BSG | ecology

Bayfields, Chepstow

Bat Survey Report

BLANK PAGE

BSG | ecology

Issuing office

Merlin House | No 1 Langstone Business Park | Newport | NP18 2HJ
T: 01633 509000 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

Client	Barratt and David Wilson Homes (South Wales)
Project	Bayfields, Chepstow, Bat Survey
Version	FINAL
Project number	P17-095 Bat Survey Report

	Name	**Position**	**Date**
Originated	James Garside	Ecologist	23 March 2018
Reviewed	James Gillespie	Partner	22 October 2018
Approved for issue to client	James Gillespie	Partner	22 October 2018
Issued to client	James Gillespie	Partner	24 October 2018

Contents

1 Methods

Desk study

1.1 A data search of the Site and a 2 km buffer was commissioned from the South East Wales Biodiversity Records Centre (SEWBReC). This area was considered sufficiently large to highlight existing species data of relevance to the Site. This search included all bat species records within the search area. In addition, a search was made of the online resource 'Magic' (Magic.defra.gov.uk, accessed 31 March 2017), for statutory designated sites with bat interest within 5 km of the Site. The relevant results of the desk study are discussed in Section 2.

Field survey

Static detector surveys

1.2 Three static detectors were deployed at the Site: one (D1) at the northern hedge (at Grid Reference: ST 52069 94285), one (D2) at the central hedge (at Grid Reference: ST 52084 93927) and one (D3) at the southern hedge (at Grid Reference: ST 52193 93841) (see Figure 1).

1.3 Song Meter 2 (SM2+) bat detectors with external microphones were deployed at each location. The detectors were configured to record above the level of ambient noise, such as from wind or rain, using an adaptive trigger set to 6 dB. They were set to define a bat pass as a call note of >2 ms separated from another by more than one second. Each bat detector was housed in a waterproof Peli-case. An external microphone was connected via a cable to the logger, and attached to a suitable tree approximately 2 m above ground level.

1.4 The static detectors were set to record for a minimum of five night periods from half an hour before sunset to half an hour after sunrise, the period during which bats are usually active away from their roosts. The duration of recording per night varied throughout the survey period according to day/night length.

Transect surveys

1.5 Eight dusk walked (manual) transects were undertaken, one per month (April to October inclusive) with a dawn transect in September also. The walked element of the surveys followed a predetermined transect route (see Figure 1) through the site and recorded all bat echolocation calls using Anabat (SD1 and 2), Bat Box Duet, and Echo Meter (EM3) bat detectors, as well as noting any bat activity heard or seen (on standardised recording forms). Two surveyors walked each transect. Surveys were carried out only when weather conditions were suitable for bats to be active, where possible, avoiding temperatures below 10°C, heavy rain and high wind (Collins, 2016). Each transect took a minimum of 2 hours to complete. The timing of the dusk surveys covered the peak bat emergence period (from sunset to 1 hr after sunset) and the period of most intense foraging activity (2 hours after sunset). The dawn survey covered the peak bat re-entry period.

1.6 The start point and direction of travel was altered between successive surveys to ensure that different parts of the Site were surveyed at different times of the night. This approach aimed to reduce potential bias in sampling.

Bat call identification

1.7 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. Species of the genus *Myotis* were grouped together as overlapping call parameters make species identification problematic (Collins, 2016).

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

- Common pipistrelle *Pipistrellus pipistrellus* ≥42 and <49 kHz
- Soprano pipistrelle *Pipistrellus pygmaeus* ≥51 kHz
- Nathusius' pipistrelle *Pipistrellus nathusii* <39 kHz
- Common pipistrelle / soprano pipistrelle ≥49 and <51 kHz
- Common pipistrelle / Nathusius' pipistrelle ≥39 and <42 kHz

Calculation of relative activity

1.9 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 >2 ms separated from another by more than one second.

1.10 AnalookW software was used for all analysis of bat calls. The software enables analysis of the relative activity (referred to as 'activity' in the text below) 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 hedge cannot be distinguished. Although relative abundance cannot therefore be estimated from this analysis, the number of bat passes does provide an indication of the importance of features/habitats 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

1.11 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

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

Project personnel

1.13 The bat survey work reported on here has been completed by Rachel Taylor ACIEEM (Senior Ecologist); Gareth Lang ACIEEM (Senior Ecologist); Matthew Hobbs, MCIEEM (Principal Ecologist); Niall Lusby, MCIEEM (Senior Ecologist); James Garside, BSc (Hons) (Ecologist) and Jim Gillespie MCIEEM (Partner).

1.14 Data analysis and reporting of the bat survey work were completed by James Garside. James has worked as a professional ecologist for over two years and has produced a number of bat survey reports for residential development projects. Jim Gillespie technically reviewed this report and was project director. Jim has worked as a professional ecologist for over 20 years, and has worked on many bat survey projects and proposed housing development schemes.

1.15 Further details can be found at http://www.bsg-ecology.com/people/

Limitations to methods

1.16 During the recording periods June-September (inclusive), large volumes of noise were recorded by the static detectors, caused by stridulating[1] crickets. This resulted in several instances of detector SD cards filling in fewer than five nights. In most cases, detectors were redeployed and 5 nights of data was recorded in total for that month (though in one instance, the first three nights of the following month were recorded). Of 105 deployment nights, 103 were recorded successfully (98%). This is not considered to have limited the overall characterisation of bat activity at the Site or the objectives of the study. As the SD cards filled at different rates between detectors, it was not always possible to record simultaneous data. Despite this, the dataset is sufficient to provide a comprehensive assessment of the Site's bat community. See Table 1 in the Appendix for more detail regarding the dates and number of days on which data was recorded.

[1] Stridulation is the act of producing sound by rubbing two body parts together. It is commonly exhibited by displaying male crickets and grasshoppers *Orthoptera*.

2 Results

Desk Study

2.1 The data search returned records of nine species of bat on the Site, as well as records for *Myotis* and *Pipistrellus* genera and general records of *Chiroptera*. These include 164 records of lesser horseshoe bat *Rhinolophus hipposideros*, 39 records of greater horseshoe bat *Rhinolophus ferrumequinum*, three records of Bechstein's bat *Myotis bechsteinii*, and a single record of Western barbastelle *Barbastella barbastellus*.

