Hollandmey Renewable Energy Development

Environmental Impact Assessment Report

Technical Appendix 8.3: Bats

avianecology

CONTENTS

ANNEXES

1 INTRODUCTION

1.1.1 This Technical Appendix has been prepared to accompany **Chapter 8: Ecology and Biodiversity,** of the Hollandmey Renewable Energy Development (RED) (hereafter the 'proposed Development') Environmental Impact Assessment (EIA) Report.

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 specific figures, presented in **Volume 3** of the EIA Report:

- **Figure 8.1** – Designated Sites for Nature Conservation;
- **Figure 8.6** – Bat Activity Survey Plan; and,
- **Figure 8.7** – Bat Roost Survey Plan.

1.2 Site Overview

1.2.1 The Site is located approximately 8 km to the south east of Dunnet Head in Caithness, Scotland. The Hamlet of Mey lies to the north of the Site.

1.2.2 The Site largely comprises compartments of commercial forestry plantation woodland, interspersed with areas of bog, heathland and grassland habitats, which are grazed in parts with sheep and cattle. The surrounding landscape comprises similar open ground used for rough grazing.

1.2.3 The Site is also intersected by a number of ditches and small shallow burns together with the Link Burn and Burn of Hollandmey, which comprise the most substantial watercourses flowing through the Site. The Phillips Mains Mire Site of Special Scientific Interest (SSSI), designated by virtue of its blanket bog and dubh lochan interests, occupies the north eastern extent of the Site.

1.2.4 A small number of agricultural buildings are also located within the Site.

2 METHODOLOGY

2.1.1 The approach to baseline information gathering with regards to bats has been undertaken with reference to current NatureScot guidance 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation' (SNH, 2019)[1].

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

2.2 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:

[1] SNH (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

- Aerial imagery and Ordinance 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 Site 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 Site, including species and roost records, obtained from the following key sources;

    - Records request to the Highland Biological Recording Group (HBRG);

    - EIA documentation for the adjacent Lochend (The Highland Council (THC) Planning Ref. 3/02682/FUL), Stroupster (THC Planning Ref. 05/00273/FULCA), Slickly (THC Planning Ref. 19/05624/FUL) and Lyth (THC Planning Ref. 3/01832/FUL) Wind Farms as available from THC ePlanning website[3];

- A review of the Sites location in relation to species known ranges in Scotland, with reference to the most recent UK Habitats Directive[4] Article 17 Report[5]; and,

- The location of other wind farm developments, including the number of turbines and their size within 10 km of the Site through a review of THC 'Wind Turbine Map'[6].

2.3 Field Surveys

2.3.1 The aims of baseline field surveys for bats were to establish the bat species assemblage using the Site, the spatial and temporal distribution of bat activity within the Site, 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.

2.3.2 The following surveys have been completed:

- Habitat Assessment;

- Ground-level Static Bat Activity Surveys; and,

- Roost Surveys.

Habitat Assessment

2.3.3 An initial habitat assessment of the Site was undertaken on 25 May 2020 to appraise the potential value of habitats within the Site for commuting and foraging bats, using the criteria detailed within Bat Conservation Trust (BCT) guidance (Collins, 2016).

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 Site. The assessment was undertaken by Mr M.

[2] https://sitelink.nature.scot/home [Accessed April 2020].
[3] No publicly available relevant documentation is available for the refused Tresdale Wind Farm located to the north east of the Site.
[4]Council Directive 92/43/EEC.
[5]https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-terrestrial [Accessed April 2020].
[6]https://highland.maps.arcgis.com/apps/webappviewer/index.html?id=5ec04b13a9b049f798cadbd5055f1787 [Accessed April 2020].

Wood, a suitably competent ecologists with considerable experience of undertaking bat activity surveys for proposed wind farm developments, at comparable sites across Scotland.

Ground-level Static Surveys

2.3.5 Bat activity surveys, comprising ground-level static surveys were undertaken in the spring (April to May), summer (June to mid-August) and autumn (mid-August to October) bat activity periods in accordance with NatureScot guidance (SNH, 2019).

2.3.6 The survey methodology employed the use of automated monitoring stations (MSs), each consisting of a 'Song Meter SM4 Acoustic Recorder', fitted with a single omnidirectional microphone and attached to a 1 m high wooden stake. Bat activity generated was based on a full spectrum analysis of the captured sound files.

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

2.3.8 In accordance with NatureScot guidance (SNH, 2019), the proposed Development comprising a ten turbine scheme, requires the use of ten automated monitoring stations. A total of 12 monitoring stations were however deployed, based on an anticipated 15 turbine scheme applicable at the time of survey commencement (**Figure 8.6** of the EIA Report).

2.3.9 In the absence of a final turbine layout, the locations of automated monitoring stations were focused in parts of the Site where turbines were most likely to be located. Placement also considered minimum mitigation requirements for bats, including habitat feature setback distances, as outlined within current NatureScot guidance (SNH, 2019), whilst ensuring a representative sampling of activity within different habitat types of potential interest to bats within the Site was obtained.

2.3.10 Automated monitoring stations were subsequently deployed for a minimum of 10 consecutive nights during the summer and autumn monitoring periods, 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.

2.3.11 Automated monitoring stations were deployed within the spring 2020 period but no successful data were obtained for the period (See **Section 2.5** Limitations for further details). Spring surveys were therefore repeated between April and May 2021.

2.3.12 NatureScot guidance (SNH, 2019) requirements of a minimum of 10 consecutive monitoring nights for each of the summer and autumn 2020 activity periods was exceeded at the minimum number of monitoring stations required for the proposed Development.

2.3.13 Recording periods for each monitoring station are summarised within **Table 2.1**. Detailed survey effort is presented in **Annex 1**, with photographs of habitat types present at each monitoring location provided in **Annex 3** (Plates 1 to 12).

Table 2.1: Monitoring station (MS) recording period summary.

Monitoring Station Ref. (Figure 8.6)	Grid Ref.	No. of Successful Recording Nights			Phase 1 Habitat Classification	Linear Feature within 50 m
		Spring	Summer	Autumn		
MS1	ND 29119 71354	30	44	53	Coniferous and Mixed Plantation Woodland.	Woodland edge
MS2	ND 29698 70092	31	43	22	Marshy grassland (adjacent to coniferous plantation woodland edge).	Woodland edge
MS3	ND 30852 70375	14	41	21	Coniferous plantation woodland (adjacent to open area of blanket bog).	Woodland edge
MS4	ND 29711 69478	0	43	51	Coniferous plantation woodland (adjacent to marshy grassland).	Woodland edge
MS5	ND 28920 69047	30	43	22	Coniferous plantation woodland (adjacent to dry modified and wet bog).	Woodland edge
MS6	ND 28697 68395	30	19	32	Coniferous plantation woodland.	n/a
MS7	ND 28774 69657	30	43	50	Coniferous plantation woodland.	Woodland edge
MS8	ND 28139 71012	30	26	22	Coniferous plantation woodland (adjacent to dry modified bog).	Woodland edge
MS9	ND 29863 68422	15	36	25	Marshy grassland (adjacent to coniferous plantation woodland), adjacent to building.	Woodland edge and buildings
MS10	ND 29840 68823	31	36	23	Improved grassland field.	n/a
MS11	ND 30307 68869	25	18	17	Blanket bog (adjacent to improved grassland field and coniferous plantation woodland).	Woodland edge
MS12	ND 27953 69857	30	42	10	Coniferous plantation woodland (adjacent to blanket bog).	Woodland edge

Weather Data

2.3.14 Weather data was collected from a Vantage Vue Weather station deployed within the Site for each of the static deployment periods.

2.3.15 Weather data were also analysed to check for any periods of poor weather which could have affected bat activity.

2.3.16 In accordance with NatureScot guidelines (SNH, 2019), bat surveys should be undertaken in appropriate weather: temperatures of >10°C (>8°C in Scotland) at dusk, maximum ground level wind speed of >5 m/s and no, or only very light rainfall.

Roost Survey

Preliminary Roost Assessment

2.3.17 Features with the potential to support maternity roosts and significant hibernation and/or swarming sites within 200 m of the Site, plus the candidate turbine rotor radius (64.5 m) i.e. within a total of 264.5 m of the Site, were identified through a review of aerial imagery and the preliminary habitat assessment.

2.3.18 This identified a collection of three stone-construction agricultural buildings located at Hollandmey, and three further stone-construction buildings located within the south-eastern extent of the Site (**Figure 8.7** of the EIA Report).

2.3.19 A daylight, ground-level preliminary roost assessment in accordance with Bat Conservation Trust (BCT) guidance (Collins, 2016), was therefore undertaken on the 22 July 2020 by Mr P. Higginson a professional, experienced and licence bat worker (Licence No. 148524).

Presence/Absence Surveys

2.3.20 The preliminary roost assessment identified that the six buildings identified ranged from providing Low to Moderate/High roost suitability, in accordance with BCT guidance (Collins, 2016). Detailed survey results are provided herein.

2.3.21 Presence/absence surveys in the form of dusk emergence and dawn re-entry surveys, were therefore undertaken at each building in accordance with BCT guidance (Collins, 2016), following timings applicable to the roost suitability afforded by each building as summarised in **Table 2.2**.

2.3.22 In accordance with BCT guidance (Collins, 2016) recommended timings for presence/absence surveys applicable to Building D comprise at least two surveys between May and August. Following the preliminary roost assessment undertaken of the building in July 2020 and prior to the completion of the first presence/absence survey in August 2020, the building was understood to have been subject to storm damage, which had prevented the earlier completion of surveys and resulted in the collapse of the building's roof and chimney structure. Subsequently the roost suitability of the building was re-classified as Low, in accordance with BCT guidance (Collins, 2016).

Table 2.2: Bat roost presence/absence surveys – survey summary.

Structure Ref. (Figure 8.7)	Roost Suitability	Presence/Absence Survey Dates
Building A	Low	• 22 July 2020 (dusk emergence survey)
Building B	Moderate	• 22 July 2020 (dusk emergence survey) • 18 August 2020 (dawn re-entry survey
Building C	Low/Moderate	• 22 July 2020 (dusk emergence survey)

Structure Ref. (Figure 8.7)	Roost Suitability	Presence/Absence Survey Dates
		• 18 August 2020 (dawn re-entry survey
Building D	Moderate/High - (Low)	• 17 August 2020 (dusk emergence survey)
Building E	Low	• 17 August 2020 (dusk emergence survey)
Building F	Low	• 17 August 2020 (dusk emergence survey)

2.3.23 In accordance with BCT guidance (Collins, 2016):

- Dusk emergence surveys were commenced 15 minutes before sunset, ending 2 hours after sunset; and,
- Dawn re-entry surveys were commenced 2 hours before sunrise, ending 15 minutes after sunrise.

2.3.24 All surveys were undertaken in weather conditions conducive for bat activity i.e. relatively mild and dry, with relatively low wind speeds (**Table 2.3**).

2.3.25 Each survey employed the use of a small team of stationary surveyors, in order to provide comprehensive visual coverage of potential roost entry and exit points for each building. Each surveyor operated an Anabat SD2 and recorded all activity of bats observed, including information on species, number and any identified roost entry or exist points. All activity either observed or heard via audio output was noted and cross-referenced onto a field map.

2.3.26 As far as possible, bats heard during the surveys were identified and contextual information on their behaviour was recorded if this could be ascertained (e.g. whether seen emerging or re-entering a structure, foraging behaviour; direction of flight).

2.3.27 All surveys were led by Mr P. Higginson a professional, experienced and licence bat worker (Licence No. 148524); assisted by experienced surveyors Mr J. Bell, Mr S. MacDonald and Mr L. Carroll.

Table 2.3: Bat roost presence/absence surveys – survey effort.

Date	Survey Type	Start Time	End Time	Sunrise/ Sunset	Survey Conditions
22 July 2020	Dusk emergence	21:40	23:55	21:55	Temp: 13°C; Rain: Nil; Wind: F2-3 South.
17 August 2020	Dusk emergence	20:35	22:50	20:50	Temp: 14°C Rain: Nil – light drizzle; Wind: F2 South.
18 August 2020	Dawn re-entry	03:40	06:00	05:43	Temp: 13°C; Rain: Nil; Wind: F1 South.

2.4 Bat Data Analysis

Data Analysis

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

2.4.2 Digital sonograms were analysed through Kaleidoscope Pro Version 5.3.3. A selection of sonograms were also manually checked prior to uploading to *Ecobat*, through Kaleidoscope Viewer and Analook (Titley Scientific).

Ecobat Tool

2.4.3 In accordance with NatureScot guidance (SNH, 2019) guidance, the *Ecobat* tool (**Box 1**) was used to provide an objective interpretation of the relative importance of bat activity levels recorded within the Site.

Box 1: *Ecobat* Tool
Ecobat[7] is a secure online tool initially designed by the University of Exeter and now hosted and developed by the Mammal Society (Lintott *et al*., 2018). The *Ecobat* tool compares baseline bat activity data collected for a site, with bat survey information collected from similar areas (i.e. the 'reference range') at the same time of year. It then provides a percentile rank for each species and a numerical representation of activity levels recorded at a Site, relative to the surrounding landscape for each night of surveying. Percentiles can then be assigned to activity categories (low, moderate, high) to provide a quantifiable and objective measure of bat activity (**Table 2.4**), rather than relying on professional judgment alone It should be noted that 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.

2.4.4 Relative levels of activity are determined by *Ecobat* by comparison to a reference dataset, the 'reference range'. When uploading data into the *Ecobat* Tool, the reference range was stratified to only include the following records from the reference data set:

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

2.4.5 Records of each species included within the reference range for comparison included:

- Common pipistrelle – 647 records;
- Soprano pipistrelle – 35 records;
- Brown long-eared – 7 records;
- Myotis spp – 14 records; and,
- Noctule – 12 records.

[7] http://www.ecobat.org.uk/about-ecobat [Accessed November 2020]

2.4.6 For each night where bat activity was recorded, the *Ecobat* tool reports the percentile and associated confidence limits of the night of data against the reference range. **Table 2.5** presents the percentile and associated bat activity category, replicated from NatureScot guidance (SNH, 2019).

Table 2.4: Percentile scope and categorised level of bat activity.

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

Risk Assessment

2.4.7 In accordance with NatureScot guidance (SNH, 2019), a risk assessment has been carried out to identify the potential risk to bat populations. Wind farm developments can impact upon bat species as a result of:

- Collision mortality, barotrauma and other injuries (although it is important to consider these in the context of other forms of anthropogenic mortality);
- Loss or damage to commuting and foraging habitat, (wind farms may form barriers to commuting or seasonal movements, and can result in severance of foraging habitat);
- Loss of, or damage to, roosts; and
- Displacement of individuals or populations (due to wind farm construction or because bats avoid the wind farm area).

2.4.8 To ensure that bat species are protected by minimising the risk of collision, NatureScot guidance (SNH, 2019) advises that an assessment of impact for a proposed wind farm development, requires a detailed appraisal of:

- The level of activity of all bat species recorded at the site assessed both spatially and temporally;
- The risk of turbine-related mortality for all bat species recorded at the site during bat activity surveys; and,
- The effect on the species' population status if predicted impacts are not mitigated.

<u>Assessing Potential Risk</u>

2.4.9 NatureScot guidance (SNH, 2019) presents a two-stage process for assessing the potential risk to bats as a result of onshore wind turbine developments:

- Stage 1 - gives an indication of the potential risk level of a site, based on a consideration of habitat and development-related features;
- Stage 2 – uses the output of Stage 1 (i.e. the potential risk level of a site) to provide an overall risk assessment based on the activity level of high collision risk species.

2.4.10 The assessment is intended to assist in the identification of those developments which are of greatest concern in terms of potential collision risks at the population level and inform the potential requirements for mitigation.

2.5 Limitations

Field Surveys

2.5.1 Due to COVID-19 restrictions on movement applicable at the time of survey commencement, automated monitoring stations were deployed at the earliest and safest possible opportunity during the spring activity period, on the 25 May 2020. However, due to unforeseen data processing issues, bat activity data which was able to be captured during the remaining spring activity period could not be retrieved.

2.5.2 Automated monitoring stations were subsequently deployed during the summer and autumn 2020 and spring 2021 monitoring periods, 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 5m/s and no, or only very light, rainfall. In light of COVID-19 restrictions and the limitations posed by the locality of the Site with regards appropriate weather conditions for bat activity (particularly in the spring and autumn months), surveys therefore sought to capture an extended period of monitoring.

2.5.3 Survey deployment in spring 2021 was placed out at temperatures of <8°C (at dusk); the majority of survey nights were below 5°C. Although this is below the threshold required by NatureScot guidance (SNH, 2019), these temperatures are typical of the locality; north Caithness. Therefore, activity recorded during the spring period is considered to be representative.

2.5.4 NatureScot guidance (SNH, 2019) requirements of a minimum of 10 consecutive monitoring nights for each of the spring, summer and autumn activity periods, was therefore far exceeded at the minimum number of monitoring stations required for the proposed Development.

Ecobat Tool

2.5.5 The *Ecobat* tool remains is in its infancy, and naturally there are fewer data 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).

2.5.6 The data within the reference range used to compare activity levels between Site data and other records within 100 km^2 is 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'). This may explain why low levels of bat passes recorded have resulted in a higher level of activity (e.g. noctule were recorded on 6 nights out of a possible 91, but activity level was considered to be low to moderate).

3 RESULTS

3.1 Desk Study

Statutory Designated Sites for Nature Conservation

3.1.1 In review of Sitelink, the Site 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 are located within 2 km of the Site.

Existing Bat Records

HBRG

3.1.3 In consultation, the HBRG returned a total of 59 bat records for the period 1986 – 2018 from within 10 km of the Site. Records were attributable to common pipistrelle and *Pipistrellus* (unknown pipistrelle species) with further details provided in **Annex 4**.

3.1.4 In review, no specific roost records were returned, with all records considered to comprise species observations, including bat detector passes.

Other Wind Farm EIA Documentation

3.1.5 A summary of existing bat records identified in a review of EIA documentation for the adjacent Lochend, Stroupster, Slickly and Lyth Wind Farms is provided in **Table 3.1**.

Table 3.1: Existing records of bat species – adjacent wind farm EIA documentation.

Wind Farm	Distance and direction to nearest wind turbine	Summary
Lochend 3/02682/FUL	0.8 km to the west	Baseline bat surveys were undertaken between May and October 2012, comprising a day time inspection of suitable structures which could support roosting bats within 500 m of the site, a nocturnal bat transect survey and remote monitoring. Bat activity recorded was attributable to common pipistrelle only, with low levels of activity concluded and which was considered attributable to a very small number of bats. No evidence of bat roosts was recorded within buildings inspected however, the tenant of Lochend Holdings at ND 264 683[8] reported 2 or 3 bats emerging from her property.
Stroupster 05/00273/FULCA 12/02391/FUL	3.8 km to the south east	EIA documentation reports that no individuals or field signs were observed during survey in 2004 within or near the application area. Although it is not clear if this included targeted survey for bats. EIA documentation suggests that the disused buildings of Stroupster Farm at ND 3330 6624[9] may offer potential as bat roosts, but an emergence check made on 6th May 2004 (during suboptimal conditions for bat activity e.g. windy and cool less than 10°C) recorded no bats emerging from the buildings.
Slickly 19/05624/FUL	2.6 km to the south east	Baseline bat activity surveys comprising transect surveys and automated monitoring surveys were undertaken between June and October 2018[10], in accordance with industry standard guidance applicable at the time (Collins, 2016). Bat activity recorded was considered to be extremely low and attributable to common

[8] Located approximately 1.6 km to the west of the proposed Development Site at its nearest point.
[9] Located approximately 3.1 km to the south east of the proposed Development Site at its nearest point.
[10] Representing survey coverage of the summer (June to mid-August) and autumn (mid-August to October) bat activity periods.

Wind Farm	Distance and direction to nearest wind turbine	Summary
		pipistrelle, or *Pipistrellus* sp. (likely common or soprano pipistrelle). No confirmed or potential roosts or hibernaculum were recorded within the wind farm site.
Lyth 3/01832/FUL	0.4 km to the south	Baseline bat activity surveys were undertaken in 2011 and 2012 following industry standard guidance applicable at the time (Hundt, 2012), including transect surveys and automated monitoring surveys. Overall bat activity recorded was considered to be low and attributable to *Pipistrellus* sp. (primarily common pipistrelle).

UK Bat Species Range

3.1.6 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), the Site is located within the known UK distribution range for the following bat species:

- Common pipistrelle; and,
- Daubenton's bat *Myotis daubentoni*.

3.1.7 Whilst beyond the general distribution range of Nathusius' pipistrelle *Pipistrellus nathusii* and brown-long eared bat, species records are known from the area of Wick, with brown-long eared bat records in northern Scotland also known from Orkney (Swift, 2004). Similarly, whilst beyond the general distribution range of soprano pipistrelle, species records are known from the area of Thurso.

3.1.8 The Site is beyond the range of Noctule bat however, specimen records are known from Orkney (Swift, 2004). The *Ecobat* tool also includes 12 noctule records within their reference range for within 100 km of the Site, 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 Site 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 closed canopy commercially managed coniferous woodlands of the Site provide relatively poor foraging opportunities for bat species, in comparison to broadleaved and non-commercially managed woodlands.

3.2.3 The north-eastern extent of the Site comprising the Phillips Mains Mire SSSI, does support areas of potentially higher quality habitats including sheltered waterbodies (dubh lochans) however, no turbines are located within close proximity to these features. There is a low incidence of prominent linear features, such as tree lines, scrub and major wooded riparian networks, providing connectivity between the Site and potentially higher value habitats for bats within wide landscape.

3.2.4 A small number of features with the potential to support roosting bats, comprising stone agricultural type buildings are identified within the Site. Bat roost surveys detailed herein, have however not identified the presence of roosting bats within these features and there are no existing local roost records identified through desk study.

Bat Activity Surveys

Summary of Results and Activity Levels

3.2.5 Bats were detected on 113 nights out of a possible 119 dates over the full survey period in 2020 and 2021.

3.2.6 Species identified are presented in **Table 3.2** along with potential collision risk and population vulnerability as described in Table 2 of NatureScot guidance (SNH, 2019).

Table 3.2: Bat species recorded, collision risk and population vulnerability.

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

3.2.7 A total of 3,470 bat passes were recorded over a total of 1,078 survey nights as summarised in **Table 3.3**.

Table 3.31: Total number of bat passes.

Species	Passes (No.)	Percentage of total (%)
Brown long-eared	25	0.7
Common pipistrelle	3,287	94.7
Myotis	27	0.8
Noctule	7	0.2
Soprano pipistrelle	124	3.6
Total	**3,470**	**100.0**

Ecobat Output

3.2.8 The full *Ecobat* Tool output report is included as **Annex 5**.

3.2.9 **Table 3.4** presents the total numbers of nights bat activity fell under each band of high to low activity and **Table 3.5** presents the percentiles and key metrics of the *Ecobat* output for each species.

Table 3.4: Number of nights recorded bat activity fell into each activity band or each species within the Site.

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
Brown long-eared	0	0	0	0	7
Common pipistrelle	55	61	101	71	150
Myotis	0	0	4	2	8
Noctule	0	1	2	4	5

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
Soprano pipistrelle	2	1	5	6	13

Table 3.5: Percentiles for each species within the Site.

Species/Species Group	Total Passes	Median Percentile[11]	95% CIs[12]	Max Percentile[13]	Nights Recorded
Brown long-eared	25	0	0 - 0	0	7
Common pipistrelle	3,287	32	68.5 - 83	100	438
Myotis	27	0	38 - 44	53	14
Noctule	7	32	42.5 - 42.5	66	12
Soprano pipistrelle	124	32	32 - 73	96	27

Spatial Distribution

3.2.10 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 3.6**. 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 and Mathews, 2018). In addition, the dataset is unlikely to be normally distributed, therefore the median is the most appropriate metric to report.

3.2.11 Data for 'Includes Absences' and 'Excludes Absences' are included in **Table 3.6**. 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, see Limitations).

Table 3.6: 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
Brown long-eared	MS1	0	0.0	0.0	0.0	0.0
	MS10	0	0.0	0.0	0.0	0.0
	MS11	0	0.0	0.0	0.0	0.0
	MS12	0	0.0	0.0	0.0	0.0
	MS2	0	0.0	0.0	0.0	0.0
	MS3	1	0.0	0.1	0.0	0.1

[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

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
	MS4	5	0.0	0.1	0.0	0.1
	MS5	0	0.0	0.1	0.0	0.0
	MS6	0	0.0	0.0	0.0	0.0
	MS7	1	0.0	0.0	0.0	0.1
	MS8	0	0.0	0.0	0.0	0.0
	MS9	0	0.0	0.0	0.0	0.0
Common pipistrelle	MS1	744	0.5	1.1	1.1	0.5
	MS10	51	0.2	0.2	0.2	0.2
	MS11	3	0.2	0.2	0.2	0.2
	MS12	443	0.4	0.6	0.6	0.4
	MS2	9	0.1	0.2	0.1	0.2
	MS3	1603	1.1	3.2	3.0	1.2
	MS4	83	0.1	0.2	0.2	0.2
	MS5	35	0.2	0.2	0.2	0.2
	MS6	148	0.3	0.5	0.5	0.3
	MS7	140	0.2	0.3	0.3	0.2
	MS8	2	0.1	0.1	0.1	0.1
	MS9	26	0.1	0.2	0.2	0.1
Myotis	MS1	0	0.0	0.1	0.0	0.0
	MS10	0	0.0	1.1	0.0	0.0
	MS11	0	0.0	0.8	0.0	0.0
	MS12	1	0.0	12	0.0	0.1
	MS2	6	0.0	0.3	0.1	0.2
	MS3	18	0.0	0.3	0.0	0.2
	MS4	0	0.0	0.0	0.0	0.0
	MS5	0	0.0	0.0	0.0	0.0
	MS6	0	0.0	0.0	0.0	0.0
	MS7	0	0.0	0.0	0.0	0.0
	MS8	0	0.0	0.0	0.0	0.0
	MS9	0	0.0	0.0	0.0	0.0
Noctule	MS1	0	0.0	0.0	0.0	0.0
	MS10	0	0.0	0.0	0.0	0.0
	MS11	0	0.0	0.0	0.0	0.0
	MS12	1	0.0	0.2	0.0	0.2
	MS2	17	0.1	0.4	0.2	0.4
	MS3	9	0.0	0.3	0.0	0.3
	MS4	0	0.0	0.0	0.0	0.0

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
	MS5	0	0.0	0.0	0.0	0.0
	MS6	0	0.0	0.0	0.0	0.0
	MS7	0	0.0	0.0	0.0	0.0
	MS8	0	0.0	0.0	0.0	0.0
	MS9	0	0.0	0.0	0.0	0.0
Soprano pipistrelle	MS1	8	0.0	0.1	0.0	0.1
	MS10	0	0.0	0.0	0.0	0.0
	MS11	0	0.0	0.0	0.0	0.0
	MS12	0	0.0	0.0	0.0	0.0
	MS2	44	0.2	1.1	0.6	0.2
	MS3	72	0.0	0.8	0.2	0.3
	MS4	0	0.0	0.0	0.0	0.0
	MS5	0	0.0	0.0	0.0	0.0
	MS6	0	0.0	0.0	0.0	0.0
	MS7	0	0.0	0.0	0.0	0.0
	MS8	0	0.0	0.0	0.0	0.0
	MS9	0	0.0	0.0	0.0	0.0

3.2.12 **Table 3.7** presents the relative bat activity levels (percentiles) per detector, per species.

Table 3.7: Percentiles for each species per detector location for the whole survey period.
Activity Level is based on the median percentile.

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
Brown long-eared	MS3	0	0	0	1	Low
	MS4	0	0 – 0	0	5	Low
	MS7	0	0	0	1	Low
Common pipistrelle	MS1	53	59.5 – 70	96	89	Moderate
	MS10	30	30 - 40	74	25	Low to moderate
	MS11	16	16 - 16	32	2	Low
	MS12	44	50 - 60.5	96	85	Moderate
	MS2	0	37 - 37	44	6	Low
	MS3	77	68.5 – 83	100	60	Moderate to high
	MS4	0	38 - 53	74	41	Low

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
	MS5	0	32 - 42.5	53	24	Low
	MS6	44	46 - 62	92	33	Moderate
	MS7	32	44 - 52	76	57	Low to moderate
	MS8	0	0 – 0	0	2	Low
	MS9	0	32 - 49	66	14	Low
Myotis	MS12	0	0	0	1	Low
	MS2	0	0 – 0	53	3	Low
	MS3	16	38 - 44	44	10	Low
Soprano pipistrelle	MS1	0	0 – 0	32	7	Low
	MS2	43	32 - 73	93	6	Moderate
	MS3	32	32 - 70	96	14	Low to moderate
Noctule	MS12	0	0	0	1	Low
	MS2	32	32 - 49	66	6	Low to moderate
	MS3	0	42.5 - 42.5	53	5	Low

Temporal Activity

3.2.13 A summary of results per season is provided in **Table 3.9**.

3.2.14 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 3.9**. Median and maximum percentiles and corresponding activity levels are presented.

Table 3.9: Percentiles for each species each month within the site. Activity Level is based on the median percentile.

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
Brown long-eared	Jul	0	0	0	1	Low
	Aug	0	0 - 0	0	1	Low
	Sep	0	0 - 0	0	4	Low
	Oct	0	0 - 0	0	1	Low
Common pipistrelle	Apr	30	68.5 - 83	93	48	Low to moderate
	May	0	59.5 - 70	63	18	Low
	Jun	32	16 - 16	32	1	Low to moderate

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Activity Level
	Jul	49	68.5 - 83	99	100	Moderate
	Aug	44	68.5 - 83	100	174	Moderate
	Sep	32	68.5 - 83	96	88	Low to moderate
	Oct	0	59.5 - 70	32	9	Low
Myotis	Jul	0	38 - 44	44	11	Low
	Aug	0	38 - 44	53	3	Low
Noctule	Jul	32	42.5 - 42.5	66	11	Low to moderate
	Aug	0	42.5 - 42.5	0	1	Low
Soprano pipistrelle	Jul	32	32 - 73	96	19	Low to moderate
	Aug	0	32 - 73	32	6	Low
	Sep	0	0 - 0	0	2	Low

Potential bat roosts within or close to the site

3.2.15 *Ecobat* analysis showed that activity was recorded within the species-specific emergence time for the following locations:

- MS 1: common pipistrelle;
- MS 2: common pipistrelle, soprano pipistrelle and noctule;
- MS 3: Myotis, common and soprano pipistrelle.
- MS 10: common pipistrelle; and,
- MS 12: common pipistrelle.

3.2.16 No activity was recorded within any species-specific emergence time at MS 4 to MS 9.

3.2.17 Based on the *Ecobat* analysis above, it is possible that roosts for four bat species are present within close proximity to the Site.

3.2.18 The full *Ecobat* output is presented in **Annex 5**.

Weather Conditions

3.2.19 Weather conditions are presented in **Annex 2.**

3.2.20 In the main, the 2020 summer and autumn periods were dry and warm, with temperatures only falling below 8°C on one occasion in October 2020.

3.2.21 Moderate to heavy rain fall was recorded during October survey dates. Common pipistrelle were still recorded and these nights are therefore not excluded from analysis.

3.2.22 Wind data was greater than 5 m/s on most survey nights. The extended survey periods adopted demonstrates that the Site does not regularly record less than 5 m/s, and therefore recording periods were undertaken in conditions representative of the Site.

Bat Roost Surveys

Preliminary Roost Assessment

3.2.23 The findings of the preliminary roost assessment for Buildings A to F and conclusions of roost suitability in accordance with BCT guidance (Collins, 2016) are presented in **Table 3.10**, which should be read with reference to **Figure 8.7** of the EIA report**,** and **Photographic Plates (13-36)**, presented in **Annex 3**.

3.2.24 As detailed, following the preliminary roost assessment undertaken of the building in July 2020 and prior to the completion of the first presence/absence survey in August 2020, Building D was understood to have been subject to storm damage (**Annex 3, Photographic Plates 37** and **38**) and subsequently the roost suitability of the building was re-classified as Low, in accordance with BCT guidance (Collins, 2016).

Table 3.10: Preliminary Roost Assessment - Findings.

