

Bat News



Celebrating
30 years of
BCT in 2021

30 years of batty discoveries – a trip down memory lane

Celebrating 25 years of UK bat monitoring
– past, present and future

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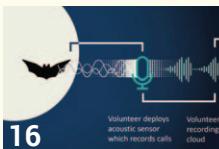
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Contents

- 4 Welcome from Kit Stoner
- 6 Spotlight on Bat Groups
- 10 Feature: 30 years of batty discoveries – a trip down memory lane
- 14 Feature: Discover, Act, Inspire – 30 years on
- 16 Feature: Celebrating 25 years of UK bat monitoring – past, present and future



10



16



18



22



20



14

Cover – Celebrating 30 years of bat conservation. © Sky Pexels - Juan.

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Summer 2021

Welcome

From Kit Stoner, Chief Executive



We are 30 years old! So much has changed in those 30 years. And so much has been achieved.

The bats themselves have changed - the number of known breeding bat species in the UK has increased since BCT was formed - the separation of the common pipistrelle and soprano pipistrelle occurred in the 1990s, and since then we have also added *Nathusius'* and *alcatheo* to the list.

It is essential that we monitor these changes. Our world leading National Bat Monitoring Programme (NBMP) also has a big birthday as it celebrates its 25th year. The number of volunteers taking part has grown more than five times since it started and the NBMP is able to produce trends for 11 of our 17

breeding species. Bat detector technology has evolved during that time, from the first handheld heterodyne devices through to the tiny static Audiomoth (see page 20).

New technology and research approaches allow us to complement existing monitoring and fill gaps in our knowledge of how some species are faring. We have a series of exciting new citizen science surveys using passive acoustic monitoring (PAM). The British Bat Survey will be our core PAM survey, designed to produce additional population trends for a range of species. We have launched Nightwatch – a simple, night-time wildlife acoustic survey open to all, and we are also developing large-scale acoustic monitoring of bats in woodlands. Looking forward, we are planning to incorporate the latest cutting-edge scientific tools into our monitoring, for example, BioDAR (this is a pioneering method to use weather radar data), genetic monitoring of cryptic bat species and passive acoustic directional monitoring of UK bats (read more on page 16)

On page 18 Shirley Thompson talks about why bats are so important. They are essential members of many types of ecosystems, and they benefit humans in many different ways, for example, pest control, bat droppings as fertiliser, pollination and seed dispersal. And we can learn a lot from bats - research informed by bats includes anti-coagulants, immune systems, speech and language.

It's never been more important to highlight the importance of bats. In previous issues of Bat News we have spoken about crucial legislation such as the Environment Bill which is currently going through parliament, and proposed planning reforms which could negatively impact on bats. We must have robust legislation in place that protects bats, other wildlife and the habitats on which they rely.

On page 26 Ian Bond talks about the importance of engagement. BCT and bat groups both work hard to engage a wide variety of people into bat conservation. Looking forward, we need to try to make conservation more inclusive and encourage a far wider section of society to take part. We continue to review our own practices to see how we can improve them, as an individual organisation, and as part of the conservation sector as a whole.

And finally, you will see on page 28 that our 2021 National Bat Conference will be taking place online Friday 29 – Sunday 31 October. I look forward to seeing some of you there!

Kirchner

Kit Stoner Chief Executive

Cover of first Bat News and first Young Batworker

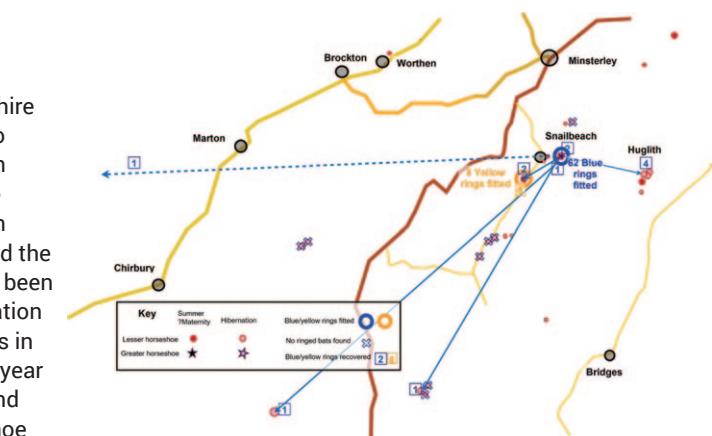
SPOTLIGHT on Bat Groups

Bat groups, made up of many dedicated volunteers, are the mainstay of bat conservation in the UK, undertaking vital front-line conservation work.

New homes for bats in Ceredigion

By Naomi Davis and Aline Denton from the North Ceredigion Bat Group

Bats in Ceredigion, west Wales will find themselves with a new 5★ accommodation as North Ceredigion Bat Group (NCBG) embarked on its "Homes for Bats" project this spring. Thanks to a grant from the Ceredigion Local Nature Partnership, funded by the Welsh Government, the group purchased eight woodcrete bat boxes for use in woodlands around Aberystwyth. These long-life boxes should last decades and help generations of bats find a place to roost. The bat group are hoping that these boxes will benefit cavity-roosting bat species like pipistrelles, brown long-eared and Natterer's bats. Once restrictions allow, NCBG will also be hosting bat box building workshops for community groups in Ceredigion including the Penparcau Community Forum, the main project partner. It is hoped that a bat survey route can be established around the village of Penparcau and the Local Nature Reserve, Parc Y Llyn, so that local bat populations can be monitored year after year. This will contribute to other national conservation efforts for bats. The funding has also paid for ladders and torches, to enable the bat group to carry out their monitoring work. The NCBG currently monitors bat roosts around the county and connects with local groups and communities to promote awareness about bats and dispel myths and rumours of these wonderful winged mammals.

