Carmarthenshire Bat Research Programme
Researching population, abundance and distribution of bat species
From 2022-2023:

2022 Results

Executive Summary

Carmarthenshire is located in south-west Wales and is bordered by 5 counties, Powys to the east, Ceredigion to the North, Swansea and Neath Port-Talbot to the south east, and Pembrokeshire to the west. The Black Mountain range in the Brecon Beacons National Park dominates the east of the county with the lower foothills of the Cambrian Mountains to the north of the county. Carmarthenshire is predominantly agricultural with other industries such as forestry, fishing and tourism. Wales has an oceanic climate with storms and high winds; the humidity and damp conditions makes it feel cold. Fog is also common in Wales and it rolls in along the coast at any time of year. However, 14 of the 17 UK breeding species are present in the county with 3 species missing being Bechstein's (*Myotis bechsteinii*), Alcathoe (*Myotis alcathoe*) and grey long-eared bat(*Plecotus austriacus*).

The first edition of the Carmarthenshire Bat Atlas was produced in 2021 using 10,772 available records received from West Wales Biodiversity Information Centre's (WWBIC). This comprehensive document includes distribution maps, explanatory notes and photographs and can be downloaded free of charge from WWBIC's or the Bat Conservation Trust's (BCT) websites.

The Carmarthenshire Bat Research Project comprises a number of survey methods, both licensable and non-licensable surveys which will boost the county's bat records. This includes garden and church acoustic surveys, driven transects and advanced surveys such as trapping and ringing. The Project is destined to run for 2 years; the first year targeting the east side of the county and the second year concentrating on the west side.

In just one year a total of 2,519 bat records has been generated and 52 records for other species (mainly nocturnal mammals and birds). The bat records collected by the Project have increased WWBIC's database by 23%. The bat most recorded during 2022 was common pipistrelle (Pipistrellus pipistrellus) followed by Soprano pipistrelle (Pipistrelle pygmaeus).

The achievements and success of this project is attributed to valuable funding received the Woolhope Dome Environmental Trust (WDET) and a few dedicated landowners and bat workers.

TABLE OF CONTENTS

Background

Carmarthenshire is located in south-west Wales and is bordered by Powys to the east, Ceredigion to the North, Swansea and Neath Port-Talbot to the south east, and Pembrokeshire to the west. The Black Mountain range in the Brecon Beacons National Park dominates the east of the county with the lower foothills of the Cambrian Mountains to the north of the county.

Carmarthenshire is predominantly agricultural but there are other industries such as forestry, fishing and tourism. The county has a population of approximately 190,000 which is 6% of Wales' total. The main urban conurbations are Carmarthen, Llanelli and Ammanford.

It has a rich landscape with important habitats for wildlife, particularly bats. These habitats include its long coastline, river networks such as the Towy, Teifi, Afon Aman, the Afon Loughor and the Afon Taf. Its geology has been well described but the limestone ridge that extends from Kidwelly in the west, north eastwards in an arc up to Mynydd Du is especially important for hibernating bats. The workings of the old coal measures that were once a crucial part of the industrial era also provide locations for bats to hibernate.

Wales has an oceanic climate with storms and high winds sweeping across it throughout the year, and with damp and cloudy conditions it makes it feel cold. Fog is also common in Wales and it rolls in along the coast at any time of year, which is not ideal for many bat species.

Carmarthenshire has a number of sites that are considered to be of international importance for nature conservation designated as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). There are six Local Nature Reserves (LNR) which support a rich variety of wildlife and 81 Sites of Special Scientific Interest (SSSI), excluding the area

within the Brecon Beacons National Park, and covers approximately 7.2% of the county. SSSI sites are important sites for wildlife; their habitats include ancient woodland, flower-rich meadows, wetlands as well as disused quarries.

In the UK, 17 species of bats are known to breed, 15 have been recorded in Wales, 14 in Carmarthenshire. Bechstein's bats have not been recorded in Carmarthenshire, but have previously been recorded in Brecon and in Pembrokeshire. The grey long-eared bat is very rare and at the very limit of its European range in the southern counties of England, but there may be a possibility it is present in Carmarthenshire, particularly as there was some DNA evidence from bat droppings collected in south west of the county some years ago. The Alcathoe bat, new to science and discovered only in 2001, was confirmed in the British Isles in 2010 and is one of three cryptic species. It has yet to be recorded in Wales.

Nathusius' pipistrelles (*Pipistrellus nathusii*) are rare but widespread in the UK, with records spanning from Cornwall to the tip of Scotland. Despite this huge geographical range less than 10 maternity colonies have been discovered in the UK. In Europe the species is a known migrant with a record migration distance of 2,224km recorded. In Wales, there are no more than 250 records of Nathusius pipistrelle and 20 of those records were collected as part of an NRW licenced project which ran from 2019 to 2021. In Carmarthenshire, only 21 records exist from 1970 to 2021 (See Figure 1 below).

Figure 1: Distribution map of Nathusius pipistrelle 1970 to 2021 taken from the Carmarthenshire Bat Atlas (1st Edition).

Gathering further data about the Nathusius pipistrelle in Wales is a focus for bat conservationists, particularly the Bat Conservation Trust who co-leads the National Nathusius' Project with Daniel Hargreaves. Nathusius' data in Wales is falling behind, compared with England and Scotland so it is important that any Nathusius bats caught during trapping are fitted with a ring and recorded appropriately, particularly as the Welsh Nathusius Pipistrelle Project is on hold due to the lack of experienced bat workers to move this project forwards.

Carmarthenshire Biological Records and County Bat Atlas

A personal review of the biological records, provided by WWBIC, was carried out in order to produce a baseline county bat atlas. A total of 772 × 1km^2 grid squares ('monads') contain bat records and since the total area of Carmarthenshire is 2440 km^2 this represents 32% coverage for the county, which is low considering the records cover 51 years of data (1970 to 2021).

On average each monad (1km^2) contains 14 bat records. However, there are concentrations of records in certain areas, mainly where a bat worker lives. The total number of available records used for the baseline Bat Atlas was 10,772 and 18% of those records were submitted by one committed individual, a team member on this project. Even though the map shown in Figure 2 illustrates good coverage, 45% of the records are pipistrelle bats.