2.2 The Wye Valley Woodlands SAC and SSSI is approximately 570 m east of the Site. The woodlands are designated for their habitat and species interest, including the presence of lesser horseshoe bat.

2.3 The Wye Valley Lesser Horseshoe Bat SAC and SSSI is a multi-component designated site that covers key roosts within the Wye valley. Itton Court is approximately 2.8 km north-west of the Site and is designated as an important transition roost.

Field survey

Static bat detector survey summary

2.4 Static bat detectors recorded for a total of 103 nights, equating to 994 hours 7 mins of survey time. Table 1 in the Appendix gives details of static detector deployment dates (by location).

2.5 Table 1 (below) gives details of the distribution of bat activity across the Site (giving a comparison between the boundary features) as well as total activity recorded (for each species and in total) during automated detector surveys. Detector locations are shown on Figures 1 and 2 and a graphical summary of automated detector survey results is shown on Figure 2

Table 1: Activity (B/h) per detector and in total for each bat species recorded during static surveys.

Note: the 'other' row refers to activity that could not be identified to species level due to overlapping call parameters (e.g. common / soprano pipistrelle) (excluding Myotis spp.).

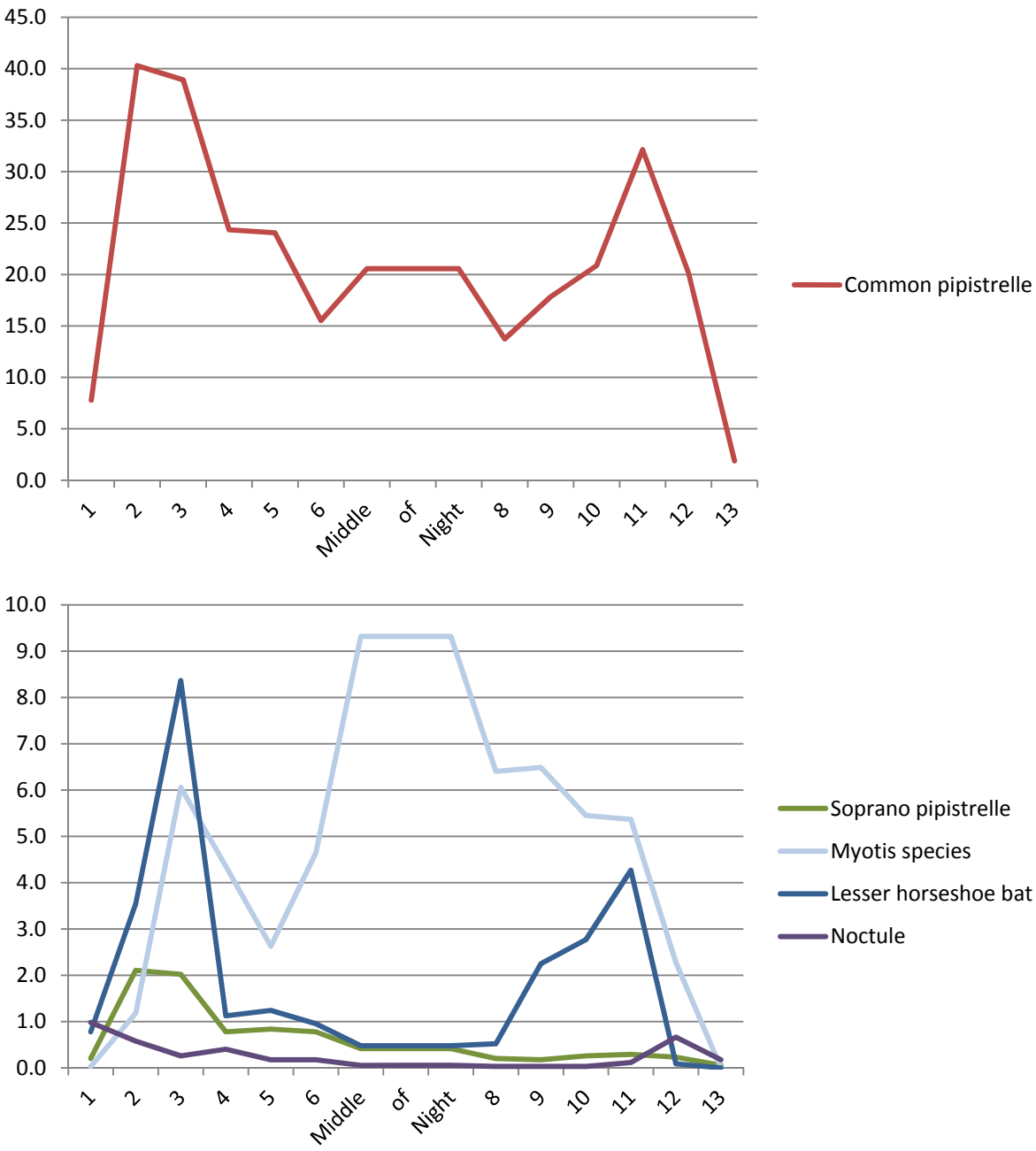
	Month							
Species	April	May	June	July	August	September	October	B/h
Common pipistrelle	2.3	6.3	20.4	16.2	8.5	45.0	32.0	20.8
Soprano pipistrelle	0.4	0.2	0.2	0.4	1.1	0.7	0.5	0.5
Myotis spp.	0.3	0.6	1.5	1.2	3.1	24.9	8.5	6.9
Long eared bat spp.	0.0	<0.1	<0.1	<0.1	0.0	0.0	<0.1	<0.1
Serotine	<0.1	0.2	0.1	0.1	0.1	0.2	<0.1	0.1
Leisler's bat	0.1	0.2	0.1	<0.1	0.1	<0.1	<0.1	0.1
Noctule	<0.1	0.2	0.1	0.1	0.3	0.2	0.1	0.2
Lesser horseshoe bat	<0.1	1.2	5.0	0.9	0.7	1.2	0.3	1.2
Greater horseshoe bat	0.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Other	0.1	0.5	1.7	0.7	0.4	0.6	0.4	0.6
Grand Total	**3.2**	**9.5**	**29.2**	**19.6**	**14.3**	**72.9**	**41.9**	**30.3**

2.6 For the whole recording period, total bat activity at the Site was recorded as 30.3 B/h (30,135 passes in total), from a minimum of nine species. The highest activity rates were recorded for common pipistrelle and *Myotis spp.*.There was an initial peak in activity in June, and a larger peak in September / October, caused primarily by an increase in common pipistrelle and *Myotis spp.* activity.

