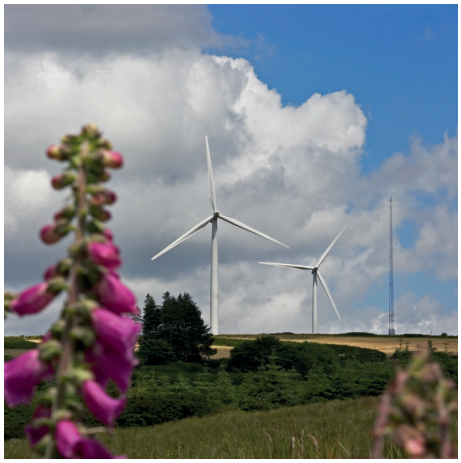
LLAN BRYN MAIR WIND FARM

Supplementary Environmental Information
October 2013





Volume III – Supporting Appendices

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BAT APPENDICES

1 BAT SURVEY METHODS

1.1 Materials and Data Analysis

Use of Bat Detectors

1.1.2 The bat detectors used for automated surveys were Wildlife Acoustics SM2Bat and SM2Bat+. These are 16-bit full-spectrum bat detectors with internal storage and computing power that allows the unit to be used as a remote fixed-point detector. Recording is triggered by ultrasound, such as bat calls, in the vicinity of the detector, and any bat calls are stored as sound files on an internal SD card.

1.1.3 SM2 detectors were placed in water-proof boxes connected by a 10m cable to an omnidirectional Wildlife Acoustics SMX-US microphone. The microphones were attached to a telescopic pole at 3.5m above ground level on, and angled at 45° to the ground to allow water to run off, as recommended by the manufacturers. For walked transect surveys and emergence/re-entry surveys surveyors used two different bat detectors on each survey to supplement visual observations: a Batbox Duet detector for listening to bat calls from the combined heterodyne/frequency division output and an Anabat (SD1 or SD2) detector or Wildlife Acoustics Echo Meter 3 (EM3) for recording calls for subsequent identification.

Assessment of data from bat detectors

1.1.4 The likelihood of detecting bats acoustically depends on the propagation of sound through air, the characteristics of bat calls, and the way sound is received and processed by the bat detector. Recent unpublished collaborative research by BSG Ecology and Bristol University has shown that bat detectors detect calls from some species of bats at greater distances than others. In general, bats with calls that can be detected over greater distances are larger bats which use calls that are both high amplitude and low frequency such as the noctule and the most difficult to detect are those which use low amplitude calls, such as the brown long-eared bat and barbastelle, or high frequencies, such as horseshoe bats (Rhinolophus spp.). Table 1.1 shows the mean frontal detection range of SM2 detectors for echolocation calls from UK bat species based on research undertaken by BSG Ecology in collaboration with Bristol University.

Table 1.1: Estimated mean frontal detection ranges for selected bat species using SM2 detectors at standard 'field' settings and converting to zero-crossing recordings.

Species	Mean Frontal Detection Range (m)
Noctule	47
Soprano pipistrelle	17
Myotis sp.[1]	6
Long-eared bat	4

Data Analysis

Bat Call Identification

1.1.5 Recorded bat calls were analysed using Analook software to confirm the identity of the bats present. Where possible, the bat was identified to species level. For species of long-eared bats records were not identified to species level due to the overlapping call parameters of

[1] Refers to any bat species of the genus Myotis.

each species but were assumed to refer to brown long-eared bats. It is unlikely that grey long-eared bat (*Plecotus austriacus*) occurs in Powys, given the species' known distribution and rarity (Harris & Yalden, 2008). Species of the genus *Myotis* were grouped together as many of the species have overlapping call parameters, making species identification problematic (BCT, 2012).

