

Bat monitoring in ECN Cairngorm Site

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Executive Summary

The purpose of this report is to describe the work associated with bat monitoring conducted at the ECN Cairngorm site and set that in the context of the wider ECN bat monitoring. We briefly describe the bats found at ECN sites as recorded on the ECN website and history of bat monitoring at ECN Cairngorm site. The deployment of a Song meter (SM2BAT, 192Khz) commissioned March 2011 is describe and preliminary results presented.

1. Bats in the UK

There are 18 species of bats which have been found in Britain, coming from two main families - Rhinolophidae (Horseshoe Bats) and Vespertilionidae (Vesper or Evening Bats) but some are very rare and have restricted distribution. The most common species are noted in Table 1.

Table 1. Characteristics of more common bats in UK and species recorded at ECN sites (information gathered from a variety of sources including;
http://www.bats.org.uk/pages/uk_bat_species.html)

Species	Common name	Behaviour	Size	Echolocation frequency	Presence at ECN Sites
<i>Pipistrellus pipistrellus</i>	Common (Bandit) Pipistrelle	One of the most common UK bats-fast and erratic flight flying at about six feet along habitat edges. Nests in trees, bat boxes and buildings. Emerges about 20-30 minutes after sunset.	small size 35-45 mm 3g - 8g	Range between 45 and 70kHz with 45kHz, the peak intensity of the call	ALI, DRA, GLE, HIL, MOO, POR, SOU, WYT, SNO
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	Fast and jerky in flight	35mm - 45mm 3g - 8g	Range between 55 and 80kHz with 55kHz, the peak intensity of the call.	
<i>Myotis daubentonii</i>	Daubenton's	Distinguished by its fast, straight flight, sometimes over water and along habitat edges. Emerges	medium in size 45mm - 55mm 7-12 g	35 to 85kHz and are loudest at 45 to 50kHz.	ALI, DRA, GLE, HIL, MOO, POR, SOU, WYT, SNO

		40-50 minutes after sunset.			
<i>Myotis nattereri</i>	Natterer's	Fast and agile flight pattern, flying over habitat edges and sometimes low over water.	medium sized bat 40mm - 50mm 7g - 12g	35-80kHz Peak at 50kHz	
<i>Myotis brandtii</i>	Brandt's bat	Rapid and skilful flight, flying at a medium height often within woodland	38mm – 50mm 4.5g – 9.5g	Between 33kHz and 89kHz, loudest at 45kHz	
<i>Plecotus auritus</i>	Brown Long Eared	Common throughout Britain roosts in trees and old buildings- characterised by its slow flight. Tends to emerge about 45-65 minute after sunset.	medium sized bat 37mm - 52mm 6g - 12g	range from 25 - 50kHz and peak at 35kHz.	DRA,NOR, POR, SNO
<i>Nyctalus noctula</i>	Noctule	Relatively common, with fast, straight flight above trees. Common in open habitats and characterised by its steep dive when hunting for food. Emerges 5-10 minutes after sunset, occasionally before.	large bat 37mm - 48mm 18g - 40g	20 to 45kHz and peak at 25kHz	ALI, NOR, POR, SOU, SNO
<i>Eptesicus serotinus</i>	Serotine	Common in southern England a fairly slow flight pattern..	large in size 58mm - 80mm 15g - 35g	range from 15 to 65kHz and peak at 25 to 30kHz.	ALI, POR
<i>Barbastella barbastellus</i>	Barbastelle	Found rarely across England and southern Wales. Flies fast near vegetation and along habitat edges. Emerges	a small bat 40mm - 55 mm 6g – 13g	best heard at approx. 32 kHz	NOR

		30-60 minutes after sunset.			
<i>Nyctalus leisleri</i>	Leisler's	Flies high and fast in the open, frequently- at or below tree top level, with shallow dives	50mm - 70mm 12g - 20g	15 to 45kHz	HIL. NOR
<i>Rhinolophus ferrumequinum</i>	Greater Horseshoe	A rare species found mainly in the south of England- has a slow, fluttering flight close to the ground. Its calls are hard to detect, even with a bat detector - a loud warbling. Tends to emerge about 40-50 minutes after sunset.	large bat 57mm - 71mm 17g - 34g	82kHz	None

2. Bat Monitoring within ECN

2.1 Protocol – see ECN book

The ECN protocol is a continuous walking and recording methodology over set distances.