2.7 Graph 1 (below) shows the activity of bats throughout the night. The highest levels of activity were recorded 21-60 minutes after sunset.

Graph 1: Activity (B/h) of bat species throughout the night.

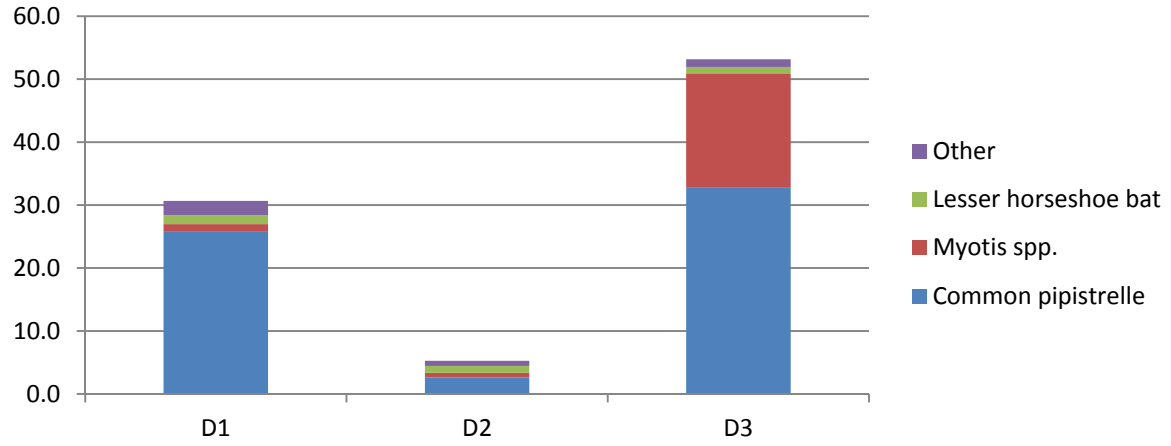
Note only data for species showing activity peaks is presented.



2.8 Noctule activity peaked in the first 20 mins following sunset, though there was only one noctule pass prior to sunset. Activity for both common and soprano pipistrelle peaked between 21-60 mins after sunset. Lesser horseshoe bat and *Myotis spp*. activity both peaked in the period 41-60 mins after sunset. Lesser horseshoe bat, *Myotis spp.* and noctule also showed lower peaks in activity in the 60 mins prior to sunrise.

2.9 Graph 2 (overleaf) shows the total activity at the three detectors across the Site. Total activity was substantially lower at D2 than the other detectors.

Graph 2: Activity at each detector over the whole recording period.



2.10 Lesser horseshoe bat activity was relatively even across the Site, with 1.4 B/h, 1.1 B/h and 1.0 B/h recorded at D1, D2 and D3 respectively.

Walked transect survey summary

2.11 Details of transect surveys are included in Table 2 of the Appendix. Figure 1 shows the transect route and stop points, and Figures 3a and 3b show the distribution of activity across the Site during each transect. Table 2 summarises the activity levels of each species, for each transect.

Table 2: Activity (B/h) for each bat species during all walked transects

Note: total number of bat passes (B) for each species is also included. The 'other' row refers to activity that could not be identified to species level due to overlapping call parameters (e.g. common / soprano pipistrelle).

Species	Month								Species Total (passes)	Species Total (B/h)
	April	May	June	July	August	September (dusk)	September (dawn)	October		
Common pipistrelle	3.3	13.6	31.9	9.1	14.8	25.1	0.0	27.4	**270**	**15.8**
Soprano pipistrelle	0.5	0.0	1.9	0.0	0.5	5.3	0.0	7.0	**33**	**1.9**
Myotis spp.	0.0	0.0	1.4	0.5	9.5	2.2	0.0	0.0	**29**	**1.7**
Barbastelle bat	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	**2**	**0.1**
Long eared bat spp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	**1**	**0.1**
Serotine	0.0	0.0	0.5	0.0	4.3	0.0	0.0	0.0	**10**	**0.6**
Noctule	0.0	0.5	0.0	3.8	3.3	0.0	0.0	0.0	**16**	**0.9**
Lesser horseshoe bat	0.0	0.0	0.0	0.0	1.0	0.4	0.0	7.4	**19**	**1.1**
Greater horseshoe bat	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	**1**	**0.1**
Other	0.0	0.0	2.8	1.0	2.4	0.9	0.0	0.5	**16**	**0.9**
Seasonal Total	**3.8**	**14.5**	**38.4**	**14.4**	**36.7**	**34.0**	**0.0**	**42.8**	**397**	**23.2**

2.12 For all species recorded during the transects, activity was concentrated along the north-west boundary of the Site which forms the woodland edge. Lower levels of activity were recorded over the rest of the Site, in particular, the fragmented hedge that crosses the centre of the Site, which had the lowest activity of all parts of the Site that were covered by the transects.

2.13 It should be noted that two barbastelle bat passes (likely from the same animal) were recorded during the August transect. This species was not recorded by the automated detector surveys. Leisler's bat was recorded during the automated detector surveys but was not recorded during the walked (manual) transect surveys.

References

Collins, J. (2016) *Bat surveys for Professional Ecologists: Good Practice guidelines*, 3rd Edition. Bat Conservation Trust.