1.1.6 For Pipistrelle species the following criteria, based on measurements of peak frequency, were used to classify calls:

Common pipistrelle	≥42 and <49 kHz
Soprano pipistrelle	≥51 kHz
Nathusius' pipistrelle	<39 kHz
Common pipistrelle / Soprano pipistrelle	≥49 and <51 kHz
Common pipistrelle / Nathusius' pipistrelle	≥39 and <42 kHz

1.1.7 Bat calls which could not be ascribed to any of these categories were not used in the analysis.

Calculation of relative activity

1.1.8 The SM2 detectors were configured to record above the level of ambient noise, such as from wind or rain, and set to define a bat pass (B) as a call note of >2ms which is separated from another by more than one second.

1.1.9 AnalookW (Version 3.8, 2010) software was used for all analysis of bat calls. It enables analysis of the relative activity of different species of bats by counting the number of bat passes (B) recorded within a unit of time – hour (h) was used. More than one pass of the same species was counted within a sound file if multiple bats were recorded calling simultaneously. During analysis of sound files, it was possible to estimate the minimum number of bats recorded on individual sound files but not whether consecutive sound files had recorded, for example, a number of individual bats passing as they commute to a feeding habitat or one bat calling repeatedly as it flies up and down the edge of forestry. Although relative abundance cannot be estimated from this analysis, the number of bat passes does reflect the relative importance of a feature/habitat to bats by assigning a level of bat activity that is associated with that feature, regardless of the type of activity.

Analysis by sunset-sunrise times

1.1.10 As part of the analysis of nocturnal patterns of behaviour for bats the data were split into discrete time periods relating to their proximity to sunset or sunrise. The time categories (time codes: TC) were as follows:

TC 0 = before sunset

TC 1 = 0-20 min after sunset

TC 2 = 20-40 min after sunset

TC 3 = 40-60 min after sunset

TC 4 = 60-80 min after sunset

TC 5 = 80-100 min after sunset

TC 6 = 100-120 min after sunset

TC 7 = Middle of night (varies across seasons)

TC 8 = 120-100 min before sunrise

TC 9 = 100-80 min before sunrise

TC 10 = 80-60 min before sunrise

TC 11 = 60-40 min before sunrise

TC 12 = 40-20 min before sunrise

TC 13 = 20-0 min before sunrise

For each of these categories B/h was calculated to allow a comparison between the activity level recorded in different time periods and TC7 was corrected to allow for variation in night length throughout the survey season.

2 BAT SURVEY RESULTS

Table 2.1: Details of walked transect surveys.

