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Technical Appendix 7.2

Clune Wind Farm

Bat Surveys

RES Group

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1 Introduction

1.1 Terms of Reference

In September 2020, Atmos Consulting Ltd. (Atmos) was commissioned by Clune and Corryborough Estate, and then latterly Renewable Energy Systems Ltd (RES), to undertake bat surveys in relation to a proposed wind farm development on land south of the village of Tomatin, Highland.

Subsequently, in late 2022, the survey area was extended to the south of the original area, encompassing land of similar terrain and stretching towards the River Dulnain. These will be referred to hereafter as the 'Original Site' and 'Additional Area' within this document as necessary, with the 'Site' being used to refer to the project area as a whole.

1.2 Site Location and Description

The Original Site (Figure 7.2.1, Appendix A refers) is located approximately 27km south-east of Inverness, and approximately 5.5km south of the village of Tomatin. It consists predominately of managed upland grouse moorland with agricultural fields and mixed woodland in lower altitude areas. Clune Burn and Allt Lathach traverse the area along with other smaller tributaries running into the River Findhorn that lies to the north-west, outwith the Site boundary.

The Original Site inclines generally in a north-east to south-west direction, reaching the highest point of the Site, 750m, at Carn Dubh 'Ic an Deoir. The northern edge is bounded by the River Findhorn and the eastern boundary by the A9. The area can be approximately divided by four main watercourses that flow north into the River Findhorn: Allt Phris, Clune Burn, Allt Lathach, and Wester Strathnoon Burn.

The Additional Area (Figure 7.2.1, Appendix A refers) is located approximately 25km south-east of Inverness, and approximately 4km south-east of the village of Tomatin. The Site is predominately managed upland grouse moorland with agricultural fields and mixed woodland in lower altitude areas. Watercourses within the site are the easterly-flowing burns of An Leth-allt, and Allt Coire Chaillich, both contained in steep sided valleys and which feed into the River Dulnain to the south.

The Additional Area is part of the Monadhliath Mountains greater area, which extends south and west towards the Great Glen, and it contains four small peaks over 500m. To the East is the Cairngorms National Park and Kinveachy Forest SAC.

The Site is mainly used as a grouse moor, managed by grazing livestock such as sheep, and regular burning of mature heather to provide new growth. The Site also consists of small patches of grassland along the northern boundary used by grazing livestock, a block of conifer plantation in the north-east, and an area of ancient deciduous woodland on the banks of the Allt Phris. There is some evidence of grazing pressure from deer. The survey area contains a variety of plant communities including blanket bog, wet heath, acid grassland, scrub and deciduous woodland.

The proposed access track will be situated on the north-eastern boundary of the Site, connecting to the A9 just north of Slochd summit, using an existing minor junction. The

plant communities within the access track boundary are a mix of heath, blanket bog, scrub, and birch *Betula* sp. woodland.

1.3 Objectives

The principal objectives of this report are as follows:

- to outline the legislative protection conferred on bats;
- to detail existing bat records and designated sites of relevance to bats in the vicinity of the proposed development (if any);
- to outline the survey methodologies; and
- to summarise the results of the bat surveys undertaken.

2 Context

2.1 Legislation and Policy

All bat species in the UK are afforded full statutory protection as European Protected Species listed on Schedule 2 of the Conservation (Natural Habitats, %c.) Regulations 1994 as amended in Scotland, which transpose into Scottish Law the European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (92/43/EEC) (the Habitats Directive).

It is an offence to deliberately or recklessly:

- capture, injure or kill a bat;
- harass an individual or group of bats;
- disturb a bat while it is occupying a structure or place used for shelter or protection;
- disturb a bat while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place, or otherwise deny the animal use of the breeding site or resting place;
- disturb a bat in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- disturb a bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- disturb a bat while it is migrating or hibernating.

It is also an offence of strict liability to:

- damage or destroy a breeding site or resting place of a bat even if they are not in use at the time (i.e. a summer roost during the winter period).

Of the 18 UK bat species, ten occur in Scotland at varying levels of distribution. Common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, Daubenton's *Myotis daubentonii*, and brown long-eared bat *Plecotus auritus* are considered to be common species within Scotland with generally widespread distributions. Nathusius' pipistrelle *P. nathusii*, Natterer's *M. nattereri*, noctule bat *Nyctalus noctula*, Leisler's bat *N. leisleri* and whiskered / Brandt's bats *M. mystacinus / M. brandtii* are also recorded within Scotland, however these are considered to be relatively rare species with a restricted distribution.

The Scottish Biodiversity List (SBL) was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) Act 2004 (NCSA) for the conservation of biodiversity. This legislation required Scottish Ministers to publish lists of species of flora and fauna and habitats considered to be of principal importance for the purposes of biodiversity. Included on this list are the following bats: Brandt's bat, Daubenton's bat, whiskered bat, Natterer's bat, noctule bat, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long-eared bat.

The 'UK Post-2010 Biodiversity Framework' (JNCC & DEFRA, 2012), published in July 2012, also sets out a framework of priorities for UK-level work for the Convention on Biological Diversity, to which the UK is a signatory. Covering the period 2011-2020, this framework replaces the original UK Biodiversity Action Plan (UK BAP, 2004) system and now the work is focussed on the separate countries (England, Scotland, Northern Ireland and Wales). The overall aim remains to protect and prevent the decline of rare species and

habitats, and so currently many of the species and habitats in the UK BAP still form the basis of the biodiversity work carried out in the devolved countries.

Furthermore, Local Biodiversity Action Plans (LBAP) are still in place under this framework to manage and conserve species and habitats of priority at a local level. The LBAP that is relevant for this proposed development is the Highland LBAP. The LBAP reflects all species listed on the SBL, including the bat species mentioned above.

2.2 Impacts of Wind Turbines on Bat Species

Natural England Technical Information Note TIN051 (Natural England, 2014) provides some guidance on the risk levels associated with UK bat species and wind turbines, based on analysis of flight patterns, foraging strategies and echolocation calls. Table 1, reproduced from TIN051, shows the levels of risk derived for key species. Table 2, also reproduced from TIN051, takes relative population sizes into account and presents the levels of risk at population level.

Table 1: Bat Species Likely to be at Risk from Wind Turbines

Low risk	Medium risk	High risk
Long-eared bats	Common pipistrelle	Noctule
Myotis species	Soprano pipistrelle	Leisler's
Lesser horseshoe	Serotine	Nathusius' pipistrelle
Greater horseshoe	Barbastelle	

Table 2: Bat Populations Likely to be Threatened due to Impacts from Wind Turbines

Low risk	Medium risk	High risk
Long-eared bats	Serotine	Nathusius' pipistrelle
Myotis species	Barbastelle	Leisler's
Horseshoe bats		Noctule
Soprano pipistrelle		
Common pipistrelle		

Three species are identified to be at high risk from wind turbines: Nathusius' pipistrelle, Leisler's bat and Noctule. This is due to the type of flight each species exhibits, the height at which each species flies at, and the type of habitat preferred. Common and soprano pipistrelle bats and *Myotis* species do cross open spaces, however, they are relatively less likely to fly at a height that would bring them into contact with a turbine blade. Noctule and Leisler's bats however, and Nathusius' pipistrelle to a lesser extent, do fly at height and often cross open spaces, making them "high risk" species.

Noctule, Leisler's bats and Nathusius' pipistrelle remain in the "high risk" category at population level as they have smaller populations than other more common species. Their populations are therefore considered to be at greater risk from wind farm developments.

Common and soprano pipistrelle bats, and *Myotis* species are more common, and therefore their populations as a whole are less threatened by impacts from wind turbines than other scarcer species. This has resulted in a "low risk" classification at the population level.

3 Methodology

3.1 Desk Study

A desk study was undertaken to gain further understanding of the Site, to gather information on the presence of statutory nature conservation sites within 10km of the Site, and any existing records of bats within 5km of the Site. Various data sources were utilised including the website of the statutory agency, NatureScot via the 'Site Link Portal', publicly available datasets available for commercial use held on the National Biodiversity Network (NBN) Atlas website, and aerial photography used to aid in the assessment of habitat features.

A review of existing bat survey data from wind energy projects (operational, under construction, and those at various stages in the planning system) within 10km of the proposed development was also undertaken.

3.2 Site Surveys

All methodology follows the current guidance in relation to bats and onshore wind turbines (Collins, 2016; NatureScot *et al*., 2021) unless otherwise specified.

3.2.1 Original Site

Habitat Assessment Surveys of the Original Site and the immediate surrounding area were undertaken in April 2022 by experienced Atmos Consulting Ltd. ecologists. Deployment of static bat detectors was undertaken at various times between April/May and October 2022 (Section 3.2.2 refers).

Habitat Assessment

A daylight bat feature assessment was undertaken in April 2022. The aim of this survey was to identify any potential or confirmed roost sites, to assess the location and suitability of habitats for foraging and commuting and to identify if further surveys such as emergence/re-entry or detailed roost inspection surveys were required. All areas of the Site were assessed with an emphasis on features located within 250m of potential/proposed turbine locations.

Activity Surveys – Static Recorders

In line with current guidance in relation to onshore wind energy projects (NatureScot, 2021), activity surveys were limited to the deployment of automated static detectors.

Three survey periods were undertaken: spring (April–May 2022, Survey 1), summer (June–July 2022, Survey 2) and autumn (August–October 2022, Survey 3). On each survey occasion, detectors were deployed for a minimum of 10 days, recording in full spectrum. All detectors were set to commence recording a minimum of 30 minutes before sunset and continue until a minimum of 30 minutes after sunrise. The full details of the static detector locations and deployment details is presented in Table 3, with detector locations for each deployment period shown on Figure 7.2.2 (Appendix A refers).

Static detectors were located approximately at the location of the proposed turbines, although turbine locations were not fixed during the period of survey and as such detector locations altered to some degree. The locations did however provide a good representation of turbine locations.

The proposed development at the time of survey was for 42 turbines. As the deployment of static detectors was based on this initial design, twenty-one detectors were utilised.

A number of limitations (Section 3.4 refers) were experienced in relation to the placement and performance of the static detectors. This resulted in a number of the detectors not recording for the full deployment period.

To place the bat activity levels into context, site specific weather monitoring was undertaken through the deployment of a weather station. Within the centre of the site, a Davis Vantage Vue Weather Station combined with a WeatherLink – Windows USB data logger was deployed for the duration of the surveys. The weather station was mounted on a pole at approximately 2m in height in open ground. Further limitations in relation to the acquisition of weather data were experienced (Section 3.4 refers).

Table 3: Bat Detector Deployment summary

Survey Visit	Detector ID and Model	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights	Scheduled Start / End Time	Total Time Recorded
1 – Spring	1 - Wildlife Acoustics Song Meter Mini	Turbine 1 NH 81776 24370	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	2 - Wildlife Acoustics Song Meter Mini	Turbine 2 NH 81190 24813	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	3 - Wildlife Acoustics Song Meter Mini	Turbine 3 NH 80585 24879	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	4 - Wildlife Acoustics Song Meter Mini	Turbine 4 NH 80774 24426	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	1 - Wildlife Acoustics Song Meter 2	Turbine 5 NH 81230 24075	30/05/2022	10/06/2022	31/05/2022	1	21:25 / 05:05	7hrs 40min
	5 - Wildlife Acoustics Song Meter Mini	Turbine 6 NH 81779 23930	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	6 - Wildlife Acoustics Song Meter Mini	Turbine 7 NH 81885 23460	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	7 - Wildlife Acoustics Song Meter Mini	Turbine 8 NH 81954 22971	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	8 - Wildlife Acoustics Song Meter Mini	Turbine 9 NH 81577 22511	30/05/2022	10/06/2022	No data	No data	21:25 / 05:05	No data
	9 - Wildlife Acoustics Song Meter Mini	Turbine 10 NH 81174 22934	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	10 – Wildlife Acoustics Song Meter Mini	Turbine 11 NH 81177 23543	30/05/2022	10/06/2022	26/06/2022	11	21:25 / 05:05	84hrs 20min
	2 - Wildlife Acoustics Song Meter 2	Turbine 14 NH 80572 23020	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	11 - Wildlife Acoustics	Turbine 17	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min