Appendix: Automated detector and walked transect survey information

Table 1: Bat detector locations and deployment dates

Month	Location		
	Detector 1	Detector 2	Detector 3
April	20-24 April (5 nights)	20-24 April (5 nights)	20-24 April (5 nights)
May	23-27 May (5 nights)	23-27 May (5 nights)	30-31 May; 01-03 June (5 nights)
June	20-24 June (5 nights)	20-24 June (5 nights)	20-24 June (5 nights)
July	24-28 July (5 nights)	24-28 July (5 nights)	24-28 July (5 nights)
August	11-15 August (5 nights)	10-12 August (3 nights)	11-15 August (5 nights)
September	20-24 September (5 nights)	20-24 September (5 nights)	20-23; 27 September (5 nights)
October	10-14 October (5 nights)	10-14 October (5 nights)	10-14 October (5 nights)

Table 2: Walked transect information

Month	Survey Date	Surveyors	Sunset / Sunrise	Time	Weather
April	24/04/2017	GL & JG	20:23	20:17 - 22:23	Wind F1, 6/8 cloud, no rain, 8-5˚C
May	23/05/2017	GL & JG	21:08	20:55 - 23:03	Wind F0-1, 0-1/8 cloud, no rain, 20-15˚C
June	19/06/2017	MH & NL	21:32	21:30 - 23:38	no wind, 1/8 cloud, no rain, 26-24˚C
July	24/07/2017	GL & RT	21:12	21:15 - 23:20	Wind F2, 5/8 cloud, no rain, 19-16˚C
August	10/08/2017	RT & JAG	20:43	20:44 - 22:58	no wind, 1/8 cloud, no rain, 17-15˚C
September	21/09/2017	GL & RT	19:12	19:15 - 21:31	no wind, 6-0/8 cloud, no rain, 15-10˚C
September	22/09/2017	GL & RT	06:57	04:55 - 07:00	no wind, 0/8 cloud, no rain, 7-5˚C
October	10/10/2017	GL & RT	18:28	18:30-21:39	Wind F3, 6-8/8 cloud, no rain, 14-12˚C

Figures

(overleaf)

LEGEND

- Static detector
- Stop point
- Transect route

BSG ecology

OFFICE: Newport
T: 01633 509 000

JOB REF: P17-095

PROJECT TITLE

BAYFIELDS, CHEPSTOW

DRAWING TITLE

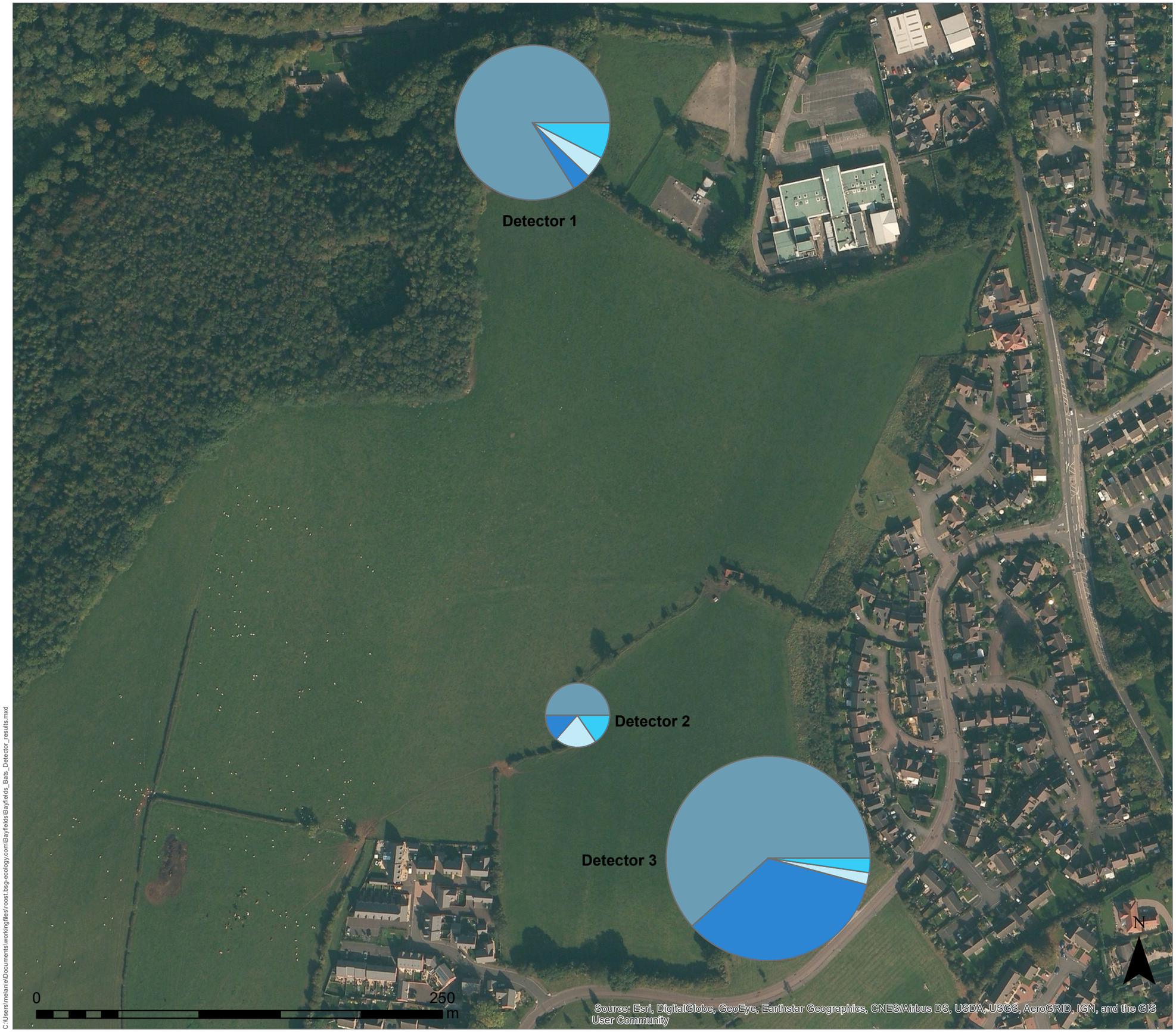
Figure 1: Static detector locations and transect route

DATE: 29.03.2018 | CHECKED: JGa | SCALE: 1:2,250

DRAWN: MS | APPROVED: JG | STATUS: DRAFT

Sources: BSG Ecology survey data

C:\Users\melanie\Documents\working\files\roost.bsg-ecology.com\Bayfields\Bayfields_Bats.mxd