Date	Survey Area	Surveyor	Time	Weather[2]
21/05/2013	1	MH, RT	21:17-23:45	START: Wind F1 NW, 10% cloud, no rain, 9˚C FINISH: Wind F1 NW, 100% cloud, no rain, 9˚C
07/05/2013	2	MH, RT	20:55-23:21	START: Wind F1 SSW, 20% cloud, no rain, 12˚C FINISH: Wind F2 SSW, 70% cloud, no rain, 12˚C
29/05/2013	3	RT, GL	21:15-00:05	START: Wind F3 NW,95% cloud, light rain, 11.4 ˚C FINISH: Wind F2 NW,95% cloud, no rain, 11.7 ˚C
30/05/2013	4	GL, RT	21:13-23:15	START: Wind F1 NW, 20% cloud, no rain, 11.4 ˚C FINISH: Wind F1 NW, 0% cloud, no rain, 11.5 ˚C
04/06/2013	1	RT, MH	21:30-00:21	START: Wind F1 NE, 30% cloud, no rain.12.4 ˚C FINISH: Wind F0-1 NE, 5% cloud, no rain, 10 ˚C
03/06/2013	2	MH, RT	21:30-00:05	START: Wind F0-1 SE, 30% cloud, no rain, 11.8 ˚C FINISH: Wind F0-1 SE, 0% cloud, no rain, 10 ˚C
17/06/2013	3	GL, CS	21:25-23:56	START: Wind F2 NE, 0% cloud, no rain, 11.7 ˚C FINISH: Wind F2 NE, 0% cloud, no rain, 9.2 ˚C
19/06/2013	4	GL, CS	21:33-00:15	START: Wind F2-3 SE, 0% cloud, no rain, 14.7 ˚C FINISH: Wind F2 NE, 0% cloud, no rain, 8.2 ˚C
04/07/2013	1	GL,RT	21:46-00:15	START: Wind F1 S, 100% cloud, no rain, 14.4 ˚C FINISH: Wind F1 W, 100% cloud, no rain, 11.9 ˚C
09/07/2013	2	RT, SB	21:37-23:49	START: Wind F2 SE, 5% cloud, no rain, 16.9 ˚C FINISH: Wind F0-1 SE, 10% cloud, no rain, 16.5 ˚C
10/07/2013	3	RT, SB	21:30-00:10	START: Wind F1-2 SE, 40% cloud, no rain,15.9 ˚C FINISH: Wind F1-2 NE, 40% cloud, no rain, 14.5 ˚C
17/07/2013	4	GL, CS	21:23-23:07	START: Wind F1-2 NE,10% cloud, no rain, 16.8 ˚C FINISH: Wind F1 NE,0% cloud, no rain, 14.1 ˚C
06/08/2013	1	RT, GL	20:57-23:36	START: Wind F2 WNW,70% cloud, no rain,14.7 ˚C FINISH: Wind F1 N, 50% cloud, no rain, 9.3 ˚C
07/08/2013	2	RT, GL	20:55-23:17	START: Wind F1 SE,30% cloud, no rain,19.1 ˚C FINISH: Wind F1 SE,0% cloud, no rain, 11.1 ˚C
14/08/2013	3	RT,GL	20:35-23:10	START: Wind F2-3 W, 80% cloud, no rain,16 ˚C FINISH: Wind F2 W, 100% cloud, light rain, 15.1 ˚C
22/08/2013	4	GL, VA	20:17-22:54	START: Wind F1 NE,0% cloud, no rain,17.4 ˚C FINISH: Wind F1 NE,0% cloud, no rain, 14.1 ˚C

[2]Wind strength is given in the Beaufort scale. This is an empirical measure that relates wind speed to observed conditions at sea or on land.

Table 2.2: Number of passes and relative activity recorded during walked transect surveys.

Species	SA1				SA2				SA3				SA4				Total	B/h
	21/05	04/06	04/07	06/08	07/05	03/06	09/07	07/08	29/05	17/06	10/07	14/08	30/05	19/06	17/07	22/08		
Myotis sp.	1	3	4	6			1				1	2			1	10	**29**	**0.7**
Noctule		2	1					2		1						2	**8**	**0.2**
Common/Nathusius' pipistrelle				1												7	**8**	**0.2**
Common pipistrelle	1	12	113	43		1	6			10	4	7		2	5	52	**256**	**6.3**
Common/soprano pipistrelle		43	32	25	1	1	17	1	1	1		18	17	7	8	13	**185**	**4.5**
Soprano pipistrelle		44	62	23	2	1	22			6		6	4		12	40	**222**	**5.5**
Total	**2**	**104**	**212**	**98**	**3**	**3**	**46**	**3**	**1**	**18**	**5**	**33**	**21**	**9**	**26**	**124**	**708**	**17.4**
B/h per transect	**0.8**	**36.5**	**85.4**	**37.0**	**1.2**	**1.2**	**20.9**	**1.3**	**0.4**	**7.2**	**1.9**	**12.8**	**10.3**	**3.3**	**9.5**	**47.4**	**17.4**	

Table 2.3: Locations and deployment dates of automated detectors.