Survey Visit	Detector ID and Model	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights	Scheduled Start / End Time	Total Time Recorded
	Song Meter Mini	NH 80621 21436						
	12 - Wildlife Acoustics Song Meter Mini	Turbine 20 NH 80010 22316	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	13 - Wildlife Acoustics Song Meter Mini	Turbine 23 NH 79394 23771	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	3 - Wildlife Acoustic Song Meter 2	Turbine 26 NH 79365 23149	30/05/2022	10/06/2022	01/06/2022	2	21:25 / 05:05	15hrs 20min
	14 - Wildlife Acoustics Song Meter Mini	Turbine 29 NH 78743 22299	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	15 - Wildlife Acoustics Song Meter Mini	Turbine 32 NH 79642 20765	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	16 - Wildlife Acoustics Song Meter Mini	Turbine 35 NH 78733 21816	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	17 - Wildlife Acoustics Song Meter Mini	Turbine 38 NH 77466 22838	30/05/2022	10/06/2022	10/06/2022	11	21:25 / 05:05	84hrs 20min
	18 - Wildlife Acoustics Song Meter Mini	Turbine 41 NH 76947 21717	30/05/2022	10/06/2022	No data	No data	21:25 / 05:05	No data
2 – Summer	1 - Wildlife Acoustics Song Meter Mini	Turbine 2 NH 81190 24813	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	2 - Wildlife Acoustics Song Meter Mini	Turbine 5 NH 81230 24075	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	3 - Wildlife Acoustics Song Meter Mini	Turbine 8 NH 81954 22971	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	4 - Wildlife Acoustics Song Meter Mini	Turbine 12 NH 80651 23936	18/07/2022	29/07/2022	No data	No data	21:05 / 05:40	No data
	5 - Wildlife Acoustics Song Meter Mini	Turbine 15 NH 80572 22541	18/07/2022	29/07/2022	19/07/2022	1	21:05 / 05:40	8hrs 35min

Survey Visit	Detector ID and Model	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights	Scheduled Start / End Time	Total Time Recorded
	6 - Wildlife Acoustics Song Meter Mini	Turbine 17 NH 80621 21436	18/07/2022	29/07/2022	18/07/2022	0	21:05 / 05:40	No data
	7 - Wildlife Acoustics Song Meter Mini	Turbine 18 NH 80086 21122	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	8 - Wildlife Acoustics Song Meter Mini	Turbine 19 NH 80013 21763	18/07/2022	29/07/2022	18/07/2022	0	21:05 / 05:40	No data
	9 - Wildlife Acoustics Song Meter Mini	Turbine 20 NH 80010 22316	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	10 - Wildlife Acoustics Song Meter Mini	Turbine 21 NH 79976 22937	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	11 - Wildlife Acoustics Song Meter Mini	Turbine 22 NH 79996 23539	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	12 - Wildlife Acoustics Song Meter Mini	Turbine 23 NH 79394 23771	18/07/2022	29/07/2022	19/07/2022	1	21:05 / 05:40	8hrs 35min
	13 - Wildlife Acoustics Song Meter Mini	Turbine 24 NH 78878 24062	18/07/2022	29/07/2022	28/07/2022	10	21:05 / 05:40	85hrs 50min
	14 - Wildlife Acoustics Song Meter Mini	Turbine 25 NH 78852 23523	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	15 - Wildlife Acoustics Song Meter Mini	Turbine 26 NH 79365 23149	18/07/2022	29/07/2022	19/07/2022	1	21:05 / 05:40	8hrs 35min
	1 - Wildlife Acoustic Song Meter 2	Turbine 28 NH 78515 22825	18/07/2022	29/07/2022	21/07/2022	3	21:05 / 05:40	25hrs 45 min
	16 - Wildlife Acoustics Song Meter Mini	Turbine 31 NH 79384 21274	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	2 - Wildlife Acoustic Song Meter 2	Turbine 34 NH 78779 21261	18/07/2022	29/07/2022	21/07/2022	3	21:05 / 05:40	25hrs 45 min
	3 - Wildlife Acoustic	Turbine 37	18/07/2022	29/07/2022	21/07/2022	3	21:05 / 05:40	25hrs 45 min

Survey Visit	Detector ID and Model	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights	Scheduled Start / End Time	Total Time Recorded
	Song Meter 2	NH 78131 22415						
	4 - Wildlife Acoustic Song Meter 2	Turbine 40 NH7767 821730	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
	17 - Wildlife Acoustics Song Meter Mini	Turbine 42 NH 76831 22150	18/07/2022	29/07/2022	29/07/2022	11	21:05 / 05:40	94hrs 25min
3 – Autumn	1 - Wildlife Acoustics Song Meter Mini	Turbine 1 NH 81776 24370	31/08/2022	12/09/2022	31/08/2022	0	19:10 / 07:15	No data
	2 - Wildlife Acoustics Song Meter Mini	Turbine 4 NH 80774 24426	15/08/2022	25/08/2022	25/08/2022	10	20:00 / 06:40	106hrs 40min
	3 - Wildlife Acoustics Song Meter Mini	Turbine 6 NH 81779 23930	31/08/2022	12/09/2022	31/08/2022	0	19:10 / 07:15	No data
	4 - Wildlife Acoustics Song Meter Mini	Turbine 7 NH 81885 23460	31/08/2022	12/09/2022	12/09/2022	12	19:10 / 07:15	145hrs
	5 - Wildlife Acoustics Song Meter Mini	Turbine 10 NH 81174 22934	31/08/2022	12/09/2022	12/09/2022	12	19:10 / 07:15	145hrs
	6 - Wildlife Acoustics Song Meter Mini	Turbine 11 NH 81177 23543	31/08/2022	12/09/2022	31/08/2022	0	19:10 / 07:15	No data
	7 - Wildlife Acoustics Song Meter Mini	Turbine 13 NH 79960 24012	15/08/2022	25/08/2022	25/08/2022	10	20:00 / 06:40	106hrs 40min
	1 - Wildlife Acoustics Song Meter 2	Turbine 14 NH 80572 23020	15/08/2022	25/08/2022	17/08/2022	2	20:00 / 06:40	21hrs 20min
	2 - Wildlife Acoustics Song Meter 2	Turbine 16 NH 80654 22041	15/08/2022	25/08/2022	17/08/2022	2	20:00 / 06:40	21hrs 20min
	8 - Wildlife Acoustics Song Meter Mini	Turbine 18 NH 80086 21122	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	3 - Wildlife Acoustics Song Meter 2	Turbine 27 NH 78015 23212	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min

Survey Visit	Detector ID and Model	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights	Scheduled Start / End Time	Total Time Recorded
	9 - Wildlife Acoustics Song Meter Mini	Turbine 29 NH 78743 22299	15/08/2022	25/08/2022	No data	No data	20:00 / 06:40	No data
	10 - Wildlife Acoustics Song Meter Mini	Turbine 30 NH 79338 21714	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	11 - Wildlife Acoustics Song Meter Mini	Turbine 32 NH 79642 20765	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	4 - Wildlife Acoustics Song Meter 2	Turbine 33 NH 78971 20748	15/08/2022	25/08/2022	No data	No data	20:00 / 06:40	No data
	12 - Wildlife Acoustics Song Meter Mini	Turbine 35 NH 78733 21816	15/08/2022	25/08/2022	No data	No data	20:00 / 06:40	No data
	13 - Wildlife Acoustics Song Meter Mini	Turbine 36 NH 78181 21988	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	14 - Wildlife Acoustics Song Meter Mini	Turbine 38 NH 77466 22838	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	15 - Wildlife Acoustics Song Meter Mini	Turbine 39 NH 77466 22197	15/08/2022	25/08/2022	18/08/2022	03/01/1900	20:00 / 06:40	32hrs
	16 - Wildlife Acoustics Song Meter Mini	Turbine 41 NH 76947 21717	15/08/2022	25/08/2022	25/08/2022	10/01/1900	20:00 / 06:40	106hrs 40min
	17 - Wildlife Acoustics Song Meter Mini	Turbine 42 NH 76831 22150	15/08/2022	25/08/2022	No data	No data	20:00 / 06:40	No data

3.2.2 Additional Area

Habitat Assessment Surveys of the Site and the immediate surrounding area were undertaken in April 2023 by experienced Atmos Consulting Ltd. ecologists. Deployment of static bat detectors was undertaken at various times between April and September 2023.

Habitat Assessment

A daylight bat feature assessment was undertaken in April 2023. The aim of this survey was to identify any potential or confirmed roost sites, to assess the location and suitability of habitats for foraging and commuting, and to identify if further surveys such as emergence/re-entry or detailed roost inspection surveys were required. All areas of the Site were assessed with an emphasis on features located within 250m of potential/proposed turbine locations.

Activity Surveys – Static Recorders

In line with current guidance in relation to onshore wind energy projects (NatureScot, 2021), activity surveys were limited to the deployment of automated static detectors.

Three main survey periods were undertaken during spring summer and autumn. However partly due to the size of the site and other logistical reasons, both the summer and autumn deployments were split into two. Not all locations were (or were required to be) monitored for all the resulting 5 periods. On each survey occasion, detectors were deployed for a minimum of 10 days, recording in full spectrum. All detectors were set to commence recording a minimum of 30 minutes before sunset and continue until a minimum of 30 minutes after sunrise. The full details of the static detector locations and deployment details is presented in Table 4, with detector locations for each deployment period shown on Figure 7.2.2 (Appendix A refers).

Static detectors were located approximately at the location of the proposed turbines, although turbine locations were not fixed during the period of survey and as such detector locations altered to some degree. The locations did however provide a good representation of turbine locations.

The model of bat detector used for all of the turbine locations across the survey season was the Wildlife Acoustics Songmeter Mini.

Table 4: Bat Detector Deployment Summary

Survey Visit	Songmeter Detector ID	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights **denotes part of night	Scheduled Start / End Time	Total Time Recorded
1 – Spring	SMU02827	Turbine 2 NH 81654 20276	18/04/2023	03/05/2023	03/05/2023	15	20:00 - 06:00	159hrs 30min
	SMU03679	Turbine 3 NH 81394 19796	18/04/2023	03/05/2023	03/05/2023	15	20:00 - 06:00	157hrs 30min
	SMU03114	Turbine 4 NH 81086 19357	18/04/2023	03/05/2023	02/05/2023	14	20:00 - 06:00	149hrs
	SMU02811	Turbine 5 NH 80498 20018	18/04/2023	03/05/2023	03/05/2023	15	20:00 - 06:00	157hrs 30min
	SMU03394	Turbine 6 NH 80976 20284	18/04/2023	03/05/2023	03/05/2023	15	20:00 - 06:00	157hrs 30min
	SMU02845	Turbine 7 NH 81448 21166	19/04/2023	03/05/2023	03/05/2023	14	20:00 - 06:00	151hrs
	SMU02473	Turbine 8 NH 81524 22115	19/04/2023	12/05/2023	12/05/2023	23	20:00 - 06:00	241hrs 30min
	SMU03633	Turbine 9 NH 80983 22130	19/04/2023	03/05/2023	03/05/2023	14	20:00 - 06:00	147hrs
	SMU03170	Turbine 11 NH 80777 21392	19/04/2023	03/05/2023	03/05/2023	14	20:00 - 06:00	151hrs
	SMU02340	Turbine 12 NH 80727 20866	19/04/2023	12/05/2023	12/05/2023	23	20:00 - 06:00	241hrs 30min
	SMU03116	Turbine 13 NH 80231 20684	19/04/2023	03/05/2023	28/04/2023	9	20:00 - 06:00	98hrs 30min
	SMU03746	Turbine 14 NH 79733 20308	18/04/2023	03/05/2023	03/05/2023	15	20:00 - 06:00	157hrs 30min
2 – Summer	SMU03170	Turbine 1 NH82075	26/06/2023	10/07/2023	10/07/2023	5 **	21:30 - 05:10	26