LEGEND

Automated Detector Survey Reults (bat passes per hour)

Size proportional to total number of bat passes recorded per hour

- Common Pipistrelle
- *Myotis* .spp
- Lesser horseshoe
- Other

BSG | ecology

OFFICE: Newport
T: 01633 509 000

JOB REF: P17-095

PROJECT TITLE

BAYFIELDS, CHEPSTOW

DRAWING TITLE

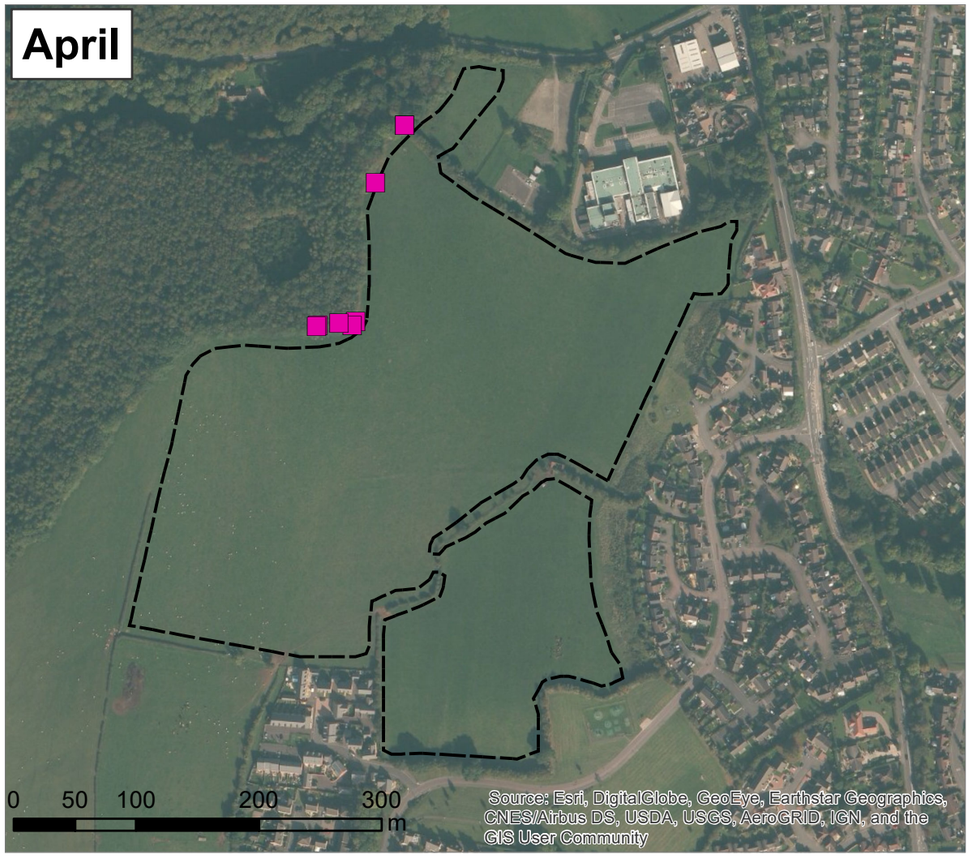
Figure 2: Static detector results

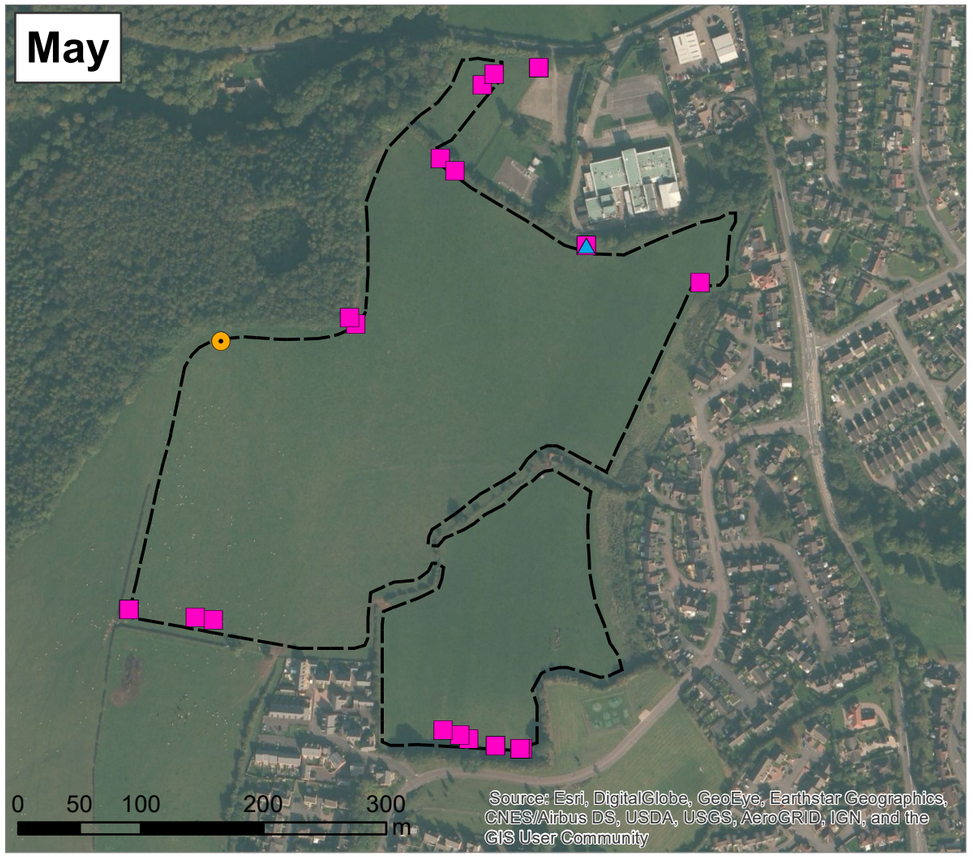
DATE: 29.03.2018 CHECKED: JGa SCALE: 1:2,250

