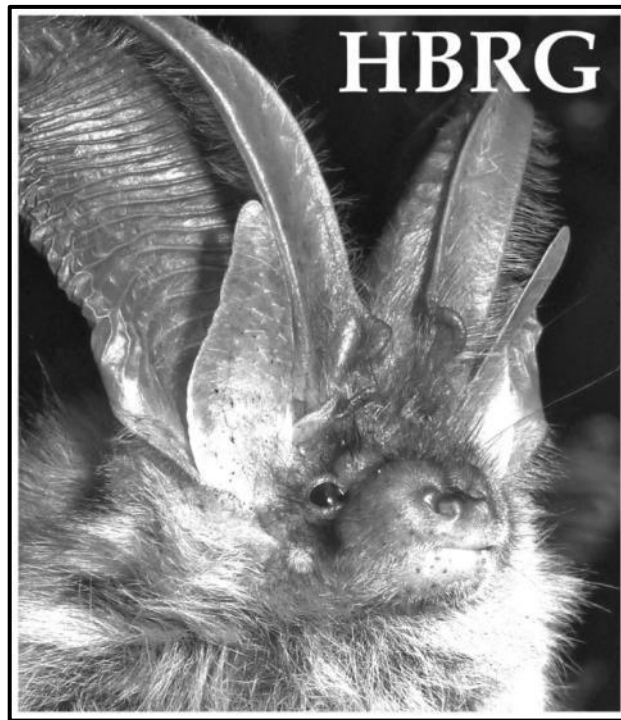


**HEREFORDSHIRE BAT ATLAS**  
**1960 to 2020**



***Herefordshire Bat Research Group***

***Produced by Denise Foster and David Lee***

***Photo credits: Denise Foster, David Lee, Daniel Whitby, Steve Parker,  
Scott Brown, Christian Dietz & Otto von Helversen***

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## Introduction

Herefordshire is located in the West Midlands and is bordered by Shropshire to the north, Worcestershire to the east, Gloucestershire to the south east and Wales (Monmouthshire and Powys) to the west. A significant proportion of the land (95%) is predominantly rural with farming practices such as forestry, dairy, poultry and beef farming. It is famous for its apple and pear orchards, potatoes, strawberries and hops (Herefordshire Council 2020). Despite much of the land being heavily managed there are some prime habitats within the county including 8 key rivers, a National Nature Reserve, Special Areas of Conservation (SAC) - specifically the River Wye, and 24 Sites of Special Scientific Interest (SSSI). Small areas of both the Malvern Hills and Wye Valley Areas of Outstanding Natural Beauty (AONB) lie within Herefordshire (Natural England 2013). Tree coverage is generally considered to be low in the county, amounting only to around 15% (HWT, 2020).

In the UK, 17 species of bats are known to breed, 15 of these have been recorded in Herefordshire. The grey long-eared bat (*Plecotus austriacus*) is at the very limit of its European range in the southern counties of England, so is unlikely to be present in Herefordshire. The Alcaholic bat (*Myotis alcaholic*), new to science and discovered only in 2001, was confirmed in the British Isles in 2010 and is one of three cryptic species. So far one record of this species has been confirmed in neighbouring Worcestershire so it is likely also to be present in Herefordshire. A small *Myotis* was caught at a trapping session at Berrington Hall (near Leominster) in 2015 which was believed to be an Alcaholic. Biometric measurements and other identification features were recorded and photographed, which matched the identification characteristics of the species. Photographs and other recorded data were sent to an expert for this species, who was confident that this bat was likely to be an Alcaholic. However, the bat did not produce a faecal sample for DNA analysis so the record could not be confirmed.

There are very limited numbers of records for certain bat species in Herefordshire for example *Myotis* bats such as Bechstein's and Brandt's bats and the larger species: Leisler's bat (*Nyctalus leisleri*) and the serotine (*Eptesicus serotinus*) (Herefordshire Biological Records Centre (HBRC) – DF: personal review of records). Nathusius' pipistrelles are also rare in Herefordshire and any records are most likely of bats commuting across the county (DF: personal opinion).

The most difficult species to identify are those in the genus *Myotis*. 5 species have been recorded as breeding in Herefordshire out of the 6 *Myotis* species known to breed nationally. A 7<sup>th</sup> *Myotis* species - the greater mouse-eared bat (*M. myotis*) was discovered in the UK in 1958 but was officially declared locally extinct in 1990. However a single individual has been recorded hibernating in a disused railway tunnel in West Sussex most years since 2002 (PTES, 2015).

The first edition of the Herefordshire Bat Atlas was produced in 2015 using 13,850 records from 1960 to 2015. These bat records comprised 12,746 from HBRC's database and 1,104 from the National Biodiversity Network Gateway (NBN).

This second edition of the Herefordshire Bat Atlas – updated to 2020 - has been created using records taken from the same sources as in 2015; HBRC and NBN, with additional records collected from projects run by the authors. A total of 25,074 bat records were available; 16,983 held by the HBRC, 3,105 held by NBN and 4,986 records generated by our local projects.

**Table 1:** Table highlighting the number of records for each bat species recorded in Herefordshire. Two sets of data showing available records from the baseline atlas compared with the number of records available for the updated second Edition.

Scientific Name	Common name	Number of Records 1960-2015 Baseline Atlas (1 <sup>st</sup> Edition)	Number of Records 1960-2020 This Atlas (2 <sup>nd</sup> Edition)
<i>Chiroptera</i>	Unidentified bat	1034	1450
<i>Pipistrellus sp.</i>	Pipistrelle species	1096	1181
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	3165	7033
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	1860	3826
<i>Pipistrellus nathusii</i>	Nathusius' pipistrelle	14	20
<i>Plecotus auritus</i>	Brown long-eared bat	2154	3420
<i>Myotis sp.</i>	Myotis species	875	1519
<i>Myotis sp. (small)</i>	Whiskered/Brandt's	6	16
<i>Myotis mystacinus</i>	Whiskered bat	140	239
<i>Myotis brandtii</i>	Brandt's bat	20	54
<i>Myotis nattereri</i>	Natterer's bat	473	801
<i>Myotis daubentonii</i>	Daubenton's bat	436	546
<i>Myotis bechsteinii</i>	Bechstein's bat	46	104
<i>Nyctalus sp.</i>	Nyctalus species	45	80
<i>Nyctalus noctula</i>	Noctule	760	1402
<i>Nyctalus leisleri</i>	Leisler's bat	22	57
<i>Nyctalus/Eptesicus agg.</i>	Nyctalus/Eptesicus	30	38
<i>Eptesicus serotinus</i>	Serotine	43	110
<i>Barbastella barbastellus</i>	Barbastelle	101	272
<i>Rhinolophus ferrumequinum</i>	Greater horseshoe bat	91	245
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe bat	1439	2661
<b>Total Records</b>		<b>13850</b>	<b>25074</b>

The majority of recorders listed in the bat record database are known by the present authors to be competent bat workers. No records on the database, other than to Order level, have been submitted by the general public. Overall, records for individual bat species generated by our local projects compare favourably with the trends in the main bulk of bat records held by HBRC with the exception of 2 species; Barbastelle (*Barbastella barbastellus*) and Bechstein's bat (*Myotis bechsteinii*). Barbastelle bats were recorded frequently during our surveys and increased the number of individual records by 73%. Bechstein's bats are difficult to identify using bat detectors alone, so discovering 5 additional sites in the county during trapping sessions from 2015 to 2018 was a great achievement.



**Barbastelle bat**



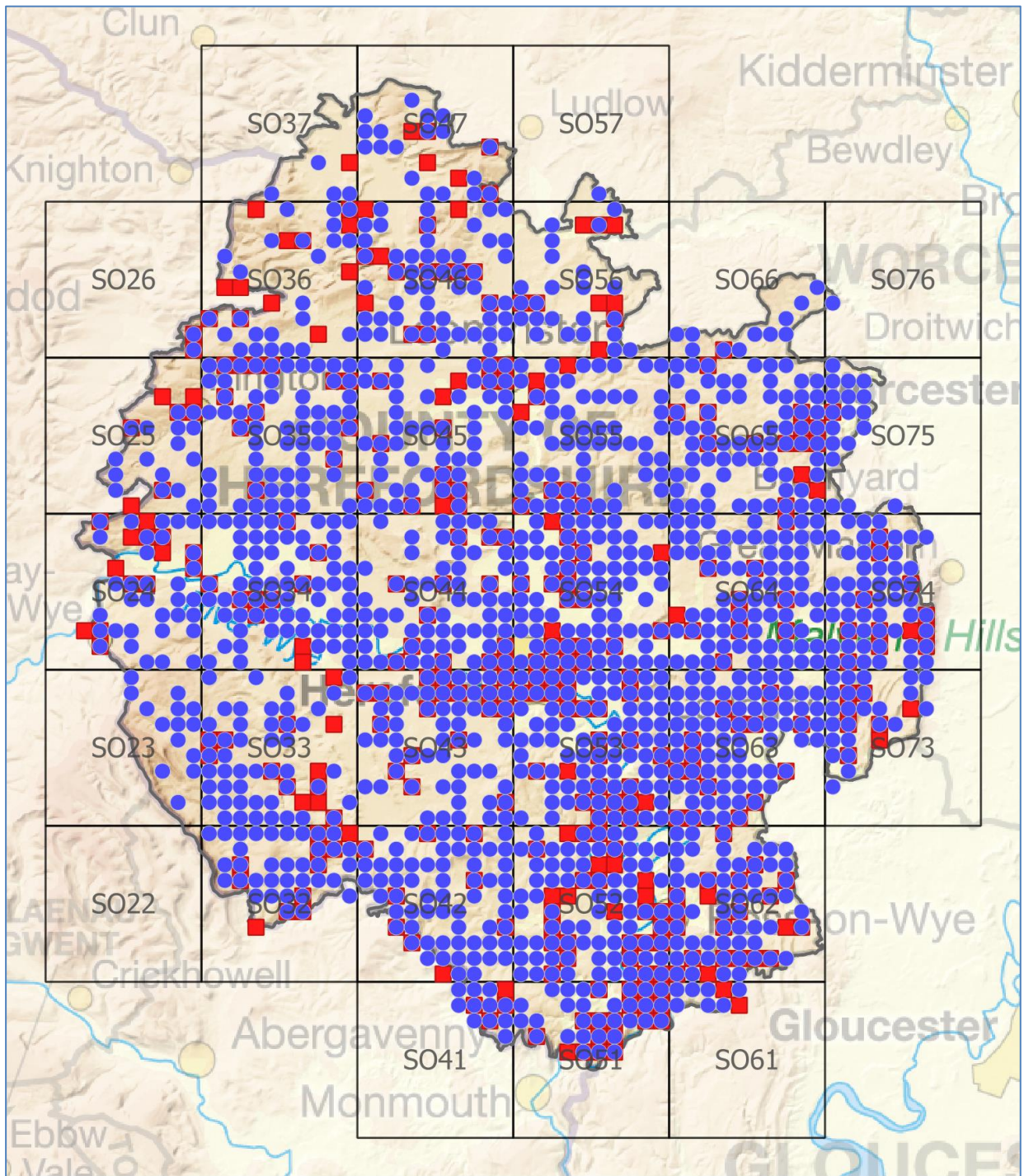
**Maternity Colony of Bechstein's bats**

Explanatory notes about the records and the species have been included in this document in addition to distribution maps and photographs.

The distribution of records from each species is mapped at a 1km square resolution, based on Ordnance Survey grid squares (monads). The current recording period for this atlas is considered to be 2000 to 2020 and distributions of records from this period are shown as blue circles. The distributions of earlier records - obtained from the years 1960 to 1999 inclusive - are indicated by underlying red squares.

Overall, the records used for this bat atlas are considered to be of good quality, however some bat species are very difficult to identify using bat detectors alone and therefore the accuracy of certain species, particularly the *Myotis* group and the “big bats” should be viewed with some caution.

### “All Bat Species” Distribution Maps



**Figure 1:** Distribution of all bat species using 25,074 records from 1960 to 2020 (pre-2000 records are shown as red squares)

## Pipistrelles (*Pipistrellus species*) (common and soprano pipistrelles)



Common pipistrelle



Soprano pipistrelle

In 1999, the soprano pipistrelle (*Pipistrellus pygmaeus*) was formally separated from the common pipistrelle (*Pipistrellus pipistrellus*) on the basis of mitochondrial DNA analysis. Previously the “common pipistrelle” was considered to be a single species, although there was increasing suspicion that this may not be true when it was discovered that there appeared to be two discrete “phonic types” echolocating at different frequencies. We now know that the common pipistrelle echolocates at around 45kHz and the soprano at around 55kHz. There are also subtle differences in their appearance, habitat preference and prey selection.

Pipistrelle bats (common and soprano pipistrelles) recorded between 1960 and 2000 are shown in the records as one species i.e. Pipistrelle species. However, since 1999 they have been recorded as separate species, as well as just pipistrelle bats.

