National Bat Monitoring Programme

Annual Report 2024

JNCC

Bat Conservation Trust
www.bats.org.uk

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Cover photo: Greater horseshoe bats by Daniel Hargreaves

Executive summary

This report presents the results of the National Bat Monitoring Programme (NBMP) up to and including summer 2024.

The NBMP is a world-leading citizen science programme that monitors the conservation status of British bat populations. This information is used by Government, scientists and conservation bodies to inform research, address evidence needs and guide policy development.

Data from four long-term monitoring surveys are used to produce population trends: Roost Count, Field Survey, Waterway Survey and Hibernation Survey. Volunteers taking part in these long-term monitoring surveys contributed approximately 14,926 hours of their time, representing an in-kind contribution to the NBMP of £242,430. Since the inception of the programme in 1996, 7,328 sites have been surveyed across these surveys. In 2024, 1,631 long-term monitoring survey sites were surveyed by 741 volunteers. 2024 saw the official launch of BCT's new monitoring survey, the British Bat Survey (BBatS). Volunteers returned data from 40 BBatS sites. We also run two semi-structured beginner-level surveys, the Sunset Survey and NightWatch, and in 2024 1,184 of these surveys were completed by at least 491 volunteers.

The NBMP produces trends for 11 of the UK's 17 breeding bat species: 11 at GB level, 11 at England level, five at Scotland level, eight at Wales level, one at Northern Ireland level, and five at UK level. Northern Ireland trends for three additional species produced by Bat Conservation Ireland are also presented in this report to give a more complete picture of available trends from the UK.

Population change is assessed relative to the baseline year of monitoring (1999 in most cases) and also over the last five years, in comparison to the penultimate year of monitoring (2023). The smoothed index value from the penultimate year of monitoring is used for trend assessments as the index value from the most recent year (2024) can change when further years of monitoring data are added.

(In the following summary, * means that a UK assessment is also available which is the same as the GB assessment.) Based on trends to 2023, species considered to have increased in GB since the baseline year of monitoring are greater horseshoe bat*, lesser horseshoe bat*, Natterer's bat, common pipistrelle and soprano pipistrelle. Species considered to have been stable in the GB since the baseline year of monitoring are Daubenton's bat*, whiskered/Brandt's bat, serotine*, noctule* and brown long-eared bat. However, this assessment should be treated with caution for whiskered/Brandt's bat as it combines data from two difficult-to-separate species with potentially differing conservation status. Serotine is encountered infrequently during surveys and there is a high level of uncertainty associated with its trends. No species for which we produce population trends are considered to have declined in the Great Britain since the baseline year of monitoring. For some species, survey indices calculated from Roost Count data are declining; however, we believe these indices to be negatively biased by these species' frequent 'roost switching', where individuals or colonies move between roosts, making it difficult to accurately estimate colony size. These indices are not therefore considered a reliable measure of population change for these species. We are currently investigating improved applications for Roost Count data.

The population status of monitored bat species over the last five years, and at country level, is more mixed. In the short term (2018-2023) fewer species are considered to have increased in the UK/GB (greater horseshoe bat, lesser horseshoe bat, and some evidence to suggest that serotine populations are also increasing). The majority of species are considered to have been stable (Daubenton's bat, whiskered/Brandt's bat, Natterer's bat, common pipistrelle, soprano pipistrelle

and noctule), and there is evidence to suggest that brown long-eared bat populations in GB are declining.

Bat population trends at country level are largely similar to those across Great Britian, however there are some notable exceptions. Whereas greater and lesser horseshoe bat populations have increased in Wales over the last five years, in England greater horseshoe bat populations have shown little change, and there is evidence to suggest that lesser horseshoe bat populations are declining.

Soprano pipistrelle populations have increased in the long term in Scotland and Northern Ireland, but have shown little change in England.

Brown long-eared bat populations are considered to have been stable in England over the last five years but are declining in Wales.

Across the UK, Daubenton's bat populations are considered to have been stable both since the baseline year of monitoring and over the last five years. However, there is evidence to suggest that Daubenton's bat populations in England may have increased in the long term, whereas over the last five years they have declined in Northern Ireland.

Trends produced by the NBMP reflect relatively recent changes in bat populations (since 1999 for most species). It is generally considered that prior to this there were significant historical declines in bat populations dating back to at least the start of the 20th century. Current legislation and conservation action to protect and conserve bats is playing a critical role in allowing bat populations to recover and it is vitally important that this continues.

Brown long-eared bat (Photo: Daniel Hargreaves)

Contents

Introduction

The National Bat Monitoring Programme (NBMP) is an annual series of bat surveys undertaken by thousands of dedicated volunteers, which allows us to monitor changes in British bat populations. The data we collect are used by the Government and conservation organisations to monitor the health of our environment, inform policy and improve the conservation of bats.

This report provides population trends for 11 of the UK's 17 breeding bat species, derived from data collected up to and including summer 2024. From this year we are using the penultimate year of the trend (in this case 2023) for assessing population change since the final year in the index is always provisional and needs to be treated with caution (see page 17).

Trends are provided at GB level and also at UK and country level where sufficient data are available. Trends are calculated for 11 species in England, five species in Scotland, nine species in Wales, one species in Northern Ireland and one species at UK level. This report also provides information on our survey methods. For the majority of species we currently have insufficient data from Northern Ireland to provide trends to enable Northern Ireland or UK-wide trends to be calculated. Bat Conservation Ireland runs a number of bat monitoring schemes across Ireland and publishes Irish bat population trends and distribution data. To give a fuller picture of available bat species population trends from across the UK, in this report we include three additional trend results for species for which robust trends are produced for Northern Ireland, with the kind permission of Bat Conservation Ireland.

The next set of bat population trends, incorporating data collected up to and including summer 2025, are due to be published in May 2026.

Official Statistics: These statistics have been produced to the high professional standards set out in the Code of Practice for Official Statistics and published on JNCC's website at jncc.gov.uk/our-work/bat-monitoring-official-statistics/. Statistically robust trends accepted for inclusion as part of the Official Statistics are indicated by the text **OFFICIAL STATISTICS** above the trend graph. The remaining trends are not considered robust enough to be Official Statistics but are presented for information with caveats.

The NBMP is run by the Bat Conservation Trust, in partnership with the Joint Nature Conservation Committee, and supported and steered by Natural England, Natural Resources Wales, NatureScot and Northern Ireland Environment Agency. We are extremely grateful to all the dedicated volunteers who have taken part in the NBMP since its inception in 1996, without whom the programme could not continue. Bat Conservation Ireland contributes Northern Ireland bat records collated by the Irish Bat Monitoring Programme which is funded by the National Parks and Wildlife Service of the Department of Housing, Local Government & Heritage and the Northern Ireland Environment Agency. Data are shared on the NBN Atlas and GBIF.

Bat monitoring in the UK

Effective conservation requires monitoring of underlying population trends to detect population changes; to ensure scarce conservation resources are targeted appropriately; to measure the effectiveness of conservation interventions; and to inform policy.

The NBMP collects data to deliver this information and to enable us to understand more about the drivers of bat population change. The NBMP delivers some of the key information needs for UK and country biodiversity strategies.

Bats are widely distributed through the range of landscapes and habitats in the UK. They are valuable indicators of the health of the environment due to their reliance on insect prey, dependence on a range of habitats, and sensitivity to climate, land and site management changes. Since 2008, NBMP data have contributed to the suite of UK biodiversity indicators which are used to help measure progress towards the Government's target of halting biodiversity loss.

Monitoring approaches

The NBMP is an integrated programme that uses a number of survey methods appropriate for different UK bat species. This approach means that most of the species monitored are surveyed at more than one stage of their annual life cycle. The NBMP includes four long-term monitoring surveys (Roost Count, Field Survey, Waterway Survey and Hibernation Survey). Data from these surveys are used to produce species population trends. The features of our long-term monitoring surveys, and the other surveys administered as part of the NBMP, are summarised in Table 1.

Roost emergence count (Photo: Philip Briggs)

Table 1. NBMP survey details

Survey	Species monitored	Start year	Survey period	Site selection, survey method and volunteer experience level required
Long-term monitoring surveys				
Roost Count	• greater horseshoe bat • lesser horseshoe bat • Natterer's bat • common pipistrelle • soprano pipistrelle • serotine • brown long-eared bat	1997 (Natterer's bat: 2000; brown long-eared bat: 2001)	6th - 25th June (lesser horseshoe bat: 9th May - 27th June; greater horseshoe bat: 7th - 21st July)	Known roosts. Roost emergence counts. Anyone who knows of a roost they can count can take part.
Field Survey	• noctule • serotine • common pipistrelle • soprano pipistrelle	1998	1st July - 30th July	Stratified-random 1km squares. Walked transect with heterodyne bat detector. Experience needed of using a heterodyne bat detector to identify the target species.
Waterway Survey	• Daubenton's bat	1997	1st August - 30th August	Selected from previous EA/NRW River Habitat Survey sites. Walked transect with heterodyne bat detector. Experience needed of using a heterodyne detector to identify
Hibernation Survey	• greater horseshoe bat • lesser horseshoe bat • Daubenton's bat • Natterer's bat • whiskered/Brandt's bat • brown long-eared bat	1997	December - March	Known or potential hibernacula. Internal hibernacula survey. Appropriate bat survey class licence is required to take part.
Other Surveys				
Sunset/ Sunrise Survey	Any species	2001	April - September	Volunteers explore an area of their choice and identify bat presence and other nocturnal wildlife. No experience required.
Woodland Survey	• barbastelle	2005	July - September	SAC sites for barbastelles (additional woodlands surveyed up to 2010). Walked transect with broadband detector.
National Nathusius' Pipistrelle Project	• Nathusius' pipistrelle	2014 (currently on hold)	Spring to autumn, avoiding key breeding period	Sites with known/likely Nathusius' pipistrelle presence. Harp trapping survey under project licence. Bat groups with experience of harp trapping

Detecting population change

The purpose of the NBMP is to allow us to draw accurate conclusions about what is happening to our bat populations. We need to be able to identify any significant changes to these populations and, in particular, identify possible declines early on so that swift conservation action can be taken.

An assessment based on power analyses and the width of the confidence limits for the current trend estimates suggests that our sample sizes should be sufficient to detect a decline of 25% or more over 25 years for all monitored species at the GB level.

Species coverage

Our four long-term monitoring surveys provide sufficient data to produce GB-level population trends for nine individual species and one species group, together covering 11 of the UK's 17 breeding bat species (Table 2). At country-level we produce trends for nine individual species and one species group in England (11 species in total), five species in Scotland, seven individual species and one species group in Wales (nine species in total), and one species in Northern Ireland (three further species trends for Northern Ireland, produced by Bat Conservation Ireland, are also included in this report); UK trends are produced for five species.

We are not able to provide population trends for the remaining GB breeding species: Bechstein's bat, Alcathoe bat, Nathusius' pipistrelle, Leisler's bat (only the NI trend produced by Bat Conservation Ireland is included) or barbastelle. However, information on the distribution of certain species is available from the Woodland Survey (barbastelle), National Nathusius' Pipistrelle Project and Bechstein's Bat Project (discontinued) (see the individual species accounts from page 76 onwards for more details).

Natterer’s bats (Photo: Daniel Hargreaves)

Table 2. Species coverage and data provision from each NBMP survey: P = enough data collected annually for trend, + = recorded, but insufficient data to produce trend

Species	Roost Count	Field / Waterway Survey	Hibernation Survey
Greater horseshoe bat	P		P
Lesser horseshoe bat	P		P
Common pipistrelle	P	P	+
Soprano pipistrelle	P	P	+
Daubenton's bat		P	P
Natterer's bat	P		P
Whiskered/Brandt's bat			P
Noctule		P	
Serotine	P	P	
Brown long-eared bat	P		P
Bechstein's bat			+
Alcathoe bat			
Nathusius' pipistrelle			+
Leisler's bat		+ (NI only)	
Barbastelle			+
Grey long-eared bat	+		

Value of volunteer contribution to the NBMP

In 2024, 741 volunteers took part in one or more of the core NBMP surveys: Roost Count, Field Survey, Waterway Survey or Hibernation Survey. The distribution of these volunteers is shown in Figure 1. In 2024, volunteers taking part in these surveys contributed approximately 14,926 hours of their time, representing an in-kind contribution to the NBMP of £242,430 (Table 3). The equivalent cost of these surveys if they were undertaken by professional ecologists would be £550,890.

Table 3. Estimated volunteer hours, value and equivalent professional value in 2023. BCD = British Crown Dependencies (Channel Islands and Isle of Man).

Country	Total hours	Volunteer value	Equivalent professional value
England	10,455	£174,060	£390,130
NI	552	£9,200	£20,608
Scotland	1248.5	£19,850	£45,652
Wales	2324.5	£35,130	£83,170
BCD	345.5	£4,190	£11,330
Total	14,926	£242,430	£550,890

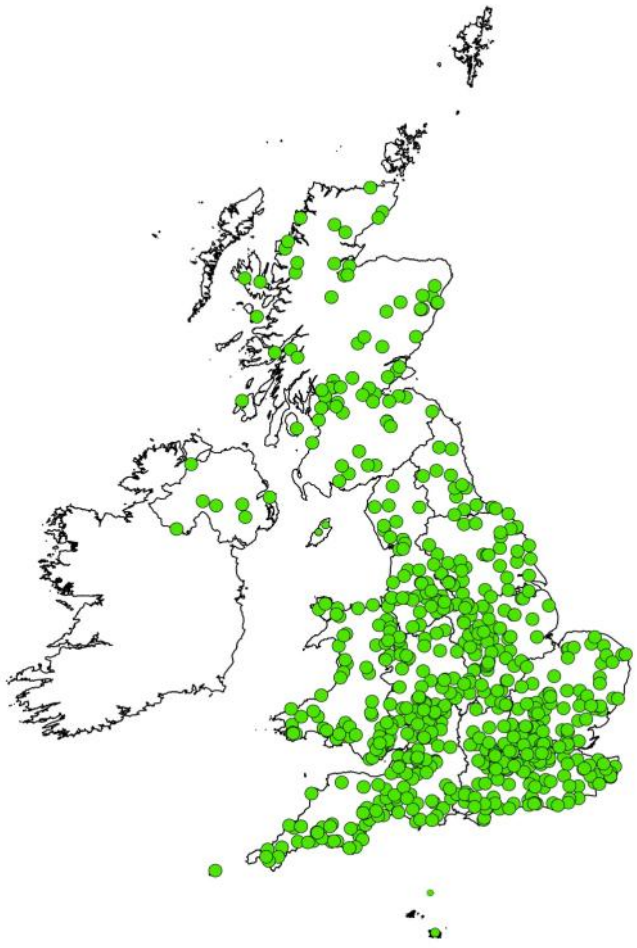


Figure 1. Locations of volunteers who took part in the four core NBMP surveys in 2024.

Survey coverage

UK site network

In total up to 2024, 7,328 sites have been surveyed across all NBMP core surveys (core surveys are those from which we produce species population trends: Roost Count, Field Survey, Waterway Survey and Hibernation Survey). In 2024, 741 NBMP volunteers completed surveys at 1,631 core survey sites. This represents an overall decrease of 7.5% on the number of sites surveyed in 2023 (Table 4). The unsettled weather in spring/summer 2024 is likely to have been a key factor behind the drop in survey participation. June was cooler than average, as was July which also had several bands of rain across the UK in the first half of the month. August too was wetter than average (www.metoffice.gov.uk). Including additional surveys, the Woodland Survey and Sunset Survey, 1,080 volunteers returned data in 2024.

We encourage new, less experienced volunteers to get involved in the NBMP by taking part in the Sunset Survey. Thanks to the engagement work carried out by our Volunteer Engagement Officer, in 2024 1,064 Sunset Surveys were completed by at least 371 volunteers, compared with 980 surveys carried out by at least 294 volunteers in 2023. Volunteers reported 31 bat roosts during this survey. Sunset Survey volunteers are encouraged to carry out the Roost Count at roosts they discover, where it is possible to make contact with the roost owner to arrange permission and access.

Repeat sites

In 2024, 91.5% of long-term monitoring sites (Roost Count, Field Survey, Waterway Survey and Hibernation Survey) had been surveyed in at least one previous year (1,493 'repeat sites', Table 4). This is lower than the 1,569 in 2023, largely due to the unfavourable weather conditions seen across the UK last year.

Hibernation Survey (Photo: Cecilia Montauban)

Table 4. UK NBMP survey coverage 2024. This shows for each survey the total number of sites surveyed to date, the number sites surveyed in 2024 and in the preceding year, and the proportion of sites surveyed in 2024 that have been surveyed in at least one year previously (aka 'repeat' sites). Sunset Survey sites are not included in these totals as a 'site' in this survey is not precisely defined.

Survey type	Total sites surveyed to date	Total sites surveyed 2024	Total sites surveyed 2023	% change in sites surveyed from 2023 to 2024	Number of repeat sites 2024	% repeat sites 2024
Field Survey (noctule, serotine, common pipistrelle, soprano pipsitrelle)	1,056	192	205	-6.3	167	87
Waterway Survey (Daubenton's bat)	1,657	312	349	-10.6	281	90.1
Hibernation Survey (all species)	1,290	425*	441	-3.6	406	95.5
Roost Count:						
• Greater horseshoe bat	47	23	26	-11.5	21	91.3
• Lesser horseshoe bat	388	171	175	-2.3	161	94.2
• Common pipistrelle	766	146	164	-10.4	132	89.8
• Soprano pipistrelle	613	155	163	-4.9	147	94.8
• Unidentified pip sp.	796	45	54	-16.7	37	82.2
• Natterer's bat	109	23	35	-34.3	22	95.7
• Serotine	152	30	29	3.4	26	86.7
• Brown long-eared bat	263	61	66	-7.6	57	93.4
• Other species	192	47	56	-16.1	36	76.6
Total long-term monitoring surveys only	7,328	1,631	1,763	-7.5	1493	91.5
Woodland Survey (barbastelle)	54	12	13	-7.7	12	100
Total long-term plus woodland	7,382	1,643	1,776	-7.5	1505	91.6

*Hibernation Survey figure refers to winter 2023/24.

Country level site networks

The NBMP produces trends for Great Britain and at UK and country level where sufficient data are available. Power analyses were completed for the NBMP in 2001, and from these it was recommended that a core of 30 sites surveyed annually would be needed for any given survey to provide sufficient data to detect changes in populations effectively (BCT, 2001). More recent power analysis has indicated that the sample size required can vary between each species and survey. However, we currently use 30 sites as our annual target number of repeat sites for each survey at country, GB and UK-level.

Survey coverage at country level is given in Table 5. Typically, we exceed our target of 30 repeat sites in England for most surveys; in 2024 this target was not achieved for greater horseshoe bat, Natterer's bat and Serotine in the Roost Count. In Wales, the target was exceeded only for the lesser horseshoe bat Roost Count and for the Hibernation Survey, while in Scotland we were only able to achieve this target for the Waterway Survey. In the Roost Count, trends are not produced for pipistrelle sp. or "Other species" (those that are more rarely recorded on this survey, such as Daubenton's bat, whiskered bat, noctule and grey long-eared bat).

Table 5. Country level NBMP survey coverage 2024. *Number of sites surveyed, with number of repeat sites shown in brackets. BCD = British Crown Dependencies (Channel Islands and Isle of Man).*

Survey type	England	Scotland	Wales	Northern Ireland	BCD
Field Survey	166 (146)	15 (11)	6 (5)	1 (1)	4 (4)
Waterway Survey	215 (191)	40 (36)	25 (22)	31 (31)	1 (1)
Hibernation Survey	306 (289)	13 (12)	104 (103)	-	2 (2)
Roost Counts:					
Greater horseshoe bat	19 (17)	-	4 (4)	-	-
Lesser horseshoe bat	60 (55)	-	111 (106)	-	-
Common pipistrelle	93 (89)	18 (16)	9 (7)	1 (1)	25 (19)
Soprano pipistrelle	113 (106)	25 (25)	9 (8)	7 (7)	1 (1)
Pipistrelle sp.	31 (24)	8 (8)	2 (2)	3 (2)	1 (1)
Natterer's bat	22 (21)	-		1 (1)	-
Serotine	28 (25)	-	2 (1)	-	-
Brown long-eared bat	38 (37)	10 (9)	4 (4)	6 (5)	3 (2)
Other species	35 (28)	2 (2)	1 (0)	5 (3)	4 (3)
Total for all surveys	1126 (1028)	131 (119)	277 (262)	55 (51)	41 (33)

Survey coverage maps

Figures 2-5 show the distribution of sites surveyed as part of the Field Survey, Waterway Survey and Roost Count in 2024 and the Hibernation Survey in winter 2023/24 (light green circles); and also the distribution of sites surveyed for each survey to date (dark blue circles).

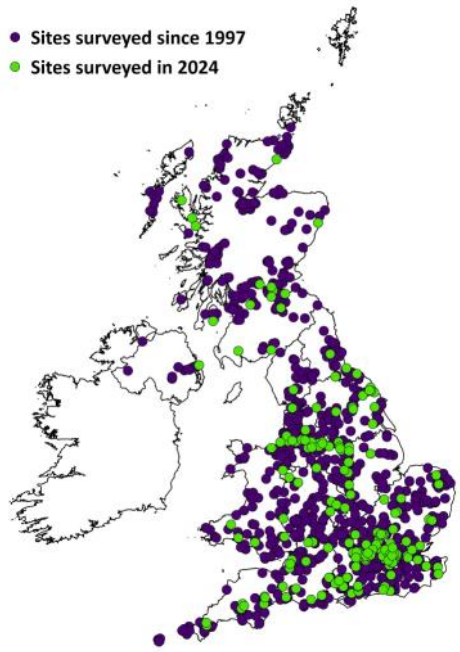


Figure 2. Distribution of Field Survey sites.
In 2024, 192 sites were surveyed, representing 18.2% of the total number of Field Survey sites surveyed to date.

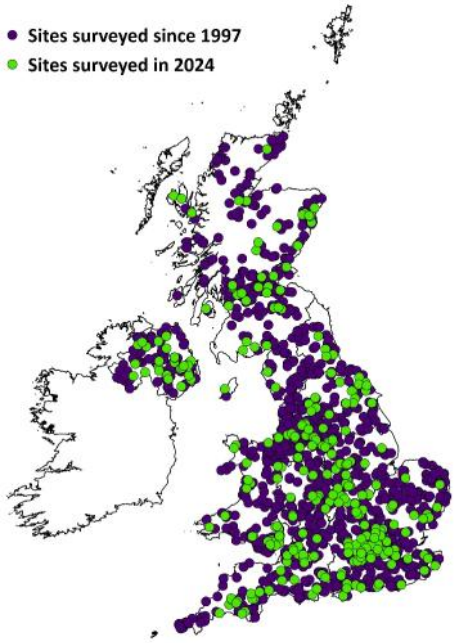


Figure 3. Distribution of Waterway Survey sites.
In 2024, 312 sites were surveyed, representing 18.8% of the total number of Waterway Survey sites surveyed to date.
Sites in Northern Ireland are monitored as part of the All-Ireland Waterway Survey, run by Bat Conservation Ireland.

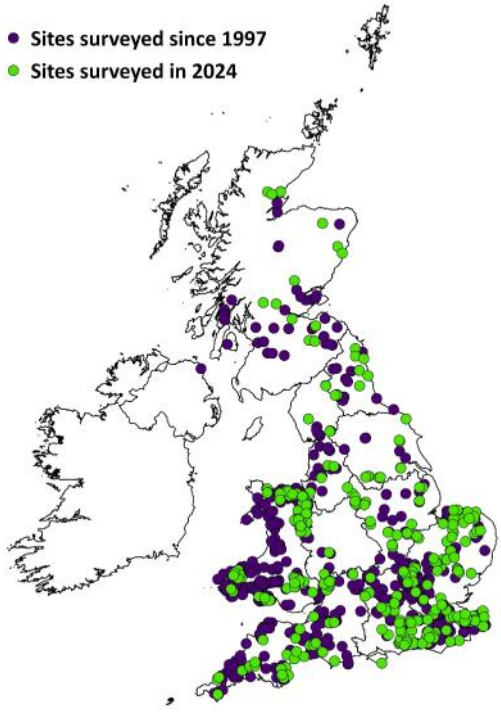


Figure 4. Distribution of Hibernation Survey sites.
In winter 2023/24, 425 sites were surveyed, representing 32.9% of the total number of Hibernation Survey sites surveyed to date.

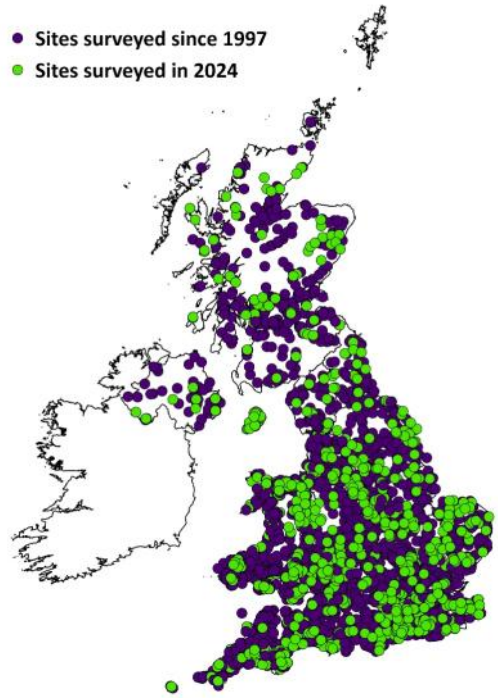


Figure 5. Distribution of all Roost Count sites.
In 2024, 701 sites were surveyed, representing 21.1% of the total number of Roost Count sites surveyed to date.

