



Hornsea Project Four: Environmental Statement (ES)

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Volume A6, Annex 3.9 – Bat Static Detector Survey Report Part B

Prepared Royal HaskoningDHV, July 2021
Checked Ant Sahota, Orsted, July 2021
Accepted Thomas Watts, Orsted, August 2021
Approved Julian Carolan, Orsted, September 2021

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Glossary

Term	Definition
Commitment	<p>A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms.</p> <p>Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES).</p> <p>Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.</p>
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
EIA Directive	European Union Directive 85/337/EEC, as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and then codified by Directive 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU).
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network.. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all

Term	Definition
	construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Project Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

Acronyms

Acronym	Definition
ACIEEM	Associate Member of the Chartered Institute of Ecology and Environmental Management
BCT	Bat Conservation Trust
CIEEM	Chartered Institute of Ecology and Environmental Management
CIWEM	Chartered Institute of Water and Environmental Management
C.WEM	Chartered Water and Environmental Manager
DCO	Development Consent Order
ECC	Export cable corridor
EECW	Environmental and Ecological Clerk of Works
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
EPS	European Protected Species
ERYC	East Riding Yorkshire Council
ES	Environmental Statement
FRGS	Fellow of the Royal Geographical Society
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LWS	Local Wildlife Site
MCIWEM	Member of Chartered Institute for Water and Environmental Management
MEECW	Member of the Ecological and Environmental Clerk of Works
MHWS	Mean High Water Spring
NE	Natural England

Acronym	Definition
NERC	Natural Environment and Rural Communities
NEYEDC	North and East Yorkshire Ecological Data Centre
NGET	National Grid Electricity Transmission
OnSS	Onshore substation
OS	Ordnance Survey
PRoW	Public Right of Way
SoS	Secretary of State
SSSI	Site of Special Scientific Interest
UK BAP	UK Biodiversity Action Plan
WCA	Wildlife and Countryside Act

Units

Unit	Definition
km	kilometre
m	metre

1 Introduction

1.1 Project background

- 1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four is located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.
- 1.1.1.2 Royal HaskoningDHV was commissioned to undertake a suite of static bat detector surveys of all linear features (i.e. hedgerows, woodland edges and watercourses) identified as part of the Extended Phase 1 Habitat Survey (EP1HS) ([Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and [Annex 3.2: Extended Phase 1 Target Note Tables](#)) and assessed as providing moderate or high potential for commuting and/or foraging bats within and up to a 50 m buffer of the onshore Hornsea Four Order Limits (i.e. the landfall, onshore export cable corridor (ECC), the onshore substation (OnSS), and 400 kV National Grid Electricity Transmission (NGET) connection area)..
- 1.1.1.3 Due to the amount and size of the data collated during the suite of static bat detector surveys, this technical report has been split into two parts, where:
- [Annex 3.8: Bat Static Detector Survey Report Part A](#) – outlines the methodology, survey results, conclusions and mitigations; and
 - [Annex 3.9: Bat Static Detector Survey Report Part B](#) (this document) – presents the full survey results from the Hornsea Four static bat detector surveys as well as the supporting information relating to the habitats and features within each survey location where a static bat detector was deployed.
- 1.1.1.4 Bat static detector and bat emergence and re-entry surveys have also been undertaken for Hornsea Four, and these can be found in [Annex 3.10: Bat Activity Transect Survey Report Part A](#); [Annex 3.11: Bat Activity Transect Survey Report Part B](#); [Annex 3.12: Bat Emergence and Re-entry Survey Report Part A](#) and [Annex 3.13: Bat Emergence and Re-entry Survey Report Part B](#), respectively. For a full understanding of the results of the bat survey programme all these bat survey reports require consideration.

2 Static Detector Deployment

- 2.1.1.1 [Table 1](#) presents the schedule for all static detector deployments throughout the Hornsea Four static bat detector survey. The table indicates (*inter alia*) where no static bat detector was deployed or highlights where no bat call data was gathered due to interference. The deployment locations can be seen on Figure 2 to Figure 15 of [Annex 3.8: Bat Static Detector Survey Report Part A](#).

2.1.1.2 Since the initial identification of the proposed static detector locations, there have been refinements made to the Hornsea Four Order Limits and consequently some of the linear habitats and/or features previously identified as being suitable for foraging/commuting bats, are now located outwith the Hornsea Four Order limits. As such, a number of locations that had previously been identified to deploy static detectors are now outside the Hornsea Four static bat detector survey area, as detailed in [Table 1](#). These static detectors are shown on Figure 2 to Figure 15 within [Annex 3.8: Bat Static Detector Survey Report Part A](#).

Table 1: Static detector deployment.

Static Bat Detector Reference	Survey Visit					
	May 2019	June 2019	July 2019	August 2019	September 2019	October 2019
Static_S01	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S02	No longer within Hornsea Four static bat detector survey area					
Static_S03	No longer within Hornsea Four static bat detector survey area					
Static_S04	No longer within Hornsea Four static bat detector survey area					
Static_S05	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S06	Deployed	No Landowner Access	Deployed	No Landowner Access	Deployed	Deployed
Static_S07	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S08	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S09	No Landowner Access	No Landowner Access	No Landowner Access	Deployed	Deployed	Deployed
Static_S10	No longer within Hornsea Four static bat detector survey area					
Static_S11	Deployed	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed	Deployed
Static_S12	No longer within Hornsea Four static bat detector survey area					
Static_S13	No longer within Hornsea Four static bat detector survey area					
Static_S14	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S15	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S16	Deployed	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed
Static_S17	Deployed	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed	Deployed
Static_S18	No longer within Hornsea Four static bat detector survey area					
Static_S19	No longer within Hornsea Four static bat detector survey area					
Static_S20	No longer within Hornsea Four static bat detector survey area					

Static Bat Detector Reference	Survey Visit					
	May 2019	June 2019	July 2019	August 2019	September 2019	October 2019
Static_S21	No longer within Hornsea Four static bat detector survey area					
Static_S22	No longer within Hornsea Four static bat detector survey area					
Static_S23	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S24	No detector deployed					
Static_S25	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed
Static_S26	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed
Static_S27	No longer within Hornsea Four static bat detector survey area					
Static_S28	No longer within Hornsea Four static bat detector survey area					
Static_S29	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S30	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed
Static_S31	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S32	No longer within Hornsea Four static bat detector survey area					
Static_S33	No longer within Hornsea Four static bat detector survey area					
Static_S34	No longer within Hornsea Four static bat detector survey area					
Static_S35	Deployed	No Data Available due to equipment malfunction	Deployed	Deployed	Deployed	Deployed
Static_S36	Deployed	Deployed	Deployed	Deployed	Deployed	Deployed
Static_S37	No longer within Hornsea Four static bat detector survey area					
Static_S38	No detector deployed					

3 Feature Descriptions

3.1.1.1 A brief description of the location of each static detector is provided within [Table 2](#) below. The locations can be found on Figures 2 to Figure 15 of [Annex 3.8: Bat Static Detector Survey Report Part A](#). The activity transects in the table below, can be found in [Annex 3.10: Bat Activity Transect Survey Report Part A](#) and [Annex 3.11: Bat Activity Transect Survey Report Part B](#).

3.1.1.2 Information on the habitat descriptions provided in [Table 2](#) is drawn from the findings from the updated Extended Phase 1 Habitat Survey. Further information on these habitats is provided in [Annex 3.1: Extended Phase 1 Habitat Survey Report](#) and [Annex 3.2: Extended Phase 1 Target Note Tables](#).

Table 2: Habitat descriptions for each static detector location.

Static Bat Detector Reference	Description of habitat	Location included within Activity Transect Survey
Static_01	Deployed on the edges of a small woodland copes, surrounding habitats consisted mainly of arable fields and areas of set aside consisting of a wildflower mix.	Yes – Activity Transect 1 (south)
Static_05	Deployed within vegetation bordering a grassland field and a road. The surrounding area was a mix of arable fields, grassland and Barmston Main Drain to the south	Yes – Activity Transect 2
Static_06	Deployed within a hedgerow bordering a grassland field and an arable field, approximately 500 m west of Static Detector_05. Due to the presence of livestock within the grassland field, this detector was not always deployed due to safety.	Yes – Activity Transect 2
Static_07	Deployed adjacent to hedgerow, surrounding habitats consisted of arable fields and hedgerows	Yes – Activity Transect 3
Static_08	Deployed adjacent to Foston Beck, surrounding habitat consisted of arable fields, hedgerows and small area of semi-improved grassland with horses grazing.	Yes – Activity Transect 3
Static_09	Deployed adjacent to a small woodland, surrounding habitats consisted of a similar make-up to those locations described previously, a mix of arable fields, hedgerows and a small woodland. Due to a lack of landowner access agreements, no detector was deployed at this location during May, June or July.	Yes – Activity Transect 4
Static_11	Deployed within grassland adjacent to the River Hull. A disused barn was located approximately 20 m away (of negligible suitability for roosting bats). The surrounding habitat consisted of poor semi-improved grassland, arable fields and the River Hull.	No
Static_14	Deployed adjacent to hedgerow running along a dry ditch, surrounding habitat consisting of arable fields, hedgerows and Watton Beck to the north	No
Static_15	Deployed adjacent to a hedgerow and dry ditch, approximately 800 m south of the Static_15.	No