Structure/Feature Ref. (Figure 8.7)	**Assessment**	**Roost Suitability (Collins, 2016)**
Building A	A low roofless building built of Caithness stone with its walls and chimney breasts remaining intact but in varying states of decay (**Annex 3**, **Photographic Plates 13** and **14**). The walls, generally c. 2 m or less with the exception of those having remnant chimney breasts, had some cracks but most were infilled with mortar. Cracks investigated were generally insubstantial and not deep and covered with cobwebs. The chimney breasts were open above but had low (<1 m) entrances and were overgrown with vegetation (**Annex 3**, **Photographic Plate 15**) though they had some cracks within them with most looking damp; access to the interior of these was restricted and were not investigated due to the restrictive and potentially dangerous access. Tall ruderals, nettles and other vegetation encircled all of the wall bases whilst the internal floor areas and chimney breasts were generally rubble/rubbish filled with overlying tall ruderal and nettle vegetation. Assessing the wall bases and chimney breasts for bat droppings was hindered by the overgrown vegetation at the walls bases or entrances to the base of the chimney breasts. Consequently, no evidence of droppings or staining was identified in, on or about this building.	Low
Building B	A large, tall (>10 m), open-ended barn built of Caithness stone with one wall partially rebuilt using breeze-blocks and various openings having also been blocked (**Annex 3, Photographic Plate 16** and **17**). The roof appeared to be made of asbestos sheeting with wooden roof trusses and some wooden boarding underneath the asbestos sheeting at each end of the barn roofs interior. There was evidence to suggest the building is, or has been, being used by barn owl *Tyto alba* as either a roost or nesting site.	Moderate

Structure/Feature Ref. (Figure 8.7)	Assessment	Roost Suitability (Collins, 2016)
	There were occasional gaps evident below the guttering with some rust staining from the fittings. The walls were generally intact, well mortared and solid but some cracks/crevices were evident. There was a large crack at c. 2 m high, near the breeze-block walled area, which appeared to enter a small cavity and also into the building's interior (**Annex 3**, **Photographic Plates 18**). This crack held some nesting material suggesting evidence of a bird's nest though no bat droppings or staining were evident. There was a crack at the edge of a blocked-up doorway/window (**Annex 3**, **Photographic Plates 19**) that affords potential for bat ingress but again there was an old nest present at about 1.5 m high; again, no staining or bat droppings were evident. The roofs wooden boarding underneath the asbestos sheeting at each end of the barn roofs interior was considered to afford some potential for roosting bats (**Annex 3**, **Photographic Plates 20**) though there was no access to these areas due to the building's height and the fact that some of the flat boarded areas have potential for barn owl. Most of the external bases of the walls were cloaked by tall ruderals, nettles and other vegetation whilst the barns internal floor was a quagmire of thick mud and cow manure suggesting it was being used by cattle. These factors hindered the assessment of the wall bases for bat droppings however no staining or droppings were found on the walls themselves or wall bases. Internally, on the roof beams/trusses at the closed end of the building there was some staining apparent – but was considered to be staining from the timbers and water ingress rather than bat excrement.	
Building C	A low (c. 3-4 m), asbestos roofed, open-ended barn built of Caithness stone with an airgap at the walls top below the roofing (**Annex 3**, **Photographic Plates 21Error! Reference source not found.** to **22**). This building appeared to have been used for livestock holding, with the floor well-trodden thick mud with cow manure. The building was draughty. There were some cracks/gaps in the walls but these were too low to be ideal for usage by bats. The roofs ridgeline had a gap running for much of its length. There was evidence of an old birds' nest in the barns closed end in addition to various cracks in the walls corners which could afford low potential for roosting bats (**Annex 3**, **Photographic Plates 23**). In addition, on the outside of the barns closed end, there was a small gap where the roofline abuts the wall top which could also afford potential as a bat roost (**Annex 3**, **Photographic Plate 21**). The barns interior floor was thick mud/manure (**Annex 3**, **Photographic Plate 23**) and the outside bases of the barn's walls had low-lying vegetation which both hampered investigation for bat droppings. No bat droppings or feeding remains were evident. In addition, no staining, or droppings, on the walls was found.	Low/Moderate
Building D	A partially slate roofed farmhouse with predominantly intact Caithness stone walls with various chimney breasts (**Annex 3**,	Moderate/High

Structure/Feature Ref. (Figure 8.7)	Assessment	Roost Suitability (Collins, 2016)
	Photographic Plates 24 to **26**). Beneath the slate roof there was relatively intact wooden boarding and wooden cladding, in various states of decay and quantities, on at least three of the walls (**Annex 3**, **Photographic Plates 25** and **27**). The exterior walls were generally intact and relatively crack/crevice free with the exception of the odd crevice below the well-vegetated guttering/roof (**Annex 3**, **Photographic Plate 24**). Owl pellets were found on the buildings floor suggesting the presence of either a roosting or nesting barn owl. There was also an active swallow *Hirundo rustica* nest under the intact roof and nesting material was evident in various parts of the roof trusses and on the floor. The open end of the farmhouse had an open fireplace with a partially intact chimney breast. Whilst there were suitable deep cracks for roosting bats present up the inside of the chimney there were many intact and extensive cobwebs suggesting little usage, at the time of surveying, by bats. The chimney breast at the enclosed end of the farmhouse was dry and had some low-lying cracks though there was a nest (possibly jackdaw *Corvus monedula*) within it. Above the 'interior' chimney breast wall there are suitable cracks and wooden panelling and a hint of staining at c. 4 m which could not be safely accessed (**Annex 3**, **Photographic Plate 28**); this was likely to be from water ingress. The floor of the building is littered with roofing and rubble debris and vegetation in the un-roofed areas. No bat droppings or feeding remains were found. The building's exterior wall bases were engulfed by tall ruderals and other vegetation which hindered examination for bat droppings; none were found. However, three bat droppings (old, dry and crumbly) were found on two of the buildings window sills but no droppings (**Annex 3**, **Photographic Plate 29**), staining or feeding remains were found elsewhere either at the walls bases or walls themselves. The windows where droppings were found have wooden lintels (**Annex 3**, **Photographic Plate 30**) that access the walls cavity and may afford roost potential, though those investigated had no bats present.	
Building E	A partially walled Caithness stone-built building with no roof (**Annex 3**, **Photographic Plates 31** and **32**) and a couple of low fireplaces with open access to their tops. The walls were c. 2 m high and the building itself, and fireplaces, were almost totally engulfed by tall ruderals and other vegetation. The walls had some potentially suitable shallow cracks within them but nothing was found to suggest these were being used by bats. Investigation of the low fireplaces showed a few suitable cracks and access into the cavity with access being from above to the open chimney (**Annex 3**, **Photographic Plates 33**) though there were extensive cobwebs and some vegetation growing out through the chimney; the cavity access was at relatively low-level	Low

Structure/Feature Ref. (Figure 8.7)	Assessment	Roost Suitability (Collins, 2016)
	(c. 1 m). No bat droppings, staining or feeding remains were found in or around the building.	
Building F	A partially walled Caithness stone-built building with partial stone-slated roof (**Annex 3**, **Photographic Plates 34** to **35**). The remaining walls had few suitable cracks with most having been plastered/mortared at some point. There was however a large crack up both corners of the joining walls but these are open to the weather and appear draughty (**Annex 3**, **Photographic Plate 36**); no evidence of bats was found within these. The building was engulfed with tall ruderals and other vegetation atop rubble thereby hampering searches for bat droppings and feeding remains. Despite searching thoroughly no evidence of bats (e.g. droppings, feeding remains or staining) was found. A single rodent dropping was found atop a rubble pile within the building. The stone 'slate' roof (**Annex 3**, **Photographic Plate 35**) itself was considered to afford some bat roost potential underneath the overlapping slabs near the roof's apex whilst much of the lower ones were open to the elements and there was no sign of bats or evidence of bats being present.	Low

Roost Presence/Absence Surveys

3.2.25 The findings of roost presence/absence surveys are presented in **Table 3.11** and should be read with reference to **Figure 8.7**.

3.2.26 No bats were recorded emerging from or re-entering any building during surveys suggesting the likely absence of any roosts.

Table 3.11: Roost Presence/Absence Survey – Findings

Date	Structure/Feature Ref. (Figure 8.7)	Surveyor Location Ref. (Figure 8.7)	Observations		
			Time	Species	Comment
22 July 2020	Building A, B and C	AA	22.54	Pipistrelle *sp.*	Heard only – not located
	Building A, B and C	AA	23.00	Pipistrelle *sp.*	Heard only – not located
	Building A, B and C	AA	23.28	Possible pipistrelle *sp.*	Heard briefly only – not located
	Building A and B	BB	23.09	Pipistrelle *sp.*	Heard only – not located
	Building A and B	BB	23.24	Pipistrelle *sp.*	Heard only – not located
	Building A and B	BB	23.36	Pipistrelle *sp.*	Flying between gable ends of Buildings A & B.
	Building B and C	CC	22.54	Pipistrelle *sp.*	Flying along eastern side of Building C.
	Building B and C	CC	22.56	Pipistrelle *sp.*	Flying along eastern side of Building C then flew past Building B towards surveyor BB.
	Building B and C	CC	23.09	Pipistrelle *sp.*	Flying around eastern side of Building C.
	Building B and C	CC	23.28	Pipistrelle *sp.*	Heard only – not located.
17 August 2020	Building D	DD	No bats heard or observed.		
	Building E and F	EE	No bats heard or observed.		
18 August 2020	Building B and C	AA	03:49	Possible pipistrelle *sp.*	Heard briefly only – not located
18 August 2020	Building B and C	CC	No bats heard or observed.		

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 proposed Development Site, 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 Site has been assessed as having an overall 'Site Risk' of **2**, represent a **Low/Lowest Site Risk**:

- The Site 'Habitat Risk' is classified as **Low**.
- The Site 'Project Size' is classified as being **Medium**, comprising a development of 10 turbines of up to 149.9 m tip height, with two other operational wind farm developments (Lochend and Stroupster Wind Farms) located within 5 km of the Site (distances measures between the nearest turbines).

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; and,
- 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 site Risk Level (Stage 1) using the matrix presented in Table 3b in 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 4.1**. 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 soprano pipistrelle is considered to fall under "Low/Medium Site Risk" and under "Low Site Risk" for noctule.

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

Table 4.1: Overall Risk Assessment (Table 3b from SNH (2019) guidance). Key: green = Low, Amber = Medium, Red = High

Species / species group	I.D	Median Percentile[14]	Percentile Category	Overall Risk Assessment (Stage 2)
Common pipistrelle	MS 1	53	Moderate	Medium (6)
	MS 2	0	Low	Low (2)
	MS 3	77	Moderate to high	Medium (8)
	MS 4	0	Low	Low (2)
	MS 5	0	Low	Low (2)
	MS 6	44	Moderate	Medium (6)
	MS 7	32	Low to moderate	Low (4)
	MS 8	0	Low	Low (2)
	MS 9	0	Low	Low (2)
	MS 10	30	Low to moderate	Low (4)
	MS 11	16	Low	Low (2)
	MS 12	44	Moderate	Medium (6)
Noctule	MS 2	32	Low to moderate	Low (4)
	MS 3	0	Low	Low (2)
	MS 12	0	Low	Low (2)
Soprano pipistrelle	MS 1	0	Low	Low (2)
	MS 2	43	Moderate	Medium (6)
	MS 3	32	Low to moderate	Low (4)

Species / species group	Month	Median Percentile	Percentile Category	Overall Risk Assessment (Stage 2)
Common pipistrelle	April	30	Low to moderate	Low (4)
	May	0	Low	Low (2)
	June	32	Low to moderate	Low (4)
	July	49	Moderate	Medium (6)
	August	44	Moderate	Medium (6)
	September	32	Low to moderate	Low (4)
	October	0	Low	Low (2)
Noctule	July	32	Low to moderate	Low (4)
	August	0	Low	Low (2)
Soprano pipistrelle	July	32	Low to moderate	Low (4)
	August	0	Low	Low (2)
	September	0	Low	Low (2)

[14] Based on the Median Percentile

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ANNEX 1: BAT ACTIVITY SURVEY EFFORT

Table A1.1 below provides further details of bat activity surveys.

Table A1.1: Bat Activity Survey Effort.

Monitoring Station Ref.	Monitoring Station Grid Ref.	Date Start	Date End	No. Nights
MS 1	ND 29119 71354	13/04/2021	13/05/2021	30
MS 2	ND 29698 70092	12/04/2021	13/05/2021	31
MS 3	ND 30852 30375	13/04/2021	27/04/2021	14
MS 4	ND 29711 69478	12/04/2021	-	0
MS 5	ND 28920 69047	13/04/2021	13/05/2021	30
MS 6	ND 28697 68395	13/04/2021	13/05/2021	30
MS 7	ND 28774 69657	13/04/2021	13/05/2021	30
MS 8	ND 28139 71012	13/04/2021	13/05/2021	30
MS 9	ND 29863 68422	12/04/2021	27/04/2021	15
MS 10	ND 29840 68823	12/04/2021	13/05/2021	31
MS 11	ND 30307 68869	12/04/2021	06/05/2021	25
MS 12	ND 27953 69857	13/04/2021	13/05/2021	30
MS 1	ND 29119 71354	02/07/2020	15/08/2020	44
MS 2	ND 29698 70092	03/07/2020	15/08/2020	43
MS 3	ND 30852 30375	05/07/2020	15/08/2020	41
MS 4	ND 29711 69478	03/07/2020	15/08/2020	43
MS 5	ND 28920 69047	03/07/2020	15/08/2020	43
MS 6	ND 28697 68395	28/07/2020	15/08/2020	19
MS 7	ND 28774 69657	03/07/2020	15/08/2020	43
MS 8	ND 28139 71012	02/07/2020	28/07/2020	26
MS 9	ND 29863 68422	11/06/2020	29/06/2020	18
MS 9	ND 29863 68422	28/07/2020	15/08/2020	18
MS 10	ND 29840 68823	11/06/2020	29/06/2020	18
MS 10	ND 29840 68823	28/07/2020	15/08/2020	18
MS 11	ND 30307 68869	11/06/2020	29/06/2020	18
MS 12	ND 27953 69857	04/07/2020	15/08/2020	42
MS 1	ND 29119 71354	16/08/2020	08/10/2020	53
MS 2	ND 29698 70092	18/08/2020	30/08/2020	12
MS 2	ND 29698 70092	09/09/2020	19/09/2020	10
MS 3	ND 30852 30375	19/08/2020	09/09/2020	21
MS 4	ND 29711 69478	18/08/2020	08/10/2020	51
MS 5	ND 28920 69047	18/08/2020	09/09/2020	22
MS 6	ND 28697 68395	15/08/2020	18/08/2020	3

Monitoring Station Ref.	Monitoring Station Grid Ref.	Date Start	Date End	No. Nights
MS 6	ND 28697 68395	09/09/2020	08/10/2020	29
MS 7	ND 28774 69657	18/08/2020	07/10/2020	50
MS 8	ND 28139 71012	18/08/2020	09/09/2020	22
MS 9	ND 29863 68422	19/08/2020	01/09/2020	13
MS 9	ND 29863 68422	08/09/2020	20/09/2020	12
MS 10	ND 29840 68823	15/08/2020	28/08/2020	13
MS 10	ND 29840 68823	08/09/2020	18/09/2020	10
MS 11	ND 30307 68869	19/08/2020	30/08/2020	11
MS 11	ND 30307 68869	09/09/2020	15/09/2020	6
MS 12	ND 27953 69857	18/08/2020	08/10/2020	39

ANNEX 2: WEATHER CONDITIONS

Table A2.1 below provides weather conditions for Bat Activity Survey periods.

Table A2.1: Weather Conditions.

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)
11/06/2020	12	0	11.2
12/06/2020	10	2.6	8.7
13/06/2020	12	0	9.3
14/06/2020	13	0	4.4
15/06/2020	16	0	8.7
16/06/2020	15	0	3.7
17/06/2020	16	0.4	3.1
18/06/2020	12	0	10.6
19/06/2020	13	0	11.8
20/06/2020	15	3.2	13
21/06/2020	14	10.4	3.7
22/06/2020	14	0.2	21.8
23/06/2020	15	0.4	6.2
24/06/2020	14	0.2	2.5
25/06/2020	15	0	13
26/06/2020	16	5.4	13.7
27/06/2020	14	4.4	19.3
28/06/2020	14	7	12.4
29/06/2020	13	3	14.9
02/07/2020	11	0.4	10.6
03/07/2020	10	7	6.2
04/07/2020	12	2.2	5
05/07/2020	13	3.2	15.5
06/07/2020	11	4.6	16.1
07/07/2020	12	3.2	8.7
08/07/2020	12	0	6.8
09/07/2020	12	0.2	3.1
10/07/2020	14	2.2	9.9
11/07/2020	12	0.2	20.5
12/07/2020	14	1.4	11.8
13/07/2020	15	2.4	19.9
14/07/2020	13	0	7.5

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)
15/07/2020	14	1	9.3
16/07/2020	17	0	8.1
17/07/2020	15	0	6.2
18/07/2020	14	0	17.4
19/07/2020	13	2.2	11.8
20/07/2020	13	1.8	1.9
21/07/2020	13	4	6.8
22/07/2020	14	3.2	10.6
23/07/2020	13	0.4	4.8
24/07/2020	15	2.6	14.9
25/07/2020	15	0.6	9.3
26/07/2020	14	3.4	6.2
27/07/2020	12	7	13.7
28/07/2020	12	2.4	29.2
29/07/2020	11	0.4	14.9
30/07/2020	12	1	17.4
31/07/2020	13	0.2	18
01/08/2020	12	1.6	7.5
02/08/2020	9	0	9.3
03/08/2020	12	0	12.4
04/08/2020	13	2	15.5
05/08/2020	14	0	2.5
06/08/2020	13	0	16.2
07/08/2020	11	2.8	12.5
08/08/2020	10	0	6.2
09/08/2020	11	0	9.9
10/08/2020	10	0	5
11/08/2020	14	4.6	10.6
12/08/2020		0.6	
13/08/2020	12	0	4.4
14/08/2020	12	0	4.4
15/08/2020	12	0	6.8
16/08/2020	13	0.8	9.3
17/08/2020	13	0.6	11.8
18/08/2020	15	0.2	6.2
19/08/2020	15	6.4	11.2

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)
20/08/2020	17	0.2	19.3
21/08/2020	16	0.8	10.6
22/08/2020	14	2.6	11.8
23/08/2020	11	1.2	6.8
24/08/2020	13	0	5
25/08/2020	13	0.6	20.5
26/08/2020	12	0	6.2
27/08/2020	11	0.4	3.7
28/08/2020	12	4.2	18.7
29/08/2020	11	1.4	6.2
30/08/2020	12	0.8	1.9
31/08/2020	13	0	11.8
01/09/2020	15	0.2	18
02/09/2020	15	0.8	24.2
03/09/2020	15	1.8	21.1
04/09/2020	11	6.4	18
05/09/2020	11	4.2	9.3
06/09/2020	11	1.2	8.7
07/09/2020	13	0.6	18
08/09/2020	13	7.8	9.3
09/09/2020	12	0.6	10.6
10/09/2020	12	2.2	19.3
11/09/2020	12	0.4	21.1
12/09/2020	12	0	16.8
13/09/2020	15	4.2	11.8
14/09/2020	16	2	3.7
15/09/2020	12	0	18
16/09/2020	10	0	8.1
17/09/2020	15	0	3.1
18/09/2020	14	0	2.5
19/09/2020	12	0	3.1
20/09/2020	12	0	5
21/09/2020	12	2.2	13.7
22/09/2020	13	3	16.8
23/09/2020	9	0	0.6
24/09/2020	10	4	8.7

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)
25/09/2020	9	1.2	14.9
26/09/2020	9	0.2	19.3
27/09/2020	9	0	5
28/09/2020	11	0	9.9
29/09/2020	11	0.4	13.1
30/09/2020	12	9.4	12.4
01/10/2020	12	7	8.7
12/04/2021	2	0	1
13/04/2021	3	0	1
14/04/2021	6	0	1
15/04/2021	6	0	10
16/04/2021	5	0	0
17/04/2021	5	0	8
18/04/2021	6	0	8
19/04/2021	7	0	5
20/04/2021	5	0	15
21/04/2021	3	0	3
22/04/2021	6	0	2
23/04/2021	4	0	2
24/04/2021	5	0	0
25/04/2021	6	0	5
26/04/2021	7	0	13
27/04/2021	5.5	0	1.3
28/04/2021	3.3	0	0.9
29/04/2021	2.9	0	0
30/04/2021	2.7	0	0
01/05/2021	3.3	0	0
02/05/2021	2.1	0	0
03/05/2021	3.8	0	3.1
04/05/2021	3.8	0	2.2
05/05/2021	1.3	0.76	0.9
06/05/2021	4.7	0	0.4
07/05/2021	2.7	0	0
08/05/2021	4.9	0	0.4
09/05/2021	7.6	0	0
10/05/2021	7.9	0	1.8

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)
11/05/2021	5.4	0	0
12/05/2021	7.3	0	3.1
13/05/2021	8	5	7

ANNEX 3: PHOTOGRAPHIC PLATES

Table A3.1 below provides photographs from the Site.

Table A3.1: Photographic plates.

		
Plate 1: MS1	**Plate 2:** MS2	**Plate 3:** MS3
		
Plate4: MS4	**Plate 5:** MS5	**Plate 6:** MS6

		
Plate 7: MS7	**Plate 8:** MS8	**Plate 9:** MS9
		
Plate 10: MS10	**Plate 11:** MS11	**Plate 12:** MS12
		
Plate 13: Building A	**Plate 14:** Building A	**Plate 15:** Building A

		
Plate 16: Building B	**Plate 17:** Building B	**Plate 18:** Building B
		
Plate 19: Building B	**Plate 20:** Building B	**Plate 21:** Building C
		
Plate 22: Building C	**Plate 23:** Building C	**Plate 24:** Building D

		
Plate 25: Building D	**Plate 26:** Building D	**Plate 27:** Building D
		
Plate 28: : Building D	**Plate 29:** Building D	**Plate 30:** Building D
		
Plate 31: Building E	**Plate 32:** Building E	**Plate 33:** Building E

		
Plate 33: Building E	**Plate 34:** Building F	**Plate 35:** Building E
		
Plate 36: Building F	**Plate 37:** Building D August 2020, following storm damage.	**Plate 38:** Building D August 2020, following storm damage.

ANNEX 4: EXISTING BAT SPECIES RECORDS – HBRG

Table A4.1 below provides further details of bat records provided by the HBRG from within 10 km of the Site.

Table A4.1: Existing bat species records – HBRG.

Species	Date	Location	Sample Spatial Reference	Abundances	Comment
Pipistrelle Bat species *Pipistrellus*	1986 - 1987	Watten	ND2557	-	From IMAG database.
Pipistrelle Bat species *Pipistrellus*	06/09/2002	Castletown Bay	ND199684	-	Seen.
Pipistrelle Bat species *Pipistrellus*	03/09/2008	Castle of Mey	ND297736	-	26 passes foraging along hedge at drive.
Pipistrelle Bat species *Pipistrellus*	03/09/2008	Castle of Mey	ND290739	-	6 passes at open entrance.
Pipistrelle Bat species *Pipistrellus*	30/09/2008	Castlehill	ND201682	-	At dawn, several foraging around avenue of trees at road. One pair chasing each other at ruined lodge.
Pipistrelle Bat species *Pipistrellus*	29/04/2009	Castlehill	ND198686	1 Count	-
Pipistrelle Bat species *Pipistrellus*	30/04/2009	Hill of Ratter	ND244733	-	-
Pipistrelle Bat species *Pipistrellus*	02/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	05/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	08/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	10/05/2009	Clett cottage	ND262711	-	-

Species	Date	Location	Sample Spatial Reference	Abundances	Comment
Pipistrelle Bat species *Pipistrellus*	11/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	19/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	25/05/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	01/06/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	09/06/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	15/06/2009	Dunnet	ND223692	-	-
Pipistrelle Bat species *Pipistrellus*	15/07/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species *Pipistrellus*	10/09/2009	Harrow	ND281742	2 Count	At old work sheds.
Pipistrelle Bat species *Pipistrellus*	10/09/2009	Harrow	ND281742	5 Count	Between ice house and barn.
Pipistrelle Bat species *Pipistrellus*	26/10/2009	Clett cottage	ND262711	-	-
Pipistrelle Bat species Pipistrellus	02/04/2015	Camster	ND210609	4 Count of Adult	First sight of year
Common Pipistrelle	16/08/2010	John o' Groats	ND379735	-	Detector contacts at dusk & dawn. WAV files analysed with BatSound.
Common Pipistrelle	25/04/2012	Lower Seater	ND2461	-	Bat Detector, 1, detected at 22:21.
Common Pipistrelle	29/04/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 00:16.

Species	Date	Location	Sample Spatial Reference	Abundances	Comment
Common Pipistrelle	01/05/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 00:23.
Common Pipistrelle	01/05/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 23:43.
Common Pipistrelle	02/05/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 01:52.
Common Pipistrelle	02/05/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 02:38.
Common Pipistrelle	06/05/2012	Lochend	ND2769	-	Bat Detector, 1 detected at 22:28.
Common Pipistrelle	12/05/2012	Lochend	ND2769	-	Bat Detector, Pass at 22:06.
Common Pipistrelle	21/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 22:51.
Common Pipistrelle	21/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:07.
Common Pipistrelle	21/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:23.
Common Pipistrelle	21/07/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 23:10.
Common Pipistrelle	21/07/2012	Lochend	ND2668	-	Bat Detector, 1 detected.
Common Pipistrelle	21/07/2012	Lochend	ND2768	-	Bat Detector, 1 detected.
Common Pipistrelle	22/07/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 02:43.
Common Pipistrelle	22/07/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 03:03.
Common Pipistrelle	23/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:26.
Common Pipistrelle	23/07/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 23:19.
Common Pipistrelle	24/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 03:24.
Common Pipistrelle	24/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:16.
Common Pipistrelle	24/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:36.
Common Pipistrelle	24/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 23:40.
Common Pipistrelle	25/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 00:31.
Common Pipistrelle	25/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 02:54.
Common Pipistrelle	26/07/2012	Lower Seater	ND26	-	Bat Detector, 8 passes.

Species	Date	Location	Sample Spatial Reference	Abundances	Comment
Common Pipistrelle	28/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 00:13.
Common Pipistrelle	28/07/2012	Lochend	ND2769	-	Bat Detector, Pass at 03:25.
Common Pipistrelle	15/09/2012	Lochend	ND2769	-	Bat Detector, 1 detected.
Common Pipistrelle	15/09/2012	Lochend	ND2668	-	Bat Detector, 1 detected.
Common Pipistrelle	15/09/2012	Lochend	ND2668	-	Bat Detector, 1 detected.
Common Pipistrelle	16/09/2012	Lochend	ND2769	-	Bat Detector, Pass at 20:27.
Common Pipistrelle	16/09/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 04:09.
Common Pipistrelle	16/09/2012	Lower Seater	ND2560	-	Bat Detector, Pass at 20:42.
Common Pipistrelle	20/09/2012	Lower Seater	ND2559	-	Bat Detector, 2 passes at 20:17.
Common Pipistrelle	22/09/2012	Lochend	ND2668	-	Bat Detector, 2 passes.
Common Pipistrelle	22/08/2018	Stangergill	ND2066067714	1 Count of Adult	Dead on pavement.

ANNEX 5: ECOBAT TOOL OUTPUT REPORT

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

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

Bat Activity Analysis

Site Name: Hollandmey

Author: [redacted]

09/08/2021

Summary

Bats were detected on **113** nights between **2020-06-21** and **2021-05-12**, using **12** static bat detectors. Throughout this period **5** species were recorded.

Table 1. Detectors were placed at the following locations:

Detector ID	Latitude	Longitude
LOC 10	58.60168	-3.208992
LOC 12	58.61065	-3.241783
LOC 1	58.62429	-3.222188
LOC 3	58.61553	-3.192902
LOC 7	58.60899	-3.227593
LOC 6	58.59765	-3.228520
LOC 11	58.60216	-3.200972
LOC 2	58.61305	-3.211829
LOC 5	58.60354	-3.224889
LOC 4	58.60754	-3.211414
LOC 8	58.62105	-3.238949
LOC 9	58.59808	-3.208472

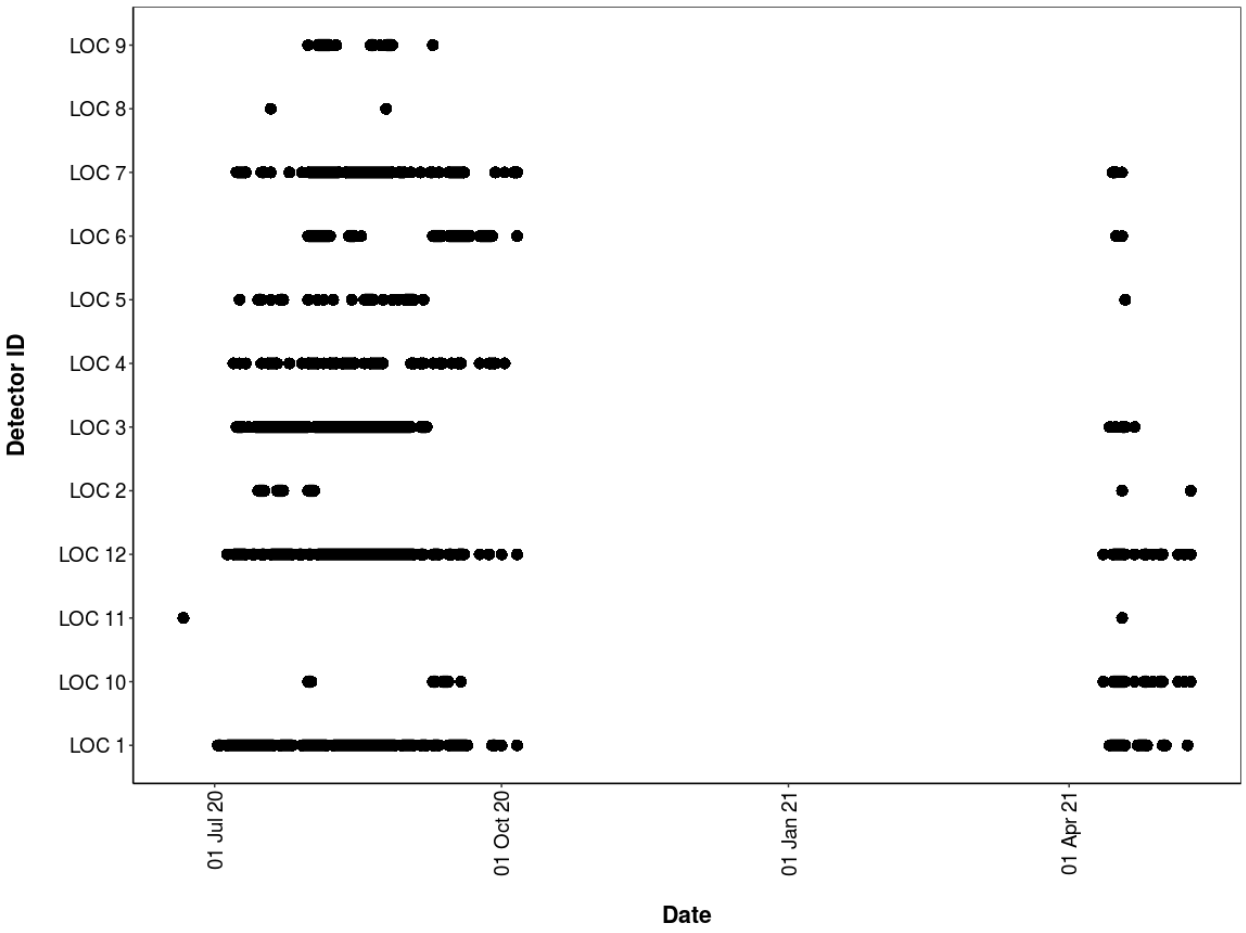
Survey Nights

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	90
LOC 10	25
LOC 11	2
LOC 12	85
LOC 2	11
LOC 3	64
LOC 4	44
LOC 5	24
LOC 6	33
LOC 7	57
LOC 8	2
LOC 9	14

Survey Nights

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



PART 1: Percentiles Analysis

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

The reference range dataset was stratified to include:

- Only records from within 30 days of the survey date.
- Only records from within 100km radius of the survey location.