Criteria for publishing trends

Various factors contribute to the decision on whether to publish a trend in the NBMP report. For example, we consider statistical elements such as sample size and confidence limits, but also monitoring frequency, the number of available sites in a region and the proportion being monitored, geographic distribution and overall risk of bias in a trend, based on the underlying biology of a species. Ideally, trends should be based on data from a minimum of 30 core survey sites that are monitored annually. However, at the country level it is sometimes only possible to achieve a sample size of 30 repeat sites where some of the sites have been repeated on less than an annual basis, due to challenges of recruiting enough volunteers in countries where large areas have relatively low populations (Scotland and Wales) and the limited distributions of some species. This sample size can still provide useful information on population changes but will have lower power than a core of 30 sites surveyed annually. In this report, trends are published that either meet this minimum target of data from 30 repeat sites or which have relatively narrow confidence intervals, although some of these have the caveate that they are based on data from a small number of sites and may therefore not give a truly representative picture of how the species is faring at that geographic scale.

Official Statistics

This year for the first time the point of first release of the Official Statistics produced from the bat monitoring data is on JNCC's website https://jncc.gov.uk/our-work/bat-monitoring-official-statistics/. Only those trends that are considered to be robust and unbiased are accepted as Official Statistics. These trends are labelled as such in the species accounts. The remaining trends are presented for information and with caveats, and this helps to highlight where monitoring of additional repeat sites is a priority for improving the statistical robustness of reporting on species at country level.

Robustness of monitoring data

Our long-term monitoring surveys have been designed to provide robust population trend estimates. However, no monitoring data can be entirely free of bias. On each survey we ask volunteers to record covariates that can influence the number of bats or levels of bat activity at the site, such as temperature, weather conditions, and site characteristics; or the ability to detect and identify the species present, such as bat detector model used and the volunteer's level of skill and experience. Sources of bias and the steps we take to address them are outlined in more detail on pages 17-20. These are periodically reviewed to identify further refinements we can make to the precision of the trends.

A sampling approach is used for all surveys, with the assumption that trends occurring at sample sites reflect trends occurring in the general population. Theoretically this assumption is strongest when sample sites are chosen at random and where a proportion of sites do not contain the species of interest. Monitoring sites where the species of interest is not present can help identify populations that are expanding into new areas. The nature of the NBMP as a citizen science programme means that we have greater survey coverage in areas of higher human population density (Figures 2 to 5, page15), and in certain habitats.

Although monitoring began in 1997 for the majority of surveys, the baseline year for trends is 1999 for the majority of species. The base year for trend estimates should be chosen to be a year when there is a good sample size and when the survey has settled down and observers have become familiar with the methodology. In addition, where smoothed trends are used the first year is best avoided because it is subject to greater uncertainty. This means that 1999 is a good choice for the majority of species/surveys; for some species earlier years could be used but it adds complexity if different years are used for different species, plus in most cases sample sizes are small prior to 1998. The choice of base year is discussed by Steve Buckland and Alison Johnston (2017) and the NBMP is quoted as a positive example.

Similarly, the last year in a smoothed trend can be subject to annual fluctuations and extreme outliers which will not be smoothed until the next year's index is calculated. In previous years' reports we have based each species' trend assessment on the index in the latest year, with the caveat that this index is provisional and needs to be treated with caution. From this year, we are using the penultimate year of the trend (in this case 2023) for assessing population change so that each species assessment is based on a relatively stable value. The 2023 index which was provisional in last year's report is now smoothed based on the indices for 2022 and 2024 and therefore gives a more robust measure of population change than the 2024 index which is currently provisional.

Addressing biases in monitoring data

Field and Waterway Surveys

Site selection

We have found that where participants can select any site, there is a tendency to select sites that support higher numbers of bats. This would give a distorted picture of how bats are faring across the UK, so one measure we take to account for this is to provide volunteers with a list of pre-selected survey sites from which to choose.

Field Survey sites are random-stratified 1km OS grid squares. Sites are stratified by ITE (Institute of Terrestrial Ecology) land class to help ensure a representative sample of UK land classes.

Waterway Survey volunteers select sites originating from the network of Environment Agency/ Natural Resources Wales River Habitat Survey sites. As with the Field Survey, these sites are generated on a stratified random basis. They also have the added value of having river habitat data associated with them, which enables additional research to be carried out on associations between river habitat and bat activity levels (Langton et al, 2006).

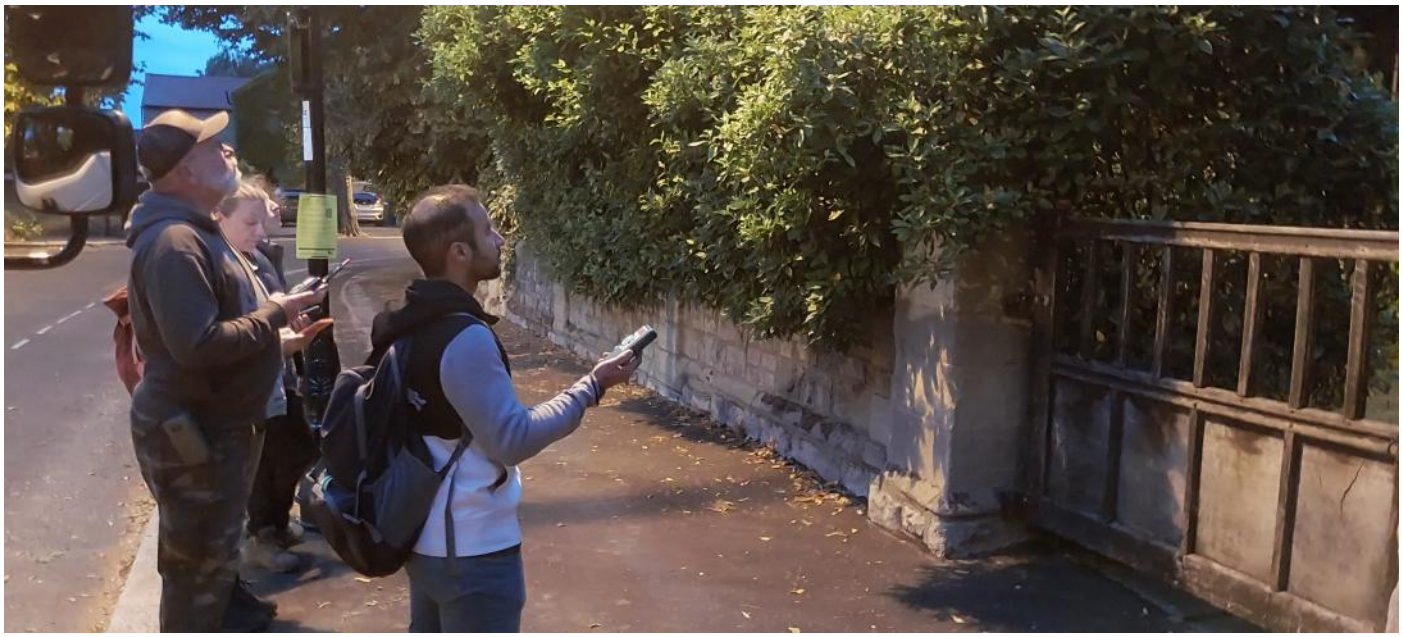
The random selection of Field and Waterway survey sites incorporates sites where the species of interest may not occur at present but has the potential to do so in future. This provides a means of assessing change in distribution as a result of population expansion or contraction as well as change in relative abundance.

Geographical distribution of sites

Despite efforts to obtain data from an unbiased sample of sites giving a representative picture of how bats are faring in different habitats across the UK, this is skewed by geographical biases in the sites surveyed.

The chief causes of this are the uneven density of the human population across the UK, with larger numbers of volunteers in the South East resulting in much higher levels of sampling than in the North East, for example; and the relative inaccessibility of certain habitat types, with uplands being very under-represented compared to lowlands.

This is partially controlled by weighting data for Great Britain by country, in proportion to the ratio of non-upland area to number of sites surveyed (see *Appendix: Statistical methods,* page 93). However, the effectiveness of this approach is limited by the small sample size for many species in Wales and Scotland. We are currently investigating the implications of the non-random spatial distribution of survey sites, and testing methods to better control for this bias.



Field Survey (Photo: Philip Briggs)

Bat detector model

A wide range of bat detector models are used on the Field Survey and Waterway Survey. Different detectors can have different levels of sensitivity across the frequency range, due largely to the frequency response of the type of microphone used. This will mean that some detectors may be more sensitive in the mid-frequency range and therefore will pick up pipistrelle calls, for example, at a greater distance. Others may be more sensitive at a lower frequency and therefore pick up noctule and serotine calls at a greater distance (Adams *et al.* 2012). Analysis of NBMP data has shown that detector type has a significant effect on the numbers of passes recorded across the four species recorded on the Field Survey (Barlow *et al.* 2015). Therefore, detector model is factored into the trend analysis in order to minimize the effect of this bias. This is particularly important given changes in the prevalence of different models of detector over time.

Volunteer skill and experience

On the survey form, volunteers are asked to categorise their levels of bat identification skill (qualitative) and experience (quantitative, as number of years). This information is requested on an annual basis, given that it will change over time, and is linked directly to the survey data the volunteers have collected in that year. Our analysis has shown that level of skill has been found to be highly correlated with numbers of bat passes confidently assigned to a species ID (as opposed to recorded as “unsure”). Therefore, volunteer self-assessment of skill is included as a covariate in the trend analysis in order to minimize the effect of this bias. As well as reflecting changes in skill over time for individual volunteers, this is important in the context of volunteer turnover, where surveying a site may be taken over by a volunteer with a different level of bat identification skills.

Weather conditions
Temperature and weather conditions have a strong influence on bat activity, with reduced activity expected in colder or wetter weather, and activity potentially restricted to more sheltered locations in windy weather. Terms for poor weather and stronger wind are included in the Field Survey and Waterway Survey species trends to adjust for these biases.

Hibernation Survey

Site selection
Hibernation Survey volunteers select a known or potential hibernation site to survey. This includes sites that are suitable for hibernating bats but have not previously been found to be occupied. This survey can therefore detect instances of bats moving into sites where they have not previously been recorded, as well as potential site abandonment and reoccupation.


Brown long-eared bat hibernating (Photo: Daniel Hargreaves)

Temperature
Temperature can have a strong influence on the numbers of bats using a hibernaculum and where they are roosting within the site. Surveyors are asked to record the external temperature, the internal temperature at coolest point (usually near the entrance), and the internal temperature at the warmest point (usually the furthest accessible point). Some years ago, we received a suggestion from a bat worker that the temperature on the days preceding the survey is likely to have a strong influence. Since 2019 we have looked at this in detail using 1km gridded temperature data from the HadUK dataset supplied by the Met Office. We use daily minimum temperatures for the 13 days prior to the survey. This has revealed a significant effect on bat numbers for certain species. For example, a prolonged cold period immediately prior to the survey date substantially increases Natterers' bat numbers. Where the association between a temperature value and the number of bats observed is statistically significant, this is factored into the relevant species trend analysis to adjust for this bias.

Visibility of bats
A potential issue with counts of bats carried out in hibernation sites is that the relationship between the numbers of bats observed and the actual numbers of bats present is not well understood. Bats can hide in cracks and crevices and there is evidence that large numbers of bats can be present even when few are actually observed. However, if the proportion of bats seen remains constant over time at any given site, population trend estimates will be valid. The proportion of bats seen can be influenced by temperature (see above).

Impact of Covid-19

In winter 2020/21 hibernation surveys were suspended in line with guidance from the IUCN Bat Specialist Group on avoiding the credible risk of passing SARS-CoV-2 (the virus that causes Covid-19) on to bats. In winter 2021/22 hibernation survey resumed but with risk assessments in place to assess the size, airflow and minimum number of volunteers required to safely survey each site, and whether these combined factors increased the risk to bats. Consequently, many sites were not surveyed in winter 2021/22 based on this risk assessment (294 sites were surveyed compared with 521 in winter 2019/20). There was also some tendency for fewer of the smaller sites to be revisited in winter 2021/22. The trend estimates are not distorted by this since they compare counts to previous counts at the same site. However, if this situation continues for several years then the reduced sample sizes are likely to reduce the precision of trends from hibernation survey data, or prevent the production of certain trends at the country level. Fortunately, there was a marked increase in the number of sites surveyed in winter 2022/23 though this still fell short of pre-Covid sample sizes. Numbers dropped off slightly in winter 2023/24 but the sample sizes were still high enough for updating the species population trends

Roost Count

Site selection

The Roost Count involves surveying known roosts that are self-selected by surveyors. Roost Counts are most effective for monitoring population change when a high proportion of existing roosts are counted and when the species tends to be faithful to its roost site between years. Since roosts are often discovered and first included in the NBMP when high numbers of bats are present, this can cause a strong imbalance in the data for species which commonly exhibit roost-switching behaviour. High numbers of bats in the first year can decline over time to low numbers or zero, and this is not counter-balanced by roosts with zero or few bats in the first year increasing to a much higher number over time, since roost monitoring rarely begins before bats have become more established at a site. Roost-switching behaviour is discussed in more detail next.

Roost fidelity

Many bat species will move between roost sites, either individually, in groups or as an entire roost. Bats may abandon a roost temporarily for several weeks, months or years before reoccupying it, or they may abandon it permanently. This is known as 'roost switching'. Roost switching may negatively bias Roost Count trends if monitoring ceases before a roost is reoccupied, as this results in a zero count being the final value entered into trend analysis for that site, and therefore a negative site trend being included in trend analysis. It is also possible for a roost to 'split' into two or more smaller roosts if it outgrows its original site, which will negatively bias the trend if bats occupying the new site (s) are not included in the count.

Species which switch or split roosts more frequently, in greater numbers or for longer periods of time are likely to be more strongly affected by this bias in Roost Counts. Common and soprano pipistrelle, Natterer’s bat and serotine show a relatively high instance of roost switching, and therefore Roost Count trends for these species should be treated with caution. However, species that are highly faithful to their roost sites, such as greater and lesser horseshoe bat, will have less biased trends. For these species Roost Count trends appear robust and are supported by evidence from other surveys.

Research into potential sources of bias in the Roost Count dataset was published in a Citizen Science special edition of the Journal of Applied Ecology (Dambly et al., 2020). Options for addressing these biases were explored in work funded by JNCC in 2021.

Species population trends for the UK/Great Britain

Summary of species trends

The smoothed population indices derived from NBMP data in Great Britain to the end of summer 2023 are shown in Table 6. For each species, the average number of sites per year contributing to the trend calculation is given. A UK trend for Daubenton's bat has been included, it being the only species with sufficient sites in Northern Ireland to enable production of trends (data provided by Bat Conservation Ireland).

From this year we are using the penultimate year of the trend (in this case 2023) for assessing population change since the final year in the index is always provisional and needs to be treated with caution (see page 17).

Short-term five-year trends (2018-2023) have been calculated to reveal more clearly any recent changes in the trends that differ from the long-term trends. Short-term trends were not calculated for the Hibernation Survey in Scotland due to low sample sizes in recent years.

For the less frequently encountered UK breeding bat species (Bechstein's bat, Alcathoe bat, Leisler's bat, Nathusius' pipistrelle, barbastelle and grey long-eared bat) there are insufficient data available at present to allow the calculation of population trends.

In each species summary, population estimates from Mathews *et al*. 2018 are given at GB and country level where available. Each estimate has been given a reliability score based on the availability of data on roost density, roost size and sex ratio. A value of 1 indicates very poor reliability, and 4 indicates very good reliability.

Currently data are not included from the British Crown Dependencies (Channel Islands and the Isle of Man) since these are outside the UK and therefore outside the NBMP reporting remit. We will review this ahead of next year's report, given that these territories are likely to be contiguous with the ranges of UK bat populations.

Trends in context

These trends reflect relatively recent changes to bat populations since the 1990s. It is generally considered that prior to this there were significant historical declines in bat populations dating back to at least the start of the 20th century, although evidence is fragmented and few data were collected in a systematic way.

Table 6. UK/GB bat species population trends summary table

Species	Survey type	Short-term trend (2018-2023)				Long-term trend (1999-2023)†			
		Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL	Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL
Greater horseshoe	Hibernation (UK/GB)	122	22.2*	1.9	86	122	241*	128.4	557.8
	Roost (UK/GB)	25	12.1	-9.4	39.9	22	222.5*	139.5	316.2
Lesser horseshoe bat	Hibernation (UK/GB)	157	17.6*	7.4	28.2	158	191.6*	142.4	244.4
	Roost (UK/GB)	134	0.4	-7.3	9.4	147	73.6*	49.7	100.4
Daubenton's bat	Hibernation (GB)	268	-2	-15.7	12.7	265	22.2	-0.7	49.2
	Waterway (GB)	234	0.6	-5.8	8.2	244	4.6	-6.5	15.8
	Waterway (UK)	262	-1.8	-8.2	4.8	263	4.2	-6.1	17.4
Whiskered/ Brandt's bat	Hibernation (GB)	162	-0.3	-10.3	11.1	160	25.7	-9.9	84.2
Natterer's bat	Hibernation (GB)	314	**2.9**	**-8.8**	**13.9**	308	**129.2***	**53.4**	**216.6**
	Roost (GB)	28	0.4	-19	18.5	37	-4.9	-37.4	38.2
Common pipistrelle	Field (GB)	163	**1.2**	**-5.9**	**9.4**	170	**86.8***	**53.2**	**125.5**
	Roost (GB)	140	-32.5*	-45.3	-20.1	185	-74.6*	-82.2	-63.4
Soprano pipistrelle	Field (GB)	163	**23.8**	**-4.5**	**56**	170	**61.5***	**15.4**	**121.1**
	Roost (GB)	126	-20.6*	-34.9	-9.6	136	-64.1*	-75.2	-50.7
Serotine	Field (UK/GB)	124	26.6*	2.8	60.3	125	28.4	-23.7	128.3
	Roost (UK/GB)	32	5.3	-12.8	27.3	36	-3.5	-28.3	36.5
Noctule	Field (UK/GB)	161	5	-10.3	22.5	167	30.5	-9.5	93.4
Brown long-eared bat	Hibernation (GB)	297	9.1	-15.7	43.6	279	-13.8	-43.7	30.1
	Roost (GB)	45	-10.6*	-20.7	-1.6	58	5.1	-25.7	42.6

"UK/GB" indicates that the species is only monitored in GB but is not known to occur in Northern Ireland; therefore the GB trend is in effect the UK trend

"GB" indicates that the species occurs in all countries of the UK but a lack of data from Northern Ireland means we are only able to produce a trend for GB

† Natterer's bat Roost Count 2002-2023, Brown long-eared bat Roost Count 2001-2023

LCL = Lower 95% confidence limit of % change estimate; UCL = Upper 95% confidence limit of % change estimate

* indicates statistically significant result at 5% level.

Bold indicates the survey method considered to be most robust in instances where survey indices show statistically significant but differing trends (see individual species accounts for further details).

Figures in red need to be treated with caution due to likely strong biases in the data due to roost -switching behaviour.

Hibernation years indicate the winter months at the start of the specified year plus December at the end of the previous year, e.g. base year 1999 = winter 1998/1999 and last year 2023 = winter 2022/2023.

Summary of trends for England, Scotland, Wales and Northern Ireland

Survey indices are produced at a country level for England, Scotland, Wales and Northern Ireland for species and surveys where sufficient data are available. Tables 7-10 show a summary of the bat species trends at country level derived from NBMP surveys to the end of summer 2023. For each species, the average annual number of sites contributing to the trend calculations is shown.

All species showed similar long-term trends at GB and country level, with the following exceptions:

- Whereas greater and lesser horseshoe bat populations have increased in Wales over the last five years, in England greater horseshoe bat populations have shown little change, and there is evidence to suggest that lesser horseshoe bat populations are declining.
- Soprano pipistrelle populations have increased in the long term in Scotland and Northern Ireland, but have shown little change in England.
- Brown-long eared bat populations are considered to have been stable in England over the last five years but are declining in Wales.
- Across the UK, Daubenton's bat populations are considered to have been stable both since the baseline year of monitoring and over the last five years. However, there is evidence to suggest that Daubenton's bat populations in England may have increased in the long term, whereas over the last five years they have declined in Northern Ireland.

Brown long-eared bats (Photo: Daniel Hargreaves)

Table 7. England bat species population trends summary table

Species	Survey type	Short-term trend (2018-2023)				Long-term trend (1999-2023)†			
		Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL	Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL
Greater horseshoe bat	Hibernation	62	5.7	-8.5	39.1	64	227*	90.2	547.4
	Roost Count	21	3.2	-14.1	38.1	18	190.1*	99.5	294.6
Lesser horseshoe bat	Hibernation	69	0.2	-25.1	21.2	71	137.8*	54.8	236.2
	Roost Count	52	-13.4*	-24	-1.1	53	72.3*	34.4	118.2
Daubenton's bat	Hibernation	201	0.1	-13	14	200	30.7*	7.4	64.4
	Waterway	190	5.1	-1.4	12.7	200	-3.1	-12.4	6.9
Whiskered/ Brandt's bat	Hibernation	106	3.4	-7.5	17.6	109	39.3	-5.6	109.2
Natterer's bat	Hibernation	231	**6.5**	**-6.7**	**17.4**	228	**163.2***	**61.8**	**263.7**
	Roost Count	25	2.5	-18.7	20.5	33	3.5	-34.2	48.7
Common pipistrelle	Field	148	**1.4**	**-6.3**	**9.5**	147	**87.6***	**59.4**	**123.3**
	Roost Count	112	-28*	-41.4	-11.6	147	-69*	-76.9	-58.5
Soprano pipistrelle	Field	148	**3.2**	**-13.3**	**18.5**	147	**20.3**	**-13.1**	**73.1**
	Roost Count	90	-12	-28.2	0.1	88	-53.4*	-68.7	-37.6
Serotine	Field	119	26.2*	0.4	57.9	118	26.1	-27.8	123.5
	Roost Count	31	8.8	-13.5	35.1	35	-3.7	-27.5	36.4
Noctule	Field	146	7.3	-9.2	23.4	145	7.6	-23.6	48.1
Brown long-eared bat	Hibernation	227	5.6	-13	27.4	218	-8.9	-38.4	23.5
	Roost Count	35	-11.7	-25.3	3.5	41	-9.7	-48.5	29.4

† Natterer's bat Roost Count 2002-2023, Brown long-eared bat Roost Count 2001-2023

LCL = Lower 95% confidence limit of % change estimate; UCL = Upper 95% confidence limit of % change estimate

* indicates statistically significant result at 5% level.

Bold indicates the survey method considered to be most robust in instances where survey indices show statistically significant but differing trends (see individual species accounts for further details).

Figures in red need to be treated with caution due to likely strong biases in the data due to roost -switching behaviour.

Hibernation years indicate the winter months at the start of the specified year plus December at the end of the previous year, e.g. base year 1999 = winter 1998/1999 and last year 2023 = winter 2022/2023.

Table 8. Scotland bat species population trends summary table.

Species	Survey type	Short-term trend (2018-2023)				Long-term trend (1999-2023)†			
		Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL	Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL
Daubenton's bat	Hibernation					12	-14.5	-57.8	73.2
	Waterway	32	-7.1	-19.8	7.1	32	10.5	-11.8	40.7
Natterer's bat	Hibernation					12	-12.7	-62.9	56.8
Common pipistrelle	Field	11	**-15.4**	**-49.5**	**22.5**	16	**18.8**	**-42.7**	**123.4**
	Roost Count	16	-37.5*	-63	-5	24	-83.2*	-93.6	-45.9
Soprano pipistrelle	Field	11	**52.9**	**-14.4**	**153.4**	16	**221.6***	**58.2**	**500.6**
	Roost Count	24	-39.1*	-53.9	-19.2	29	-79.9*	-87.1	-68.7
Brown long-eared bat	Hibernation					12	34.1	-53.9	180.4
	Roost Count	6	-14	-40.8	4.9	10	44.9	-29.3	177.6

† Daubenton's bat hibernation 2009-2023, waterway 2000-2023; Natterer's bat hibernation (2011 -2023); brown long-eared bat hibernation (2008-2023), roost (2002-2023)

Table 9. Wales bat species population trends summary table

Species	Survey type	Short-term trend (2018-2023)				Long-term trend (1999-2023)^			
		Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL	Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL
Greater horseshoe bat	Hibernation	60	231.3*	38.7	622.9	58	470*	207.3	1186.1
Lesser horseshoe bat	Hibernation	88	22.9*	11.3	41	86	214.4*	155.1	278.1
	Roost Count	82	6.3	-4.6	17.1	94	76.3*	47.6	114.1
Daubenton's bat	Hibernation	59	11.8	-10.1	45.7	55	38.4	-20.4	160.5
	Waterway	12	-5	-16.8	10.7	13	30.5*	8	67
Whiskered/ Brandt's bat	Hibernation	49	-16.9	-34.1	8.5	45	-21.4	-37.3	7.9
Natterer's bat	Hibernation	73	26.1	-6.7	41.1	69	125.5*	40.5	170.9
Common pipistrelle	Roost Count	12	-43.1	-81.6	2.6	14	-80.7*	-95.1	-57.7
Soprano pipistrelle	Roost Count	13	-74.3*	-88.9	-58.5	18	-91.5*	-95.8	-85.9
Brown long-eared bat	Hibernation	60	-53.6*	-70.4	-27.9	51	-27.4	-58.5	11.3

^ Daubenton's bat waterway 2000-2023; soprano pipistrelle roost 2002-2023

LCL = Lower 95% confidence limit of % change estimate; UCL = Upper 95% confidence limit of % change estimate

* indicates statistically significant result at 5% level.

Bold indicates the survey method considered to be most robust in instances where survey indices show statistically significant but differing trends (see individual species accounts for further details).

Figures in red need to be treated with caution due to likely strong biases in the data due to roost -switching behaviour.