Static Bat Detector Reference	Description of habitat	Location included within Activity Transect Survey
Static_16	Deployed within vegetation adjacent to Bryan Mills Beck, surrounding habitat consisting of arable fields, standalone trees and grassland.	Yes – Activity Transect 5
Static_17	Deployed on the edges of woodland adjacent to Bealey's Beck, surrounding habitat consisting of woodland and arable fields.	Yes – Activity Transect 5
Static_23	Deployed adjacent to Moor Lane Local Wildlife Site (LWS), surrounding habitat consisting of woodland edges, hedgerows and arable fields.	Yes – Activity Transect 6
Static_25	Deployed adjacent to a hedgerow along a semi-dry ditch, surrounding habitats consisting of woodland edges and arable fields.	Yes – Activity Transect 6
Static_26	Deployed adjacent to Jillywood Lane LWS, surrounding habitats consisting of woodland edges and arable fields.	Yes – Activity Transect 7
Static_29	Deployed adjacent to a hedgerow, surrounding habitats included arable fields and hedgerows.	Yes – Activity Transect 7/Activity Transect 8
Static_30	Deployed adjacent to a hedgerow and standalone trees, surrounding habitats consisted of arable fields.	Yes – Activity Transect 8
Static_35	Deployed within vegetation bordering a Public Right of Way (PRoW), surrounding habitats consisting of hedgerows, a pond, dry watercourse and arable fields. Vegetation exists to the northern boundary of the OnSS.	Yes – Activity Transect 8
Static_36	Deployed adjacent to a hedgerow, surrounding habitats include arable fields and hedgerows. Vegetation exists to the western edge of the planned onshore export cable corridor (ECC) connection to the OnSS.	Yes – Activity Transect 9

4 Static Detector Survey Results

4.1.1.1 The following graphs indicate the total number of passes by each species, recorded at all the static detector locations during the Hornsea Four bat static detector survey. This section should be read in conjunction with [Table 1](#), as this indicates when certain static detectors were not deployed, as well as the figures contained within [Annex 3.8: Bat Static Detector Survey Report Part A](#).

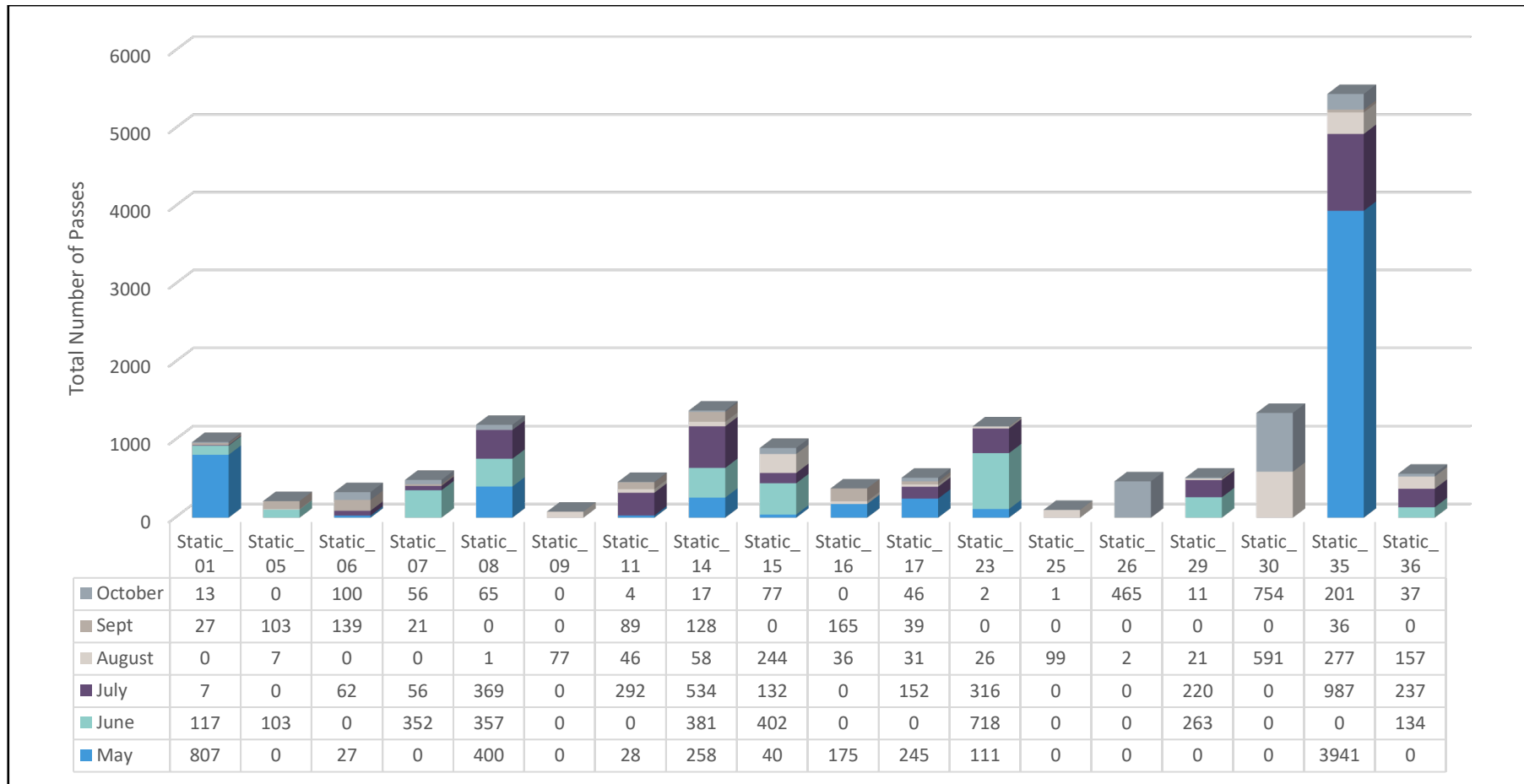


Figure 1: Summary of Bat Activity at all static detector locations.

4.1.2 Static detector 01

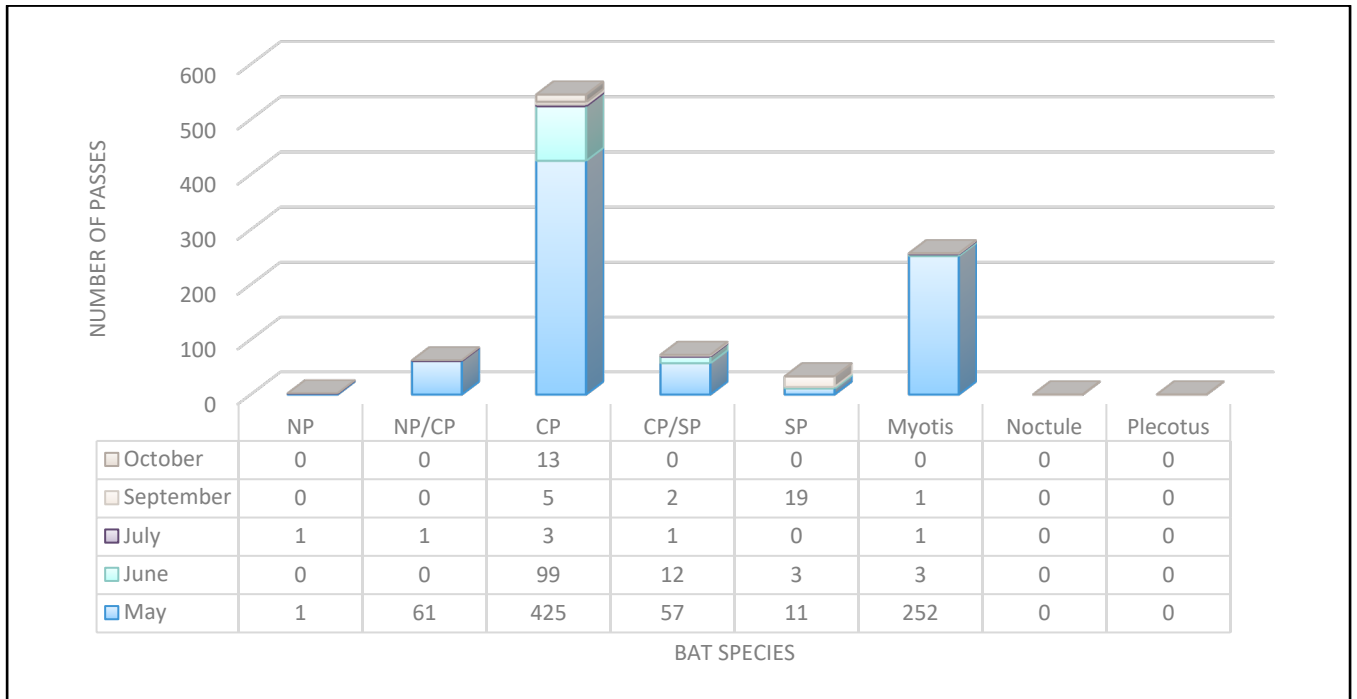


Figure 2: Bat activity results for Static_01.