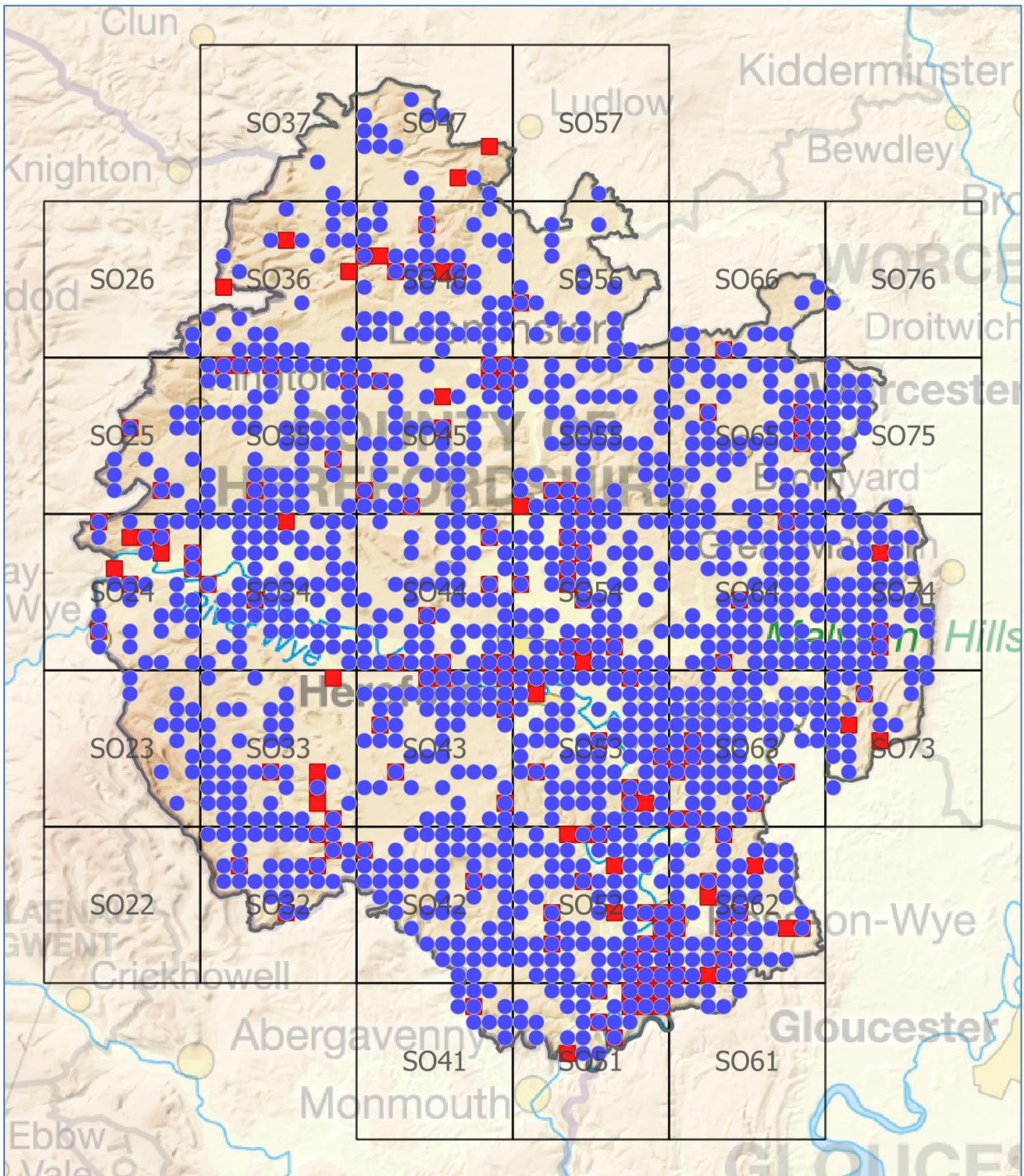
**Distribution:** The pipistrelle is found in most of Europe and it is the most common and widespread bat in the British Isles. In Herefordshire, it is also widely distributed and considered to be common.

**Identification:** This small bat emerges approximately 20 minutes after sunset flying fast and erratically pursuing small insects, which it catches and eats on the wing. Pipistrelles are relatively easy to identify using a bat detector and it is the bat the public are most likely to see.

**Roosts:** Summer roosts are usually found in crevices around the outside of buildings such as behind hanging tiles, soffits, barge or eaves boarding, between roofing felt and roof tiles or in cavity walls. This species also roosts in bat boxes, tree holes and crevices. In winter it is found in crevices of buildings and trees, and also in bat boxes. It is rarely encountered underground.



**Pipistrelle bats (common and soprano), *Pipistrellus* species**



**Figure 2:** Distribution of *Pipistrellus* species from 1960 to 2020 using 12,060 records (pre-2000 records are shown as red squares)

## Common pipistrelle (*Pipistrellus pipistrellus*)



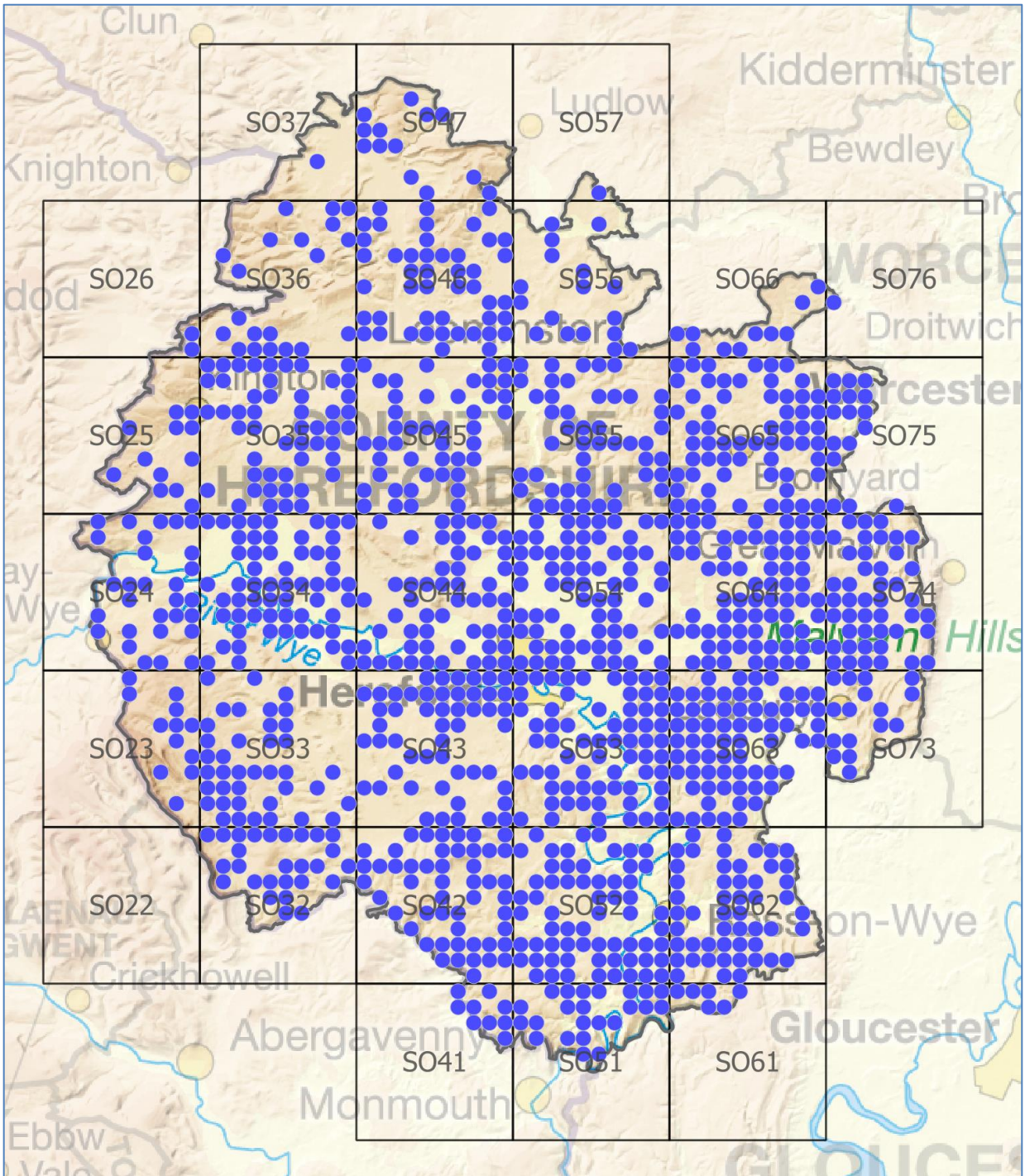
**Distribution:** The common pipistrelle bat is found in most of Europe and is common and widespread in most of the British Isles. In Herefordshire, it is also widespread and considered common.

**Identification:** This small bat usually emerges from its roost about 20 minutes after sunset and can be seen flying fast and erratically pursuing their prey. The dorsal fur is dark to chestnut brown and the ventral fur is paler. It has a long snout and the face and ears are dark brown to black. Males have white buccal glands in the breeding season.

**Feeding Habitat and Diet:** It forages in a wide range of habitats comprising woodland, hedgerows, grassland and farmland and also in suburban and urban areas. It feeds on a wide range of small flies, aquatic midges and mosquitoes, which it catches and eats on the wing by 'aerial hawking'.

**Roosts:** Summer roosts are usually found in crevices around the outside of buildings, such as behind hanging tiles, soffits and barge boarding, between roofing felt and roof tiles, or in cavity walls. This species also roosts in bat boxes, tree holes and crevices. In winter it is found in crevices of buildings and trees, and also in bat boxes. It is rarely encountered underground.

### Common pipistrelle (*Pipistrellus pipistrellus*)



**Figure 3:** Distribution of *Pipistrellus pipistrellus* from 2000 to 2020 using 7033 records (pre-2000 records are not shown since these will include *P. pygmaeus*)

## Soprano pipistrelle (*Pipistrellus pygmaeus*)



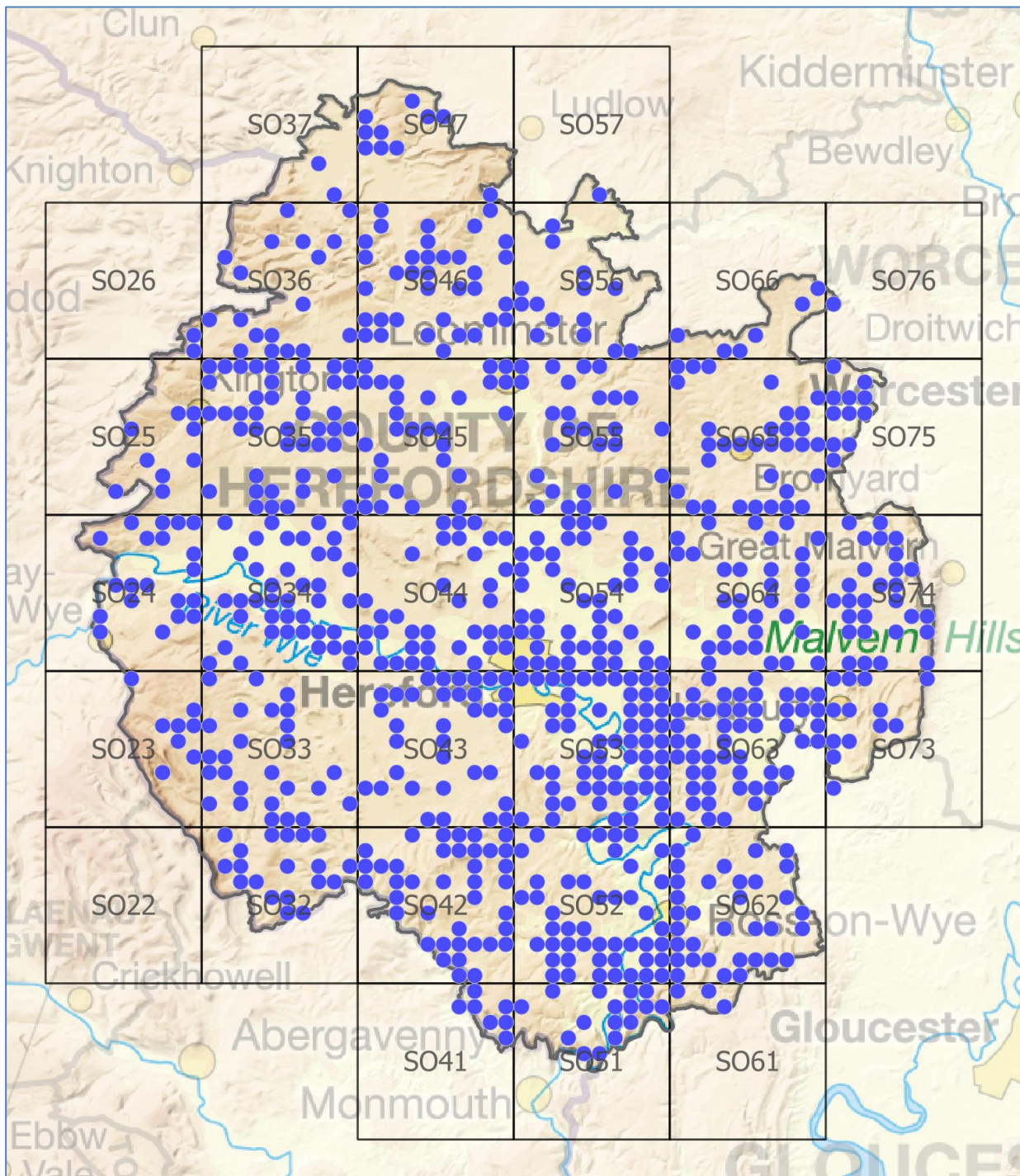
**Distribution:** The soprano pipistrelle bat is found in most of Europe and is common and widespread in the British Isles. In Herefordshire, it is widespread and considered common.

**Identification:** This small bat usually emerges from its roost about 20 minutes after sunset and can be seen flying fast and erratically pursuing their prey. The dorsal fur is chestnut brown and can sometimes have an olive tinge; the ventral fur is paler. It has a short pale snout, pale face and ears; there is a pale bald area around the ears and eyes. Males have yellow buccal glands in the breeding season.

**Feeding Habitat and Diet:** It usually forages over lakes and rivers, around woodland edges, tree lines, hedgerows, in gardens and parks. It feeds on a wide range of Hymenoptera, Diptera, mayflies and lacewings, as well as the aquatic midges which it catches and eats on the wing

**Roosts:** Summer roosts are usually found in crevices around the outside of buildings, such as behind hanging tiles, soffits and barge boarding, between roofing felt and roof tiles or in cavity walls. This species also roosts in bat boxes, tree holes and crevices. In winter, it is found in crevices of buildings and trees, and also in bat boxes. It is rarely encountered underground.