Hibernation years indicate the winter months at the start of the specified year plus December at the end of the previous year, e.g. base year 1999 = winter 1998/1999 and last year 2023 = winter 2022/2023.

Table 10. Northern Ireland bat species population trend summary table.

Species	Survey type	Short-term trend (2018-2023)				Long-term trend (1999-2023)†			
		Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL	Avg sites per year in trend analysis	Trend since base year (%)	LCL	UCL
Daubenton's bat	Waterway	28	-16*	-29.5	-1.1	26	7.6	-14	36.8
Common pipistrelle	Car Survey					4.7	54.8*	10.1	111.3
Soprano pipistrelle	Car Survey					4.7	102.2*	3.0	205.0
Leisler's bat	Car Survey					4.7	99.3*	21.9	304.4

LCL = Lower 95% confidence limit of % change estimate; UCL = Upper 95% confidence limit of % change estimate
† 2010-2023
* indicates statistically significant result at 5% level.

From the core NBMP surveys, Daubenton's bat is the only species for which we currently have a sufficient sample size to enable a statistically robust trend to be produced for Northern Ireland. Most of the data are from the All-Ireland Waterway Survey which has been run by Bat Conservation Ireland since 2008.

The Car Survey results are kindly provided by Bat Conservation Ireland and derived from the Irish Bat Monitoring Programme. They are not part of the Official Statistics that comprise the other robust trends presented in this report. The Car Survey requires survey teams to complete annual surveys of a mapped route within a defined 30km Survey Square. Routes cover 15 x 1.609km (1 mile) Monitoring Transects each separated by a minimum distance of 3.2km (2 miles). Surveyors are asked to undertake the survey on two dates, one in mid to late July and one in early to mid-August. Transect coverage begins 45 minutes after sunset. Each of the 1.609km transects is driven at 24km (15 miles) per hour (at night) while continuously recording on a Batlogger detector.

Sample sizes for Northern Ireland are sufficient for producing population trends for three species: Leisler's bat, common pipistrelle and soprano pipistrelle. All three species currently show a statistically significant increase in the 2023 index compared with the 2010 baseline.

For more information see the latest Northern Ireland Bat Monitoring Report at www.batconservationireland.org/what-we-do/publications

Greater horseshoe bat

Rhinolophus ferrumequinum

Population trends are calculated for greater horseshoe bat for Great Britain and at a country level for England and Wales. This species is not found in Scotland or Northern Ireland.

Photo: Daniel Hargreaves

Distribution and abundance

The greater horseshoe bat is rare in the UK with a distribution restricted to south-west England and south Wales. It is absent from Scotland and Northern Ireland.

Population estimate

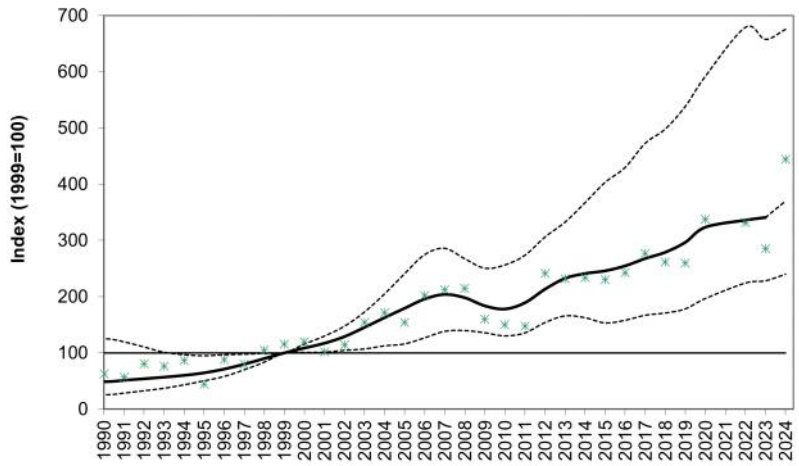
Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	12,900 (9,210 – 18,500)	10,200 (7,280 – 14,600)	2,700 (1,930 – 3,850)	Does not occur	Does not occur
	Reliability score: 4/5 (scores >3 most reliable)				
Source	Mathews *et al.* 2018				

Range of greater horseshoe bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019).

Greater horseshoe bat | UK/GB trends

In Great Britain, the greater horseshoe bat Hibernation Survey and Roost Count indices have increased significantly since the baseline year of monitoring (1999), and the Hibernation Survey index has also increased significantly also over the last five years. **The population of greater horseshoe bat in Great Britain is considered to have increased in both the long-term (since 1999) and the short-term (since 2018).** Greater horseshoe bat is not known to occur in Northern Ireland and therefore the GB trends are in effect UK trends.

Hibernation Survey **OFFICIAL STATISTIC**

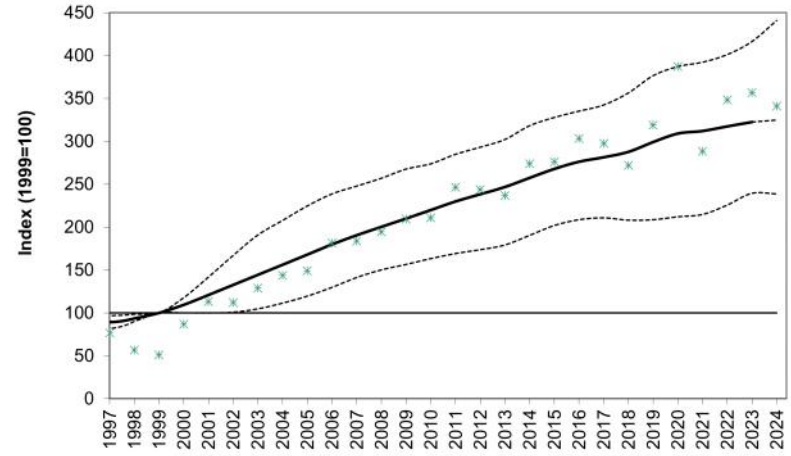


Between 1999 and 2023 the smoothed survey index has increased significantly by 241% (95% CI 128.4% to 557.8%).

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 22.2% (95% CI 1.9% to 86%).

From 1999-2024 on average 122 sites per year contribute to the trend analysis (sites surveyed in two or more years with greater horseshoe bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 222.5% (95% CI 139.5% to 316.2%).

Over the last five years (2018-2023) the smoothed survey index has increased by 12.1% (95% CI -9.4% to 39.9%), however this change is not statistically significant.

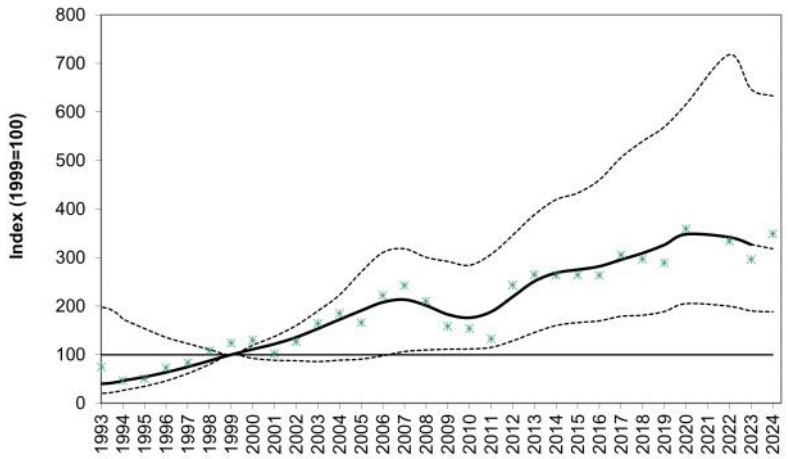
From 1999-2024 on average 22 sites per year contribute to the trend analysis (sites surveyed in two or more years with greater horseshoe bat recorded in at least one year).

Figure 6. Hibernation Survey and Figure 7. Roost Count indices for Greater horseshoe bat in the UK/Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Greater horseshoe bat | England trends

In England, the greater horseshoe bat Hibernation Survey and Roost Count indices have increased significantly since the baseline year of monitoring (1999). Over the last five years however, neither index has changed significantly. **The population of greater horseshoe bat in England is considered to have increased in the long-term (since 1999) and to have been stable in the short term (since 2018)**.

Hibernation Survey **OFFICIAL STATISTIC**

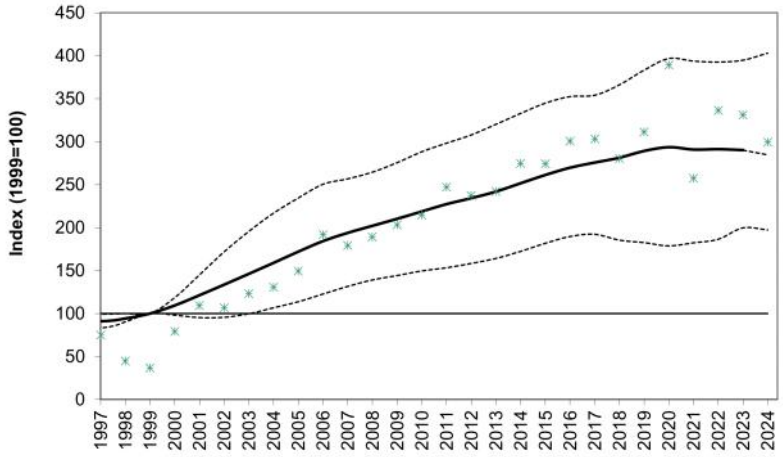


Between 1999 and 2023 the smoothed survey index has increased significantly by 227% (95% CI 90.2% to 547.4%).

Over the last five years (2018-2023) the smoothed survey index has increased by 5.7% (95% CI -8.5% to 39.1%), however this change is not statistically significant.

From 1999-2024 on average 64 sites per year contribute to the trend analysis (sites surveyed in two or more years with greater horseshoe bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 190.1% (95% CI 99.5% to 294.6%).

Over the last five years (2018-2023) the smoothed survey index has increased by 3.2% (95% CI -14.1% to 38.1%), however this change is not statistically significant.

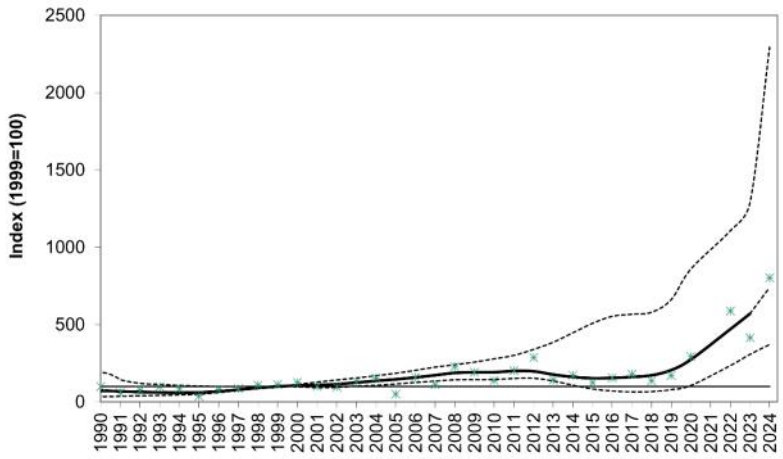
From 1999-2024 on average 18 sites per year contribute to the trend analysis (sites surveyed in two or more years with greater horseshoe bat recorded in at least one year).

Figure 8. Hibernation Survey and Figure 9. Roost Count indices for Greater horseshoe bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Greater horseshoe bat | Wales trend

In Wales, the greater horseshoe bat Hibernation Survey index has increased significantly since the baseline year of monitoring (1999) and also over the last five years. **The population of greater horseshoe bat in Wales is considered to have increased in both the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 470% (95% CI 207.3% to 1186.1%).

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 231.3% (95% CI 38.7% to 622.9%).

From 1999-2024 on average 58 sites per year contribute to the trend analysis (sites surveyed in two or more years with greater horseshoe bat recorded in at least one year).

Figure 10. Hibernation Survey index for Greater horseshoe bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Lesser horseshoe bat

Rhinolophus hipposideros

Population trends are calculated for lesser horseshoe bat for Great Britain and at a country level for England and Wales. This species is not found in Scotland or Northern Ireland.

Photo: Daniel Hargreaves

Distribution and abundance

The lesser horseshoe bat is rare in the UK with a distribution largely restricted to south-west England and Wales. It is absent from Scotland and Ireland.

Population estimate

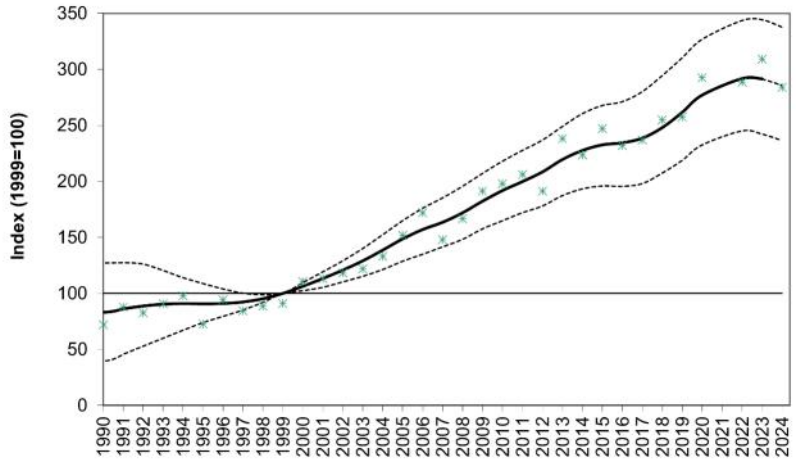
Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	50,400 (36,000 –72,000).	19,400 (13,900 – 27,700)	30,900 (22,000 – 44,100)	Does not occur	Does not occur
	Reliability score = 3 (scores >3 most reliable)				
Source	Mathews *et al.* 2018				

Range of lesser horseshoe bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019).

Lesser horseshoe bat | UK/GB trends

In Great Britain, the lesser horseshoe bat Hibernation and Roost Count indices have increased significantly since the baseline year of monitoring (1999), and the Hibernation Survey index has also increased significantly over the last five years. **The population of lesser horseshoe bat in Great Britain is considered to have increased in both the long-term (since 1999) and the short-term (since 2018).** Lesser horseshoe bat is not known to occur in Northern Ireland and therefore the GB trends are in effect UK trends.

Hibernation Survey **OFFICIAL STATISTIC**

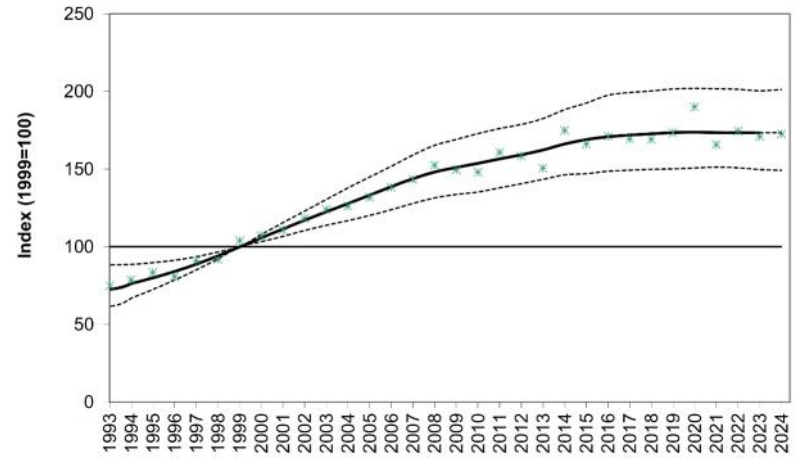


Between 1999 and 2023 the smoothed survey index has increased significantly by 191.6% (95% CI 142.4% to 244.4%).

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 17.6% (95% CI 7.4% to 28.2%).

From 1999-2024 on average 158 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 73.6% (95% CI 49.7% to 100.4%).

Over the last five years (2018-2023) the smoothed survey index has increased by 0.4% (95% CI -7.3% to 9.4%), however this change is not statistically significant.

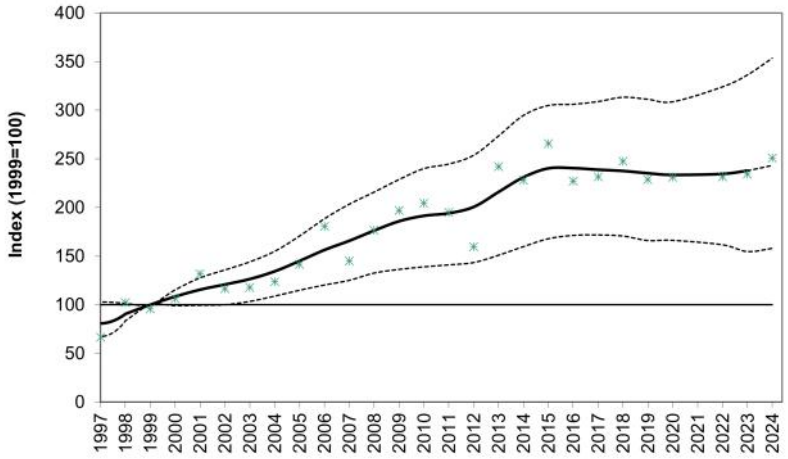
From 1999-2024 on average 147 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Figure 11. Hibernation Survey and Figure 12. Roost Count indices for Lesser horseshoe bat in the UK/Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Lesser horseshoe bat | England trends

In England, the lesser horseshoe bat Hibernation Survey and Roost Count indices have increased significantly since the baseline year of monitoring (1999). Over the last five years the Hibernation Survey index has shown no significant change and the Roost Count index has declined significantly. **The population of lesser horseshoe bat in England is considered to have increased in the long-term (since 1999), and there is evidence to suggest it has declined in the short term**

Hibernation Survey **OFFICIAL STATISTIC**

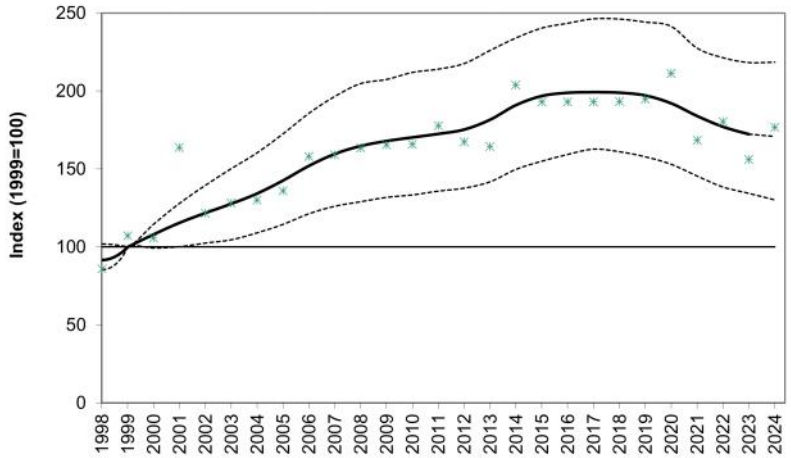


Between 1999 and 2023 the smoothed survey index has increased significantly by 137.8% (95% CI 54.8% to 236.2%).

Over the last five years (2018-2023) the smoothed survey index has increased by 0.2% (95% CI -25.1% to 21.2%), however this change is not statistically significant.

From 1999-2024 on average 71 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 72.3% (95% CI 34.4% to 118.2%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -13.4% (95% CI -24% to -1.1%).

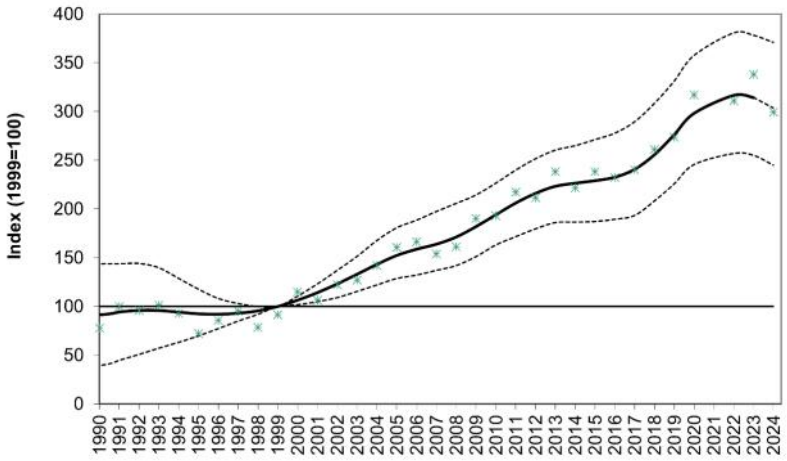
From 1999-2024 on average 53 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Figure 13. Hibernation Survey and Figure 14. Roost Count indices for Lesser horseshoe bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Lesser horseshoe bat | Wales trends

In Wales, the lesser horseshoe bat Hibernation Survey and Roost Count indices have increased significantly since the baseline year of monitoring (1999) and the Hibernation Survey index has also increased significantly over the last five years. **The population of lesser horseshoe bat in Wales is considered to have increased in both the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

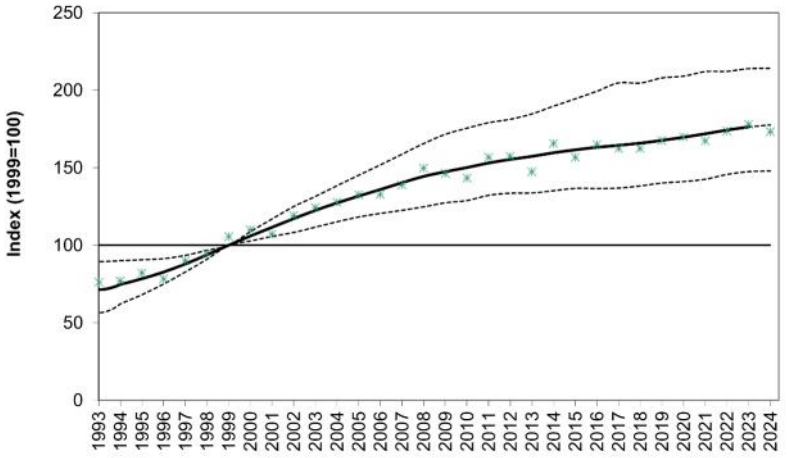


Between 1999 and 2023 the smoothed survey index has increased significantly by 214.4% (95% CI 155.1% to 278.1%).

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 22.9% (95% CI 11.3% to 41%).

From 1999-2024 on average 86 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 76.3% (95% CI 47.6% to 114.1%).

Over the last five years (2018-2023) the smoothed survey index has increased by 6.3% (95% CI -4.6% to 17.1%), however this change is not statistically significant.

From 1999-2024 on average 94 sites per year contribute to the trend analysis (sites surveyed in two or more years with lesser horseshoe bat recorded in at least one year).

Figure15. Hibernation Survey and Figure 16. Roost Count indices for Lesser horseshoe bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat

Myotis daubentonii

Population trends are calculated for Daubenton's bat for Great Britain, England, Scotland, Wales and also (due to the availability of sufficient data from a comparable survey programme in Northern Ireland) Northern Ireland and the UK.

Photo: Daniel Hargreaves

Distribution and abundance

Daubenton's bat is widespread across England, Wales and Northern Ireland, and much of Scotland.

Range of Daubenton's bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019).

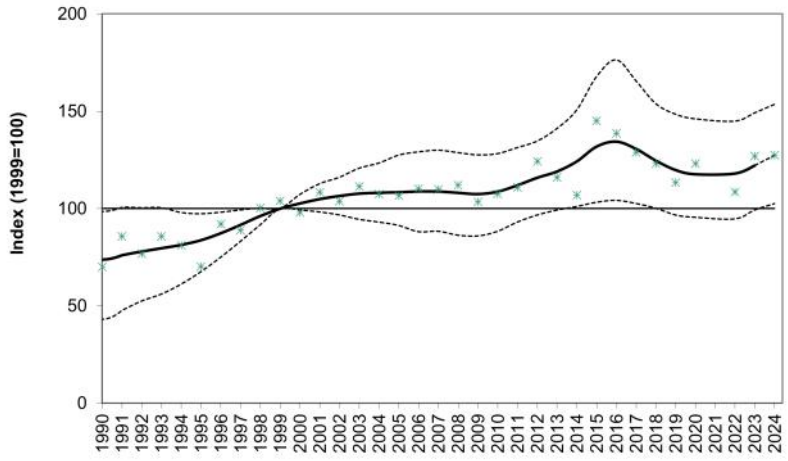
Population estimate

Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	1,030,000 (27,000 – 4,440,000)	682,000 (18,100 – 2,950,000)	108,000 (2,860 – 466,000)	235,000 (6,220 – 1,020,000)	410,000
	Reliability score = 1 (scores >3 most reliable)				
Source	Mathews *et al.* 2018				Russ 1999

Daubenton's bat | GB trends

In Great Britain, the Daubenton's bat Hibernation Survey and Waterway Survey indices show no significant change since the baseline year of monitoring (1999) or over the last five years. **The population of Daubenton's bat in Great Britain is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

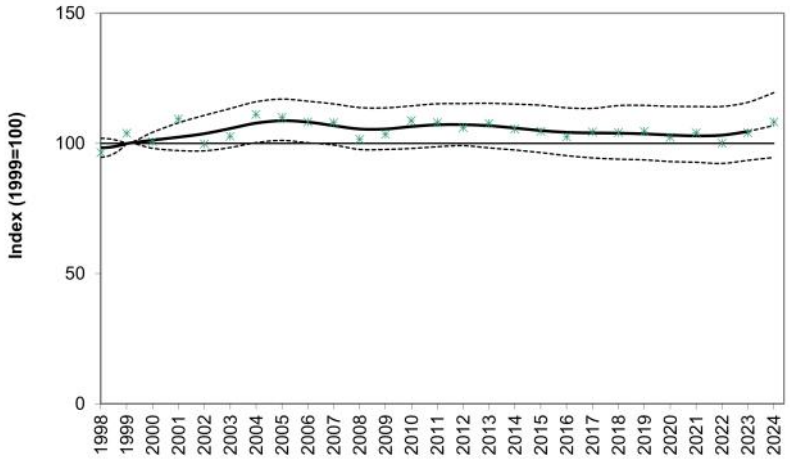


Between 1999 and 2023 the smoothed survey index has increased by 22.2% (95% CI -0.7% to 49.2%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -2% (95% CI -15.7% to 12.7%), however this change is not statistically significant.