4.1.3 Static detector 05

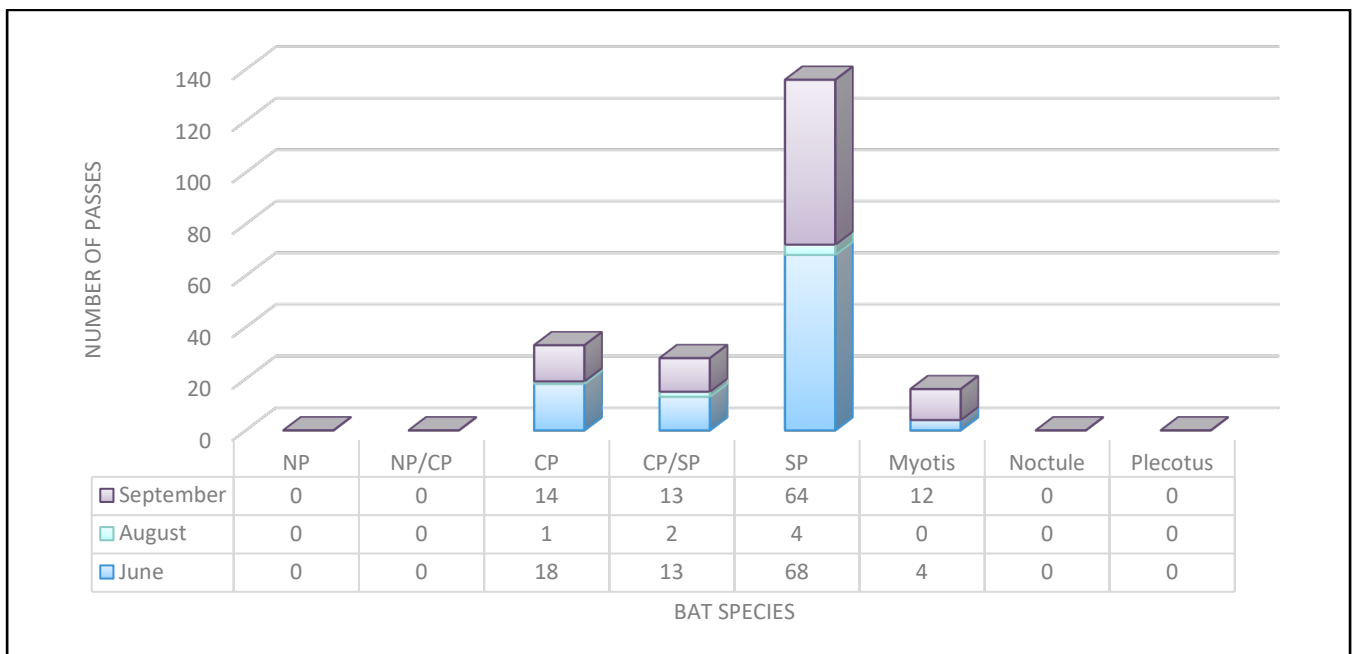


Figure 3: Bat activity results for Static_05.

4.1.4 Static detector O6

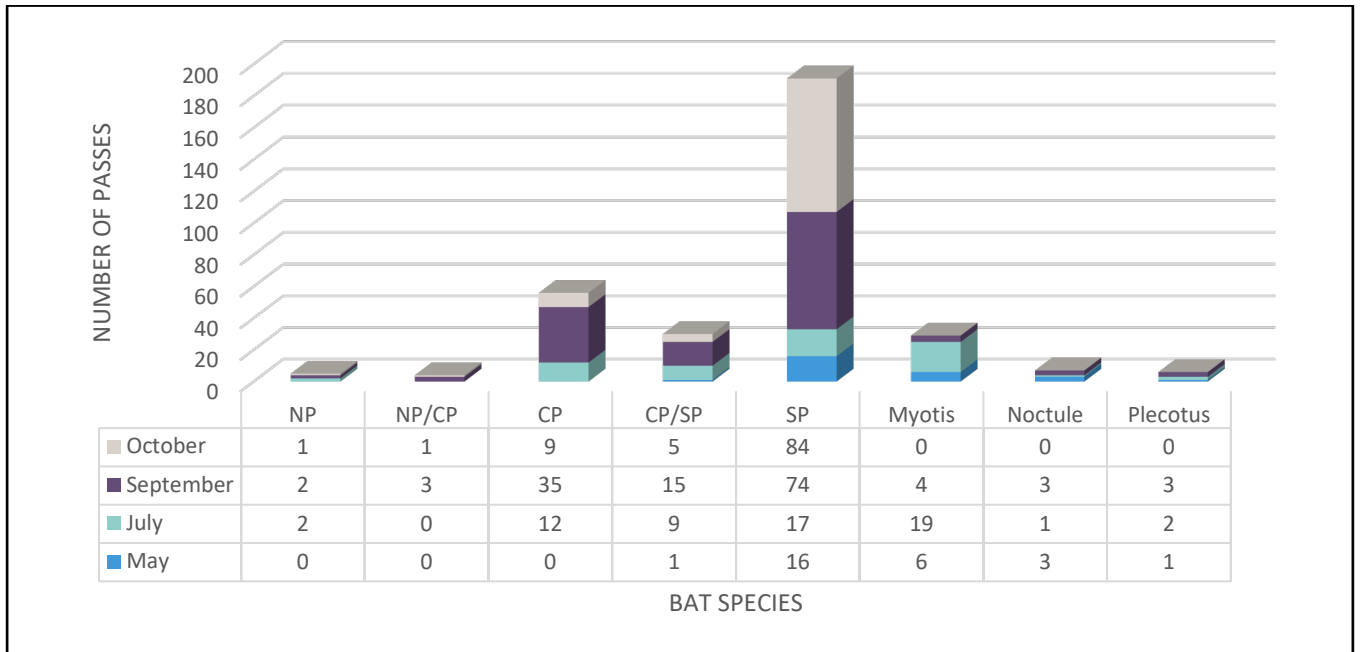


Figure 4: Bat activity results for Static_06.

4.1.5 Static detector O7

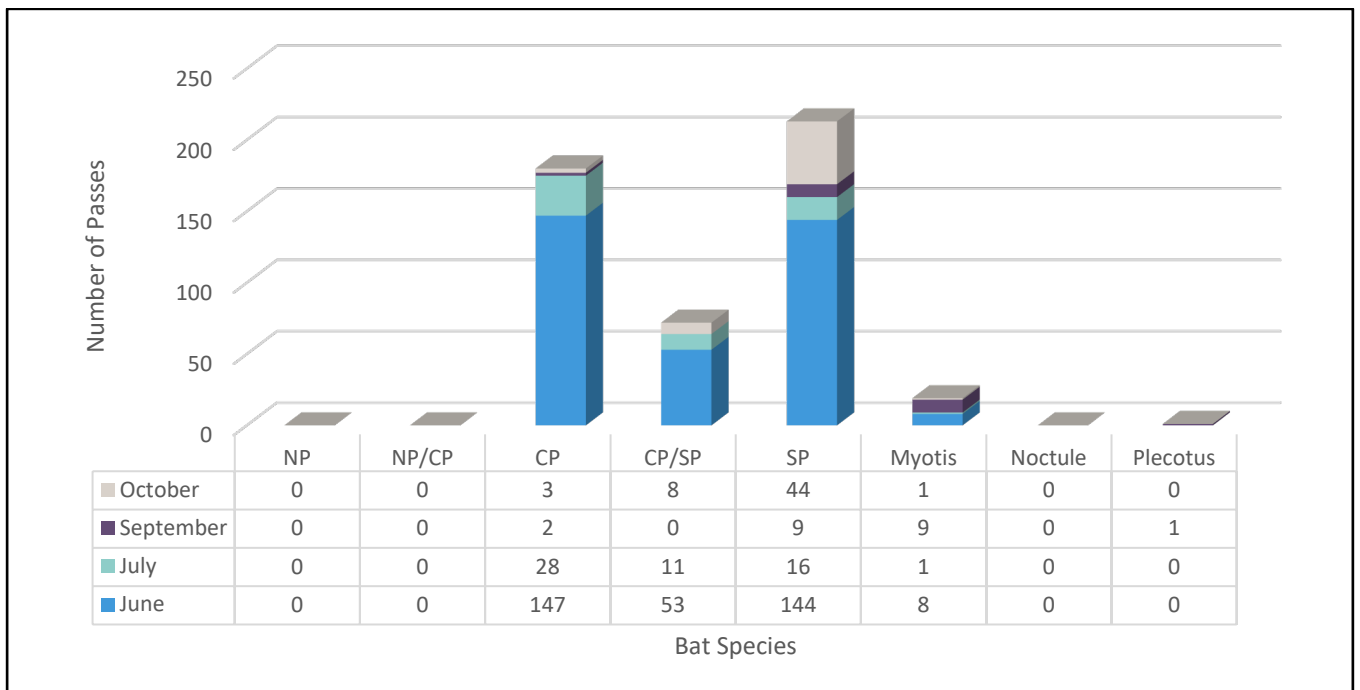


Figure 5: Bat activity results for Static_07.