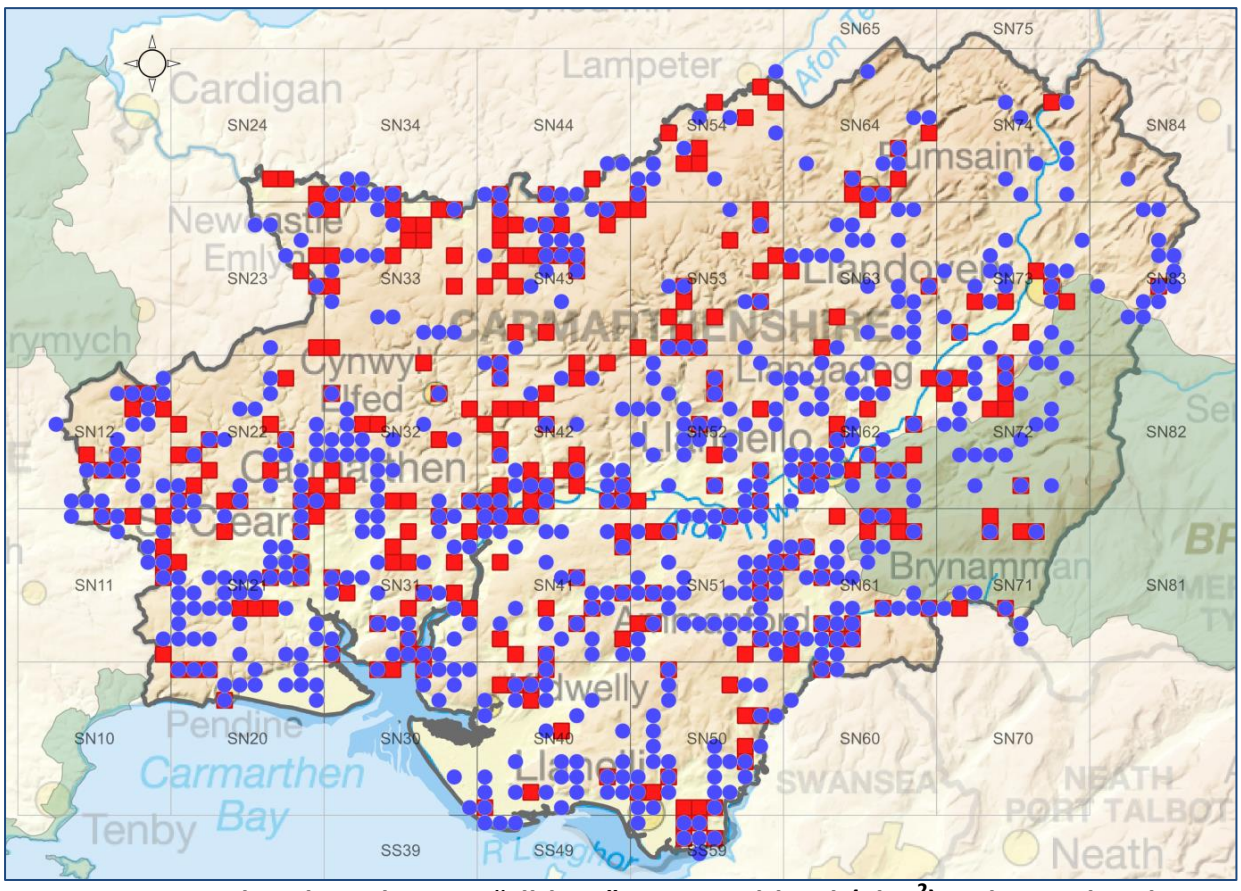

Figure 2: Carmarthenshire showing "all bats" at monad level (1km^2). Blue circles show records from 2000 to 2021 and underlying red squares show records from 1970 to 1999. Pipistrelle bats contribute 45% of the records database.

The main land use in Carmarthenshire is agricultural but as with many modern farming methods this leads to adverse effects on the local environment including the river networks. Hedgerow removal to create more space for crops, spraying, barn conversions, change of use for agricultural buildings, forestry services and other landscape management schemes are all having an impact on the county's bat species. Ash die-back and the relentless stormy weather in Wales has a major impact on trees that bats rely on for roosting, breeding and hibernating.

Bats are long-lived, highly mobile animals and many aspects of their biology and behaviour are still largely unknown. This certainly applies to commuting routes, foraging areas and roosting and hibernation sites. It is therefore extremely difficult to predict the impact of threats to a bat population, such as from new road schemes, housing estates or the construction of wind energy facilities, particularly if there are no bat records or supporting information.

The Carmarthenshire Bat Research Project's (CBRP) primary aim is to build on the current biological records database that WWBIC currently hold. This will involve projects, such as driven transects, trapping surveys, church surveys, and garden surveys that will generate a vast number of records very quickly.

However, to identify accurately "rare" or "under-recorded" species such as the small *Myotis*, Leisler's (*Nyctalus leisleri*), Serotine (*Eptesicus serotinus*) or even grey long-eared bats, this will require more advanced techniques of bat work such as trapping using mist nets and harp traps. The more advanced techniques will enable us to look at trends and patterns in specific areas such as woodlands, waterbodies, cave systems and park land etc.

It is known that underground sites are being used for winter hibernation, summer bachelor roosts, maternity colony roosts and night-time feeding roosts but no one has observed bats using these sites for autumn swarming behaviour. Swarming surveys are the best indicator to measure the importance of underground sites for bats because most hibernation surveys only reveal a small percentage of those bats, as most will be concealed behind stonework.

Swarming surveys, may establish the presence of Alcathoe's bat and grey long-eared bat within the county. It will certainly establish any *Myotis* species as this group has been well-recorded swarming at underground sites.

Overall these projects will feed into the second edition of the "Carmarthenshire Bat Atlas" to be produced in 2024 or earlier if appropriate.

The Carmarthenshire Bat Atlas is now available which can be downloaded free of charge from BCT's website www.bats.org.uk/support-bats/bat-groups/wales or from WWBIC website www.wwbic.org.uk/contacts-links/local-groups-and-blogs/carms-bat-group/.

Project Aims

The intention of this project is to determine presence or absence of bat species at various sites in Carmarthenshire, particularly areas that currently have no bat records, and to gain some indication of how the habitat is being used for further research. The likely presence of

nearby breeding colonies will be determined by checking the breeding condition of any females caught.

Determining bat abundance at swarming sites compared to numbers recorded at hibernation checks will provide important information about how those underground sites are being used.

The survey data gained will be used to describe the distribution, and if possible the relative density of bats at a variety of locations throughout Carmarthenshire. All records and reports for each site will be disseminated to interested parties (NRW, Carmarthenshire Bat Group, the Local Wildlife Trust, Bat Conservation Trust, National Trust, CADW, Forestry Commission and private land owners who participate). This project will contribute to the Carmarthenshire Bat Atlas but also provide knowledge about the distribution/habitat needs of each species and give some indication of where breeding sites occur.

The data gathered will also be used for the sustainable management of our natural resources by both NRW as well as relevant public bodies such as Carmarthenshire County Council. All public bodies have a legal obligation under the section 6 Environment (Wales) Act 2016 and also to contribute to sustainable development under section 3 Well-being of Future Generations Act 2015.

In summary, the main aims of the project are:

1) Provide further information (supplementary to that which had been obtained through bat detector surveys) on species assemblage
2) Gain insight into species demographics
3) Over time, generate biological records and build up a picture of which species are using which sites at different times of year
4) Ring any migrant Nathusius pipistrelles caught during trapping sessions. This data will feed into the National Nathusius Project which maps these rare bats and will provide vital information should that individual ever be recaptured.
5) Gather species information from underground sites during autumn swarming, particularly those that are currently monitored for hibernation.

Survey Methods

Non licensable Bat surveys - Listed below are citizen-science based projects that have the potential to generate large numbers of biological records and to help pinpoint areas for further survey work. These are listed below. Full details and methodology can be found in Appendix 1.

- Driven transects
- Walking transects
- Garden surveys
- Church surveys

Advanced Bat Surveys requiring an NRW licence - This part of the project is licensable by NRW and requires bat workers with a mix of skill-sets such as deploying bat detectors, scribing, handling bats, extracting from harp traps and mist nets, chalk-marking, identifying individual bats caught, and ringing where appropriate (see Figures 7 & 8).

Capturing bats by using mist nets and harp traps requires an NRW licence and a high level of experience. Even though the number of records per survey is much lower using this method, it helps identify and confirm the more difficult species such as the *Myotis* group of bats; it also provides additional knowledge of why bats are using a site.

Site Selection

Habitat types such as large waterbodies, woodlands, outside cave and mine entrances disused railway tunnels, parkland and historic buildings will be targeted. Sites are surveyed just once unless there is good reason to return. Large sites that cover more than one OS British National Grid monad (1km^2) may require a second or third survey (such as Carmel Woods which covers 3 monad squares).