**Soprano pipistrelle (*Pipistrellus pygmaeus*)**



**Figure 4:** Distribution of *Pipistrellus pygmaeus* from 2000 to 2020 using 3826 records

## Nathusius' pipistrelle (*Pipistrellus nathusii*)



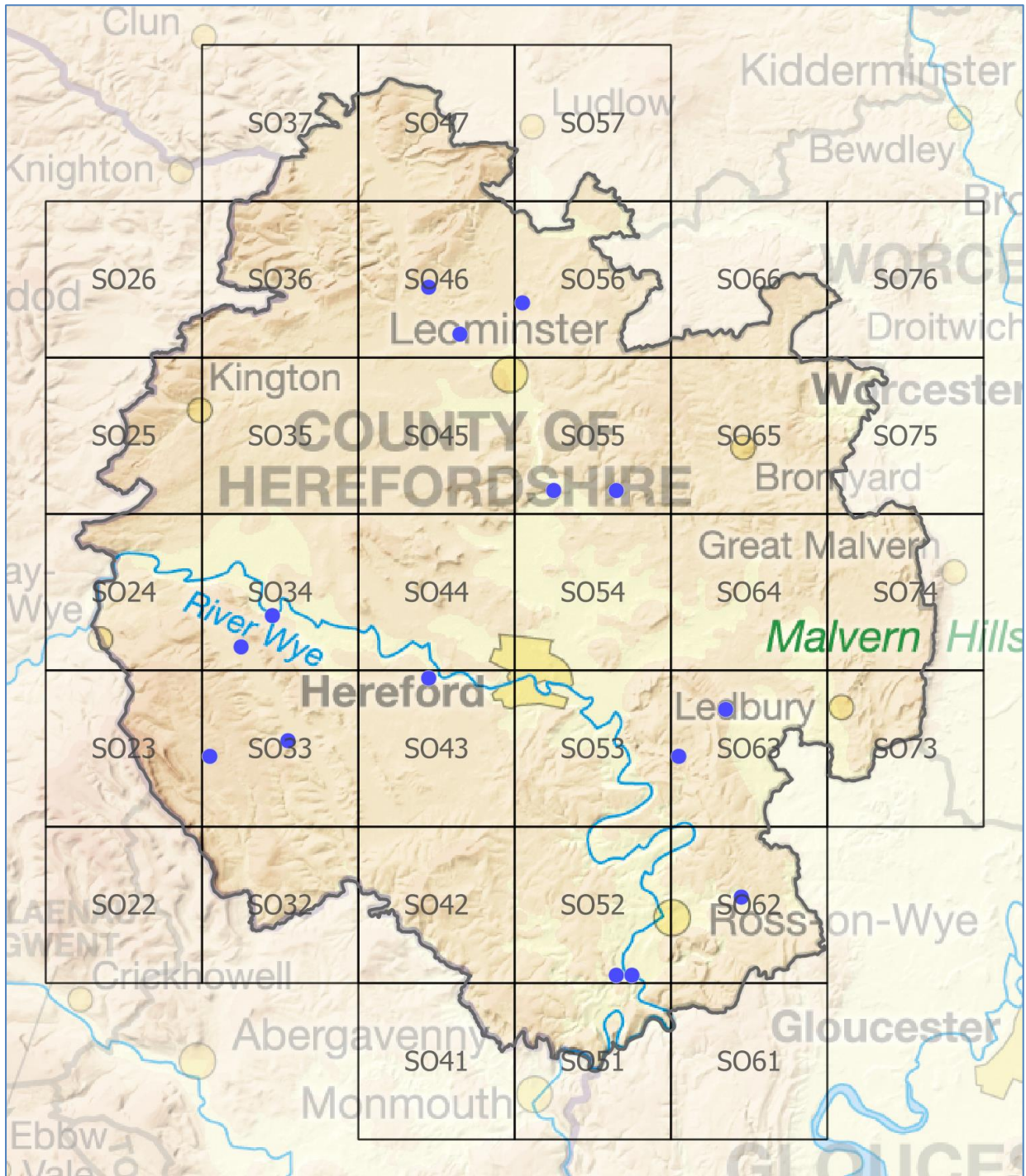
**Distribution:** The Nathusius' pipistrelle is found from Western Europe to Asia Minor. It is a migratory species and it is mostly encountered in autumn, although some do remain all year and breed in the British Isles. In Herefordshire, it is considered to be extremely rare.

**Identification:** This medium-sized bat has dark-reddish dorsal fur which extends considerably on the tail membrane; the ventral fur is paler. The tail projects <6mm beyond the tail membrane and has a post-calcarial lobe with a visible T-piece. The penis is egg-shaped and is robust with long hairs and a medial groove.

**Feeding Habitat and Diet:** Nathusius' pipistrelle forages near rivers, canals, lakes and water-logged areas, as well as along woodland rides and edges. It feeds on medium-sized flying insects such as aquatic flies, midges, mosquitoes and caddis flies which are caught on the wing by "aerial hawking".

**Roosts:** In summer, maternity roosts are located in cavity walls or under slate in brick buildings. In both summer and winter, individuals are found in cracks in brickwork, under soffit boards, fissures in rocks and sometimes in bat boxes.

**Nathusius' pipistrelle (*Pipistrellus nathusii*)**



**Figure 5:** Distribution of *Pipistrellus nathusii* 2000 to 2020 using 20 records (there are no records from 1960 to 2000)

## Brown long-eared Bat (*Plecotus auritus*)



**Distribution:** The brown long-eared bat is found in the whole of Europe, but is rare or absent in the Mediterranean region. It is found throughout Britain and is widespread and common in Herefordshire. The distribution maps include records submitted as "*Plecotus species*" as well as "*Plecotus auritus*" since it assumed that the grey long-eared bat, *Plecotus austriacus*, is not present in Herefordshire.

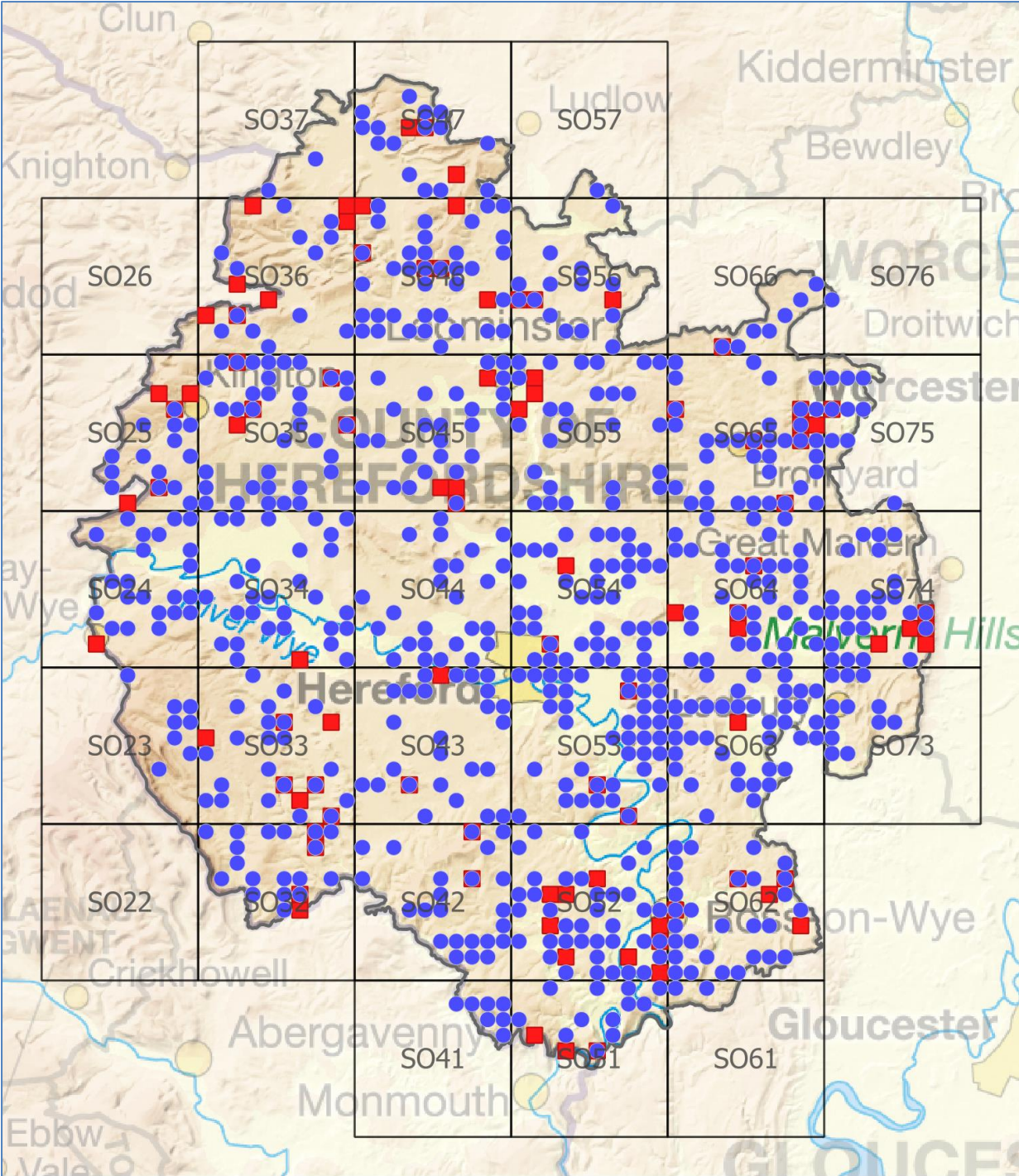
**Identification:** This medium-sized bat has long, delicate ears (>28mm) which join at the base. The long and fluffy dorsal fur is brown with a reddish tinge; the ventral fur is yellowish grey. It has large sometimes bulging eyes and a short muzzle, compared to the grey long-eared bat. The ears are curled and tucked under the wings when at rest; the tragus (inner ear lobe) can be confused as being ears when the bat is torpid.

**Feeding Habitat and Diet:** It forages in coniferous and deciduous woodlands, orchards, parks, and gardens. It is known as the "whispering bat" due to its quiet echolocation calls. It hunts slowly amongst foliage searching for prey and will often glean insects from the surface of foliage. It feeds on Diptera, grasshoppers, moths, spiders, earwigs and caterpillars.

**Roosts:** In summer, it is found in older buildings, barns, churches, trees and bat boxes. In winter, it is found hibernating in caves, tunnels, mines, icehouses, and occasionally in trees and buildings.



**Brown long-eared Bat (*Plecotus auritus*)**



**Figure 6:** Distribution of *Plecotus species/Plecotus auritus* using 3420 records from 1960 to 2020 (pre-2000 records are shown as red squares)

## The Myotis Genus

In the British Isles, there are six species of *Myotis* bats; Natterer's (*Myotis nattereri*), Daubenton's, (*M. daubentonii*) Bechstein's, Brandt's (*M. brandti*), whiskered (*M. mystacinus*) and Alcatheo. Five out of the UK's six *Myotis* species have been recorded in Herefordshire, with the exception of the Alcatheo.



**Figure 7:** The *Myotis* group of bats – all 6 species in the hand – From left to right Bechstein's, Natterer's and Daubenton's and the 3 cryptic species (Alcatheo, Brandt's and Whiskered).

*Myotis* bats are all similar in both appearance and echolocation calls. They all have distinct dark dorsal fur with pale/white ventral fur. *Myotis* bats have similar preferences for roosting, especially in winter where they use cave systems, disused mines and railway tunnels for hibernating; they can also be found in cracks in stonework. They will often gather at these sites during the autumn for swarming activities.

All *Myotis* species echolocate using short, frequency modulated calls with slight tonal differences. However, it is difficult to determine individual species from these broadband sweeps in the field. Identification cannot always be relied upon even when calls are analysed using sophisticated sound analysis software. Surveyors frequently group all 6 species under the genus *Myotis* when carrying out bat activity surveys to avoid ambiguity.

However, observation of flight patterns and foraging habitat can assist in the identification of some *Myotis bats* to species. Daubenton's bats, for example, are fairly easy to identify when they trawl across lakes and ponds just above the water's surface. Natterer's bats can be recognised as they will normally fly strongly and higher from the water's surface; they can also echolocate at frequencies ranging from around 120kHz to 20kHz, where most other *Myotis* species echolocate over a much narrower range of frequencies. However, this latter observation cannot always be relied upon.

Where it is possible to separate Natterer's and Daubenton's echolocation calls, it is extremely difficult to separate the small *Myotis* species which are normally grouped as whiskered/Alcathoe/Brandt's, whiskered/Brandt's or "WABS" for short.

Whiskered, Brandt's and Alcathoe are known as "cryptic species" because they are difficult to identify even in the hand. Whiskered and Brandt's bats were separated in 1970 and these two species can now be fairly reliably separated by differences in dentition and penis shape. Other distinguishing features are thought to include tragus shape and claw length. Little information is known about the Alcathoe, a new species for the British Isles since 2010 and new to science being first identified in Greece in 2001.