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	*Pipistrellus pipistrellus*	19	20	21	10	19
LOC 1	*Pipistrellus pygmaeus*	0	0	0	1	6
LOC 10	*Pipistrellus pipistrellus*	0	1	4	10	10
LOC 11	*Pipistrellus pipistrellus*	0	0	0	1	1
LOC 12	*Myotis*	0	0	0	0	1
LOC 12	*Nyctalus noctula*	0	0	0	0	1
LOC 12	*Pipistrellus pipistrellus*	7	18	22	18	20
LOC 2	*Myotis*	0	0	1	0	2
LOC 2	*Nyctalus noctula*	0	1	1	3	1
LOC 2	*Pipistrellus pipistrellus*	0	0	1	1	4
LOC 2	*Pipistrellus pygmaeus*	1	0	2	2	1
LOC 3	*Myotis*	0	0	3	2	5
LOC 3	*Nyctalus noctula*	0	0	1	1	3
LOC 3	*Pipistrellus pipistrellus*	27	10	11	4	8
LOC 3	*Pipistrellus pygmaeus*	1	1	3	3	6
LOC 3	*Plecotus auritus*	0	0	0	0	1
LOC 4	*Pipistrellus pipistrellus*	0	2	7	7	25
LOC 4	*Plecotus auritus*	0	0	0	0	5
LOC 5	*Pipistrellus pipistrellus*	0	0	2	5	17
LOC 6	*Pipistrellus pipistrellus*	2	5	12	5	9
LOC 7	*Pipistrellus pipistrellus*	0	4	20	7	26
LOC 7	*Plecotus auritus*	0	0	0	0	1

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 8	*Pipistrellus pipistrellus*	0	0	0	0	2
LOC 9	*Pipistrellus pipistrellus*	0	1	1	3	9

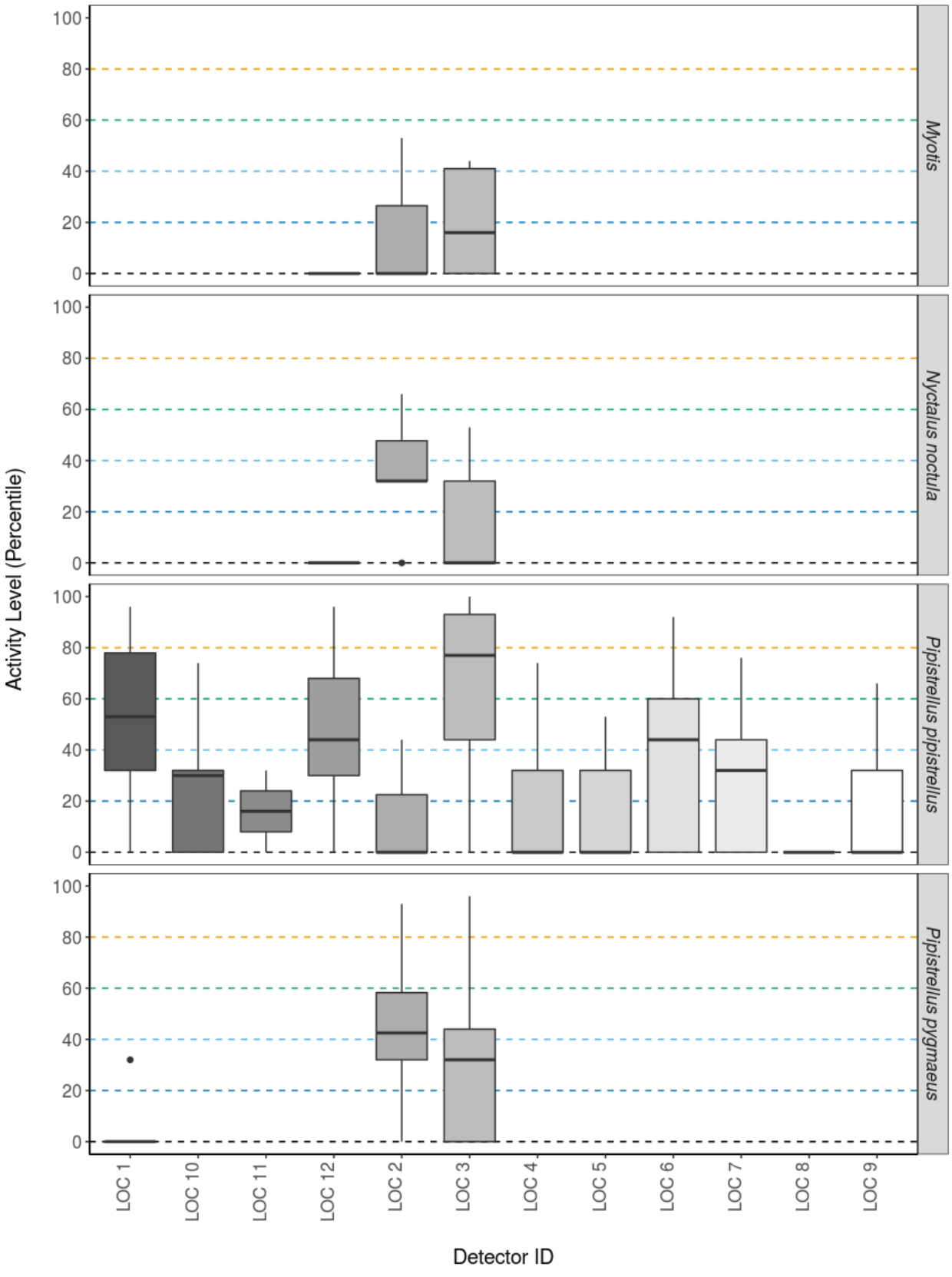
Table 4. Summary table showing key metrics for each species recorded. The reference range is the number of nights for each species that your data were compared to. We recommend a Reference Range of 200+ to be confident in the relative activity level.

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
LOC 12	*Myotis*	0	0	0	1	14
LOC 2	*Myotis*	0	0 - 0	53	3	14
LOC 3	*Myotis*	16	38 - 44	44	10	14
LOC 12	*Nyctalus noctula*	0	0	0	1	12
LOC 2	*Nyctalus noctula*	32	32 - 49	66	6	12
LOC 3	*Nyctalus noctula*	0	42.5 - 42.5	53	5	12
LOC 1	*Pipistrellus pipistrellus*	53	59.5 - 70	96	89	561.2
LOC 10	*Pipistrellus pipistrellus*	30	30 - 40	74	25	300.9
LOC 11	*Pipistrellus pipistrellus*	16	16 - 16	32	2	392.5
LOC 12	*Pipistrellus pipistrellus*	44	50 - 60.5	96	85	545.2
LOC 2	*Pipistrellus pipistrellus*	0	37 - 37	44	6	477.3
LOC 3	*Pipistrellus pipistrellus*	77	68.5 - 83	100	60	587.6
LOC 4	*Pipistrellus pipistrellus*	0	38 - 53	74	41	647
LOC 5	*Pipistrellus pipistrellus*	0	32 - 42.5	53	24	625.8
LOC 6	*Pipistrellus pipistrellus*	44	46 - 62	92	33	600.7
LOC 7	*Pipistrellus pipistrellus*	32	44 - 52	76	57	620.2
LOC 8	*Pipistrellus pipistrellus*	0	0 - 0	0	2	647
LOC 9	*Pipistrellus pipistrellus*	0	32 - 49	66	14	647
LOC 1	*Pipistrellus pygmaeus*	0	0 - 0	32	7	35
LOC 2	*Pipistrellus pygmaeus*	43	32 - 73	93	6	35

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
LOC 3	*Pipistrellus pygmaeus*	32	32 - 70	96	14	35
LOC 3	*Plecotus auritus*	0	0	0	1	7
LOC 4	*Plecotus auritus*	0	0 - 0	0	5	7
LOC 7	*Plecotus auritus*	0	0	0	1	7

FIGURES

Figure 2a. 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)



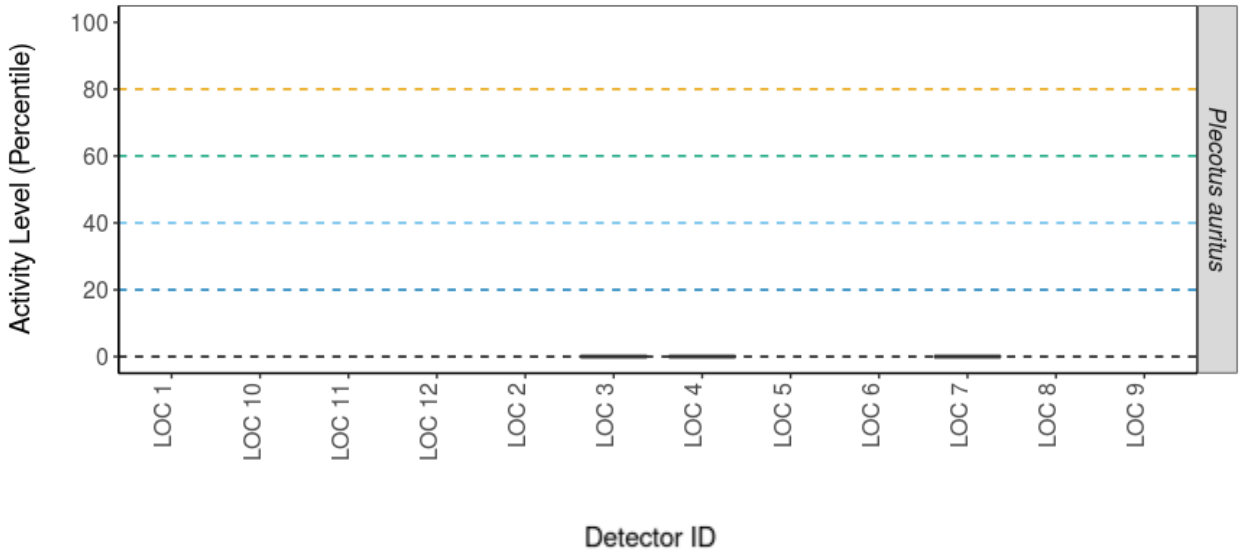
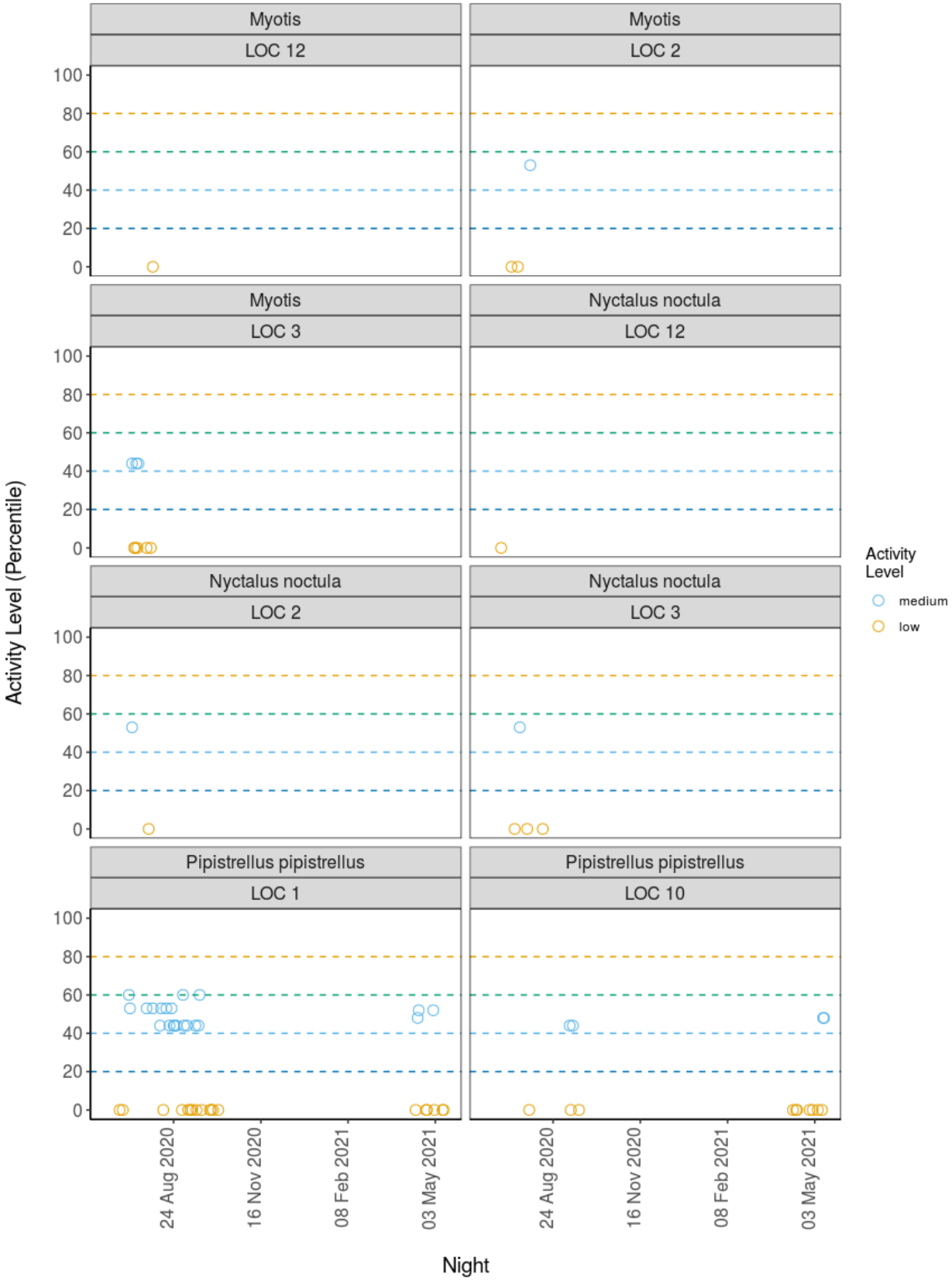
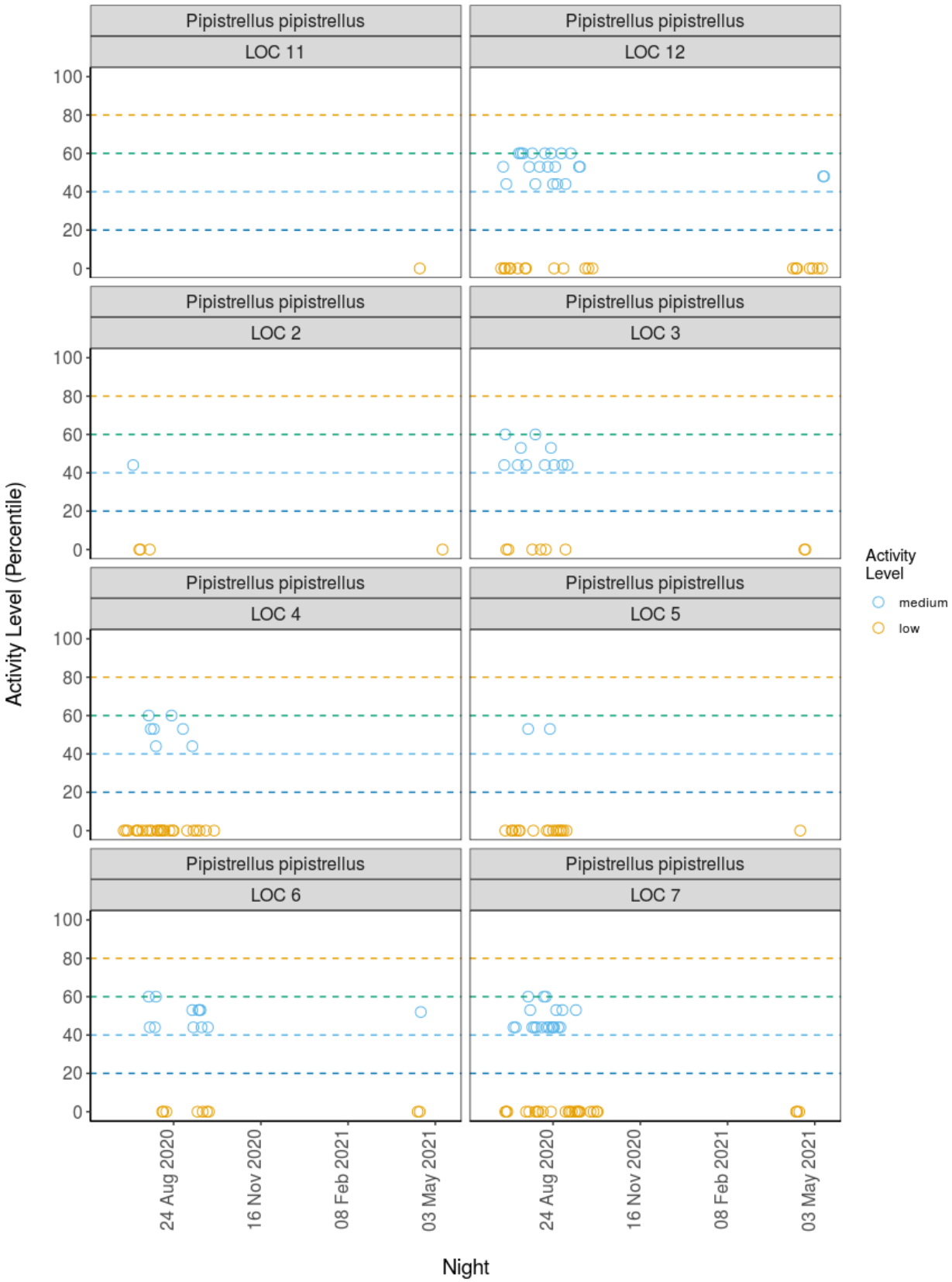
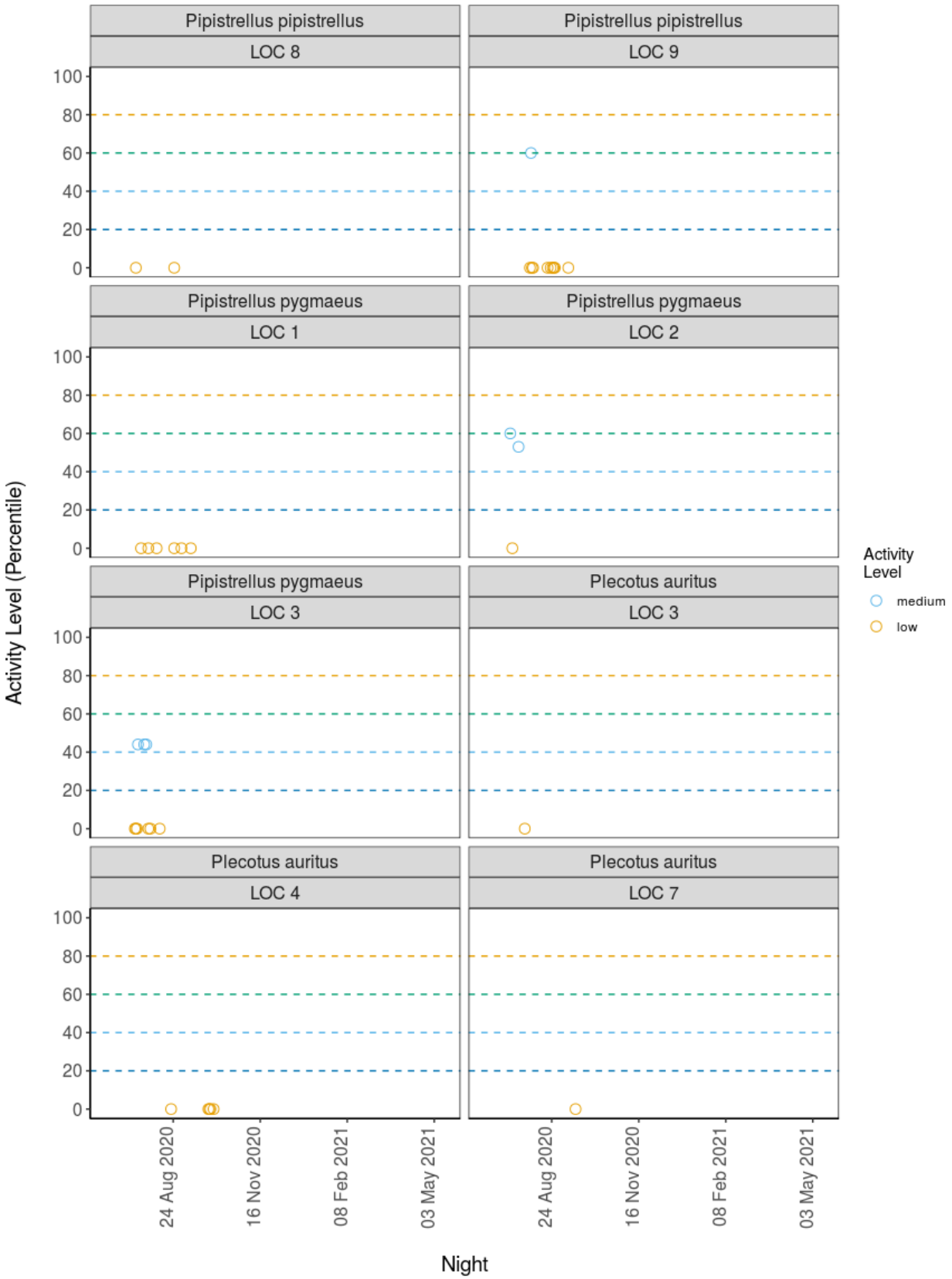

Activity Level (Percentile)
100
80
60
40
20
0
Plecotus auritus
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID

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




Pipistrellus pipistrellus
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
Activity Level (Percentile)
100
80
60
40
20
0
24 Aug 2020
16 Nov 2020
08 Feb 2021
03 May 2021
Night
Activity Level
medium
low


Pipistrellus pipistrellus
LOC 8
Pipistrellus pipistrellus
LOC 9
Pipistrellus pygmaeus
LOC 1
Pipistrellus pygmaeus
LOC 2
Pipistrellus pygmaeus
LOC 3
Plecotus auritus
LOC 3
Plecotus auritus
LOC 4
Plecotus auritus
LOC 7
Activity Level (Percentile)
0
20
40
60
80
100
24 Aug 2020
16 Nov 2020
08 Feb 2021
03 May 2021
Night
Activity Level
medium
low

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	*Pipistrellus pipistrellus*	Apr	0	2	2	3	3
LOC 1	*Pipistrellus pipistrellus*	May	0	1	1	0	3
LOC 1	*Pipistrellus pipistrellus*	Jul	14	7	3	0	2
LOC 1	*Pipistrellus pipistrellus*	Aug	5	10	9	4	1
LOC 1	*Pipistrellus pipistrellus*	Sep	0	0	6	3	8
LOC 1	*Pipistrellus pipistrellus*	Oct	0	0	0	0	2
LOC 1	*Pipistrellus pygmaeus*	Jul	0	0	0	0	2
LOC 1	*Pipistrellus pygmaeus*	Aug	0	0	0	1	2
LOC 1	*Pipistrellus pygmaeus*	Sep	0	0	0	0	2
LOC 10	*Pipistrellus pipistrellus*	Apr	0	0	0	7	4
LOC 10	*Pipistrellus pipistrellus*	May	0	0	2	1	3
LOC 10	*Pipistrellus pipistrellus*	Jul	0	0	0	1	0
LOC 10	*Pipistrellus pipistrellus*	Aug	0	0	0	0	1
LOC 10	*Pipistrellus pipistrellus*	Sep	0	1	2	1	2
LOC 11	*Pipistrellus pipistrellus*	Apr	0	0	0	0	1
LOC 11	*Pipistrellus pipistrellus*	Jun	0	0	0	1	0
LOC 12	*Myotis*	Aug	0	0	0	0	1
LOC 12	*Nyctalus noctula*	Jul	0	0	0	0	1

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 12	*Pipistrellus pipistrellus*	Apr	0	0	0	7	4
LOC 12	*Pipistrellus pipistrellus*	May	0	0	2	1	3
LOC 12	*Pipistrellus pipistrellus*	Jul	2	4	5	2	8
LOC 12	*Pipistrellus pipistrellus*	Aug	3	13	10	3	1
LOC 12	*Pipistrellus pipistrellus*	Sep	2	1	5	4	3
LOC 12	*Pipistrellus pipistrellus*	Oct	0	0	0	1	1
LOC 2	*Myotis*	Jul	0	0	0	0	2
LOC 2	*Myotis*	Aug	0	0	1	0	0
LOC 2	*Nyctalus noctula*	Jul	0	1	1	3	1
LOC 2	*Pipistrellus pipistrellus*	Apr	0	0	0	1	0
LOC 2	*Pipistrellus pipistrellus*	May	0	0	0	0	1
LOC 2	*Pipistrellus pipistrellus*	Jul	0	0	1	0	2
LOC 2	*Pipistrellus pipistrellus*	Aug	0	0	0	0	1
LOC 2	*Pipistrellus pygmaeus*	Jul	1	0	2	1	1
LOC 2	*Pipistrellus pygmaeus*	Aug	0	0	0	1	0
LOC 3	*Myotis*	Jul	0	0	3	2	4
LOC 3	*Myotis*	Aug	0	0	0	0	1
LOC 3	*Nyctalus noctula*	Jul	0	0	1	1	2
LOC 3	*Nyctalus noctula*	Aug	0	0	0	0	1
LOC 3	*Pipistrellus pipistrellus*	Apr	3	1	0	1	2
LOC 3	*Pipistrellus pipistrellus*	Jul	8	2	5	1	2

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 3	*Pipistrellus pipistrellus*	Aug	15	6	4	2	3
LOC 3	*Pipistrellus pipistrellus*	Sep	1	1	2	0	1
LOC 3	*Pipistrellus pygmaeus*	Jul	1	1	3	3	4
LOC 3	*Pipistrellus pygmaeus*	Aug	0	0	0	0	2
LOC 3	*Plecotus auritus*	Jul	0	0	0	0	1
LOC 4	*Pipistrellus pipistrellus*	Jul	0	0	1	2	8
LOC 4	*Pipistrellus pipistrellus*	Aug	0	1	4	2	11
LOC 4	*Pipistrellus pipistrellus*	Sep	0	1	2	3	5
LOC 4	*Pipistrellus pipistrellus*	Oct	0	0	0	0	1
LOC 4	*Plecotus auritus*	Aug	0	0	0	0	1
LOC 4	*Plecotus auritus*	Sep	0	0	0	0	3
LOC 4	*Plecotus auritus*	Oct	0	0	0	0	1
LOC 5	*Pipistrellus pipistrellus*	Apr	0	0	0	0	1
LOC 5	*Pipistrellus pipistrellus*	Jul	0	0	1	0	6
LOC 5	*Pipistrellus pipistrellus*	Aug	0	0	1	4	7
LOC 5	*Pipistrellus pipistrellus*	Sep	0	0	0	1	3
LOC 6	*Pipistrellus pipistrellus*	Apr	0	0	1	0	2
LOC 6	*Pipistrellus pipistrellus*	Jul	0	0	1	0	0
LOC 6	*Pipistrellus pipistrellus*	Aug	0	3	3	2	3
LOC 6	*Pipistrellus pipistrellus*	Sep	2	2	7	2	4
LOC 6	*Pipistrellus pipistrellus*	Oct	0	0	0	1	0

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 7	*Pipistrellus pipistrellus*	Apr	0	0	0	0	3
LOC 7	*Pipistrellus pipistrellus*	Jul	0	0	3	3	4
LOC 7	*Pipistrellus pipistrellus*	Aug	0	4	15	4	6
LOC 7	*Pipistrellus pipistrellus*	Sep	0	0	2	0	10
LOC 7	*Pipistrellus pipistrellus*	Oct	0	0	0	0	3
LOC 7	*Plecotus auritus*	Sep	0	0	0	0	1
LOC 8	*Pipistrellus pipistrellus*	Jul	0	0	0	0	1
LOC 8	*Pipistrellus pipistrellus*	Aug	0	0	0	0	1
LOC 9	*Pipistrellus pipistrellus*	Jul	0	0	0	1	0
LOC 9	*Pipistrellus pipistrellus*	Aug	0	1	1	2	8
LOC 9	*Pipistrellus pipistrellus*	Sep	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	*Pipistrellus pipistrellus*	Apr	30	59.5 - 70	65	10
LOC 1	*Pipistrellus pipistrellus*	May	0	59.5 - 70	63	5
LOC 1	*Pipistrellus pipistrellus*	Jul	87	59.5 - 70	94	26
LOC 1	*Pipistrellus pipistrellus*	Aug	68	59.5 - 70	96	29
LOC 1	*Pipistrellus pipistrellus*	Sep	32	59.5 - 70	60	17
LOC 1	*Pipistrellus pipistrellus*	Oct	0	59.5 - 70	0	2
LOC 1	*Pipistrellus pygmaeus*	Jul	0	0 - 0	0	2
LOC 1	*Pipistrellus pygmaeus*	Aug	0	0 - 0	32	3
LOC 1	*Pipistrellus pygmaeus*	Sep	0	0 - 0	0	2
LOC 10	*Pipistrellus pipistrellus*	Apr	30	30 - 40	30	11
LOC 10	*Pipistrellus pipistrellus*	May	15	30 - 40	48	6
LOC 10	*Pipistrellus pipistrellus*	Jul	32	30 - 40	32	1
LOC 10	*Pipistrellus pipistrellus*	Aug	0	30 - 40	0	1
LOC 10	*Pipistrellus pipistrellus*	Sep	38	30 - 40	74	6
LOC 11	*Pipistrellus pipistrellus*	Apr	0	16 - 16	0	1
LOC 11	*Pipistrellus pipistrellus*	Jun	32	16 - 16	32	1
LOC 12	*Myotis*	Aug	0	0	0	1
LOC 12	*Nyctalus noctula*	Jul	0	0	0	1
LOC 12	*Pipistrellus pipistrellus*	Apr	30	50 - 60.5	30	11
LOC 12	*Pipistrellus pipistrellus*	May	15	50 - 60.5	48	6

Detector ID	Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
LOC 12	*Pipistrellus pipistrellus*	Jul	44	50 - 60.5	87	21
LOC 12	*Pipistrellus pipistrellus*	Aug	67	50 - 60.5	86	30
LOC 12	*Pipistrellus pipistrellus*	Sep	44	50 - 60.5	96	15
LOC 12	*Pipistrellus pipistrellus*	Oct	16	50 - 60.5	32	2
LOC 2	*Myotis*	Jul	0	0 - 0	0	2
LOC 2	*Myotis*	Aug	53	0 - 0	53	1
LOC 2	*Nyctalus noctula*	Jul	32	32 - 49	66	6
LOC 2	*Pipistrellus pipistrellus*	Apr	30	37 - 37	30	1
LOC 2	*Pipistrellus pipistrellus*	May	0	37 - 37	0	1
LOC 2	*Pipistrellus pipistrellus*	Jul	0	37 - 37	44	3
LOC 2	*Pipistrellus pipistrellus*	Aug	0	37 - 37	0	1
LOC 2	*Pipistrellus pygmaeus*	Jul	53	32 - 73	93	5
LOC 2	*Pipistrellus pygmaeus*	Aug	32	32 - 73	32	1
LOC 3	*Myotis*	Jul	32	38 - 44	44	9
LOC 3	*Myotis*	Aug	0	38 - 44	0	1
LOC 3	*Nyctalus noctula*	Jul	16	42.5 - 42.5	53	4
LOC 3	*Nyctalus noctula*	Aug	0	42.5 - 42.5	0	1
LOC 3	*Pipistrellus pipistrellus*	Apr	67	68.5 - 83	93	7
LOC 3	*Pipistrellus pipistrellus*	Jul	71	68.5 - 83	99	18
LOC 3	*Pipistrellus pipistrellus*	Aug	80	68.5 - 83	100	30
LOC 3	*Pipistrellus pipistrellus*	Sep	44	68.5 - 83	82	5
LOC 3	*Pipistrellus pygmaeus*	Jul	32	32 - 70	96	12
LOC 3	*Pipistrellus pygmaeus*	Aug	0	32 - 70	0	2