4.1.6 Static detector 08

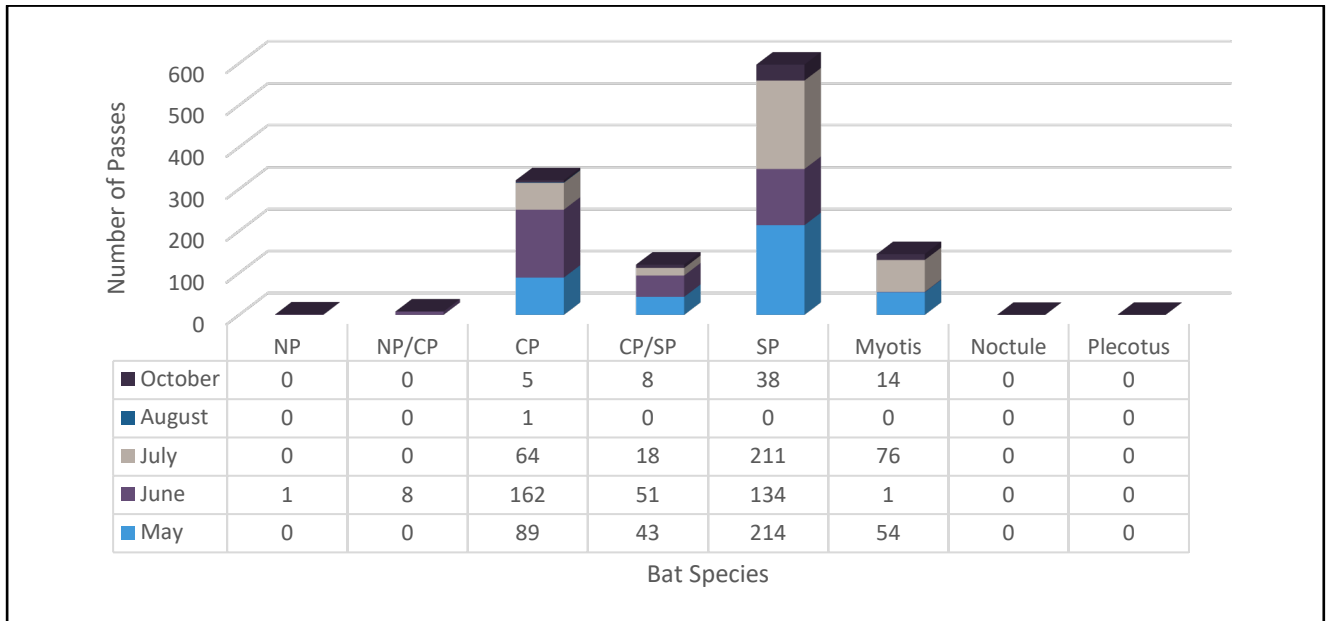


Figure 6: Bat activity results for Static_08.

4.1.7 Static detector 09

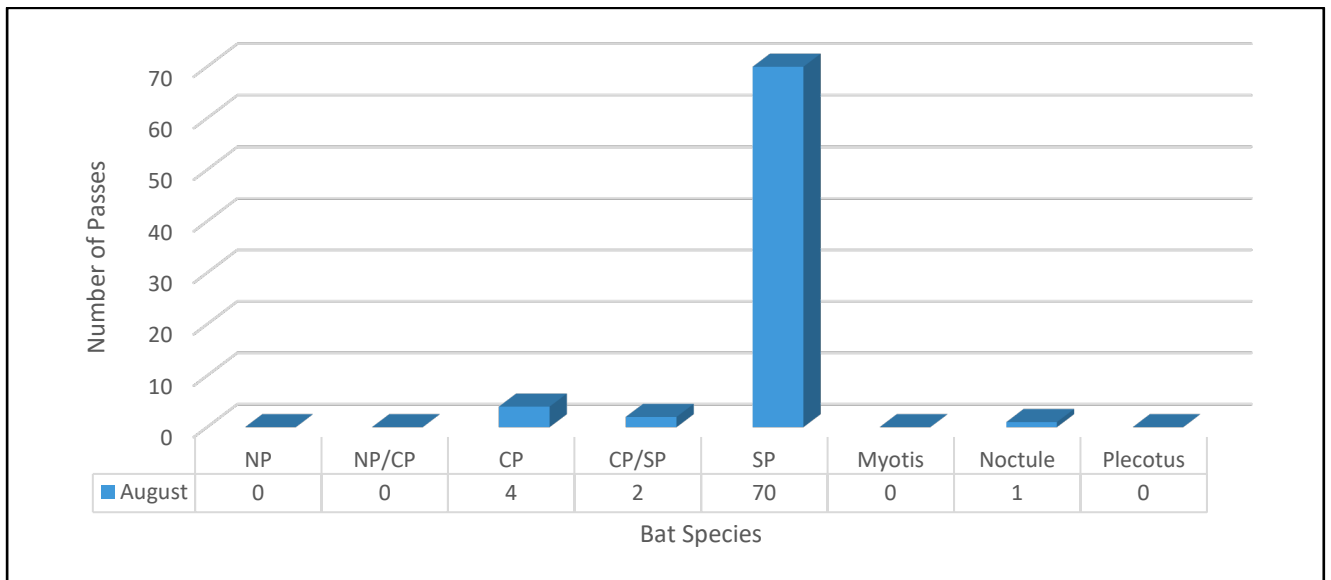


Figure 7: Bat activity results for Static_09.

4.1.8 Static detector 11

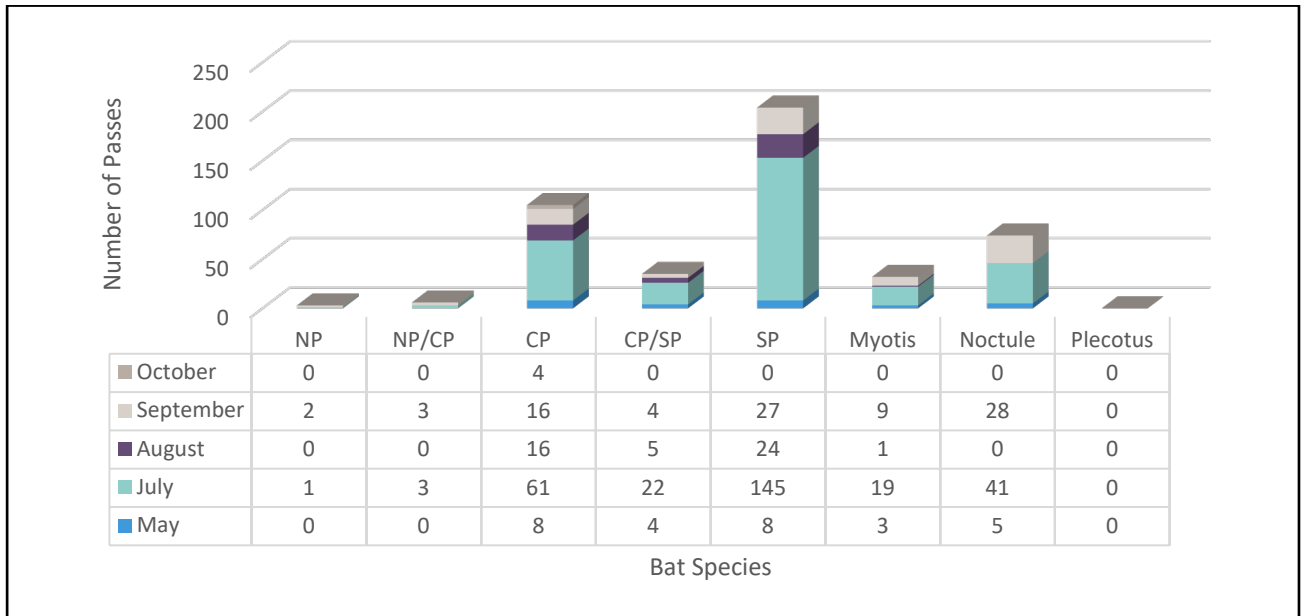


Figure 8: Bat activity results for Static_11.

4.1.9 Static detector 14

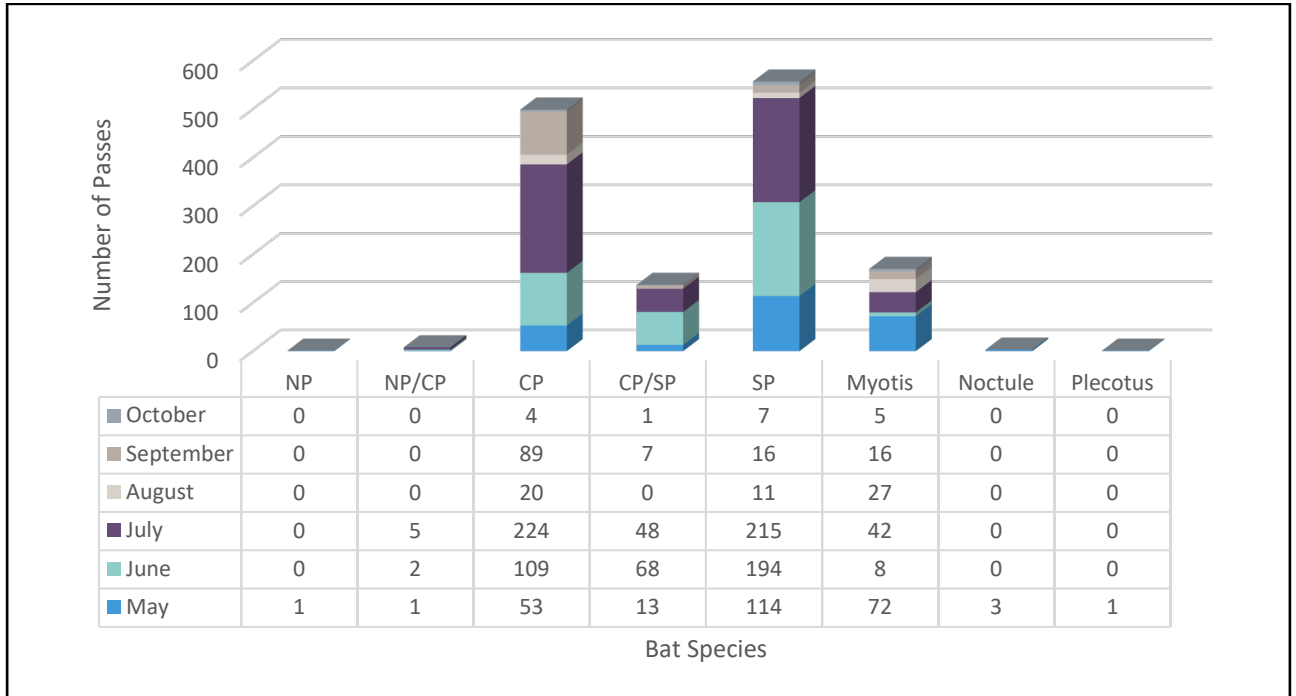


Figure 9: Bat activity results for Static_14.