**Brandt's**



**Alcathoe**

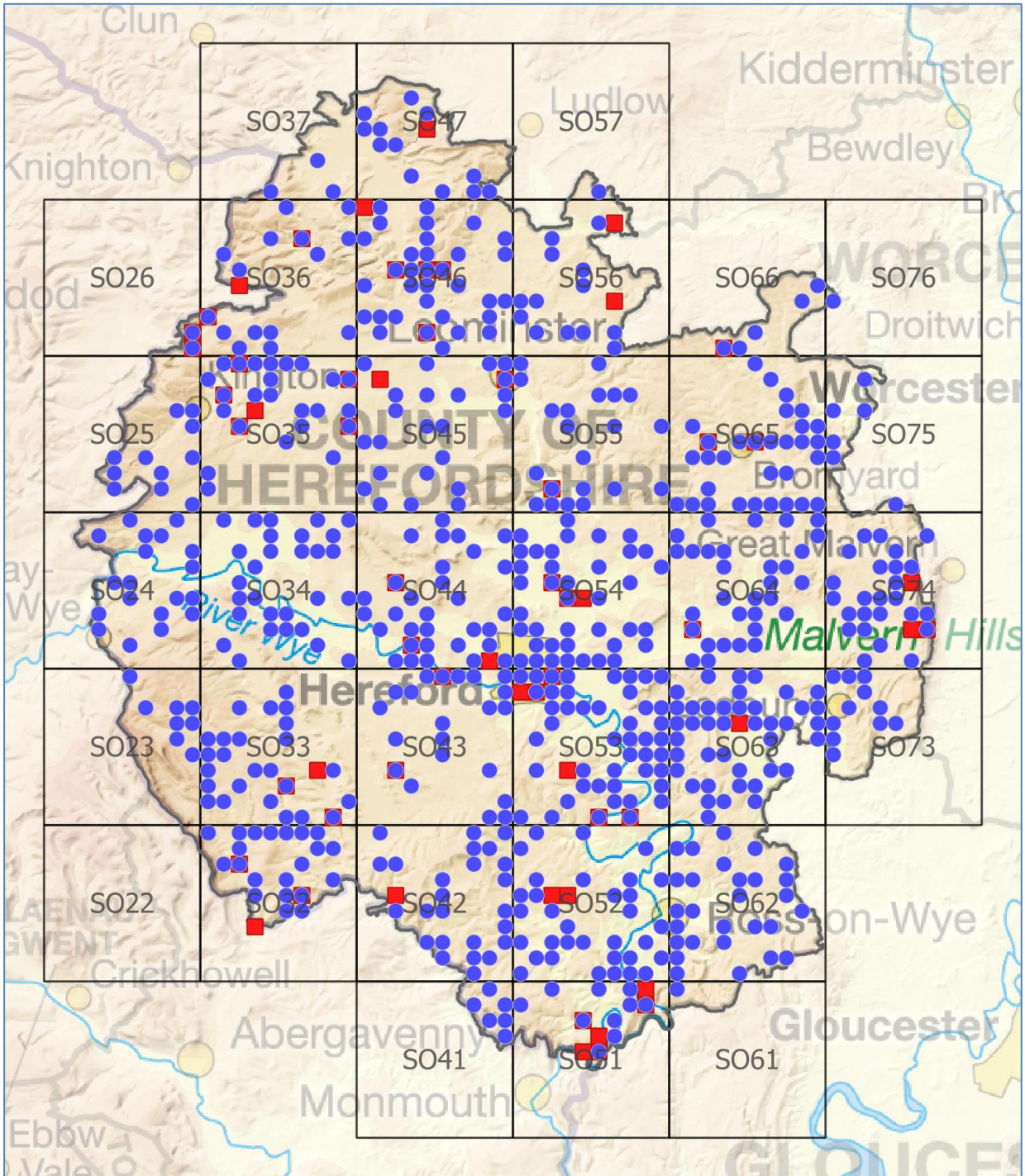


**Whiskered**



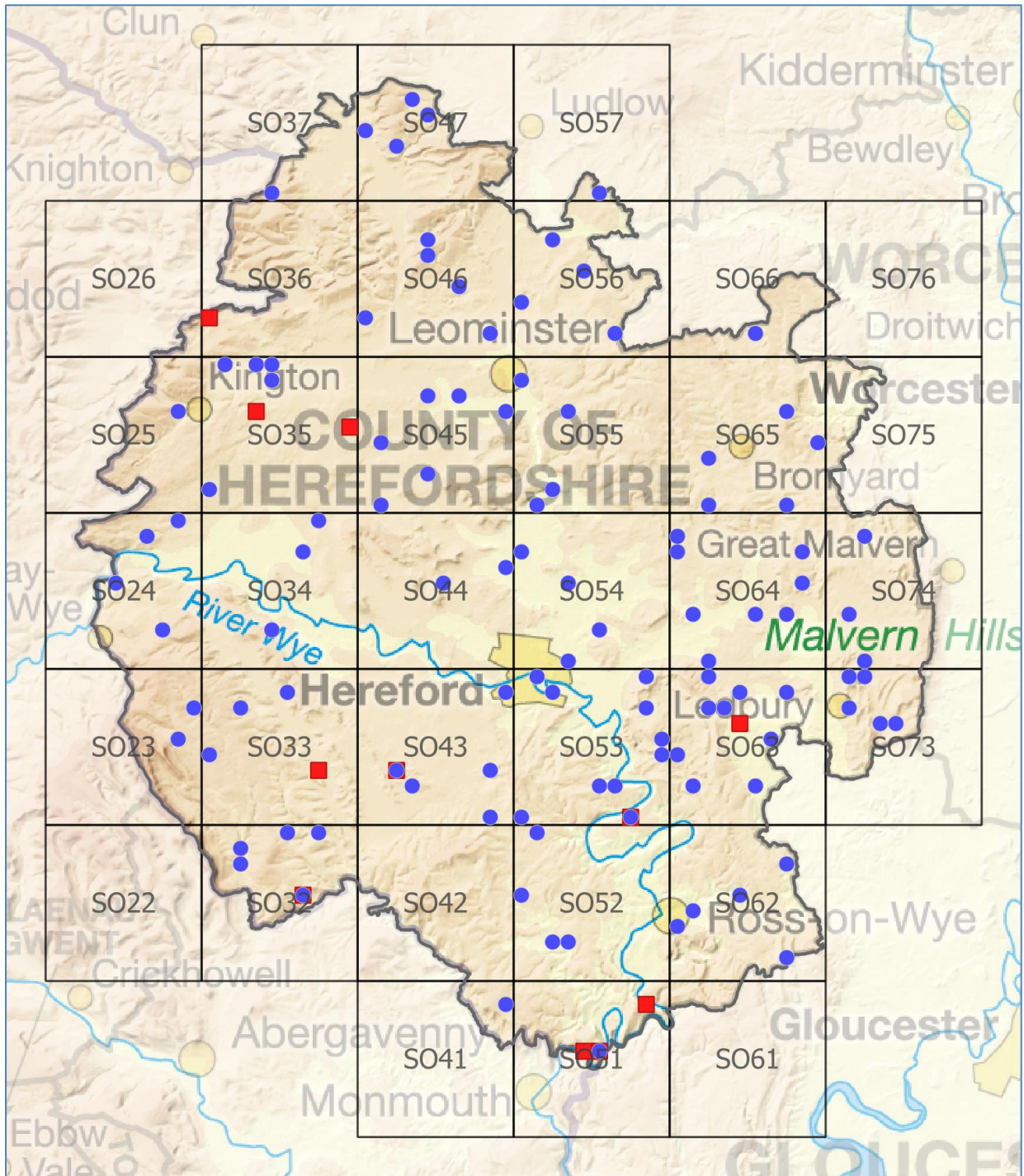
(Photos: Dietz & von Helversen)

## Myotis species



**Figure 8:** Distribution of all *Myotis* species using 3279 records from 1960 to 2020  
(Pre-2000 records are shown as red squares)

## Whiskered/Brandt's Aggregate



**Figure 9:** Distribution of Whiskered/Brandt's aggregate using 309 records from 1960 to 2020 (pre-2000 records are shown as red squares)

## Whiskered Bat (*Myotis mystacinus*)



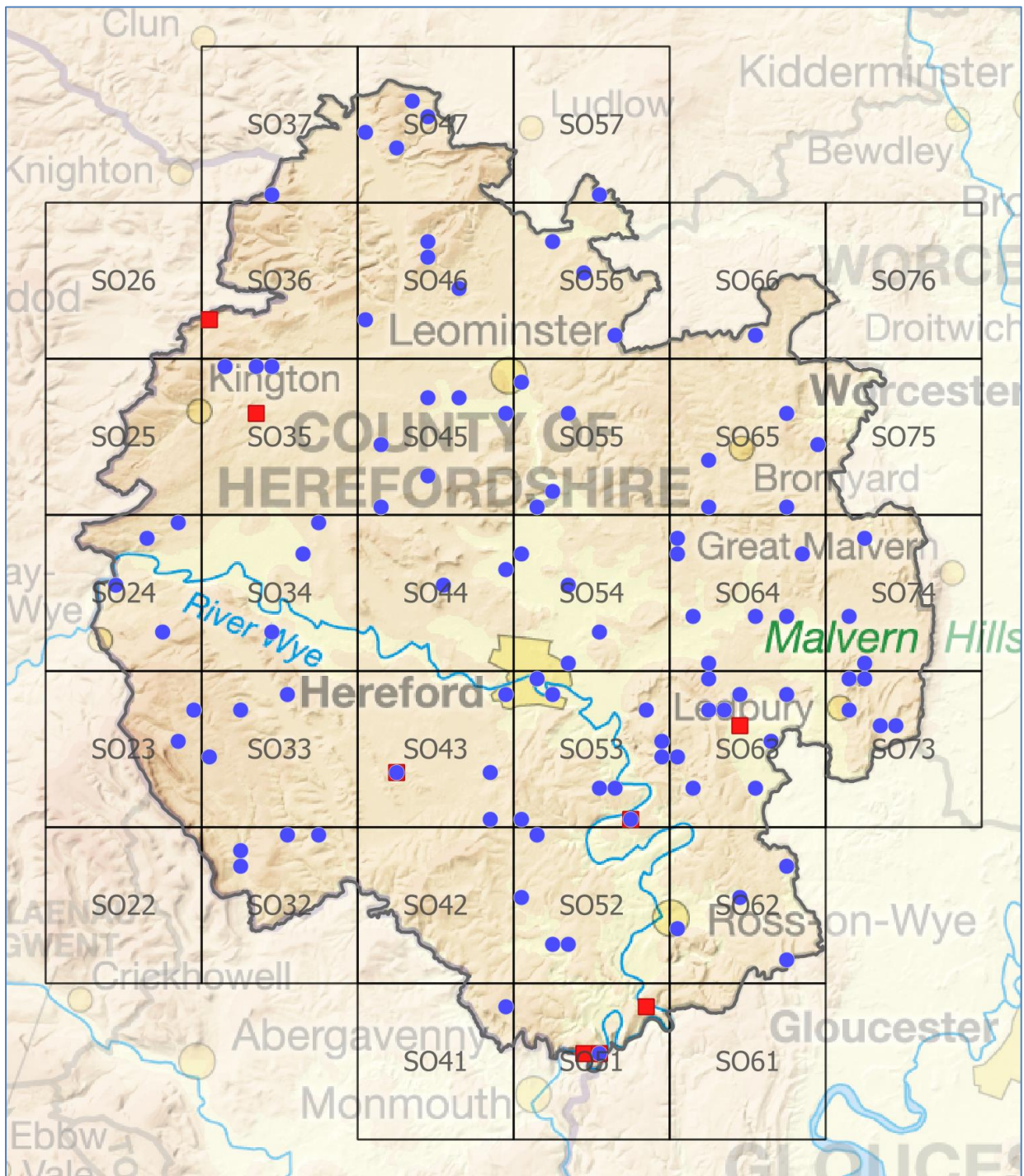
**Distribution:** The whiskered bat is found throughout Europe, England, Wales, Ireland and southern Scotland. In Herefordshire, it is considered widespread and fairly rare.

**Identification:** The dorsal fur of this small bat is grey-brown with pale highlights; the ventral fur is whitish. It has a shaggy coat particularly around neck which forms a ruff. The ears are dark blackish-brown without colour inside and the muzzle is dark black-brown. The tragus is pointed with a concave or straight posterior edge. It is similar to the Brandt's bat but differences lie in the shape of tragus, penis and dentition (the shape of the 3rd upper pre-molar). Brandt's bat has a large cusp at the base on the inside of this tooth. The cusp is bigger than the tiny tooth next to it where the whiskered bat has a small or no cusp. The penis shape of the whiskered bat is narrow compared to Brandt's bats which is club shaped. The calcar extends  $\frac{1}{2}$  of the length from foot to tail with a narrow edging of skin.

**Feeding Habitat and Diet:** It usually forages in semi-open landscapes, woodland edges, water courses, woodlands, villages and along hedgerows. It feeds on flying insects such as Diptera, moths, lacewings and spiders.

**Roosts:** In summer, it is found in cavities of houses and trees. In winter, it is found hibernating in caves, mines, or any underground shelter.

### Whiskered Bat (*Myotis mystacinus*)



**Figure 10:** Distribution of *Myotis mystacinus* using 239 records from 1960 to 2020. (pre-2000 records are shown as red squares)

## Brandt's Bat (*Myotis brandtii*)



**Distribution:** Brandt's bat is found in central and northern Europe, England, Wales and more recently Ireland. In Herefordshire, it is considered very rare.

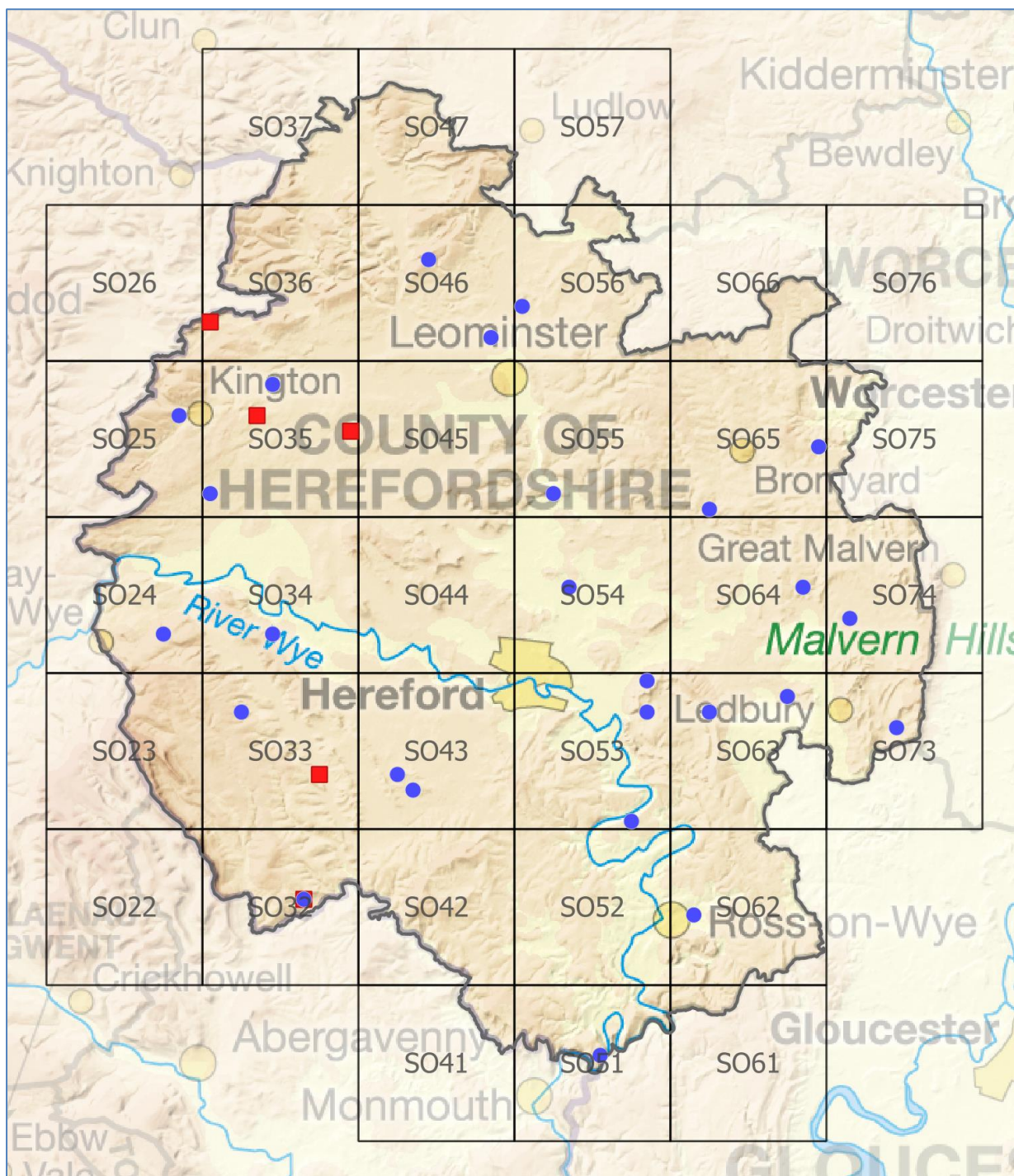
**Identification:** The dorsal fur of this small bat is grey-brown with a reddish tinge; the ventral fur is whitish or pale grey. The ears are long with an indentation on the posterior margin of the ear; the tragus is pointed with a convex posterior edge which projects above the indentation. It is similar to the whiskered bat but differences lie in the shape of tragus, penis and dentition (the shape of the 3rd upper pre-molar). The penis shape of Brandt's is club shaped compared to the whiskered bat which is narrow. Its calcar extends  $\frac{1}{2}$  of the length from foot to tail. Brandt's bat has a large cusp at the base on the inside of this tooth; the cusp is bigger than the tiny tooth next to it whereas the whiskered bat has a small cusp or none at all.