2.2 Results

Records are available on the web for 10 of the 12 sites with Cairngorm and Rothemstead being the exceptions (Table 2). North Wyke has recorded the greatest number of bat species (10) while Sourhope has only recorded two species of bats. The summary data does not distinguish between species rather it groups species of the same genus together (see Table 1).

Table 2 Number of bat species recorded on web site (www.ecn.ac.uk)

ALI	CAI	DRA	GLE	HIL	MOO	NOR	POR	ROT	SOU	WYT	SNO
6	0	4	3	4	3	10	4	0	2	6	3

3. Bat monitoring at ECN Cairngorm

3.1.1 Protocol manual walk

Records show that there was one survey in 1999, which consisted of a walk along the Allt a'Mharcaidh burn but that no bats were detected and due to the hazard of walking the site

bat surveys were suspended. In 2009 we contacted Dr Emily Wadsworth to review and suggest potential protocols to monitor bats in the catchment (see Wadsworth 2009). A desk study highlighted three trial transects based on terrain, habitats and linear features (Figure 1).

Dr Wadsworth recommended a method of continuous recording whilst walking transects (as done in ECN protocol), but recommended in conjunction 10 stops of 4 minutes to record species as recommended by BCT and support by Prof Ian Marshall at ECN site managers meeting 2011. The location of stops was a compromise of regular timing and distance. As the terrain varies in slope and habitat, stops are closer together in the steeper and more physically demanding woodland, than in the open easier terrain of the moorland (Figure 1).

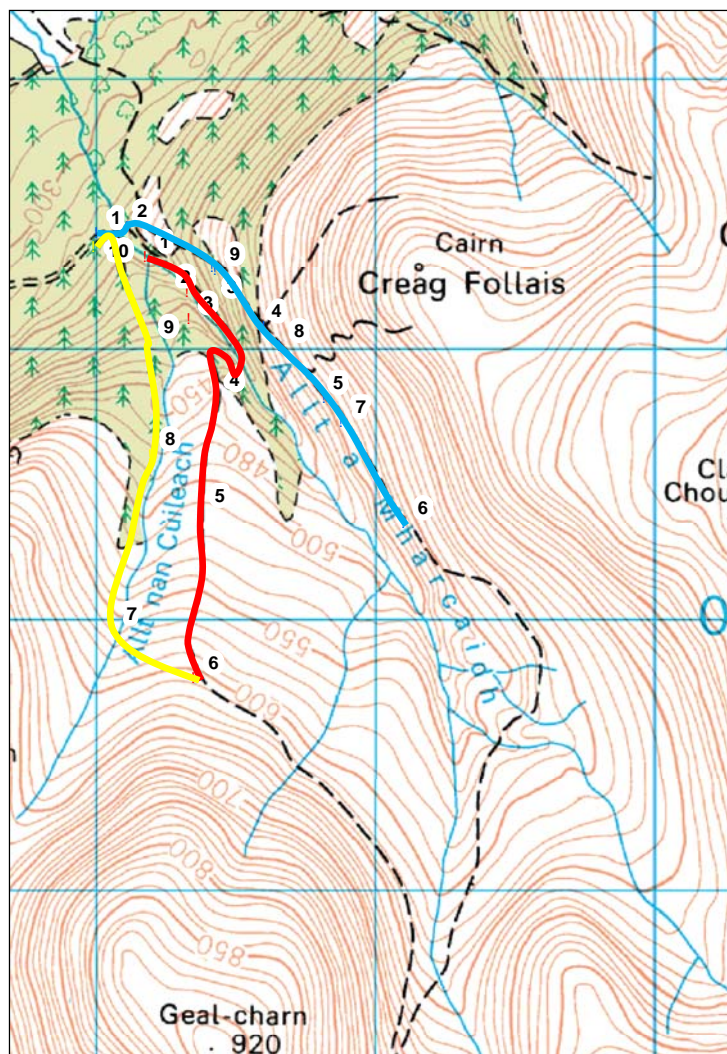


Fig. 1 Three potential bat transects for the Allt a' Mharcaidh as identified by Wadsworth 2009.