4.1.10 Static detector 15

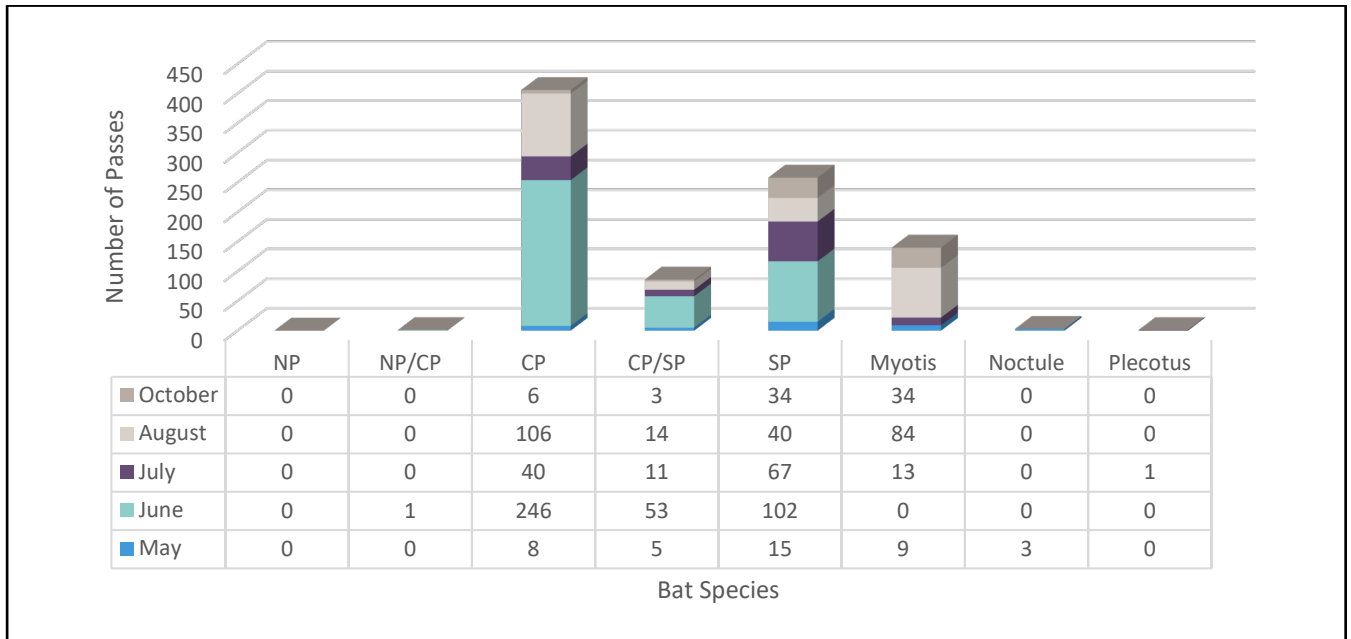


Figure 10: Bat activity results for Static_15.

4.1.11 Static detector 16

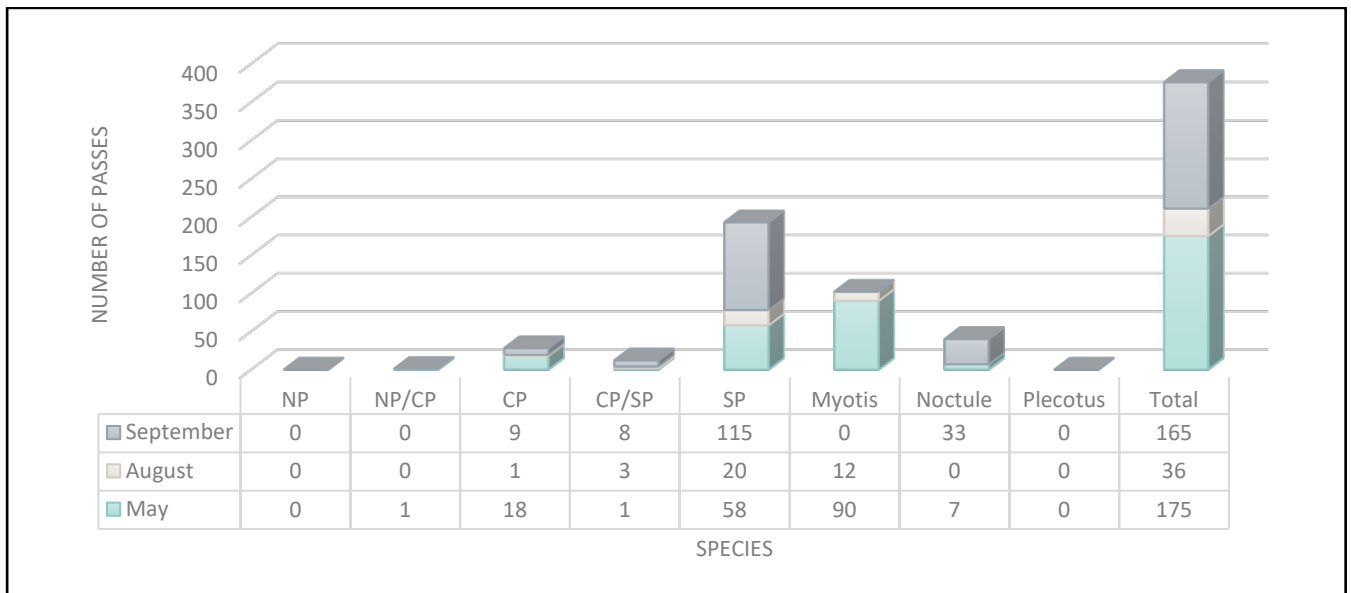


Figure 11: Bat activity results for Static_16.

4.1.12 Static detector 17

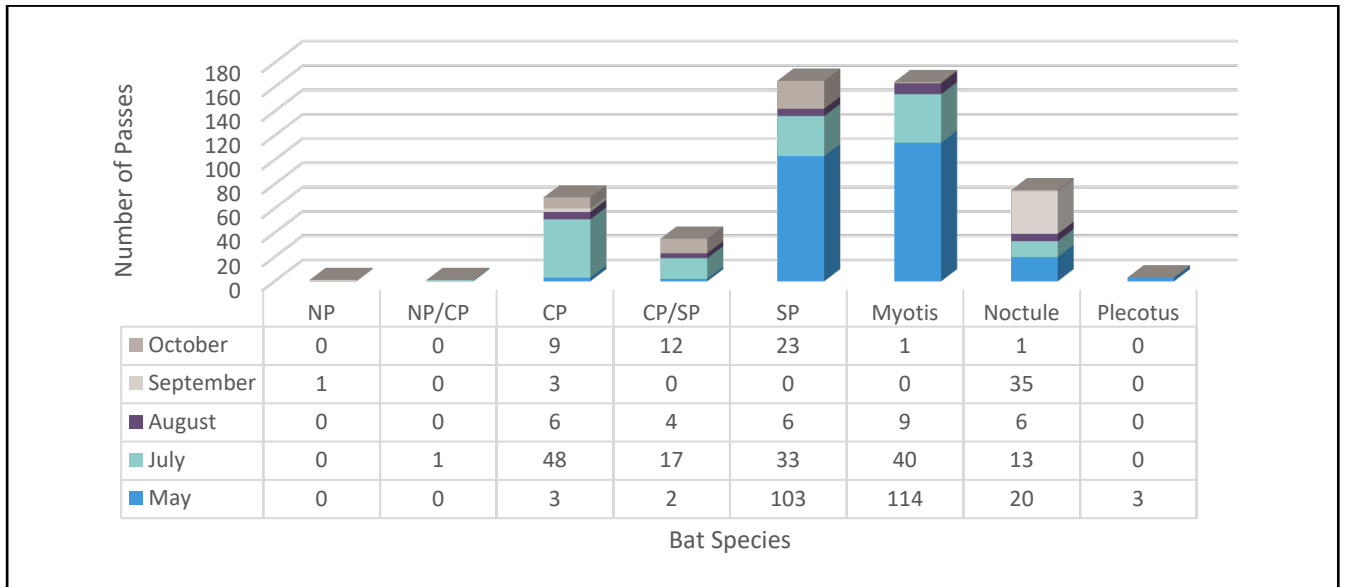


Figure 12: Bat activity results for Static_17.