From 1999-2024 on average 265 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Waterway Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 4.6% (95% CI -6.5% to 15.8%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 0.6% (95% CI -5.8% to 8.2%), however this change is not statistically significant.

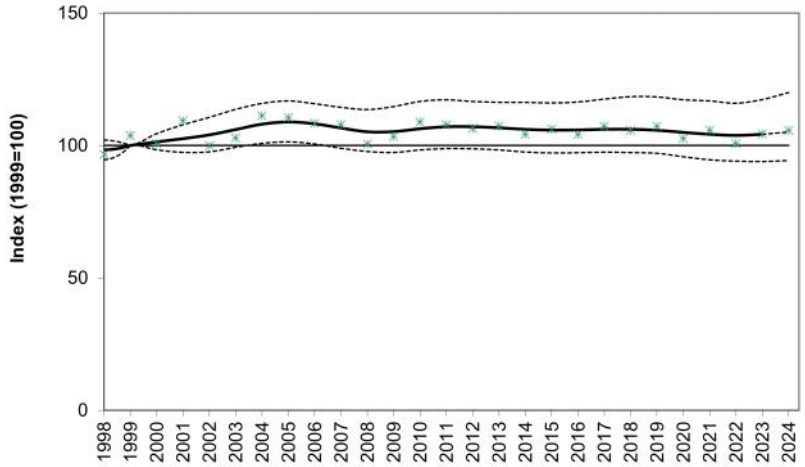
From 1999-2024 on average 244 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Figure 17. Hibernation Survey and Figure 18. Waterway Survey indices for Daubenton's bat in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat | United Kingdom trend ⟷

In the UK, the Daubenton's bat Waterway Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. **The population of Daubenton's bat in the UK is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Waterway Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 4.2% (95% CI -6.1% to 17.4%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -1.8% (95% CI -8.2% to 4.8%), however this change is not statistically significant.

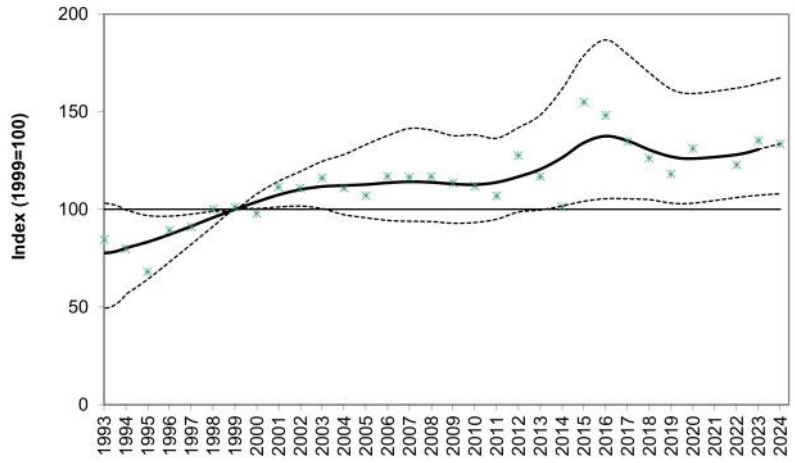
From 1999-2024 on average 263 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Figure 19. Waterway Survey index for Daubenton's bat in the United Kingdom, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat | England trends ⟷

In England the Daubenton's bat Hibernation Survey index has increased significantly since the baseline year of monitoring. Over the same time period the Waterway Survey index shows no significant change. Neither index shows a significant change over the last five years. **The population of Daubenton's bat in England is considered to have been stable in the short-term (since 2018), while there is evidence to suggest that it may have increased in the long-term (since 1999).**

Hibernation Survey **OFFICIAL STATISTIC**

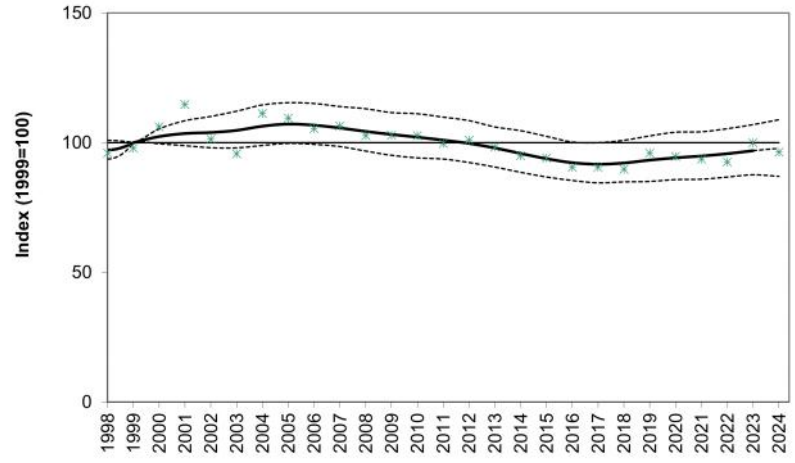


Between 1999 and 2023 the smoothed survey index has increased significantly by 30.7% (95% CI 7.4% to 64.4%).

Over the last five years (2018-2023) the smoothed survey index has increased by 0.1% (95% CI -13% to 14%), however this change is not statistically significant.

From 1999-2024 on average 200 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Waterway Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has decreased by -3.1% (95% CI -12.4% to 6.9%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 5.1% (95% CI -1.4% to 12.7%), however this change is not statistically significant.

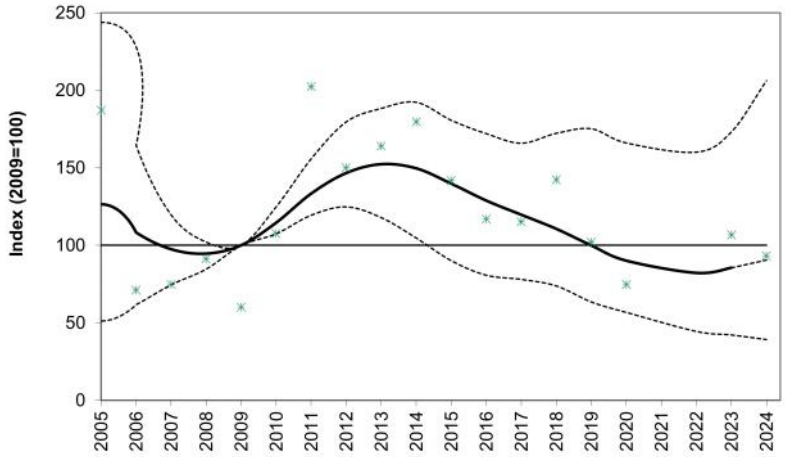
From 1999-2024 on average 200 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Figure 20. Hibernation Survey and Figure 21. Waterway Survey indices for Daubenton's bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat | Scotland trends ⟷

In Scotland, the Daubenton's bat Hibernation Survey and Waterway Survey indices show no significant change since the baseline year of monitoring (1999), although the Hibernation Survey trend should be treated with caution due to a small sample size.. The Waterway Survey shows no significant change over the last five years. Change in the Hibernation Survey index over the last five years was not assessed due to a small sample size. **The population of Daubenton's bat in Scotland is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey

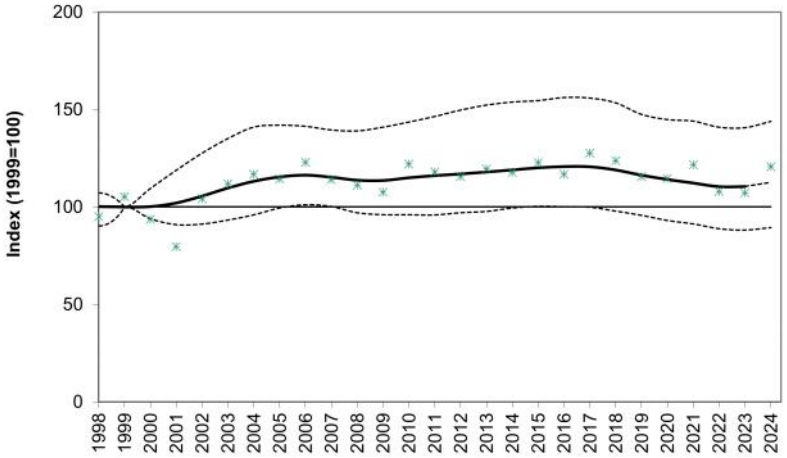


Between 1999 and 2023 the smoothed survey index has decreased by -14.5% (95% CI -57.8% to 73.2%), however this change is not statistically significant.

Change in the Hibernation Survey index over the last five years was not assessed due to a small sample size.

From 1999-2024 on average 12 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Waterway Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 10.5% (95% CI -11.8% to 40.7%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -7.1% (95% CI -19.8% to 7.1%), however this change is not statistically significant.

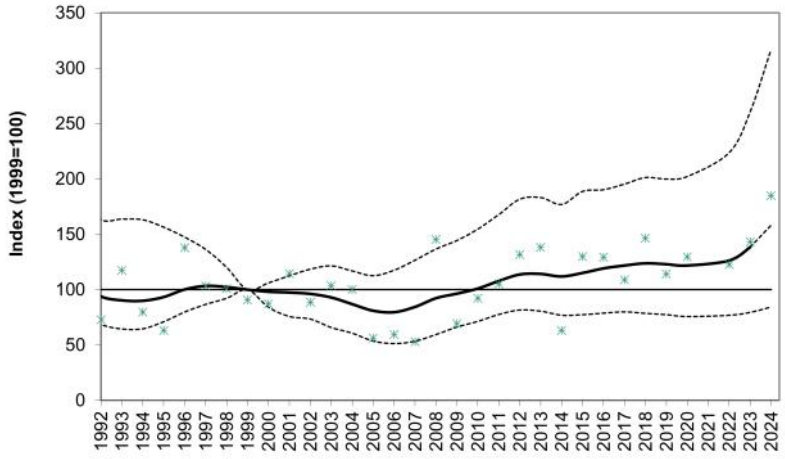
From 1999-2024 on average 32 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Figure 22. Hibernation Survey and Figure 23. Waterway Survey indices for Daubenton's bat in Scotland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat | Wales trends

In Wales, the Daubenton's bat Hibernation Survey index shows no significant change since the baseline year of monitoring (1999). The Waterway Survey index has increased significantly since the baseline year of monitoring (2000), although this trend should be treated with caution due to a small sample size. Neither index shows any significant change over the last five years. **The population of Daubenton's bat in Wales is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

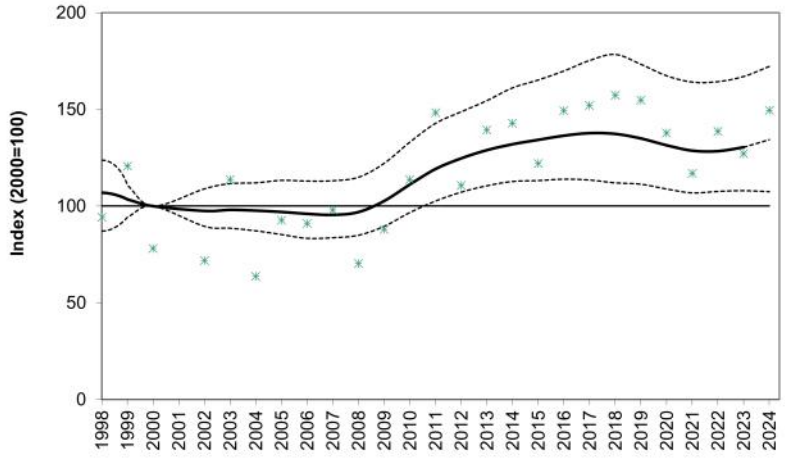


Between 1999 and 2023 the smoothed survey index has increased by 38.4% (95% CI -20.4% to 160.5%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 11.8% (95% CI -10.1% to 45.7%), however this change is not statistically significant.

From 1999-2024 on average 55 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Waterway Survey



Between 2000 and 2023 the smoothed survey index has increased significantly by 30.5% (95% CI 8% to 67%).

Over the last five years (2018-2023) the smoothed survey index has decreased by -5% (95% CI -16.8% to 10.7%), however this change is not statistically significant.

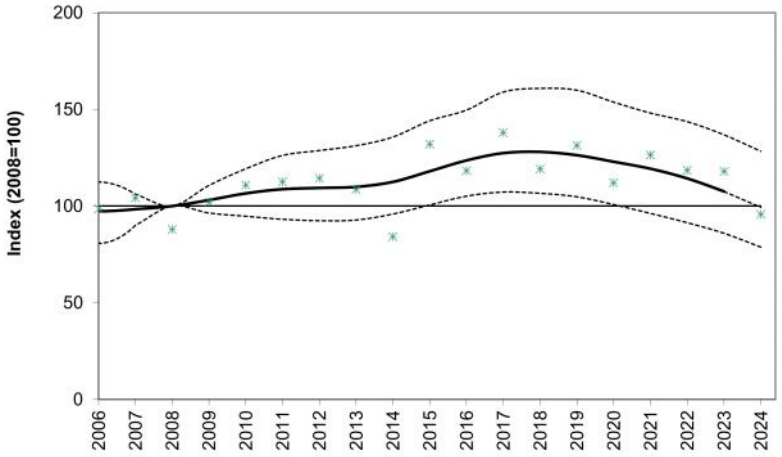
From 2000-2023 on average 13 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Figure 24. Hibernation Survey and Figure 25. Waterway Survey indices for Daubenton's bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Daubenton's bat | Northern Ireland trend ⟺

In Northern Ireland, the Daubenton's bat Waterway Survey index shows no significant change since the baseline year of monitoring (2008). It has declined significantly over the last five years. **The population of Daubenton's bat in Northern Ireland is considered to have been stable in the long-term (since 2008) and to have declined in the short-term (since 2018).**

Waterway Survey **OFFICIAL STATISTIC**



Between 2008 and 2023 the smoothed survey index has increased by 7.6% (95% CI -14% to 36.8%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -16% (95% CI -29.5% to -1.1%).

From 2008-2024 on average 26 sites per year contribute to the trend analysis (sites surveyed in two or more years with Daubenton's bat recorded in at least one year).

Most data are from sites surveyed as part of the All-Ireland Waterway Survey which is run by Bat Conservation Ireland with funding from the National Parks and Wildlife Service of the Department of Housing, Local Government & Heritage and the Northern Ireland

Figure 26. Waterway Survey index for Daubenton's bat in Northern Ireland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Whiskered/Brandt's bat

Myotis mystacinus/brandtii

A combined population trend is produced for these species for Great Britain and at country-level due to the difficulty separating them with confidence in the field. These trends should therefore be interpreted with caution as they include data from two species with differing ecological requirements and potentially differing conservation status. This uncertainty has been compounded by the discovery of Alcathoe bat in the UK in 2010, a third cryptic species in this species group. It is likely under-recorded, but current knowledge suggests that it has a highly localised distribution, restricted to areas of North Yorkshire, Sussex, Surrey, Kent and Wiltshire. Based on current knowledge of this species' distribution, we believe it will be encountered too infrequently during monitoring of whiskered/Brandt's bats to include this species within the whiskered/Brandt's bat combined trend. We will review this as further data become available.

Whiskered bat (Daniel Hargreaves)

Brandt's bat (Daniel Hargreaves)

Distribution and abundance

Whiskered bat is widespread across much of England and Wales. It is patchily distributed across Northern Ireland and in Scotland occurs mainly in the south of the country. Brandt's bat is widespread across much of England and Wales, though it is more common in northern England than in the south. It is rarely found in southern Scotland and thought to be absent in Northern Ireland.

Population estimates

Country	GB	N. Ireland
Whiskered bat numbers	Not available (plausible population ranges not available) Reliability score = 0 (scores >3 most reliable)	24,000
Brandt's bat numbers		Does not occur
Source	Mathews *et al.* 2018	Russ 1999

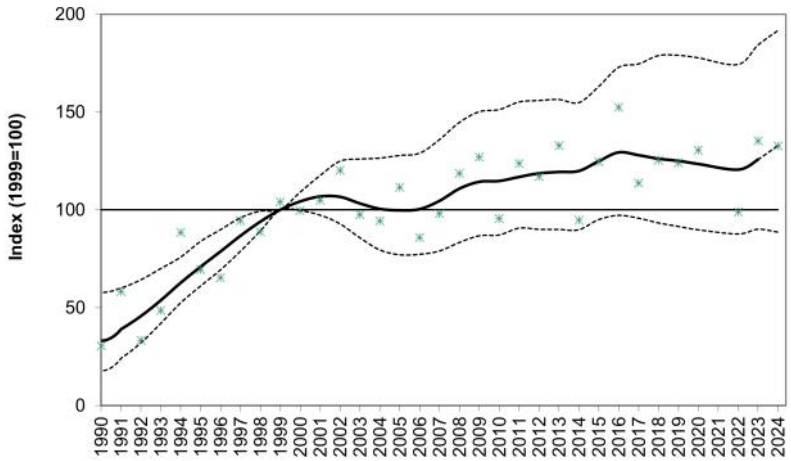
Range of whiskered bat (left) and Brandt's bat (right) in the UK

(Maps taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Whiskered/Brandt's bat | GB trend ⟷

In Great Britain, the whiskered/Brant's bat Hibernation Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. **The combined population of whiskered and Brandt's bat in Great Britain is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 25.7% (95% CI -9.9% to 84.2%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -0.3% (95% CI -10.3% to 11.1%), however this change is not statistically significant.

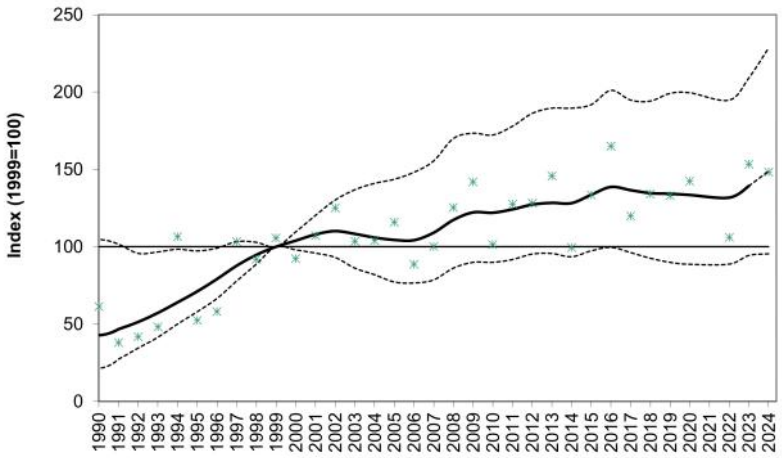
From 1999-2024 on average 160 sites per year contribute to the trend analysis (sites surveyed in two or more years with whiskered/Brandt's bat recorded in at least one year).

Figure 27. Hibernation Survey index for whiskered/Brandt's bat in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Whiskered/Brandt's bat | England trend ⟷

In England, the whiskered/Brant's bat Hibernation Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. **The combined population of whiskered and Brandt's bat in England is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 39.3% (95% CI -5.6% to 109.2%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 3.4% (95% CI -7.5% to 17.6%), however this change is not statistically significant.

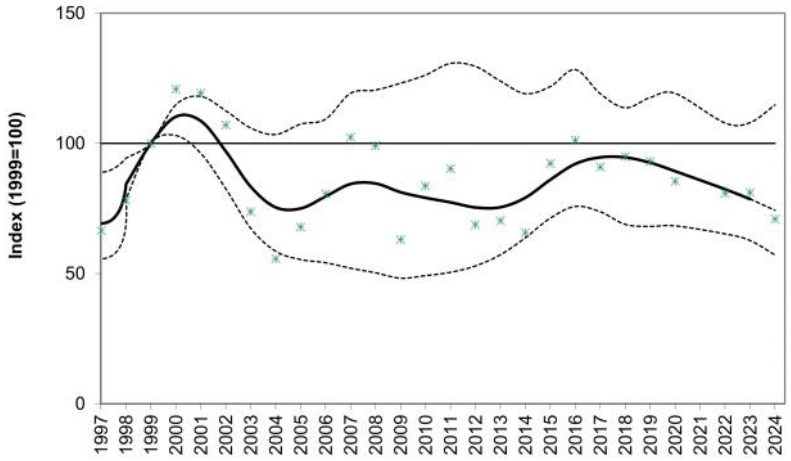
From 1999-2024 on average 109 sites per year contribute to the trend analysis (sites surveyed in two or more years with whiskered/Brandt's bat recorded in at least one year).

Figure 28. Hibernation Survey index for whiskered/Brandt's bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Whiskered/Brandt's bat | Wales trend ⟷

In Wales, the whiskered/Brandt's bat Hibernation Survey index show no significant change since the baseline year of monitoring (1999) or over the last five years. **The combined population of whiskered and Brandt's bat in Wales is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has decreased by -21.4% (95% CI -37.3% to 7.9%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -16.9% (95% CI -34.1% to 8.5%), however this change is not statistically significant.

From 1999-2024 on average 45 sites per year contribute to the trend analysis (sites surveyed in two or more years with whiskered/Brandt's bat recorded in at least one year).

Figure 29. Hibernation Survey index for whiskered/Brandt's bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Natterer's bat

Myotis nattereri

Population trends are calculated for Natterer's bat for Great Britain and at a country-level for England, Scotland and Wales.

Photo: Daniel Hargreaves

Distribution and abundance

Natterer's bat is widespread across England and Wales, with a patchier distribution in Scotland and Northern Ireland.

Range of Natterer's bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019).

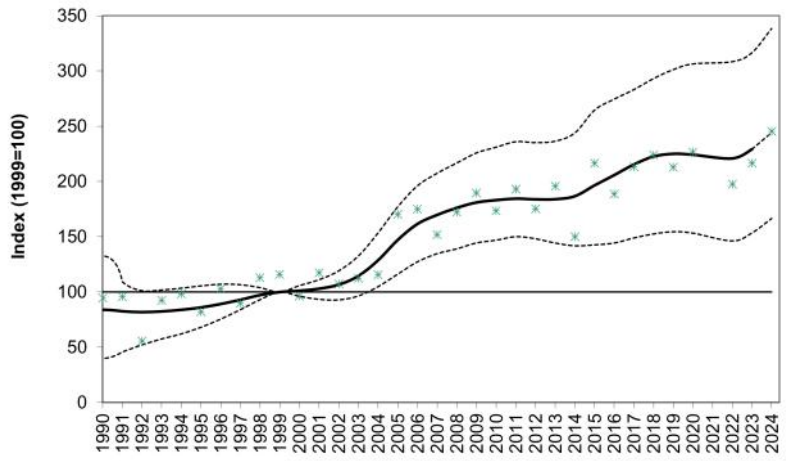
Population estimate

Country	GB	England	Wales	Scotland	N. Ireland
Number (plausible population range in brackets)	414,000 (15,000–2,630,000	321,000 (11,700 – 2,040,000)	52,000 (1,900 – 332,000)	41,000 (1,490 – 260,000)	48,000
	Reliability score = 2 (scores >3 most reliable)				48,000
Source	Mathews *et al.* 2018				Russ 1999

Natterer's bat | GB trends

In Great Britain, the Hibernation Survey index has increased significantly since the baseline year of monitoring (1999), while the Roost Count index shows no significant change since the baseline year (2002). Neither index shows any significant change over the last five years. As the Roost Count index is not considered a reliable measure of Natterer's bat population trends, **the population of Natterer's bat in Great Britain is considered to have increased in the long term (since 1999) and to have been stable in the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

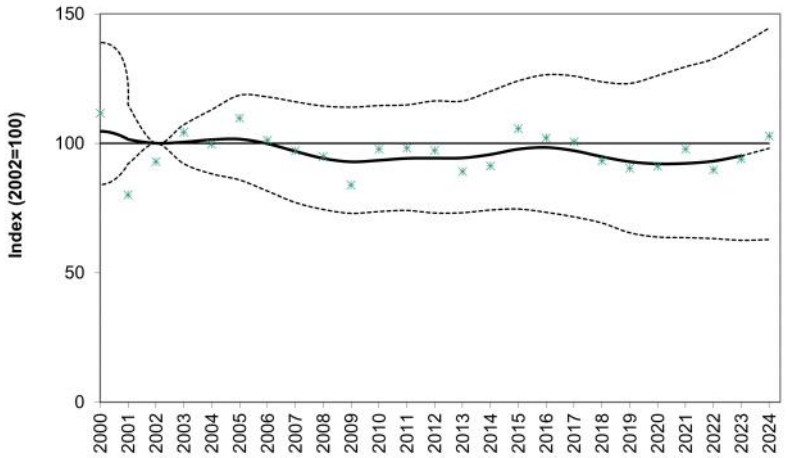


Between 1999 and 2023 the smoothed survey index has increased significantly by 129.2% (95% CI 53.4% to 216.6%).

Over the last five years (2018-2023) the smoothed survey index has increased by 2.9% (95% CI -8.8% to 13.9%), however this change is not statistically significant.

From 1999-2024 on average 308 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year).

Roost Count



Between 2002 and 2023 the smoothed survey index has decreased by -4.9% (95% CI -37.4% to 38.2%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 0.4% (95% CI -19% to 18.5%), however this change is not statistically significant.

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for Natterer's bat.

