Appendix 1 – Ecology Corresponding to RFI Point

Order	Document Title
1	Ecology Response Report – Habitat Items; Bats (and other survey data)
2	Invasive Species Management Plan
3	Kerry Slug Derogation Licence, Application and Supporting Information
4	Whooper Swan Acoustic Survey Report

Gortloughra Wind Farm

Response to An Coimisiún Pleanála Further Information

Habitat Items

Doherty Environmental Consultants Ltd

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Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

This report has been prepared by Doherty Environmental Consultants Ltd with all reasonable skill, care and diligence. Information report herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is prepared for Jennings O'Donovan & Partners and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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1.0 INTRODUCTION

2.0 RESPONSE TO HABITAT ITEM 1

You are required to provide an updated Habitat Map (EIAR Figure 6.8) based on data collected from additional survey and monitoring stops undertaken as part of the appeal. This map should be at an appropriate scale to allow for clear identification of habitat classification. The turbines shall also be correctly numbered as per the submitted layout drawings.

Figure 6.8 has been updated to provide a series of habitat map sheets (Habitat Map Sheet 1 to 15). The updated habitat map sheets have been prepared at a scale of 1:3,000. All monitoring stop locations are illustrated on the Habitat Map. The total extent of habitats, identified as key ecological receptors in the EIAR Biodiversity Chapter, as shown on the Habitat Map series, are set out in **Table 2.1** below.

In addition to the habitat maps and series of maps showing the extent of Annex 1 Habitat Condition & Non-Annex 1 habitat occurring within the redline boundary of the Gortloughra Wind Farm have been prepared. All monitoring stop locations are also illustrated on this additional map series. The total extent of Annex 1 habitats and non-Annex 1 habitat, as shown on the map series, are set out in **Table 2.2** below.

Table 2.1: Extent of Habitats, identified as Key ecological receptors, occurring within the Gortloughra Wind Farm redline boundary

Habitat	Habitat in Footprint	
	m^2	HA
Upland Blanket Bog PB2	115,820.98	11.58
Wet heath HH3	453,227.01	45.32
Wet Heath HH3 Sliceous Rock ER3 Mosaic	30,093.68	3.01
Wet Heath/Siliceous Rock/Acid Grassland Mosaic	139,722.06	13.97
Wet Heath HH3/Acid Grassland GS3 Mosaic	76,694.79	7.67
Wet Grassland GS4	69,063.02	6.91
Dry Acid Grassland	28,980.56	2.90
Dry Heath HH1 Siliceous Rock ER3	663.81	0.07
Wet GS4 Acid GS3 Grassland	85,153.27	8.52

Table 2.2: Extent of Annex 1 habitat, by condition & non-Annex 1 habitat occurring within the Gortloughra Wind Farm redline boundary

Annex 1 Habitat Condition & Non-Annex Habitat	Habitat Type	Area in Footprint	
		m^2	HA
4010_Favourable	Wet heath	85701.04093	7.240154
4010_Unfavourable-Inadequate	Wet heath	353423.4112	29.85775
4010_Unfavourable Bad	Wet heath	54715.03239	4.622409
4060_Favourable	Montane heath	52842.57917	4.464221
7130_Unfavourable Bad	Blanket bog	102930.4709	8.695722
7130_Unfavourable Inadequate	Blanket bog	32294.08544	2.728253
Non-Annex		501784.2457	42.39149

The turbines are labelled correctly as per the submitted layout drawings.

3.0 RESPONSE TO HABITAT ITEM 2

In terms of the updated vegetation survey pelase provide justification/rationale on how the survey methodology alings with perrin 2014 (NPWS, IWM 79) upland survey guidelines

Wet heath, wet heath mosaic and upland blanket bog habitats occur within the footprint of the proposed Gortloughra Wind Farm. Perrin et al. (2014) has identified a link between wet heath and upland blanket bog with the EU Habitats Directive Annex 1 listed habitats:

- 4010 Northern Atlantic wet heaths with *Erica tetralix* (Habitat short name 'wet heaths'); and
- 7130 blanket bogs (*if active bog) (Habitat short name 'blanket bog (active)*')

In order to inform the significance of the loss of wet heath, wet heath mosaic and blanket bog to the Proposed Development a condition assessment of these habitats has been completed. In the framework of conservation status assessment under the Habitats Directive, condition corresponds to the parameter 'structure and function (including typical species)' (Olmeda et al., 2025). It is noted that for the purposes of EU Habitats Directive Article 17 monitoring overall conservation status is derived from not only current condition (i.e. structure and function) but also area (or more accurately area change) and future prospects. For the purposes of this habitat condition assessment the current conservation status of wet heath and blanket bog habitats are determined by the results of the condition (i.e. structure and function) assessment.

The condition of a habitat is interpreted as the ensemble of multiple relevant characteristics which are measured by sets of variables. The condition of wet heath habitats and blanket bog habitats occurring at the Gortloughra Wind Farm site were assessed in terms of their structure and function. The set of measurable variables that are used to assess wet heath and blanket bog condition have been set out by Perrin et. al. (2014). These are referred to by Perrin et al. as 'monitoring criteria'. Appendix V of Perrin et al. sets out the monitoring criteria for upland Annex 1 habitats with those for wet heaths and blanket bog listed. The monitoring criteria are categorised under vegetation composition; vegetation structure and physical structure.

The complete list of monitoring criteria set out by Perrin et al. for wet heath are shown on **Table 3.1** below; whilst those for blanket bog are shown on **Table 3.2**.

Table 3.1: Wet heath Monitoring Criteria as per Perrin et al.

Criteria		Scale of assessment
Vegetation composition		
1	*Erica tetralix* present	20m radius
2	Cover of positive indicator species ≥ 50% (Appendix VI)	Relevé
3	Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%	Relevé
4	Cover of ericoid species and *Empetrum nigrum* ≥ 15%	Relevé
5	Cover of dwarf shrub species < 75%	Relevé
6	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%	Relevé
7	Cover of non-native species < 1%	Relevé
8	Cover of non-native species < 1%	Local vicinity
9	Cover of scattered native trees and scrub < 20%	Local vicinity
10	Cover of *Pteridium aquilinum* < 10%	Local vicinity
11	Cover of *Juncus effusus* < 10%	Local vicinity
Vegetation structure		
12	Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé
13	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of <u>browsing</u> collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé
14	No signs of <u>burning</u> into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity
15	No signs of <u>burning</u> inside boundaries of sensitive areas†	Local vicinity
Physical structure		
16	Cover of <u>disturbed</u> bare ground < 10%	Relevé
17	Cover of <u>disturbed</u> bare ground < 10%	Local vicinity
18	Area showing signs of <u>drainage</u> resulting from heavy trampling or tracking or ditches < 10%	Local vicinity

Table 3.2: Blanket bog Monitoring Criteria as per Perrin et al.

	Criteria	Scale of assessment
Vegetation composition		
1	Number of positive indicator species present ≥ 7 (Appendix VI)	Relevé
2	Cover of bryophyte or lichen species, excluding *Sphagnum fallax* ≥ 10%	Relevé
3	Cover of <u>each</u> of the following species: *Calluna vulgaris, Eleocharis multicaulis, Eriophorum vaginatum, Molinia caerulea, Schoenus nigricans, Trichophorum germanicum* individually < 75%	Relevé
4	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Pteridium aquilinum, Ranunculus repens* collectively < 1%	Relevé
5	Cover of non-native species < 1%	Relevé
6	Cover of non-native species < 1%	Local vicinity
7	Cover of scattered native trees and scrub < 10%	Local vicinity
Vegetation structure		
8	Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé
9	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of <u>browsing</u> collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé
10	No signs of <u>burning</u> into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Local vicinity
11	No signs of <u>burning</u> inside boundaries of sensitive areas†	Local vicinity
Physical structure		
12	Cover of <u>disturbed</u> bare ground < 10%	Relevé
13	Cover of <u>disturbed</u> bare ground < 10%	Local vicinity
14	Area showing signs of <u>drainage</u> resulting from heavy trampling or tracking or ditches or peat cutting < 10%	Local vicinity
15	Cover of <u>erosion</u> gullies and eroded areas within the greater bog mosaic‡ < 5%	Local vicinity

During the field survey monitoring stops were completed within the footprint of the Proposed Development in areas of wet heath habitats and blanket bog. The stops were completed along the proposed wind farm access track, at turbine hardstand areas and within the proposed habitat management area. An Arc GIS point feature layer with attribute field names following the criteria for both habitat types was prepared in advance of the field survey. Two no. point feature layers were prepared: one for wet heath habitats and the other for blanket bog.

For the condition assessment of wet heath habitats, the monitoring criteria listed in **Table 3.1** were used to record condition at each monitoring stop. An Arc GIS point feature layer shapefile was prepared with the fields for these criteria set out in the attribute table for the shapefile layer. **Table 3.3** below lists each of the monitoring criteria and the shapefile attribute table field name.

Table 3.3: Arc GIS Shapefile Attribute Field Names for the Recording of Wet Heath Habitats Monitoring Criteria

Monitoring Criteria (from Perrin et al.)	Shapefile Attribute Field Name
Erica tetralix Present	ErTetPrsen
Cover of Positive indicator species ≥50%	CovPosSpp50
Cover of Cladonia species; Sphagnum species, Racomitrium lanuginosum and pleurocarpous mosses ≥10%	CovClad_Sp
Cover of Ericoid species and Empetrum nigrum ≥15%	CovEric_Em
Cover of Dwarf Shrub species <75%	CovDwarfSh
Cover of Negative Indicator species <1%	CovNegSpp1
Cover of non-native species <1%	Cov_NNPS_1
Cover of scattered trees and scrubs <20%	CovTreeShr
Cover of Pteridium aquilinum <10%	Cov_Pter_A
Cover of Juncus effusus <10%	Cov_JunEff
Disturbed Sphagnum <10%	Distribution_Sphag
Shrub shoots showing signs of browsing <33%	Browse_33
No signs of burning	No_Burning
Cover of disturbed ground <10%	Distribution_Groun
Area showing signs of drainage <10%	Drainage_S

For the condition assessment of blanket bog, the monitoring criteria set out in **Table 3.2** were used to record condition at each monitoring stop. An Arc GIS point feature layer shapefile was prepared with the fields for these criteria set out in the attribute table for the shapefile layer. **Table 3.4** below lists the each of the monitoring criteria and the shapefile attribute table field name.

Table 3.4: Arc GIS Shapefile Attribute Field Names for the Recording of Blanket Bog Habitats Monitoring Criteria

Monitoring Criteria (from Perrin et al.)	Shapefile Attribute Field Name
Cover of Positive indicator species ≥7	NoPosSpp7

Cover of bryophyte or lichen species, excluding Sphagnum fallax ≥10%	CovByolic
Cover of Dominant species <75%	CovDomSp75
Cover of Negative Indicator species <1%	CovNegSpCo
Cover of non-native species <1%	CovNNPS1
Cover of scattered trees and scrubs <10%	CovTreeShr
Disturbed Sphagnum <10%	DistSphag10
Shrub shoots showing signs of browsing <33%	BrowCollect
No signs of burning	NoBurning
Cover of disturbed ground <10%	DistGround
Area showing signs of drainage <10%	Drainage10
Cover of erosion gullies and eroded areas <5%	GullErosGr

ESRI Field Maps application was used to plot each monitoring stop and populate the attribute table criteria in the field. At each stop the criteria were examined with a pass ('p') or fail ('f') assigned to each. The point locations for the completion of a monitoring stop were selected by the qualified surveyor in the field. Each point was selected in order to obtain condition data representative of the vegetation in area at which the monitoring stop is located.

As Perrin et al. using the results of the monitoring stops, an overall assessment of structure and functions for a habitat can be given following the guidelines in Table 3.5.

Table 3.5: Conservation Status of Habitat Based on Condition Monitoring Results

Conservation status	Favourable (green)	Unfavourable Inadequate	Unfavourable Bad
Criteria	No stop failures	1 – 25% of stops failed	>25% of stops failed

To determine the conservation status of the wet heath habitats and blanket bog habitat all monitoring stops were analysed and the percentage failure rate was calculated. The results of the Habitat Condition Assessment are provided in Appendix 1.

A key output of the condition assessment is the Annex 1 Habitat Condition & Non-Annex 1 Habitat Map Series, referenced under Item 1 above ~~(See updated Figure 6.8)~~ and provided under separate cover as part of the further information response. This map series was prepared by importing the results of the Condition Assessment as a shapefile point layer into an ESRI Arc Pro Project. The Condition Assessment shapefile point layer along with habitat target notes taken during previous habitat surveys and interpretation of aerial imagery provided by Maxar and Google Earth (from May 2023) were used to finalise the Annex 1 Habitat Condition & Non-Annex 1 Habitat Map Series.

4.0 RESPONSE TO HABITAT ITEM 3

Provide an updated table of habitat loss/damage showing the amounts (quantitative) of habitat (including Annex 1) directly and indirectly impacted

The habitats identified as key ecological receptors that will be subject to loss as a result of the Proposed Development are listed in **Table 4.1** below. The quantities of habitat loss as listed in **Table 4.1** below represent an update to those set out in Table 6.14 of the EIAR Biodiversity Chapter. The updated calculations provided in **Table 4.1** include the area of habitat lost to the footprint of proposed stilling ponds. In addition, a minor change to the extent of Upland Blanket Bog PB2 has been made with areas of previously mapped Upland blanket bog PB2 being changed to Wet Grassland GS4. This change relates to sections of land bounding the north side of the stretch of the access track between T3 and T7. Along the track verge a strip of Juncus effusus dominated wet grassland habitat separates the existing access track from Upland Blanket Bog to the north.

Table 4.2 provides an additional table that quantifies the extent of habitat loss to Annex 1 habitats. The condition of these Annex 1 habitats are also set out in **Table 4.2** below.

Table 4.1: Area of Wet Heath, Wet Heath Mosaics & Blanket Bog to be lost to the footprint of the proposed wind farm

Habitat	Habitat in Footprint	
	m^2	HA

Upland Blanket Bog PB2	7460	0.75
Wet heath HH3	58136	5.81
Wet Heath HH3 Sliceous Rock ER3 Mosaic	3948	0.39
Wet Heath/Siliceous Rock/Acid Grassland Mosaic	20637	2.06
Wet Heath HH3/Acid Grassland GS3 Mosaic	26664	2.67
Wet Grassland GS4	13716	1.37
Dry Acid Grassland	5948	0.59
Dry Heath HH1 Siliceous Rock ER3	93	0.01
Wet GS4 Acid GS3 Grassland	10060	1.01

Table 4.2: Area of Annex 1 Habitat, by Habitat Condition & Noon Annex 1 Habitat to be lost to the footprint of the proposed wind farm

Annex 1 Habitat Condition & Non-Annex Habitat	Area in Footprint	
	m^2	HA
4010_Favourable	20345.22	2.03
4010_Unfavourable Bad	48211.56	4.82
4010_Unfavourable-Inadequate	10133.57	1.01
4060_Favourable	0	0
7130_Unfavourable Bad	7462.72	0.75
7130_Unfavourable Inadequate	276.41	0.03
Non-Annex	116051.50	11.61

Indirect effects to terrestrial habitats during the construction phase of the wind farm relate to the potential for works to undermine key processes that underpin the status of these habitats. For terrestrial habitats this relates to the potential for works to undermine key hydrological or hydrogeological processes that underpin the status of terrestrial wetland habitats. In the context of the wind farm site, such processes are related to blanket bog habitat occurring on deeper peat deposits. Two discrete areas of blanket bog occurring on deeper peat deposits occur at the Site, one at T06 and the other to the north of the existing access track to T07. Such indirect impact, with related consequences of habitat loss, are not considered to apply to wet heath habitats within the proposed wind farm site due to the firm and shallow peat layer upon which this habitat occurs.

Given that the existing access track on site will be used to access T07 the Proposed Development will not result in any further indirect effects to this example of blanket bog.

Blanket bog habitat will be lost to the footprint of turbine T06. Examples of blanket bog occur to the west and south of the wind farm layout at T06. The extent of indirect impacts to blanket bog at this location adjacent to the layout footprint is likely to be restricted to a discrete area immediately to the east and west of the T06 Turbine Hardstand. The example of spur bog at this location is fragmented by the existing access track south of T6 and by the Shehy Beg Stream to the west. These existing fragmenting features will limit the extent of indirect effects from water table drawdown within the peat deposit at the T06 location.

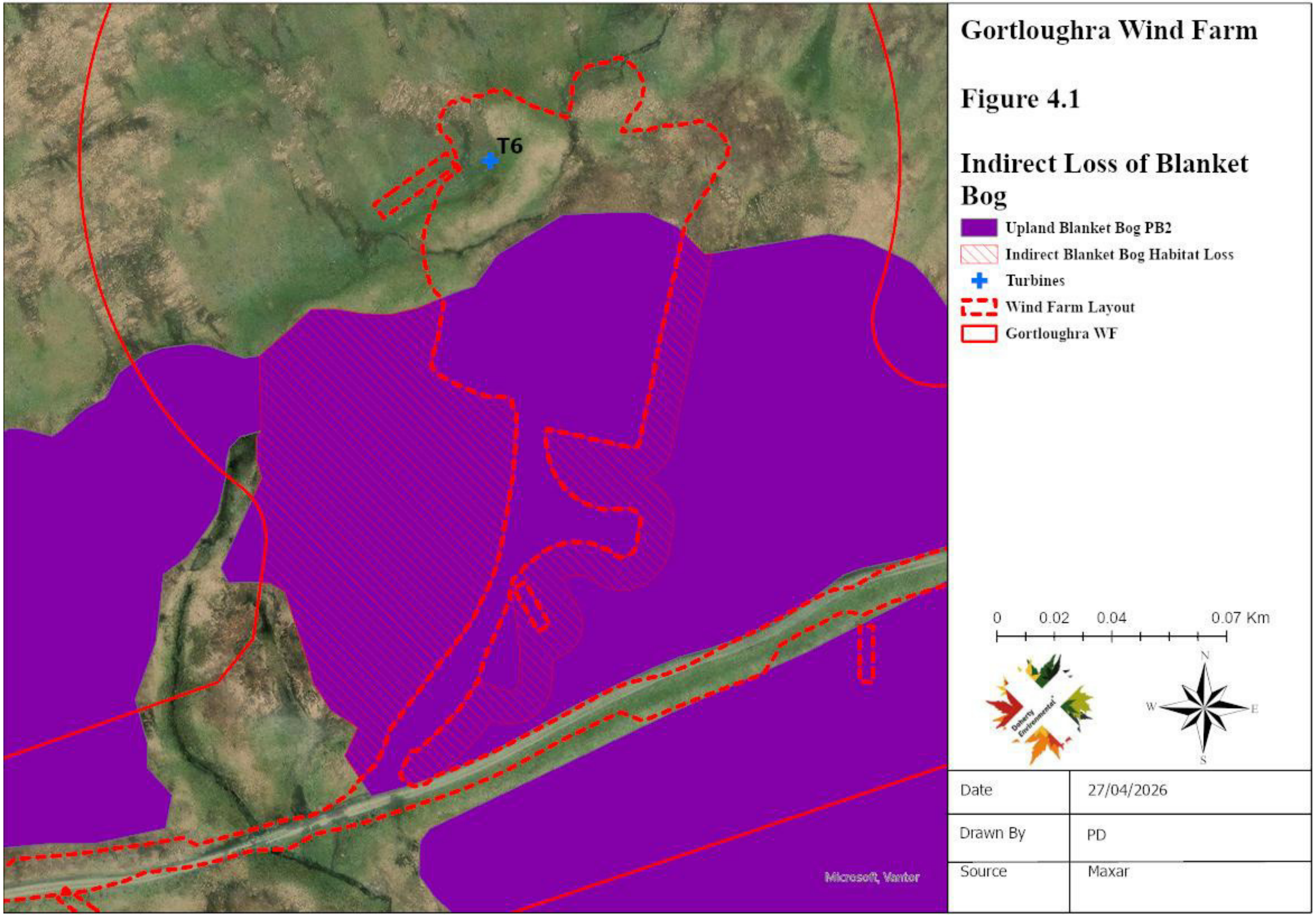
The blanket bog habitat to the west of the proposed wind farm layout is already dehumidified and representative of inactive peat and of blanket bog in unfavourable bad condition. Given the isolated plot of blanket bog that will remain to the west of the proposed wind farm layout between the layout and the Shehy Beg Stream and based on a worst-case scenario, it is considered that this remaining area of unfavourable bad blanket bog will be lost over time as a result of indirect impacts arising from the Wind Farm infrastructure. The extent of this area of blanket bog to the west of the proposed wind farm layout is c. 0.75 Ha area. This area is shown on **Figure 4.1** below.

To the east of the proposed wind farm layout at T06 a larger area of blanket bog will remain. This area of blanket bog will susceptible to indirect effects that will have the potential to result in habitat degradation and ultimate loss of blanket bog within the immediate vicinity (i.e. less than 10m) of the proposed wind farm layout. This is considered to be the case given the evidence of localised disturbance, degradation and ultimate conversion of blanket bog habitat in the immediate vicinity of existing infrastructure bounding blanket bog on site. Particular examples of such localised disturbance, degradation and ultimate habitat conversion occur to the west of the proposed wind farm site between T03 and T07. At this location, the existing access track will result in changes to peat hydrology immediately adjacent to the existing access track with Juncus effusus cover dominating. This gives way to typical blanket bog vegetation within less than 10m of the access track. Applying a 10m buffer to the east of the proposed wind farm layout at T06 will result in a worst-case scenario habitat loss through indirect impacts of c. 0.28 Ha (see **Figure 4.1** for indication of area of blanket bog occurring within the 10m buffer of the proposed wind farm layout at T06).

The combined area of indirect habitat loss will amount to c. 1 Ha of blanket bog in unfavourable bad condition.

Combining this with the direct loss of blanket bog habitat to the proposed wind farm footprint will amount to:

- 1.75 Ha of blanket bog in unfavourable bad condition; and
- 0.03 Ha of blanket bog in unfavourable inadequate condition.


T6
Microsoft, Vantor
Gortloughra Wind Farm
Figure 4.1
Indirect Loss of Blanket Bog
Upland Blanket Bog PB2
Indirect Blanket Bog Habitat Loss
Turbines
Wind Farm Layout
Gortloughra WF
0 0.02 0.04 0.07 Km
N
W
E
S
Date 27/04/2026
Drawn By PD
Source Maxar

5.0 RESPONSE TO HABITAT ITEM 4

Provide greater clarification on what does/doesn't conform to Annex 1 habitat and clarify how much Annex is directly/indirectly impacted. The language in the appeal document isn't definitive in referencing which isn't "excellent quality/example of Annex' but it doesn't conclude whether it is Annex 1 or not

The Annex 1 Habitat Condition & Non-Annex Habitat Map series, as referenced under Item 1 above, has been prepared to provide greater clarity on what does/doesn't conform to Annex 1 habitat.

Areas considered to be representative of excellent quality and examples of Annex 1 habitat are those that are identified to be in Favourable Conservation Condition. These are shown on Annex 1 Habitat Condition & Non-Annex Habitat Map series.

The methodology used to identify what Annex 1 habitat condition is has been described under Item 2 above.

The extent of Annex 1 habitat and non-Annex 1 habitat that will be directly impacted and indirectly impacted by the proposed wind farm development is quantified under Item 3 above.

6.0 RESPONSE TO HABITAT ITEM 5

In terms of the habitat mitigation being proposed, you are required to provide an assessment of confidence in the effectiveness of the restoration measures proposed.

Response

6.1 INTRODUCTION

The Habitat Management Plan prepared for the proposed Gortloughra Wind Farm sets out the purpose, scope and methods for habitat restoration at the Wind Farm Site. The aim of the HMP is to:

a) restore wet and montane heath within the HMP Restoration Lands that consist of lands associated with the temporary construction footprint around infrastructure elements of the Proposed Development;
b) maintain and/or restore areas of heath occurring within the HMP Management Lands so as to compensate for the loss of heath habitat to the footprint of the Proposed Development.
c) maintain and/or restore heath habitat conditions within the HMP Management Lands that are favourable for red grouse and other ground nesting bird species (such as meadow pipit and skylark).

The restoration strategy for heath habitats within the HMP Restoration Lands and HMP Management Lands is based on well-established techniques widely applied across heathlands in Ireland and the UK. These techniques have been tested in comparable ecological contexts including wind farm reinstatement, peatland restoration, and agri-environment schemes.

The measures proposed for effective restoration and management of heath at the proposed Site, namely re-turving, heather brash application, direct seeding, grazing management, and fencing, are all supported by a substantial body of applied research and practical guidance, including:

- Natural England guidance on upland habitat restoration
- Scottish Natural Heritage upland management advisory materials
- Joint Nature Conservation Committee habitat management documentation
- National Parks and Wildlife Service conservation management recommendations
- Peer-reviewed studies on upland heath and peatland restoration across the Ireland and the UK.

6.2 METHODOLOGY FOR CONFIDENCE ASSESSMENT

Confidence levels are assigned based on:

- Strength and consistency of the evidence base (peer-reviewed literature and applied guidance);
- Demonstrated success in comparable upland/heathland environments;
- Sensitivity to site-specific conditions; and

- Degree of management control over outcomes.

Confidence categories are defined as:

- High: Strong, consistent evidence of success under comparable conditions; low uncertainty when best practice is followed.
- Moderate: Evidence supports effectiveness, but outcomes are more variable or context-dependent.
- Low: Limited or inconsistent evidence; high uncertainty in outcomes.

6.3 EVIDENCE BASE FOR RESTORATION MEASURES

6.3.1 Re-turving of Heath Sods

Reinstatement using intact heath turves is widely recognised as a highly effective restoration method in heathlands, particularly in infrastructure developments (e.g. wind farms, pipelines).

Turves retain:

- Established vegetation communities;
- Soil structure and hydrological function; and
- Seed banks and microbial assemblages.

Guidance from Natural England and Scottish Natural Heritage identifies turf translocation as a best-practice approach where original vegetation can be salvaged and reinstated.

Key supporting literature identifying re-turving as an effective method for habitat restoration include:

- Putwain et al. (2026) – Heathland Habitat Restoration
- Pywell et al. (2011) – Heathland Restoration on former Grassland
- Anderson (2003) – Habitat translocation principles
- Gilbert & Anderson (1998) – Habitat Creation and Repair
- Humphries (2010) – Moorland restoration techniques
- SNH (2016) – Good practice during wind farm construction

Conclusion: High reliability when turves are appropriately handled, stored, and reinstated within suitable timeframes. Detailed methods for the appropriate handling, storing and reinstatement of turves within suitable timeframes are set out in the HMP.

6.3.2 Heather Brash Application

Heather brash spreading is a well-established technique for restoring dwarf shrub communities. Brash provides:

- A viable seed source;
- Vegetative fragments capable of regeneration;
- Mulch for erosion control and moisture retention.

Guidance from Joint Nature Conservation Committee and National Parks and Wildlife Service supports its use in heathland and peatland restoration.

Key supporting literature:

- Putwain et al. (2026) – identification of heather brash as an effective method of heath restoration
- Pywell et al. (1996) – Heathland restoration using harvested heather shoots
- Mitchell et al. (2008) – Upland vegetation recovery
- Natural England (2010) – Heather management guidance
- Gilbert & Anderson (1998) – Habitat Creation and Repair
- SNH (Scottish Natural Heritage) (1996a) Heather Re-establishment on Mechanically Disturbed Areas. Information Advisory Note No 44
- EAU (Environmental Advisory Unit, University of Liverpool) (1988). Heathland Restoration: A Handbook of Techniques. British Gas, Southampton (Comprehensive and authoritative).

Conclusion: Consistently effective for establishing heather where site conditions are suitable and material is locally sourced.

6.3.3 Direct Heather Seed Application

Direct seeding is widely used but shows more variable outcomes compared to brash spreading.

Success depends on:

- Seed viability and provenance;
- Soil preparation and competition control; and
- Climatic conditions.

Key supporting literature:

- Pywell et al. (2002) – Heathland re-creation techniques
- Walker et al. (2004) – Seed-based restoration outcomes

Conclusion: Effective as a supplementary measure, particularly for increasing spatial coverage and diversity, but less reliable as a primary method.

6.3.4 Livestock Density Management

Grazing management is a critical determinant of heathland condition. Extensive evidence shows that:

- Putwain et al. (2026). Application of livestock grazing densities to
- Overgrazing suppresses dwarf shrub recovery;
- Undergrazing can lead to grass dominance or scrub encroachment.

Adaptive grazing regimes are a cornerstone of upland habitat management, as reflected in agri-environment schemes and guidance from Natural England and National Parks and Wildlife Service.

Key supporting literature:

- Grant et al. (1996) – Grazing impacts on moorland
- Martin et al. (2013) – Sustainable grazing systems

Conclusion: Highly effective when stocking densities are actively managed and adjusted based on monitoring.

6.3.5 Fencing Controls

Fencing is routinely used to:

- Exclude grazing during early restoration phases; and
- Enable controlled grazing regimes.

Evidence demonstrates that temporary grazing exclusion significantly improves vegetation establishment success.

Key supporting literature:

- Putwain et al. (2026) – application of fencing to restrict grazing during heath establishment
- Stewart et al. (2005) – Grazing exclusion studies
- Natural England (2010) – Moorland management guidance

Conclusion: A reliable enabling measure that underpins the success of other restoration techniques.

6.4 CONFIDENCE MATRIX

Following on from the review set out in Section 6.3 above **Table 6.1** sets out the confidence level, as per the methods described in Section 6.2, for each of the Restoration and Management measures to achieve effect heathland habitat enhancement at the proposed wind farm site.

Table 6.1: Confidence Matrix – Identification of Level of Confidence in Effectiveness of HMP Habitat Restoration & Management Measures

Restoration Measure	Evidence Strength	Key Dependencies	Timescale to Effectiveness	Confidence Level
Re-turving of heath sods	Strong	Turf handling, storage duration, seasonal timing	Short (1–3 years)	High
Heather brash application	Strong	Seed viability, local provenance, ground conditions	Short–Medium (2–5 years)	High

Direct heather seeding	Moderate	Soil conditions, competition, weather	Medium–Long (3–10 years)	Moderate
Livestock density management	Strong	Stocking control, adaptive management	Ongoing	High
Fencing controls	Strong	Maintenance, appropriate design	Immediate–Short	High

6.4.1 Combined Effectiveness of Measures

The HMP adopts a multi-method restoration strategy, which is widely recognised as best practice. Combining these techniques will enhance establishment success and ecological resilience and reduces reliance on any single method. The methods to be adopted as per the HMP supports both short-term recovery and long-term habitat establishment and enhancement.

This integrated approach aligns with guidance from CIEEM; Joint Nature Conservation Committee; and Nature Scotland.

In view of the foregoing the overall confidence in restoration success is considered to be **High.**

7.0 RESPONSE TO INVASIVE SPECIES ITEM 1

You are required to clarify the presence/absence of Third Schedule invasive species (European Communities (Bird and Natural Habitats) Regulations 2011) within the development footprint. Should a third schedule species be recorded within the proposed Wind Farm Site, the turbine delivery route, or the grid connection, a site specific and project specific Invasive Species Management Plan shall be submitted to An Coimisiún Pleanála.

It is noted that Section 6.5.6.7 of the EIAR Chapter 6 states "No non-native invasive species were identified within the proposed development site." This should state "No non-native invasive species were identified within the proposed wind farm site". non-native invasive species have been identified along the proposed turbine delivery route.

Japanese Knotweed occurs along the proposed Turbine Delivery Route and this species has also been recorded along the proposed grid connection route in the past.

~~*Rhododendron ponticum* and~~ *Prunus laurocerasus* occur along the proposed grid connection route and Turbine Delivery Route.~~.~~

Section 6.7.1.2.2 sets out measures for the proper treatment and management of Japanese Knotweed such that the project does not present a risk of spreading this non-native invasive species.

A Site-Specific Invasive Species Management Plan has been prepared and ~~will be~~ is submitted to An Coimisiún Pleanála as part of the documentation provided in response to ~~a~~ this ~~request for~~ further information ~~by An Coimisiún Pleanála~~item.

8.0 OTHER PROTECTED SPECIES ITEM 1

Kerry Slug: As disturbance of this species has been identified in the EIAR, An Coimisiún Pleanála will require a valid derogation under Regulation 54 of the EC (Birds and Natural Habitats) Regulations 2011, as amended in line with recent advice from the National Parks and Wildlife Survey (Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants).

A derogation licence under Regulation 54 of the EC (Birds and Natural Habitats) Regulations 2011, as amended has been submitted to the National Parks and Wildlife Service (NPWS). The licence application and supporting licencing documentation is provided under separate cover with the further information response documentation.

DEC Ltd. have submitted and sought the derogation licence application on behalf of Gortloughra Wind Farm Ltd. It is noted that DEC Ltd. have held numerous Annex II and Annex IV species derogation licences in past.

The licence application is still undergoing consideration and assessment by the NPWS Wildlife Licencing Unit. At the time of writing the licence assessment has passed the first stage of a Regulation 54 licence application (i.e. Test 1) and is undergoing assessment for Test 2 prior to moving forward to Test 3 assessment.

It is expected that the licence application will be fully assessment by the NPWS during May 2026.

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APPENDIX 1: GORTLOUGHRA WIND FARM HABITAT CONDITION ASSESSMENT

1.0 INTRODUCTION

This appendix provides the results of a habitat condition survey of wet heath, wet heath mosaic and blanket bog habitats occurring within the footprint of the proposed Gortloughra Wind Farm. The purpose of the survey is to evaluate the condition of these habitats to further inform the significance of the loss of areas of these habitats to the footprint of the development.

2.0 METHODOLOGY

Wet heath, wet heath mosaic and upland blanket bog habitats occur within the footprint of the proposed Gortloughra Wind Farm. Perrin et al. (2014) has identified a link between wet heath and upland blanket bog with the EU Habitats Directive Annex 1 listed habitats:

- 4010 Northern Atlantic wet heaths with *Erica tetralix* (Habitat short name 'wet heaths'); and
- 7130 blanket bogs (*if active bog) (Habitat short name 'blanket bog (active)*')

In order to inform the significance of the loss of wet heath, wet heath mosaic and blanket bog to the Proposed Development a condition assessment of these habitats has been completed. The condition assessment was completed on the 7th June 2025.

In the framework of conservation status assessment under the Habitats Directive, condition corresponds to the parameter 'structure and function (including typical species)' (Olmeda et al., 2025). It is noted that for the purposes of EU Habitats Directive Article 17 monitoring overall conservation status is derived from not only current condition (i.e. structure and function) but also area (or more accurately area change) and future prospects. For the purposes of this habitat condition assessment the current conservation status of wet heath and blanket bog habitats are determined by the results of the condition (i.e. structure and function) assessment.

The condition of a habitat is interpreted as the ensemble of multiple relevant characteristics which are measured by sets of variables. The condition of wet heath habitats and blanket bog habitats occurring at the Gortloughra Wind Farm site were assessed in terms of their structure and function. The set of measurable variables that are used to assess wet heath and blanket bog condition have been set out by Perrin et. al. (2014). These are referred to by Perrin et al. as 'monitoring criteria'. Appendix V of Perrin et al. sets out the monitoring criteria for upland Annex 1 habitats with those for wet heaths and blanket bog listed. The monitoring criteria are categorised under vegetation composition; vegetation structure and physical structure.

The complete list of monitoring criteria set out by Perrin et al. for wet heath are shown on **Table 2.1** below; whilst those for blanket bog are shown on **Table 2.2**.

Table 2.2.1: Wet heath Monitoring Criteria as per Perrin et al.

	Criteria	Scale of assessment
Vegetation composition		
1	*Erica tetralix* present	20m radius
2	Cover of positive indicator species ≥ 50% (Appendix VI)	Relevé
3	Total cover of *Cladonia* species, *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses ≥ 10%	Relevé
4	Cover of ericoid species and *Empetrum nigrum* ≥ 15%	Relevé
5	Cover of dwarf shrub species < 75%	Relevé
6	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Ranunculus repens* collectively < 1%	Relevé
7	Cover of non-native species < 1%	Relevé
8	Cover of non-native species < 1%	Local vicinity
9	Cover of scattered native trees and scrub < 20%	Local vicinity
10	Cover of *Pteridium aquilinum* < 10%	Local vicinity
11	Cover of *Juncus effusus* < 10%	Local vicinity
Vegetation structure		
12	Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé
13	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of <u>browsing</u> collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé
14	No signs of <u>burning</u> into the moss, liverwort or lichen layer, or exposure of peat surface due to burning	Local vicinity
15	No signs of <u>burning</u> inside boundaries of sensitive areas†	Local vicinity
Physical structure		
16	Cover of <u>disturbed</u> bare ground < 10%	Relevé
17	Cover of <u>disturbed</u> bare ground < 10%	Local vicinity
18	Area showing signs of <u>drainage</u> resulting from heavy trampling or tracking or ditches < 10%	Local vicinity

Table 2.2.2: Blanket bog Monitoring Criteria as per Perrin et al.

Criteria		Scale of assessment
Vegetation composition		
1	Number of positive indicator species present ≥ 7 (Appendix VI)	Relevé
2	Cover of bryophyte or lichen species, excluding *Sphagnum fallax* ≥ 10%	Relevé
3	Cover of each of the following species: *Calluna vulgaris, Eleocharis multicaulis, Eriophorum vaginatum, Molinia caerulea, Schoenus nigricans, Trichophorum germanicum* individually < 75%	Relevé
4	Cover of the following negative indicator species: *Agrostis capillaris, Holcus lanatus, Phragmites australis, Pteridium aquilinum, Ranunculus repens* collectively < 1%	Relevé
5	Cover of non-native species < 1%	Relevé
6	Cover of non-native species < 1%	Local vicinity
7	Cover of scattered native trees and scrub < 10%	Local vicinity
Vegetation structure		
8	Crushed, broken and/or pulled up *Sphagnum* species < 10% of *Sphagnum* cover	Relevé
9	Last complete growing season's shoots of ericoids, *Empetrum nigrum* and *Myrica gale* showing signs of browsing collectively < 33% (Assess a minimum of 10 shoots distributed across the plot)	Relevé
10	No signs of burning into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Local vicinity
11	No signs of burning inside boundaries of sensitive areas†	Local vicinity
Physical structure		
12	Cover of disturbed bare ground < 10%	Relevé
13	Cover of disturbed bare ground < 10%	Local vicinity
14	Area showing signs of drainage resulting from heavy trampling or tracking or ditches or peat cutting < 10%	Local vicinity
15	Cover of erosion gullies and eroded areas within the greater bog mosaic‡ < 5%	Local vicinity

During the field survey monitoring stops were completed within the footprint of the Proposed Development in areas of wet heath habitats and blanket bog. The stops were completed along the proposed wind farm access track, at turbine hardstand areas and within the proposed habitat management area. An Arc GIS point feature layer with attribute field names following the criteria for both habitat types was prepared in advance of the field survey. Two no. point feature layers were prepared: one for wet heath habitats and the other for blanket bog.

For the condition assessment of wet heath habitats, the monitoring criteria listed in **Table 2.1** were used to record condition at each monitoring stop. An Arc GIS point feature layer shapefile was prepared with the fields for these criteria set out in the attribute table for the shapefile layer. **Table 2.3** below lists each of the monitoring criteria and the shapefile attribute table field name.

Table 2.2.3: Arc GIS Shapefile Attribute Field Names for the Recording of Wet Heath Habitats Monitoring Criteria

Monitoring Criteria (from Perrin et al.)	Shapefile Attribute Field Name
Erica tetralix Present	ErTetPrsen
Cover of Positive indicator species ≥50%	CovPosSpp50
Cover of Cladonia species; Sphagnum species, Racomitrium lanuginosum and pleurocarpous mosses ≥10%	CovClad_Sp
Cover of Ericoid species and Empetrum nigrum ≥15%	CovEric_Em
Cover of Dwarf Shrub species <75%	CovDwarfSh
Cover of Negative Indicator species <1%	CovNegSpp1
Cover of non-native species <1%	Cov_NNPS_1
Cover of scattered trees and scrubs <20%	CovTreeShr
Cover of Pteridium aquilinum <10%	Cov_Pter_A
Cover of Juncus effusus <10%	Cov_JunEff
Disturbed Sphagnum <10%	Distribution_Sphag
Shrub shoots showing signs of browsing <33%	Browse_33
No signs of burning	No_Burning
Cover of disturbed ground <10%	Distribution_Groun
Area showing signs of drainage <10%	Drainage_S

For the condition assessment of blanket bog, the monitoring criteria set out in **Table 3.2** were used to record condition at each monitoring stop. An Arc GIS point feature layer shapefile was prepared with the fields for these criteria set out in the attribute table for the shapefile layer. **Table 2.4** below lists the each of the monitoring criteria and the shapefile attribute table field name.

Table 2.2.4: Arc GIS Shapefile Attribute Field Names for the Recording of Blanket Bog Habitats Monitoring Criteria

Monitoring Criteria (from Perrin et al.)	Shapefile Attribute Field Name
Cover of Positive indicator species ≥7	NoPosSpp7

Cover of bryophyte or lichen species, excluding Sphagnum fallax ≥10%	CovByolic
Cover of Dominant species <75%	CovDomSp75
Cover of Negative Indicator species <1%	CovNegSpCo
Cover of non-native species <1%	CovNNPS1
Cover of scattered trees and scrubs <10%	CovTreeShr
Disturbed Sphagnum <10%	DistSphag10
Shrub shoots showing signs of browsing <33%	BrowCollect
No signs of burning	NoBurning
Cover of disturbed ground <10%	DistGround
Area showing signs of drainage <10%	Drainage10
Cover of erosion gullies and eroded areas <5%	GullErosGr

ESRI Field Maps application was used to plot each monitoring stop and populate the attribute table criteria in the field. At each stop the criteria were examined with a pass ('p') or fail ('f') assigned to each. The point locations for the completion of a monitoring stop were selected by the qualified surveyor in the field. Each point was selected in order to obtain condition data representative of the vegetation in area at which the monitoring stop is located.

As Perrin et al. using the results of the monitoring stops, an overall assessment of structure and functions for a habitat can be given following the guidelines in Table 2.5.

Table 2.2.5: Conservation Status of Habitat Based on Condition Monitoring Results

Conservation status	Favourable (green)	Unfavourable Inadequate	Unfavourable Bad
Criteria	No stop failures	1 – 25% of stops failed	>25% of stops failed

To determine the conservation status of the wet heath habitats and blanket bog habitat all monitoring stops were analysed and the percentage failure rate was calculated. The results of the Habitat Condition Assessment are provided in Appendix 1.

A key output of the condition assessment is the Annex 1 Habitat Condition & Non-Annex 1 Habitat Map Series. This map series was prepared by importing the results of the Condition Assessment as a shapefile point layer into an ESRI Arc Pro Project. The Condition Assessment shapefile point layer along with habitat target notes taken during previous habitat surveys and interpretation of aerial imagery provided by Maxar and Google Earth (from May 2023) were used to finalise the Annex 1 Habitat Condition & Non-Annex 1 Habitat Map Series.

3.0 RESULTS

The condition of habitats occurring at each of the discrete sections of the proposed wind farm site (i.e. individual track sections and turbine hardstands) as well as the overall wet heath and upland blanket bog stops are set out in the following subsections.

The detailed results for each monitoring stop structure and function criteria (in terms of pass/fail) are presented as Appendix 1 to this habitat condition assessment.

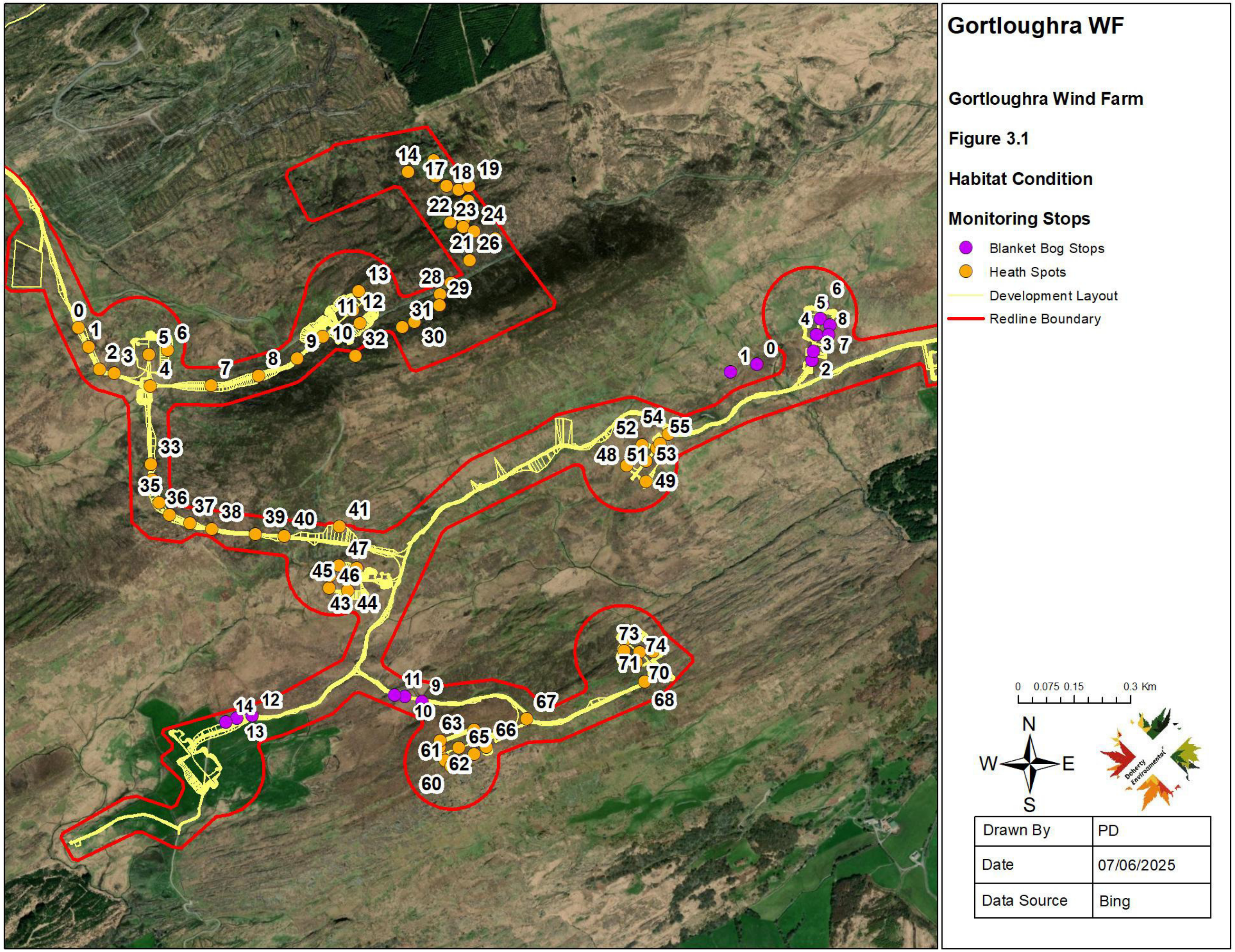
The locations of all monitoring stops are shown on **Figure 3.1** below.

3.1 TRACK TO T1 & T1 – WET HEATH 4010

Along the access track to T1 and surrounding T1 hardstand there is evidence of overgrazing with low cover of Calluna vulgaris and other ericoids and high cover of graminoids, particularly Molinia caerulea. Patches of well grazed short sward grassland largely devoid of ericoid cover occur at the T1 hardstand. Such areas are representative of non-Annex 1 habitat in the form of acid grassland. Structure and function criteria failed at all stops indicating Unfavourable Bad condition. Given the existing grazing pressures in this area future prospect is considered to be Unfavourable Bad, resulting in overall Unfavourable Bad condition.

3.2 TRACK TO T2 AND T2 – WET HEATH 4010

The track to T2 from T1 passes by Stop 4, where conditions failed due to absence of Erica tetralix and low cover of ericoids with an overwhelming dominance of Molinia caerulea. These conditions persist moving east before Stop 7 where there is a change in the vegetation with a dominance of Calluna vulgaris cover. Stop 7, 8 and 9 passed all structure and function criteria. Stop 10, 11, 12 and 13 failed structure and function criteria due to signs of overgrazing as well as the presence of artificial drainage features and low ericoid cover. Whilst conditions at the


Gortloughra WF
Gortloughra Wind Farm
Figure 3.1
Habitat Condition
Monitoring Stops
Blanket Bog Stops
Heath Spots
Development Layout
Redline Boundary
0 0.075 0.15 0.3 Km
N
W
E
S
Drawn By | PD
Date | 07/06/2025
Data Source | Bing

foot of the slope between Stop 7 and 9 are in favourable condition for structure and function, the future prospect for this area is considered to be unfavourable given the signs of degradation in the surrounding area. The area of heath at good condition to the east and Stops 7 to 9 and northeast, moving upslope is considered to be favourable. As such the overall conditions along the track to T2 and at T2 hardstand is considered to be Unfavourable Inadequate.

3.3 TRACK TO T3 AND T3 – WET HEATH 4010

Moving south along the access track from T2 towards T3 the cover is initially characterised by low Calluna vulgaris and other ericoid cover with a dominance of species-poor Molinia caerulea. Moving upslope to the ridgeline this gives way to vegetation supporting abundant Calluna vulgaris and ericoid species with the heath in good condition. Variations in quality occur on the south facing side of the ridge nearer T3, whilst structure and function condition at T3 is generally favourable. A total of 15 monitoring stops were completed along the track to T3 and at T3 with a failure in c. 25% of the stops resulting in a structure and function at Unfavourable Inadequate. The area of heath is considered to be favourable. Current grazing levels on the south facing side of Shehy More are now in keeping with favourable livestock densities and as such future prospects are likely to be favourable. Overall condition within this section of the wind farm footprint is considered to be Unfavourable Inadequate.

3.4 TRACK TO T4 AND T4 – WET HEATH 4010

All the track to T4 conditions are currently undermined by the presence of the existing access track, drainage and low cover of Calluna vulgaris and other ericoids. High levels of grazing are evident and can be clearly observed from a review of current satellite imagery with an apparent change in vegetation pixelation either side of an existing fenceline. Conditions improve to the west of the fenceline but Molinia caerulea is overall considered to be over abundant in this area. Conditions to the east of the fenceline are considered to be Unfavourable Bad with structure and function criteria at all four no. monitoring stops in this area. Structure and function conditions to the west are favourable with all four no. monitoring stops passing all structure and function criteria. Overall, the structure and function within the footprint of the access track to T4 and at T4 combine to result in this area been classed at Unfavourable Inadequate condition. The area is considered to be favourable, whilst future prospects are also considered to be favourable given that livestock densities are now in keeping with favourable densities. The overall condition is considered to be Unfavourable Inadequate.

3.5 TRACK TO T6 AND T6 – 7130 UPLAND BLANKET BOG

The track to T6 leaves the existing access track and crossed degraded heath (overgrazing) before the small area of blanket bog at T6. This area of blanket bog occurs to the east and west of the Shehy Beg stream and an additional area, outside the footprint of the wind farm, also occurs to the south of the existing access track. A total of 8 no. monitoring stops were completed within this area with greater than 25% of stops failing at least one structure and function criteria. Criteria failed include presence of disturbed ground and disturbed Sphagnum, over dominance of Molinia caerulea and Pteridium aquilinum and presence of drainage. The structure and function of this small area of blanket bog is considered to be at Unfavourable Bad condition. The limited extent of this example of blanket bog is considered to fall well short of an area threshold for blanket bog at favourable area status. As such the area condition is considered to be unfavourable bad. Current land management in the form of livestock densities are favourable. However, continued drainage will undermine the status of this blanket bog, resulting in Unfavourable Bad condition. The overall condition of this example of blanket bog is Unfavourable Bad.

3.6 TRACK TO T8 & T7 – 7130 UPLAND BLANKET BOG

A short section of track, approximately 65m in length, will cross along the edge of upland blanket bog adjacent to the existing access track approach the proposed T8 access track spur. Along a second of access track approaching T7 an area of fill associated with the proposed access track will encroach upon the boundary of the blanket bog for a length of c. 100m. A total of 5 no. monitoring stops were completed along the footprint of both sections of track. Structure and function failed at each of the monitoring spots, resulting from a species-poor sward and proximity to drainage. The overall structure and function condition of the blanket bog habitat at and surrounding the monitoring stops is considered to be Unfavourable Bad. The limited area of both examples of blanket bog is considered to be Unfavourable Bad whilst the presence of existing drainage will undermine the future prospects resulting in Unfavourable Bad conditions. The overall condition is considered to be Unfavourable Bad.

3.7 TRACK TO T8 AND T8 – WET HEATH 4010

Conditions along the initial section of the access track to T8 to the west of the existing access track are degraded with disturbance ground, signs of overgrazing and absent to low ericoid cover occurring. Moving west to T8, the structure and function of the heath is generally favourable, albeit overgrazed patches are present. A total of 12 monitoring stops were completed along the access track to T8 and at T8 with failures of criteria at 3 of the stops resulting in a condition of Unfavourable Inadequate being assigned. The area is considered to be favourable, whilst future prospects are also considered to be favourable given that livestock densities are now in keeping with favourable densities. The overall condition is considered to be Unfavourable Inadequate.

3.8 TRACK TO T9 AND T9 – WET HEATH 4010

Along the access track to T9 and at the T9 hardstand a total of 8 monitoring stops were completed. Along the access track to T9, near the existing access track conditions are degraded as a result of overgrazing and disturbed ground. Artificial drainage occurring at the T9 location, undermining the structure and function criteria. At the majority of the monitoring stops at least one structure and function criteria failed resulting in an Unfavourable Bad condition being assigned for structure and function. The area is considered to be favourable, whilst future prospects are also considered to be favourable given that livestock densities are now in keeping with favourable densities. The overall condition is considered to be Unfavourable Bad.

3.9 HABITAT MANAGEMENT AREA – WET HEATH 4010

Monitoring of the heath condition within the habitat management area was completed as part of the condition assessment. A total of 18 monitoring stops were completed. Unfavourable conditions, resulting from overgrazing and past drainage was recorded towards the north of these lands at lower elevations and to the east nearer a fenceline boundary. Conditions are variable immediately to the north of the existing access track with grazing and drainage being apparent. To the south of the existing access track, the land rises steeply and conditions here are more favourable. Of the 18 monitoring stops completed, approximately 22% recorded at least one failure for structure and function criteria. As such the structure and function of the wet heath in this area is considered to be Unfavourable Inadequate. The area of the wet heath in the wider is considered to be favourable. Overgrazing in evident in the wider surrounding area and on the basis of current grazing pressures, the future prospects are considered to be Unfavourable Bad.

4.0 CONCLUSION

The results of the condition monitoring at the Gortloughra Wind Farm site has found that the condition of the wet heath habitat within the footprint of the Proposed Development is variable. Of the 75 monitoring stops completed in wet heath habitat within the footprint of the proposed wind farm, over 25% recorded at least one failure of a structure and function criteria indicating Unfavourable Bad at the overall Site scale for wet heath habitat. It is acknowledged that the completion of further monitoring within the wider Site may well reduce the percentage of criteria failing at stops. However, given the high percentage of failure at stops completed to date, it is considered that even with further monitoring, the overall status of the wet heath will be representative of Unfavourable Inadequate condition. The monitoring stops at upland blanket bog within the Site has recorded the status of this habitat within the footprint of the wind farm are Unfavourable Bad condition. This is considered to be representative of the areas of blanket bog habitat occurring within and adjacent to the wind farm site.

Appendix 1: Monitoring Stop Structure & Function Criteria Results

Appendix Table 1: Monitoring Stop Results for Wet heath Habitats

No	ErTet Prsen	CovPosSpp5	CovClad_Sp	CovEric_Em	CovDwarfSh	CovNeg Spp1	Cov_NNPS_1_	CovTrreShr	Cov_Pter_A	Cov_Jun Eff	Dist_ Sphag	BROWSE_ 33	No_Burning	Dist_Groun	Drainage_S
1	P	f	p	f	p	p	p	p	p	p	f	p	p	f	p
2	p	f	p	f	p	p	p	p	p	p	f	f	p	p	p
3	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
4	p	f	f	f	p	p	p	p	p	p	f	f	p	f	p
5	f	f	p	f	p	p	p	p	p	p	f	p	p	p	p
6	p	p	p	p	p	p	p	p	p	p	f	p	p	f	p
7	f	f	p	f	p	f	p	p	p	p	f	f	p	p	p
8	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
9	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
10	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
11	p	p	p	p	p	p	p	p	p	p	p	p	p	p	f
12	p	p	p	p	p	p	p	p	p	p	p	f	p	p	f
13	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
14	p	f	f	f	p	f	p	p	p	p	f	f	p	p	p
15	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
16	p	f	p	f	p	p	p	p	p	p	f	f	p	p	p
17	p	f	p	f	p	p	p	p	p	f	p	p	p	p	p
18	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
19	p	f	p	f	p	p	p	p	p	p	p	p	p	f	p
20	f	f	p	f	p	p	p	p	p	f	p	p	p	p	p
21	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
22	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
23	p	f	p	f	p	p	p	p	p	p	f	f	p	p	p
24	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p

25	p	f	p	p	p	p	p	p	p	p	p	p	p	p	p
26	p	p	p	p	p	p	p	p	p	p	p	f	p	f	p
27	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
28	p	p	p	p	p	p	p	p	p	p	p	p	p	f	p
29	p	p	p	p	p	p	p	p	p	p	p	p	p	p	f
30	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
31	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
32	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
33	p	f	p	p	p	p	p	p	p	p	f	f	p	p	p
34	p	f	p	p	p	p	p	p	p	p	p	p	p	p	p
35	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
36	p	p	p	p	p	p	p	p	p	f	p	f	p	p	p
37	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
38	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
39	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
40	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
41	p	f	p	f	p	p	p	l	l	f	p	p	p	p	p
42	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
43	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
44	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
45	p	p	p	p	p	p	p	p	p	p	p	f	p	f	p
46	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
47	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
48	p	p	p	f	p	p	p	p	p	p	p	p	p	p	p
49	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
50	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
51	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
52	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
53	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
54	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
55	p	f	p	p	p	p	p	p	p	p	p	f	p	p	f
56	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
57	p	f	p	f	p	p	p	p	p	p	p	p	p	p	p
58	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p

59	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
60	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
61	p	f	f	f	p	p	p	p	p	f	f	f	p	p	p
62	p	p	p	p	p	p	p	p	p	p	p	f	p	p	p
63	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
64	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
65	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
66	p	f	p	p	p	p	p	p	p	p	p	p	p	p	p
67	p	f	p	p	p	p	p	p	p	p	p	p	p	p	p
68	p	f	f	f	p	p	p	p	p	p	p	f	p	f	p
69	f	f	f	f	p	p	p	p	p	f	f	f	p	p	p
70	p	f	f	f	p	p	p	p	p	p	p	p	p	p	p
71	p	p	p	p	p	p	p	p	p	p	p	p	p	p	f
72	p	p	p	p	p	p	p	p	p	p	f	f	p	f	p
73	p	p	p	p	p	p	p	p	p	p	p	p	p	p	f
74	p	f	p	f	p	p	p	p	p	p	p	f	p	p	p
75	p	f	p	f	p	p	p	p	p	p	p	f	p	p	p

Appendix Table 2: Monitoring Stop Results for Blanket Bog Habitats

Critera	Stop	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
-	-	Track to T6 & T6 & Surrounding									Track to T8 & T7					
No. Positive Indicator Species >7	-	f	f	f	p	p	p	f	f	p	f	f	f	f	f	f
Cover of Bryophyte & Lichens >10	-	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Cover of Dominant Species Each <75%	-	p	p	f	p	p	p	f	f	p	p	f	f	p	p	p
Cover of Negative Species <1%	-	p	p	p	p	p	p	f	p	p	p	p	p	p	p	p
Cover of NNPS <1%	-	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Cover of Trees and Shrubs <1%	-	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Disturbed Sphagnum <10%	-	f	f	f	p	p	p	p	p	p	f	p	p	p	p	p

Critera	Stop	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
-	-	Track to T6 & T6 & Surrounding									Track to T8 & T7					
Browsing <33%	-	p	p	f	p	p	p	f	p	p	p	p	p	p	p	p
No signs of buring	-	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Disturbed <10%	-	f	f	f	p	p	f	p	p	p	f	p	p	f	f	f
Drainage <10%	-	f	f	p	p	p	f	p	p	p	f	p	f	f	f	f
Cover of erosion gullies <5%	-	f	f	p	p	p	f	f	p	p	f	p	p	f	f	f

Gortloughra Wind Farm

Response to An Coimisiún Pleanála Further Information

Bats (and other survey data)

Doherty Environmental Consultants Ltd

July 2026

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

This report has been prepared by Doherty Environmental Consultants Ltd with all reasonable skill, care and diligence. Information report herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is prepared for Jennings O'Donovan & Partners and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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1.0 INTRODUCTION

The An Coimisiún Pleanála further information letter sets out the following under the Item: Bats (and other survey data):

In relation to ecological surveys, CIEEM advice on the lifespan of ecological surveys and reports considers that data over 3 years old may not be valid. An Coimisiún Pleanála requires you to provide a robust justification as to why data may still be valid and/or provide updated data for bats in particular as the data is from 2020/2021.

The response has been prepared with respect to the provision of updated data for bats as set out in this item. The following reports sets out the additional bat monitoring surveys completed and the methods used and provides a description of the results of the monitoring. The results of the monitoring are then compared to the results of the 2020/2021 data.

2.0 METHODS

2.1 BAT ACTIVITY SURVEYS

Bat activity surveys were undertaken during the 2026 bat activity year, comprising the spring and summer seasons.

A minimum of 10 no. nights of monitoring per meteorological season of spring and summer 2026 were completed at the 8 no turbine positions. Wildlife Acoustics Bat detectors were used for all surveys. The Wildlife Acoustics bat detectors deployed during monitoring comprise SM-Mini Bat 2 FS. Fresh branded batteries (e.g. Duracell; Panasonic) were used at the start of each monitoring session.

All automatic bat detectors were mounted at c. 2m above ground level. The heights at which each detector was mounted during automatic surveys is in accordance with the Bat Conservation Ireland (2026) guidelines for bat surveys at onshore wind turbine in Ireland. Each detector was set to record continuously on a nightly basis during the monitoring session, commencing at 30 minutes before sunset and ending 30 minutes after sunrise.

2.2 BAT CALL ANALYSIS

Bat calls recorded by the SM4 bat detectors during the automatic bat monitoring sessions were analysed using Kaleidoscope Pro (v. 5.8.1) software. Kaleidoscope automatic bat identification software was used to assign bat calls to the species level. Bat calls assigned to species within the Myotis genus were grouped together.

2.3 BAT ACTIVITY ANALYSIS

In accordance with NatureScot et al. (2021), further analysis of bat data was carried out using the online tool Ecobat tool, hosted by the Mammal Society. This tool was used to gain a measure of relative bat activity at the Proposed Development.

The results of the Kaleidoscope analysis outputs were sorted and uploaded to EcoBat. The Kaleidoscope output for all bat passes recorded during each monitoring session was uploaded to EcoBat. The data inputs are analysed by the online tool so that bat activity is scored as a percentile with each percentile indicative of an activity category ranging from:

- low activity (0 to 20 percentile);
- low to moderate activity (21 to 40 percentile);
- moderate activity 41 to 60 percentile);
- moderate to high activity (61 to 80 percentile); and
- high activity (81 to 100 percentile).

The data set range used for reference for the percentile analysis was stratified to include:

- Only records from within 1 month of each survey date; and
- Only records from within the wider region of the survey location

There are currently a number of limitations with the results of analysis provided by EcoBat. EcoBat classifies bat activity recorded at the project site against a reference range in the wider region surrounding the proposed development site. The accuracy of the EcoBat activity levels improves with the greater number of bat records available within the reference range, with a reference range of +200 recommended by EcoBat to have confidence in the result of the bat activity classification assigned. Given the very low levels of records available on the EcoBat database for the region surrounding the proposed development site, particularly during spring, the level of bat activity recorded on site is likely to be skewed towards higher percentiles. Also EcoBat does not take into account nights where no bat activity is recorded and so analysis is only carried out on presence data. This acts to skew the results and elevate the risk to bats species recorded. On a site such as proposed development site, where the landscape is characterised by open, exposed ground with an absence of roosting opportunities for bats, it is not unexpected to have nights where bats are not present.

In order to balance the results of the EcoBat analysis, the approach outlined by Kepel (2011), as adapted for an Irish context, to quantifying bat activity is also referenced to evaluate the levels of bat activity recorded at the proposed wind farm site. The Kepel approach is based on assigning the number of bat passes recorded per hour of each monitoring session to an activity category. Kepel has assigned the number of passes per hour to three activity categories. These activity categories, as adapted for the Irish context, are as follows:

- Pipistrelle species and Leisler's bat: Low = <3.5 passes per hour; Moderate = 3.6 – 6.5 passes per hour; High = >6.5 passes per hour
- All Other Bat species: Low = <4.0 passes per hour; Moderate 4.1 to 10 passes per hour; high = >10 passes per hour.

3.0 RESULTS

The following bat species were recorded during the automatic static bat detector surveys during the 2026 monitoring year:

- Myotis species;
- Leisler's bat;
- Soprano pipistrelle;
- Common pipistrelle;
- Nathusius pipistrelle;
- Brown long-eared bat;
- Lesser horseshoe bats (only recorded during spring when 1 no. pass was detected at T4)

A total of 15 nights monitoring was completed per monitoring point during spring, amount to a total of 120 nights of spring monitoring at the proposed development site. A total of 26 nights monitoring was completed per monitoring point during summer, amounting to a total of 208 nights of summer monitoring at the proposed development site. The combined total number of monitoring nights during the 2026 bat activity year amounts to 328 nights.

The prevailing weather conditions during the spring and summer monitoring conditions were suitable for bat monitoring in that temperatures exceeded 10°C at dusk and wind speeds were less than 5m/s.

The total number of bat passes recorded during monitoring are presented in **Table 3.1** below. As can be seen in **Table 3.1** activity was dominated by Leisler's bat followed by Common pipistrelle, both which accounted for c. 80% of all activity recorded.

Table 3.1: **Total No. Bat Passes Recorded**

Species	Passes (No.)	Percentage of Total (%)
Leisler's bat	1614	47
Common pipistrelle	1092	32
Soprano pipistrelle	359	11
Nathusius pipistrelle	94	3
Myotis species	97	3
Brown long-eared bat	161	5
Lesser horseshoe bats	1	<1
Total	**3418**	**100**

Table 3.2 and **Table 3.3** presents the number of bat passes recorded at each monitoring point during spring and summer respectively. Also shown on **Table 3.2** and **Table 3.3** is the median pass per hour recorded for each species at each turbine location over the duration of the spring and summer monitoring sessions. Appendix 1 provides the detailed results of nightly monitoring at each turbine monitoring point during the spring and summer monitoring sessions.

All median pass/hour values shown on **Table 3.2** and **Table 3.3** are colour coded in green, which denotes low median bat passes per hour. For instance, the highest median pass per hour recorded at a turbine monitoring point during the 2026 monitoring was 0.67 passes/hour (for Leisler's bat at T2 during summer). For the vast majority of turbine monitoring points, the bat pass per hour is zero to two decimal points. Other bat pass per hour metrics also highlights the low levels of bat activity, based on median bat pass per hour values, recorded during the 2026. An example of this is the Kepel (2011) activity categories that have been adapted for bat activity evaluation at wind farm developments in Ireland in recent years. The adapted Kepel categories are as follows:

- Pipistrelle species and Leisler's bat: Low = <3.5 passes per hour; Moderate = 3.6 – 6.5 passes per hour; High = >6.5 passes per hour;

- All Other Bat species: Low = <4.0 passes per hour; Moderate 4.1 to 10 passes per hour; high = >10 passes per hour.

As can be seen on **Table 3.2** and **Table 3.3** below the median pass per hour for all species at all turbine monitoring points during both spring and summer are well below the adapted Kepel low category threshold.

Table 3.2: Spring Monitoring Results – No. of Passes and Median Pass per Hour for all Species at Each Turbine Monitoring Point

Turbine	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
T1 Total Passes	0		9		91		0		0		0		0	
T1 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T2 Total Passes	1		4		0		96		8		5		0	
T2 Median Pass/Hr		0.00		0.00		0.00		0.13		0.00		0.00		0.00
T3 Total Passes	0		1		0		0		0		0		0	
T3 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T4 Total Passes	28		7		1		6		2		0		1	
T4 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T5 Total Passes	0		5		0		0		0		0		0	

Turbine	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
T5 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T7 Total Passes	0		14		0		25		5		0		0	
T7 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T8 Total Passes	0		7		0		7		5		0		0	
T8 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T9 Total Passes	8		2		0		7		0		0		0	
T9 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Total No. Passes	37		49		92		141		20		5		1	

Table 3.3: Summer Monitoring Results – No. of Passes and Median Pass per Hour for all Species at Each Turbine Monitoring Point

Turbine	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
T1 Total Passes	6		113		0		225		110		11		0	
T1 Median Pass/Hr		0.00		0.33		0.00		0.00		0.00		0.00		0.00
T2 Total Passes	3		248		0		23		4		20		0	
T2 Median Pass/Hr		0.00		0.67		0.00		0.00		0.00		0.00		0.00
T3 Total Passes	12		218		0		69		17		73		0	
T3 Median Pass/Hr		0.00		0.53		0.00		0.00		0.00		0.20		0.00
T4 Total Passes	14		40		0		13		3		3		0	
T4 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T5 Total Passes	11		71		0		195		54		8		0	
T5 Median Pass/Hr		0.00		0.00		0.00		0.00		0.00		0.00		0.00
T7 Total Passes	6		113		0		225		110		11		0	

Turbine	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
T7 Median Pass/Hr		0.00		0.33		0.00		0.00		0.00		0.00		0.00
T8 Total Passes	4		491		0		44		10		11		0	
T5 Median Pass/Hr		0.00		0.13		0.00		0.00		0.00		0.00		0.00
T9 Total Passes	4		271		2		157		31		19		0	
T9 Median Pass/Hr		0.00		0.13		0.00		0.00		0.00		0.00		0.00
Total No. Passes	49		1565		2		951		339		156		0	

As noted in Section 2 above the Mammal Society have recently established EcoBat, an online database that facilitates a comparison of bat activity recorded at static monitoring locations against all other bat activity (i.e. the reference range) held by the database for a surrounding reference area (e.g. a surrounding 100km or 200km area etc.). With the development of the EcoBat database the Mammal Society have provided a tool that will facilitate the development of a large enough dataset so that bat activity recorded at a given location can be contextualised against reference levels recorded in the same region, at the same time of year etc. The "reference range" is the stratified dataset of bat activity recorded in the same region at the same time of year from which percentiles for bat activity can be generated. Percentiles provide a numerical indicator of the relative importance of a nights worth of bat activity. For example, activity data in the 70th percentile would indicate that the recorded data was in the top 30% of activity for the reference range. EcoBat has categorised percentiles into levels of bat activity ranging from low activity to high activity. The relationship between bat activity categories and percentiles, as used by EcoBat are as follows:

- Low activity – 0 – 20th percentile
- Low/moderate activity – 21 – 40th percentile
- Moderate activity – 41 – 60th percentile
- Moderate/high activity – 61 / 80th percentile
- High activity – 81 – 100th percentile.

The reference area against which bat activity recorded during monitoring at Gortloughra Wind Farm was compared and activity percentiles calculated was set to surrounding Region. The reference range provided by the EcoBat database, against which the results of monitoring was compared are provided in **Table 3.5** below. Lintott *et al*. (2018) recommend that a minimum reference range of "200+" is required to be confident in the classification of activity provided by EcoBat. **Table 3.4** below summarises the EcoBat results for the number of nights when activity was recorded at the five different EcoBat activity categories for each species.

Table 3.4: Nights of Monitoring Contained Within Each Activity Category as assigned following EcoBat analysis

Species	High		High/Moderate		Moderate		Moderate/Low		Low	
	Spr	Sum	Spr	Sum	Spr	Sum	Spr	Sum	Spr	Sum
Myotis	2	6	2	16	0	270	1	0	5	0
Leisler's bat	2	3	1	14	2	17	13	37	0	83
Nathusius Pipistrelle	1	2	0	6	0	0	0	0	3	2
Common pipistrelle	2	1	0	6	1	6	6	10	10	62
Soprano pipistrelle	1	1	0	3	0	4	3	9	0	31
Brown Long-eared bat	2	11	1	11	2	10	0	37	1	19
Lesser Horseshoe Bat	1	1	0	0	0	0	0	0	0	0

Table 3.5 presents the results of Ecobat analysis of the data gathered at each of the monitoring points during the 2026 activity year. The median percentile is presented for each species at each monitoring point, along with the reference range against which the activity was assessed and the categorisation of activity levels in accordance with the Ecobat categorises outlined above.

It is noted that EcoBat analysis is completed to assigned percentiles, and associated activity categorisation is calculated using the nights when activity was recorded (i.e. the analysis is carried out only on presence data and does not take into account the nights when zero bat activity was recorded). The detailed EcoBat reporting for the calculation of the median bat pass per hour per night does take into account nights where bats are both present and absent.

Table 3.5: **EcoBat Median Level of Bat Activity, Reference Range (R.R.) and Assigned Activity Level (A.L.) for each Monitoring Point**

MP No.	Myotis Species			Leisler's bat			Nathusius Pipistrelle			Common pipistrelle			Soprano pipistrelle			Brown long-eared bat			Lesser horseshoe bats		
	Median	R.R.	A.L	Median	R.R.	A.L	Median	R.R.	A.L	Median	R.R.	A.L	Median	R.R.	A.L	Median	R.R.	A.L	Median	R.R.	A.L
T1_Spring	0	38	L	78	50	M/H	100	96	H	0	136	L	0	10	L/M	0	13	L	0	1	L
T1_Summer	40	76	L/M	12	1668	L	0	3	L	12	876	L	22	270	L/M	16	264	L	0	1	L
T2_Spring	7	38	L	24	50	L/M	5	96	L	21	136	L/M	65	10	M/H	58	13	L	0	1	L
T2_Summer	40	76	L/M	19	1668	L	0	3	L	8	876	L	7	270	L	23	264	L/M	0	1	L
T3_Spring	0	38	L/M	24	50	L/M	0	96	L	0	136	L	0	10	L	0	13	L	0	1	L
T3_Summer	40	76	M	17	1668	L	0	3	L	8	876	L	17	270	L	35	264	L/M	0	1	L
T4_Spring	63	38	M/H	40	50	L/M	2	96	L	4	136	L	30	10	L/M	0	13	L	100	1	H
T4_Summer	40	76	L/M	4	1668	L	0	3	L	6	876	L	7	270	L	8	264	L/M	0	1	L
T5_Spring	0	0	L	60	50	M	0	96	L	0	136	L	0	10	L	0	13	L	0	1	L
T5_Summer	75	76	M/H	22	1668	L/M	0	3	L	17	876	L	30	270	L/M	48	264	M	0	1	L
T7_Spring	0	0	L	100	50	H	0	96	L	19	136	L	11	10	L	0	13	L	0	1	L
T7_Summer	75	76	M/H	20	1668	L	33	3	L/M	15	876	L	14	270	L	67	264	M/H	0	1	L
T8_Spring	0	0	L	24	50	L/M	0	96	L	36	136	L/M	64	10	M/H	0	13	L	0	1	L
T8_Summer	40	76	L/M	30	1668	M	0	3	L	12	876	L	14	270	L	16	264	L	0	1	L
T9_Spring	26	38	L	24	50	L/M	2	96	L	15	136	L	0	10	L	0	13	L	0	1	L
T9_Summer	40	76	L/M	8	1668	L	38	3	L/M	11	876	L	20	270	L	23	264	L/M	0	1	L

Key

L	Low Activity
L/M	Low/Moderate Activity
M	Moderate Activity
M/H	Moderate/High Activity
H	High Activity
	Colour indicates reference range below recommended 200
	Colour indicates reference range satisfies recommended 200

EcoBat has categorised activity at levels greater than Low/Moderate (i.e. Moderate to High) at a number of monitoring points, as shown on Table 3.5. Each of these categorising exceeding Low/Moderate are discussed below with reference to each of the species for which such activity categories have been assigned.

Myotis Species

For Myotis species 12 of the 16 no. monitoring sessions have been assigned EcoBat categories of Low or Low/Moderate. One has been assigned to the Moderate Activity category whilst three have been assigned to the Moderate/high category.

The moderate activity category has been assigned to the turbine monitoring point T3 during summer. During the 26-no. night of monitoring at T3 during summer, Myotis species activity was recorded during 6 separate nights. A total of 6 passes were recorded on the 7th July; 2 passes on the 18th July; and 1 pass respectively on the 16th; 19th; 20th and 22nd July. Overall, a total of 12 passes were recorded during the 26 nights of monitoring. It is noted that the reference range for Myotis species falls well below the recommended threshold of 200 and that the overall median Myotis species pass/hr for the duration of the monitoring session at T3 was <0.00 pass/hour. On the basis of this it is considered that the EcoBat categorisation over-emphasises the levels of Myotis species activity at T3 during summer and that the levels of Myotis species activity is representative of low levels of Myotis species activity.

The moderate/high activity category has been assigned to the turbine monitoring point T4 (spring); T5 (summer); and T7 (summer). The Myotis species activity records underpinning this categorisation is provided in **Table 3.6** below.

Table 3.6: Myotis species Activity Assigned to EcoBat Moderate/High Category

T4		T5		T7	
Date	No. Passes	Date	No. Passes	Date	No. Passes
17th May	1	7th July	1	4th July	1
19th May	1	11th July	1	7th July	1
27th May	3	14th July	1	15th July	1
28th May	9	15th July	2	16th July	1
29th May	5	20th July	1	23rd July	6
30th May	9	21st July	1		
		22nd July	3		
		23rd July	1		

During the 26-no. night of monitoring at the above points listed on Table 3.6 Myotis species was predominantly absent, with low levels of activity recorded. A total of 6 passes were recorded on the 7th July; 2 passes on the 18th July; and 1 pass respectively on the 16th; 19th; 20th and 22nd July. It is noted that the reference range for Myotis species falls well below the recommended threshold of 200 and that the overall median Myotis species pass/hr for the duration of the monitoring session at the turbine monitoring points listed in **Table 3.6** was <0.00 pass/hour. On the basis of this it is considered that the EcoBat categorisation over-emphasises the levels of Myotis species activity at T4 (spring); T5 (summer); and T7 (summer) during summer and that the levels of Myotis species activity is representative of low levels of Myotis species activity.

<u>Leisler's Bat</u>

For Leisler's bat 12 of the 16 no. monitoring sessions have been assigned EcoBat categories of Low or Low/Moderate. Two has been assigned to the Moderate Activity category; one to the Moderate/high category; and one to the High category.

The moderate activity category has been assigned to the turbine monitoring point T5 (spring) and T8 (summer). The Moderate Activity category for T5 is based on 5 no. passes being recorded on the 19th May. All five passes were recorded within a 5-minute period between 21:15 and 21:20. Aside from this activity no other Leisler's bat activity was detected during the 12 nights of spring monitoring at T5. It is noted that the reference range for Leisler's bat falls well below the recommended threshold of 200 and that the overall median Leisler's bat pass/hr for the duration of the monitoring session at the T5 turbine monitoring point during spring was <0.00 pass/hour. On the basis of this and the only bout of activity being recorded over a 5-minute period, the overall Leisler's bat activity at T5 (spring) is considered to be representative of low activity rather than moderate activity.

The Moderate Activity category for T8 is based on 491 no. passes being recorded over 12 of the 26 monitoring nights. For the majority of nights bat activity was absent at T8 during summer and over the 12 nights where activity was recorded, 5 nights amounted to 2 or less calls being recorded. The majority of the activity was recorded during one night (18th July) when 315 of the 491 passes were recorded. Notwithstanding the predominance nights with no Leisler's bat activity, it is noted that the reference range for Leisler's bats for summer satisfies recommended threshold of 200 and as such the finding of Moderate activity is considered to be appropriate for Leisler's bat activity at T8 during summer.

The Moderate/High Activity category at T1 during spring is based on 9 Leisler's bat passes being detected during one night (24th May) of monitoring. No other Leisler's bat activity was recorded during the other 11 nights of monitoring. On the basis of the monitoring results at T1 (spring) Leisler's bat are not considered to rely on the habitat surrounding T1 for foraging and the activity recorded is representative of an activity outlier. It is noted that the reference range for Leisler's bat falls well below the recommended threshold of 200 and that the overall median Leisler's bat species pass/hr for the duration of the monitoring session at the T1 turbine monitoring point during spring was <0.00 pass/hour. On the basis of this, the overall Leisler's bat activity at T8 (spring) is considered to be representative of Low activity rather than Moderate activity.

The High Activity Category at T7 during spring is based on 7 passes being recorded on both the 27th and 28th May, amounting to a total of 14 passes over the 12 nights of monitoring. No other Leisler's bat activity was recorded at T7 during the 10 other nights of monitoring. It is noted that the reference range for Leisler's bat falls well below the recommended threshold of 200 and that the overall median Leisler's bat species pass/hr for the duration of the monitoring session at the T8 turbine monitoring point during spring was <0.00 pass/hour. On the basis of this, the overall Leisler's bat activity at T8 (spring) is considered to be representative of Low activity rather than High activity.

Nathusius Pipistrelle

For Nathusius pipistrelle 14 of the 16 no. monitoring sessions have been assigned EcoBat categories of Low or Low/Moderate. One has been assigned to the High Activity category: at T1 (spring).

A total of 91 Nathusius pipistrelle passes were recorded at T1 during spring. All passes were recorded on the night of the 24th May. Of the 91 passes recorded, 89 were recorded during a c. 20 minute period between 04:20 and 04:40. The other 2 passes were recorded at 02:48 and 02:50. Aside from this activity no other Nathusius pipistrelle was recorded over the 11 other nights of monitoring. It is noted that the reference range for Nathusius pipistrelle falls well below the recommended threshold of 200 and that the overall median Nathusius pipistrelle pass/hr for the duration of the monitoring session at the T1 turbine monitoring point during spring was <0.00 pass/hour. On the basis of this, the overall Nathusius pipistrelle activity at T1 (spring) is considered to be representative of Low activity rather than High activity.

Soprano Pipistrelle

For Soprano pipistrelle 14 of the 16 no. monitoring sessions have been assigned EcoBat categories of Low or Low/Moderate. Two have been assigned to the Moderate/High Activity category: at T2 (spring) and T8 (spring).

At T2 (spring) at total of 8 passes were recorded over the 12 nights of monitoring, with 7 being recorded on the 22th May and 1 being recorded on the 24th May. No Soprano pipistrelle activity was recorded during 10 of the nights of monitoring.

At T8 (spring) a total of 5 passes were recorded over the 12 nights of monitoring, with 2 being recorded on the 29th May and 3 being recorded on the 31st May. No Soprano pipistrelle activity was recorded during 10 of the nights of monitoring.

It is noted that the reference range for Soprano pipistrelle falls well below the recommended threshold of 200 and that the overall median Soprano pipistrelle species pass/hr for the duration of the monitoring session at the T2 and T8 turbine monitoring points during spring were <0.00 pass/hour. On the basis of this, the overall Soprano pipistrelle activity at T2 (spring) and T8 (spring) is considered to be representative of Low activity rather than Moderate High activity.

Brown Long-eared Bat

For Brown long-eared bat 14 of the 16 no. monitoring sessions have been assigned EcoBat categories of Low or Low/Moderate. T5 (summer) has been assigned to the Moderate Activity category and T7 (summer) has been assigned to Moderate/High.

At T5 (summer) at total of 8 Brown long-eared bat passes were recorded over the 26 nights of monitoring. These were recorded on 4 different nights: 1 pass on 6th July; 4 passes on 7th July; 2 passes on 9th July; and 1 pass on 11th July. Brown long-eared bat activity was absent on 22 of the 26 nights of monitoring. Whilst it is noted that the reference range for Brown long-eared bat during summer satisfies the 200-reference range threshold, it is noted that the overall median bat pass per hour is extremely low and the results of the monitoring data at T5 do not indicate elevated levels of activity. Overall, on the basis of the results it is considered at the activity at T5 (summer) is representative of Low activity rather than Moderate Activity.

At T7 (summer) at total of 11 Brown long-eared bat passes were recorded over the 26 nights of monitoring. These were recorded on 6 different nights: 4 passes on 7th July; 2 passes on 11th July; 1 pass on 15th July; 2 passes on the 16th July; 1 pass on the 21st July; and 1 pass on 22nd July. Brown long-eared bat activity was absent on 20 of the 26 nights of monitoring. Whilst it is noted that the reference range for Brown long-eared bat during summer satisfies the 200-reference range threshold, it is noted that the overall median bat pass per hour is extremely low and the results of the monitoring data at T7 do not indicate elevated levels of activity. Overall, on the basis of the results it is considered at the activity at T7 (summer) is representative of Low activity rather than Moderate Activity.

Lesser horseshoe bats

For lesser horseshoe bats 15 of the 16 no. monitoring sessions have been assigned an EcoBat category of Low. One has been assigned to the High Activity category: at T4 (spring). Only 1 no. lesser horseshoe bats pass was recorded at T4 during spring 20th May 2026. It is noted that the reference range for lesser horseshoe bats is extremely low, falling well below the recommended threshold of 200 and that the overall median lesser horseshoe bats pass/hr for the duration of the monitoring session at the T4 turbine monitoring point during spring was <0.00 pass/hour. On the basis of this, the overall lesser horseshoe bats activity at T4 (spring) is considered to be representative of Low activity rather than High activity.

4.0 SUMMARY OF RISK FACTORS BASED ON RECORDED ACTIVITY

In view of the results and associated considerations set out in Section 3 below **Table 4.1** provides a summary of the NatureScot (2021) risk factor scores for the median EcoBat activity percentiles. The NatureScot Risk Factor scores for EcoBat Activity Categorises are set out on Table 3b of the NatureScot guidelines and are as follows:

Low = 1

Low/Moderate = 2

Moderate = 3

Moderate/High = 4

High = 5

The interpretation of EcoBat categories set out in Section 3 above has informed the final category and associated risk factor value for each of the turbine locations. Where EcoBat has assigned a category of Low/Moderate this has been retained (on the basis of a precautionary approach). The cumulative (i.e. for spring and summer at each turbine monitoring point) EcoBat category and the associated risk factor score is based on the highest category assigned to each turbine monitoring point (e.g. T8 monitoring points is L/M for Spring and M for Summer and a cumulative score of M is assigned).

MP No.	Myotis Species	Leisler's bat	Nathusius Pipistrelle	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	Lesser horseshoe bats
T1_Summer	2	1	1	1	2	1	1
T2_Spring	2	2	1	2	1	2	1
T3_Spring	2	2	1	1	1	2	1
T4_Spring	2	2	1	1	2	2	1
T5_Spring	1	2	1	1	2	1	1
T7_Spring	1	1	2	1	1	1	1
T8_Spring	2	3	1	2	1	1	1
T9_Spring	2	2	2	1	1	2	1

5.0 COMPARISON WITH 2020/2021 BAT REPORT FINDINGS

The monitoring data gathered during bat monitoring surveys completed in 2020 and 2021 was analysed using EcoBat to assigned activity categories. The Ecobat categories assigned were as follows:

Leisler's bat: EcoBat categories of Low; Low/Moderate; and Moderate were assigned. These three categories have also been assigned to turbine locations following analysis of the 2026 data.

Common pipistrelle: EcoBat categories of Low; Low/Moderate; and Moderate were assigned. The 2020/2021 represents a worst-case scenario in that only two categories Low and Low/Moderate were assigned to turbine locations following analysis of the 2026 data. No Moderate Category was assigned to any turbine location.

Soprano pipistrelle: EcoBat categories of Low; Low/Moderate; Moderate & Moderate/High were assigned. The 2020/2021 represents a worst-case scenario in that only two categories Low and Low/Moderate were assigned to turbine locations following analysis of the 2026 data. No Moderate or Moderate/High Category was assigned to any turbine location.

Nathusius pipistrelle: EcoBat categories of Low and Low/Moderate were assigned. These two categories have also been assigned to turbine locations following analysis of the 2026 data. As such no change in the risk assessment for this species between the 2020/2021 data and the 2026 data.

On the basis of the 2020 and 2021 baseline data it was concluded that the proposed wind farm site did not present a risk to local Myotis species or lesser horseshoe bat populations. This finding is in keeping with the analysis of the 2026 data which has identified a Low to Low/Moderate Categories and Low Categories for Myotis species and lesser horseshoe bats respectively.