Detector ID	Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
LOC 3	*Plecotus auritus*	Jul	0	0	0	1
LOC 4	*Pipistrellus pipistrellus*	Jul	0	38 - 53	60	11
LOC 4	*Pipistrellus pipistrellus*	Aug	0	38 - 53	74	18
LOC 4	*Pipistrellus pipistrellus*	Sep	32	38 - 53	68	11
LOC 4	*Pipistrellus pipistrellus*	Oct	0	38 - 53	0	1
LOC 4	*Plecotus auritus*	Aug	0	0 - 0	0	1
LOC 4	*Plecotus auritus*	Sep	0	0 - 0	0	3
LOC 4	*Plecotus auritus*	Oct	0	0 - 0	0	1
LOC 5	*Pipistrellus pipistrellus*	Apr	0	32 - 42.5	0	1
LOC 5	*Pipistrellus pipistrellus*	Jul	0	32 - 42.5	53	7
LOC 5	*Pipistrellus pipistrellus*	Aug	0	32 - 42.5	53	12
LOC 5	*Pipistrellus pipistrellus*	Sep	0	32 - 42.5	32	4
LOC 6	*Pipistrellus pipistrellus*	Apr	0	46 - 62	52	3
LOC 6	*Pipistrellus pipistrellus*	Jul	60	46 - 62	60	1
LOC 6	*Pipistrellus pipistrellus*	Aug	44	46 - 62	74	11
LOC 6	*Pipistrellus pipistrellus*	Sep	44	46 - 62	92	17
LOC 6	*Pipistrellus pipistrellus*	Oct	32	46 - 62	32	1
LOC 7	*Pipistrellus pipistrellus*	Apr	0	44 - 52	0	3
LOC 7	*Pipistrellus pipistrellus*	Jul	32	44 - 52	60	10
LOC 7	*Pipistrellus pipistrellus*	Aug	44	44 - 52	76	29
LOC 7	*Pipistrellus pipistrellus*	Sep	0	44 - 52	53	12
LOC 7	*Pipistrellus pipistrellus*	Oct	0	44 - 52	0	3
LOC 7	*Plecotus auritus*	Sep	0	0	0	1

Detector ID	Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
LOC 8	*Pipistrellus pipistrellus*	Jul	0	0 - 0	0	1
LOC 8	*Pipistrellus pipistrellus*	Aug	0	0 - 0	0	1
LOC 9	*Pipistrellus pipistrellus*	Jul	32	32 - 49	32	1
LOC 9	*Pipistrellus pipistrellus*	Aug	0	32 - 49	66	12
LOC 9	*Pipistrellus pipistrellus*	Sep	0	32 - 49	0	1

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	4	2	8
Nyctalus noctula	0	1	2	4	5
Pipistrellus pipistrellus	55	61	101	71	150
Pipistrellus pygmaeus	2	1	5	6	13
Plecotus auritus	0	0	0	0	7

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

Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	0	38 - 44	53	14
Nyctalus noctula	32	42.5 - 42.5	66	12
Pipistrellus pipistrellus	32	68.5 - 83	100	438
Pipistrellus pygmaeus	32	32 - 73	96	27
Plecotus auritus	0	0 - 0	0	7

Figures

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

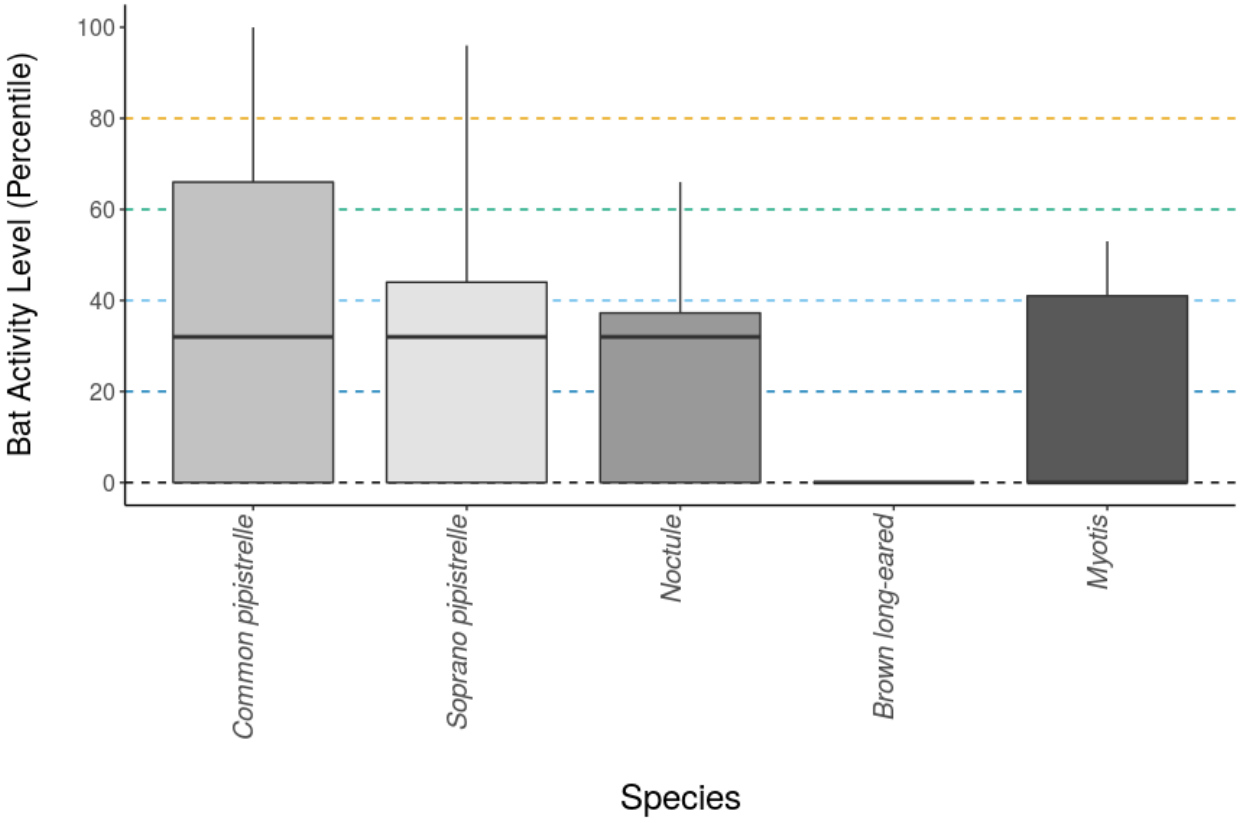
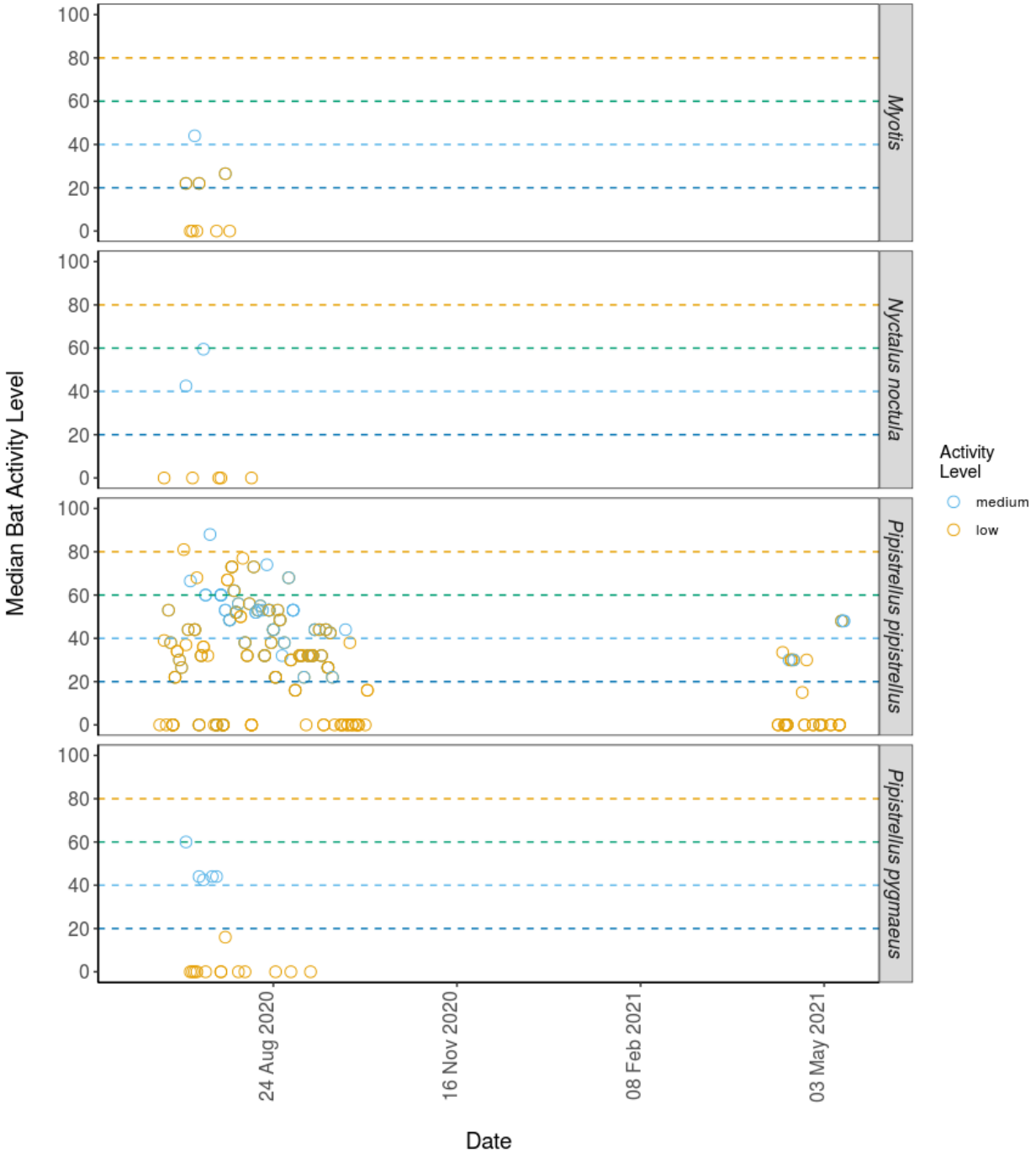
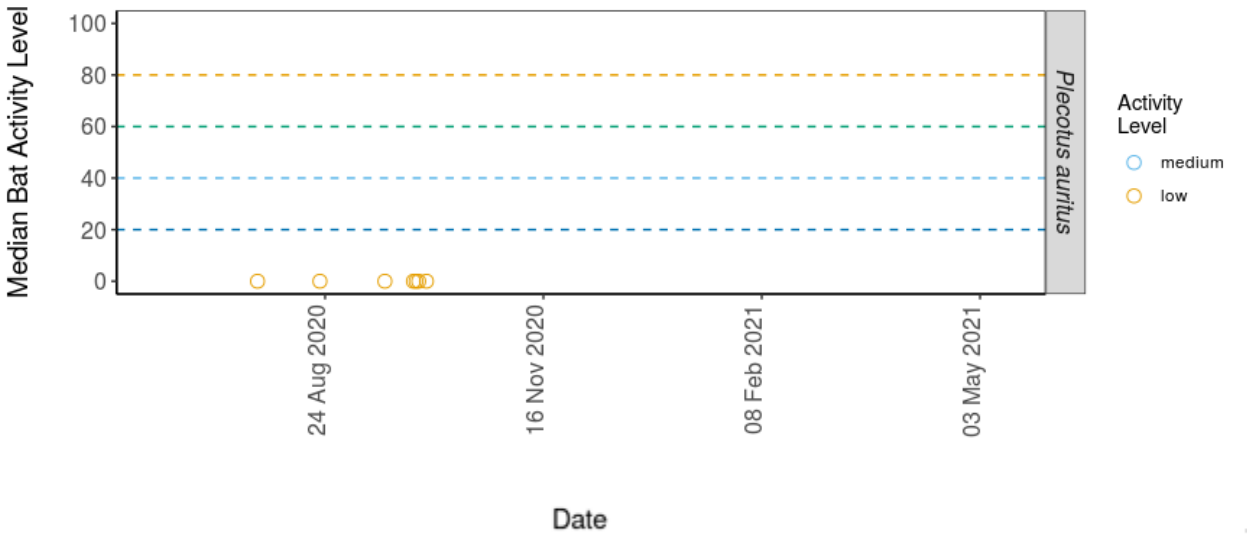


Figure 5. The median activity levels of bats recorded across all detectors each night.




Median Bat Activity Level
100
80
60
40
20
0
24 Aug 2020
16 Nov 2020
08 Feb 2021
03 May 2021
Date
Plecotus auritus
Activity Level
medium
low

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.

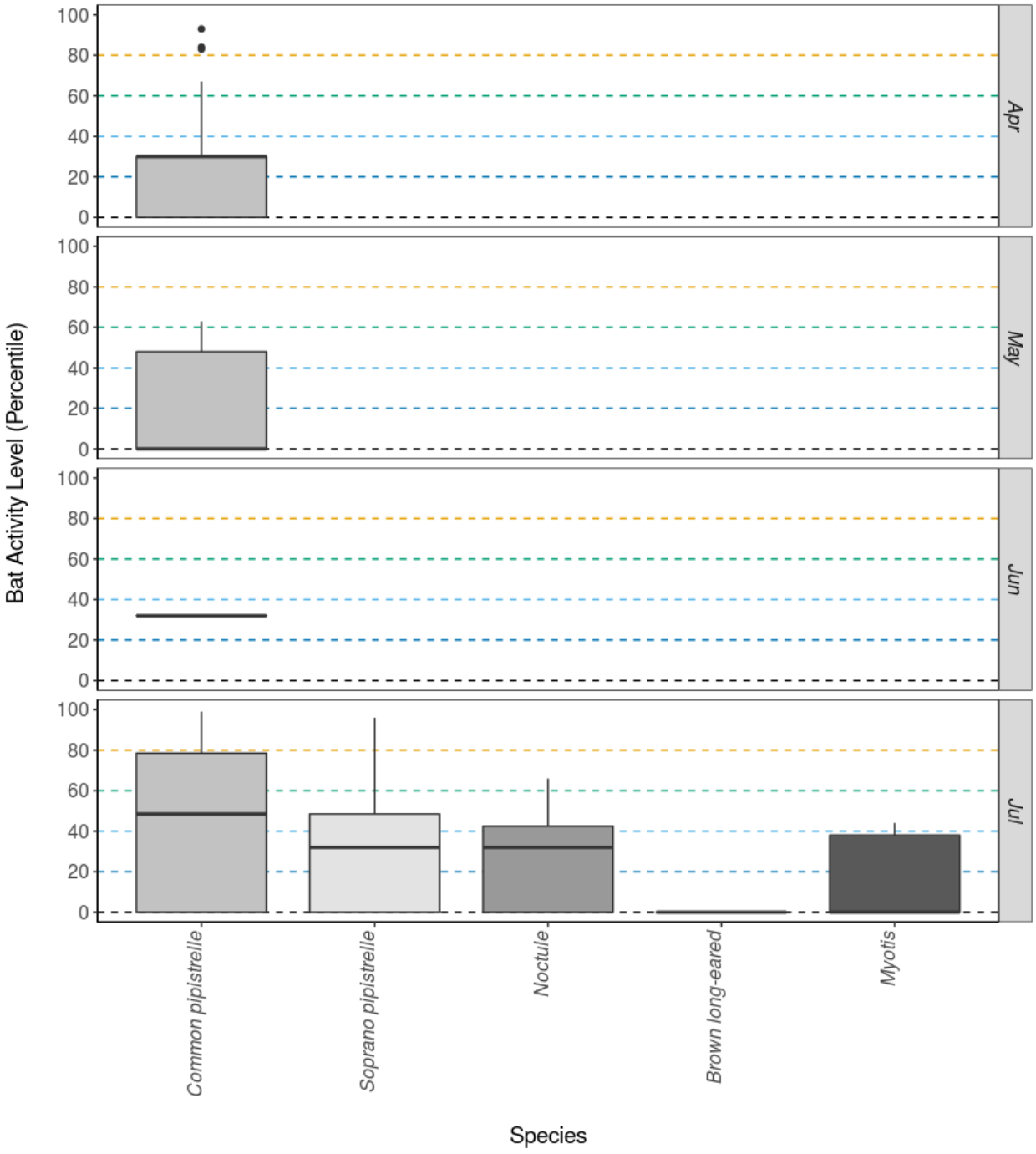
Species/Species Group	Month	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
Myotis	Jul	0	0	3	2	6
Myotis	Aug	0	0	1	0	2
Nyctalus noctula	Jul	0	1	2	4	4
Nyctalus noctula	Aug	0	0	0	0	1
Pipistrellus pipistrellus	Apr	3	3	3	19	20
Pipistrellus pipistrellus	May	0	1	5	2	10
Pipistrellus pipistrellus	Jun	0	0	0	1	0
Pipistrellus pipistrellus	Jul	24	13	20	10	33
Pipistrellus pipistrellus	Aug	23	38	47	23	43
Pipistrellus pipistrellus	Sep	5	6	26	14	37
Pipistrellus pipistrellus	Oct	0	0	0	2	7
Pipistrellus pygmaeus	Jul	2	1	5	4	7
Pipistrellus pygmaeus	Aug	0	0	0	2	4
Pipistrellus pygmaeus	Sep	0	0	0	0	2
Plecotus auritus	Jul	0	0	0	0	1
Plecotus auritus	Aug	0	0	0	0	1
Plecotus auritus	Sep	0	0	0	0	4
Plecotus auritus	Oct	0	0	0	0	1

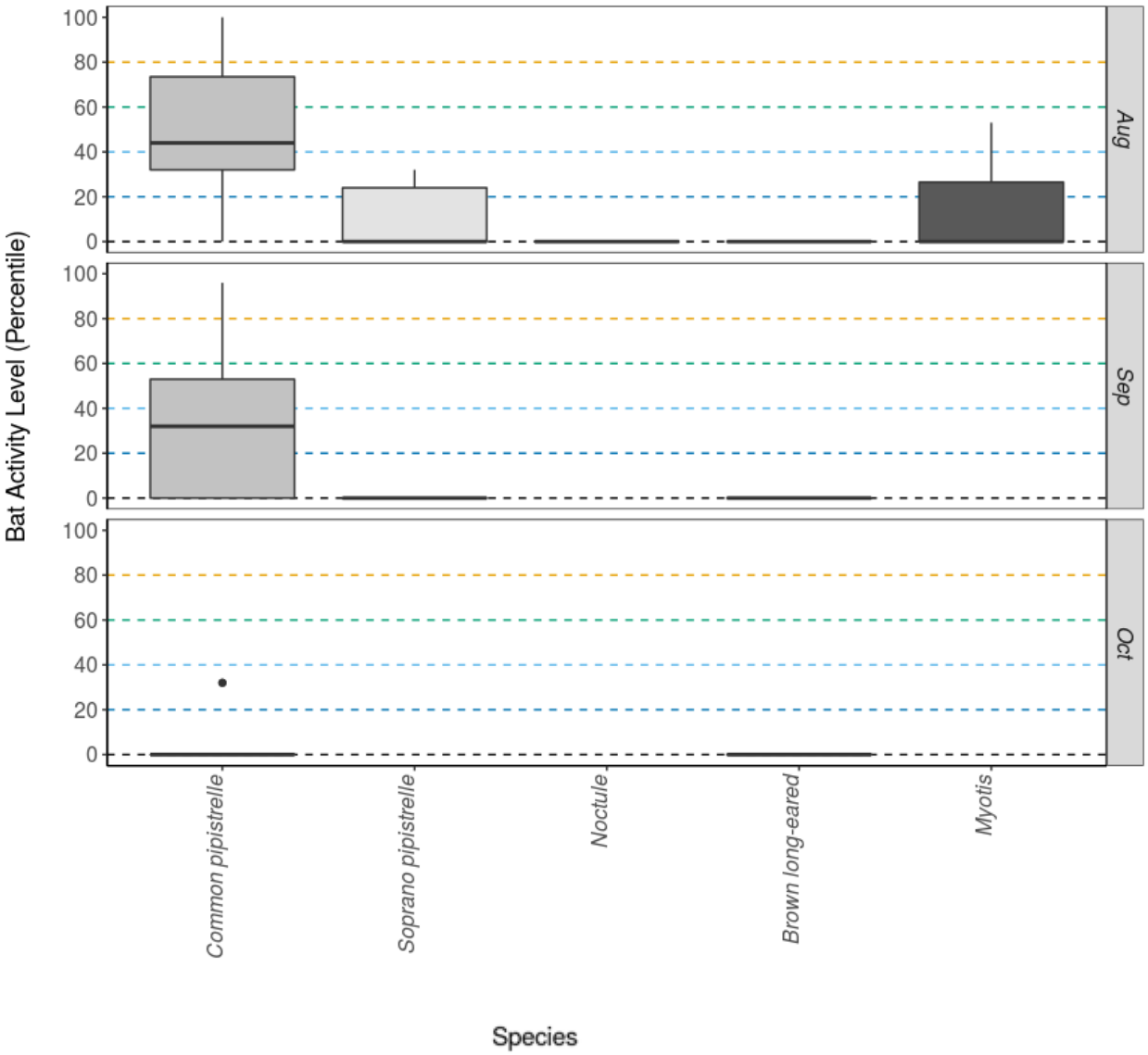
Table 10. Summary table showing key metrics for each species recorded per month.

Species/Species Group	Month	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Myotis	Jul	0	38 - 44	44	11
Myotis	Aug	0	38 - 44	53	3
Nyctalus noctula	Jul	32	42.5 - 42.5	66	11
Nyctalus noctula	Aug	0	42.5 - 42.5	0	1
Pipistrellus pipistrellus	Apr	30	68.5 - 83	93	48
Pipistrellus pipistrellus	May	0	59.5 - 70	63	18
Pipistrellus pipistrellus	Jun	32	16 - 16	32	1
Pipistrellus pipistrellus	Jul	49	68.5 - 83	99	100
Pipistrellus pipistrellus	Aug	44	68.5 - 83	100	174
Pipistrellus pipistrellus	Sep	32	68.5 - 83	96	88
Pipistrellus pipistrellus	Oct	0	59.5 - 70	32	9
Pipistrellus pygmaeus	Jul	32	32 - 73	96	19
Pipistrellus pygmaeus	Aug	0	32 - 73	32	6
Pipistrellus pygmaeus	Sep	0	0 - 0	0	2
Plecotus auritus	Jul	0	0	0	1
Plecotus auritus	Aug	0	0 - 0	0	1
Plecotus auritus	Sep	0	0 - 0	0	4
Plecotus auritus	Oct	0	0 - 0	0	1

Figures

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




Bat Activity Level (Percentile)
100
80
60
40
20
0
Aug
Sep
Oct
Common pipistrelle
Soprano pipistrelle
Noctule
Brown long-eared
Myotis
Species

PART 2: Nightly Analysis

ENTIRE SURVEY PERIOD

Sunrise and Sunset Times

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

Night (y-m-d)	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
2020-06-21	22:27	04:04	5.6
2020-07-02	22:24	04:12	5.8
2020-07-03	22:23	04:13	5.8
2020-07-05	22:21	04:16	5.9
2020-07-06	22:21	04:17	5.9
2020-07-07	22:20	04:19	6.0
2020-07-08	22:18	04:20	6.0
2020-07-09	22:17	04:22	6.1
2020-07-10	22:16	04:23	6.1
2020-07-11	22:15	04:25	6.2
2020-07-12	22:13	04:26	6.2
2020-07-13	22:12	04:28	6.3
2020-07-14	22:11	04:30	6.3
2020-07-15	22:09	04:32	6.4
2020-07-16	22:07	04:33	6.4
2020-07-17	22:06	04:35	6.5
2020-07-18	22:04	04:37	6.5
2020-07-19	22:02	04:39	6.6
2020-07-20	22:01	04:41	6.7
2020-07-21	21:59	04:43	6.7
2020-07-22	21:57	04:45	6.8
2020-07-23	21:55	04:47	6.9
2020-07-24	21:53	04:49	6.9
2020-07-25	21:51	04:51	7.0
2020-07-26	21:49	04:53	7.1
2020-07-27	21:47	04:55	7.1
2020-07-28	21:45	04:57	7.2
2020-07-29	21:43	05:00	7.3
2020-07-30	21:40	05:02	7.4
2020-07-31	21:38	05:04	7.4
2020-08-01	21:36	05:06	7.5

2020-08-02	21:34	05:08	7.6
2020-08-03	21:31	05:10	7.7
2020-08-04	21:29	05:13	7.7
2020-08-05	21:27	05:15	7.8
2020-08-06	21:24	05:17	7.9
2020-08-07	21:22	05:19	8.0
2020-08-08	21:19	05:22	8.0
2020-08-09	21:17	05:24	8.1
2020-08-10	21:14	05:26	8.2
2020-08-11	21:12	05:28	8.3
2020-08-12	21:09	05:31	8.4
2020-08-13	21:07	05:33	8.4
2020-08-14	21:04	05:35	8.5
2020-08-15	21:01	05:37	8.6
2020-08-16	20:59	05:40	8.7
2020-08-17	20:56	05:42	8.8
2020-08-18	20:53	05:44	8.8
2020-08-19	20:51	05:46	8.9
2020-08-20	20:48	05:48	9.0
2020-08-21	20:45	05:51	9.1
2020-08-22	20:43	05:53	9.2
2020-08-23	20:40	05:55	9.3
2020-08-24	20:37	05:57	9.3
2020-08-25	20:34	06:00	9.4
2020-08-26	20:32	06:02	9.5
2020-08-27	20:29	06:04	9.6
2020-08-28	20:26	06:06	9.7
2020-08-29	20:23	06:09	9.8
2020-08-30	20:20	06:11	9.8
2020-08-31	20:17	06:13	9.9
2020-09-01	20:15	06:15	10.0
2020-09-02	20:12	06:17	10.1
2020-09-03	20:09	06:20	10.2
2020-09-05	20:03	06:24	10.3
2020-09-06	20:00	06:26	10.4
2020-09-07	19:57	06:28	10.5
2020-09-08	19:55	06:30	10.6
2020-09-09	19:52	06:33	10.7
2020-09-10	19:49	06:35	10.8

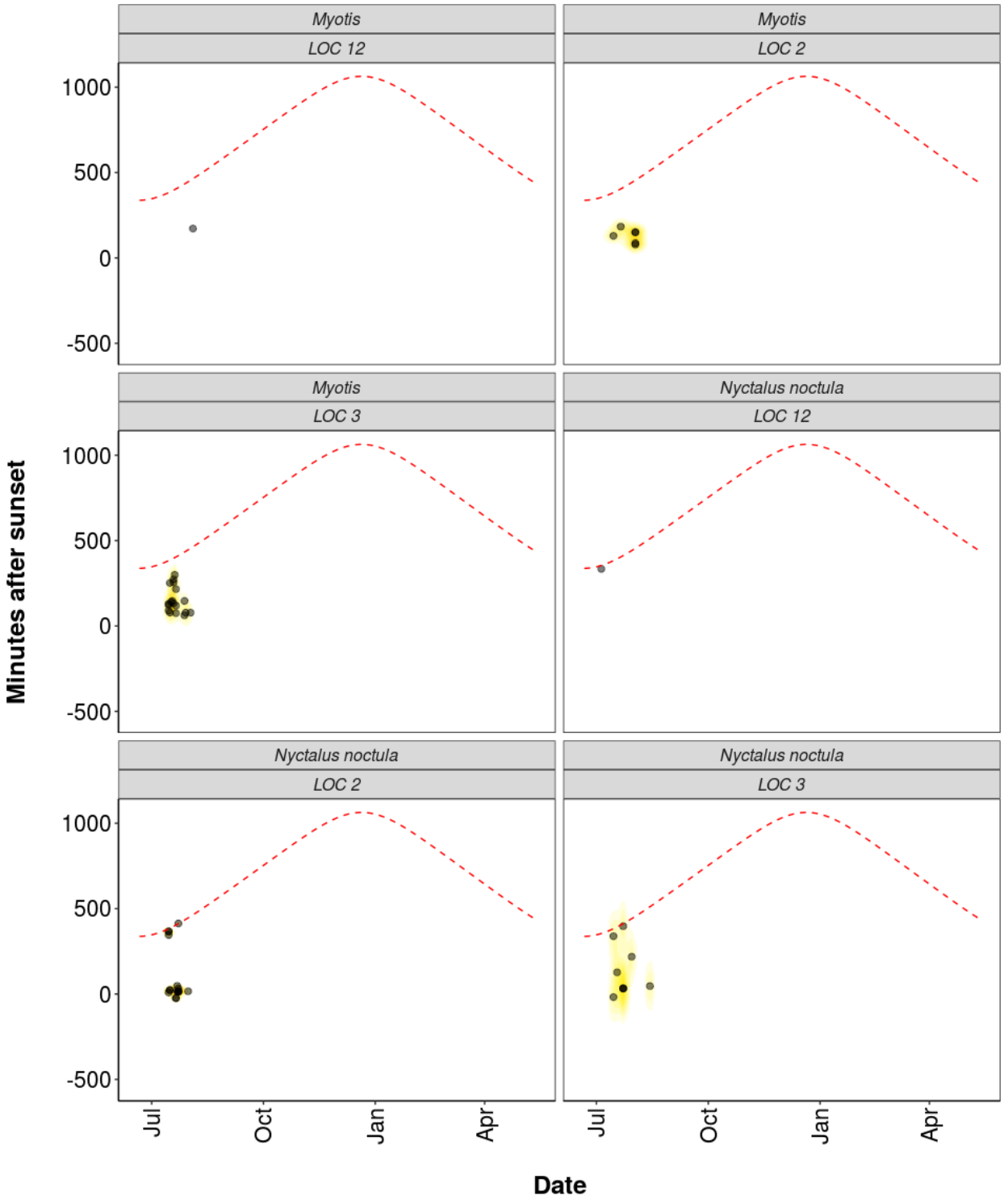
2020-09-11	19:46	06:37	10.9
2020-09-12	19:43	06:39	10.9
2020-09-13	19:40	06:41	11.0
2020-09-14	19:37	06:44	11.1
2020-09-15	19:34	06:46	11.2
2020-09-16	19:31	06:48	11.3
2020-09-17	19:28	06:50	11.4
2020-09-18	19:25	06:52	11.4
2020-09-19	19:22	06:54	11.5
2020-09-20	19:20	06:57	11.6
2020-09-21	19:17	06:59	11.7
2020-09-24	19:08	07:05	12.0
2020-09-25	19:05	07:08	12.0
2020-09-26	19:02	07:10	12.1
2020-09-27	18:59	07:12	12.2
2020-09-28	18:56	07:14	12.3
2020-09-29	18:53	07:16	12.4
2020-10-01	18:48	07:21	12.6
2020-10-02	18:45	07:23	12.6
2020-10-05	18:36	07:30	12.9
2020-10-06	18:33	07:32	13.0
2021-04-12	20:19	06:06	9.8
2021-04-14	20:24	06:01	9.6
2021-04-15	20:26	05:58	9.5
2021-04-16	20:28	05:55	9.4
2021-04-17	20:31	05:52	9.4
2021-04-18	20:33	05:50	9.3
2021-04-19	20:35	05:47	9.2
2021-04-22	20:42	05:39	8.9
2021-04-23	20:45	05:36	8.9
2021-04-24	20:47	05:34	8.8
2021-04-25	20:49	05:31	8.7
2021-04-26	20:52	05:28	8.6
2021-04-28	20:56	05:23	8.4
2021-04-30	21:01	05:18	8.3
2021-05-01	21:03	05:15	8.2
2021-05-02	21:06	05:13	8.1
2021-05-06	21:15	05:03	7.8
2021-05-08	21:19	04:59	7.7