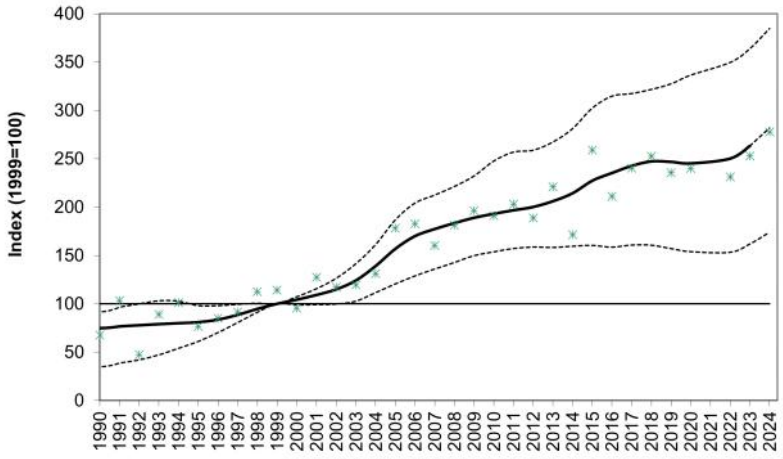
From 2002-2024 on average 37 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year).

Figure 30. Hibernation Survey and Figure 31. Roost Count indices for Natterer's bat in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Natterer's bat | England trends

In England, the Hibernation Survey index has increased significantly since the baseline year of monitoring (1999), while the Roost Count index shows no significant change since the baseline year (2002). Neither index shows any significant change over the last five years. As the Roost Count index is not considered a reliable measure of Natterer's bat population trends, **the population of Natterer's bat in England is considered to have increased in the long term (since 1999) and to have been stable in the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

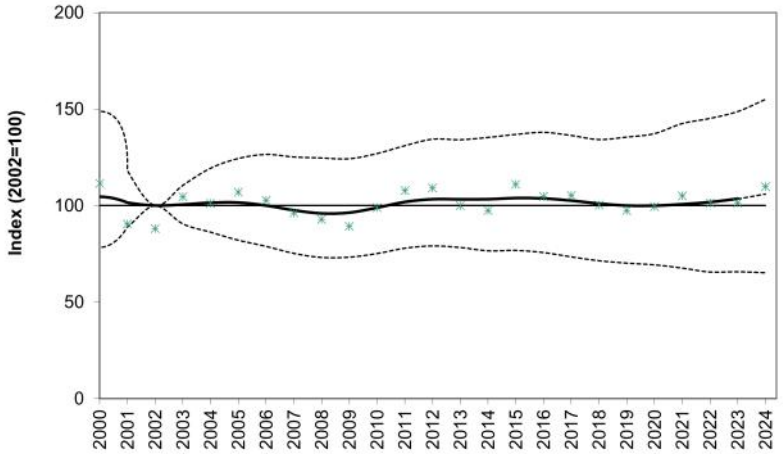


Between 1999 and 2023 the smoothed survey index has increased significantly by 163.2% (95% CI 61.8% to 263.7%).

Over the last five years (2018-2023) the smoothed survey index has increased by 6.5% (95% CI -6.7% to 17.4%), however this change is not statistically significant.

From 1999-2024 on average 228 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year).

Roost Count



Between 2002 and 2023 the smoothed survey index has increased by 3.5% (95% CI -34.2% to 48.7%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 2.5% (95% CI -18.7% to 20.5%), however this change is not statistically significant.

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for Natterer's bat.

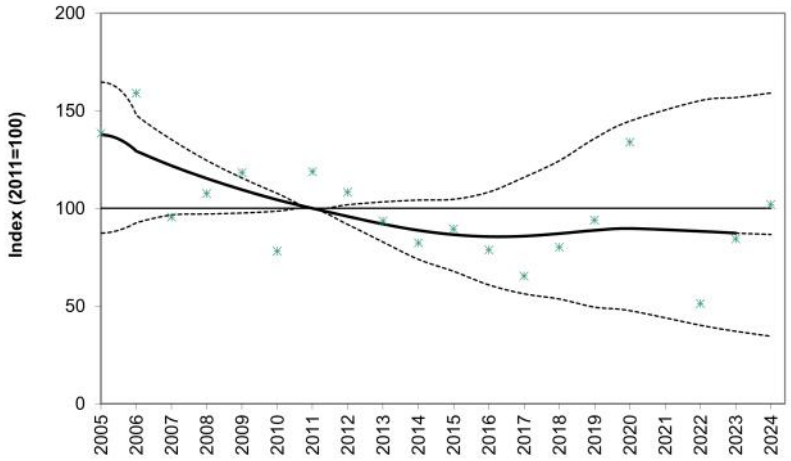
From 2002-2024 on average 33 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year).

Figure 32. Hibernation Survey and Figure 33. Roost Count indices for Natterer's bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Natterer's bat | Scotland trends ⟷

In Scotland, the Hibernation Survey index shows no significant change since the baseline year of monitoring (2011). Change in the Hibernation Survey index over the last five years was not assessed due to a small sample size. **The population of Natterer's bat in Scotland is considered to have been stable in the since 2011, although this assessment should be treated with caution due to a small sample size.**

Hibernation Survey



Between 1999 and 2023 the smoothed survey index has decreased by -12.7% (95% CI -62.9% to 56.8%), however this change is not statistically significant.

Change in the Hibernation Survey index over the last five years was not assessed due to a small sample size.

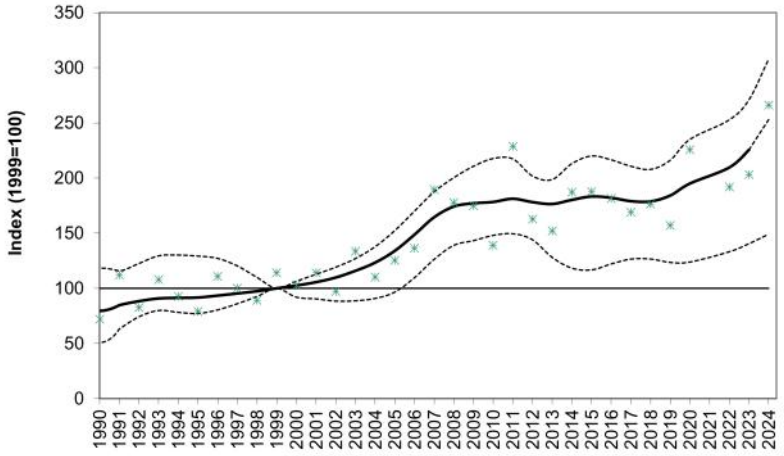
From 1999-2024 on average 12 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year). This trend should be treated with caution due to a small sample size.

Figure 34. Hibernation Survey for Natterer's bat in Scotland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Natterer's bat | Wales trends

In Wales, the Hibernation Survey index has increased significantly since the baseline year of monitoring (1999). The index shows no significant change of the last five years. **The population of Natterer's bat in Wales in considered to have increased in the long-term (since 1999) and to have been stable in the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased significantly by 125.5% (95% CI 40.5% to 170.9%).

Over the last five years (2018-2023) the smoothed survey index has increased by 26.1% (95% CI -6.7% to 41.1%), however this change is not statistically significant.

From 1999-2024 on average 69 sites per year contribute to the trend analysis (sites surveyed in two or more years with Natterer's bat recorded in at least one year).

Figure 35. Hibernation Survey for Natterer's bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Common pipistrelle

Pipistrellus pipistrellus

Survey indices for common pipistrelle are produced for Great Britain, and at country level for England, Scotland and Wales (for Wales only a Roost Count trend is available, which is not considered a reliable measure of population change for this species). For Northern Ireland the sample sizes from the Field Survey and Roost Count are not large enough to produce statistically robust trends.

Photo: Daniel Hargreaves

Distribution and abundance

Common pipistrelle is widespread across the UK.

Range of common pipistrelle in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

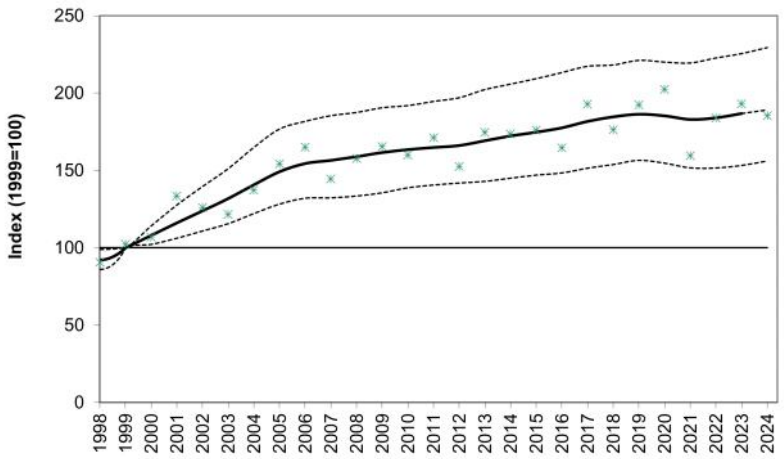
Population estimate

Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	3,040,000 (991,000–7,510,000)	1,870,000 (609,000 – 4,620,000)	297,000 (96,600 – 732,000)	875,000 (285,000 – 2,160,000)	1,150,000
	Reliability score = 2 (scores >3 most reliable)				Russ 1999
Source	Mathews *et al. 2018*				

Common pipistrelle | GB trends

In Great Britain, the common pipistrelle Field Survey trend has increased significantly since the baseline year of monitoring (1999). The index shows no significant change over the last five years. The Roost Count index is not considered a reliable measure of population change for common pipistrelle. **The population of common pipistrelle in Great Britain is considered to have increased in the long-term (since 1999) and to have been stable in the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**

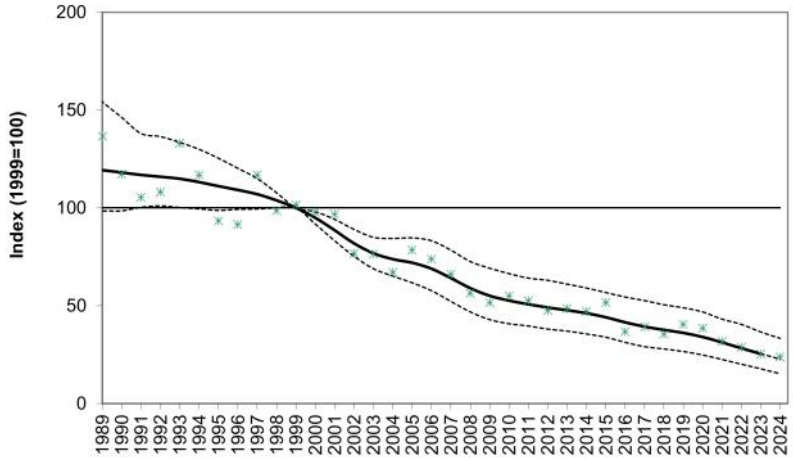


Between 1999 and 2023 the smoothed survey index has increased significantly by 86.8% (95% CI 53.2% to 125.5%).

Over the last five years (2018-2023) the smoothed survey index has increased by 1.2% (95% CI -5.9% to 9.4%), however this change is not statistically significant.

From 1999-2024 on average 170 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -74.6% (95% CI -82.2% to -63.4%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -32.5% (95% CI -45.3% to -20.1%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for common pipistrelle.

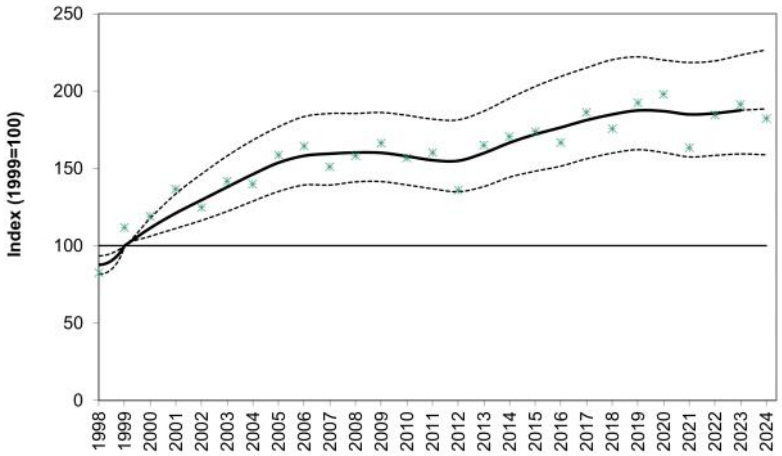
From 1999-2024 on average 185 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Figure 36. Field Survey and Figure 37. Roost Count indices for common pipistrelle in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Common pipistrelle | England trends

In England, the common pipistrelle Field Survey trend has increased significantly since the baseline year of monitoring (1999). The index shows no significant change over the last five years. The Roost Count index is not considered a reliable measure of population change for common pipistrelle. **The population of common pipistrelle in England is considered to have increased in the long-term (since 1999) and to have been stable in the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**

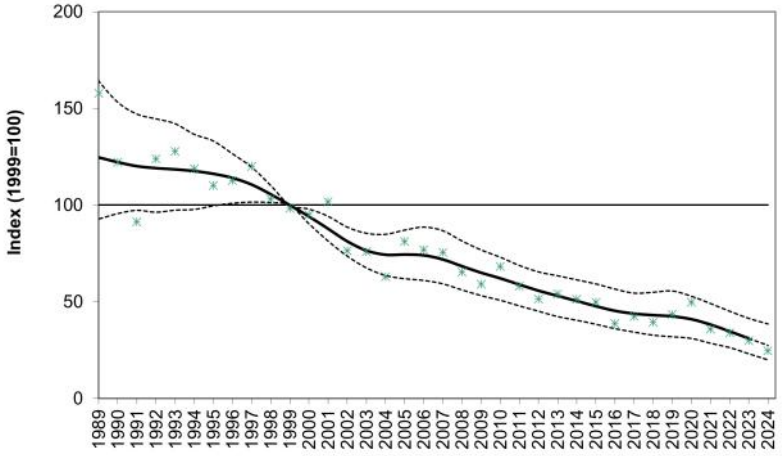


Between 1999 and 2023 the smoothed survey index has increased significantly by 87.6% (95% CI 59.4% to 123.3%).

Over the last five years (2018-2023) the smoothed survey index has increased by 1.4% (95% CI -6.3% to 9.5%), however this change is not statistically significant.

From 1999-2024 on average 147 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -69% (95% CI -76.9% to -58.5%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -28% (95% CI -41.4% to -11.6%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for common pipistrelle.

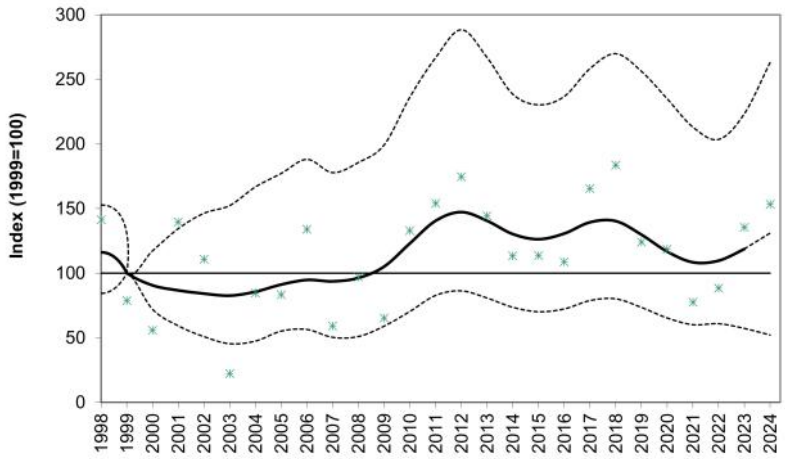
From 1999-2024 on average 147 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Figure 38. Field Survey and Figure 39. Roost Count indices for common pipistrelle in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Common pipistrelle | Scotland trends ⟷

In Scotland, the common pipistrelle Field Survey trend shows no significant change since the baseline year of monitoring (1999) or over the last five years. The Roost Count index is not considered a reliable measure of population change for common pipistrelle. **The population of common pipistrelle in Scotland is considered to have been stable in the long-term (since 1999) and the short-term (since 2018), although this assessment should be treated with caution due to a small sample size.**

Field Survey

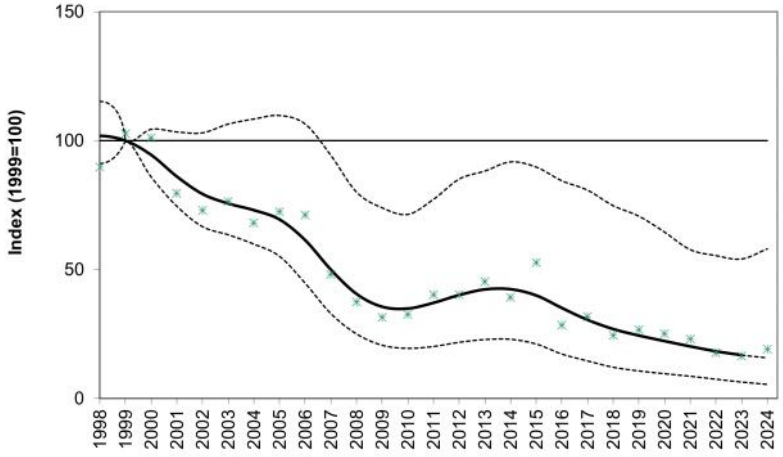


Between 1999 and 2023 the smoothed survey index has increased by 18.8% (95% CI -42.7% to 123.4%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -15.4% (95% CI -49.5% to 22.5%), however this change is not statistically significant.

From 1999-2024 on average 16 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -83.2% (95% CI -93.6% to -45.9%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -37.5% (95% CI -63% to -5%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for common pipistrelle.

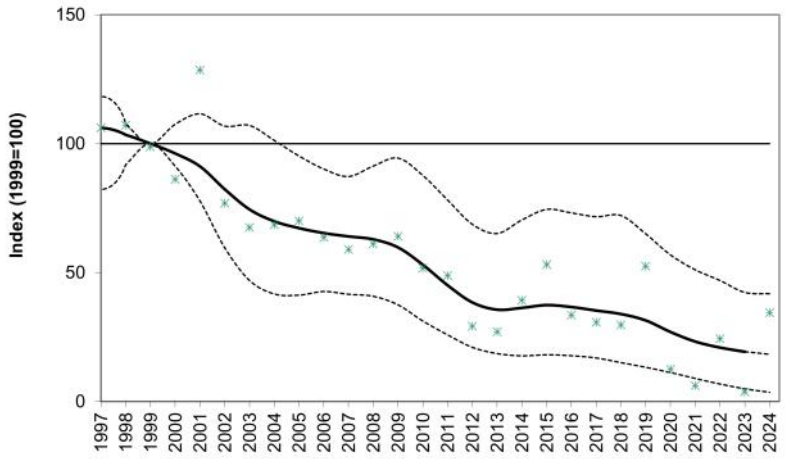
From 1999-2024 on average 24 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Figure 40. Field Survey and Figure 41. Roost Count indices for common pipistrelle in Scotland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Common pipistrelle | Wales trend

In Wales the common Roost Count index has declined significantly since the baseline year of monitoring (1999) and over the last five years. However the Roost Count index is not considered a reliable measure of population change for common pipistrelle, so **we are not able to assess the population status of common pipistrelle in Wales**.

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -80.7% (95% CI -95.1% to -57.7%).

Over the last five years (2018-2023) the smoothed survey index has decreased by -43.1% (95% CI -81.6% to 2.6%), however this change is not statistically significant.

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity,* p.20). This trend is not therefore considered a reliable measure of population change for common pipistrelle.

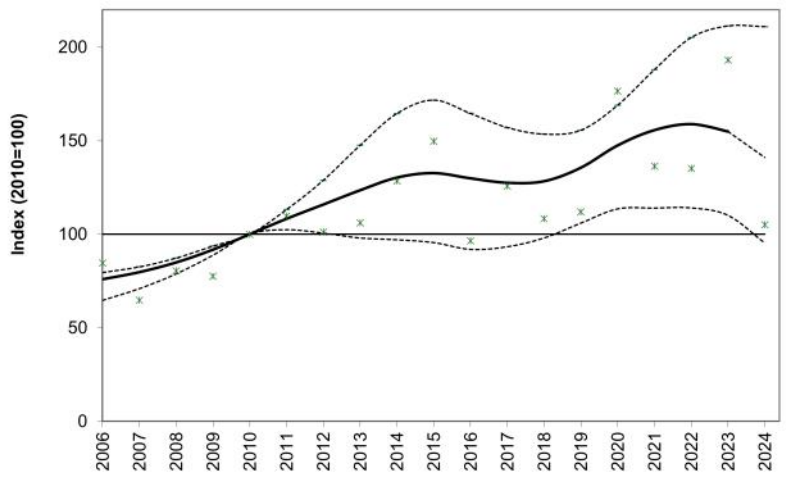
From 1999-2024 on average 14 sites per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Figure 42. Roost Count index for common pipistrelle in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Common pipistrelle | Northern Ireland trend

In Northern Ireland, Bat Conservation Ireland's common pipistrelle Car Survey index has increased significantly since the baseline year of monitoring (2010). A short-term five-year trend is not produced. **The population of common pipistrelle in Northern Ireland is considered to have increased in the long-term (since 2010).**

Car Survey



Between 2010 and 2023 the smoothed survey index has increased significantly by 54.8% (95% CI 10.1% to 111.3%).

From 1999-2024 on average 4.7 transects per year contribute to the trend analysis (sites surveyed in two or more years with common pipistrelle recorded in at least one year).

Figure 43. Car Survey index for common pipistrelle in Northern Ireland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

These results are from the Car-based Bat Monitoring scheme run by Bat Conservation Ireland and funded by the National Parks and Wildlife Service of the Department of Housing, Local Government & Heritage and the Northern Ireland Environment Agency. For the full report see: www.batconservationireland.org/what-we-do/publications

Soprano pipistrelle

Pipistrellus pygmaeus

Survey indices for soprano pipistrelle are produced for Great Britain, and at country level for England, Scotland and Wales (for Wales only a Roost Count trend is available, which is not considered a reliable measure of population change for this species). For Northern Ireland the sample sizes for both the Field Survey and Roost Count are not high enough to enable the production of statistically robust trends.

Photo: Daniel Hargreaves

Distribution and abundance

Soprano pipistrelle is widespread across the UK.

Range of soprano pipistrelle in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

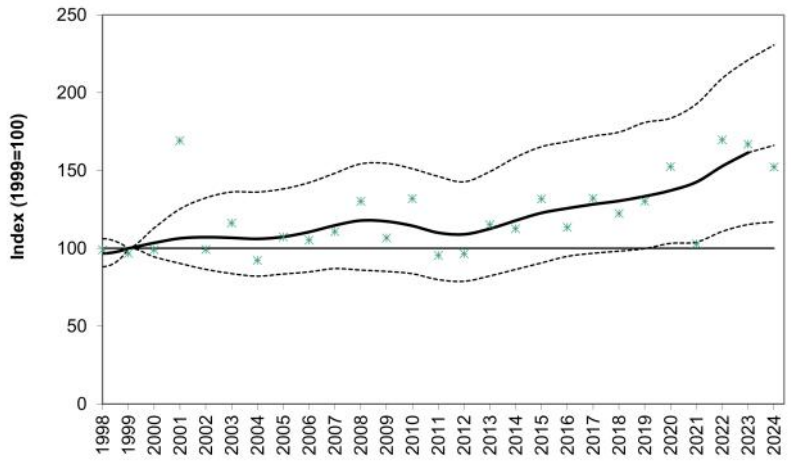
Population estimate

Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	4,670,000 (1,970,000–8,400,000)	2,980,000 (1,260,000 – 5,360,000)	478,000 (202,000 – 862,000)	1,210,000 (512,000 – 2,180,000)	580,000
	Reliability score = 2 (scores >3 most reliable)				Russ 1999
Source	Mathews *et al. 2018*				

Soprano pipistrelle | GB trends

In Great Britain, the soprano pipistrelle Field Survey trend has increased significantly since the baseline year of monitoring (1999). Over the last five years the index shows no significant change. The Roost Count index is not considered a reliable measure of population change for soprano pipistrelle. **The population of soprano pipistrelle in Great Britain is considered to have increased in the long-term (since 1999) and to have been stable in the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**

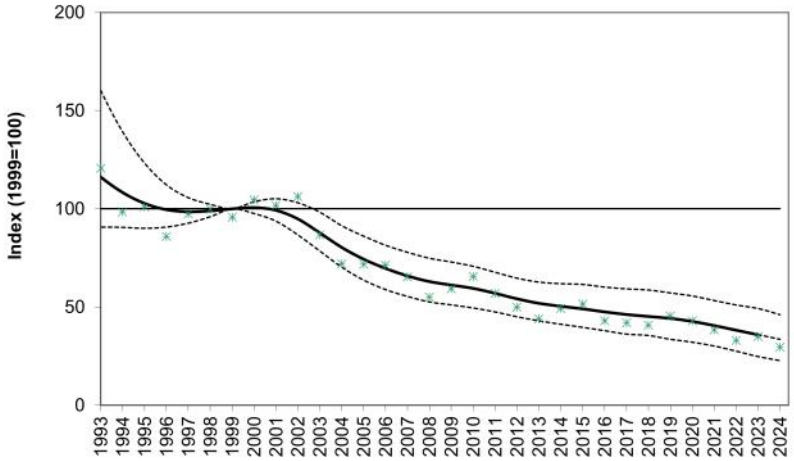


Between 1999 and 2023 the smoothed survey index has increased significantly by 61.5% (95% CI 15.4% to 121.1%).

Over the last five years (2018-2023) the smoothed survey index has increased by 23.8% (95% CI -4.5% to 56%), however this change is not statistically significant.

From 1999-2024 on average 170 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -64.1% (95% CI -75.2% to -50.7%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -20.6% (95% CI -34.9% to -9.6%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for soprano pipistrelle.