Survey Visit	Songmeter Detector ID	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights **denotes part of night	Scheduled Start / End Time	Total Time Recorded
Deployment No.1		21035						
	Fault, empty	Turbine 6 NH80976 20284	28/06/2023	10/07/2023	28/06/2023	0	21:30 - 05:10	0
	SMU02827	Turbine 7 NH81448 21166	26/06/2023	10/07/2023	12/07/2023	14	21:30 - 05:10	107.33
	SMU03679	Turbine 8 NH81524 22115	28/06/2023	10/07/2023	10/07/2023	12 **	21:30 - 05:10	62
	SMU03633	Turbine 9 NH80983 22130	26/06/2023	10/07/2023	11/07/2023	13	21:30 - 05:10	101.66
	SMU03116	Turbine 10 NH81237 21649	28/06/2023	10/07/2023	10/07/2023	11 **	21:30 - 05:10	59.33
	SMU02850	Turbine 11 NH80777 21392	28/06/2023	10/07/2023	30/06/2023	1	21:30 - 05:10	7.66
	SMU03394	Turbine 12 NH80727 20866	20/06/2023	10/07/2023	28/06/2023	5	21:30 - 05:10	47.79
	SMU02811	Turbine 13 NH80231 20684	28/06/2023	10/07/2023	28/06/2023	1	21:30 - 05:10	7.66
2 – Summer Deployment No.2	SMU02821	Turbine 2 NH81654 20276	28/06/2023	31/07/2023	25/07/2023	26	21:00 - 05:45	237.75
	SMU02827	Turbine 5 NH80498 20018	18/07/2023	31/07/2023	29/07/2023	10	21:00 - 05:45	90.5
	SMU03679	Turbine 14 NH79733 20308	18/07/2023	31/07/2023	29/07/2023	11 **	21:00 - 05:45	63.25
3 – Autumn Deployment No.1	SMU03679	Turbine 2 NH81654 20276	15/08/2023	29/08/2023	27/08/2023	12 **	19:50 - 06:45	81
	SMU02827	Turbine 3 NH81394 19796	15/08/2023	29/08/2023	27/08/2023	12	19:50 - 06:45	135.16
	SMU02845	Turbine 4 NH81086 19357	15/08/2023	29/08/2023	27/08/2023	11 **	19:50 - 06:45	77.58

Survey Visit	Songmeter Detector ID	Deployment Location (Turbine Number, Grid Reference)	Deployment Date	Collection Date	Detector Failure Date	Minimum Number of Active Nights **denotes part of night	Scheduled Start / End Time	Total Time Recorded
	SMU02811	Turbine 5 NH80498 20018	15/08/2023	29/08/2023	24/08/2023	8	19:50 - 06:45	93.5
	SMU02853	Turbine 6 NH80976 20284	15/08/2023	29/08/2023	31/08/2023	15	19:50 - 06:45	171.17
	SMU03394	Turbine 7 NH81448 21166	16/08/2023	29/08/2023	27/08/2023	12 **	19:50 - 06:45	81
	SMU03633	Turbine 8 NH81524 22115	15/08/2023	29/08/2023	27/08/2023	12	19:50 - 06:45	135
	SMU03116	Turbine 9 NH80983 22130	15/08/2023	29/08/2023	27/08/2023	12 **	19:50 - 06:45	81
	No data in file	Turbine 10 NH81237 21649	15/08/2023	29/08/2023	15/08/2023	0	19:50 - 06:45	0
	SMU03170	Turbine 14 NH79733 20308	15/08/2023	29/08/2023	27/08/2023	7	19:50 - 06:45	76.41
3 – Autumn Deployment No.2	SMU03679	Turbine 1 NH82075 21035	07/09/2023	18/09/2023	18/09/2023	12 **	18:55 - 07:25	89
	SMU02811	Turbine 11 NH80777 21392	07/09/2023	18/09/2023	11/09/2023	5	18:55 - 07:25	65.5
	SMU02821	Turbine 12 NH80727 20866	07/09/2023	25/09/2023	25/09/2023	19	18:55 - 07:25	241.5
	SMU02853	Turbine 13 NH80231 20684	07/09/2023	21/09/2023	21/09/2023	15	18:55 - 07:25	187.5

3.3 Sonogram Analysis

Analysis of full spectrum WAV files was undertaken firstly using Kaleidoscope (to convert the raw data into ZCA files), and then Analook W software to enable batch processing of the ZCA files, with the results confirmed through a detailed review of the full spectrum WAV files in Kaleidoscope, to enable identification of species. All files were manually analysed to identify bat species and to separate common and soprano pipistrelle. All sonogram files classified as "noise" by Kaleidoscope during the conversion process were then subject to manual checking of the original full spectrum WAV files, and where bat calls were present, manual identification was undertaken. Species identification broadly followed that presented in Russ (2012), taking into account the geographical location of the Site, habitats present and ecologists' own expertise and Site knowledge.

Absolute measures of bat activity are not possible to reliably calculate for automated field studies as during an individual recording session, it is not possible to differentiate between one individual bat passing the detector ten times or ten different bats passing the detector on a single occasion. As a result, relative measures are used and must be taken into consideration when interpreting results.

For ease of examination, three arbitrary levels have been created to provide a context in which to discuss the results. Table 6 indicates the levels of activity required to be considered to be "low", "medium" or "high" activity. It should be recognised that in the context of bat activity across wider landscapes these activity brackets are all relatively low as would be expected for a Site at this altitude supporting open moorland habitats.

Table 5: Criteria for Determining Bat Activity Levels

Activity Level	Median Number of Bat Passes per Hour [1]
Low	< 2
Medium	2 – 5
High	> 5

[1] A bat pass is classified as the presence of a species within a single Kaleidoscope / Analook file.

The index of bat activity was taken to be a sonogram file (maximum length of 15 seconds) recorded from the static detectors. Although this is to some degree an arbitrary measure, the activity levels are comparable across detectors and is a frequently used index. For the purpose of this report, each file containing a call from a species is termed a 'pass'. Data is then converted to passes per hour adjusting for location specific night-time duration (sunset to sunrise) and days of deployment (adjusted to each detectors period of functioning).

3.4 Limitations

3.4.1 Original Site

A number of limitations were experienced during the bat assessment and surveys:

- The deployed weather station did not function correctly with data not logged. As a result, no site specific data was obtained. This represents a significant limitation

when attempting to draw conclusions on the influence of weather on activity levels. Proxy data from approximately 23.68km to the north-north-east of the Site was utilised to provide reasonable estimates of wind and temperature, but rainfall from this location would not be particularly relevant.

- Some static detectors deployed functioned for varying times with some units recording for only a small number of days. The reasons for this are unclear but is likely to be a result of the effect of cold temperatures on batteries. This reduces the survey duration and results in variable survey durations at different locations. For any detailed analysis, data is adjusted to a per unit time measure removing the majority of this limitation, however, some locations did not record the recommended number of nights resulting in a limitation.
- During the grouse breeding season, access was limited to vehicular access tracks only to prevent accidental flushing of adult grouse which would leave eggs or young chicks vulnerable to the conditions. This led to challenges in uniform deployment and collection, with some detectors being left out longer than others. The Autumn survey period consisted of two separate deployment periods as a result (Table 3 refers).

Although a number of limitations exist the data obtained provides a clear picture of bat activity across the site and wider environs, and as a result it is not anticipated that the limitations affect the robustness of the results to a significant degree.

3.4.2 Additional Area

A number of limitations were experienced during the bat assessment and surveys:

- The weather stations were not functioning reliably at the time of the surveys and so were not deployed. Therefore, no site-specific meteorological data was obtained. This represents a significant limitation when attempting to draw conclusions on the influence of weather on activity levels. Proxy data from approximately 24km to the north-north-east of the Site (Inverness Airport) was utilised to provide reasonable estimates of wind and temperature, but rainfall from this location would not be particularly relevant. A chart of the monthly rainfall record obtained from the MET office station at Nairn has been included for the purposes of broad regional context.
- Some of the static detectors deployed functioned for varying times with some units recording for only a small number of nights or only parts of nights. The reasons for this are unclear, but some failure was due to low voltage alone, and likely to be a result of the effect of cold temperatures on batteries. This has reduced the overall survey duration and results in variable survey durations at different locations. Data has been adjusted to a per unit time measure removing the majority of this limitation, however, some locations did not record the recommended number of nights resulting in a limitation.
- During the grouse breeding season, access was limited to vehicular access tracks, in order to prevent accidental flushing of adult grouse which would leave eggs or young chicks vulnerable. This led to challenges regarding uniform deployment and collection times, with some detectors being left out longer than others. Both the Summer and Autumn survey periods consisted of two separate deployment periods as a result so that valid comparisons may be made (Table 4 refers).

Despite the above limitations the data obtained appears consistent with expectations, comparing well with the previous year's observations on the adjacent site. It is believed that it provides a clear picture of bat activity across the site and wider environs, and as a result it is not anticipated that the limitations affect the robustness of the results to a significant degree.

4 Results

4.1.1 Desk Study

4.1.2 Designated Sites

There are no environmentally designated sites with bats as a qualifying species within 10km of the Site.

4.1.3 Species Records

According to the publicly held datasets on the National Biodiversity Network (NBN) Atlas, there are two records of Daubenton's bat, nine records of Natterer's bat, one record of soprano pipistrelle, one record of common pipistrelle, and two records of brown long-eared bat within 5km of the approximate centre of the Site (NH 80714 25002) in the past 15 years.

4.1.4 Review of Existing Bat Survey Data from Wind Energy Projects

Two operational wind farm developments are located within 10km of the Site (The Highland Council, 2022), and EIA documents available online via The Highland Council's planning portal were reviewed with respect to the level of bat activity recorded, and likely significant effects (Table 6 refers).

Table 6: Wind Farm Developments within 10km of the Site

Wind Farm Development	Details	Status	Approx. Distance from Site at its Closest Point	Bat Species Present	Likely Significant Effect
Glen Kyllachy	20 turbines	Operational	Other side of the Findhorn River to the north-west of the Site (c. 3.2km distance between nearest turbines)	A small number of pipistrelle species were recorded (a total of five flights recorded over 2011 and 2012).	None
Farr Wind Farm	40 turbines	Operational	Other side of the Findhorn River to the north-west of the Site (c. 6.12km distance between nearest turbines)	Common pipistrelle was the only species recorded on site in 2011 and 2012.	None

4.2 Habitat Assessment

The Site is on exposed ground supporting a combination of wet and dry heath, with areas of blanket bog and marshy grassland also present.

The habitats in the field study area are considered to be of low potential for the support of bats as the open moorland habitat is considered to be low quality foraging habitat and is not connected to the wider landscape by prominent linear features such as woodland or hedgerows. Most watercourses are small burns flowing in a north-westerly direction into the River Findhorn.

4.2.1 Wider Habitat and Connectivity

The wider environs support moorland at higher altitude with woodland and grazing land at lower levels (i.e. along the River Findhorn to the north of the Site).

The relatively high altitude and exposed nature of the generally open habitats of low suitability result in local bat populations generally being at low density with low species diversity.

4.3 Bat Activity Surveys

4.3.1 Weather

Current guidance (NatureScot, 2021) stipulates that surveys should capture a sufficient number of nights with appropriate weather conditions for bat activity. Lower temperature requirements are identified for Scotland with a minimum recommended temperature of 8°C at dusk.

Original Site – May to October 2022

Due to malfunctions with the on-site weather station, the nearest reliable historical weather data was used as a proxy for conditions on Site. The weather station was located at Cawdor Castle, approximately 23.68km to the south-south-east of the Site at approximately 23m above sea level (asl), allowing broad comparisons to be made for the Site in the absence of Site-specific weather data.

During the spring survey, average temperatures were generally in excess of the 8°C minimum although the nighttime minimums were in the region of generally 6 to 9°C. The summer deployment period had minimum nighttime temperatures in the region of 7 to 12°C. The autumn deployment period had minimum nighttime temperatures generally in excess of the 8°C minimum, with a small number of nights experiencing lows of 1 – 4°C (Chart 1 refers).

The average wind speeds throughout the survey periods were generally around the acceptable survey maximum of 5 – 6m/s with occasional daily highs around 8 – 12m/s. Within northern Scotland the wind is generally high and the maximum wind speeds indicate that throughout the majority of the 2022 activity season strong gusts were prevalent (Chart 2 refers).

Rainfall was varied throughout the survey periods and as rainfall is likely to be more Site specific than either temperature or wind speed, the details presented in Chart 3 should be viewed cautiously. However, based on the available information, the area can be regarded as relatively dry with summer monthly minimums of c. 35mm. Overall, it is anticipated that the weather is likely to have affected the activity levels from bats within the survey area, although the weather was generally adequate and consistent with that of the region.

