

Environmental Impact Assessment Report

Cummeennabuddoge Wind Farm

Technical Appendix 8-2: Bat Surveys

Cummeennabuddoge Wind (DAC)

September 2024



Contents

1	Introduction	1
1.1	Terms of reference	1
1.2	Objectives	1
2	Legislative context	2
3	Methodology	3
3.1	Automatic Detector Survey	3
3.1.1	2020	3
3.2	Sonogram Analysis	4
3.3	Limitations	5
4	Results	7
4.1	Weather	7
4.2	2020	7
4.2.1	Overall Site Activity	7
4.2.2	Spatial analysis	8
4.3	2021	12
4.3.1	Overall Site Activity	12
4.3.2	Spatial analysis	13
5	Summary	18
6	References	19
	Appendix 1: Average bat passes per hour data for species/species group dominated by low activity	20
	2020	20
	2021	24

1 Introduction

1.1 Terms of reference

Automated static surveys were undertaken by Malachy Walsh & Partners (MWP) Ireland over two seasons in 2020 -21 at the site of the proposed Cummeennabuddoge Wind Farm development.

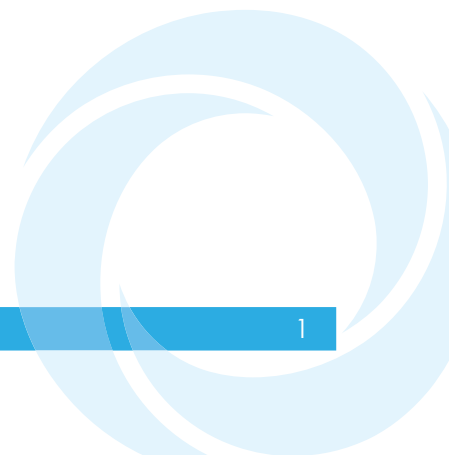
The Proposed Development Site is centred on Irish Transverse Mercator (ITM) coordinate system (W 19846 83148) and occupies an area of approximately 986ha, (shown bounded by the red line on Figure 1-1a).

This Technical Appendix should be read in conjunction with TA 8-1: Terrestrial Ecology.

1.2 Objectives

This report seeks to confirm the presence or likely absence of bats and document the results of the surveys with the following details:

- Legislative context;
- Field survey methodology; and
- Field survey results.



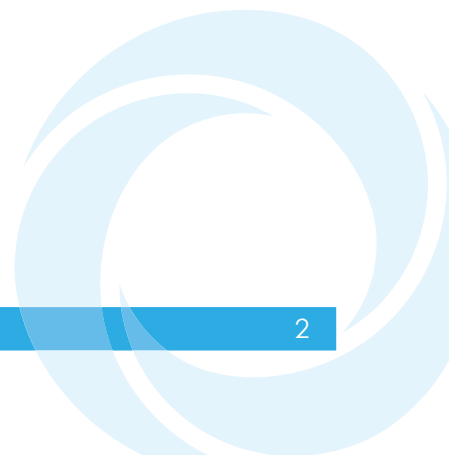
2 Legislative context

All bat species in Ireland are protected under the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011-2021) and the Wildlife Acts 1976-2012. All bat species found in Ireland are listed under Annex IV of the EC (Birds and Natural Habitats) Regulations 2011 – 2021 and as a result works which would capture or kill them, damage, or destroy their roosts or disturb them at important parts of their life cycle cannot take place without first obtaining a Derogation Licence¹.

There are nine bat species found in Ireland:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *P. pygmaeus*;
- Nathusius' pipistrelle *P. nathusii*;
- Leisler's *Nyctalus leisleri*;
- Brown long-eared *Plecotus auratus*;
- Whiskered *Myotis mystacinus*;
- Natterer's *Myotis nattereri*;
- Daubenton's *M. daubentonii*; and
- Lesser horseshoe *Rhinolophus hipposideros*.

Lesser horseshoe bat is listed in Annex II of the EU Habitats Directive, while all bat species are listed in Annex IV of the same Directive. The level of protection offered to lesser horseshoe bats effectively means that areas important for this species are designated as Special Areas of Conservation. For the other bat species, the EU requires that they are strictly protected. Among the obligations under this Directive, the conservation status of species listed on the Annexes should be maintained as 'favourable'.



3 Methodology

3.1 Automatic Detector Survey

Static detectors deployments took place over two years (2020 and 2021) as opposed to one year as required by guidance (SNH, 2019). The 2021 data is used in the Environmental Impact Assessment Report (EIAR) and the 2020 data is considered contextual information. Deployment was as close to turbines as possible at 'Spot Points' (SPs) and for the 2021 data this is shown in Figure 8-5.

Deployment took place over three visits during April – September in 2020 and for three visits during May – September 2021. An additional detector was added in 2021 to provide better coverage as a result of minor design changes since 2020.

3.1.1 2020

Detectors were deployed at 12 SPs during April, June, and August/September which corresponded to an early iteration of the wind farm design. Table 1 shows the details of each of the three visits.

Table 1: Bat static deployment details

Visit Number	Date of deployment and retrieval	Number of nights deployed	Automatic time on and off	Hours detector per night
1	20/04/2020 – 29/04/2020	10	20:14/20:27 – 06:56/06:38	10.6 to 10.2
2	09/06/2020 – 18/06/2020	10	21:26/21:30 - 05:47/05:46	8.4
3	24/08/2020 – 02/09/2020	10	20:12/19:52 – 07:07/07:22	11 to 11.5

Detectors were deployed in areas close to the proposed turbine locations as shown in Table 2.

Table 2: Detector locations for 2020

Detector	Corresponding Turbine	Approximate Grid Reference (ITM)
SP1	T2	521631 584275
SP2	T13	518634 583717
SP3	T6	520428 583160
SP4	NA	518217 582180
SP5	T17	517568 582447
SP6	T8	520299 584072
SP7	T1	522089 583454
SP8	T7/T10	520247 583639
SP9	T3	521296 583151
SP10	T14	518387 582391
SP11	T12	519398 583348
SP12	T15	518301 582872

3.1.2 2021

Detectors were deployed at 13 SPs over three visits in May, July, and September. Table 3 shows the details of each of the three visits.

