USK VALLEY CAVES BAT ACTIVITY STUDY by Stuart France

THE FIRST YEAR

Five counters triggered by Lesser Horseshoe bat echo location calls using an ultrasonic detector tuned to 108KHz were installed for the winter of 2019-20 just inside five cave entrances or within their entrance series at convenient pinch points in the bat flight paths. It was installed in stages during November and December 2019 and removed in May 2020.

The counters record flights past the microphone allowing 2 seconds for each pass. Retriggering within any 2 second timed period simply causes it to be extended by another 2 seconds ad infinitum until there is no bat detection for a full 2 seconds. The count is incremented after the bat is deemed to have passed and silence has returned. This is not the same figure as the *number of distinct bats* because the same individual might fly around in large circles and add a count for every loop, the same individual may use the entrance on many dates, and entrances are likely places for bats to be hesitant about committing to flying in or out leading to a non-fluid pattern of flights which are what, in effect, are being recorded. So the equipment records a bat activity index for the cave, not individual bats.

The caves in this experiment and the names of the data series were: Agen Allwedd (AABATS), Ogof Cnwc (CNWCBATS), Ogof Craig a'Ffynnon (OCAFBATS), Ogof Draenen Nunnery Entrance (NUNBATS) and Ogof Draenen Drws Cefn Entrance (DRWSBATS). The numbers at OCAF were so low compared to all the other caves that it was dropped from the study. It is thought this is due to the immense entrance gate which bats will have difficulty passing.

The results were published in BCRA CREG Journal issue 111, a copy of which is available from https://linetop.co.uk/creg/creg_j111.pdf along with a link to a raw data download.

THE FOLLOWING YEAR

The same five counters were placed in the same positions in the same caves except that OCAFBATS was dropped and the Agen Allwedd Bat Entrance (AABEBATS) added. This is not the entrance used by cavers. The junction where the bat route joins the caver route was also monitored as in the initial year.

None of the units suffered any damage or malfunction except the device just inside the Agen Allwedd Bat Entrance. When a visit was made to collect the data in May 2021 the pelicase was found in a different position to that in which it had been placed in September 2020 and it was flooded with water. As the passage itself cannot flood and any drips on to the case would tend to drop off the sides and would not cross a rubber lid gasket, this is presumed to be sabotage. The very same thing happened to a caver counter placed near to the main entrance of Ogof Draenen which is not monitored for bats. The damaged bat counter in Agen Allwedd stopped recording in February 2021 which is a pity but fortunately all the data for the autumn and most of the winter is complete.

It is also a pity in view of the results that the data for the September 2020 swarming period is not complete, again due to phased equipment installation from late August to mid September. In future years it will need to be in place by late August.

RESULTS TO DATE

	AABATS	AABEBATS	CNWCBATS	DRWSBATS	NUNBATS
Jan-20	1589	n/a	965	1072	109
Feb-20	1518	n/a	996	668	151
Mar-20	2263	n/a	2295	1961	163
Apr-20	6364	n/a	16169	12200	918
TOTAL	**11734**	**n/a**	**20425**	**15901**	**1341**
	AABATS	AABEBATS	CNWCBATS	DRWSBATS	NUNBATS
Sep-20	*13736*	*47705*	*49588*	*28322*	2470
Oct-20	2819	7138	3147	4850	253
Nov-20	1179	5867	1774	2730	107
Dec-20	1308	4885	1404	1561	106
Jan-21	1356	5537	1893	1233	158
Feb-21	1122	n/a	1840	1392	200
Mar-21	2450	n/a	3864	3366	208
Apr-21	2823	n/a	9511	10107	544
TOTAL	**26793**	**n/a**	**73021**	**53561**	**4046**
NB. Results in italics scaled up to show a predicted full-month total in September 2020					