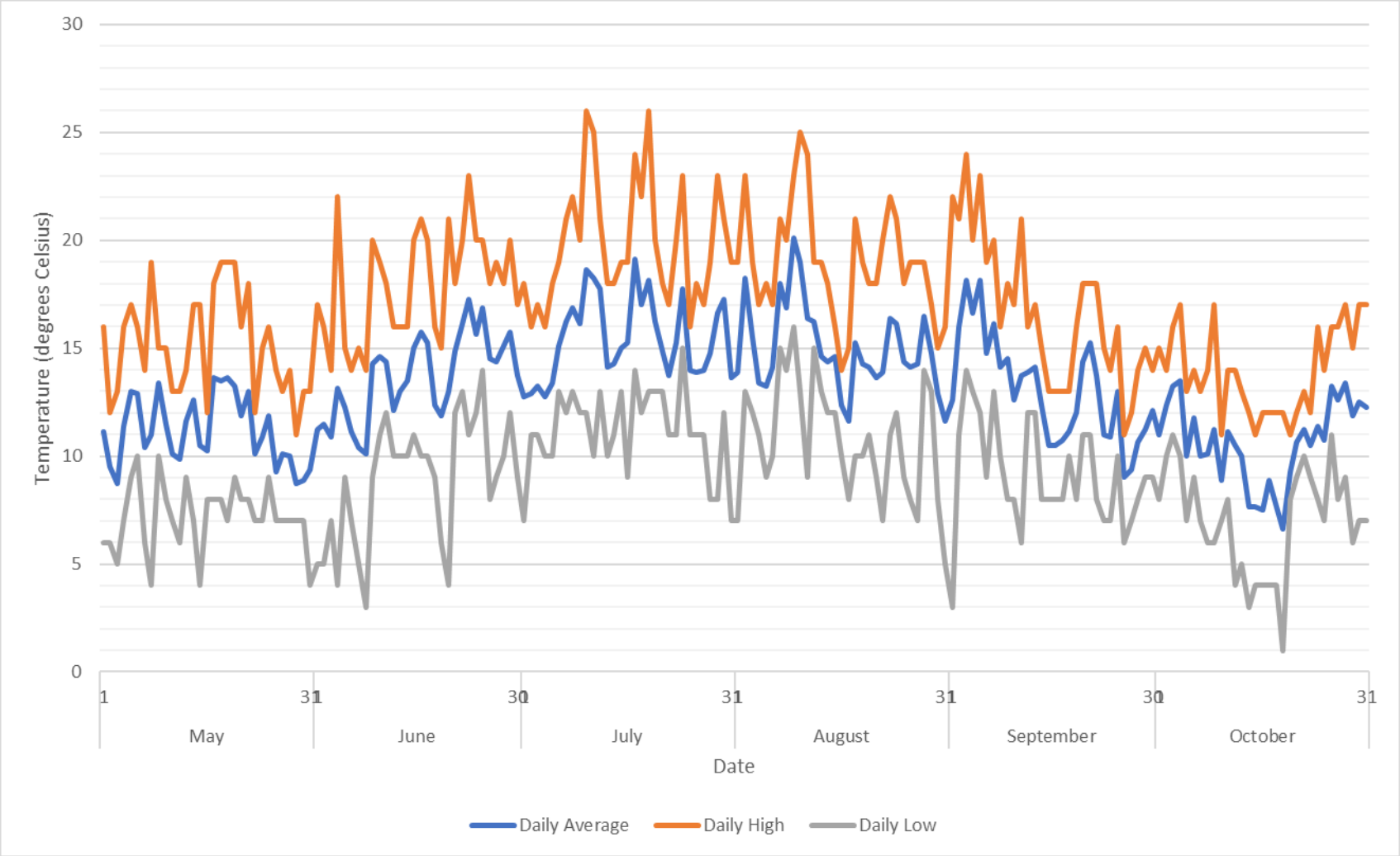


Chart 1: Temperature (Cawdor Castle proxy) for 2022 field season.

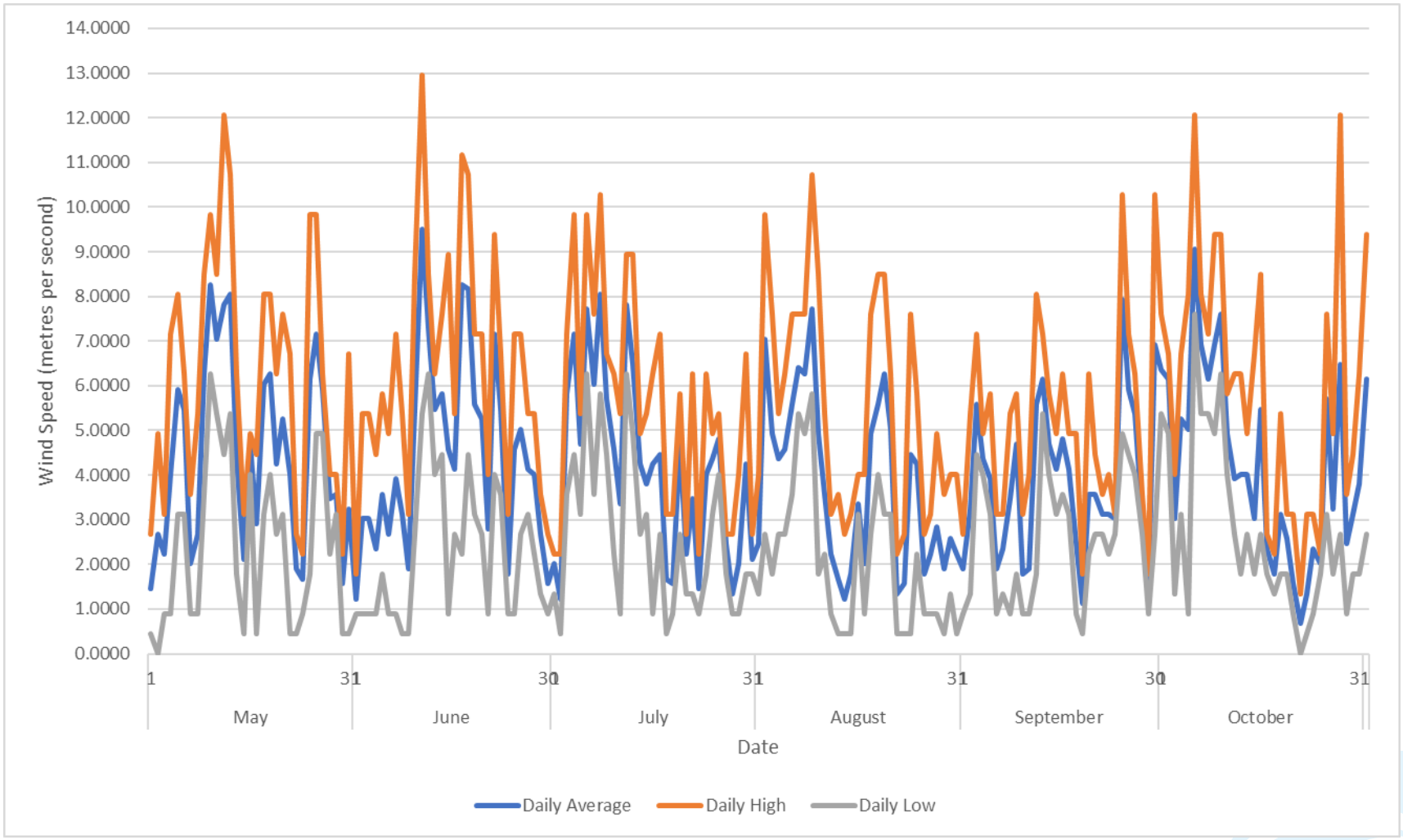


Chart 2: Wind speed (Cawdor Castle proxy) for 2022 field season.

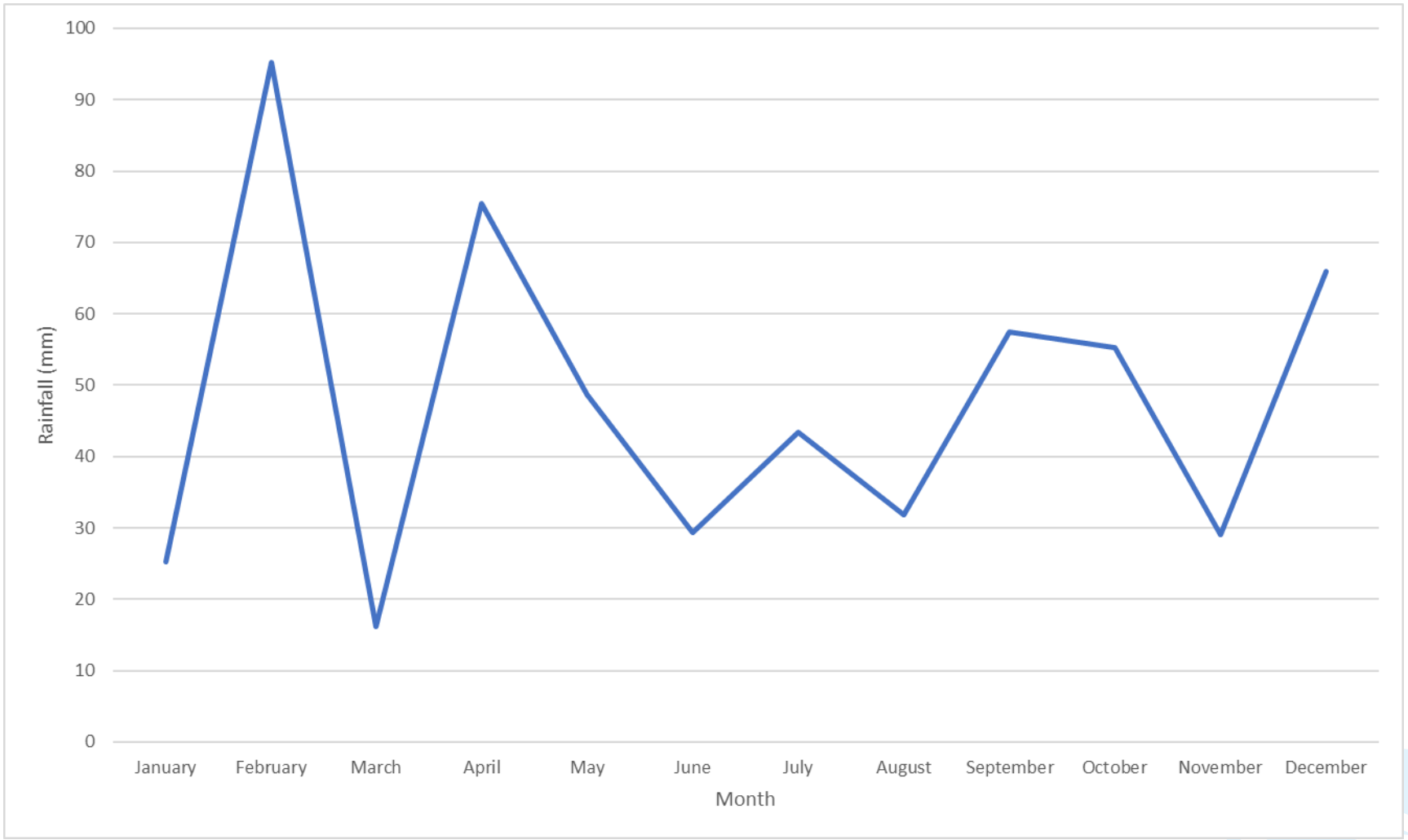


Chart 3: Average monthly rainfall (Castle Cawdor proxy) for 2022.

Additional Area – April to September 2023

Due to reliability issues with the weather stations, which would normally be deployed on-site, alternative reliable and publicly available data was used as a proxy for conditions on Site. The weather station was located at Inverness Airport, approximately 24km to the north-north-east of the Site at 23m above sea level (asl). Broad comparisons can be made; however, the Site is both much further inland and at an altitude of around 500m. Assuming a temperature reduction of around 1.5°C for every 150m altitude, actual on-site temperatures will be in the region of 3-4 degrees cooler. This will result in borderline values for much of the spring and some of the autumn surveys.

Using the proxy data, during the spring survey, average temperatures were generally in excess of the 8°C minimum although the nighttime minimums were commonly between 0 and 5°C. The summer deployment period was considerably warmer and had minimum nighttime temperatures in the region of 10°C. The autumn deployment period exhibited much the same minimum nighttime temperatures, cooling in the second part of September, when minimum temperatures were in the 2-6°C range (Chart 4 refers).

Again. referring to the proxy data, the average wind speeds throughout the survey periods were generally around the acceptable survey maximum of 5 – 6m/s or less, with occasional daily highs around 8 – 12m/s. Note that it is thought that local wind speed may vary considerably across the Site, owing to its hilly terrain (Chart 5 refers).