Searching water company websites may be required to find locations of lakes and reservoirs in the area as well as using Google Earth and OS maps. All potential sites will be visited during the day to recce and to assess habitat and potential trapping locations (see below). Daytime visits will be carried out with landowner permission to determine public access.

Survey Results for 2022

Survey work started in May 2022 until end of September 2022 to start the process of obtaining new and up-to-date county bat records.

Advanced Bat Surveys – a total of 8 trapping surveys were carried out between May and September with 101 bats/8 species captured, including 3 of the *Myotis* group; Natterer's bat (*Myotis nattereri*), Daubenton's bat (*Myotis daubentonii*) and whiskered bat (*Myotis mystacinus*). An additional 3 bat species were recorded on bat detectors deployed around the sites, amounting to 11 species in total for this arm of the project.

Sites surveyed were Carmel Woods (2 times), Carmel Wood Caves, National Botanical Gardens Wales, Dolacauthi Gold mines, Castle Woods, Mill Pond and Bog Wood (Dinefwr Estate) and a private site near Kidwelly (see Figure 6).

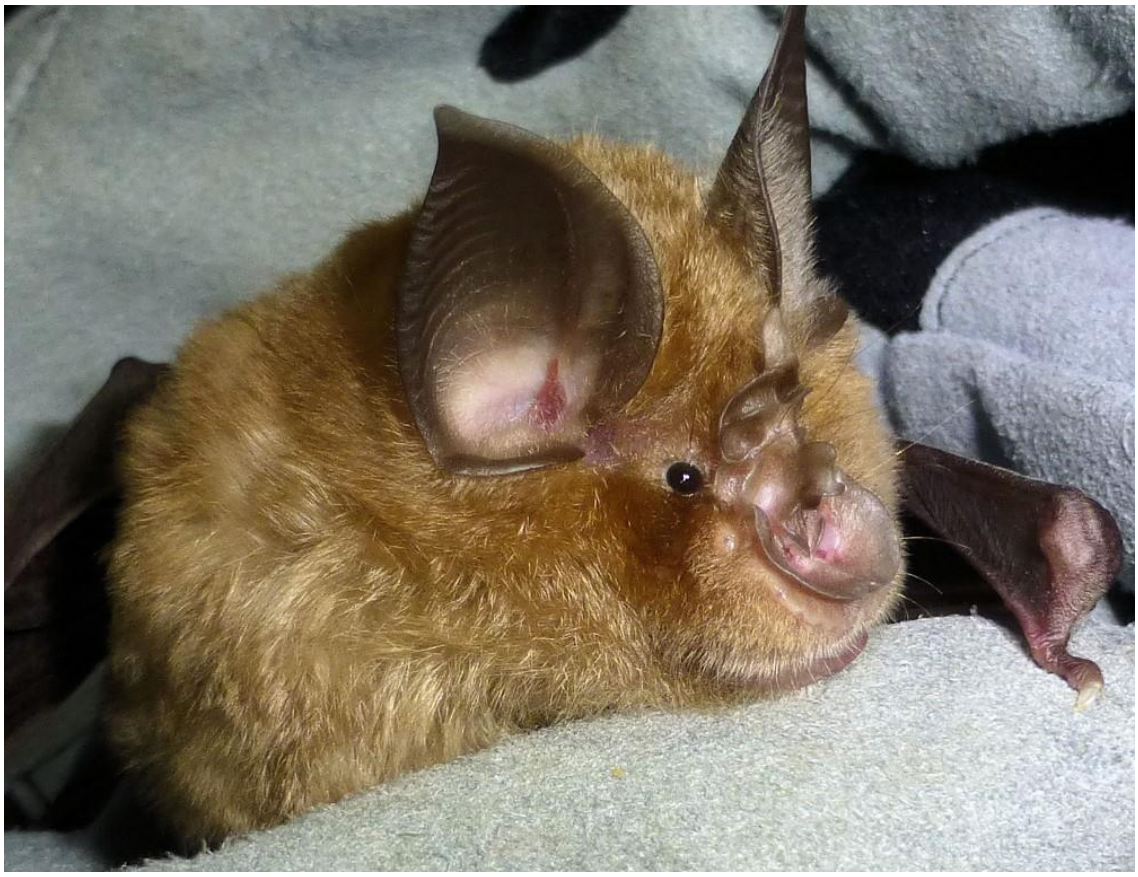

Figure 3: One of 5 greater horseshoe bats captured during 2022 including a pregnant female (photo credit Denise Plume)

Figure 4: Harp Trap deployed at the National Botanical Garden Wales to capture bats under licence (photo credit Denise Plume)

Driven Transects - One of the main undertakings of the project was to drive well-planned routes at 15mph recording bats using Anabat Express or Anabat Swift bat detectors in transect mode whilst making notes of other nocturnal animals (dead or alive) along the route. This has been the most successful way of collecting large numbers of records in a short space of time. A total of 19 driven transects were carried which generated an average of 80 records per transect route, amounting to 60% of the total records the Project collected this year (See Figure 5).