**Feeding Habitat and Diet:** It usually forages within woodland, woodland edges, riparian habitats, wet woodlands, and water courses. It feeds on flying insects such as Diptera, moths, spiders and earwigs.

**Roosts:** In summer, it is found in trees holes, behind peeling bark and cracks in trunks. In winter, it is found hibernating in caves, mines, or any underground shelter.



### Brandt's Bat (*Myotis brandtii*)



**Figure 11:** Distribution of *Myotis brandtii* using 54 records from 1960 to 2020 (pre-2000 records are shown as red squares)

## Natterer's Bat (*Myotis nattereri*)



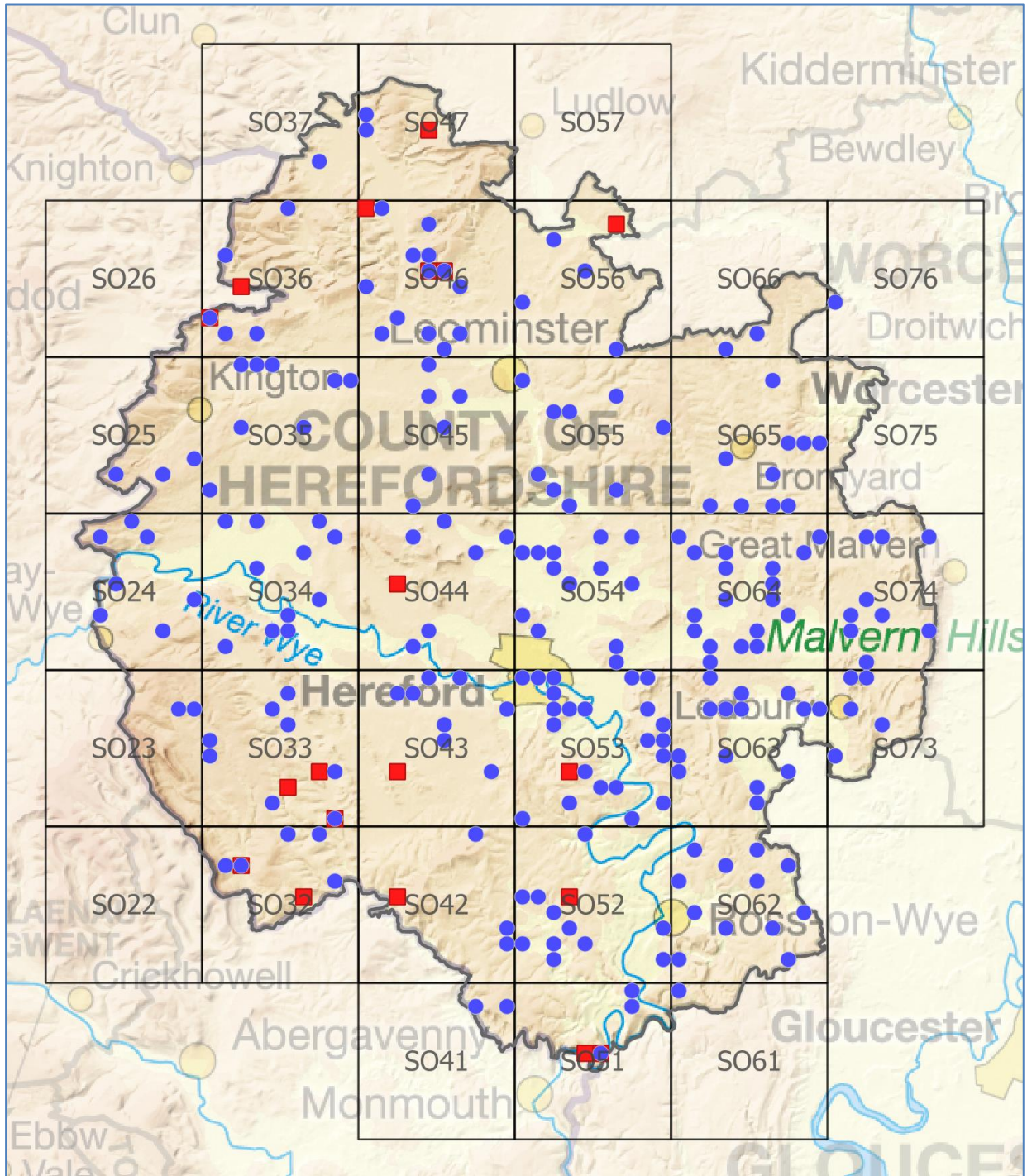
**Distribution:** Natterer's bat is found throughout most of the British Isles and is widespread in Europe. In Herefordshire, it is considered widespread and quite common.

**Identification:** The dorsal fur of this medium-sized bat is light brown; the ventral fur can be dazzling white. The ears are less than 20mm long and when folded forward they extend the nose by a maximum of 5mm. The ears are light in colour, thin and translucent. They have a characteristic recurve at the ear tips and a spear-shaped tragus that is longer than half the ear. A characteristic feature of this species is a very long S-shaped calcar and a row of bristles between tail and end of the calcar.

**Feeding Habitat and Diet:** It usually forages around trees and other vegetation, gleaning insects from the surface of foliage. It often feeds in open woodland, parkland, hedgerows, along and around watercourses and will prey on Diptera, moths, spiders and other small insects.

**Roosts:** In summer, it is found in crevices in old timber beams, or gaps in beam joints in old buildings such as churches, castles and traditional barns. Although Natterer's bats are traditionally tree-roosting bats it will readily take to using bat boxes. In winter, it is found hibernating in caves, mines, or any underground shelter.

### Natterer's Bat (*Myotis nattereri*)



**Figure 12:** Distribution of *Myotis nattereri* using 801 records 1960 to 2020 (pre-2000 records shown as red squares)

## Daubenton's Bat (*Myotis daubentonii*)



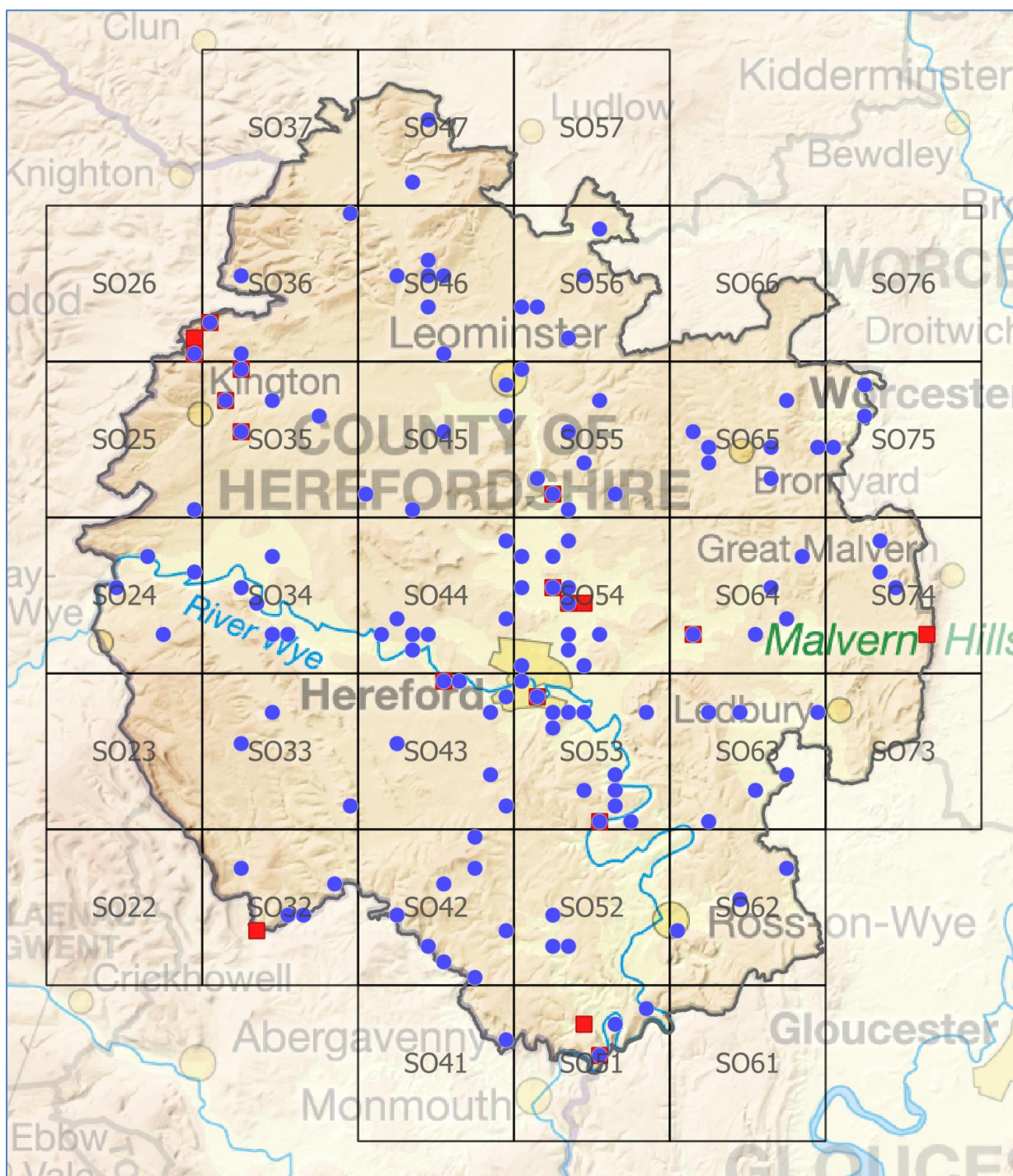
Distribution: Daubenton's bat is found throughout most of Europe and the British Isles. In Herefordshire, it is considered widespread and fairly rare.

Identification: The dorsal fur of this medium-sized bat is uniform brown and shiny; the ventral fur is whitish or often a dirty-grey colour. Its face is reddish brown with an area of bare skin around the eyes, giving it a spectacled appearance. It has rubbery ears that do not project past the nose when bent forward. The tragus reaches half the ear length with a blunt tip. The feet are large and the wing membrane joins high up on the ankle. The calcar length is  $\frac{3}{4}$  if the distance from the foot to the tail. There is a row of fine hairs, approx. 1mm long, on the trailing edge of the tail membrane and calcar.

Feeding Habitat and Diet: Daubenton's bats primarily forage over water but some will forage in woodland, parkland and traditional orchards. It forages within a few centimetres of the water's surface taking insects using its large feet as hooks or its tail membrane as a scoop. Females can forage about 6-10km from their roost site.

Roosts: Summer roosts are usually close to water and include tree holes, tunnels, bridges, bat boxes and occasionally buildings. Winter roosts include tree holes, caves, mines and other underground sites, which are entered in October.

### Daubenton's Bat (*Myotis daubentonii*)



**Figure 13:** Distribution of *Myotis daubentonii* using 546 records from 1960 to 2020 (pre-2000 records shown as red squares)

## Bechstein's Bat (*Myotis bechsteinii*)



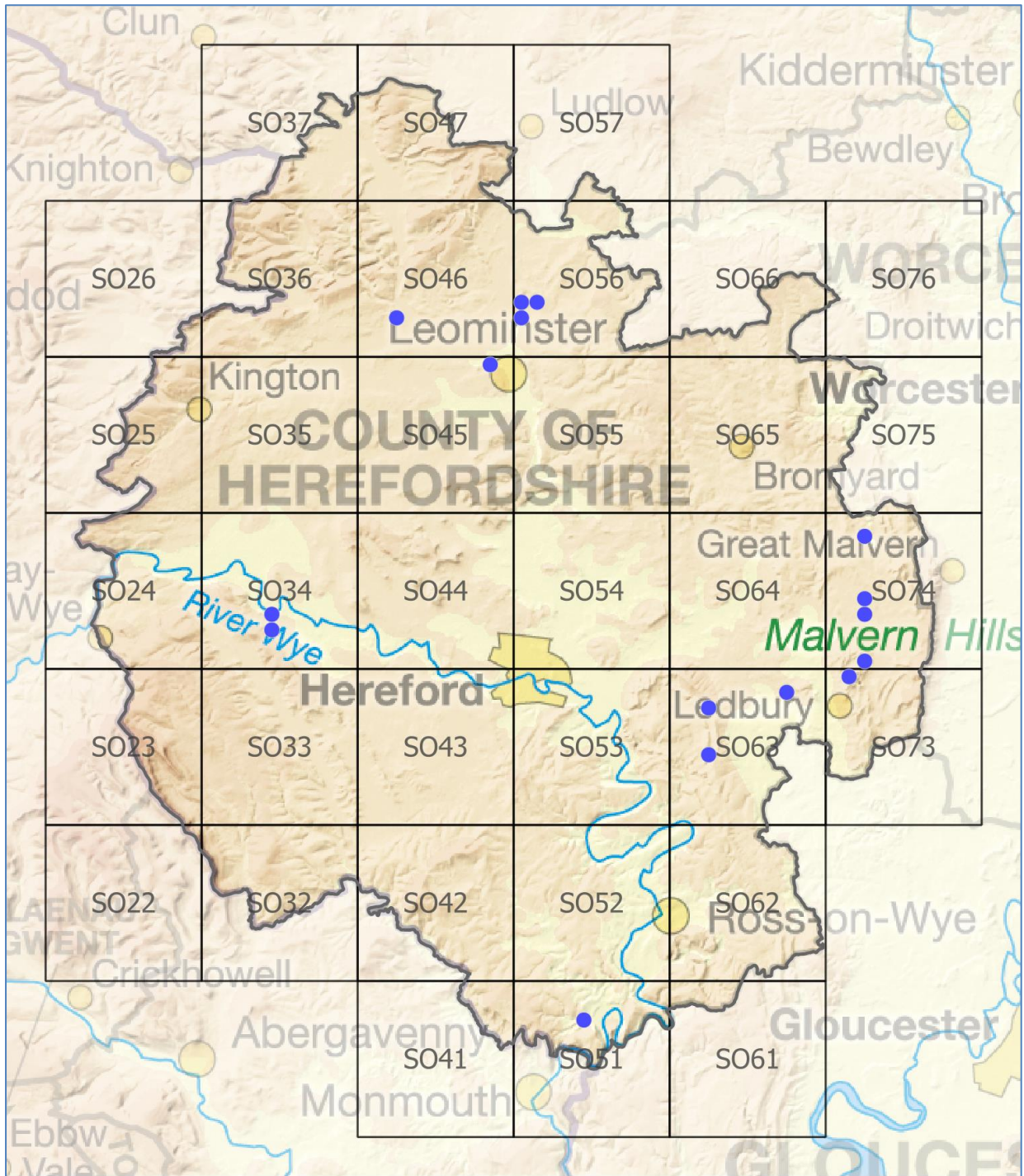
**Distribution:** Bechstein's bat is found throughout most of Europe and the British Isles where it is at its northernmost range. It is found in southern Wales and parts of southern England. In Herefordshire, the distribution is patchy and it is generally considered to be very rare.