Survey Area	Location	OS Grid Ref	May	June	July	August
1	26	SH 95982 09095	08-12/05	14-18/06	04-08/07	07-11/08
	26A	SH 95988 09190	08-12/05	14-18/06	04-08/07	07-10/08
	27	SH 96419 09027	08-10/05	14-18/06	04-08/07	07-11/08
	27A	SH 96350 09069	08-10/05	14-18/06	04-08/07	07-11/08
	35+36A	SH 95946 08373	08-12/05		04-08/07	07-11/08
	37A	SH 95703 08835	08-12/05		04-08/07	
	38	SH 96007 08635		14-18/06		07-11/08
	40	SH 96788 08936	22-26/05	14-18/06	04-08/07	06-10/08
	40A	SH 96828 08966	22-26/05	14-18/06	04-08/07	06-10/08
	43	SH 96818 08469		14-18/06		07-11/08
2	14	SH 94590 06305	07-11/05		05-09/07	
	15	SH 94938 06501		18-22/06		07-11/08
	16	SH 94341 06803	07-11/05	14-18/06	04-08/07	07-11/08
	16A	SH 94285 06772	07-11/05	14-18/06	04-08/07	07-11/08
	17	SH 95230 06939		14-18/06		07-11/08
	24	SH 94991 06123		14-16/06		07-11/08
	25	SH 95014 07338	08-12/05		11-15/07	
	42	SH 95340 06551	07-11/05		05-09/07	
3	7	SH 92960 04935	22-26/05		11-15/07	
	8	SH 93404 05040		20-24/06	11-15/07	15-19/08
	12	SH 94288 05267	22-26/05	18-22/06	11-15/07	15-19/08
	12A	SH 94418 05215	22-26/05	18-22/06	11-15/07	15-19/08
	13	SH 94242 05795	22-26/05	18-22/06	18-22/07	15-19/08
	13A	SH 94209 05744	22-26/05	18-22/06	18-22/07	15-19/08
	23	SH 94680 05562		28/06-02/07		15-19/08
4	4A	SH 92614 04310	22-26/05		11-15/07	
	5	SH 92925 04087	23-27/05		15-19/08	
	6	SH 93298 04091	23-27/05		11-15/07	
	9	SH 93763 04052	23-27/05	20-24/06	11-15/07	15-19/08
	9A	SH 93768 04114	23-27/05	20-24/06	11-15/07	15-18/08
	18A	SH 93482 03680	22-26/05		11-15/07	
	31A	SH 92488 03904		19-23/06		15-18/08
	32	SH 92572 03619		19-23/06		15-19/08
	39A	SH 93542 03198		20-24/06		15-19/08
	41	SH 93019 03645		19-23/06		15-19/08

Table 2.4: Number of passes and relative activity recorded during automated detector surveys.

	Species		Common pipistrelle	Common/soprano pipistrelle	Soprano pipistrelle	*Myotis* sp.	Noctule	Common/ Nathusius' pipistrelle	Long-eared bat sp.	Total	Detector duration	B/h	Group B/h
Group 1	**9**	MAY	0	1	0	1	0	0	0	2	2618	0.05	1.99
		JUNE	0	7	7	2	0	1	0	17	2445	0.42	
		JULY	37	66	37	29	10	1	0	180	2574	4.20	
		AUGUST	32	91	82	32	3	0	0	240	3130	4.60	
	12	MAY	0	1	0	3	0	0	0	4	2630	0.09	
		JUNE	2	6	0	1		0	0	9	2444	0.22	
		JULY	10	34	9	18	2	0	0	73	2574	1.70	
		AUGUST	17	22	24	5	2	0	0	70	3130	1.34	
	13	MAY	0	0	0	7	0	0	0	7	2630	0.16	
		JUNE	0	0	0	0	0	0	0	0	2444	0.00	
		JULY	11	11	4	21	4	0	0	51	2662	1.15	
		AUGUST	33	195	396	51	1	1	0	677	3130	12.98	
	16	MAY	1	0	0	0	0	0	0	1	2854	0.02	
		JUNE	0	0	0	0	0	0	0	0	2449	0.00	
		JULY	0	0	0	0	0	0	0	0	2508	0.00	
		AUGUST	12	17	12	6	0	0	0	47	2982	0.95	
	26	MAY	0	0	0	4	0	0	0	4	2838	0.08	
		JUNE	1	0	0	0	0	0	0	1	2449	0.02	
		JULY	117	56	35	63	0	5	0	276	2508	6.60	
		AUGUST	37	6	13	2	19	0	0	77	2982	1.55	
	27	MAY	0	0	0	0	0	0	0	0	1713	0.00	
		JUNE	1	1	0	0	0	2	0	4	2449	0.10	
		JULY	130	71	33	54	2	7	0	297	2508	7.11	
		AUGUST	57	29	27	21	12	1	0	147	2982	2.96	
	40	MAY	0	0	0	1	0	0	0	1	2630	0.02	