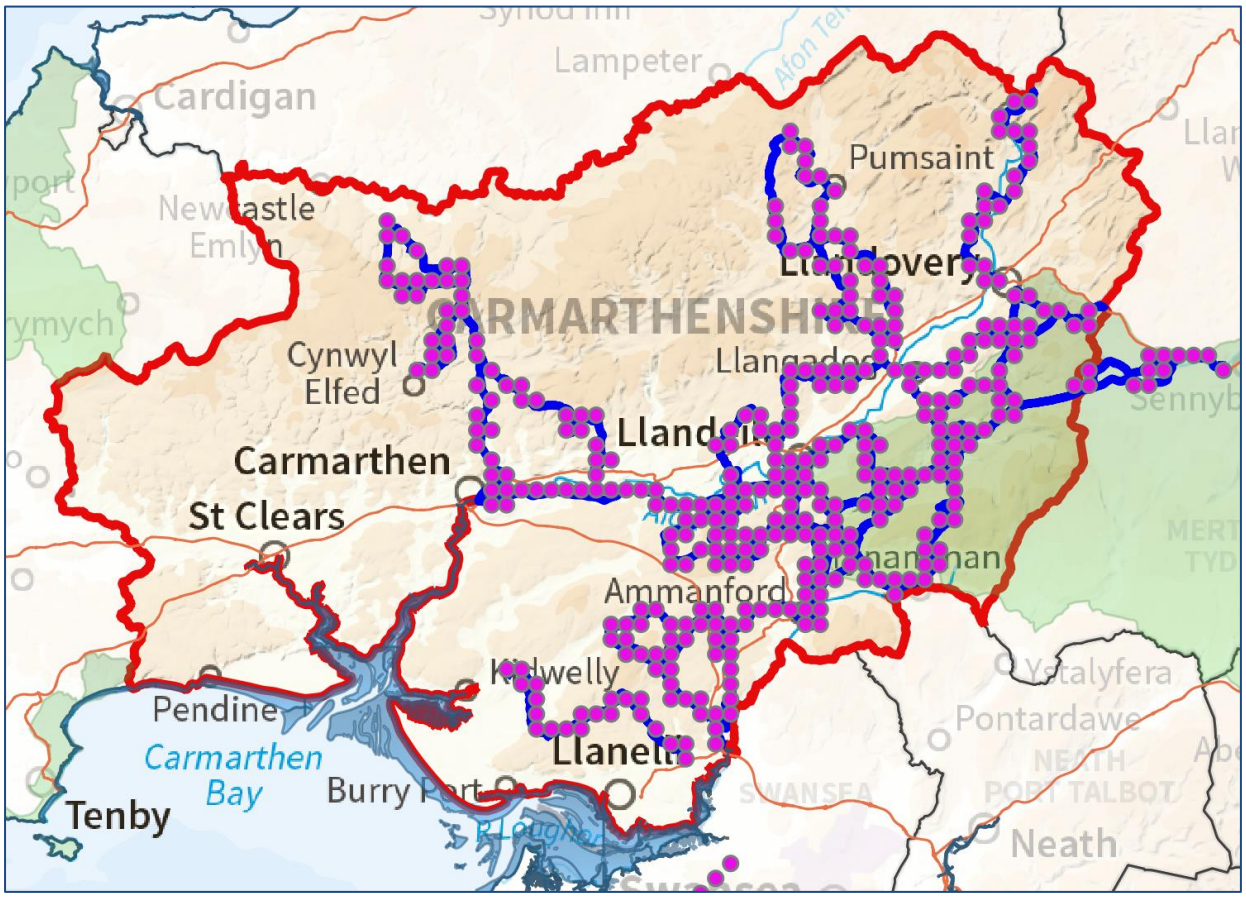

Figure 5: Driven transects carried out in 2022. Pink circles represent bat records collected at monad (1km^2) level along the transect routes.

Garden Surveys – These surveys provided the Project with local knowledge about bat species. Bat detectors were deployed in gardens for set periods between 3 and 7 days. In total 19 surveys were carried out generating 760 records/8 species (see Figure 6). Some gardens had a substantial amount of land and, where appropriate, detectors were deployed in as many monad (1km^2) squares to increase record coverage.

Walking Surveys - Just 3 walking surveys were carried out during 2022 (Betws Park, RSPB Gwenffrwd-Dinas Nature Reserve and Carmel Woods (Lime Kilns). These sites were considered unsuitable for advanced survey methods due to the site's accessibility, the safety of Bat Workers in areas used by the general public and the security of electronic equipment deployed overnight.

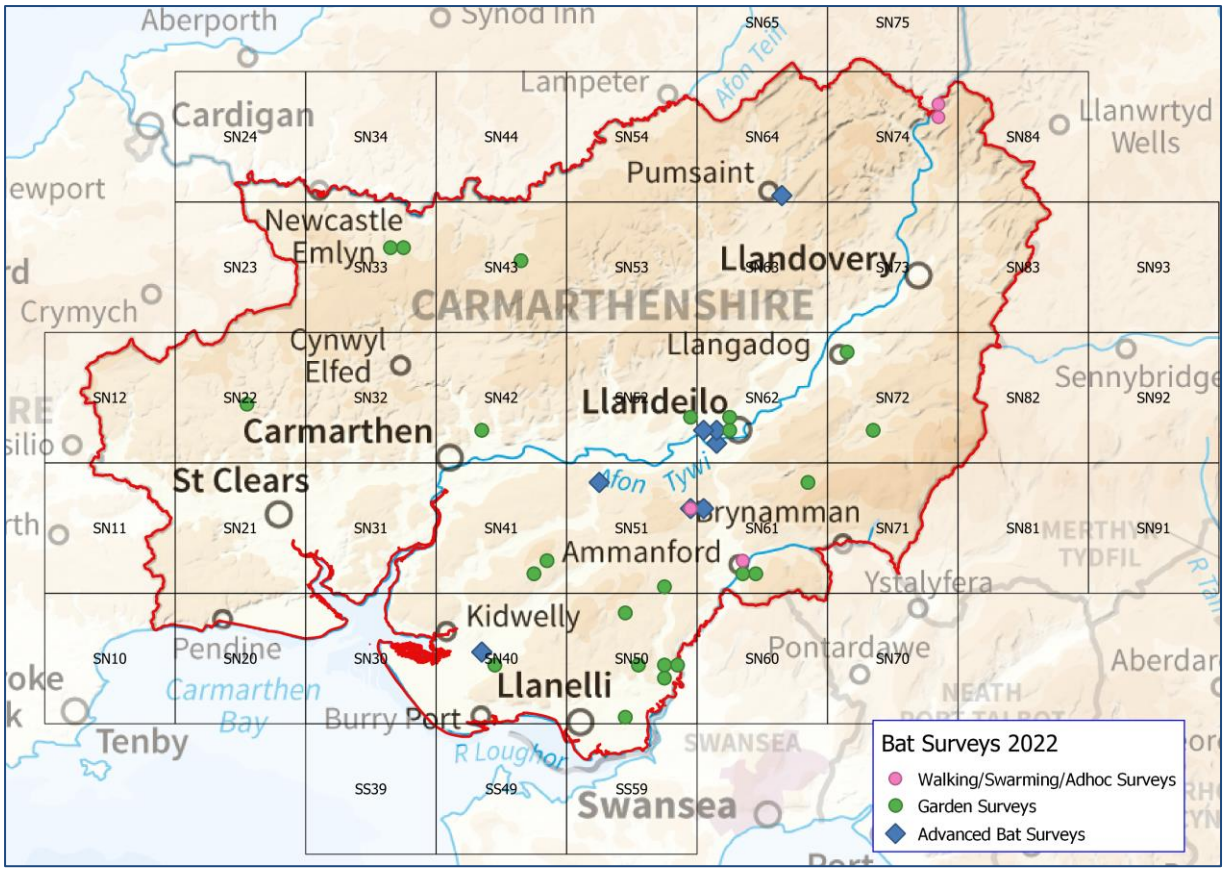

Figure 6: Survey methods carried out in 2022 - Blue triangles represent advanced bat survey (trapping) sites, green circles represent garden surveys and pink circles represent adhoc surveys/walking transects/swarming surveys.

There were a similar number of bat species identified under each survey type with the exception of advanced bat surveys where an additional 2 *Myotis* species were identified in the hand (see Figure 9 below).

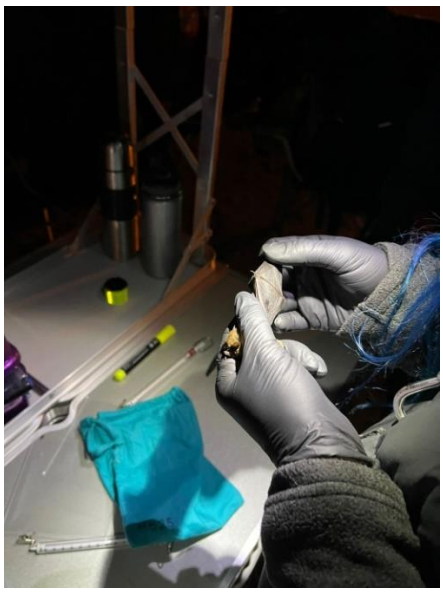

Figure 7: Trapping/handling bats is licensable by NRW and requires skilled bat workers (Photo credit Lee Gwyther)

Figure 8: Setting up harp trap outside a cave entrance in a local woodland (Photo credit: Denise Plume)