Table 3: Bat static deployment details

Visit Number	Date of deployment and retrieval	Number of nights deployed	Automatic time on and off	Hours detector per night
1	17/05/2021 to 26/05/2021	10	20:58/21:09 – 06:06/05:56	9 to 8.9
2	08/07/2021 to 17/07/2021	10	21:25/21:17 – 05:57/06:07	8.5 to 8.9
3	01/09/2021 to 09/09/2021	10	19:53/19:35 – 07:19/07:32	11.4 to 12

Table 4: Detector locations for 2021 (as per Figure 8-5)

Detector	Corresponding Turbine	Approximate Grid Reference (ITM)
SP1	T2	521631 584275
SP2	T13	518634 583717
SP3	T6	520428 583160
SP4	NA	518217 582180
SP5	T17	517568 582447
SP6	T8	520299 584072
SP7	T1	522089 583454
SP8	T7/T10	520247 583639
SP9	T3	521296 583151
SP10	T14	518387 582391
SP11	T12	519398 583348
SP12	T15	518301 582872
SP13	T5	521014 584109

3.2 Sonogram Analysis

Analysis of full spectrum WAV files was undertaken using the Kaleidoscope Pro Auto ID feature for the data collected in 2020. Due to the limitations of the Auto-ID, some species were not identified by the program and therefore have been returned as NO – ID bat calls. This details that there are bats in the area, however it is not classified as to what species are present.

For the 2021 data, AnalookW v4.4a was used with the assistance of bespoke species filters (using zero cross outputs). Any bat passes not recognised by the filters were categorized manually - therefore all bat calls were categorized to at least a genus level. Some species of bat are also difficult to confidently identify from sonogram analysis alone. As a result, not all calls were identified to species level with all species from the *Myotis* genus identified to genus level only. Additionally, some pipistrelle calls could not be identified at a species level through the bespoke AnalookW filters. Therefore, there is an additional species category of pipistrelle spp. to highlight the presence of pipistrelles in the area.

To allow comparison of activity levels between static detector locations, data was transformed to Bat Passes per Hour (BPpH) for both years by dividing the total number of bat passes recorded at each static location by the total number of hours for which the unit was operational.

Absolute measures of bat activity are not possible to reliably calculate for automated field studies as during recording sessions it is not possible to differentiate between one 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.

As the Ecobat bat activity level assessment tool is off-line², and has been for some time, a bespoke assessment methodology was employed. For ease of examination, three arbitrary levels have been created to provide a context in which to discuss the results. Table 5 indicates the levels of activity required to be considered to be "low", "medium" or "high" activity. These criteria have been developed by Atmos Consulting based on over 6 years working on multiple upland windfarm projects. 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 upland habitats.

Table 5: Criteria for Determining Bat Activity Levels

Activity Level	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 Analook file.

Bat activity was defined by the presence of a sonogram file (maximum length of 15 secs) recorded from the static detectors. Although this is to some degree an arbitrary measure, this definition means that records of activity levels are comparable across detectors, and it is a frequently used definition. 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).

Sonogram data for each detector location during each of the survey sessions was organised and used for analysis of activity levels across static detector locations and across survey periods. Microsoft Excel was used to create tables that outline species density, total population, species distribution between detector points and seasonal changes.

3.3 Limitations

Whilst there were differences between methods for analysis for bat static survey data between 2020 and 2021, only one year is required as per guidance (SNH 2019) i.e. the 2021 data on which the assessment is based. The 2020 is regarded as contextual information, supplementing the understanding of how bats use the Site.

² As of 13/12/23

No automated at height static bat surveys or supplementary transect surveys were undertaken however given the two years of static survey, as opposed to the one year recommended by guidance, this is not considered a limitation.

4 Results

4.1 Weather

Current guidance (SNH 2019, Bat Conservation Ireland, 2012) stipulates that surveys should capture a sufficient number of nights with appropriate weather conditions for bat activity. Appropriate is defined as a minimum recommended temperature of 7°C at dusk and with a windspeed of less than Beaufort force 5.

4.2 2020

4.2.1 Overall Site Activity

There was a total of 41,088 passes across 12 detectors on the site (Table 6). Of this, 51.86% of the passes involved common pipistrelle with Leisler's making up 17.8% of the passes. Soprano pipistrelle, *Myotis* species and Brown long-eared bat were also recorded on the site at lower levels. The second highest category was the No-ID which contributed to 18.94% of passes across the detectors.

Table 6: Species' annual totals by SP (2020)

SP	Myotis spp.	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	No-ID	Total	%
1	350	216	396	203	12	200	1,377	3.35
2	31	331	1,425	111	11	478	2,387	5.81
3	15	26	349	237	5	87	719	1.75
4	20	2,245	4,676	618	206	3,217	10,982	26.73
5	64	637	527	128	74	197	1,627	3.96
6	153	203	4,333	553	146	536	5,924	14.42
7	45	99	343	50	27	112	676	1.65
8	98	738	2,345	812	187	869	5,049	12.29
9	17	113	589	15	33	185	952	2.32
10	15	188	2,894	20	11	743	3,871	9.42
11	36	2,505	3,385	319	54	1,147	7,446	18.12
12	4	11	47	5	0	11	78	0.19
Total	848	7,312	21,309	3,071	766	7,782	41,088	
%	2.06	17.80	51.86	7.47	1.86	18.94		

Seasonally, the spring period was the busiest month in 2020 with over 20,000 passes recorded during this season. Autumn was the second busiest season with over 12,000 passes recorded and finally the summer season was the quietist with less than 8,000 passes recorded.

Table 7: Seasonal & annual totals all SPs (2020)

SP No	Spring	Summer	Autumn	TOTAL
1	222	804	351	1,377
2	297	1,902	188	2,387
3	39	67	613	719
4	6,014	458	4,510	10,982
5	928	268	431	1,627
6	2,347	1,322	2,255	5,294
7	193	346	137	676
8	1,737	1,289	2,023	5,049
9	371	126	455	952
10	3,581	136	154	3,871
11	5,236	831	1,379	7,446
12	0	78	0	78
Total	20,965	7,627	12,496	41,088

4.2.2 Spatial analysis

The three detectors that recorded the highest levels of bat passes were SPs 4, 11 and 6 (Table 8). SP4 recorded over a quarter of all the bat passes on the site. The lowest number of passes were recorded by SP12. This contributed to only 0.19% of the bat passes. SPs with the highest activity were located along incised and wooded river channels. Rivers are linear routes typically used by commuting bats and the gorged nature of the channels on the Proposed Site would provide a level of protection for these pathways. The shelter and increased humidity would predispose invertebrate prey species to use them thereby increasing the likelihood of bat use.