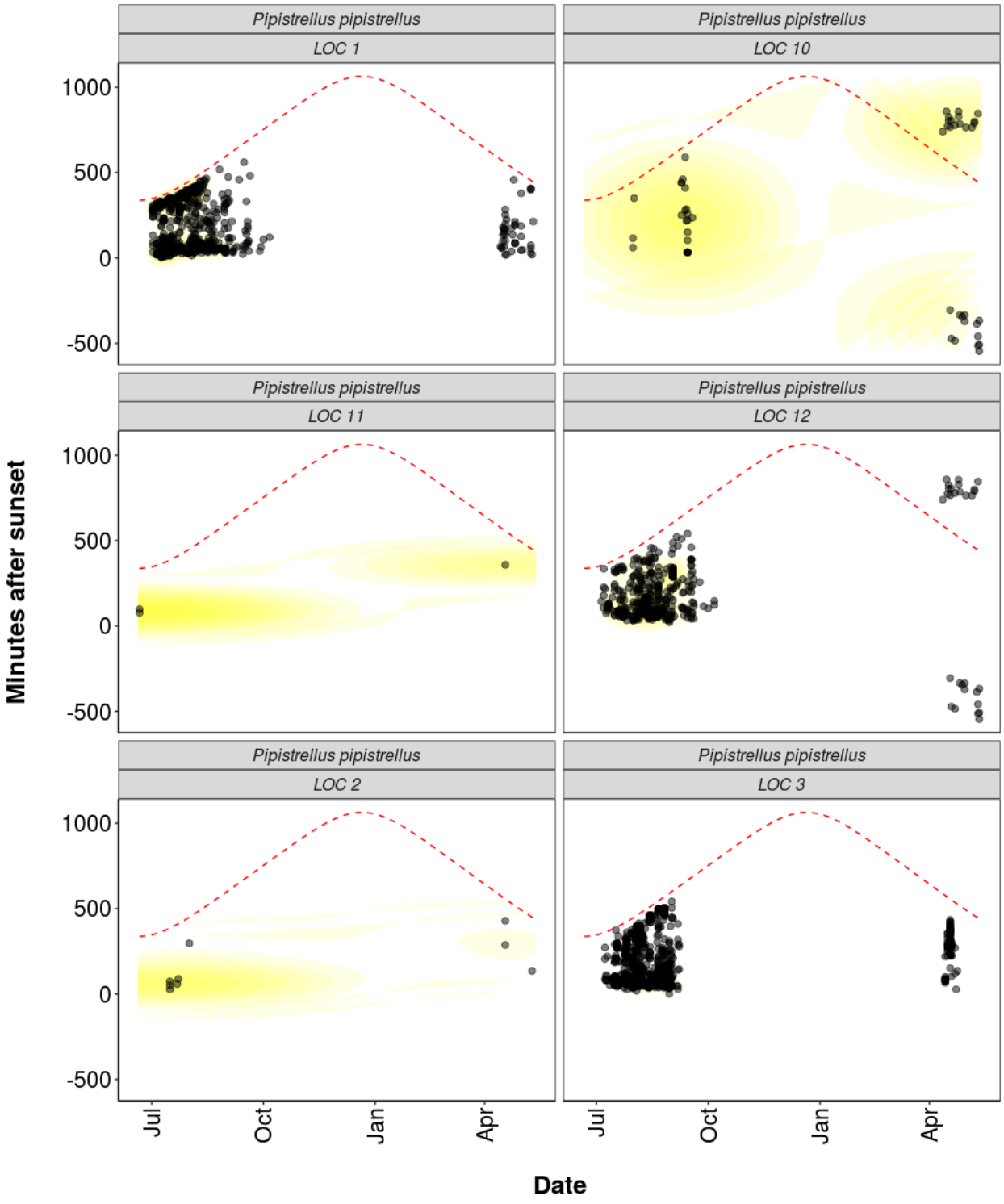
2021-05-09	21:22	04:56	7.6
2021-05-10	21:24	04:54	7.5
2021-05-11	21:26	04:52	7.4
2021-05-12	21:28	04:50	7.4

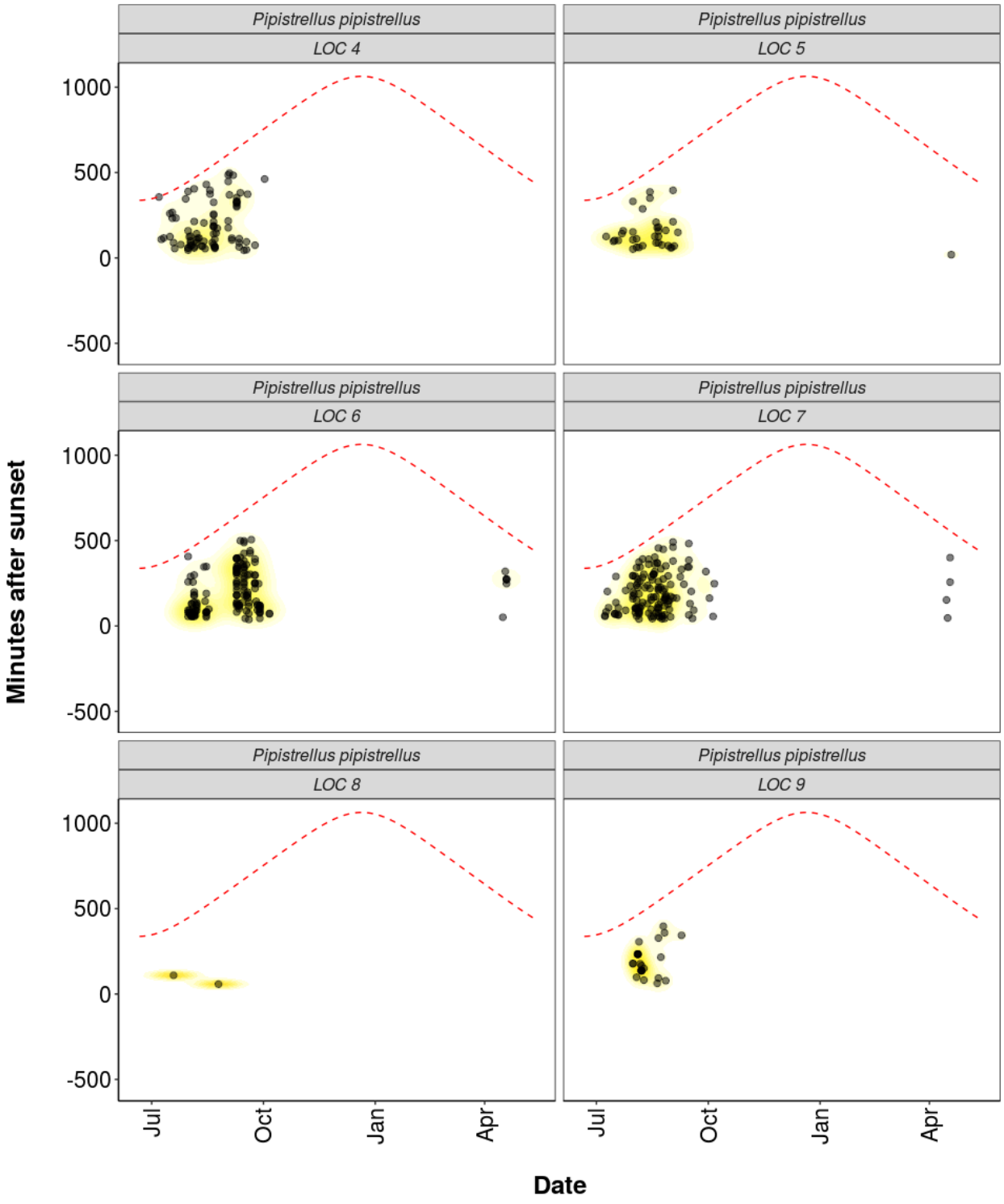
Distribution of Bat Activity Across the Night through Time

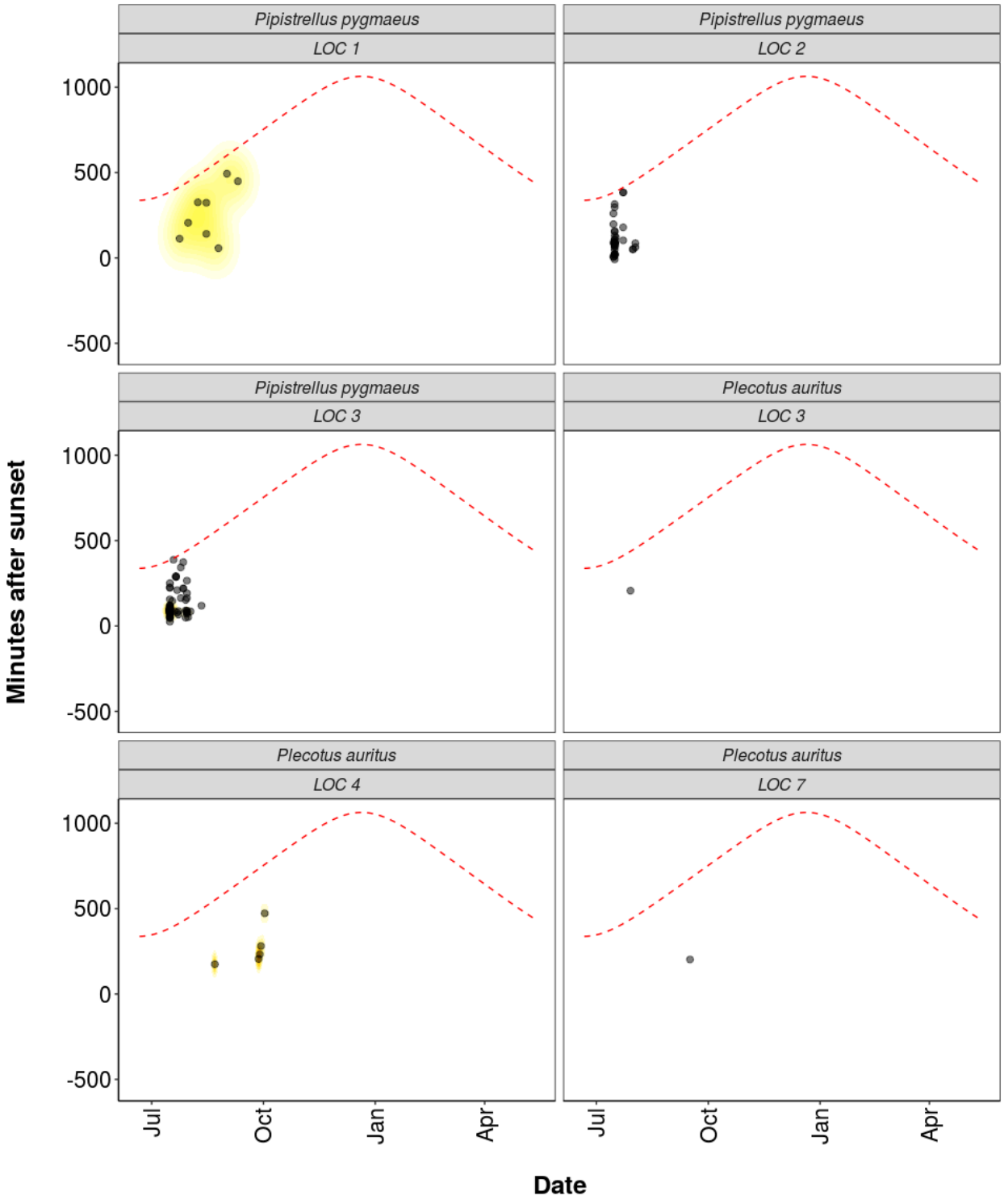
Per Detector

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


Myotis
LOC 12
Myotis
LOC 2
Myotis
LOC 3
Nyctalus noctula
LOC 12
Nyctalus noctula
LOC 2
Nyctalus noctula
LOC 3
1000
500
0
-500
Minutes after sunset
Jul
Oct
Jan
Apr
Date


Pipistrellus pipistrellus
LOC 1
Pipistrellus pipistrellus
LOC 10
Pipistrellus pipistrellus
LOC 11
Pipistrellus pipistrellus
LOC 12
Pipistrellus pipistrellus
LOC 2
Pipistrellus pipistrellus
LOC 3
1000
500
0
-500
Minutes after sunset
Jul
Oct
Jan
Apr
Date


Pipistrellus pipistrellus
LOC 4
Pipistrellus pipistrellus
LOC 5
Pipistrellus pipistrellus
LOC 6
Pipistrellus pipistrellus
LOC 7
Pipistrellus pipistrellus
LOC 8
Pipistrellus pipistrellus
LOC 9
Minutes after sunset
1000
500
0
-500
Jul
Oct
Jan
Apr
Date


Pipistrellus pygmaeus
LOC 1
Pipistrellus pygmaeus
LOC 2
Pipistrellus pygmaeus
LOC 3
Plecotus auritus
LOC 3
Plecotus auritus
LOC 4
Plecotus auritus
LOC 7
1000
500
0
-500
Minutes after sunset
Jul
Oct
Jan
Apr
Date

Roost Emergence Time and Bat Observation

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

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

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

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

Table continues below

Species	Detector ID	2020-07-05	2020-07-07	2020-07-08	2020-07-09	2020-07-10
Common pipistrelle	LOC 1	4	17	1	13	10
Common pipistrelle	LOC 10	0	0	0	0	0
Common pipistrelle	LOC 12	0	0	0	0	0
Common pipistrelle	LOC 2	0	0	0	0	0
Common pipistrelle	LOC 3	0	0	0	0	0
Common pipistrelle	LOC 5	0	0	0	0	0
Soprano pipistrelle	LOC 2	0	0	0	0	0
Soprano pipistrelle	LOC 3	0	0	0	0	0
Noctule	LOC 2	0	0	0	0	0
Noctule	LOC 3	0	0	0	0	0
Myotis	LOC 3	0	0	0	0	0

Table continues below

2020-07-11	2020-07-12	2020-07-13	2020-07-14	2020-07-15	2020-07-16	2020-07-19
3	4	1	10	0	5	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	1	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	2	7	0
0	0	0	0	0	1	0

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

Table continues below

2020-07-20	2020-07-21	2020-07-26	2020-07-28	2020-07-29	2020-07-31	2020-08-03
2	0	1	0	1	5	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	0	0	1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	2	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	1	0	0	0

Table continues below

2020-08-05	2020-08-11	2020-08-30	2020-08-31	2020-09-06	2020-09-14	2021-04-18
1	1	1	2	1	1	1
0	0	0	0	0	0	1
0	0	1	0	0	0	1
0	0	0	0	0	0	0
0	0	1	0	1	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Table continues below

2021-04-19	2021-04-22	2021-04-23	2021-04-26	2021-04-28	2021-04-30	2021-05-09
1	0	0	0	0	0	1
1	1	0	1	1	2	0
1	1	0	1	1	2	0
0	0	0	0	0	0	0
0	0	1	0	0	0	0
1	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

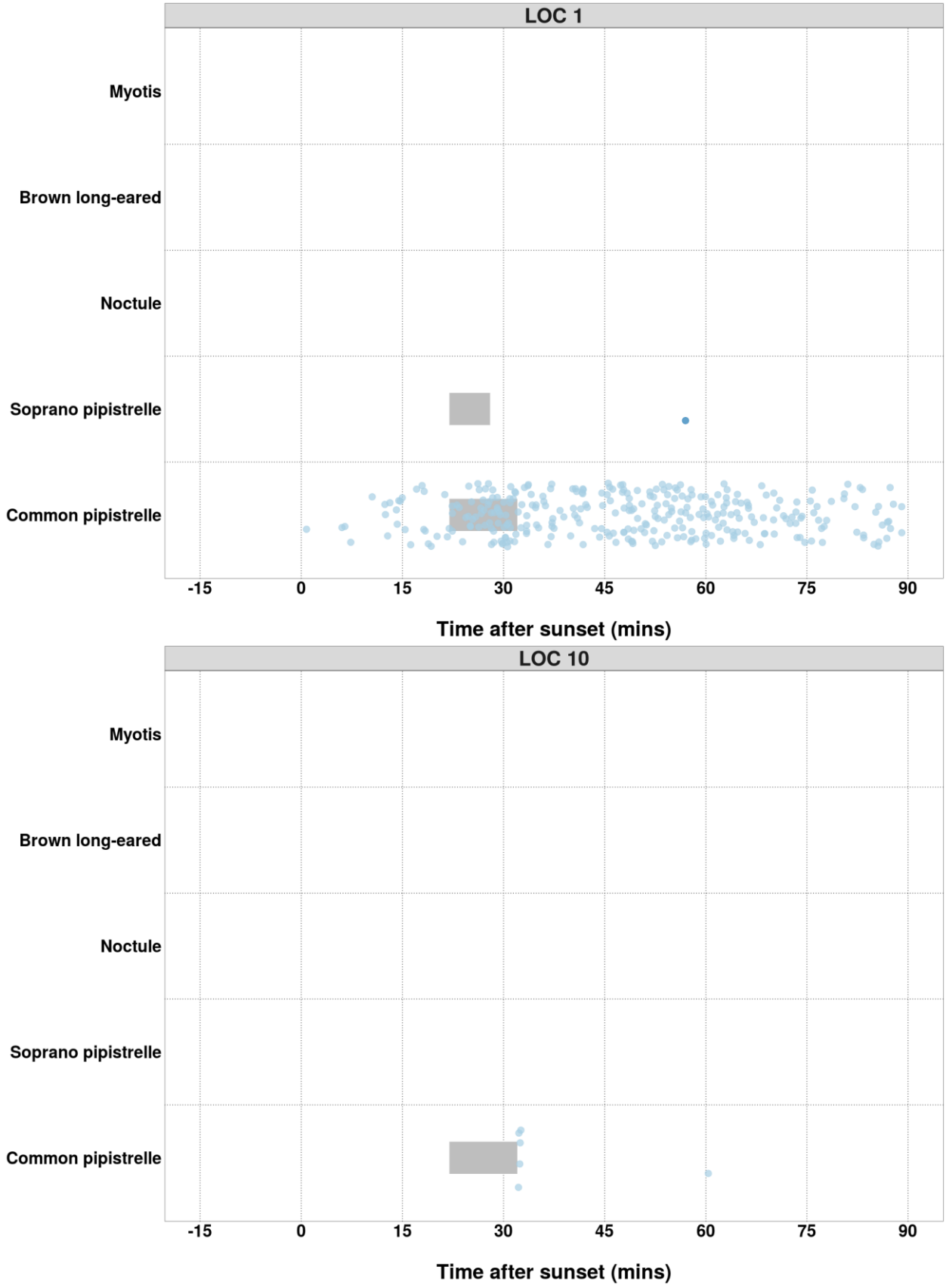
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

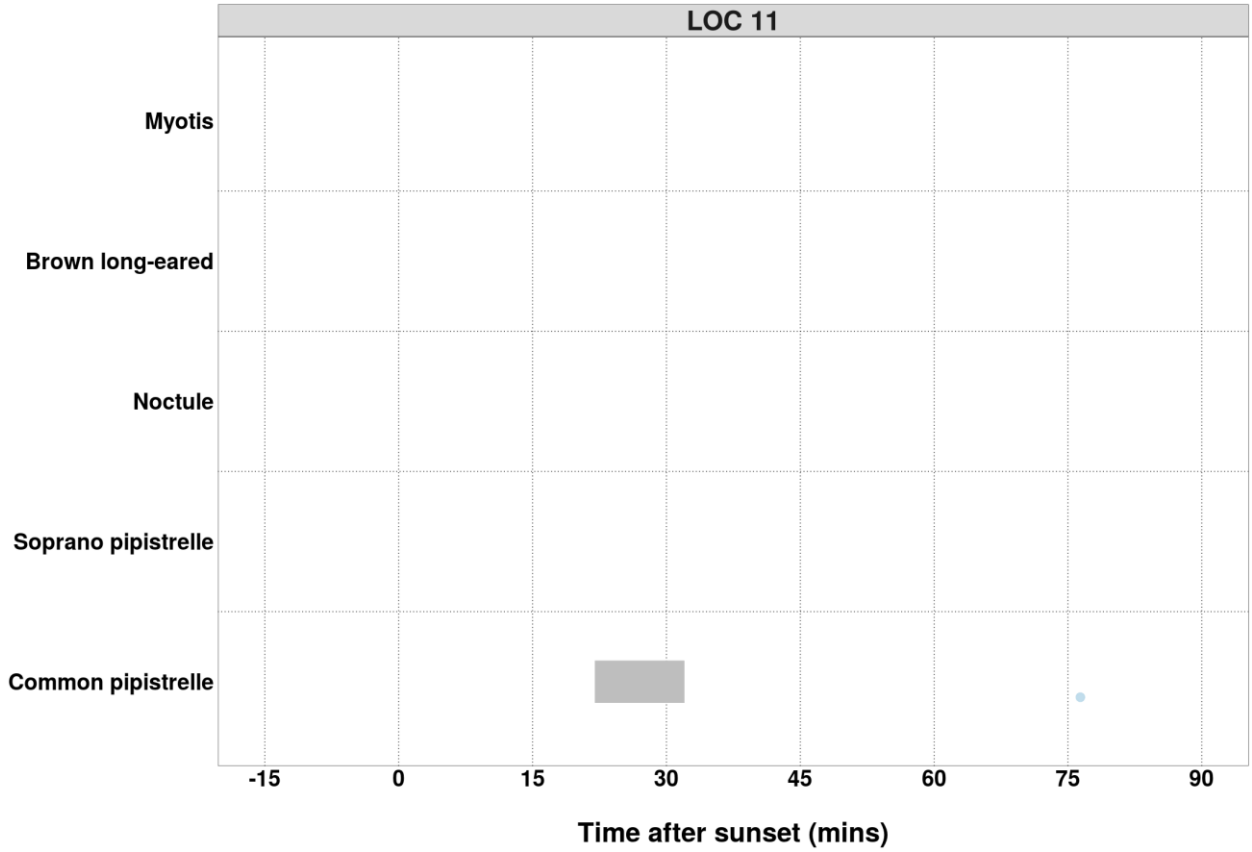
Table continues below

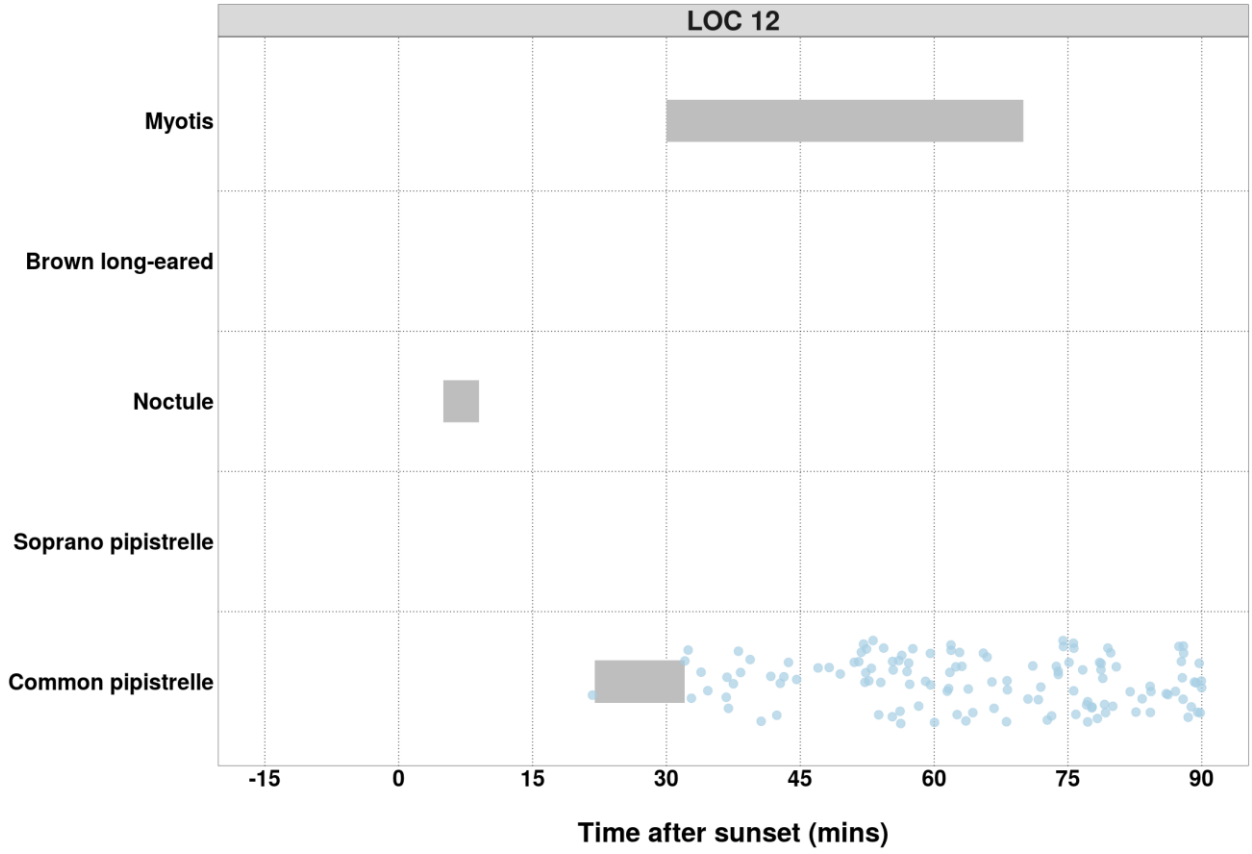
2021-05-10	2021-05-11	2021-05-12
1	0	0
1	2	3
1	2	3
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0

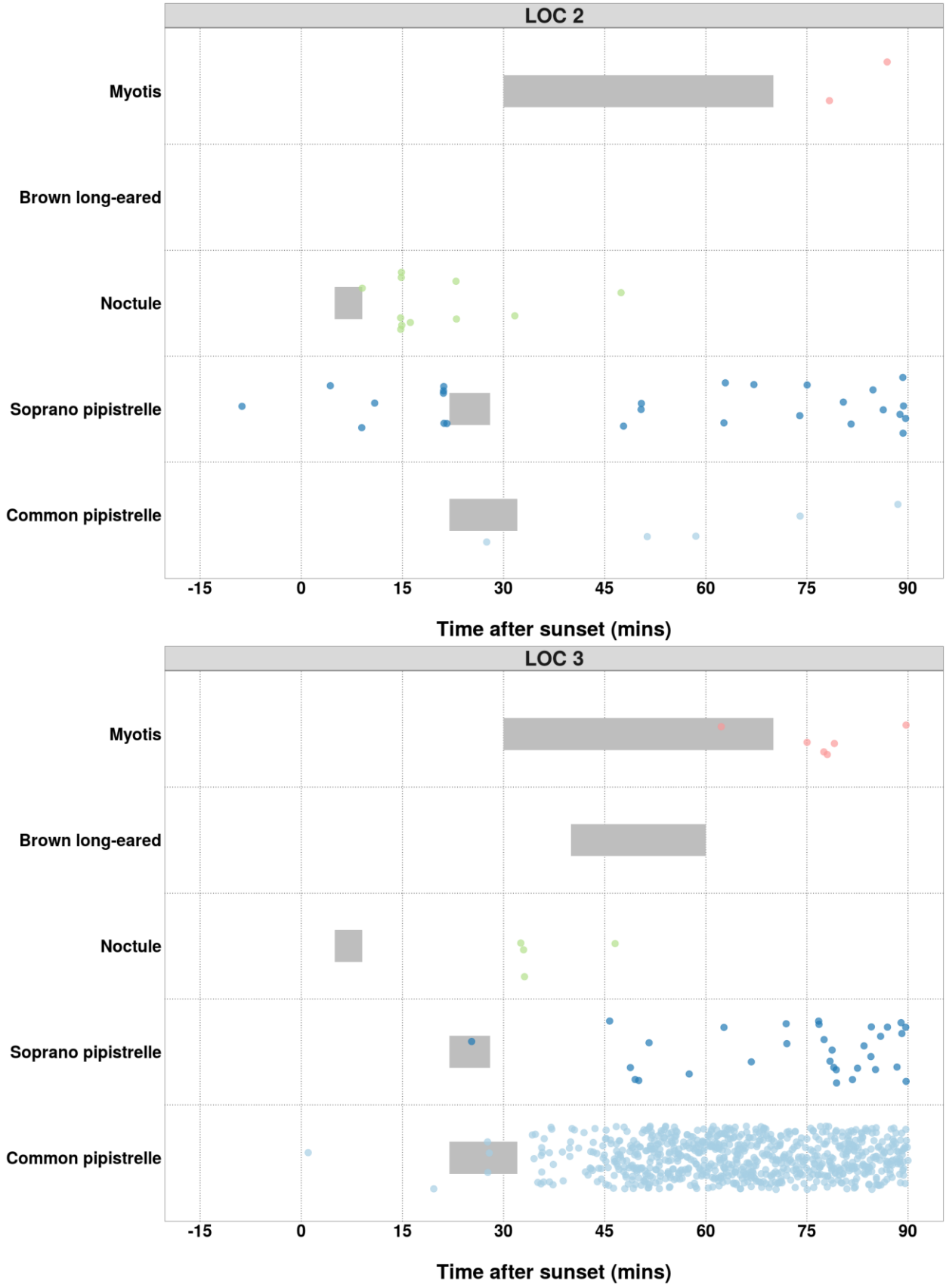
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012) - Figures

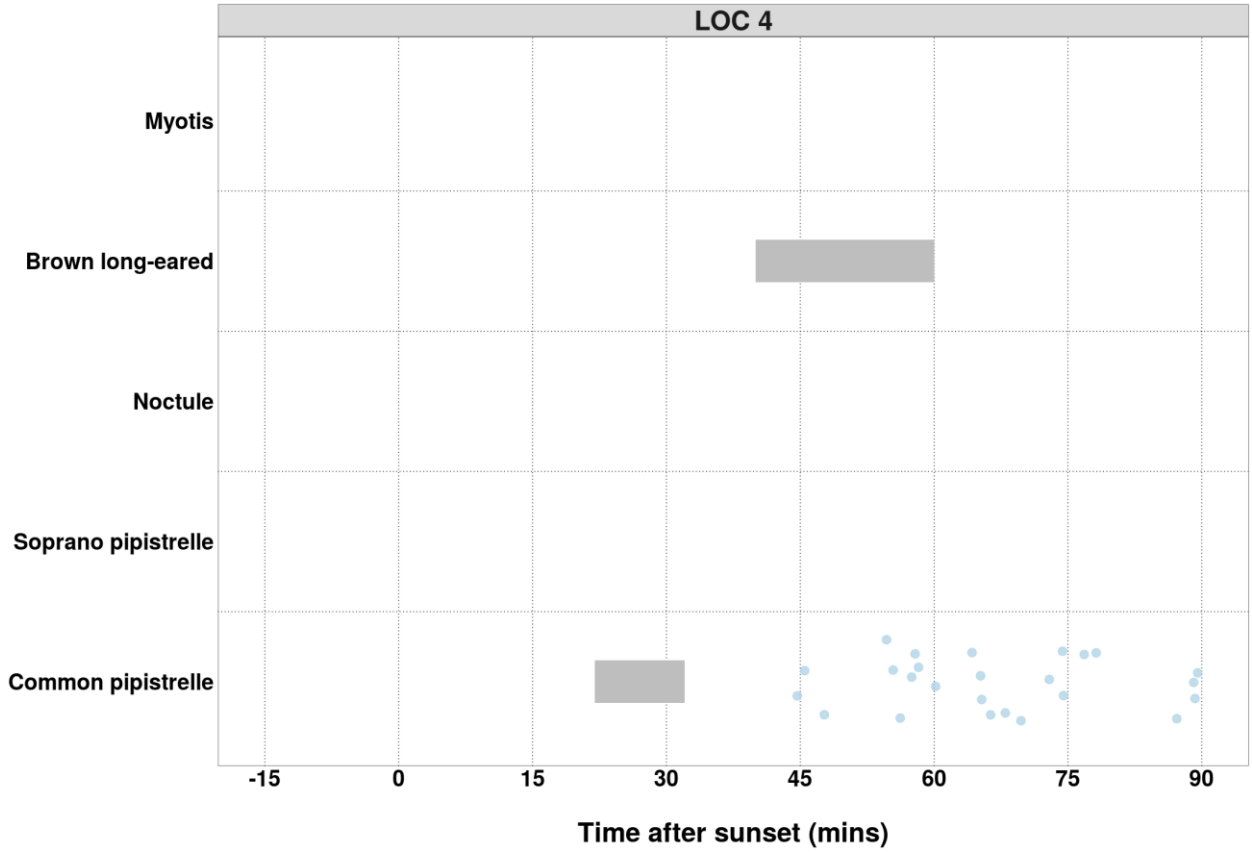
Figure 8. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occurring earlier than this time range, may potentially indicate the presence of a nearby roost.