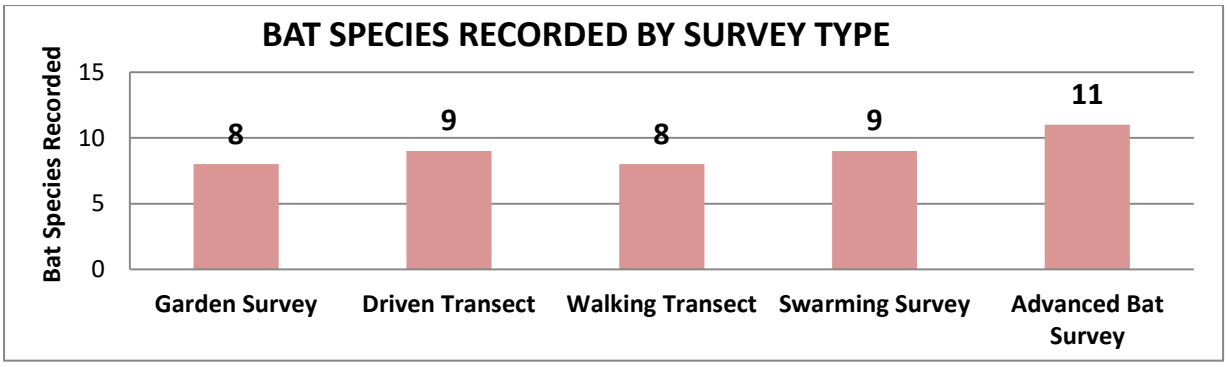

Figure 9: This map shows the number of species recorded by survey type with advanced bat surveys (trapping) recording the highest number of species.

All Surveys - A total of 50 surveys were carried out between May and the end of September 2022 generating 2,519 records. All records were "cleaned up" which involved removing duplicates, particularly for driven and walking transects. The following two pie charts (Figures 10 and 11) show the number of records generated per survey type and the number of surveys performed.

The number of records generated in just one season by the Carmarthenshire Bat Research Project have boosted WWBIC's database by 23%. The trend for some bats species follows the same pattern as the county records as shown in Figure 12 below, particularly pipistrelles (*Pipistrellus species*). During 2022, the common pipistrelle (*Pipistrellus pipistrellus*) was encountered on more occasions than soprano pipistrelle (*Pipistrellus pygmaeus*), whereas the local records show the reverse.

Table 1: Records generated by CBRP compared to records currently available at the WWBIC (2021 dataset). The increase in records generated is shown as a percentage.

Species	WWBIC Records (1970 to 2021)	CBRP (2022)	Total Records (2022)	% Increase
Common Pipistrelle	1901	1022	2923	53.76
Soprano Pipistrelle	1960	810	2770	41.33
Noctule Bat	546	130	676	23.81
Myotis species	893	163	1056	18.25
Brown Long-eared Bat	904	134	1038	14.82
Nyctalus species	96	12	108	12.50
Daubenton's Bat	694	66	760	9.51
Whiskered/Brandt's Bat	441	36	477	8.16
Natterer's Bat	920	70	990	7.61
Greater Horseshoe Bat	844	32	876	3.79
Pipistrelle	933	34	967	3.64
Whiskered Bat	158	5	163	3.16
Serotine	32	1	33	3.13
Lesser Horseshoe Bat	221	2	223	0.90
Barbastelle	132	1	133	0.76
Brandt's Bat	47	0	47	0.00
Lesser Noctule	29	0	29	0.00
Nathusius Pipistrelle	21	0	21	0.00

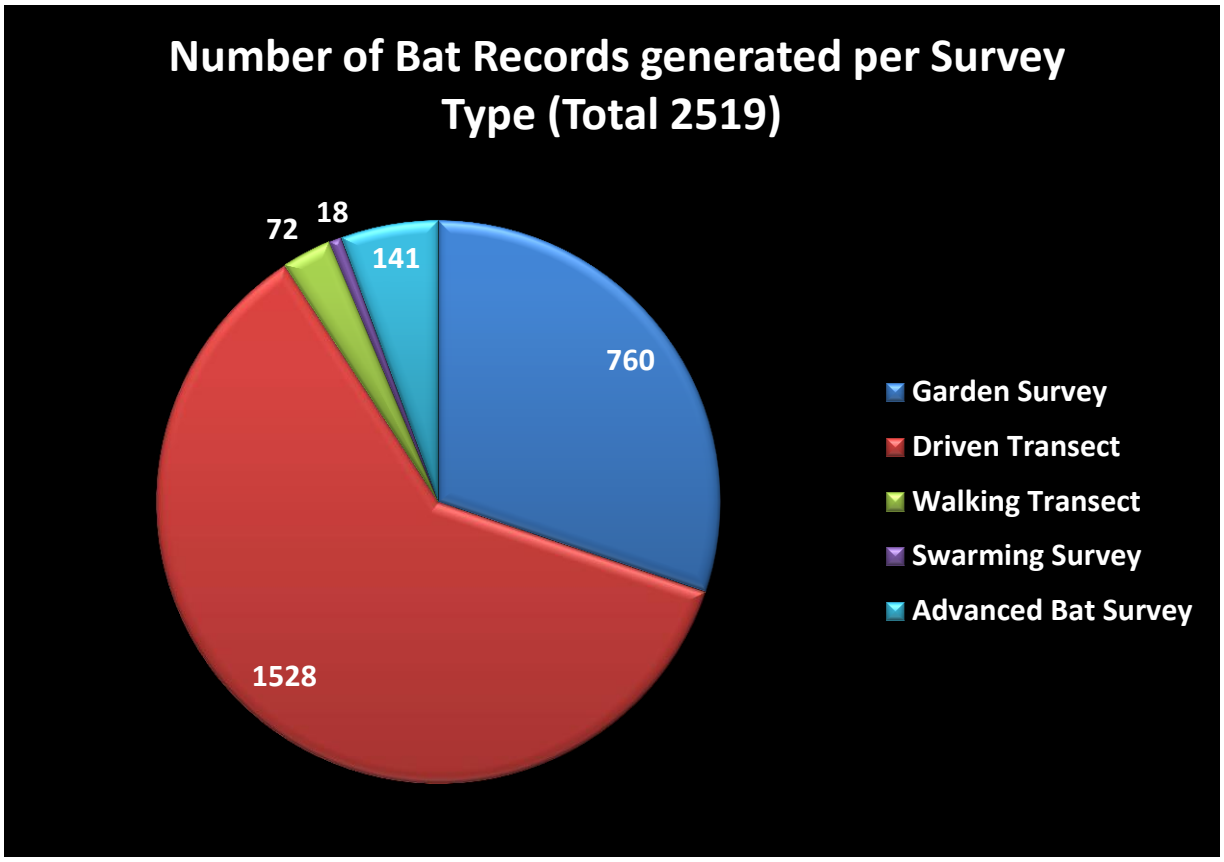

Figure 10: A total of 2,519 Records covering 11 species were generated from 50 bat surveys from May until the end of September 2022