Rainfall data was taken from proxy data and since rainfall tend to vary between areas and regions much more than windspeed and temperature, the data presented here is less reliable. However, based on the available information, and as was well documented, 2023 was a wet summer. It is expected that the weather over the course of the survey period affected bat activity, though there was no weather recorded that may be deemed unusual for the region or for the time periods in which the surveys took place.

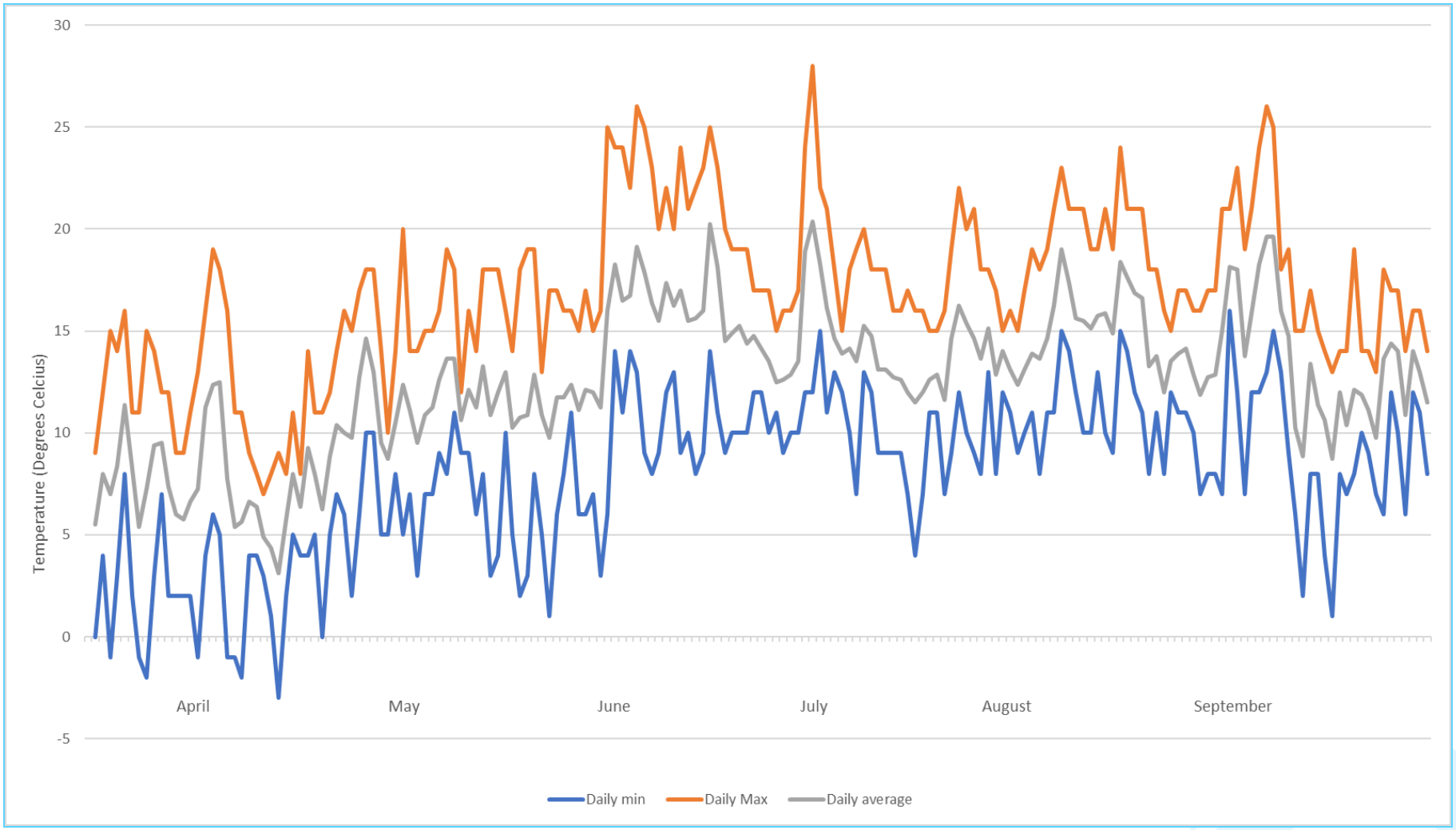


Chart 4: Temperature (Inverness Airport, Dalcross proxy) for 2023 field season.

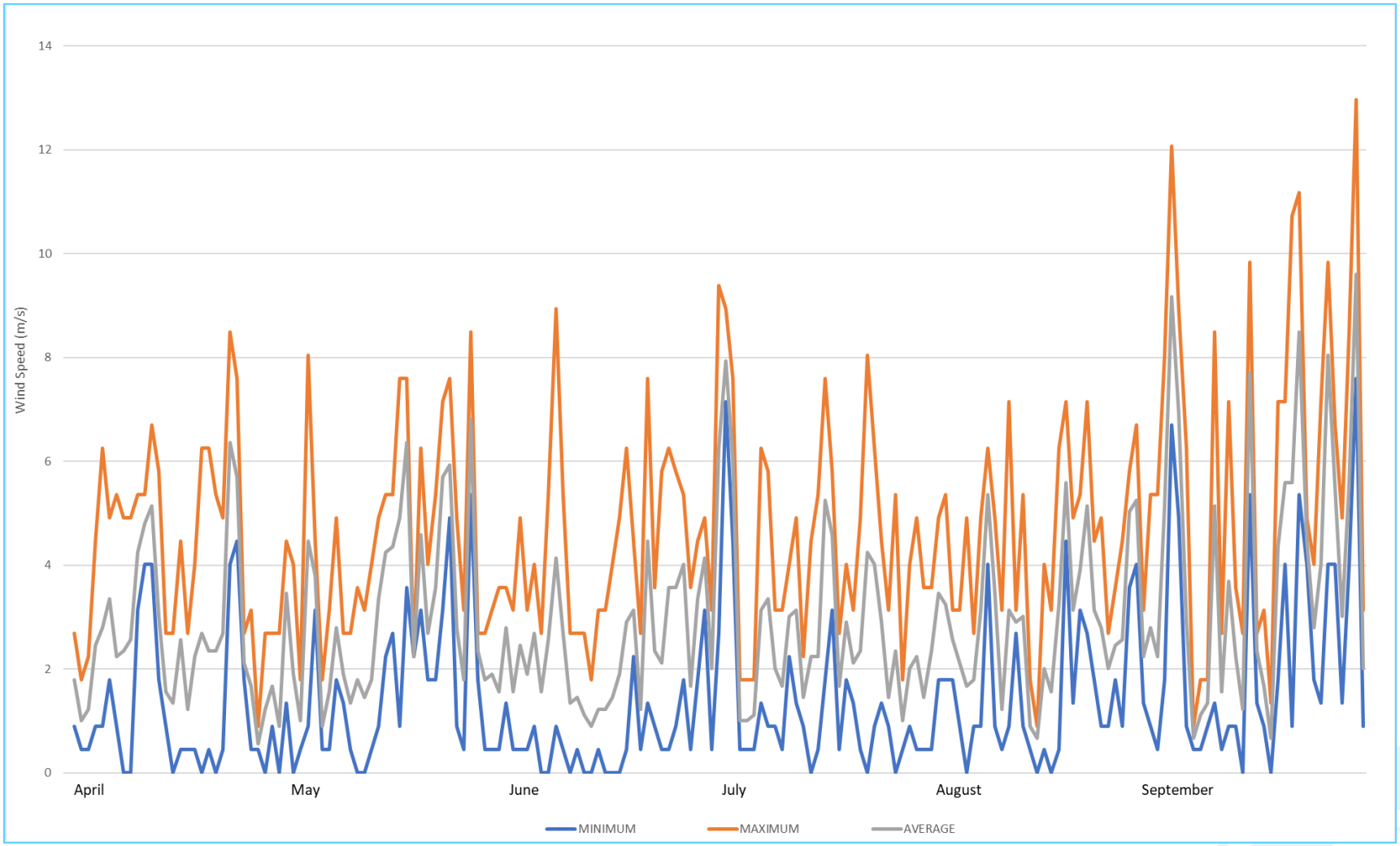


Chart 5: Wind speed (Inverness Airport, Dalcross) for 2023 survey season.

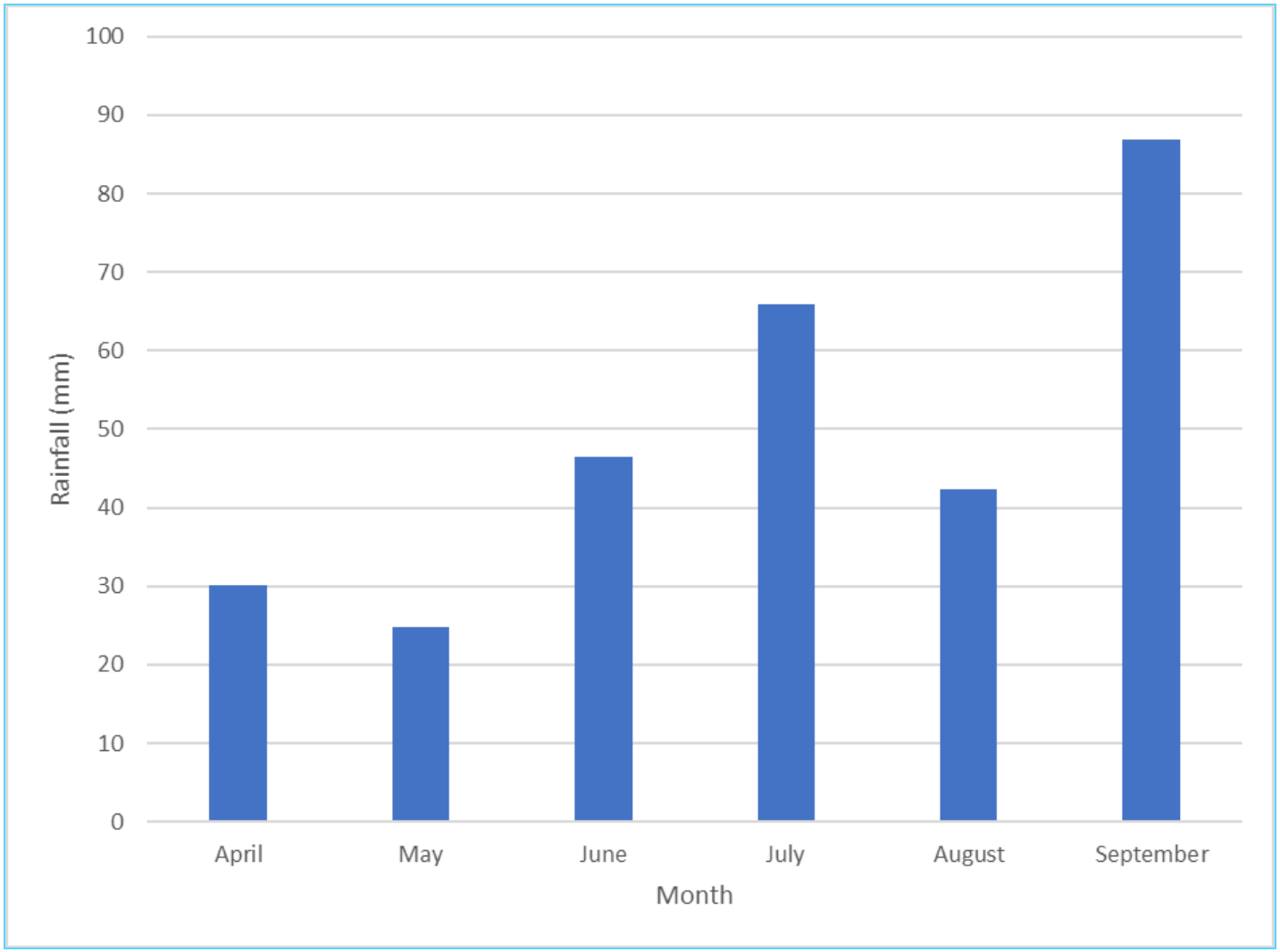


Chart 6: Average monthly rainfall (MET office Nairn Proxy) for 2023 survey season.

4.3.2 Overall Site Activity

Original Site

The results of the static detector surveys identified the presence of common and soprano pipistrelle, *Myotis* sp. and *Pipistrellus* sp.