**Identification:** The dorsal fur of this medium-sized bat is pale brown; the ventral fur is whitish/grey. The ears are large but not as long as long-eared bats and when folded forwards, the ears protrude by nearly half their length beyond the snout. The tragus is long and reaches to half the length of the ear. It has a straight calcar with a narrow edging of skin.

**Feeding Habitat and Diet:** It tends to forage in woodland, around trees and other vegetation, within a kilometre or two of their roost site. It generally feeds high up in the canopy, gleaning insects from the surface of foliage, but occasionally at ground level feeding on invertebrates such as moths, beetles, earwigs, Diptera (crane flies) and spiders.

**Roosts:** Roosts are largely found in mature deciduous woodland habitat. In summer, it will use tree holes, occasionally bat boxes but will rarely roost in buildings. In winter, it is thought to hibernate in trees and also in underground sites.

### Bechstein's Bat (*Myotis bechsteinii*)



**Figure 14:** Distribution of *Myotis bechsteinii* 2000 to 2020 using 104 records  
 (There were no confirmed records of Bechstein's bats in Herefordshire prior to 2000)

## Nyctalus species



**Noctule**

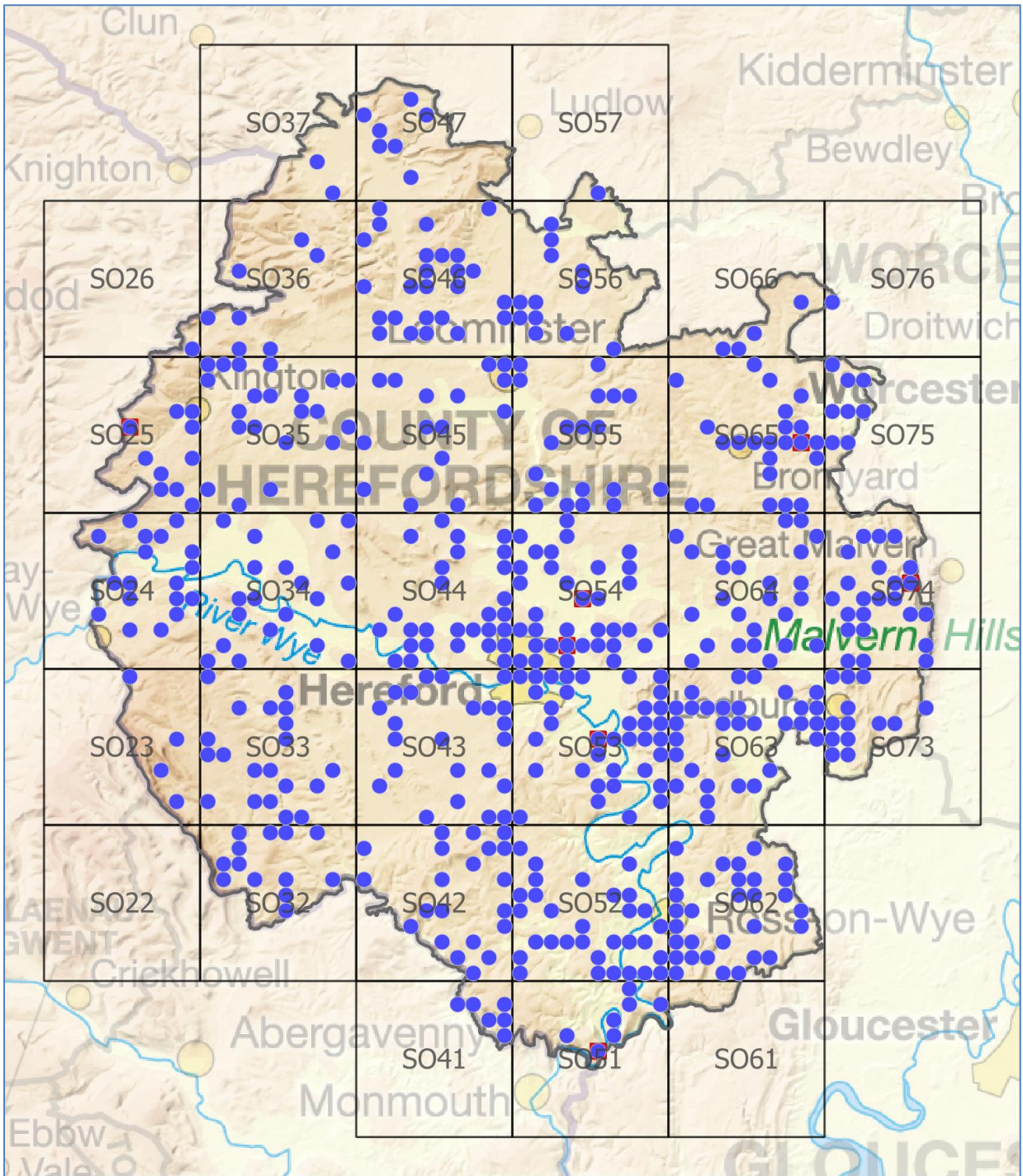
Herefordshire is fortunate to have records for all three species of British “big bats”; noctule (*Nyctalus noctula*), Leisler’s bat or lesser noctule (*Nyctalus leisleri*) and serotine bat (*Eptesicus serotinus*). In Herefordshire the noctule is by far the most common of the three species whereas the serotine and Leisler’s bat are generally considered as very rare.

To distinguish the three bats in the field using bat detectors alone can be challenging due to their overlapping echolocation call structures. Surveyors will often group the three “big bats” together as “*Nyctalus/Eptesicus* species” or just *Nyctalus species*. All three bat species echolocate at low frequencies ranging from 18 kHz (noctule) to 32 kHz (Serotine). Leisler’s bats normally echo-locate at around 25-27 kHz but noctule bats can echolocate at higher frequencies when foraging in a cluttered environment such as woodland.

In Herefordshire, noctule bats are Herefordshire’s most common “big bat” species, so it is likely that many of the records submitted as “*Nyctalus species*” will be the noctule.



## Nyctalus species



**Figure 15:** Distribution of *Nyctalus* species using 1539 records from 1960 to 2020

## Noctule (*Nyctalus noctula*)



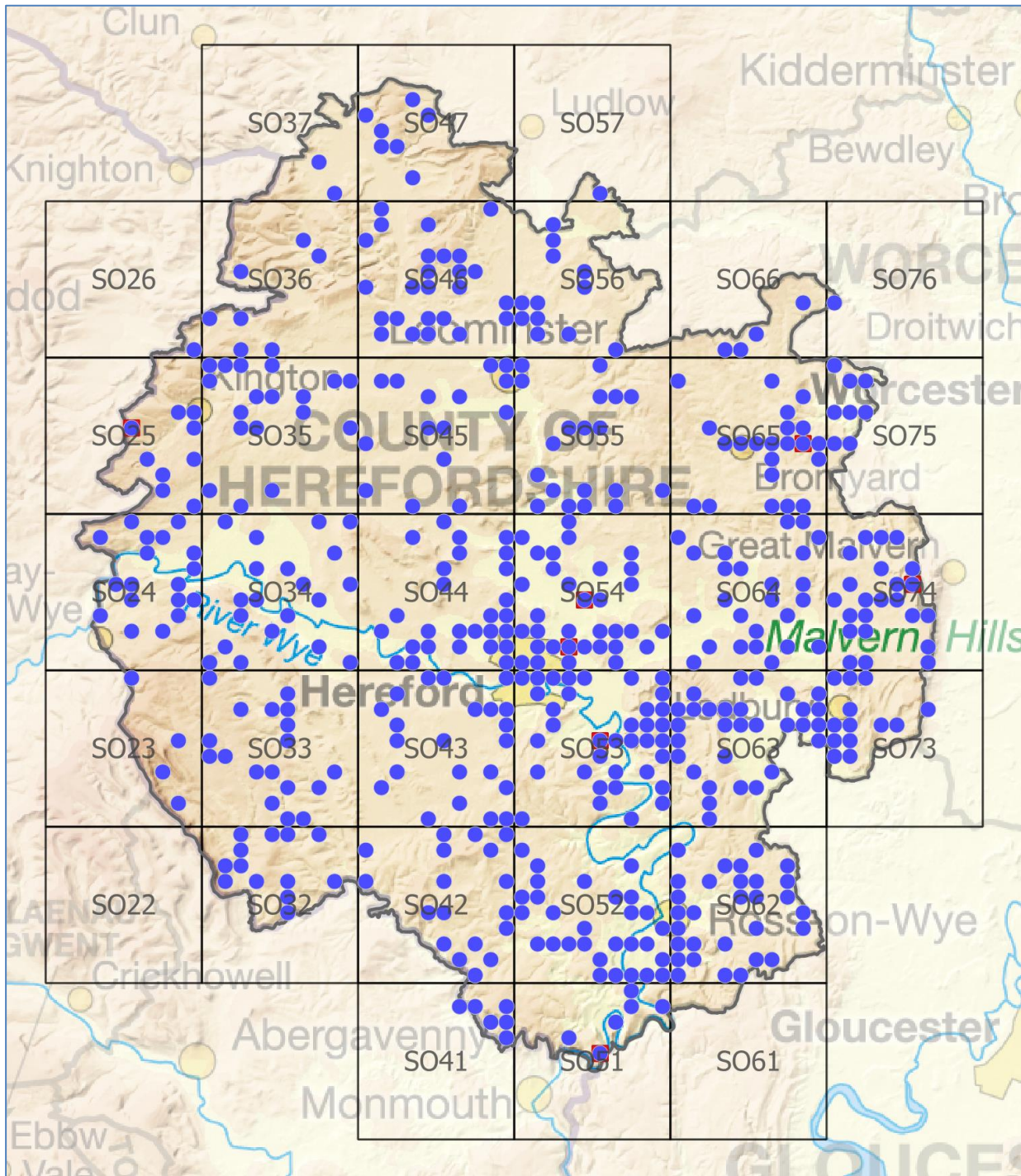
**Distribution:** The noctule bat is found in most of Europe but absent from Ireland. It is relatively common in most of England, Wales and up to the south west of Scotland. In Herefordshire, it is considered widespread and fairly common.

**Identification:** The noctule bat is one of the UK's largest bats. It has golden or reddish brown dorsal fur which is short and lays flat; the ventral fur is slightly paler. The ears and nose are rounded and the tragus is mushroom shaped. The calcar has a post-calcarial lobe with a visible T-piece.

**Feeding Habitat and Diet:** It emerges early in the evening and has a fast direct flight. It forages at heights of 10-50m over water bodies, woodland edge, hedgerows and meadows. It feeds on Diptera, bugs, caddis flies, beetles, moths, cockchafers, shield bugs, winged ants and hoverflies.

**Roosts:** In summer, it is found high up in tree holes such as old woodpecker nest sites and rot holes. It is occasionally found in buildings and bat boxes. In winter, it is found in thick walled tree holes, rock crevices and crevices in buildings.