Table 8: SP ranked (lowest to highest) by level of activity during spring to autumn surveys (2020)

SP	Total	%
12	78	0.19
7	676	1.65
3	719	1.75
9	952	2.32
1	1,377	3.35
5	1,627	3.96
2	2,387	5.81
10	3,871	9.42
8	5,049	12.29
6	5,924	14.42
11	7,446	18.12
4	10,982	26.73

Leisler's

Most Leisler's passes were recorded at SPs 4 and 11 (Table 9). Each detector had over 2,000 in total across the three seasons. All the other detectors recorded less than 1,000 passes each with SPs 3, 7 and 12 had less than 100 Leisler's passes each.

Table 9: Leisler's passes recorded by SP and season (2020)

SP No	Spring	Summer	Autumn	TOTAL	Nightly Mean
1	109	44	63	216	7.20
2	79	233	19	331	11.03
3	5	8	13	26	0.87
4	2,210	5	120	2,245	74.83
5	563	39	35	637	21.23
6	195	4	4	203	6.77
7	82	6	11	99	3.30
8	622	50	66	738	24.60
9	85	12	16	113	3.77
10	163	7	1	188	6.27
11	2,009	483	13	2,505	83.50
12	0	11	0	11	0.37
Total	6,032	902	378	7,312	

Table 10 shows the number of Leisler's passes per detector per location per deployment period, with this converted to mean bat passes per hour.

Table 10: Number of Leisler's passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of Leisler's passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	109	124 hours 18 minutes	0.88	Low
	2	79	124 hours 18 minutes	0.64	Low
	3	5	124 hours 18 minutes	0.04	Low
	4	2,120	124 hours 18 minutes	17.06	High
	5	563	124 hours 18 minutes	4.53	Medium
	6	195	124 hours 18 minutes	1.57	Low
	7	82	124 hours 18 minutes	0.66	Low
	8	622	124 hours 18 minutes	5.00	Medium
	9	85	124 hours 18 minutes	0.68	Low
	10	163	124 hours 18 minutes	1.31	Low
	11	2,009	124 hours 18 minutes	16.06	High
	12	0	124 hours 18 minutes	0.00	n/a
Spring mean		503		4.04	Medium
Summer	1	44	83 hours 6 minutes	0.53	Low
	2	233	83 hours 6 minutes	2.80	Medium
	3	8	83 hours 6 minutes	0.10	Low
	4	5	83 hours 6 minutes	0.06	Low

Survey Period	SP no:	Number of Leisler's passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	5	39	83 hours 6 minutes	0.47	Low
	6	4	83 hours 6 minutes	0.05	Low
	7	6	83 hours 6 minutes	0.07	Low
	8	50	83 hours 6 minutes	0.60	Low
	9	12	83 hours 6 minutes	0.14	Low
	10	7	83 hours 6 minutes	0.08	Low
	11	483	83 hours 6 minutes	5.81	High
	12	11	83 hours 6 minutes	0.13	Low
Summer mean		75		0.90	Low
Autumn	1	63	112 hours 15 minutes	0.56	Low
	2	19	112 hours 15 minutes	0.17	Low
	3	13	112 hours 15 minutes	0.12	Low
	4	120	112 hours 15 minutes	1.07	Low
	5	35	112 hours 15 minutes	0.31	Low
	6	4	112 hours 15 minutes	0.04	Low
	7	11	112 hours 15 minutes	0.10	Low
	8	66	112 hours 15 minutes	0.59	Low
	9	16	112 hours 15 minutes	0.14	Low
	10	18	112 hours 15 minutes	0.16	Low
	11	13	112 hours 15 minutes	0.12	Low
	12	0	112 hours 15 minutes	0	n/a
Autumn mean		32		0.28	Low

Common pipistrelle

Table 11 shows the number of Common pipistrelle passes per detector per location per deployment period, with this converted to mean bat passes per hour.

Table 11: Number of Common pipistrelle passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of Common pipistrelle Passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
Spring	1	38	124 hours 18 minutes	0.31	Low
	2	120	124 hours 18 minutes	0.97	Low
	3	11	124 hours 18 minutes	0.09	Low
	4	1,247	124 hours 18 minutes	10.03	High
	5	183	124 hours 18 minutes	1.47	Low
	6	1,525	124 hours 18 minutes	12.27	High
	7	53	124 hours 18 minutes	0.43	Low
	8	175	124 hours 18 minutes	1.41	Low
	9	202	124 hours 18 minutes	1.63	Low

Survey Period	SP no:	Number of Common pipistrelle Passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
	10	2,695	124 hours 18 minutes	21.68	High
	11	2,369	124 hours 18 minutes	19.06	High
	12	0	124 hours 18 minutes	0.00	Low
Spring mean		719		5.78	High
Summer	1	287	83 hours 6 minutes	3.45	Medium
	2	1,218	83 hours 6 minutes	14.66	High
	3	39	83 hours 6 minutes	0.47	Low
	4	274	83 hours 6 minutes	3.30	Medium
	5	149	83 hours 6 minutes	1.79	Low
	6	1,051	83 hours 6 minutes	12.65	High
	7	232	83 hours 6 minutes	2.79	Medium
	8	964	83 hours 6 minutes	11.60	High
	9	31	83 hours 6 minutes	0.37	Low
	10	106	83 hours 6 minutes	1.28	Low
	11	182	83 hours 6 minutes	2.19	Medium
	12	47	83 hours 6 minutes	0.57	Low
Summer mean		382		4.59	Medium
Autumn	1	71	112 hours 15 minutes	0.63	Low
	2	87	112 hours 15 minutes	0.78	Low
	3	299	112 hours 15 minutes	2.66	Medium
	4	3,155	112 hours 15 minutes	28.11	High
	5	195	112 hours 15 minutes	1.74	Low
	6	1,757	112 hours 15 minutes	15.65	High
	7	58	112 hours 15 minutes	0.52	Low
	8	1,206	112 hours 15 minutes	10.74	High
	9	356	112 hours 15 minutes	3.17	Medium
	10	93	112 hours 15 minutes	0.83	Low
	11	834	112 hours 15 minutes	7.43	High
	12	0	112 hours 15 minutes	0.00	Low
Autumn mean		676		6.02	High

Brown Long-eared Bat

During the 2020 survey season there were 766 passes of Brown long-eared bat through the detectors on the site (Table 12). SPs 4, 6 and 8 recorded over 100 passes each in total and were the areas which recorded most activity for this species. SP12 recorded zero passes from this species.