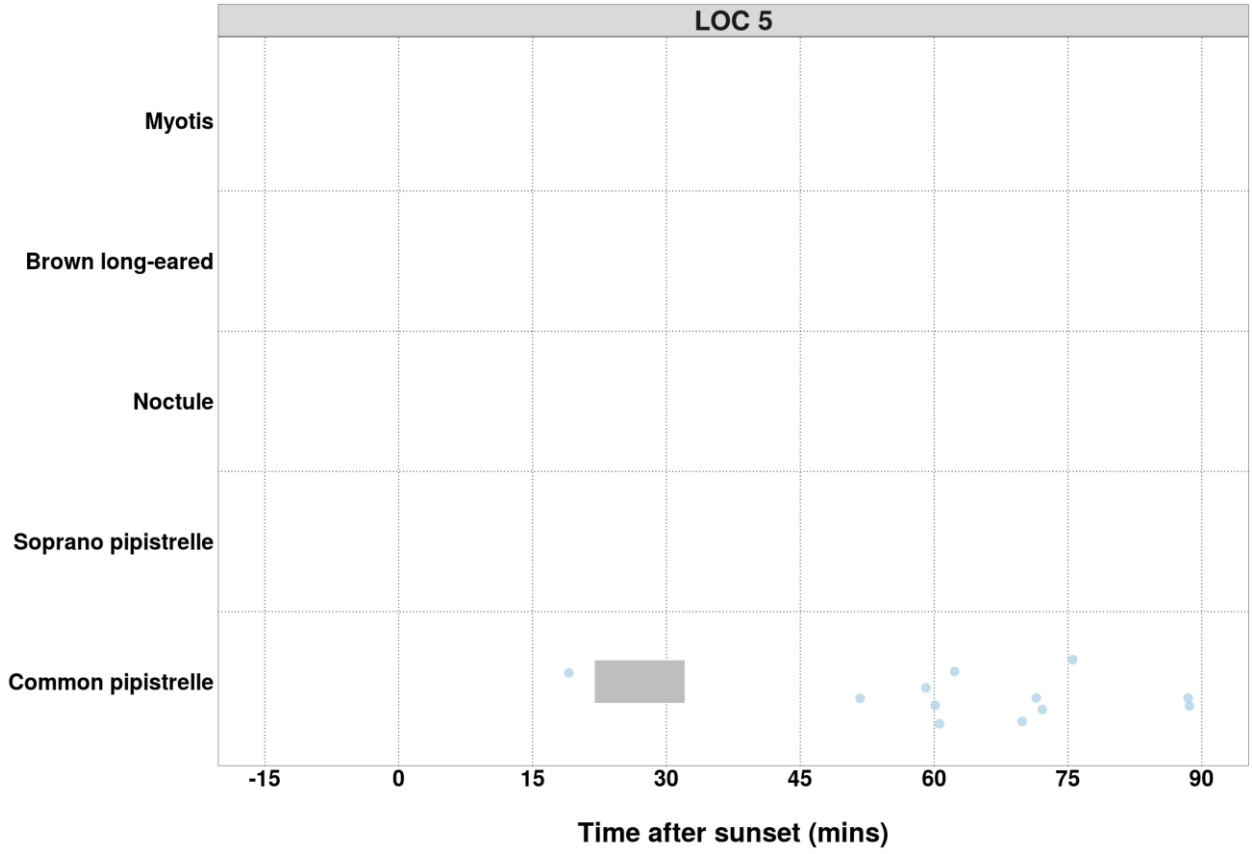

LOC 1
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)
LOC 10
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

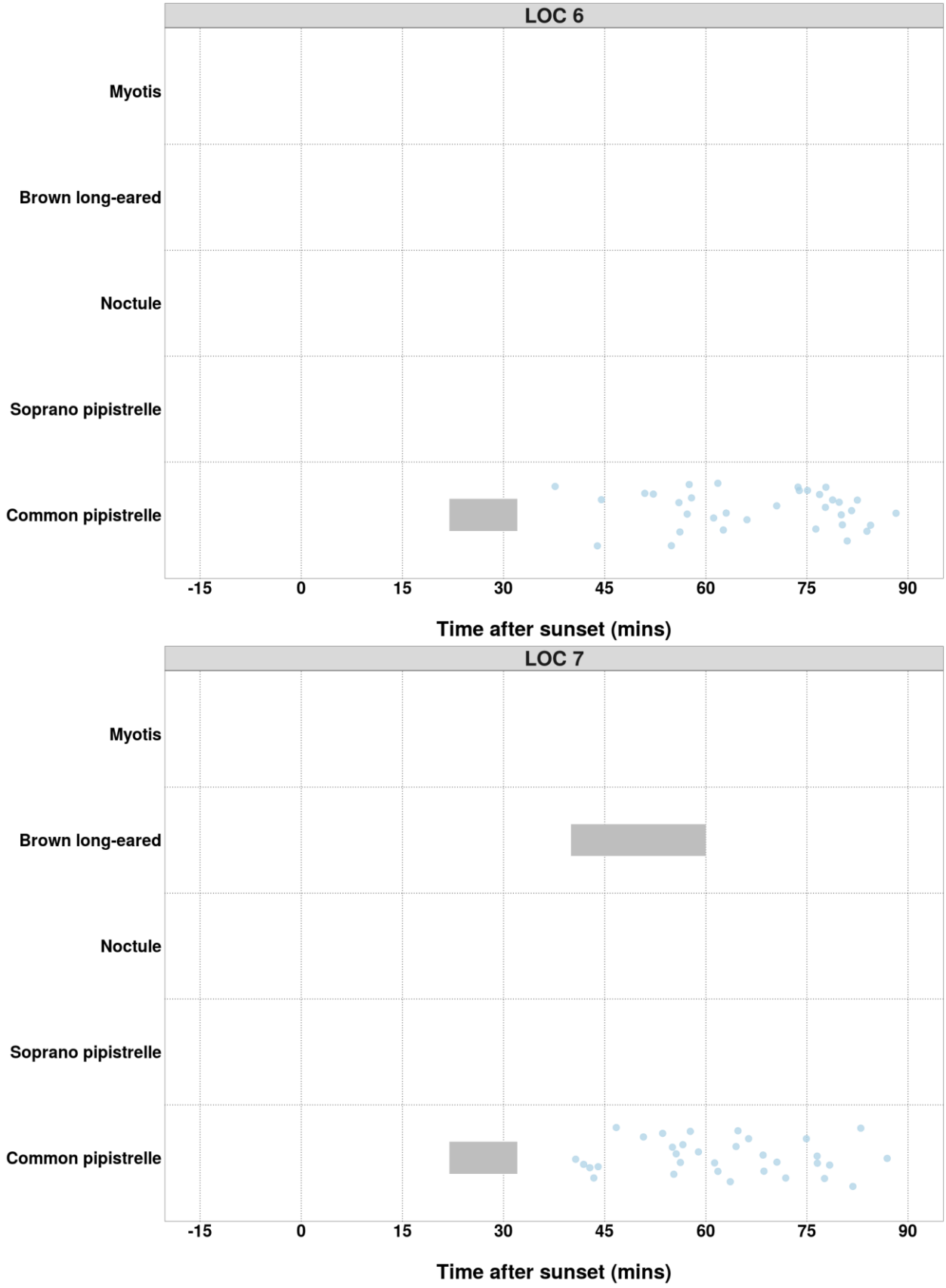

LOC 11
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

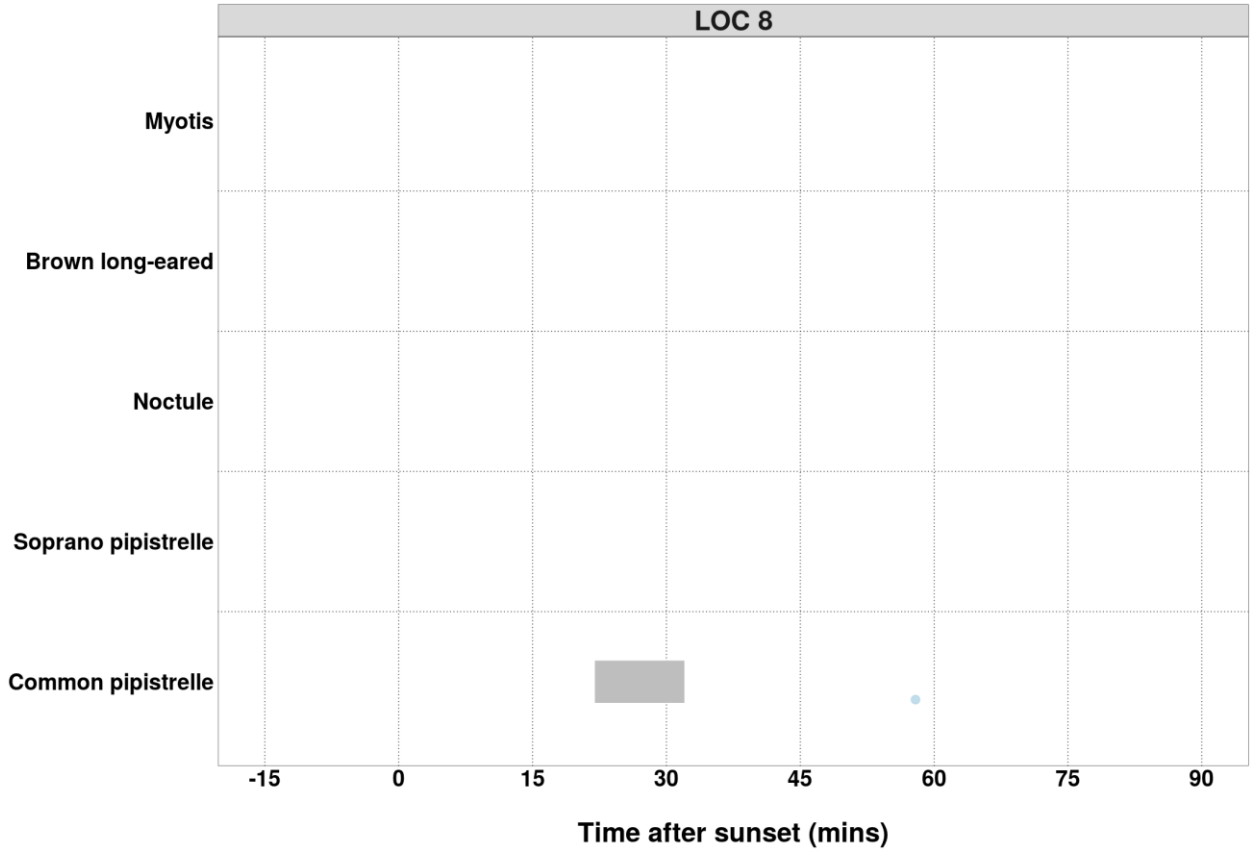

LOC 12
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

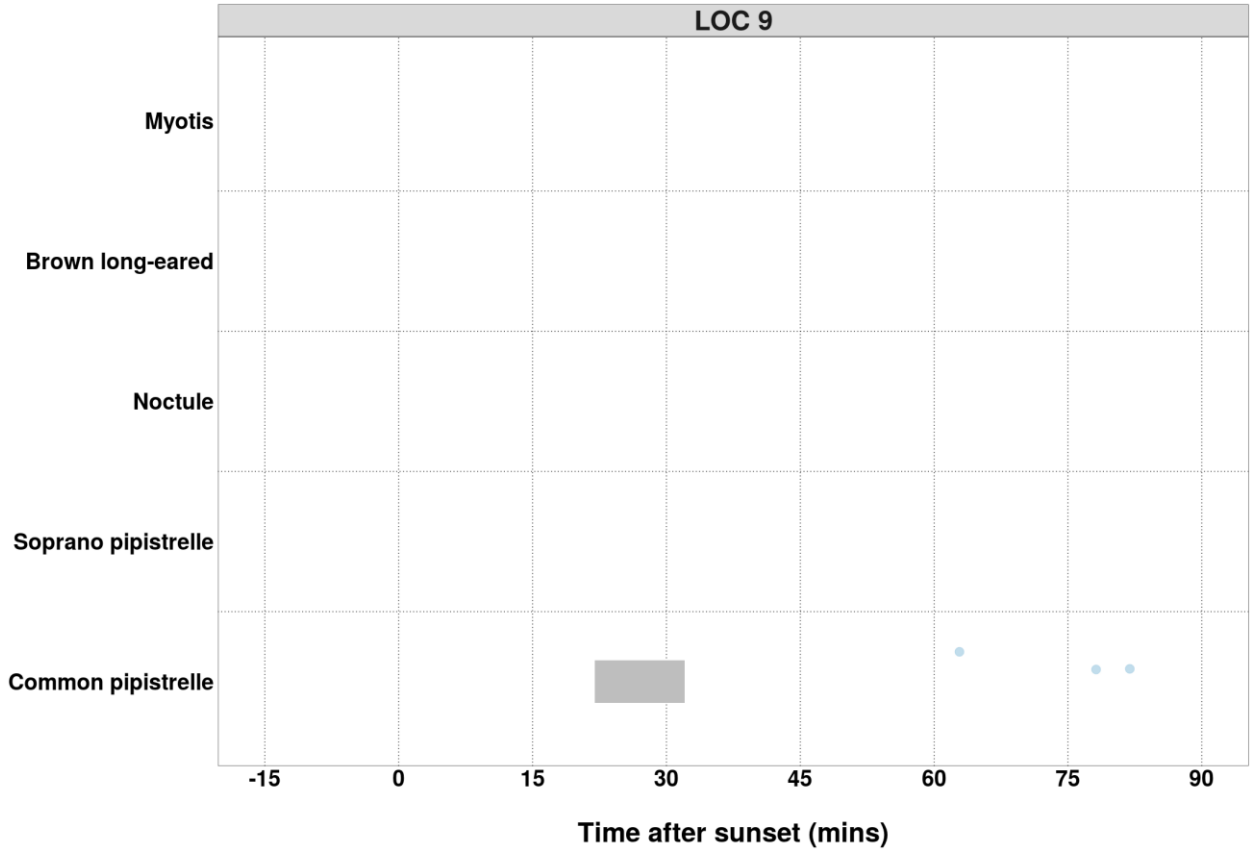

LOC 2
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)
LOC 3
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


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


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


LOC 6
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)
LOC 7
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 8
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)


LOC 9
Myotis
Brown long-eared
Noctule
Soprano pipistrelle
Common pipistrelle
-15
0
15
30
45
60
75
90
Time after sunset (mins)

Counts of Bat Passes

All detectors

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

Species	Passes (No.)	Percentage of total (%)
Common pipistrelle	3287	94.7
Soprano pipistrelle	124	3.6
Noctule	27	0.8
Brown long-eared	7	0.2
Myotis	25	0.7
Total	3470	100.0

Counts of Bat Passes

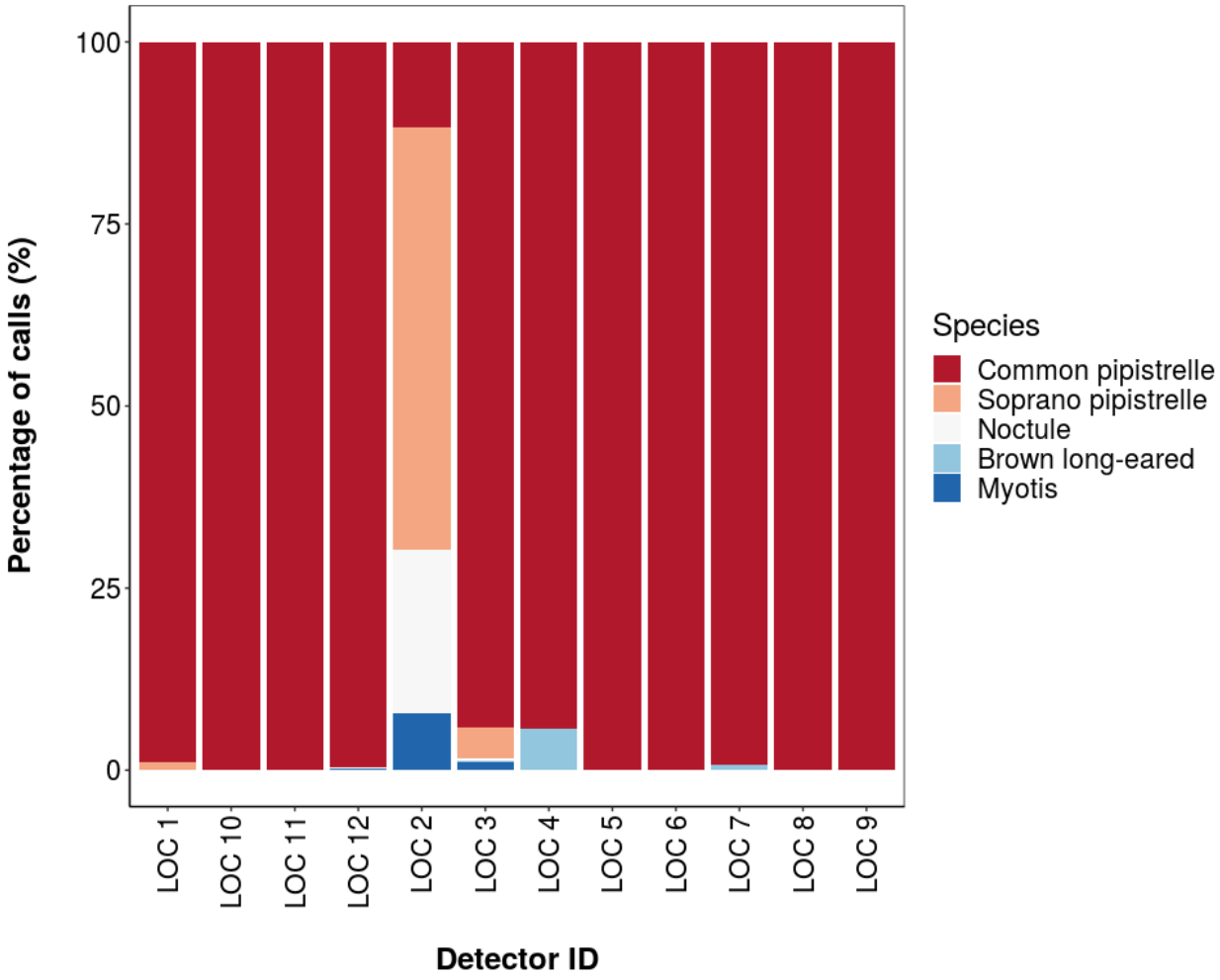
Per Detector

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

Species	Detector ID	Count (No)	Percentage by Detector (%)
Common pipistrelle	LOC 1	744	98.9
Common pipistrelle	LOC 10	51	100.0
Common pipistrelle	LOC 11	3	100.0
Common pipistrelle	LOC 12	443	99.6
Common pipistrelle	LOC 2	9	11.8
Common pipistrelle	LOC 3	1603	94.1
Common pipistrelle	LOC 4	83	94.3
Common pipistrelle	LOC 5	35	100.0
Common pipistrelle	LOC 6	148	100.0
Common pipistrelle	LOC 7	140	99.3
Common pipistrelle	LOC 8	2	100.0
Common pipistrelle	LOC 9	26	100.0
Soprano pipistrelle	LOC 1	8	1.1
Soprano pipistrelle	LOC 2	44	57.9
Soprano pipistrelle	LOC 3	72	4.2
Noctule	LOC 12	1	0.2
Noctule	LOC 2	17	22.4
Noctule	LOC 3	9	0.5
Brown long-eared	LOC 3	1	0.1
Brown long-eared	LOC 4	5	5.7
Brown long-eared	LOC 7	1	0.7
Myotis	LOC 12	1	0.2
Myotis	LOC 2	6	7.9
Myotis	LOC 3	18	1.1

Species Composition

Figure 9. Percentage species composition of passes at each detector.



PART 2a: Presence Only

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

Nightly Bat Pass Rate (Bat passes per hour)

Median Per Detector

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

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

Species	Detector ID	Median Pass Rate
Common pipistrelle	LOC 1	0.5
Common pipistrelle	LOC 10	0.2
Common pipistrelle	LOC 11	0.2
Common pipistrelle	LOC 12	0.4
Common pipistrelle	LOC 2	0.2
Common pipistrelle	LOC 3	1.2
Common pipistrelle	LOC 4	0.2
Common pipistrelle	LOC 5	0.2
Common pipistrelle	LOC 6	0.3
Common pipistrelle	LOC 7	0.2
Common pipistrelle	LOC 8	0.1
Common pipistrelle	LOC 9	0.1
Soprano pipistrelle	LOC 1	0.1
Soprano pipistrelle	LOC 2	0.4
Soprano pipistrelle	LOC 3	0.3
Noctule	LOC 12	0.2
Noctule	LOC 2	0.3
Noctule	LOC 3	0.2
Brown long-eared	LOC 3	0.1
Brown long-eared	LOC 4	0.1
Brown long-eared	LOC 7	0.1
Myotis	LOC 12	0.1
Myotis	LOC 2	0.2
Myotis	LOC 3	0.2

Nightly Bat Pass Rate (Bat passes per hour)

Mean per Detector

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

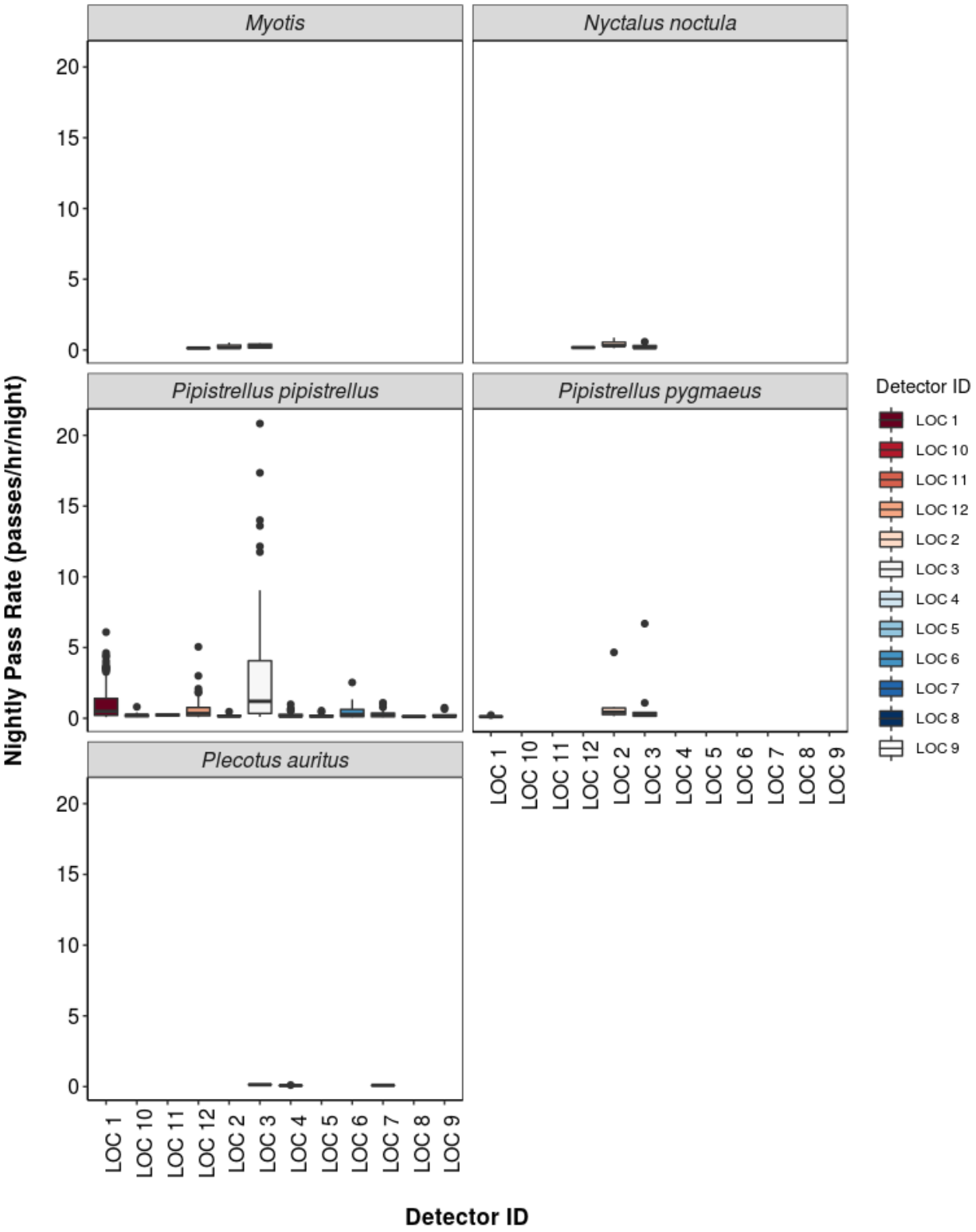
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

Species	Detector ID	Mean Pass Rate
Common pipistrelle	LOC 1	1.1
Common pipistrelle	LOC 10	0.2
Common pipistrelle	LOC 11	0.2
Common pipistrelle	LOC 12	0.6
Common pipistrelle	LOC 2	0.2
Common pipistrelle	LOC 3	3.2
Common pipistrelle	LOC 4	0.2
Common pipistrelle	LOC 5	0.2
Common pipistrelle	LOC 6	0.5
Common pipistrelle	LOC 7	0.3
Common pipistrelle	LOC 8	0.1
Common pipistrelle	LOC 9	0.2
Soprano pipistrelle	LOC 1	0.1
Soprano pipistrelle	LOC 2	1.1
Soprano pipistrelle	LOC 3	0.8
Noctule	LOC 12	0.2
Noctule	LOC 2	0.4
Noctule	LOC 3	0.3
Brown long-eared	LOC 3	0.1
Brown long-eared	LOC 4	0.1
Brown long-eared	LOC 7	0.1
Myotis	LOC 12	0.1
Myotis	LOC 2	0.3
Myotis	LOC 3	0.3

Nightly Bat Passes (Bat passes per hour)

Per Detector - Figures

Figure 10. Boxplots for the number of bat passes per hour each night, for each detector. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.


Myotis
Nyctalus noctula
Pipistrellus pipistrellus
Pipistrellus pygmaeus
Plecotus auritus
Nightly Pass Rate (passes/hr/night)
0
5
10
15
20
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID

SPLIT BY MONTH

Total Bat Passes per Detector, each Month

Per Detector

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

Species	Detector ID	Apr	May	Jun	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	29	13	0	412	252	36	2
Common pipistrelle	LOC 10	18	11	0	2	1	19	0
Common pipistrelle	LOC 11	1	0	2	0	0	0	0
Common pipistrelle	LOC 12	18	11	0	98	210	103	3
Common pipistrelle	LOC 2	2	1	0	5	1	0	0
Common pipistrelle	LOC 3	108	0	0	404	1064	27	0
Common pipistrelle	LOC 4	0	0	0	17	40	25	1
Common pipistrelle	LOC 5	1	0	0	10	19	5	0
Common pipistrelle	LOC 6	6	0	0	5	42	93	2
Common pipistrelle	LOC 7	3	0	0	21	95	18	3
Common pipistrelle	LOC 8	0	0	0	1	1	0	0
Common pipistrelle	LOC 9	0	0	0	2	23	1	0
Soprano pipistrelle	LOC 1	0	0	0	2	4	2	0
Soprano pipistrelle	LOC 2	0	0	0	42	2	0	0
Soprano pipistrelle	LOC 3	0	0	0	70	2	0	0
Noctule	LOC 12	0	0	0	1	0	0	0
Noctule	LOC 2	0	0	0	17	0	0	0
Noctule	LOC 3	0	0	0	8	1	0	0
Brown long-eared	LOC 3	0	0	0	1	0	0	0
Brown long-eared	LOC 4	0	0	0	0	1	3	1
Brown long-eared	LOC 7	0	0	0	0	0	1	0
Myotis	LOC 12	0	0	0	0	1	0	0
Myotis	LOC 2	0	0	0	2	4	0	0
Myotis	LOC 3	0	0	0	17	1	0	0

Survey Effort

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

Month	Detector ID	No. of Survey Nights
Apr	LOC 1	10
Apr	LOC 10	11
Apr	LOC 11	1
Apr	LOC 12	11
Apr	LOC 2	1
Apr	LOC 3	7
Apr	LOC 5	1
Apr	LOC 6	3
Apr	LOC 7	3
May	LOC 1	5
May	LOC 10	6
May	LOC 12	6
May	LOC 2	1
Jun	LOC 11	1
Jul	LOC 1	26
Jul	LOC 10	1
Jul	LOC 12	21
Jul	LOC 2	7
Jul	LOC 3	22
Jul	LOC 4	11
Jul	LOC 5	7
Jul	LOC 6	1
Jul	LOC 7	10
Jul	LOC 8	1
Jul	LOC 9	1
Aug	LOC 1	29
Aug	LOC 10	1
Aug	LOC 12	30
Aug	LOC 2	2
Aug	LOC 3	30
Aug	LOC 4	18
Aug	LOC 5	12
Aug	LOC 6	11
Aug	LOC 7	29
Aug	LOC 8	1

Aug	LOC 9	12
Sep	LOC 1	18
Sep	LOC 10	6
Sep	LOC 12	15
Sep	LOC 3	5
Sep	LOC 4	14
Sep	LOC 5	4
Sep	LOC 6	17
Sep	LOC 7	12
Sep	LOC 9	1
Oct	LOC 1	2
Oct	LOC 12	2
Oct	LOC 4	1
Oct	LOC 6	1
Oct	LOC 7	3

Nightly Bat Pass Rate for each Month

Median Per Detector

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

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

Species	Detector ID	Apr	May	Jun	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	0.2	0.1	NA	3.0	0.7	0.2	0.1
Common pipistrelle	LOC 10	0.2	0.2	NA	0.3	0.1	0.2	NA
Common pipistrelle	LOC 11	0.1	NA	0.4	NA	NA	NA	NA
Common pipistrelle	LOC 12	0.2	0.2	NA	0.5	0.7	0.3	0.1
Common pipistrelle	LOC 2	0.2	0.1	NA	0.2	0.1	NA	NA
Common pipistrelle	LOC 3	0.9	NA	NA	1.2	1.4	0.3	NA
Common pipistrelle	LOC 4	NA	NA	NA	0.2	0.1	0.2	0.1
Common pipistrelle	LOC 5	0.1	NA	NA	0.2	0.1	0.1	NA
Common pipistrelle	LOC 6	0.1	NA	NA	0.7	0.4	0.3	0.2
Common pipistrelle	LOC 7	0.1	NA	NA	0.3	0.3	0.1	0.1
Common pipistrelle	LOC 8	NA	NA	NA	0.2	0.1	NA	NA
Common pipistrelle	LOC 9	NA	NA	NA	0.3	0.1	0.1	NA
Soprano pipistrelle	LOC 1	NA	NA	NA	0.1	0.1	0.1	NA
Soprano pipistrelle	LOC 2	NA	NA	NA	0.6	0.3	NA	NA
Soprano pipistrelle	LOC 3	NA	NA	NA	0.3	0.1	NA	NA
Noctule	LOC 12	NA	NA	NA	0.2	NA	NA	NA
Noctule	LOC 2	NA	NA	NA	0.3	NA	NA	NA
Noctule	LOC 3	NA	NA	NA	0.2	0.1	NA	NA
Brown long-eared	LOC 3	NA	NA	NA	0.1	NA	NA	NA
Brown long-eared	LOC 4	NA	NA	NA	NA	0.1	0.1	0.1
Brown long-eared	LOC 7	NA	NA	NA	NA	NA	0.1	NA
Myotis	LOC 12	NA	NA	NA	NA	0.1	NA	NA
Myotis	LOC 2	NA	NA	NA	0.2	0.5	NA	NA
Myotis	LOC 3	NA	NA	NA	0.3	0.1	NA	NA