It is further noted that:

given that there has been no land cover or habitat changes at the proposed development site in the intervening years between 2021 and 2026; and

given that the proposed wind farm remains unchanged from that assessed as part of the 2021 Bat Report it can be concluded that the site risk, as per the 2021 Bat Report remains valid.

6.0 CONCLUSION

Bat activity monitoring has been completed during the spring and summer seasons of the 2026 bat activity year. The monitoring has been completed to provide up to date baseline information for bat activity at the proposed wind farm site. The main purpose of the 2026 surveys was to investigate whether or not significant changes in bat activity have occurred at the site during the time between the completion of surveys in 2020/2021 and 2026. The results of the 2026 surveys are similar to those for the 2020/2021 monitoring in that the dominant activity category for all species detected at the proposed wind farm site is Low to Low/Moderate.

The 2026 surveys identified very low median bat pass per hour for all species at all turbine monitoring points. In terms of the EcoBat analysis all instances of activity categories above

Low for Myotis species (in both spring and summer); Leisler's bat (in spring); Nathusius pipistrelle (in both spring and summer); Common pipistrelle (in spring); Soprano pipistrelle (in spring); Brown long-eared bat (in spring) are considered to be representative of exaggerated average categories on the basis of the very low reference ranges used to inform the EcoBat Analysis. This is supported by the very low median bat pass/hour at all monitoring locations. Notwithstanding this, a worst-case scenario for the assignment of the 2026 EcoBat activity categories has been adopted and as such the category of Low/Moderate has been assigned for all species, aside from lesser horseshoe bats, where poor reference ranges occur.

Even with the worst-case scenario approach adopted for the 2026 activity categories, those assigned for 2026 fall below the activity categories and associated risk scores assigned to the 2020/2021 data. As such the results of the 2026 monitoring demonstrate that the findings of the impact assessment set out in the 2021 Bat Report continue to be relevant, are representative of a worst-case scenario assessment and can be relied upon to inform a thorough and robust assessment of the potential impact of the proposed wind farm to local bat populations.

APPENDIX 1: DETAILED BAT DATA RESULTS

T1 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	9	1.13	91	11.38	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
30/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**9**		**91**		**0**		**0**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T2 Spring nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	19	2.38	0	0.00	1	0.13	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	3	0.38	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	47	5.88	7	0.88	1	0.13	0	0.00
23/05/2026	0	0.00	1	0.13	0	0.00	21	2.63	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	1	0.13	0	0.00	3	0.38	1	0.13	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	1	0.13	1	0.13	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	2	0.25	0	0.00
30/05/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
Total	**1**		**4**		**0**		**96**		**8**		**5**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.13**		**0.00**		**0.00**		**0.00**

T3 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
30/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**1**		**0**		**0**		**0**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T4 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	1	0.13	3	0.38	1	0.13	1	0.13	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	3	0.38	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	9	1.13	3	0.38	0	0.00	4	0.50	1	0.13	0	0.00	0	0.00
29/05/2026	5	0.63	1	0.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
30/05/2026	9	1.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**28**		**7**		**1**		**6**		**2**		**0**		**1**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T5 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	5	0.63	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
30/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**5**		**0**		**0**		**0**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T7 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	7	0.88	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	7	0.88	0	0.00	5	0.63	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	5	0.63	2	0.25	0	0.00	0	0.00
30/05/2026	0	0.00	0	0.00	0	0.00	2	0.25	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	12	1.50	3	0.38	0	0.00	0	0.00
Total	**0**		**14**		**0**		**25**		**5**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T8 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	0	0.00	5	0.63	0	0.00	7	0.88	0	0.00	0	0.00	0	0.00
29/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	2	0.25	0	0.00	0	0.00
30/05/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	3	0.38	0	0.00	0	0.00
Total	**0**		**7**		**0**		**7**		**5**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T9 Spring Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
17/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28/05/2026	5	0.63	1	0.13	0	0.00	3	0.38	0	0.00	0	0.00	0	0.00
29/05/2026	3	0.38	1	0.13	0	0.00	4	0.50	0	0.00	0	0.00	0	0.00
30/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31/05/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**8**		**2**		**0**		**7**		**0**		**0**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T1 Summer Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
02/07/2026	0	0.00	1	0.13	0	0.00	9	1.20	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	1	0.13	0	0.00	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	1	0.13	38	5.07	0	0.00	189	25.20	103	13.73	4	0.53	0	0.00
08/07/2026	0	0.00	9	1.20	0	0.00	0	0.00	3	0.40	0	0.00	0	0.00
09/07/2026	0	0.00	11	1.47	0	0.00	14	1.87	3	0.40	0	0.00	0	0.00
10/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
12/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
14/07/2026	0	0.00	1	0.13	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
15/07/2026	1	0.13	5	0.67	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
16/07/2026	1	0.13	6	0.80	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
17/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	7	0.93	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	4	0.53	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
20/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
22/07/2026	0	0.00	6	0.80	0	0.00	2	0.27	0	0.00	1	0.13	0	0.00
23/07/2026	2	0.27	5	0.67	0	0.00	5	0.67	0	0.00	0	0.00	0	0.00

24/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**6**		**113**		**0**		**225**		**110**		**11**		**0**	
Median Pass/Hr		**0.00**		**0.33**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T2 Summer Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
02/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	12	1.60	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	0	0.00	36	4.80	0	0.00	4	0.53	1	0.13	0	0.00	0	0.00
08/07/2026	1	0.13	44	5.87	0	0.00	0	0.00	1	0.13	1	0.13	0	0.00
09/07/2026	0	0.00	53	7.07	0	0.00	3	0.40	1	0.13	2	0.27	0	0.00
10/07/2026	0	0.00	5	0.67	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
11/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
12/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
13/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00

14/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	1	0.13	1	0.13	0	0.00
15/07/2026	0	0.00	5	0.67	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
16/07/2026	0	0.00	10	1.33	0	0.00	3	0.40	0	0.00	5	0.67	0	0.00
17/07/2026	0	0.00	12	1.60	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	13	1.73	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	14	1.87	0	0.00	1	0.13	0	0.00	2	0.27	0	0.00
20/07/2026	0	0.00	10	1.33	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
21/07/2026	1	0.13	3	0.40	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
22/07/2026	1	0.13	8	1.07	0	0.00	3	0.40	0	0.00	3	0.40	0	0.00
23/07/2026	0	0.00	9	1.20	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00
24/07/2026	0	0.00	6	0.80	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
25/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**3**		**248**		**0**		**23**		**4**		**20**		**0**	
Median Pass/Hr		**0.00**		**0.67**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T3 Summer Nightly Results

Date	MYOSPP		NYCLEI		PIPNAT		PIPPIP		PIPPYG		PLEAUR		RHIHIP	
02/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

04/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	6	0.80	38	5.07	0	0.00	27	3.60	2	0.27	10	1.33	0	0.00
08/07/2026	0	0.00	38	5.07	0	0.00	14	1.87	9	1.20	14	1.87	0	0.00
09/07/2026	0	0.00	29	3.87	0	0.00	21	2.80	1	0.13	7	0.93	0	0.00
10/07/2026	0	0.00	6	0.80	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
11/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
12/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
13/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
14/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	1	0.13	2	0.27	0	0.00
15/07/2026	0	0.00	14	1.87	0	0.00	2	0.27	2	0.27	9	1.20	0	0.00
16/07/2026	1	0.13	3	0.40	0	0.00	0	0.00	1	0.13	5	0.67	0	0.00
17/07/2026	0	0.00	6	0.80	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
18/07/2026	2	0.27	12	1.60	0	0.00	0	0.00	0	0.00	3	0.40	0	0.00
19/07/2026	1	0.13	8	1.07	0	0.00	0	0.00	0	0.00	5	0.67	0	0.00
20/07/2026	1	0.13	28	3.73	0	0.00	3	0.40	0	0.00	6	0.80	0	0.00
21/07/2026	0	0.00	5	0.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/07/2026	1	0.13	5	0.67	0	0.00	0	0.00	0	0.00	4	0.53	0	0.00
23/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/07/2026	0	0.00	9	1.20	0	0.00	1	0.13	1	0.13	2	0.27	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**12**		**218**		**0**		**69**		**17**		**73**		**0**	

Median Pass/Hr		**0.00**		**0.53**		**0.00**		**0.00**		**0.00**		**0.20**		**0.00**

T4 Summer Nightly Results

Date	MYOSPP		NYCLEI		PIPNAT		PIPPIP		PIPPYG		PLEAUR		RHIHIP	
02/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	1	0.13	3	0.40	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
08/07/2026	0	0.00	6	0.80	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
09/07/2026	1	0.13	3	0.40	0	0.00	5	0.67	0	0.00	1	0.13	0	0.00
10/07/2026	1	0.13	2	0.27	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
11/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
12/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13/07/2026	1	0.13	1	0.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
14/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
15/07/2026	2	0.27	1	0.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
16/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
17/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

19/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
22/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
23/07/2026	0	0.00	13	1.73	0	0.00	2	0.27	0	0.00	1	0.13	0	0.00
24/07/2026	2	0.27	7	0.93	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	5	0.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**14**		**40**		**0**		**13**		**3**		**3**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T5 Summer Nightly Results

Date	**MYOSPP**	**Pass/Hr**	**NYCLEI**	**Pass/Hr**	**PIPNAT**	**Pass/Hr**	**PIPPIP**	**Pass/Hr**	**PIPPYG**	**Pass/Hr**	**PLEAUR**	**Pass/Hr**	**RHIHIP**	**Pass/Hr**
02/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	41	5.47	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
07/07/2026	1	0.13	7	0.93	0	0.00	87	11.60	22	2.93	4	0.53	0	0.00
08/07/2026	0	0.00	13	1.73	0	0.00	32	4.27	8	1.07	0	0.00	0	0.00

09/07/2026	0	0.00	2	0.27	0	0.00	64	8.53	21	2.80	2	0.27	0	0.00
10/07/2026	0	0.00	1	0.13	0	0.00	11	1.47	1	0.13	0	0.00	0	0.00
11/07/2026	1	0.13	1	0.13	0	0.00	0	0.00	2	0.27	1	0.13	0	0.00
12/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
14/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
15/07/2026	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
16/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
17/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/07/2026	3	0.40	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**11**		**71**		**0**		**195**		**54**		**8**		**0**	
Median Pass/Hr		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T7 Summer Nightly Results

Date	MYOSPP	Pass/Hr	NYCLEI	Pass/Hr	PIPNAT	Pass/Hr	PIPPIP	Pass/Hr	PIPPYG	Pass/Hr	PLEAUR	Pass/Hr	RHIHIP	Pass/Hr
02/07/2026	0	0.00	1	0.13	0	0.00	9	1.20	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	1	0.13	0	0.00	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	1	0.13	38	5.07	0	0.00	189	25.20	103	13.73	4	0.53	0	0.00
08/07/2026	0	0.00	9	1.20	0	0.00	0	0.00	3	0.40	0	0.00	0	0.00
09/07/2026	0	0.00	11	1.47	0	0.00	14	1.87	3	0.40	0	0.00	0	0.00
10/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
12/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
14/07/2026	0	0.00	1	0.13	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
15/07/2026	1	0.13	5	0.67	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
16/07/2026	1	0.13	6	0.80	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
17/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	7	0.93	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	4	0.53	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
20/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
22/07/2026	0	0.00	6	0.80	0	0.00	2	0.27	0	0.00	1	0.13	0	0.00
23/07/2026	2	0.27	5	0.67	0	0.00	5	0.67	0	0.00	0	0.00	0	0.00

24/07/2026	0	0.00	3	0.40	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**6**		**113**		**0**		**225**		**110**		**11**		**0**	
Median Pass/Hr		**0.00**		**0.33**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T8 Summer Nightly Results

Date	MYOSPP		NYCLEI		PIPNAT		PIPPIP		PIPPYG		PLEAUR		RHIHIP	
02/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
03/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
04/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
07/07/2026	2	0.27	20	2.67	0	0.00	15	2.00	3	0.40	0	0.00	0	0.00
08/07/2026	0	0.00	17	2.27	0	0.00	5	0.67	3	0.40	1	0.13	0	0.00
09/07/2026	0	0.00	7	0.93	0	0.00	6	0.80	0	0.00	0	0.00	0	0.00
10/07/2026	1	0.13	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
12/07/2026	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
13/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

14/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
15/07/2026	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
16/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
17/07/2026	0	0.00	73	9.73	0	0.00	8	1.07	2	0.27	4	0.53	0	0.00
18/07/2026	0	0.00	315	42.00	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	5	0.67	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
20/07/2026	0	0.00	29	3.87	0	0.00	2	0.27	0	0.00	1	0.13	0	0.00
21/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00
22/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
23/07/2026	0	0.00	9	1.20	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
24/07/2026	0	0.00	9	1.20	0	0.00	3	0.40	0	0.00	2	0.27	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**4**		**491**		**0**		**44**		**10**		**11**		**0**	
Median Pass/Hr		**0.00**		**0.13**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

T9 Summer Nightly Results

Date	**MYOSPP**		**NYCLEI**		**PIPNAT**		**PIPPIP**		**PIPPYG**		**PLEAUR**		**RHIHIP**	
02/07/2026	1	0.13	41	5.47	0	0.00	0	0.00	2	0.27	0	0.00	0	0.00
03/07/2026	0	0.00	47	6.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

04/07/2026	0	0.00	28	3.73	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00
05/07/2026	0	0.00	20	2.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
06/07/2026	0	0.00	37	4.93	0	0.00	17	2.27	2	0.27	0	0.00	0	0.00
07/07/2026	0	0.00	11	1.47	0	0.00	21	2.80	4	0.53	6	0.80	0	0.00
08/07/2026	0	0.00	40	5.33	0	0.00	98	13.07	19	2.53	2	0.27	0	0.00
09/07/2026	1	0.13	12	1.60	2	0.27	9	1.20	1	0.13	1	0.13	0	0.00
10/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
11/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
12/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
13/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
14/07/2026	0	0.00	12	1.60	0	0.00	4	0.53	1	0.13	0	0.00	0	0.00
15/07/2026	1	0.13	7	0.93	0	0.00	4	0.53	2	0.27	0	0.00	0	0.00
16/07/2026	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00
17/07/2026	0	0.00	4	0.53	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18/07/2026	0	0.00	2	0.27	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
19/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
20/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	3	0.40	0	0.00
21/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
22/07/2026	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
23/07/2026	1	0.13	1	0.13	0	0.00	0	0.00	0	0.00	2	0.27	0	0.00
24/07/2026	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00	2	0.27	0	0.00
25/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
26/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
27/07/2026	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**4**		**271**		**2**		**157**		**31**		**19**		**0**	

Median Pass/Hr		**0.00**		**0.13**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**

APPENDIX 2: ECOBAT REPORTS

Ecobat Report

2026-07-29

Geo filter: region, Time filter: +- 1 month

Summary

Bats were detected on **14** nights between **16/05/2026** and **01/06/2026**, using **8** static bat detectors. Throughout this period, **8** species were recorded. **Table 1.**
Detectors were placed at the following locations:

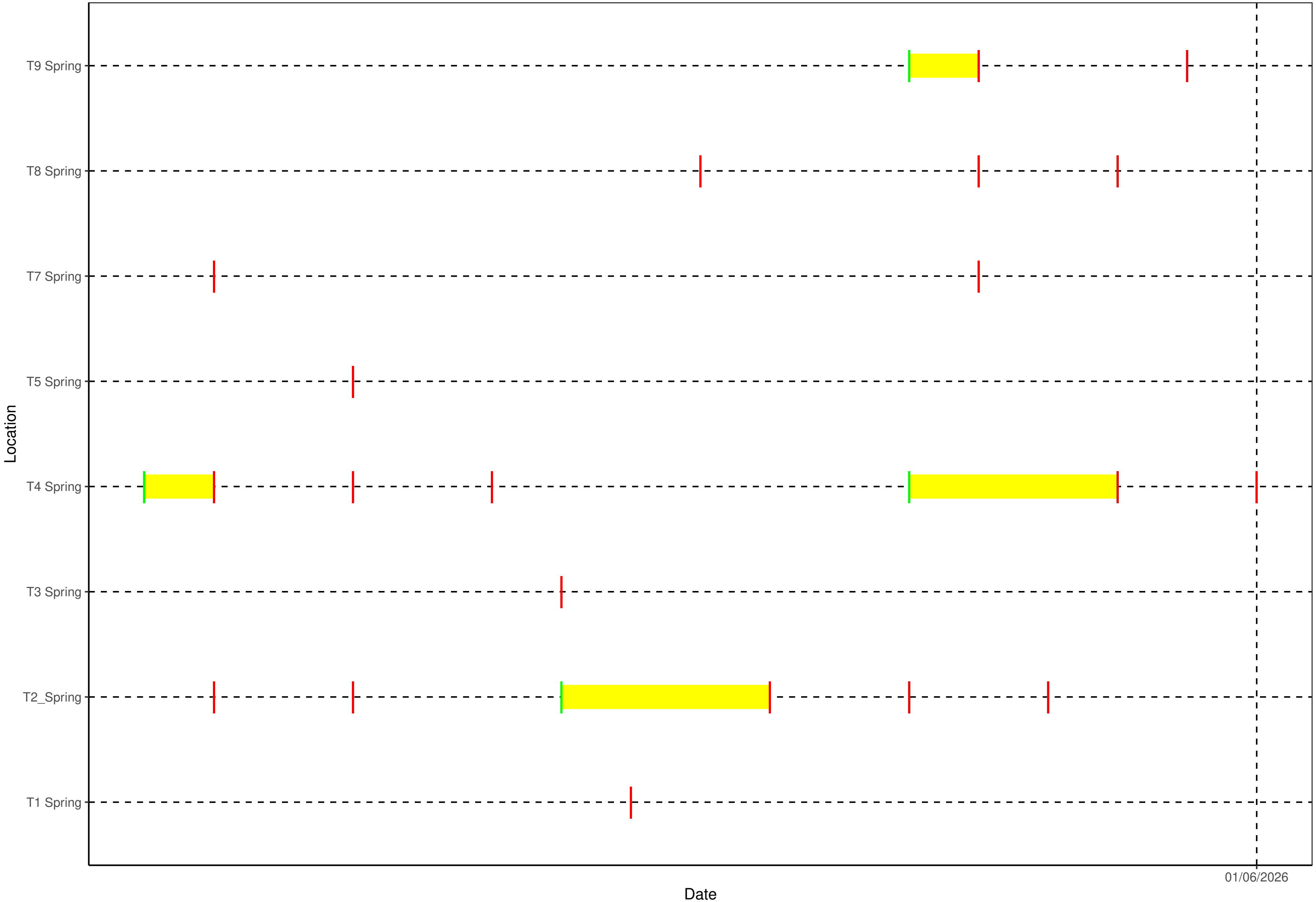
Detector ID	Latitude	Longitude
T1 Spring	51.78016	9.238685
T2_Spring	51.78667	9.238160
T4 Spring	51.78277	9.227272
T9 Spring	51.77825	9.227468
T3 Spring	51.78016	9.238685
T5 Spring	51.78646	9.220396
T7 Spring	51.78646	9.220396
T8 Spring	51.77554	9.233981

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
T1 Spring	1
T2_Spring	10
T3 Spring	1
T4 Spring	9
T5 Spring	1
T7 Spring	4
T8 Spring	3
T9 Spring	3

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



T9 Spring
T8 Spring
T7 Spring
T5 Spring
T4 Spring
T3 Spring
T2_Spring
T1 Spring
Location
01/06/2026
Date

Part 1: Percentile 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.

Per Detector

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

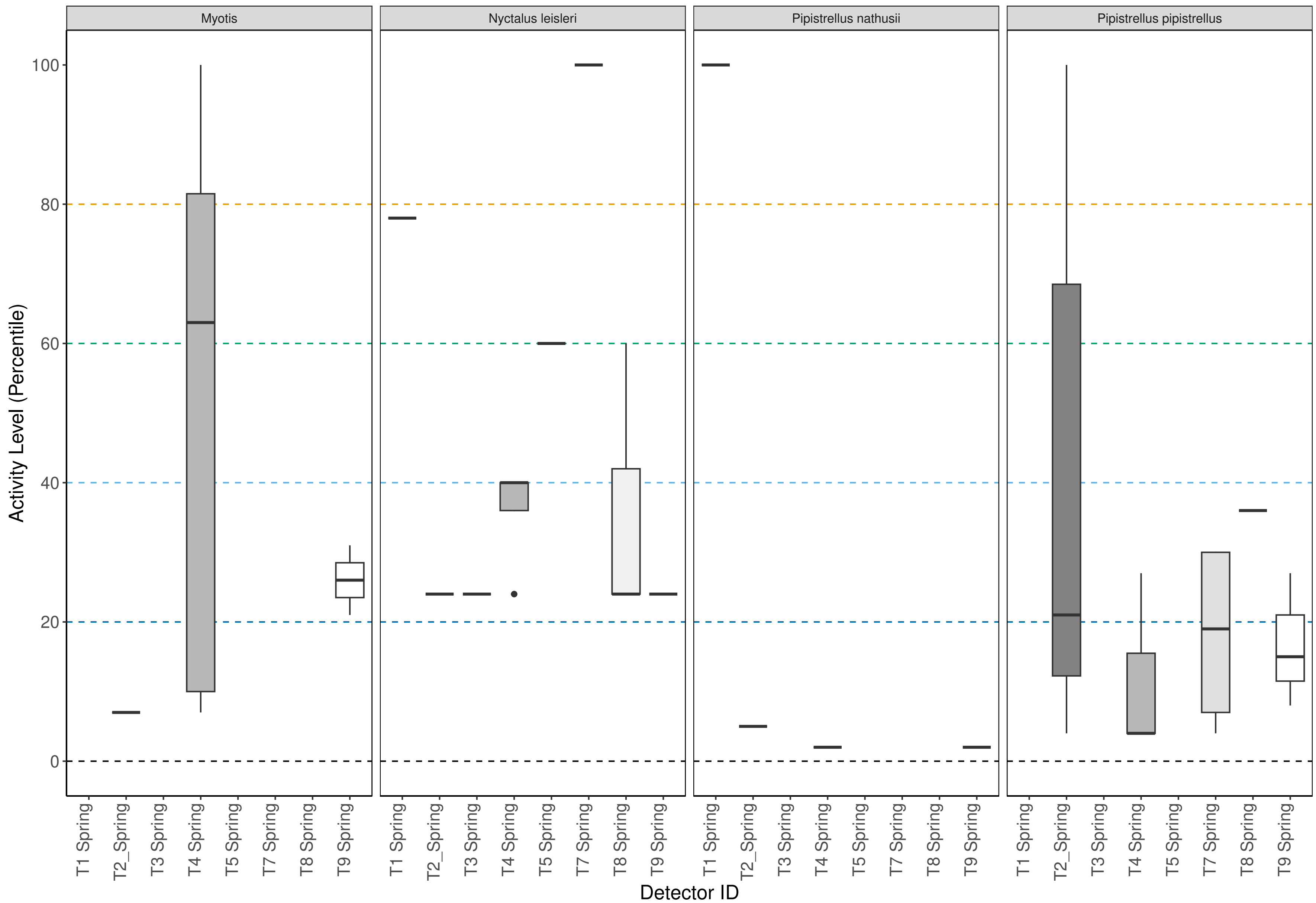
Detector ID	Species/Species Group	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T1 Spring	Nyctalus leisleri	0	0	1	0	0	0
T1 Spring	Pipistrellus nathusii	1	0	0	0	0	0
T2_Spring	Myotis	0	0	0	0	0	1
T2_Spring	Nyctalus leisleri	0	0	0	0	4	0
T2_Spring	Pipistrellus nathusii	0	0	0	0	0	1
T2_Spring	Pipistrellus pipistrellus	2	0	0	1	1	4
T2_Spring	Pipistrellus pygmaeus	1	0	0	0	1	0
T2_Spring	Plecotus auritus	2	0	1	2	0	1
T3 Spring	Nyctalus leisleri	0	0	0	0	1	0
T4 Spring	Myotis	2	0	2	0	0	3
T4 Spring	Nyctalus leisleri	0	0	0	0	4	0
T4 Spring	Pipistrellus nathusii	0	0	0	0	0	1
T4 Spring	Pipistrellus pipistrellus	0	0	0	0	1	2
T4 Spring	Pipistrellus pygmaeus	0	0	0	0	2	0
T4 Spring	Rhinolophus hipposideros	1	0	0	0	0	0
T5 Spring	Nyctalus leisleri	0	0	0	1	0	0

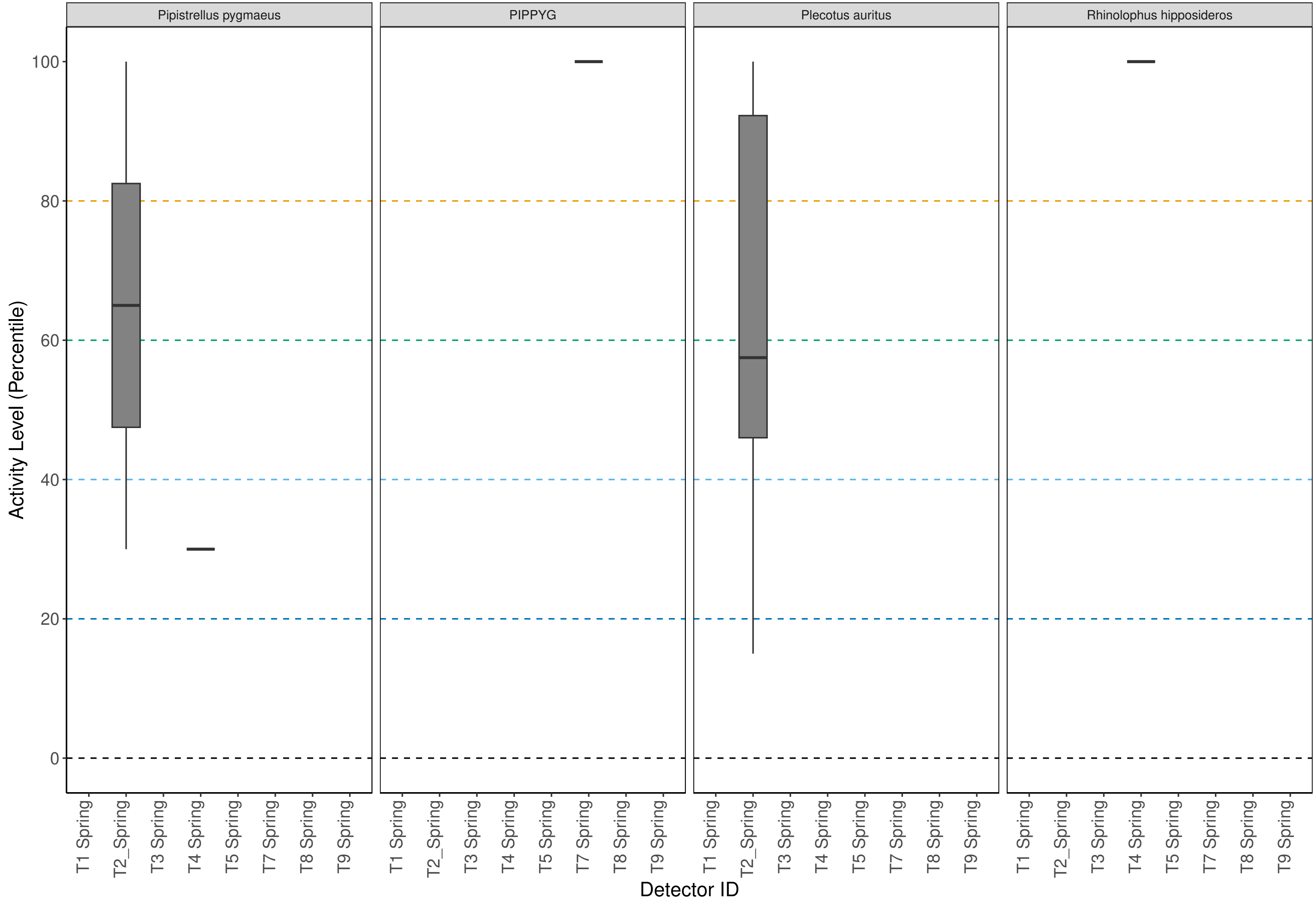
Detector ID	Species/Species Group	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T7 Spring	Nyctalus leisleri	2	0	0	0	0	0
T7 Spring	Pipistrellus pipistrellus	0	0	0	0	2	2
T7 Spring	PIPPYG	1	0	0	0	0	0
T8 Spring	Nyctalus leisleri	0	0	0	1	2	0
T8 Spring	Pipistrellus pipistrellus	0	0	0	0	1	0
T9 Spring	Myotis	0	0	0	0	1	1
T9 Spring	Nyctalus leisleri	0	0	0	0	2	0
T9 Spring	Pipistrellus nathusii	0	0	0	0	0	1
T9 Spring	Pipistrellus pipistrellus	0	0	0	0	1	2

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
T1 Spring	Nyctalus leisleri	78	0	78	1	50
T1 Spring	Pipistrellus nathusii	100	0	100	1	96
T2_Spring	Myotis	7	0	7	1	38
T2_Spring	Nyctalus leisleri	24	24 - 24	24	4	50
T2_Spring	Pipistrellus nathusii	5	0	5	1	96
T2_Spring	Pipistrellus pipistrellus	21	9.5 - 79	100	8	136
T2_Spring	Pipistrellus pygmaeus	65	65 - 65	100	2	10
T2_Spring	Plecotus auritus	58	30.5 - 100	100	6	13
T3 Spring	Nyctalus leisleri	24	0	24	1	50
T4 Spring	Myotis	63	10 - 81.5	100	7	38
T4 Spring	Nyctalus leisleri	40	40 - 40	40	4	50
T4 Spring	Pipistrellus nathusii	2	0	2	1	96
T4 Spring	Pipistrellus pipistrellus	4	4 - 4	27	3	136
T4 Spring	Pipistrellus pygmaeus	30	30 - 30	30	2	10
T4 Spring	Rhinolophus hipposideros	100	0	100	1	1
T5 Spring	Nyctalus leisleri	60	0	60	1	50
T7 Spring	Nyctalus leisleri	100	100 - 100	100	2	50
T7 Spring	Pipistrellus pipistrellus	19	8 - 30	30	4	136
T7 Spring	PIPPYG	100	0	100	1	2
T8 Spring	Nyctalus leisleri	24	24 - 24	60	3	50
T8 Spring	Pipistrellus pipistrellus	36	0	36	1	136
T9 Spring	Myotis	26	26 - 26	31	2	38
T9 Spring	Nyctalus leisleri	24	24 - 24	24	2	50
T9 Spring	Pipistrellus nathusii	2	0	2	1	96
T9 Spring	Pipistrellus pipistrellus	15	8 - 27	27	3	136

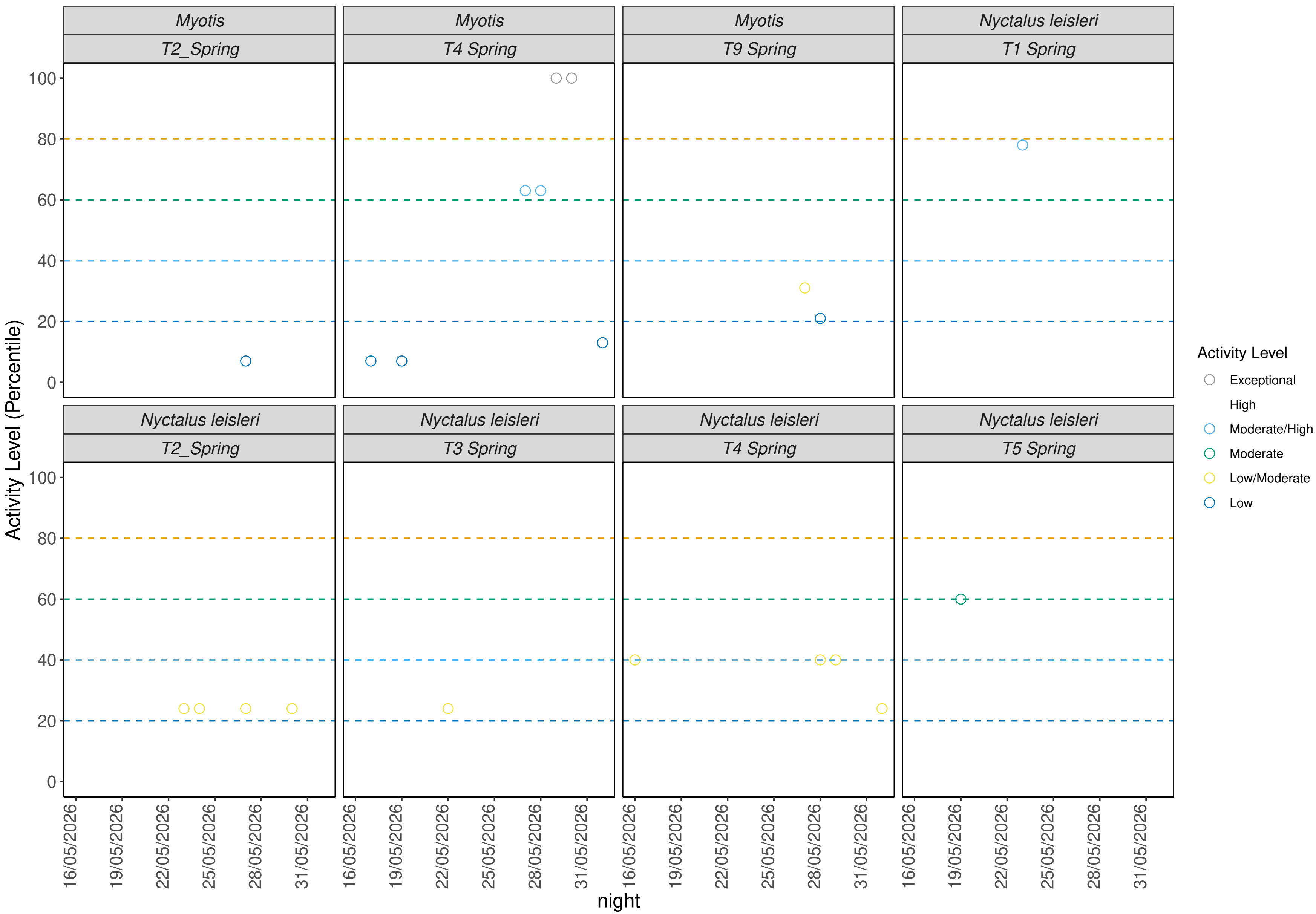
Figure 2. The recorded activity of bats during the survey. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity).


Myotis
Nyctalus leisleri
Pipistrellus nathusii
Pipistrellus pipistrellus
Activity Level (Percentile)
0
20
40
60
80
100
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID

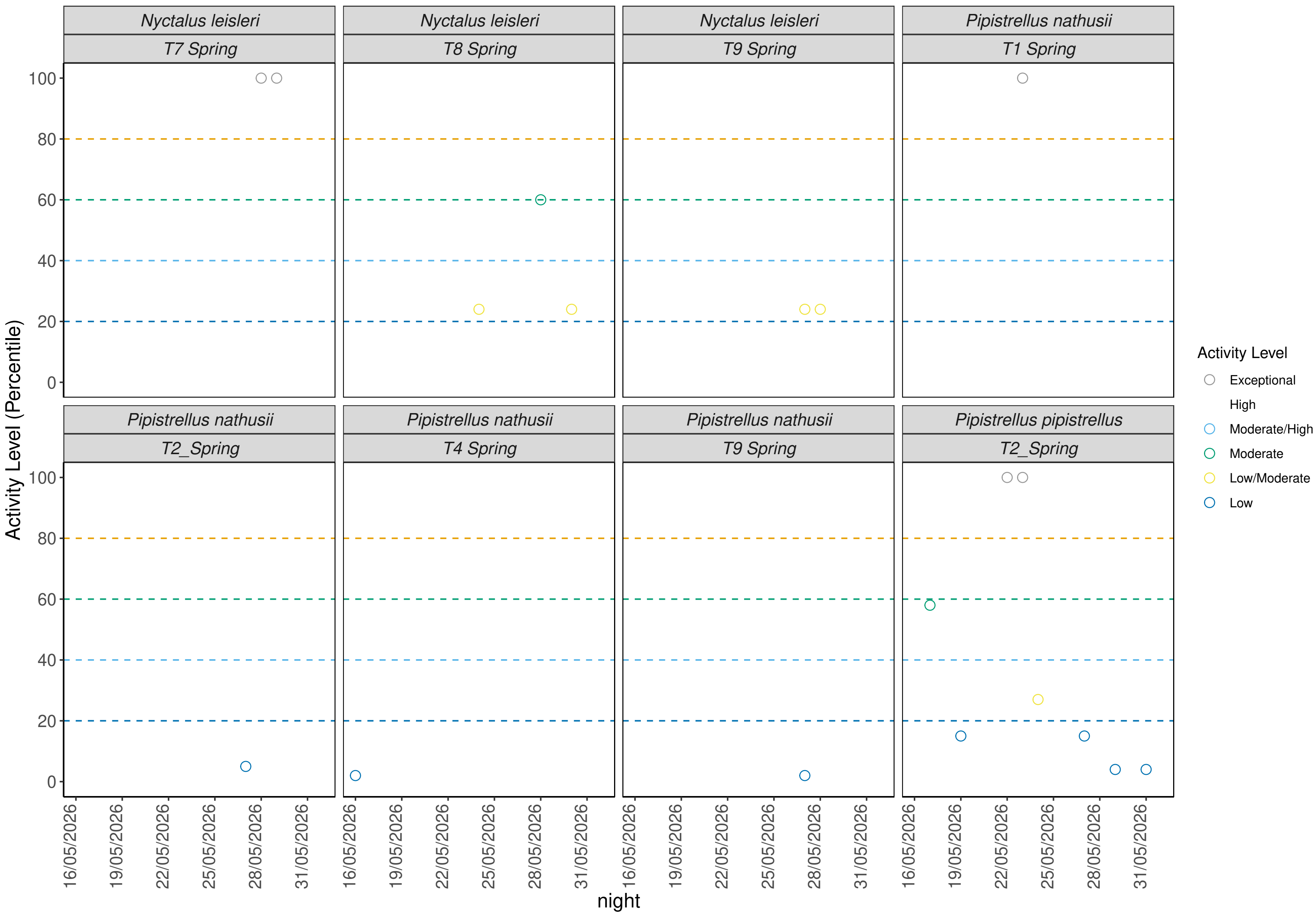


Pipistrellus pygmaeus
PIPPYG
Plecotus auritus
Rhinolophus hipposideros
Activity Level (Percentile)
100
80
60
40
20
0
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID

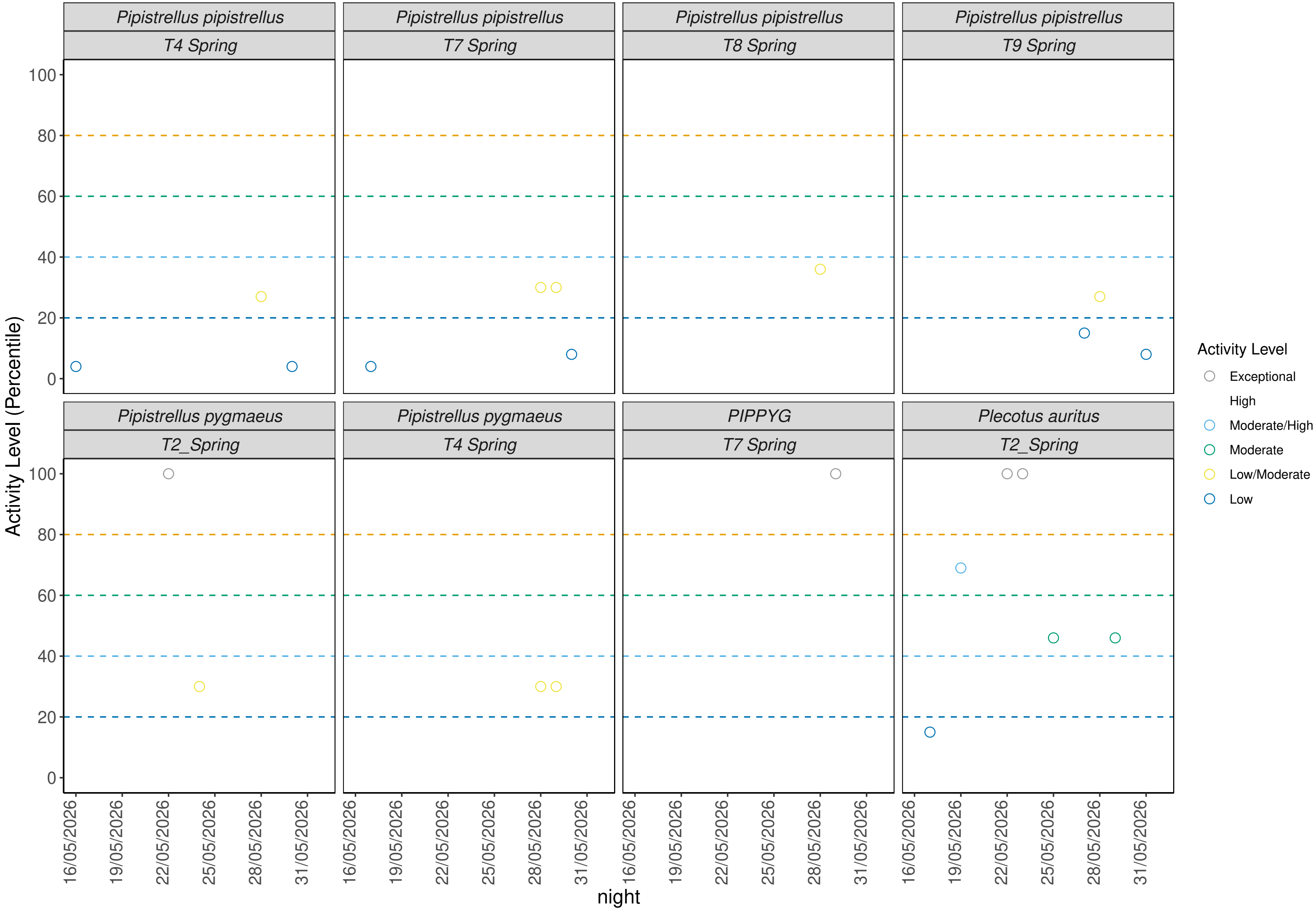
Figure 3. The activity level (percentile) of bats recorded across each night of the bat survey.

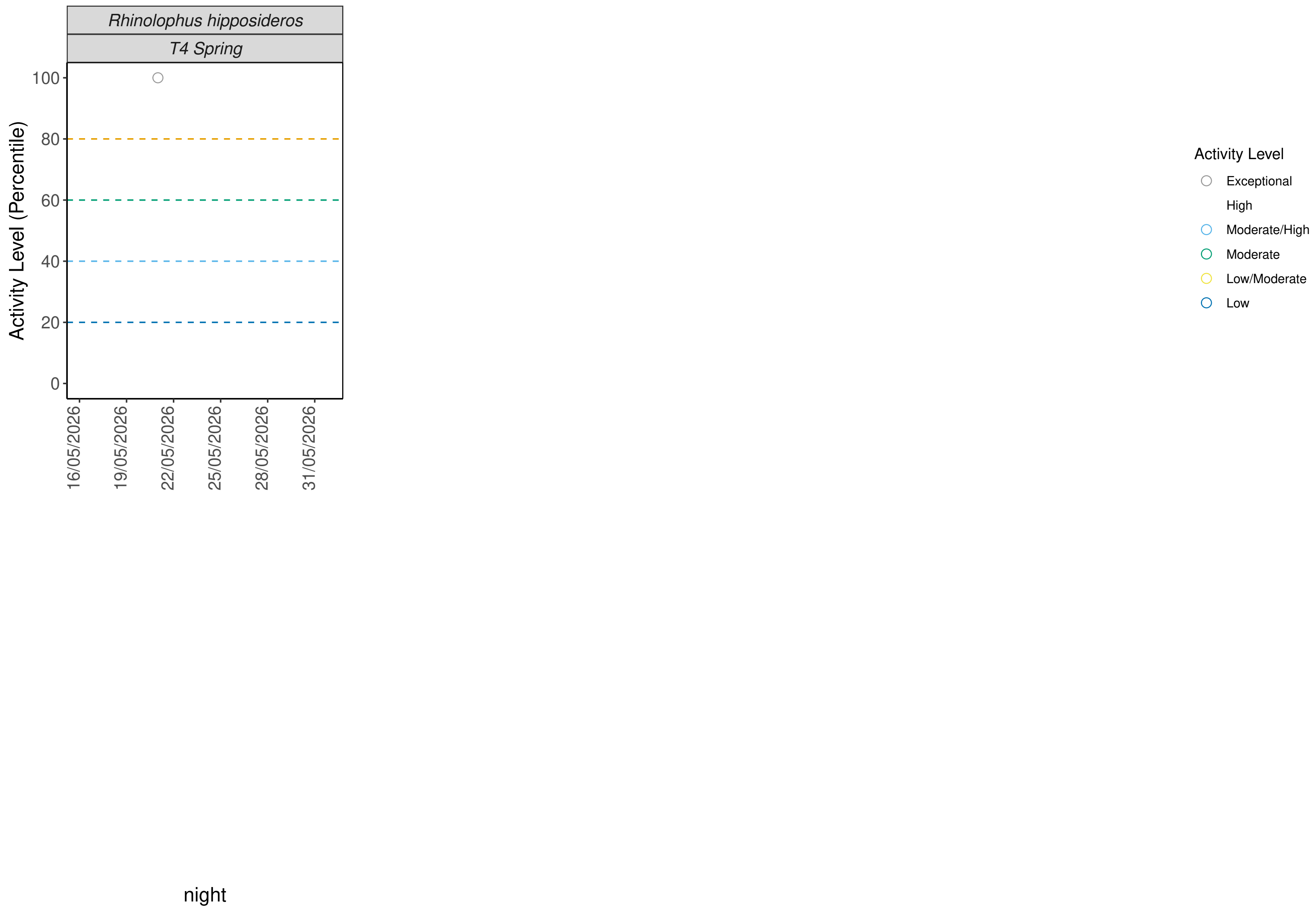


Myotis
T2_Spring
Myotis
T4 Spring
Myotis
T9 Spring
Nyctalus leisleri
T1 Spring
Nyctalus leisleri
T2_Spring
Nyctalus leisleri
T3 Spring
Nyctalus leisleri
T4 Spring
Nyctalus leisleri
T5 Spring
Activity Level (Percentile)
100
80
60
40
20
0
16/05/2026
19/05/2026
22/05/2026
25/05/2026
28/05/2026
31/05/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low



Nyctalus leisleri
T7 Spring
Nyctalus leisleri
T8 Spring
Nyctalus leisleri
T9 Spring
Pipistrellus nathusii
T1 Spring
Pipistrellus nathusii
T2_Spring
Pipistrellus nathusii
T4 Spring
Pipistrellus nathusii
T9 Spring
Pipistrellus pipistrellus
T2_Spring
Activity Level (Percentile)
0
20
40
60
80
100
16/05/2026
19/05/2026
22/05/2026
25/05/2026
28/05/2026
31/05/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low


Pipistrellus pipistrellus
T4 Spring
Pipistrellus pipistrellus
T7 Spring
Pipistrellus pipistrellus
T8 Spring
Pipistrellus pipistrellus
T9 Spring
Pipistrellus pygmaeus
T2_Spring
Pipistrellus pygmaeus
T4 Spring
PIPPYG
T7 Spring
Plecotus auritus
T2_Spring
Activity Level (Percentile)
0
20
40
60
80
100
16/05/2026
19/05/2026
22/05/2026
25/05/2026
28/05/2026
31/05/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low


Rhinolophus hipposideros
T4 Spring
Activity Level (Percentile)
100
80
60
40
20
0
16/05/2026
19/05/2026
22/05/2026
25/05/2026
28/05/2026
31/05/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
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 Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T1 Spring	Nyctalus leisleri	May	0	0	1	0	0	0
T1 Spring	Pipistrellus nathusii	May	1	0	0	0	0	0
T2_Spring	Myotis	May	0	0	0	0	0	1
T2_Spring	Nyctalus leisleri	May	0	0	0	0	4	0
T2_Spring	Pipistrellus nathusii	May	0	0	0	0	0	1
T2_Spring	Pipistrellus pipistrellus	May	2	0	0	1	1	4
T2_Spring	Pipistrellus pygmaeus	May	1	0	0	0	1	0
T2_Spring	Plecotus auritus	May	2	0	1	2	0	1
T3 Spring	Nyctalus leisleri	May	0	0	0	0	1	0
T4 Spring	Myotis	May	2	0	2	0	0	2
T4 Spring	Myotis	Jun	0	0	0	0	0	1
T4 Spring	Nyctalus leisleri	May	0	0	0	0	3	0
T4 Spring	Nyctalus leisleri	Jun	0	0	0	0	1	0
T4 Spring	Pipistrellus nathusii	May	0	0	0	0	0	1
T4 Spring	Pipistrellus pipistrellus	May	0	0	0	0	1	2
T4 Spring	Pipistrellus pygmaeus	May	0	0	0	0	2	0

Detector ID	Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T4 Spring	Rhinolophus hipposideros	May	1	0	0	0	0	0
T5 Spring	Nyctalus leisleri	May	0	0	0	1	0	0
T7 Spring	Nyctalus leisleri	May	2	0	0	0	0	0
T7 Spring	Pipistrellus pipistrellus	May	0	0	0	0	2	2
T7 Spring	PIPPYG	May	1	0	0	0	0	0
T8 Spring	Nyctalus leisleri	May	0	0	0	1	2	0
T8 Spring	Pipistrellus pipistrellus	May	0	0	0	0	1	0
T9 Spring	Myotis	May	0	0	0	0	1	1
T9 Spring	Nyctalus leisleri	May	0	0	0	0	2	0
T9 Spring	Pipistrellus nathusii	May	0	0	0	0	0	1
T9 Spring	Pipistrellus pipistrellus	May	0	0	0	0	1	2

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
T1 Spring	Nyctalus leisleri	May	78	0	78	1
T1 Spring	Pipistrellus nathusii	May	100	0	100	1
T2_Spring	Myotis	May	7	0	7	1
T2_Spring	Nyctalus leisleri	May	24	24 - 24	24	4
T2_Spring	Pipistrellus nathusii	May	5	0	5	1
T2_Spring	Pipistrellus pipistrellus	May	21	9.5 - 79	100	8
T2_Spring	Pipistrellus pygmaeus	May	65	65 - 65	100	2
T2_Spring	Plecotus auritus	May	58	30.5 - 100	100	6
T3 Spring	Nyctalus leisleri	May	24	0	24	1
T4 Spring	Myotis	May	63	10 - 81.5	100	6
T4 Spring	Myotis	Jun	13	10 - 81.5	13	1
T4 Spring	Nyctalus leisleri	May	40	40 - 40	40	3
T4 Spring	Nyctalus leisleri	Jun	24	40 - 40	24	1
T4 Spring	Pipistrellus nathusii	May	2	0	2	1
T4 Spring	Pipistrellus pipistrellus	May	4	4 - 4	27	3
T4 Spring	Pipistrellus pygmaeus	May	30	30 - 30	30	2
T4 Spring	Rhinolophus hipposideros	May	100	0	100	1
T5 Spring	Nyctalus leisleri	May	60	0	60	1
T7 Spring	Nyctalus leisleri	May	100	100 - 100	100	2
T7 Spring	Pipistrellus pipistrellus	May	19	8 - 30	30	4
T7 Spring	PIPPYG	May	100	0	100	1
T8 Spring	Nyctalus leisleri	May	24	24 - 24	60	3
T8 Spring	Pipistrellus pipistrellus	May	36	0	36	1
T9 Spring	Myotis	May	26	26 - 26	31	2
T9 Spring	Nyctalus leisleri	May	24	24 - 24	24	2
T9 Spring	Pipistrellus nathusii	May	2	0	2	1
T9 Spring	Pipistrellus pipistrellus	May	15	8 - 27	27	3

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.

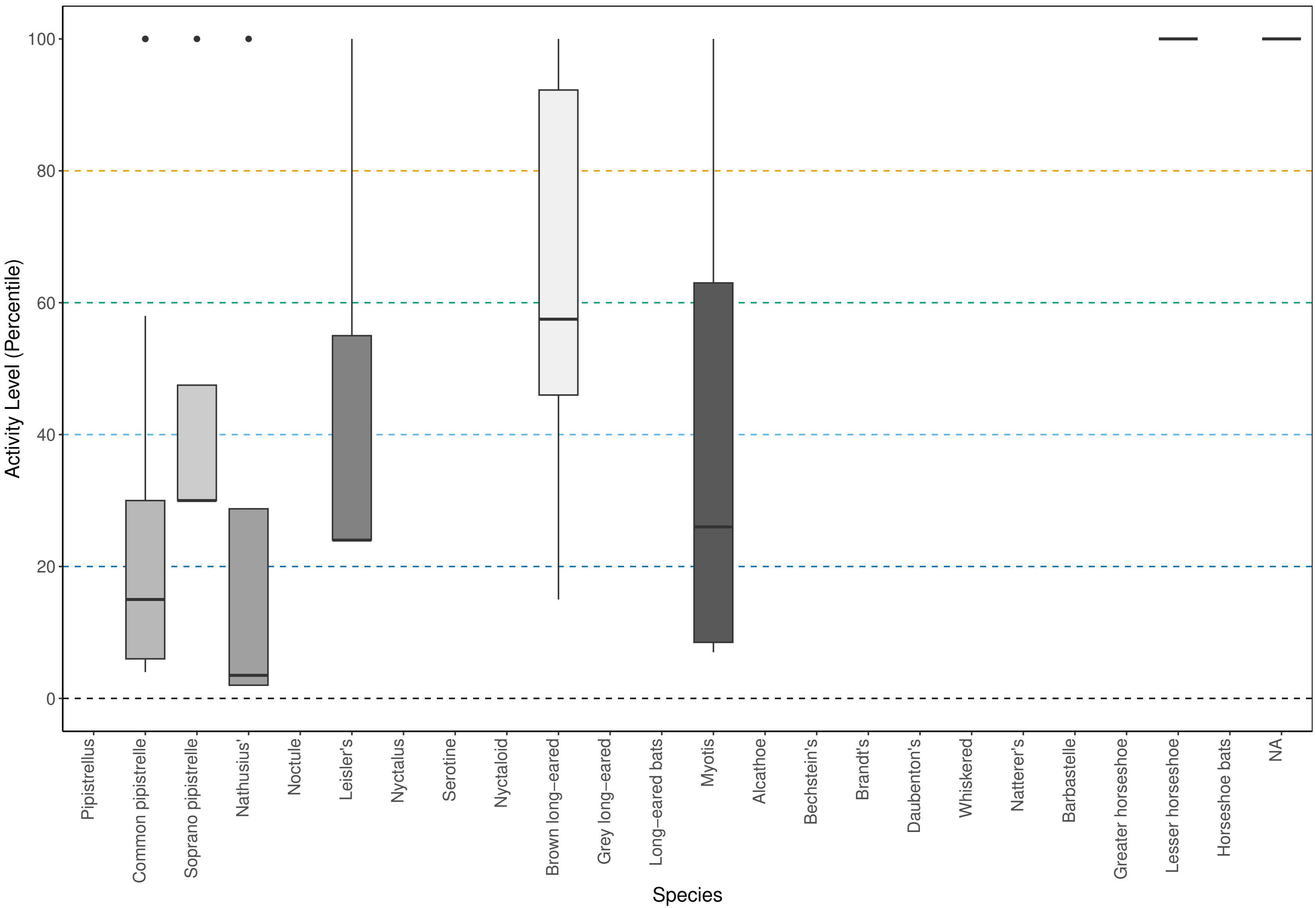
Table 7. Summary table showing the number of nights recorded bat activity fell into each activity band for each species.

Species/Species Group	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
Myotis	2	0	2	0	1	5
Nyctalus leisleri	2	0	1	2	13	0
Pipistrellus nathusii	1	0	0	0	0	3
Pipistrellus pipistrellus	2	0	0	1	6	10
Pipistrellus pygmaeus	1	0	0	0	3	0
PIPPYG	1	0	0	0	0	0
Plecotus auritus	2	0	1	2	0	1
Rhinolophus hipposideros	1	0	0	0	0	0

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

Species/Species Group	Median Percentile	95% CIs	Max. Percentile	Nights Recorded
Myotis	26	26 - 26	100	10
Nyctalus leisleri	24	40 - 40	100	18
Pipistrellus nathusii	4	0	100	4
Pipistrellus pipistrellus	15	9.5 - 79	100	19
Pipistrellus pygmaeus	30	65 - 65	100	4
PIPPYG	100	0	100	1
Plecotus auritus	58	30.5 - 100	100	6
Rhinolophus hipposideros	100	0	100	1

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



Activity Level (Percentile)
100
80
60
40
20
0
Pipistrellus
Common pipistrelle
Soprano pipistrelle
Nathusius'
Noctule
Leisler's
Nyctalus
Serotine
Nyctaloid
Brown long−eared
Grey long−eared
Long−eared bats
Myotis
Alcathoe
Bechstein's
Brandt's
Daubenton's
Whiskered
Natterer's
Barbastelle
Greater horseshoe
Lesser horseshoe
Horseshoe bats
NA
Species

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

Per Site, Per Month

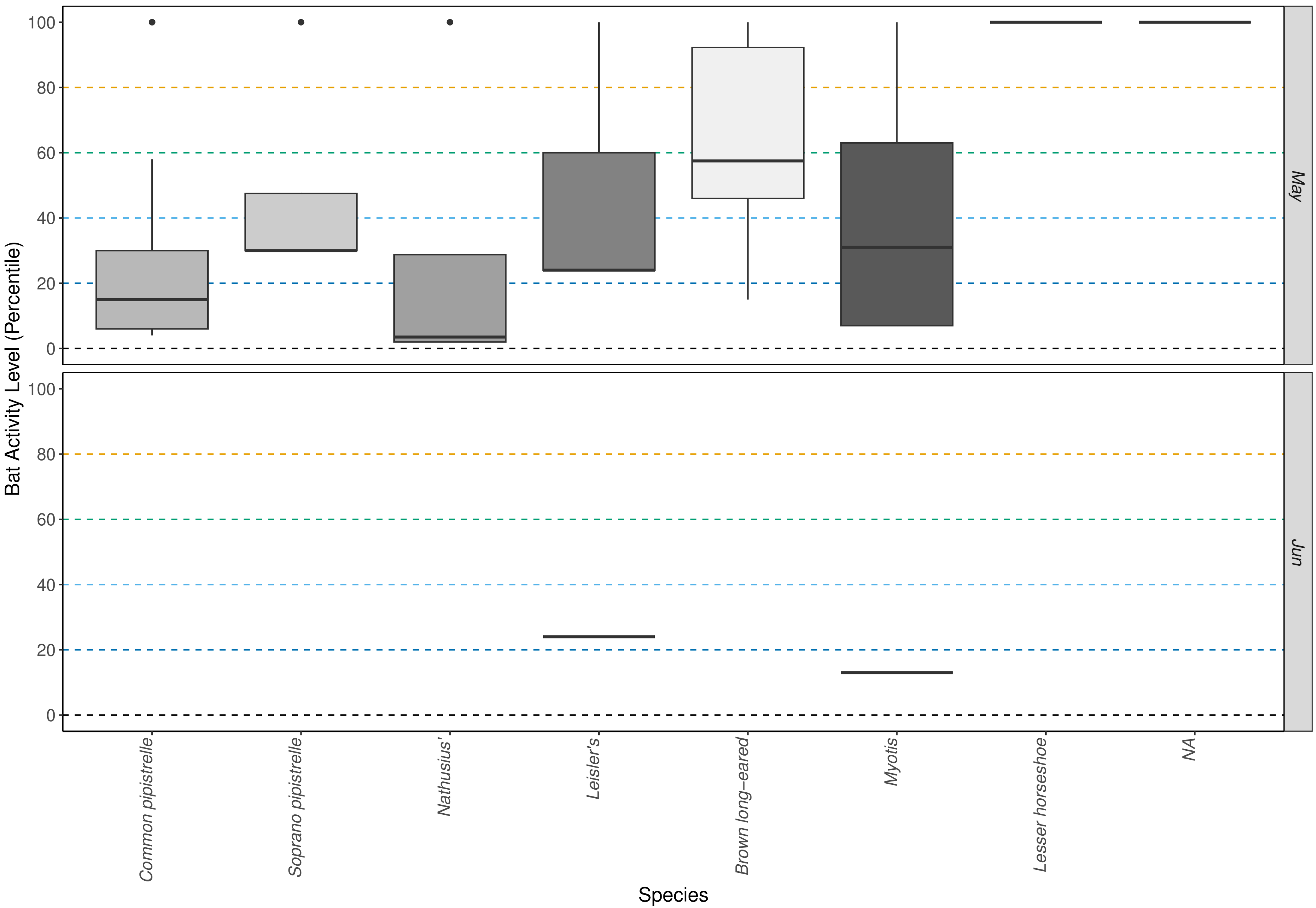
Table 9. Summary table showing the number of nights recorded bat activity fell into each activity band for each species during each month.

Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
Myotis	May	2	0	2	0	1	4
Myotis	Jun	0	0	0	0	0	1
Nyctalus leisleri	May	2	0	1	2	12	0
Nyctalus leisleri	Jun	0	0	0	0	1	0
Pipistrellus nathusii	May	1	0	0	0	0	3
Pipistrellus pipistrellus	May	2	0	0	1	6	10
Pipistrellus pygmaeus	May	1	0	0	0	3	0
PIPPYG	May	1	0	0	0	0	0
Plecotus auritus	May	2	0	1	2	0	1
Rhinolophus hipposideros	May	1	0	0	0	0	0

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

Species/Species Group	month	Median Percentile	95% CIs	Max. Percentile	Nights Recorded
Myotis	May	31	26 - 26	100	9
Myotis	Jun	13	10 - 81.5	13	1
Nyctalus leisleri	May	24	40 - 40	100	17
Nyctalus leisleri	Jun	24	40 - 40	24	1
Pipistrellus nathusii	May	4	0	100	4
Pipistrellus pipistrellus	May	15	9.5 - 79	100	19
Pipistrellus pygmaeus	May	30	65 - 65	100	4
PIPPYG	May	100	0	100	1
Plecotus auritus	May	58	30.5 - 100	100	6
Rhinolophus hipposideros	May	100	0	100	1

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



Bat Activity Level (Percentile)
100
80
60
40
20
0
May
Jun
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Brown long−eared
Myotis
Lesser horseshoe
NA
Species

Part 2: Nightly Analysis

```
Error in `[<-`:
! Assigned data `values` must be compatible with existing data.
i Error occurred for column `species_scientific_names`.
Caused by error in `vec_assign()`:
! Can't convert <double> to <character>.
```

```
Error:
! object 'df_zero' not found
```

Entire Survey Period

Sunrise and Sunset Times

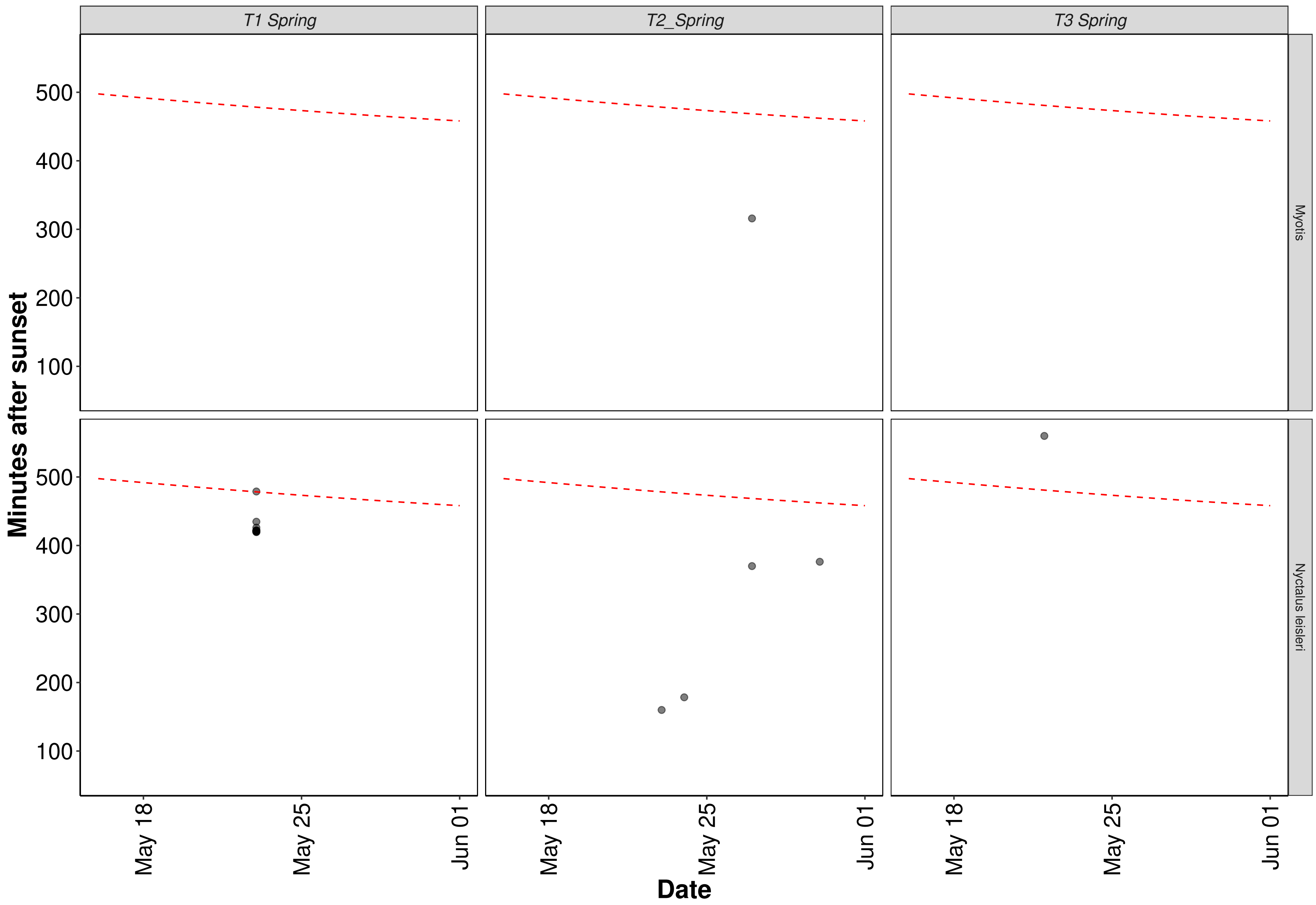
Table 11. The times of sunset and sunrise the following morning for surveys beginning on the date shown.

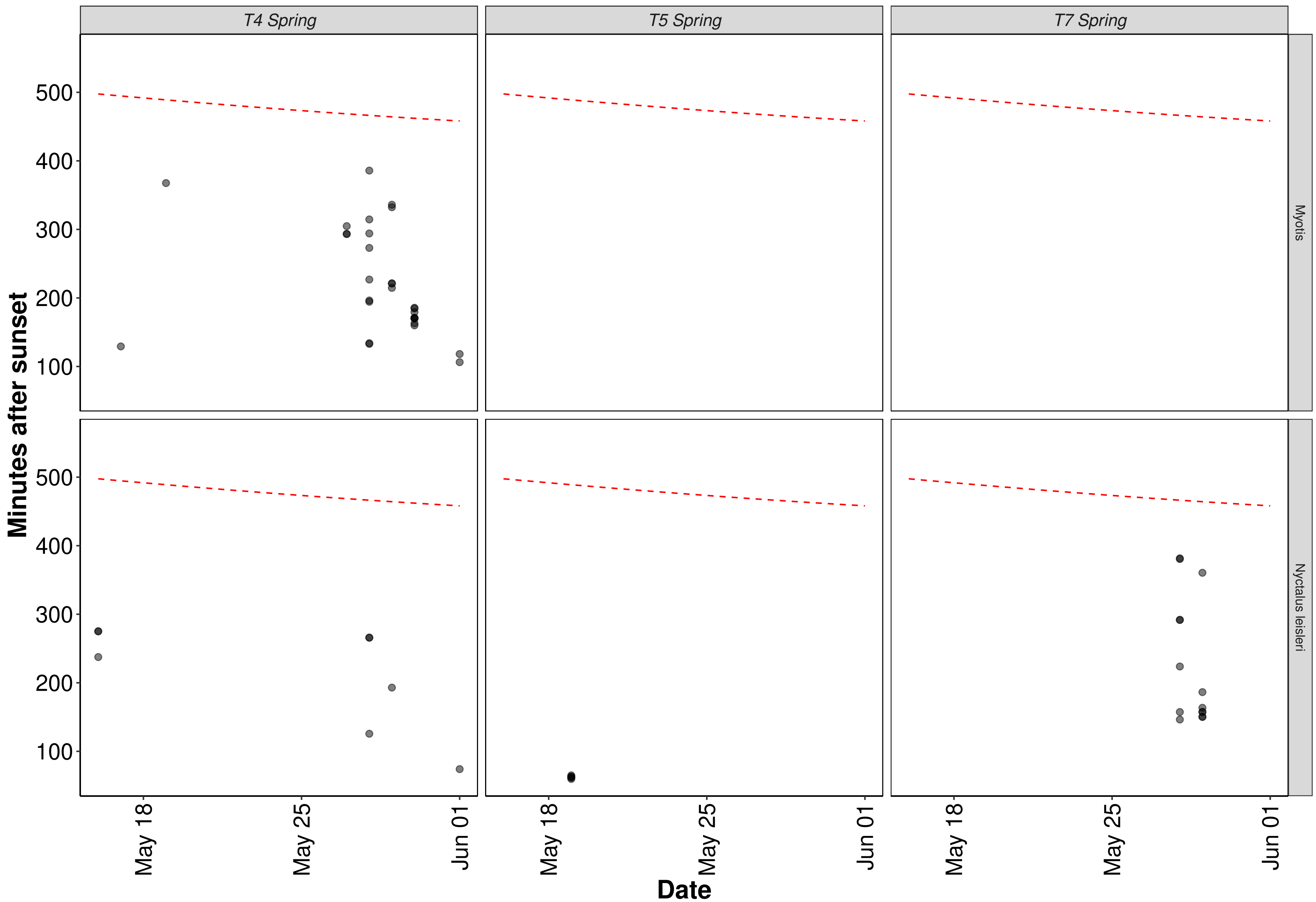
Night (y-m-d)	Sunset (h:m)	Sunrise (h:m)	Night Length (hours)
2026-05-16	20:11	04:28	8.3
2026-05-17	20:12	04:27	8.2
2026-05-19	20:15	04:24	8.1
2026-05-21	20:18	04:22	8.1
2026-05-22	20:20	04:20	8.0
2026-05-23	20:21	04:19	8.0
2026-05-24	20:22	04:18	7.9
2026-05-25	20:24	04:17	7.9
2026-05-27	20:26	04:15	7.8
2026-05-28	20:28	04:14	7.8
2026-05-29	20:29	04:13	7.7
2026-05-30	20:30	04:12	7.7
2026-05-31	20:31	04:11	7.7
2026-06-01	20:32	04:10	7.6

Distribution of Bat Activity Across the Night through Time

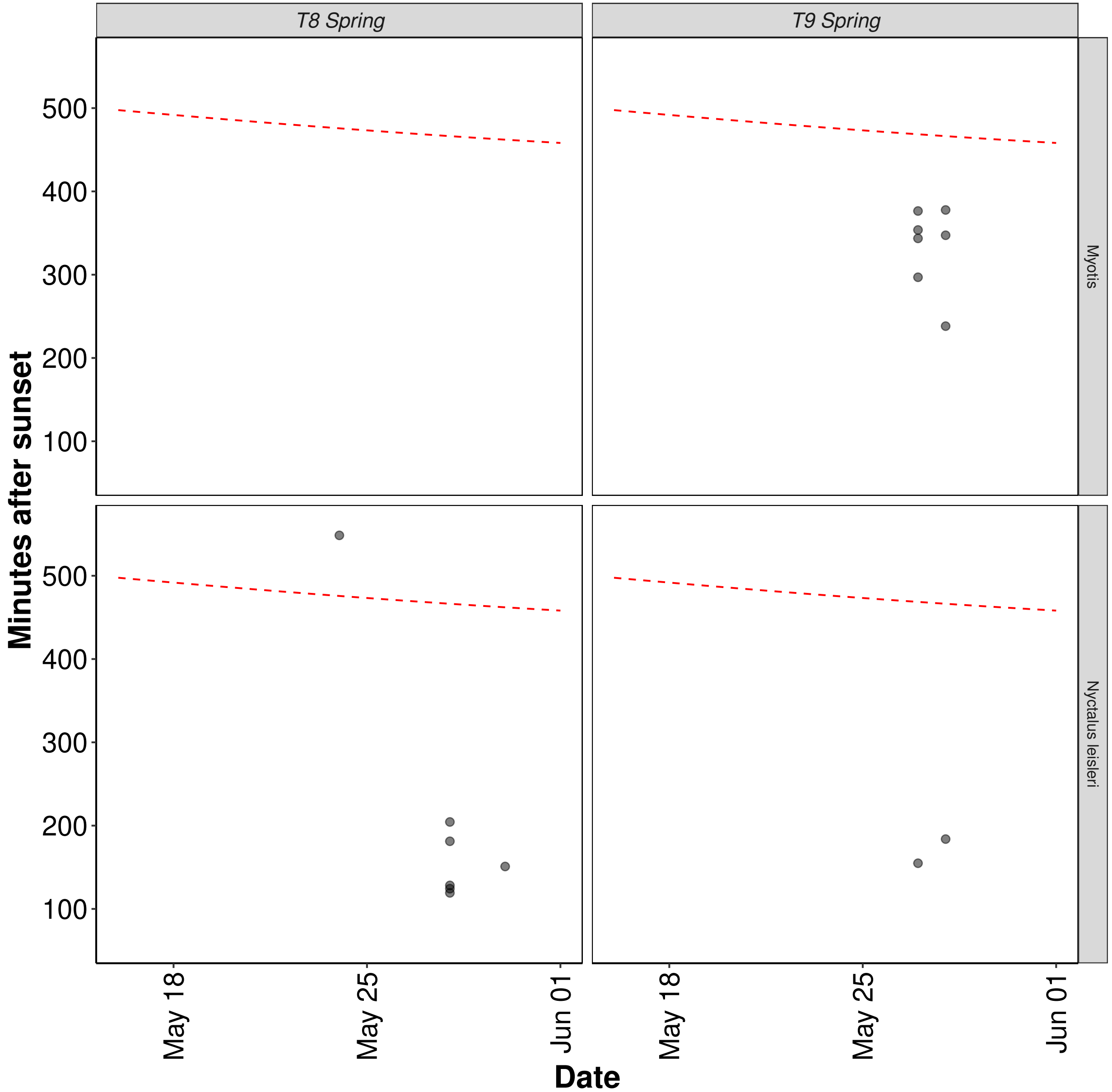
Per Detector

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.

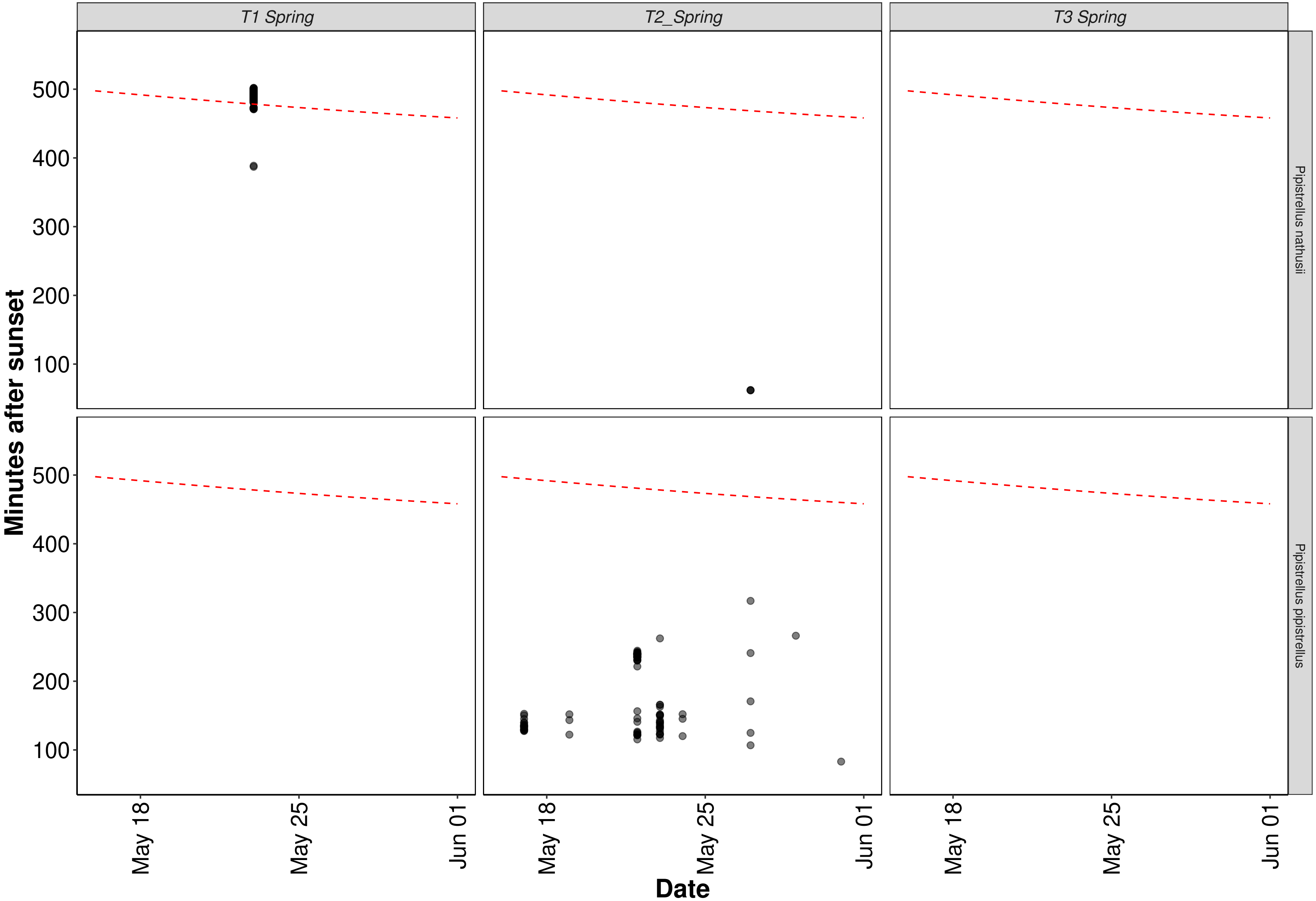

T1 Spring
T2_Spring
T3 Spring
Myotis
Nyctalus leisleri
Minutes after sunset
500
400
300
200
100
May 18
May 25
Jun 01
Date

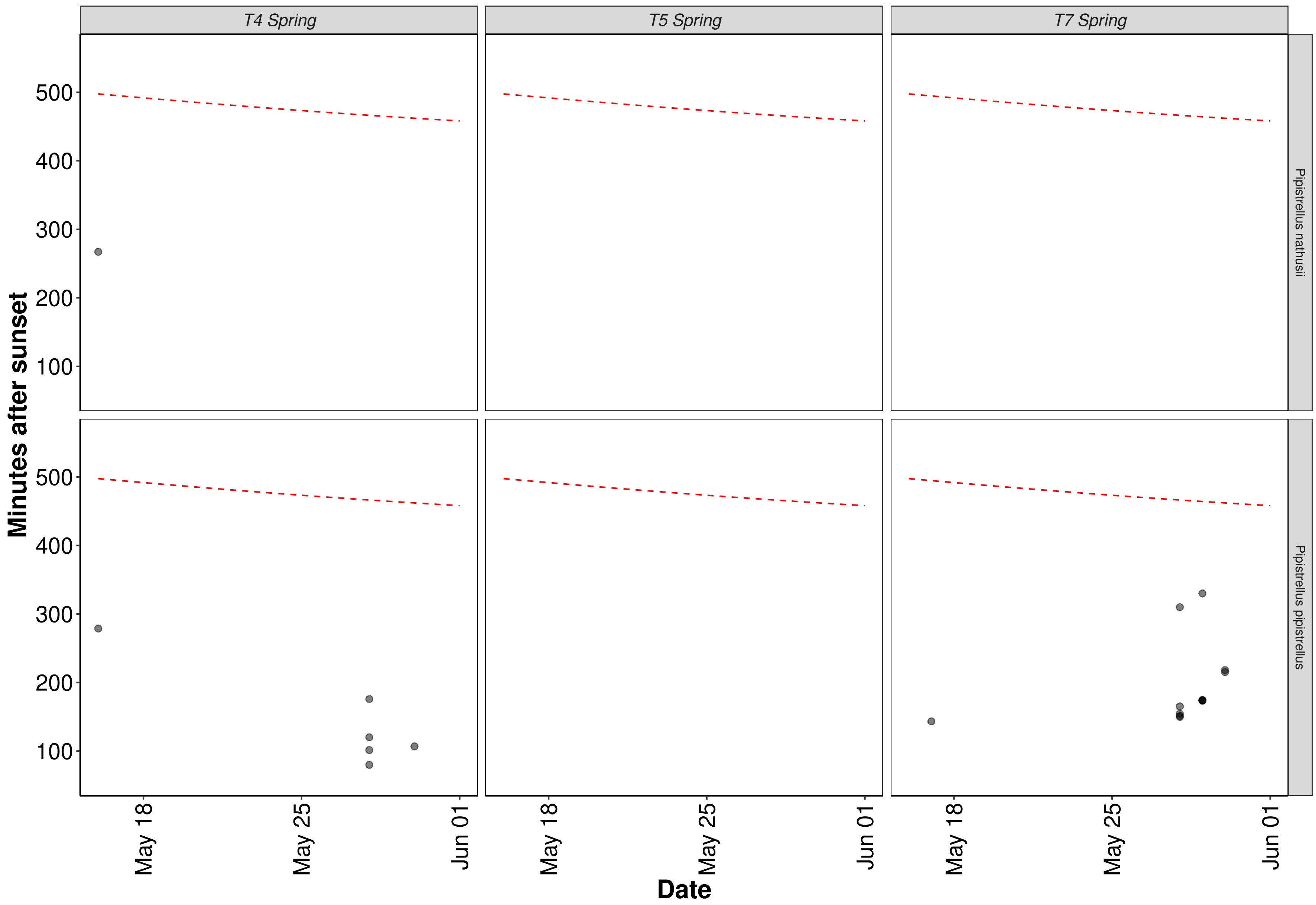


T4 Spring
T5 Spring
T7 Spring
Myotis
Nyctalus leisleri
Minutes after sunset
500
400
300
200
100
May 18
May 25
Jun 01
Date



T8 Spring
T9 Spring
Myotis
Nyctalus leisleri
Minutes after sunset
500
400
300
200
100
May 18
May 25
Jun 01
Date


T1 Spring
T2_Spring
T3 Spring
Pipistrellus nathusii
Pipistrellus pipistrellus
Minutes after sunset
500
400
300
200
100
May 18
May 25
Jun 01
Date



T4 Spring
T5 Spring
T7 Spring
Pipistrellus nathusii
Pipistrellus pipistrellus
Minutes after sunset
100
200
300
400
500
May 18
May 25
Jun 01
Date

Roost Emergence Time and Bat Observation

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

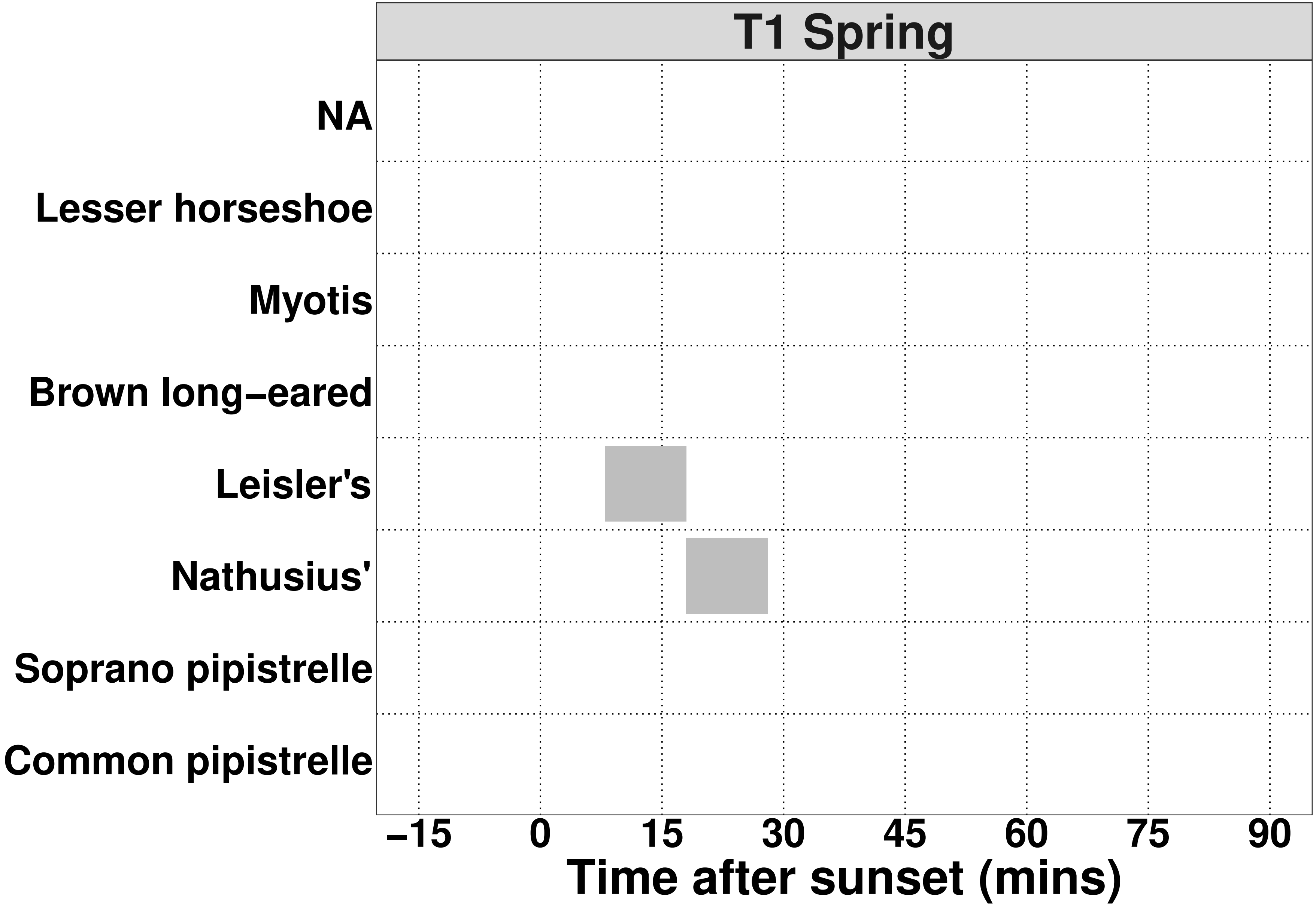
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012)

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

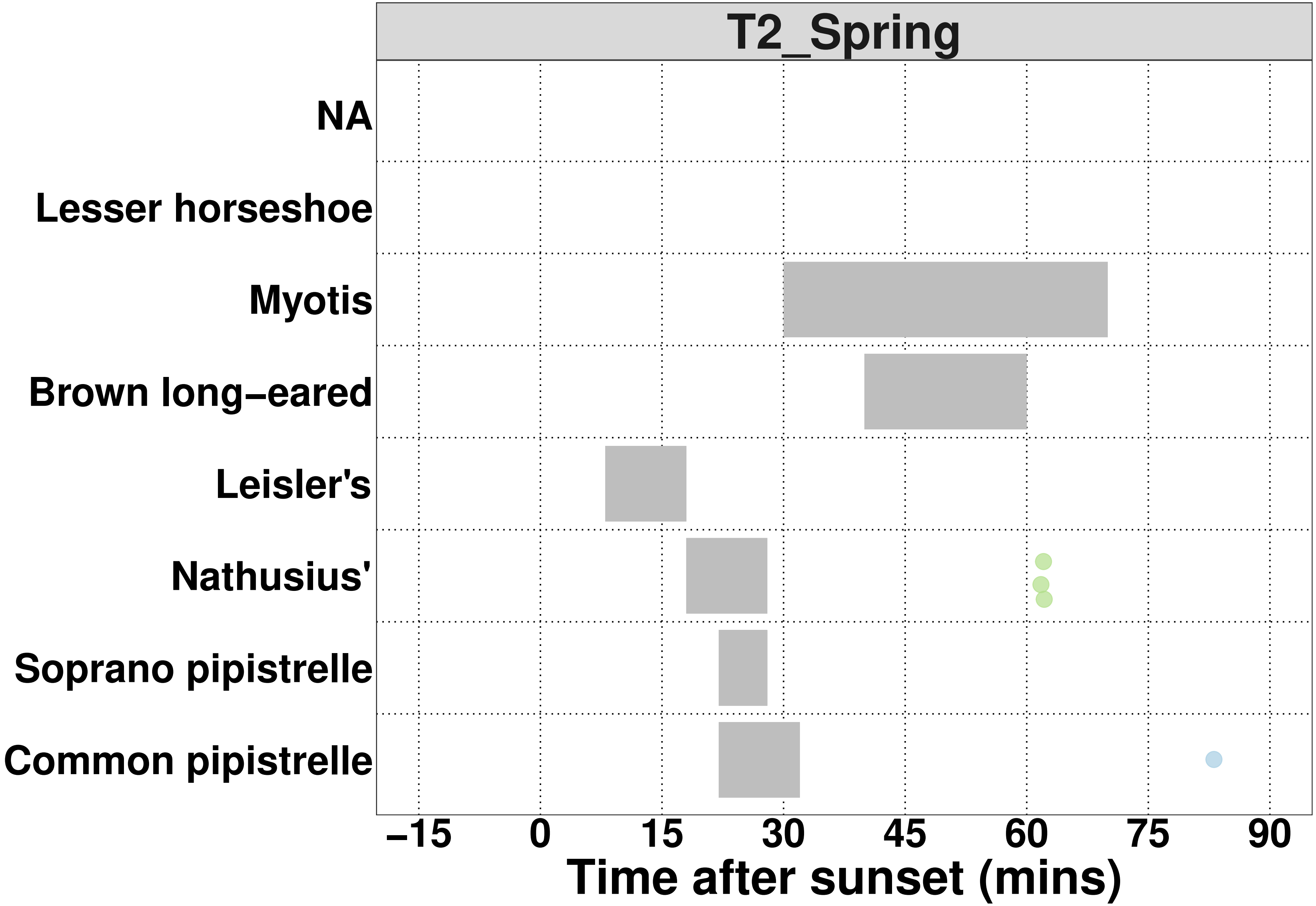
Species	Detector ID

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

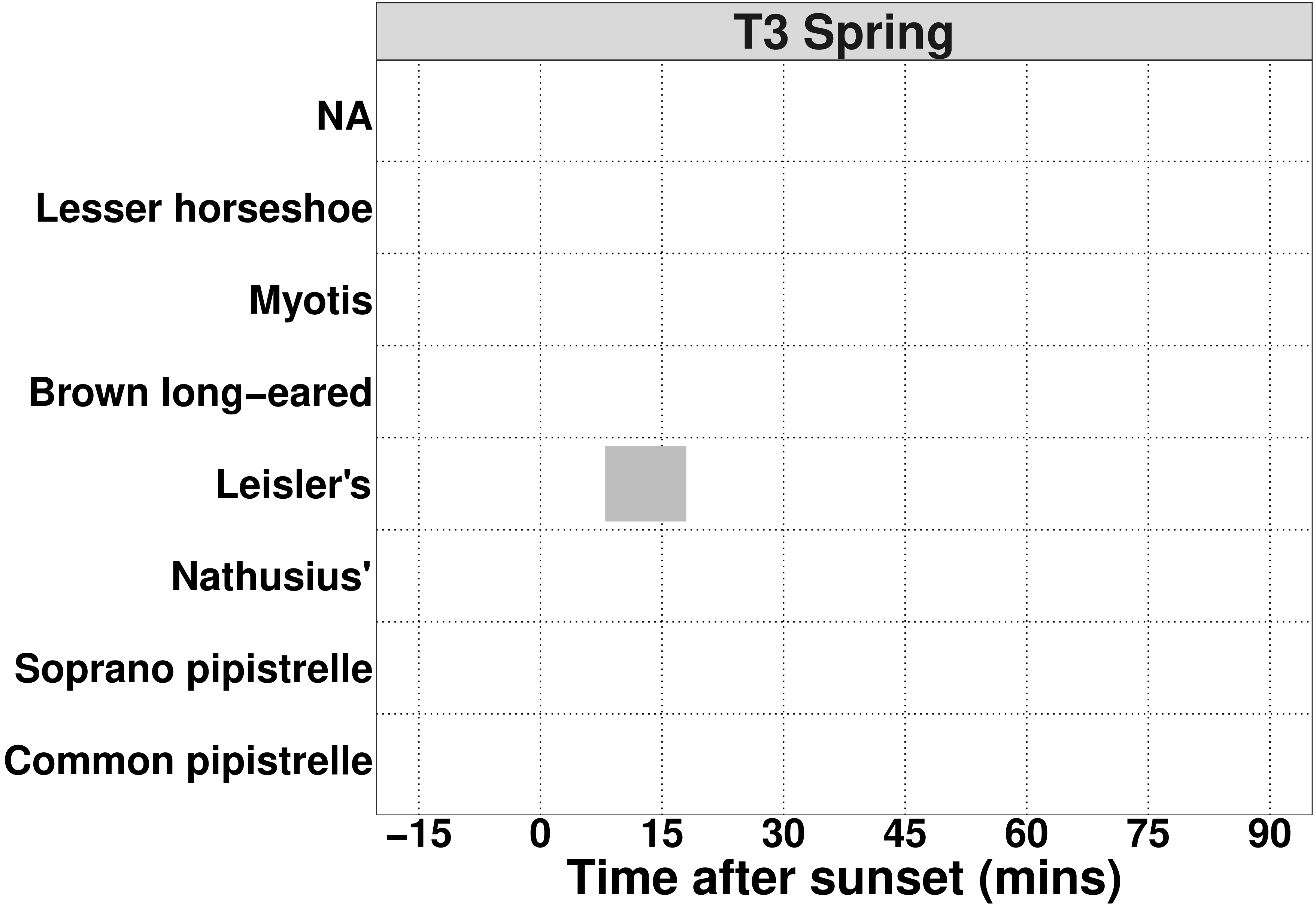
Figure 8. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occuring earlier than this time range, may potentially indicate the presence of a nearby roost.