The 2009 surveys proved that the bats were present on the site. After undertaking several surveys in 2009, it was decided to drop the eastern transect (blue) due to a lack of bat activity. The two western transects (red and yellow) were merged to form a single circular transect that could be walked in alternate directions. Due to the very difficult

terrain encountered along parts of the red transect, this was modified again in 2011 to follow the Allt nan Cuileach in the lower reaches rather than the Allt a'Mharcaidh. The final transect and stopping points are shown on the map below. Each walk collects bat information for 20 different sections (10 walks and 10 stops), starting 30 minutes after sunset, and taking on average 116mins to complete.

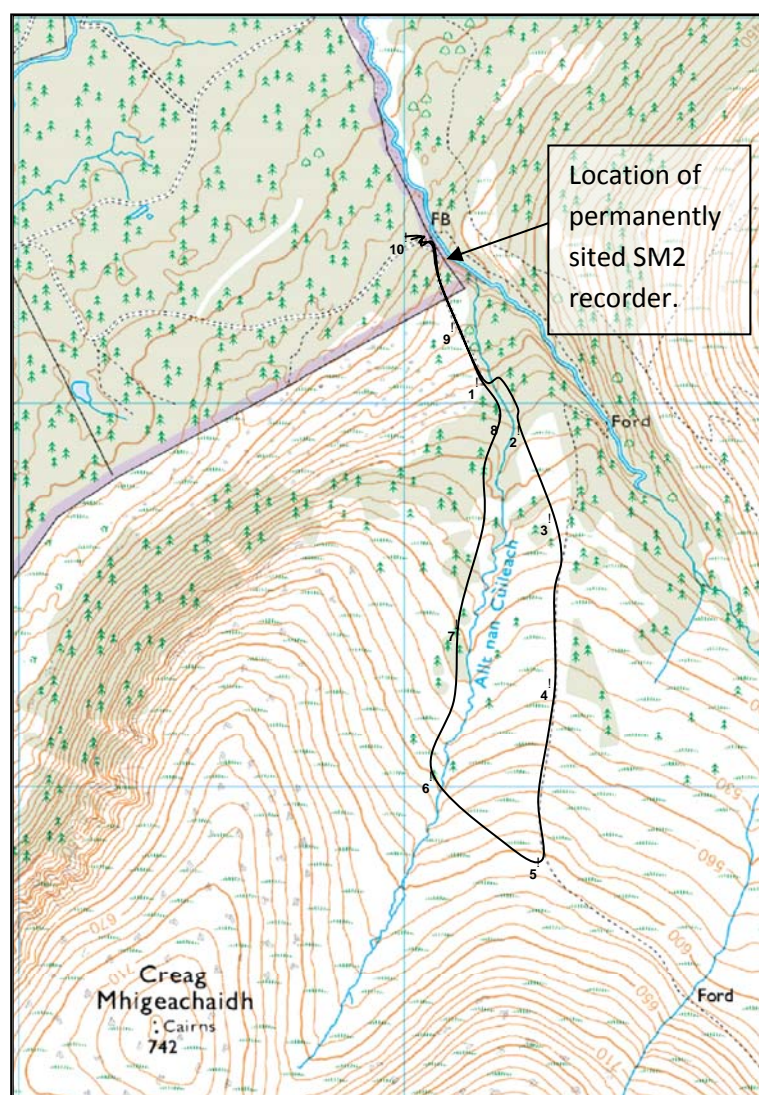


Fig. 2 Revised and finalised bat transect for the Allt a'Mharcaidh. Operational from 2011 onwards.

3.1.2 Fixed location ultrasonic recorder (SM2BAT)

Due in part to the challenging nature of surveying in the catchment, and to provide a more reliable and continuous dataset, a Wildlife Acoustics Song Meter 2 (SM2BAT) with 192Khz ultrasonic daughter card was purchased and installed in the catchment during late winter 2011 (23/03/2011). The site chosen for the SM2 is along the edge of the Scots Pine plantation approximately 100m downstream of the confluence of the Allt a'Mharcaidh and Allt nan Cuileach. The recorder overlooks the river and thus captures bats commuting along the woodland edge and the river valley below.

The SM2 is configured to record the dawn and dusk bird chorus as well as bats throughout the night. Bat recording starts 30mins after sunset, and runs until sunrise. A high pass filter was applied to prevent recording of low frequency sounds (<16Khz), whilst a 12dB trigger (requiring 1 sec of sound above threshold) was also applied to prevent other sounds such as wind/rain causing too many false recordings. To prevent any clipping of marginal recordings, the SM2 was set to store data without compression (WAC0 lossless).