Nightly Bat Pass Rate for each Month

Mean per Detector

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

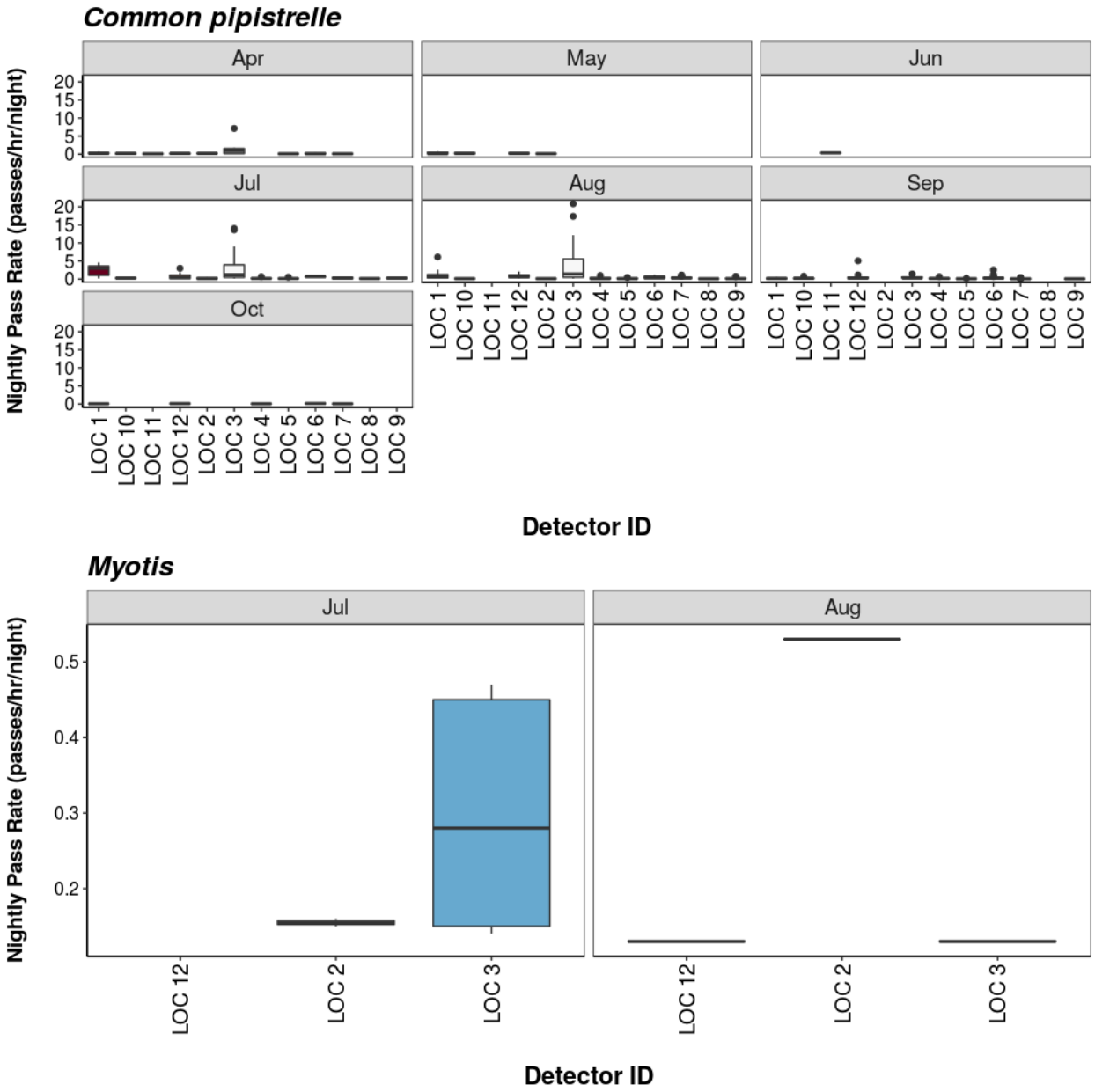
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

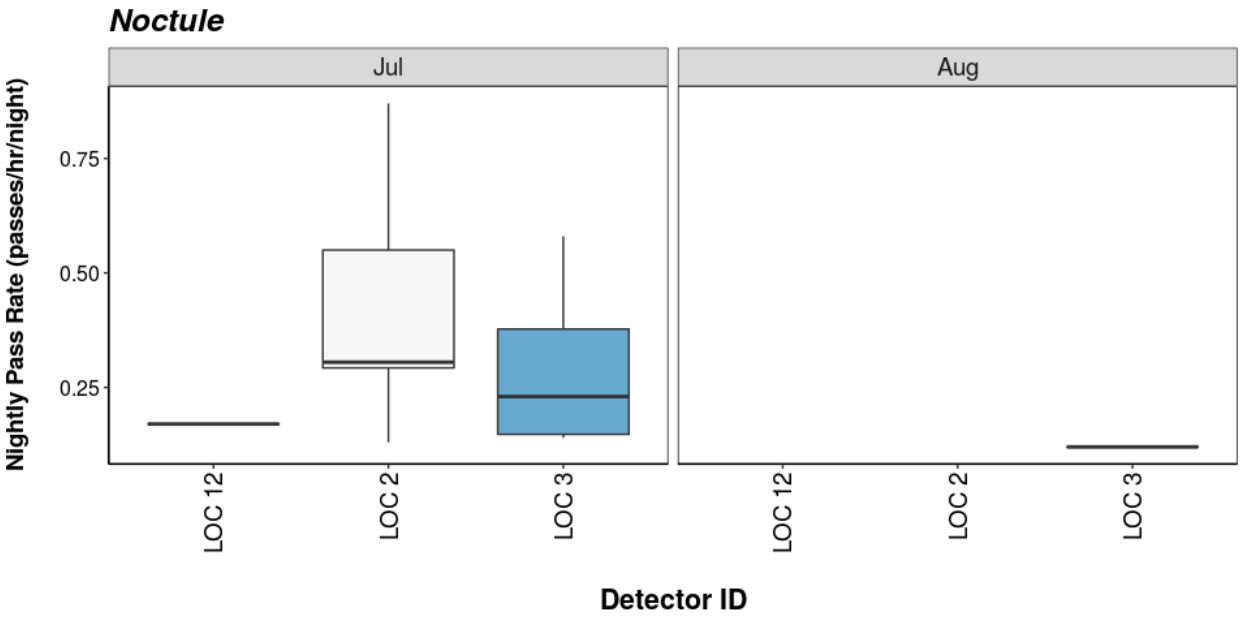
Species	Detector ID	Apr	May	Jun	Jul	Aug	Sep	Oct
Common pipistrelle	LOC 1	0.3	0.3	NA	2.4	1.0	0.2	0.1
Common pipistrelle	LOC 10	0.2	0.2	NA	0.3	0.1	0.3	NA
Common pipistrelle	LOC 11	0.1	NA	0.4	NA	NA	NA	NA
Common pipistrelle	LOC 12	0.2	0.2	NA	0.7	0.8	0.7	0.1
Common pipistrelle	LOC 2	0.2	0.1	NA	0.3	0.1	NA	NA
Common pipistrelle	LOC 3	1.7	NA	NA	3.2	4.1	0.5	NA
Common pipistrelle	LOC 4	NA	NA	NA	0.2	0.3	0.2	0.1
Common pipistrelle	LOC 5	0.1	NA	NA	0.2	0.2	0.1	NA
Common pipistrelle	LOC 6	0.2	NA	NA	0.7	0.5	0.5	0.2
Common pipistrelle	LOC 7	0.1	NA	NA	0.3	0.4	0.1	0.1
Common pipistrelle	LOC 8	NA	NA	NA	0.2	0.1	NA	NA
Common pipistrelle	LOC 9	NA	NA	NA	0.3	0.2	0.1	NA
Soprano pipistrelle	LOC 1	NA	NA	NA	0.1	0.2	0.1	NA
Soprano pipistrelle	LOC 2	NA	NA	NA	1.3	0.3	NA	NA
Soprano pipistrelle	LOC 3	NA	NA	NA	0.9	0.1	NA	NA
Noctule	LOC 12	NA	NA	NA	0.2	NA	NA	NA
Noctule	LOC 2	NA	NA	NA	0.4	NA	NA	NA
Noctule	LOC 3	NA	NA	NA	0.3	0.1	NA	NA
Brown long-eared	LOC 3	NA	NA	NA	0.1	NA	NA	NA
Brown long-eared	LOC 4	NA	NA	NA	NA	0.1	0.1	0.1
Brown long-eared	LOC 7	NA	NA	NA	NA	NA	0.1	NA
Myotis	LOC 12	NA	NA	NA	NA	0.1	NA	NA
Myotis	LOC 2	NA	NA	NA	0.2	0.5	NA	NA
Myotis	LOC 3	NA	NA	NA	0.3	0.1	NA	NA

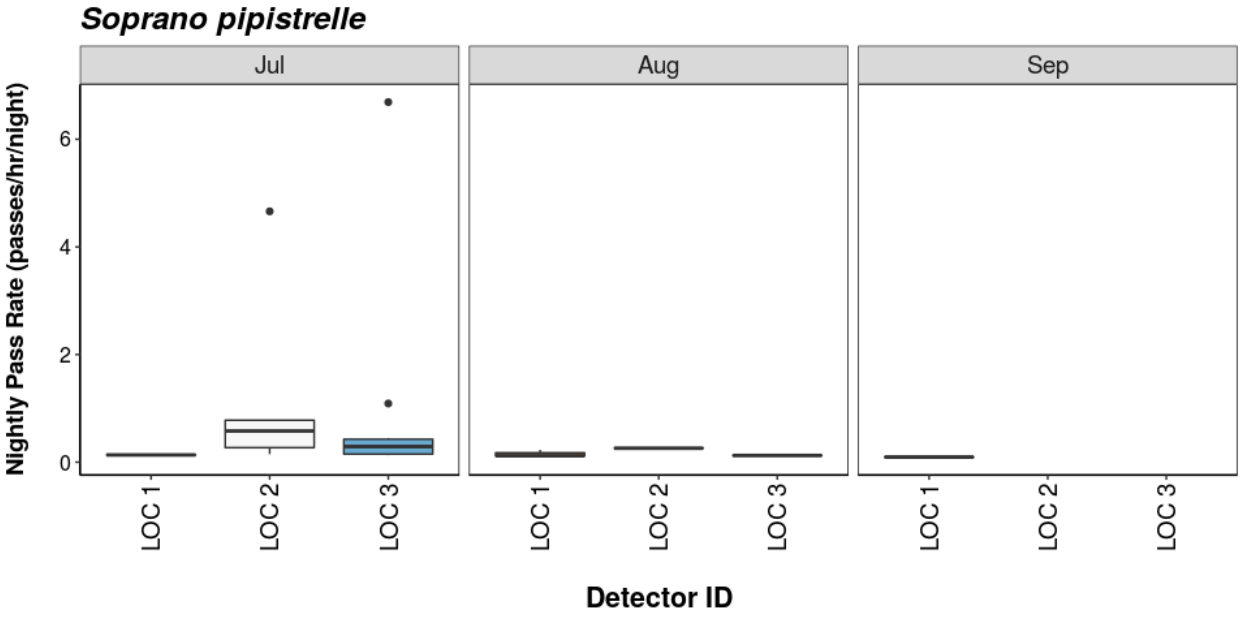
Nightly Bat Pass Rate for each Month

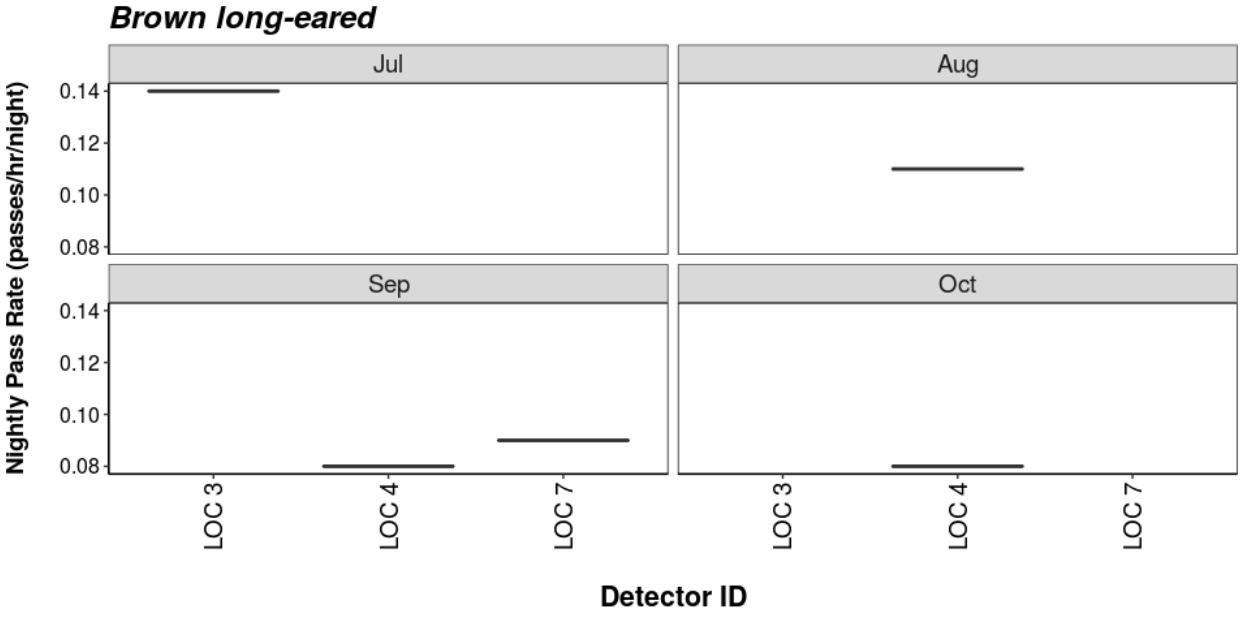
Per Detector - Figures

Figure 11. 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.




Noctule
Jul
Aug
Nightly Pass Rate (passes/hr/night)
0.75
0.50
0.25
LOC 12
LOC 2
LOC 3
Detector ID


Soprano pipistrelle
Jul
Aug
Sep
Nightly Pass Rate (passes/hr/night)
6
4
2
0
LOC 1
LOC 2
LOC 3
Detector ID


Brown long-eared
Jul
Aug
Sep
Oct
Nightly Pass Rate (passes/hr/night)
0.14
0.12
0.10
0.08
LOC 3
LOC 4
LOC 7
Detector ID

Bat Activity per Detector Location

Figure 12. Detector ID reference:

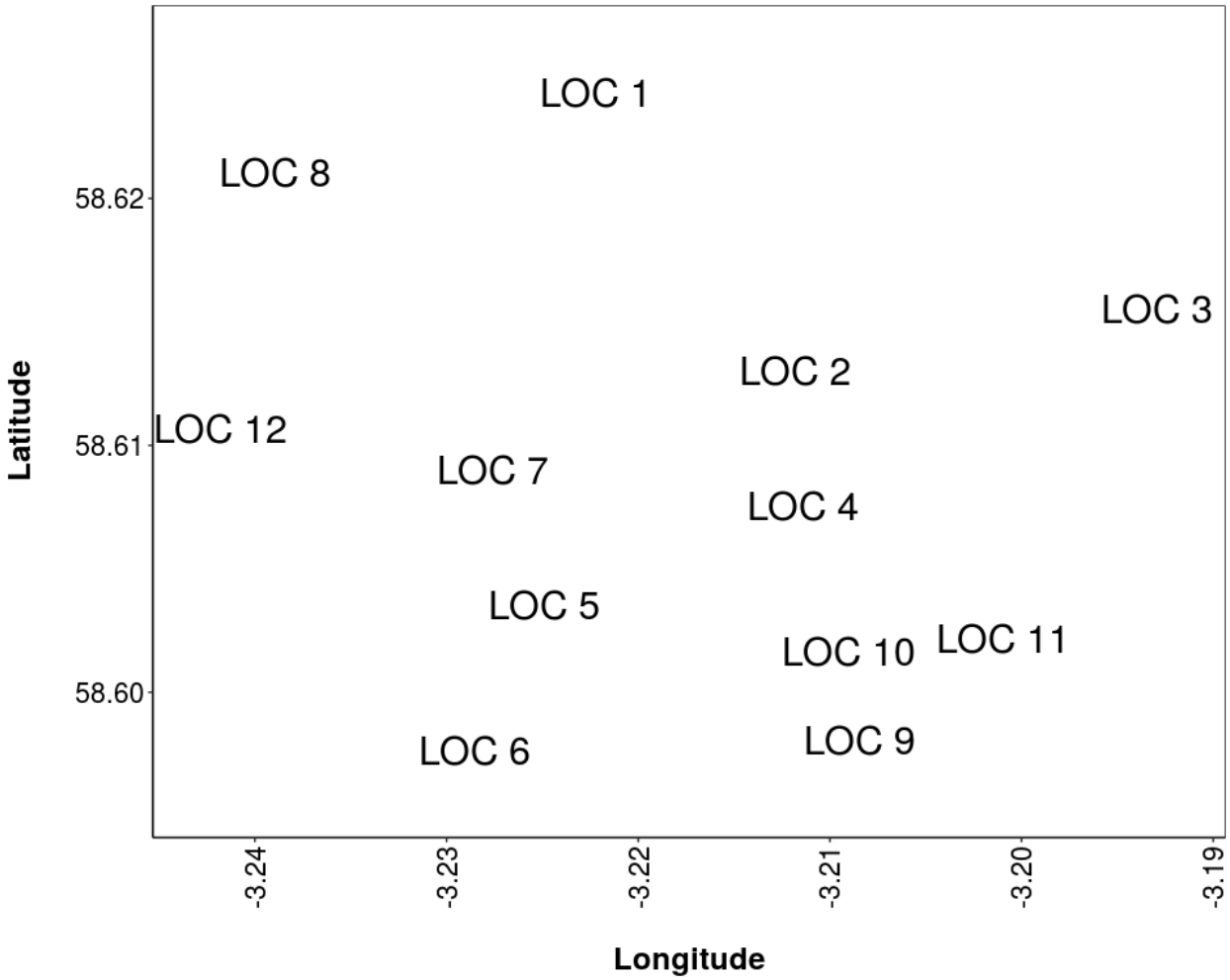


Figure 13. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

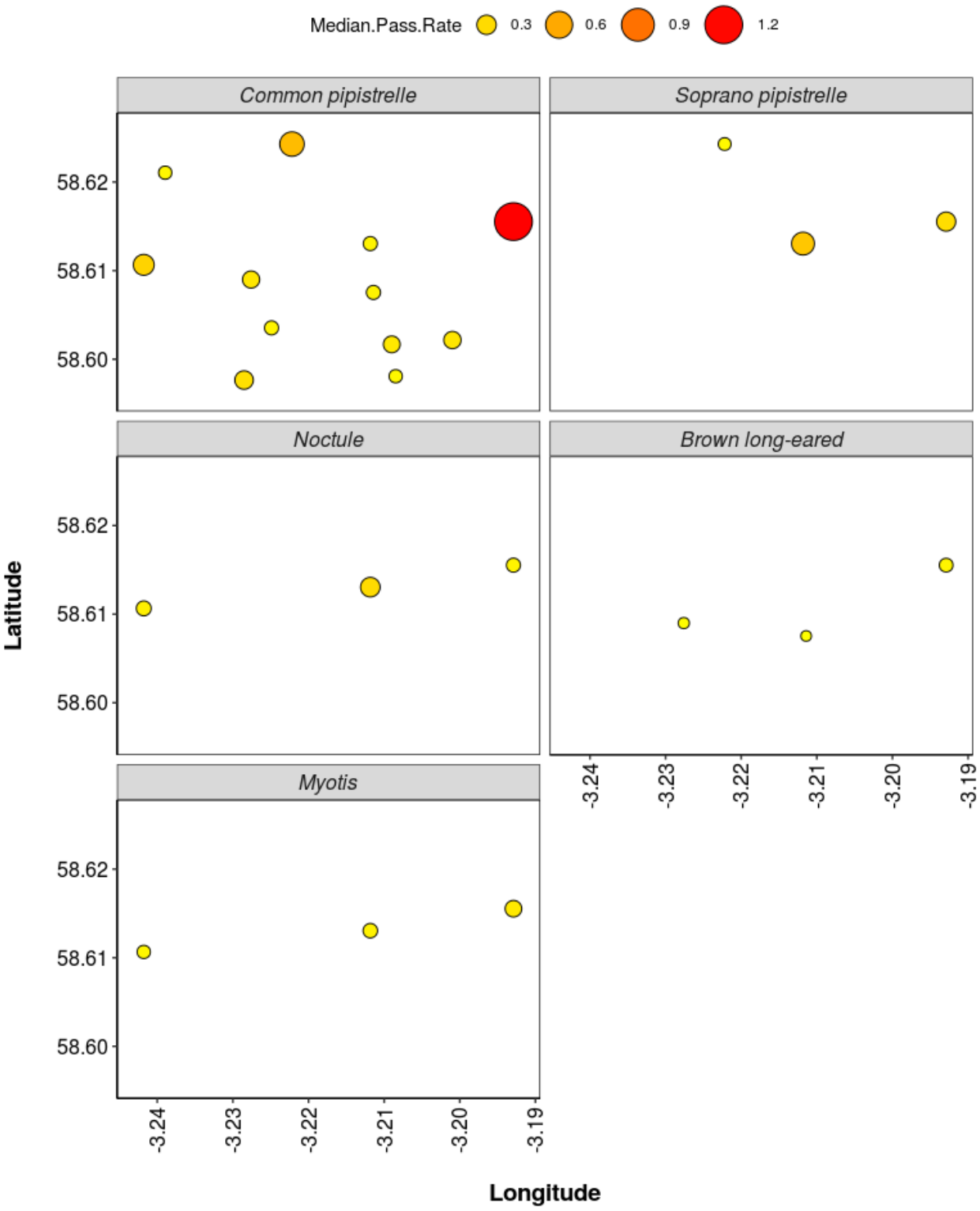
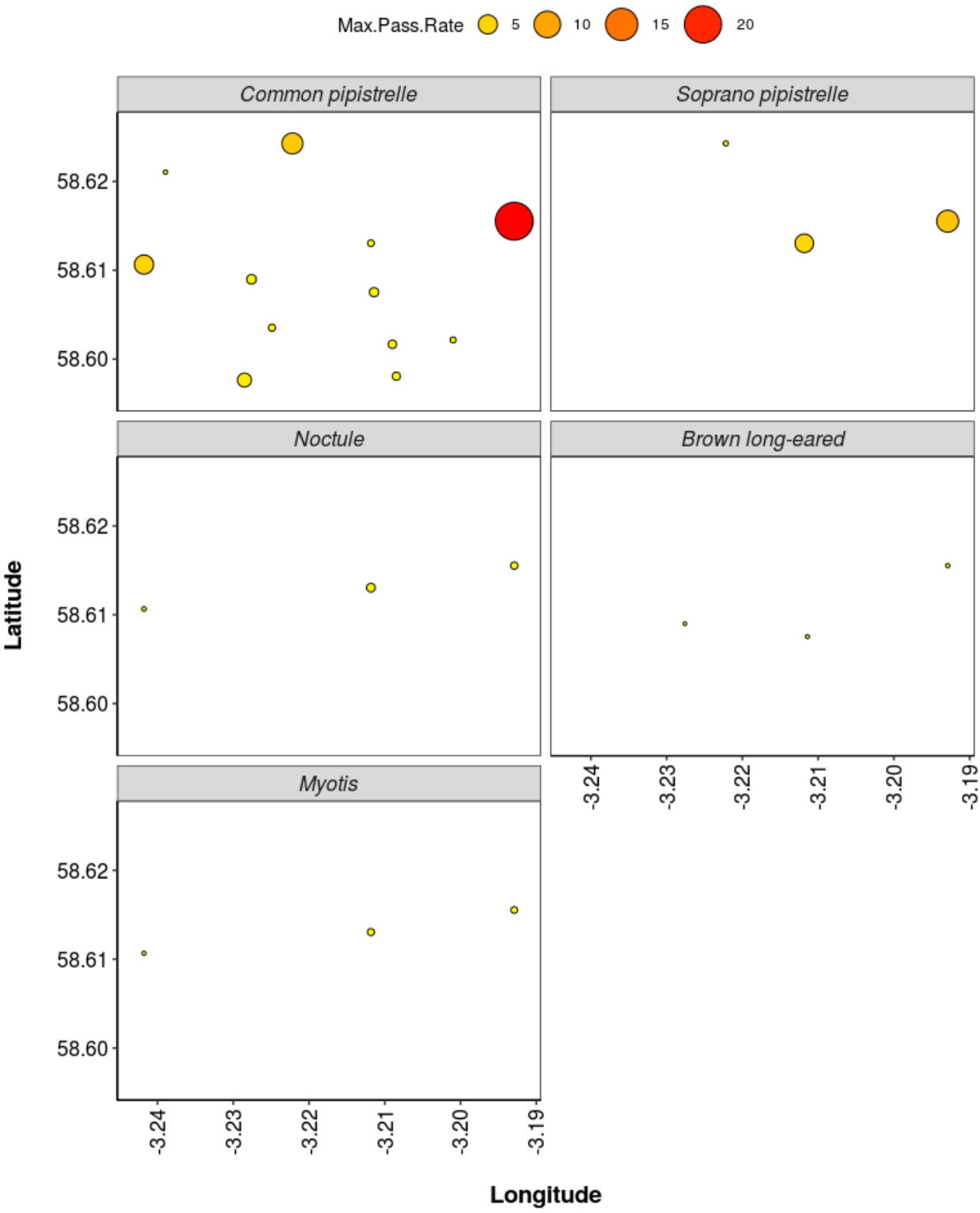


Figure 14. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



PART 2B: Includes absences

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

Nightly Bat Pass Rate (Bat passes per hour)

Median Per Detector

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

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

Species	Detector ID	Median Pass Rate
Brown long-eared	LOC 1	0.0
Brown long-eared	LOC 10	0.0
Brown long-eared	LOC 11	0.0
Brown long-eared	LOC 12	0.0
Brown long-eared	LOC 2	0.0
Brown long-eared	LOC 3	0.0
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
Brown long-eared	LOC 9	0.0
Common pipistrelle	LOC 1	0.5
Common pipistrelle	LOC 10	0.2
Common pipistrelle	LOC 11	0.2
Common pipistrelle	LOC 12	0.4
Common pipistrelle	LOC 2	0.1
Common pipistrelle	LOC 3	1.1
Common pipistrelle	LOC 4	0.1
Common pipistrelle	LOC 5	0.2
Common pipistrelle	LOC 6	0.3
Common pipistrelle	LOC 7	0.2
Common pipistrelle	LOC 8	0.1
Common pipistrelle	LOC 9	0.1
Myotis	LOC 1	0.0
Myotis	LOC 10	0.0
Myotis	LOC 11	0.0
Myotis	LOC 12	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	0.0
Myotis	LOC 9	0.0
Noctule	LOC 1	0.0
Noctule	LOC 10	0.0
Noctule	LOC 11	0.0
Noctule	LOC 12	0.0
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	0.0
Noctule	LOC 8	0.0
Noctule	LOC 9	0.0
Soprano pipistrelle	LOC 1	0.0
Soprano pipistrelle	LOC 10	0.0
Soprano pipistrelle	LOC 11	0.0
Soprano pipistrelle	LOC 12	0.0
Soprano pipistrelle	LOC 2	0.2
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
Soprano pipistrelle	LOC 9	0.0

Nightly Bat Pass Rate (Bat passes per hour)

Mean per Detector

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

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

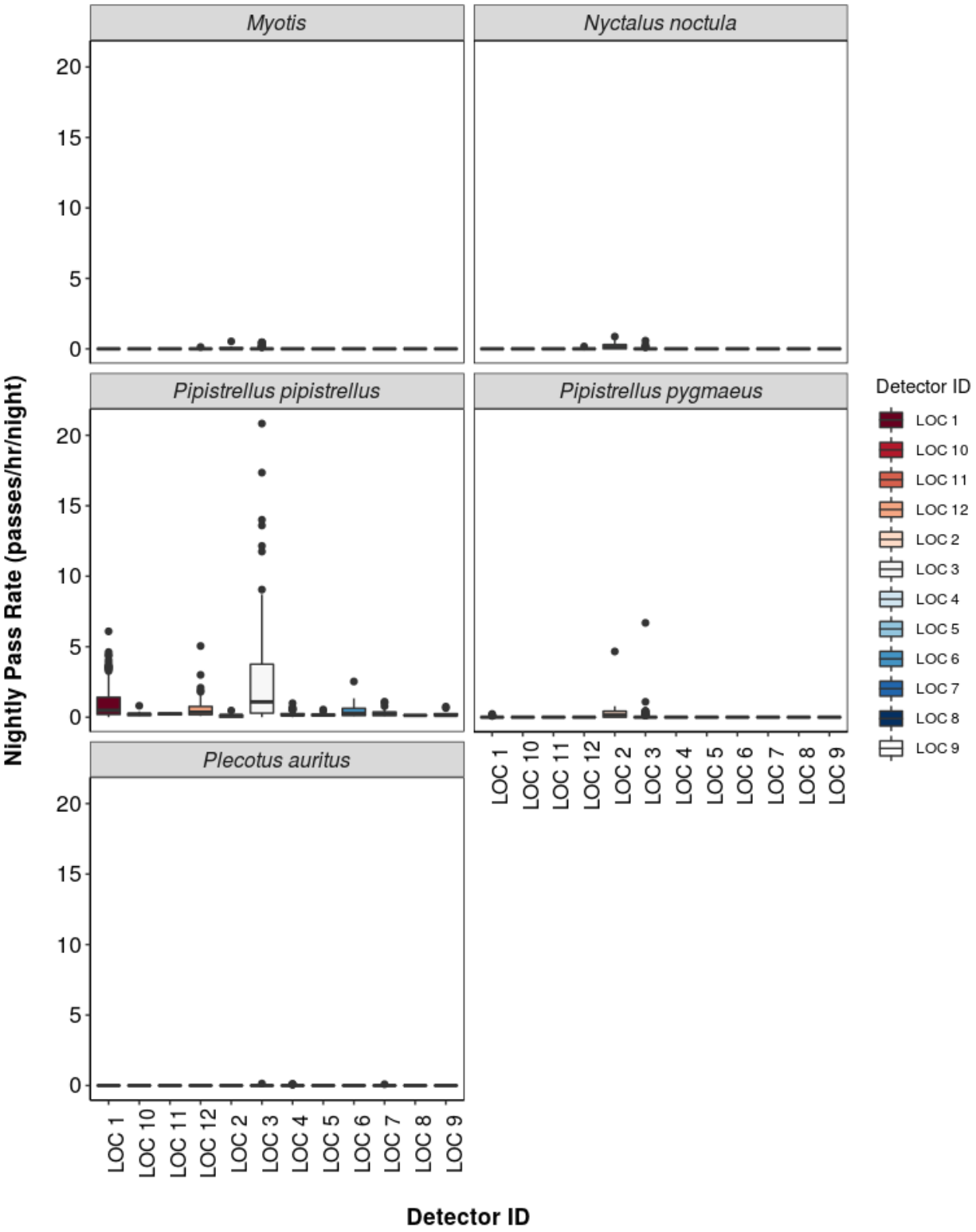
Species	Detector ID	Mean Pass Rate
Brown long-eared	LOC 1	0.0
Brown long-eared	LOC 10	0.0
Brown long-eared	LOC 11	0.0
Brown long-eared	LOC 12	0.0
Brown long-eared	LOC 2	0.0
Brown long-eared	LOC 3	0.0
Brown long-eared	LOC 4	0.0
Brown long-eared	LOC 5	0.0
Brown long-eared	LOC 6	0.0
Brown long-eared	LOC 7	0.0
Brown long-eared	LOC 8	0.0
Brown long-eared	LOC 9	0.0
Common pipistrelle	LOC 1	1.1
Common pipistrelle	LOC 10	0.2
Common pipistrelle	LOC 11	0.2
Common pipistrelle	LOC 12	0.6
Common pipistrelle	LOC 2	0.1
Common pipistrelle	LOC 3	3.0
Common pipistrelle	LOC 4	0.2
Common pipistrelle	LOC 5	0.2
Common pipistrelle	LOC 6	0.5
Common pipistrelle	LOC 7	0.3
Common pipistrelle	LOC 8	0.1
Common pipistrelle	LOC 9	0.2
Myotis	LOC 1	0.0
Myotis	LOC 10	0.0
Myotis	LOC 11	0.0
Myotis	LOC 12	0.0
Myotis	LOC 2	0.1
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	0.0
Myotis	LOC 9	0.0
Noctule	LOC 1	0.0
Noctule	LOC 10	0.0
Noctule	LOC 11	0.0
Noctule	LOC 12	0.0
Noctule	LOC 2	0.2
Noctule	LOC 3	0.0
Noctule	LOC 4	0.0
Noctule	LOC 5	0.0
Noctule	LOC 6	0.0
Noctule	LOC 7	0.0
Noctule	LOC 8	0.0
Noctule	LOC 9	0.0
Soprano pipistrelle	LOC 1	0.0
Soprano pipistrelle	LOC 10	0.0
Soprano pipistrelle	LOC 11	0.0
Soprano pipistrelle	LOC 12	0.0
Soprano pipistrelle	LOC 2	0.6
Soprano pipistrelle	LOC 3	0.2
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
Soprano pipistrelle	LOC 9	0.0

Nightly Bat Passes (Bat passes per hour)

Per Detector - Figures

Figure 15. Figures show boxplots for the number of bat passes per hour each night, for each detector. The ‘box’ shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The ‘whiskers’ extend from the box and represent the ranges for the bottom 25% and the top 25% of the data values, excluding outliers. An outlier is any extreme value that lies further away from the box than 1.5 times the interquartile range. Outliers are shown as dots. Where very few passes are recorded it is not possible to produce the box, so the data are shown as a line.