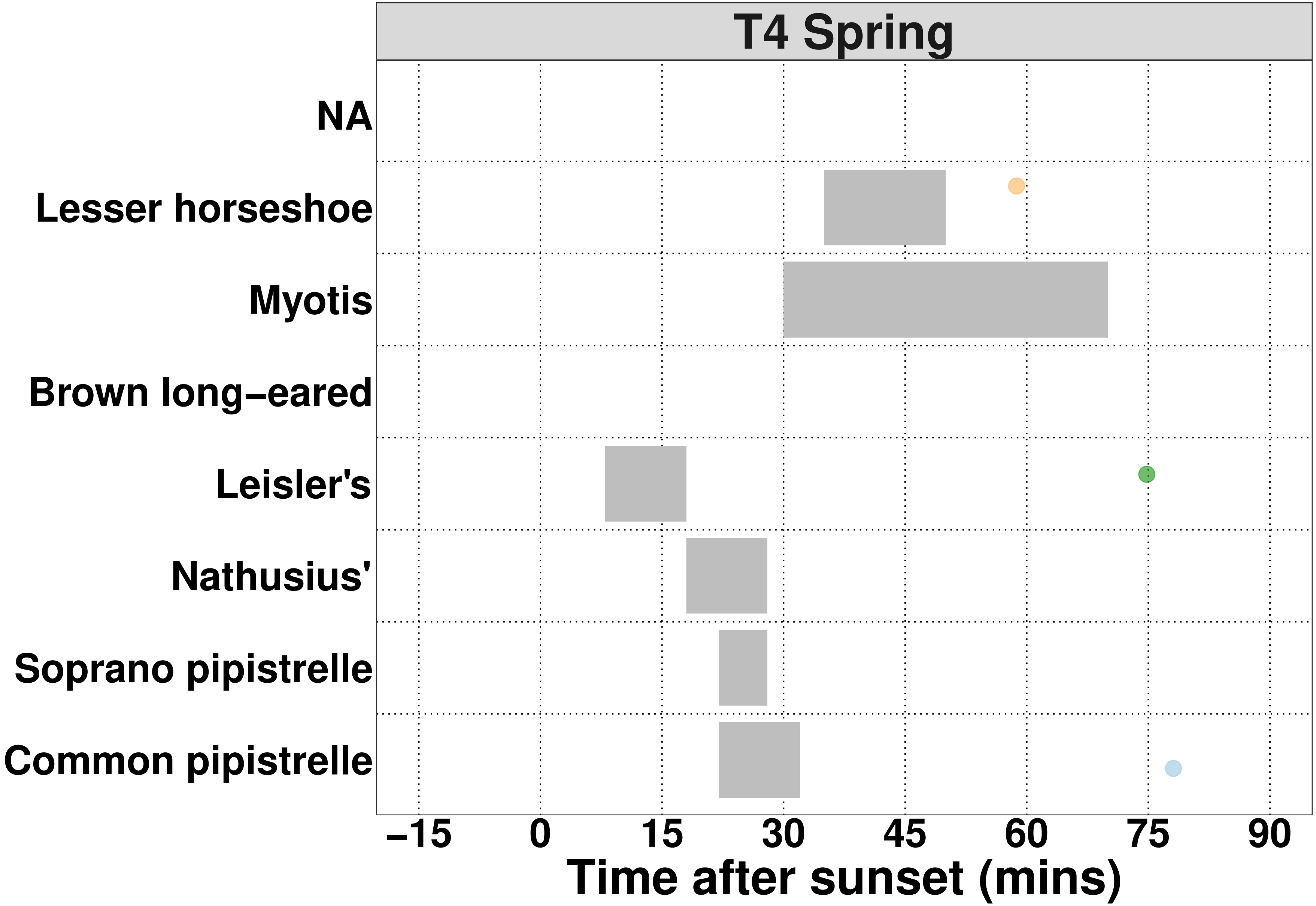


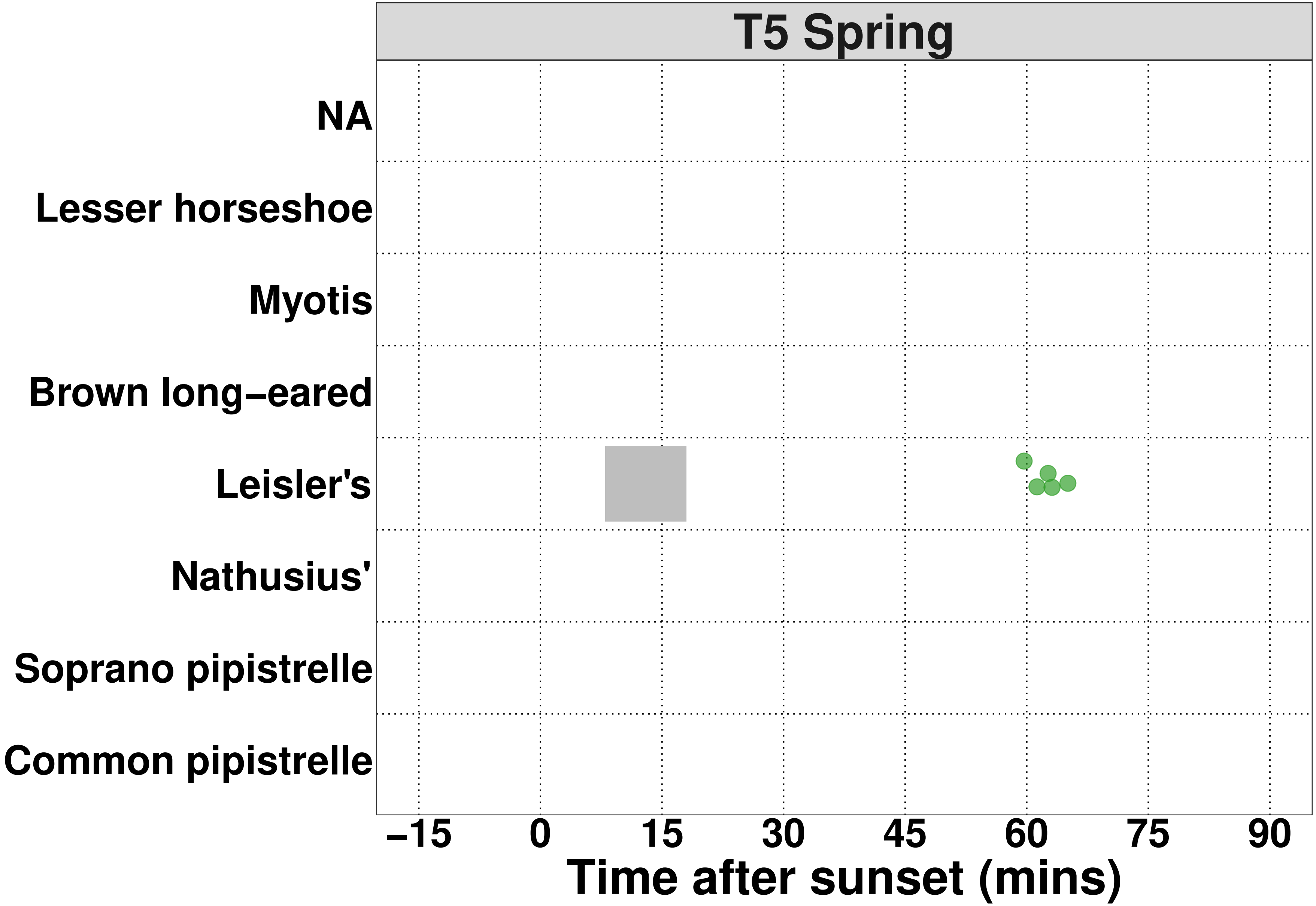
T1 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

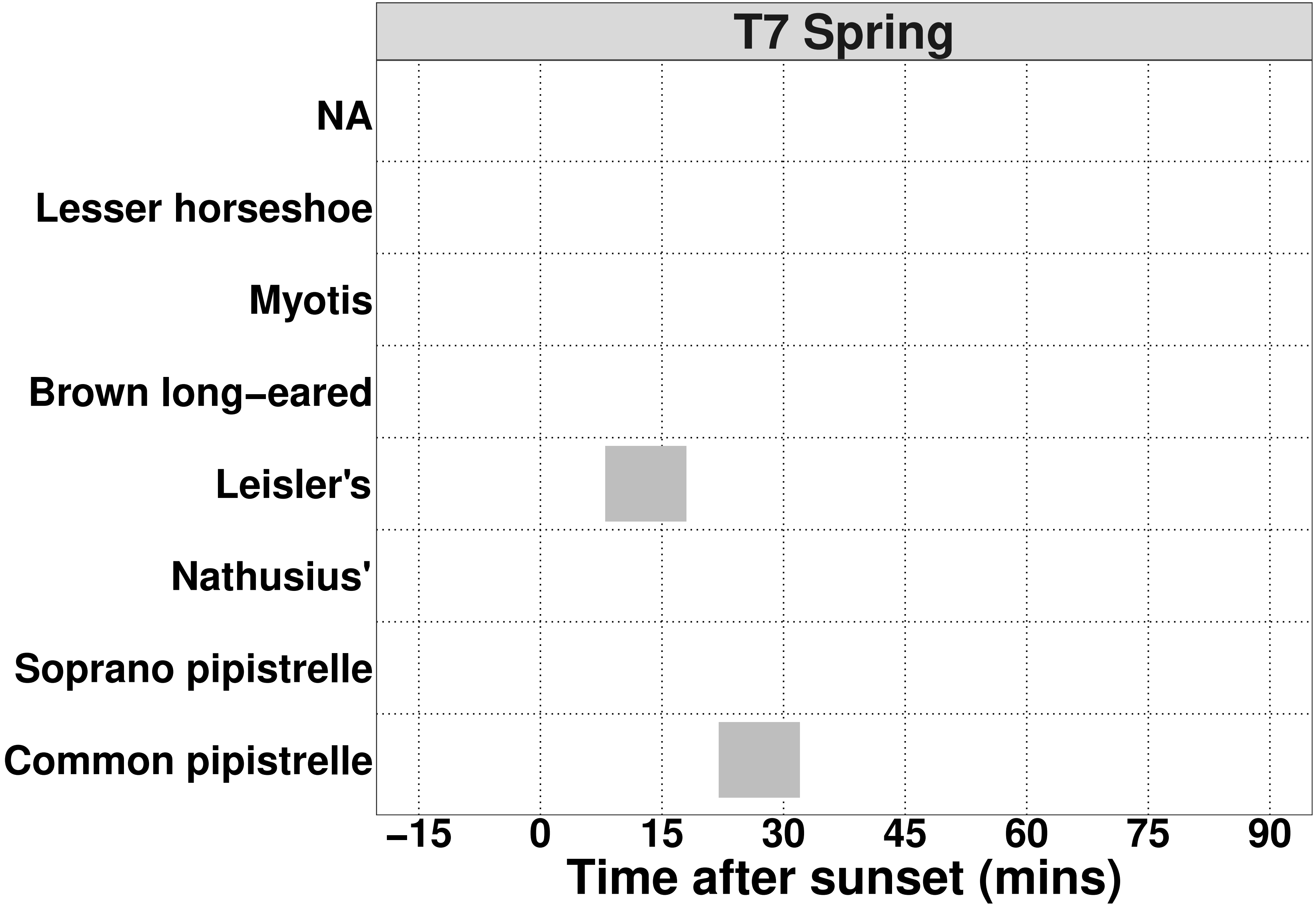


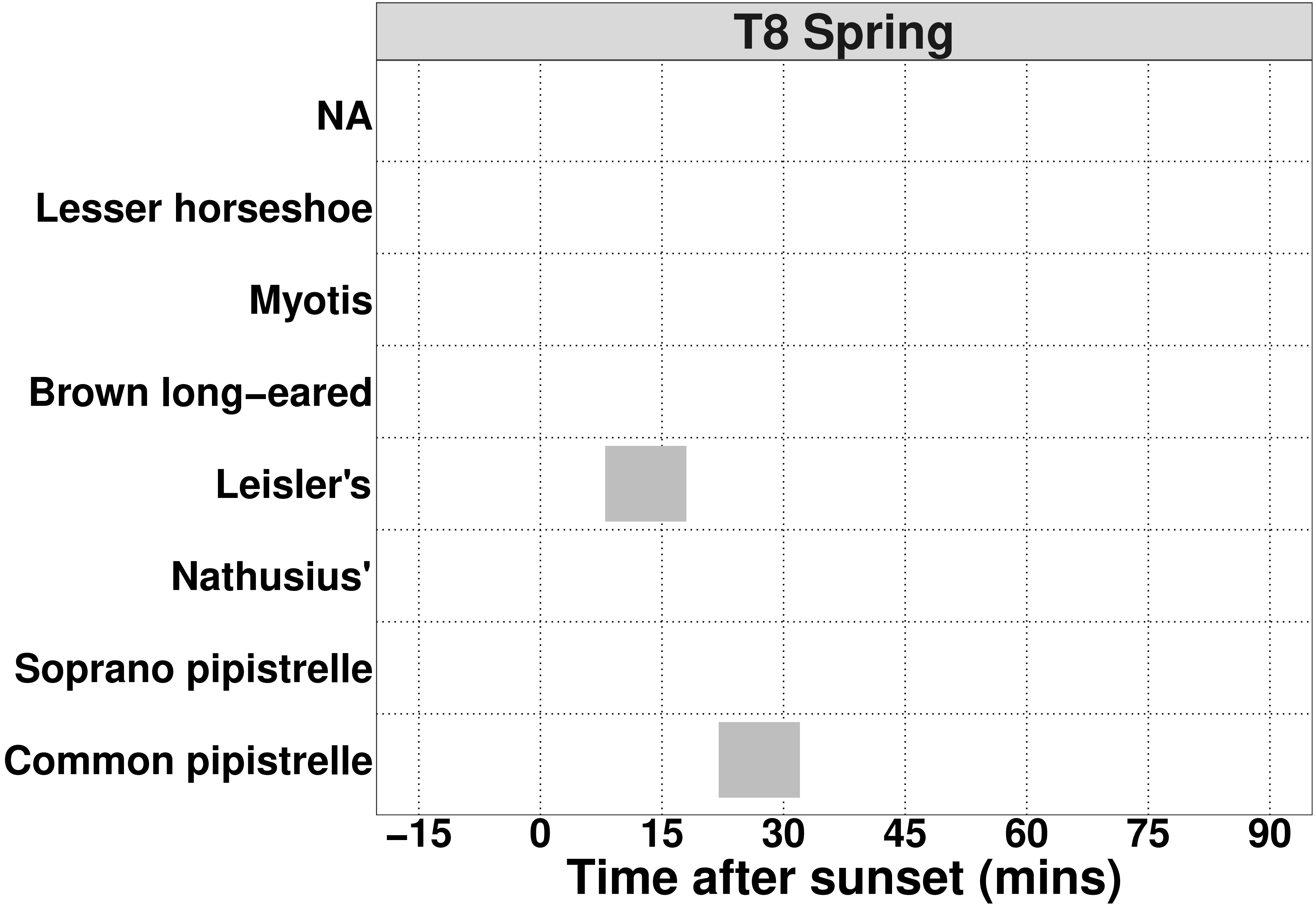
T2_Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

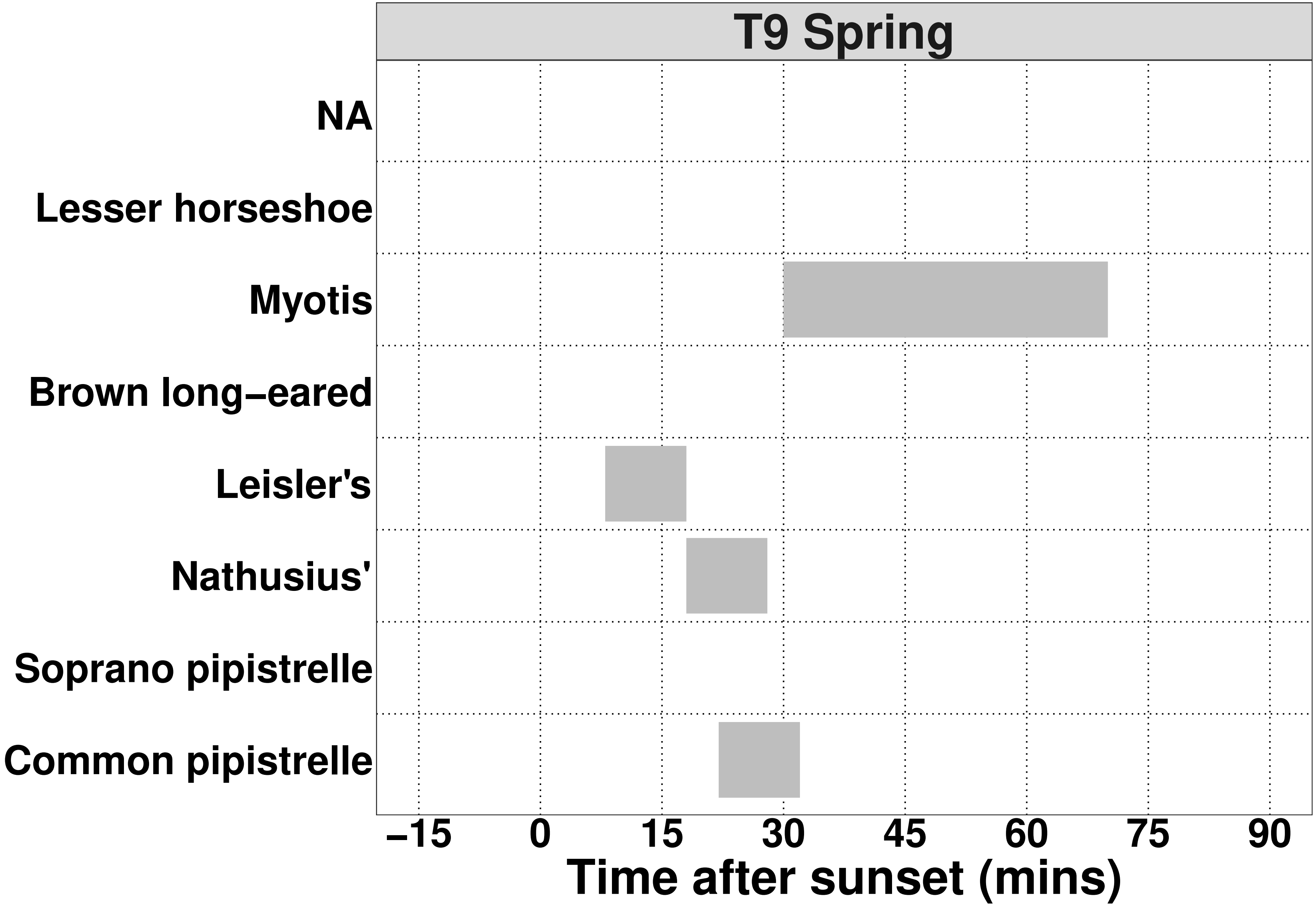

T3 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T4 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T5 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T7 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T8 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T9 Spring
NA
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

Count 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 (%)
Myotis	38	11.0
Nyctalus leisleri	50	14.5
PIPPYG	2	0.6
Pipistrellus nathusii	96	27.7
Pipistrellus pipistrellus	136	39.3
Pipistrellus pygmaeus	10	2.9
Plecotus auritus	13	3.8
Rhinolophus hipposideros	1	0.3
Total	346	100.1

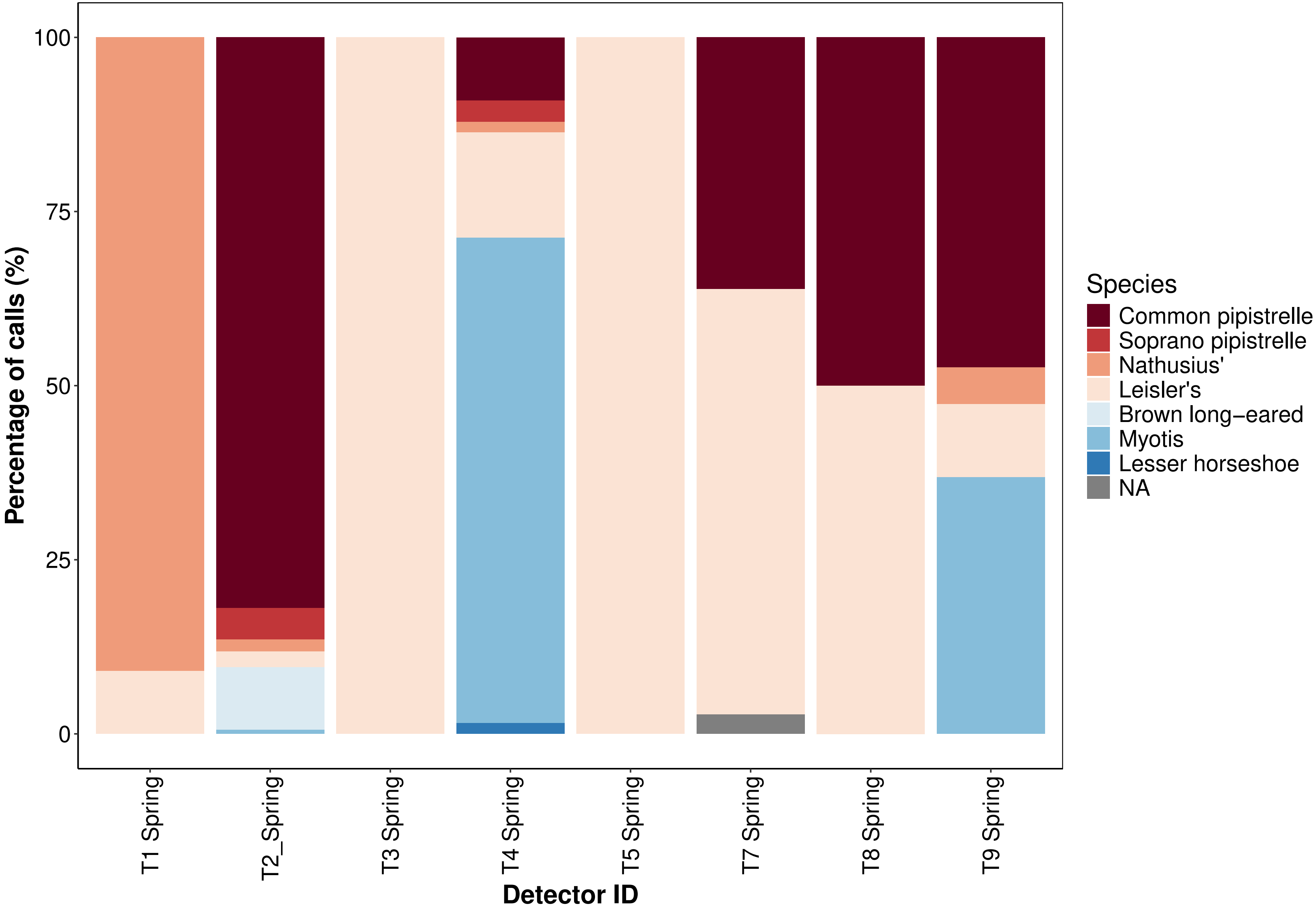
Per Detector

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

Species	Detector ID	Count (no.)	Percentage by Detector (%)
Common pipistrelle	T2_Spring	101	77.6923077
Common pipistrelle	T4 Spring	6	12.5000000
Common pipistrelle	T7 Spring	13	44.8275862
Common pipistrelle	T8 Spring	7	50.0000000
Common pipistrelle	T9 Spring	9	47.3684211
Soprano pipistrelle	T2_Spring	8	6.1538462
Soprano pipistrelle	T4 Spring	2	4.1666667
Nathusius'	T1 Spring	91	91.0000000
Nathusius'	T2_Spring	3	2.3076923
Nathusius'	T4 Spring	1	2.0833333
Nathusius'	T9 Spring	1	5.2631579
Leisler's	T1 Spring	9	9.0000000
Leisler's	T2_Spring	4	3.0769231
Leisler's	T3 Spring	1	100.0000000
Leisler's	T4 Spring	8	16.6666667
Leisler's	T5 Spring	5	100.0000000
Leisler's	T7 Spring	14	48.2758621
Leisler's	T8 Spring	7	50.0000000
Leisler's	T9 Spring	2	10.5263158
Brown long-eared	T2_Spring	13	10.0000000
Myotis	T2_Spring	1	0.7692308
Myotis	T4 Spring	30	62.5000000
Myotis	T9 Spring	7	36.8421053
Lesser horseshoe	T4 Spring	1	2.0833333
NA	T7 Spring	2	6.8965517

Species Composition

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


Percentage of calls (%)
100
75
50
25
0
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID
Species
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Brown long−eared
Myotis
Lesser horseshoe
NA

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.

Nighlty 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	T2_Spring	0.4
Common pipistrelle	T4 Spring	0.1
Common pipistrelle	T7 Spring	0.4
Common pipistrelle	T8 Spring	0.9
Common pipistrelle	T9 Spring	0.4
Soprano pipistrelle	T2_Spring	0.5
Soprano pipistrelle	T4 Spring	0.1
Nathusius’	T1 Spring	11.4
Nathusius’	T2_Spring	0.4
Nathusius’	T4 Spring	0.1
Nathusius’	T9 Spring	0.1
Leisler’s	T1 Spring	1.1
Leisler’s	T2_Spring	0.1
Leisler’s	T3 Spring	0.1
Leisler’s	T4 Spring	0.4
Leisler’s	T5 Spring	0.6
Leisler’s	T7 Spring	1.4
Leisler’s	T8 Spring	0.1
Leisler’s	T9 Spring	0.1
Brown long-eared	T2_Spring	0.3
Myotis	T2_Spring	0.1
Myotis	T4 Spring	0.9
Myotis	T9 Spring	0.4
Lesser horseshoe	T4 Spring	0.1
NA	T7 Spring	0.1

Mean Per Detector

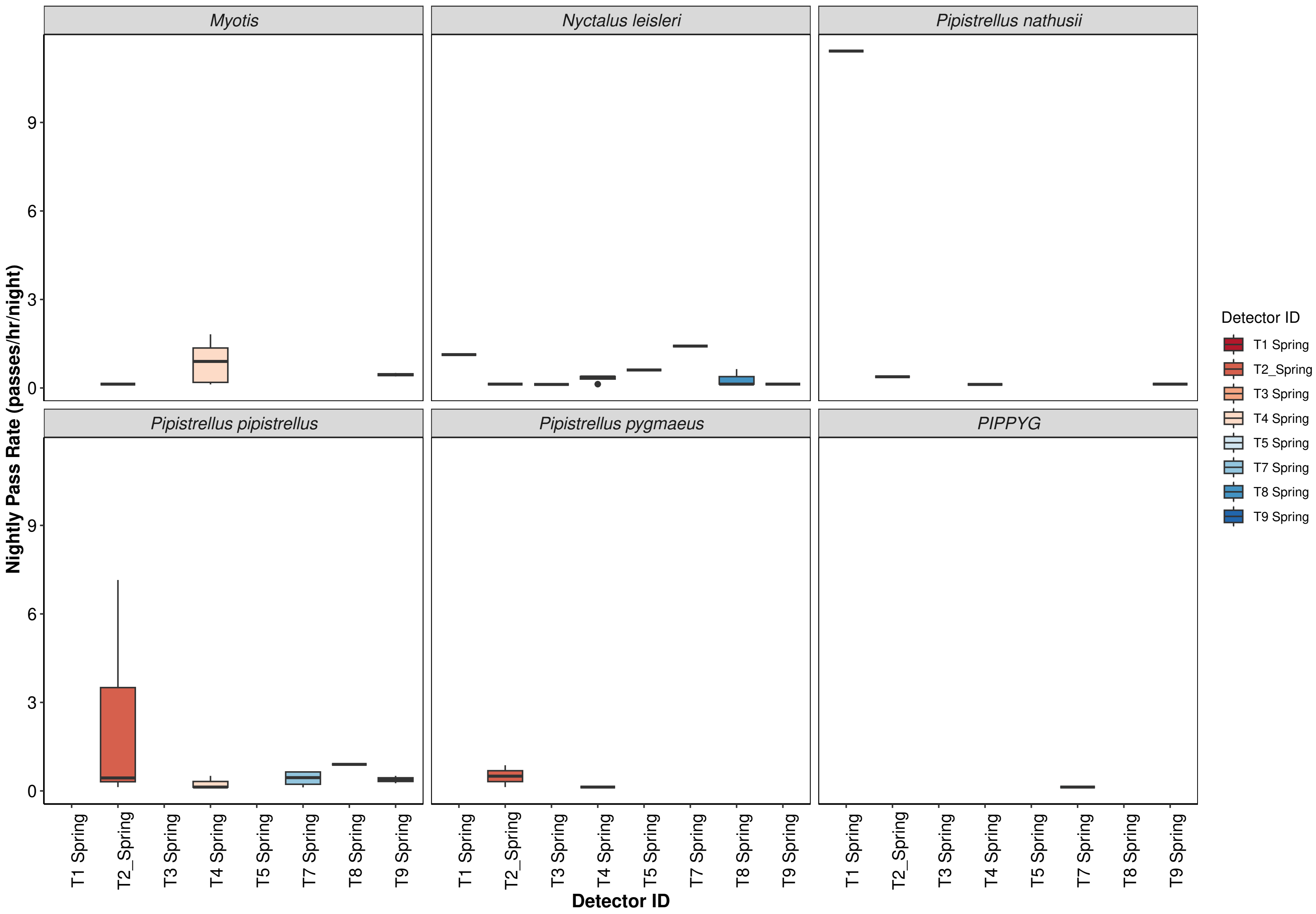
Table 17. The mean Nightly Pass Rate (bat passes per hour, per night) of each species at each detector. Values are given to 1 decimal place.

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

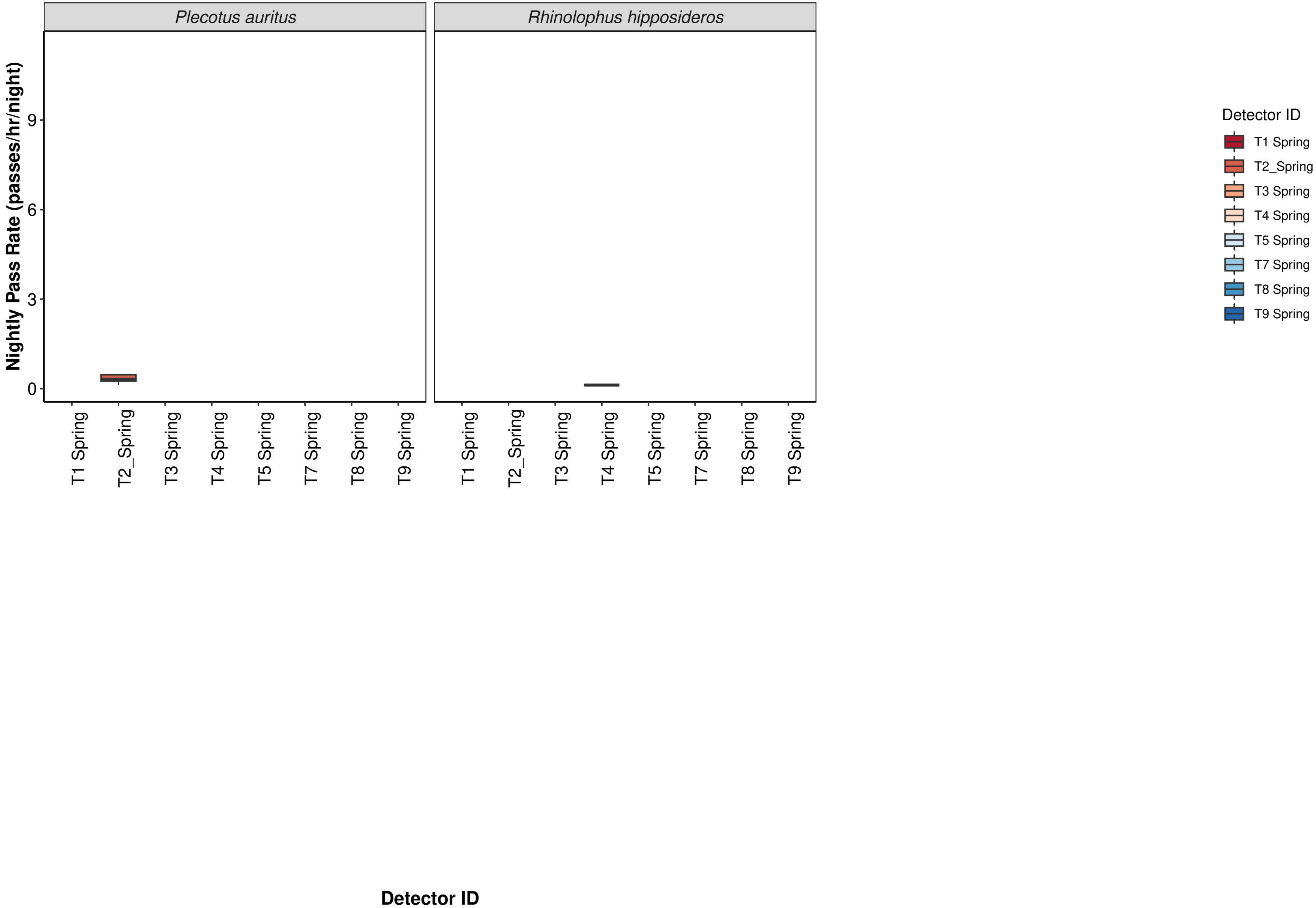
Species	Detector ID	Mean Pass Rate
Common pipistrelle	T2_Spring	2.3
Common pipistrelle	T4 Spring	0.3
Common pipistrelle	T7 Spring	0.4
Common pipistrelle	T8 Spring	0.9
Common pipistrelle	T9 Spring	0.4
Soprano pipistrelle	T2_Spring	0.5
Soprano pipistrelle	T4 Spring	0.1
Nathusius'	T1 Spring	11.4
Nathusius'	T2_Spring	0.4
Nathusius'	T4 Spring	0.1
Nathusius'	T9 Spring	0.1
Leisler's	T1 Spring	1.1
Leisler's	T2_Spring	0.1
Leisler's	T3 Spring	0.1
Leisler's	T4 Spring	0.3
Leisler's	T5 Spring	0.6
Leisler's	T7 Spring	1.4
Leisler's	T8 Spring	0.3
Leisler's	T9 Spring	0.1
Brown long-eared	T2_Spring	0.3
Myotis	T2_Spring	0.1
Myotis	T4 Spring	0.8
Myotis	T9 Spring	0.4
Lesser horseshoe	T4 Spring	0.1
NA	T7 Spring	0.1

Per Detector

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



Myotis
Nyctalus leisleri
Pipistrellus nathusii
Pipistrellus pipistrellus
Pipistrellus pygmaeus
PIPPYG
Nightly Pass Rate (passes/hr/night)
0
3
6
9
Detector ID
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring


Plecotus auritus
Rhinolophus hipposideros
Nightly Pass Rate (passes/hr/night)
0
3
6
9
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID

Split by Month

Total Bat Passes per Detector each Month

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.

```
Error in `[<-`:
! Assigned data `value` must be compatible with existing data.
i Error occurred for column `Species`.
Caused by error in `vec_assign()`:
! Can't convert <double> to <factor<85c70>>.
```

Species	Detector ID	May	Jun
Common pipistrelle	T2_Spring	145	NA
Common pipistrelle	T4 Spring	6	NA
Common pipistrelle	T7 Spring	13	NA
Common pipistrelle	T8 Spring	7	NA
Common pipistrelle	T9 Spring	9	NA
Soprano pipistrelle	T2_Spring	8	NA
Soprano pipistrelle	T4 Spring	2	NA
Nathusius'	T1 Spring	91	NA
Nathusius'	T2_Spring	3	NA
Nathusius'	T4 Spring	1	NA
Nathusius'	T9 Spring	1	NA
Leisler's	T1 Spring	9	NA
Leisler's	T2_Spring	4	NA
Leisler's	T3 Spring	1	NA
Leisler's	T4 Spring	9	1
Leisler's	T5 Spring	5	NA
Leisler's	T7 Spring	22	NA
Leisler's	T8 Spring	7	NA
Leisler's	T9 Spring	2	NA
Brown long-eared	T2_Spring	16	NA
Myotis	T2_Spring	1	NA
Myotis	T4 Spring	44	2
Myotis	T9 Spring	7	NA
Lesser horseshoe	T4 Spring	1	NA
NA	T7 Spring	1	NA

Survey Effort

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

month	Detector ID	No. of Survey Nights
May	T1 Spring	1
May	T2_Spring	10
May	T3 Spring	1
May	T4 Spring	8
May	T5 Spring	1
May	T7 Spring	4
May	T8 Spring	3
May	T9 Spring	3
Jun	T4 Spring	1

Nightly Bat Passes for Each Month

Median Per Detector

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

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

Species	Detector ID	May	Jun
Common pipistrelle	T2_Spring	0.4	NA
Common pipistrelle	T4 Spring	0.1	NA
Common pipistrelle	T7 Spring	0.4	NA
Common pipistrelle	T8 Spring	0.9	NA
Common pipistrelle	T9 Spring	0.4	NA
Soprano pipistrelle	T2_Spring	0.5	NA
Soprano pipistrelle	T4 Spring	0.1	NA
Nathusius'	T1 Spring	11.4	NA
Nathusius'	T2_Spring	0.4	NA
Nathusius'	T4 Spring	0.1	NA
Nathusius'	T9 Spring	0.1	NA
Leisler's	T1 Spring	1.1	NA
Leisler's	T2_Spring	0.1	NA
Leisler's	T3 Spring	0.1	NA
Leisler's	T4 Spring	0.4	0.1
Leisler's	T5 Spring	0.6	NA
Leisler's	T7 Spring	1.4	NA
Leisler's	T8 Spring	0.1	NA
Leisler's	T9 Spring	0.1	NA
Brown long-eared	T2_Spring	0.3	NA
Myotis	T2_Spring	0.1	NA
Myotis	T4 Spring	0.9	0.3
Myotis	T9 Spring	0.4	NA
Lesser horseshoe	T4 Spring	0.1	NA
NA	T7 Spring	0.1	NA

Mean Per Detector

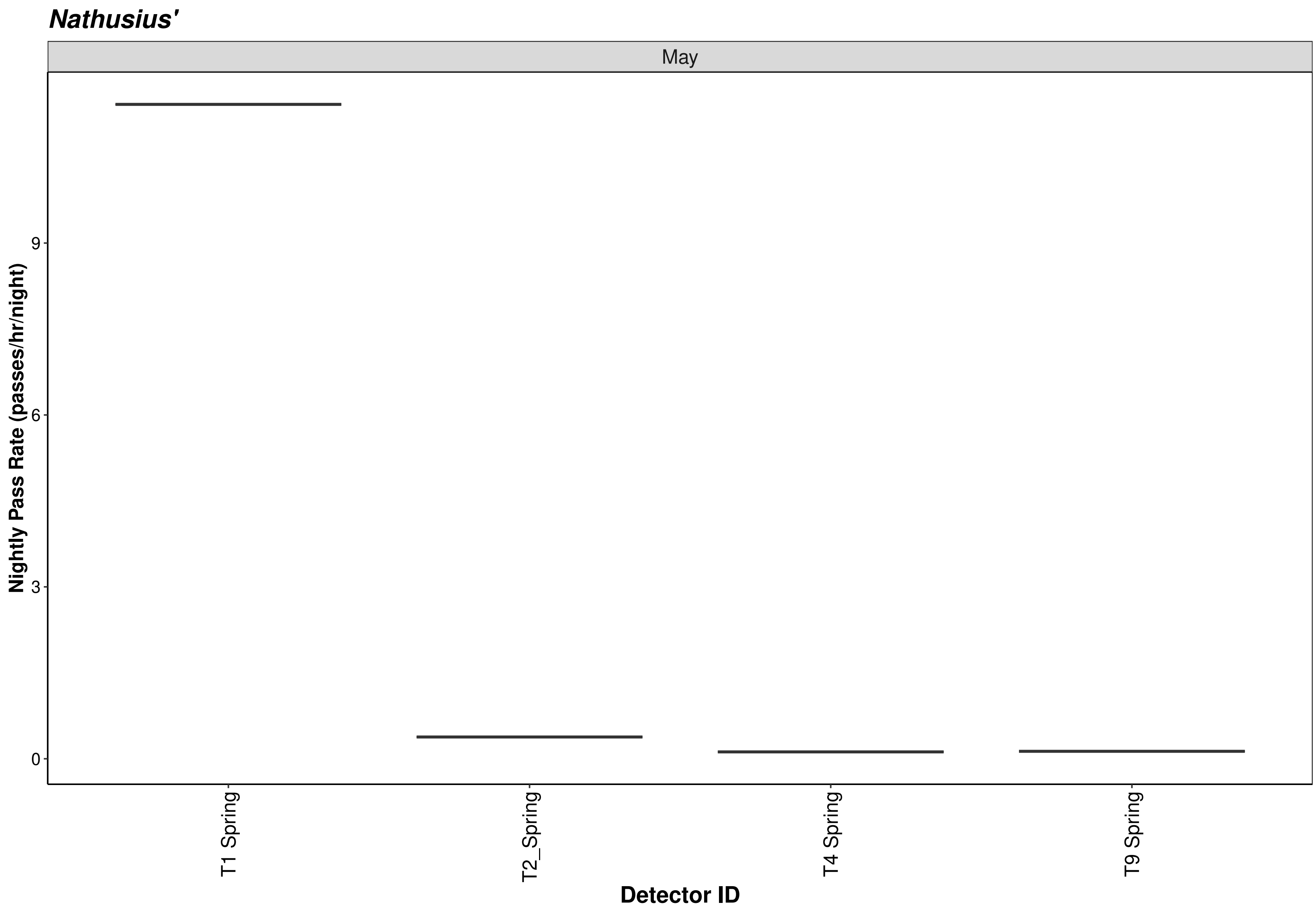
Table 21: The mean Nightly Pass Rate (bat passes per hour, per night) of each species throughout each month. Values are given to 1 decimal place.

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

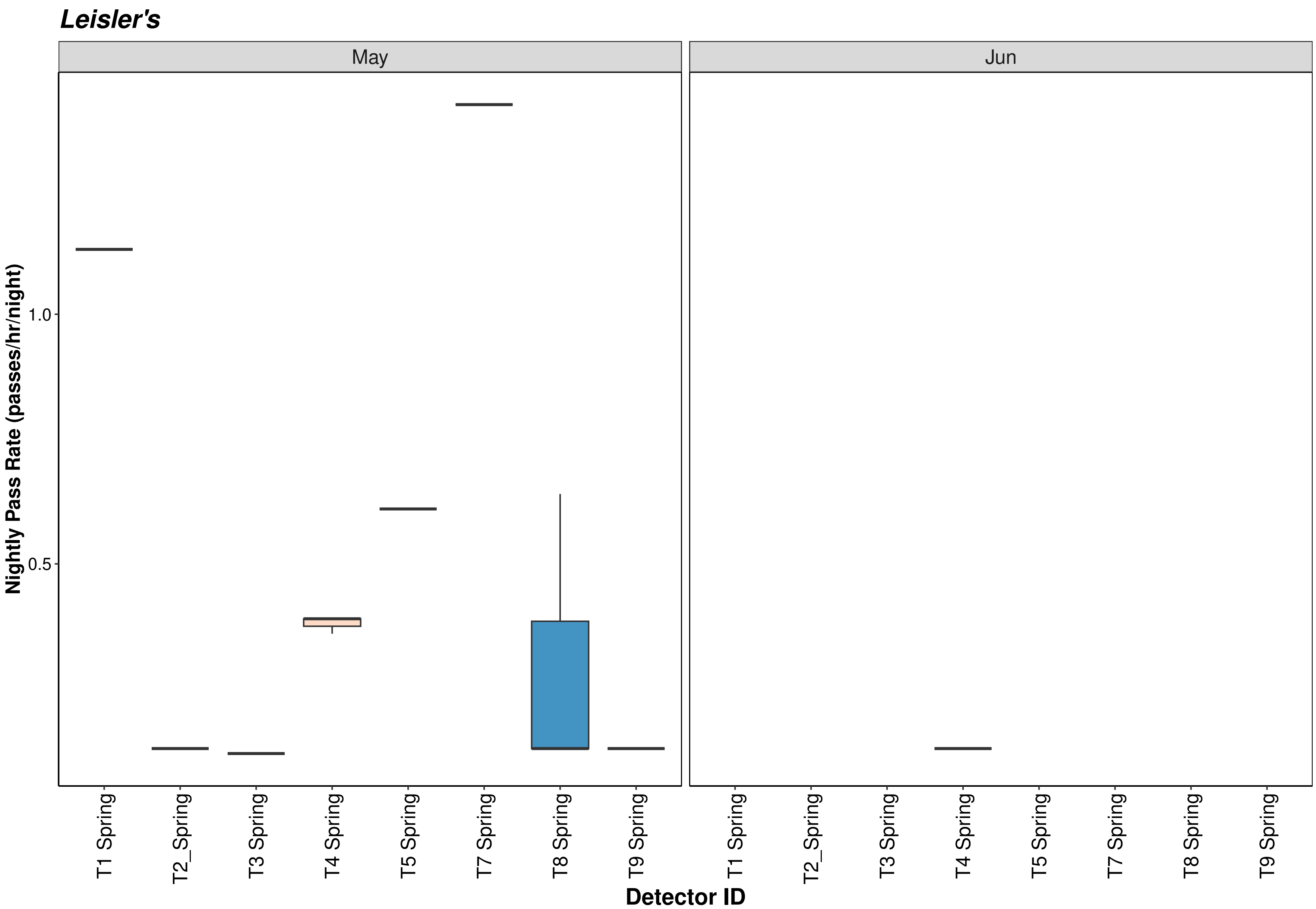
Species	Detector ID	May	Jun
Common pipistrelle	T2_Spring	2.3	NA
Common pipistrelle	T4 Spring	0.3	NA
Common pipistrelle	T7 Spring	0.4	NA
Common pipistrelle	T8 Spring	0.9	NA
Common pipistrelle	T9 Spring	0.4	NA
Soprano pipistrelle	T2_Spring	0.5	NA
Soprano pipistrelle	T4 Spring	0.1	NA
Nathusius’	T1 Spring	11.4	NA
Nathusius’	T2_Spring	0.4	NA
Nathusius’	T4 Spring	0.1	NA
Nathusius’	T9 Spring	0.1	NA
Leisler’s	T1 Spring	1.1	NA
Leisler’s	T2_Spring	0.1	NA
Leisler’s	T3 Spring	0.1	NA
Leisler’s	T4 Spring	0.4	0.1
Leisler’s	T5 Spring	0.6	NA
Leisler’s	T7 Spring	1.4	NA
Leisler’s	T8 Spring	0.3	NA
Leisler’s	T9 Spring	0.1	NA
Brown long-eared	T2_Spring	0.3	NA
Myotis	T2_Spring	0.1	NA
Myotis	T4 Spring	0.9	0.3
Myotis	T9 Spring	0.4	NA
Lesser horseshoe	T4 Spring	0.1	NA
NA	T7 Spring	0.1	NA

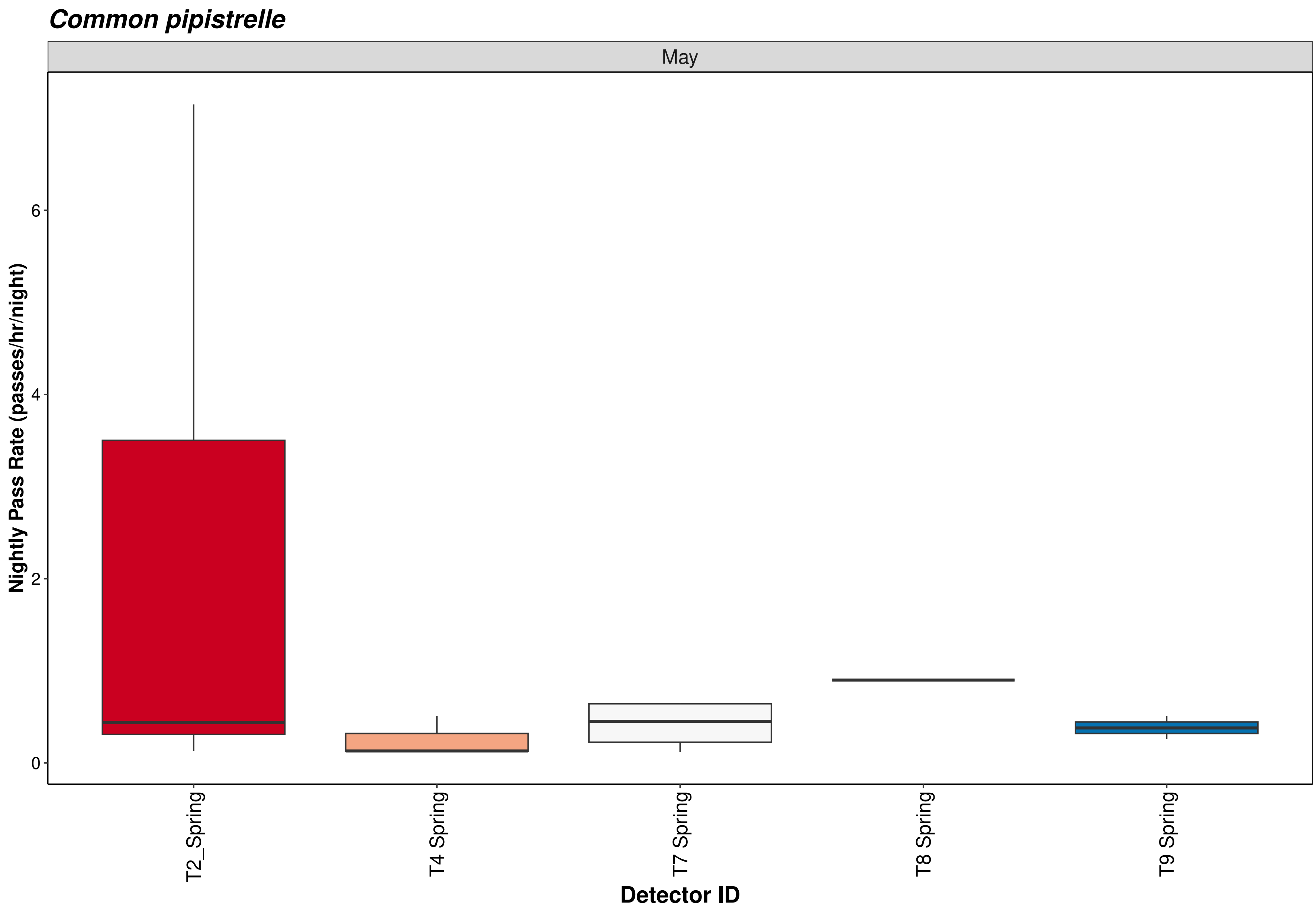
Per Detector

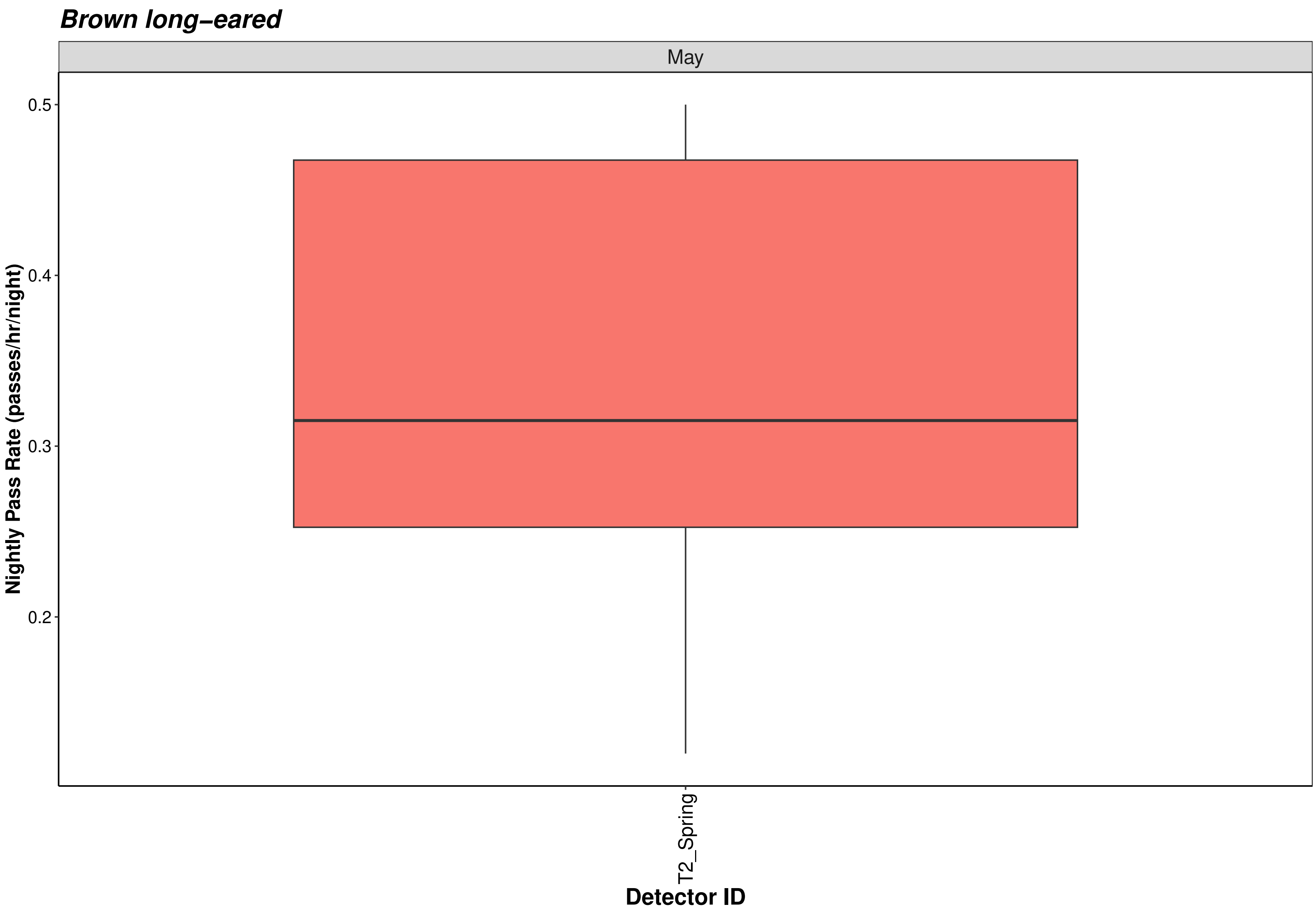
Figure 12. Figures show boxplots for the number of bat passes per hour by detector, for each month. The 'box' shows the interquartile range, which is where the middle 50% of the data lie. The line dividing the box is the median, the mid-point of the data. The 'whiskers' extend from the box and represent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



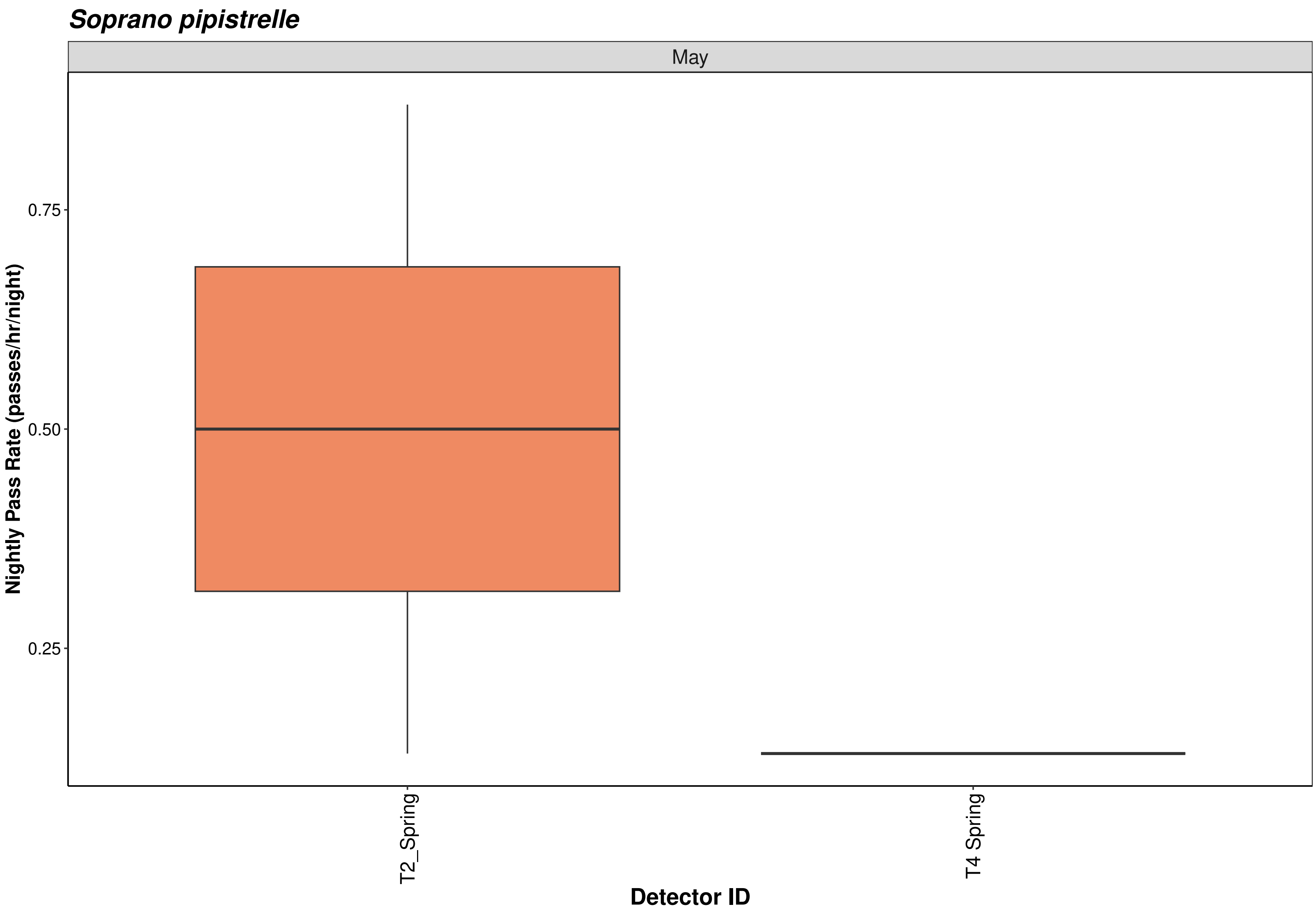
Nathusius'
May
Nightly Pass Rate (passes/hr/night)
9
6
3
0
T1 Spring
T2_Spring
T4 Spring
T9 Spring
Detector ID

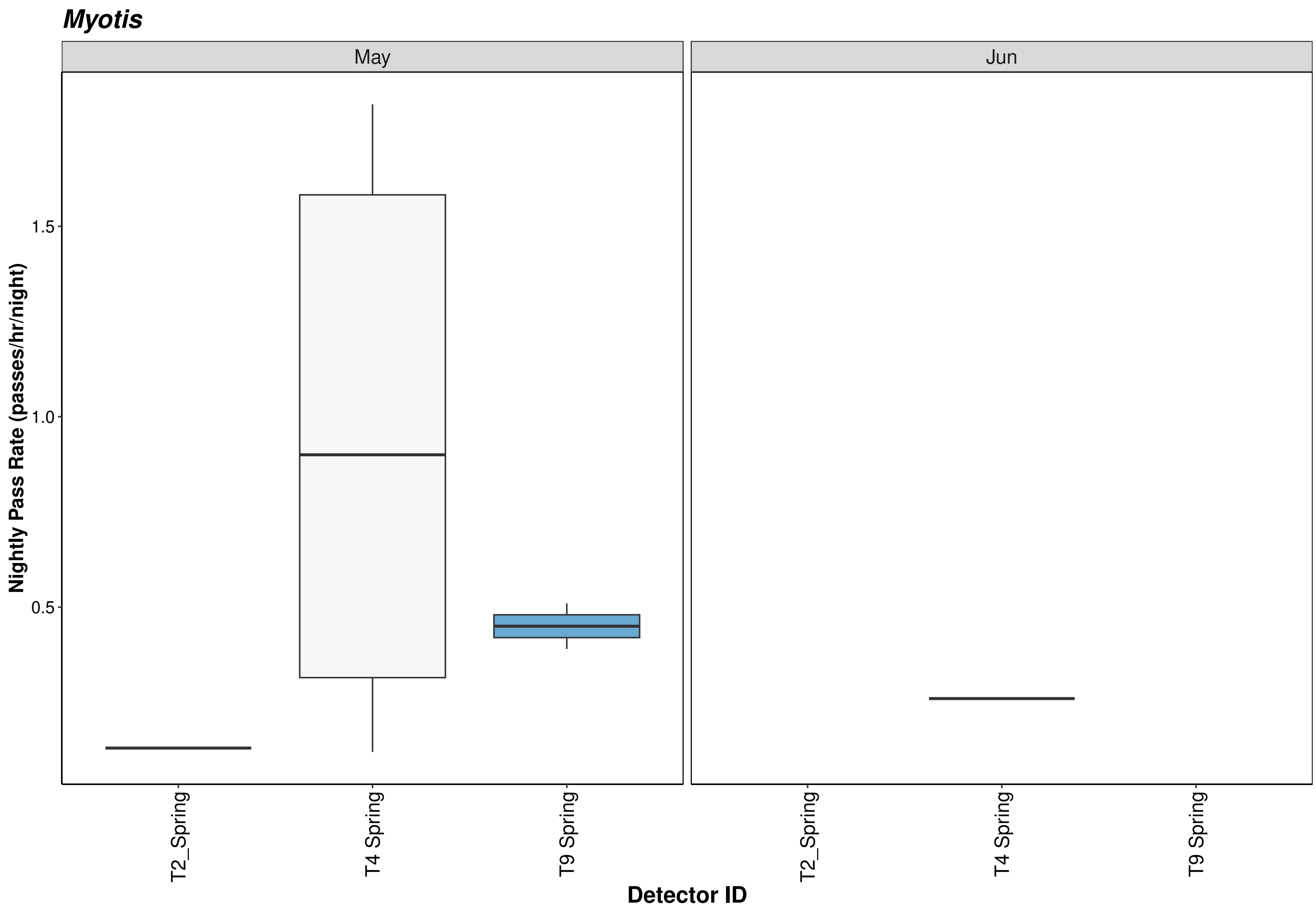

Leisler's
May
Jun
Nightly Pass Rate (passes/hr/night)
1.0
0.5
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
T1 Spring
T2_Spring
T3 Spring
T4 Spring
T5 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID

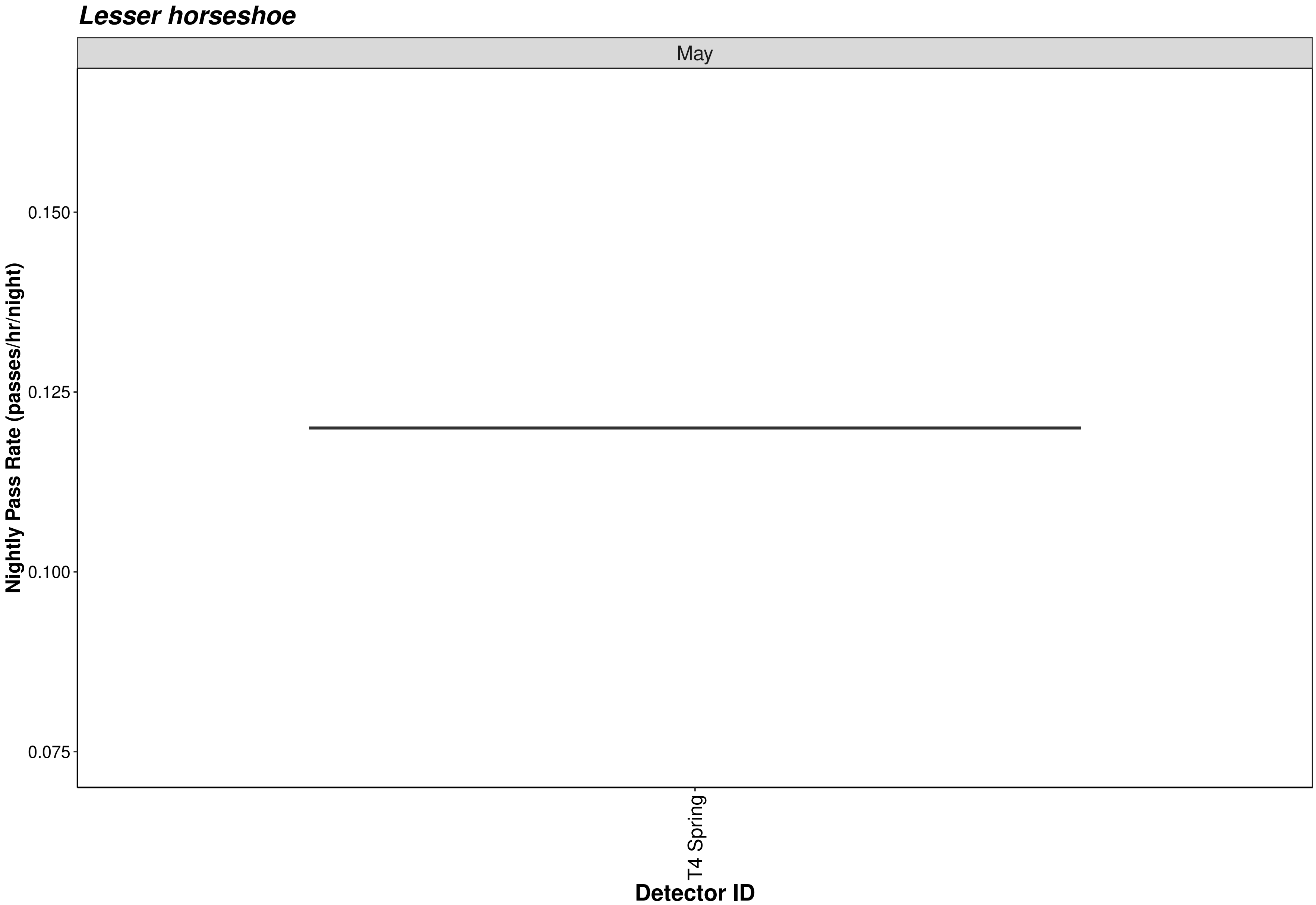

Common pipistrelle
May
Nightly Pass Rate (passes/hr/night)
0
2
4
6
T2_Spring
T4 Spring
T7 Spring
T8 Spring
T9 Spring
Detector ID



Brown long–eared
May
Nightly Pass Rate (passes/hr/night)
0.5
0.4
0.3
0.2
T2_Spring
Detector ID


Soprano pipistrelle
May
Nightly Pass Rate (passes/hr/night)
0.75
0.50
0.25
T2_Spring
T4 Spring
Detector ID


Myotis
May
Jun
Nightly Pass Rate (passes/hr/night)
1.5
1.0
0.5
T2_Spring
T4 Spring
T9 Spring
T2_Spring
T4 Spring
T9 Spring
Detector ID


Lesser horseshoe
May
Nightly Pass Rate (passes/hr/night)
0.150
0.125
0.100
0.075
T4 Spring
Detector ID

```
Error in `combine_vars()`:
! Faceting variables must have at least one value.
```

Bat Activity per Detector Location

Figure 13. Detector ID reference:

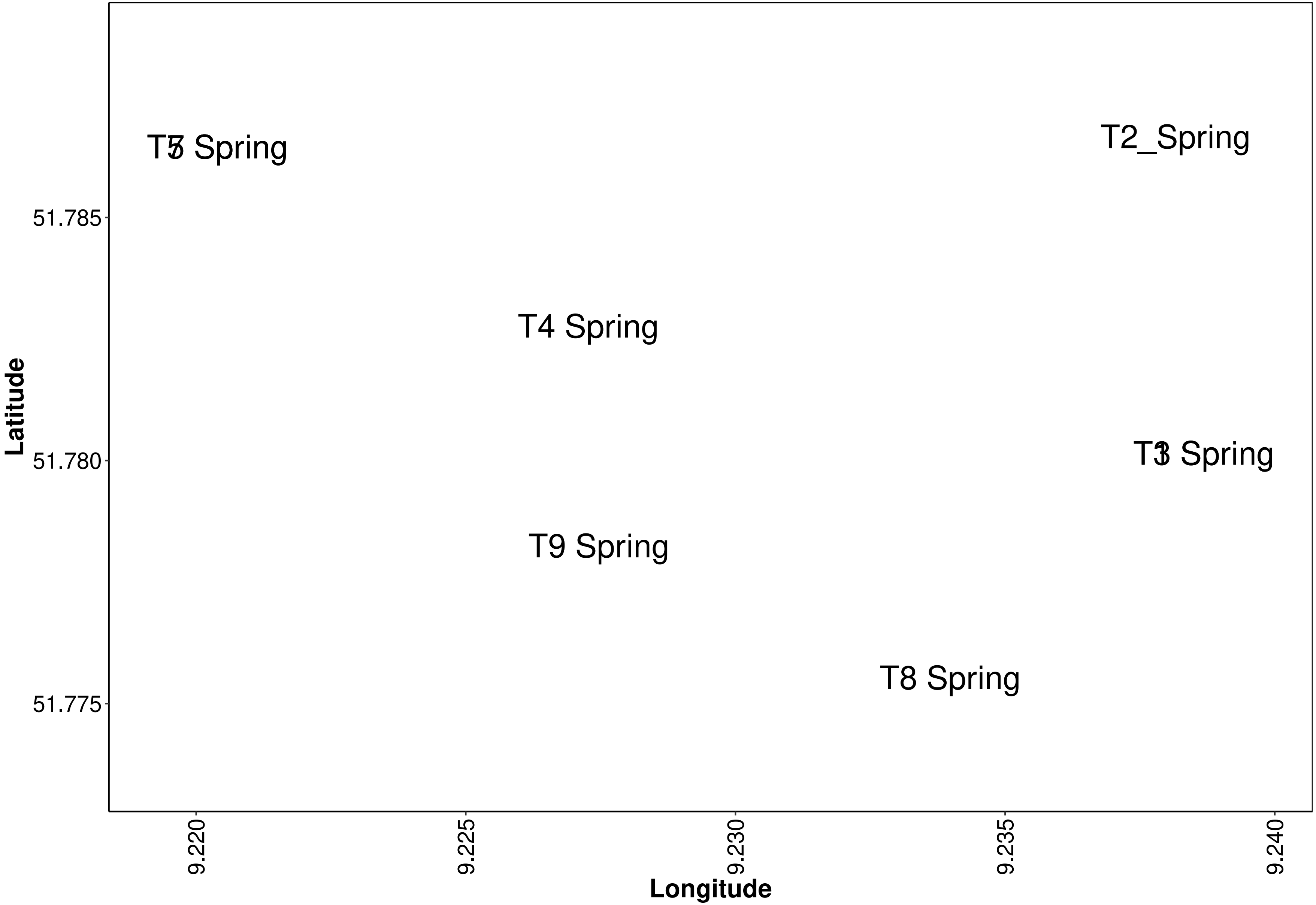
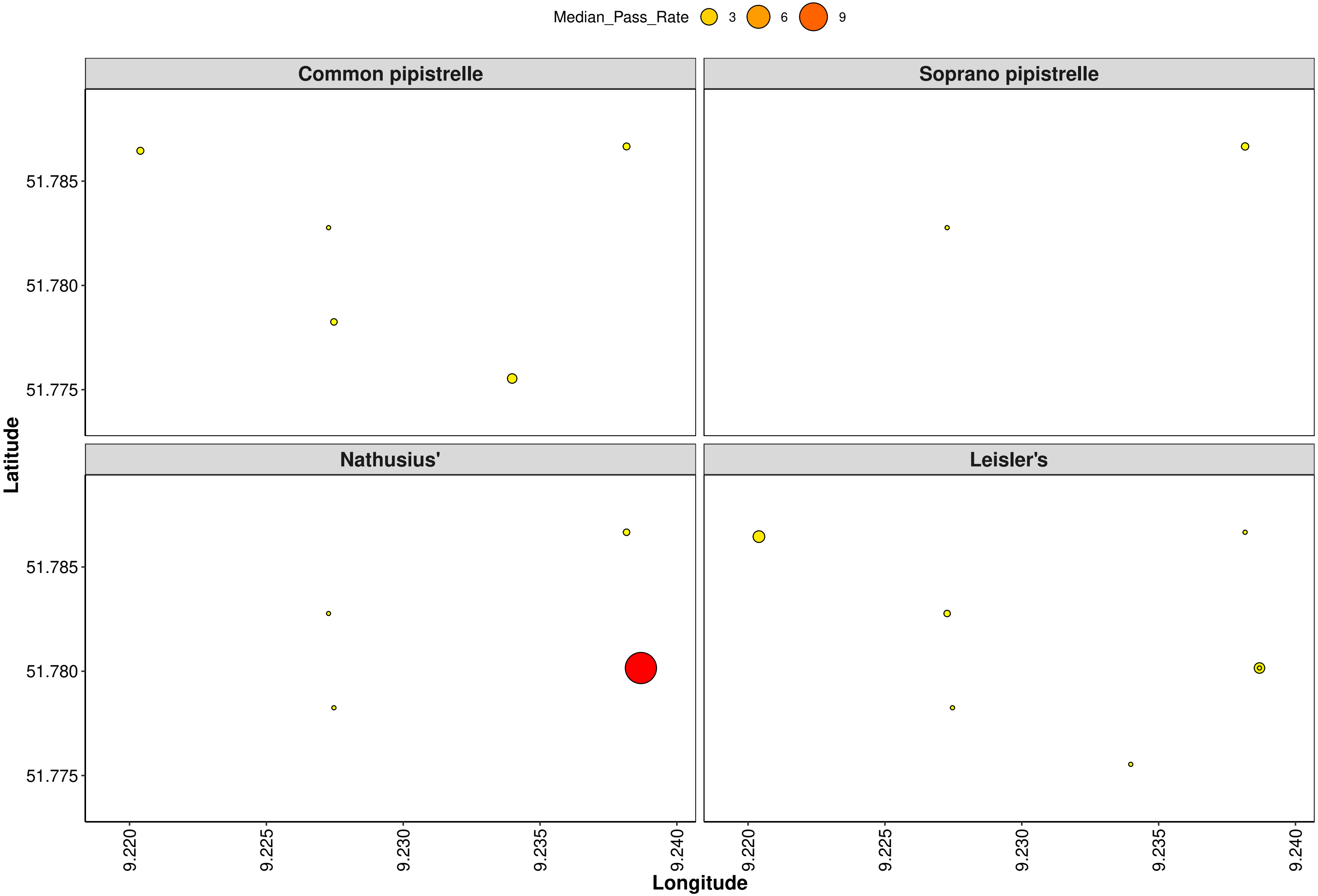
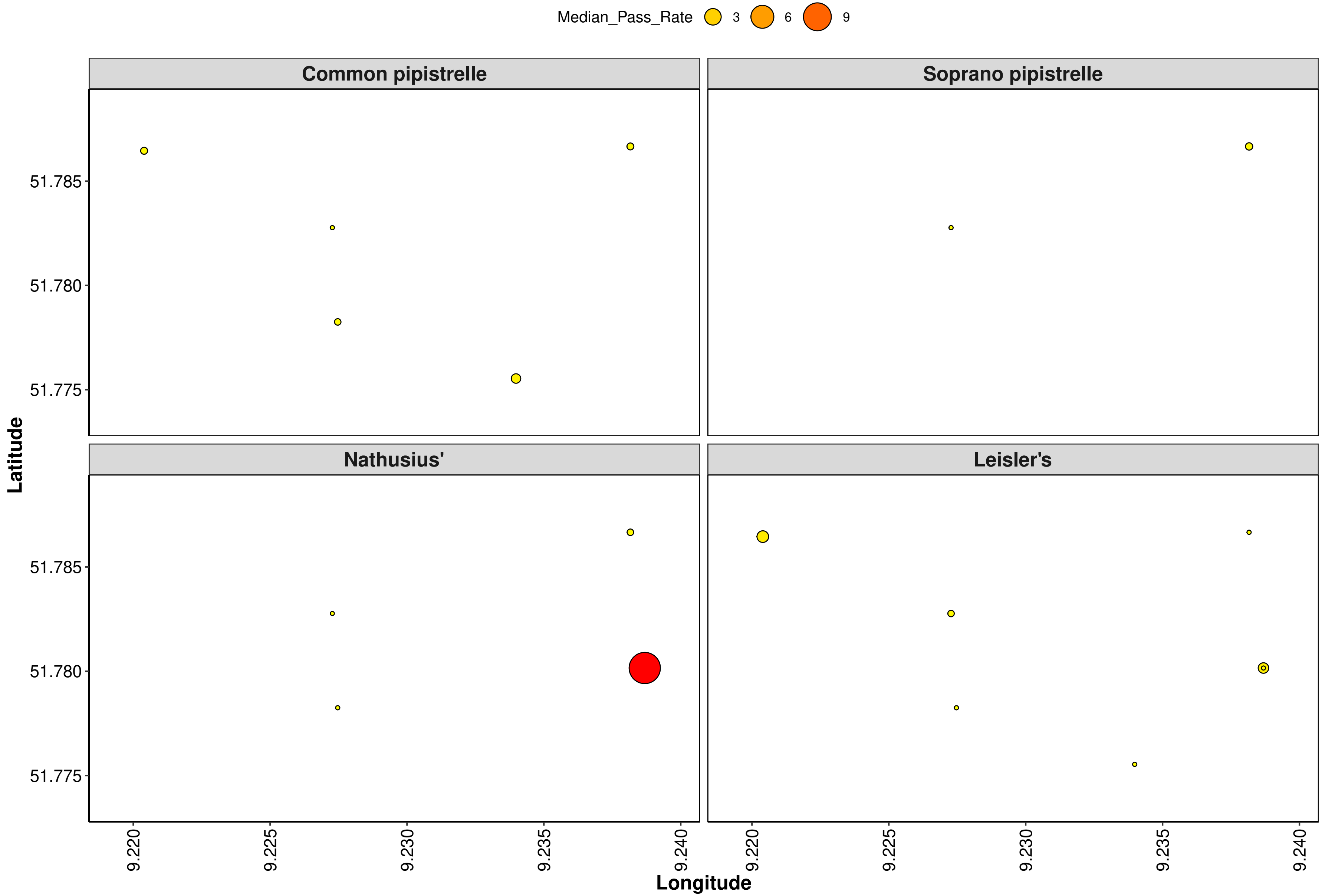

T2_Spring
T4 Spring
T9 Spring
T8 Spring
51.785
51.780
51.775
9.220
9.225
9.230
9.235
9.240
Latitude
Longitude

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

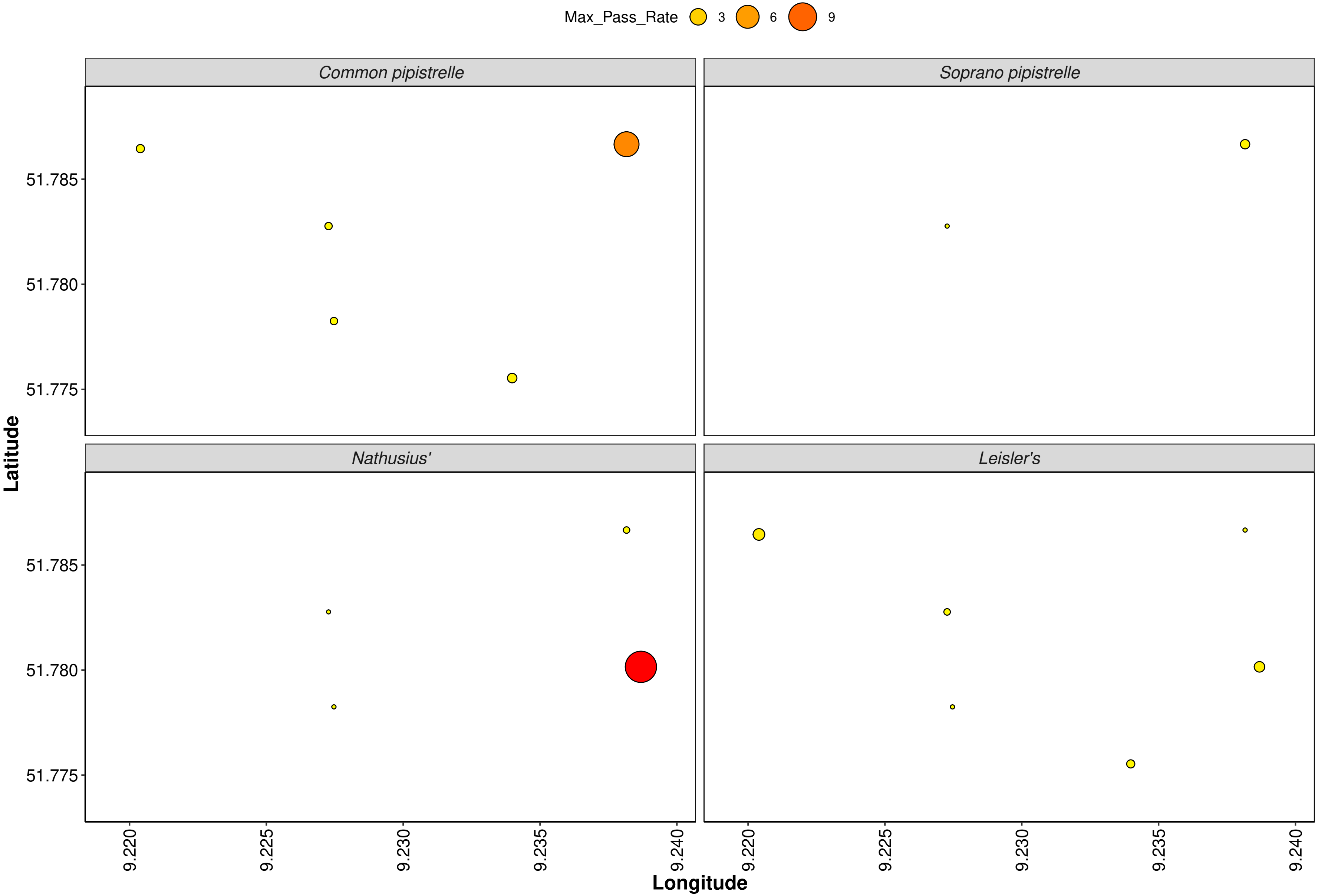


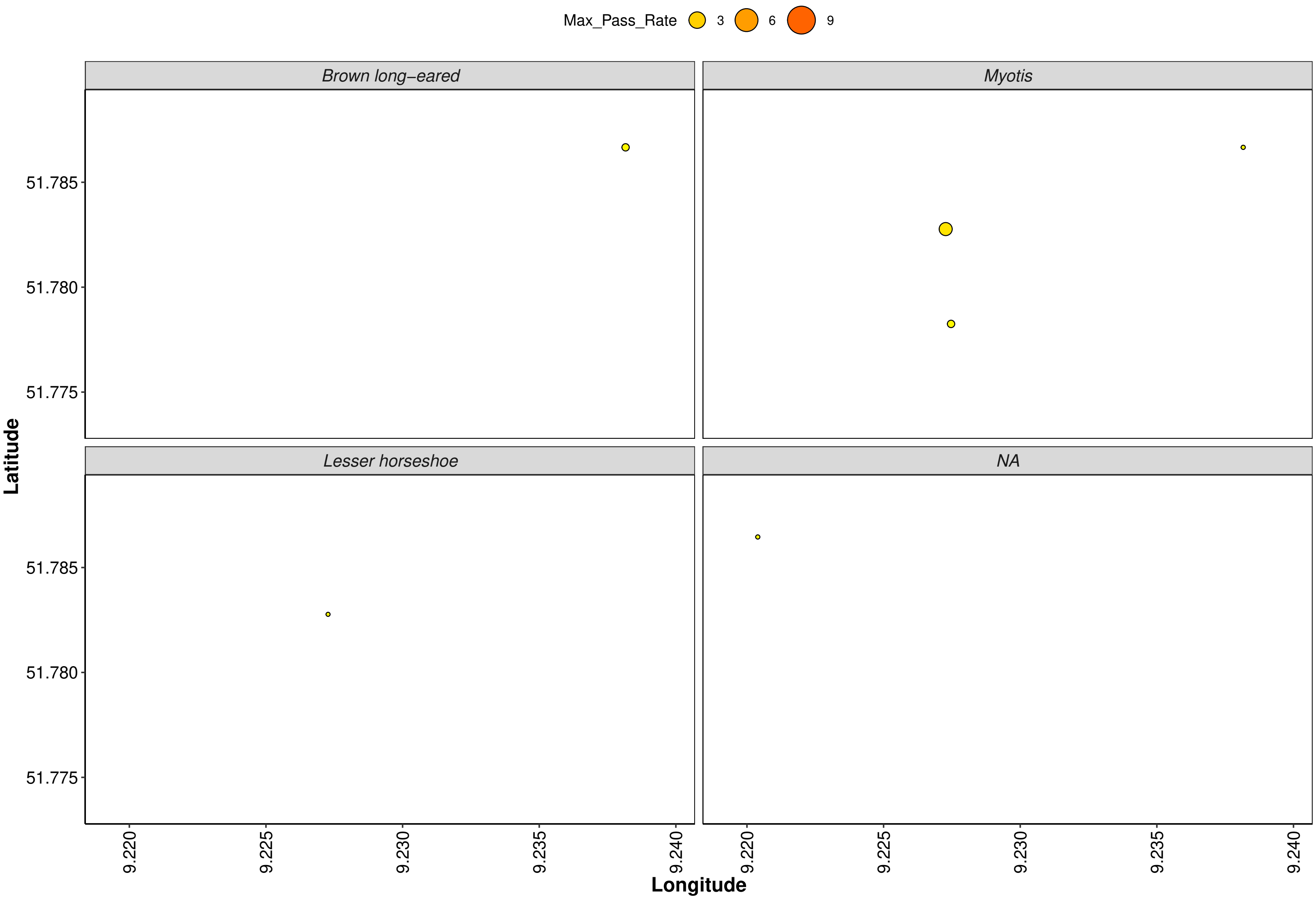
Median_Pass_Rate
3
6
9
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
Longitude
9.220
9.225
9.230
9.235
9.240



Median_Pass_Rate
3
6
9
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
9.220
9.225
9.230
9.235
9.240
Longitude

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


Max_Pass_Rate
3
6
9
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
Longitude
9.220
9.225
9.230
9.235
9.240



Max_Pass_Rate
3
6
9
Brown long−eared
Myotis
Lesser horseshoe
NA
Latitude
51.785
51.780
51.775
51.785
51.780
51.775
9.220
9.225
9.230
9.235
9.240
9.220
9.225
9.230
9.235
9.240
Longitude

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

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

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location	[illegible]	date	species	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
T4 Spring	51.7[illegible]	[illegible]-05-2026	Pipistrellus nathusii	[illegible]	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-17 00:38	2026-05-16 [illegible]8:27	May	2026-05-16 20:10	2026-05-17 [illegible]:52	[illegible]	Nathusius'	18 28 0.12
T3 Spring	51.7[illegible]	[illegible]-05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	NA	NA	NA	NA	NA	NA	NA	NA	NA NA NA	[illegible]	[illegible]	2026-05-23 05:3[illegible]	2026-05-22 [illegible]9:59	May	2026-05-22 20:20	2026-05-23 [illegible]:56	[illegible] -79.0500[illegible]	Leisler's	18 0.12
T4 Spring	51.7[illegible]	[illegible]-05-2026	Rhinolophus hipposideros	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-21 21:1[illegible]	2026-05-21 [illegible]9:06	May	2026-05-21 20:18	2026-05-22 [illegible]:10	[illegible]	Lesser horseshoe	35 50 0.12
T9 Spring	51.7[illegible]	[illegible]-05-2026	Pipistrellus nathusii	[illegible]	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-28 02:2[illegible]	2026-05-27 [illegible]6:40	May	2026-05-27 20:26	2026-05-28 [illegible]5:25	[illegible]	Nathusius'	18 28 0.13
T2_Spring	51.7[illegible]	[illegible]-05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-23 23:0[illegible]	2026-05-23 [illegible]1:28	May	2026-05-23 20:21	2026-05-24 [illegible]9:45	[illegible]	Leisler's	18 0.13
T9 Spring	51.7[illegible]	[illegible]-05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-27 23:0[illegible]	2026-05-27 [illegible]1:40	May	2026-05-27 20:26	2026-05-28 [illegible]5:25	[illegible]	Leisler's	18 0.13
T4 Spring	51.7[illegible]	[illegible]-05-2026	Pipistrellus pygmaeus	30	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-28 22:3[illegible]	2026-05-28 [illegible]1:00	May	2026-05-28 20:28	2026-05-29 [illegible]4:26	[illegible]	Soprano pipistrelle	22 28 0.13
T2_Spring	51.7[illegible]	[illegible]-05-2026	Myotis	7	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-28 01:4[illegible]	2026-05-27 [illegible]2:42	May	2026-05-27 20:26	2026-05-28 [illegible]5:25	[illegible]	Myotis	30 70 0.13

location	lat lon name	date	species	passes	activity	...																				max	Pass	names Rate
T7 Spring	51.78249396	29-05-2026	PIPPYG	1	100 Exceptional	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-29 22:24:58	2026-05-29 22:24:56	May	2026-05-29 20:29:19	2026-05-30 04:13:30	-7.7346349183316557694446	44	NA	NA NA 0.13
T2_Spring	51.78633871-60	27-05-2026	Pipistrellus nathusii	3	5 Low	Pass 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-27 21:28:32	2026-05-27 21:28:34	May	2026-05-27 20:26:49	2026-05-28 04:15:25	-8.1406801.7506850978733	33	Nathusius’	18 28 0.38
T4 Spring	51.78227272	29-05-2026	Nyctalus leisleri	3	40 Low	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-29 00:53:05	2026-05-28 23:52	May	2026-05-28 20:28:01	2026-05-29 04:54:26	-7.742562550783548374277	78	Leisler’s	8 18 0.39
T2_Spring	51.78633871-60	23-05-2026	Plecotus auritus	4	100 Exceptional	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-23 02:20:42	2026-05-22 20:41	May	2026-05-22 20:20:40	2026-05-23 04:20:56	-8.0148339315863092167	67	Brown long-eared	40 60 0.50
T4 Spring	51.78227272	28-05-2026	Pipistrellus pipistrellus	4	27 Low	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-28 21:47:56	2026-05-28 21:47:56	May	2026-05-28 20:28:01	2026-05-29 04:54:26	-7.742567058533080413666	67	Common pipistrelle	22 32 0.51
T9 Spring	51.97828468	28-05-2026	Pipistrellus pipistrellus	4	27 Low	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-28 22:59:33	2026-05-28 22:59:33	May	2026-05-28 20:28:01	2026-05-29 04:54:26	-7.74250510428753244055	56	Common pipistrelle	22 32 0.51
T9 Spring	51.97828468	28-05-2026	Myotis	4	31 Low	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-28 01:21:42	2026-05-27 23:44	May	2026-05-27 20:26:49	2026-05-28 04:15:25	-8.1406806917698386513	89	Myotis	30 70 0.51
T5 Spring	51.78240396	19-05-2026	Nyctalus leisleri	5	60 Moderate	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-19 21:18:32	2026-05-19 21:18:32	May	2026-05-19 20:16:42	2026-05-20 04:14:44	-8.1498692.7506200750833	33	Leisler’s	8 18 0.61
T8 Spring	51.97553981	28-05-2026	Nyctalus leisleri	5	60 Moderate	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	Gostrougha	2026-05-28 22:27:19	2026-05-28 22:27:19	May	2026-05-28 20:28:01	2026-05-29 04:54:26	-7.7425065092313385722276	78	Leisler’s	8 18 0.64

location	lat	lon	date	species	species_score	activity	detection_type	recorder	model	col	col	col	col	col	col	col	col	id_method	software	col	timestamps			sunset	sunrise	values	common_name	col	col	col
T7 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Pipistrellus pipistrellus	80	Low	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-29 23:22:41	[illegible]	[illegible]	2026-05-29 20:[illegible]	2026-05-30 [illegible]3:30	-7.[illegible]44	Common pipistrelle	22	32	0.65
T2_Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Pipistrellus pygmaeus	100	Excellent	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-23 00:0[illegible]	2026-05-22 [illegible]9:02	[illegible]	2026-05-22 20:[illegible]	2026-05-23 [illegible]0:56	-8.0[illegible]33	Soprano pipistrelle	22	28	0.87
T8 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Pipistrellus pipistrellus	86	Low	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-28 23:0[illegible]	2026-05-28 [illegible]3:24	[illegible]	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]39	Common pipistrelle	22	32	0.90
T1 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Nyctalus leisleri	78	Moderate	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-24 03:[illegible]	2026-05-23 [illegible]1:02	[illegible]	2026-05-23 20:[illegible]	2026-05-24 [illegible]9:45	-9.7[illegible]11	Leisler's	8	18	1.13
T7 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Nyctalus leisleri	100	Excellent	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-29 00:1[illegible]	2026-05-28 [illegible]1:51	[illegible]	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]56	Leisler's	8	18	1.42
T4 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Myotis	14	100 Excellent	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-30 23:1[illegible]	2026-05-30 [illegible]0:28	[illegible]	2026-05-30 20:3[illegible]	2026-05-31 [illegible]2:37	-7.70[illegible]33	Myotis	30	70	1.82
T2_Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Pipistrellus pipistrellus	57	100 Excellent	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-23 22:1[illegible]	2026-05-23 [illegible]8:53	[illegible]	2026-05-23 20:[illegible]	2026-05-24 [illegible]9:45	-9.7[illegible]44	Common pipistrelle	22	32	7.15
T1 Spring	51.7[illegible]	[illegible]	[illegible]-05-2026	Pipistrellus nathusii	91	100 Excellent	Passive 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-24 02:4[illegible]	2026-05-23 [illegible]8:33	[illegible]	2026-05-23 20:[illegible]	2026-05-24 [illegible]9:45	-9.7[illegible]00	Nathusius'	18	28	11.42

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.