Table 7 shows the number of bat passes per detector per location per deployment period for each species, with this converted to bat passes per hour and median bat passes per hour (Chart 7 refers). The results are also presented in Appendix A (Figures 7.2.3a – 7.2.3c, 7.2.4a – 7.2.4d, and 7.2.5a – 7.2.5d refer).

Table 7: Number of Bat Passes per Detector per Location per Deployment Period for Each Species

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
1 – Spring	1 (Song Meter Mini)	Turbine 1 NH 81776 24370	0	84hrs 20min	0	0	Low
	2 (Song Meter Mini)	Turbine 2 NH 81190 24813	7 (common pipistrelle)	84hrs 20min	0.083 (common pipistrelle)	1.5 (common pipistrelle)	Low
	3 (Song Meter Mini)	Turbine 3 NH 80585 24879	3 (common pipistrelle) 1 (soprano pipistrelle)	84hrs 20min	0.036 (common pipistrelle) 0.012 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	4 (Song Meter Mini)	Turbine 4 NH 80774 24426	1 (common pipistrelle)	84hrs 20min	0.012 (common pipistrelle)	1 (common pipistrelle)	Low
	1 (Song Meter 2)	Turbine 5 NH 81230 24075	0	7hrs 40min	0	0	Low
	5 (Song Meter Mini)	Turbine 6 NH 81779 23930	0	84hrs 20min	0	0	Low
	6 (Song Meter Mini)	Turbine 7 NH 81885 23460	0	84hrs 20min	0	0	Low
	7 (Song Meter Mini)	Turbine 8 NH 81954 22971	1 (common pipistrelle) 1 (soprano pipistrelle)	84hrs 20min	0.012 (common pipistrelle) 0.012 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	8 (Song Meter Mini)	Turbine 9 NH 81577 22511	0	No data	0	0	Low
	9 (Song Meter Mini)	Turbine 10 NH 81174 22934	15 (common pipistrelle) 2 (soprano pipistrelle)	84hrs 20min	0.179 (common pipistrelle) 0.024 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	10 (Song Meter Mini)	Turbine 11 NH 81177 23543	1 (*Myotis* sp.)	84hrs 20min	0.012 (*Myotis* sp.)	1 (*Myotis* sp.)	Low
	2 (Song Meter 2)	Turbine 14 NH 80572 23020	0	84hrs 20min	0	0	Low
	11 (Song Meter Mini)	Turbine 17 NH 80621 21436	0	84hrs 20min	0	0	Low
	12 (Song Meter Mini)	Turbine 20 NH 80010 22316	0	84hrs 20min	0	0	Low
	13 (Song Meter Mini)	Turbine 23 NH 79394 23771	1 (common pipistrelle)	84hrs 20min	0.012 (common pipistrelle)	1 (common pipistrelle)	Low
	3 (Song Meter 2)	Turbine 26 NH 79365 23149	0	15hrs 20min	0	0	Low
	14 (Song Meter Mini)	Turbine 29 NH 78743 22299	0	84hrs 20min	0	0	Low
	15 (Song Meter Mini)	Turbine 32 NH 79642 20765	0	84hrs 20min	0	0	Low
	16 (Song Meter Mini)	Turbine 35 NH 78733 21816	1 (*Myotis* sp.)	84hrs 20min	0.012 (*Myotis* sp.)	1 (*Myotis* sp.)	Low
	17 (Song Meter Mini)	Turbine 38 NH 77466 22838	0	84hrs 20min	0	0	Low
	18 (Song Meter Mini)	Turbine 41 NH 76947 21717	0	No data	0	0	Low
2 - Summer	1 (Song	Turbine 2	3 (common pipistrelle)	94hrs	0.032 (common pipistrelle)	1 (common pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	Meter Mini)	NH 81190 24813	3 (soprano pipistrelle)	25min	0.032 (soprano pipistrelle)	1 (soprano pipistrelle)	
	2 (Song Meter Mini)	Turbine 5 NH 81230 24075	2 (*Myotis* sp.) 15 (common pipistrelle) 12 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	94hrs 25min	0.021 (*Myotis* sp.) 0.160 (common pipistrelle) 0.128 (soprano pipistrelle) 0.011 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	3 (Song Meter Mini)	Turbine 8 NH 81954 22971	3 (*Myotis* sp.) 11 (common pipistrelle) 8 (soprano pipistrelle) 3 (*Pipistrellus* sp.)	94hrs 25min	0.032 (*Myotis* sp.) 0.117 (common pipistrelle) 0.085 (soprano pipistrelle) 0.032 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1 (common pipistrelle) 2 (soprano pipistrelle) 1.5 (*Pipistrellus* sp.)	Low
	4 (Song Meter Mini)	Turbine 12 NH 80651 23936	0	No data	0	0	Low
	5 (Song Meter Mini)	Turbine 15 NH 80572 22541	0	8hrs 35min	0	0	Low
	6 (Song Meter Mini)	Turbine 17 NH 80621 21436	0	No data	0	0	Low
	7 (Song Meter Mini)	Turbine 18 NH 80086 21122	1 (common pipistrelle) 3 (soprano pipistrelle)	94hrs 25min	0.011 (common pipistrelle) 0.032 (soprano pipistrelle)	1 (common pipistrelle) 3 (soprano pipistrelle)	Low (common pipistrelle) Medium (soprano pipistrelle)
	8 (Song Meter Mini)	Turbine 19 NH 80013 21763	0	No data	0	0	Low
	9 (Song	Turbine 20	1 (common pipistrelle)	94hrs	0.011 (common pipistrelle)	1 (common pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	Meter Mini)	NH 80010 22316	3 (soprano pipistrelle)	25min	0.032 (soprano pipistrelle)	1 (soprano pipistrelle)	
	10 (Song Meter Mini)	Turbine 21 NH 79976 22937	1 (*Myotis* sp.) 10 (common pipistrelle) 3 (soprano pipistrelle) 2 (*Pipistrellus* sp.)	94hrs 25min	0.011 (*Myotis* sp.) 0.106 (common pipistrelle) 0.032 (soprano pipistrelle) 0.021 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1.5 (common pipistrelle) 1.5 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	11 (Song Meter Mini)	Turbine 22 NH 79996 23539	10 (*Myotis* sp.) 8 (common pipistrelle) 9 (soprano pipistrelle) 2 (*Pipistrellus* sp.)	94hrs 25min	0.106 (*Myotis* sp.) 0.085 (common pipistrelle) 0.096 (soprano pipistrelle) 0.021 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	12 (Song Meter Mini)	Turbine 23 NH 79394 23771	0	8hrs 35min	0	0	Low
	13 (Song Meter Mini)	Turbine 24 NH 78878 24062	11 (common pipistrelle) 11 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	85hrs 50min	0.129 (common pipistrelle) 0.129 (soprano pipistrelle) 0.012 (*Pipistrellus* sp.)	1 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	14 (Song Meter Mini)	Turbine 25 NH 78852 23523	1 (*Myotis* sp.) 22 (common pipistrelle) 9 (soprano pipistrelle) 3 (*Pipistrellus* sp.)	94hrs 25min	0.011 (*Myotis* sp.) 0.234 (common pipistrelle) 0.096 (soprano pipistrelle) 0.032 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	15 (Song Meter Mini)	Turbine 26 NH 79365 23149	0	8hrs 35min	0	0	Low
	1 (Song	Turbine 28	0	25hrs	0	0	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	Meter 2)	NH 78515 22825		45 min			
	16 (Song Meter Mini)	Turbine 31 NH 79384 21274	3 (*Myotis* sp.) 12 (common pipistrelle) 3 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	94hrs 25min	0.032 (*Myotis* sp.) 0.128 (common pipistrelle) 0.032 (soprano pipistrelle) 0.011 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 1 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	2 (Song Meter 2)	Turbine 34 NH 78779 21261	0	25hrs 45 min	0	0	Low
	3 (Song Meter 3)	Turbine 37 NH 78131 22415	0	25hrs 45 min	0	0	Low
	4 (Song Meter 2)	Turbine 40 NH 7767 821730	0	94hrs 25min	0	0	Low
	17 (Song Meter Mini)	Turbine 42 NH 76831 22150	4 (common pipistrelle)	94hrs 25min	0.043 (common pipistrelle)	2 (common pipistrelle)	Low
3 - Autumn	1 (Song Meter Mini)	Turbine 1 NH 81776 24370	0	No data	0	0	Low
	2 (Song Meter Mini)	Turbine 4 NH 80774 24426	0	106hrs 40 min	0	0	Low
	3 (Song Meter Mini)	Turbine 6 NH 81779 23930	0	No data	0	0	Low
	4 (Song Meter Mini)	Turbine 7 NH 81885 23460	2 (common pipistrelle) 6 (soprano pipistrelle)	145hrs	0.014 (common pipistrelle) 0.041 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	5 (Song Meter Mini)	Turbine 10 NH 81174 22934	28 (*Myotis* sp.) 21 (soprano pipistrelle)	145hrs	0.193 (*Myotis* sp.) 0.145 (soprano pipistrelle)	1 (*Myotis* sp.) 1 (soprano pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	6 (Song Meter Mini)	Turbine 11 NH 81177 23543	0	No data	0	0	Low
	7 (Song Meter Mini)	Turbine 13 NH 79960 24012	15 (soprano pipistrelle)	106hrs 40 min	0.142 (soprano pipistrelle)	2 (soprano pipistrelle)	Low
	1 (Song Meter 2)	Turbine 14 NH 80572 23020	0	21hrs 20min	0	0	Low
	2 (Song Meter 2)	Turbine 16 NH 80654 22041	0	21hrs 20min	0	0	Low
	8 (Song Meter Mini)	Turbine 18 NH 80086 21122	0	106hrs 40 min	0	0	Low
	3 (Song Meter 2)	Turbine 27 NH 78015 23212	16 (common pipistrelle) 11 (soprano pipistrelle)	106hrs 40 min	0.151 (common pipistrelle) 0.104 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	9 (Song Meter Mini)	Turbine 29 NH 78743 22299	0	No data	0	0	Low
	10 (Song Meter Mini)	Turbine 30 NH 79338 21714	3 (*Myotis* sp.) 28 (common pipistrelle) 19 (soprano pipistrelle) 14 (*Pipistrellus* sp.)	106hrs 40 min	0.028 (*Myotis* sp.) 0.264 (common pipistrelle) 0.179 (soprano pipistrelle) 0.132 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 2 (common pipistrelle) 4 (soprano pipistrelle) 7 (*Pipistrellus* sp.)	Low (*Myotis* sp.) Low (common pipistrelle) Medium (soprano pipistrelle) High (*Pipistrellus* sp.)
	11 (Song Meter Mini)	Turbine 32 NH 79642 20765	18 (common pipistrelle)	106hrs 40 min	0.170 (common pipistrelle) 0.038 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
			4 (soprano pipistrelle) 13 (*Pipistrellus* sp.)		0.123 (*Pipistrellus* sp.)	2 (*Pipistrellus* sp.)	
	4 (Song Meter 2)	Turbine 33 NH 78971 20748	0	No data	0	0	Low
	12 (Song Meter Mini)	Turbine 35 NH 78733 21816	0	No data	0	0	Low
	13 (Song Meter Mini)	Turbine 36 NH 78181 21988	1 (*Myotis* sp.) 2 (*Pipistrellus* sp.)	106hrs 40 min	0.009 *Myotis* sp.) 0.019 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 2 (*Pipistrellus* sp.)	Low
	14 (Song Meter Mini)	Turbine 38 NH 77466 22838	1 (*Myotis* sp.) 16 (common pipistrelle) 2 (soprano pipistrelle) 3 (*Pipistrellus* sp.)	106hrs 40 min	0.009 (*Myotis* sp.) 0.151 (common pipistrelle) 0.019 (soprano pipistrelle) 0.028 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 2 (common pipistrelle) 1 (soprano pipistrelle) 1 (*Pipistrellus* sp.)	Low
	15 (Song Meter Mini)	Turbine 39 NH 77466 22197	1 (soprano pipistrelle)	32hrs	0.031 (soprano pipistrelle)	1 (soprano pipistrelle)	Low
	16 (Song Meter Mini)	Turbine 41 NH 76947 21717	2 (*Myotis* sp.) 16 (common pipistrelle) 3 (soprano pipistrelle) 8 (*Pipistrellus* sp.)	106hrs 40 min	0.019 (*Myotis* sp.) 0.151 (common pipistrelle) 0.028 (soprano pipistrelle) 0.075 (*Pipistrellus* sp.)	1 (*Myotis* sp.) 2 (common pipistrelle) 1.5 (soprano pipistrelle) 4 (*Pipistrellus* sp.)	Low (*Myotis* sp.) Low (common pipistrelle) Low (soprano pipistrelle) Medium (*Pipistrellus* sp.)
	17 (Song Meter Mini)	Turbine 42 NH 76831 22150	0	No data	0	0	Low

