pipistrelle



Soprano pipistrelle



Grey long-eared



25 BAT ACTIVITY PER DETECTOR LOCATION

Figure 18. Detector ID reference:

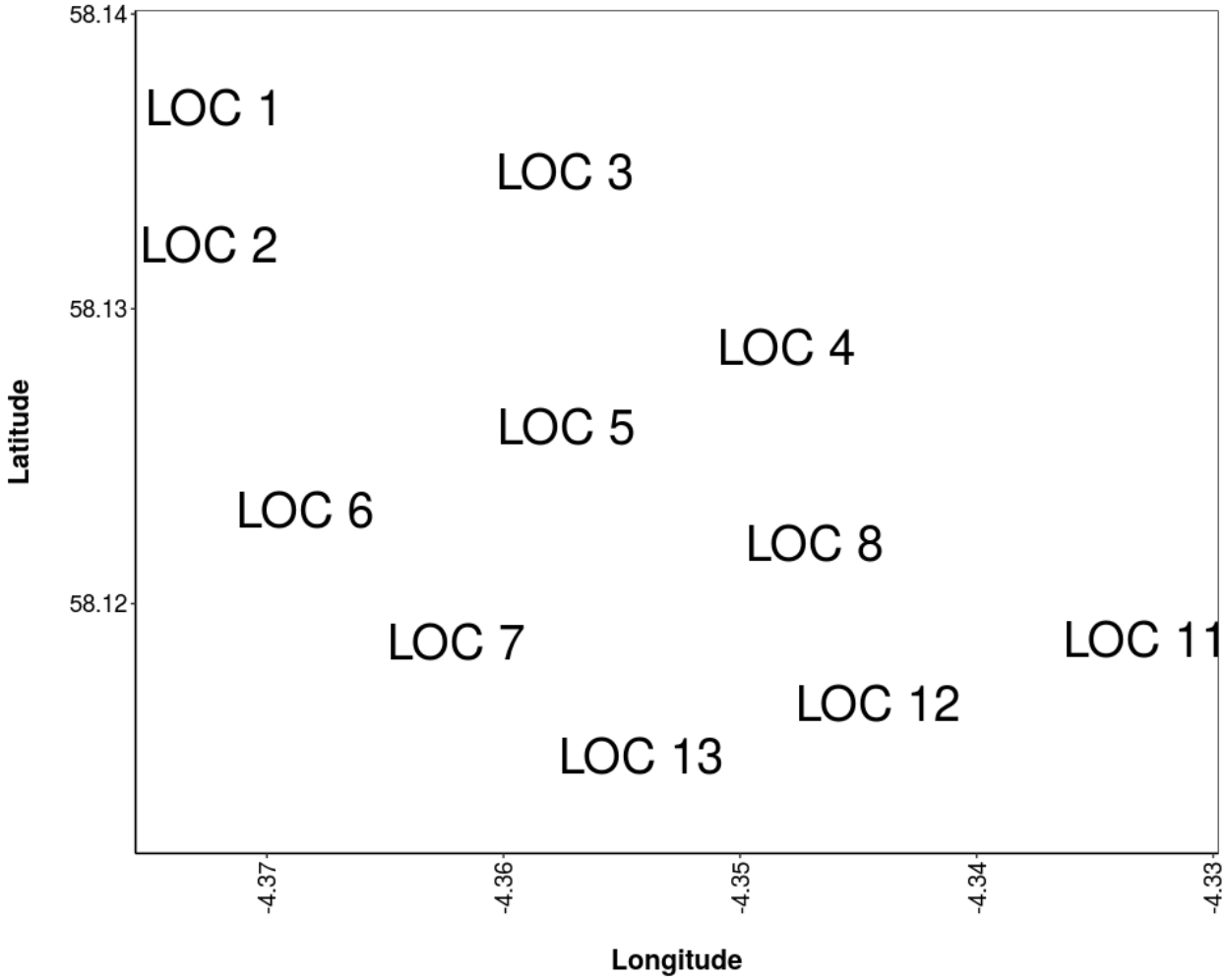


Figure 19. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

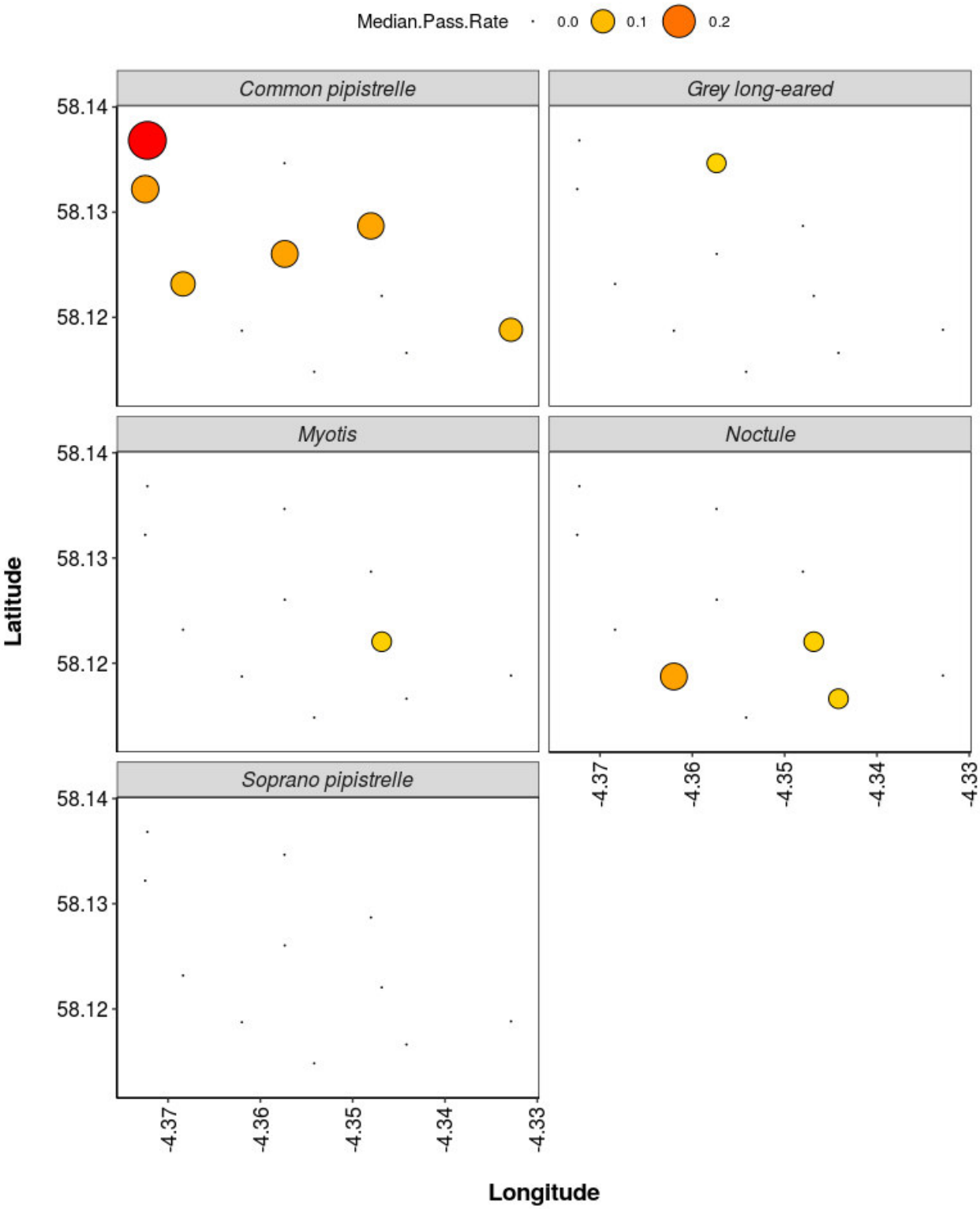