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T4 Spring	[illegible]	05-2026	Pipistrellus nathusii	[illegible]	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Nathusius'	[illegible]	0.12
T3 Spring	[illegible]	05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-4 Mini_Bat	NA	NA	NA	NA	NA	NA	NA	NA	NA NA	[illegible]	[illegible]	Leisler's	[illegible]	0.12
T4 Spring	[illegible]	05-2026	Rhinolophus hipposideros	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Lesser horseshoe	35 50	0.12
T9 Spring	[illegible]	05-2026	Pipistrellus nathusii	[illegible]	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Nathusius'	[illegible]	0.13
T2_Spring	[illegible]	05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Leisler's	[illegible]	0.13
T9 Spring	[illegible]	05-2026	Nyctalus leisleri	24	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Leisler's	[illegible]	0.13
T4 Spring	[illegible]	05-2026	Pipistrellus pygmaeus	30	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Soprano pipistrelle	[illegible]	0.13
T2_Spring	[illegible]	05-2026	Myotis	7	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID Kaleidoscope	[illegible]	[illegible]	Myotis	30 70	0.13

location	lat / lon	date	species	passes	activity	type	manufacturer	model									method	software / classifier	analysis / night / times		night	sunset / sunrise		score / values	common name	min	max	Rate
T7 Spring	51.7[illegible]	[illegible] 05-2026	PIPPYG	100	Exceptional	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 22:2[illegible]	2026-05-29 [illegible] / 2026-05-29 [illegible]4:56	May	2026-05-29 20:[illegible]	2026-05-30 [illegible]3:30	-7.[illegible]44	NA	NA	NA	0.13
T2_Spring	51.7[illegible]	[illegible] 05-2026	Pipistrellus nathusii	3	Low	Passive 1s	Wildlife Acoustics	SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 21:2[illegible]	2026-05-27 [illegible] / 2026-05-27 [illegible]8:34	May	2026-05-27 20:[illegible]	2026-05-28 [illegible]5:25	-7.8[illegible]33	Nathusius'	18	28	0.38
T4 Spring	51.7[illegible]	[illegible] 05-2026	Nyctalus leisleri	3	40	Low	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 00:5[illegible]	2026-05-29 [illegible] / 2026-05-28 [illegible]3:52	May	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]78	Leisler's	8	18	0.39
T2_Spring	51.7[illegible]	[illegible] 05-2026	Plecotus auritus	4	100	Exceptional	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 02:2[illegible]	2026-05-23 [illegible] / 2026-05-22 [illegible]0:41	May	2026-05-22 20:[illegible]	2026-05-23 [illegible]0:56	-8.0[illegible]67	Brown long-eared	40	60	0.50
T4 Spring	51.7[illegible]	[illegible] 05-2026	Pipistrellus pipistrellus	4	27	Low	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 21:4[illegible]	2026-05-28 [illegible] / 2026-05-28 [illegible]7:56	May	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]67	Common pipistrelle	22	32	0.51
T9 Spring	51.7[illegible]	[illegible] 05-2026	Pipistrellus pipistrellus	4	27	Low	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 22:5[illegible]	2026-05-28 [illegible] / 2026-05-28 [illegible]9:33	May	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]56	Common pipistrelle	22	32	0.51
T9 Spring	51.7[illegible]	[illegible] 05-2026	Myotis	4	31	Low	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 01:2[illegible]	2026-05-28 [illegible] / 2026-05-27 [illegible]3:44	May	2026-05-27 20:[illegible]	2026-05-28 [illegible]5:25	-7.8[illegible]89	Myotis	30	70	0.51
T5 Spring	51.7[illegible]	[illegible] 05-2026	Nyctalus leisleri	5	60	Moderate	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 21:1[illegible]	2026-05-19 [illegible] / 2026-05-19 [illegible]8:32	May	2026-05-19 20:1[illegible]	2026-05-20 [illegible]4:44	-8.1[illegible]33	Leisler's	8	18	0.61
T8 Spring	51.7[illegible]	[illegible] 05-2026	Nyctalus leisleri	5	60	Moderate	Passive 1s	Wildlife Acoustics SM-Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope [illegible]	[illegible] 05-2026 22:2[illegible]	2026-05-28 [illegible] / 2026-05-28 [illegible]7:19	May	2026-05-28 20:[illegible]	2026-05-29 [illegible]4:26	-7.7[illegible]78	Leisler's	8	18	0.64

location	[illegible]	date	species	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Rate
T7 Spring	51.7[illegible]	2026-05-29	Pipistrellus pipistrellus	5	30	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-29 23:22[illegible]	2026-05-29 [illegible]	2026-05-29 [illegible]:41	May	2026-05-29 20:29[illegible]	2026-05-30 04:19[illegible]3:30	-7.34[illegible]	[illegible]44	Common pipistrelle	22 32	0.65
T2_Spring	51.7[illegible]	2026-05-23	Pipistrellus pygmaeus	7	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-23 00:09[illegible]	2026-05-22 [illegible]	2026-05-22 [illegible]9:02	May	2026-05-22 20:20[illegible]	2026-05-23 04:0[illegible]0:56	-8.01[illegible]	[illegible]33	Soprano pipistrelle	22 28	0.87
T8 Spring	51.7[illegible]	2026-05-28	Pipistrellus pipistrellus	7	36	Low	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-28 23:03[illegible]	2026-05-28 [illegible]	2026-05-28 [illegible]3:24	May	2026-05-28 20:28[illegible]	2026-05-29 04:0[illegible]4:26	-7.74[illegible]	[illegible]39	Common pipistrelle	22 32	0.90
T1 Spring	51.7[illegible]	2026-05-24	Nyctalus leisleri	9	78	Moderate	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-24 03:20[illegible]	2026-05-23 [illegible]	2026-05-23 [illegible]1:02	May	2026-05-23 20:20[illegible]	2026-05-24 04:3[illegible]9:45	-9.74[illegible]	[illegible]11	Leisler's	8 18	1.13
T7 Spring	51.7[illegible]	2026-05-29	Nyctalus leisleri	11	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-29 00:10[illegible]	2026-05-28 [illegible]	2026-05-28 [illegible]1:51	May	2026-05-28 20:28[illegible]	2026-05-29 04:0[illegible]4:26	-7.74[illegible]	[illegible]56	Leisler's	8 18	1.42
T4 Spring	51.7[illegible]	2026-05-30	Myotis	14	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-30 23:1[illegible]	2026-05-30 [illegible]	2026-05-30 [illegible]0:28	May	2026-05-30 20:30[illegible]	2026-05-31 04:3[illegible]2:37	-7.04[illegible]	[illegible]33	Myotis	30 70	1.82
T2_Spring	51.7[illegible]	2026-05-23	Pipistrellus pipistrellus	57	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-23 22:1[illegible]	2026-05-23 [illegible]	2026-05-23 [illegible]8:53	May	2026-05-23 20:20[illegible]	2026-05-24 04:3[illegible]9:45	-9.74[illegible]	[illegible]44	Common pipistrelle	22 32	7.15
T1 Spring	51.7[illegible]	2026-05-24	Pipistrellus nathusii	91	100	Exceptional	Pass 1s	Wildlife Acoustics	SM-3 Mini_Bat	no	no	None	None	None	None	15	NA	AutoID	Kaleidoscope	[illegible]	2026-05-24 02:48[illegible]	2026-05-23 [illegible]	2026-05-23 [illegible]8:33	May	2026-05-23 20:20[illegible]	2026-05-24 04:3[illegible]9:45	-9.74[illegible]	[illegible]00	Nathusius'	18 28	11.42

Per Detector

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

```
Error:
! object 'df_zero' not found
```

Survey Effort

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

month	Detector ID	No. of Survey Nights
May	T1 Spring	1
May	T2_Spring	10
May	T3 Spring	1
May	T4 Spring	8
May	T5 Spring	1
May	T7 Spring	4
May	T8 Spring	3
May	T9 Spring	3
Jun	T4 Spring	1

Nighlty 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

```
Error:
! object 'df_zero' not found
```

month	Detector ID	No. of Survey Nights
May	T1 Spring	1
May	T2_Spring	10
May	T3 Spring	1
May	T4 Spring	8
May	T5 Spring	1
May	T7 Spring	4
May	T8 Spring	3
May	T9 Spring	3
Jun	T4 Spring	1

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.

```
Error:
! object 'df_zero' not found
```

month	Detector ID	No. of Survey Nights
May	T1 Spring	1
May	T2_Spring	10
May	T3 Spring	1
May	T4 Spring	8
May	T5 Spring	1
May	T7 Spring	4
May	T8 Spring	3
May	T9 Spring	3
Jun	T4 Spring	1

Per Detector

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

```
Error:
! object 'df_zero' not found
```

Bat Activity per Detector Location

Figure 18. Detector ID reference:

```
Error:
! object 'df_zero' not found
```

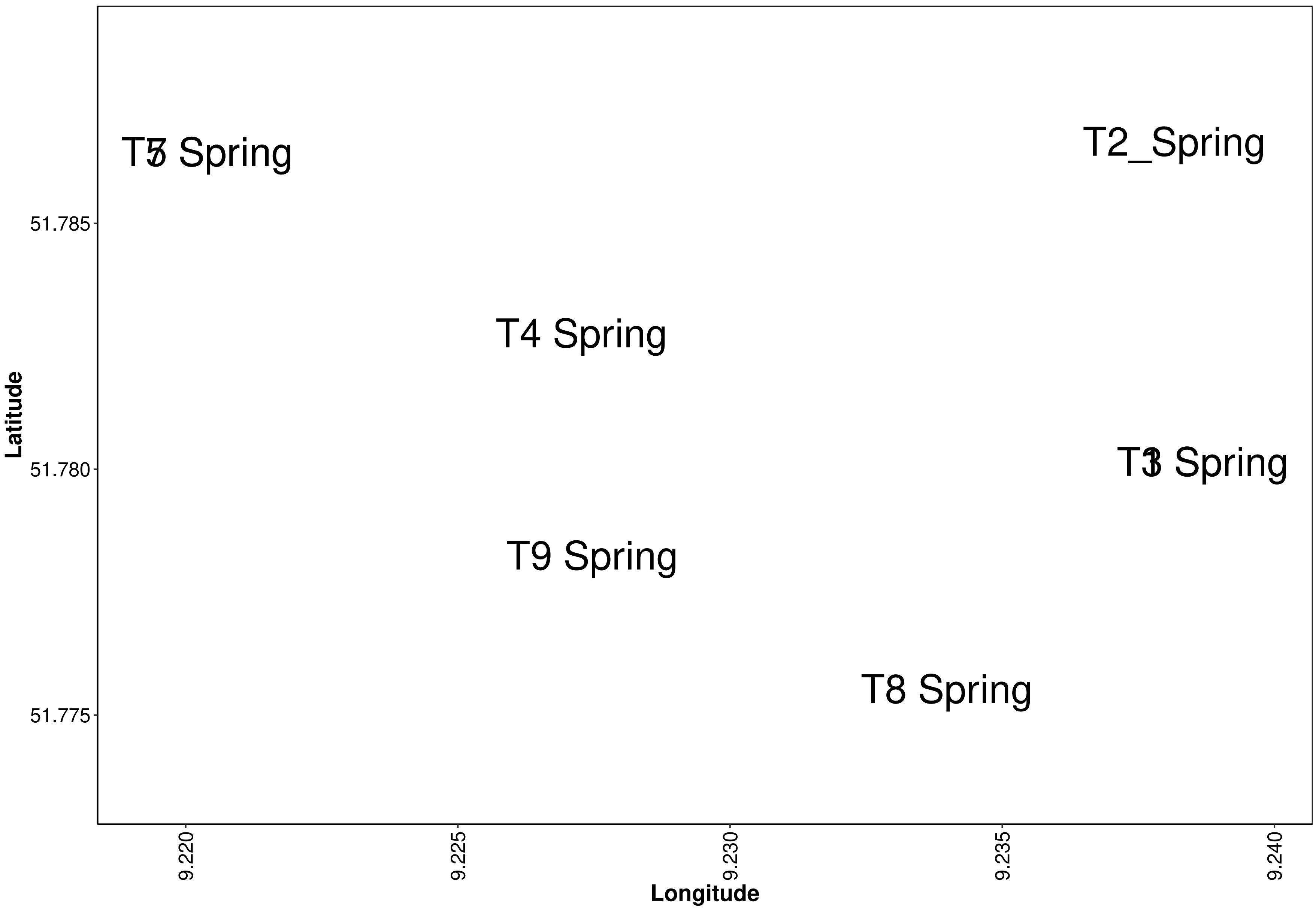

T5
T7 Spring
T2_Spring
T4 Spring
T3
T1 Spring
T9 Spring
T8 Spring
51.785
51.780
51.775
Latitude
9.220
9.225
9.230
9.235
9.240
Longitude

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

```
Error:
! object 'df_zero' not found
```

```
Error in `combine_vars()`:
! At least one layer must contain all faceting variables:
  `species_common_names`
x Plot is missing `species_common_names`
x Layer 1 is missing `species_common_names`
```

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

```
Error:
! object 'df_zero' not found
```

```
Error in `combine_vars()`:
! At least one layer must contain all faceting variables:
  `species_common_names`
x Plot is missing `species_common_names`
x Layer 1 is missing `species_common_names`
```

Thank you for using Ecobat!

Ecobat Report
2026-07-30

Geo filter: region, Time filter: +- 1 month

Summary

Bats were detected on **27** nights between **02/07/2026** and **28/07/2026**, using **8** static bat detectors. Throughout this period, **7** species were recorded. **Table 1.**
Detectors were placed at the following locations:

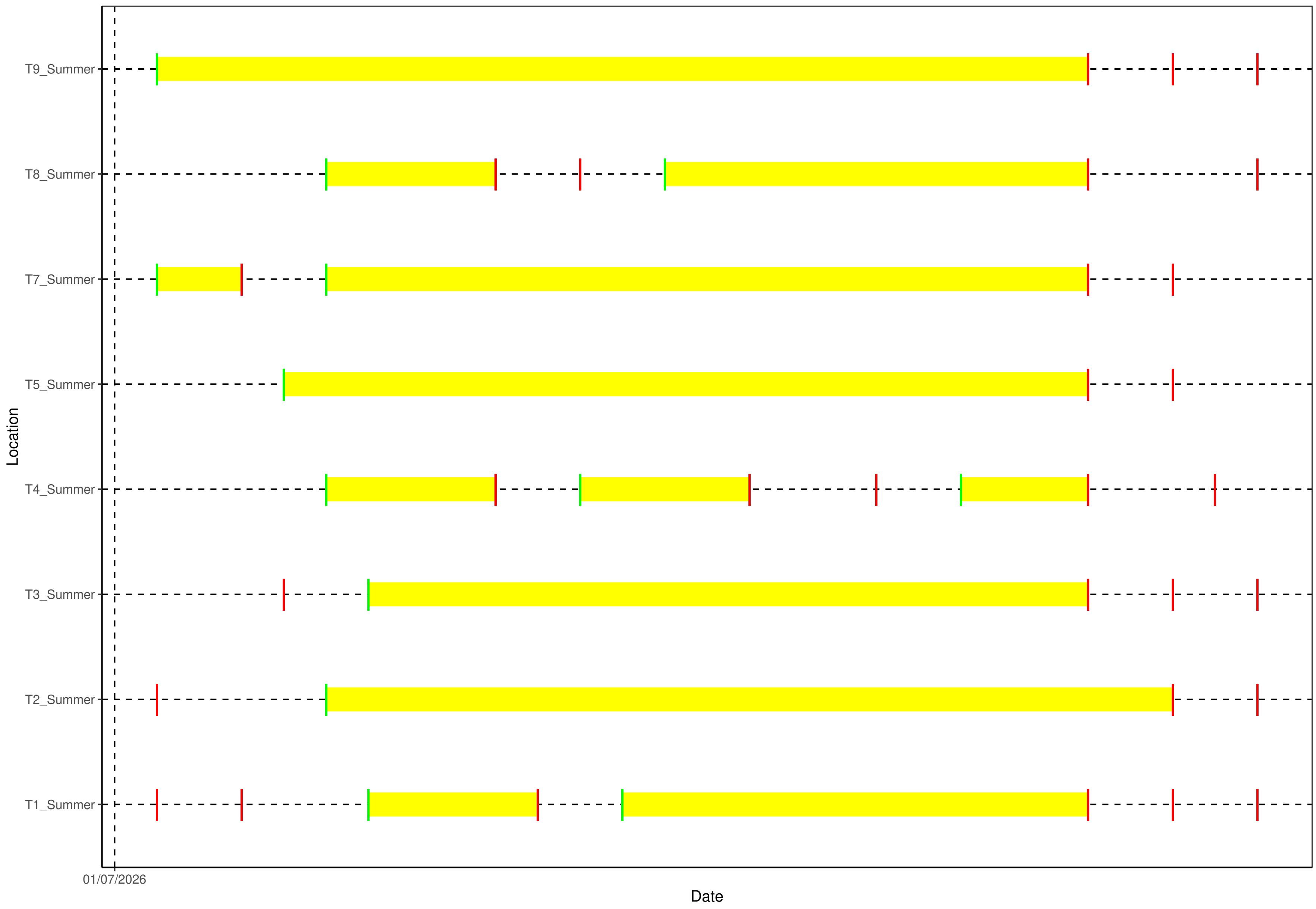
Detector ID	Latitude	Longitude
T1_Summer	51.78444	9.248440
T2_Summer	51.78667	9.238160
T3_Summer	51.78016	9.238685
T4_Summer	51.78277	9.227272
T5_Summer	51.78646	9.220396
T7_Summer	51.78646	9.220396
T8_Summer	51.77554	9.233981
T9_Summer	51.77825	9.227468

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
T1_Summer	21
T2_Summer	23
T3_Summer	21
T4_Summer	17
T5_Summer	23
T7_Summer	25
T8_Summer	18
T9_Summer	25

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


T9_Summer
T8_Summer
T7_Summer
T5_Summer
T4_Summer
T3_Summer
T2_Summer
T1_Summer
Location
01/07/2026
Date

Part 1: Percentile 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.

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 Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T1_Summer	Myotis	0	0	0	5	0	0
T1_Summer	Nyctalus leisleri	0	0	0	2	1	16
T1_Summer	Pipistrellus nathusii	0	0	1	0	0	0
T1_Summer	Pipistrellus pipistrellus	1	0	0	0	2	7
T1_Summer	Pipistrellus pygmaeus	1	0	0	0	2	1
T1_Summer	Plecotus auritus	0	0	0	0	3	3
T2_Summer	Myotis	0	0	0	3	0	0
T2_Summer	Nyctalus leisleri	0	0	4	0	7	11
T2_Summer	Pipistrellus nathusii	0	0	1	0	0	0
T2_Summer	Pipistrellus pipistrellus	0	0	0	0	0	11
T2_Summer	Pipistrellus pygmaeus	0	0	0	0	0	4
T2_Summer	Plecotus auritus	0	0	0	1	5	5
T3_Summer	Myotis	0	1	1	4	0	0
T3_Summer	Nyctalus leisleri	0	0	2	3	4	10
T3_Summer	Pipistrellus nathusii	0	0	1	0	0	0
T3_Summer	Pipistrellus pipistrellus	0	0	0	0	3	5
T3_Summer	Pipistrellus pygmaeus	0	0	0	0	2	5
T3_Summer	Plecotus auritus	0	1	2	4	7	1
T4_Summer	Myotis	0	1	2	5	0	0
T4_Summer	Nyctalus leisleri	0	0	0	0	1	11

Detector ID	Species/Species Group	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T4_Summer	Pipistrellus nathusii	0	0	1	0	0	0
T4_Summer	Pipistrellus pipistrellus	0	0	0	0	0	8
T4_Summer	Pipistrellus pygmaeus	0	0	0	0	0	3
T4_Summer	Plecotus auritus	0	0	0	0	0	3
T5_Summer	Myotis	1	1	3	1	0	0
T5_Summer	Nyctalus leisleri	0	0	1	4	8	7
T5_Summer	Pipistrellus nathusii	1	0	0	0	0	0
T5_Summer	Pipistrellus pipistrellus	0	0	2	3	0	6
T5_Summer	Pipistrellus pygmaeus	0	0	1	2	2	4
T5_Summer	Plecotus auritus	1	3	4	2	6	2
T7_Summer	Myotis	1	1	9	3	0	0
T7_Summer	Nyctalus leisleri	0	0	2	4	9	9
T7_Summer	Pipistrellus nathusii	1	0	0	0	0	1
T7_Summer	Pipistrellus pipistrellus	0	0	2	3	0	11
T7_Summer	Pipistrellus pygmaeus	0	0	2	0	1	6
T7_Summer	Plecotus auritus	2	4	5	2	7	0
T8_Summer	Myotis	0	0	1	2	0	0
T8_Summer	Nyctalus leisleri	2	1	1	1	3	7
T8_Summer	Pipistrellus nathusii	0	0	1	0	0	0
T8_Summer	Pipistrellus pipistrellus	0	0	0	0	3	8
T8_Summer	Pipistrellus pygmaeus	0	0	0	0	0	5
T8_Summer	Plecotus auritus	0	0	0	0	3	3

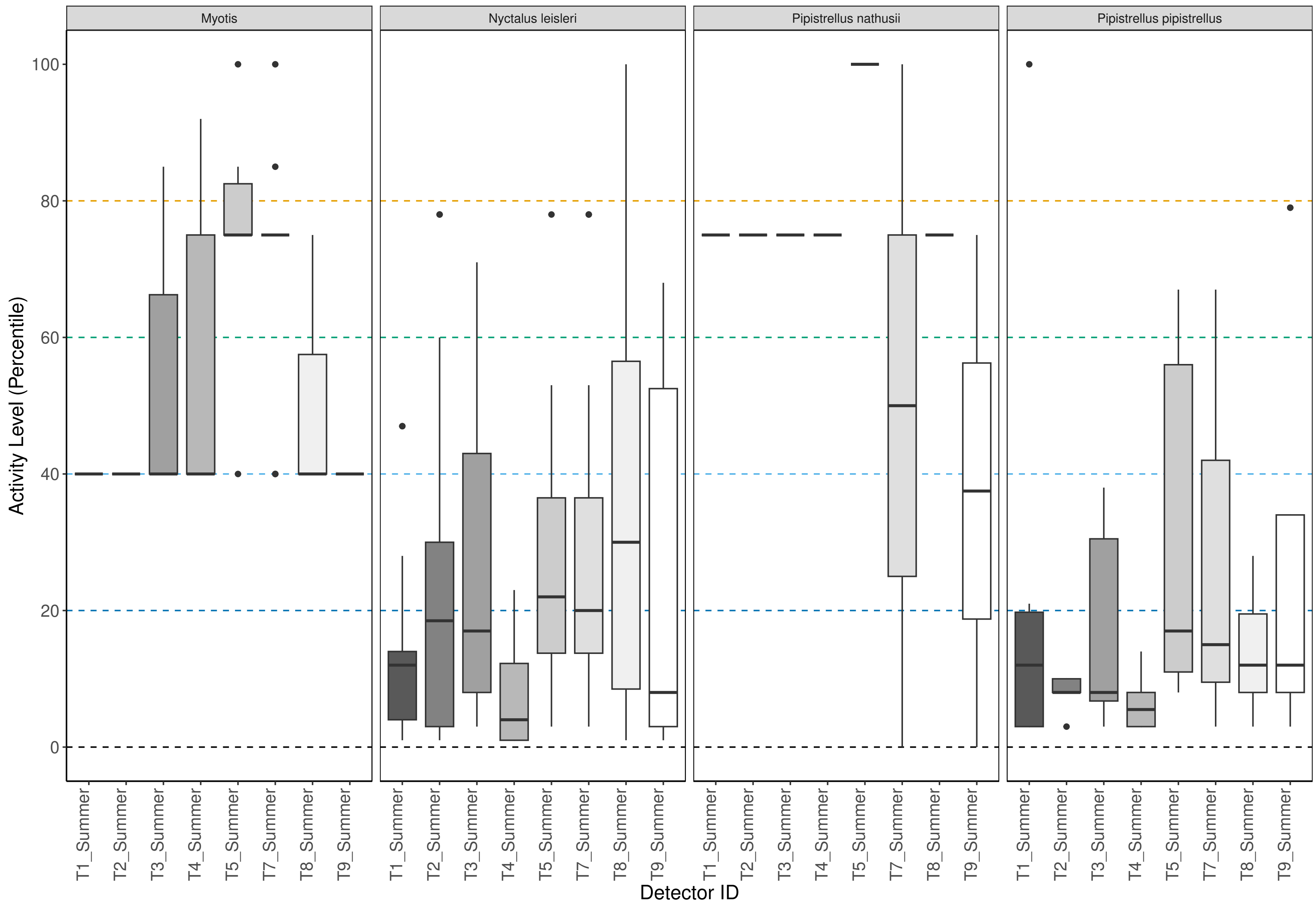
Detector ID	Species/Species Group	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T8_Summer	Rhinolophus hipposideros	1	0	0	0	0	0
T9_Summer	Myotis	0	0	0	4	0	0
T9_Summer	Nyctalus leisleri	0	0	4	3	4	12
T9_Summer	Pipistrellus nathusii	0	0	1	0	0	1
T9_Summer	Pipistrellus pipistrellus	0	0	2	0	2	6
T9_Summer	Pipistrellus pygmaeus	0	0	0	2	2	3
T9_Summer	Plecotus auritus	0	0	0	1	6	2

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
T1_Summer	Myotis	40	40 - 40	40	5	76
T1_Summer	Nyctalus leisleri	12	7.5 - 18.5	47	19	1792
T1_Summer	Pipistrellus nathusii	75	0	75	1	699
T1_Summer	Pipistrellus pipistrellus	12	3 - 51.5	100	10	897
T1_Summer	Pipistrellus pygmaeus	22	14.5 - 61	100	4	270
T1_Summer	Plecotus auritus	16	8 - 23	35	6	264
T2_Summer	Myotis	40	40 - 40	40	3	76
T2_Summer	Nyctalus leisleri	19	11.5 - 36	78	22	1792
T2_Summer	Pipistrellus nathusii	75	0	75	1	699
T2_Summer	Pipistrellus pipistrellus	8	6.5 - 9	10	11	897
T2_Summer	Pipistrellus pygmaeus	7	7 - 7	7	4	270
T2_Summer	Plecotus auritus	23	8 - 26.5	45	11	264
T3_Summer	Myotis	40	40 - 62.5	85	6	76
T3_Summer	Nyctalus leisleri	17	12.5 - 39.5	71	19	1792
T3_Summer	Pipistrellus nathusii	75	0	75	1	699
T3_Summer	Pipistrellus pipistrellus	8	5.5 - 33	38	8	897
T3_Summer	Pipistrellus pygmaeus	17	7 - 23.5	30	7	270
T3_Summer	Plecotus auritus	35	26 - 56	91	15	264
T4_Summer	Myotis	40	40 - 66	92	8	76
T4_Summer	Nyctalus leisleri	4	2 - 12	23	12	1792
T4_Summer	Pipistrellus nathusii	75	0	75	1	699
T4_Summer	Pipistrellus pipistrellus	6	3 - 8.5	14	8	897
T4_Summer	Pipistrellus pygmaeus	7	7 - 7	7	3	270
T4_Summer	Plecotus auritus	8	8 - 8	8	3	264
T5_Summer	Myotis	75	57.5 - 87.5	100	6	76
T5_Summer	Nyctalus leisleri	22	17.5 - 35	78	20	1792
T5_Summer	Pipistrellus nathusii	100	0	100	1	699
T5_Summer	Pipistrellus pipistrellus	17	11 - 54.5	67	11	897
T5_Summer	Pipistrellus pygmaeus	30	10.5 - 41	61	9	270
T5_Summer	Plecotus auritus	48	34 - 65	100	18	264
T7_Summer	Myotis	75	57.5 - 75	100	14	76
T7_Summer	Nyctalus leisleri	20	16.5 - 34.5	78	24	1792
T7_Summer	Pipistrellus nathusii	50	50 - 50	100	2	699

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
T7_Summer	Pipistrellus pipistrellus	15	11 - 37.5	67	16	897
T7_Summer	Pipistrellus pygmaeus	14	10.5 - 37.5	61	9	270
T7_Summer	Plecotus auritus	67	46.5 - 74	100	20	264
T8_Summer	Myotis	40	40 - 40	75	3	76
T8_Summer	Nyctalus leisleri	30	15.5 - 56.5	100	15	1792
T8_Summer	Pipistrellus nathusii	75	0	75	1	699
T8_Summer	Pipistrellus pipistrellus	12	7.5 - 19.5	28	11	897
T8_Summer	Pipistrellus pygmaeus	14	7 - 17	17	5	270
T8_Summer	Plecotus auritus	16	8 - 23	29	6	264
T8_Summer	Rhinolophus hipposideros	100	0	100	1	1
T9_Summer	Myotis	40	40 - 40	40	4	76
T9_Summer	Nyctalus leisleri	8	5.5 - 35.5	68	23	1792
T9_Summer	Pipistrellus nathusii	38	37.5 - 37.5	75	2	699
T9_Summer	Pipistrellus pipistrellus	12	7.5 - 45.5	79	10	897
T9_Summer	Pipistrellus pygmaeus	20	14 - 34.5	49	7	270
T9_Summer	Plecotus auritus	23	15.5 - 35	45	9	264

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


Myotis
Nyctalus leisleri
Pipistrellus nathusii
Pipistrellus pipistrellus
Activity Level (Percentile)
100
80
60
40
20
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

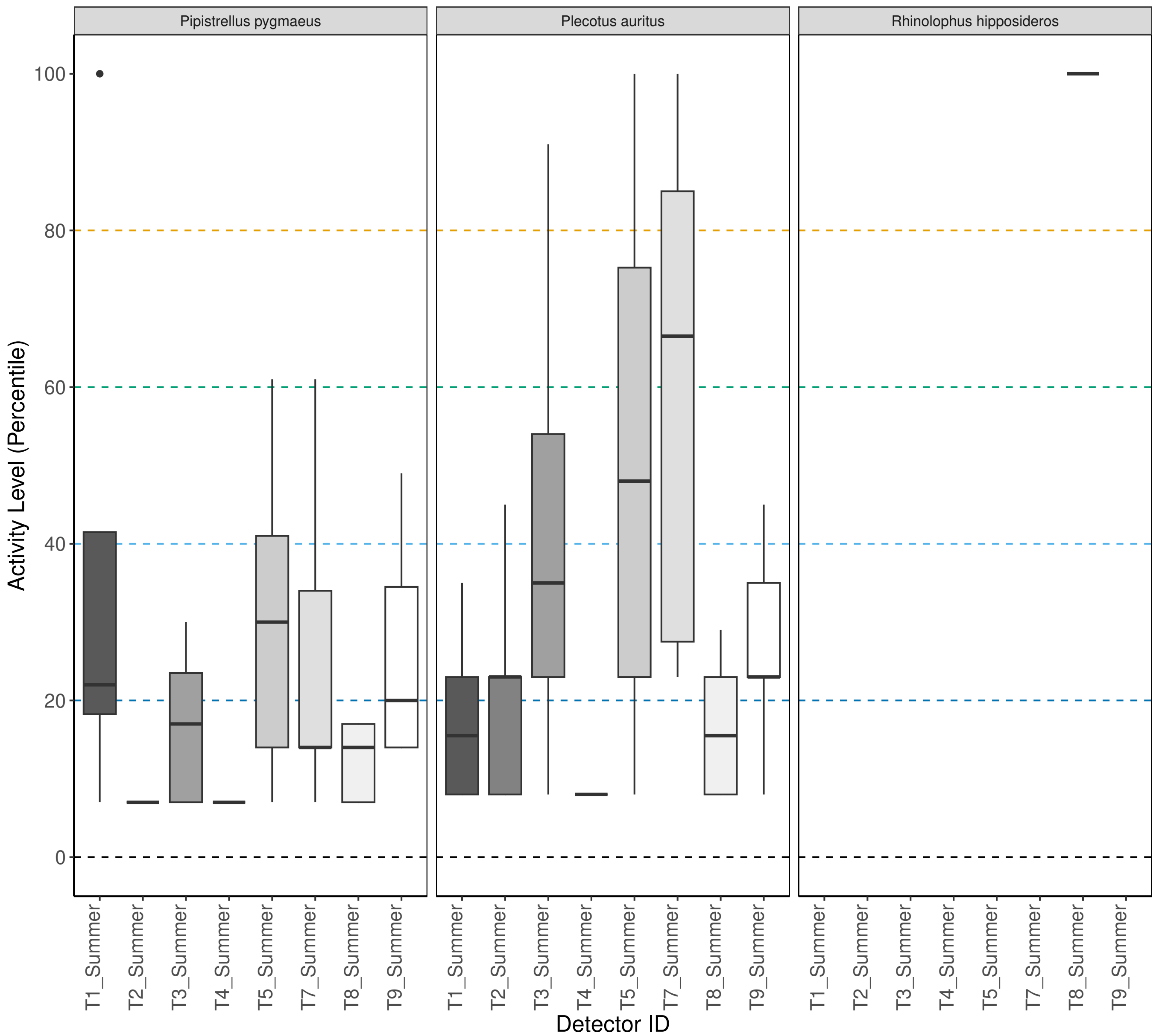
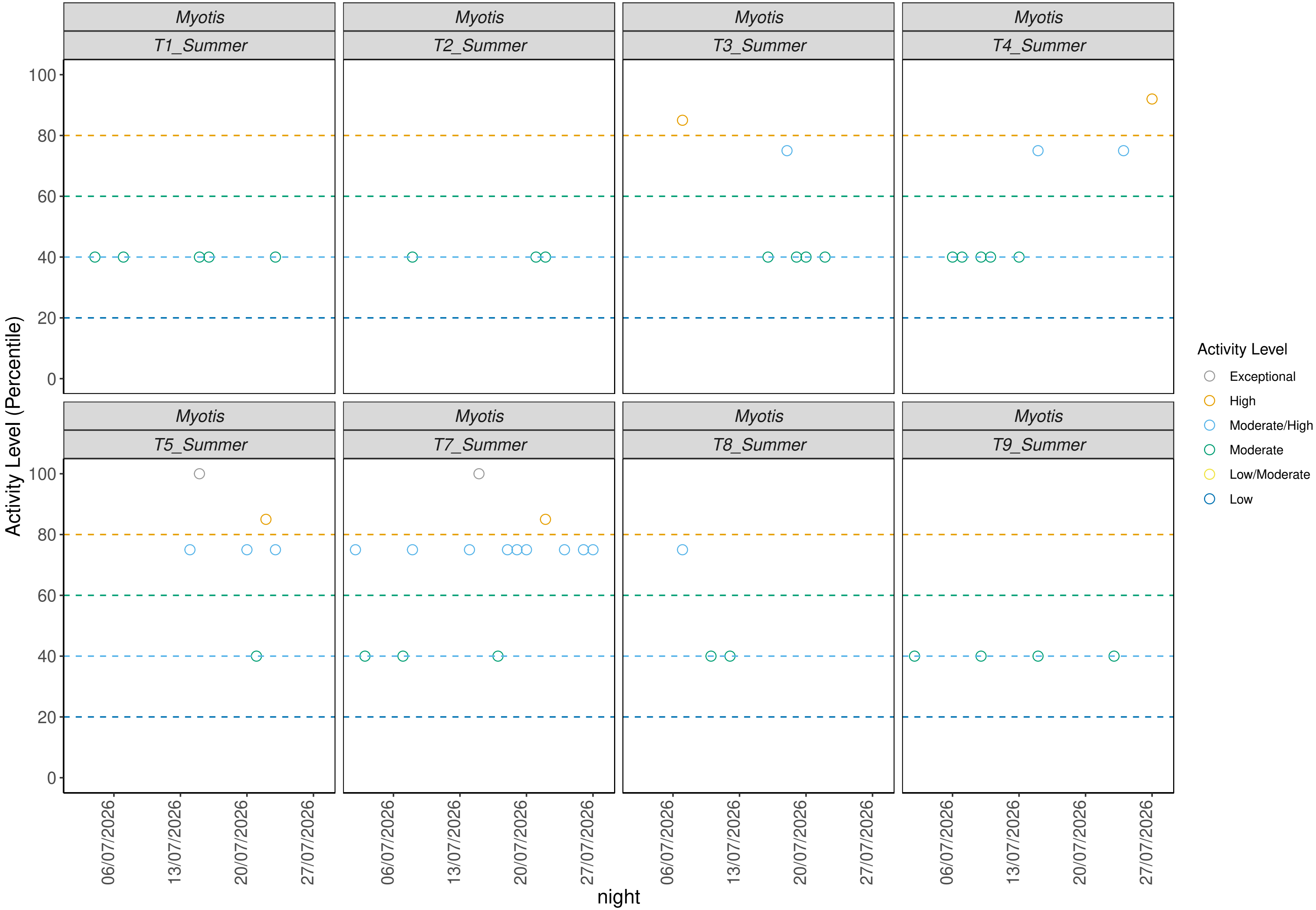
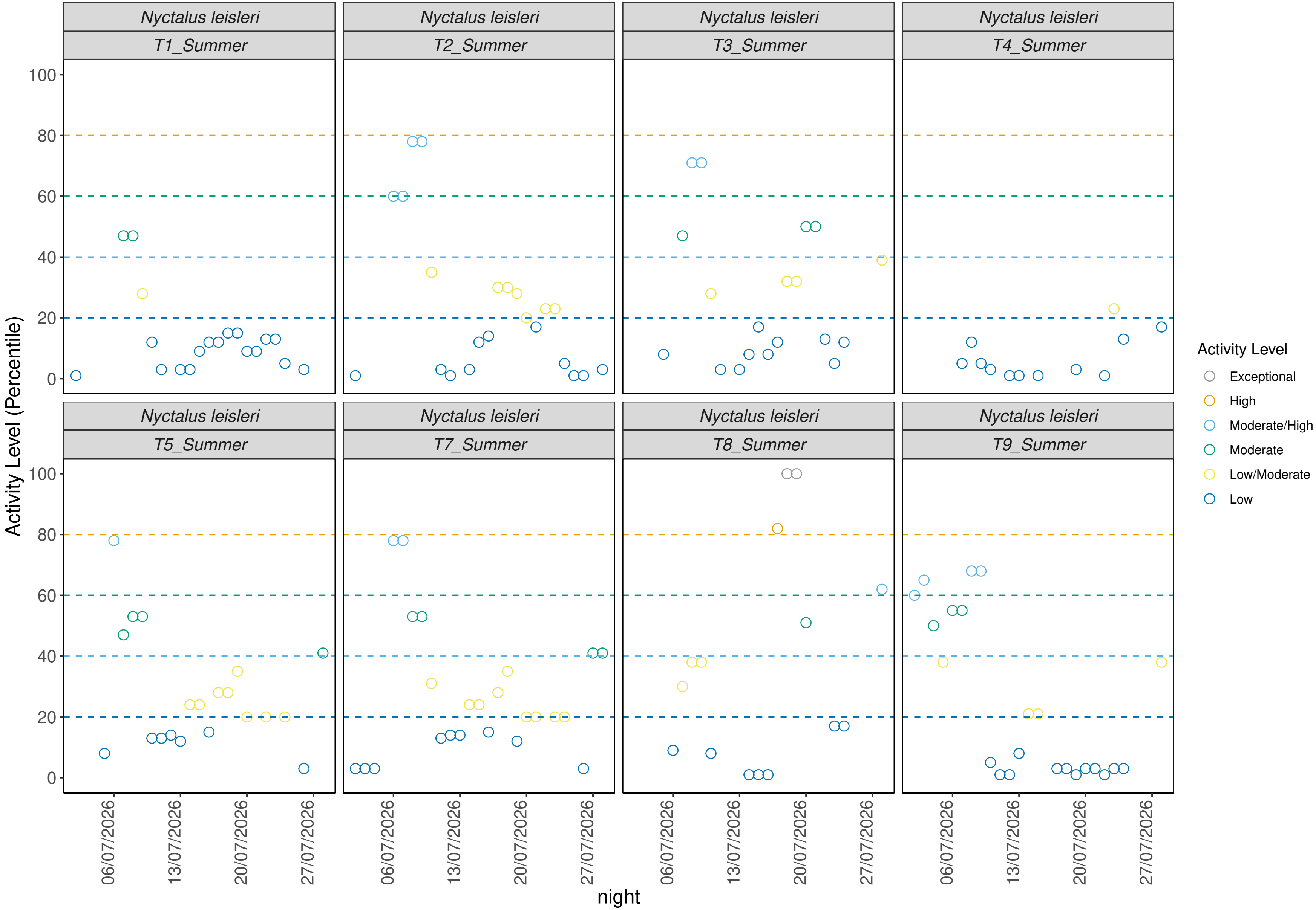
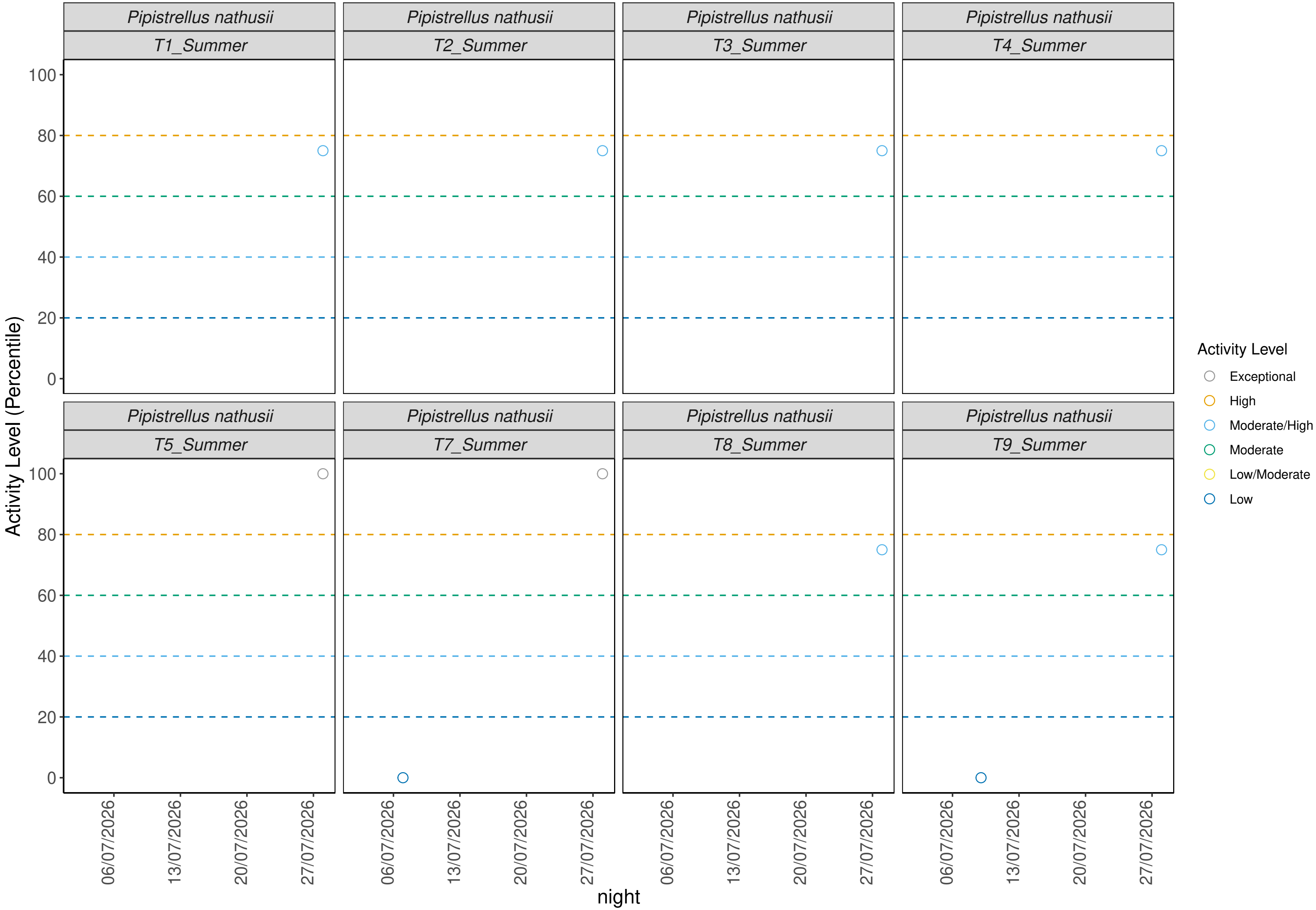
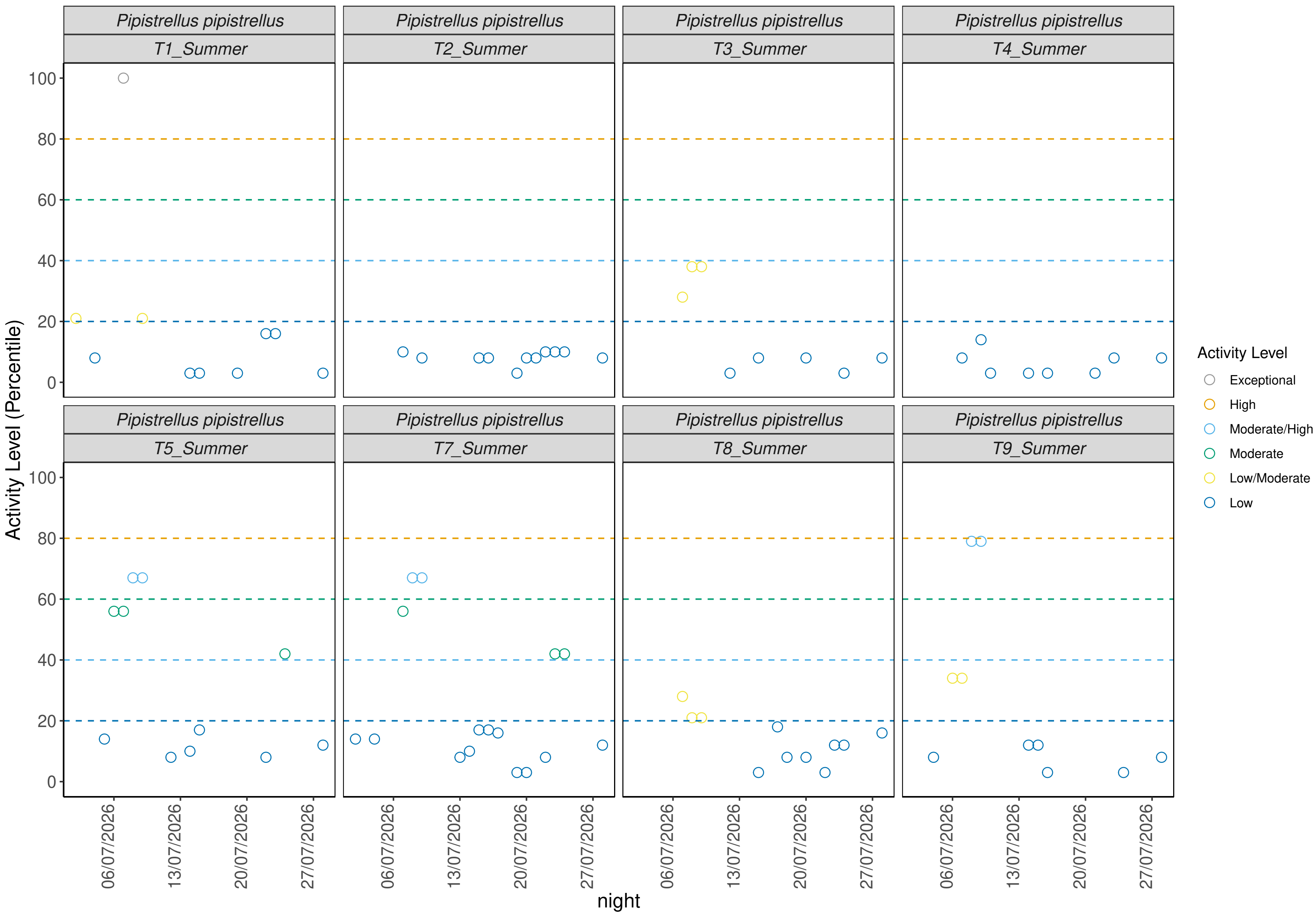

Pipistrellus pygmaeus
Plecotus auritus
Rhinolophus hipposideros
Activity Level (Percentile)
100
80
60
40
20
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

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

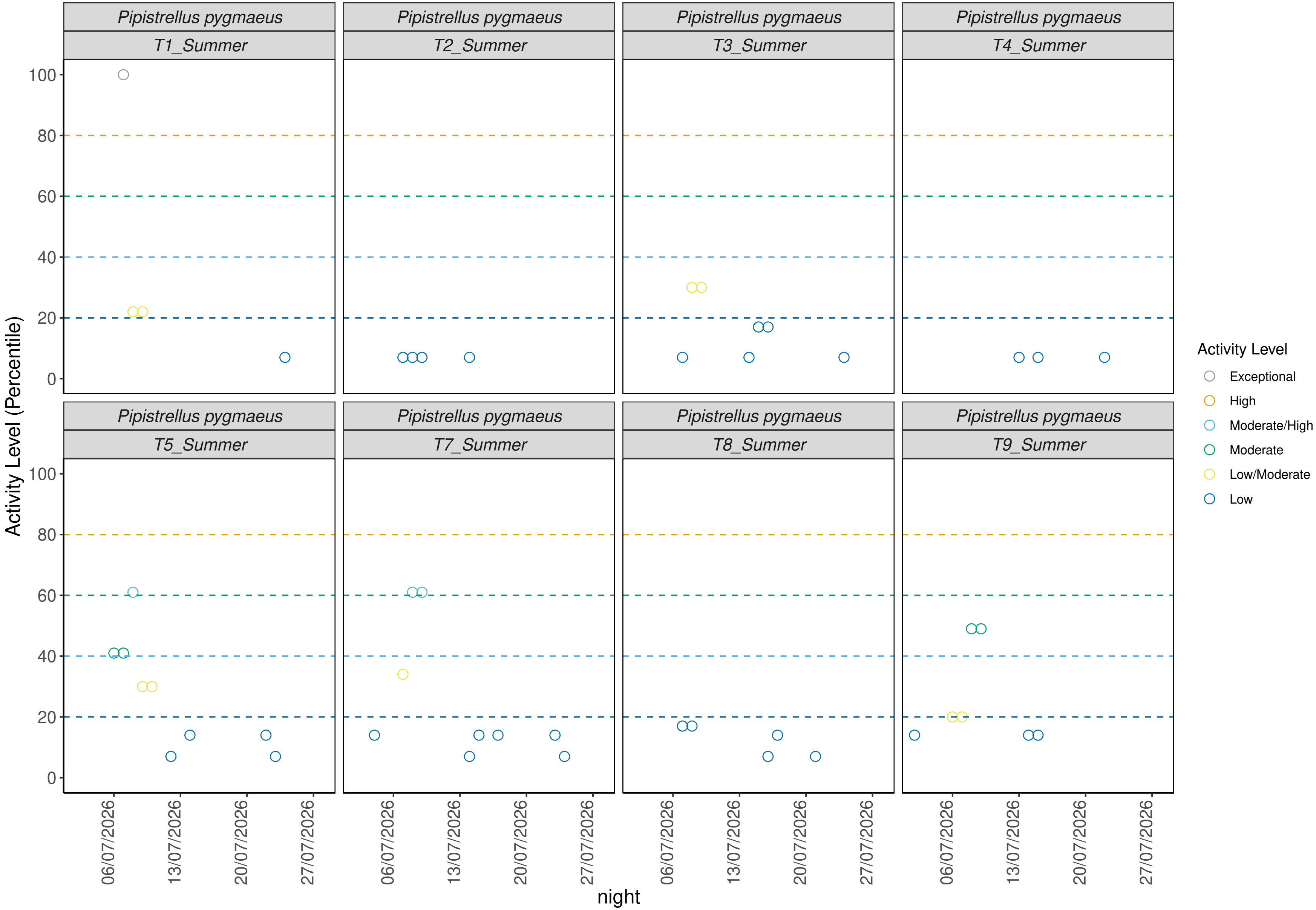

Myotis
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Activity Level (Percentile)
0
20
40
60
80
100
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low

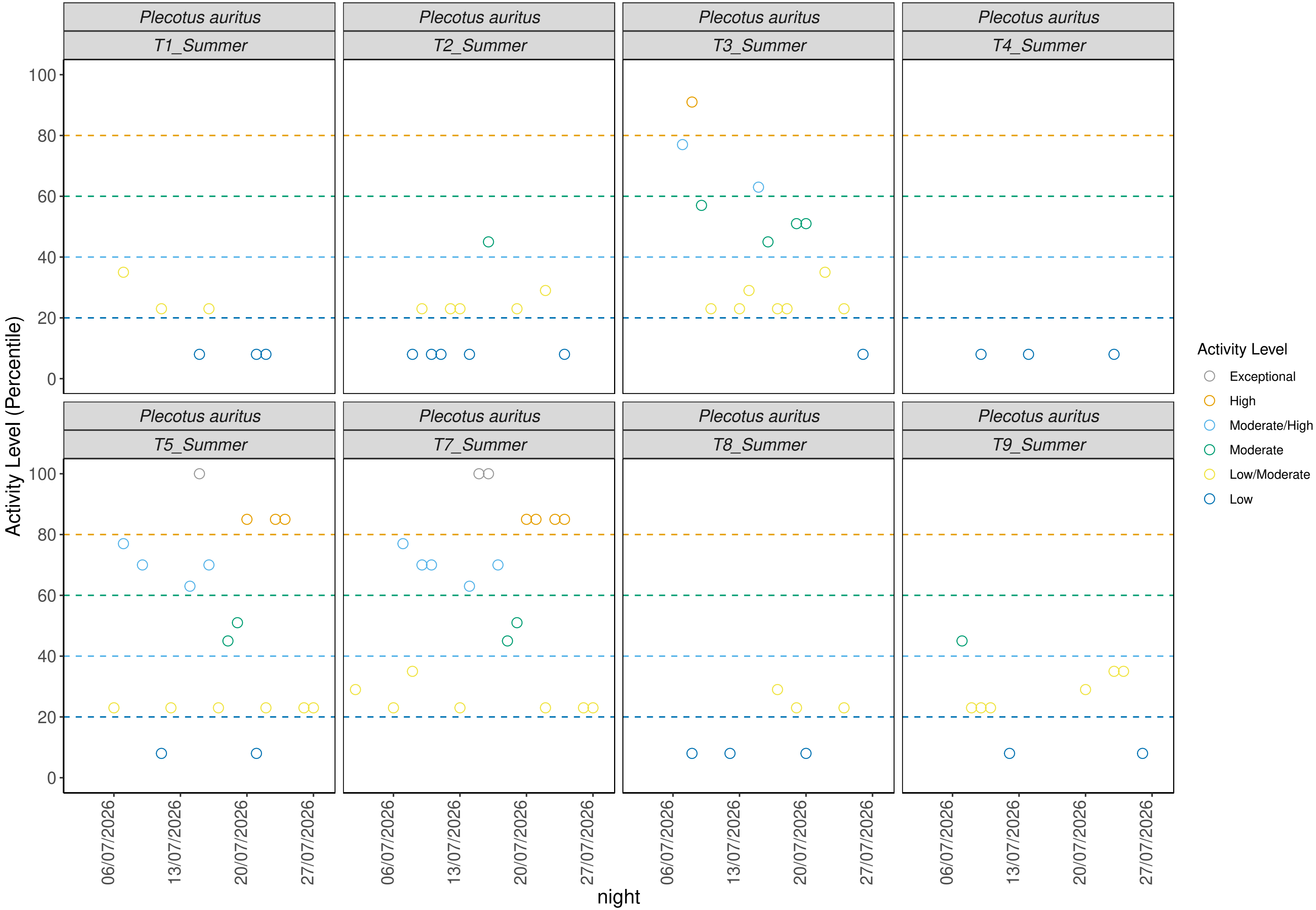

Nyctalus leisleri
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Activity Level (Percentile)
100
80
60
40
20
0
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low


Pipistrellus nathusii
T1_Summer
Pipistrellus nathusii
T2_Summer
Pipistrellus nathusii
T3_Summer
Pipistrellus nathusii
T4_Summer
Pipistrellus nathusii
T5_Summer
Pipistrellus nathusii
T7_Summer
Pipistrellus nathusii
T8_Summer
Pipistrellus nathusii
T9_Summer
Activity Level (Percentile)
0
20
40
60
80
100
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low

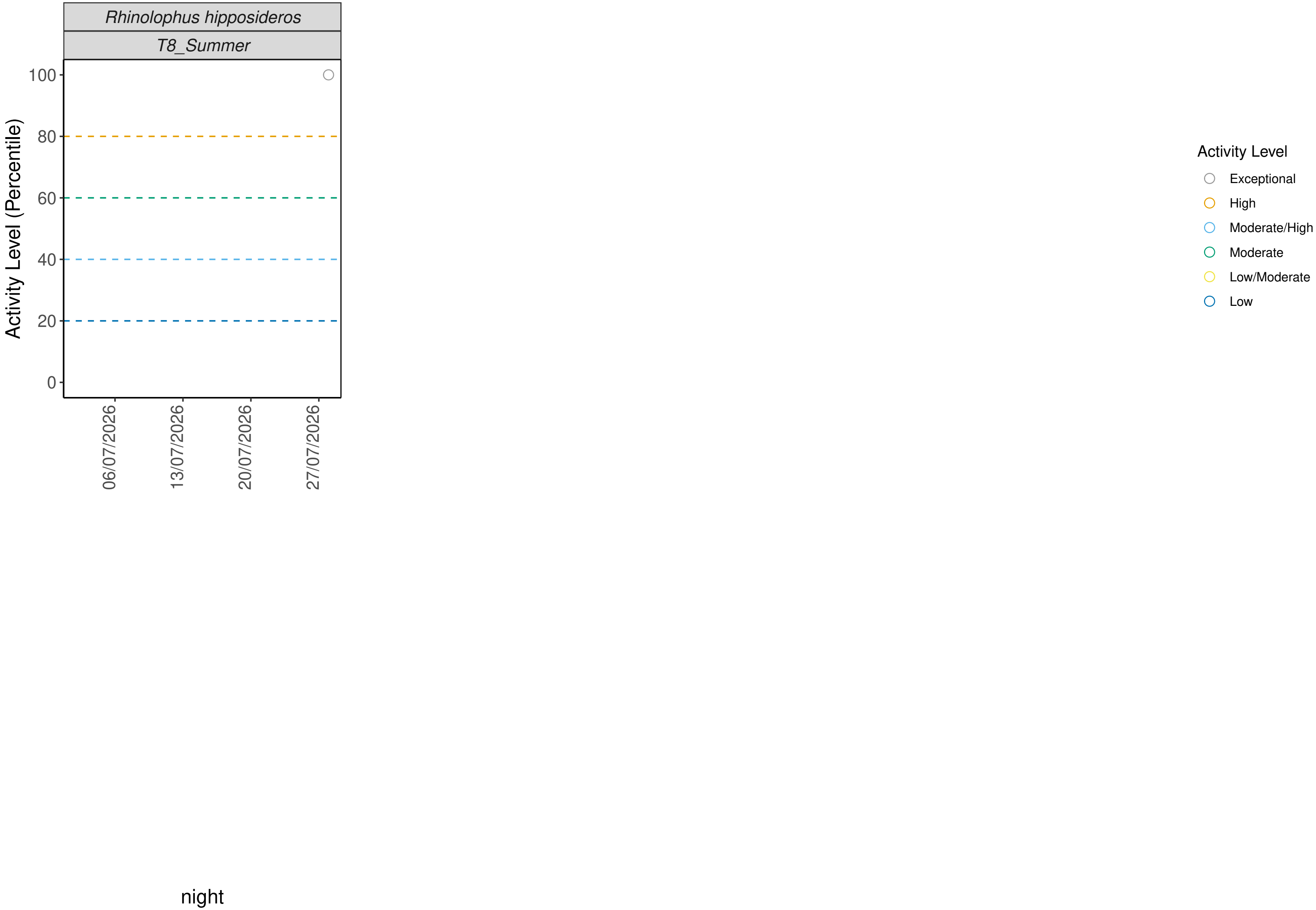


Pipistrellus pipistrellus
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Activity Level (Percentile)
100
80
60
40
20
0
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low


Pipistrellus pygmaeus
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Activity Level (Percentile)
0
20
40
60
80
100
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low



Plecotus auritus
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Activity Level (Percentile)
0
20
40
60
80
100
06/07/2026
13/07/2026
20/07/2026
27/07/2026
night
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low



Rhinolophus hipposideros
T8_Summer
Activity Level (Percentile)
100
80
60
40
20
0
06/07/2026
13/07/2026
20/07/2026
27/07/2026
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low
night

Per Detector, Per Month

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

Detector ID	Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T1_Summer	Myotis	Jul	0	0	0	5	0	0
T1_Summer	Nyctalus leisleri	Jul	0	0	0	2	1	16
T1_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	0
T1_Summer	Pipistrellus pipistrellus	Jul	1	0	0	0	2	7
T1_Summer	Pipistrellus pygmaeus	Jul	1	0	0	0	2	1
T1_Summer	Plecotus auritus	Jul	0	0	0	0	3	3
T2_Summer	Myotis	Jul	0	0	0	3	0	0
T2_Summer	Nyctalus leisleri	Jul	0	0	4	0	7	11
T2_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	0
T2_Summer	Pipistrellus pipistrellus	Jul	0	0	0	0	0	11
T2_Summer	Pipistrellus pygmaeus	Jul	0	0	0	0	0	4
T2_Summer	Plecotus auritus	Jul	0	0	0	1	5	5
T3_Summer	Myotis	Jul	0	1	1	4	0	0
T3_Summer	Nyctalus leisleri	Jul	0	0	2	3	4	10
T3_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	0
T3_Summer	Pipistrellus pipistrellus	Jul	0	0	0	0	3	5
T3_Summer	Pipistrellus pygmaeus	Jul	0	0	0	0	2	5
T3_Summer	Plecotus auritus	Jul	0	1	2	4	7	1
T4_Summer	Myotis	Jul	0	1	2	5	0	0
T4_Summer	Nyctalus leisleri	Jul	0	0	0	0	1	11

Detector ID	Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T4_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	0
T4_Summer	Pipistrellus pipistrellus	Jul	0	0	0	0	0	8
T4_Summer	Pipistrellus pygmaeus	Jul	0	0	0	0	0	3
T4_Summer	Plecotus auritus	Jul	0	0	0	0	0	3
T5_Summer	Myotis	Jul	1	1	3	1	0	0
T5_Summer	Nyctalus leisleri	Jul	0	0	1	4	8	7
T5_Summer	Pipistrellus nathusii	Jul	1	0	0	0	0	0
T5_Summer	Pipistrellus pipistrellus	Jul	0	0	2	3	0	6
T5_Summer	Pipistrellus pygmaeus	Jul	0	0	1	2	2	4
T5_Summer	Plecotus auritus	Jul	1	3	4	2	6	2
T7_Summer	Myotis	Jul	1	1	9	3	0	0
T7_Summer	Nyctalus leisleri	Jul	0	0	2	4	9	9
T7_Summer	Pipistrellus nathusii	Jul	1	0	0	0	0	1
T7_Summer	Pipistrellus pipistrellus	Jul	0	0	2	3	0	11
T7_Summer	Pipistrellus pygmaeus	Jul	0	0	2	0	1	6
T7_Summer	Plecotus auritus	Jul	2	4	5	2	7	0
T8_Summer	Myotis	Jul	0	0	1	2	0	0
T8_Summer	Nyctalus leisleri	Jul	2	1	1	1	3	7
T8_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	0
T8_Summer	Pipistrellus pipistrellus	Jul	0	0	0	0	3	8
T8_Summer	Pipistrellus pygmaeus	Jul	0	0	0	0	0	5
T8_Summer	Plecotus auritus	Jul	0	0	0	0	3	3

Detector ID	Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
T8_Summer	Rhinolophus hipposideros	Jul	1	0	0	0	0	0
T9_Summer	Myotis	Jul	0	0	0	4	0	0
T9_Summer	Nyctalus leisleri	Jul	0	0	4	3	4	12
T9_Summer	Pipistrellus nathusii	Jul	0	0	1	0	0	1
T9_Summer	Pipistrellus pipistrellus	Jul	0	0	2	0	2	6
T9_Summer	Pipistrellus pygmaeus	Jul	0	0	0	2	2	3
T9_Summer	Plecotus auritus	Jul	0	0	0	1	6	2

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
T1_Summer	Myotis	Jul	40	40 - 40	40	5
T1_Summer	Nyctalus leisleri	Jul	12	7.5 - 18.5	47	19
T1_Summer	Pipistrellus nathusii	Jul	75	0	75	1
T1_Summer	Pipistrellus pipistrellus	Jul	12	3 - 51.5	100	10
T1_Summer	Pipistrellus pygmaeus	Jul	22	14.5 - 61	100	4
T1_Summer	Plecotus auritus	Jul	16	8 - 23	35	6
T2_Summer	Myotis	Jul	40	40 - 40	40	3
T2_Summer	Nyctalus leisleri	Jul	19	11.5 - 36	78	22
T2_Summer	Pipistrellus nathusii	Jul	75	0	75	1
T2_Summer	Pipistrellus pipistrellus	Jul	8	6.5 - 9	10	11
T2_Summer	Pipistrellus pygmaeus	Jul	7	7 - 7	7	4
T2_Summer	Plecotus auritus	Jul	23	8 - 26.5	45	11
T3_Summer	Myotis	Jul	40	40 - 62.5	85	6
T3_Summer	Nyctalus leisleri	Jul	17	12.5 - 39.5	71	19
T3_Summer	Pipistrellus nathusii	Jul	75	0	75	1
T3_Summer	Pipistrellus pipistrellus	Jul	8	5.5 - 33	38	8
T3_Summer	Pipistrellus pygmaeus	Jul	17	7 - 23.5	30	7
T3_Summer	Plecotus auritus	Jul	35	26 - 56	91	15
T4_Summer	Myotis	Jul	40	40 - 66	92	8
T4_Summer	Nyctalus leisleri	Jul	4	2 - 12	23	12
T4_Summer	Pipistrellus nathusii	Jul	75	0	75	1
T4_Summer	Pipistrellus pipistrellus	Jul	6	3 - 8.5	14	8
T4_Summer	Pipistrellus pygmaeus	Jul	7	7 - 7	7	3
T4_Summer	Plecotus auritus	Jul	8	8 - 8	8	3
T5_Summer	Myotis	Jul	75	57.5 - 87.5	100	6
T5_Summer	Nyctalus leisleri	Jul	22	17.5 - 35	78	20
T5_Summer	Pipistrellus nathusii	Jul	100	0	100	1
T5_Summer	Pipistrellus pipistrellus	Jul	17	11 - 54.5	67	11
T5_Summer	Pipistrellus pygmaeus	Jul	30	10.5 - 41	61	9
T5_Summer	Plecotus auritus	Jul	48	34 - 65	100	18
T7_Summer	Myotis	Jul	75	57.5 - 75	100	14
T7_Summer	Nyctalus leisleri	Jul	20	16.5 - 34.5	78	24
T7_Summer	Pipistrellus nathusii	Jul	50	50 - 50	100	2

Detector ID	Species/Species Group	month	Median Percentile	95% CIs	Max. Percentile	Nights Recorded
T7_Summer	Pipistrellus pipistrellus	Jul	15	11 - 37.5	67	16
T7_Summer	Pipistrellus pygmaeus	Jul	14	10.5 - 37.5	61	9
T7_Summer	Plecotus auritus	Jul	67	46.5 - 74	100	20
T8_Summer	Myotis	Jul	40	40 - 40	75	3
T8_Summer	Nyctalus leisleri	Jul	30	15.5 - 56.5	100	15
T8_Summer	Pipistrellus nathusii	Jul	75	0	75	1
T8_Summer	Pipistrellus pipistrellus	Jul	12	7.5 - 19.5	28	11
T8_Summer	Pipistrellus pygmaeus	Jul	14	7 - 17	17	5
T8_Summer	Plecotus auritus	Jul	16	8 - 23	29	6
T8_Summer	Rhinolophus hipposideros	Jul	100	0	100	1
T9_Summer	Myotis	Jul	40	40 - 40	40	4
T9_Summer	Nyctalus leisleri	Jul	8	5.5 - 35.5	68	23
T9_Summer	Pipistrellus nathusii	Jul	38	37.5 - 37.5	75	2
T9_Summer	Pipistrellus pipistrellus	Jul	12	7.5 - 45.5	79	10
T9_Summer	Pipistrellus pygmaeus	Jul	20	14 - 34.5	49	7
T9_Summer	Plecotus auritus	Jul	23	15.5 - 35	45	9

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 Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
Myotis	2	4	16	27	0	0
Nyctalus leisleri	2	1	14	17	37	83
Pipistrellus nathusii	2	0	6	0	0	2
Pipistrellus pipistrellus	1	0	6	6	10	62
Pipistrellus pygmaeus	1	0	3	4	9	31
Plecotus auritus	3	8	11	10	37	19
Rhinolophus hipposideros	1	0	0	0	0	0

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

Species/Species Group	Median Percentile	95% CIs	Max. Percentile	Nights Recorded
Myotis	40	57.5 - 87.5	100	49
Nyctalus leisleri	15	7.5 - 18.5	100	154
Pipistrellus nathusii	75	50 - 50	100	10
Pipistrellus pipistrellus	10	7.5 - 45.5	100	85
Pipistrellus pygmaeus	14	7 - 7	100	48
Plecotus auritus	23	8 - 8	100	88
Rhinolophus hipposideros	100	0	100	1

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

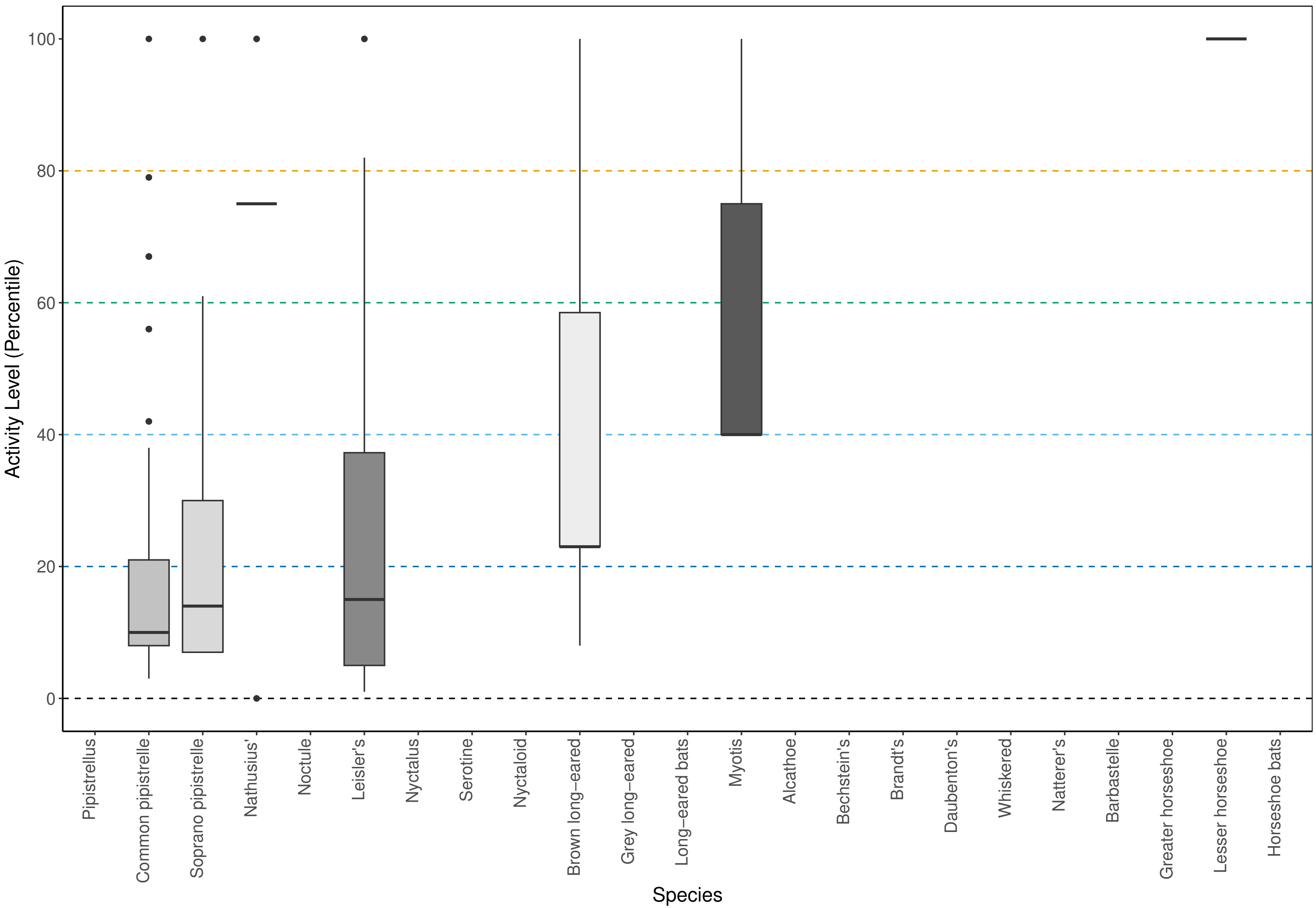
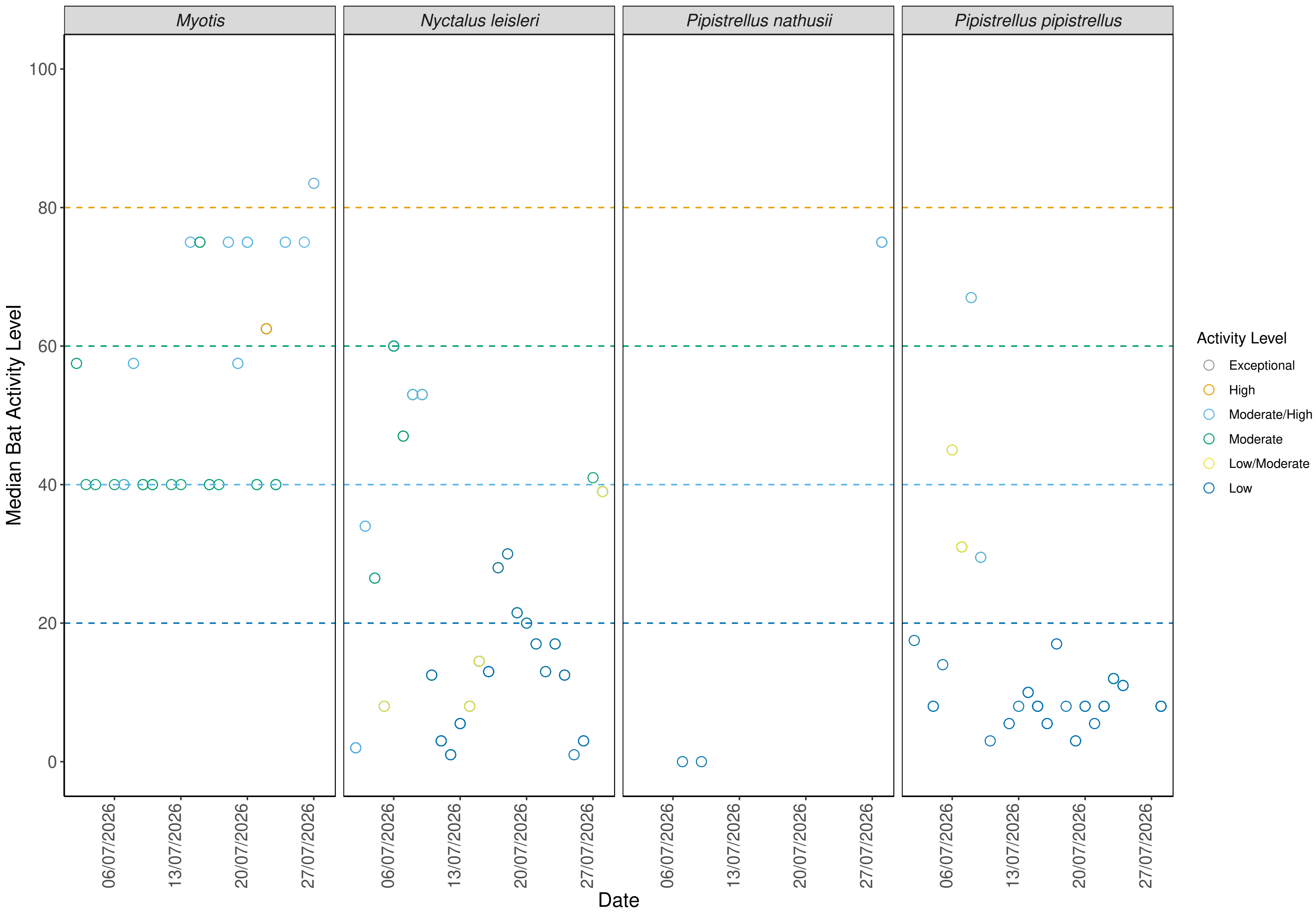
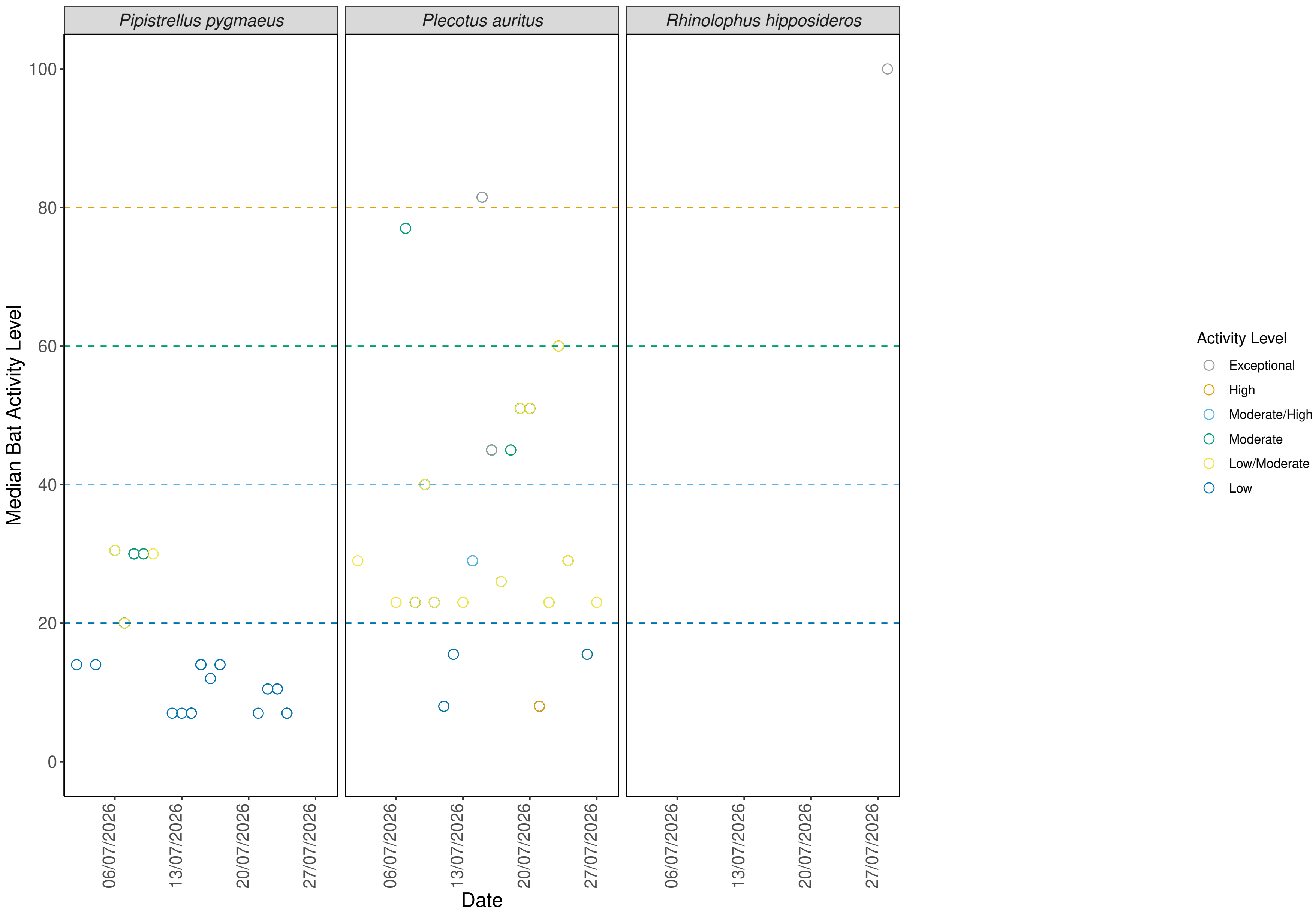

Activity Level (Percentile)
100
80
60
40
20
0
Pipistrellus
Common pipistrelle
Soprano pipistrelle
Nathusius'
Noctule
Leisler's
Nyctalus
Serotine
Nyctaloid
Brown long−eared
Grey long−eared
Long−eared bats
Myotis
Alcathoe
Bechstein's
Brandt's
Daubenton's
Whiskered
Natterer's
Barbastelle
Greater horseshoe
Lesser horseshoe
Horseshoe bats
Species

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



Myotis
Nyctalus leisleri
Pipistrellus nathusii
Pipistrellus pipistrellus
Median Bat Activity Level
0
20
40
60
80
100
06/07/2026
13/07/2026
20/07/2026
27/07/2026
Date
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low



Pipistrellus pygmaeus
Plecotus auritus
Rhinolophus hipposideros
Median Bat Activity Level
100
80
60
40
20
0
06/07/2026
13/07/2026
20/07/2026
27/07/2026
Date
Activity Level
Exceptional
High
Moderate/High
Moderate
Low/Moderate
Low

Per Site, Per Month

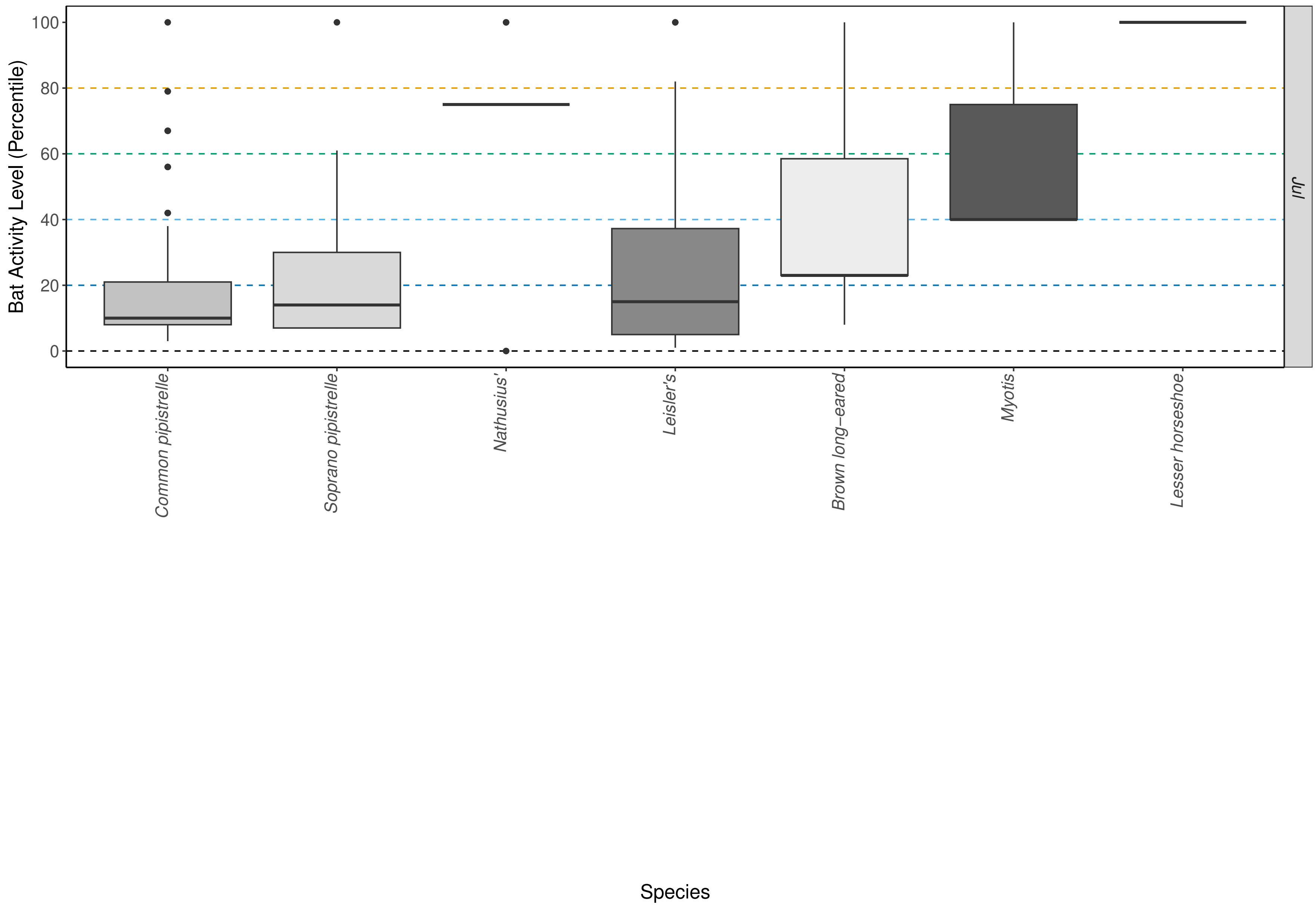
Table 9. Summary table showing the number of nights recorded bat activity fell into each activity band for each species during each month.