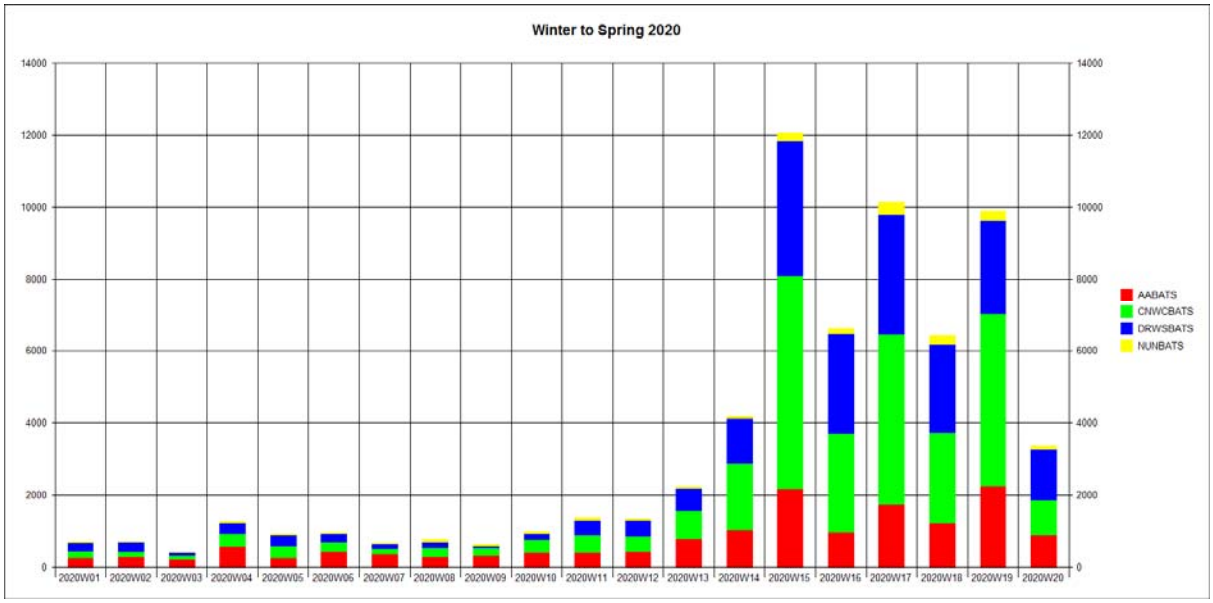
Totals for AABEBATS are not given in the table above because of absent or incomplete monthly data. However, what data is available shows that the activity at the bat entrance itself is about 4 times greater than that measured some distance into Agen Allwedd near to where the caver route join the bat route.

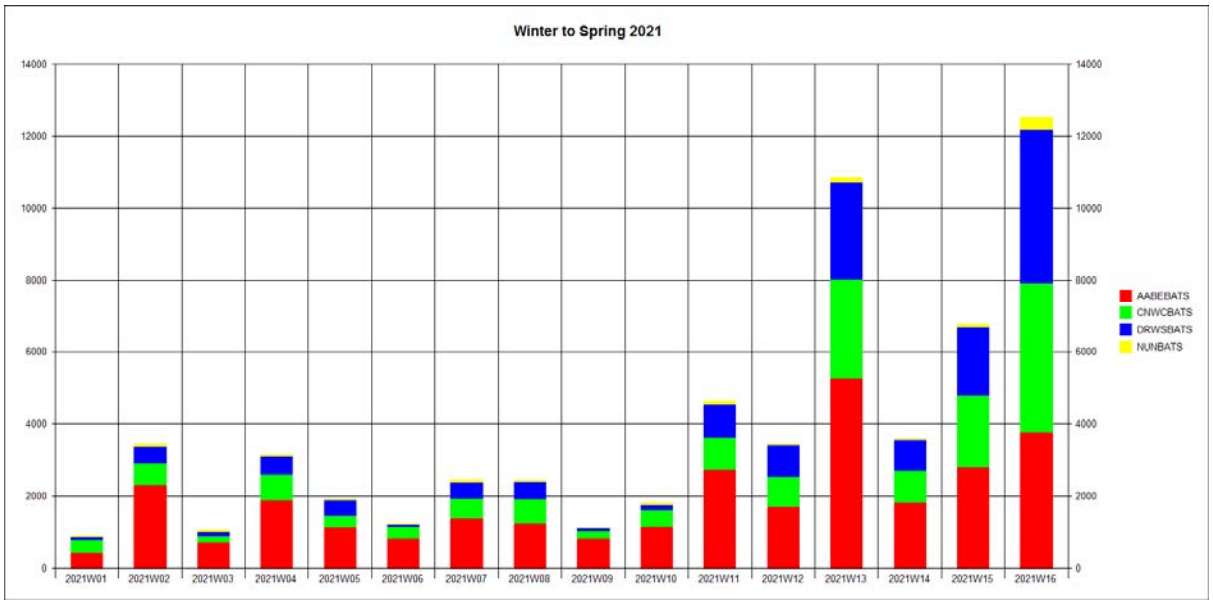
Using the available AABEBATS data so as to compare only the *counters which are positioned close to entrances* for the period September 2020 to January 2021 we find:

	AABEBATS	CNWCBATS	DRWSBATS	NUNBATS
Sep-Jan total	71132	57806	38696	3094
% Share	42%	34%	23%	2%