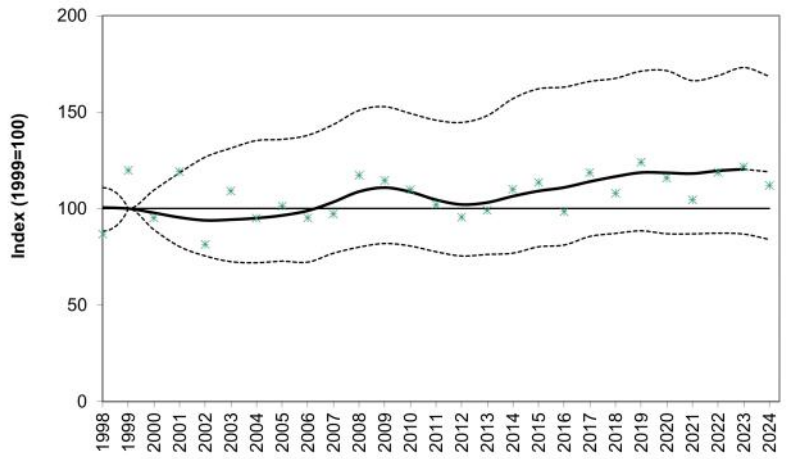
From 1999-2024 on average 136 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 44. Field Survey and Figure 45. Roost Count indices for soprano pipistrelle in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Soprano pipistrelle | England trends ⟷

In England, the soprano pipistrelle Field Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. The Roost Count index is not considered a reliable measure of population change for soprano pipistrelle. **The population of soprano pipistrelle in England in considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**

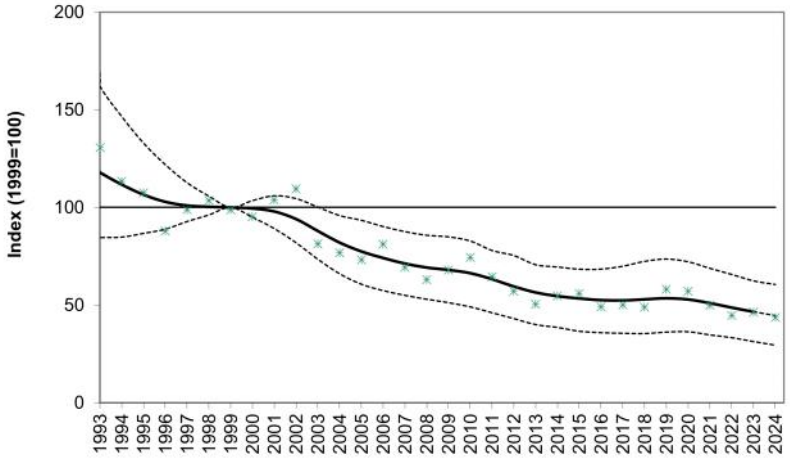


Between 1999 and 2023 the smoothed survey index has increased by 20.3% (95% CI -13.1% to 73.1%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 3.2% (95% CI -13.3% to 18.5%), however this change is not statistically significant.

From 1999-2024 on average 147 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -53.4% (95% CI -68.7% to -37.6%).

Over the last five years (2018-2023) the smoothed survey index has decreased by -12% (95% CI -28.2% to 0.1%), however this change is not statistically significant.

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for soprano pipistrelle.

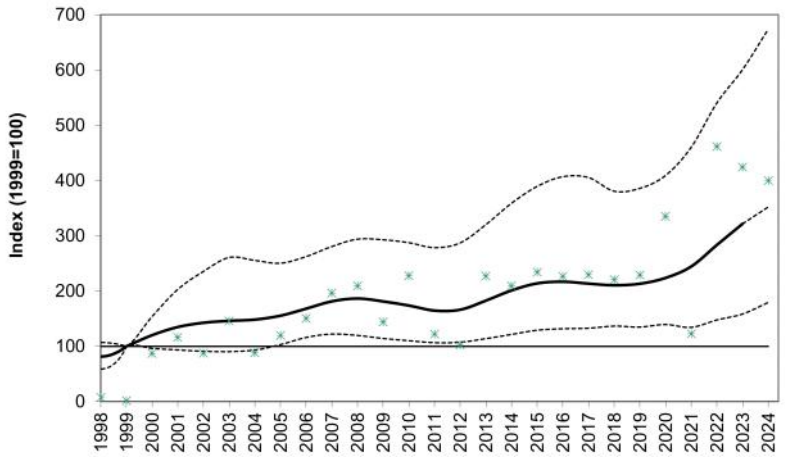
From 1999-2024 on average 88 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 46. Field Survey and Figure 47. Roost Count indices for soprano pipistrelle in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Soprano pipistrelle | Scotland trends

In Scotland, the soprano pipistrelle Field Survey trend has increased significantly since the baseline year of monitoring (1999). Over the last five years the index shows no significant change. The Roost Count index is not considered a reliable measure of population change for soprano pipistrelle. **The population of soprano pipistrelle in Scotland is considered to have increased in the long-term (since 1999) and to have been stable in the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**

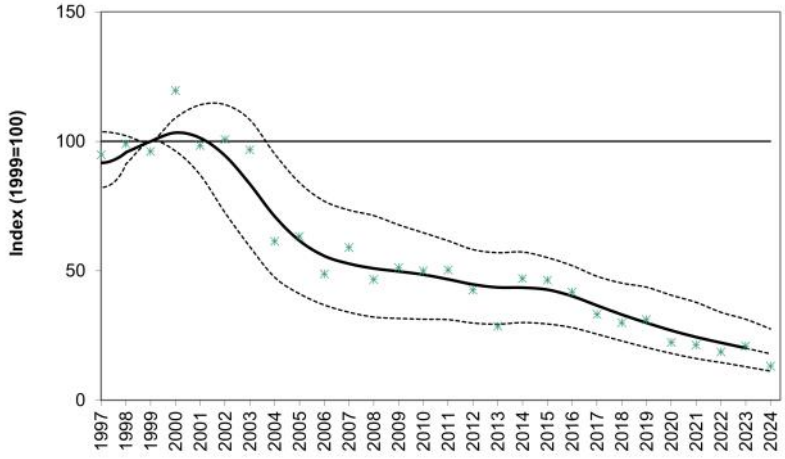


Between 1999 and 2023 the smoothed survey index has increased significantly by 221.6% (95% CI 58.2% to 500.6%).

Over the last five years (2018-2023) the smoothed survey index has increased by 52.9% (95% CI -14.4% to 153.4%), however this change is not statistically significant.

From 1999-2024 on average 16 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -79.9% (95% CI -87.1% to -68.7%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -39.1% (95% CI -53.9% to -19.2%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity*, p.20). This trend is not therefore considered a reliable measure of population change for soprano pipistrelle.

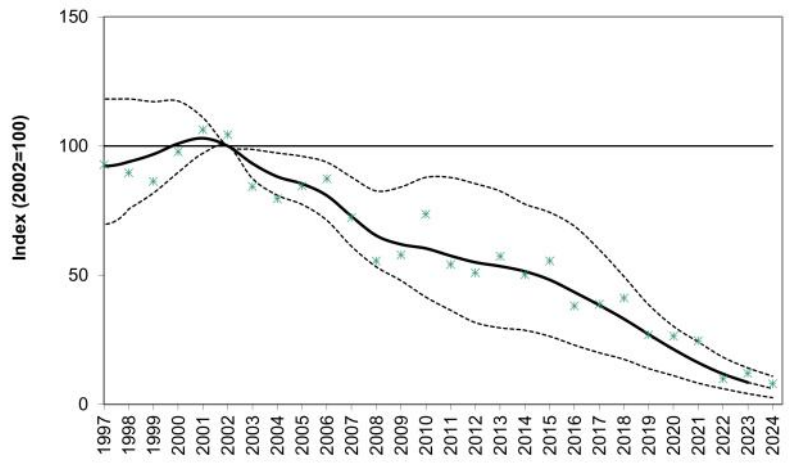
From 1999-2024 on average 29 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 48. Field Survey and Figure 49. Roost Count indices for soprano pipistrelle in Scotland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Soprano pipistrelle | Wales trend

In Wales the soprano pipistrelle Roost Count index has declined significantly since the baseline year of monitoring (1999) and over the last five years. However, the Roost Count index is not considered a reliable measure of population change for soprano pipistrelle, so **we are not able to assess the population status of soprano pipistrelle in Wales**.

Roost Count



Between 1999 and 2023 the smoothed survey index has decreased significantly by -91.5% (95% CI -95.8% to -85.9%).

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -74.3% (95% CI -88.9% to -58.5%).

It is likely that this species' frequent roost switching results in a negative bias in the Roost Count trend (see *Roost fidelity,* p.20). This trend is not therefore considered a reliable measure of population change for soprano pipistrelle.

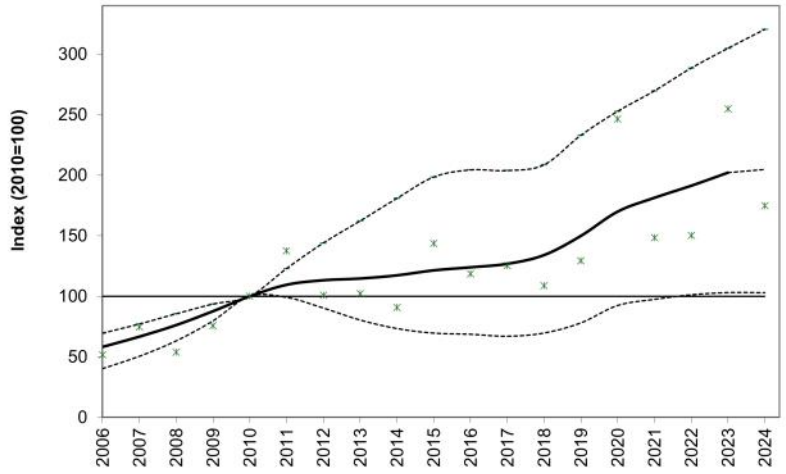
From 2002-2024 on average 18 sites per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 50. Roost Count index for soprano pipistrelle in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Soprano pipistrelle | Northern Ireland trend

In Northern Ireland Bat Conservation Ireland's soprano pipistrelle Car Survey index has increased significantly since the baseline year of monitoring (2010). A short-term five-year trend is not produced. **The population of soprano pipistrelle in Northern Ireland is considered to have increased in the long-term (since 2010).**

Car Survey



Between 2010 and 2023 the smoothed survey index has increased significantly by 102.2% (95% CI 3.0% to 205%).

From 1999-2024 on average 4.7 transects per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 51. Car Survey index for soprano pipistrelle in Northern Ireland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

These results are from the Car-based Bat Monitoring scheme run by Bat Conservation Ireland and funded by the National Parks and Wildlife Service of the Department of Housing, Local Government & Heritage and the Northern Ireland Environment Agency. For the full report see: www.batconservationireland.org/what-we-do/publications

Serotine

Eptesicus serotinus

Survey indices for serotine are produced for Great Britain, and at a country level for England. Serotine is only rarely recorded in Wales, therefore there are insufficient data to calculate a population trend for that country. This species does not occur in Scotland or Northern Ireland.

Photo: Daniel Hargreaves

Distribution and abundance

Serotine occurs across southern England and parts of Wales. It is absent from Scotland and Northern Ireland.

Range of serotine in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

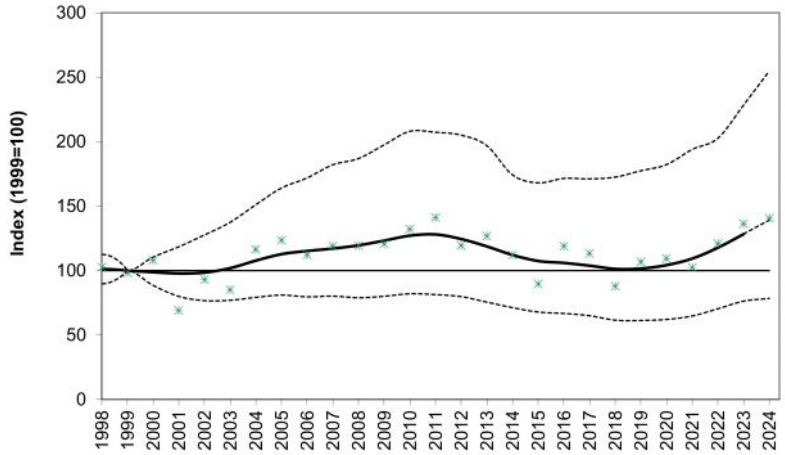
Population estimate

Country	GB	N.Ireland
Number (plausible population range in brackets)	136,000 (7,300–413,000). Reliability score = 3 (scores >3 most reliable)	does not occur
Source	Mathews *et al. 2018*	

Serotine | UK/GB trends

In Great Britain, the serotine Field Survey and Roost Count indices show no significant change since the baseline year of monitoring (1999). Over the last five years the Field Survey index has increased and the Roost Count index shows no significant change. **The population of serotine in Great Britain is considered to have been stable in the long-term (since 1999), while there is evidence to suggest it has increased in the short term (since 2018).** However, this finding should be treated with caution as serotine is encountered relatively infrequently during surveys. Therefore, the level of uncertainty associated with these trends is large, making trends for this species more difficult to detect. Serotine is not known to occur in Northern Ireland and therefore the GB trends are in effect UK trends.

Field Survey **OFFICIAL STATISTIC**



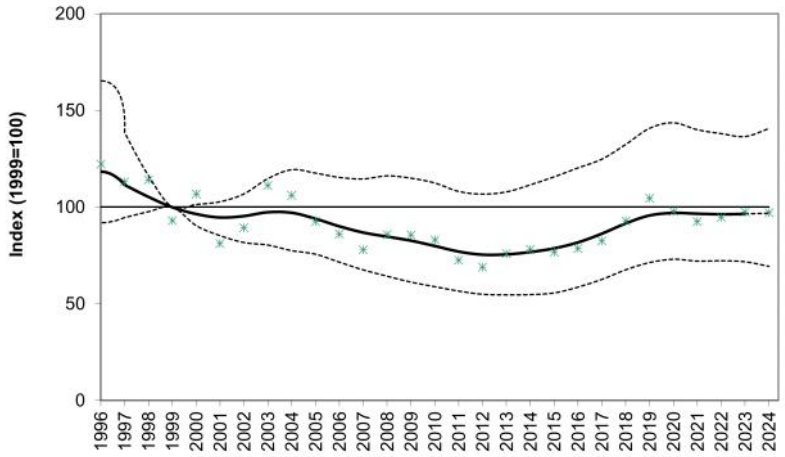
Between 1999 and 2023 the smoothed survey index has increased by 28.4% (95% CI -23.7% to 128.3%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 26.6% (95% CI 2.8% to 60.3%).

From 1999-2024 on average 125 sites per year contribute to the trend analysis (sites surveyed in two or more years with serotine recorded in at least one year).

Note: As serotine is restricted to southern parts of GB no geographic weighting has been applied to this analysis.

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has decreased by -3.5% (95% CI -28.3% to 36.5%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 5.3% (95% CI -12.8% to 27.3%), however this change is not statistically significant.

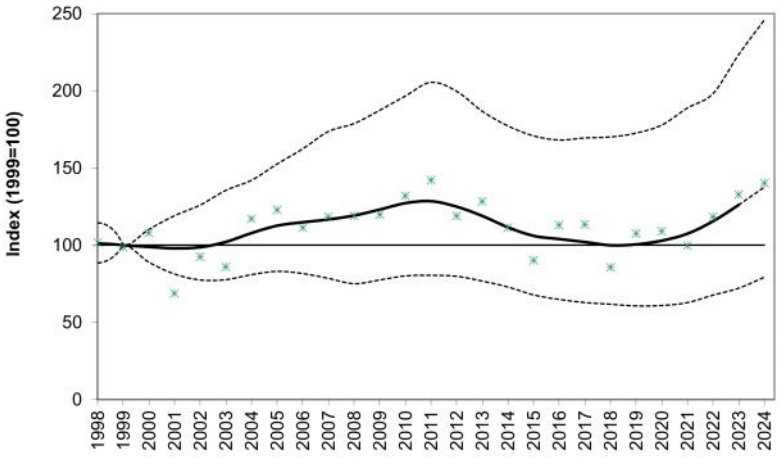
From 1999-2024 on average 36 sites per year contribute to the trend analysis (sites surveyed in two or more years with serotine recorded in at least one year).

Figure 52. Field Survey and Figure 53. Roost Count indices for serotine in the UK/Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Serotine | England trends ⟷

In England, the serotine Field Survey and Roost Count indices show no significant change since the baseline year of monitoring (1999). Over the last five years the Field Survey index has increased, although this change is only just significant, and the Roost Count index shows no significant change. **The population of serotine in England is considered to have been stable in the long-term (since 1999), while there is evidence to suggest it has increased in the short term (since 2018).** However, this finding should be treated with caution as serotine is encountered relatively infrequently during surveys resulting in increased variability in the data. Therefore, the level of uncertainty associated with these trends is large, making trends for this species more difficult to detect.

Field Survey **OFFICIAL STATISTIC**

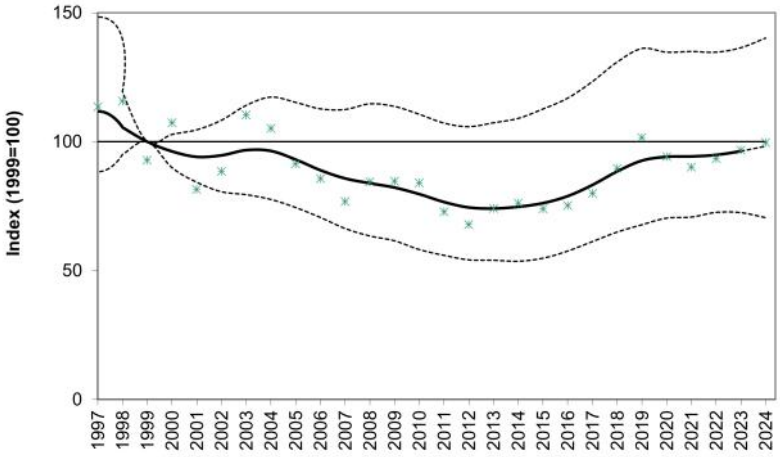


Between 1999 and 2023 the smoothed survey index has increased by 26.1% (95% CI -27.8% to 123.5%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased significantly by 26.2% (95% CI 0.4% to 57.9%).

From 1999-2024 on average 118 sites per year contribute to the trend analysis (sites surveyed in two or more years with serotine recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has decreased by -3.7% (95% CI -27.5% to 36.4%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 8.8% (95% CI -13.5% to 35.1%), however this change is not statistically significant.

From 1999-2024 on average 35 sites per year contribute to the trend analysis (sites surveyed in two or more years with serotine recorded in at least one year).

Fig 54. Field Survey and Fig 55. Roost Count indices for serotine in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Noctule

Nyctalus noctula

Survey indices for noctule are produced for Great Britain and at a country level for England. There are insufficient data to calculate population trends for this species in Wales, and it is only rarely encountered in Scotland. It is not found in Northern Ireland.

Photo: Ross Baker

Distribution and abundance

Noctule occurs across England, Wales and southern Scotland. It is absent from Northern Ireland.

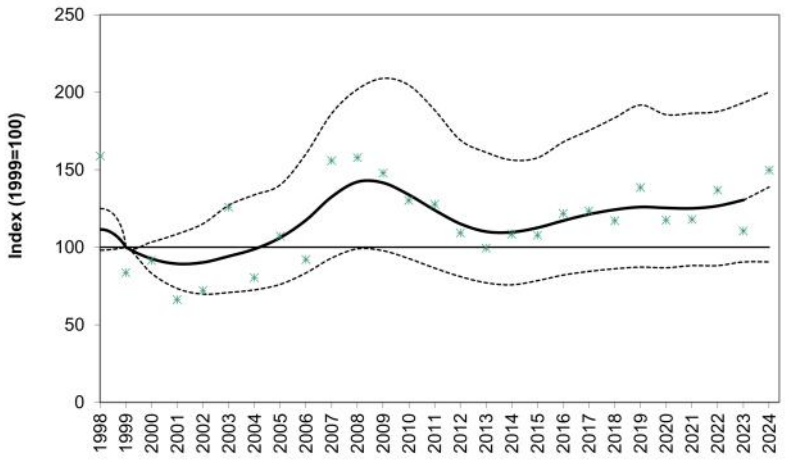
Range of noctule in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Population estimate

Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	Not assessed	565,000 (17,700 – 1,872,000)	91,900 (2,880 –304,000)	Not assessed	Does not occur
	Reliability score = 0 (scores >3 most reliable)				
Source	Mathews *et al.* 2018				

Noctule | UK/GB trend ⟷

In Great Britain, the noctule Field Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. **The population of noctule in Great Britain is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).** Noctule is not known to occur in Northern Ireland and therefore the GB trend is in effect a UK trend.



Between 1999 and 2023 the smoothed survey index has increased by 30.5% (95% CI -9.5% to 93.4%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 5% (95% CI -10.3% to 22.5%), however this change is not statistically significant.

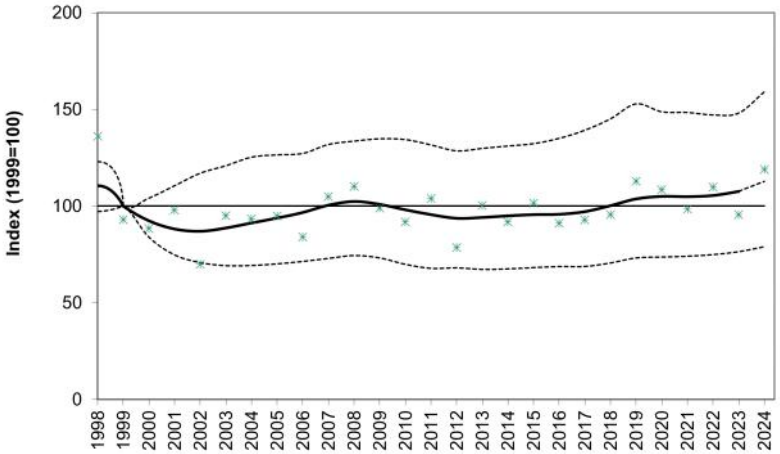
From 1999-2024 on average 167 sites per year contribute to the trend analysis (sites surveyed in two or more years with noctule recorded in at least one year).

Figure 56. Field Survey index for noctule in the UK/Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Noctule | England trend ⟷

In England, the noctule Field Survey index shows no significant change since the baseline year of monitoring (1999) or over the last five years. **The population of noctule in England is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Field Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has increased by 7.6% (95% CI -23.6% to 48.1%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 7.3% (95% CI -9.2% to 23.4%), however this change is not statistically significant.

From 1999-2024 on average 145 sites per year contribute to the trend analysis (sites surveyed in two or more years with noctule recorded in at least one

Figure 57. Field Survey index for noctule in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Leisler’s bat

Nyctalus leisleri

This species is uncommon but widespread throughout England, Wales and Scotland. It is more abundant in Northern Ireland, as Ireland is a stronghold for the species. It is a mobile species and individuals move between roosts regularly; it is primarily a woodland species, but will also use buildings for roosting, although few building roosts are known.

Bat Conservation Ireland produce a Leisler’s bat trend for Northern Ireland from Car Survey data. BCT introduced a modification of the Field Survey for Northern Ireland in 2008 to allow for monitoring of Leisler's bats. Five sites in Northern Ireland have been surveyed using this modified methodology to date. A larger sample size is required before these data can be used to calculate species population trends. The British Bat Survey (see page 84) has potential for delivering GB monitoring data for this species in future.

Photo: Robert Stebbings

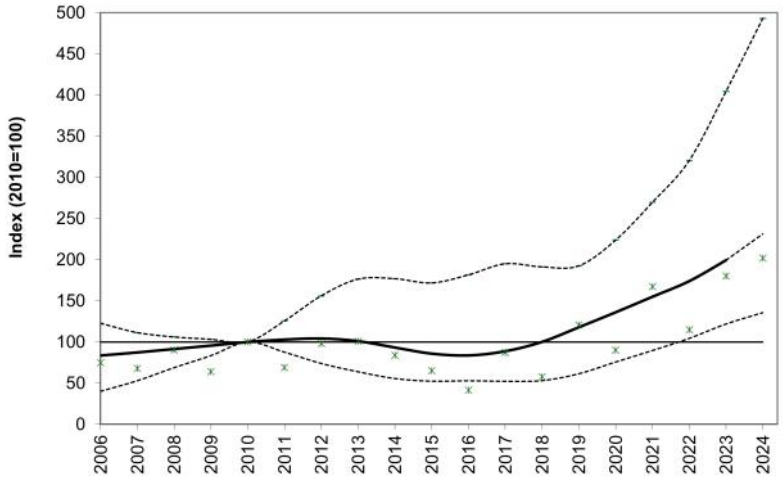
Population estimate:
Numbers unknown for Great Britain and Northern Ireland.

Range of Leisler’s bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Leisler's bat | Northern Ireland trend

In Northern Ireland Bat Conservation Ireland's Leisler's bat Car Survey index has increased significantly since the baseline year of monitoring (2010). A short-term five-year trend is not produced. **The population of Leisler's bat in Northern Ireland is considered to have increased in the long-term (since 2010).**

Car Survey



Between 2010 and 2023 the smoothed survey index has increased significantly by 99.3% (95% CI 21.9% to 304.4%).

From 2006-2024 on average 4.7 transects per year contribute to the trend analysis (sites surveyed in two or more years with soprano pipistrelle recorded in at least one year).

Figure 58. Car Survey index for Leisler's bat in Northern Ireland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

These results are from the Car-based Bat Monitoring scheme run by Bat Conservation Ireland and funded by the National Parks and Wildlife Service of the Department of Housing, Local Government & Heritage and the Northern Ireland Environment Agency. For the full report see: www.batconservationireland.org/what-we-do/publications

Brown long-eared bat

Plecotus auritus

Survey indices for brown long-eared bat are produced for Great Britain and at a country level for England, Scotland and Wales. This species is also recorded by the Roost Count in Northern Ireland but the sample size is not large enough to produce a statistically robust trend.