		JUNE	48	16	7	6	7	2	0	86	2449	2.11	
		JULY	17	7	1	3	0	0	0	28	2508	0.67	
		AUGUST	70	34	23	23	9	4	0	163	2964	3.30	
Group 2	**9A**	MAY	2	3	4	7	0	0	0	16	2618	0.37	19.49
		JUNE	5	7	6	1	0	0	0	19	2445	0.47	
		JULY	1129	678	602	123	13	70	3	2618	2574	61.03	
		AUGUST	0	0	0	0	0	0	0	0	2496	0.00	
	12A	MAY	0	0	0	0	0	0	0	0	2630	0.00	
		JUNE	31	24	16	7	0	3	0	81	2444	1.99	
		JULY	131	156	99	37	3	2	0	428	2574	9.98	
		AUGUST	304	165	221	28	1	5	0	724	3130	13.88	
	13A	MAY	0	0	0	0	0	0	0	0	2630	0.00	
		JUNE	42	5	5	8	0	0	0	60	2444	1.47	
		JULY	57	29	22	50	10	1	3	172	2662	3.88	
		AUGUST	640	2859	2806	53	8	0	0	6366	3130	122.03	
	16A	MAY	0	0	0	0	0	0	0	0	2854	0.00	
		JUNE	0	0	0	0	0	0	0	0	2449	0.00	
		JULY	137	76	33	23	0	4	0	273	2508	6.53	
		AUGUST	167	258	445	53	2	1	0	926	2982	18.63	
	26A	MAY	0	0	0	1	0	0	0	1	2838	0.02	
		JUNE	74	21	7	7	0	9	0	118	2449	2.89	
		JULY	1653	793	280	164	14	62	0	2966	2508	70.96	
		AUGUST	44	7	0	0	0	0	0	51	2378	1.29	
	27A	MAY	0	0	0	0	0	0	0	0	1713	0.00	
		JUNE	63	13	10	6	0	13	0	105	2449	2.57	
		JULY	2258	1115	455	234	267	63	0	4392	2508	105.07	
		AUGUST	1819	457	709	96	4	2	0	3087	2982	62.11	
	4OA	MAY	0	0	0	0	0	0	0	0	2630	0.00	

		JUNE	1	0	0	1	0	0	0	2	2449	0.05	
		JULY	0	0	0	0	0	0	0	0	2508	0.00	
		AUGUST	671	264	238	92	16	7	0	1288	2964	26.07	
Group 2	**4**	MAY	5	1	0	13	0	1	0	20	2630	0.46	14.07
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	356	181	152	162	4	4	0	859	2574	20.02	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	5	MAY	2	2	1	12	0	0	0	17	2618	0.39	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	3130	0.00	
		AUGUST	62	62	118	187	2	1	0	432	N/A	#VALUE!	
	18	MAY	0	0	0	3	0	0	0	3	2630	0.07	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	309	272	423	128	16	22	1	1171	2574	27.30	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	31	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JUNE	35	12	9	30	0	1	0	87	2444	2.14	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	o	2	6	0	0	0	0	8	2496	0.19	
	35-6	MAY	0	0	0	4	0	0	0	4	3972	0.06	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	1535	1033	134	66	20	11	0	2799	2508	66.96	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	37	MAY	0	0	0	4	0	0	0	4	3972	0.06	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	1383	307	313	76	22	3	0	2104	2508	50.33	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	39	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	