Species/Species Group	month	Nights of Exceptional Activity	Nights of High Activity	Nights of Moderate/High Activity	Nights of Moderate Activity	Nights of Low/Moderate Activity	Nights of Low Activity
Myotis	Jul	2	4	16	27	0	0
Nyctalus leisleri	Jul	2	1	14	17	37	83
Pipistrellus nathusii	Jul	2	0	6	0	0	2
Pipistrellus pipistrellus	Jul	1	0	6	6	10	62
Pipistrellus pygmaeus	Jul	1	0	3	4	9	31
Plecotus auritus	Jul	3	8	11	10	37	19
Rhinolophus hipposideros	Jul	1	0	0	0	0	0

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

Species/Species Group	month	Median Percentile	95% CIs	Max. Percentile	Nights Recorded
Myotis	Jul	40	57.5 - 87.5	100	49
Nyctalus leisleri	Jul	15	7.5 - 18.5	100	154
Pipistrellus nathusii	Jul	75	50 - 50	100	10
Pipistrellus pipistrellus	Jul	10	7.5 - 45.5	100	85
Pipistrellus pygmaeus	Jul	14	7 - 7	100	48
Plecotus auritus	Jul	23	8 - 8	100	88
Rhinolophus hipposideros	Jul	100	0	100	1

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


Bat Activity Level (Percentile)
100
80
60
40
20
0
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Brown long−eared
Myotis
Lesser horseshoe
Jul
Species

Part 2: Nightly Analysis

Entire Survey Period

Sunrise and Sunset Times

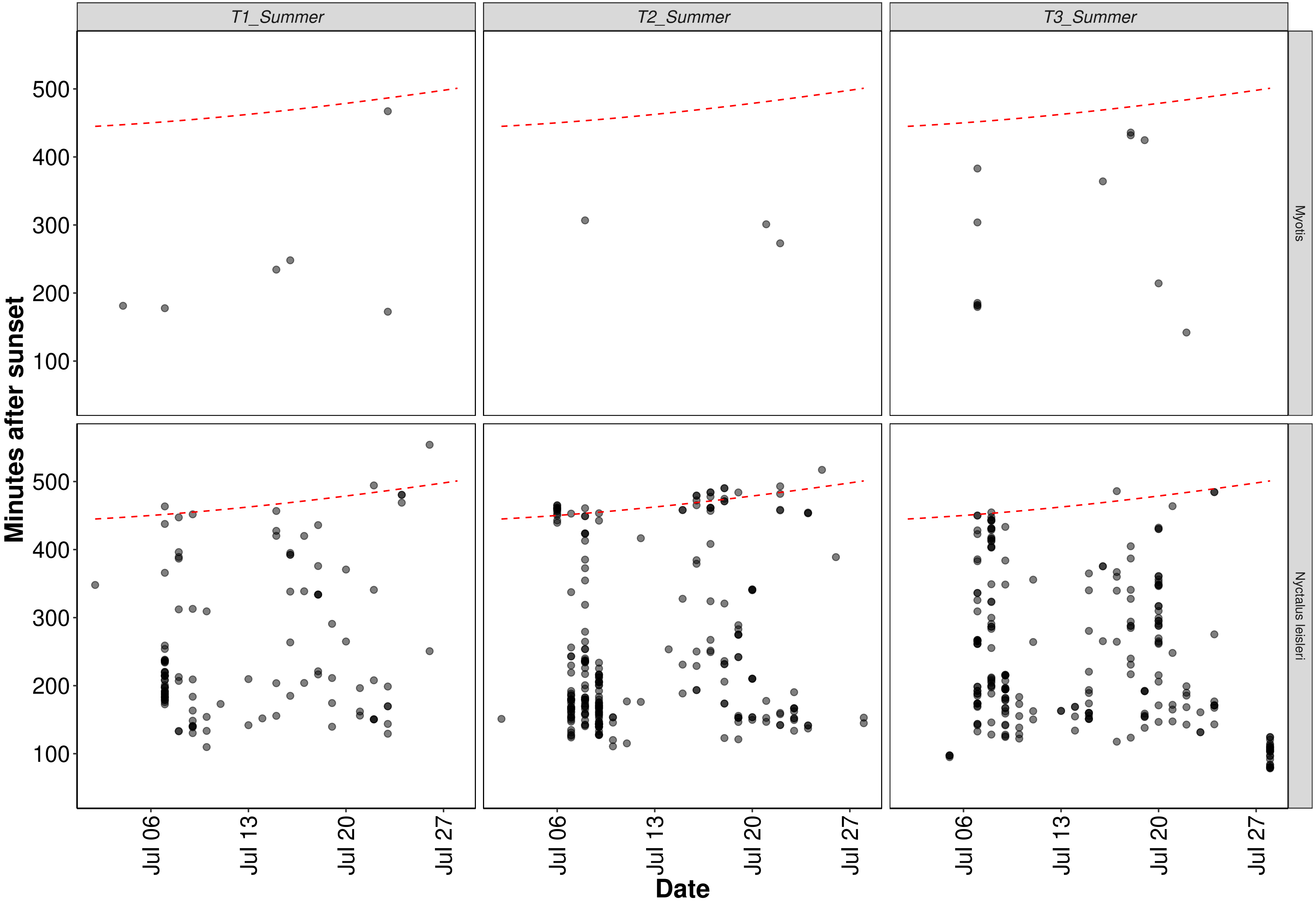
Table 11. The times of sunset and sunrise the following morning for surveys beginning on the date shown.

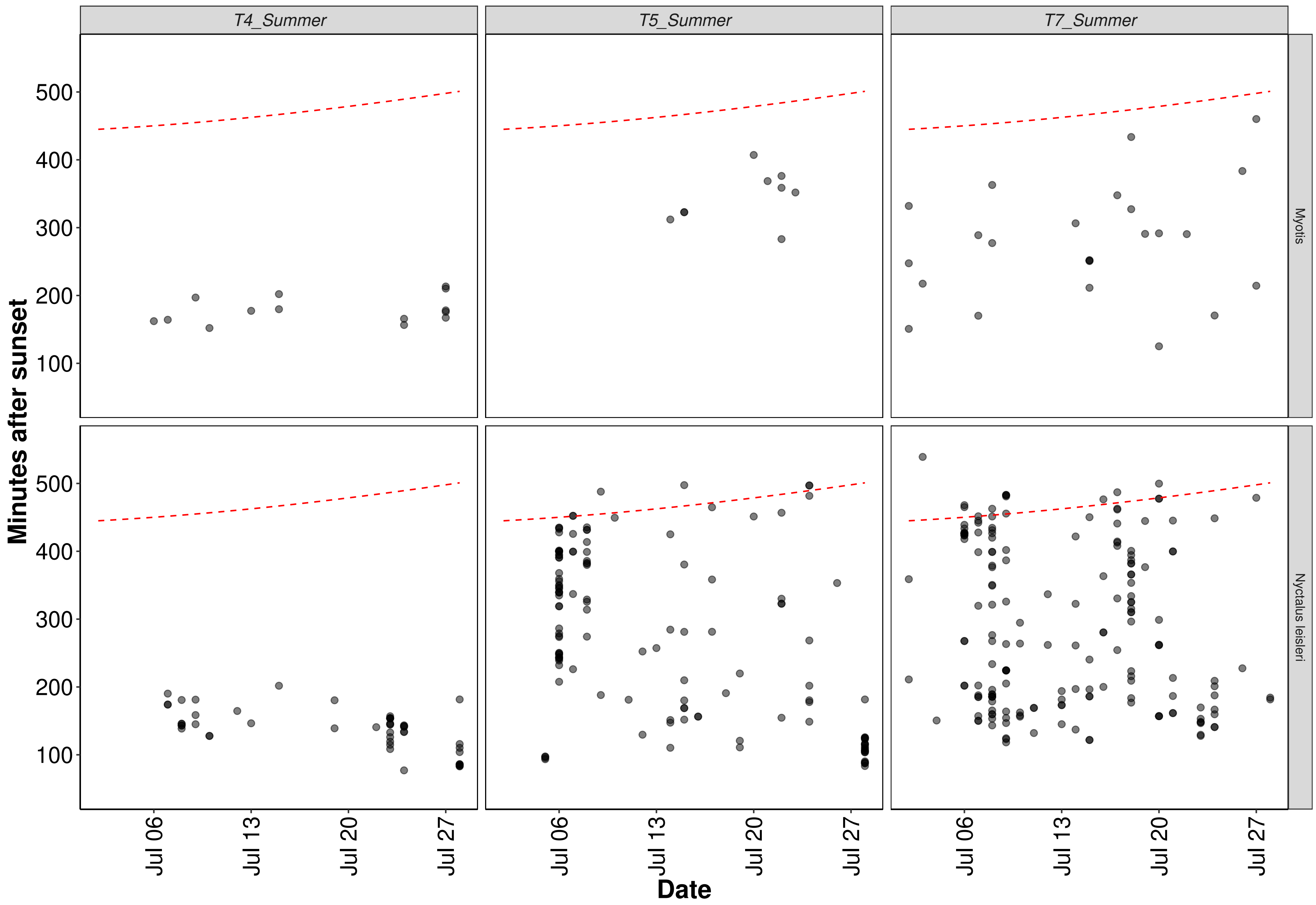
Night (y-m-d)	Sunset (h:m)	Sunrise (h:m)	Night Length (hours)
2026-07-02	20:46	04:11	7.4
2026-07-03	20:45	04:11	7.4
2026-07-04	20:45	04:12	7.5
2026-07-05	20:44	04:13	7.5
2026-07-06	20:44	04:14	7.5
2026-07-07	20:43	04:15	7.5
2026-07-08	20:43	04:16	7.6
2026-07-09	20:42	04:17	7.6
2026-07-10	20:41	04:18	7.6
2026-07-11	20:40	04:19	7.6
2026-07-12	20:40	04:20	7.7
2026-07-13	20:39	04:21	7.7
2026-07-14	20:38	04:22	7.7
2026-07-15	20:37	04:24	7.8
2026-07-16	20:36	04:25	7.8
2026-07-17	20:35	04:26	7.9
2026-07-18	20:34	04:27	7.9
2026-07-19	20:32	04:29	7.9
2026-07-20	20:31	04:30	8.0
2026-07-21	20:30	04:31	8.0
2026-07-22	20:29	04:33	8.1
2026-07-23	20:28	04:34	8.1
2026-07-24	20:26	04:36	8.2
2026-07-25	20:25	04:37	8.2
2026-07-26	20:23	04:38	8.3
2026-07-27	20:22	04:40	8.3
2026-07-28	20:21	04:41	8.3

Distribution of Bat Activity Across the Night through Time

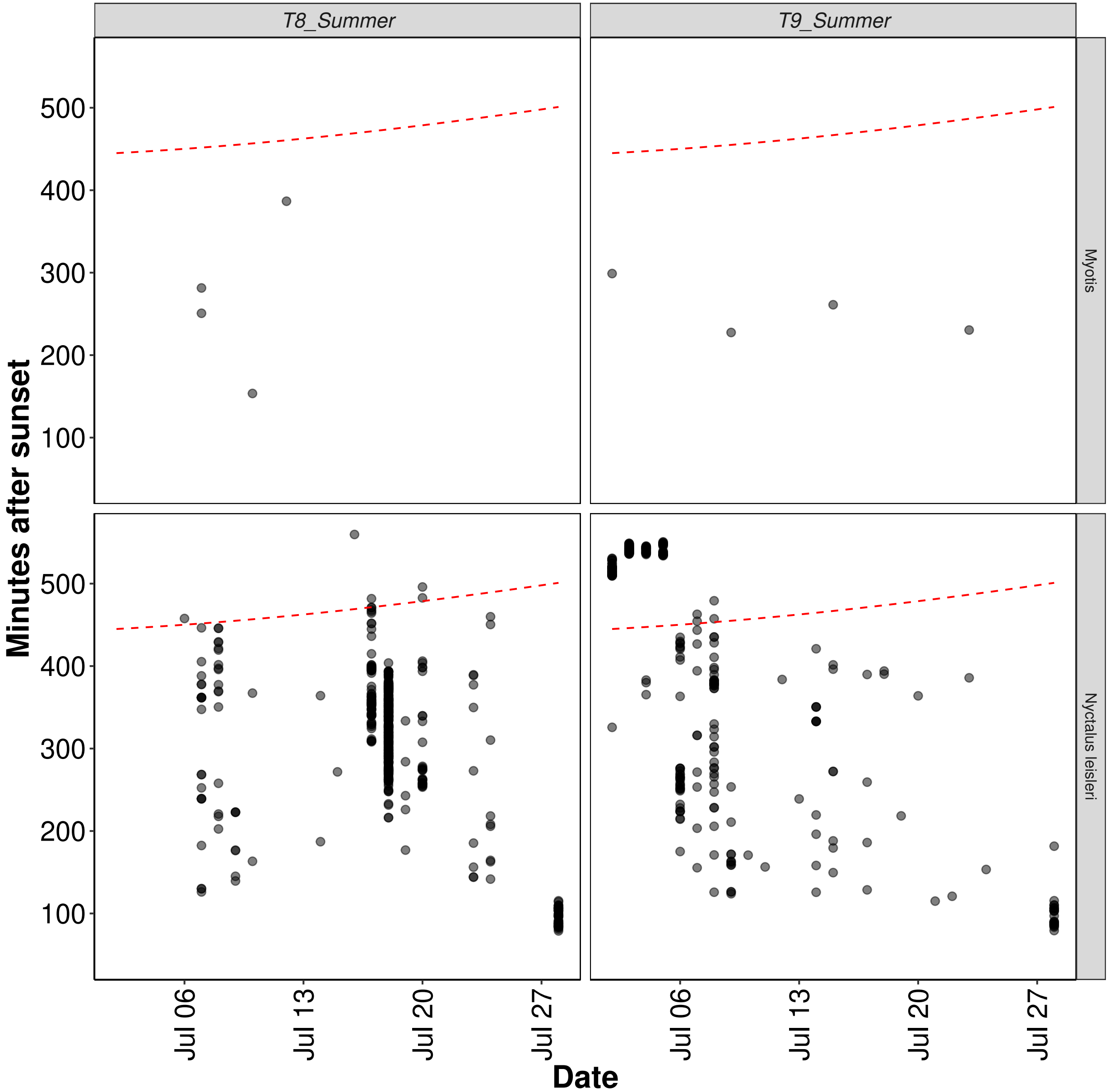
Per Detector

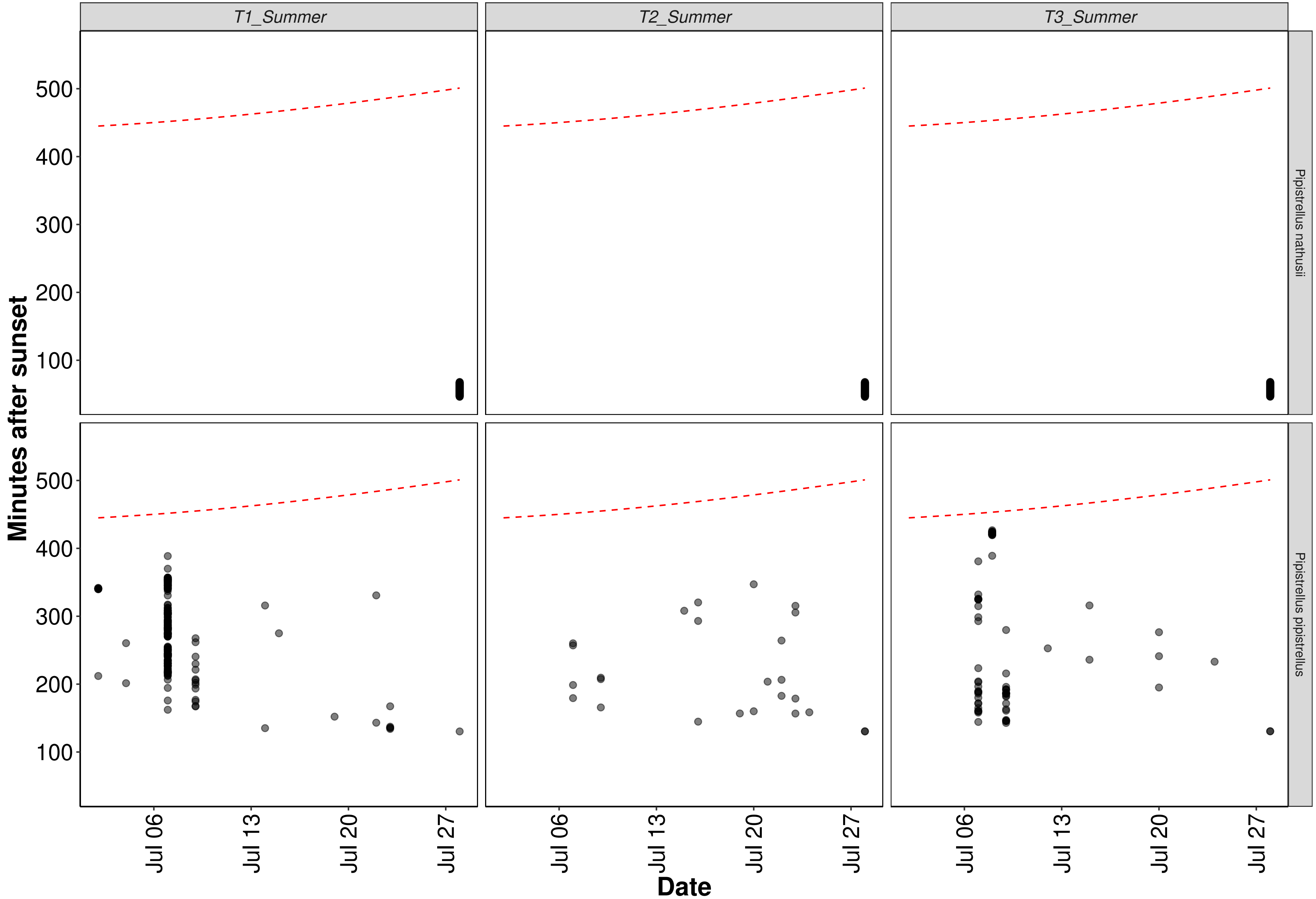
Figure 7. Timing of bat calls plotted as minutes before/after sunset, whereby 0 on the y axis represents sunset. Sunrise throughout the survey period is depicted as the red dashed line. Colours indicate kernel densities, with darkest colours showing peaks of activity. These colours are comparative only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


T1_Summer
T2_Summer
T3_Summer
Myotis
Nyctalus leisleri
Minutes after sunset
100
200
300
400
500
Jul 06
Jul 13
Jul 20
Jul 27
Date

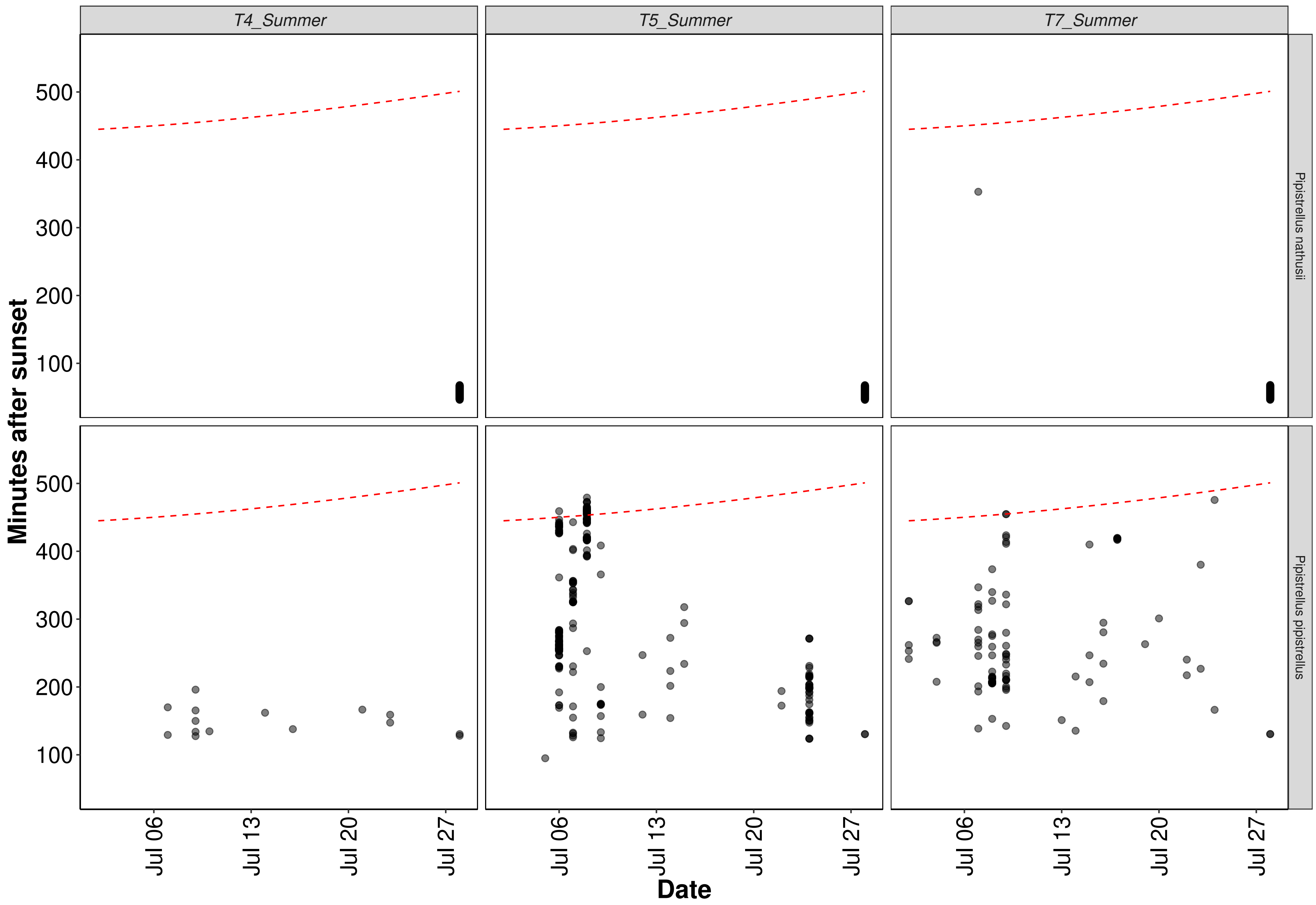


T4_Summer
T5_Summer
T7_Summer
Myotis
Nyctalus leisleri
Minutes after sunset
100
200
300
400
500
Jul 06
Jul 13
Jul 20
Jul 27
Date

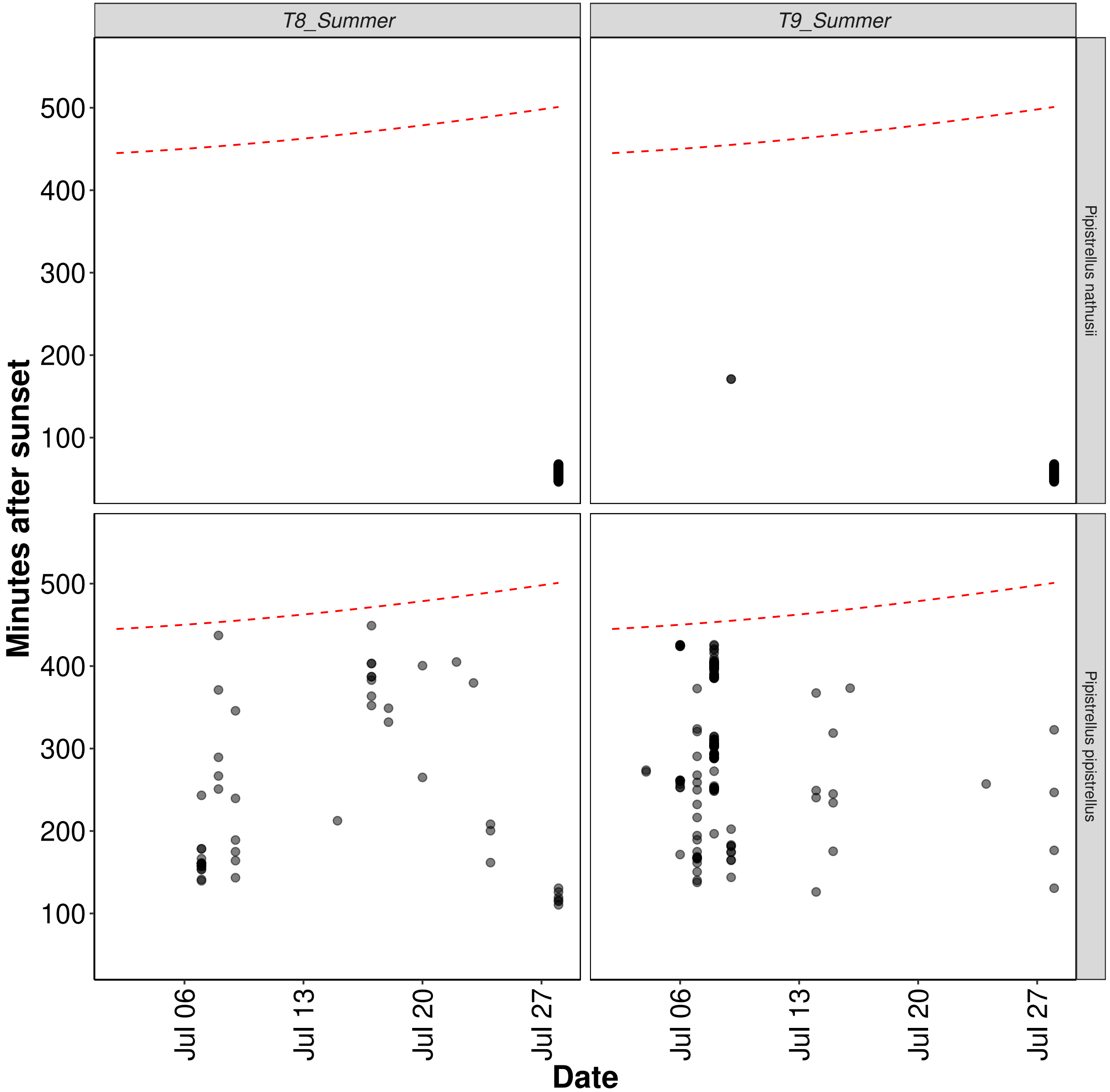

T8_Summer
T9_Summer
Myotis
Nyctalus leisleri
Minutes after sunset
500
400
300
200
100
Jul 06
Jul 13
Jul 20
Jul 27
Date

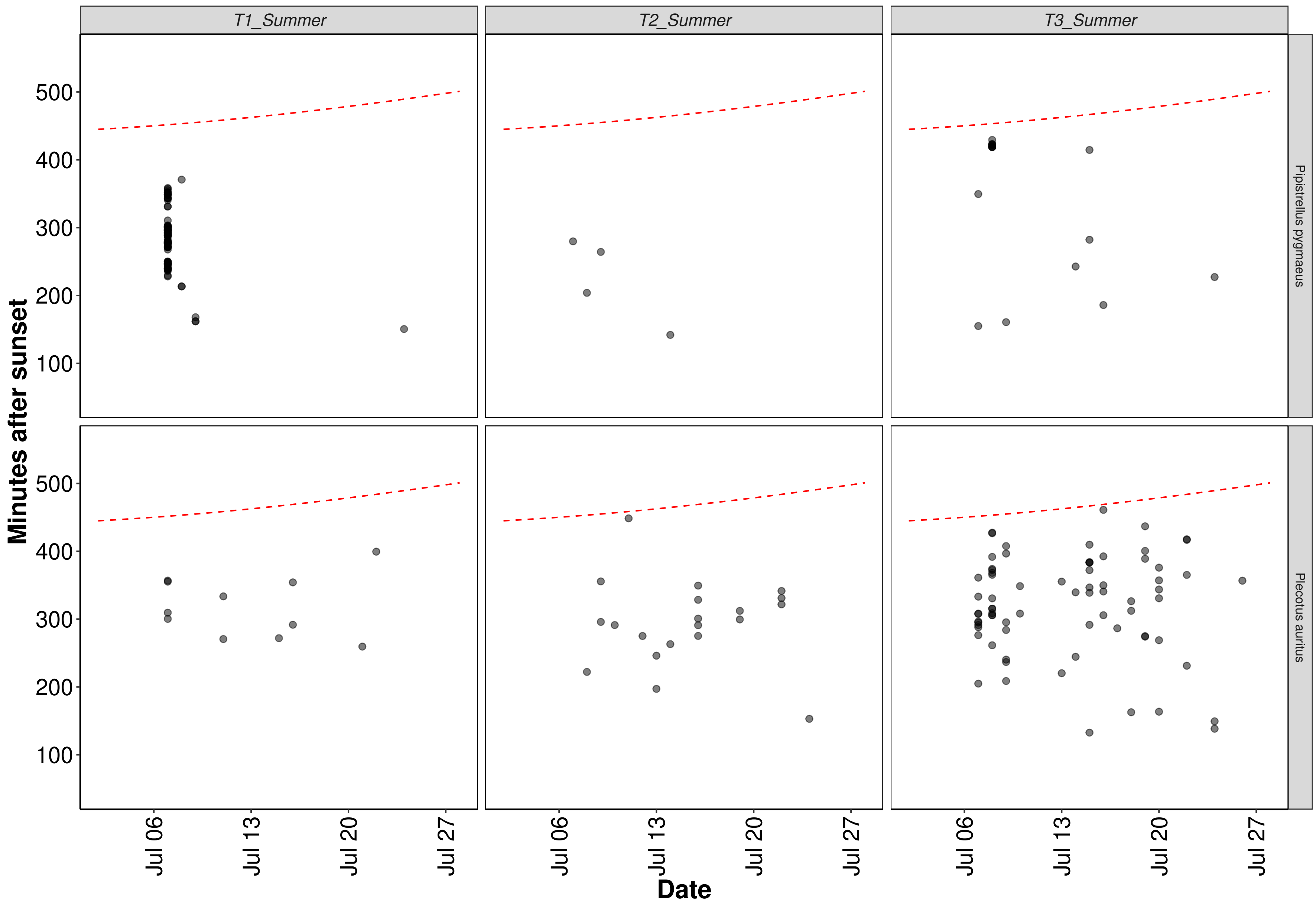


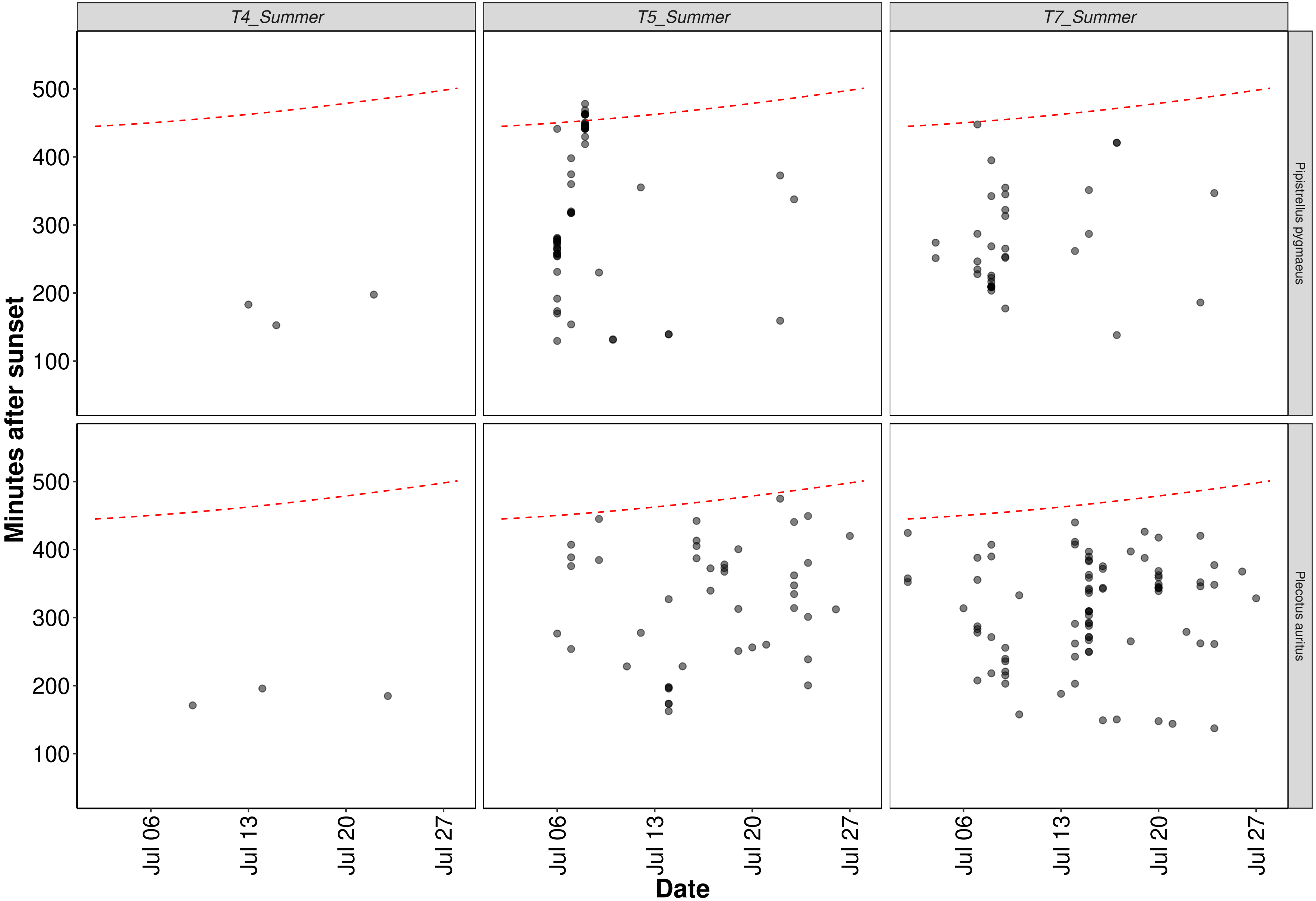
T1_Summer
T2_Summer
T3_Summer
Pipistrellus nathusii
Pipistrellus pipistrellus
Minutes after sunset
100
200
300
400
500
Date
Jul 06
Jul 13
Jul 20
Jul 27



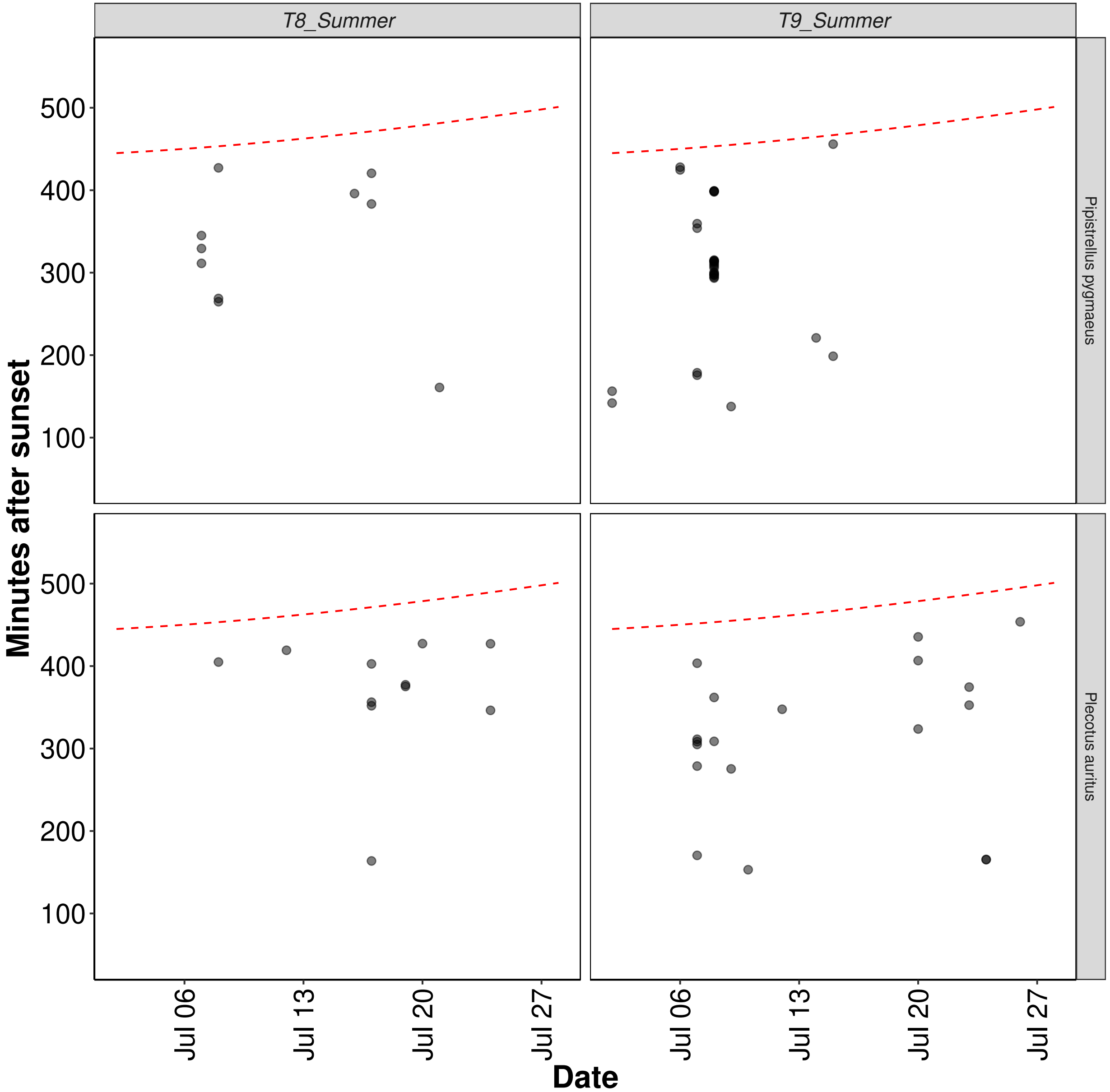
T4_Summer
T5_Summer
T7_Summer
Pipistrellus nathusii
Pipistrellus pipistrellus
Minutes after sunset
500
400
300
200
100
Jul 06
Jul 13
Jul 20
Jul 27
Date


T8_Summer
T9_Summer
Pipistrellus nathusii
Pipistrellus pipistrellus
Minutes after sunset
500
400
300
200
100
Jul 06
Jul 13
Jul 20
Jul 27
Date


T1_Summer
T2_Summer
T3_Summer
Pipistrellus pygmaeus
Plecotus auritus
Minutes after sunset
100
200
300
400
500
Jul 06
Jul 13
Jul 20
Jul 27
Date



T4_Summer
T5_Summer
T7_Summer
Pipistrellus pygmaeus
Plecotus auritus
Minutes after sunset
100
200
300
400
500
Jul 06
Jul 13
Jul 20
Jul 27
Date



T8_Summer
T9_Summer
Pipistrellus pygmaeus
Plecotus auritus
Minutes after sunset
500
400
300
200
100
Jul 06
Jul 13
Jul 20
Jul 27
Date

Roost Emergence Time and Bat Observation

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

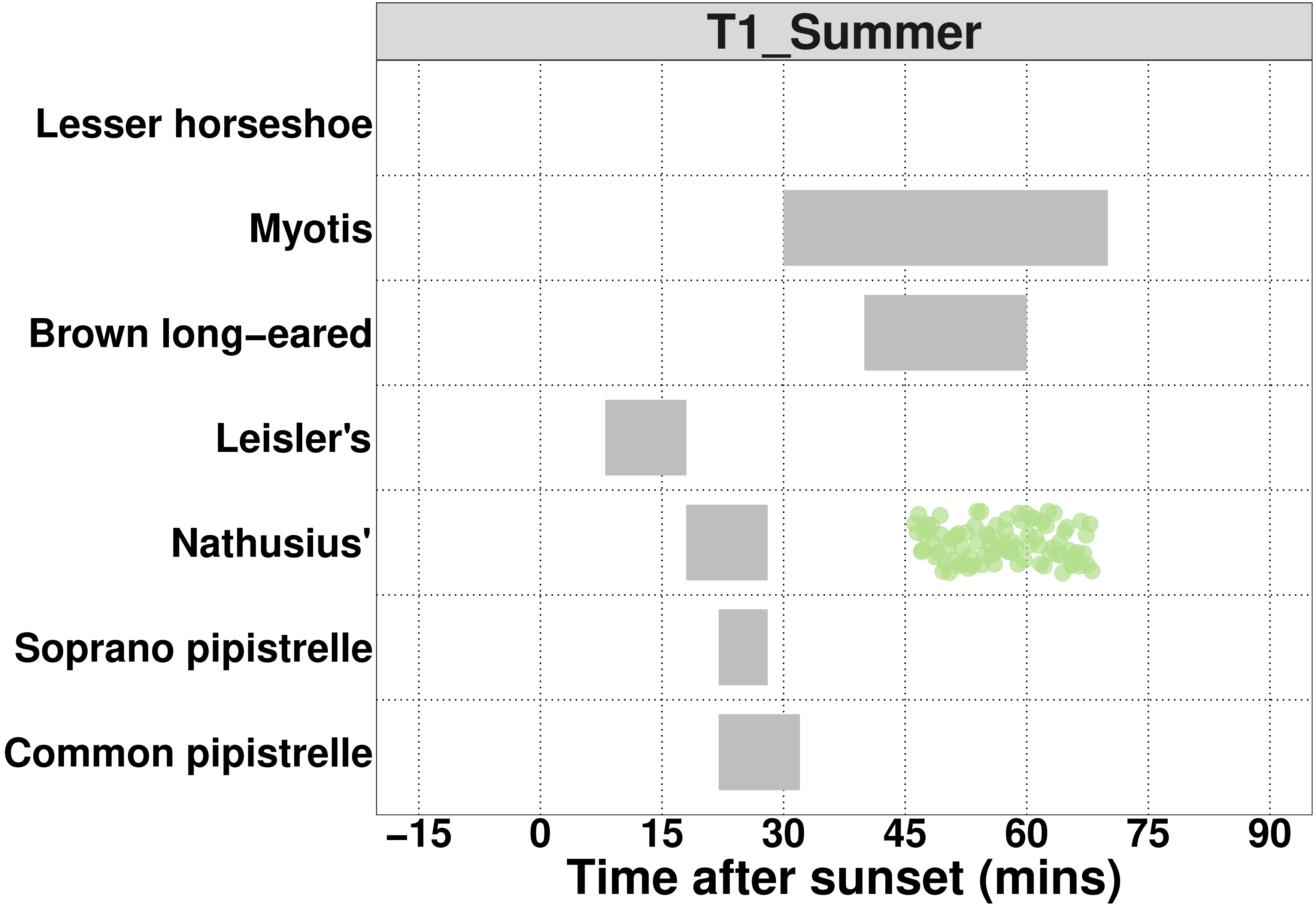
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012)

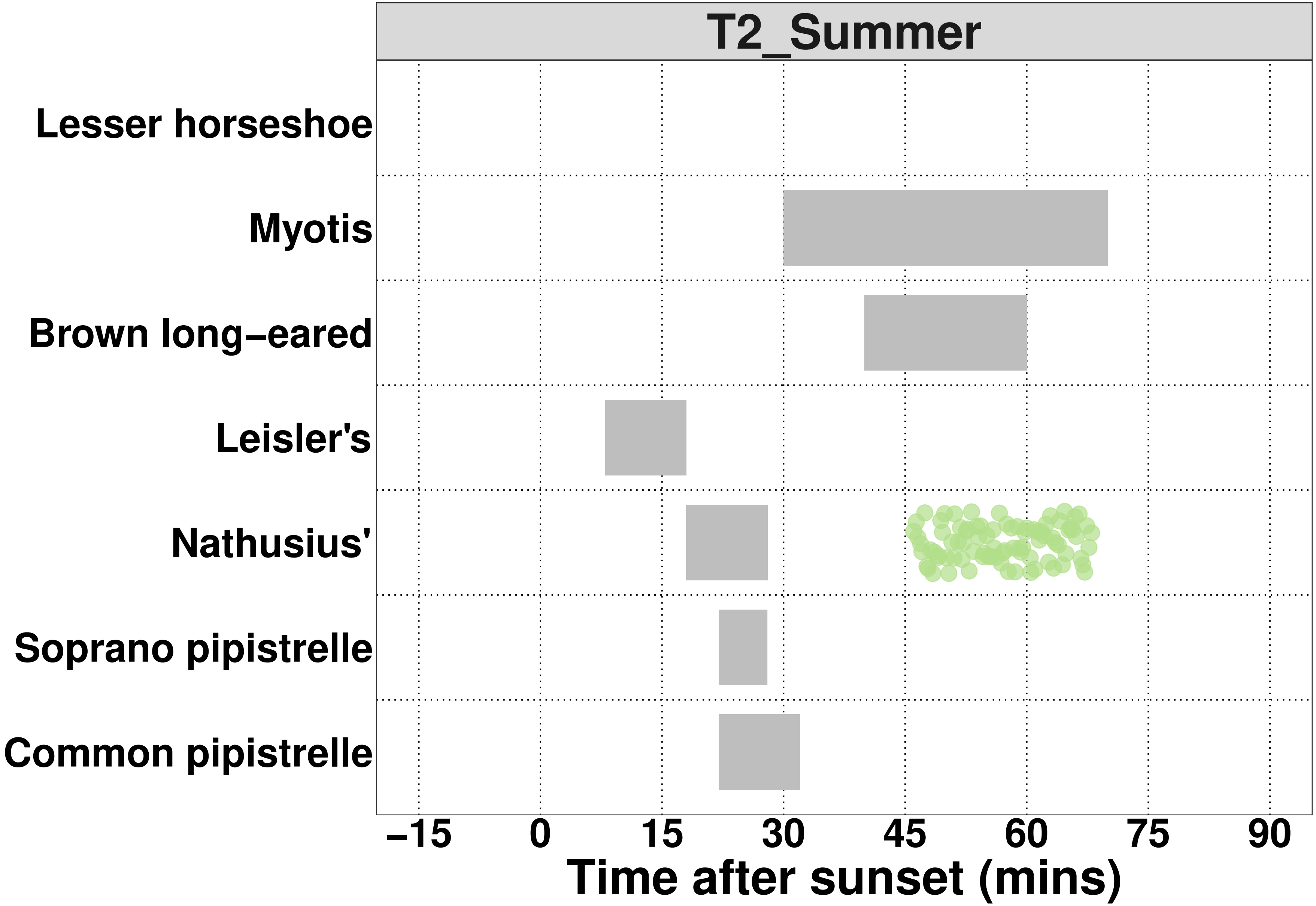
Table 12. Number of bat calls recorded before the upper time of the species-specific emergence time range, and which therefore may potentially indicate the presence of a nearby roost.

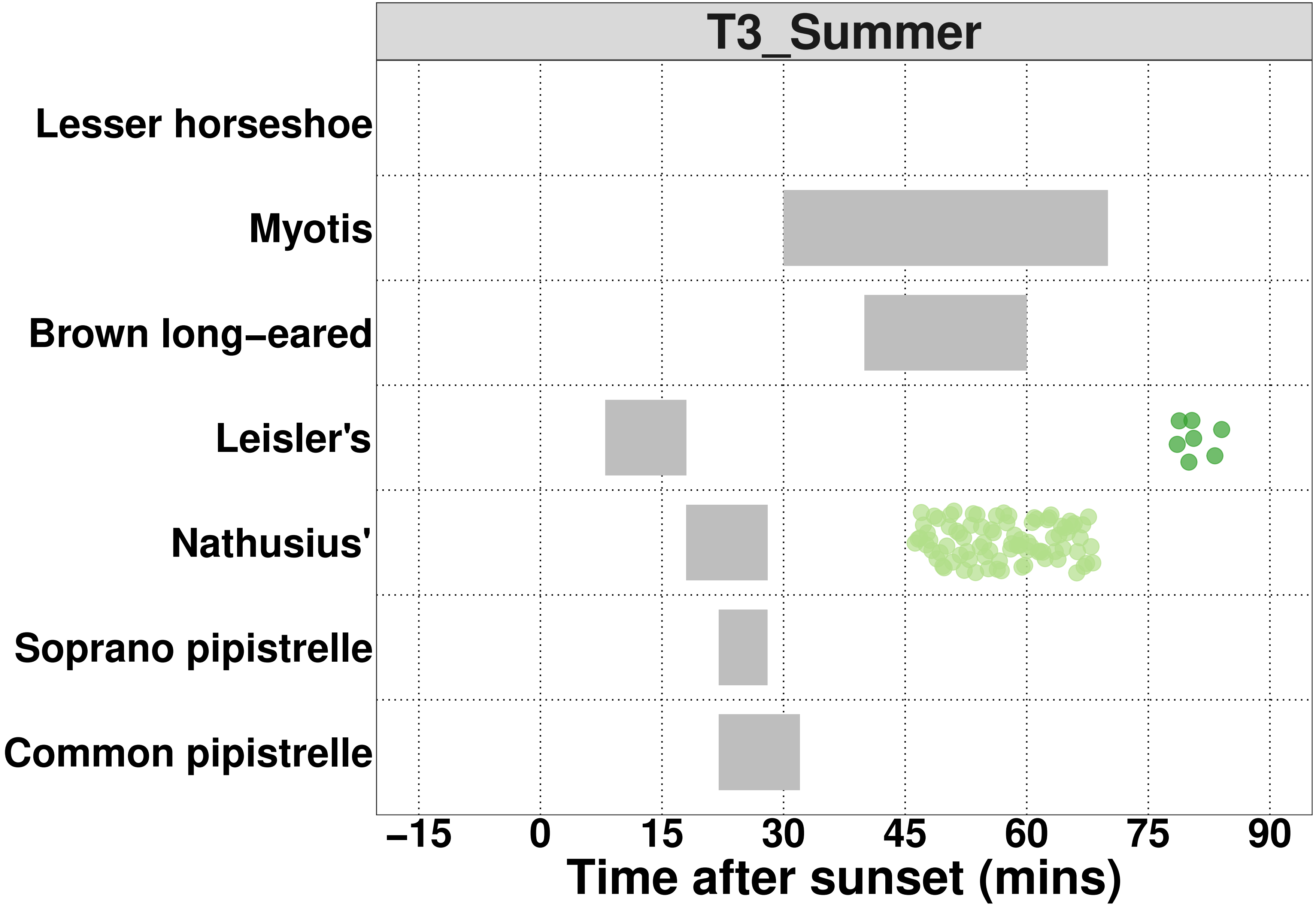
Species	Detector ID	2026-07-28
Lesser horseshoe	T8_Summer	1

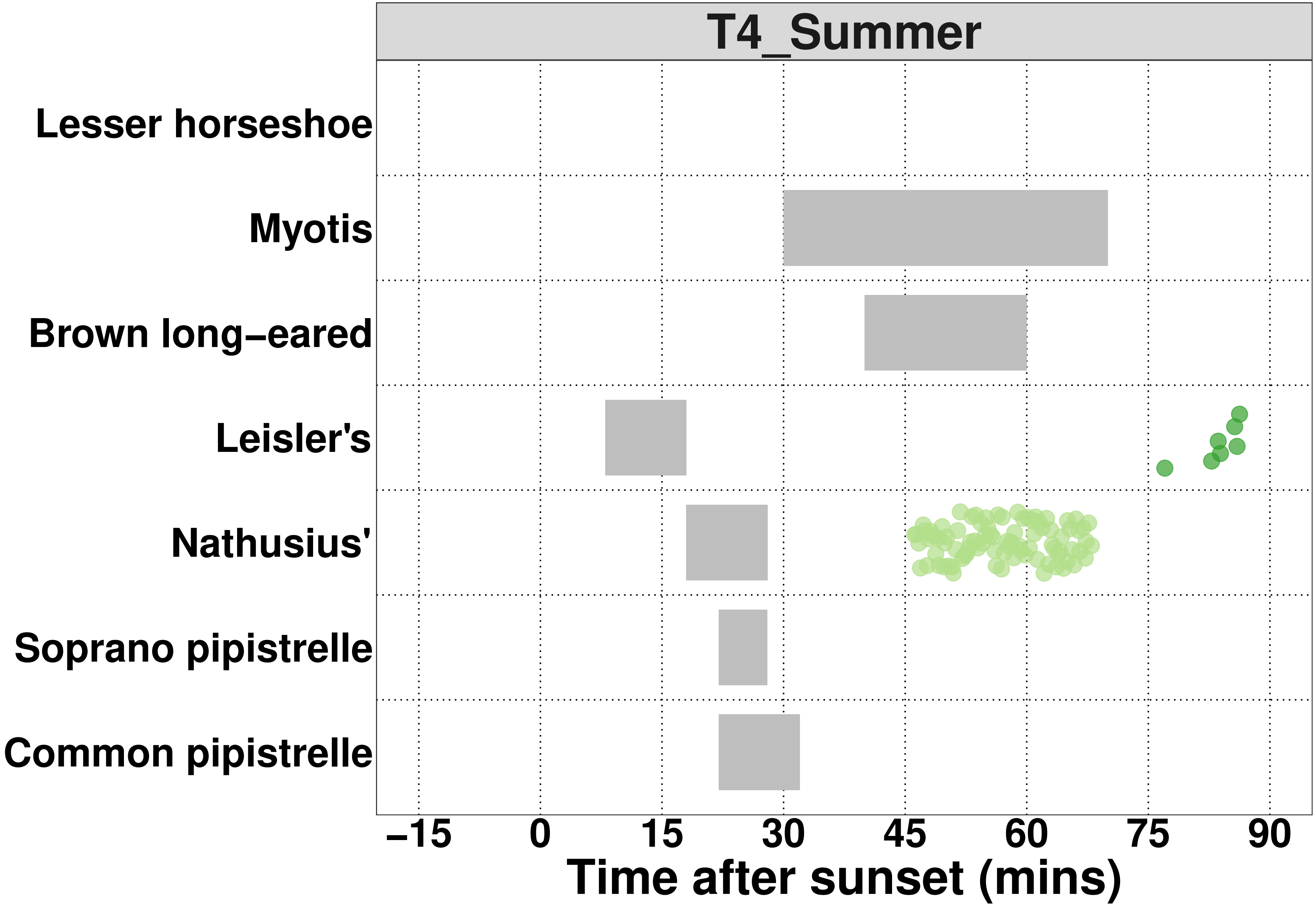
Bat Passes Potentially Indicating Close Proximity to a Roost (Russ 2012)

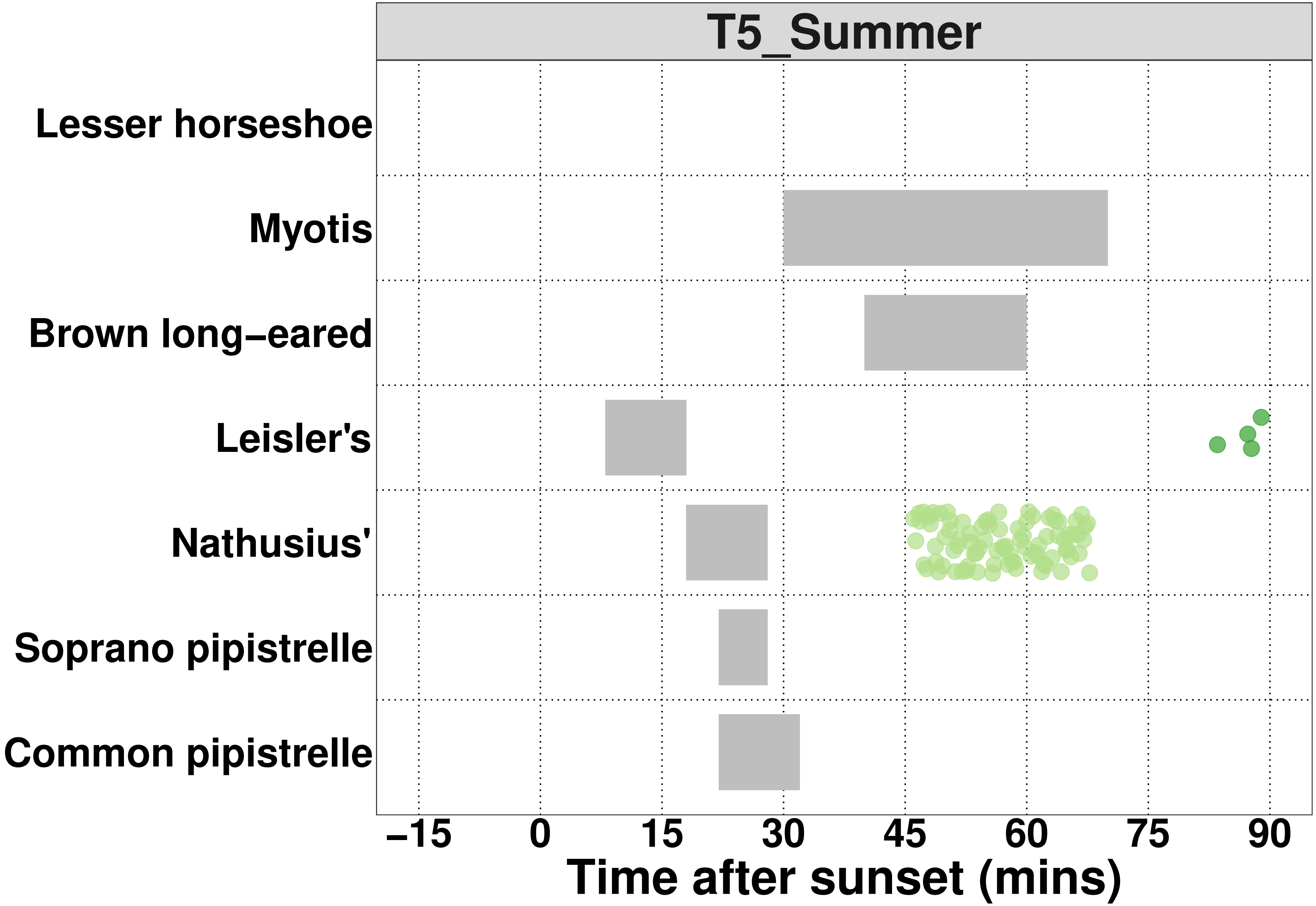
Figure 8. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars. Bat passes overlapping species-specific grey bars, or occuring earlier than this time range, may potentially indicate the presence of a nearby roost.

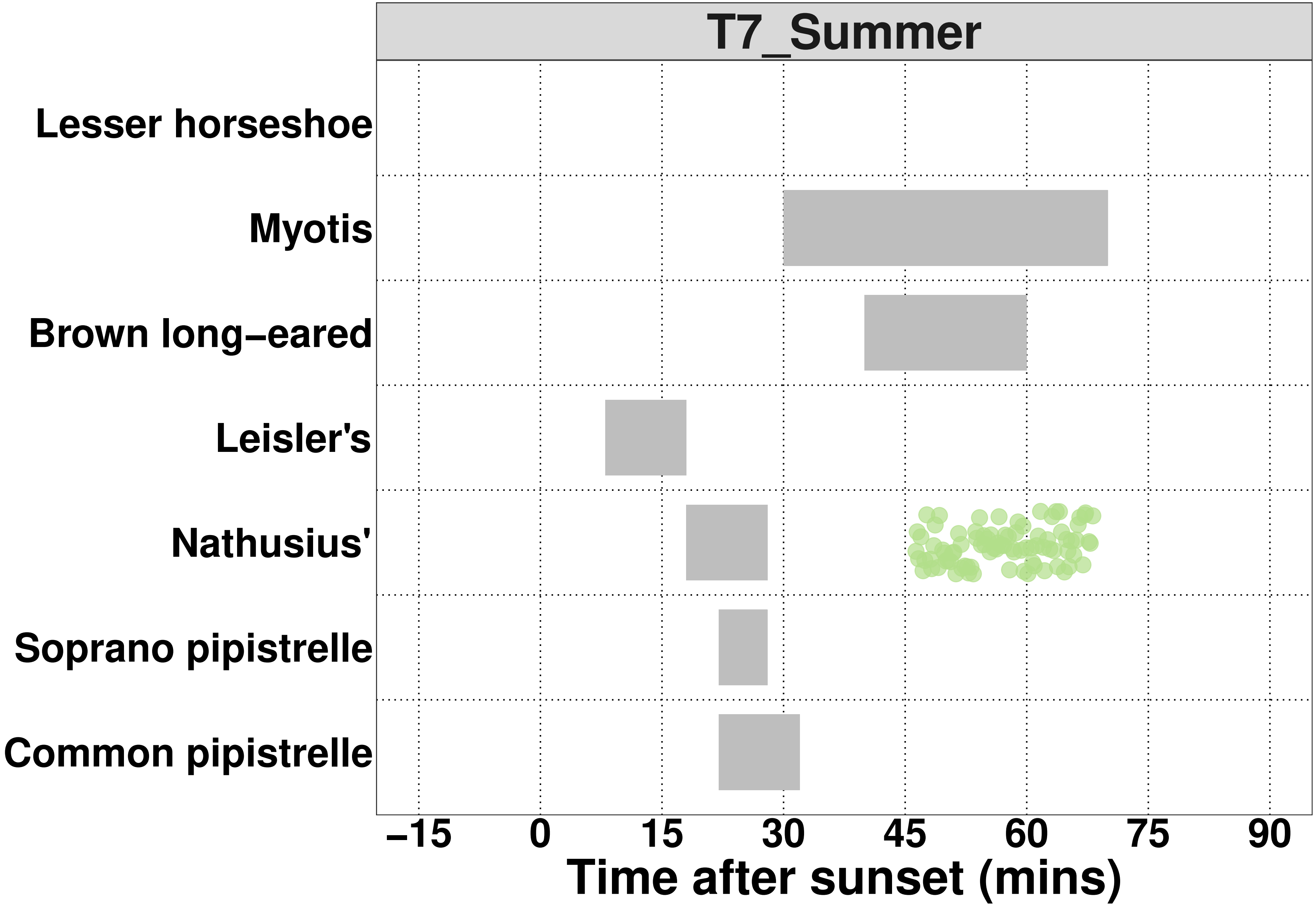

T1_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

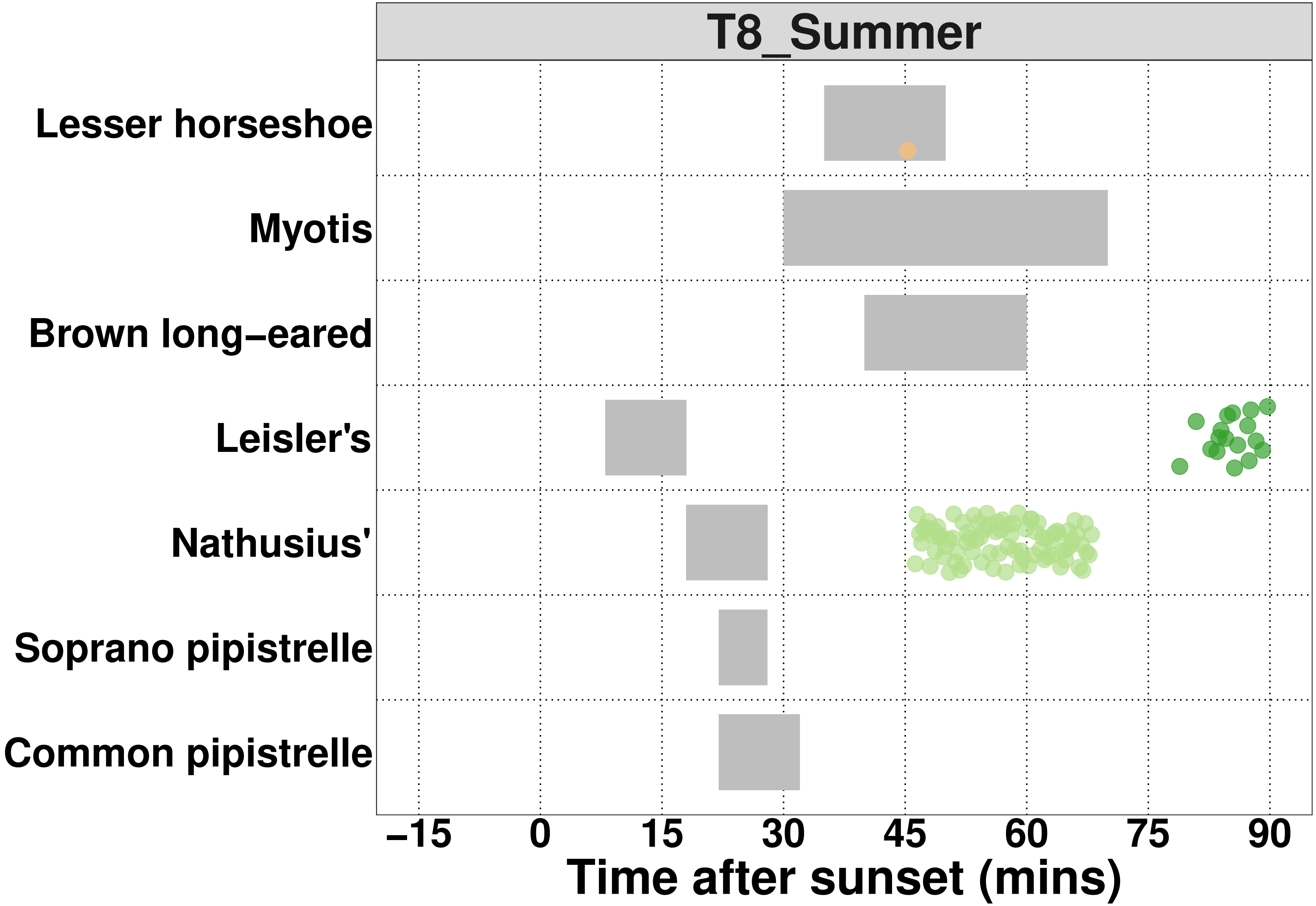

T2_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T3_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

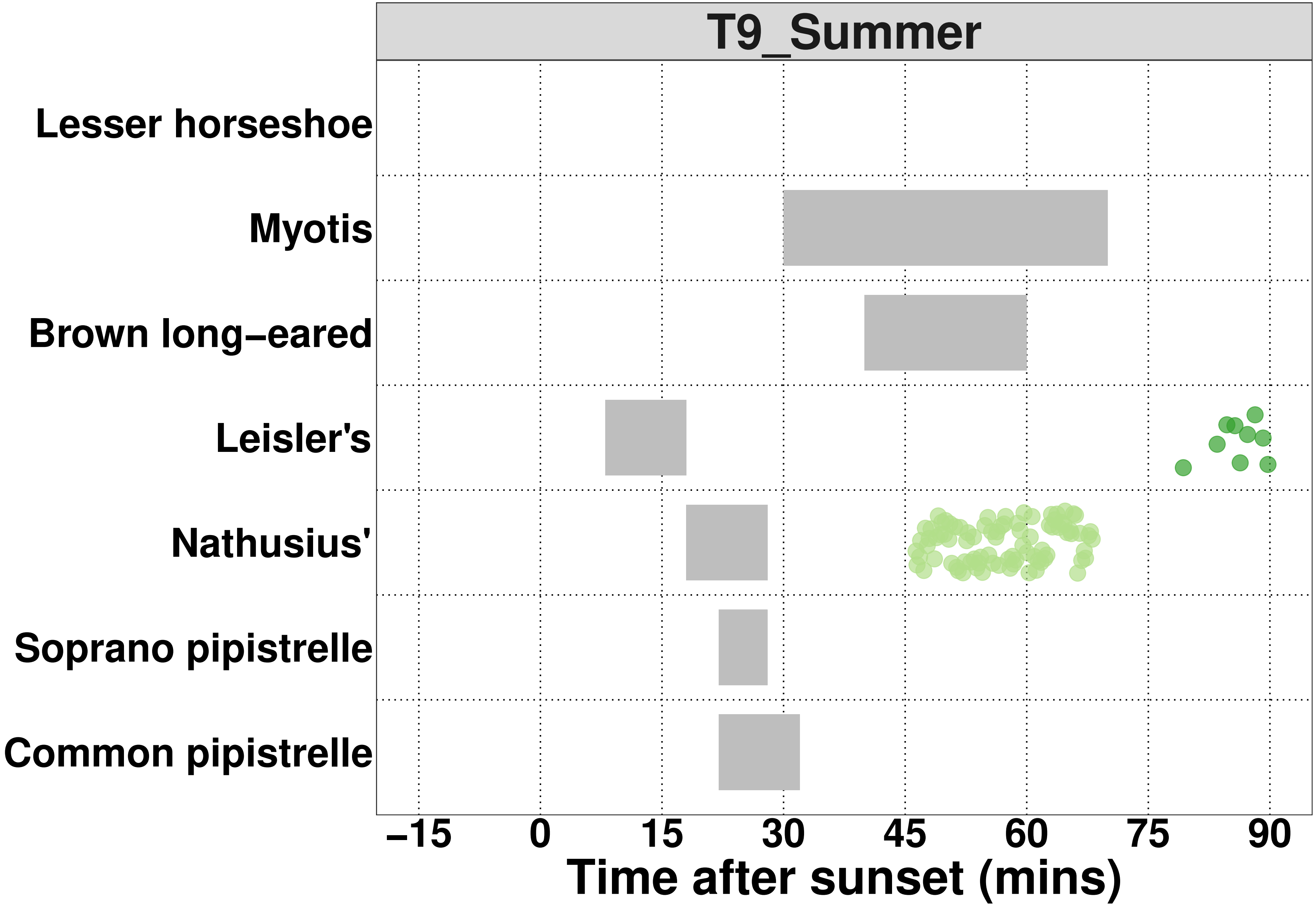

T4_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T5_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T7_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)



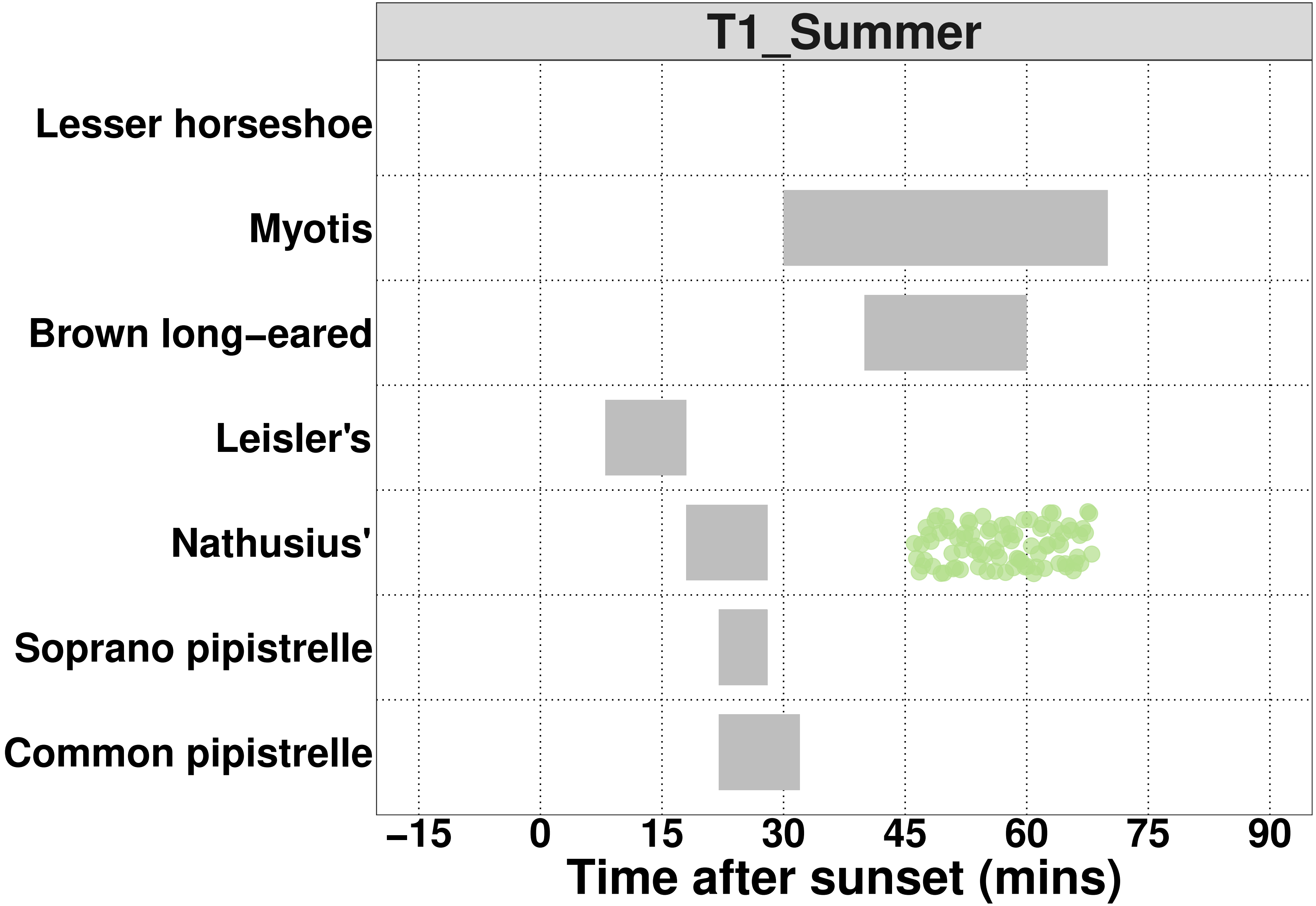
T8_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

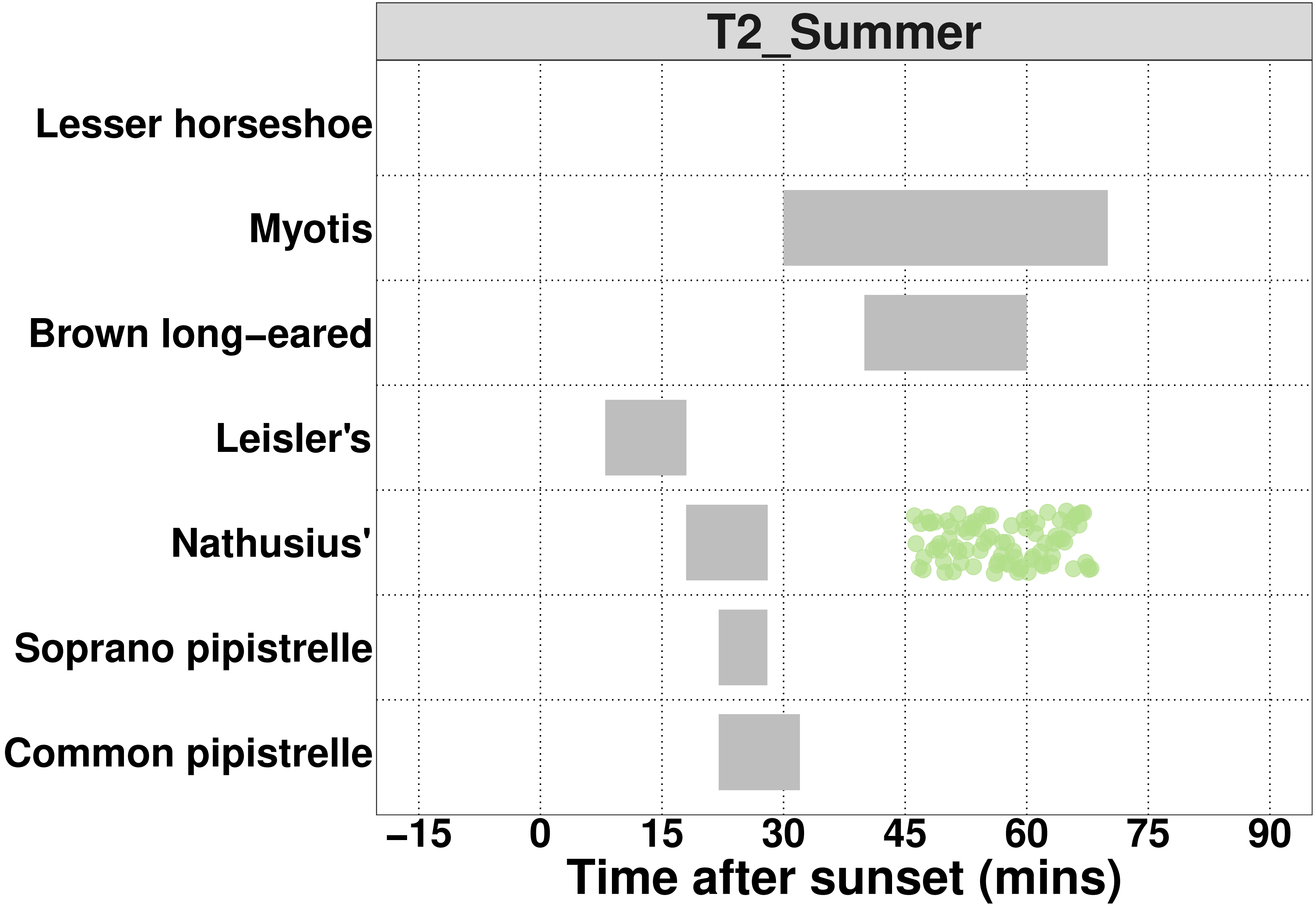

T9_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

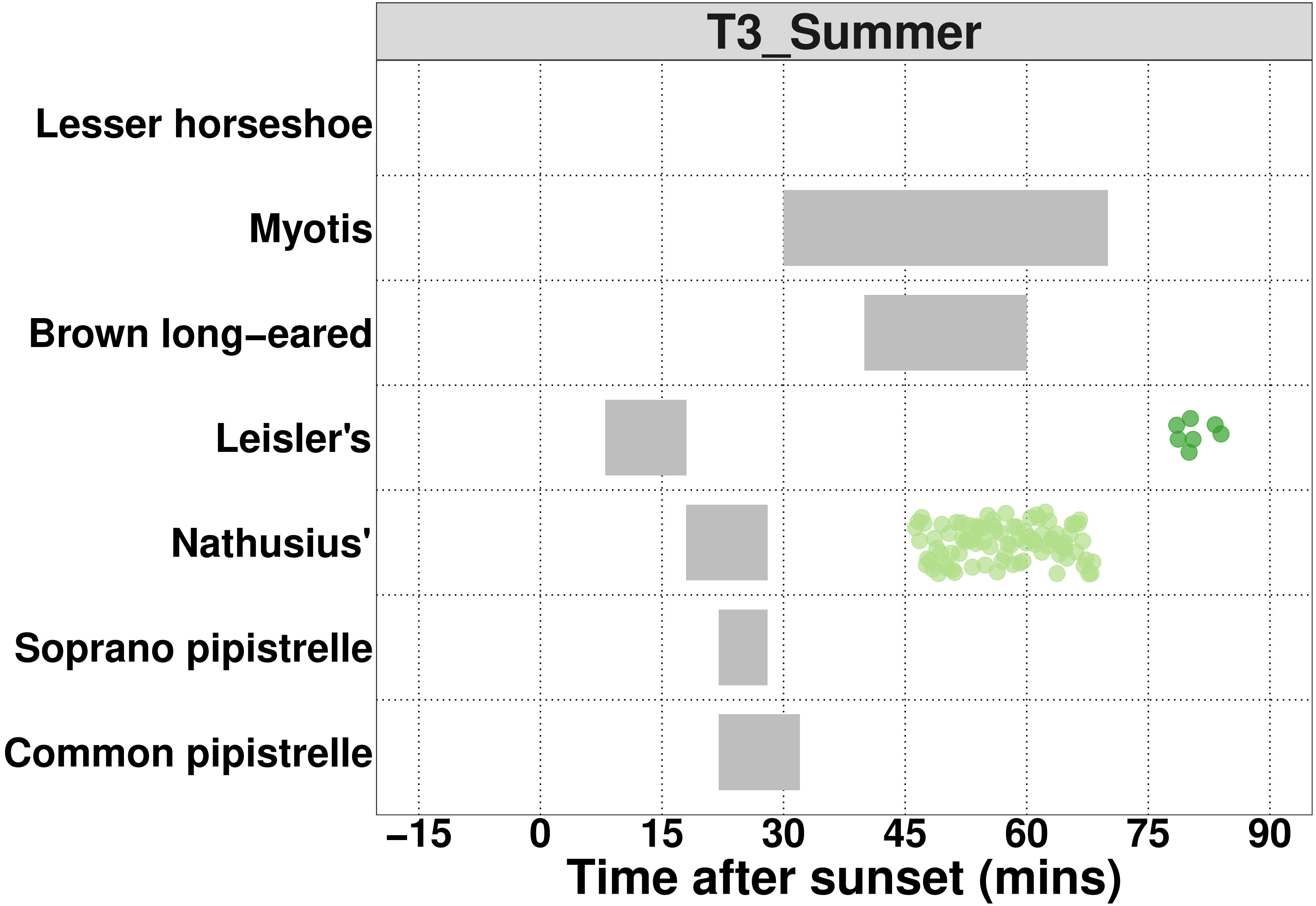
Bat Passes Potentially Indicating Close Proximity to a Roost (Maternity Period Only) - *Maternity period defined as 15th June - 30th July.