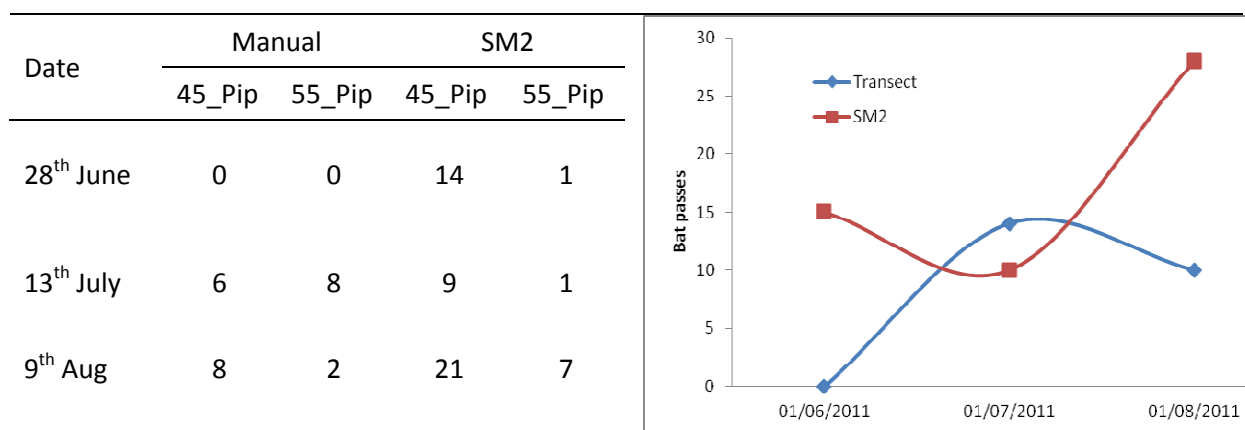
The SM2 was installed on site with an 85ah leisure battery and 32GB SD (Class 6) sound card. This provides enough memory/power to record continually for 4 weeks in the field before rotating the battery with a recharged spare. Data was normally downloaded on a fortnightly basis to minimise any potential losses to equipment failure, with the memory card cleared and returned to the SM2 whilst in the field.

3.2 Results 2011

A total of three manual bat surveys detected 24 bat recordings (activity events) during the summer of 2011 (Table 2). On the same nights the fixed location ultrasonic recorder recorded a total of 53 activity/events during the same period taken to complete the manual surveys. The manual method on 28th June 2011 failed to detect any bats at all but the SM2BAT recorded a low level of activity (total of 15 activity events for the same 128min period). The manual methods recorded a slightly greater level of activity during the second recording period (13/7/11) but only approximately a third of the activity of the SM2BAT on the final walk (09/08/11).

The frequency of the recorded sound allows identification of the species of bat and the two common species of Pipistrelle (Common and Soprano) were both detected by both the methods tested. The common Pipistrelle was the most frequently recorded.

Table 2 Passes recorded in 2011 for Common (45) and Soprano (55) Pipistrelle's from the ECN Cairngorm bat transect, and from the fixed location ultrasonic recorder (SM2BAT) for the same period.



Bat activity was recorded every night after deployment in the field on 23 March 2011 (Figure 3). The highest number of recordings was noted in September by the SM2BAT when the manual protocol was finished for the season (Figure 4). A greater number of

recordings of the common Pipistrelle's were recorded every week during the test period (Figure 4).