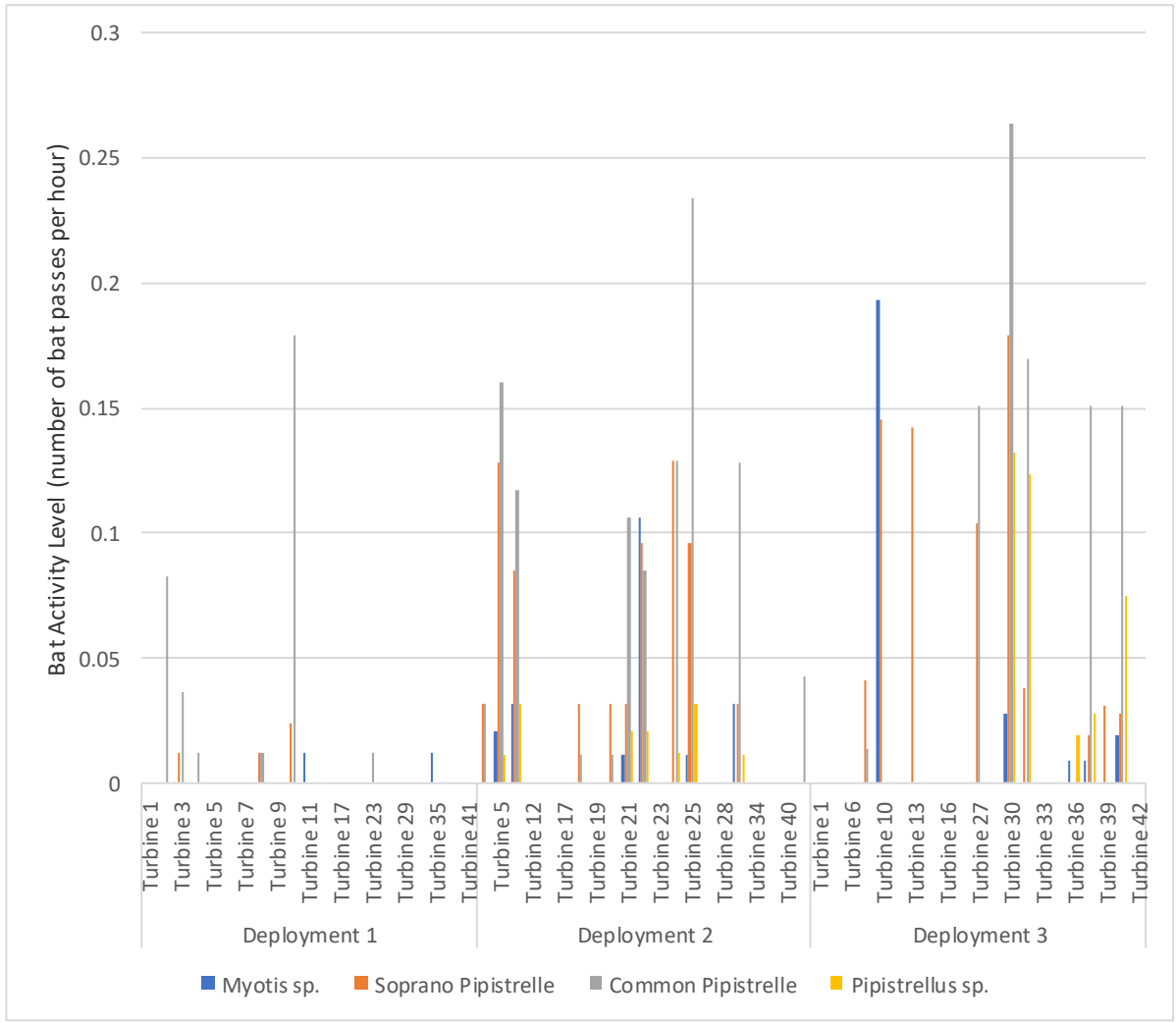


Chart 7: Number of bat passes per hour per turbine location in each deployment period.

As can be seen in Table 7 and Chart 7, the number of bat passes recorded within each deployment period was low with a peak of 28 recorded (sonogram analysis identified these as common pipistrelle) at the location of Turbine 30 during the autumn deployment phase. When converted to bat passes per hour, it is clear that activity across the Site is low, reflecting its exposed, upland geographical location with little to no roosting and / or foraging habitat.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having higher activity. This is particularly pronounced on sites within the Scottish Highlands. In these circumstances, the median is likely to be a more useful summary of the typical activity than the mean (Lintott & Mathews, 2018).

Additional Area

The results of the static detector surveys identified the presence of common and soprano pipistrelle, *Myotis* sp. and *Pipistrellus* sp.

Table 8 shows the number of bat passes per detector(location) per deployment period for each species, and also the average number of bat passes per hour, and median bat passes per hour (Chart 8 refers). The results are also presented in Appendix A (Figures 7.2.3a – 7.2.3c, 7.2.4a – 7.2.4d, and 7.2.5a – 7.2.5d refer).

Table 8: Number of Bat Passes Per Detector Per Location Per Deployment Period for Each Species

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded (hrs)	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
1 - Spring	SMU02827	Turbine 2 NH 81654 20276	1 (soprano pipistrelle)	159hrs 30min	0.01 (soprano pipistrelle)	1 (soprano pipistrelle)	Low
	SMU03679	Turbine 3 NH 81394 19796	0	157hrs 30min	0	0	Low
	SMU03114	Turbine 4 NH 81086 19357	0	149hrs	0	0	Low
	SMU02811	Turbine 5 NH 80498 20018	0	157hrs 30min	0	0	Low
	SMU03394	Turbine 6 NH 80976 20284	0	157hrs 30min	0	0	Low
	SMU02845	Turbine 7 NH 81448 21166	0	151hrs	0	0	Low
	SMU02473	Turbine 8 NH 81524 22115	1 (*myotis* sp.)	241hrs 30min	0.01 (*myotis* sp.)	1 (*myotis* sp.)	Low
	SMU03633	Turbine 9 NH 80983 22130	0	147hrs	0	0	Low
	SMU03170	Turbine 11 NH 80777 21392	0	151hrs	0	0	Low
	SMU02340	Turbine 12 NH 80727 20866	0	241hrs 30min	0	0	Low
	SMU03116	Turbine 13 NH 80231 20684	0	98hrs 30min	0	0	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded (hrs)	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
	SMU03746	Turbine 14 NH 79733 20308	0	157hrs 30min	0	0	Low
2 - Summer Deployment No.1	SMU03170	Turbine 1 NH 82075 21035	8 (common pipistrelle) 2 (*myotis* sp.)	26hrs	0.31 (common pipistrelle) 0.08 (*myotis* sp.)	2 (common pipistrelle) 1 (*myotis* sp.)	Low
	Fault, empty	Turbine 6 NH 80976 20284		0hrs			n/a
	SMU02827	Turbine 7 NH 81448 21166	1 (*myotis* sp.)	107hrs 20min	0.01 (*myotis* sp.)	1 (*myotis* sp.)	Low
	SMU03679	Turbine 8 NH 81524 22115	0	62hrs	0	0	Low
	SMU03633	Turbine 9 NH 80983 22130	0	101hrs 40min	0	0	Low
	SMU03116	Turbine 10 NH 81237 21649	0	59hrs 20min	0	0	Low
	SMU02850	Turbine 11 NH 80777 21392	0	7hrs 40min	0	0	Low
	SMU03394	Turbine 12 NH 80727 20866	8 (common pipistrelle)	47hrs 50min	0.17 (common pipistrelle)	1 (common pipistrelle)	Low
	SMU02811	Turbine 13 NH 80231 20684	0	7hrs 40min	0	0	Low
2 - Summer Deployment No.2	SMU02821	Turbine 2 NH 81654 20276	1 (common pipistrelle) 2 (soprano pipistrelle)	237hrs 45min	0.004 (common pipistrelle) 0.01 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	SMU02827	Turbine 5	1 (common pipistrelle)	90hrs 30min	0.01 (common pipistrelle)	1 (common pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded (hrs)	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
		NH 80498 20018					
	SMU03679	Turbine 14 NH 79733 20308	0	63hrs 15min	0	0	Low
3 - Autumn Deployment No.1	SMU03679	Turbine 2 NH 81654 20276	1 (soprano pipistrelle) 2 (*myotis* sp.)	81hrs	0.02 (soprano pipistrelle) 0.03 (*myotis* sp.)	1 (soprano pipistrelle) 1 (*myotis* sp.)	Low
	SMU02827	Turbine 3 NH 81394 19796	41 (common pipistrelle) 7 (soprano pipistrelle) 9 (*pipstrellus* sp.) 4 (*myotis* sp.)	135hrs 10min	0.30 (common pipistrelle) 0.05 (soprano pipistrelle) 0.07 (*pipstrellus* sp.) 0.03 (*myotis* sp.)	5 (common pipistrelle) 5 (soprano pipistrelle) 27 (*pipstrellus* sp.) 1 (*myotis* sp.)	Medium (common pipistrelle) Medium (soprano pipistrelle) High (*pipstrellus* sp.) Low (*myotis* sp.)
	SMU02845	Turbine 4 NH 81086 19357	0	77hrs 35min	0	0	Low
	SMU02811	Turbine 5 NH 80498 20018	7 (common pipistrelle) 4 (soprano pipistrelle) 8 (*pipstrellus* sp.)	93hrs 30min	0.07 (common pipistrelle) 0.04 (soprano pipistrelle) 0.09 (*pipstrellus* sp.)	1 (common pipistrelle) 2 (soprano pipistrelle) 6 (*pipstrellus* sp.)	Low (common pipistrelle) Low (soprano pipistrelle) High (*pipstrellus* sp.)
	SMU02853	Turbine 6 NH 80976 20284	4 (common pipistrelle) 3 (soprano pipistrelle) 1 (*pipstrellus* sp.)	171hrs 10min	0.02 (common pipistrelle) 0.02 (soprano pipistrelle) 0.01 (*pipstrellus* sp.)	1.5 (common pipistrelle) 1 (soprano pipistrelle) 1 (*pipstrellus* sp.)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded (hrs)	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
			2 (*myotis* sp.)		0.01 (*myotis* sp.)	2 (*myotis* sp.)	
	SMU03394	Turbine 7 NH 81448 21166	1 (common pipistrelle) 1 (soprano pipistrelle)	81hrs	0.01 (common pipistrelle) 0.01 (soprano pipistrelle)	1 (common pipistrelle) 1 (soprano pipistrelle)	Low
	SMU03633	Turbine 8 NH 81524 22115	4 (common pipistrelle) 6 (soprano pipistrelle) 3 (*pipstrellus* sp.) 1 (*myotis* sp.)	135hrs	0.03 (common pipistrelle) 0.04 (soprano pipistrelle) 0.02 (*pipstrellus* sp.) 0.01 (*myotis* sp.)	1.5 (common pipistrelle) 1 (soprano pipistrelle) 1 (*pipstrellus* sp.) 1 (*myotis* sp.)	Low
	SMU03116	Turbine 9 NH 80983 22130	1 (common pipistrelle)	81hrs	0.01 (common pipistrelle)	1 (common pipistrelle)	Low
	Fault, empty	Turbine 10 NH 81237 21649		0hrs			n/a
	SMU03170	Turbine 14 NH 79733 20308	3 (common pipistrelle) 2 (soprano pipistrelle) 2 (*pipstrellus* sp.) 2 (*myotis* sp.)	76hrs 25min	0.04 (common pipistrelle) 0.03 (soprano pipistrelle) 0.03 (*pipstrellus* sp.) 0.03 (*myotis* sp.)	2 (common pipistrelle) 1 (soprano pipistrelle) 1 (*pipstrellus* sp.) 1 (*myotis* sp.)	Low
3 - Autumn Deployment No.2	SMU03679	Turbine 1 NH 82075 21035	10 (common pipistrelle) 7 (soprano pipistrelle) 8 (*pipstrellus* sp.) 3 (*myotis* sp.)	89hrs	0.11 (common pipistrelle) 0.08 (soprano pipistrelle) 0.09 (*pipstrellus* sp.) 0.03 (*myotis* sp.)	5 (common pipistrelle) 1 (soprano pipistrelle) 1 (*pipstrellus* sp.) 1 (*myotis* sp.)	Medium (common pipistrelle) Low (soprano pipistrelle) Low (*pipstrellus* sp.) Low (*myotis* sp.)
	SMU02811	Turbine 11 NH 80777 21392	2 (common pipistrelle) 2 (soprano pipistrelle)	65hrs 30min	0.03 (common pipistrelle) 0.03 (soprano pipistrelle)	2 (common pipistrelle) 2 (soprano pipistrelle)	Low