Table 12: Brown long-eared bat passes recorded by SP and season

	Spring	Summer	Autumn	TOTAL	Nightly Mean
1	5	1	6	12	0.40
2	4	0	7	11	0.37
3	0	0	5	5	0.17
4	89	6	111	206	6.87
5	10	7	57	74	2.47
6	107	14	25	146	4.87
7	6	3	18	27	0.90
8	98	3	86	187	6.23
9	15	4	14	33	1.10
10	4	1	6	11	0.37
11	31	3	20	54	1.80
12	0	0	0	0	0
Total	369	42	355	766	

Other species/species groups

For ease of reading and due to the low overall activity of other species/species groups Mean bat passes per hour data, which includes Soprano pipistrelle and *Myotis* spp. is included in Appendix 1.

4.3 2021

4.3.1 Overall Site Activity

The total amount of passes on this site was 22,804 from all species. Like 2020, Common pipistrelle was the most frequent with 55.6% being recorded from this species. Leisler's was recorded 21.25% of the time and pipistrelle at the genus level was recorded 13.88% of the time.

Table 13: Species' annual totals by SP (2021)

SP	Myotis spp.	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	Pipistrellus sp.	Total	%
1	22	823	847	110	17	1784	3603	15.80
2	77	405	63	29	25	39	638	2.78
3	20	274	1,429	233	13	102	2071	7.76
4	64	202	1,010	212	32	125	1645	9.88
5	14	233	2,072	139	12	338	2808	12.55
6	23	565	1,750	117	23	180	2658	13.39
7	33	320	714	11	14	48	1140	6.77
8	32	1200	1,488	249	19	289	3277	11.90
9	106	107	1,180	104	18	54	1569	6.77

SP	Myotis spp.	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Brown long-eared bat	Pipistrellus sp.	Total	%
10	12	129	102	12	7	15	277	1.37
11	22	94	791	58	12	124	1101	4.13
12	33	170	728	53	16	33	1033	5.62
13	27	240	482	64	29	21	863	3.19
Total	486	4846	12,679	1,391	237	3,165	22,804	
%	2.13	21.25	55.60	6.10	1.04	13.88		

During the three seasons, the most passes were recorded in autumn with 15,299 recordings identified as bat species (Table 14). Conversely to the 2020 data, spring was the quietest season in terms of bats passing the detectors.

Table 14: Seasonal & annual totals all SPs (2021)

SP No	Spring	Summer	Autumn	TOTAL
1	Missing data	338	3,065	3,603
2	9	331	298	638
3	89	219	1,763	2,071
4	65	771	809	1,645
5	7	186	2,615	2,808
6	31	184	2,443	2,658
7	486	332	322	1,140
8	74	1,550	1,653	3,277
9	856	476	237	1,569
10	21	108	148	277
11	13	252	836	1,101
12	33	369	631	1,033
13	28	356	479	863
Total	1,712	5,793	15,299	22,804

4.3.2 Spatial analysis

It should be remembered that the SP locations differed between 2020 and 2021 so the two sets of data are not directly comparable.

The three detectors that recorded the highest levels of bat passes were SPs 1, 5 and 8 (Table 15). Detector one recorded over 15% of all the bat passes on the site. The second lowest was detector 10 which recorded 1.21% of passes during 2021. Similarly, to the 2020 data SP8 is a location of high activity and situated near a river valley. SPs 1 and 5 do not follow this pattern however, being situated over conifer block with no discernible landscape features which tend to be used by commuting bats.

Table 15: SP ranked by level of activity spring to autumn surveys (2021)

SP	Total	%
10	277	1.21
2	638	2.80
13	863	3.78
12	1033	4.53

SP	Total	%
11	1101	4.83
7	1140	5.00
9	1569	6.88
4	1645	7.21
3	2071	9.08
6	2658	11.66
5	2808	12.31
8	3277	14.37
1	3603	15.80

Leisler's

Most Leisler's passes were recorded at detector eight which recorded 1200 passes (Table 16). The other detectors recorded less than a thousand passes each with SP11.

Table 16: Leisler's bat passes recorded by SP and season (2021)

SP No	Spring	Summer	Autumn	TOTAL	Nightly Mean
1	Missing data	147	676	823	27.43
2	7	290	108	405	13.50
3	78	140	56	274	9.13
4	22	149	31	202	6.73
5	4	104	125	233	7.77
6	23	112	430	565	18.83
7	59	224	37	320	10.67
8	43	636	521	1,200	40.00
9	24	75	8	107	3.57
10	20	76	33	129	4.30
11	2	69	23	94	3.13
12	17	129	24	170	5.67
13	17	148	75	240	8.00
Total	316	2,383	2,147	2,147	

Table 17 shows the number of Leisler's passes per detector per location per deployment period, with this converted to mean bat passes per hour.

Table 17: Number of Leisler's passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of Leisler's passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	7	89 hours 48 minutes	0.08	Low
	3	78	89 hours 48 minutes	0.87	Low
	4	22	89 hours 48 minutes	0.24	Low
	5	4	89 hours 48 minutes	0.04	Low
	6	23	89 hours 48 minutes	0.26	Low
	7	59	89 hours 48 minutes	0.66	Low

Survey Period	SP no:	Number of Leisler's passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
	8	43	89 hours 48 minutes	0.48	Low
	9	24	89 hours 48 minutes	0.27	Low
	10	20	89 hours 48 minutes	0.22	Low
	11	2	89 hours 48 minutes	0.02	Low
	12	17	89 hours 48 minutes	0.19	Low
	13	17	89 hours 48 minutes	0.19	Low
Spring mean		24		0.27	Low
Summer	1	147	86 hours 42 minutes	1.70	Low
	2	290	86 hours 42 minutes	3.34	Medium
	3	140	86 hours 42 minutes	1.61	Low
	4	149	86 hours 42 minutes	1.72	Low
	5	104	86 hours 42 minutes	1.20	Low
	6	112	86 hours 42 minutes	1.29	Low
	6	112	86 hours 42 minutes	1.29	Low
	8	636	86 hours 42 minutes	7.34	High
	9	75	86 hours 42 minutes	0.87	Low
	10	76	86 hours 42 minutes	0.88	Low
	11	69	86 hours 42 minutes	0.80	Low
	12	129	86 hours 42 minutes	1.49	Low
	13	148	86 hours 42 minutes	1.71	Low
Summer mean		168		1.94	Low
Autumn	1	676	119 hours 6 minutes	5.68	High
	2	108	119 hours 6 minutes	0.91	Low
	3	56	119 hours 6 minutes	0.47	Low
	4	31	119 hours 6 minutes	0.26	Low
	5	125	119 hours 6 minutes	1.05	Low
	6	430	119 hours 6 minutes	3.61	Medium
	7	37	119 hours 6 minutes	0.31	Low
	8	521	119 hours 6 minutes	4.37	Medium
	9	8	119 hours 6 minutes	0.07	Low
	10	33	119 hours 6 minutes	0.28	Low
	11	23	119 hours 6 minutes	0.19	Low
	12	24	119 hours 6 minutes	0.20	Low
	13	75	119 hours 6 minutes	0.63	Low
Autumn mean		113		0.95	Low