		JUNE	37	75	28	26	0	7	0	173	2445	4.25	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	307	762	365	136	29	12	2	1613	3130	30.92	
Group 3	**6**	MAY	1	0	1	2	0	0	0	4	2618	0.09	0.61
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	22	38	39	40	7	2	0	148	2574	3.45	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	7	MAY	0	0	0	1	0	0	0	1	2630	0.02	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	9	7	10	5	2	0	0	33	2574	0.77	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0.00	
	8	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JUNE	0	1	0	1	0	0	0	2	2445	0.05	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	4	11	8	4	0	0	0	27	3130	0.52	
	14	MAY	0	1	0	0	0	0	0	1	2854	0.02	
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JULY	5	7	4	8	2	1	0	27	2517	0.64	
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
	15	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JUNE	7	13	0	0	0	0	0	20	2444	0.49	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	43	154	100	11	15	4	0	327	2982	6.58	
	17	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		JUNE	2	2	1	0	3	0	0	8	2449	0.20	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	6	12	3	5	9	0	0	35	2982	0.70	
	23	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	

		JUNE	0	0	0	7	0	0	0	7	2469	0.17
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		AUGUST	17	43	52	11	2	0	0	125	3130	2.40
	24	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1471	0.00
		JUNE	0	0	0	0	0	0	0	0	N/A	0.00
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	2982	0.00
		AUGUST	4	7	3	10	0	0	0	24	2838	0.51
	25	MAY	0	0	0	0	0	0	0	0	N/A	0.00
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		JULY	21	21	3	2	2	4	0	53	2574	1.24
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
	32	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		JUNE	4	4	4	33	0	0	0	45	2444	1.10
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		AUGUST	64	104	103	36	5	4	1	317	3130	6.08
	38	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		JUNE	34	19	4	6	2	6	0	71	3829	1.11
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		AUGUST	86	16	17	15	6	1	0	141	2982	2.84
	41	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		JUNE	3	5	2	0	0	2	0	12	2444	0.29
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		AUGUST	12	39	41	99	0	0	0	191	2496	4.59
	42	MAY	0	2	0	0	0	0	0	2	2854	0.04
		JUNE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
		JULY	190	103	58	33	0	0	0	384	2517	9.15
		AUGUST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00
	43	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00

		JUNE	32	25	15	7	5	6	0	90	2449	2.20	
		JULY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0.00	
		AUGUST	214	153	123	82	35	4	0	611	2982	12.29	
	Total		14672	11097	8808	2609	597	362	10	38155	262551	8.72	
	Detector duration		262551	262551	262551	262551	262551	262551	262551	262551			
	B/hr		3.35	2.54	2.01	0.60	0.14	0.08	0.00	8.72			

Table 2.5: Details of driven transect surveys.

Date	Surveyors	Weather	Start/finish times of survey
22/05/2013	MH	Cloud 60%, Wind F3-4 NW, no rain, 8^{0}C	21:22-00:33
07/07/2013	MH	Cloud 0%, Wind F0 NW, no rain, 17.5-13^{0}C	21:36-00:09
16/07/2013	MH	Cloud 80%, Wind F0, no rain, 13.5-9.5^{0}C	21:01-23:54

Table 2.6: Summary of bat activity during emergence/re-entry surveys.