Photo: Daniel Hargreaves

Distribution and abundance

Brown long-eared bat occurs across most of the UK.

Population estimate

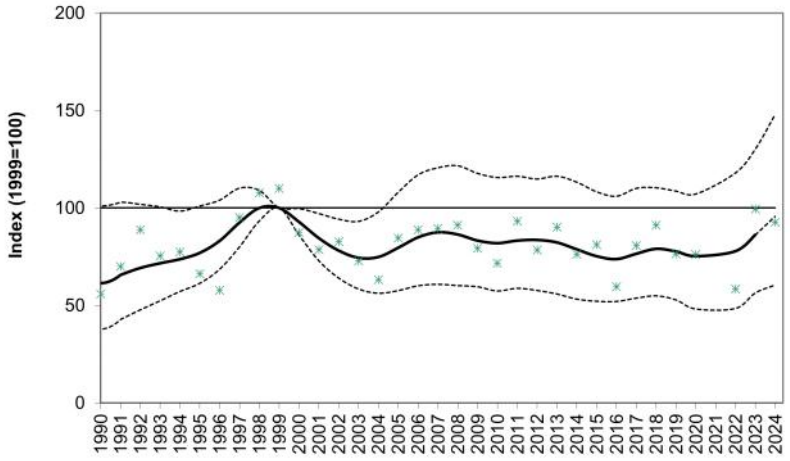
Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	934,000 (52,000–2,200,000)	607,000 (33,700 – 1,430,000)	96,600 (5,370 – 228,000)	230,000 (12,800 – 543,000)	45,000
	Reliability score = 2 (scores >3 most reliable)				
Source	Mathews *et al. 2018*				Russ 1999

Range of brown long-eared bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Brown long-eared bat | GB trends

In Great Britain, the brown long-eared bat Hibernation Survey and Roost Count indices show no significant change since the baseline year of monitoring (1999 for the Hibernation Survey, 2001 for the Roost Count). Over the last five years, the Hibernation Survey index shows no significant change, however the Roost Count index has declined significantly. **The population of brown long-eared bat in Great Britain is considered to have been stable in the long-term (since 1999), while there is evidence to suggest the population may have declined in the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

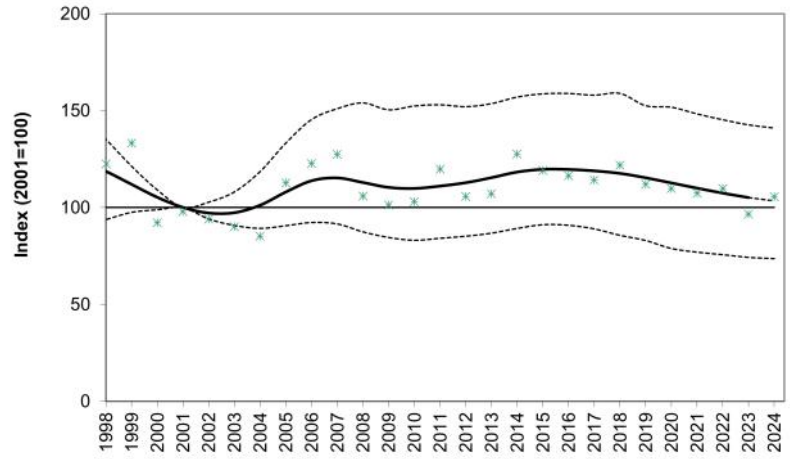


Between 1999 and 2023 the smoothed survey index has decreased by -13.8% (95% CI -43.7% to 30.1%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 9.1% (95% CI -15.7% to 43.6%), however this change is not statistically significant.

From 1999-2024 on average 279 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in

Roost Count **OFFICIAL STATISTIC**



Between 2001 and 2023 the smoothed survey index has increased by 5.1% (95% CI -25.7% to 42.6%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -10.6% (95% CI -20.7% to -1.6%).

From 2001-2024 on average 58 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in at least one year).

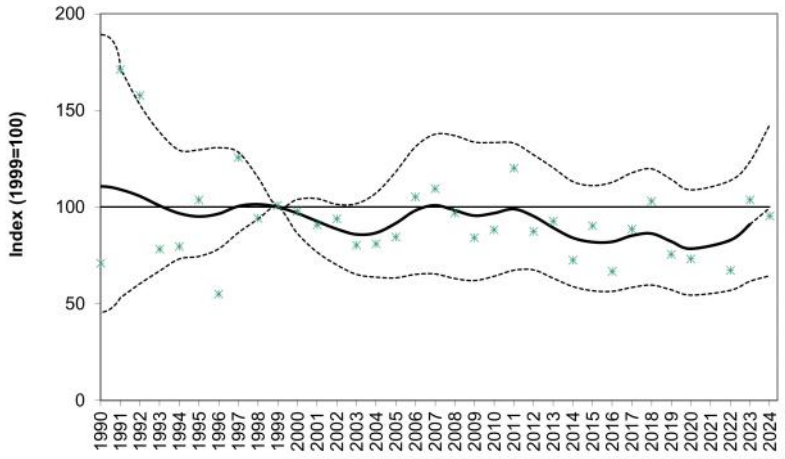
Note: the baseline year for calculation of this trend has been set at 2001 as very few roosts were counted in earlier years.

Figure 59. Hibernation Survey and Figure 60. Roost Count indices for brown long-eared bat in Great Britain, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Brown long-eared bat | England trends

In England, the brown long-eared bat Hibernation and Field Survey indices show no significant change since the baseline year of monitoring (1999 for the Hibernation Survey, 2001 for the Roost Count), or over the last five years. **The population of brown long-eared bat in England is considered to have been stable in the long-term (since 1999) and the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**

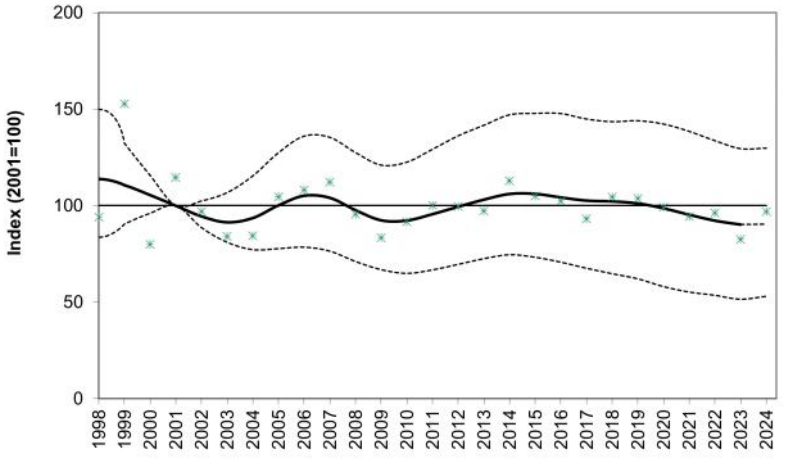


Between 1999 and 2023 the smoothed survey index has decreased by -8.9% (95% CI -38.4% to 23.5%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has increased by 5.6% (95% CI -13% to 27.4%), however this change is not statistically significant.

From 1999-2024 on average 218 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in at least one year).

Roost Count **OFFICIAL STATISTIC**



Between 2001 and 2023 the smoothed survey index has decreased by -9.7% (95% CI -48.5% to 29.4%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -11.7% (95% CI -25.3% to 3.5%), however this change is not statistically significant.

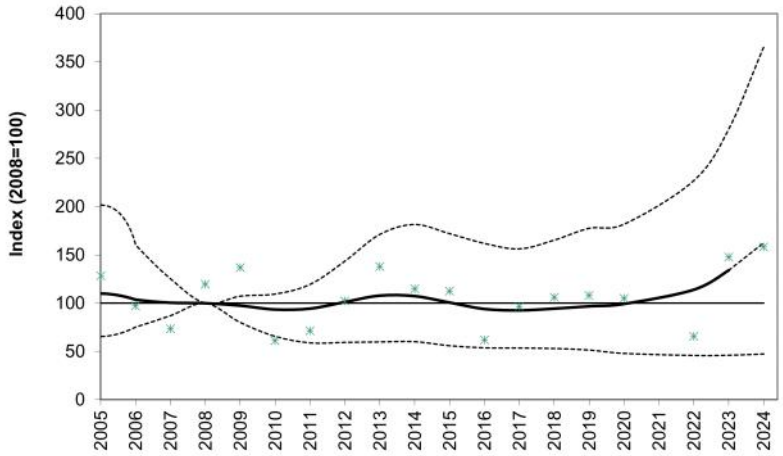
From 2001-2024 on average 41 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in

Figure 61. Hibernation Survey and Figure 62. Roost Count indices for brown long-eared bat in England, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Brown long-eared bat | Scotland trends ⟷

In Scotland, the brown long-eared bat Hibernation Survey and Roost Count indices show no significant change since the baseline year of monitoring (1999 for the Hibernation Survey, 2001 for the Roost Count) or over the last five years. **The population of brown-long eared bat in Scotland is considered to have been stable in the long-term (since 1999) and short-term (since 2018), however this assessment should be treated with caution due to small sample sizes.**

Hibernation Survey

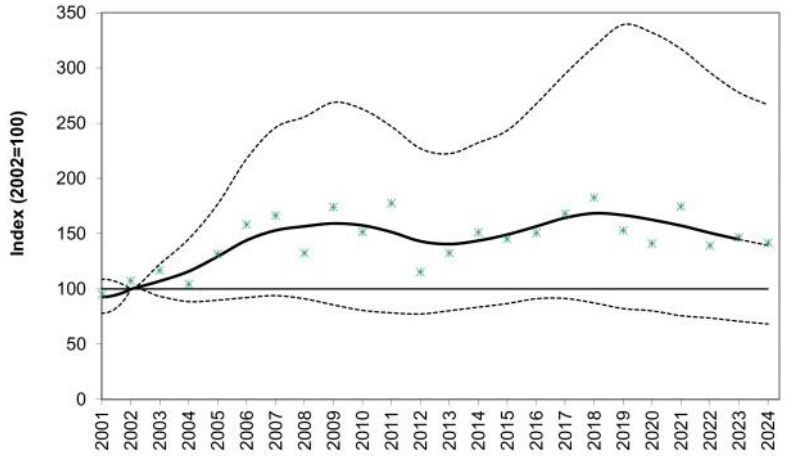


Between 1999 and 2023 the smoothed survey index has increased by 34.1% (95% CI -53.9% to 180.4%), however this change is not statistically significant.

Change in the Hibernation Survey index over the last five years was not assessed due to a small sample size.

From 1999-2024 on average 12 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in at least one year). This trend should be treated with caution due to a small sample size.

Roost Count



Between 2001 and 2023 the smoothed survey index has increased by 44.9% (95% CI -29.3% to 177.6%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased by -14% (95% CI -40.8% to 4.9%), however this change is not statistically significant.

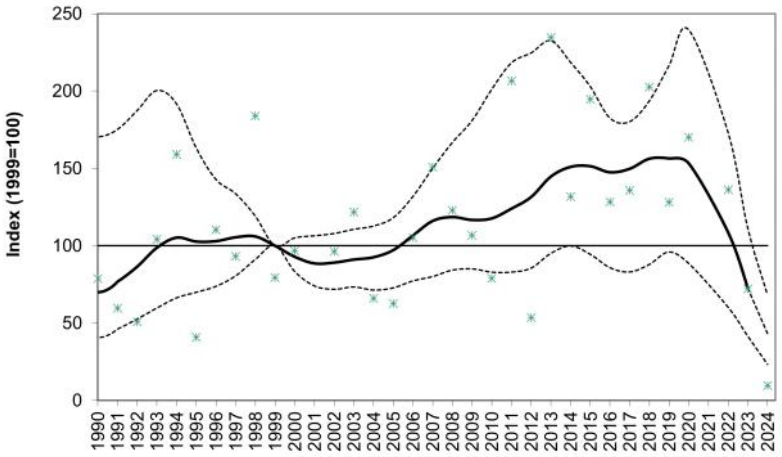
From 2001-2024 on average 10 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in at least one year). This trend should be treated with caution due to a small sample size.

Figure 63. Hibernation Survey and Figure 64. Roost Count indices for brown long-eared bat in Scotland, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Brown long-eared bat | Wales trend ⟷

In Wales, the brown long-eared bat Hibernation Survey index shows no significant change since the baseline year of monitoring (1999), but has declined significantly over the last five years. **The population of brown long-eared bat in Wales is considered to have been stable in the long-term (since 1999) and to have declined in the short-term (since 2018).**

Hibernation Survey **OFFICIAL STATISTIC**



Between 1999 and 2023 the smoothed survey index has decreased by -27.4% (95% CI -58.5% to 11.3%), however this change is not statistically significant.

Over the last five years (2018-2023) the smoothed survey index has decreased significantly by -53.6% (95% CI -70.4% to -27.9%).

From 1999-2024 on average 51 sites per year contribute to the trend analysis (sites surveyed in two or more years with brown long-eared bat recorded in at least one year).

Figure 65. Hibernation Survey index for brown long-eared bat in Wales, showing the baseline value (solid horizontal line), unsmoothed index value for each year (green crosses), smoothed trend (solid line) and 95% confidence intervals (dotted lines). The smoothed trend for 2024 is shown as a dashed line to indicate that it is provisional.

Species for which population trends are not currently produced

Greater mouse-eared bat

Myotis myotis

In recent years the greater mouse-eared bat has been considered to be a resident but non-breeding species in the UK. After being declared extinct in the UK in 1990, a single juvenile male was found during a Hibernation Survey in West Sussex in winter 2002/03 and was subsequently recorded on an almost annual basis. Winter 2022/23 brought the exciting news of a second individual hibernating in a nearby site. Neither of these bats was found during the winter 2023/24 surveys. In winter 2024/25 two individuals were recorded: a female in West Sussex and one in Kent (sex unknown). Neither of these was the individual that had been found almost annually since winter 2002/03 and it is not clear whether either was the individual found in 2022/23. Therefore a minimum of three individuals have been recorded in recent years.

Photo: Martyn Phillis

Population estimate
Only three confirmed individuals recorded in recent years in the UK

Range of greater mouse-eared bat in the UK (from NBMP data)

Alcathoe bat

Myotis alcathoe

This species was first described in 2001 (von Helversen *et al.* 2001) and confirmed as a resident species in the UK in 2010 (Jan *et al.* 2010). It is likely under-recorded, but current knowledge suggests that it has a highly localised distribution restricted to areas of Herefordshire, Kent, North Yorkshire, Sussex, Surrey and Wiltshire. It is very similar in appearance to whiskered and Brandt's bats and these three species cannot be distinguished acoustically or visually during NBMP surveys. However, based on current knowledge of this species' distribution, we believe it will be encountered too infrequently during monitoring of whiskered/Brandt's bats to include this species within the whiskered/Brandt's bat combined trend. We will review this as further information becomes available.

Photo: Daniel Hargreaves

Population estimate:
Numbers unknown for Great Britain. This species is not known to occur in Northern Ireland.

Range of Alcathoe bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019). Areas that contain very isolated records, including those in Yorkshire, do not appear on the map.

Bechstein’s bat

Myotis bechsteini

This rare species is restricted to southern England and southern Wales and is associated with semi-natural woodlands. It is difficult to monitor using standard survey methods as it spends much of its time foraging high up in the canopy and produces low intensity echolocation calls which are challenging to record and identify on a bat detector.

The Bechstein's Bat Project (bats.org.uk/BBP_NBMP), which ran from 2007-2011, used survey techniques specifically designed for Bechstein's bat in order to establish baseline distribution data on this species in woodlands in southern England and South Wales, and to gather information to inform future conservation policy and woodland management. A new conservation and monitoring project for Bechstein’s bat began in summer 2024 (see page 88).

Photo: Daniel Hargreaves

Range of Bechstein’s bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Population estimate

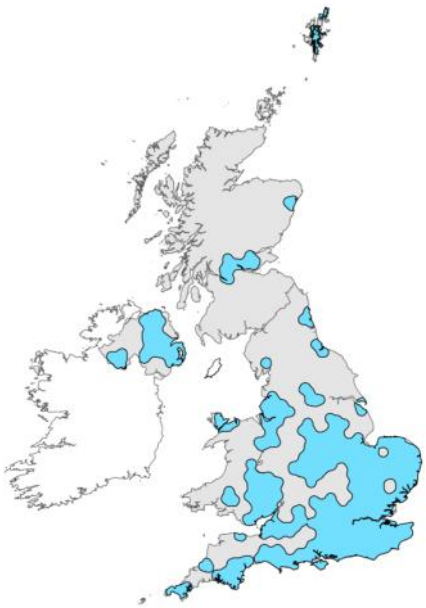
Country	GB	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	21,800 (10,300–55,600)	21,600 (10,200 – 55,000)	247 (116 – 626)	0	0
	Reliability score = 2 (scores >3 most reliable)				
Source	Mathews *et al. 2018*				

Nathusius’ pipistrelle

Pipistrellus nathusii

Nathusius’ pipistrelle is rarer than other pipistrelle species in the UK, though records have increased in recent years. Distribution data on Nathusius' pipistrelle have been collected through the NBMP by the Nathusius' Pipistrelle Survey, a bat detector survey at waterbodies which ran from 2009-2014, and from 2014-2023 by the National Nathusius' Pipistrelle Project (NNPP), which involved carrying out trapping surveys to improve knowledge of the species’ status in GB (bats.org.uk/nnpp). Data from the NNPP have been analysed as part of a review of the evidence of bat migration and interactions with offshore windfarms in British Waters, on behalf of Natural England (see page 89).

Photo: Roger Jones



Range of Nathusius’ pipistrelle in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Population estimate:
Numbers unknown for Great Britain and Northern Ireland.

Barbastelle

Barbastella barbastellus

Special Areas of Conservation designated for barbastelle are monitored through the Woodland Survey (now renamed the Barbastelle Woodland SAC Survey), funded by Natural England. Data on barbastelle are also collected from a small number of Hibernation Survey sites but currently there are insufficient data to produce a robust population trend. A new conservation and monitoring project for barbastelle began in summer 2024 (see page 88).

Photo: Daniel Hargreaves

Population estimate:
Numbers unknown for Great Britain. This species does not occur in Scotland or Northern Ireland.

Range of barbastelle in the UK

(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019).

Results from the Barbastelle Woodland SAC Survey

The NBMP Woodland Survey was piloted by BCT in 2004 and launched in 2005 to assess the presence and relative abundance of barbastelle at woodland sites. The survey and analysis methods were revised in 2006 and surveys have been completed using this revised methodology since then.
The surveys are completed in three periods:
• Period 1: 25th July to 8th August
• Period 2: 9th to 23rd August
• Period 3: 24th August to 7th September

Since 2005 a total of 49 transects have been surveyed. This includes transects in seven Special Areas of Conservation (SACs). From 2011 surveys have been entirely focused on the SAC sites. Currently Natural England (NE) provide funding to monitor the presence of barbastelles using this survey methodology at five woodland SACs in England where the presence of barbastelle is a primary reason or qualifying feature for designation: Ebernoe Common, Eversden & Wimpole Woodlands, Exmoor & Quantocks Woodlands, The Mens, and Mottisfont Bats. Barbastelle presence was again confirmed at all sites in 2024.

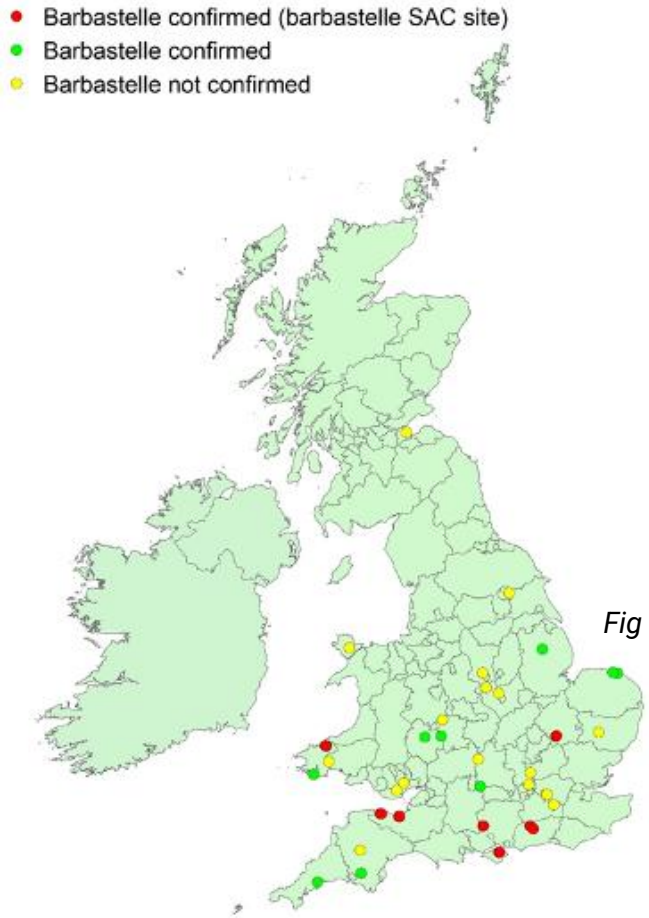


Fig 66. Distribution of Woodland Survey sites 2005-2024

Grey long-eared bat

Plecotus austriacus

Grey long-eared bat is the rarest breeding bat species in the UK, with a distribution largely confined to the southern edge of England. It is monitored on the Roost Count and, while the sample size is too small for producing a species population trend, the high importance of known roosts makes these a priority for ongoing monitoring. As part of the "Back From the Brink" suite of projects (2017-2021) (naturebftb.co.uk) BCT led on a project focused on grey long-eared bat which involves working with landowners to discover how to retain and enhance the precious habitats that the bats need. An aim of this project was to have eight maternity roosts monitored for the NBMP. Seven grey long-eared bat roosts are included in the NBMP, although two of these are not currently allocated to volunteers. None of these roosts was monitored in 2024 so they will be a priority for monitoring in 2025.

Photo: Daniel Hargreaves

Population estimate

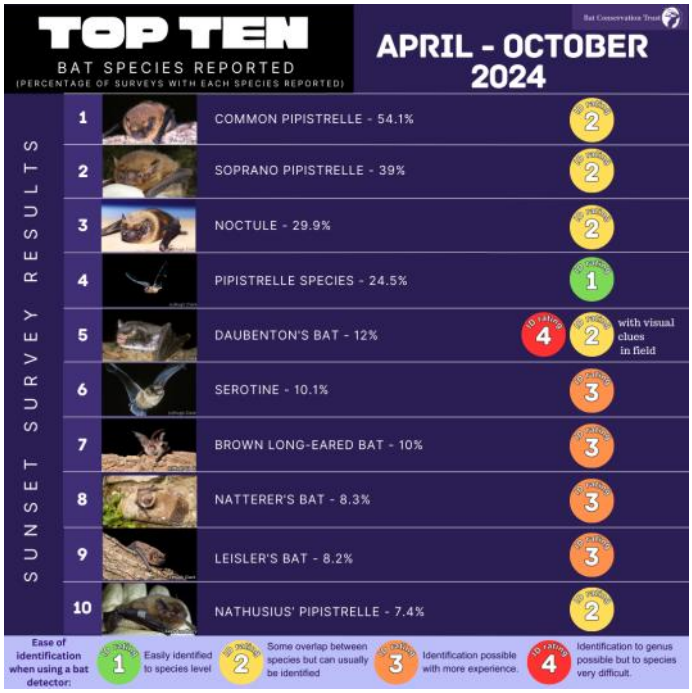
Country	England	Wales	Scotland	N.Ireland
Number (plausible population range in brackets)	1,000 (400–3,000). Reliability score = 1. (scores >3 most reliable)	Does not occur	Does not occur	Does not occur
Source	Mathews *et al. 2018*			

Range of grey long-eared bat in the UK
(Map taken from 4th Report under Article 17 on implementation of the Habitats Directive in the UK, JNCC 2019)

Sunset Survey

The Sunset Survey (April-October) has been running since 2002 as an engagement survey designed to enable new volunteers to take part in a simple beginner level bat survey. This is ideal for anyone who does not have previous bat surveying experience. More experienced volunteers have also taken part as it is an effective technique for locating bat roosts. The survey encourages volunteers to get together with family or friends and discover bats and other wildlife in their local area. From 2002 to 2024, 2,992 volunteers have taken part in the survey.

Volunteers are asked to spend the hour after sunset and/or the hour before sunrise from their windows/in their garden or local open space and look for any bats or other nocturnal animals they can spot. A visual guide is provided to help beginners identify a few of the more common bat species. Results are submitted via a dedicated online recording page developed and hosted by iRecord.



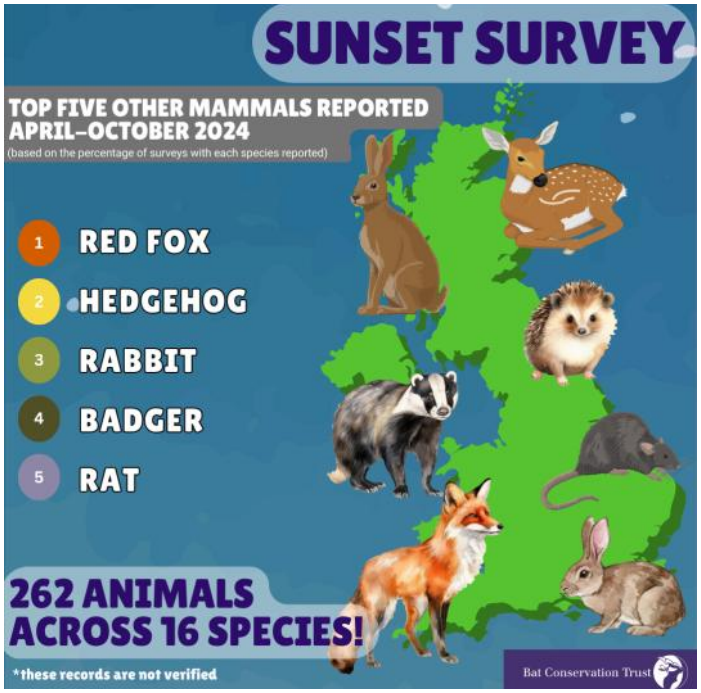


Figure 67 and Figure 68 show the top ten bat species and top five other mammals reported by Sunset Survey volunteers in 2024.