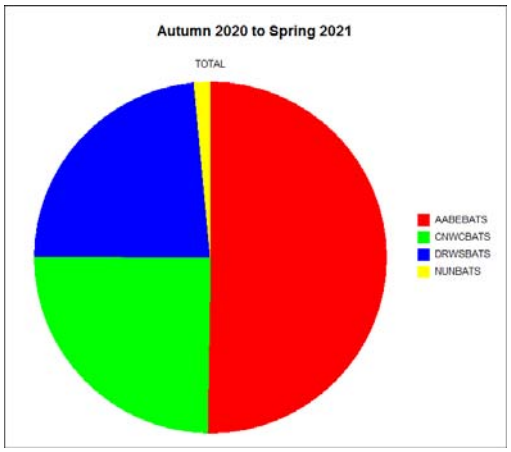
On this basis 76% of the total measured bat activity is at the Mynydd Llangattock major caves and 24% at the Ogof Draenen open entrances. It is noteworthy that the Agen Allwedd Bat Entrance will have been open to bats for at least a century following quarrying. Access into the main passages of Daren Cilau via Ogof Cnwc has been open for about 20 years following its connection by cavers,. The connection from Drws Cefn to the main part of Ogof Draenen has been viable for about 10 years.

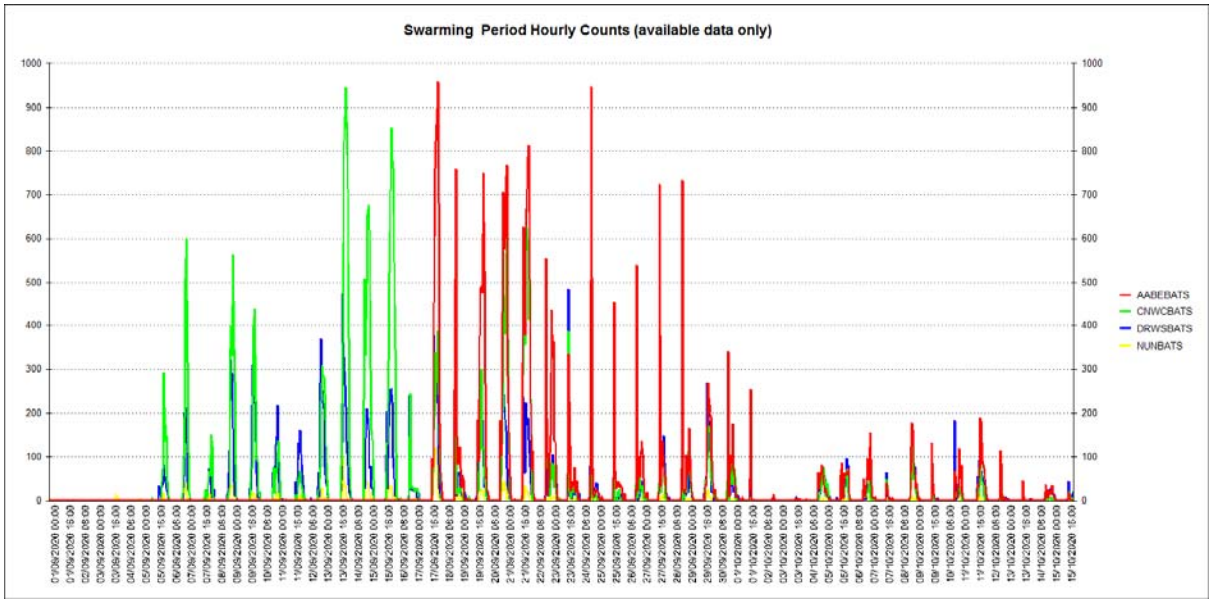
The Nunnery entrance has only been opened in very recent years and casual observations by passing cavers have noted the numbers of hibernating bats roughly doubling every year (say 8-16-32-64 individuals) in consecutive mid-winters to 2020. There are no observations for January 2021 due to the Covid-19 pandemic lockdown preventing caver access then.