Date	Diosig Bridge	Gosen Bridge	Ash Tree
12/06/2013	Emergence Low levels of foraging by soprano pipistrelle bats from around 50mins after sunset. Occasional common pipistrelle bat activity. One *Myotis* bat passe 60mins after sunset.		Emergence Noctule bat/s recorded at 22:05-22:08hrs (but did not emerge from the tree). Regular common pipistrelle activity with bats foraging in the trees. Occasional soprano pipistrelle passes. *Myotis* bats infrequent, with only one pass recorded at 23:09hrs.
13/06/2013	Re-entry Low levels of bat activity with occasional soprano and common pipistrelle bat passes. Short feeding bouts by individual bats.	Emergence Single cmmon pipistrelles emerged at 21:50hrs and 21:58hrs. Activity at sunset from low numbers of common and soprano pipistrelle bats foraging. Two passes by *Myotis* bats around 22:50hrs	Re-entry Regular activity from common and soprano pipistrelle bats until 04:22hrs.
14/06/2013		Re-entry Very low levels of activity with only seven common and soprano pipistrelle passes.	
16/06/2013	Emergence Low levels of foraging by soprano pipistrelle bats from around 30 minutes after sunset. *Myotis* bat passes were recorded at 22:08, 22:17 and 22:21hrs. A noctule bat passed over the site at 22:38hrs.		Emergence First activity at 21:28hrs, almost half and hour after sunset. Soprano pipistrelle bats foraging, with up to two bats seen. *Myotis* bat passes at 22:08hrs, flying directly overhead. Two subsequent passes by *Myotis* bats were recorded later in the

			evening. Most activity was from soprano pipistrelle bats.
17/06/2013		<u>Re-entry</u> Constant activity around the bridge between 03:34hrs and 04:14hrs by *Myotis* and common and soprano bats. Activity reduced after this, but continued until 04:29hrs .	<u>Re-entry</u> Regular activity by *Myotis* bats between 03:45hrs and 04:21hrs, probably feeding in the woodland and trees, but not close to the ash tree. One common pipistrelle bat pass at 04:11hrs.

Image 2.1: A rot hole in the single mature ash tree.

Image 2.2: The context of the ash tree on the edge of the Talerddig to Llanerfyl road.

Image 2.3: Missing blocks in the south-east face of the Gosen Bridge.

Image 2.4: a small crack in the pointing on south-west corner of the arch

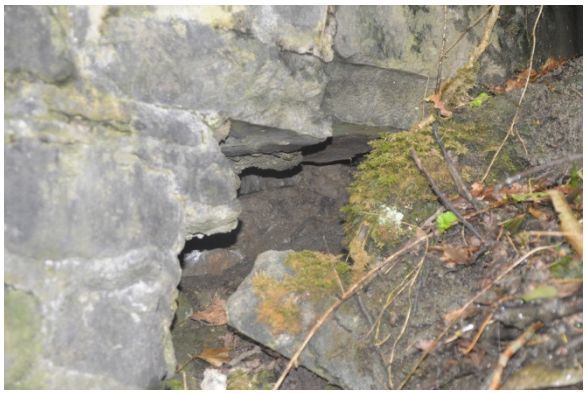

Image 2.5: The eastern arch of the Gosen Bridge. The underside at the far corner has a small crack from where two common pipistrelle bats emerged on 13/06/2013.

Image 2.4: A crack beneath ivy on the north-east face of the Gosen Bridge.

Image 2.7: The arch of the Diosig Bridge. The arch has been repointed and consequently there are only a few remaining crevices.

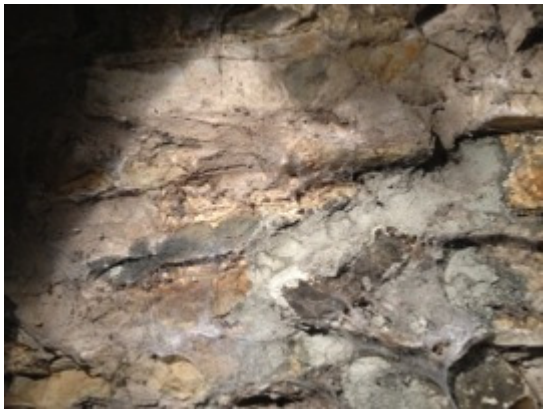

Image 2.8: One of the few remaining crevices which provides enough space for one or two bats.