DRAWN: MS APPROVED: JG STATUS: DRAFT

Sources: BSG Ecology survey data

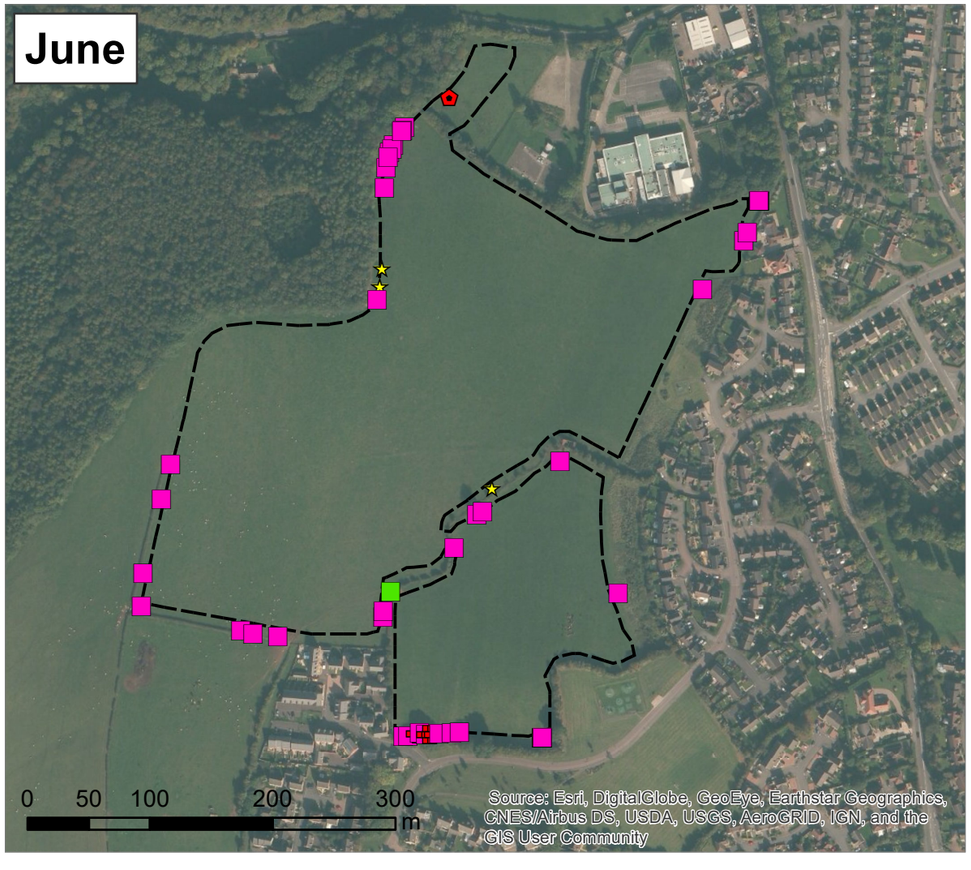
C:\Users\melanie\Documents\working\files\root.bsg-ecology.com\Bayfields\Bayfields_Bats_Detector_results.mxd

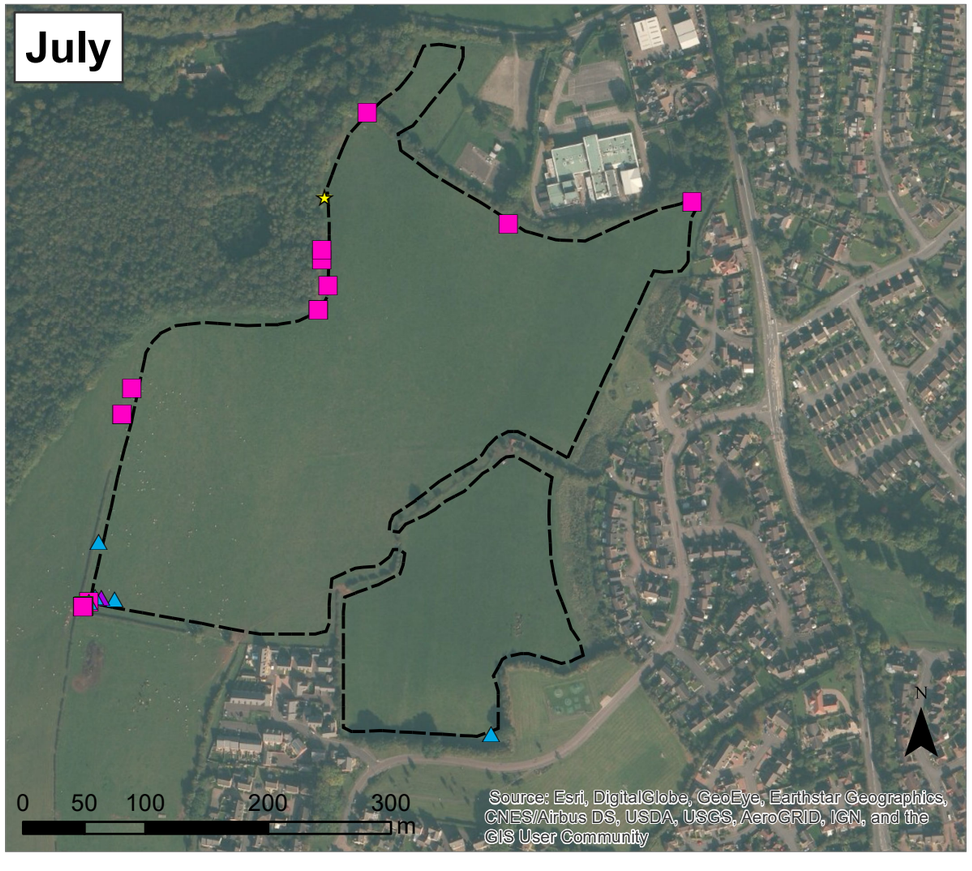




LEGEND

- Transect route
- Noctule
- Myotis
- Soprano pipistrelle
- Serotine
- Greater horseshoe bat
- Common / soprano pipistrelle
- Common pipistrelle
- Noctule / Leisler's bat