Survey Period	Detector ID	Location (Turbine Number and Grid Reference)	Number of Bat Passes	Total Time Recorded (hrs)	Bat Passes per Hour	Median Bat Passes per Hour	Activity Level
			1 (*pipstrellus* sp.)		0.02 (*pipstrellus* sp.)	1 (*pipstrellus* sp.)	
	SMU02821	Turbine 12 NH 80727 20866	17 (common pipistrelle) 8 (soprano pipistrelle) 9 (*pipstrellus* sp.) 3 (*myotis* sp.)	241hrs 30min	0.07 (common pipistrelle) 0.03 (soprano pipistrelle) 0.04 (*pipstrellus* sp.) 0.01 (*myotis* sp.)	2 (common pipistrelle) 2 (soprano pipistrelle) 1.5 (*pipstrellus* sp.) 1 (*myotis* sp.)	Low
	SMU02853	Turbine 13 NH 80231 20684	7 (common pipistrelle) 6 (soprano pipistrelle) 4 (*pipstrellus* sp.)	187hrs 30min	0.04 (common pipistrelle) 0.03 (soprano pipistrelle) 0.02 (*pipstrellus* sp.)	1 (common pipistrelle) 2 (soprano pipistrelle) 1 (*pipstrellus* sp.)	Low

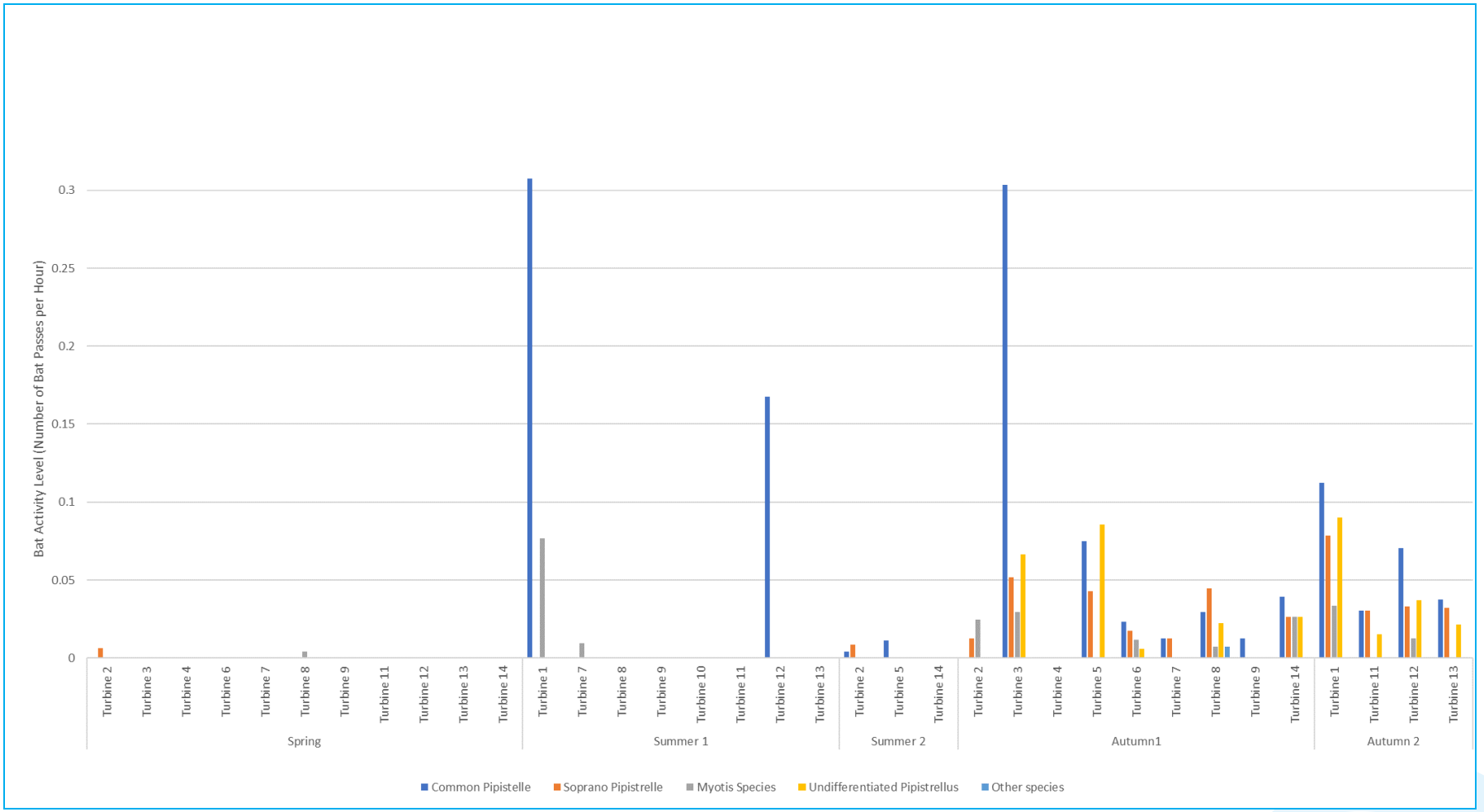


Chart 8: Number of bat passes per hour per turbine location in each deployment period.

Note detector location selections were unique to each of the 5 deployments, but all turbine locations had a detector deployed in each of the three main seasons (spring, summer, autumn).

As can be seen in Table 8 and Chart 8, the number of bat passes recorded within each deployment period was low with a peak of 41 common pipistrelle passes recorded at the location of Turbine 3 during the early autumn deployment phase. When converted to bat passes per hour, it is clear that activity across the Site is low. This reflects its exposed, upland geographical location with little to no roosting and / or foraging habitat.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. This is particularly pronounced on sites within the Scottish Highlands. In these circumstances, the median is likely to be a more useful summary of the typical activity than the mean (Lintott & Mathews, 2018).

4.3.3 Spatial Variation

The fact the Site is located in the north of Scotland requires consideration of the activity levels in that context, which is likely to result in reduced levels. Northern Scotland is also on the edge of the species range for the majority of the UK bat species, and thus it would be expected that only 6 of the 18 known British bat species could be found.

Considering the individual Turbine/Detector locations, a small number of them have much higher pass numbers recorded than others. This may be a reflection of a more favourable spot in terms of shelter, foraging, or commuting. This is further explored in Section 5.

4.3.4 Temporal Variation

Activity levels can vary significantly throughout the activity season which may indicate a number of potential features being close by, such as maternity roosts, swarming sites and hibernation roosts.

The activity levels of static detectors within the Site did not support enough bat passes to enable any worthwhile analysis.

5 Discussion

The site of Clune Wind Farm is characterised by an area of upland, exposed habitat which offers sub-optimal habitat for bats in terms of foraging and commuting. With respect to roosting, the Site offers no significant potential due to a lack of structures and mature deciduous woodland habitat.

Activity levels across the Original Site were low with a total of:

- 482 (57 attributed to *Myotis* sp.,
- 150 attributed to soprano pipistrelle,
- 222 attributed to common pipistrelle, and
- 53 attributed to *Pipistrellus* sp.) bat passes across all detectors over three deployment occasions.

Activity levels across the Additional Area were low with a total of 230 bat passes across all detectors over all deployment occasions. The species assemblage of the bat passes was as follows:

- 115 attributed to common pipistrelle
- 50 attributed to soprano pipistrelle,
- 43 attributed to undifferentiated Pipistrellus sp.,
- 21 attributed to Myotis sp. including Daubenton's and Natterer's,
- 1 pass attributed to a Brown Long Eared bat.

Numbers are lower than those recorded in the previous year on the adjacent Original Site, but are broadly in proportion with the relative areas of land.

Some patterns in activity can be seen in the data. Turbine locations 1, 3 and 12 all had larger pass numbers than others, and furthermore both 12 and 1 had larger pass numbers recorded in both summer and autumn. Both of these data points lie in the E-W trending valley of *Allt an t-Sionnaich* and *Allt Coire Chaillich*. Here there are slopes with a more sheltered eastern aspect and also some Juniper scrub. It is possible that this valley is used as a commuting route and that some foraging is available.

The other Turbine location of note (Turbine 3) lies in a ridge location and had the highest number of passes (numbering 61) recorded from the whole survey season. This location, although exposed, is within 2km of the river Dulnain and its wooded floodplain. Aerial imagery shows the regenerating pinewoods are within 1km. Although pinewoods are not generally thought of as good habitat for many species, it is not unknown for bats to be found near coniferous plantations. Tree cover is sparse, but this area of protected woodland does form a loose link to the denser woodland and the river to the south-east.

Both common and soprano pipistrelle are considered to be species of medium risk from wind turbine mortality. *Myotis* sp. are considered to be of low risk from wind turbine mortality. However, based upon the results of the static bat detector deployments, it is concluded that the number of bat passes per hour is low and reflects the occasional use of the Site by a small number of bat species. It is concluded that the frequency of use of the Site and specifically the turbine envelope is low enough that the risk of killing and injury of bats from the wind turbines is very low. This risk is further reduced due to the open nature of the site and lack of features such as mature deciduous woodland.

6 References

Begon, M., Harper, J. L., and Townsend, C. R. (1996). Ecology: individuals, populations and communities. Blackwell Science.

Collins, J. (Ed). (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edn).

Lintott, P. & Mathews, F. (2018). Reviewing the evidence on mitigation strategies for bats in buildings: informing best-practice for policy makers and practitioners. CIEEM.

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

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

The Highland Council (2022). Highland Council Wind Turbine Map https://www.highland.gov.uk/info/198/planning_-_long_term_and_area_policies/152/renewable_energy/4 (accessed January 2023)

Appendices

Appendix A. Figures

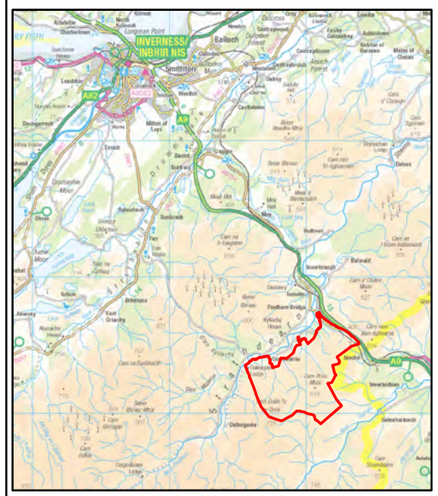
Figure 7.2.1 - Site Location
Figure 7.2.2 - Bat Detectors and Site Layout
Figure 7.2.3a - Bat Activity Survey Results – Spring (*Myotis* sp.)
Figure 7.2.3b - Bat Activity Survey Results – Spring (Common Pipistrelle)
Figure 7.2.3c - Bat Activity Survey Results – Spring (Soprano Pipistrelle)
Figure 7.2.4a - Bat Activity Survey Results – Summer (*Myotis* sp.)
Figure 7.2.4b - Bat Activity Survey Results – Summer (Common Pipistrelle)
Figure 7.2.4c - Bat Activity Survey Results – Summer (Soprano Pipistrelle)
Figure 7.2.4d - Bat Activity Survey Results – Summer (*Pipistrellus* sp.)
Figure 7.2.5a - Bat Activity Survey Results – Autumn (*Myotis* sp.)
Figure 7.2.5b - Bat Activity Survey Results – Autumn (Common Pipistrelle)
Figure 7.2.5c - Bat Activity Survey Results – Autumn (Soprano Pipistrelle)
Figure 7.2.5d - Bat Activity Survey Results – Autumn (*Pipistrellus* sp.)

Clune Wind Farm

Figure 7.2.1
Site location Plan

Key

Site boundary



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