4.1.13 Static detector 23

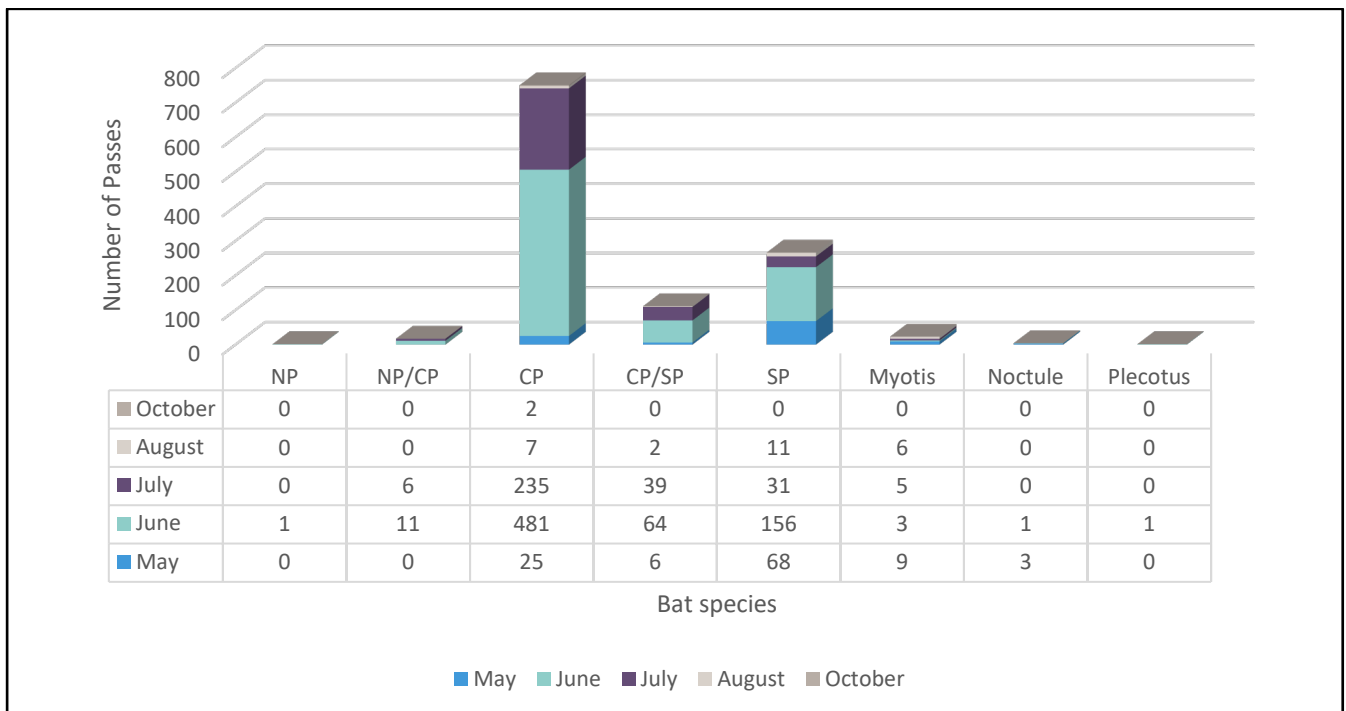


Figure 13: Bat activity results for Static_23.

4.1.14 Static detector 25

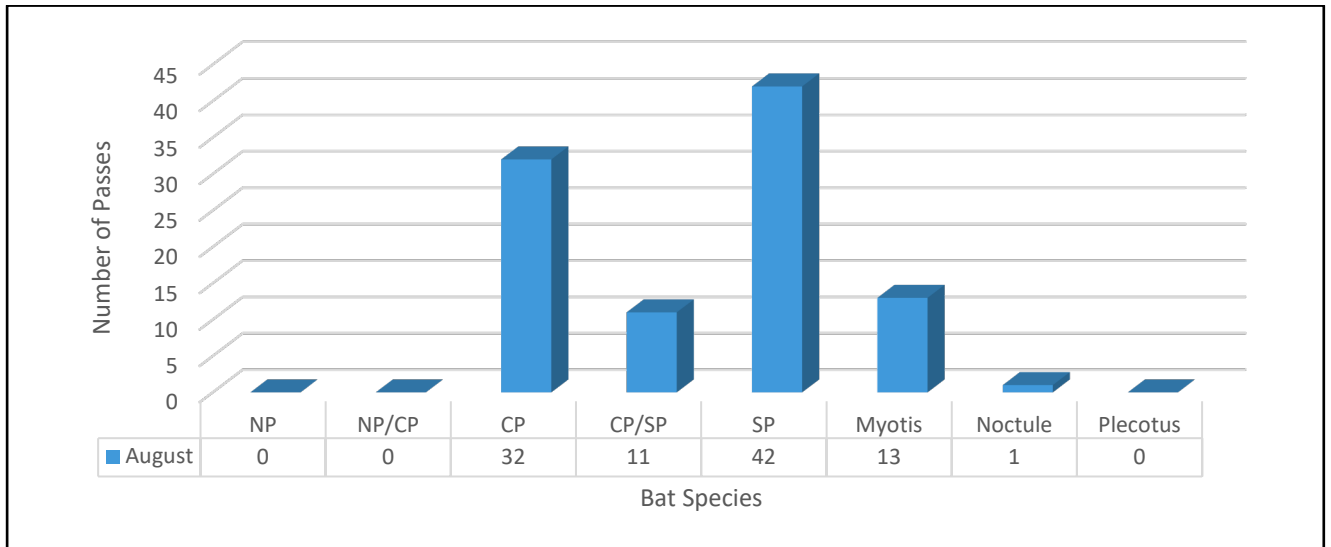


Figure 14: Bat activity results for Static_25.

4.1.15 Static detector 26

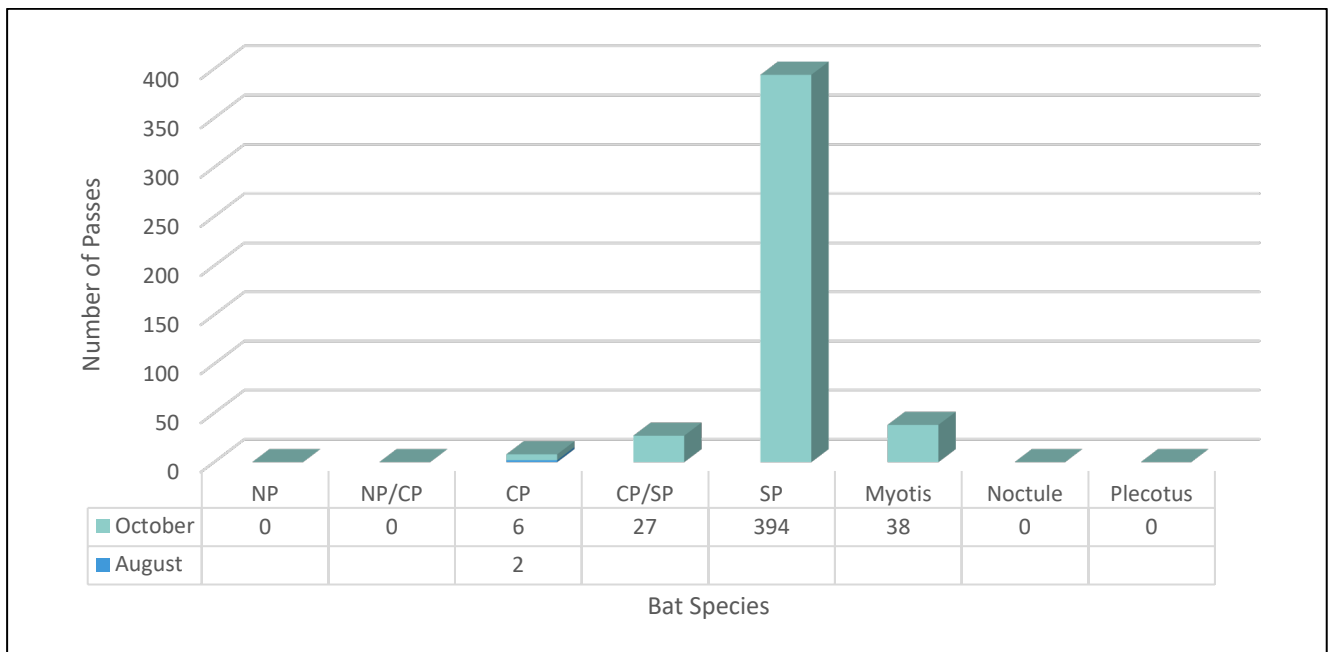


Figure 15: Bat activity results for Static_26.