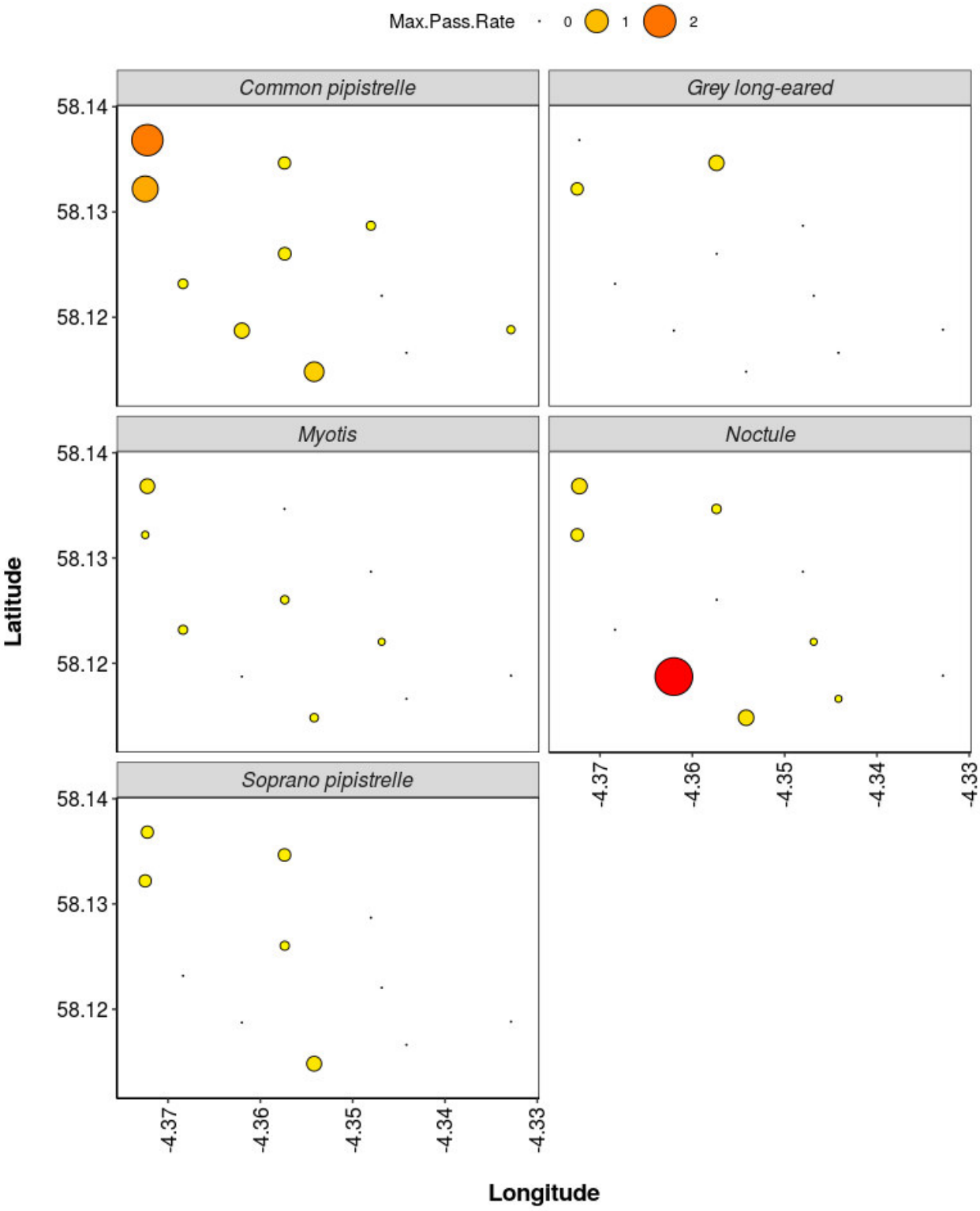


Figure 20. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



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