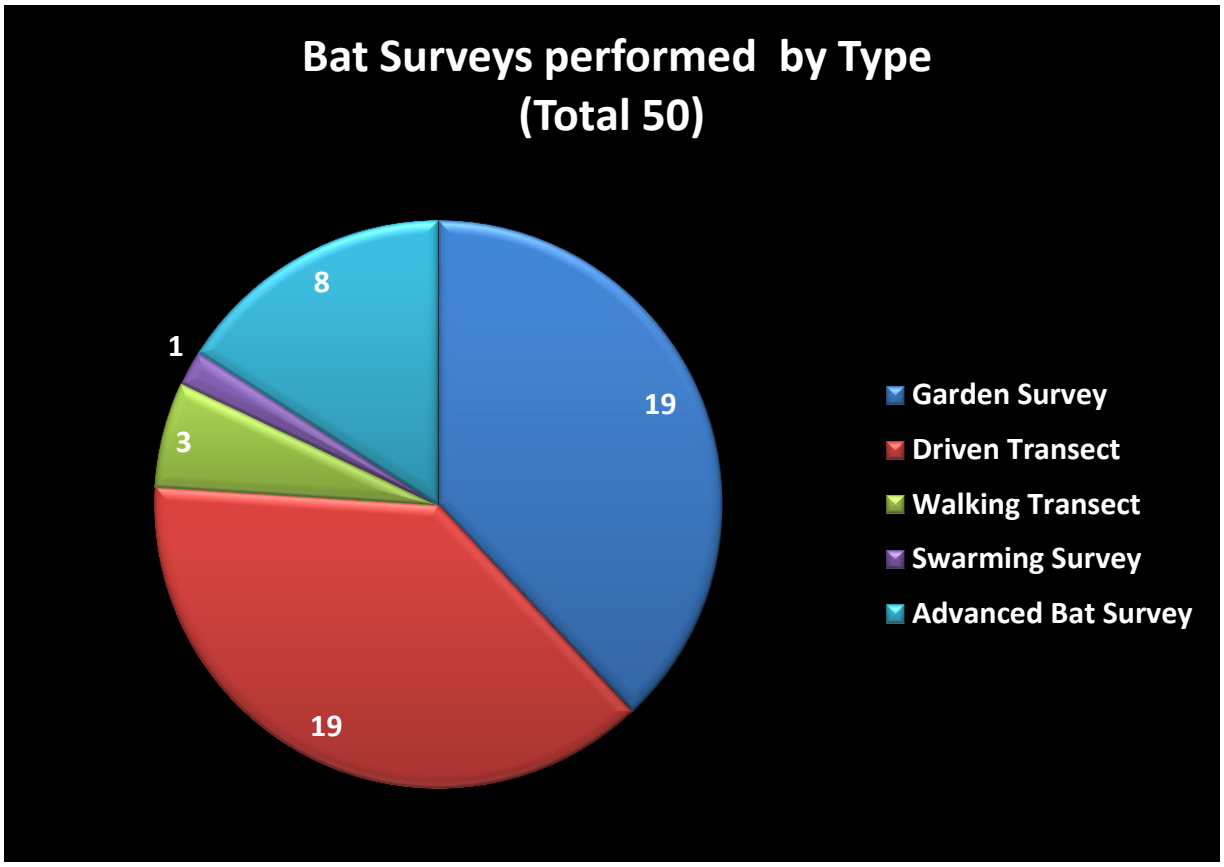

Figure 11: A total of 50 surveys, generating 2,519 bat records, were performed from May until end of September.

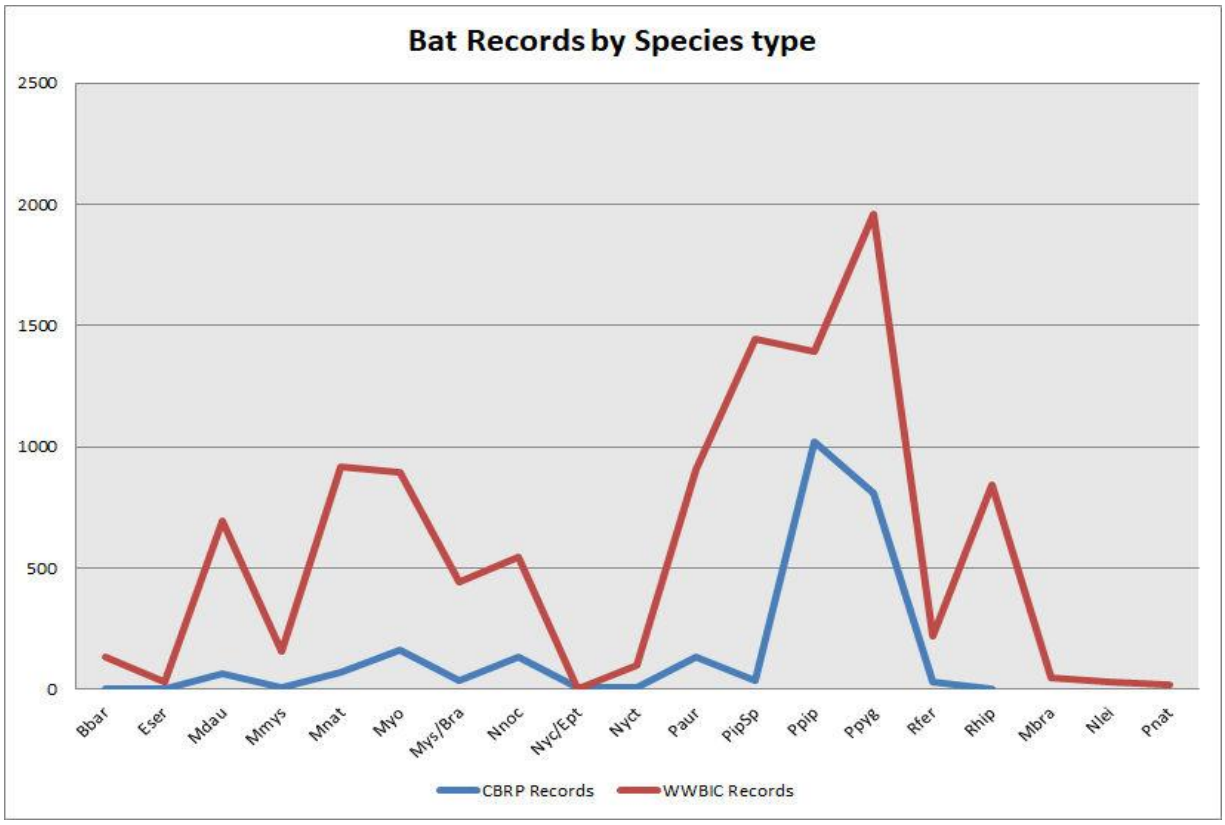

Figure 12: Comparing the trends of CBRP records with WWBIC records (2021 dataset).