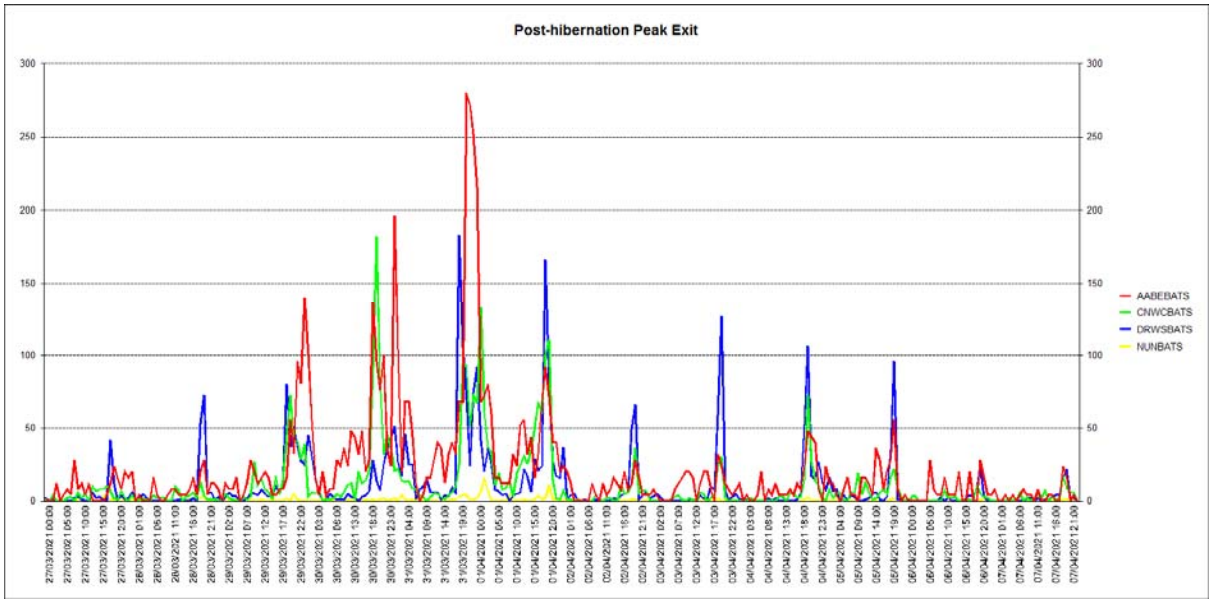


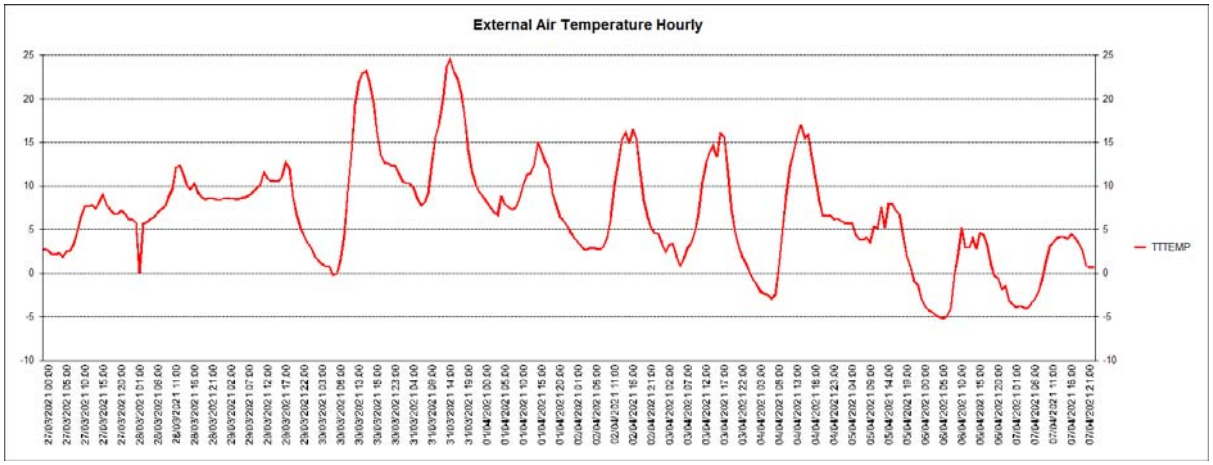


In the second chart above, the AABEBATS series was estimated as 4 times AABATS from 10/02/2021 to 30/04/2021 due to the interruption in raw data following equipment damage.




Swarming Period Hourly Counts (available data only)
AABEBATS
CNWCBATS
DRWSBATS
NUNBATS


Post-hibernation Peak Exit
AABEBATS
CNWCBATS
DRWSBATS
NUNBATS


External Air Temperature Hourly
TTTEMP

Peak exit corresponds to daytime temperatures up into the 20's C. The earlier part of March 2021 had daytime temperatures always below 15C but for 3 days in the range 15-17C. The bats appear to be aware of the weather during the afternoons before making mass exits.

FUTURE WORK

It is intended to carry on with this study next autumn and winter with the aim of following the trends and capturing more comparative data during the late summer swarming period.

Whilst Agen Allwedd is well known as a major bat roost of international importance and as part of the Usk SAC, the entrances to other major caves facing the Usk valley have not been fully appreciated in terms of their contribution to bat habitat.

Those concerned also need encouragement to consider re-opening OCAF to bats by building a practical bat slot adjacent to the solid metal cave gate with its narrow bars which dates from the 1970s.