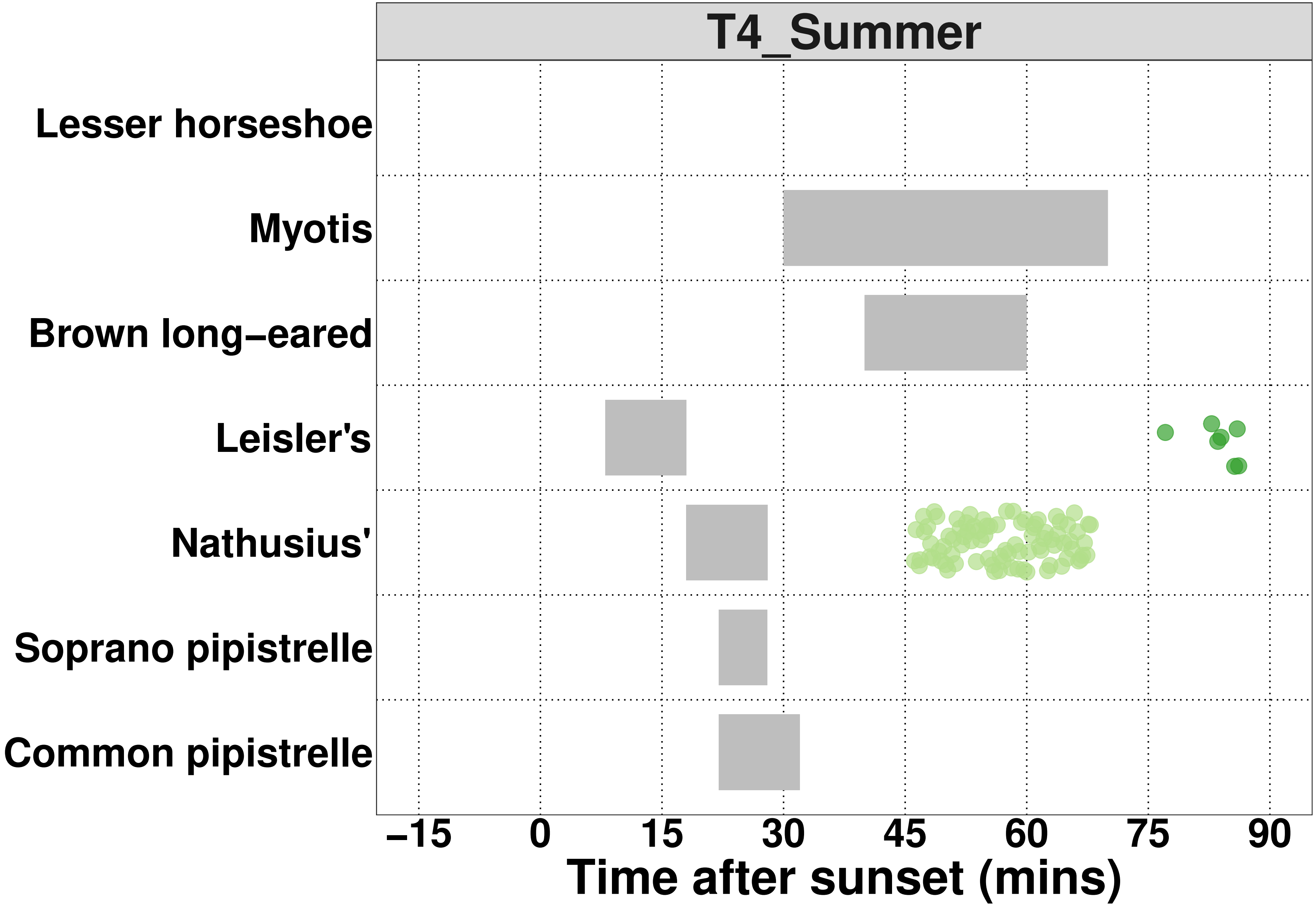
Species	Detector ID	2026-07-28
Lesser horseshoe	T8_Summer	1

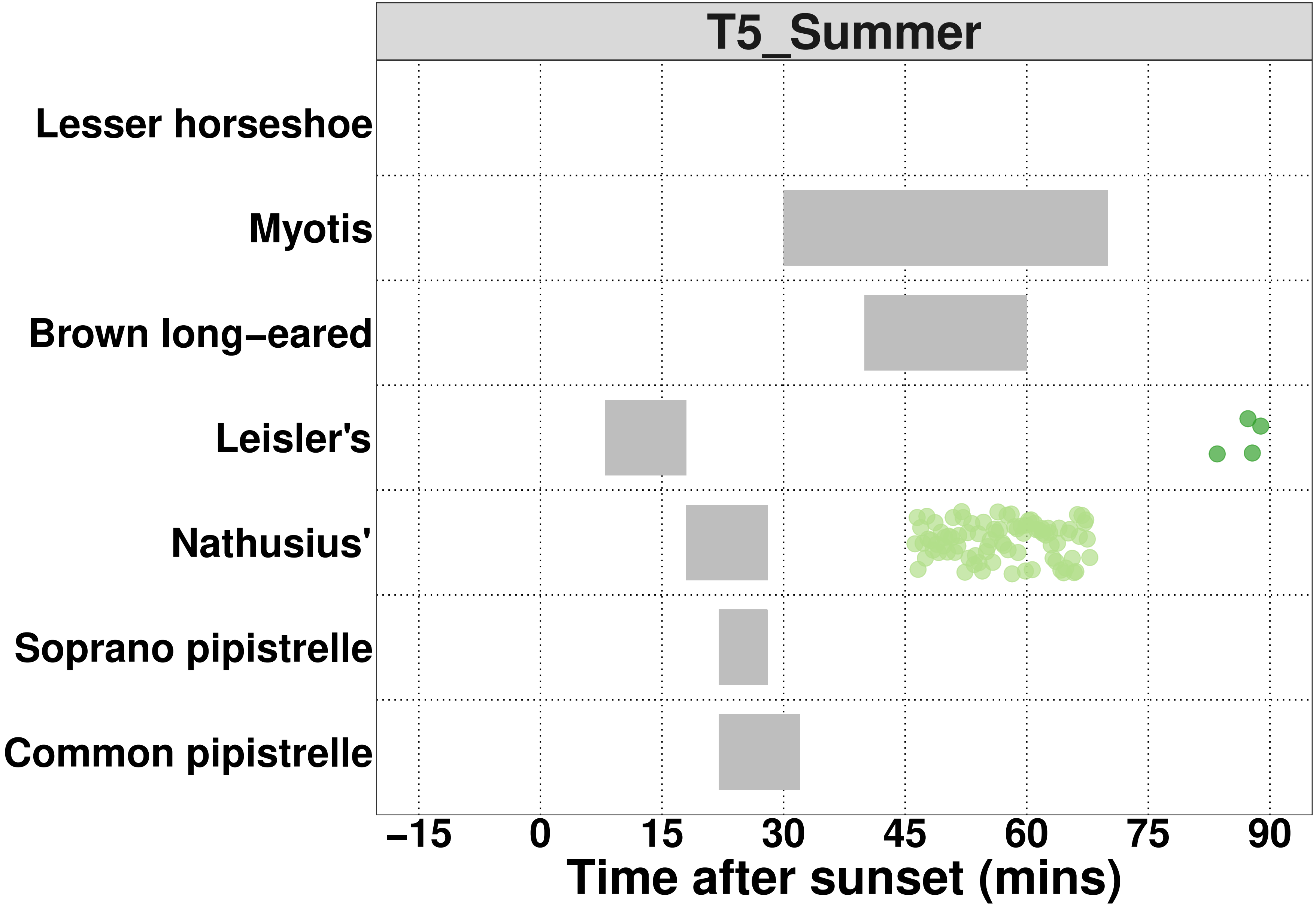
Bat Passes Potentially Indicating Close Proximity to a Roost (Maternity Period Only) - Maternity period defined as 15th June - 30th July.

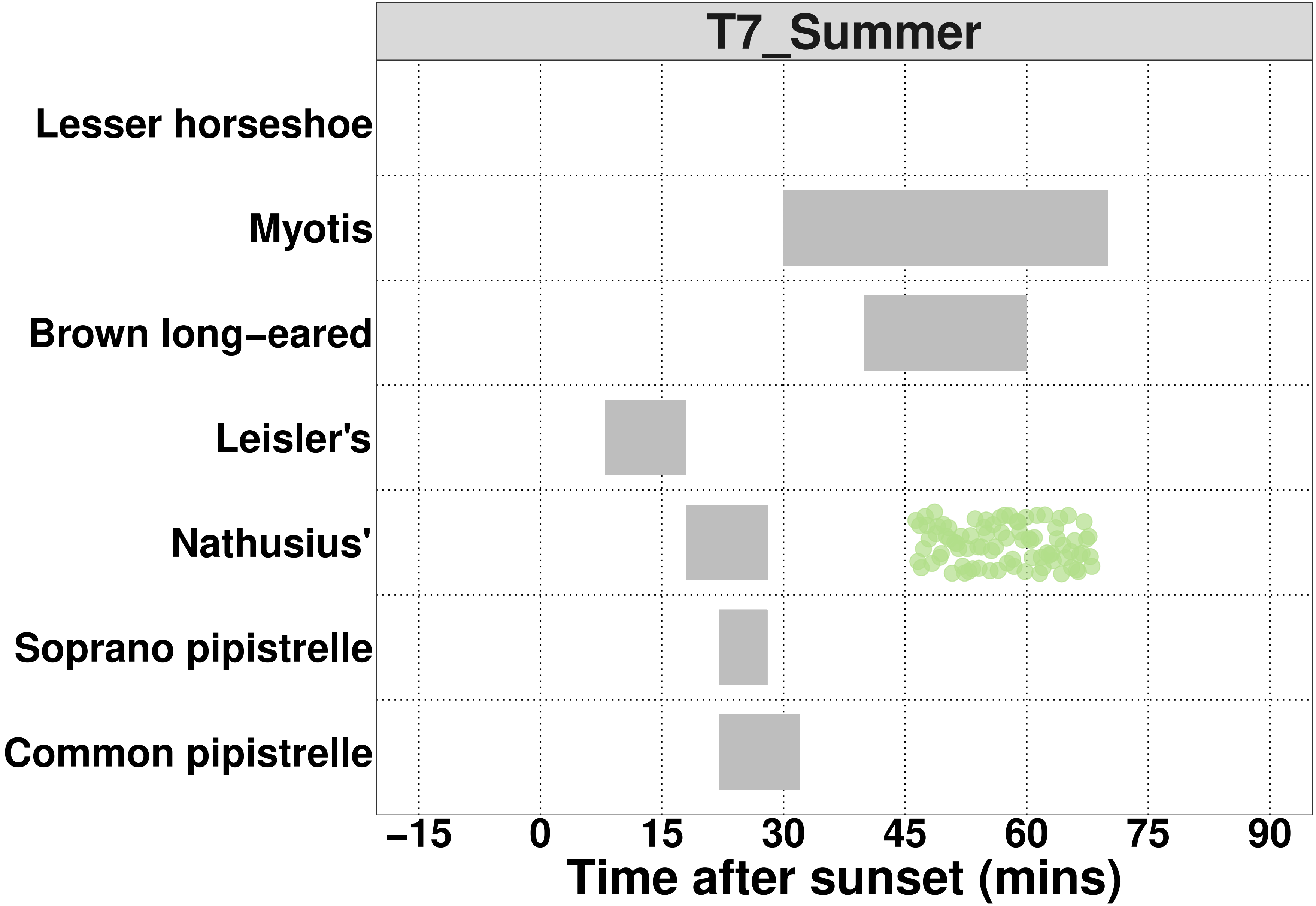

T1_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T2_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

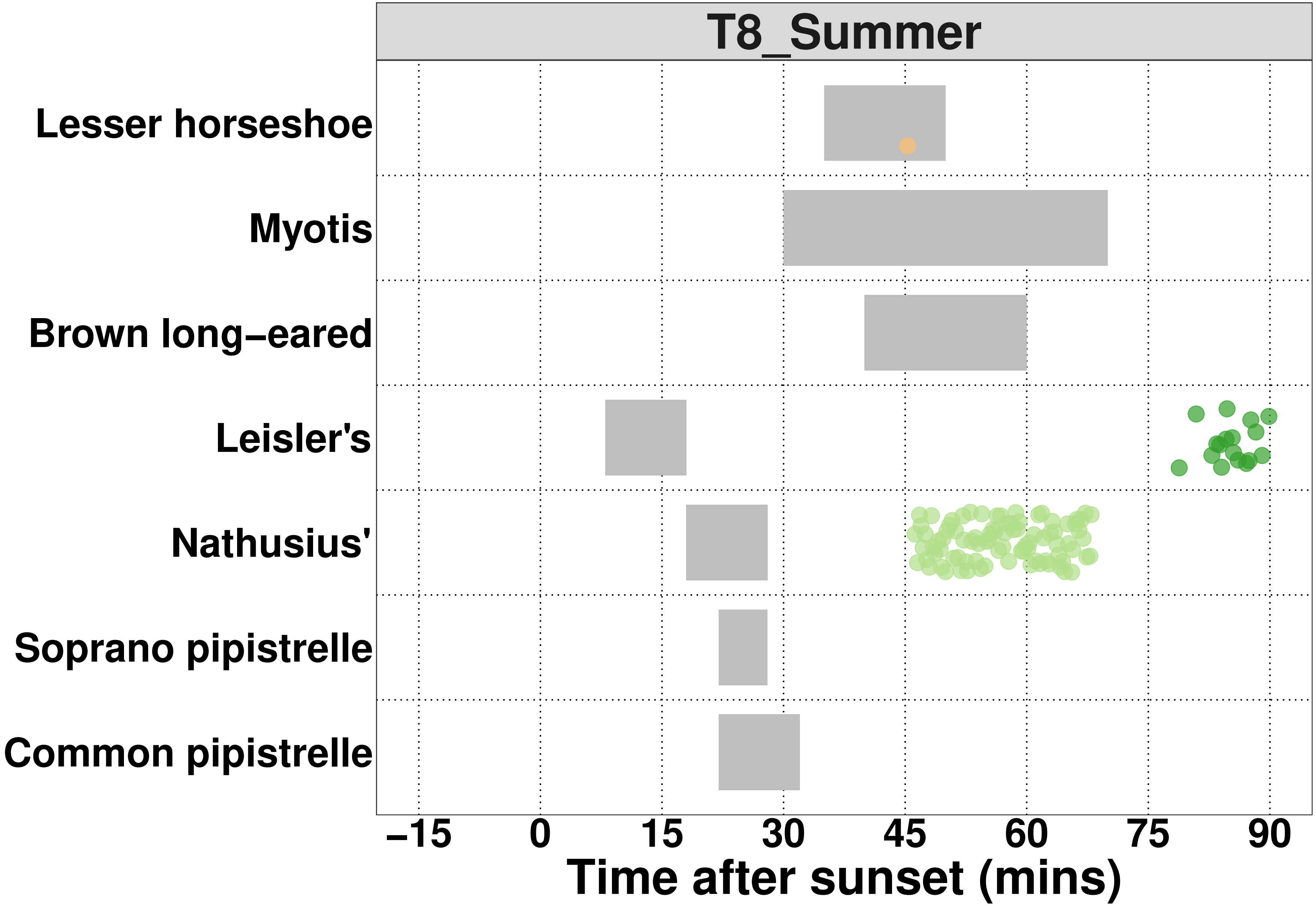

T3_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T4_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

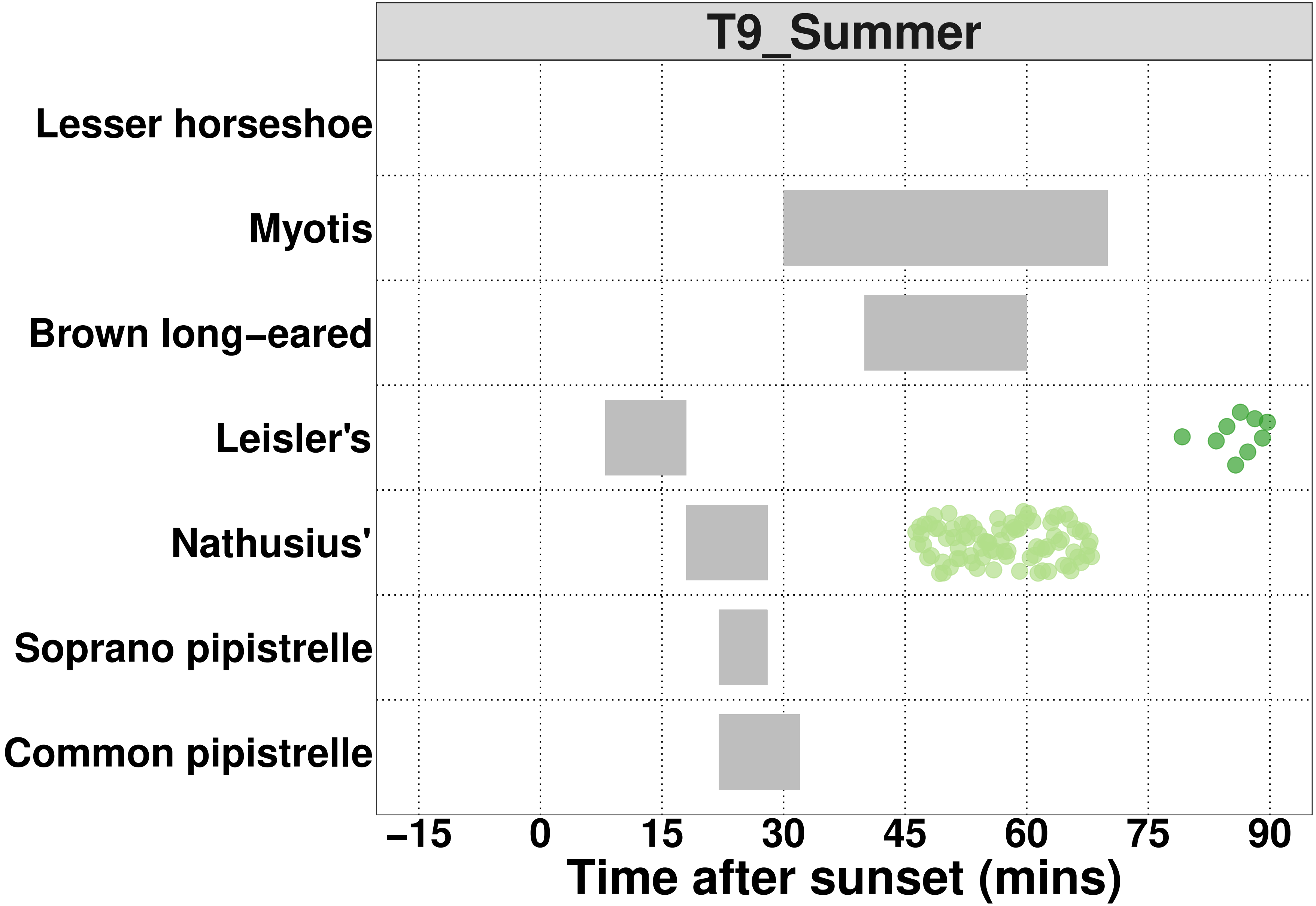

T5_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)



T7_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)



T8_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)


T9_Summer
Lesser horseshoe
Myotis
Brown long–eared
Leisler's
Nathusius'
Soprano pipistrelle
Common pipistrelle
–15
0
15
30
45
60
75
90
Time after sunset (mins)

Count 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 (%)
Myotis	76	1.9
Nyctalus leisleri	1792	44.8
Pipistrellus nathusii	699	17.5
Pipistrellus pipistrellus	897	22.4
Pipistrellus pygmaeus	270	6.8
Plecotus auritus	264	6.6
Rhinolophus hipposideros	1	0.0
Total	3999	100.0

Per Detector

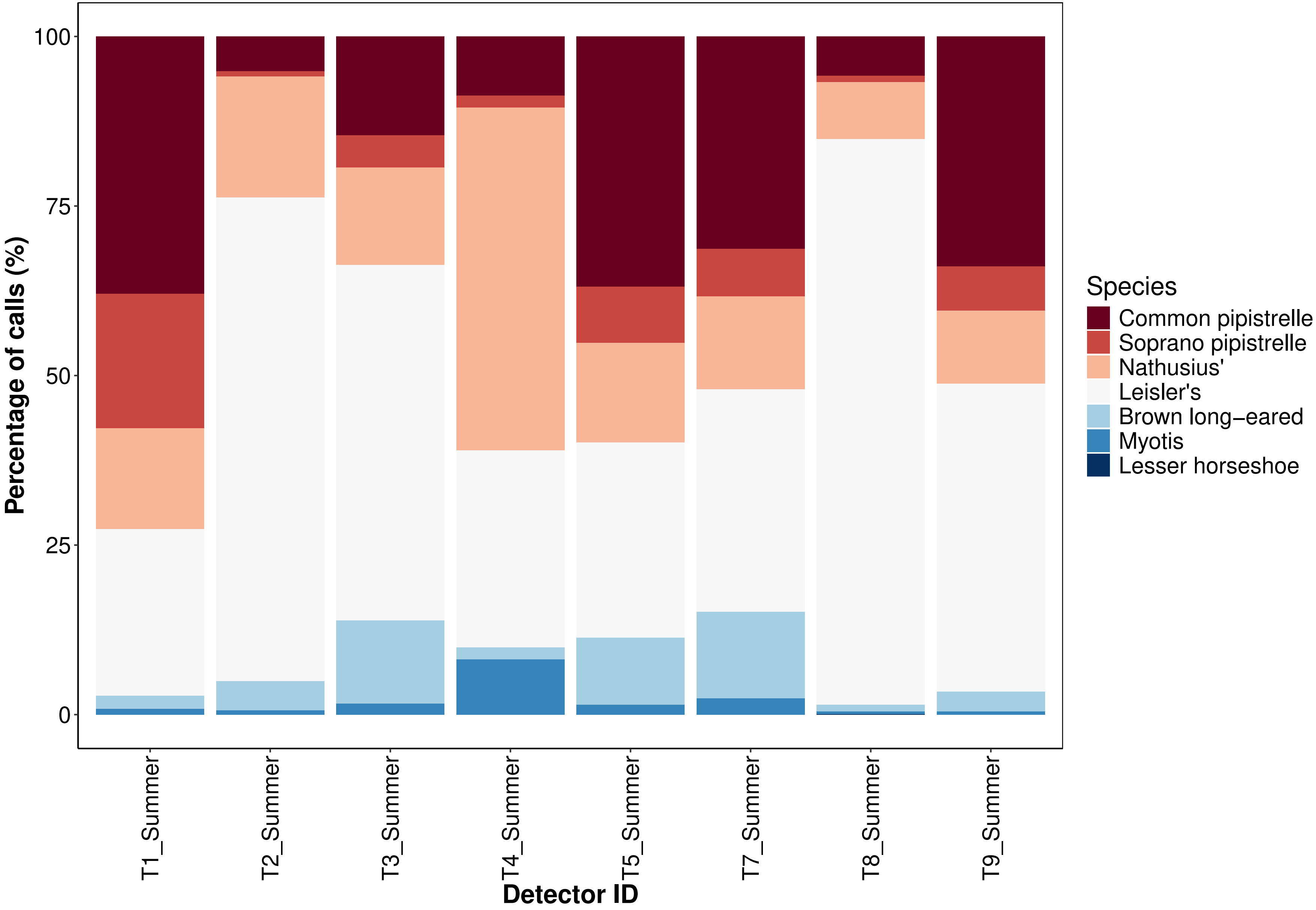
The number of passes recorded for each species at each detector.

Species	Detector ID	Count (no.)	Percentage by Detector (%)
Common pipistrelle	T1_Summer	226	40.8679928
Common pipistrelle	T2_Summer	25	6.4267352
Common pipistrelle	T3_Summer	71	14.1434263
Common pipistrelle	T4_Summer	15	8.7209302
Common pipistrelle	T5_Summer	252	43.2246998
Common pipistrelle	T7_Summer	97	19.1321499
Common pipistrelle	T8_Summer	50	7.1736011
Common pipistrelle	T9_Summer	161	27.0134228
Soprano pipistrelle	T1_Summer	110	19.8915009
Soprano pipistrelle	T2_Summer	4	1.0282776
Soprano pipistrelle	T3_Summer	17	3.3864542
Soprano pipistrelle	T4_Summer	3	1.7441860
Soprano pipistrelle	T5_Summer	60	10.2915952
Soprano pipistrelle	T7_Summer	35	6.9033531
Soprano pipistrelle	T8_Summer	10	1.4347202
Soprano pipistrelle	T9_Summer	31	5.2013423
Nathusius’	T1_Summer	87	15.7323689
Nathusius’	T2_Summer	87	22.3650386
Nathusius’	T3_Summer	87	17.3306773
Nathusius’	T4_Summer	87	50.5813953
Nathusius’	T5_Summer	87	14.9228130
Nathusius’	T7_Summer	88	17.3570020
Nathusius’	T8_Summer	87	12.4820660
Nathusius’	T9_Summer	89	14.9328859
Leisler’s	T1_Summer	113	20.4339964
Leisler’s	T2_Summer	250	64.2673522
Leisler’s	T3_Summer	242	48.2071713
Leisler’s	T4_Summer	50	29.0697674
Leisler’s	T5_Summer	131	22.4699828
Leisler’s	T7_Summer	180	35.5029586
Leisler’s	T8_Summer	534	76.6140603
Leisler’s	T9_Summer	292	48.9932886

Species	Detector ID	Count (no.)	Percentage by Detector (%)
Brown long-eared	T1_Summer	11	1.9891501
Brown long-eared	T2_Summer	20	5.1413882
Brown long-eared	T3_Summer	73	14.5418327
Brown long-eared	T4_Summer	3	1.7441860
Brown long-eared	T5_Summer	44	7.5471698
Brown long-eared	T7_Summer	83	16.3708087
Brown long-eared	T8_Summer	11	1.5781923
Brown long-eared	T9_Summer	19	3.1879195
Myotis	T1_Summer	6	1.0849910
Myotis	T2_Summer	3	0.7712082
Myotis	T3_Summer	12	2.3904382
Myotis	T4_Summer	14	8.1395349
Myotis	T5_Summer	9	1.5437393
Myotis	T7_Summer	24	4.7337278
Myotis	T8_Summer	4	0.5738881
Myotis	T9_Summer	4	0.6711409
Lesser horseshoe	T8_Summer	1	0.1434720

Species Composition

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



Percentage of calls (%)
100
75
50
25
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID
Species
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Brown long−eared
Myotis
Lesser horseshoe

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.

Nighlty 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	T1_Summer	0.5
Common pipistrelle	T2_Summer	0.3
Common pipistrelle	T3_Summer	0.3
Common pipistrelle	T4_Summer	0.2
Common pipistrelle	T5_Summer	0.9
Common pipistrelle	T7_Summer	0.7
Common pipistrelle	T8_Summer	0.5
Common pipistrelle	T9_Summer	0.5
Soprano pipistrelle	T1_Summer	0.8
Soprano pipistrelle	T2_Summer	0.1
Soprano pipistrelle	T3_Summer	0.4
Soprano pipistrelle	T4_Summer	0.1
Soprano pipistrelle	T5_Summer	1.3
Soprano pipistrelle	T7_Summer	0.3
Soprano pipistrelle	T8_Summer	0.2
Soprano pipistrelle	T9_Summer	0.5
Nathusius'	T1_Summer	10.4
Nathusius'	T2_Summer	10.4
Nathusius'	T3_Summer	10.4
Nathusius'	T4_Summer	10.4
Nathusius'	T5_Summer	20.8
Nathusius'	T7_Summer	10.5
Nathusius'	T8_Summer	10.4
Nathusius'	T9_Summer	5.3
Leisler's	T1_Summer	0.8
Leisler's	T2_Summer	1.3
Leisler's	T3_Summer	1.3
Leisler's	T4_Summer	0.3
Leisler's	T5_Summer	1.6
Leisler's	T7_Summer	1.4
Leisler's	T8_Summer	2.1
Leisler's	T9_Summer	0.5
Brown long-eared	T1_Summer	0.2
Brown long-eared	T2_Summer	0.2
Brown long-eared	T3_Summer	0.5
Brown long-eared	T4_Summer	0.1

Species	Detector ID	Median Pass Rate
Brown long-eared	T5_Summer	0.7
Brown long-eared	T7_Summer	1.1
Brown long-eared	T8_Summer	0.2
Brown long-eared	T9_Summer	0.3
Myotis	T1_Summer	0.1
Myotis	T2_Summer	0.1
Myotis	T3_Summer	0.1
Myotis	T4_Summer	0.1
Myotis	T5_Summer	0.3
Myotis	T7_Summer	0.2
Myotis	T8_Summer	0.1
Myotis	T9_Summer	0.1
Lesser horseshoe	T8_Summer	0.1

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.

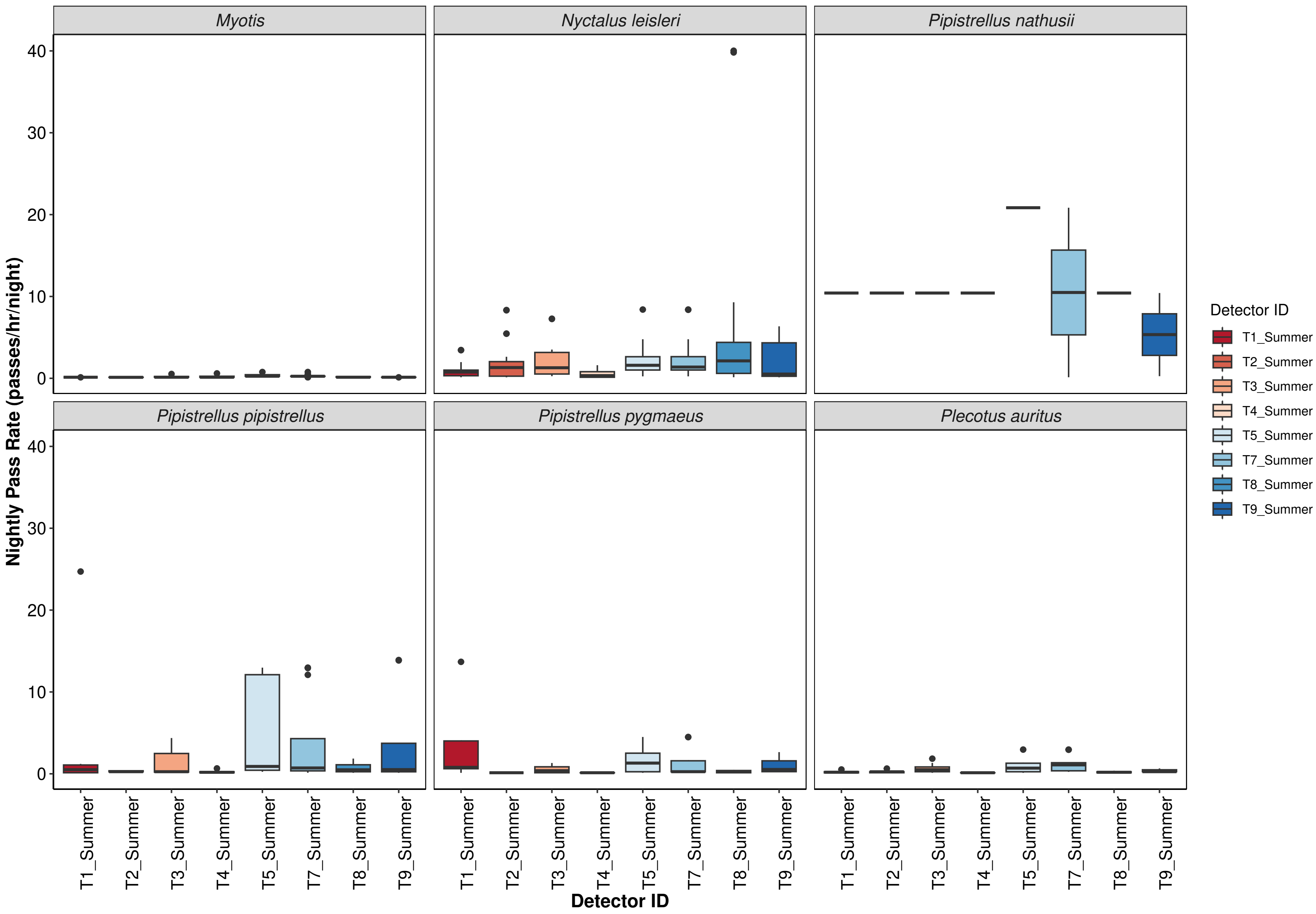
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

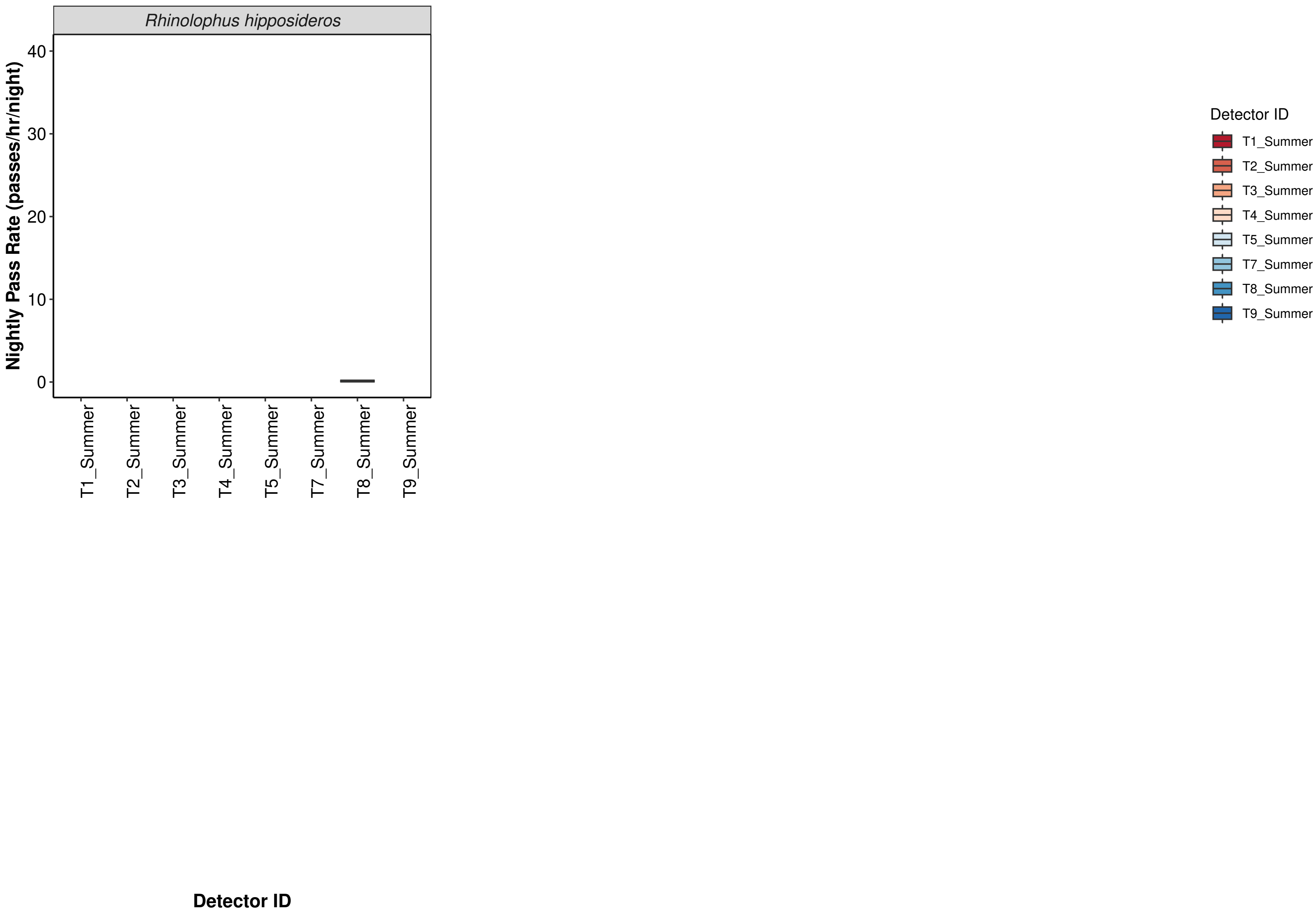
Species	Detector ID	Mean Pass Rate
Common pipistrelle	T1_Summer	2.9
Common pipistrelle	T2_Summer	0.3
Common pipistrelle	T3_Summer	1.4
Common pipistrelle	T4_Summer	0.2
Common pipistrelle	T5_Summer	5.2
Common pipistrelle	T7_Summer	3.3
Common pipistrelle	T8_Summer	0.7
Common pipistrelle	T9_Summer	3.7
Soprano pipistrelle	T1_Summer	3.8
Soprano pipistrelle	T2_Summer	0.1
Soprano pipistrelle	T3_Summer	0.5
Soprano pipistrelle	T4_Summer	0.1
Soprano pipistrelle	T5_Summer	1.4
Soprano pipistrelle	T7_Summer	1.3
Soprano pipistrelle	T8_Summer	0.3
Soprano pipistrelle	T9_Summer	1.0
Nathusius’	T1_Summer	10.4
Nathusius’	T2_Summer	10.4
Nathusius’	T3_Summer	10.4
Nathusius’	T4_Summer	10.4
Nathusius’	T5_Summer	20.8
Nathusius’	T7_Summer	10.5
Nathusius’	T8_Summer	10.4
Nathusius’	T9_Summer	5.3
Leisler’s	T1_Summer	1.0
Leisler’s	T2_Summer	2.1
Leisler’s	T3_Summer	2.1
Leisler’s	T4_Summer	0.5
Leisler’s	T5_Summer	2.2
Leisler’s	T7_Summer	2.3

Species	Detector ID	Mean Pass Rate
Leisler's	T8_Summer	7.3
Leisler's	T9_Summer	2.2
Brown long-eared	T1_Summer	0.2
Brown long-eared	T2_Summer	0.2
Brown long-eared	T3_Summer	0.6
Brown long-eared	T4_Summer	0.1
Brown long-eared	T5_Summer	0.8
Brown long-eared	T7_Summer	1.0
Brown long-eared	T8_Summer	0.2
Brown long-eared	T9_Summer	0.3
Myotis	T1_Summer	0.1
Myotis	T2_Summer	0.1
Myotis	T3_Summer	0.2
Myotis	T4_Summer	0.2
Myotis	T5_Summer	0.4
Myotis	T7_Summer	0.3
Myotis	T8_Summer	0.2
Myotis	T9_Summer	0.1
Lesser horseshoe	T8_Summer	0.1

Per Detector

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


Myotis
Nyctalus leisleri
Pipistrellus nathusii
Pipistrellus pipistrellus
Pipistrellus pygmaeus
Plecotus auritus
Nightly Pass Rate (passes/hr/night)
0
10
20
30
40
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID
Detector ID
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer


Rhinolophus hipposideros
Nightly Pass Rate (passes/hr/night)
40
30
20
10
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID
Detector ID
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer

Split by Month

Total Bat Passes per Detector each Month

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	Jul
Common pipistrelle	T1_Summer	222
Common pipistrelle	T2_Summer	25
Common pipistrelle	T3_Summer	88
Common pipistrelle	T4_Summer	15
Common pipistrelle	T5_Summer	436
Common pipistrelle	T7_Summer	400
Common pipistrelle	T8_Summer	60
Common pipistrelle	T9_Summer	280
Soprano pipistrelle	T1_Summer	116
Soprano pipistrelle	T2_Summer	4
Soprano pipistrelle	T3_Summer	29
Soprano pipistrelle	T4_Summer	3
Soprano pipistrelle	T5_Summer	98
Soprano pipistrelle	T7_Summer	90
Soprano pipistrelle	T8_Summer	10
Soprano pipistrelle	T9_Summer	54
Nathusius’	T1_Summer	87
Nathusius’	T2_Summer	87
Nathusius’	T3_Summer	87
Nathusius’	T4_Summer	87
Nathusius’	T5_Summer	174
Nathusius’	T7_Summer	175
Nathusius’	T8_Summer	87
Nathusius’	T9_Summer	89
Leisler’s	T1_Summer	144
Leisler’s	T2_Summer	349
Leisler’s	T3_Summer	317
Leisler’s	T4_Summer	50
Leisler’s	T5_Summer	340
Leisler’s	T7_Summer	419
Leisler’s	T8_Summer	867
Leisler’s	T9_Summer	375
Brown long-eared	T1_Summer	11
Brown long-eared	T2_Summer	21
Brown long-eared	T3_Summer	74
Brown long-eared	T4_Summer	3

Species	Detector ID	Jul
Brown long-eared	T5_Summer	117
Brown long-eared	T7_Summer	163
Brown long-eared	T8_Summer	10
Brown long-eared	T9_Summer	24
Myotis	T1_Summer	5
Myotis	T2_Summer	3
Myotis	T3_Summer	10
Myotis	T4_Summer	14
Myotis	T5_Summer	17
Myotis	T7_Summer	31
Myotis	T8_Summer	4
Myotis	T9_Summer	4
Lesser horseshoe	T8_Summer	1

Survey Effort

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

month	Detector ID	No. of Survey Nights
Jul	T1_Summer	21
Jul	T2_Summer	23
Jul	T3_Summer	21
Jul	T4_Summer	17
Jul	T5_Summer	23
Jul	T7_Summer	25
Jul	T8_Summer	18
Jul	T9_Summer	25

Nightly Bat Passes 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	Jul
Common pipistrelle	T1_Summer	0.5
Common pipistrelle	T2_Summer	0.3
Common pipistrelle	T3_Summer	0.3
Common pipistrelle	T4_Summer	0.2
Common pipistrelle	T5_Summer	0.9
Common pipistrelle	T7_Summer	0.7
Common pipistrelle	T8_Summer	0.5
Common pipistrelle	T9_Summer	0.5
Soprano pipistrelle	T1_Summer	0.8
Soprano pipistrelle	T2_Summer	0.1
Soprano pipistrelle	T3_Summer	0.4
Soprano pipistrelle	T4_Summer	0.1
Soprano pipistrelle	T5_Summer	1.3
Soprano pipistrelle	T7_Summer	0.3
Soprano pipistrelle	T8_Summer	0.2
Soprano pipistrelle	T9_Summer	0.5
Nathusius'	T1_Summer	10.4
Nathusius'	T2_Summer	10.4
Nathusius'	T3_Summer	10.4
Nathusius'	T4_Summer	10.4
Nathusius'	T5_Summer	20.8
Nathusius'	T7_Summer	10.5
Nathusius'	T8_Summer	10.4
Nathusius'	T9_Summer	5.3
Leisler's	T1_Summer	0.8
Leisler's	T2_Summer	1.3
Leisler's	T3_Summer	1.3
Leisler's	T4_Summer	0.3
Leisler's	T5_Summer	1.6
Leisler's	T7_Summer	1.4
Leisler's	T8_Summer	2.1
Leisler's	T9_Summer	0.5
Brown long-eared	T1_Summer	0.2
Brown long-eared	T2_Summer	0.2
Brown long-eared	T3_Summer	0.5
Brown long-eared	T4_Summer	0.1

Species	Detector ID	Jul
Brown long-eared	T5_Summer	0.7
Brown long-eared	T7_Summer	1.1
Brown long-eared	T8_Summer	0.2
Brown long-eared	T9_Summer	0.3
Myotis	T1_Summer	0.1
Myotis	T2_Summer	0.1
Myotis	T3_Summer	0.1
Myotis	T4_Summer	0.1
Myotis	T5_Summer	0.3
Myotis	T7_Summer	0.2
Myotis	T8_Summer	0.1
Myotis	T9_Summer	0.1
Lesser horseshoe	T8_Summer	0.1

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.

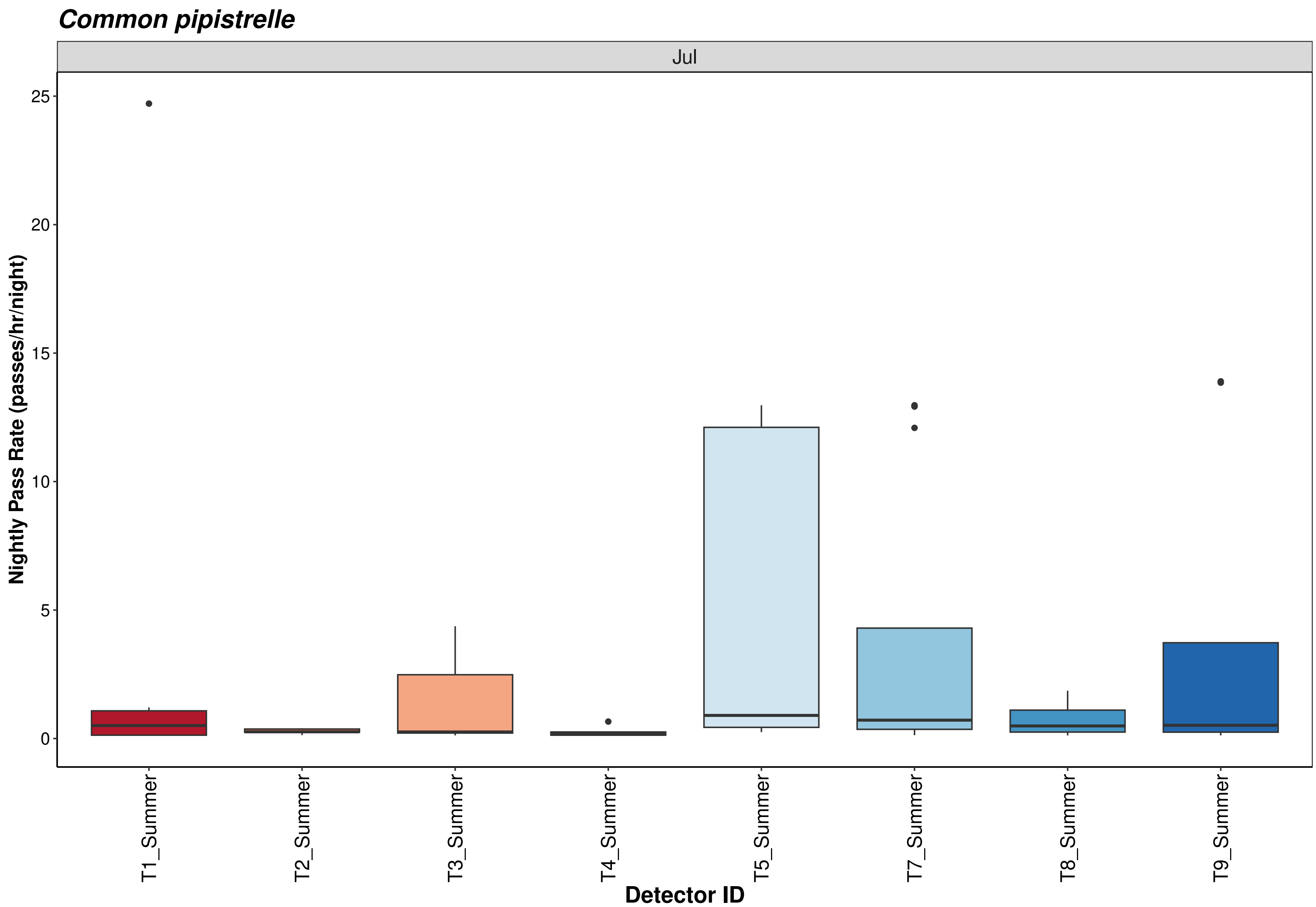
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

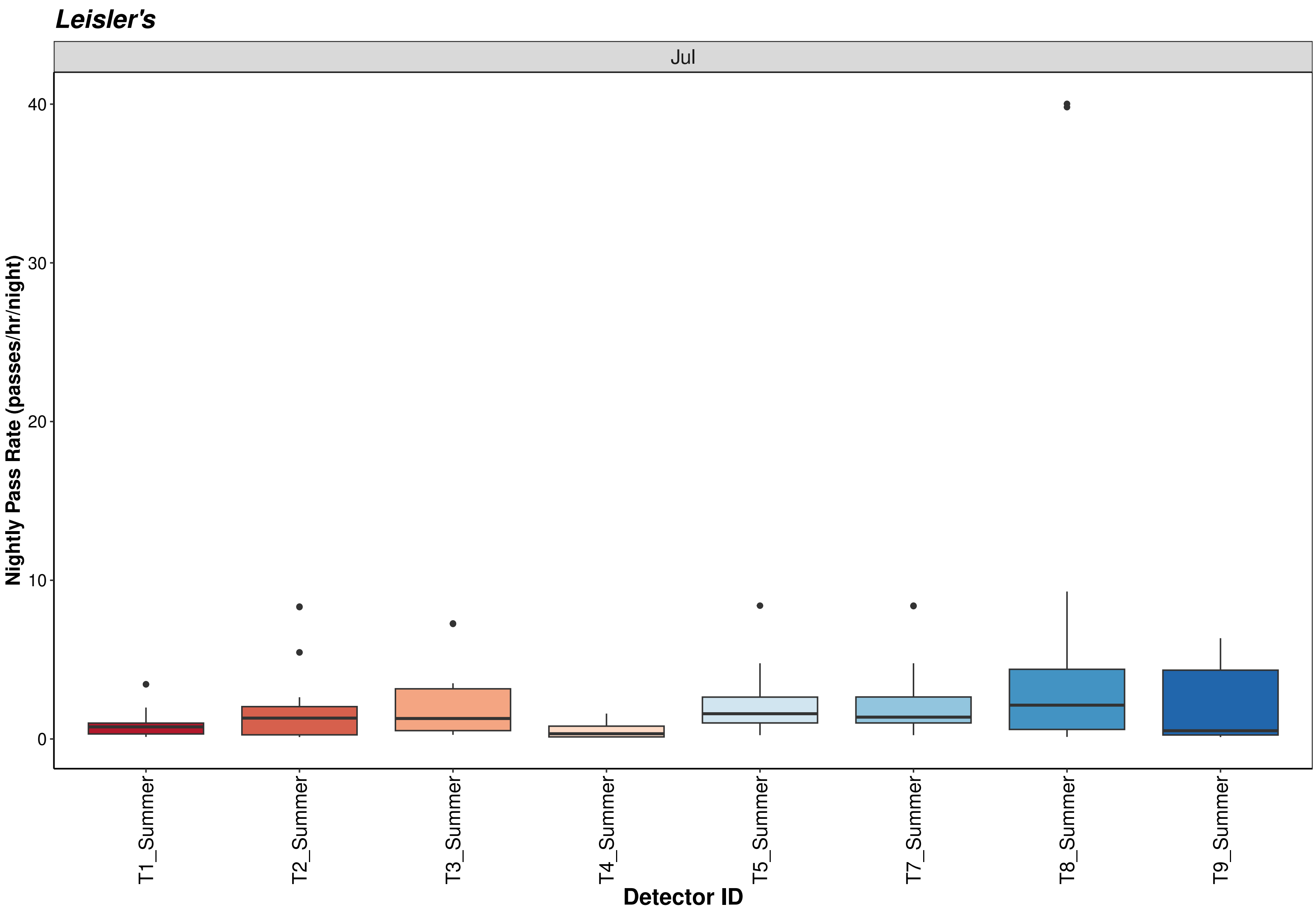
Species	Detector ID	Jul
Common pipistrelle	T1_Summer	2.9
Common pipistrelle	T2_Summer	0.3
Common pipistrelle	T3_Summer	1.4
Common pipistrelle	T4_Summer	0.2
Common pipistrelle	T5_Summer	5.2
Common pipistrelle	T7_Summer	3.3
Common pipistrelle	T8_Summer	0.7
Common pipistrelle	T9_Summer	3.7
Soprano pipistrelle	T1_Summer	3.8
Soprano pipistrelle	T2_Summer	0.1
Soprano pipistrelle	T3_Summer	0.5
Soprano pipistrelle	T4_Summer	0.1
Soprano pipistrelle	T5_Summer	1.4
Soprano pipistrelle	T7_Summer	1.3
Soprano pipistrelle	T8_Summer	0.3
Soprano pipistrelle	T9_Summer	1.0
Nathusius’	T1_Summer	10.4
Nathusius’	T2_Summer	10.4
Nathusius’	T3_Summer	10.4
Nathusius’	T4_Summer	10.4
Nathusius’	T5_Summer	20.8
Nathusius’	T7_Summer	10.5
Nathusius’	T8_Summer	10.4
Nathusius’	T9_Summer	5.3
Leisler’s	T1_Summer	1.0
Leisler’s	T2_Summer	2.1
Leisler’s	T3_Summer	2.1
Leisler’s	T4_Summer	0.5
Leisler’s	T5_Summer	2.2
Leisler’s	T7_Summer	2.3

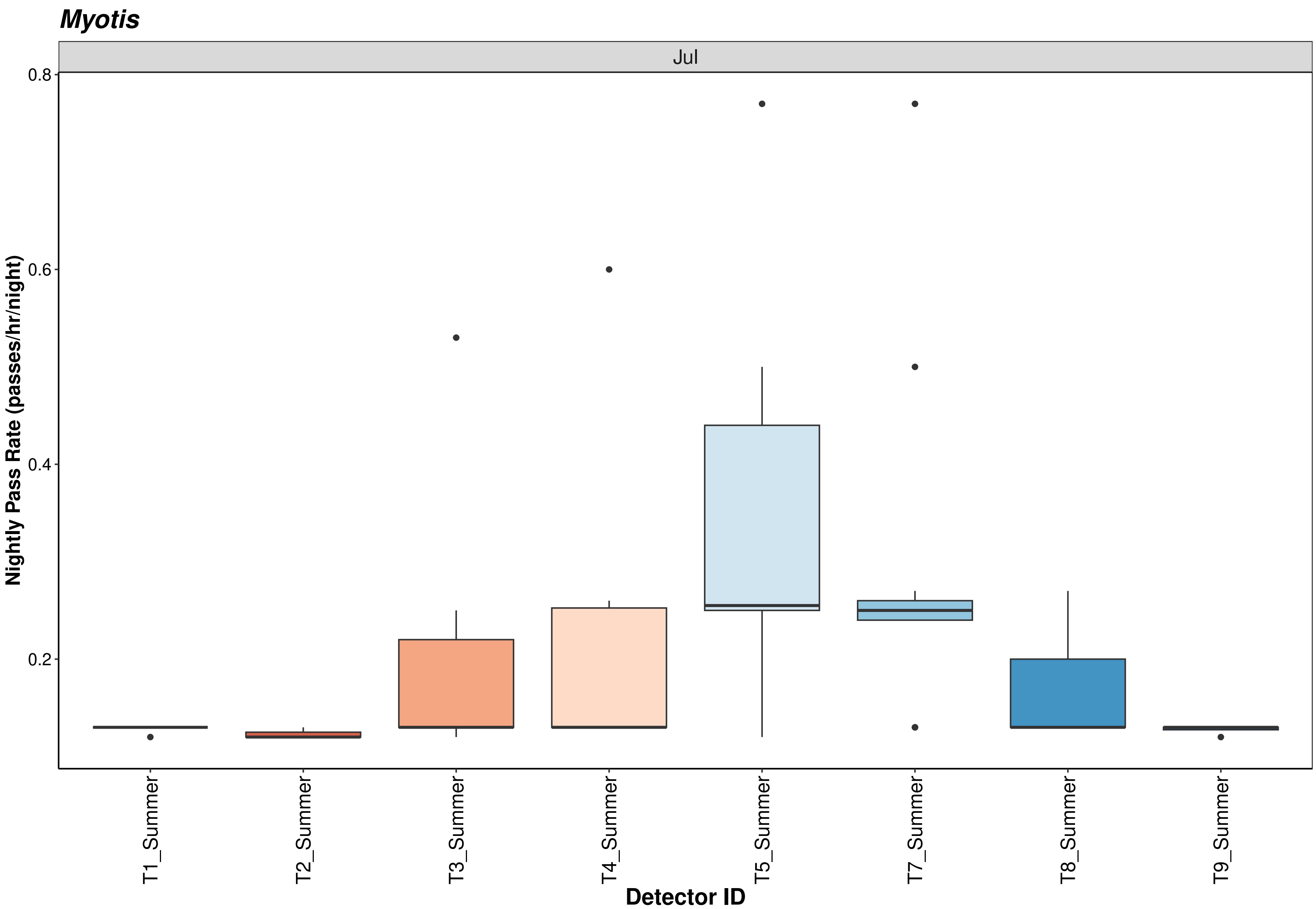
Species	Detector ID	Jul
Leisler's	T8_Summer	7.3
Leisler's	T9_Summer	2.2
Brown long-eared	T1_Summer	0.2
Brown long-eared	T2_Summer	0.2
Brown long-eared	T3_Summer	0.6
Brown long-eared	T4_Summer	0.1
Brown long-eared	T5_Summer	0.8
Brown long-eared	T7_Summer	1.0
Brown long-eared	T8_Summer	0.2
Brown long-eared	T9_Summer	0.3
Myotis	T1_Summer	0.1
Myotis	T2_Summer	0.1
Myotis	T3_Summer	0.2
Myotis	T4_Summer	0.2
Myotis	T5_Summer	0.4
Myotis	T7_Summer	0.3
Myotis	T8_Summer	0.2
Myotis	T9_Summer	0.1
Lesser horseshoe	T8_Summer	0.1

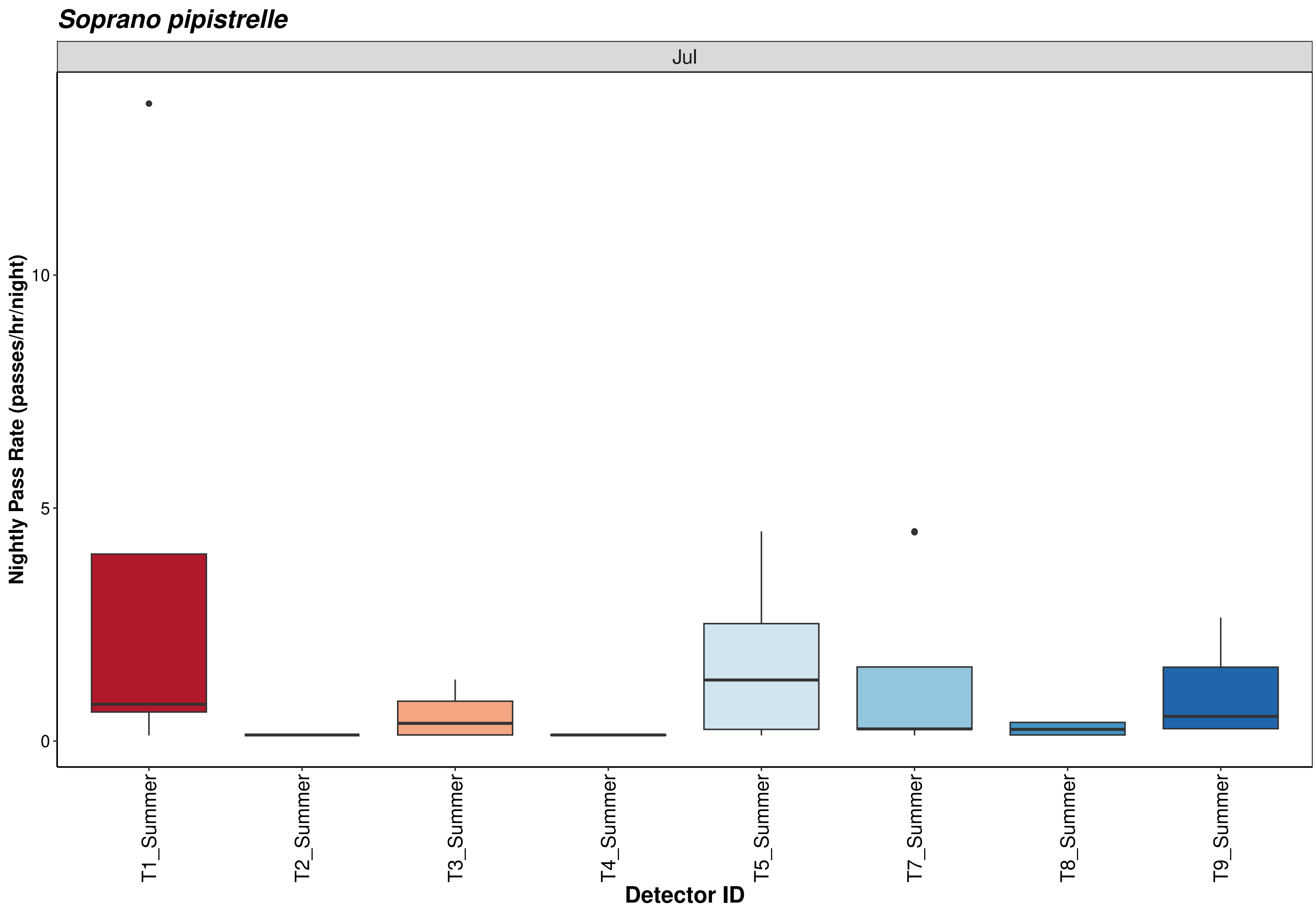
Per Detector

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

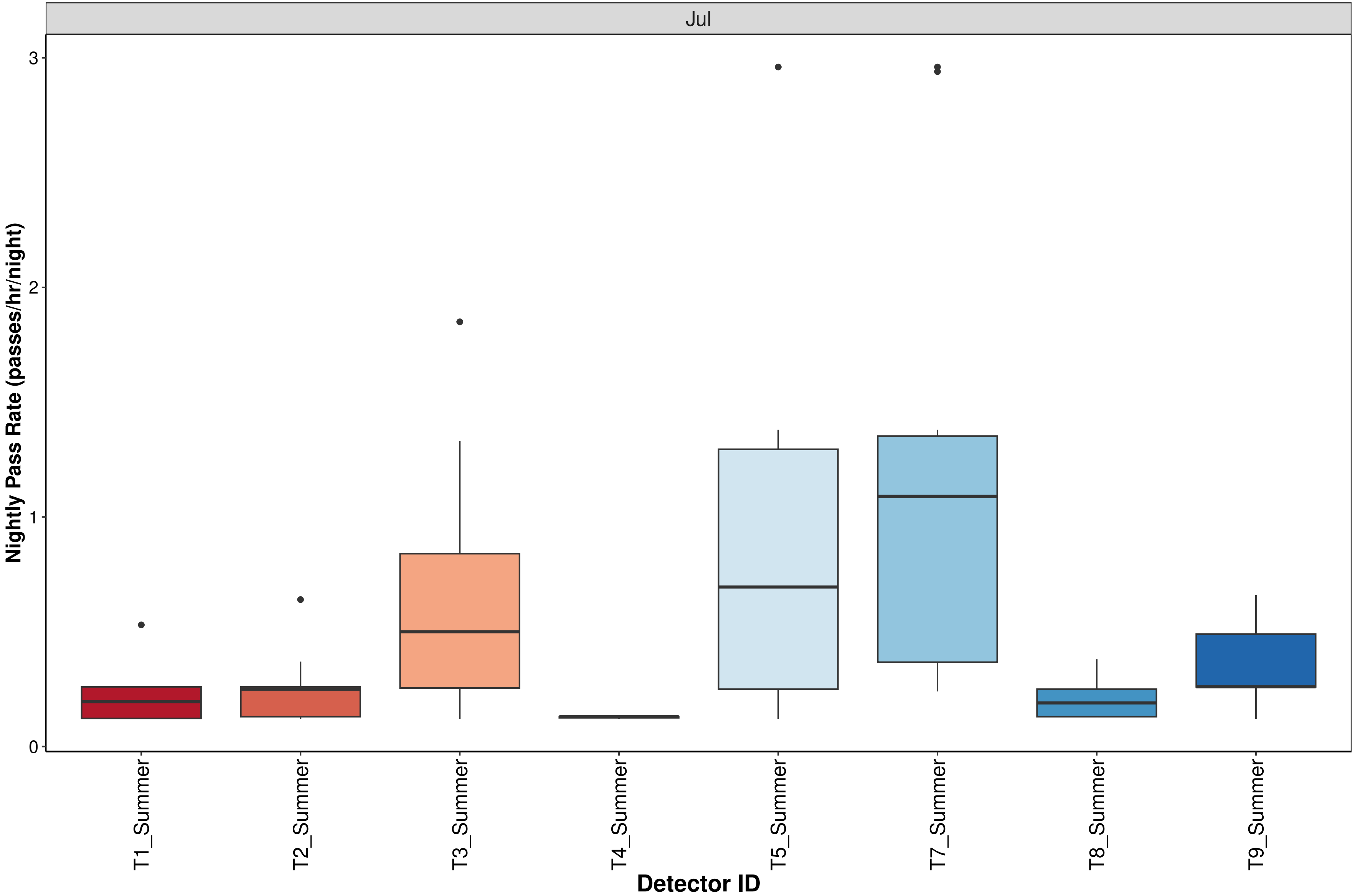

Common pipistrelle
Jul
Nightly Pass Rate (passes/hr/night)
25
20
15
10
5
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

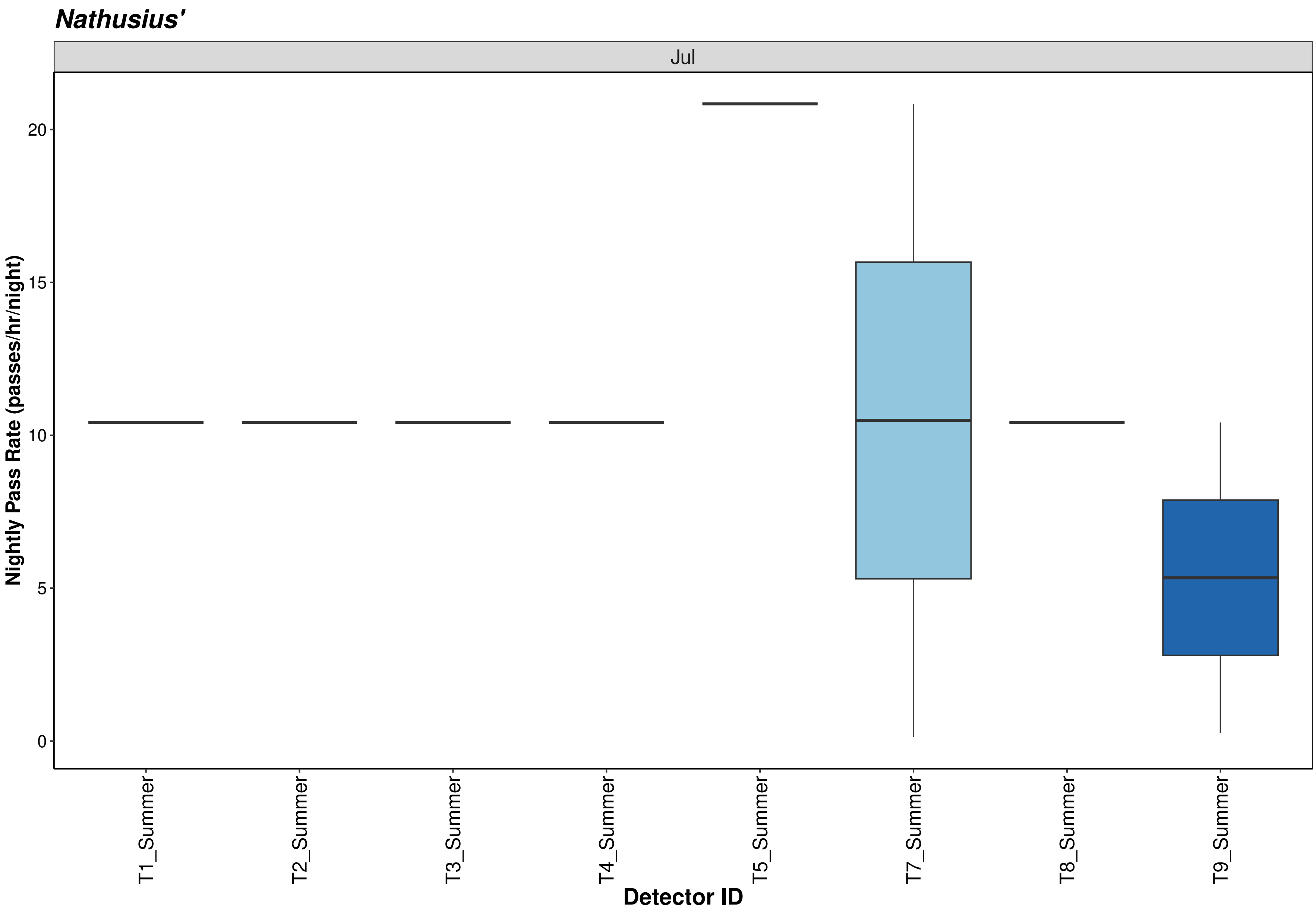

Leisler's
Jul
Nightly Pass Rate (passes/hr/night)
40
30
20
10
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID


Myotis
Jul
0.8
0.6
0.4
0.2
Nightly Pass Rate (passes/hr/night)
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

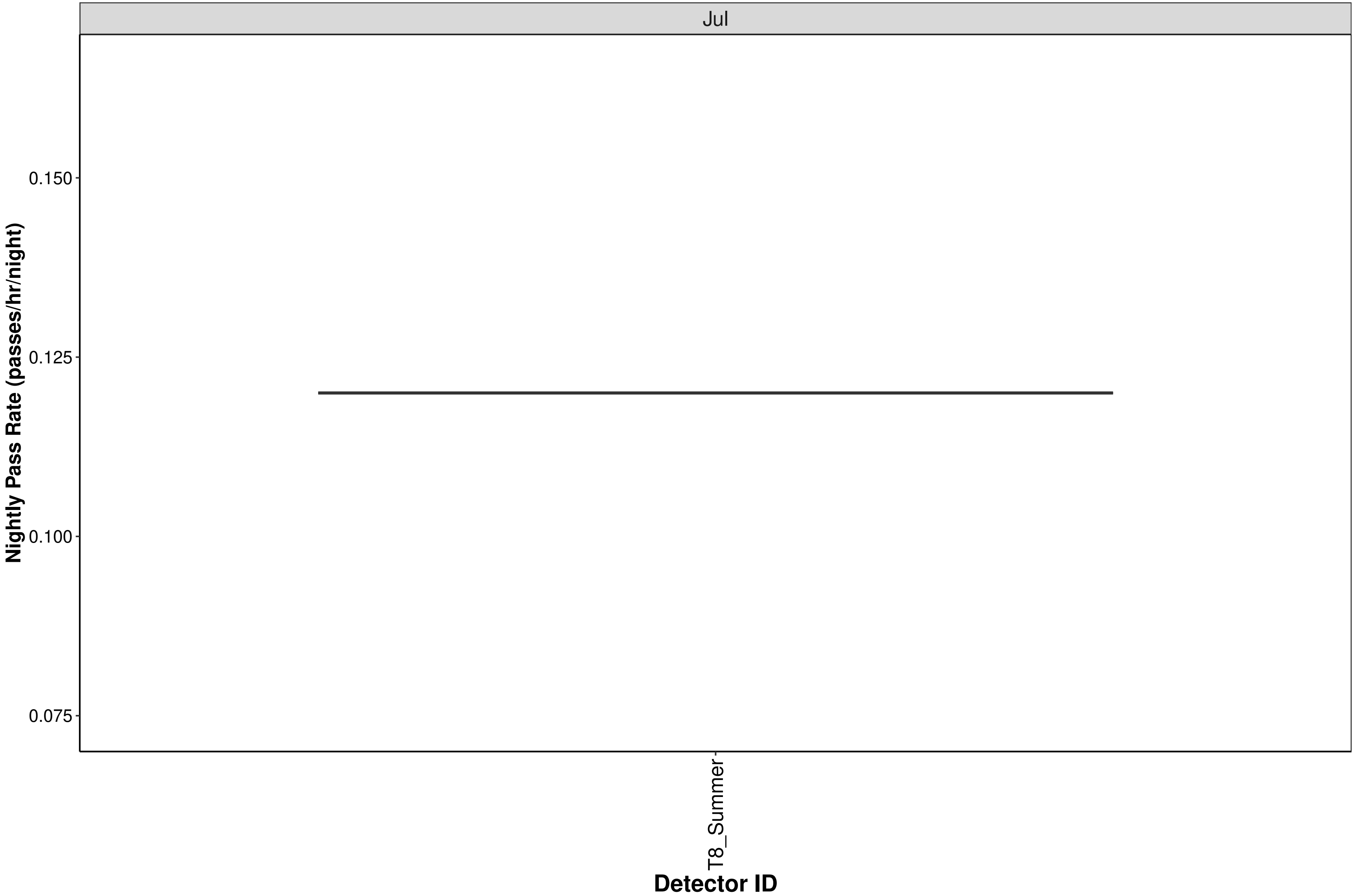

Soprano pipistrelle
Jul
Nightly Pass Rate (passes/hr/night)
10
5
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

Brown long–eared




Nathusius'
Jul
Nightly Pass Rate (passes/hr/night)
20
15
10
5
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

Lesser horseshoe



Bat Activity per Detector Location

Figure 13. Detector ID reference:

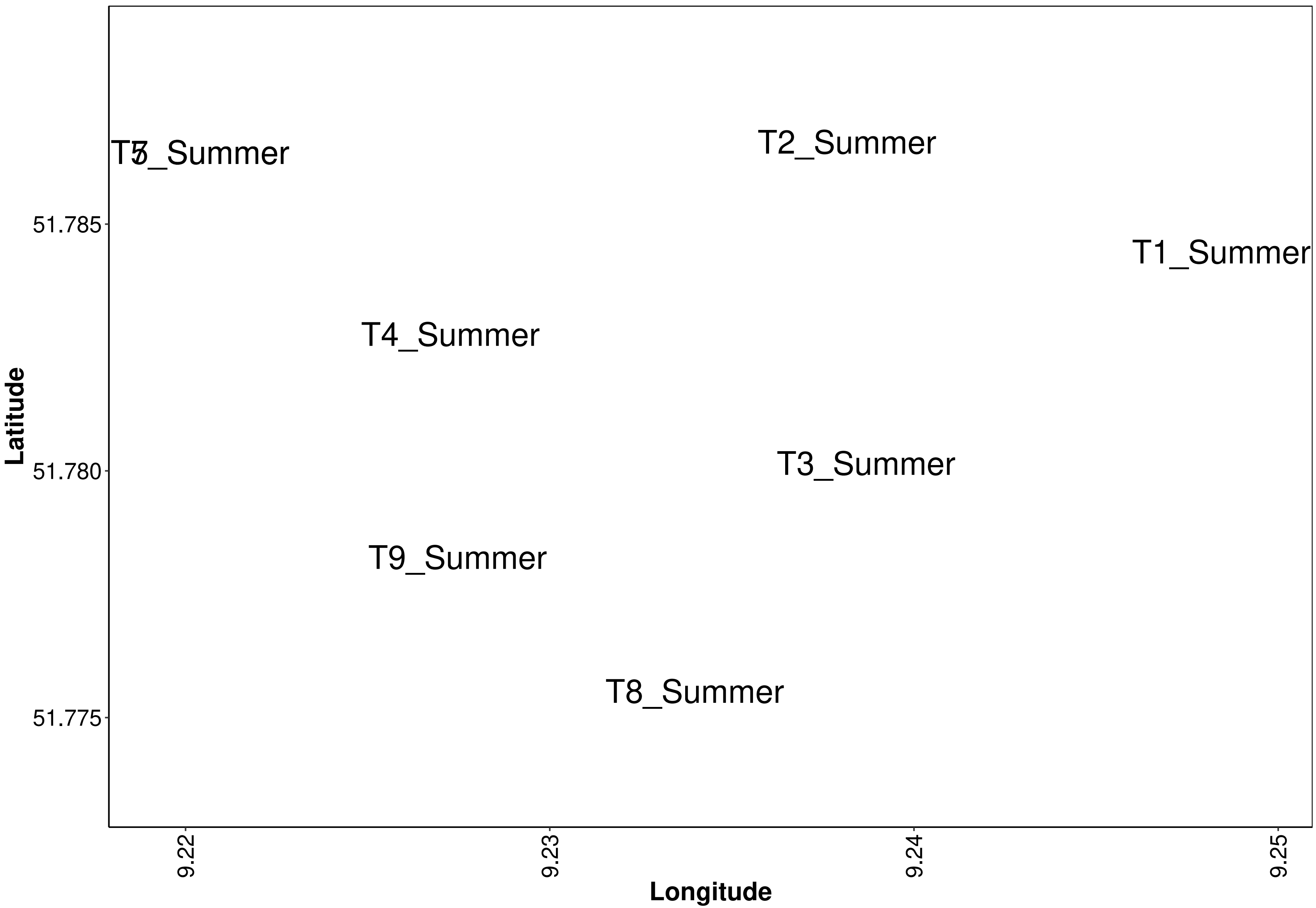
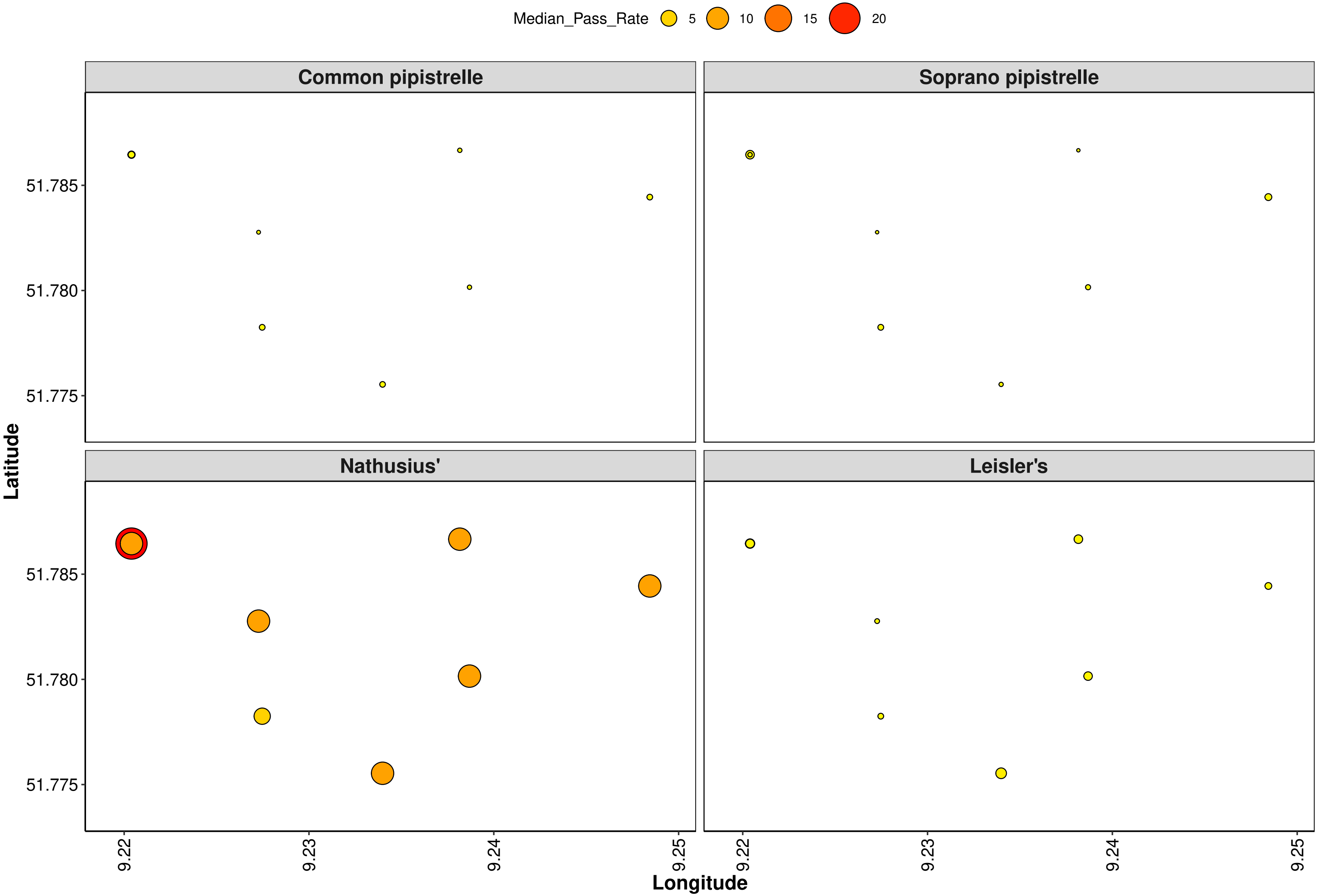
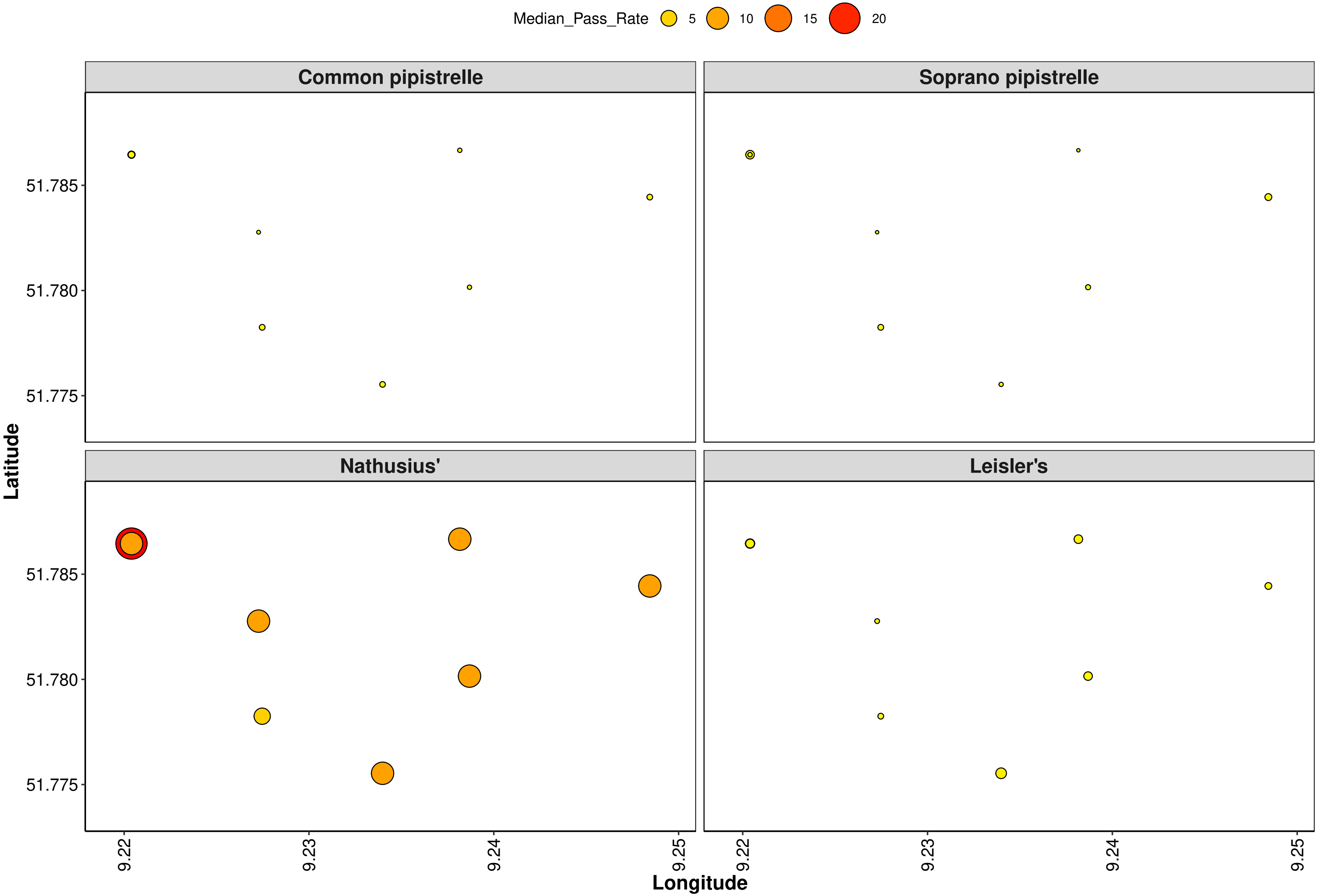

T5_Summer
T7_Summer
T2_Summer
T1_Summer
T4_Summer
T3_Summer
T9_Summer
T8_Summer
51.785
51.780
51.775
Latitude
9.22
9.23
9.24
9.25
Longitude

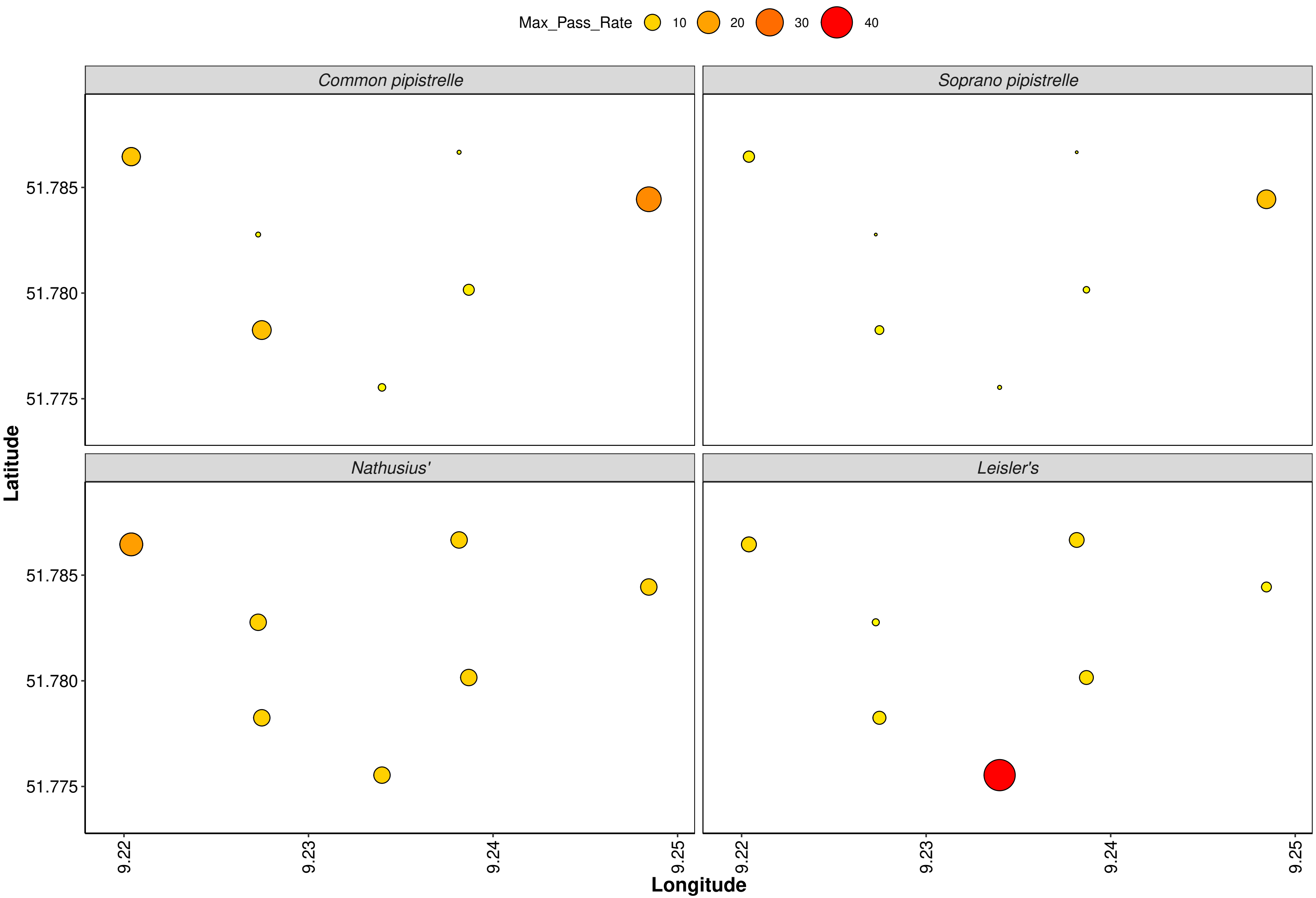
Figure 14. Median Nightly Pass Rate (bat passes/hr/night) throughout the survey period - represented by the size and colour of the point at each detector location.