4.1.16 Static detector 29

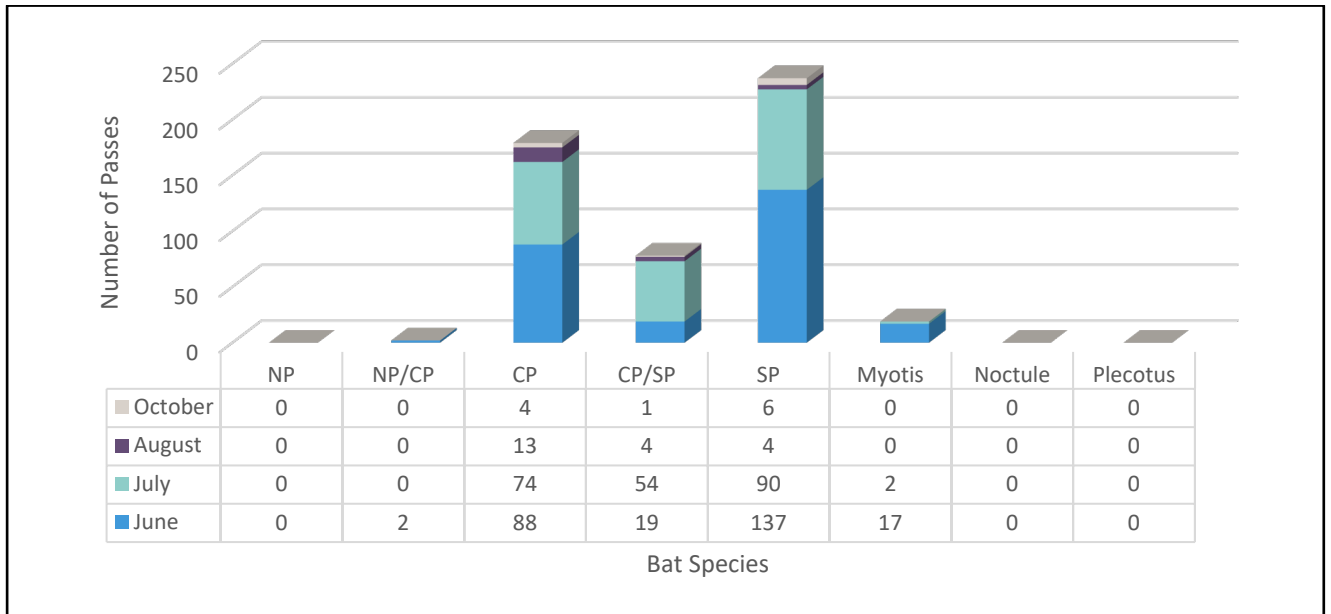


Figure 16: Bat activity results for Static_29.

4.1.17 Static detector 30

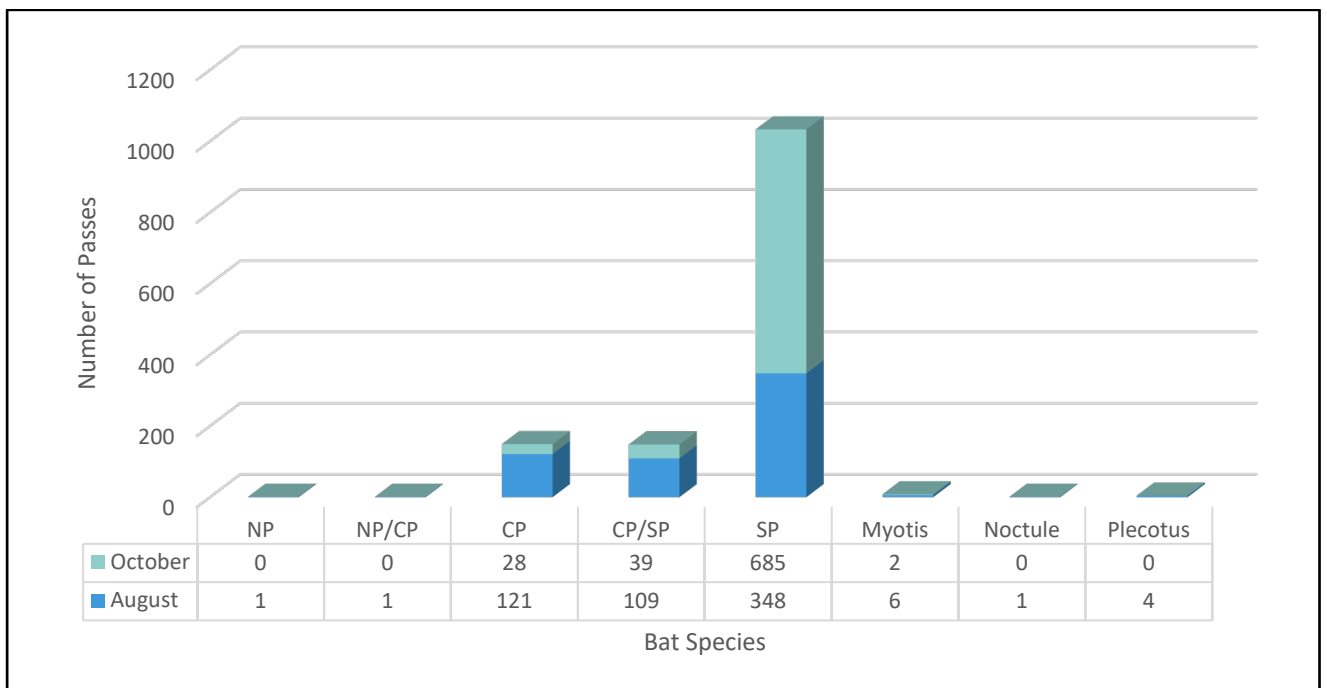


Figure 17: Bat activity results for Static_30.

4.1.18 Static detector 35

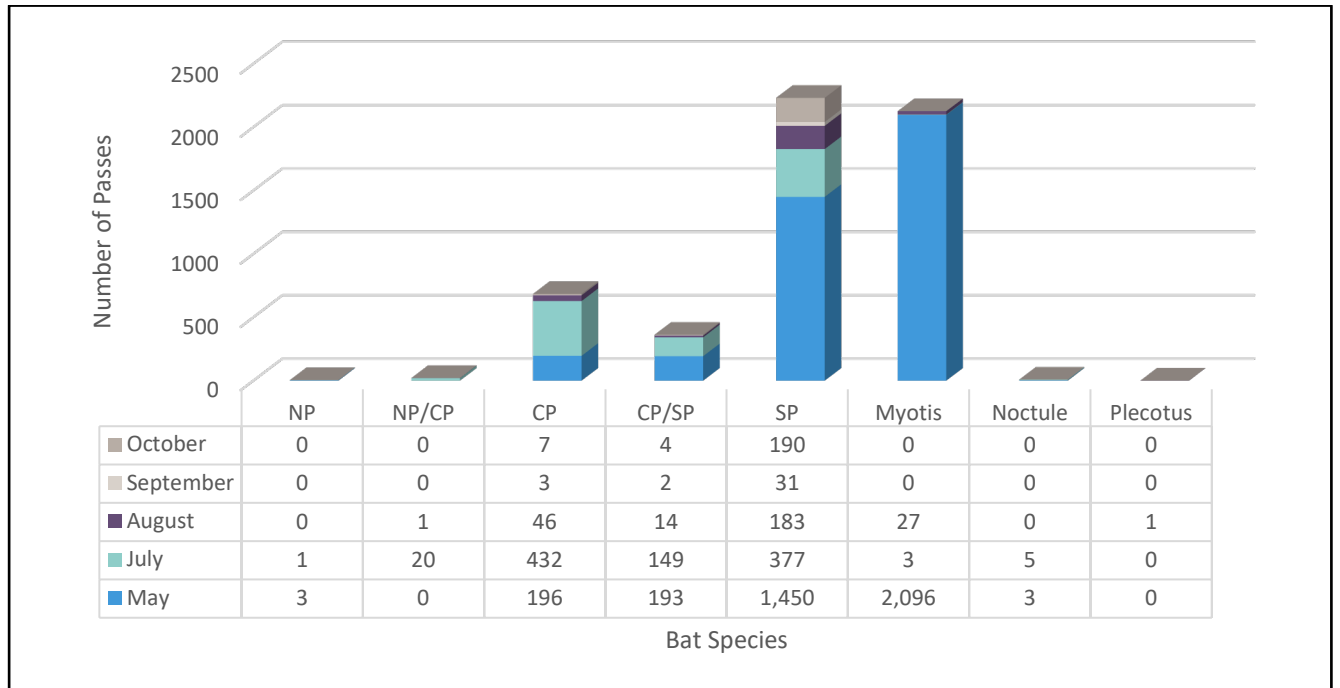


Figure 18: Bat activity results for Static_35.

4.1.19 Static detector 36

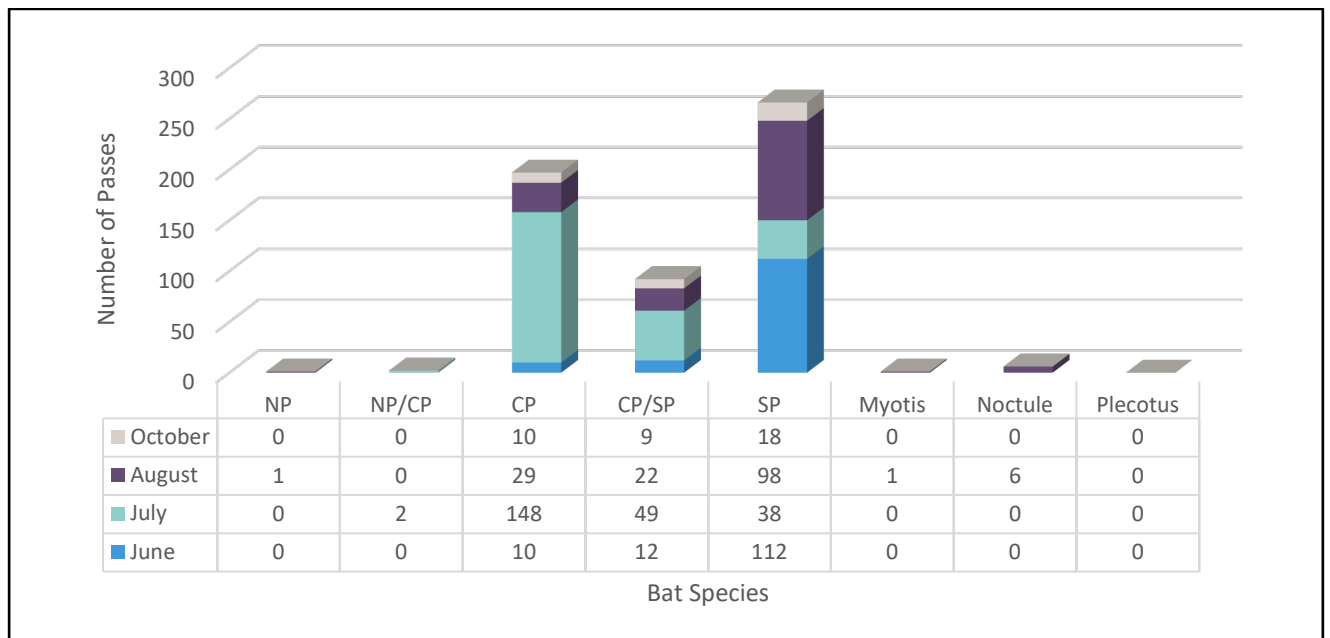


Figure 19: Bat activity results for Static_36.