BSG | ecology

OFFICE: Newport
T: 01633 509 000

JOB REF: P17-095

PROJECT TITLE

BAYFIELDS, CHEPSTOW

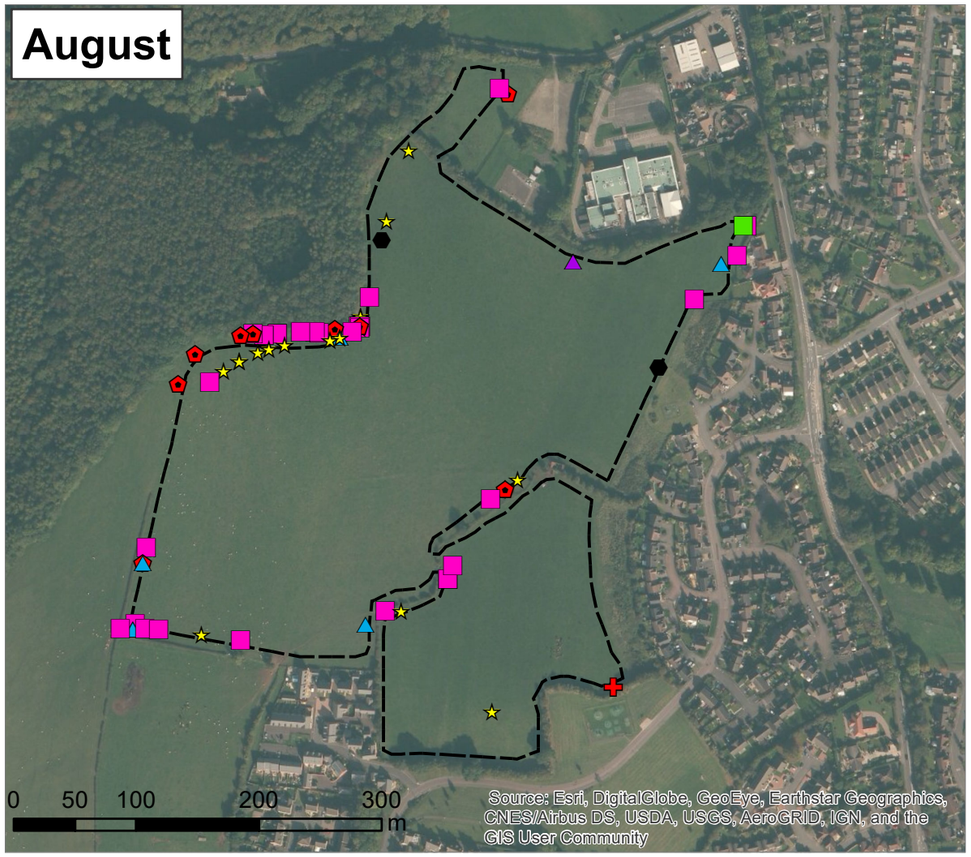
DRAWING TITLE

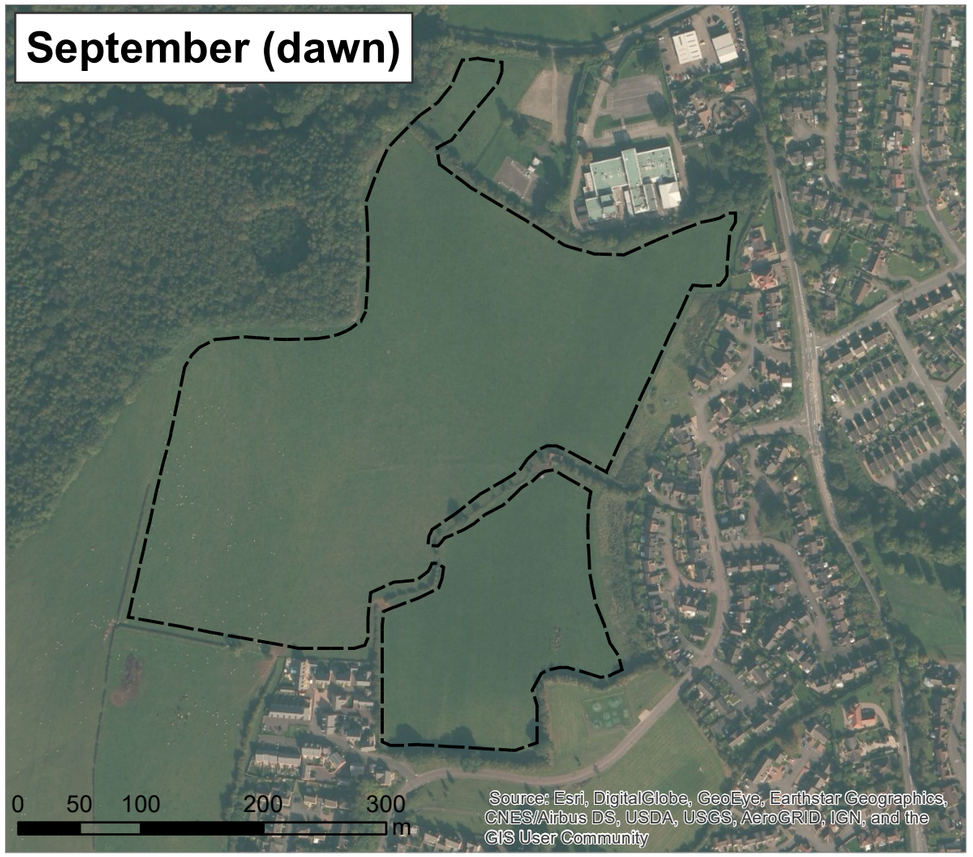
Figure 3a: Monthly transect results

DATE: 29.03.2018 CHECKED: JGa SCALE: 1:5,000

DRAWN: MS APPROVED: JG STATUS: DRAFT

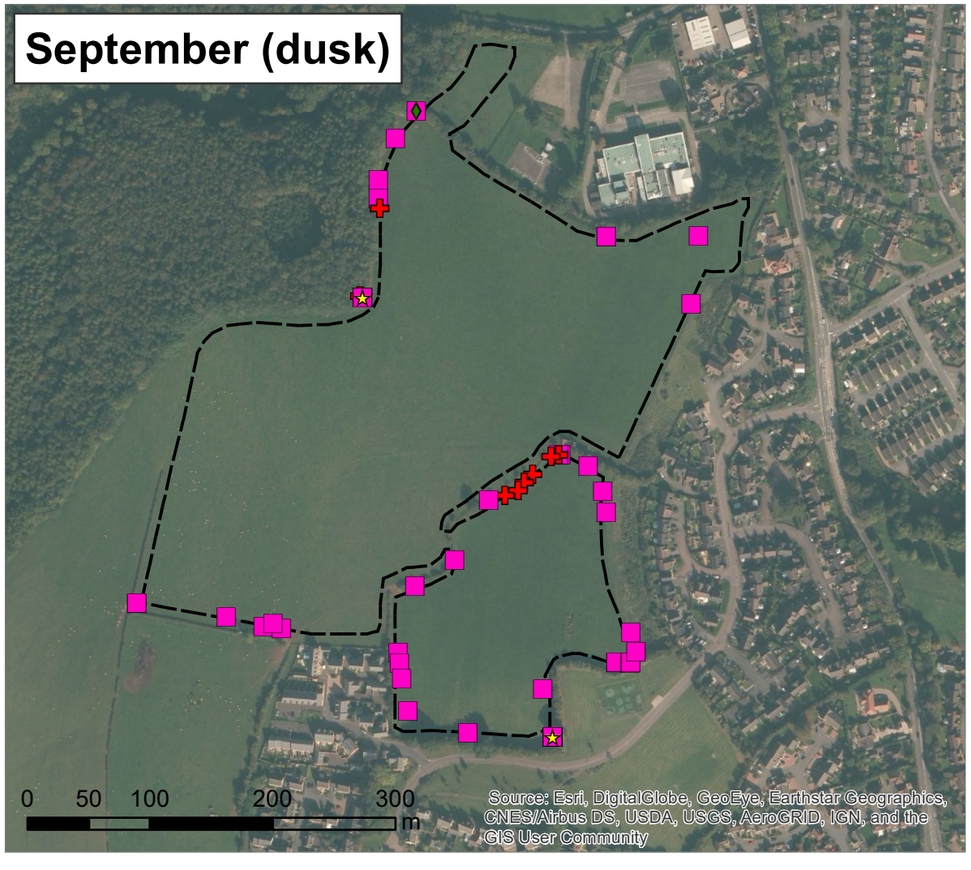
C:\Users\melanie\Documents\workingfiles\roost.bsg-ecology.com\Bayfields\Bayfields_Bats.mxd

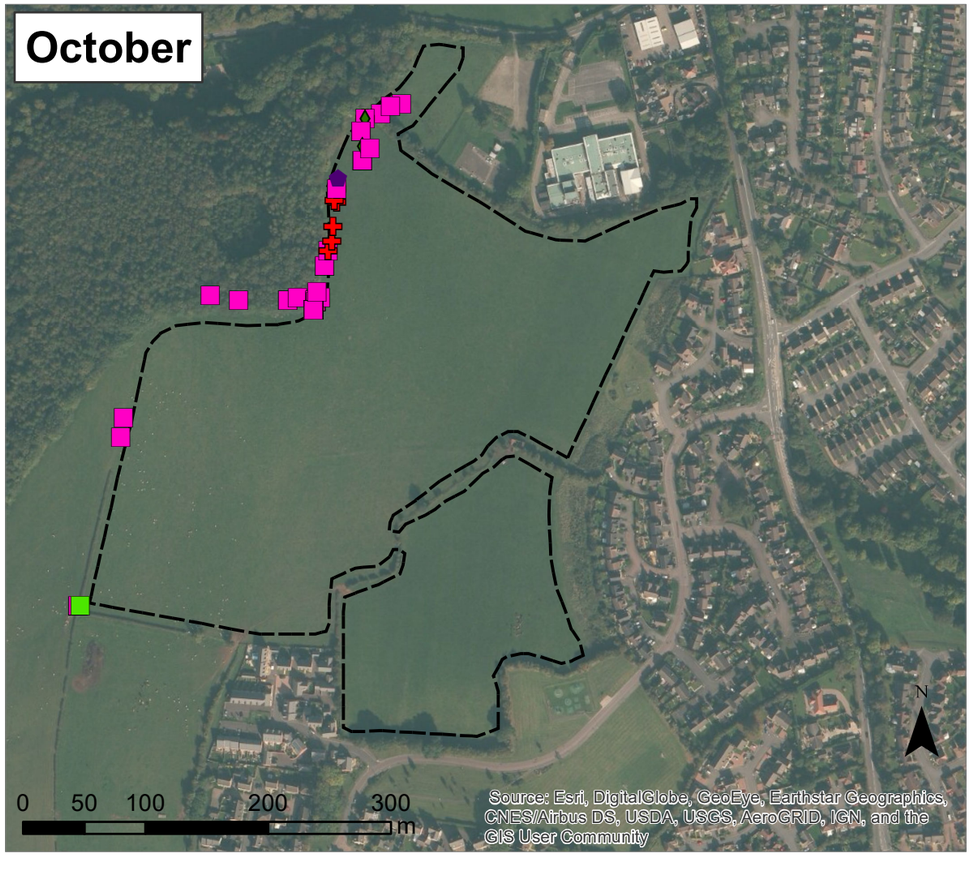




LEGEND

- Transect route
- Lesser horseshoe bat
- Myotis species
- Barbastelle bat
- Long eared bat species
- Noctule
- Noctule / Leisler's bat
- Greater horseshoe bat
- Serotine
- Soprano pipistrelle
- Common / Soprano pipistrelle
- Common pipistrelle





BSG | ecology

OFFICE: Newport
T: 01633 509 000

JOB REF: P17-095

PROJECT TITLE
BAYFIELDS, CHEPSTOW

DRAWING TITLE
Figure 3b: Monthly transect results

DATE: 29.03.2018 CHECKED: JGa SCALE: 1:5,000
DRAWN: MS APPROVED: JG STATUS: DRAFT

C:\Users\melanie\Documents\workingfiles\roost.bsg-ecology.com\Bayfields\Bayfields_Bats.mxd