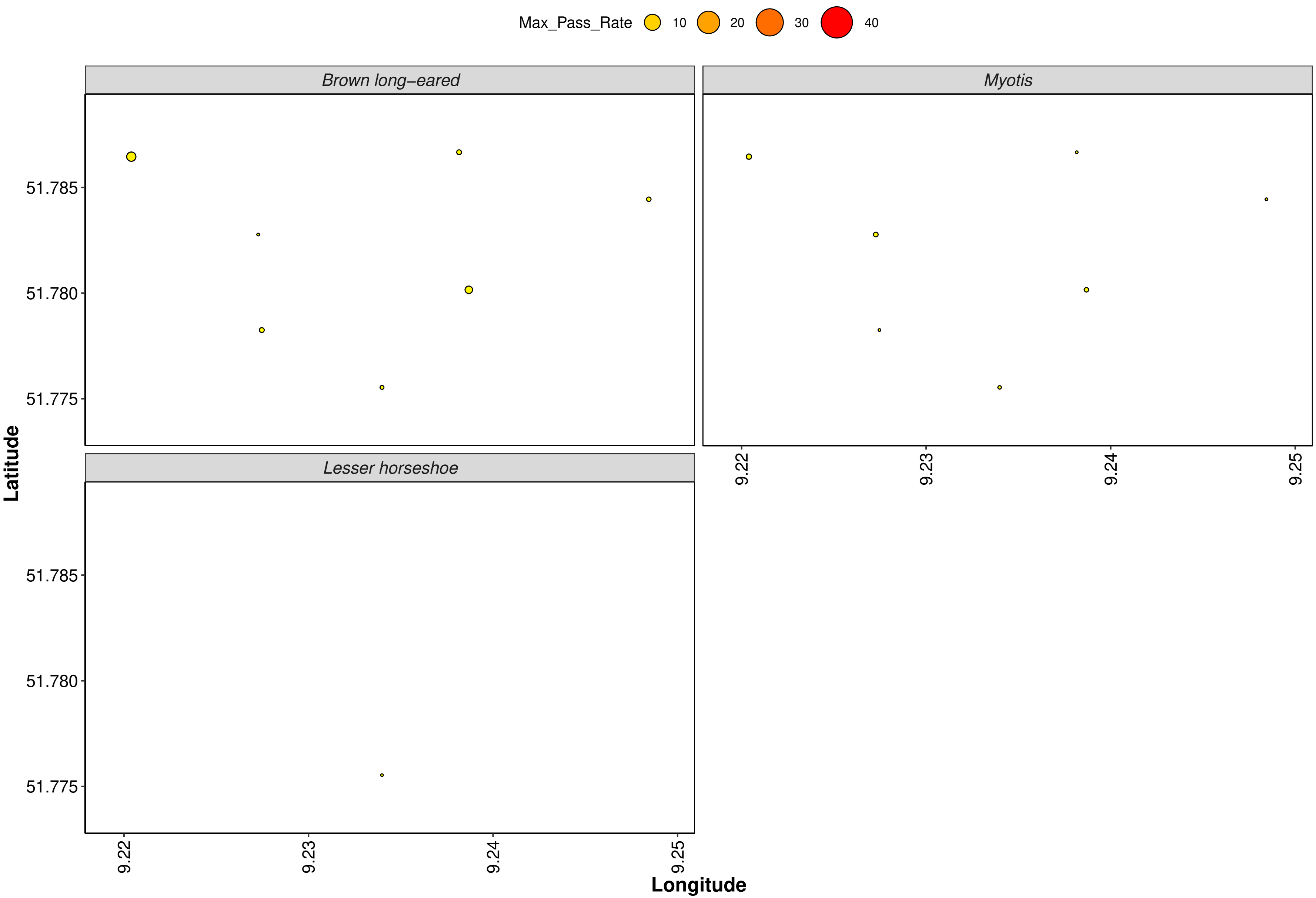

Median_Pass_Rate
5
10
15
20
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
Longitude
9.22
9.23
9.24
9.25



Median_Pass_Rate
5
10
15
20
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
Longitude
9.22
9.23
9.24
9.25

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


Max_Pass_Rate
10
20
30
40
Common pipistrelle
Soprano pipistrelle
Nathusius'
Leisler's
Latitude
51.785
51.780
51.775
Longitude
9.22
9.23
9.24
9.25



Max_Pass_Rate
10
20
30
40
Brown long−eared
Myotis
Lesser horseshoe
Latitude
51.785
51.780
51.775
9.22
9.23
9.24
9.25
Longitude

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

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	T1_Summer	0.0
Brown long-eared	T2_Summer	0.0
Brown long-eared	T3_Summer	0.3
Brown long-eared	T4_Summer	0.0
Brown long-eared	T5_Summer	0.3
Brown long-eared	T7_Summer	0.6
Brown long-eared	T8_Summer	0.0
Brown long-eared	T9_Summer	0.0
Common pipistrelle	T1_Summer	0.0
Common pipistrelle	T2_Summer	0.0
Common pipistrelle	T3_Summer	0.0
Common pipistrelle	T4_Summer	0.0
Common pipistrelle	T5_Summer	0.0
Common pipistrelle	T7_Summer	0.3
Common pipistrelle	T8_Summer	0.2
Common pipistrelle	T9_Summer	0.0
Leisler's	T1_Summer	0.6
Leisler's	T2_Summer	1.2
Leisler's	T3_Summer	0.9
Leisler's	T4_Summer	0.1
Leisler's	T5_Summer	1.4
Leisler's	T7_Summer	1.4
Leisler's	T8_Summer	1.2
Leisler's	T9_Summer	0.4
Lesser horseshoe	T1_Summer	0.0
Lesser horseshoe	T2_Summer	0.0
Lesser horseshoe	T3_Summer	0.0
Lesser horseshoe	T4_Summer	0.0
Lesser horseshoe	T5_Summer	0.0
Lesser horseshoe	T7_Summer	0.0
Lesser horseshoe	T8_Summer	0.0
Lesser horseshoe	T9_Summer	0.0
Myotis	T1_Summer	0.0
Myotis	T2_Summer	0.0
Myotis	T3_Summer	0.0
Myotis	T4_Summer	0.0

Species	Detector ID	Median Pass Rate
Myotis	T5_Summer	0.0
Myotis	T7_Summer	0.1
Myotis	T8_Summer	0.0
Myotis	T9_Summer	0.0
Nathusius’	T1_Summer	0.0
Nathusius’	T2_Summer	0.0
Nathusius’	T3_Summer	0.0
Nathusius’	T4_Summer	0.0
Nathusius’	T5_Summer	0.0
Nathusius’	T7_Summer	0.0
Nathusius’	T8_Summer	0.0
Nathusius’	T9_Summer	0.0
Soprano pipistrelle	T1_Summer	0.0
Soprano pipistrelle	T2_Summer	0.0
Soprano pipistrelle	T3_Summer	0.0
Soprano pipistrelle	T4_Summer	0.0
Soprano pipistrelle	T5_Summer	0.0
Soprano pipistrelle	T7_Summer	0.0
Soprano pipistrelle	T8_Summer	0.0
Soprano pipistrelle	T9_Summer	0.0

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.

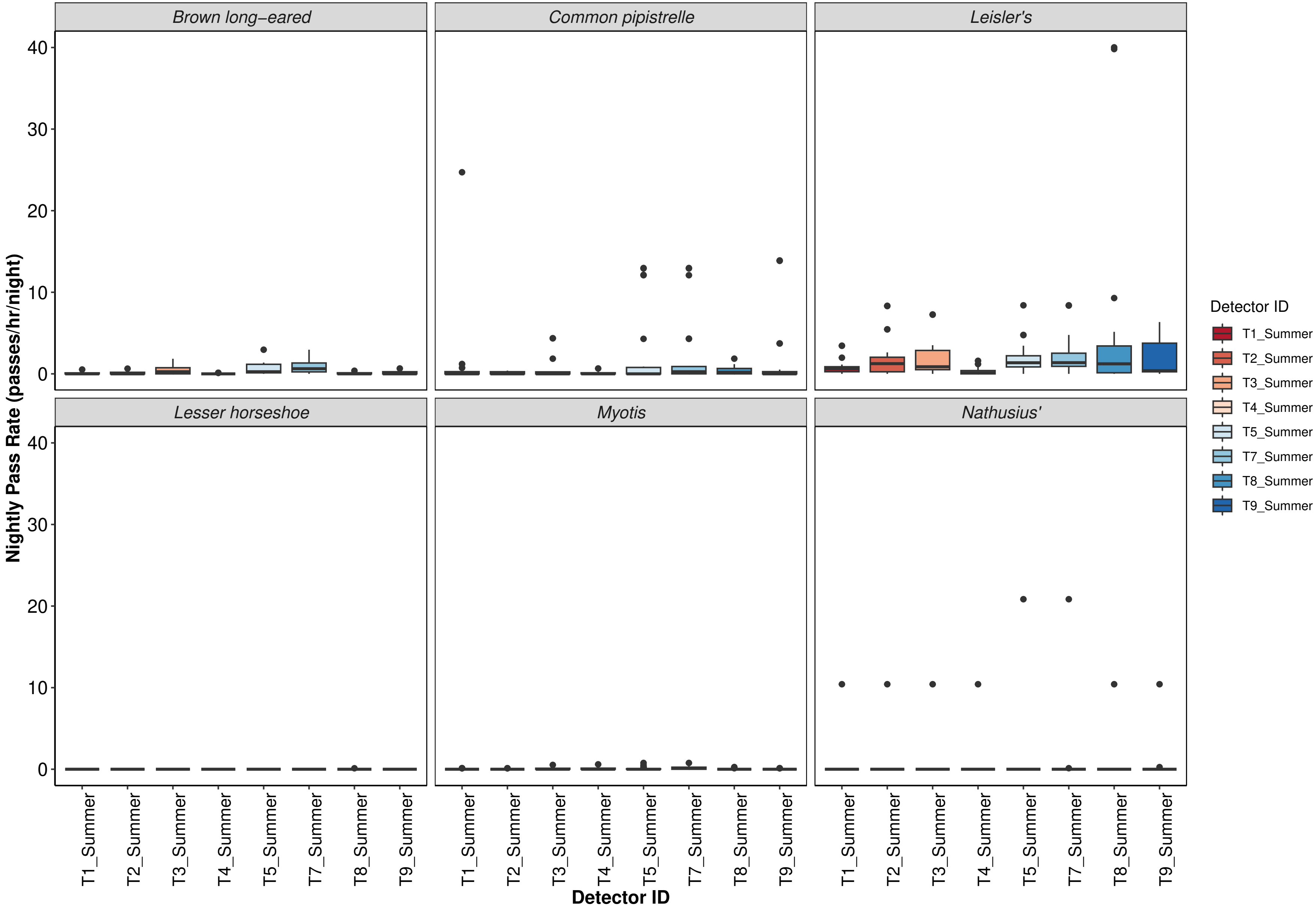
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

Species	Detector ID	Mean Pass Rate
Brown long-eared	T1_Summer	0.1
Brown long-eared	T2_Summer	0.1
Brown long-eared	T3_Summer	0.5
Brown long-eared	T4_Summer	0.0
Brown long-eared	T5_Summer	0.6
Brown long-eared	T7_Summer	0.8
Brown long-eared	T8_Summer	0.1
Brown long-eared	T9_Summer	0.1
Common pipistrelle	T1_Summer	1.4
Common pipistrelle	T2_Summer	0.1
Common pipistrelle	T3_Summer	0.6
Common pipistrelle	T4_Summer	0.1
Common pipistrelle	T5_Summer	2.5
Common pipistrelle	T7_Summer	2.1
Common pipistrelle	T8_Summer	0.4
Common pipistrelle	T9_Summer	1.5
Leisler’s	T1_Summer	0.9
Leisler’s	T2_Summer	2.0
Leisler’s	T3_Summer	1.9
Leisler’s	T4_Summer	0.4
Leisler’s	T5_Summer	1.9
Leisler’s	T7_Summer	2.2
Leisler’s	T8_Summer	6.1
Leisler’s	T9_Summer	2.0
Lesser horseshoe	T1_Summer	0.0
Lesser horseshoe	T2_Summer	0.0
Lesser horseshoe	T3_Summer	0.0
Lesser horseshoe	T4_Summer	0.0
Lesser horseshoe	T5_Summer	0.0
Lesser horseshoe	T7_Summer	0.0
Lesser horseshoe	T8_Summer	0.0
Lesser horseshoe	T9_Summer	0.0
Myotis	T1_Summer	0.0
Myotis	T2_Summer	0.0
Myotis	T3_Summer	0.1
Myotis	T4_Summer	0.1

Species	Detector ID	Mean Pass Rate
Myotis	T5_Summer	0.1
Myotis	T7_Summer	0.2
Myotis	T8_Summer	0.0
Myotis	T9_Summer	0.0
Nathusius’	T1_Summer	0.5
Nathusius’	T2_Summer	0.5
Nathusius’	T3_Summer	0.5
Nathusius’	T4_Summer	0.6
Nathusius’	T5_Summer	0.9
Nathusius’	T7_Summer	0.8
Nathusius’	T8_Summer	0.6
Nathusius’	T9_Summer	0.4
Soprano pipistrelle	T1_Summer	0.7
Soprano pipistrelle	T2_Summer	0.0
Soprano pipistrelle	T3_Summer	0.2
Soprano pipistrelle	T4_Summer	0.0
Soprano pipistrelle	T5_Summer	0.6
Soprano pipistrelle	T7_Summer	0.5
Soprano pipistrelle	T8_Summer	0.1
Soprano pipistrelle	T9_Summer	0.3

Per Detector

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


Brown long−eared
Common pipistrelle
Leisler's
Lesser horseshoe
Myotis
Nathusius'
Nightly Pass Rate (passes/hr/night)
0
10
20
30
40
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID
Detector ID
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer


Soprano pipistrelle
Nightly Pass Rate (passes/hr/night)
40
30
20
10
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer

Detector ID

Survey Effort

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

month	Detector ID	No. of Survey Nights
Jul	T1_Summer	21
Jul	T2_Summer	23
Jul	T3_Summer	21
Jul	T4_Summer	17
Jul	T5_Summer	23
Jul	T7_Summer	25
Jul	T8_Summer	18
Jul	T9_Summer	25

Nighlty 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	Jul
Brown long-eared	T1_Summer	0.0
Brown long-eared	T2_Summer	0.0
Brown long-eared	T3_Summer	0.3
Brown long-eared	T4_Summer	0.0
Brown long-eared	T5_Summer	0.3
Brown long-eared	T7_Summer	0.6
Brown long-eared	T8_Summer	0.0
Brown long-eared	T9_Summer	0.0
Common pipistrelle	T1_Summer	0.0
Common pipistrelle	T2_Summer	0.0
Common pipistrelle	T3_Summer	0.0
Common pipistrelle	T4_Summer	0.0
Common pipistrelle	T5_Summer	0.0
Common pipistrelle	T7_Summer	0.3
Common pipistrelle	T8_Summer	0.2
Common pipistrelle	T9_Summer	0.0
Leisler’s	T1_Summer	0.6
Leisler’s	T2_Summer	1.2
Leisler’s	T3_Summer	0.9
Leisler’s	T4_Summer	0.1
Leisler’s	T5_Summer	1.4
Leisler’s	T7_Summer	1.4
Leisler’s	T8_Summer	1.2
Leisler’s	T9_Summer	0.4
Lesser horseshoe	T1_Summer	0.0
Lesser horseshoe	T2_Summer	0.0
Lesser horseshoe	T3_Summer	0.0
Lesser horseshoe	T4_Summer	0.0
Lesser horseshoe	T5_Summer	0.0
Lesser horseshoe	T7_Summer	0.0
Lesser horseshoe	T8_Summer	0.0
Lesser horseshoe	T9_Summer	0.0
Myotis	T1_Summer	0.0
Myotis	T2_Summer	0.0
Myotis	T3_Summer	0.0
Myotis	T4_Summer	0.0

Species	Detector ID	Jul
Myotis	T5_Summer	0.0
Myotis	T7_Summer	0.1
Myotis	T8_Summer	0.0
Myotis	T9_Summer	0.0
Nathusius’	T1_Summer	0.0
Nathusius’	T2_Summer	0.0
Nathusius’	T3_Summer	0.0
Nathusius’	T4_Summer	0.0
Nathusius’	T5_Summer	0.0
Nathusius’	T7_Summer	0.0
Nathusius’	T8_Summer	0.0
Nathusius’	T9_Summer	0.0
Soprano pipistrelle	T1_Summer	0.0
Soprano pipistrelle	T2_Summer	0.0
Soprano pipistrelle	T3_Summer	0.0
Soprano pipistrelle	T4_Summer	0.0
Soprano pipistrelle	T5_Summer	0.0
Soprano pipistrelle	T7_Summer	0.0
Soprano pipistrelle	T8_Summer	0.0
Soprano pipistrelle	T9_Summer	0.0

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.

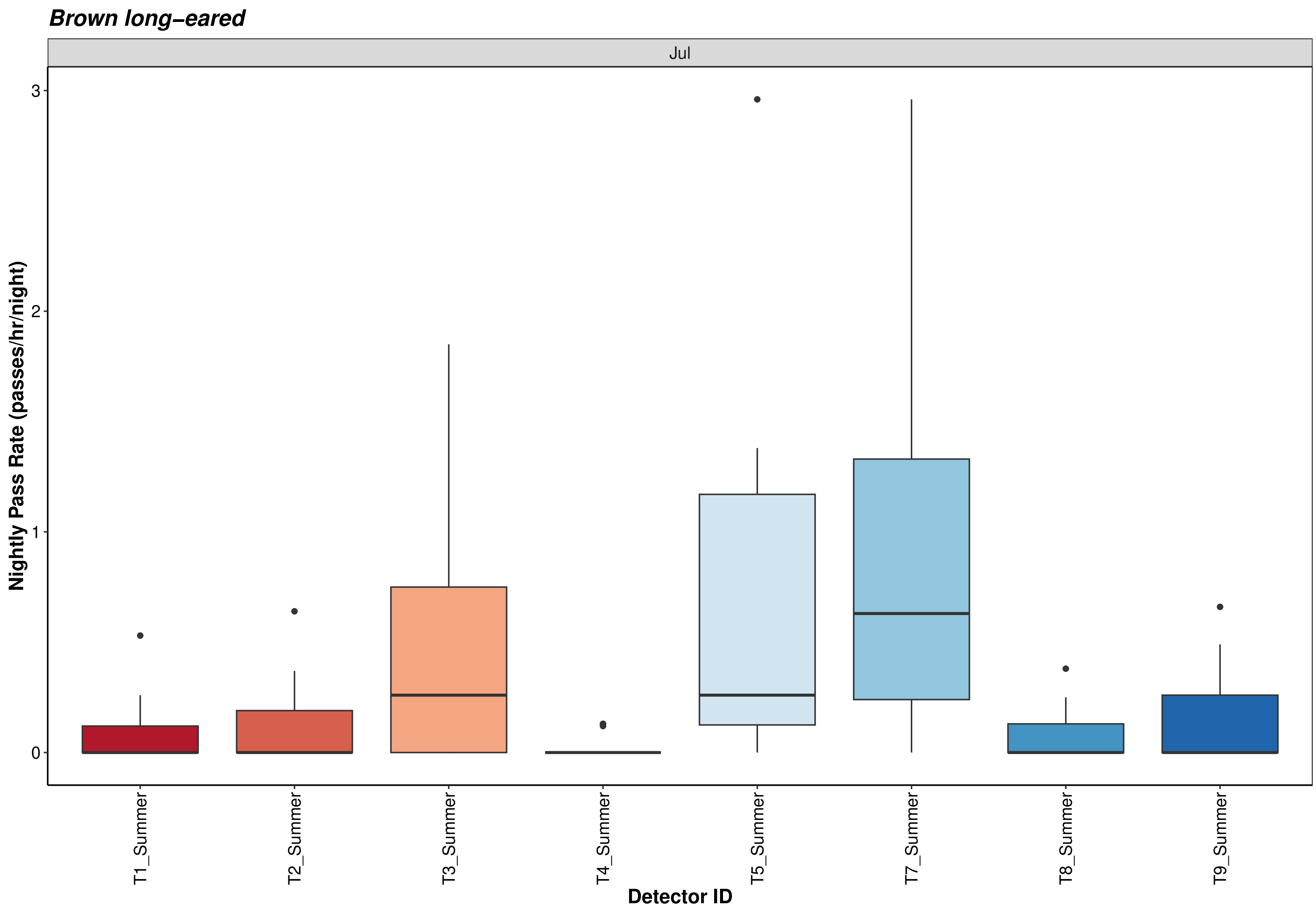
We recommend using the median values given above, for the reasons stated above, but provide the mean values in the table below.

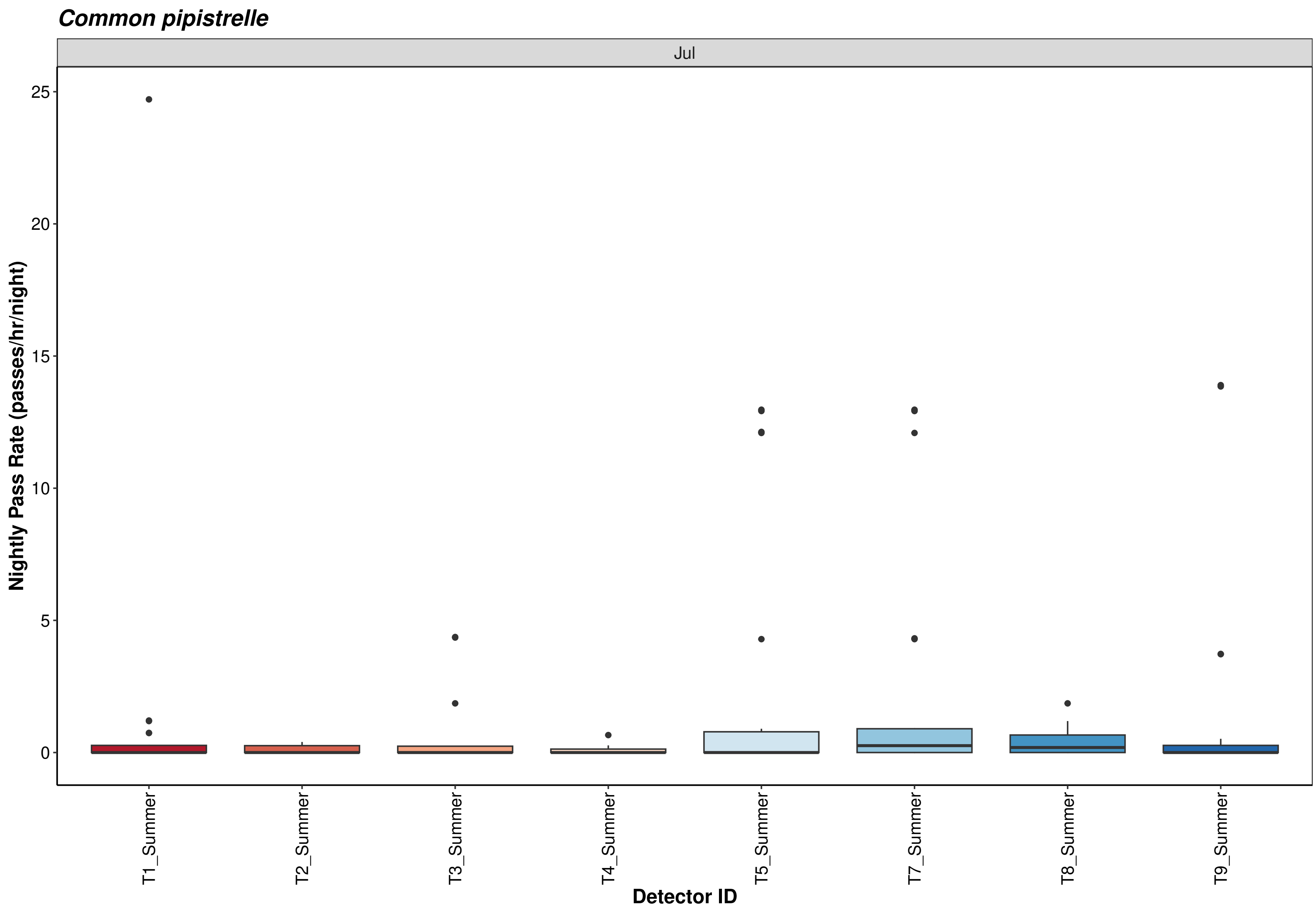
Species	Detector ID	Jul
Brown long-eared	T1_Summer	0.1
Brown long-eared	T2_Summer	0.1
Brown long-eared	T3_Summer	0.5
Brown long-eared	T4_Summer	0.0
Brown long-eared	T5_Summer	0.6
Brown long-eared	T7_Summer	0.8
Brown long-eared	T8_Summer	0.1
Brown long-eared	T9_Summer	0.1
Common pipistrelle	T1_Summer	1.4
Common pipistrelle	T2_Summer	0.1
Common pipistrelle	T3_Summer	0.6
Common pipistrelle	T4_Summer	0.1
Common pipistrelle	T5_Summer	2.5
Common pipistrelle	T7_Summer	2.1
Common pipistrelle	T8_Summer	0.4
Common pipistrelle	T9_Summer	1.5
Leisler's	T1_Summer	0.9
Leisler's	T2_Summer	2.0
Leisler's	T3_Summer	1.9
Leisler's	T4_Summer	0.4
Leisler's	T5_Summer	1.9
Leisler's	T7_Summer	2.2
Leisler's	T8_Summer	6.1
Leisler's	T9_Summer	2.0
Lesser horseshoe	T1_Summer	0.0
Lesser horseshoe	T2_Summer	0.0
Lesser horseshoe	T3_Summer	0.0
Lesser horseshoe	T4_Summer	0.0
Lesser horseshoe	T5_Summer	0.0
Lesser horseshoe	T7_Summer	0.0
Lesser horseshoe	T8_Summer	0.0
Lesser horseshoe	T9_Summer	0.0
Myotis	T1_Summer	0.0
Myotis	T2_Summer	0.0
Myotis	T3_Summer	0.1
Myotis	T4_Summer	0.1

Species	Detector ID	Jul
Myotis	T5_Summer	0.1
Myotis	T7_Summer	0.2
Myotis	T8_Summer	0.0
Myotis	T9_Summer	0.0
Nathusius’	T1_Summer	0.5
Nathusius’	T2_Summer	0.5
Nathusius’	T3_Summer	0.5
Nathusius’	T4_Summer	0.6
Nathusius’	T5_Summer	0.9
Nathusius’	T7_Summer	0.8
Nathusius’	T8_Summer	0.6
Nathusius’	T9_Summer	0.4
Soprano pipistrelle	T1_Summer	0.7
Soprano pipistrelle	T2_Summer	0.0
Soprano pipistrelle	T3_Summer	0.2
Soprano pipistrelle	T4_Summer	0.0
Soprano pipistrelle	T5_Summer	0.6
Soprano pipistrelle	T7_Summer	0.5
Soprano pipistrelle	T8_Summer	0.1
Soprano pipistrelle	T9_Summer	0.3

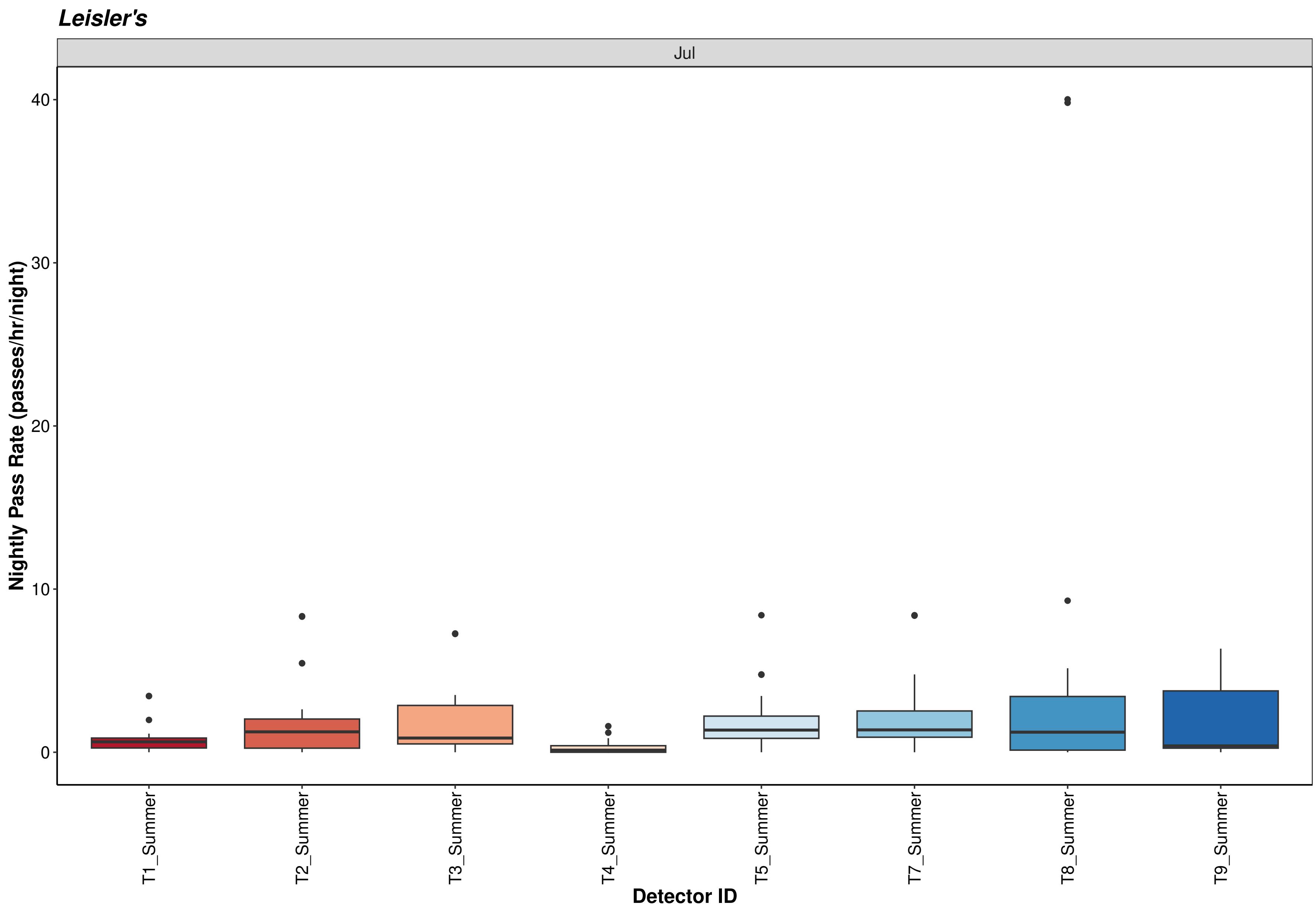
Per Detector

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

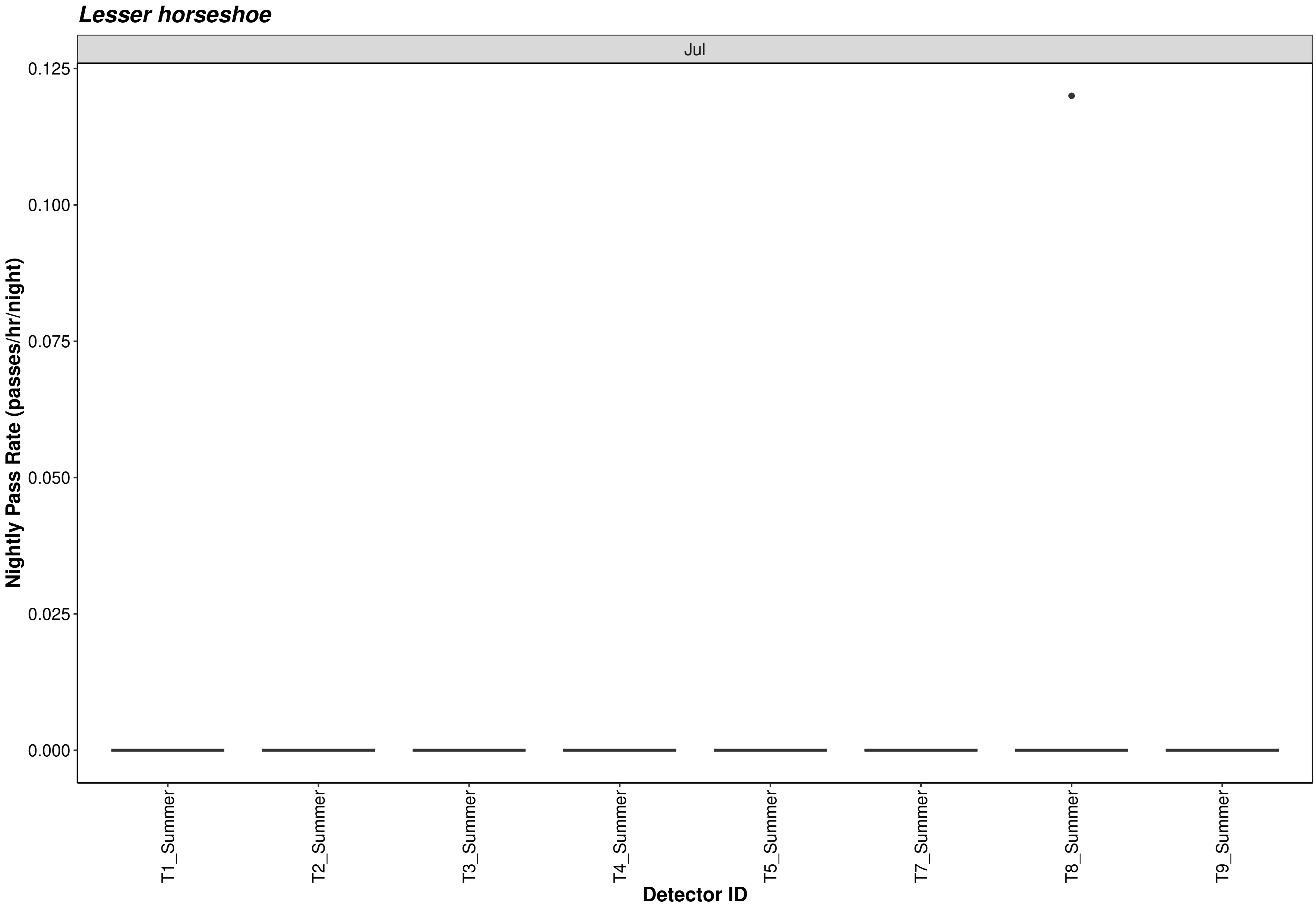

Brown long-eared
Jul
Nightly Pass Rate (passes/hr/night)
0
1
2
3
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

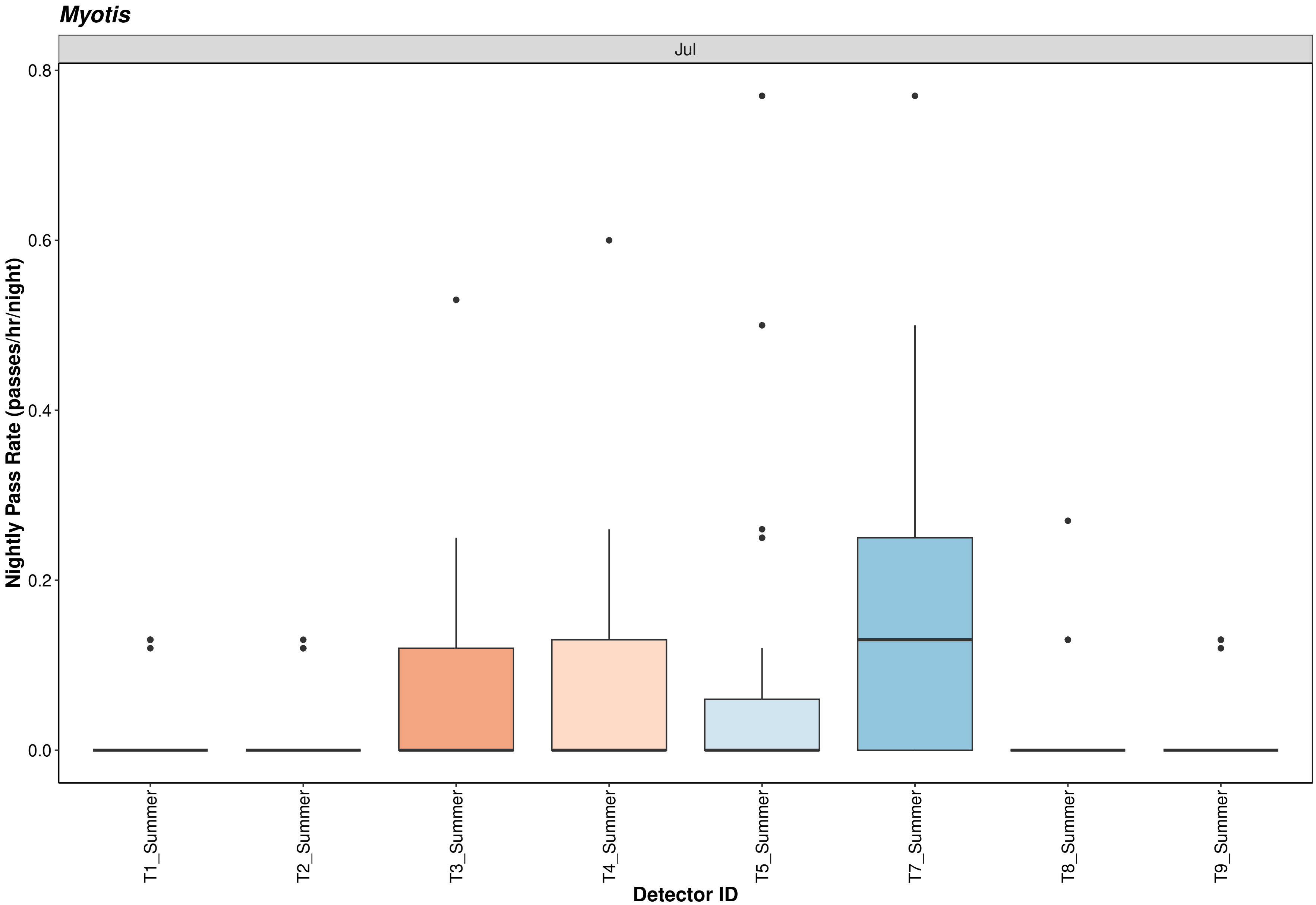


Common pipistrelle
Jul
Nightly Pass Rate (passes/hr/night)
25
20
15
10
5
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

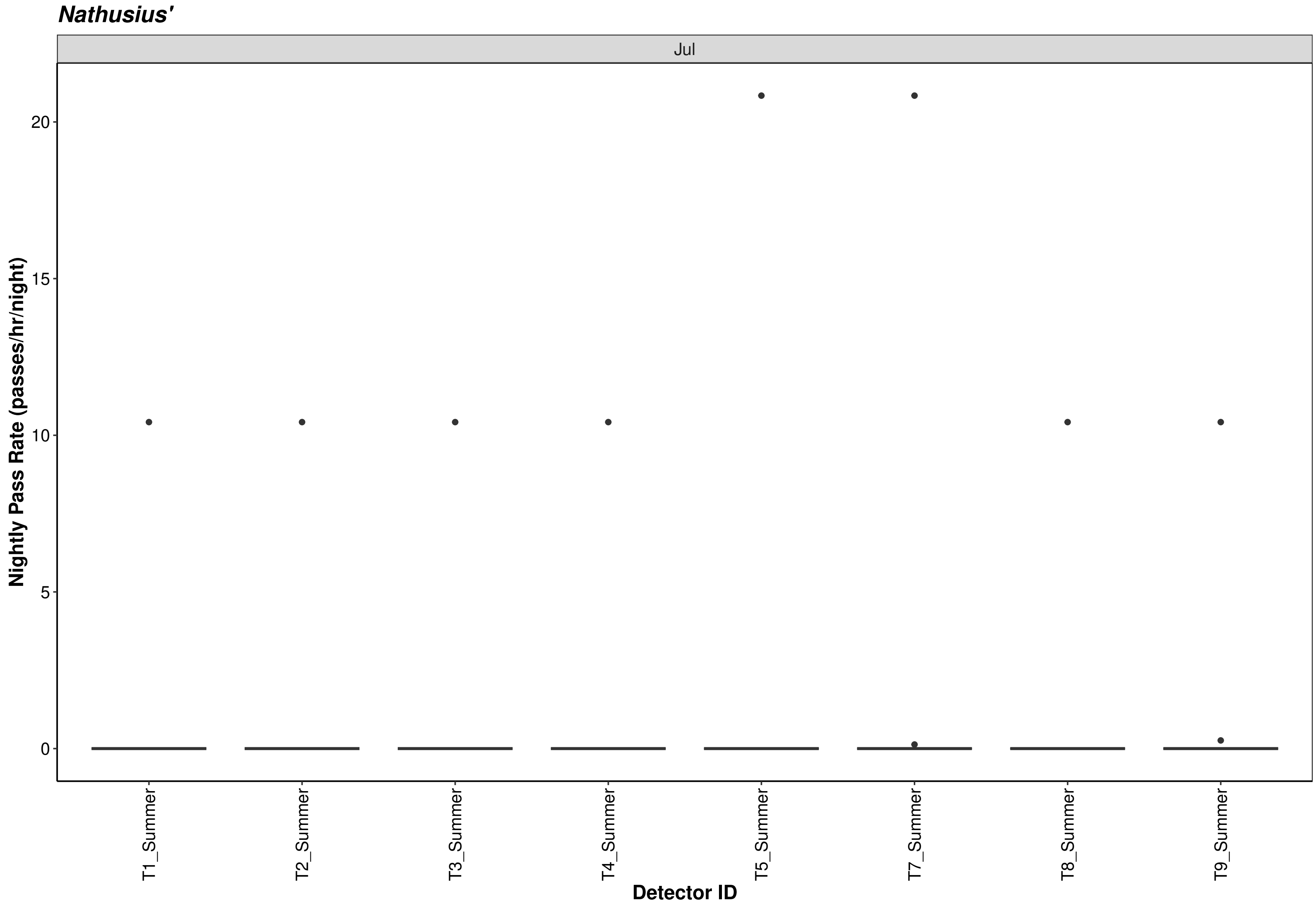


Leisler's
Jul
Nightly Pass Rate (passes/hr/night)
40
30
20
10
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

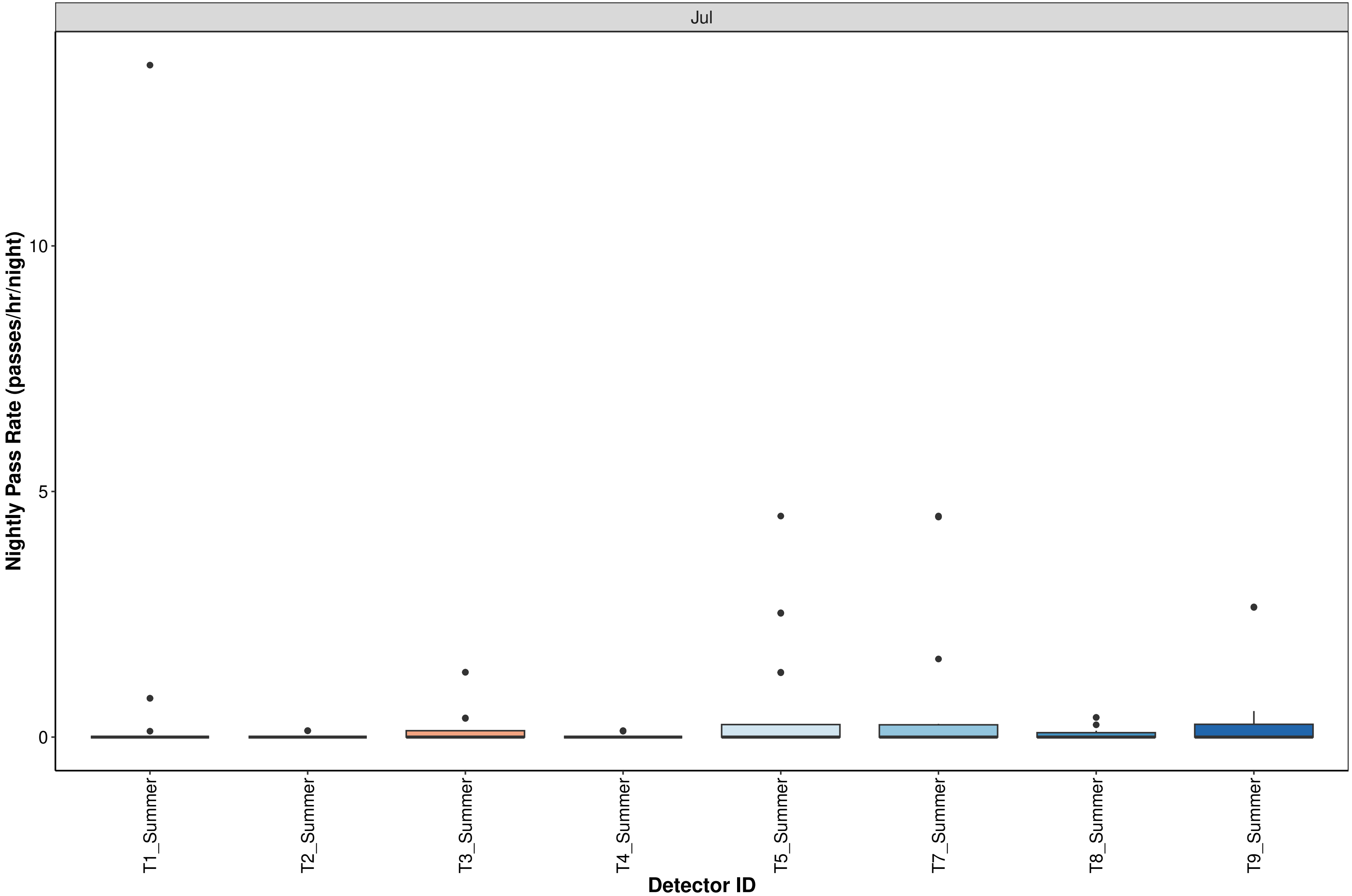

Lesser horseshoe
Jul
0.125
0.100
0.075
0.050
0.025
0.000
Nightly Pass Rate (passes/hr/night)
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID



Myotis
Jul
0.8
0.6
0.4
0.2
0.0
Nightly Pass Rate (passes/hr/night)
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID


Nathusius'
Jul
Nightly Pass Rate (passes/hr/night)
20
15
10
5
0
T1_Summer
T2_Summer
T3_Summer
T4_Summer
T5_Summer
T7_Summer
T8_Summer
T9_Summer
Detector ID

Soprano pipistrelle



Bat Activity per Detector Location

Figure 18. Detector ID reference:

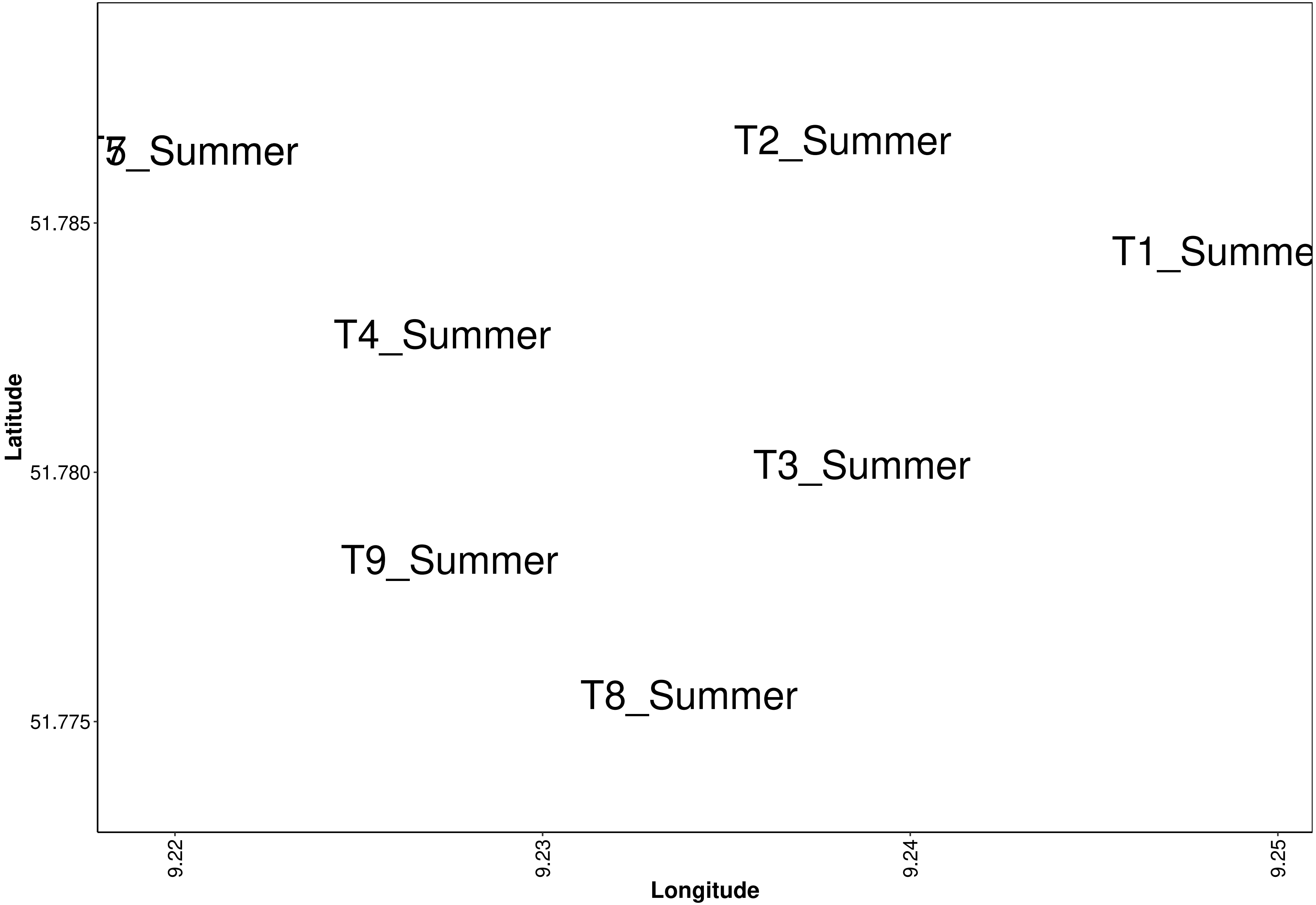
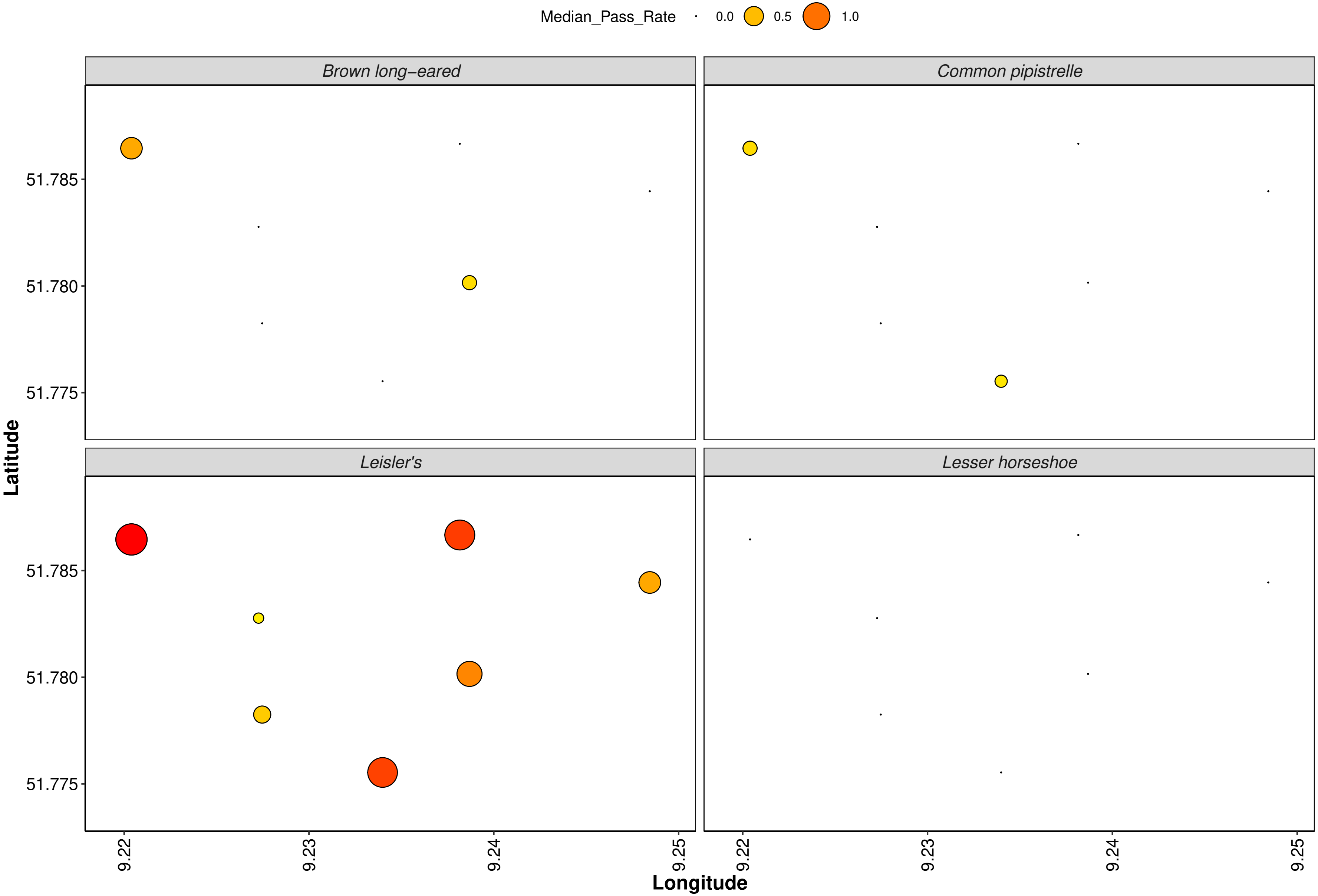

T2_Summer
T1_Summe
T4_Summer
T3_Summer
T9_Summer
T8_Summer
51.785
51.780
51.775
Latitude
9.22
9.23
9.24
9.25
Longitude

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


Median_Pass_Rate
0.0
0.5
1.0
Brown long–eared
Common pipistrelle
Leisler's
Lesser horseshoe
51.785
51.780
51.775
51.785
51.780
51.775
Latitude
9.22
9.23
9.24
9.25
9.22
9.23
9.24
9.25
Longitude

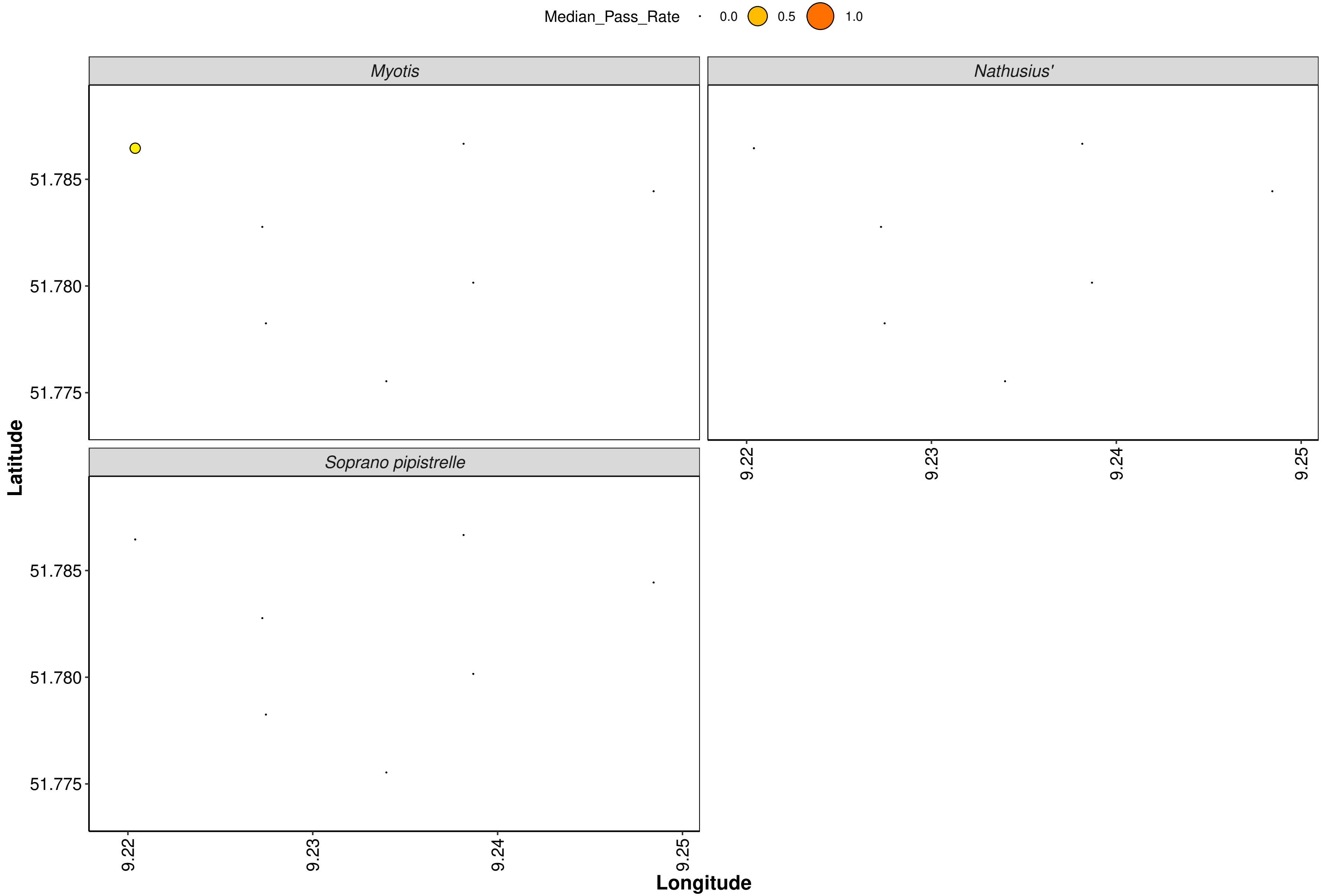
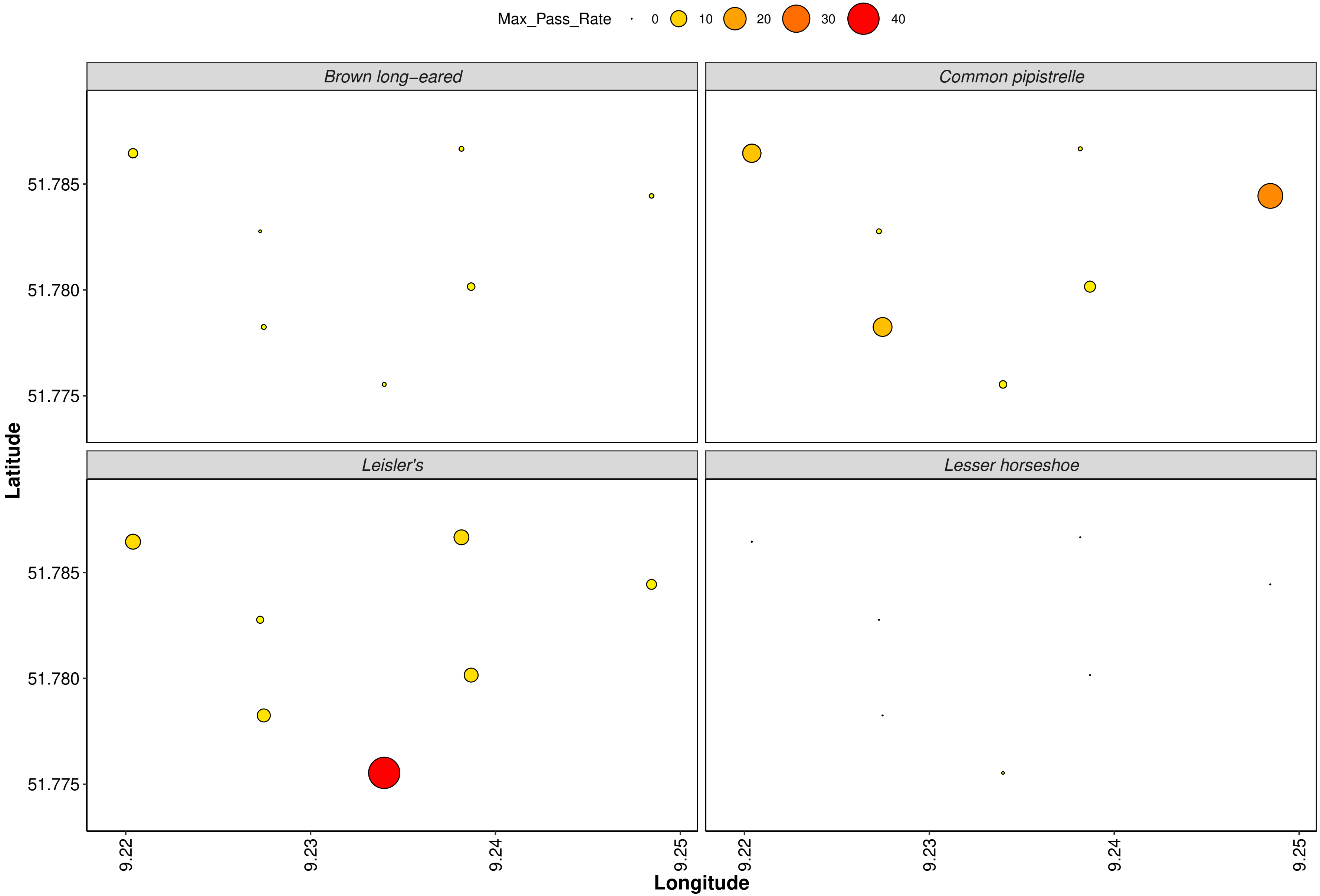
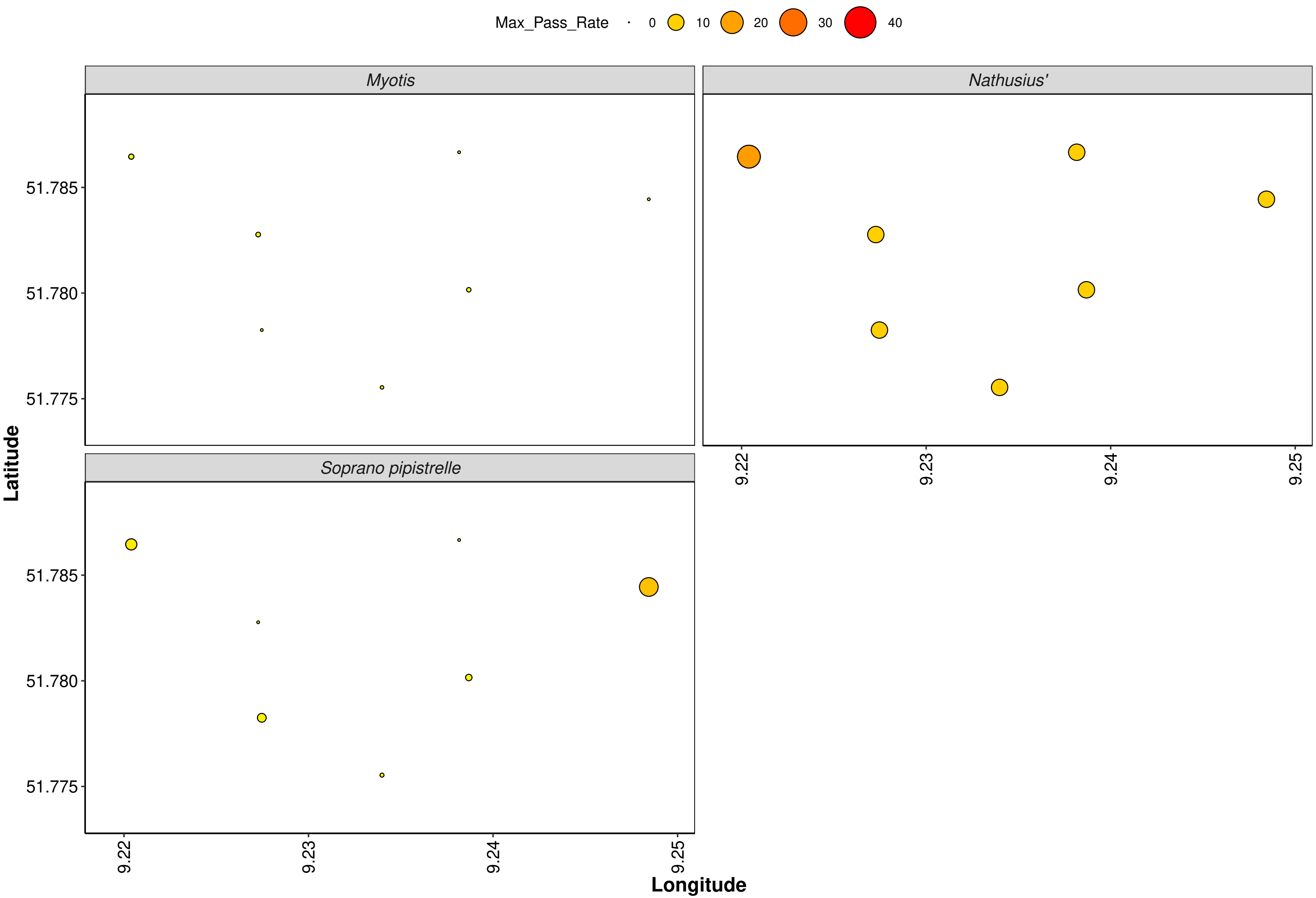

Median_Pass_Rate
0.0
0.5
1.0
Myotis
Nathusius'
Soprano pipistrelle
51.785
51.780
51.775
Latitude
9.22
9.23
9.24
9.25
Longitude

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


Max_Pass_Rate
0
10
20
30
40
Brown long−eared
Common pipistrelle
Leisler's
Lesser horseshoe
Latitude
51.785
51.780
51.775
Longitude
9.22
9.23
9.24
9.25



Max_Pass_Rate
0
10
20
30
40
Myotis
Nathusius'
Soprano pipistrelle
Latitude
51.785
51.780
51.775
9.22
9.23
9.24
9.25
Longitude

Thank you for using Ecobat!

Invasive Species Management Plan

Gortloughra Wind Farm

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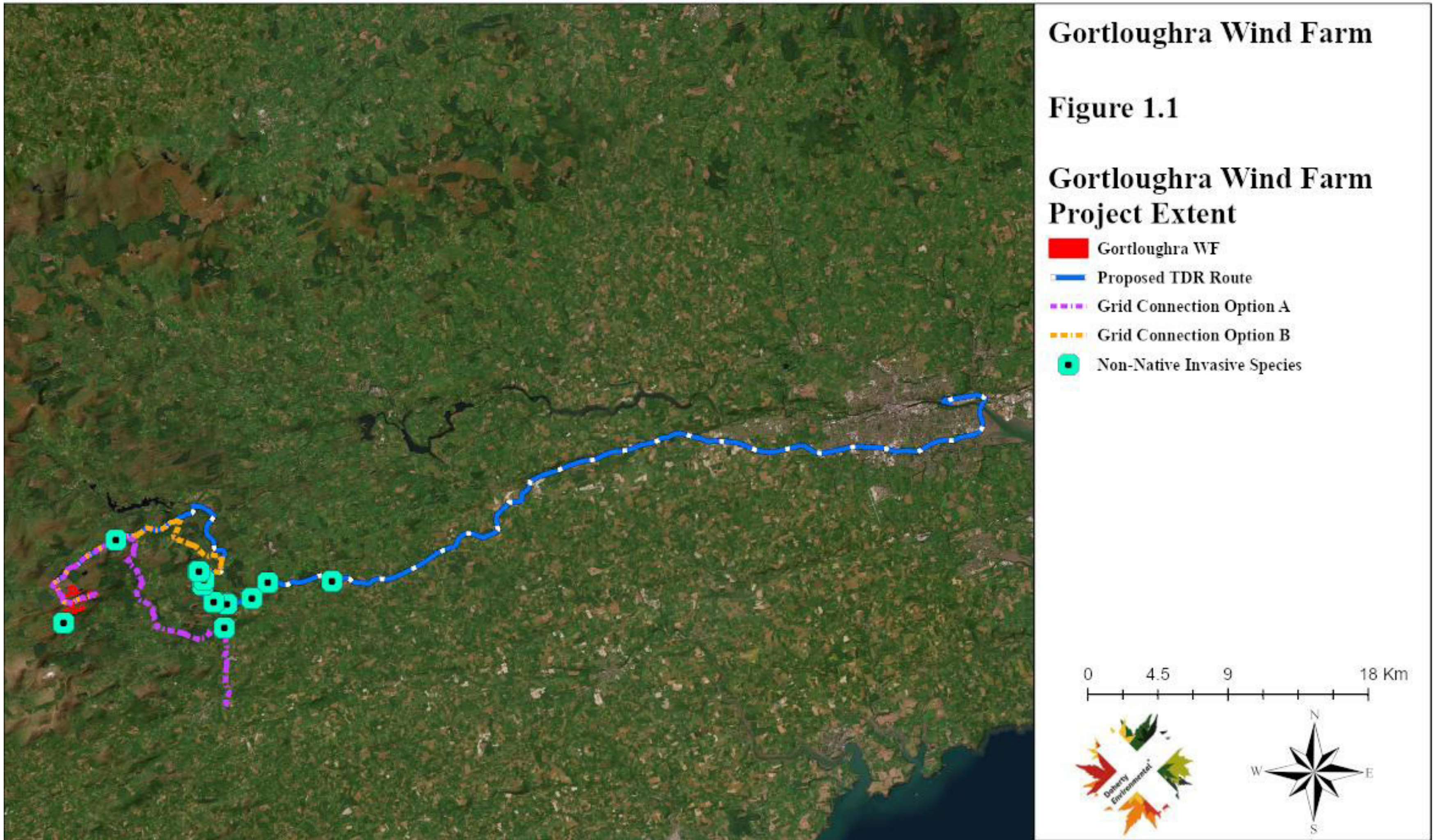
1.0 INTRODUCTION

This Invasive Species Management Plan has been prepared for the proposed Gortloughra Wind Farm project. Non-native invasive plant species have been identified adjacent to the proposed grid connection route and turbine delivery route that form part of the project. No non-native invasive plant species have been identified as occurring at the proposed wind farm site.

This Invasive Species Management Plan defines specific measures that are to be put in place and procedures to be followed to avoid the spread of third schedule non-native invasive plant species, namely Japanese Knotweed (*Fallopia japonica*), identified as occurring along the proposed Turbine Delivery Route and the proposed grid connection route respectively for the Gortloughra Wind Farm. In addition, measures are set out for the management of works such that they do not result in the spread of the Cherry Laurel (*Prunus laurocerasus*), which is also present along the turbine delivery route and the grid connection route. This latter species is not listed on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477/2011, as amended).

It is noted that no other third schedule non-native invasive plant species such as *Rhododendron ponticum, Gunnera tinctoria* etc. have been identified as occurring at the project site during baseline surveys completed during October 2025 and April 2026.

The location and extent of the turbine delivery route and the proposed grid connection route are shown on Figure 1.1. The areas of Japanese Knotweed infestations are shown on Figure 2.1 whilst the location of Cherry Laurel is shown on Figure 2.2.



Date	27/04/2026
Drawn By	PD
Source	Maxar

1.1 LEGISLATIVE BACKGROUND

Both Japanese Knotweed and Rhododendron ponticum are listed as restricted plant species on the third schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477/2011, as amended). Section 49(2) of the regulations state:

49(2) Save in accordance with a licence granted [by the Department of Housing, Local Government and Heritage]*, any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place* [a restricted non-native plant]*, shall be guilty of an offence.*

Section 49(3) state:

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence

Given that both species are listed on the third schedule of the regulations it is an offence under regulation 49(2) to cause their spread. As noted in the Invasive Species Management Plan prepared for the Part VIII planning documentation an offence may be avoided if a licence is obtained from the Department of Housing, Local Government and Heritage, and if reasonable steps and due diligence are put in place. In recognition of these regulations, this management plan outlines the reasonable steps and due diligence that will be implemented during the construction phase to ensure compliance with the legislation.

2.0 DESCRIPTION OF NON-NATIVE INVASIVE PLANT SPECIES INFESTATIONS

2.1 JAPANESE KNOTWEED

There are 9 no. records of Japanese Knotweed occurring along the proposed Turbine Delivery Route/grid connection route. These 9 no. locations are shown on Figure 2.1 and are described below.

Location 1 relates to an infestation along the southern side of the R585 to the west of Coppeen. The infestation is located to the south of a roadside hedgerow and fenceline. It is set back from the road corridor by approximately 2m with no Japanese Knotweed vegetation oversailing the road corridor. No works are proposed along this section of the R585 to facilitate turbine delivery. Activities associated with the delivery of turbines along the proposed Turbine Delivery Route are not anticipated to have the potential to result in the spread of Japanese Knotweed from this location.

Location 2 relates to a Japanese Knotweed infestation along the south side of the R585 regional road at Cluan Cross. The infestation occurs along a drain flowing parallel to the south of the existing regional road corridor. The infestation is low to the ground and set back from the road. No Japanese Knotweed vegetation oversails the road as it is buffered back from the road by c. 2m at least and is at a slightly lower elevation. Works are proposed at the location of the infestation. As such control measures are set out in Section 6 below to ensure that works do not result in the spread of Japanese Knotweed.

Location 3 and 4 relates to historical records for the presence of Japanese Knotweed held by the National Biodiversity Data Centre. No Japanese Knotweed infestations were recorded at these locations during surveys along the turbine delivery route corridor in October 2025 and April 2026. It is noted that Location 3 is located in the vicinity of a works location for the proposed turbine delivery route. As such particular attention will be given to confirming the continued absence of Japanese Knotweed from this location during the pre-construction non-native invasive species surveys, as set out under Section 5 below. It is noted that the nearest works locations for the proposed Turbine Delivery Route to Location 4 will be approximately 100m to the west.

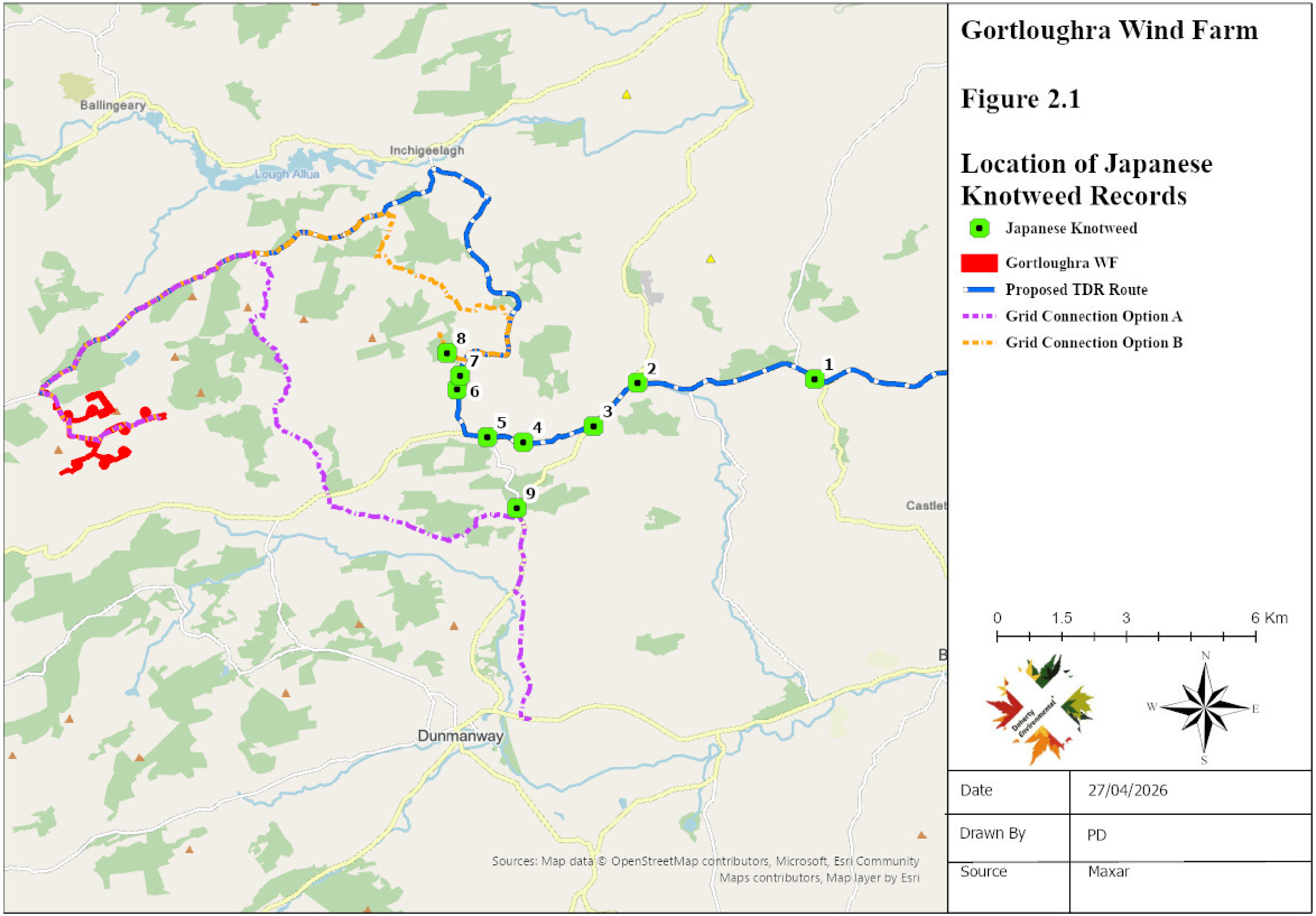
Location 5 relates to a Japanese Knotweed infestation along the north side of the R585 regional road. the main infestation is set back from the road surface with immature seedlings occurring close to the road along the verge. No works location for the proposed Turbine Delivery Route are identified at or in the vicinity of Location 5, with the nearest works location being located approximately 450m to the west. Control measures as identified in Section 6 below will be put in place in advance of turbine delivery activities along this stretch of the R585.

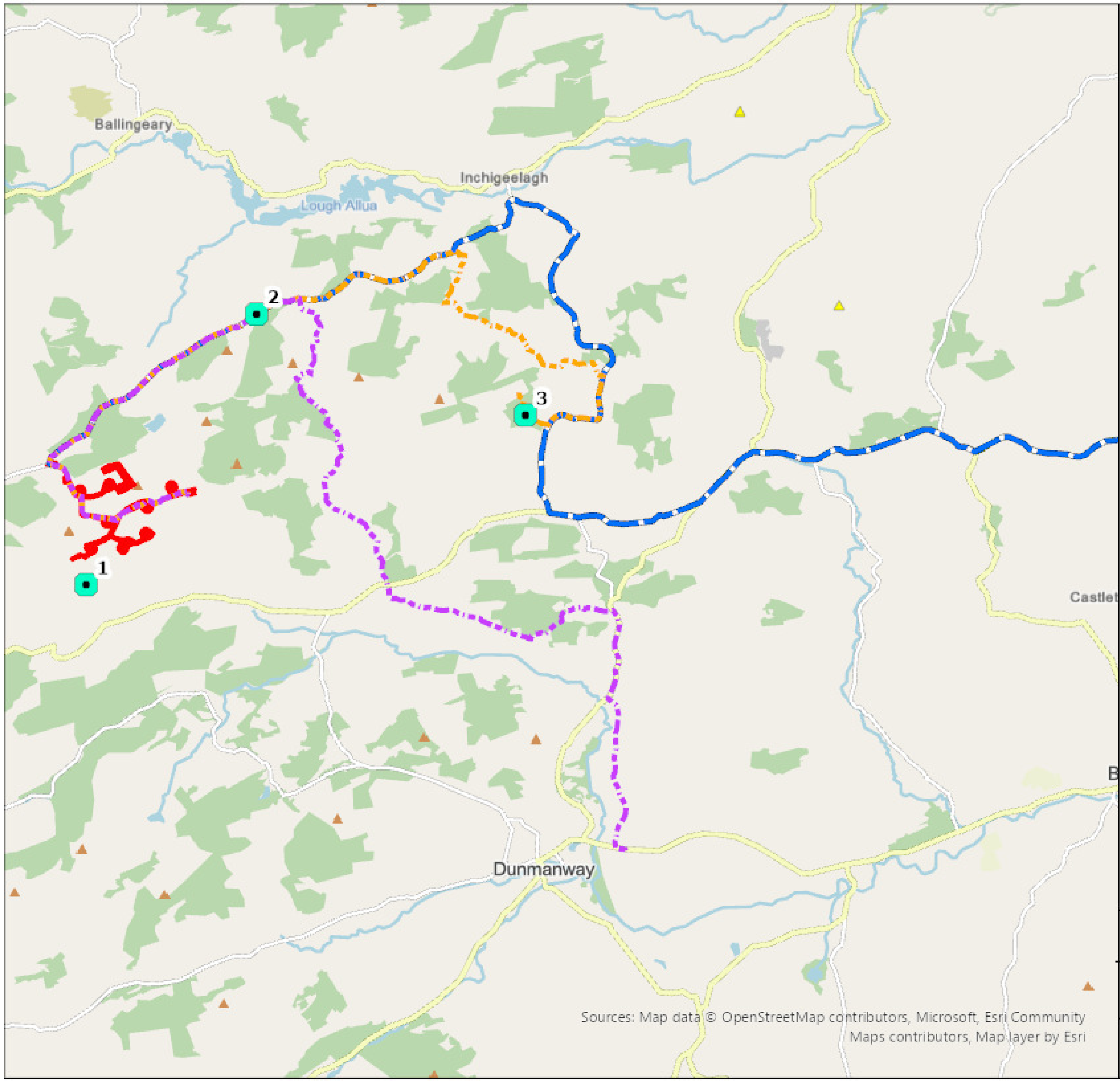
Location 6 relates to a historical record for the presence of Japanese Knotweed held by the National Biodiversity Data Centre. During the October 2025 and April 2026 surveys no Japanese Knotweed infestation were identified as occurring at this location. It is noted that no works location for the proposed Turbine Delivery Route are identified at or in the vicinity of Location 6, with the nearest works location being located approximately 550m to the south.

Location 7 relates to a historical record for the presence of Japanese Knotweed held by the National Biodiversity Data Centre. This infestation was also identified during baseline surveys for the proposed Wind Farm grid connection associated with Cork County Council Planning Reference 17/431. An Invasive Species Management Plan was prepared for the Project under 17/431. During the October 2025 and April 2026 surveys no Japanese Knotweed infestation were identified as occurring at this location. It is noted that no works location for the proposed Turbine Delivery Route are identified at or in the vicinity of Location 6, with the nearest works location being located approximately 550m to the south.

Location 8 relates to a historical record for the presence of Japanese Knotweed identified during baseline surveys for the proposed Wind Farm grid connection associated with Cork County Council Planning Reference 17/431. An Invasive Species Management Plan was prepared for the Project under 17/431. During the October 2025 and April 2026 surveys no Japanese Knotweed infestation were identified as occurring at this location. It is noted that Location 8 is located along the local road within which grid connection route option B is to be installed. As such particular attention will be given to confirming the continued absence of Japanese Knotweed from this location during the pre-construction non-native invasive species surveys, as set out under Section 5 below.

Location 9 relates to the presence of Japanese Knotweed identified during baseline surveys completed during October 2025 and April 2026. It is noted that Location 9 is not located along the existing road corridors to be used to accommodate the grid connection route option A. This infestation is located along the R587 regional road, approximately 50m to the north of the L8552 and R587 road junctions. The proposed grid connection route option A will be installed along the L8552 and within the R587 south of the L8552 and R587 junction. However, given the proximity of this infestation to the north of the grid connection route option A particular attention will be given to confirming the continued absence of Japanese Knotweed from the sections of road corridor along the L8552 and R587 accommodation the grid connection route option A.


Ballingeary
Inchigeelagh
Lough Allua
Castlet
Dunmanway
B
1
2
3
4
5
6
7
8
9
Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri
Gortloughra Wind Farm
Figure 2.1
Location of Japanese Knotweed Records
Japanese Knotweed
Gortloughra WF
Proposed TDR Route
Grid Connection Option A
Grid Connection Option B
0
1.5
3
6 Km
N
S
E
W
Date
27/04/2026
Drawn By
PD
Source
Maxar



Gortloughra Wind Farm

Figure 2.2

Location of Prunus laurocerasus Records

P. laurocerasus
Gortloughra WF
Proposed TDR Route
Grid Connection Option A
Grid Connection Option B

0 1.5 3 6 Km

N S W E

Date	27/04/2026
Drawn By	PD
Source	Maxar

2.2 PRUNUS LAUROCERASUS

Prunus laurocerasus has been recorded at 3 no. locations along or in the vicinity of the Gortloughra Wind Farm project. These locations are shown on Figure 2.2 below.

Location 1 is located to the south of the Gortloughra Wind Farm project and no works associated with the project will occur at or in the vicinity of this small stand of *Prunus laurocerasus*.

Location 2 is located along the north side of the local road in the townland of Tooreenalour. It is situated within a works location identified for the proposed Turbine Delivery Route and adjacent to a section of local road that will be used to accommodate the grid connection route. Control measures with respect to this infestation are set out in Section 6 below.

Location 3 is located to the south of the local road that will be used to accommodate the grid connection route option B. It is situated to the southeast of the entrance to the existing substation and is representative of an immature stand of *Prunus laurocerasus* consisting of one stem. Control measures with respect to this infestation are set out in Section 6 below.

3.0 OVERVIEW OF NON-NATIVE INVASIVE SPECIES

3.1 JAPANESE KNOTWEED

Japanese Knotweed was originally introduced to the UK and Ireland as an ornamental plant but has spread extensively in the wild. It was first recorded in Ireland in 1902. With its rapid growth of more than 20mm a day, it forms dense clumps over 3m high which crowd out and prevent the growth of native plants.

All plants occurring in the British Isles are thought to be male sterile (Bailey & Connolly, 2002) and reproduction is almost entirely asexual with very little viable seed produced (0% to <2%) (Tiébré et al., 2007). It spreads through rhizomes and vegetatively in local areas. The rhizome root system, from which new plants grow, typically spread up to 3 metres away from the original plant (RICS, 2022). The plant spreads so rapidly not only through progression of its root system but because any fragments of its stem or root will grow to form a new plant (a piece as small as 2cm can regenerate). This can make it a very difficult plant to eradicate.

Japanese Knotweed will grow in any type of soil no matter how poor and is often found along railways, riverbanks, roads and particularly on derelict sites.

Japanese Knotweed has been categorised by the NBDC as a species of high impact invasiveness and has been attributed an invasiveness risk score of 20.

3.2 CHERRY LAUREL

Cherry laurel is present within woodland habitats within the Site.

Prunus laurocerasus is a perennial evergreen shrub species that was first reported in the wild in Ireland in 1950. It occurs in woodland habitats as well as bogs, fens and grasslands. It spreads by layering and suckering and the fruit may be eaten and dispersed by birds (Reynolds, 2002). It outcompetes native species and suppresses regeneration by forming thick stands. It is not browsed as a forage plant by herbivores which enhances conditions for its spread (Maguire et al., 2008).

Prunus laurocerasus has been categorised by the NBDC as a species of high impact invasiveness and has been attributed an invasiveness risk score of 18.

4.0 AIMS & OBJECTIVES

The primary site management objective is to prevent the spread of the identified invasive species as a result of the proposed works during construction and the eradication of the infestations prior to the commencement of the operational phase. The primary risk is perceived as during the construction period when the excavation of materials and presence of plant, machinery and site operative can facilitate the spread of the non-native invasive plant species identified on the project site.

The works will aim to avoid the spread of the non-native invasive plant species during construction works.

The management objectives are:

- Objective 1. Prevention of further spread of non-native invasive plant species as a result of construction works.
- Objective 2. Eradicate any non-native invasive plant species infestations within the footprint of works associated with the Gortloughra Wind Farm prior to the commencement of construction works.