Common pipistrelle

Table 18 shows the number of Common pipistrelle passes per detector per location per deployment period, with this converted to bat passes per hour and mean bat passes per hour.

Table 18: Number of Common pipistrelle passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of Common Pipistrelle Bat passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	1	89 hours 48 minutes	0.01	Low
	3	11	89 hours 48 minutes	0.12	Low
	4	39	89 hours 48 minutes	0.43	Low
	5	1	89 hours 48 minutes	0.01	Low
	6	1	89 hours 48 minutes	0.01	Low
	7	404	89 hours 48 minutes	4.50	Medium
	8	17	89 hours 48 minutes	0.19	Low
	9	727	89 hours 48 minutes	8.10	High
	10	1	89 hours 48 minutes	0.01	Low
	11	5	89 hours 48 minutes	0.06	Low
	12	9	89 hours 48 minutes	0.10	Low
	13	7	89 hours 48 minutes	0.08	Low
Spring mean		94		1.04	Low
Summer	1	349	86 hours 42 minutes	4.03	Medium
	2	22	86 hours 42 minutes	0.25	Low
	3	59	86 hours 42 minutes	0.68	Low
	4	484	86 hours 42 minutes	5.58	High
	5	70	86 hours 42 minutes	0.81	Low
	6	53	86 hours 42 minutes	0.61	Low
	7	73	86 hours 42 minutes	0.84	Low
	8	588	86 hours 42 minutes	6.78	High
	9	335	86 hours 42 minutes	3.86	Medium
	10	18	86 hours 42 minutes	0.21	Low
	11	137	86 hours 42 minutes	1.58	Low
	12	206	86 hours 42 minutes	2.38	Medium
	13	180	86 hours 42 minutes	2.08	Medium
Summer mean		198		2.28	Medium
Autumn	1	498	119 hours 6 minutes	4.18	Medium
	2	40	119 hours 6 minutes	0.34	Low
	3	1,359	119 hours 6 minutes	11.41	High
	4	486	119 hours 6 minutes	4.08	Medium
	5	2,007	119 hours 6 minutes	16.85	High
	6	1,696	119 hours 6 minutes	14.24	High
	7	237	119 hours 6 minutes	1.99	Low
	8	883	119 hours 6 minutes	7.41	High
	9	118	119 hours 6 minutes	0.99	Low
	10	83	119 hours 6 minutes	0.70	Low
	11	649	119 hours 6 minutes	5.45	High

Survey Period	SP no:	Number of Common Pipistrelle Bat passes	Total Time Recorded	Mean Bat Passes per Hour	Comparative Activity level
	12	513	119 hours 6 minutes	4.31	Medium
	13	295	119 hours 6 minutes	2.48	Medium
Autumn mean		682		5.73	High

Brown long-eared Bat

The number of passes for 2021 was less than half of records in 2020, totaling 237 passes although SP locations were different in 2021 from those used in 2020. The most passes recorded from one detector was at SP4 with 32 passes in total over the three seasons. The lowest number of passes was at SP10 with seven passes.

Table 19: Brown long eared bat passes recorded by SP and season (2021)

SP No	Spring	Summer	Autumn	TOTAL	Nightly Mean
1	0	1	16	17	0.57
2	0	4	21	25	0.83
3	0	3	10	13	0.43
4	0	6	26	32	1.07
5	0	0	12	12	0.40
6	0	2	21	23	0.77
7	0	3	11	14	0.47
8	1	4	14	19	0.63
9	1	1	16	18	0.60
10	0	2	5	7	0.23
11	2	7	3	12	0.40
12	0	1	15	16	0.53
13	0	3	26	29	0.97
Total	4	37	196	237	

Other species/species groups

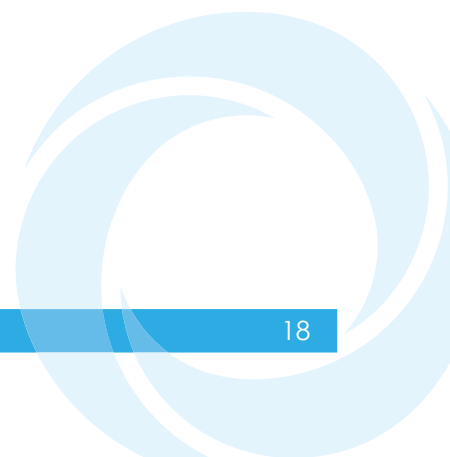
For ease of reading and due to the low overall activity of other species/species groups bat passes per hour data, which includes soprano pipistrelle and *Myotis* spp. is included in Appendix 1.

5 Summary

Overall, there was high variation between the years 2020 and 2021. The latter year yielded far fewer passes than the initial year of recording. It is possible that changing weather conditions affecting migration movements, or changes in habitat caused this variation, beyond natural variations between surveying months. Common pipistrelle was the species that used the site the most followed by Leisler's. Soprano pipistrelle, *Myotis* species and Brown long-eared bat also used the site in lower numbers.

The Leisler's population in Ireland is considered important due to the density of individuals within the country. They are the second most common identifiable species that was recorded from the data and had similar proportion of recordings between the two years.

No bat roost potential structures were identified during terrestrial surveys (see Technical Appendix 8-1). The prevailing conifer plantation which dominates the Site offers limited opportunities for roosting bats.



6 References

Bat Conservation Ireland. (2012) *Wind Turbine/Wind Farm Development: Bat Survey Guidelines*.

SNH, 2019. *Bats and onshore wind turbines: Survey, assessment and mitigation*, Battleby: SNH.