5 Bat Sonogram Examples

5.1.1.1 **Figure 20** to **Figure 25** show a selection of the sonograms obtained from the static bat detectors deployed in 2019. An example sonogram of each species, or species group, has been included alongside sonograms showing social calls and/or feeding activity. This data has been downloaded and screen grabbed from the Kaleidoscope software that was used to interrogate the data obtained.

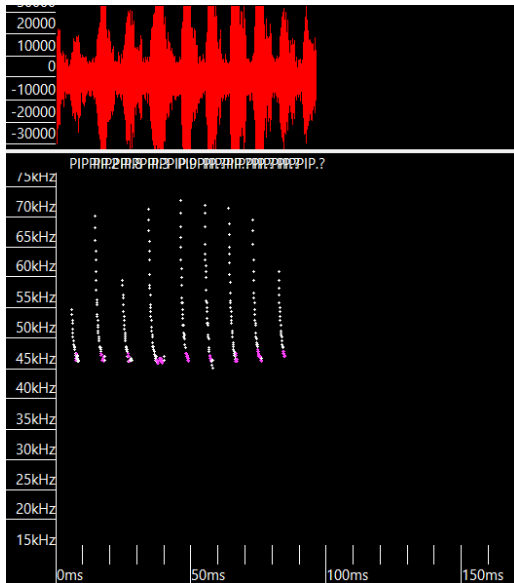


Figure 20: Typical echolocation call of a Common pipistrelle (CP).

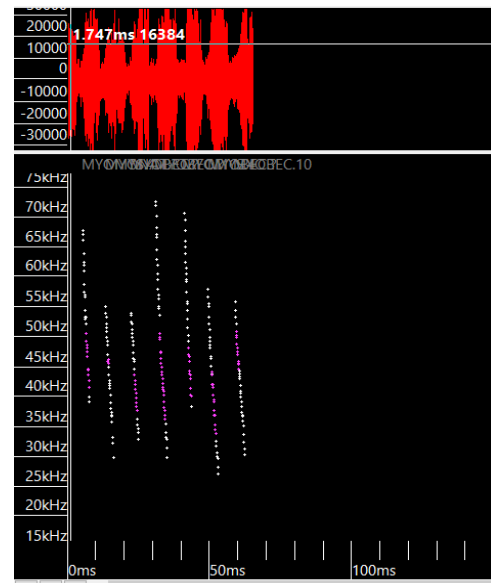


Figure 21: Typical echolocation of a *Myotis* spp.

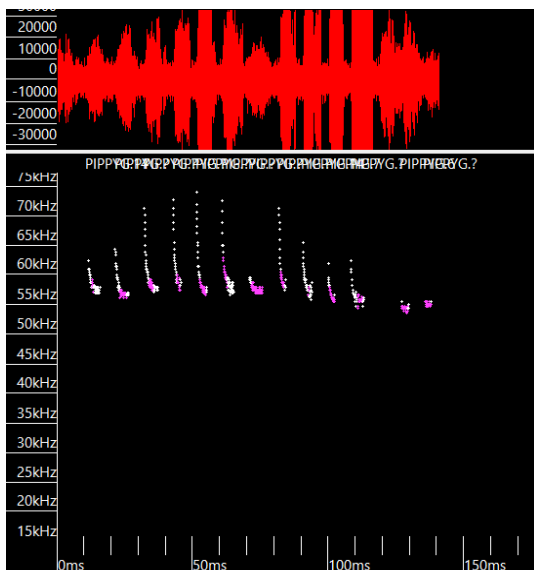


Figure 22: Echolocation call of a Soprano pipistrelle (SP).

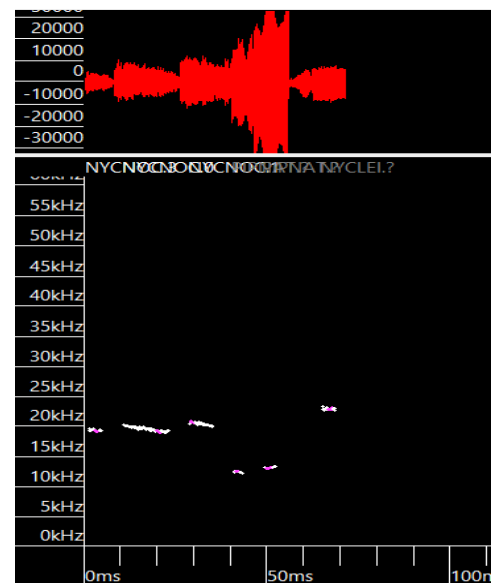


Figure 23: Echolocation call of a noctule.

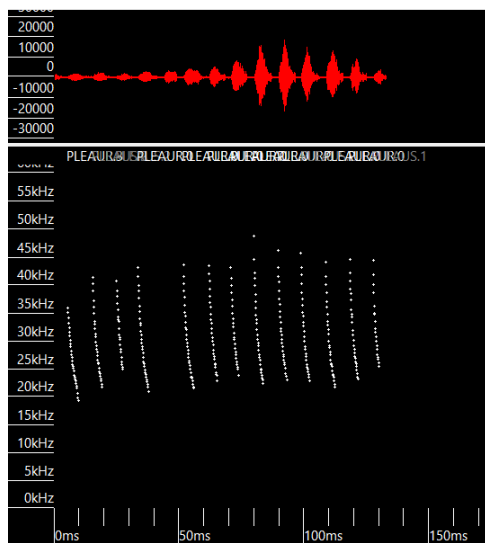


Figure 24: Echolocation call of a *Plecotus* spp.

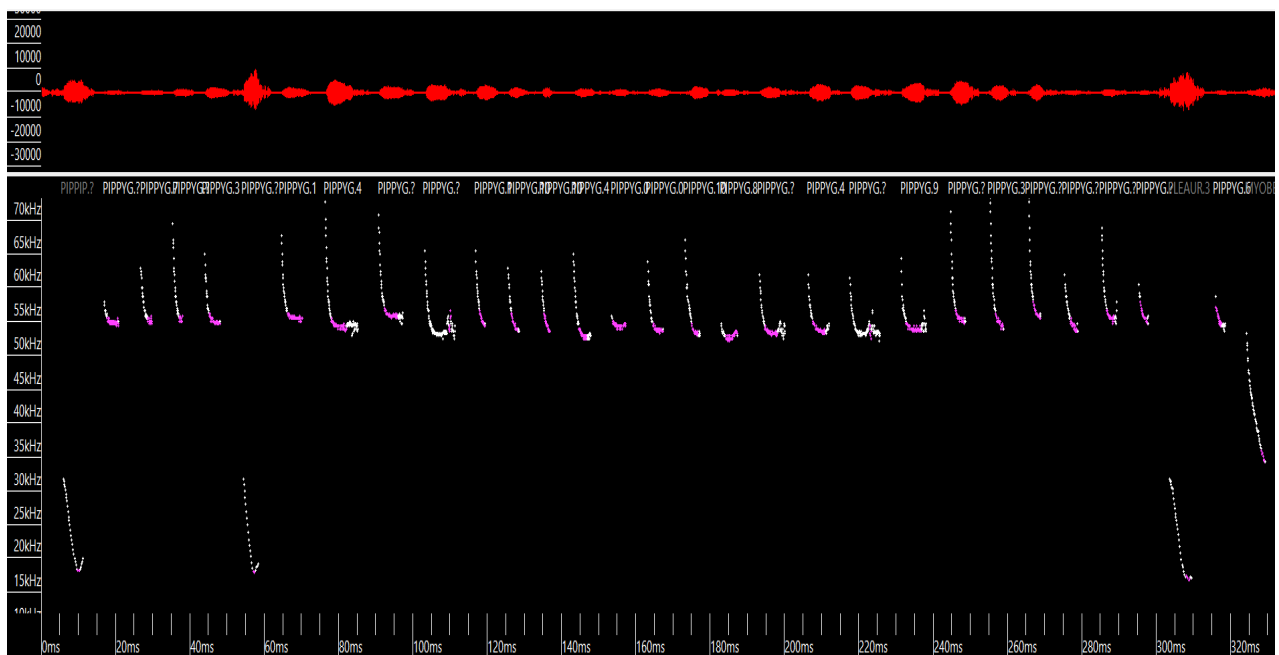


Figure 25: Echolocation call of Common pipistrelle with social call.