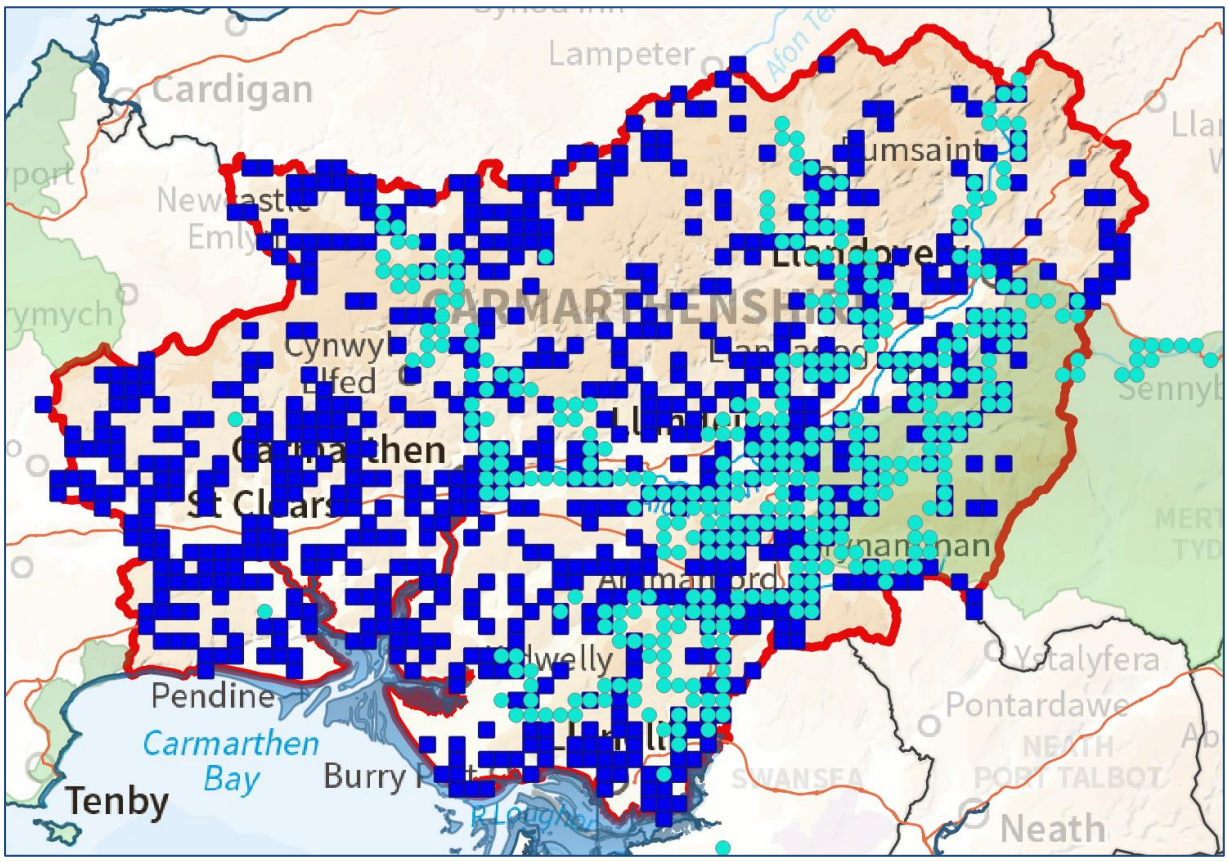

Figure 13: Carmarthenshire's "All bats" records; dark blue 1km^2 monad squares are records from WWBIC's 2021 database. Turquoise circles represent bat records generated from CBRP's survey efforts amounting to an increase in the records of over 23%.

Other Species Records

A total of 52 records were generated from surveyors commuting to/from survey sites as well as during surveys such as driven transects and trapping surveys (See Tables 2 and 3).

Table 2: 43 Nocturnal Mammals/Birds records were collected during survey work in 2022

Common Name	Number of Records	Adult/Juvenile	Alive/Dead
Badger	**3**	**Adult**	**Alive**
Red Fox	**6**	**3 Adult/3 Juvenile**	**Alive**
Brown Rat	**1**	**Adult**	**Alive**
Brown Hare	**3**	**Adult**	**Alive**
Fallow Deer	**3**	**Adult**	**Alive**
Hedgehog	**12**	**6 Adult/5 juvenile**	**11 Alive/1 dead**
Rabbit	**9**	**1 Adult/8 juvenile**	**Alive**
Barn Owl	**2**	**Adult**	**Alive**
Tawny Owl	**7**	**Adult**	**Alive**

Table 3: 9 Adhoc bird records were collected commuting to survey sites

Common Name	Number of Records	Adult/Juvenile	Alive/Dead
Kestrel	**1**	**Adult**	**Alive**
Stonechat	**4**	**Adult**	**Alive**
Green Woodpecker	**1**	**Adult**	**Alive**
Peregrine	**1**	**Adult**	**Alive**
Kingfisher	**1**	**Adult**	**Alive**
Mistle Thrush	**6**	**Adult**	**Alive**
Sparrowhawk	**2**	**Adult**	**Alive**

Conclusion

The first edition of the Carmarthenshire Bat Atlas was produced in January 2022 using 10,772 records/14 species provided by WWBIC. The baseline Atlas covers 772 monad squares (1km^2) in the county which is approximate 32%. The county Bat Atlas is free to download from the WWBIC's website at https://www.wwbic.org.uk/contacts-links/local-groups-and-blogs/carms-bat-group/attachment/carmarthenshire-bat-atlas-2021/ or Bat Conservation Trust's website at https://www.bats.org.uk/support-bats/bat-groups/wales under Carmarthenshire Bat Group.

Survey work carried out between May and September 2022 CBRP generated 2,519 bat records and 52 adhoc records (nocturnal mammals and birds). Survey effort in 2022 increased the records by 23% covering 407 monad squares (1km^2), 166/407 of those monad squares were new records. The most prolific survey method was the driven transect; 19 routes, over 300 miles were driven generating 1528 records.

The most recorded bat was the common pipistrelle increasing the records by 53.76%. Soprano pipistrelle closely followed by an increase in records by 41.33%. The other most recorded bats were unidentified *Myotis*, longeared (*Plecotus species*) and noctule (*Nyctalus noctula*). Bat species not recorded or captured in 2022 were Brandt's bat (*Myotis brantii*),

Leisler's (*Nyctalus leisleri*) and Nathusius pipistrelle. Only one Barbastelle pass was recorded at Dolacauthi Gold Mines which was likely to be a single bat commuting (See Table 1).

Social Media coverage includes regular updates on a designated Facebook Page - Carmarthenshire Bat Research Project. Also presentations and talks to the local community include a local community group in Ammanford, WWBIC, and East Carmarthenshire Wildlife Trust Group. Articles about the project have been published in local newsletters and annual reports for Carmarthenshire Council Nature Partnership and West Wales Biodiversity Information Centre.

This work was achieved by a small group of individuals from the Carmarthenshire Bat Research Project, the Carmarthenshire Bat Group and householders who participated in this project.

Acknowledgements

Special thanks to **Woolhope Dome Environmental Trust** for their continued support and for funding this particular project, as well as other project work in Herefordshire.

Also to **West Wales Biodiversity Information Centre** for providing the biological records free of charge to produce a County bat atlas.

National Resourse Wales (NRW), Ruth Harding, Jennifer Day, Sam Dyer, Ali Baird and the Species Licencing team for their support and for swiftly turning around SSSI concents for some sites.

Landowners/Site Managers: National Trust, National Botanical Garden Wales, West Wales Wildlife Trust, Becky Holme (RSPB), Alex Gill and Ted Williams (Betws Park) for supporting the project and allowing us to carry out on-site surveys.

Key Trapping Team; Lee Gwyther, Steve Lucas, Simeon Jones, Denbigh Vaughan

Steve Lucas - **Chair of the Carms Bat Group** for his local knowledge, expertise and commitment in carrying out some of the project work with the use of his own personal equipment.

Lee Gwyther (who idea it was to start this Project) for his commitment, expertise, enthusiam, calm influence, good humour and positivity to keep the Project alive and to keep everyone motivated.

Herefordshire Bat Rescue Group: Mike Bailey and Rachel Davies for providing additional expertise and training and for driving from Herefordshire to support the Project.

Richard Crompton, **Carmarthenshire Bat Group and Carmarthenshire Bat Research Project** members for supporting the Project and participating at trapping events.

All Carmarthenshire Householders who allowed us to deploy bat detectors in their gardens for a set period.

Appendix 1 – Carmarthenshire Bat Research Project Methodology for Non-licensable surveys

Project Aim for non-licensable activities 2022

1. Generate Biological Records for the Carmarthenshire Bat Atlas
2. To collect data on non-bat wildlife when appropriate
3. To extrapolate information on bat activity within survey squares to determine 'hotspot' areas, and/or areas of high bat diversity
4. To engage volunteers of all levels of experience to get involved
5. To provide training to inexperienced members of the bat group to survey for bats and carry out complex sound analysis

Garden and Church Surveys

The built environment is often a neglected area for bat surveys as there is a tendency to look for bats in the more interesting habitats so targeting gardens in urban and per-urban area will generate interesting data for bat activity. Static bat detectors will be supplied and deployed in garden of bat group members and members of the public known to the Project for a period of 3 to 7 days.