Appendix 1: Average bat passes per hour data for species/species group dominated by low activity

2020

Table A: Number of Brown long-eared passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of Brown long-eared Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	7	89 hours 48 minutes	0.08	Low
	3	78	89 hours 48 minutes	0.87	Low
	4	22	89 hours 48 minutes	0.24	Low
	5	4	89 hours 48 minutes	0.04	Low
	6	23	89 hours 48 minutes	0.26	Low
	7	6	124 hours 18 minutes	0.05	Low
	8	98	124 hours 18 minutes	0.79	Low
	9	15	124 hours 18 minutes	0.12	Low
	10	4	124 hours 18 minutes	0.03	Low
	11	31	124 hours 18 minutes	0.25	Low
	12	0	124 hours 18 minutes	0.00	Low
Spring mean		24		0.23	Low
Summer	1	1	83 hours 6 minutes	0.01	Low
	2	0	83 hours 6 minutes	0.00	Low
	3	0	83 hours 6 minutes	0.00	Low
	4	6	83 hours 6 minutes	0.07	Low
	5	7	83 hours 6 minutes	0.08	Low
	6	14	83 hours 6 minutes	0.17	Low
	7	3	83 hours 6 minutes	0.04	Low
	8	3	83 hours 6 minutes	0.04	Low
	9	4	83 hours 6 minutes	0.05	Low
	10	1	83 hours 6 minutes	0.01	Low
	11	3	83 hours 6 minutes	0.04	Low
	12	0	83 hours 6 minutes	0.00	Low
Summer mean		3.5		0.04	Low
Autumn	1	6	112 hours 15 minutes	0.05	Low
	2	7	112 hours 15 minutes	0.06	Low
	3	5	112 hours 15 minutes	0.04	Low
	4	111	112 hours 15 minutes	0.99	Low

Survey Period	SP no:	Number of Brown long-eared Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	5	57	112 hours 15 minutes	0.51	Low
	6	25	112 hours 15 minutes	0.22	Low
	7	18	112 hours 15 minutes	0.16	Low
	8	86	112 hours 15 minutes	0.77	Low
	9	14	112 hours 15 minutes	0.12	Low
	10	6	112 hours 15 minutes	0.05	Low
	11	20	112 hours 15 minutes	0.18	Low
	12	0	112 hours 15 minutes	0.00	Low
Autumn mean		30		0.26	Low

Table B: Number of *Myotis* Species passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of <i>Myotis</i> Species Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	19	124 hours 18 minutes	0.15	Low
	2	8	124 hours 18 minutes	0.06	Low
	3	0	124 hours 18 minutes	0.00	Low
	4	10	124 hours 18 minutes	0.08	Low
	5	13	124 hours 18 minutes	0.10	Low
	6	118	124 hours 18 minutes	0.95	Low
	7	14	124 hours 18 minutes	0.11	Low
	8	43	124 hours 18 minutes	0.35	Low
	9	7	124 hours 18 minutes	0.06	Low
	10	8	124 hours 18 minutes	0.06	Low
	11	10	124 hours 18 minutes	0.08	Low
	12	0	124 hours 18 minutes	0.00	Low
Spring mean		21		0.16	Low
Summer	1	217	83 hours 6 minutes	2.61	Medium
	2	12	83 hours 6 minutes	0.14	Low
	3	2	83 hours 6 minutes	0.02	Low
	4	8	83 hours 6 minutes	0.10	Low
	5	22	83 hours 6 minutes	0.26	Low
	6	17	83 hours 6 minutes	0.20	Low
	7	23	83 hours 6 minutes	0.28	Low
	8	13	83 hours 6 minutes	0.16	Low
	9	3	83 hours 6 minutes	0.04	Low
	10	3	83 hours 6 minutes	0.04	Low
	11	5	83 hours 6 minutes	0.06	Low
	12	4	83 hours 6 minutes	0.05	Low

Survey Period	SP no:	Number of Myotis Species Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Summer mean		28		0.03	Low
Autumn	1	114	112 hours 15 minutes	1.02	Low
	2	11	112 hours 15 minutes	0.10	Low
	3	13	112 hours 15 minutes	0.12	Low
	4	2	112 hours 15 minutes	0.02	Low
	5	29	112 hours 15 minutes	0.26	Low
	6	18	112 hours 15 minutes	0.16	Low
	7	8	112 hours 15 minutes	0.07	Low
	8	42	112 hours 15 minutes	0.37	Low
	9	7	112 hours 15 minutes	0.06	Low
	10	4	112 hours 15 minutes	0.04	Low
	11	21	112 hours 15 minutes	0.19	Low
	12	0	112 hours 15 minutes	0.00	Low
Autumn mean		23		0.20	Low

Table C: Number of Soprano pipistrelle passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of Soprano pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	22	124 hours 18 minutes	0.18	Low
	2	15	124 hours 18 minutes	0.12	Low
	3	0	124 hours 18 minutes	0.00	Low
	4	327	124 hours 18 minutes	2.63	Medium
	5	54	124 hours 18 minutes	0.43	Low
	6	259	124 hours 18 minutes	2.08	Medium
	7	15	124 hours 18 minutes	0.12	Low
	8	510	124 hours 18 minutes	4.10	Medium
	9	4	124 hours 18 minutes	0.03	Low
	10	5	124 hours 18 minutes	0.04	Low
	11	80	124 hours 18 minutes	0.64	Low
	12	0	124 hours 18 minutes	0.00	Low
Spring mean		108		0.86	Low
Summer	1	119	83 hours 6 minutes	1.43	Low
	2	69	83 hours 6 minutes	0.83	Low
	3	1	83 hours 6 minutes	0.01	Low
	4	9	83 hours 6 minutes	0.11	Low
	5	26	83 hours 6 minutes	0.31	Low
	6	28	83 hours 6 minutes	0.34	Low

Survey Period	SP no:	Number of Soprano pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	7	23	83 hours 6 minutes	0.28	Low
	8	30	83 hours 6 minutes	0.36	Low
	9	1	83 hours 6 minutes	0.01	Low
	10	1	83 hours 6 minutes	0.01	Low
	11	5	83 hours 6 minutes	0.06	Low
	12	5	83 hours 6 minutes	0.06	Low
Summer mean		27		0.31	Low
Autumn	1	62	112 hours 15 minutes	0.55	Low
	2	27	112 hours 15 minutes	0.24	Low
	3	236	112 hours 15 minutes	2.10	Medium
	4	282	112 hours 15 minutes	2.51	Medium
	5	48	112 hours 15 minutes	0.43	Low
	6	266	112 hours 15 minutes	2.37	Medium
	7	12	112 hours 15 minutes	0.11	Low
	8	272	112 hours 15 minutes	2.42	Medium
	9	10	112 hours 15 minutes	0.09	Low
	10	14	112 hours 15 minutes	0.12	Low
	11	234	112 hours 15 minutes	2.08	Medium
	12	0	112 hours 15 minutes	0.00	Low
Autumn mean		122		1.08	Low