## Noctule (*Nyctalus noctula*)



**Figure 16:** Distribution of *Nyctalus noctula* using 1402 records from 1960 to 2020 (pre-2000 records shown as red squares)

## Leisler's (*Nyctalus leisleri*)



Photo Credit: Daniel Whitby

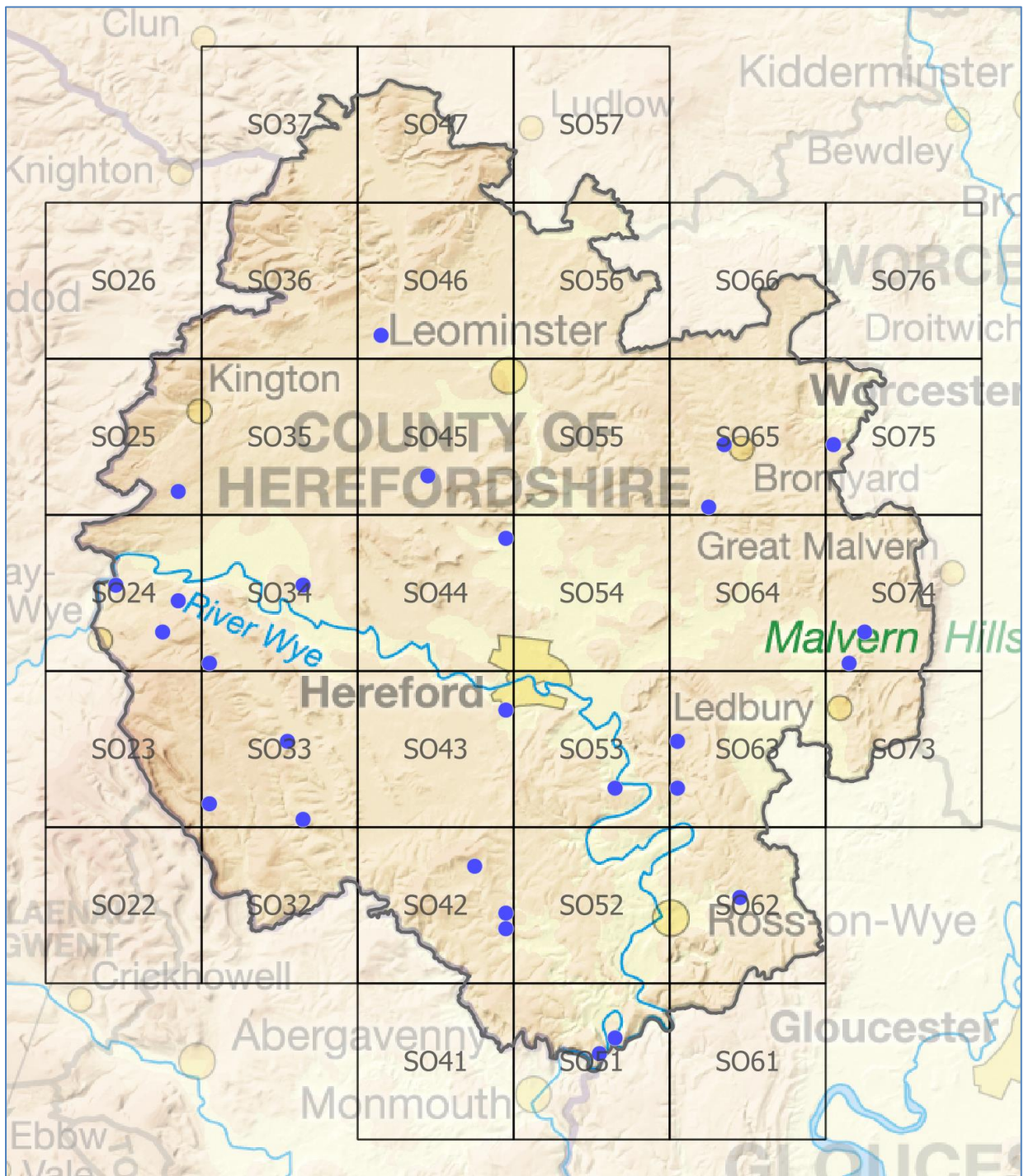
**Distribution:** Leisler's bat is found throughout Europe and the British Isles, with the exception of northern Scotland. Ireland is a stronghold for this species but in Herefordshire, and England as a whole, it is considered to be rare.

**Identification:** This large bat has golden-brown, two-tone effect dorsal fur with a darker base; the ventral fur is yellowish brown. The fur is short and lays flat but it is shaggier than the noctule, especially the mane over the shoulders in males. The fur extends over the wing membrane; this is the origin of one of its older names: "the hairy-armed bat". The ears and nose are rounded and the tragus is mushroom shaped. The calcar has a post-calcarial lobe with a visible T-piece.

**Feeding Habitat and Diet:** It has a fast direct flight and will forage in deciduous and coniferous woodland, parkland, suburban areas and around street lights. It feeds on Diptera, bugs, caddis flies, beetles, moths, cockchafers, shield bugs, winged ants and hoverflies.

**Roosts:** In summer, it roosts in tree holes and will occasionally take to bat boxes. It roosts in buildings particularly using the gable end, in lofts, between tiles and under felt and under ridge tiles. In winter, it hibernates in tree holes, in cracks and cavities of buildings and occasionally in caves and tunnels.

**Leisler's (*Nyctalus leisleri*)**



**Figure17:** Distribution of *Nyctalus leisleri* using 57 records from 2000 to 2020  
(no records exist pre-2000)

***Nyctalus/Eptesicus* Aggregate  
Noctule, Leisler's and Serotine**



**Leisler's Bat (Photo credit: Scott Brown)**

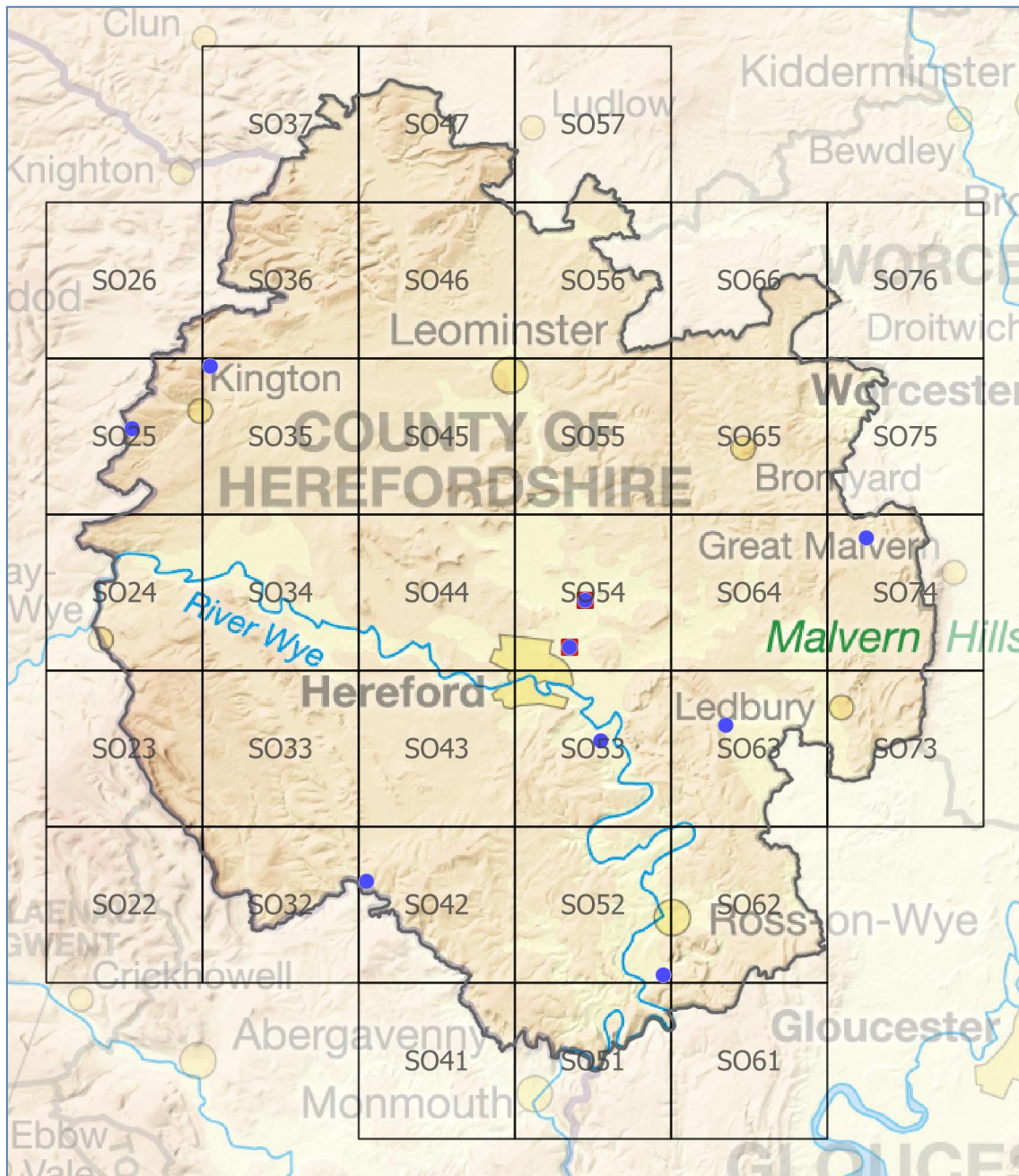
**Noctule**



**Serotine**

### ***Nyctalus/Eptesicus* Aggregate**

There are very limited numbers of records for the larger bat species like the Leisler's and serotine bat. The noctule is by far the most widespread of the 3 big bats in Herefordshire. The scarcity of these two species has been confirmed by local trapping projects from 2013 to 2018. The echolocation calls of all 3 big bats can overlap depending on where they are foraging or commuting, so it is no surprise to find that there is an entry in the records for a *Nyctalus/Eptesicus* category which amounts to just 38 records. It was worth including a map showing this limited number of records.



**Figure 17:** Distribution of *Nyctalus/Eptesicus* aggregate using 38 records from 1960 to 2020 (pre-2000 records shown as red squares)

## Serotine (*Eptesicus serotinus*)



**Distribution:** The serotine bat is found throughout Europe and southern England. In Herefordshire, they are considered very rare.

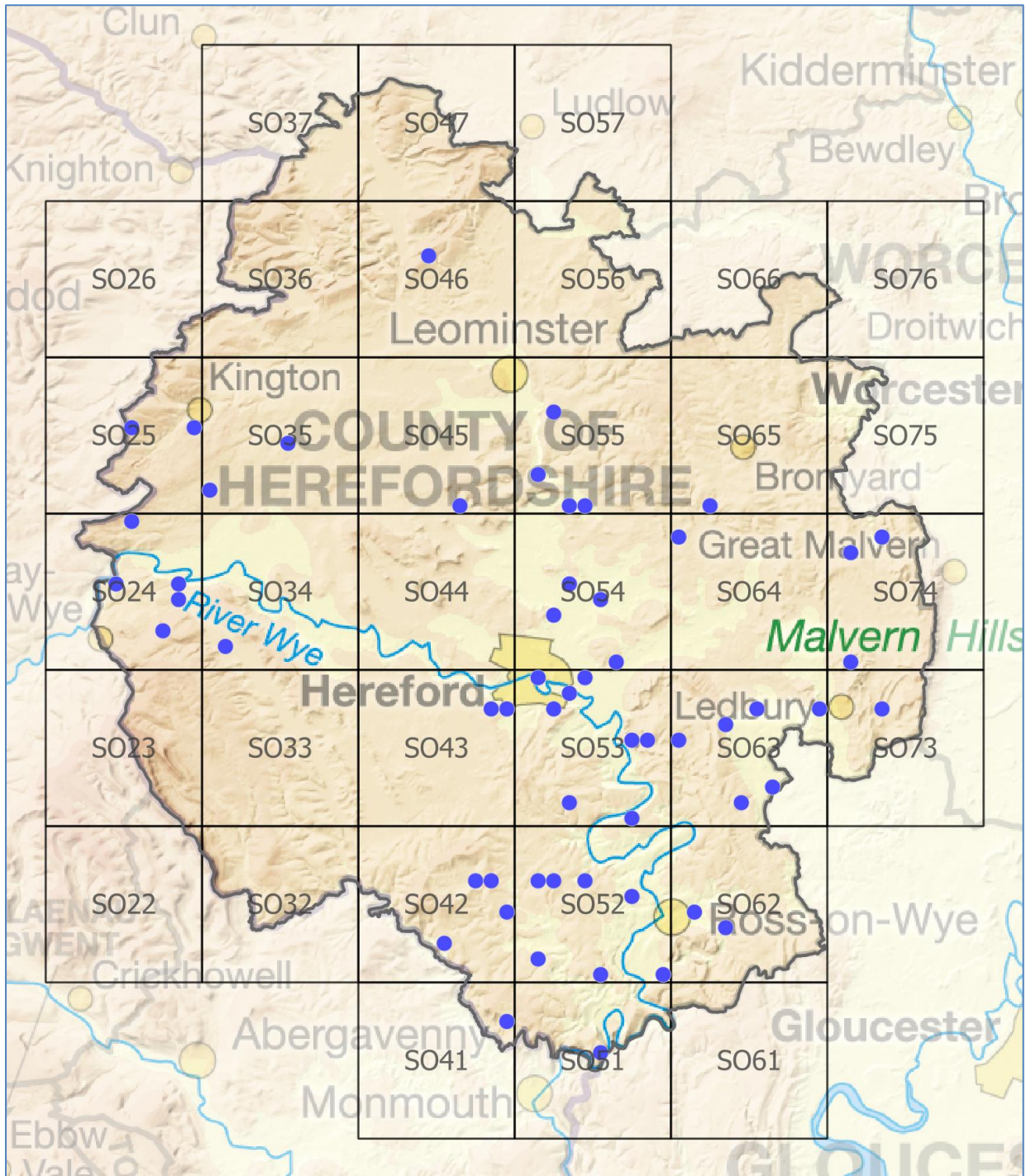
**Identification:** The serotine is one of the Britain's largest bats. The dorsal and ventral fur is golden to dark brown; the ears are black and quite long and their muzzle is black. The tragus is long and broad not mushroom shaped like *Nyctalus* species. Its tail projects >6mm beyond the tail membrane and has a post-calcarial lobe which is usually narrow. The penis widens toward the end.

**Feeding Habitat and Diet:** It forages at about tree-top height and often close to vegetation. It has broad wings, which makes it very maneuverable and it is able to drop on foliage with outstretched wings to catch large insects. The serotine will also feed around street lamps and even take prey from the ground. It feeds mainly on moths, Diptera, chafers and dung beetles.

**Roosts:** In summer, it roosts mainly in older buildings with high gables and cavity walls and it is rarely found in trees. In winter, it most likely hibernates in buildings.