Churches can provide suitable places for bats to roost in, and in some cases, bats can present a problem to the church fabric and users of the church.

Members are encouraged to visit their local church and look for signs of bat usage inside the church building which can provide an indication if problems are being encountered by bats. This will enable group member to offer advice to mitigate issues. Volunteers are also encouraged to undertake static bat detector surveys outside the church building using the same protocol as garden surveys but only where the security of the detector can be assured. A minimum of 2 static bat detectors is recommended per church survey.

This will provide valuable data for bats using Welsh churches and generate more biological records, particularly for historic buildings.

Equipment Supplied for garden and church surveys and other suitable sites

Table 4: A box will include the following equipment

Audio Moth 1.2.0 with Case
USB Cable
SanDisk Memory Cards/Sticks Extra Plus 64GB
AA Battery Chargers
Batteries Rechargeable (Pks 4)
Instruction Manual

Transect Surveys (Driven, Cycle or Walking)

Carmarthenshire is pre-dominantly rural with many miles of quiet country lanes, single-track roads as well as a network of cycle tracks and footpaths such as the Llanelli coastal footpath. Country lanes are lined with trees and hedgerows, and constitute a major network of connectivity in the landscape. Bats need to fly along linear landscape features when commuting from roost to foraging sites and vice versa. Hedgerow and tree-line habitats along many roads provide a source of insect prey for bats in flight too.

Carmarthenshire has a limited number of experienced bat workers and many of those have limited availability to carry out county wide bat detector surveys. Surveying from a moving vehicle with bat detectors can increase the number of sampling points per surveyor per survey night and make this detector-based monitoring programme possible with a relatively small number of surveyors. Individuals with little or no bat knowledge can also get involved in undertaking the survey but it does require highly trained individuals to analyse the data. However, full training will be provided to individuals who want to analyse their own calls, but all calls will have to be verified by an expert prior to submitting them to the records office. Road surveys generally provide an insight into bat populations in very different habitats, which will be indicative of insect abundance and distribution which bats rely upon. Data collected on this project, when analysed in conjunction with roadside habitat data, will help decision making on future road network leading to lessened environmental impacts.

Survey routes for driven, cycle or walking transects

A transect of a minimum of 20km (12 miles) is suggested to be driven from May until September, starting 30 minutes after sunset. Bats are recorded using appropriate bat detection equipment supplied by the Project (Anabat Express), which has geo-referencing facilities. A box containing all equipment and full instructions will be supplied to volunteers who participate in the project.

Volunteers are required to drive at 15 mph along a chosen monitoring transect, recording bat activity via the static bat detector. This speed was chosen because low speeds reduce background noise and the effect of Doppler shifts on recorded calls.

Routes should be selected from areas that currently have limited or no biological records (the baseline BatAtlas will provide volunteers with this information). This document is available on BCT's website and is free to download.

Surveyors plan their routes well in advance; download the route either in paper form or directly onto a SatNav or GPS. By forward planning the surveyor is less likely to get lost or end up on major roads.

Driven transects can be carried out by one surveyor as long as they have the route displayed on a SatNav or GPS and that the survey is covering bats only. However, it is recommended that a team of two people carry out the survey, a driver and a passenger. The passenger's role will be to navigate and to note any other species observed during the survey (owls, hedgehogs, badgers etc.).

Cycling or Walking Transects

Surveyors have the option of carrying out cycling or walking transects as well as driven transects. This may be cycle routes around towns/villages or around town parks/lakes or reservoirs etc. This requires a minimum of two people for safety reasons. All cycle and walking transects should be subject to reckoning prior to the survey. All surveyors must have access to a bicycle, hi-viz jackets and head torches. Cycle lights, front and rear must be sufficiently bright enough for road use at night.

Driven Transects

Major highways should be avoided wherever possible, but sometimes this is not always possible. If this is the case then it is recommended the driver/surveyor increases speed suitable for that stretch of road. The flashing beacon supplied can legally be used at 25mph or less, so it must be detached prior to joining a major highway, as there is a risk the beacon will detach from the car roof.

To warn other drivers of a slow moving vehicle, surveyors will be equipped with an amber flashing beacon and signage to warn other drivers of "Wildlife Surveying". Surveyors must pull over and allow vehicles to pass when safe to do so.

Figure 14: An example of a car ready to carry out a driven transect. The bat detector microphone is positioned just inside the open car window to avoid wind noise.

Equipment Supplied for a Driven/Walking/Cycling Transect

Table 5: A 9L box will include the following equipment:

Equipment	Transect Type
Full instructions	All transect types
Anabat Express with Omni-directional Microphone	All transect types
Anabat Extension cable	All transect types
AA Battery Chargers for 8 batteries (Anabat Swifts)	All transect types
0.55L Boxes (batteries, charger and memory stick)	All transect types
SanDisk Memory Cards/Sticks	All transect types
Batteries Rechargeable (Pk 4)	All transect types
Memory Stick	All transect types
Batteries x 8	All transect types
Rotating Amber Beacon	Driven Transect only
Camera Suction Mounts	Driven Transect only
Window display suction fasteners	Driven Transect only
Fold back Bulldog Clip	Driven Transect only
Laminated Wildlife surveying signage (2)	Driven Transect Only
Splitter for car socket	Driven Transect only
Cable ties	Cycling or Walking Transect

The Anabat Express or Anabat Swift is the bat detector of choice for driven/cycle or walking transects because of its simple set up, its automated GPS transect mode and zero crossing recording.

For walking and cycling transects, a static bat detector can be placed in a rucksack using an extension cable attach to the microphone. The microphone can then be clipped to a rear strap with a cable tie. Having the microphone facing away from the surveyor will eliminate noise. The addition of an Echo Metre Touch Pro with a tablet will be used purely to show members of the public bat calls for training and interest purposes, particularly on Walking Transects and organised bat walks.

For driven transects, the detector microphone is attached to an extension cable and positioned at the rear window of a vehicle with a modified camera car window clamp. The microphone is placed just inside the open window to reduce wind noise (Figure 14). The detector is safety secured to the back of the passenger seat to avoid it falling to the floor in the event of the vehicle braking hard. Surveyors are provided with a recording sheet to record any mammals sighted (dead or alive) during the survey and to record additional survey details (this only applies to surveyors who have passengers). If possible key features of the landscape (and a grid reference) should be noted, which may attract or deter bats during the survey e.g. water bodies, sewage farms, woodlands, etc.

Training will be provided to members to explain how to use the equipment and any risks associated with the survey.

Once a survey had been completed, surveyors must download the evening's data onto the data stick supplied and clearly labelled. The SD card should then be cleared for the next surveyor. Otherwise this can complicate matters for the person analyzing the data.

The data from survey forms containing any other species (even bats seen flying) should be entered onto a spreadsheet or paper copies scanned and sent to the Project Leader.

Denise Plume (was Foster)
Carmarthenshire Bat Research Project
Project Leader for Carmarthenshire Bat Research Project Bat and licenced for related project work such as trapping, marking and ringing
NRW Licenced Bat Worker for all of Wales
NRW Licenced Dormouse Worker for all of Wales
Treasurer for Carmarthenshire Bat Group
Facebook Link : https://www.facebook.com/profile.php?id=100080646277972