Table D: Number of No ID Pipistrelle passes per SP per Deployment Period in 2020

Survey Period	SP no:	Number of No ID Pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	29	124 hours 18 minutes	0.23	Low
	2	71	124 hours 18 minutes	0.57	Low
	3	23	124 hours 18 minutes	0.19	Low
	4	2,221	124 hours 18 minutes	17.87	High
	5	105	124 hours 18 minutes	0.84	Low
	6	143	124 hours 18 minutes	1.15	Low
	7	23	124 hours 18 minutes	0.19	Low
	8	289	124 hours 18 minutes	2.33	Medium
	9	58	124 hours 18 minutes	0.47	Low
	10	706	124 hours 18 minutes	5.68	High
	11	737	124 hours 18 minutes	5.93	High
	12	0	124 hours 18 minutes	0.00	Low
Spring mean		367		2.95	Medium

Survey Period	SP no:	Number of No ID Pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Summer	1	136	83 hours 6 minutes	1.64	Low
	2	370	83 hours 6 minutes	4.45	Medium
	3	17	83 hours 6 minutes	0.20	Low
	4	156	83 hours 6 minutes	1.88	Low
	5	25	83 hours 6 minutes	0.30	Low
	6	208	83 hours 6 minutes	2.50	Medium
	7	59	83 hours 6 minutes	0.71	Low
	8	229	83 hours 6 minutes	2.76	Medium
	9	75	83 hours 6 minutes	0.90	Low
	10	18	83 hours 6 minutes	0.22	Low
	11	153	83 hours 6 minutes	1.84	Low
	12	11	83 hours 6 minutes	0.13	Low
Summer mean		122		1.46	Low
Autumn	1	35	112 hours 15 minutes	0.31	Low
	2	37	112 hours 15 minutes	0.33	Low
	3	47	112 hours 15 minutes	0.42	Low
	4	840	112 hours 15 minutes	7.48	High
	5	67	112 hours 15 minutes	0.60	Low
	6	185	112 hours 15 minutes	1.65	Medium
	7	30	112 hours 15 minutes	0.27	Low
	8	351	112 hours 15 minutes	3.13	Medium
	9	52	112 hours 15 minutes	0.46	Low
	10	19	112 hours 15 minutes	0.17	Low
	11	257	112 hours 15 minutes	2.29	Medium
	12	0	112 hours 15 minutes	0.00	Low
Autumn mean		160		1.42	Low

2021

Table E: Number of Brown long-eared passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of Brown long-eared Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	0	89 hours 48 minutes	0.00	Low
	3	0	89 hours 48 minutes	0.00	Low
	4	0	89 hours 48 minutes	0.00	Low

Survey Period	SP no:	Number of Brown long-eared Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	5	0	89 hours 48 minutes	0.00	Low
	6	0	89 hours 48 minutes	0.00	Low
	7	0	89 hours 48 minutes	0.00	Low
	8	1	89 hours 48 minutes	0.01	Low
	9	1	89 hours 48 minutes	0.01	Low
	10	0	89 hours 48 minutes	0.00	Low
	11	2	89 hours 48 minutes	0.02	Low
	12	0	89 hours 48 minutes	0.00	Low
	13	0	89 hours 48 minutes	0.00	Low
Spring mean		0.3		0.003	Low
Summer	1	1	86 hours 42 minutes	0.01	Low
	2	4	86 hours 42 minutes	0.05	Low
	3	3	86 hours 42 minutes	0.03	Low
	4	6	86 hours 42 minutes	0.07	Low
	5	0	86 hours 42 minutes	0.00	Low
	6	2	86 hours 42 minutes	0.02	Low
	7	3	86 hours 42 minutes	0.03	Low
	8	4	86 hours 42 minutes	0.05	Low
	9	1	86 hours 42 minutes	0.01	Low
	10	2	86 hours 42 minutes	0.02	Low
	11	7	86 hours 42 minutes	0.08	Low
	12	1	86 hours 42 minutes	0.01	Low
	13	3	86 hours 42 minutes	0.03	Low
Summer mean		3		0.03	Low
Autumn	1	16	119 hours 6 minutes	0.13	Low
	2	21	119 hours 6 minutes	0.18	Low
	3	10	119 hours 6 minutes	0.08	Low
	4	26	119 hours 6 minutes	0.22	Low
	5	12	119 hours 6 minutes	0.10	Low
	6	21	119 hours 6 minutes	0.18	Low
	7	11	119 hours 6 minutes	0.09	Low
	8	14	119 hours 6 minutes	0.12	Low
	9	16	119 hours 6 minutes	0.13	Low
	10	5	119 hours 6 minutes	0.04	Low
	11	3	119 hours 6 minutes	0.03	Low
	12	15	119 hours 6 minutes	0.13	Low
	13	26	119 hours 6 minutes	0.22	Low
Autumn mean		15		0.13	Low

Table F: Number of *Myotis* Species passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of <i>Myotis</i> Species Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	1	89 hours 48 minutes	0.01	Low
	3	0	89 hours 48 minutes	0.00	Low
	4	1	89 hours 48 minutes	0.01	Low
	5	0	89 hours 48 minutes	0.00	Low
	6	1	89 hours 48 minutes	0.01	Low
	7	0	89 hours 48 minutes	0.00	Low
	8	2	89 hours 48 minutes	0.02	Low
	9	91	89 hours 48 minutes	1.01	Low
	10	0	89 hours 48 minutes	0.00	Low
	11	1	89 hours 48 minutes	0.01	Low
	12	2	89 hours 48 minutes	0.02	Low
	13	0	89 hours 48 minutes	0.00	Low
Spring mean		8		0.08	Low
Summer	1	0	86 hours 42 minutes	0.00	Low
	2	5	86 hours 42 minutes	0.06	Low
	3	0	86 hours 42 minutes	0.00	Low
	4	23	86 hours 42 minutes	0.27	Low
	5	1	86 hours 42 minutes	0.01	Low
	6	0	86 hours 42 minutes	0.00	Low
	7	19	86 hours 42 minutes	0.22	Low
	8	11	86 hours 42 minutes	0.13	Low
	9	12	86 hours 42 minutes	0.14	Low
	10	7	86 hours 42 minutes	0.08	Low
	11	10	86 hours 42 minutes	0.12	Low
	12	7	86 hours 42 minutes	0.08	Low
	13	5	86 hours 42 minutes	0.06	Low
Summer mean		8		0.09	Low
Autumn	1	22	119 hours 6 minutes	0.18	Low
	2	71	119 hours 6 minutes	0.60	Low
	3	20	119 hours 6 minutes	0.17	Low
	4	40	119 hours 6 minutes	0.34	Low
	5	13	119 hours 6 minutes	0.11	Low
	6	22	119 hours 6 minutes	0.18	Low
	7	14	119 hours 6 minutes	0.12	Low
	8	19	119 hours 6 minutes	0.16	Low
	9	3	119 hours 6 minutes	0.03	Low