5.0 PRE-CONSTRUCTION WORKS SURVEY

Prior to the commencement of construction works the project will be subject to an up to date pre-construction survey to identify the location of non-native invasive plant species infestations within and adjacent to the areas of works associated with the proposed wind farm, grid connection route and turbine delivery route. The pre-construction survey will be completed by the appointed Ecological Clerk of Works for the project.

All locations of infestations and their extent will be mapped and the Invasive Species Management Plan will be updated with the results of the surveys to include map figures identifying the location of these infestations. All control requirements set out below will be implemented for all infestations occurring within or adjacent to the footprint of the construction works for the project.

6.0 CONTROL REQUIREMENTS

The control and eradication of non-native invasive species within the project site will be completed in accordance with Transport Infrastructure Ireland (TII) publication “The Management of Invasive Alien Plant Species on National Roads – Technical Guidance” (2020).

The control measures to be applied for the control and eradication of non-native invasive species will be supervised by the construction phase ECoW, which will have experience with the control and eradication of non-native invasive species from development sites.

The location and extent of non-native invasive species occurring within the works footprint of the project will be subject to up-to-date mapping during the growing season prior to the commencement of vegetation clearance. Where infestations of stands of non-native invasive species occur the boundary of these areas will be mapped as a polygon which will be digitised and made available in shapefile and/or autocad format.

Where individual stems of non-native invasive species are identified during the up-to-date survey, these will be mapped as points, which will be digitised and made available in shapefile and/or autocad format.

The up-to-date maps will be provided to the vegetation clearance contractor prior to the commencement of vegetation clearance. As noted above the clearance of non-native invasive species will be supervised by the construction phase EcoW.

6.1 JAPANESE KNOTWEED

6.1.1 Management of Construction Works at Japanese Knotweed Infestations

Japanese Knotweed infestation at Location 2 occurs at a works location for the proposed Turbine Delivery Route. As such the control measure to be implemented for this infestation will be disposal offsite at a Licence Facility. The steps required under this management option are as follows:

a) Pre-excavation & Letter of Acceptance: The area of Japanese Knotweed infestation and associated underlying soil layer that will be treated as contaminated will be marked out prior to excavations.

b) Soil samples have been taken from a trial pit completed within the contaminated area. A WAC soil analysis of the soils will be completed to inform the provision of a letter of acceptance by the licenced landfill operator. A material excavated during the trial pit (aside from the sample) will be stored at the infested area and will be backfilled into the trial pit at the infested area. This will ensure the avoidance of movement or spread of material originating at the infested area away from it to other locations. The trial pit operation will be supervised by the project ECoW.

c) A tool-box talk will be provided by the ECoW to all site personnel prior to the commencement of physical treatment works.

d) Once a Letter of Acceptance is received by the licenced landfill operator it will be forwarded to the Minster for their information, as part of a licence application to permit the movement and disposal offsite of the contaminated material.

e) Access to Contaminated Area: Access to the contaminated area will be restricted to site personnel and machinery required to complete the excavations. Specified access routes to the contaminated areas will be defined and site personnel and machinery will be restricted to these access routes. Trucks that will be loaded with contaminated material will approach the contaminated area from the established access route. The trucks will be loaded by the site excavator. The trucks will not drive over any exposed or loose soil or excavations. This will ensure that the trucks and wheels do not come into contact with potentially contaminated soil from excavated areas. As further precaution the truck wheels and undercarriage will be washed down prior to exiting the contaminated area.

f) All personnel footwear, equipment, and vehicles will be washed down in the wash down area prior to exiting the contaminated area. All washings will be required to be directed to the existing contaminated area. This will ensure that all disinfected wash down water is contained within the existing contaminated area and does not runoff to an area outside the contaminated area. Virkon disinfectant will be used with all wash down waters during washing and cleaning of footwear, equipment, plant and vehicles.

g) Excavation & Removal of Contaminated Material: Excavations will be monitored by the ECoW. All contaminated soil will be deposited directly from the dig site into containers loaded onto trucks. Trucks will be loaded to a maximum levels of 100mm below the top side of the trucks. The loads will be covered by a tarpaulin and will be sealed prior to exiting the site. The trucks will be washed down and wheels and undercarriages will be disinfected with Virkon and inspected in the wash down area prior to leaving the wash down area. Trucks will proceed directly to the licenced landfill to be weighed. Weights will be recorded on consignment dockets and exit dockets will also be provided.

h) The trucks at the licenced landfill site will enter and exit the disposal area on a clearly defined route and will be washed down and disinfected at the wash area, paying particular attention to wheels and undercarriage.

In the event that the pre-construction surveys identify the presence of Japanese Knotweed at works locations for the project, then the above measures will be implemented in full to ensure that the infestation is properly managed and eradicated prior to the commencement of construction works.

6.1.2 Management of Japanese Knotweed Infestations along Turbine Delivery Route outside Works Locations

Japanese Knotweed infestations have been identified along the turbine delivery route outside of works locations. These are at Japanese Knotweed infestation location no. 1 and 5. The infestation at Location 1 is on third party lands to the south of the R585. It is set back from the roadside and no interaction with turbine delivery route vehicles and this infestation are will occur. The extent of the infestation will be re-surveyed during the pre-construction survey. During the delivery, delivery personnel will be stationed at Location 1 to direct the delivery vehicle to ensure no interaction with the infestation arises.

The infestation at Location 5 is along the roadside verge. The extent of the infestation will be re-surveyed during the pre-construction survey. During the delivery, delivery personnel will be stationed at Location 1 to direct the delivery vehicle to ensure no interaction with the infestation arises.

6.2 CHERRY LAUREL

The TII (2020) guidelines specify measures for the control of *Rhododendron ponticum* but do not specify guidelines for the control of Cherry Laurel. However, given that Cherry Laurel growth is similar to *Rhododendron ponticum* the approach to be implemented for the control of Cherry Laurel will follow that outlined for *Rhododendron ponticum*. It is noted that should *Rhododendron ponticum* be identified as occurring within or adjacent to the project during the pre-construction surveys then the measures set out below will be implemented for any such *Rhododendron ponticum* infestation identified.

The existing known location of Cherry Laurel at Location 2 will be removed by hand cutting larger trunks and stems using a chainsaw. The remaining stump will be subject to chemical treatment via the stem injection of herbicide. Any seedlings occurring within the works footprint will be hand pulled.

All Cherry Laurel cutting and removal will be completed during the non-breeding bird season during the months of January and February.

All Cherry Laurel cut material will be mulched on site within a mobile mulcher. The mulched material will be transported offsite for disposal at a local authority licenced waste disposal facility.

7.0 CONCLUSION

Two non-native invasive plant species, Japanese Knotweed and Cherry Laurel, have been identified at the project site during baseline surveys.

Measures have been outlined for the control and eradication of non-native invasive species within the project site. The proposed approach to the control and eradication of these species is in line with best practice guideline recommendations (see TII, 2020) and the proper implementation of the approach outlined in this report will minimise the potential for the spread of these species during site clearance works and will seek to achieve their eradication from the subject site.

8.0 REFERENCES

Bailey, J. P., & Conolly, A. P. (2000). Prize-winners to pariahs-a history of Japanese knotweed sl (Polygonaceae) in the British Isles. Watsonia, 23(1), 93-110.

Booy, O., Wade, M. & Roy, H. (2015) *A Field Guide to Invasive Plants & Animals in Britain*. Bloomsbury.

Heleno, R. H., Ross, G., Everard, A. M. Y., Memmott, J., & Ramos, J. A. (2011). The role of avian 'seed predators' as seed dispersers. *Ibis*, 153(1), 199-203.

Invasive Species Ireland 2016, 'Japanese Knotweed, Best Practice Management Guidelines'

Kelly, J., Maguire, C.M. and Cosgrove, P.J., Muir, R.A. (2015). Best Practice Management Guidelines Japanese knotweed Fallopia japonica. Prepared for NIEA and NPWS as part of Invasive Species Ireland.

Reynolds, S.C.P. (2002) A catalogue of alien plants in Ireland. National Botanic Gardens. Glasnevin, Dublin

RICS (2022). Japanese Knotweed and Residential Property. RICS Guidance Note, UK.

Tiébré, M. S., Vanderhoeven, S., Saad, L., & Mahy, G. (2007). Hybridization and sexual reproduction in the invasive alien Fallopia (Polygonaceae) complex in Belgium. Annals of Botany, 99(1), 193-203.

TII (2020a). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance. GE-ENVIRONMENT-01105.

TII (2020b). The Management of Invasive Alien Plant Species on National Roads – Standard. GE-ENVIRONMENT-01104.

Derogation Number
DER-KERRY SLUG-2026-12

EUROPEAN COMMUNITIES (BIRDS AND NATURAL HABITATS) REGULATIONS, 2011 (S.I. No 477 of 2011)

DEROGATION

Granted under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011, hereinafter referred to as “the Habitats Regulations”.

The Minister for Housing, Local Government & Heritage, in exercise of the powers conferred on him by Regulation 54 of the Habitats Regulations hereby grants to **Pat Doherty** of **Doherty Environmental Consultants (DEC) Ltd., Glanturkin, Guileen, Whitegate, County Cork, P25 K803** a derogation. It is stated that this derogation is issued:

A. In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment
B. As there is no satisfactory alternative, and the action authorised by this derogation will not be detrimental to the maintenance of the population of **Kerry Slug** referred to below at a favourable conservation status in their natural range.

This derogation authorises the following:
1. Disturbance
2. Actions authorised within the derogation

Terms and Conditions

1. This derogation is granted solely to allow the activities specified in connection with the works located at **Gortloughra Wind Farm (within the townlands of tSeithe Bheag (Shehy Beg), (Muscraí Gaeltacht),**
2. **Gortloughra, Cloghboola and Inchinroe), County Cork** for **Pat Doherty.**
3. All activities authorised by this derogation, and all equipment used in connection herewith, shall be carried out, constructed and maintained (as the case may be) so as to avoid unnecessary injury or distress to any species of **Kerry Slug**.
4. The works will be supervised by an ecologist: **Pat Doherty**
5. This derogation may be modified or revoked, for stated reasons, at any time.
6. The mitigation measures outlined in the application report (**Gortloughra Wind Farm Kerry Slug Derogation Licence Application Supporting Information**), together with any changes or clarification agreed in correspondence between NPWS and the agent or applicant, are to be carried out. Strict adherence must be paid to all the proposed measures in the application.
7. The actions which this derogation authorise shall be completed between the **8th July 2026 – 31st December 2027, inclusive.**
8. This derogation shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or an authorised NPWS officer appointed under Regulation 4 of the Habitats Regulations.
9. If this derogation addresses works that are subject of a planning application, no such works permitted under this derogation can occur until planning permission is granted.
10. If this derogation expires prior to works permitted under this derogation commencing, a new application must be sought in advance, including the provision of any updated data or reports.
11. The below **NPWS Conservation Ranger** must be contacted prior to the commencement of any activity, and if bats are detected on site during the course of the work, under the terms of this derogation.
    - **Macroom CR Louis Sullivan** louis.sullivan@npws.gov.ie
    - **Clonakilty/Bandon CR Claire Deasy** claire.deasy@npws.gov.ie**,**
    - **Beara & Bantry CR Patrick Graham** patrick.graham@npws.gov.ie**,**
12. There should be no net loss of habitat due to the work and replacement habitat should be provided in terms of woodland planting of native species that suitable for **Kerry Slugs** or by movement and replacement of rock outcrops or by creation of new bare rock faces.
13. On completion of the actions which this derogation authorises, all recordings of Kerry Slugs affected will be made using the standardised data form provided below and must be submitted to the NPWS within four weeks of the expiry date of this derogation. Included with the below returns form, a report must be submitted to **Dr. Chris Peppiatt, chris.peppiatt@npws.gov.ie.** This report should include locations of all translocation sites, the number of **Kerry Slugs** translocated, areas of replacement habitat created and results of the monitoring programme. A copy of same report must be submitted to **wildlife.reports@npws.gov.ie**.

For the Minister for Housing, Local Government & Heritage

Fiona O' Mahony.

(an officer authorised by the Minister to sign on his behalf)

08 July 2026

Any query in relation to this derogation should be sent to reg54derogations@npws.gov.ie

National Parks & Wildlife Services

LICENCE

Derogation Assessment

Name of Applicant: Pat Doherty

Location/Name of Project: Gortloughra Wind Farm, County Cork

Tick the following prohibition as chosen on the application:

(a) Deliberately capture or kill any specimen of the relevant species in the wild	☐
(b) Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration	☐
(c) Deliberately take or destroy eggs of the relevant species in the wild	☐
(d) Damage or destroy a breeding or resting place of such an animal, or	☐
(e) Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of the relevant species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive.	☒
(a) Deliberately pick, collect, cut, uproot or destroy any specimen of these species in the wild, or	☐
(b) Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 13(1)(b) of the Habitats Directive.	☐

Test 1: A reason(s) listed in Regulation 54 (a)-(e) applies to the proposed activity

i. Tick which reason the applicant claims should be applied to the derogation

(a) In the interests of protecting wild flora and fauna and conserving natural habitats,	☐
(b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property	☐
(c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment,	☒
(d) For the purpose of research and education, of re-populating and re-introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants, or	☐
(e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule.	☐

ii. Test 1: Conclusion

Please tick the following where it applies:

There is a valid reason(s) listed in Regulation 54 (a)-(e) which applies to the proposed activity:	Yes	☒
	No	☐

Please outline your analysis below and state how the applicant has provided evidence to support your conclusion:

The application form and associated documentation provided by the applicant has been reviewed in full. The application relies on regulation 54(2)(c) '*in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment'* as the reason chosen for a derogation that they believe applies to the proposed activity.

In the detail provided, it is clear that the applicants are relying on the imperative reasons of overriding public interest, including those of a social or economic nature aspect of Reason C. As outlined in the accompanying report titled "Kerry Slug Derogation Licence Application, Supporting Information", a derogation is required to facilitate proposed activities at Gortloughra Wind Farm Ltd, within the townlands of Seithe Bheag (Shehy Beg), (Muscraí Gaeltacht), Gortloughra, Cloghboola and Inchinroe.

The objective of the activity is to translocate Kerry Slugs prior to and during the construction of the wind farm to the nearest area of suitable habitat. The report notes a small area of habitat for Kerry Slugs will be lost as it forms part of the wind farm site.

The report further outlines that the proposed windfarm will help to deliver a "renewable energy project that will contribute towards climate goals as set out in the climate action plan". These climate goals include a net zero emissions target for Ireland by at the latest, 2050. The report also mentions the Renewable Energy Directive, which mandates renewable projects to be of overriding public interest.

The applicant has provided evidence as to the nature and scale of the public interest including those of a social or economic nature for the proposed works and the proposed activity is necessary to achieve these overall objectives. Based on the above this application has passed Test 1 and can now proceed to Test 2

Test 2: Absence of a satisfactory alternative

Please tick the following where it applies and add a comment below to support the recommendation:

The applicant has provided satisfactory evidence that alternative solutions have been considered and have given reasons why the proposed approach is the only satisfactory alternative:	Yes	☒
	No	☐

Please outline your analysis below and state how the applicant has provided evidence to support your conclusion (If you wish to add additional conditions please complete pg. 6):

The documentation submitted by the applicant has been reviewed, including the evidence for alternative solutions.
The purpose of the derogation is to allow the following activity to take place:
Gortloughra Wind Farm Ltd. intend to carry out application for a derogation licence for disturbance to Kerry Slug (Geomalacus maculosus) as required under Regulation 54(2) (A-E) of the European Communities (Birds and Natural Habitats) Regulations. The derogation licence is required to fulfil mitigation measures to translocate the Kerry slug during the construction phase of the Proposed Project which comprises a Proposed Wind Farm in the townlands of Seithe Bheag (Shehy Beg), (Muscraí Gaeltacht), Gortloughra, Cloghboola and Inchinroe.
The alternative solutions suggested by the applicant are

1. "Do-Nothing" scenario [The 'do-nothing' scenario would mean constructing the wind farm without implementing the required Kerry Slug translocation measures, which could result in potential direct negative impacts and loss of individuals from the local population. NPWS regional staff are in agreement with the applicant that this alternative is not satisfactory as a derogation licence and associated mitigation measures are essential to protect this mobile species, which have the potential to occur within the construction footprint.]
2. Alternative 2 – This alternative would be to not construct the planned renewable energy development. NPWS regional staff are in agreement with the applicant that this alternative is not satisfactory as this would exclude the opportunity to harness renewable energy and remove a vital contribution to the National and European plans to increase the production of renewable energy.
3. Alternative 3 – The only viable and satisfactory alternative is to undertake a search and translocation of Kerry slug to avoid potential impacts on the species and to fulfil the mitigation measures required during construction of the Proposed Project.

NPWS regional staff are in agreement with the applicant that this alternative is the most satisfactory as the mitigation for the proposed works involves:

- During the construction phase of the Proposed Project, the construction corridor will be kept to a minimum to avoid direct habitat loss for Kerry slug.
- Prior to undertaking works in areas of suitable habitat, translocation will be employed to avoid and minimise a direct impact on the species. Translocation to suitable habitat in the surrounding area will be employed to avoid direct loss of individuals.
- Monitoring of Kerry Slug in the areas adjacent to the site works will be undertaken to provide a before and after impact assessment. This will ensure that populations remain stable post-construction.

Alternative 3 was considered the most suitable option in this instance.

The applicant [has] provided satisfactory evidence that alternative solutions have clearly been considered. Based on the assessment of the application documentation, it is regarded that the applicant has considered all available alternative solutions and at this time no other alternative solutions are apparent.
Having weighed the possible solutions to solve the applicant's problem against the effects of a derogation on the species concerned, it is concluded that the application has passed Test 2 and can proceed to Test 3

<u>Upon completion of your assessment, please return this Recommendation to WLU to continue the application process.</u>

Test 3: Impact of a derogation on conservation status of the species

Please tick the following where it applies and add a comment below to support the recommendation:

The derogation would NOT be detrimental to the maintenance of the populations of the species in question at a favourable conservation status in their natural range.	Yes	☒
	No	☐

Please outline your analysis below and state how the applicant has provided evidence to support your conclusion. (If you wish to add additional conditions please complete pg. 6)

The site of the proposed Gortloughra Wind Farm, in the townlands of Seithe Bheag (Shehy Beg), (Muscraí Gaeltacht), Gortloughra, Cloghboola and Inchinroe in Co. Cork (W15), is within the distribution range of the Kerry Slug in Ireland. It is not close to any SAC for which Kerry Slug is a qualifying interest and is 8.4 kilometres east of the nearest SAC (for which Kerry Slug is not a qualifying interest). The wider area contains areas of suitable habitat for the species. As part of the baseline ecological studies completed for the Wind Farm Project, a desk study review and field survey for Kerry Slug were undertaken. The desk study review identified previous records for the presence of this species in the immediate vicinity of the Wind Farm Site, whilst the field surveys identified the presence of this species within the Wind Farm Site.

The derogation application is to cover for hand searching and metric survey trapping of Kerry Slug and for translocation works to suitable siliceous rock habitat within the wind farm site area during the construction stage of the proposed project in line with mitigation set out in the EIAR for the project as proposed.

The range and population of this species in Ireland has been assessed as increasing and it is not considered that the proposed disturbance would affect the conservation status of Kerry Slug in this country.

Any derogation licence issued shall condition all of the actions as regards mitigation measures and monitoring methodology that was detailed in the submitted DER licence application form and supporting document. The results of the searching/trapping and translocation works, i.e. as regards numbers of Kerry Slug recorded and their locations, should be submitted to NPWS as part of the licence conditions

<u>If the answer above is Yes then the derogation may be granted, providing Tests 1 and 2 have also been met.</u>

<u>Upon completion of your assessment, please return this Recommendation to WLU to continue the application process.</u>

Derogation decision

The application for a derogation under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011), as amended, has been assessed by officials in the Department and the following decision has been made:

Tick box where appropriate:

There is no satisfactory alternative	☒
and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range.	☒

Therefore, a derogation may be granted to the applicant, since it is—

(a) in the interests of protecting wild fauna and flora and conserving natural habitats,	☐
(b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property,	☐
(c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment,	☒
(d) for the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants, or	☐
(e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule.	☐
OR **This application has been refused as one or more of the conditions set out above have not been met**	☐

The following conditions should be attached to the derogation:

1. Any derogation licence issued shall condition all of the actions as regards mitigation measures and monitoring methodology that was detailed in the submitted DER licence application form and supporting document.
2. The results of the searching/trapping and translocation works, i.e. as regards numbers of Kerry Slug recorded and their locations, should be submitted to NPWS as part of the licence conditions.
3.
4.

[add additional conditions where required]

Signed: Kate Greaney   Date: July 8, 2026

Position: Ecologist

Application for Derogation

Under Regulation 54 & 54A of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended

Revision 2.0 – July 2025

- This form can be used by any individual or Company applying for a derogation under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 ("the Regulations") **or** any individual applying on behalf of the Minister for Housing, Local Government and Heritage under Regulation 54(A) of the Regulations.

- Note this application form is not for Domestic Dwelling Derogations (bats within private homes) which can be found here > (3D Application Form)

- Please ensure that you answer questions fully in order to avoid delays and/or your application being rejected on the basis that it does not contain sufficient information and detail for the application to be considered further.

- Please read and familiarise yourself with the NPWS Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants

- Please read and familiarise yourself with the European Commission's Guidance document on the strict protection of animal species of Community interest under the Habitats Directive

- Please also note that the responses to these questions are supplementary to the documentation required for the NPWS to be in a position to consider your application. A complete application should include both the application form and an associated report. Failure to supply either will result in your application being returned and/or refused.

- In circumstances in which a derogation is given on foot of this application, the Applicant is responsible for ensuring compliance with the conditions of any such derogation, even though they may employ another person to act on their behalf. To carry out any activity without, or not in accordance with, a derogation granted under regulation 54 or 54A of the Regulations constitutes a criminal offence, subject to prosecution.

- If you experience any problems filling in this form, please contact the Wildlife Licensing Unit: reg54derogations@npws.gov.ie

- Please note – applications, associated reports and derogations will be published on the NPWS website and/or the Department's Open Data website.

- Where any applicant is applying for a derogation to carry out surveys, please ensure to list all qualified ecologists and trainees under their supervision. See section 1(c) of Part A.

Part A: The Applicant - Personal Details

These questions relate to the person responsible for any proposed works and who will be the **Applicant**. **If this application is being submitted on behalf of a third party, please also complete Part B below.**

1. (a) Name of Applicant

Title (Mr/Mrs/Miss/Ms/Dr)	Forename(s)	Surname
Mr	Pat	Doherty
(b) Company Name, if applicable	Doherty Environmental Consultants (DEC) Ltd.	
(c) Address Line 1	Glanturkin	
Address Line 2	Guileen	
Town	Whitegate	
County	Cork	
Eircode	P25K803	
(d) Contact number	0879314907	
(e) Email address	pdoherty@dohertyenvironmental.com	
(f) Address where works are to be carried out if different from (b) above.		
Address Line 1	Gortloughra Wind Farm	
Address Line 2	Towlands of tSeithe Bheag (Shehy Beg), (Muscraí Gaeltacht), Gortloughra, Cloghboola and Inchinroe	
Town		
County	Co .Cork	
Eircode	N/A	

Details of Person Submitting Application on Behalf of Applicant/Derogation Holder

Information relating to the person (e.g. ecologist) responsible for submitting the application on behalf of the applicant should be entered below:

1. (b) Name of Person/Ecologist

Title (Mr/Mrs/Miss/Ms/Dr)	Forename(s)	Surname
	Pat	Doherty
(b) Company Name	Doherty Environmental Consultants (DEC) Ltd.	
Address Line 1	Glanturkin	
Address Line 2	Guileen	
Town	Whitegate	
County	Cork	
Eircode		
(c) Contact number	087 9314907	
(d) Email address	pdoherty@dohertyenvironmental.com	

(e) Relationship to Applicant	Client

For Survey Derogations Only

1. (c) Please Indicate the Names to Appear on the Derogation Along with the Position Held e.g. Supervisor/Trainee

Forename(s)	Surname	Supervisor or Trainee
Pat	Doherty	Supervisor & Surveyor

Part B: Species covered by the Derogation

1. **Species of Animal:** Please indicate which species is/are the subject of the application:

- Bat ☐
- Otter ☐
- Kerry Slug ☒
- Natterjack Toad ☐
- Dolphin ☐
- Whale ☐
- Turtle ☐
- Porpoise ☐

2. Please detail the exact species (scientific name): Geomalacus maculosus

3. Please provide the maximum number of individuals affected* Unknown

4. Please provide the maximum number of breeding or resting sites affected* None

5. Please provide the maximum number of eggs to be taken* None

6. Please provide the maximum number of eggs to be destroyed* None

*If no figures can be provided for the maximum number of individuals, breeding sites, resting places and eggs to be covered by the derogation please provide reasons why.

The derogation licence is being sought to facilitate pre-emptive mitigation measures for the protection of Geomalacus maculosus during the construction phase of the proposed Gortloughra Wind Farm. Geomalacus maculosus have been recorded at the Wind Farm Site during baseline surveys (see Gortloughra Wind Farm Kerry Slug Derogation Licence Application Supporting Information, provided under separate cover with this licence application). Geomalacus maculosus have been recorded in association with suitable exposed siliceous rock habitat outside of the footprint of the proposed Wind Farm Site. In addition the Wind Farm Site is located within a wider area that is known to support Geomalacus maculosus and the presence of discrete areas of suitable habitat for this species has been identified within the footprint of the proposed wind farm. The licence is sought to permit the translocation of Geomalacus maculosus from the footprint of the Wind Farm Site, in the event that Geomalacus maculosus are found to be present within the footprint, during pre-construction surveys to be completed prior to the commencement of construction works and ground clearance. As set out in the accompanying supporting information any translocations permitted under licence will be within the proposed wind farm site to the nearest adjacent area of suitable habitat.

7. **Species of Plant:** Please indicate which species is/are the subject of the application:

- Killarney Fern ☐
- Slender Naiad ☐
- Marsh Saxifrage ☐

8. If you previously received a derogation for any species of animal or plant, please state derogation number and confirm that you have made a return to NPWS on the numbers actually affected by that derogation.

DER-Bat-2025-334 – licence return form issued to Wildlife Licencing Unit

DER-Bat-2025-52 – licence return form issued to Wildlife Licencing Unit

9. **Proposed Dates for Activities:** Please indicate the timeframe that you propose to carry out the activities. Dates set by NPWS may differ from dates proposed here. *A derogation will only be issued with a start and end date within a calendar year.*

Start Date:	01/05/202
End Date:	31/12/2026

Part C: Nature of the Derogation.

1. Please tick which prohibition(s) the application for a derogation relates to:

Regulation 51	
Deliberately capture or kill any specimen of the relevant species in the wild	☐
Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration	☐
Deliberately take or destroy eggs of the relevant species in the wild	☐
Damage or destroy a breeding or resting place of such an animal, or	☐
Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of the relevant species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive.	☒
Regulation 52	
Deliberately pick, collect, cut, uproot or destroy any specimen of these species in the wild, or	☐
Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 13(1)(b) of the Habitats Directive.	☐

Further information should be provided in the format set out in Part E: Template for Supporting Information

Part D: Derogation Tests

Note: The following summary information must be provided by the applicant in all cases, and will be used to determine if a derogation can be provided. Further information must be provided in the format set out in Part E: Template for Supporting Information

Test 1: Reason for the Derogation

1. Please tick which reason(s) below explains how this application qualifies under Regulation 54(2)(a-e) or Regulation 54A(2)(a-e) of the European Communities (Birds and Natural Habitats)

Regulations: Please provide a summary of how the application meets the 3 conditions required to provide a derogation. Note that in all cases additional information must be provided (see Part E).

a.	In the interests of protecting wild flora and fauna and conserving natural habitats **(proceed to 1a)**	☒
b.	To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property **(proceed to 1b)**	☐
c.	In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment **(proceed to 1c)**	☒
d.	For the purpose of research and education, of re-populating and re-introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants **(proceed to 1d)**	☐
e.	To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule **(proceed to 1e)**	☒

1a. In the interests of protecting wild flora and fauna and conserving natural habitats:

i) Please state the wild flora, fauna or habitats that require protection and /or conservation.

Geomalacus maculosus requires protection during the construction phase of the proposed wind farm project. The permission to translocate Geomalacus maculosus locally within the Wind Farm Site prior to and during construction works is representative of a mitigation measure that aims to protect specimens from any loss that may otherwise occur should specimens be present within the construction footprint prior to and/or during works and in the absence of permission to translocate specimens.

ii) Please summarise how the interests of protection and conservation of the species/habitat concerned justify affecting another species under strict protection.

No other species under strict protection will be affected by local translocation of Geomalacus maculosus, which is intended to protect this species.

1b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property:

i) Please summarise the nature of the potential damage, why it is considered "serious" and how this outweighs the conservation interest of the species under strict protection.

1c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment:

i) Where the reason is for public health and public safety, summarise the evidence provided to support this reason (e.g. documentary evidence of the risk from a chartered structural engineer, tree surgeon, Garda Síochána, qualified health professional etc.)

ii) Where the reason is for "other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment", summarise the nature of the public interest and how this outweighs the conservation interest of the species under strict protection.

The provision of the proposed wind farm project will deliver a renewable energy project that will contribute towards climate goals as set out in the Climate Action Plan which seeks to achieve net zero emissions by, at latest, 2050. The proposed wind farm project is representative of a Renewable Energy Directive (RED III) Project, which mandates renewable energy projects to be of overriding public interest (see Paragraph 44 of the Renewable Energy Directive (EU) 2023/2413

1d) For the purpose of research and education, of re-populating and re-introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants:

i) Please summarise the objective(s) of the proposed activities making reference to those listed above and how the the purpose of such activities overrides the interests of strict protection of the species. [1]

[1] Note that this reason may be appropriate for when research involves surveys that may cause disturbance of species under strict protection. But the sole purpose of the surveys should be for research and education or the other reasons listed above under 1d.

1e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule

i) Please clearly state the objective of the activity and verify that this reason is being chosen as the objective of the activity does not match reasons a-d listed above.

The activity for which a derogation licence is sought does match 1a and 1c as set out above.

ii) Please summarise how the activity will result in the taking or keeping of limited numbers of specimens of the species, how it will be applied on a selective basis and to a limited extent, and how it will be done under strictly supervised conditions.

The activity seeks permission to take specimens of Kerry Slug in the event that such specimens are present within the construction footprint prior to the clearance of surface vegetation and construction works. The 'taking' of Kerry Slug, as sought under this licence application, will be in the form of:

1. the collection of individual specimens during hand searches and their immediate translocation to the nearest area of suitable habitat (i.e. exposed siliceous rock, as identified 'Suitable habitat siliceous ridges/outcrops' in Figure 3.2) outside the footprint of the Wind Farm construction corridor; and

2. the trapping of Kerry Slug using De Sangosse traps as per the methods set out by McDonnell & Gormally (2011) and their translocation to the nearest area of suitable habitat (i.e. exposed siliceous rock, as identified 'Suitable habitat siliceous ridges/outcrops' in Figure 3.2) outside the footprint of the Wind Farm construction corridor

The procedure for translocation of specimens will comprise:
pre-vegetation clearance searches of the proposed wind farm footprint for the presence of specimens to be completed by the licence holder;
collection of specimens, if present, and immediate translocation to adjacent areas of suitable exposed siliceous rock habitat

Test 2: Absence of Alternative solutions

2. Please summarise the alternative solutions that have been considered and why these solutions are deemed unsatisfactory. This must include the option of the "do-nothing" alternative and evidence should be objective and robust. Note that in all cases further information must be provided in the format set out in Part E: Template for Supporting Information.

Alternative Solution	Reasons for "Unsatisfactory"
Do-Nothing	Under the do-nothing scenario the opportunity for the provision of a renewable energy project at the proposed wind farm site will not be realised, which in turn will lead to a missed opportunity that would otherwise contribute to the achievement of renewable energy targets and climate goals which are of imperative public interest
Avoidance of Kerry Slug Habitat loss	The Gortloughra Wind Farm project has been designed to minimise the loss of preferred Kerry Slug within the Wind Farm footprint. The principal areas of exposed siliceous rock occurring within the Wind Farm Site lie outside the footprint of the proposed wind farm and will not be disturbed as a result of the construction of the Wind Farm. This approach has been adopted to minimise, insofar as possible, the potential for loss of suitable Kerry Slug habitat as well as other semi-natural habitat. Areas of exposed siliceous rock outcrops within the construction footprint occur as a minor component of wet heath and exposed siliceous rock mosaic and wet heath/exposed siliceous rock/acid grassland habitat (i.e. the estimated extent of exposed siliceous rock at the surface within the proposed wind farm footprint is c. 300m^2). No Kerry Slug have been recorded within the area of exposed siliceous rock within the footprint of the project. Whilst every opportunity has been taken to avoid the loss of suitable Kerry Slug habitat, in order to design a functional Wind Farm layout the loss of a discrete area of exposed siliceous rock is unavoidable.

* Please insert additional rows above if needed

Test 3: Impact of a Derogation on Conservation Status

3. Please summarise the possible impacts on the population of the species that is subject to this application, taking into account all the mitigation and/or compensation measures that are to be undertaken. Evidence that such mitigation has been successful elsewhere should be provided where relevant. Mitigation measures being relied upon must ensure that the derogation will not be detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range. Note that in all cases further information must be provided in the format set out in Part E: Template for Supporting Information.

A discrete area of suitable Kerry Slug habitat in the form of exposed siliceous rock (area = c. 300m^2) will be lost to the footprint of the proposed wind farm. The impact of this habitat loss to the local Kerry Slug population will be imperceptible given the discrete area to be lost and the abundance of suitable habitat for this species within the Wind Farm Site that will remain undisturbed by the Wind Farm project. The mitigation measure to survey and translocate specimens, which is the subject of this derogation licence application, aims to avoid the loss of any individual specimens during construction works. The mitigation measures that set out requirements for the provision of suitable Kerry Slug habitat, in the form of bryophyte and/or lichen clad boulders along the verge of the permanent Wind Farm infrastructure will compensate for the discrete loss of exposed siliceous rock habitat to the footprint of the proposed wind farm.

Part E: Template for Supporting Information

This application form should provide a summary of the evidence that the applicant has provided. In all cases, it is necessary to provide separate supporting information so that the assessment of the application can be undertaken in a robust and comprehensive manner. Applicants should refer to guidance provided by the NPWS and the European Commission whilst preparing this application form and the supporting information.

It is essential that supporting information is prepared in a consistent manner using the template below so that NPWS officials assessing the application can locate the relevant evidence to determine if the three Tests can be met. Failure to provide sufficient evidence will result in the application being refused.

The structure of the Supporting Information should be as follows:

1) Table of Contents

2) Introduction
    a. Objective of the proposed works (for example, as part of construction of a national road, repair of roofing, undertaking surveys etc.)
    b. Name, qualifications and relevant experience of scientific staff, including trainees, (e.g. ecologist) involved in the preparation of the application and those responsible for carrying out the proposed activity.
    c. If this application is for the carrying out of surveys that may cause disturbance, qualifications of all involved must be provided and trainees must be clearly identified.

3) Background to proposed activity including location, ownership, type of and need for the proposed activity, planning history, policy context, zoning in relevant Development plan (or equivalent), etc.

4) Full details of proposed activity to be covered by the derogation (including a site plan). The site may be inspected by an NPWS representative, so the details given should clearly reflect the extent of the project. This information will be used to compare site conditions with the Method Statement.

5) Ecological Survey and site assessment (<u>Not required</u> <u>for applications to carry out surveys</u>)
    a. Pre-existing information on species at location and environs.
    b. Status of the species in the local/regional area (relevant to the consideration of the impact on the population at the relevant geographic scale (Test 3))
    c. Objective(s) of survey
    d. Description of Surveys Area
    e. Survey methodology (including evidence as to how the methodology represents best practice and is appropriate to the Objective). Methodology should include survey maps, details of timing, climate, equipment used and identify any uncertainties or difficulties encountered.
    f. Survey results including raw data, any processed or aggregated data, and negative results as appropriate. Photographs and maps must be provided where site-specific features are referred.
    g. Population size class assessment.

6) Evidence to support the Derogation Tests

    a. Test 1 - Reason for Derogation:
        i. There should be a clear explanation as to why a specific reason(s) has been selected in the application form.

    ii. Applicants are advised to read the guidance published by the NPWS '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants]" with specific reference to Section 3.1.

b. Test 2 - Absence of Alternative Solutions

    i. Applicants must list the alternatives to the proposed activity that have been considered, including the do-nothing alternatives in a clear and objective manner. A basic requirement is that these alternatives should be compared in terms of their impact on the species subject to strict protection. It should be clear to NPWS officials as to why the chosen approach has been selected.

    ii. Applicants are advised to read the guidance published by '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants]" with specific reference to Section 3.2.

c. Test 3 - Impact of a derogation on Conservation Status

    i. Applicants should include details of the population at the appropriate geographic scale and an evaluation of how the proposed activity will affect the conservation status both before and after mitigation measures have been applied.

    ii. Full and detailed descriptions of proposed mitigation measures that are relevant to the potential impact on the target species. Evidence that such mitigation has been successful elsewhere should be provided, where available.

    iii. Applicants are advised to read the guidance published '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants]" with specific reference to Section 3.3.

7) Monitoring the impacts of the derogations

a. Applicants must include details of how they propose to verify whether the derogations have been implemented correctly and whether they achieved their objective, using scientifically based evidence, and, if necessary, how the applicant will take corrective measures where required.

b. Applicants should provide details of proposed reports to be submitted to the NPWS including the results of monitoring.

c. Applicants are advised to read the guidance published by the European Commission "[Guidance document on the strict protection of animal species of Community interest under the Habitats Directive]" with specific reference to Section 3.4.

Part F. Declaration

I declare that all of the foregoing particulars are, to the best of my knowledge and belief, true and correct. I understand that the deliberate killing, injuring, capturing or disturbing of protected species, or damage or destruction of their breeding sites or resting places or the deliberate taking or destroying of eggs is an offence without a derogation and that it is a legal requirement to comply with the conditions of any derogation I may be granted following this application. I understand that NPWS may visit to check compliance with a derogation.

Please note that under Regulation 5 of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 an authorised officer may enter and inspect any land or premises for the purposes of performing any of their functions under these Regulations or for obtaining any information which they may require for such purposes.

Signature of the Applicant		**Date**	27/03/2026
Name in BLOCK LETTERS	Pat Doherty		

PRIVACY STATEMENT

See Privacy Statement at www.npws.ie/licences

npws.ie

Gortloughra Wind Farm

Kerry Slug Derogation Licence Application

Supporting Information

Doherty Environmental Consultants Ltd

March 2026

Document Stage	Document Version	Prepared by
Final	1	Pat Doherty MSc, MCIEEM

This report has been prepared by Doherty Environmental Consultants Ltd with all reasonable skill, care and diligence. Information report herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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1.0 INTRODUCTION

Gortloughra Wind Farm Ltd. have applied to An Coimisiún Pleanála for planning permission for a proposed 8 Turbine Wind Farm and associated infrastructure at a site within the townlands of tSeithe Bheag (Shehy Beg), (Muscraí Gaeltacht), Gortloughra, Cloghboola and Inchinroe.

As part of the baseline ecological studies completed for the Wind Farm Project a desk study review and field survey for Kerry Slug (*Geomalacus maculosus*) were undertaken. The desk study review identified previous records for the presence of this species in the immediate vicinity of the Wind Farm Site, whilst the field surveys identified the presence of this species within the Wind Farm Site.

Upon review of the planning application and accompanying EIAR An Coimisiún Pleanála have sought further information with respect to Kerry Slug. An Coimisiún Pleanála noted that as potential disturbance of this has been identified in the EIAR they require a valid derogation under Regulation 54 of the EC (Birds and Natural Habitats) Regulations 2011.

In view this request by An Coimisiún Pleanála, a derogation licence application for Kerry Slug is being made to the NPWS Wildlife Licencing Unit and this report has been prepared in support of the derogation licence application.

1.1 DESCRIPTION OF THE PROPOSED WIND FARM DEVELOPMENT

The Proposed Development will comprise of the following main components:

- Erection of eight wind turbines with an overall ground to blade tip height of 175 m. The candidate wind turbine will have a rotor diameter of 150 m and a hub height of 100 m;
- Construction of site access roads, Turbine Hardstands and Turbine Foundations;
- Development of a site drainage network;
- Internal wind farm underground power and communications cabling;
- Erection of a permanent 100 m Met Mast for monitoring wind speeds;

- Construction of a Temporary Construction Compound for use during construction.1 no. borrow pit;

- Biodiversity improvements including improvement of heath habitat in fenced off lands designated for Habitat Enhancement and restriction of livestock in lands to allow establishment of heath vegetation in these areas; and,

- Recreational community improvements including the erection of 4 No. permanent information boards relating to cultural heritage and upgrades to amenity tracks across the site.

A 10-year planning permission and 40-year operational life from the date of commissioning of the entire wind farm is being sought. This EIAR also assesses the construction of an on-site 110 kV substation and 2 no. grid connection route (GCR) options along public roads:

- Option A: Dunmanway 110 kV substation or

- Option B: Carrigdangan 110 kV substation.

While not part of the planning consent for this planning application, this EIA also assesses the works at 18 No. locations along the Turbine Delivery Route (TDR) from the Port of Cork to Site.

1.2 KERRY SLUG SURVEY: AIMS & OBJECTIVES

The primary aim of the Kerry Slug survey at the Gortloughra Wind Farm was to identify the presence of this species within the Wind Farm Site and to establish whether or not this species relied upon suitable habitat in the form of exposed siliceous rock within the Wind Farm Site.

1.3 LEGISLATIVE CONTEXT

Kerry Slug is protected under both European and National legislation. This species is listed on *Annex II* of the *EU Habitats Directive (92/43/EEC)*, transposed into Irish law under the *European Communities (Birds and Natural Habitats) Regulations 2011* as amended. Regulation 51 of the *European Communities (Birds and Natural Habitats) Regulations 2011* as amended affords protection to Kerry Slug. At the national level all species are protected under the *Wildlife Acts, as amended (1976 and 2000)*.

Section 54 of the *European Communities (Birds and Natural Habitats) Regulations 2011* as amended provides the legislative basis whereby a derogation licence can be granted by the Minister that can derogated the requirement to comply with Regulation 51. Such a derogation licence can only be granted by the Minister under strict circumstances. These circumstances are set out in Regulation 54A(2)(a) – (e).

1.4 CONSERVATION STATUS

The current conservation status of Kerry Slug in Ireland has been reported on by the National Parks & Wildlife Service (NPWS) as part of the requirement set out under Article 17 of the Habitats Directive. The current conservation status reporting under Article 17 is set out in the 2025 Article 17 Report Volume 3: Species Assessments. The current overall assessment of conservation status for Kerry Slug is Favourable (FV).

2.0 METHODOLOGY

2.1 DESK STUDY

A desktop assessment was carried out to collate available information for Kerry Slug at and surrounding proposed Wind Farm Site. The following research with respect to establishing baseline information for Kerry Slug was also undertaken:

- A review of the National Biodiversity Database Centre (NBDC) to identify the presence or otherwise of Kerry Slug records occurring within or within close proximity to the proposed Wind Farm Site;
- A review of NPWS protected species records for the proposed wind farm site and surrounding area;
- A review of baseline geological information pertaining to bedrock conditions and the presence of favourable siliceous bedrock at and surrounding the proposed wind farm site for Kerry Slug
- A review of baseline ecological information for the surrounding area sourced from EIAR Biodiversity Chapters and Ecological Impact Assessment reports for previous project surrounding the proposed wind farm site.

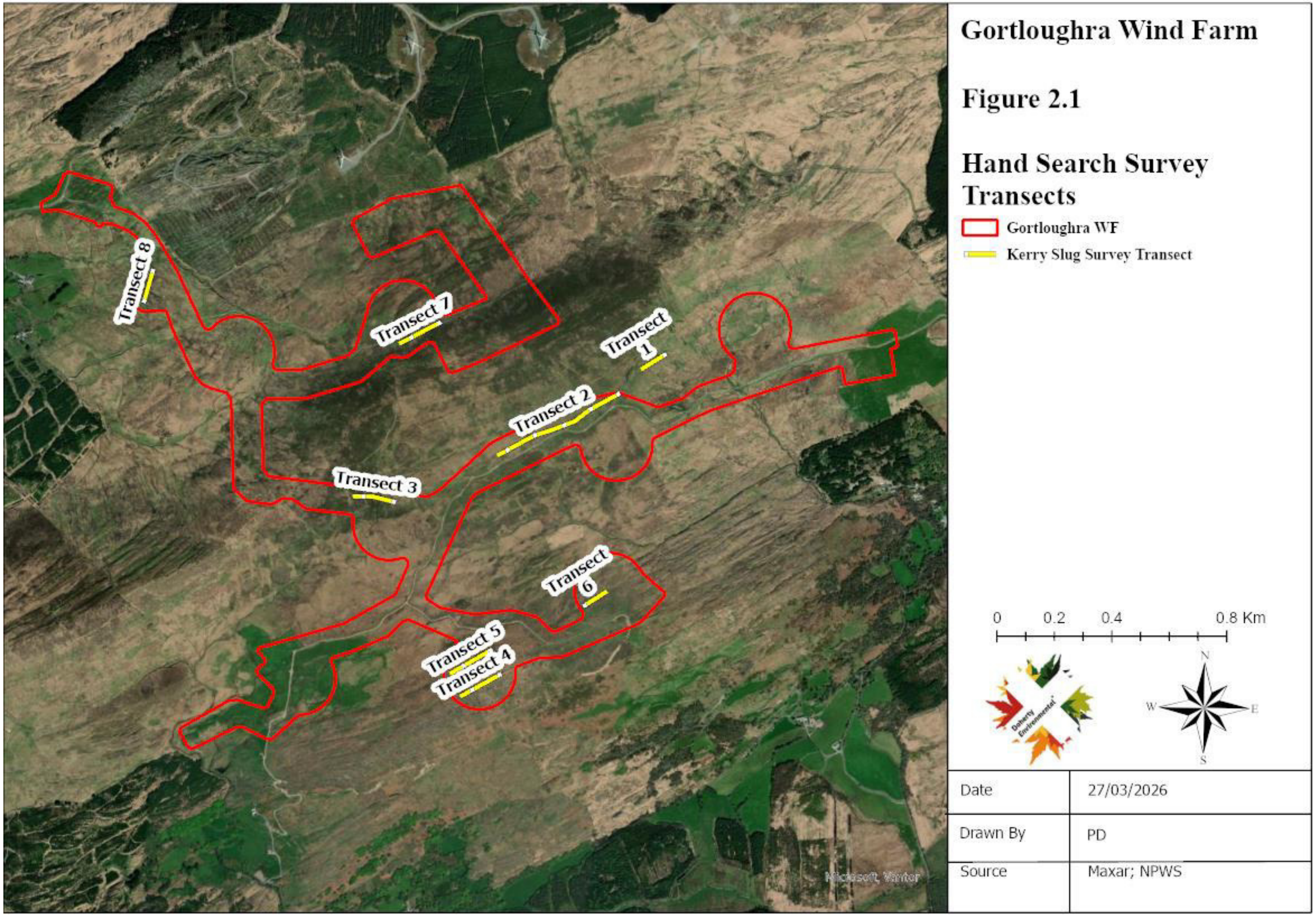
2.2 FIELD STUDY

The aim of the field surveys was to establish the presence/absence of Kerry Slug at the proposed wind farm site. A hand search method was used as the primary survey method to identify presence/absence. Where presence was confirmed using this survey method, no further surveys were completed. In the event that no presence was confirmed using this method than further surveys in the form of De Sangosse traps as per the methods described by McDonnell & Gormally (2011) would be required.

The hand search survey methodology for this species follows the National Roads Authority (NRA) guidelines on the Ecological surveying techniques of protected flora and fauna during the planning of national road schemes (NRA, 2009). These guidelines recommend that fixed route transects should be walked at 20 m intervals throughout oak woodland or bog habitat, ideally at night using torchlight, and a visual count made of the number of individuals observed within five metres of the transect. A day time survey was completed to identify areas of suitable habitat for Kerry Slug crossed by the proposed wind farm layout. Suitable Kerry Slug habitat, in the form of exposed siliceous rock, comprised of sandstone rock faces, ridgelines and outcropping, occur as linear, east to west orientated, features within the proposed wind farm site. Such suitable habitat was targeted for dedicated Kerry slug surveys. These areas were identified during the daytime and transect polylines were prepared in the field using ESRI Field Maps. These habitats were targeted by completing searches for the presence/absence of Kerry Slug along 8 no. transects spanning the exposed siliceous rock habitat. The location of the 8 no. transect surveys are shown on Figure 2.1.

The presence/absence surveys involved a slow walk along each transect searching exposed rock and intervening vegetation for the presence of Kerry Slug. The transect surveys were completed during the daytime and during the nighttime involving a torch survey. No trapping of Kerry Slug was undertaken during the baseline surveys.

The surveys were completed on the 23rd February 2024 during suitable weather with wet, humid, damp and mild conditions at c. 9°C occurring with rainfall during the daytime search and continued damp conditions prevailing during the nighttime search when rainfall ceased.


Gortloughra Wind Farm
Figure 2.1
Hand Search Survey Transects
Gortloughra WF
Kerry Slug Survey Transect
Transect 1
Transect 2
Transect 3
Transect 4
Transect 5
Transect 6
Transect 7
Transect 8
0 0.2 0.4 0.8 Km
N
E
S
W
Date 27/03/2026
Drawn By PD
Source Maxar; NPWS

As Kerry Slug were identified as present at the proposed wind farm site during the primary hand search surveys, no trapping surveys were completed.

3.0 SURVEY RESULTS

3.1 DESK STUDY

Kerry slug are known to occur in the area surrounding the proposed wind farm site having previously been recorded in the neighbouring townland of Torreen to the southeast and during baseline ecological surveys for the Shehy More Wind Farm (see Figure 3.1 for record locations).

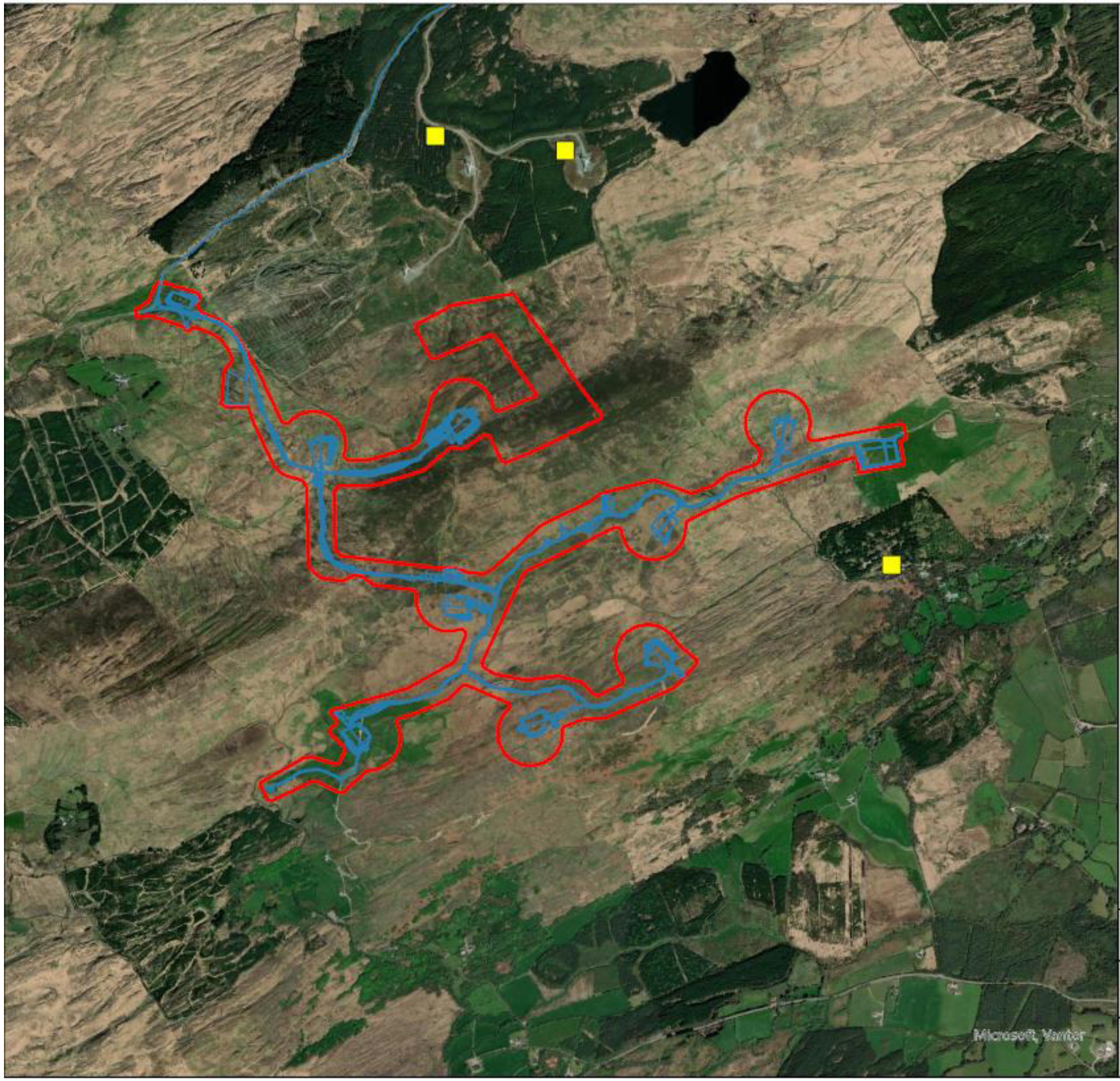
The record from the townland of Torreen adjacent to the proposed wind farm site is located approximately 400m from the Wind Farm Site redline boundary and the nearest point of the Wind Farm Site infrastructure. This record relates to 1 no specimen recorded within a residential firewood shed.

The records from the baseline ecological surveys for the Shehy More Wind Farm are located approximately 590m and 680m from the Wind Farm Site redline boundary with both records being approximately 1km from the nearest point of the Wind Farm Site infrastructure. At the more westerly record 2 no. slugs were recorded on a conifer tree stump; whilst at the more easterly record 8 no. slugs were recorded on boulders.

3.2 FIELD SURVEYS

3.2.1 Extent of Suitable Exposed Siliceous Rock Habitat Within the Proposed Wind Farm Footprint

The extent of exposed siliceous rock occurring within these mosaic habitats is estimated to be less than 300m^2, comprised of bedrock outcrops at the proposed wind turbine T09 location (amounting to c. 150m^2, see Figure 3.2 for location of suitable habitat at the T09 location) and an additional estimated surface area of c. 150m^2 to account for individual boulders occurring within heath/acid grassland habitat).



Gortloughra Wind Farm

Figure 3.1

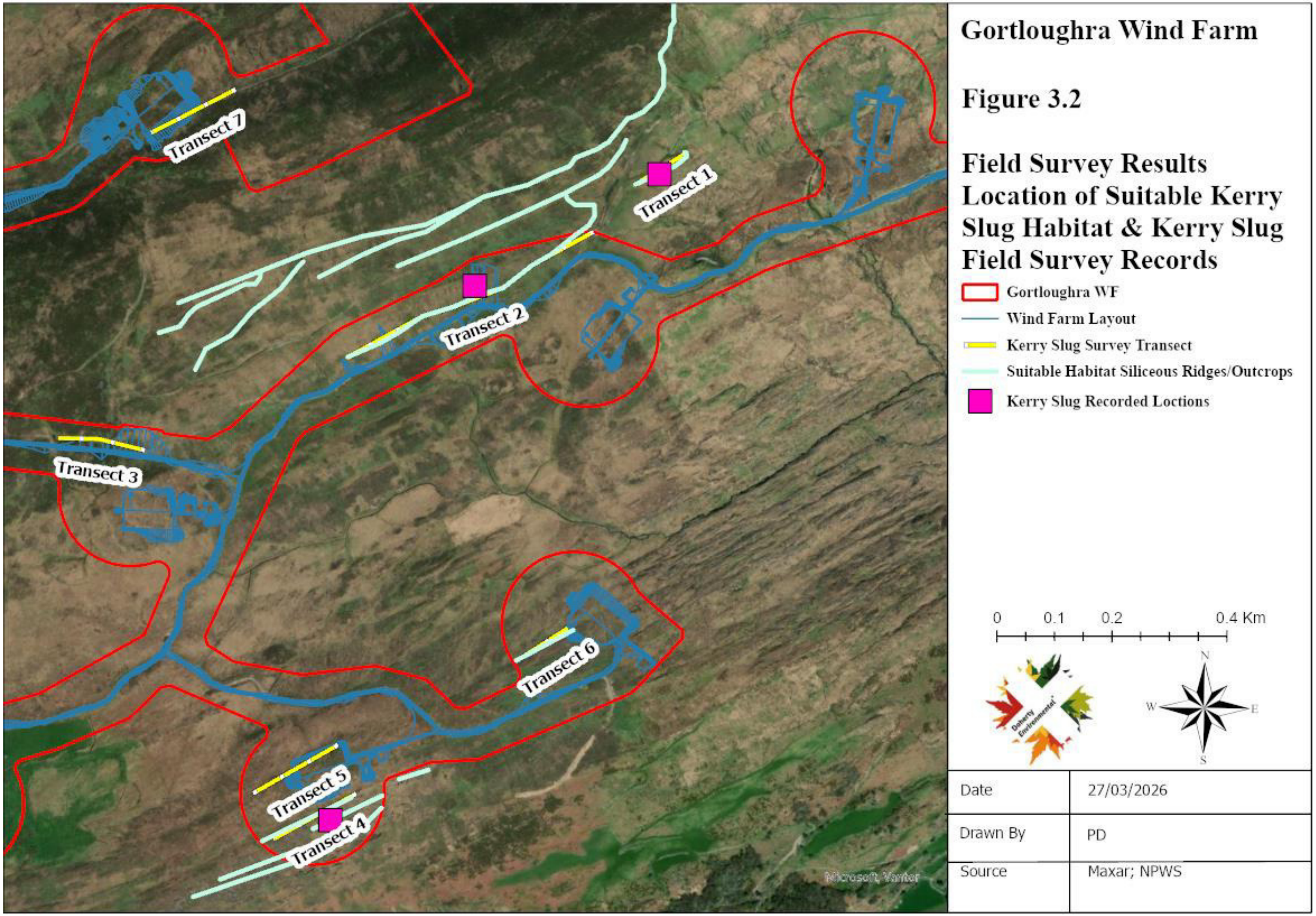
Desk Study Results Location of Historical Kerry Slug Records

Gortloughra WF
Wind Farm Layout
Kerry Slug Records

0 0.28 0.55 1.1 Km

N W E S

Date	27/03/2026
Drawn By	PD
Source	Maxar; NPWS



Transect 7
Transect 1
Transect 2
Transect 3
Transect 6
Transect 5
Transect 4
Microsoft, Vantor
Gortloughra Wind Farm
Figure 3.2
Field Survey Results
Location of Suitable Kerry Slug Habitat & Kerry Slug Field Survey Records
Gortloughra WF
Wind Farm Layout
Kerry Slug Survey Transect
Suitable Habitat Siliceous Ridges/Outcrops
Kerry Slug Recorded Loctions
0
0.1
0.2
0.4 Km
N
S
E
W
Date
27/03/2026
Drawn By
PD
Source
Maxar; NPWS

3.2.2 Presence/Absence Search Results

During the presence/absence field surveys Kerry Slug were recorded from Transect No. 1, 2 & 4. One no. specimen was recorded along each of these transects. No Kerry Slug were recorded along transects 3; 5; 6; 7; and 8. The location of the Kerry Slug records are shown on Figure 3.2.

4.0 IMPACT ASSESSMENT

Kerry Slug have been recorded during surveys along Transect 1, 2 and 4 during baseline Kerry Slug surveys. Suitable exposed siliceous rock along these transects are located outside the wind farm footprint. Suitable exposed siliceous rock for Kerry Slug occurs within the construction footprint and the construction of wind farm infrastructure will have the potential to result in the loss of suitable habitat for Kerry Slug. This will occur in mosaic habitats where exposed siliceous rock forms a minor component part of the habitat mosaic with wet heath and acid grassland. The extent of exposed siliceous rock occurring within these mosaic habitats is estimated to be less than 300m^2, comprised of bedrock outcrops at the proposed wind turbine T09 location (amounting to c. 150m^2) and an estimated additional surface area of c. 150m^2 to account for boulders within heath/acid grassland habitat. Based on the likely extent of habitat loss throughout the Site the impact of habitat loss is likely to be slight and localised as only a small proportion of suitable Kerry Slug habitat within the Wind Farm Site will be impacted, whilst the most extensive areas of exposed siliceous rock occurring within the wider landholding will remain outside of the wind farm footprint and as such unaffected by the Proposed Development. It is noted that the species is known to populate extensive areas of this type of habitat throughout the wider landscape and has a favourable conservation status across its range (NPWS 2025). It is further noted that, in the absence of adequate safeguards the construction phase works could result in the death of individual Kerry Slugs due to machinery movements in areas of suitable habitat. Based upon the results of baseline surveys and the discrete extent of suitable Kerry Slug habitat within the Wind Farm footprint the likelihood of mortality is considered to be low and not having the potential to result in a significant impact to the local population (i.e. the proposed wind farm project is not predicted to have the potential to undermine the local Kerry Slug population). It is further noted that with the implementation of mitigation measures the potential for Kerry Slug mortality will be avoided, whilst the loss of a discrete area of suitable Kerry Slug will be mitigated for through the provision of habitat during the operation phase.

5.0 MITIGATION MEASURES

In order to avoid the potential for mortality to Kerry Slug surveys for the presence of Kerry Slug within the construction footprint will be undertaken. All surveys will be undertaken by the licence holder. The surveys to be undertaken will comprise hand searches and De Sangoose trap surveys within the proposed wind farm footprint. Where individual specimens are identified they will be translocated to adjacent habitat. Translocation receptor habitats are identified as all areas of suitable habitat: siliceous ridges/outcrops shown on Figure 3.2 above. The receptor habitats are comprised of areas with abundant exposed siliceous rock cover. Any specimens present within the construction footprint will be translocated to the nearest receptor habitat as shown on Figure 3.2.

The Kerry Slug surveys to be undertaken within the proposed wind farm construction footprint prior to construction will comprise both hand searches and De Sangosse traps to be placed on exposed siliceous rock using the methods described by McDonnell & Gormally (2011). In addition to placing traps on exposed siliceous rock, ground traps will be placed over vegetation/bare soil on the ground within the Wind Farm Site construction footprint at a distance of 45m from each site of suitable Kerry Slug exposed siliceous rock habitat within the construction footprint. The provision of the ground traps is in line with the approach adopted by Johnston (2016) and the findings of McDonnell & Gormally (2011) who showed that Kerry Slug can move along the ground between suitable habitat sites.

All hand searches and trapping will occur during suitable weather conditions comprising wet, damp, humid and mild conditions.

In advance of construction works all areas of suitable Kerry Slug habitat occurring outside of but adjacent to the proposed wind farm construction footprint will be identified and demarcated on the ground with barrier and signage. No trafficking of plant, personnel or works will be permitted in such areas.

Prior to the commencement of construction a toolbox talk will be delivered to all construction personnel by the Kerry Slug licence holder. The toolbox talk will inform all personnel of the characteristics of suitable Kerry Slug habitat and Kerry Slug identification features. In the event that Kerry Slug is encountered within the construction footprint during works (and subsequent to pre-construction surveys and translocations (as required)), construction activities within 50m of the specimen will cease. The Kerry Slug licence holder will be contacted immediately and arrangements for immediate translocation by the licence holder will be made. Works will only be permitted to recommence after the specimen has been translocated to the nearest receptor habitat.

In addition to the above measures, Kerry Slug habitat enhancement measures will be implemented during the construction phase that will be maintained for the operation phase of the Wind Farm. The provision of these measures will compensate for the loss of discrete areas of exposed siliceous rock to the footprint of the proposed wind farm project. All boulders occurring within the proposed wind farm construction footprint that support a cover of bryophyte and lichens will be placed along the margin of the construction footprint and will be retained in place along the margin upon completion of the construction phase. The boulders will be maintained in place for the duration of the operation phase. Heathland vegetation cover will be restored within the temporary construction footprint and this will provide for a vegetated ground cover connecting retained boulders along the margin of the permanent Wind Farm infrastructure.

6.0 MONITORING & REPORTING

The results of the pre-construction surveys comprising the number of Kerry Slug translocated from the proposed wind farm site construction footprint and the receptor areas to which each Kerry Slug is translocated to will be detailed in a report to be issued to the NPWS. This report will be issued to the NPWS in advance of the commencement of construction works.

Ongoing monitoring for the presence of Kerry Slug within the construction footprint will be undertaken during the construction phase. This monitoring will be completed on a fortnightly basis for the duration of the construction phase. Any Kerry Slug present within the construction footprint during the construction phase and translocate to adjacent receptor habitat will be recorded. The results of ongoing construction phase monitoring and any translocations will be set out in the licence return form and where necessary accompanying reporting.

Upon completion of the construction phase, operation phase monitoring for the presence of Kerry Slug at the Wind Farm Site and for the occupancy of Kerry Slug habitat to be provided as part of the above mitigation measures will be undertaken. The monitoring will be completed during years 1, 2, 3 and 5 of the operation phase. The monitoring will comprise hand searches and De Sangosse trap surveys as per McDonnell & Gormally (2011). A report detailing the results of the operation phase monitoring will be provided to the NPWS within the calendar year of each annual round of surveying. In the event that the results of monitoring indicate that the habitat measures as set out in Section 5 above are unsuccessful, the surveyor and author of the annual monitoring reports will be required to set out remedial actions which will be required to be implemented by the Wind Farm operator.

7.0 EVIDENCE TO SUPPORT THE DEROGATION TESTS

The process for the provision of a derogation licence to permit pre-construction surveys and translocation of Kerry Slug to be completed at the proposed Gortloughra Wind Farm Site requires the applicant to meet the requirements of three no. "Derogation Tests". These tests are titled as follows:

Test 1 – Reason for Derogation

Test 2 – Absence of Alternative Solutions

Test 3 – Impact of a derogation on Conservation status.

The following subsections provide information for each of the 3 no. test.

7.1 TEST 1 – REASON FOR DEROGATION

The derogation licence is sought under the provisions of:

- Regulation 54(2)(a) In the interests of protecting wild flora and fauna and conserving natural habitats;
- Regulation 54(2)(c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment; and
- Regulation 54(2)(e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule;

of the Birds and Natural Habitats Regulations, 2011 as amended.

7.1.1 Regulation 54(2)(a) In the interests of protecting wild flora and fauna and conserving natural habitats

Kerry Slug requires protection during the construction phase of the proposed wind farm project. The permission to translocate Kerry Slug locally within the Wind Farm Site prior to and during construction works is representative of a mitigation measure that aims to protect specimens from any loss that may otherwise occur should specimens be present within the construction footprint during works and in the absence of permission to translocate specimens.

7.1.2 Regulation 54(2)(c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment

The provision of the proposed wind farm project will deliver a renewable energy project that will contribute towards climate goals as set out in the Climate Action Plan which seeks to achieve net zero emissions by, at latest, 2050. The proposed wind farm project is representative of a Renewable Energy Directive (RED III) Project, which mandates renewable energy projects to be of overriding public interest (see Paragraph 44 of the Renewable Energy Directive (EU) 2023/2413

7.1.3 Regulation 54(2)(e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule

The activity seeks permission to take specimens of Kerry Slug in the event that such specimens are present within the construction footprint prior to the clearance of surface vegetation and construction works. The 'taking' of Kerry Slug, as sought under this licence application, will be in the form of:

1. the collection of individual specimens during hand searches and their immediate translocation to the nearest area of suitable habitat (i.e. exposed siliceous rock, as identified 'Suitable habitat siliceous ridges/outcrops' in Figure 3.2) outside the footprint of the Wind Farm construction corridor; and
2. the trapping of Kerry Slug using De Sangosse traps as per the methods set out by McDonnell & Gormally (2011) and their translocation to the nearest area of suitable habitat (i.e. exposed siliceous rock, as identified 'Suitable habitat siliceous ridges/outcrops' in Figure 3.2) outside the footprint of the Wind Farm construction corridor

The procedure for translocation of specimens will comprise:

pre-vegetation clearance searches of the proposed wind farm footprint for the presence of specimens to be completed by the licence holder;

collection of specimens, if present, and immediate translocation to adjacent areas of suitable exposed siliceous rock habitat

7.2 TEST 2 - ABSENCE OF ALTERNATIVE SOLUTIONS

Under the do-nothing scenario the opportunity for the provision of a renewable energy project at the proposed wind farm site will not be realised, which in turn will lead to a missed opportunity that would otherwise contribute to the achievement of renewable energy targets and climate goals which are of imperative public interest.

The Gortloughra Wind Farm project has been designed to minimise the loss of preferred Kerry Slug within the Wind Farm footprint. The principal areas of exposed siliceous rock occurring within the Wind Farm Site lie outside the footprint of the proposed wind farm and will not be disturbed as a result of the construction of the Wind Farm. This approach has been adopted to minimise, insofar as possible, the potential for loss of suitable Kerry Slug habitat as well as other semi-natural habitat. Areas of exposed siliceous rock outcrops within the construction footprint occur as a minor component of wet heath and exposed siliceous rock mosaic and wet heath/exposed siliceous rock/acid grassland habitat (i.e. the estimated extent of exposed siliceous rock at the surface within the proposed wind farm footprint is c. 300m^2).

No Kerry Slug have been recorded within the area of exposed siliceous rock within the footprint of the project.

Whilst every opportunity has been taken to avoid the loss of suitable Kerry Slug habitat, in order to design a functional Wind Farm layout the loss of a discrete area of exposed siliceous rock is unavoidable.

7.2.1.1 Test 3 – Impact of Derogation on Conservation Status

A discrete area of suitable Kerry Slug habitat in the form of exposed siliceous rock (area = c. 300m^2) will be lost to the footprint of the proposed wind farm. The impact of this habitat loss to the local Kerry Slug population will be imperceptible given the discrete area to be lost and the abundance of suitable habitat for this species within the Wind Farm Site that will remain undisturbed by the Wind Farm project. The mitigation measure to survey and translocate specimens, which is the subject of this derogation licence application, aims to avoid the loss of any individual specimens during construction works. The mitigation measures that set out requirements for the provision of suitable Kerry Slug habitat, in the form of bryophyte and/or lichen clad boulders along the verge of the permanent Wind Farm infrastructure will compensate for the discrete loss of exposed siliceous rock habitat to the footprint of the proposed wind farm.

8.0 CONCLUSION

Kerry Slug is known to be present in the vicinity of the proposed wind farm site and the baseline hand searches have identified the presence of Kerry Slug within the proposed wind farm site.

The proposed wind farm site will result in the loss of a discrete area of Kerry Slug habitat, estimated to be c. $300m^2$.

No Kerry Slug were identified as occurring within the discrete area of suitable Kerry Slug habitat occurring within the proposed wind farm site.

A small number of Kerry Slug were recorded during the baseline survey (no. = 3).

Mitigation measures have been set out to avoid the accidental loss of any individual Kerry Slug specimens during the construction phase of the Wind Farm Project. Mitigation measures have also been set out to avoid the loss of suitable Kerry Slug habitat to the Wind Farm Project.

This report and the mitigation measures set out therein are provided to demonstrate that proposed Wind Farm Project will not be detrimental to the maintenance of the local Kerry Slug population at favourable conservation status or the maintenance of sufficient habitat suitable for maintaining the local Kerry Slug population. It is intended that this report will be provided in support of an application to the Minister for a derogation licence under Regulation 54 of the *European Communities (Birds and Natural Habitats) Regulations 2011* as amended.

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GORTLOUGHRA WIND FARM

Whooper Swan Acoustic Survey Report

Gortloughra Wind Farm Ltd.

5481043-D01 (01)

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General Notes

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1 Introduction

1.1.1 This report presents the methodology and findings of an automated acoustic detector survey undertaken between March and April 2024 to provide supplementary information on whooper swan (*Cygnus cygnus*) activity at the proposed Gortloughra wind farm site. This report accompanies Chapter 7: Ornithology Volume II of the EIAR for the Proposed Development.

1.1.2 The 118.7 ha developable area (hereafter referred to as 'the Site') is situated approximately 8 km northwest of Dunmanway, Co. Cork in Ireland. Habitats within this area largely comprised upland blanket bog, wet heath, dry heath, wet grassland, acid grassland, exposed rock and artificial surfaces.

1.1.3 The development proposals include the construction of wind turbines, hardstanding, access tracks, permanent meteorological mast, onsite substation and control building, internal wind farm cabling, permanent grid connection route (two options), temporary construction compound, drainage infrastructure, and all associated ancillary works in relation to the proposed wind farm (hereafter referred to as 'the Proposed Development'). A detailed description of the Proposed Development is provided in Chapter 2 Volume II of the EIAR.

1.1.4 Chapter 7 Volume II of the EIAR identified non-breeding whooper swan as a relevant ornithological feature to the Proposed Development. Relevant records of whooper swan were identified within the desktop study (Section 7.3.2.2 Chapter 7 Volume II of the EIAR); most recently within 10 km of the Site in 2011.

1.1.5 The total Vantage Point (VP) survey effort over the five-year survey period (5x summer seasons, and 5x winter seasons) was approximately 1,147 hours. Details of all whooper swan observations across all five years of surveys are provided in Section 7.3.3.4 Chapter 7 Volume II of the EIAR. Throughout the five-year survey period, no whooper swan observations were recorded within the 500 m buffer zone for the proposed turbines. Whooper swans were recorded six times across the five-year survey period, during monthly VPs at Lough Nambrackderg approximately 1.08 km to the north of the Site in winter 2020/21, winter 2021/22, and winter 2023/24 (Section 7.3.3.4.28 Chapter 7 Volume II of the EIAR). There were no observations during winter 2019/20 or winter 2022/23.

1.1.6 The five years of monthly hinterland surveys indicate whooper swans are present in the surrounding landscape, with a total of 72 observations recorded across six of the 33 hinterland sites. Full results for these hinterland surveys are provided in Appendix 7.4 Volume IV of the EIAR. 55 of these 72 observations were recorded at sites exceeding 14 km from the Proposed Development. All sites where whooper swans were recorded were located to the north of the Proposed Development, with no records at hinterland sites to the south of the Site. The main clusters of activity were recorded over 14 km to the northeast of the Site (An Gearagh, Inchisine and Toon Valley), which accounted for 73.3% of all observations, and at Lough Allua approximately 6.2 km to the northeast of the Site (14.7%). These two areas accounted for 88.0% of all observations.

1.1.7 The nearest observations to the Site from the hinterland surveys were from Lough Nambrackderg. Over the five-year period, whooper swans were recorded on four occasions at Lough Nambrackderg during hinterland surveys, with no observations recorded during winter 2019/20 or winter 2022/23. Flock sizes ranged from 2-5 individuals.

1.1.8 To supplement analysis of acoustic data for whooper swan obtained using the automated detectors deployed in 2024, this report also identifies any records from the automated acoustic detector survey for two other notable non-breeding bird species for the Proposed Development: Greenland white-fronted goose (*Anser albifrons flavirostris*) and golden plover (*Pluvialis apricaria*).

2 Methods

2.1 Data Collection

2.1.1 Four AudioMoth automated acoustic detectors were deployed by suitably qualified ecologists from Fehily Timoney in March and April 2024. Detectors were deployed at this time to coincide with the typical passage period for whooper swan (i.e., as they leave for their breeding grounds following the 2023/24 non-breeding season).

2.1.2 To coincide with nocturnal activity periods, detectors were set to record between sunset and sunrise. During each night, detectors recorded data for 595 seconds with 5 seconds to reset between each recording file. Detectors were set to a 48,000 hertz (Hz) sample rate with medium gain to ensure accurate microphone detection. Detectors were checked every two weeks across two recording periods between March and April. During each check, acoustic detector settings were verified to ensure consistency and accuracy between recording periods.

2.1.3 The detectors were spaced across the Site to maximise coverage. Where possible, detectors were strategically placed in areas of suitable habitat for whooper swan or within sections of the Site with topography or other features which may be favoured for whooper swan flight activity. Acoustic detector locations are shown in *Figure 1*.

2.1.4 Further details regarding parameters and locations of the acoustic detectors deployed between March and April 2024 are provided in *Table 1.*

Table 1. Automated acoustic detector parameters

Detector name	Location (longitude/latitude)	Recording period	Survey effort	Recording time – Coordinated Universal Time (UTC)
Location 1	51.78328, -9.22656	1	6th March to 18th March	17:55 – 07:45
		2	21st March to 4th April	18:20 – 07:00
Location 2	51.78541, -9.23876	1	6th March to 17th March	17:55 – 07:45
		2	21st March to 31st March	18:20 – 07:00
Location 3	51.77952, -9.23951	1	6th March to 18th March	17:55 – 07:45
		2	21st March to 3rd April	18:20 – 07:00
Location 4	51.78792, -9.23044	1	6th March to 17th March	17:55 – 07:45
		2	21st March to 2nd April	18:20 – 07:00

2.2 Data Analysis

2.2.1 The British Trust for Ornithology (BTO) Pipeline's Nocturnal Flight Call (Europe) model (hereafter referred to as 'the Pipeline') was used to analyse all recordings from the four AudioMoth detectors. This is a multi-species classifier for 53 European bird species known to be nocturnal migrants[1].

2.2.2 Prior to being processed through the Pipeline, all files were checked to ensure they met the requirements and recommendations set by the BTO to increase the likelihood of successful detections and performance of the model:

- a minimum length of 4 seconds;
- a maximum length of 15 minutes;
- a minimum sample rate of 22,050 Hz; and
- filenames with associated metadata formatted to be recognised by the Pipeline.

2.2.3 All files met these requirements, and no additional processing was required prior to processing the data using the Pipeline.

2.2.4 The Pipeline uses individual species classifiers (i.e., recorded calls, songs or other noises produced by a specific species) to identify the bird species within the sound files submitted for acoustic analysis. For each sound file analysed by the Pipeline, it produces 4-second sections where birds are identified by classifier files (hereafter referred to as a 'detection'). For each detection produced, multiple bird noises (i.e., additional birds or different species) are possible within the same detection analysed. If this occurs, additional species or further activity by the same species recorded within detections can be identified within spreadsheet exports produced by the Pipeline. All 4-second detections are split into separate audio files and copied into separate species folders for manual review and verification.

2.2.5 Of the 53 species classifiers within the Pipeline, whooper swan, golden plover and Greenland white-fronted goose were considered. All detections for these three species analysed by the Pipeline were manually audited by a suitably experienced ornithologist (RSK Biocensus staff member EP15) to verify if the detection was a true positive, false positive, or indeterminate result.

2.3 Limitations and Assumptions

2.3.1 Once deployed, acoustic detectors rely on the detection of sound to identify the species present. Less vocal species present during the recording period may not be identified if vocalisations are not produced at a sufficient volume within range of the acoustic detectors. Therefore, there is potential for less vocal nocturnal bird species to be present but not recorded during acoustic detector surveys. This is not considered to be a limitation to the detection of whooper swan, which is known to frequently vocalise in flight. The likelihood of whooper swan being present within the survey area without detection is therefore considered to be relatively low.

[1] Further details are available at: https://www.bto.org/sites/default/files/acoustic_pipeline_classifier_technical_spec_nocturnalbreedingbirdseurope.pdf (accessed 30/07/2026).

2.3.2 Acoustic detector surveys are limited in their ability to identify the abundance of a species within an area. Indeed, the total number of detections for a species does not directly correlate to the total number of birds within an area. Data collected during this survey should only been used for assisting with determining the likely presence or absence of a species within the vicinity of the Site. A lack of detections for a species does not confirm that it was absent from the Site and its immediate surroundings during the survey period.

2.3.3 The survey duration only includes the spring passage period for whooper swan and other winter migrant species. Whilst surveying at this time also provides an indication of likely autumn passage activity, this survey does not include coverage of the autumn passage period, or of any other times of year (e.g., the peak breeding or wintering seasons).

2.3.4 Detectors were operational at appropriate times of day and generally under suitable weather conditions. While a small proportion of the survey effort coincided with suboptimal conditions (e.g., periods of high wind, rainfall, or extreme temperatures), these instances were infrequent and did not materially affect data quality or recording capabilities. Conducting surveys under a range of weather conditions is important to ensure that bird activity is assessed under a representative spectrum of environmental conditions. Considering most of the survey effort was completed during optimal survey conditions, these occasional periods of unfavourable weather are not deemed to represent a limitation to the acoustic detector survey.

3 Results

3.1.1 Automated acoustic detector survey results, based on the data collection and analysis methods specified in *Section 2*, are summarised below. Verification for each detection is detailed in *Appendix A*.

3.2 Whooper Swan

3.2.1 From the four detectors deployed across the survey duration, one indeterminate detection of whooper swan was identified during data analysis. This detection was recorded on 25th March 2024 at 20:10 at Location 2. After manually verifying the detection from the audio recording, the vocalisation was determined to be a potential but unconfirmed whooper swan call (specifically, a single potential call by a single individual). No other whooper swan detections were recorded.

3.3 Other Species

3.3.1 Regarding the other target species considered during data analysis:

- Golden plover: a total of 16 confirmed detections were recorded across the 2024 survey period, plus two indeterminate detections. These mostly comprised birds calling, with one detection of a bird singing briefly. These included confirmed detections at Location 1 (12 detections), Location 2 (one detection), Location 3 (two detections) and Location 4 (one detection). Detections were recorded on 11th March, 14th March, 15th March and 25th March.
- Greenland white-fronted goose: no detections were recorded.

4 Conclusion

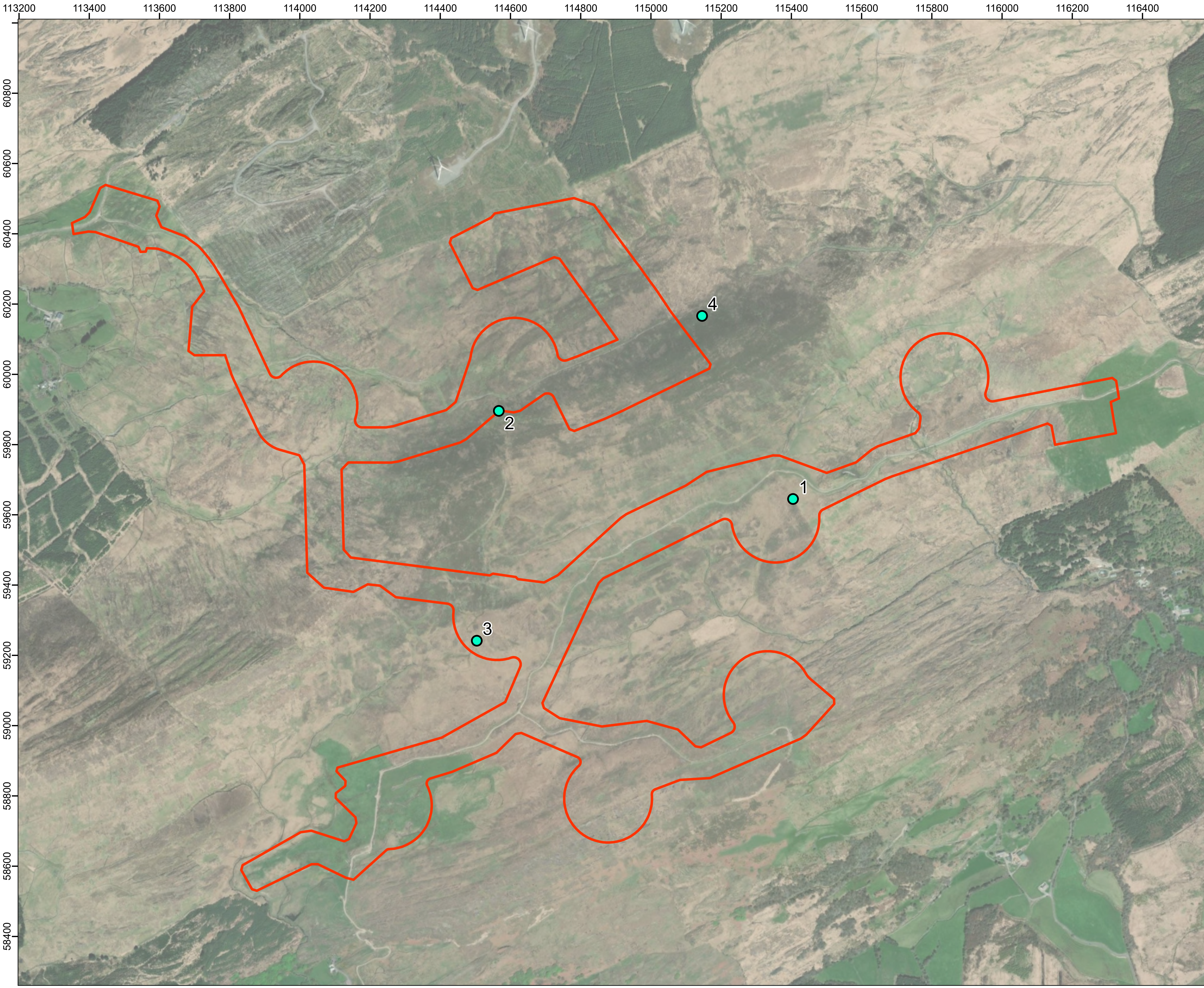
4.1.1 During the automated acoustic detector survey undertaken between March and April 2024 there was one indeterminate detection of whooper swan at Location 2 (specifically, a single potential call by a single individual). No confirmed whooper swan detections were recorded. This survey covered the spring passage season, when whooper swan activity levels would likely be highest across the Site. The survey findings therefore suggest that airspace over the Site was not subject to frequent nocturnal migratory flight activity by whooper swan, and did not identify any evidence of larger whooper swan flocks passing through airspace over the Site.

4.1.2 Golden plover was recorded within the Site across all detectors. Detections across much of the survey duration were relatively infrequent and did not appear to comprise large flocks. No detections of Greenland white-fronted goose were recorded.

4.1.3 The limitations stated in *Section 2.3* are not considered to have significantly impacted the findings of this survey.

Figures

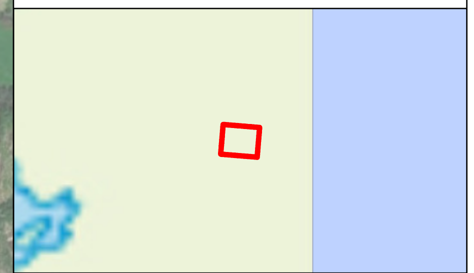
Figure 1. Acoustic detector survey locations



Legend:

Site boundary

Acoustic detector location



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Irish Windfarm Whooper Swan Acoustic

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TITLE: Figure 1:

Acoustic Detector Locations

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Appendix A – Raw Data

Detector	File name	Recording date	Recording time	Detection species (BTO Pipeline)	QA outcome	QA species
Location 1	20240311_060500.WAV	11/03/2024	06:10	Golden plover	True positive	Golden plover
Location 1	20240311_060500.WAV	11/03/2024	06:10	Golden plover	True positive	Golden plover
Location 1	20240311_060500.WAV	11/03/2024	06:10	Golden plover	True positive	Golden plover
Location 1	20240311_060500.WAV	11/03/2024	06:10	Golden plover	True positive	Golden plover
Location 1	20240311_060500.WAV	11/03/2024	06:12	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:16	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:17	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:19	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:19	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:22	Golden plover	True positive	Golden plover
Location 1	20240315_191500.WAV	15/03/2024	19:22	Golden plover	True positive	Golden plover
Location 1	20240325_194000.WAV	25/03/2024	19:46	Golden plover	True positive	Golden plover
Location 1	20240402_051000.WAV	02/04/2024	05:18	Golden plover	Indeterminate	Possible golden plover (Inconclusive)
Location 1	20240402_053000.WAV	02/04/2024	05:30	Golden plover	Indeterminate	Possible golden plover (Inconclusive)
Location 2	20240311_061500.WAV	11/03/2024	06:21	Golden plover	True positive	Golden plover
Location 3	20240311_060500.WAV	11/03/2024	06:11	Golden plover	True positive	Golden plover
Location 3	20240314_061500.WAV	14/03/2024	06:19	Golden plover	True positive	Golden plover
Location 4	20240315_191500.WAV	15/03/2024	19:16	Golden plover	True positive	Golden plover
Location 2	20240325_201000.WAV	25/03/2024	20:15	Whooper swan	Indeterminate	Possible whooper swan (Inconclusive)

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