**Serotine (*Eptesicus serotinus*)**



**Figure 18:** Distribution of *Eptesicus serotinus* from 2000 to 2020 using 110 records (no records exist pre-2000)

## Barbastelle (*Barbastella barbastellus*)



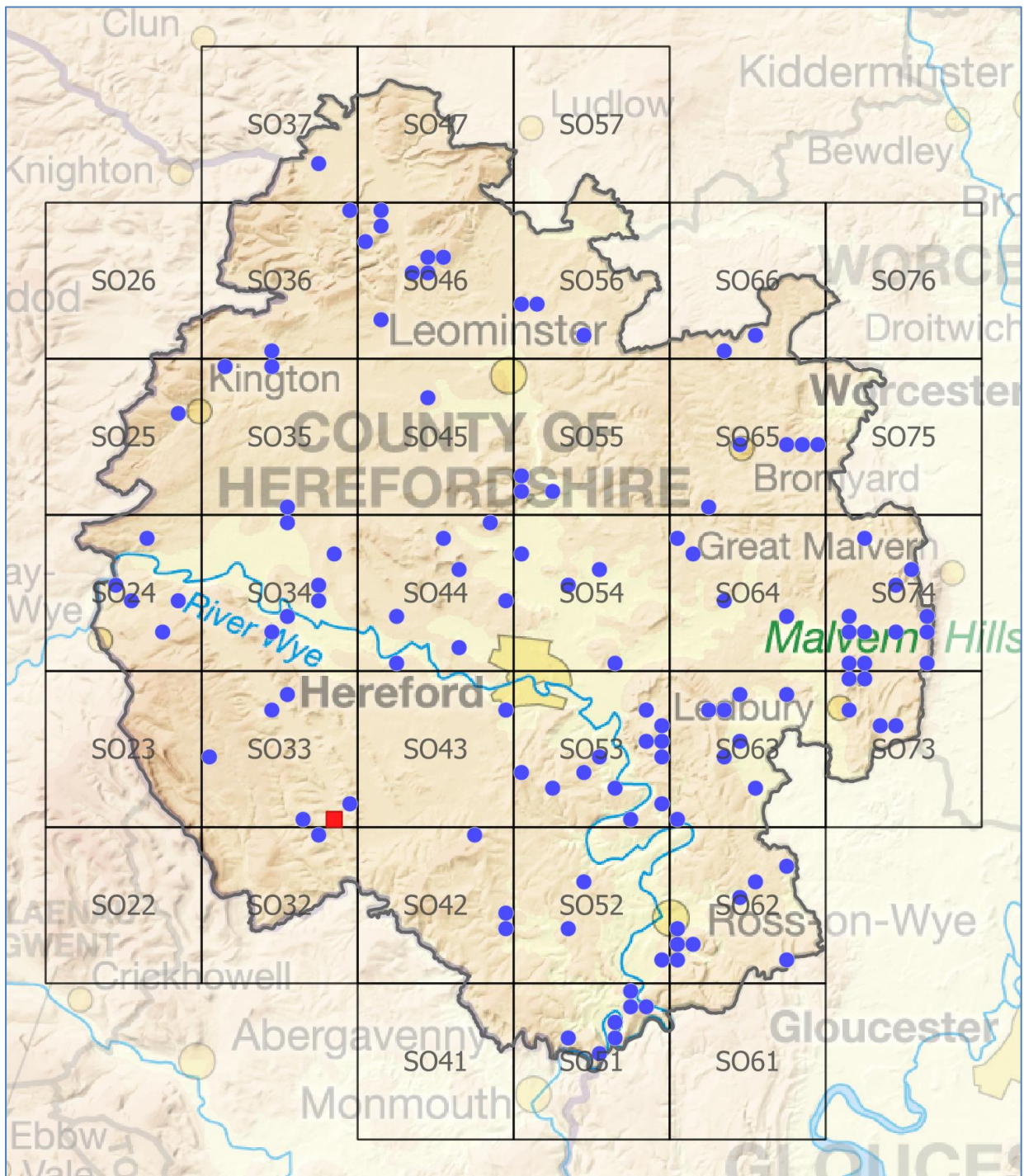
**Distribution:** The barbastelle is found in large parts of Europe and central and southern England. A few isolated records exist for northern England where it is considered to be rare. In Herefordshire, it is considered widespread and rare.

**Identification:** The barbastelle is a medium-sized bat distinctive by its pug-shaped nose and its dorsal and ventral fur which is blackish with light frosted tips. The ears are quite large and joined over its head; the eyes are placed within the orbit of its ears. The tragus has a long rounded tip which tapers abruptly at half its length.

**Feeding Habitat and Diet:** It emerges at dusk and forages above the tree canopy and along vegetation edges. It is a fast flyer and can forage considerable distances from its roost during the night. It feeds mainly on moths but will also feed on Diptera, small beetles and other flying insects.

**Roosts:** In summer, it roosts behind loose bark, in tree crevices, buildings and will sometimes take to flat bat boxes; it is known to change roosts every few days. In winter, it is found hibernating in caves, mines, disused railway tunnels, rock crevices or any underground shelter.

**Barbastelle (*Barbastella barbastellus*)**



**Figure 19:** Distribution of *Barbastella barbastellus* using 272 records from 1960 to 2020 (pre-2000 records shown as red squares)

## Greater horseshoe bat (*Rhinolophus ferrumequinum*)



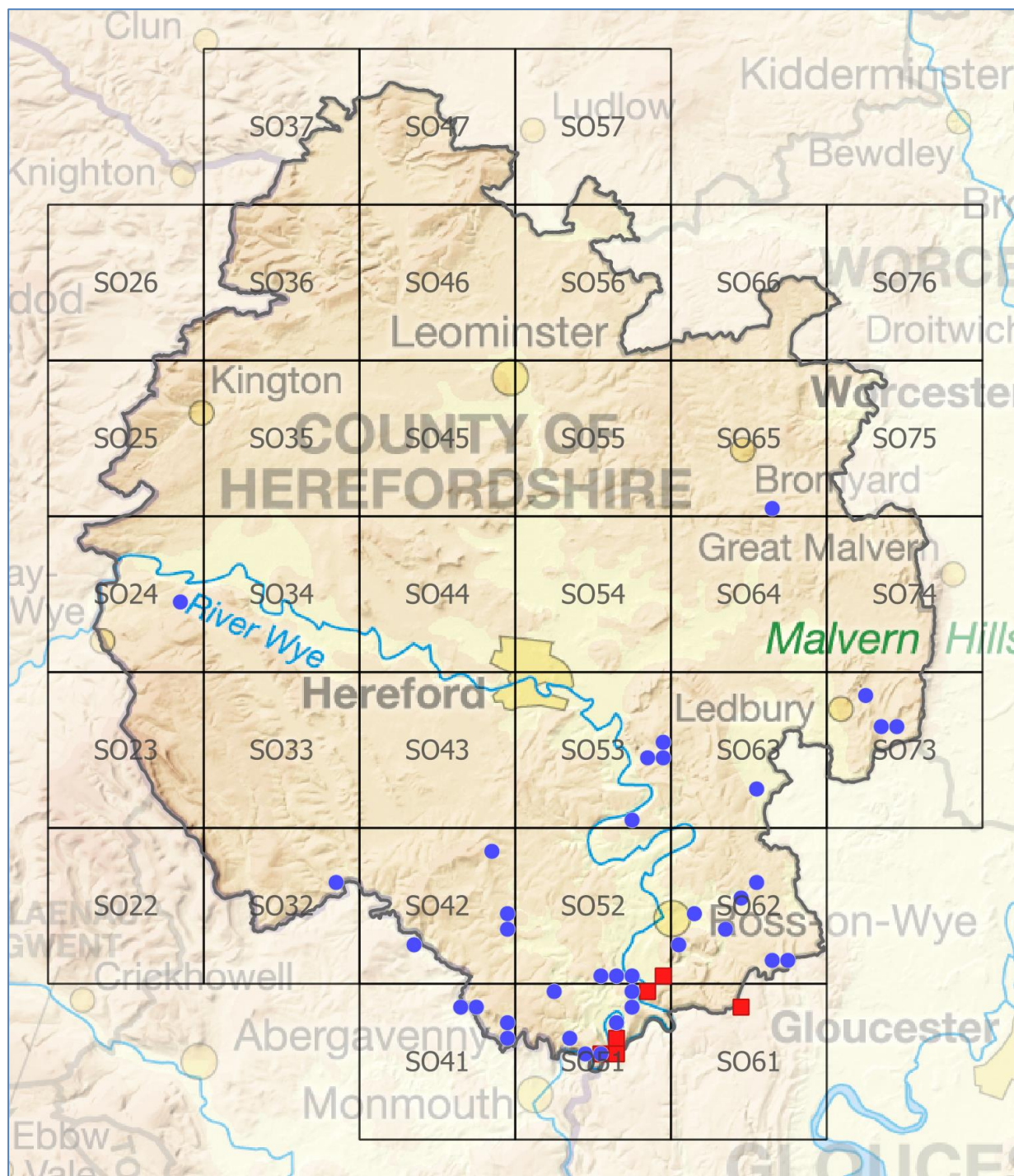
**Distribution:** The greater horseshoe bat is distributed throughout the entire Mediterranean region and into central Europe. Overall, it is rare in Britain and confined to southwest England. In Herefordshire, it is mainly confined to the south of the county but it appears to be spreading northwards.

**Identification:** The greater horseshoe bat is one of Britain's largest bat species and recognised at rest, hanging free where it enfolds its wings around its body when it resembles the size and shape of a pear. The dorsal fur is brown to grey-brown often with a yellowish/reddish tinge; the ventral fur is a paler grey-white to yellowish white. Horseshoe bats can be distinguished by their complex horseshoe-shaped nose-leaf.

**Feeding Habitat and Diet:** It emerges approximately 30 minutes after sunset and forage over meadows just above the ground or close to vegetation. It feeds on moths and particularly beetles such as cockchafers and dung beetles.

**Roosts:** In summer, females use buildings that have large entrance holes with access to open roof spaces. Roosts are found in large, older houses, churches and barns. Males will use caves and tunnels during the summer. In winter, it uses caves, disused mines, cellars and tunnels as hibernation sites. These sites can be up to 50km from the breeding roost.

### Greater horseshoe bat (*Rhinolophus ferrumequinum*)



**Figure 20:** Distribution of *Rhinolophus ferrumequinum* using 245 records from 1960 to 2020 (pre-2000 records shown as red squares)

## Lesser horseshoe bat (*Rhinolophus hipposideros*)



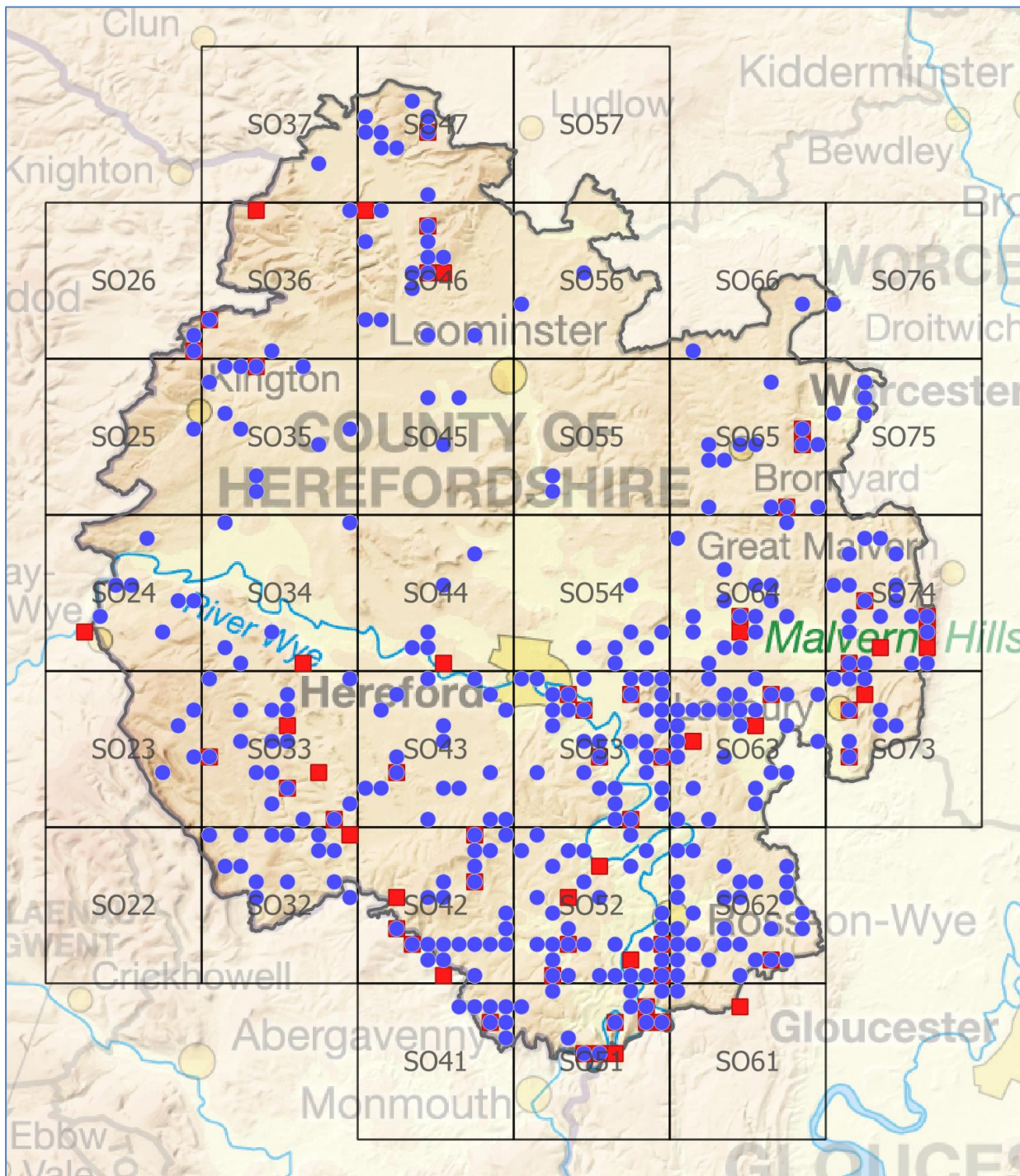
**Distribution:** The lesser horseshoe bat is found in Europe, Mediterranean, Asia and Africa. In Britain, it is confined to Wales, western England and western Ireland. In Herefordshire, it is widespread but generally considered rare.

**Identification:** The lesser horseshoe is one of Britain's smallest bats and is recognised at rest hanging free with its wings enfolding its body when it resembles the size and shape of a plum. The dorsal fur is brownish and the ventral fur is grey-white. It can be distinguished by its complex horseshoe-shaped nose-leaf.

**Feeding Habitat and Diet:** It emerges approximately 30 minutes after sunset and will follow linear structures such as hedgerows when commuting to foraging grounds, which tend to be within woodland. It is a very agile flyer and forages over vegetation and in dense foliage looking for Diptera, Hymenoptera, lacewings and small moths.

**Roosts:** In summer, females use roof spaces of castles, churches and other large buildings where they can enter with uninterrupted flight to the roof apex. However, they are capable of using more discreet gaps. Night roosts are used for consuming large prey and these can be porches, cellars, or open sheds. Males will use caves and tunnels during the summer. In winter, caves and old disused railway tunnels are used as hibernation sites.

**Lesser horseshoe bat (*Rhinolophus hipposideros*)**



**Figure 21:** Distribution of *Rhinolophus hipposideros* using 2651 records from 1960 to 2020 (pre-2000 records shown as red squares)

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