Survey Period	SP no:	Number of Myotis Species Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	10	5	119 hours 6 minutes	0.04	Low
	11	11	119 hours 6 minutes	0.09	Low
	12	24	119 hours 6 minutes	0.20	Low
	13	22	119 hours 6 minutes	0.18	Low
Autumn mean		22		0.18	Low

Table G: Number of Soprano Pipistrelle passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of Soprano pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	0	89 hours 48 minutes	0.00	Low
	3	0	89 hours 48 minutes	0.00	Low
	4	1	89 hours 48 minutes	0.01	Low
	5	0	89 hours 48 minutes	0.00	Low
	6	4	89 hours 48 minutes	0.04	Low
	7	0	89 hours 48 minutes	0.00	Low
	8	1	89 hours 48 minutes	0.01	Low
	9	9	89 hours 48 minutes	0.10	Low
	10	0	89 hours 48 minutes	0.00	Low
	11	2	89 hours 48 minutes	0.02	Low
	12	3	89 hours 48 minutes	0.03	Low
	13	4	89 hours 48 minutes	0.04	Low
Spring mean		2		0.02	Low
Summer	1	22	86 hours 42 minutes	0.25	Low
	2	3	86 hours 42 minutes	0.03	Low
	3	8	86 hours 42 minutes	0.09	Low
	4	48	86 hours 42 minutes	0.55	Low
	5	2	86 hours 42 minutes	0.02	Low
	6	7	86 hours 42 minutes	0.08	Low
	7	2	86 hours 42 minutes	0.02	Low
	8	169	86 hours 42 minutes	1.95	Low
	9	21	86 hours 42 minutes	0.24	Low
	10	3	86 hours 42 minutes	0.03	Low
	11	1	86 hours 42 minutes	0.01	Low
	12	11	86 hours 42 minutes	0.13	Low
	13	8	86 hours 42 minutes	0.09	Low
Summer mean		24		0.27	Low

Survey Period	SP no:	Number of Soprano pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Autumn	1	88	119 hours 6 minutes	0.74	Low
	2	26	119 hours 6 minutes	0.22	Low
	3	225	119 hours 6 minutes	1.89	Low
	4	163	119 hours 6 minutes	1.37	Low
	5	137	119 hours 6 minutes	1.15	Low
	6	106	119 hours 6 minutes	0.89	Low
	7	9	119 hours 6 minutes	0.08	Low
	8	79	119 hours 6 minutes	0.66	Low
	9	74	119 hours 6 minutes	0.62	Low
	10	9	119 hours 6 minutes	0.08	Low
	11	55	119 hours 6 minutes	0.46	Low
	12	39	119 hours 6 minutes	0.33	Low
	13	52	119 hours 6 minutes	0.44	Low
Autumn mean		82		0.69	Low

Table H: Number of No ID Pipistrelle passes per SP per Deployment Period in 2021

Survey Period	SP no:	Number of No ID Pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
Spring	1	0	89 hours 48 minutes	0.00	Low
	2	0	89 hours 48 minutes	0.00	Low
	3	0	89 hours 48 minutes	0.00	Low
	4	2	89 hours 48 minutes	0.02	Low
	5	2	89 hours 48 minutes	0.02	Low
	6	2	89 hours 48 minutes	0.02	Low
	7	23	89 hours 48 minutes	0.26	Low
	8	10	89 hours 48 minutes	0.11	Low
	9	4	89 hours 48 minutes	0.04	Low
	10	0	89 hours 48 minutes	0.00	Low
	11	1	89 hours 48 minutes	0.01	Low
	12	2	89 hours 48 minutes	0.02	Low
	13	0	89 hours 48 minutes	0.00	Low
Spring mean		4		0.04	Low
Summer	1	19	86 hours 42 minutes	0.22	Low
	2	7	86 hours 42 minutes	0.08	Low
	3	9	86 hours 42 minutes	0.10	Low
	4	61	86 hours 42 minutes	0.70	Low
	5	9	86 hours 42 minutes	0.10	Low
	6	10	86 hours 42 minutes	0.12	Low

Survey Period	SP no:	Number of No ID Pipistrelle Bat passes	Total Time Recorded	Mean bat passes per hour	Comparative Activity level
	7	11	86 hours 42 minutes	0.13	Low
	8	142	86 hours 42 minutes	1.64	Low
	9	32	86 hours 42 minutes	0.37	Low
	10	2	86 hours 42 minutes	0.02	Low
	11	28	86 hours 42 minutes	0.32	Low
	12	15	86 hours 42 minutes	0.17	Low
	13	12	86 hours 42 minutes	0.14	Low
Summer mean		28		0.32	Low
Autumn	1	1,765	119 hours 6 minutes	14.82	High
	2	32	119 hours 6 minutes	0.27	Low
	3	93	119 hours 6 minutes	0.78	Low
	4	62	119 hours 6 minutes	0.52	Low
	5	327	119 hours 6 minutes	2.75	Medium
	6	168	119 hours 6 minutes	1.41	Low
	7	14	119 hours 6 minutes	0.12	Low
	8	137	119 hours 6 minutes	1.15	Low
	9	18	119 hours 6 minutes	0.15	Low
	10	13	119 hours 6 minutes	0.11	Low
	11	95	119 hours 6 minutes	0.80	Low
	12	16	119 hours 6 minutes	0.13	Low
	13	9	119 hours 6 minutes	0.08	Low
Autumn mean		212		1.77	