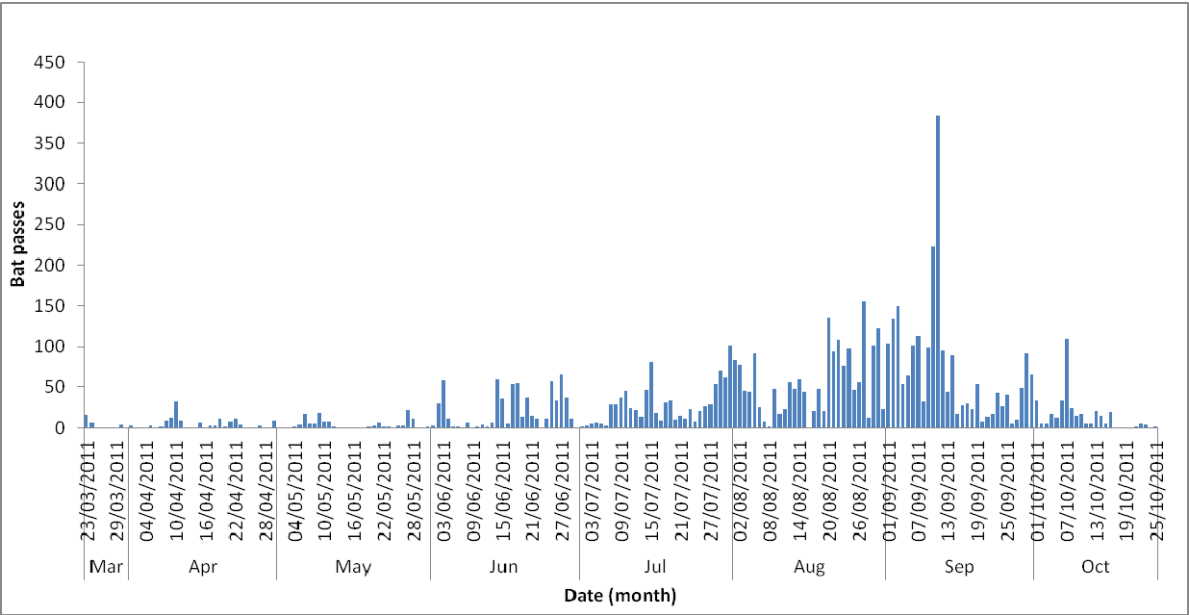


Figure 3. Nightly bat activity recorded by fixed location ultrasonic recorder (SM2BAT) from March to October 2011 at ECN Cairngorm site.

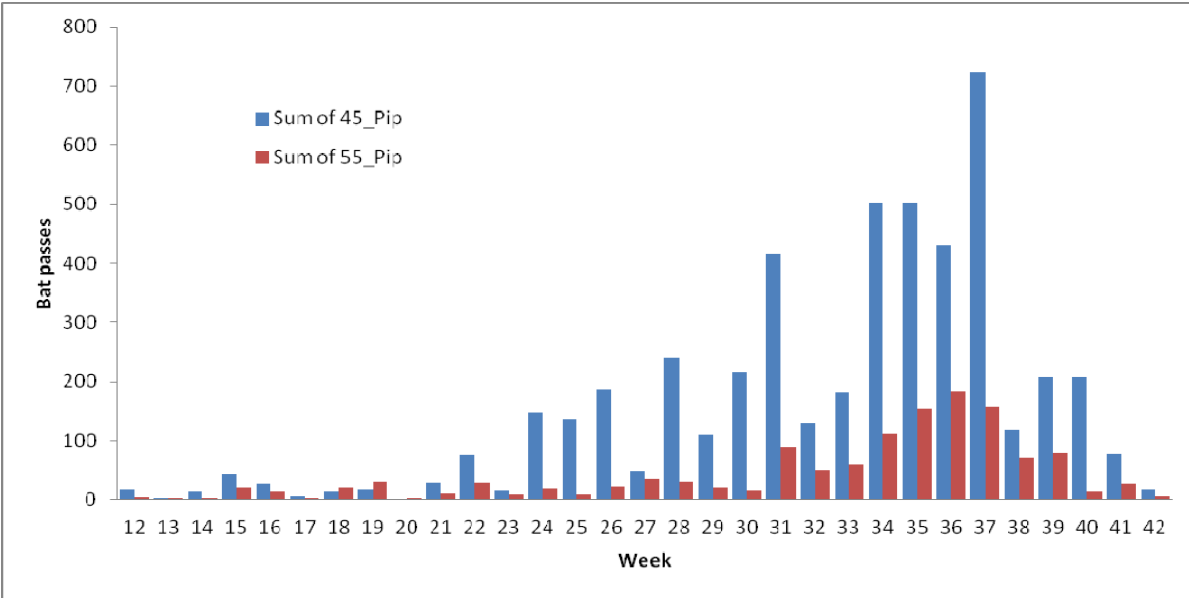


Figure 4 Weekly bat activity recorded at 45 and 55 kHz by fixed location ultrasonic recorder (SM2BAT) from March to October 2011 at ECN Cairngorm site