Myotis
Nyctalus noctula
Pipistrellus pipistrellus
Pipistrellus pygmaeus
Plecotus auritus
Nightly Pass Rate (passes/hr/night)
0
5
10
15
20
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID

Survey Effort

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

Month	Detector ID	No of Survey Nights
Apr	LOC 1	10
Apr	LOC 10	11
Apr	LOC 11	1
Apr	LOC 12	11
Apr	LOC 2	1
Apr	LOC 3	7
Apr	LOC 5	1
Apr	LOC 6	3
Apr	LOC 7	3
May	LOC 1	5
May	LOC 10	6
May	LOC 12	6
May	LOC 2	1
Jun	LOC 11	1
Jul	LOC 1	26
Jul	LOC 10	1
Jul	LOC 12	21
Jul	LOC 2	7
Jul	LOC 3	22
Jul	LOC 4	11
Jul	LOC 5	7
Jul	LOC 6	1
Jul	LOC 7	10
Jul	LOC 8	1
Jul	LOC 9	1
Aug	LOC 1	29
Aug	LOC 10	1
Aug	LOC 12	30
Aug	LOC 2	2
Aug	LOC 3	30
Aug	LOC 4	18
Aug	LOC 5	12
Aug	LOC 6	11
Aug	LOC 7	29
Aug	LOC 8	1

Aug	LOC 9	12
Sep	LOC 1	18
Sep	LOC 10	6
Sep	LOC 12	15
Sep	LOC 3	5
Sep	LOC 4	14
Sep	LOC 5	4
Sep	LOC 6	17
Sep	LOC 7	12
Sep	LOC 9	1
Oct	LOC 1	2
Oct	LOC 12	2
Oct	LOC 4	1
Oct	LOC 6	1
Oct	LOC 7	3

Nightly Bat Pass Rate for each Month

Median Per Detector

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

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

Species	Detector ID	Apr	Aug	Jul	Jun	May	Oct	Sep
Brown long-eared	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Brown long-eared	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Brown long-eared	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Brown long-eared	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Brown long-eared	LOC 2	0.0	0.0	0.0	NA	0.0	NA	NA
Brown long-eared	LOC 3	0.0	0.0	0.0	NA	NA	NA	0.0
Brown long-eared	LOC 4	NA	0.0	0.0	NA	NA	0.1	0.0
Brown long-eared	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Brown long-eared	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Brown long-eared	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Brown long-eared	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Brown long-eared	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Common pipistrelle	LOC 1	0.2	0.7	3.0	NA	0.1	0.1	0.1
Common pipistrelle	LOC 10	0.2	0.1	0.3	NA	0.2	NA	0.2
Common pipistrelle	LOC 11	0.1	NA	NA	0.4	NA	NA	NA
Common pipistrelle	LOC 12	0.2	0.7	0.5	NA	0.2	0.1	0.3
Common pipistrelle	LOC 2	0.2	0.1	0.0	NA	0.1	NA	NA
Common pipistrelle	LOC 3	0.9	1.4	0.7	NA	NA	NA	0.3
Common pipistrelle	LOC 4	NA	0.1	0.2	NA	NA	0.1	0.1
Common pipistrelle	LOC 5	0.1	0.1	0.2	NA	NA	NA	0.1
Common pipistrelle	LOC 6	0.1	0.4	0.7	NA	NA	0.2	0.3
Common pipistrelle	LOC 7	0.1	0.3	0.3	NA	NA	0.1	0.1
Common pipistrelle	LOC 8	NA	0.1	0.2	NA	NA	NA	NA
Common pipistrelle	LOC 9	NA	0.1	0.3	NA	NA	NA	0.1
Myotis	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Myotis	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Myotis	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Myotis	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Myotis	LOC 2	0.0	0.3	0.0	NA	0.0	NA	NA

Myotis	LOC 3	0.0	0.0	0.0	NA	NA	NA	0.0
Myotis	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0
Myotis	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Myotis	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Myotis	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Myotis	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Myotis	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Noctule	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Noctule	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Noctule	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Noctule	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Noctule	LOC 2	0.0	0.0	0.3	NA	0.0	NA	NA
Noctule	LOC 3	0.0	0.0	0.0	NA	NA	NA	0.0
Noctule	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Noctule	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Noctule	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Soprano pipistrelle	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Soprano pipistrelle	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Soprano pipistrelle	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	LOC 2	0.0	0.1	0.3	NA	0.0	NA	NA
Soprano pipistrelle	LOC 3	0.0	0.0	0.1	NA	NA	NA	0.0
Soprano pipistrelle	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Soprano pipistrelle	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Soprano pipistrelle	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0

Nightly Bat Pass Rate for each Month

Mean per Detector

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

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

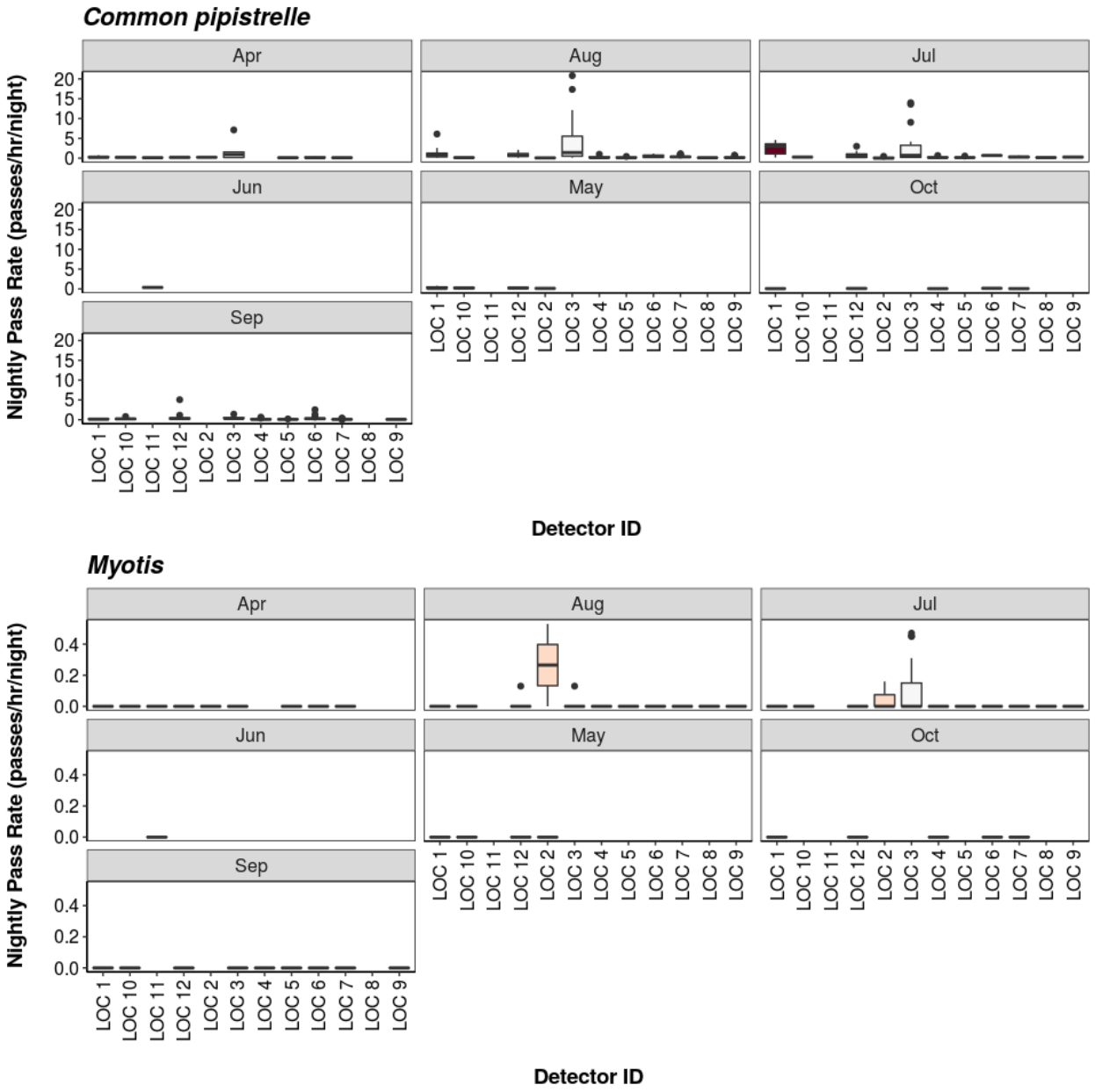
Species	Detector ID	Apr	Aug	Jul	Jun	May	Oct	Sep
Brown long-eared	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Brown long-eared	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Brown long-eared	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Brown long-eared	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Brown long-eared	LOC 2	0.0	0.0	0.0	NA	0.0	NA	NA
Brown long-eared	LOC 3	0.0	0.0	0.0	NA	NA	NA	0.0
Brown long-eared	LOC 4	NA	0.0	0.0	NA	NA	0.1	0.0
Brown long-eared	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Brown long-eared	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Brown long-eared	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Brown long-eared	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Brown long-eared	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Common pipistrelle	LOC 1	0.3	1.0	2.4	NA	0.3	0.1	0.2
Common pipistrelle	LOC 10	0.2	0.1	0.3	NA	0.2	NA	0.3
Common pipistrelle	LOC 11	0.1	NA	NA	0.4	NA	NA	NA
Common pipistrelle	LOC 12	0.2	0.8	0.7	NA	0.2	0.1	0.7
Common pipistrelle	LOC 2	0.2	0.1	0.1	NA	0.1	NA	NA
Common pipistrelle	LOC 3	1.7	4.1	2.6	NA	NA	NA	0.5
Common pipistrelle	LOC 4	NA	0.3	0.2	NA	NA	0.1	0.2
Common pipistrelle	LOC 5	0.1	0.2	0.2	NA	NA	NA	0.1
Common pipistrelle	LOC 6	0.2	0.5	0.7	NA	NA	0.2	0.5
Common pipistrelle	LOC 7	0.1	0.4	0.3	NA	NA	0.1	0.1
Common pipistrelle	LOC 8	NA	0.1	0.2	NA	NA	NA	NA
Common pipistrelle	LOC 9	NA	0.2	0.3	NA	NA	NA	0.1
Myotis	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Myotis	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Myotis	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Myotis	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Myotis	LOC 2	0.0	0.3	0.0	NA	0.0	NA	NA
Myotis	LOC 3	0.0	0.0	0.1	NA	NA	NA	0.0
Myotis	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0

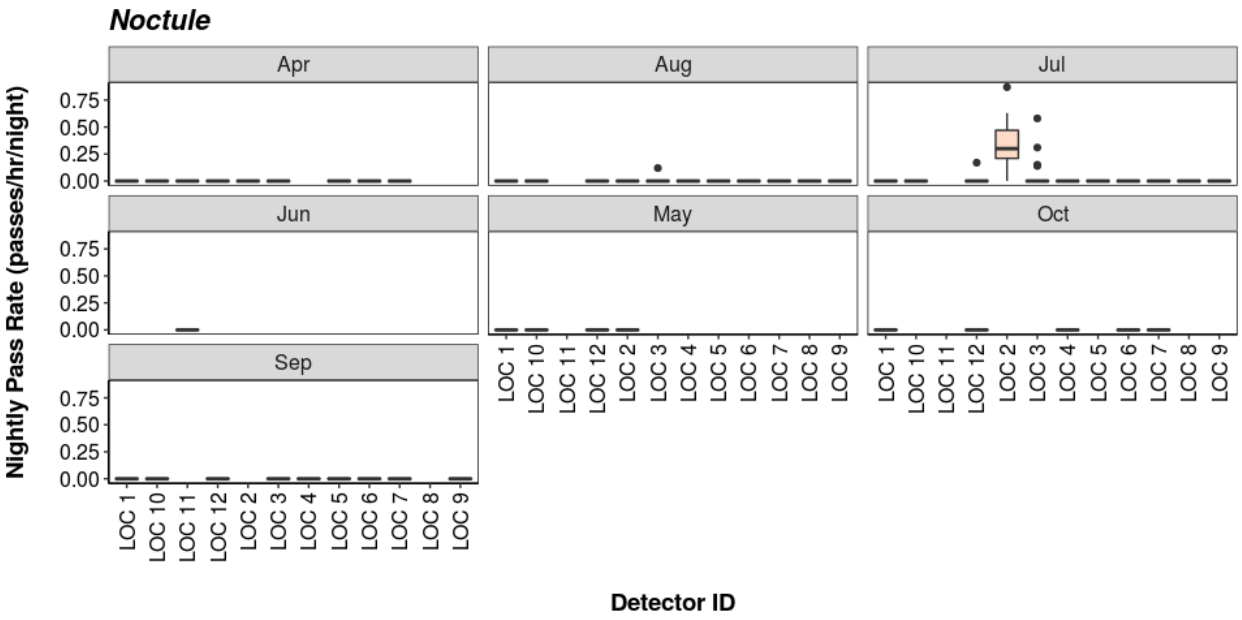
Myotis	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Myotis	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Myotis	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Myotis	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Myotis	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Noctule	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Noctule	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Noctule	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Noctule	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Noctule	LOC 2	0.0	0.0	0.4	NA	0.0	NA	NA
Noctule	LOC 3	0.0	0.0	0.1	NA	NA	NA	0.0
Noctule	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Noctule	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Noctule	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Noctule	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0
Soprano pipistrelle	LOC 1	0.0	0.0	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	LOC 10	0.0	0.0	0.0	NA	0.0	NA	0.0
Soprano pipistrelle	LOC 11	0.0	NA	NA	0.0	NA	NA	NA
Soprano pipistrelle	LOC 12	0.0	0.0	0.0	NA	0.0	0.0	0.0
Soprano pipistrelle	LOC 2	0.0	0.1	0.9	NA	0.0	NA	NA
Soprano pipistrelle	LOC 3	0.0	0.0	0.5	NA	NA	NA	0.0
Soprano pipistrelle	LOC 4	NA	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 5	0.0	0.0	0.0	NA	NA	NA	0.0
Soprano pipistrelle	LOC 6	0.0	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 7	0.0	0.0	0.0	NA	NA	0.0	0.0
Soprano pipistrelle	LOC 8	NA	0.0	0.0	NA	NA	NA	NA
Soprano pipistrelle	LOC 9	NA	0.0	0.0	NA	NA	NA	0.0

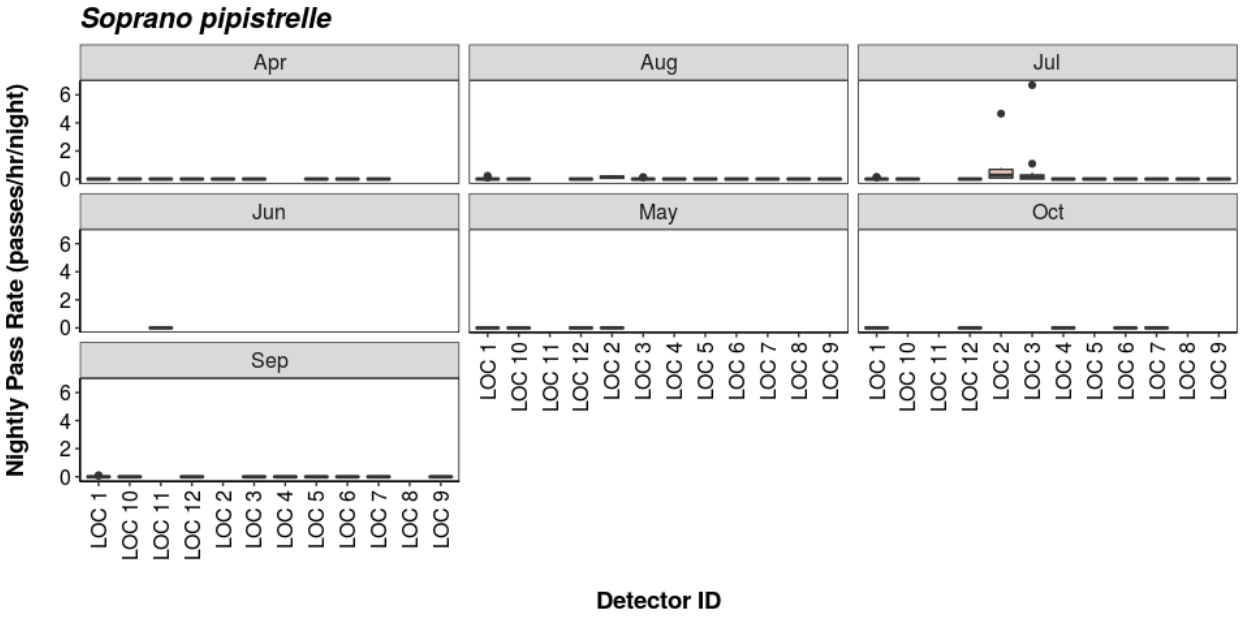
Nightly Bat Pass Rate for each Month

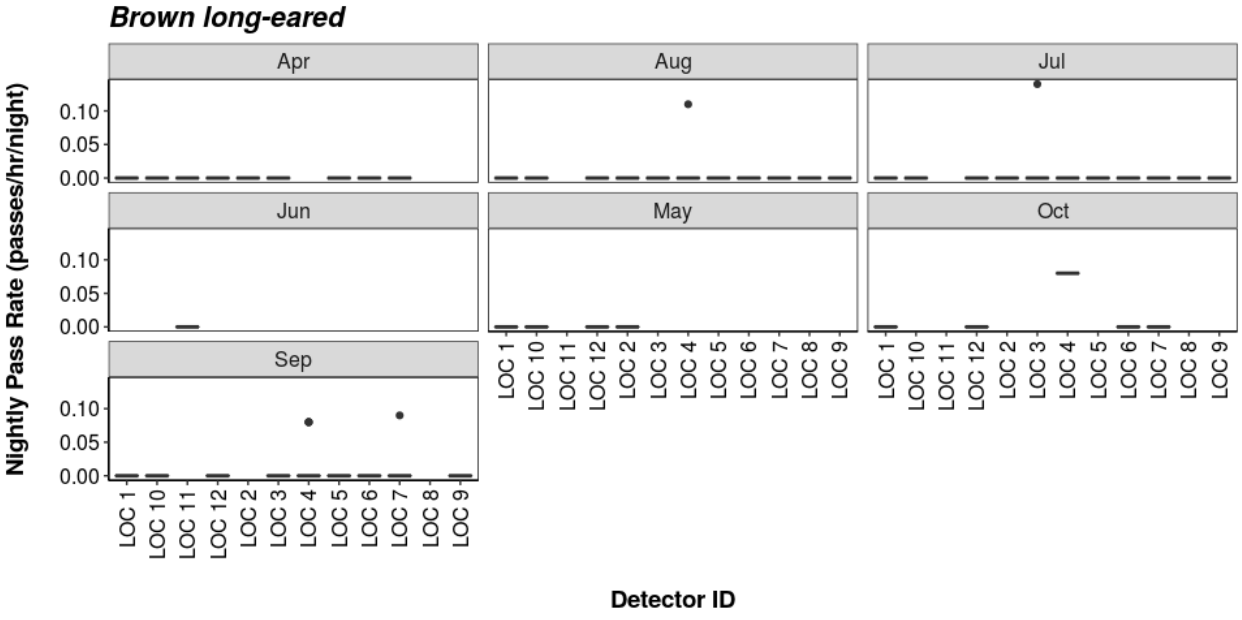
Per Detector - Figures

Figure 16. 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.




Noctule
Apr
Aug
Jul
Jun
May
Oct
Sep
Nightly Pass Rate (passes/hr/night)
0.00
0.25
0.50
0.75
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID


Soprano pipistrelle
Apr
Aug
Jul
Jun
May
Oct
Sep
Nightly Pass Rate (passes/hr/night)
0
2
4
6
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID


Brown long-eared
Apr
Aug
Jul
Jun
May
Oct
Sep
Nightly Pass Rate (passes/hr/night)
0.00
0.05
0.10
LOC 1
LOC 10
LOC 11
LOC 12
LOC 2
LOC 3
LOC 4
LOC 5
LOC 6
LOC 7
LOC 8
LOC 9
Detector ID

Bat Activity per Detector Location

Figure 17. Detector ID reference:

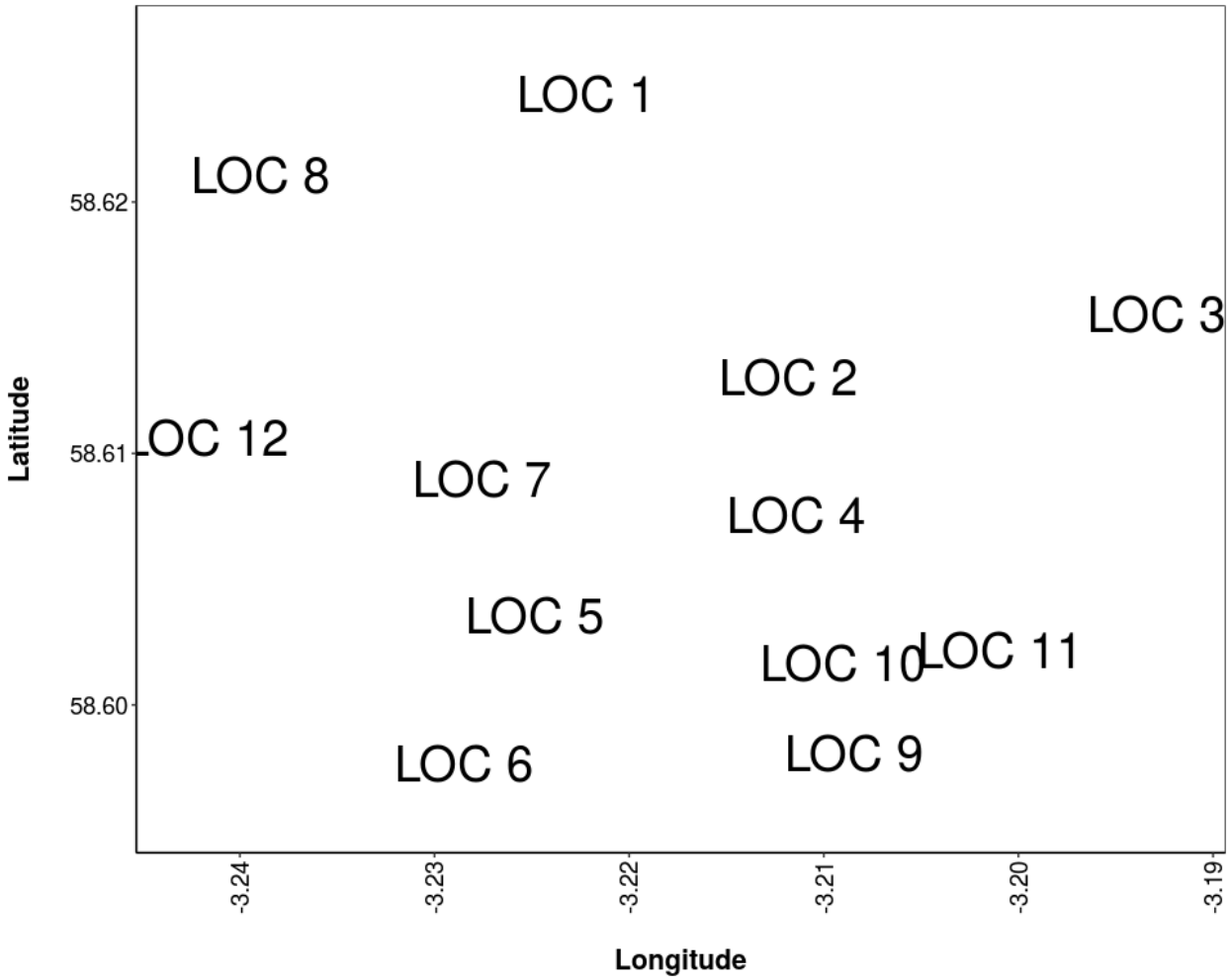


Figure 18. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

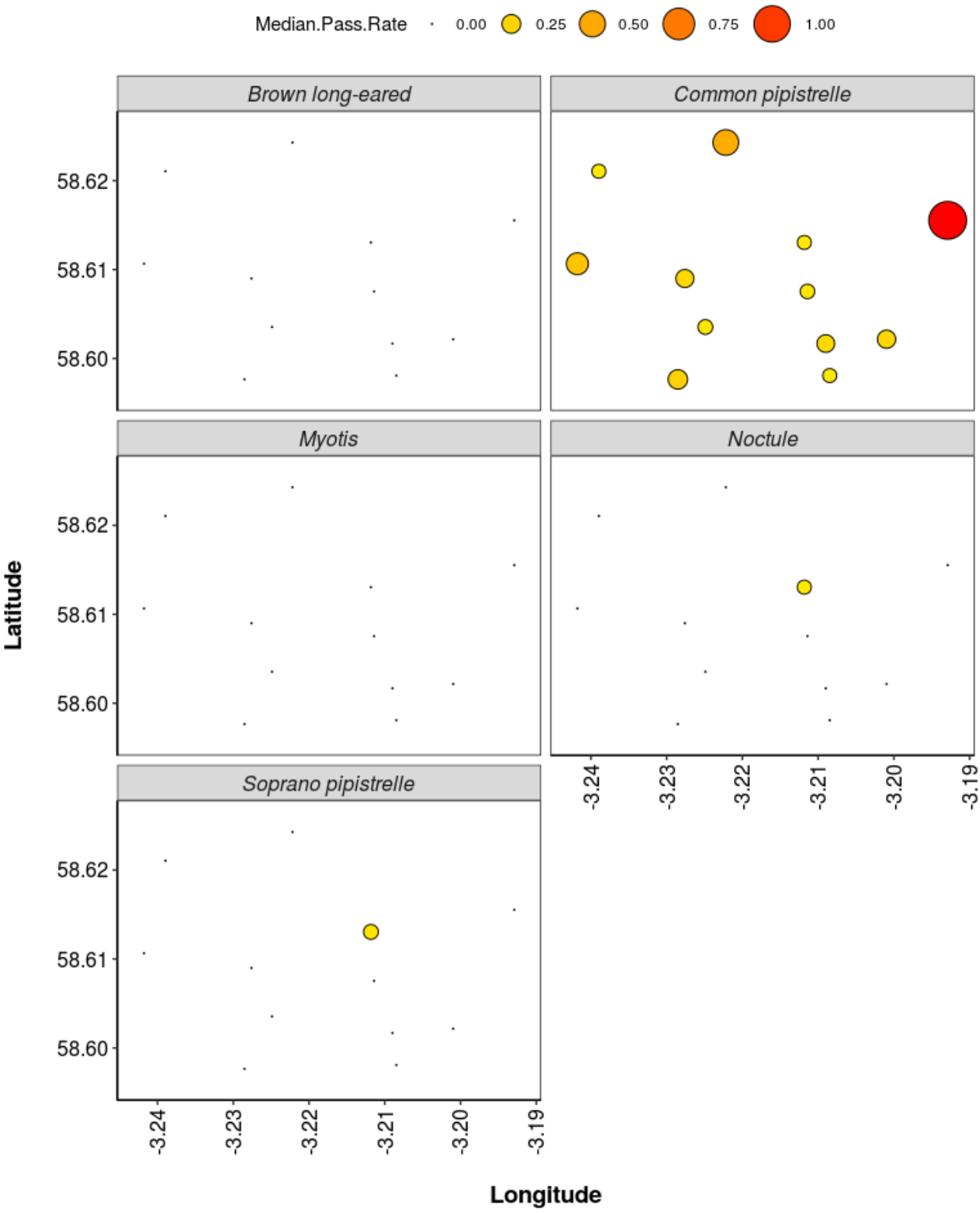
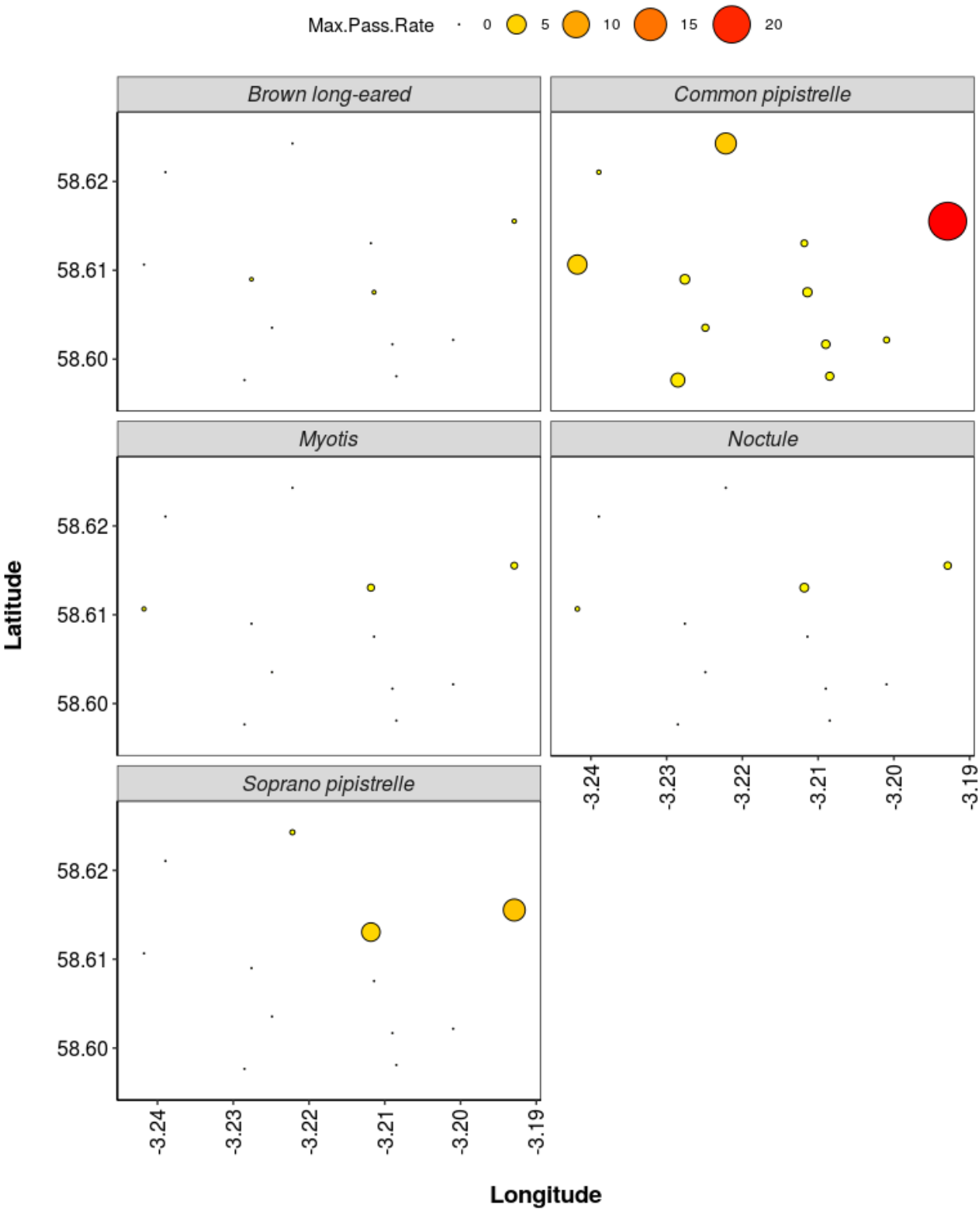


Figure 19. Maximum Nightly Pass Rate (bat passes/hr/night) recorded in a single night throughout the survey period - represented by the size and colour of the point at each detector location.



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