In 2024, 1,064 Sunset/Sunrise Surveys were completed by at least 371 volunteers. 31 bat roosts were reported through spotting dawn swarming. The infographics on this page were produced after the 2024 survey season to give feedback to volunteers who took part in the survey. As indicated on the bats infographic (Figure 67), the records are unverified. While the survey is aimed at beginners, more experienced surveyors also take part, but it is not possible to distinguish records that are likely to be correct identifications from those which are from less experienced volunteers potentially making an incorrect identification. Volunteers are encouraged to only identify species as far as they are sure and in fact a correct record of “bat” or “pipistrelle” is more useful than a record uncertainly identified to species level. It is likely that some identifications are unverified auto-identifications from the popular EchoMeter Touch bat detector, as records include cryptic species that cannot usually be identified with confidence from flight/bat detector records. By just presenting the top ten bat species recorded (Figure 68) we largely focus on the species that can be plausibly identified in flight and from their calls.

"I am 83 and my husband isn’t that well. Going out at night listening to bats has helped me to find peace and restoration. I also enjoy evaluating the data the next day. To date I have picked up 12 species which is very exciting considering it is all close to my home. So much to learn and the Zoom lessons have been great”.— Sunset Survey volunteer

Research and future directions

The strategic aim of the NBMP is to deliver a world-leading, cost-effective citizen science monitoring programme supported by motivated volunteers, providing high quality data able to inform evidence needs, policy-relevant questions and metrics of bat population status, change and distribution. Here is a summary of some recent work to further this aim, and work planned for the future.

British Bat Survey (BBatS)

AudioMoth installed at a BBatS monitoring location (Photo: Philip Briggs)

The British Bat Survey (BBatS) is a structured passive acoustic monitoring survey of bats, funded by the Joint Nature Conservation Committee (JNCC). It is designed to provide population trends for bat species found in GB, particularly to enable production of population trends for a larger number of species and to survey currently under-recorded habitats and regions. After three years of piloting different aspects of the survey, in 2024 BBatS was officially launched as a new monitoring scheme carried out at randomly selected sites across GB, stratified by region and Land Cover type. Each site is a 1km square with a randomly generated suggested monitoring location within the target habitat for that site. The volunteer seeks landowner permission to access the site and install an AudioMoth as close as possible to the suggested monitoring location. The AudioMoth is left to record continuously for two periods of five nights in July. In 2024, 79 volunteers activated 89 sites on the BBatS online portal (surveys.bats.org.uk/survey/87). Recordings were received from 40 sites and processed through BCT's Sound Classification System (SCS) which filters for bat calls in the recordings and then classifies them to species level. Manual verification of more unusual or challenging species identifications is then carried out by BCT staff and then a report is generated for each site and sent to the volunteer who collected the recordings.

The targets for 2025 are to establish a baseline of 40 sites monitored in each GB country and to start looking at targeted monitoring for species with more restricted distributions such as barbastelle.

NightWatch

NightWatch (surveys.bats.org.uk/survey/52) is an unstructured passive acoustic bat survey run by BCT, designed to engage people with nature, particularly those from urban and ethnic minority communities, while producing robust locally-focused biodiversity data. It is a community science/citizen science project which has been running since 2021, funded by the Esmée Fairbairn Foundation and JNCC. In 2024, the project was funded by the Greater London Authority (GLA) which meant that volunteer engagement and survey participation were confined to the Greater London area. Through working with different communities and running engagement events, we were able to reach over 800 Londoners and engage them in bat monitoring. We delivered 14 events across the city, and partnered with seven new collaborators. 40% of participants we engaged with identified as being from minority ethnic backgrounds and 29% identified as having a disability. These figures equal or exceed the percentage of the population belonging to these demographics in London.

In 2024, we piloted a new volunteering scheme offering another way to join in with NightWatch. Local Coordinators were offered training in How to Run a Bat Walk and long-term loan of NightWatch equipment. Coordinators then brought NightWatch surveys and bat events to the community directly, or used the scheme to carry out multiple surveys across managed land such as parks and other greenspaces. 19 Local Coordinators engaged with the project, reaching an extra 270 Londoners and collecting many new bat records. One Local Coordinator ran a bat walk focusing on queer ecology and reflected on his experiences in a blog for BCT. Another ran a bat walk for a local school attracting 140 attendees in a single evening.

NightWatchers return their AudioMoth and data to BCT in a Freepost envelope via their local post box. As with BBatS, the recordings are processed via BCT's Sound Classification System and each volunteer then receives a bespoke report all about the species they detected and what they can do next to continue their journey with night-time nature. Recordings were received from over 120 sites during 2024, the most notable record being a barbastelle recorded by a NightWatcher in Trent Country Park.

NightWatchers are also encouraged to spend one hour over sunset on the night of their survey watching, listening and recording night-time nature on their doorsteps. This is an important part of the process; encouraging people to enjoy and appreciate the wildlife in their neighbourhoods.

Thanks to funding from JNCC, NightWatch will return to being a GB-wide scheme in 2025.

NightWatch event with Wanderers of Colour (Photo: Phew Nguyen)

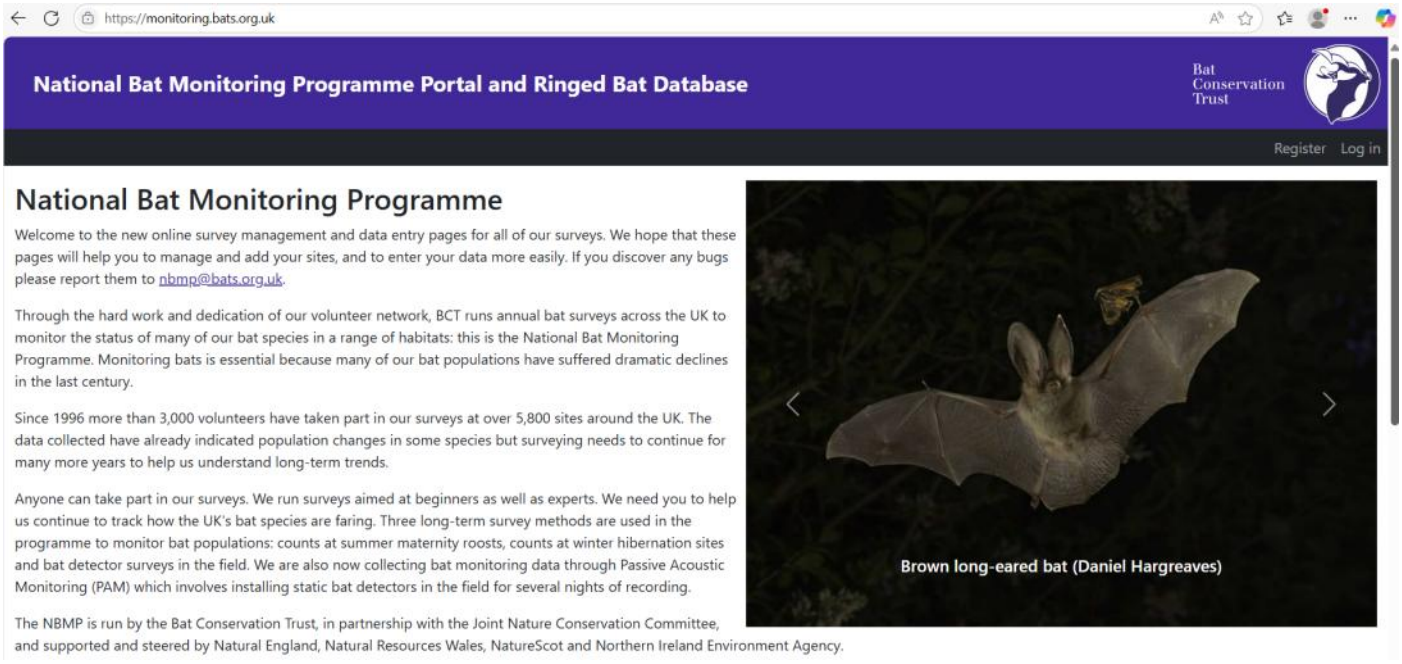
Equity, diversity and inclusion

During winter 2023/24, BCT undertook research, funded by JNCC, designed to better understand the ways we can develop and sustain mutually beneficial relationships with underrepresented audiences within the NBMP volunteer pool. The resulting report includes a review of the work done by the NBMP so far, new audience research, and a set of recommendations for where next to focus engagement activities designed to meet this objective. The key finding from this research reinforced the importance of events and on the ground engagement activities as important tools for engaging new audiences, and that simple changes to the design and communication of events can ensure a wide diversity of people are interested and feel safe to attend. Additionally, building self-sustaining and diverse volunteer pools requires long-term relationship building with multi-year engagement plans. The recommended approach for NBMP is therefore to continue delivering high-impact engagement activities and make improvements to processes throughout the volunteer journey. While the focus of this research was the NBMP, the findings may offer helpful insights for similar conservation projects, especially those involving citizen science or a community engagement focus. The report is available at bats.org.uk/NBMP-EDI-report-2024.

In 2025, BCT is carrying out further research funded by JNCC, which will involve working with two focus groups of people who identify as being from ethnic minority backgrounds and having not previously engaged with wildlife conservation or monitoring. The aim will be to better understand how best to engage with audiences we are not currently reaching. We will also enlist three volunteers from ethnic minority backgrounds, ask them to identify a learning and volunteering journey for 2025/26, and support them closely on this journey, helping them overcome any barriers they face. This will help us better understand how to support volunteers from under-represented backgrounds and will involve the co-creation of resources designed to engage and support future volunteers.

New NBMP online portal

The new National Bat Monitoring Programme online portal was launched in October 2024. It replaces the previous portal which had been in use since 2012 and was in need of updating to a newer platform. The new site reproduces the core functionality of the old site, but makes it more streamlined and compatible with the wide range of devices used nowadays. There is additional functionality we plan to add in future phases once further funding has been secured. For example, volunteers have expressed an interest in being able to indicate if they are happy for other volunteers to contact them about assisting at specific sites. This would be valuable functionality for new volunteers who are looking to get some experience before taking on sites of their own. The new NBMP online portal was developed in tandem with an online portal for bat ringers to order rings, and input and store their ringing data. It acts as a central repository for bat ringing data in line with a Eurobats resolution passed in 2003. Both portals can be accessed at monitoring.bats.org.uk.



Home page of National Bat Monitoring Programme Portal and Ringed Bat Database

Local Change Detection

We are working with JNCC to understand how the National Bat Monitoring Programme could be adapted and used by people wishing to survey and monitor their local bat populations, supported by funding from Defra's Natural Capital and Ecosystem Assessment programme. In 2023 and 2024 we consulted with people who may have an interest in monitoring their local wildlife, including community groups, large landowners, farmers and local authorities, and used their responses to adapt the Roost Count survey and British Bat Survey for local-scale monitoring. We hope to undertake a limited pilot of these new 'local-scale' surveys in 2025.

Ecoacoustics

We have been collaborating with Forest Research on a number of ecoacoustics studies, funded by Defra's Natural Capital and Ecosystem Assessment programme. Work includes a collaboration with Dr Sarab Sethi of Imperial College to develop a 'soundscape' classifier that can identify different classes of anthropogenic, environmental and biological noise from whole soundscape recordings. The classifier has performed well in testing. In 2025 we are collaborating with Forest Research to investigate whether the classifier can be used in combination with passive acoustic monitoring to quantify anthropogenic use of woodlands. We are also working with Dr Simon Chapple and researchers at the University of Edinburgh to develop a version of their 'Soprano' autonomous acoustic sensor platform that is suitable for use in passive acoustic bat surveys.

Automated Sound Classification

Over the last year we have been working to develop a specification for EchoHub, a sound annotation platform that will allow BCT staff and citizen scientists to automatically create annotated sounds when manually reviewing sound files; to provide a platform where citizen scientists can annotate their own pre-verified sound files; and to provide a platform where annotated sounds can be shared with others to foster the development of new acoustic classification algorithms.

Alongside this we are laying the foundations for EchoHub through a collaborative project to mobilise 2,500 UK bat calls into the Xeno Canto sound library (xeno-canto.org) from BCT surveys, funded by Xeno Canto. With Xeno Canto we are also partners on a project to develop an annotation metadata import/export function for Xeno Canto, and another to develop metadata standards for annotated recordings.

Woodland

The National Woodland Bat Survey, a passive acoustic bat survey in collaboration with Forest Research with funding from Defra's Natural Capital and Ecosystem Assessment programme, is now in its fourth year. In 2024 audio recordings were returned from 163 National Woodland Inventory plots across England. The data have been classified and verified and site reports are being created.

Funded by the Nature Networks Fund from the National Lottery Heritage Fund in partnership with Welsh Government, the Gobaith Coetir/Woodland Hope Project aims to assess the health of a set of Celtic rainforest sites in North Wales, while bridging the gap between local communities and their woodland heritage. As part of this project we worked with Dr Todd Lewis at the University of West England to develop an acoustic index of temperate rainforest health. The results of this work are currently being prepared for publication.

Built environment

Urban expansion is increasing rapidly and the extensive land use change coupled with the widespread introduction of man-made ecological stressors can take a heavy toll on bat populations. The built environment can influence the behaviour and population dynamics of bats and it is likely that responses will vary among species which may restructure whole bat communities. The Bat Conservation Trust are using bat data collected from a variety of urban conservation and citizen science projects to model different threats facing urban bat populations as well as investigating what habitat features are most important for our urban bats. These datasets include work undertaken for the Greater London Authority and citizen science project Nightwatch and research outputs will be designed in close collaboration with Local Planning Authorities to ensure they meet the needs of those working with wildlife in the built environment.

National Barbastelle and Bechstein's Bat Survey

The Bat Conservation Trust and the Vincent Wildlife Trust (VWT) have been contracted by Natural England to deliver the *National Barbastelle and Bechstein's Bat Survey* project. This ambitious, multi-year project began in late 2023, and aims to increase the accuracy of the known species range for barbastelle and Bechstein's bat; allow habitats to be more accurately assessed for species suitability; identify the factors potentially limiting population distribution; identify locations and methodology to improve, connect and expand habitats; identify practical solutions for the conservation of these species when they are impacted by large scale infrastructure projects; identify items to include within a trial national strategic recovery plan for these species; and to make recommendations for a national monitoring plan for both barbastelle and Bechstein's bats. The first season of fieldwork took place in 2024. Capture and radio-tagging surveys led by VWT took place in Somerset, Devon and Herefordshire, with data collected on roost use, atypical habitat use and sex-related differences in foraging behaviour. Acoustic surveys led by BCT were conducted to establish the presence of barbastelle in regions for which we currently lack data, establish the survey effort needed to detect this species in woodland, collect reference calls of Bechstein's bat with which to retrain our bat sound classification algorithm, test the relative performance of different detector makes for passive acoustic surveys in woodland and test the effect of time of year and detector height on barbastelle and Bechstein's bat detectability. Analysis of data collected in 2024 and planning for the 2025 field season is underway.

Bat box checks for Bechstein's bats (Photo: Philip Briggs

Airborne DNA monitoring

Airborne DNA offers great potential for monitoring bat species occupancy, particularly for species that are challenging to survey acoustically. In 2020 BCT collaborated with NatureMetrics to test the use of different air samplers for airborne DNA detection of bat species in churches (NatureMetrics, 2023). In 2021 we collaborated with Dr Joanne Littlefair at University College London to test the use of airborne DNA sampling in 14 known bat hibernacula, and in summer 2023, with funding from Natural England, we again collaborated with Dr Littlefair to investigate the utility of different primer sets for UK bat species and establish the sampling duration needed to detect an airborne DNA signal from a target bat species at increasing distances from a roost in woodland. The four primer sets tested were shown to amplify bat tissue DNA from UK bat species, and in the majority of cases provide good taxonomic resolution between congeneric species. Where congeneric species could not be separated by one primer set they were separated by another, which supports using primer sets in parallel in future bat eDNA studies. A variety of woodland taxa were detected in our airborne DNA samples; however, we did not find reliable detections of bat species at any distance from the roost, or for any of the durations assessed. This suggests that airborne bat DNA is at low concentrations, requiring greater air flow rate or sampling durations greater than 20 hours to be detected.

We are currently collaborating with NatureMetrics and Dr Littlefair on an UK Innovate-funded study to further assess the utility of airborne DNA sampling for bats in open and closed environments. We have conducted tests of the sampling equipment in an anechoic chamber to

assess sound levels and noise reduction strategies, and have begun open-environment surveys in the surroundings of a multi-species bat roost in Somerset, with assistance from VWT. In 2025 we are aiming to conduct tests in a closed environment, and conduct further open-environment tests at a second site and a swarming site later in the year.

Insect populations

We are collaborators on a study led by Dr Luke Evans at the University of Reading, assessing the effects of insect population change on insectivore populations in the UK. This study used data from several long running invertebrate surveys, together with data from the National Bat Monitoring Programme, to look at links between insect and bat population trends. Quantifying the direct effect of insect abundance on bat population dynamics is challenging because the data are noisy, and because bats and insects are often impacted by environmental change in similar ways. However, the study did find that indices of insect food availability are declining, and that there is moderate evidence of a link between Daubenton's bat population trends and the abundance of aquatic Diptera. This study in now in review prior to journal publication.

Landscape change

We are collaborating with Dr Claudia Acerini and Dr Emma Gardner from the UK Centre for Ecology and Hydrology to develop a process-based model that simulates how UK bat species might respond to landcover change. This model was originally developed to predict common pipistrelle responses to landcover change, and has now been extended to include Daubenton's bat, serotine and lesser horseshoe bat. The model has been parameterised using expert opinion and evidence from the literature on roosting and foraging resource preferences and availability, bat movement ranges, survival probabilities and population growth parameters. It was then ground-truthed using data from the National Bat Monitoring Programme. The results of this work are currently being prepared for the submission of the final project report, and will be published in due course.

Migration and offshore wind energy infrastructure

In early 2024 BCT completed a review of the evidence of bat migration and interactions with offshore windfarms in British waters, on behalf of Natural England. The results of this project are now in review prior to journal publication.

As part of this review, BCT undertook a summary analysis of data collected during the National Nathusius' Pipistrelle Project. This analysis confirms the presence of both a resident and migratory population of Nathusius' pipistrelle in Great Britain. If capture rates are assumed to be proportional to abundance, the analysis suggests that the population of Nathusius' pipistrelle resident in GB is predominantly male, whereas the migratory population that arrives here in the autumn is approximately 50:50 male to female. While evidence of breeding was seen, the extremely low capture rate of juvenile Nathusius' pipistrelles in the period during which juvenile bats typically become volant suggest Nathusius' pipistrelle breeding attempts in Great Britain are infrequent and sporadic. Four Nathusius' pipistrelles ringed in GB were recovered in central or eastern Europe or Russia, and six Nathusius' pipistrelles ringed in Latvia or Lithuania were recovered in Great Britain. This represents the first direct evidence of long-distance movements of Nathusius' pipistrelle from central and eastern Europe to Great Britain. In 2024/25 we have been working with Natural England and Dr Todd Lewis at the University of West England to extend this analysis using innovative Bayesian modelling and visualisation approaches. The results of this work are currently being prepared for publication.

The Bat Conservation Trust are collaborators on a new study led by Dr Samantha Ball at Atlantic Technological University Ireland, that will investigate the migratory movements of Nathusius' pipistrelle and Leisler's bat between Ireland, Britain and continental Europe. The project, titled *GREENBAT: Migratory bats and offshore wind energy in Ireland* is funded by the Sustainable Energy Authority of Ireland and will draw on data and fur samples collected during the National Nathusius' Pipistrelle Project and data from the National Bat Monitoring Programme.

Acknowledgements

NBMP volunteers

A huge thank you must go out to all our hard-working NBMP volunteers who have collected bat data that have contributed to this report. The NBMP relies on the ongoing efforts of hundreds of volunteers whose dedication allows us to produce population trends for UK bats. Without our volunteers the NBMP would not exist.

Many of our volunteers have received training from our volunteer Regional Bat Detector Workshop Leaders and we would like to thank them for their continuing dedication to helping us to train up volunteers to maintain the high standards of NBMP surveys. Workshop leaders include Cathryn Baillie, Mike Castle, Diana Clark, Ian Cornforth, Richard Crompton, Richard Dodd, Colin Edwards, Elisabeth Ferrell, Rich Flight, Andrea Hudspeth, Steve Lucas, Helen Lundie, Mhairi Mackintosh, Aidan Matthews, Jean Oudney, Steve Parker, Liz Probert, Clare Rawcliffe, Natalie Todman, Edward Wells and Lisa Worledge.

Many BCT staff have also contributed to the NBMP.

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Other organisations

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Appendix: Statistical methods

In order to produce a clear picture of the long-term trend for each species, Generalised Additive Models (GAMs) are used to fit a smoothed line to each dataset, allowing for factors that could influence the means where appropriate (e.g. bat detector make, temperature, see Barlow *et al*. 2015 for more details). These smoothed curves are quite robust against random variation between years, except where annual fluctuations and extreme outliers at the either end of the series can have an unacceptably large impact on the first and/or last few years of the time series. To counteract this problem, it is best practice not to use the first year of a survey as the baseline year (where the index equals 100). In this report the year 1999 has been taken as the baseline year wherever possible. Most surveys start from 1997, although there are a few exceptions. The Field Survey starts from 1998, and some Hibernation Surveys and Roost Counts have earlier years of data for some species. Where these data are available and improve trend estimation, they have been included in the GAM analysis but as they comprise small amounts of data, the start year is still shown as 1997. In all cases, the estimate for the most recent year should be regarded as provisional and a dotted line is used in figures to indicate this.

The average annual percentage change is an approximation based on the assumption that the trend during the period considered is constant and linear. It is estimated by calculating the annual percentage change that would take the population from 100 in the base year to the index value in the current year.

Generalised Additive Models are based on the method described by Fewster et al. (2000). These involve fitting a log-linear generalised linear model (i.e. a regression model with a logarithmic relationship to the explanatory variables and a Poisson error distribution) to the counts on each survey. A site term is fitted in the model to allow for differences in abundance between sites and the time trend is modelled using the GAM framework to fit a smoothed curve. These GAM models are essentially a more sophisticated version of a polynomial curve and are less likely to display misleading trends at the extremes of the data than a polynomial. The degree of smoothing is controlled by specifying the degrees of freedom for the smoothing process; this may vary between 1 (equivalent to a simple linear trend) and one less than the number of years (a 'saturated model' equivalent to fitting individual annual means). For the results presented here the degrees of freedom are generally set to the default value suggested by Fewster et al. (2000), which is 0.3 times the number of years. However, curves for different degrees of freedom are always checked to ensure that the model provides an appropriate degree of smoothing to the annual means without being unduly influenced by individual outlying years. The index values are derived from the fitted curve, taking the base year to be 100. Annual means from the saturated model are also shown on the graphs in order to give a visual impression of any deviations from the smoothed curve.

The other feature of these models is that confidence limits based on standard theory will not be valid due to temporal correlations. In addition, NBMP data suffer from other complications not present in the data examined by Fewster et al. (2000) which also invalidate the usual method of calculating confidence limits. Firstly the data are much more variable than would be expected from a Poisson distribution. This phenomenon, known as 'overdispersion', is very common in biological data, but is particularly extreme in these datasets. Fewster et al. (2000) suggest a negative binomial distribution might be an alternative but simulations suggest that, while it sometimes produces more precise results, this is not always the case, and it can lead to bias in

some situations. Secondly the repeat counts in each year add a further complexity to the correlation structure of the data. All these problems are avoided by using the bootstrap approach recommended by Fewster in which the model is fitted to a large number of new datasets created by resampling sites with replacement from the original sites. At least 400 bootstrap samples are used for each model to ensure robust 95% confidence limits. The same bootstrapping approach can be used to produce confidence limits to other quantities of interest, including the short- and long-term assessments used in the Defra biodiversity indicators (jncc.gov.uk/our-work/uk-biodiversity-indicators-2024).

Data for Great Britain are weighted to allow for the different sampling rates in England, Scotland and Wales. This is achieved by weighting each site in proportion to the ratio of non-upland area to number of sites surveyed for the relevant country, thus ensuring that each country contributes equally to the trends based on lowland land area. Weighting is not applied to those species, such as serotine and horseshoe bats, which have a restricted range within the UK.

Overdispersion is a particular problem for the Field and Waterway Surveys, where a single bat repeatedly flying past the observer may give rise to a large count of bat passes. This results in wide confidence limits for Poisson or negative binomial GAM models and so we have instead presented results for a binomial model of the proportion of observation points on each survey where the species was observed. Apart from this difference in the response variable, the same GAM approach, with bootstrap confidence limits, is adopted. Simulations suggest that these binomial models have greater power to detect trends with the high levels of overdispersion seen in the Field and Waterway Surveys.

In order to test whether the smoothed curves differ between different countries or regions Fewster et al. (2000) suggest a deviance test. However, simulations have suggested that this test can produce too many significant results, and so the results presented here use a randomisation approach to obtain a probability value from the change in deviance.

Analyses were conducted in R (version 4.0.2) and Genstat (23rd Edition).