By Mike Worsfold from
Shropshire Bat Group

In late 2018, the Shropshire Bat Group was invited to contribute to a project in the southern Shropshire uplands, in collaboration with Natural England and the National Trust. We have been counting bats in hibernation sites and summer roosts in Shropshire mines every year since 1993. We had found our first greater horseshoe bats hibernating in north Shropshire in 2003, and subsequently the Montgomeryshire Bat Group identified a summer roost in 2014. After training with Geoff Billington, we started ringing and radio-tagging horseshoe bats in north Shropshire and nearby Wales in 2015, with the Montgomeryshire Bat Group. For that project, I had developed a way to anodise and colour the rings, which, due to population size, ring placement, number and colour, allowed us to identify individual greater horseshoe bats.

The opportunity to track bats in southern Shropshire fitted well with the group's long held ambition to study their movements between different mines and other roosts. During the spring and late summer-autumn of 2019, we trapped and ringed bats near the portal of Perkins Level, Snailbeach Mine, and another small mine 1.4km from Perkins Level. We fitted 62 lesser horseshoe bats with blue rings at Perkins Level and eight lesser horseshoes with yellow rings at the second site. We also ringed two greater horseshoe bats, radio tagging one of them, as well as Daubenton's, Natterer's and brown long-eared bats.

During our annual hibernaculum counts in winter 2019, we checked for rings. It was often possible to determine ID at a distance by using photography and thanks to the ringing system used. However, some of the mines, particularly Snailbeach, have large voids which can only be reached with ropes, if at all. In these areas only the colour of ring could be seen on bats, rather than the ID numbers used to identify specific individuals.

The main findings were that recovery of blue rings (from Perkins Level) was quite low but spread over a wide area. Very few blue rings were found at Snailbeach, two were in Wales, one of which is more than 13km from Perkins Level. In contrast, recovery of the yellow rings from the other site was 75%. Two blue rings were seen at this site as well, which is a useful contrast to the dispersion of bats from the Perkins Level site, as it reassures that the poor recovery of blue rings was probably not due to injury of the bats.

We had long believed that the behaviour of the lesser horseshoe bats at Perkins Level was due to swarming behaviour, although it has been thought that this species does not swarm in this way. However, the dispersion of the bats so soon after marking is strong evidence for swarming.

Bats and the Sefton Coast: Site of Special Scientific Interest

By Stan Irwin from the Merseyside and West Lancashire Bat Group

The Sefton Coast (SSSI) is located in north Merseyside, adjacent to Liverpool Bay and the Irish Sea. It stretches for approximately 22km, making it the largest sand dune system in England and one of the most important dune habitats in North-west Europe. The dune system comprises of frontal "mobile" dynamic/embryonic dunes and wet slacks, whilst "fixed" dunes dominated by willow scrub and coniferous plantations lie further inland. In addition to the dune system, there are important intertidal salt marshes. Although acclaimed for its ecological habitats and species, there hasn't been any systematic attempt to identify whether bats are present, and if so where and how they use the coast. I was particularly interested to establish use of the open dunes and shoreline by bats. To address this, I started surveying for bats during 2019-2020; however surveys in 2019 were limited and plans for several teams of surveyors in 2020 were thwarted by COVID-19. However, in previous years I have surveyed many parts of the coniferous woodlands. A number of bat boxes have been erected in Ainsdale National Nature Reserve (NNR) in which common pipistrelle, noctule and brown long-eared bats have been recorded at various times of the year. Whiskered/Brandt's have also been recorded on one occasion, whilst soprano pipistrelle is yet to be



Mobile, embryonic dunes



Wet slacks

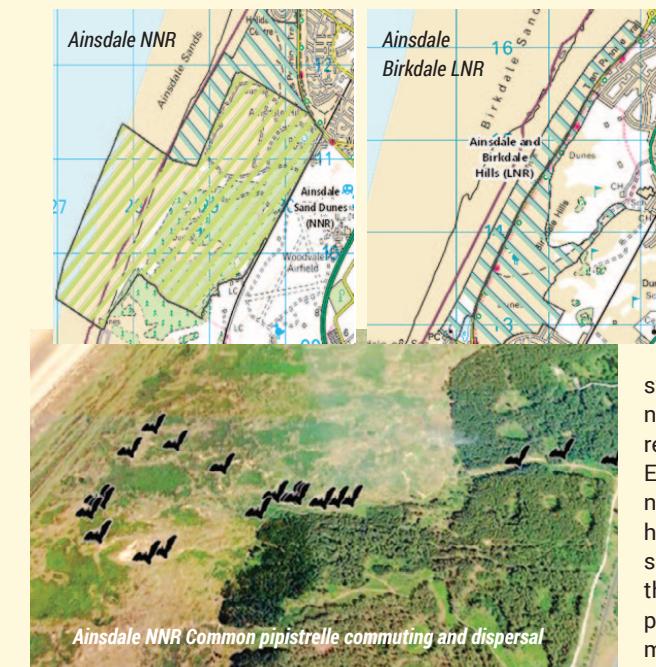


Fixed dunes

recorded in the coastal zone. The surveys focused on two parts of the coast – Ainsdale & Birkdale Local Nature Reserve (LNR) and the Ainsdale NNR, with future surveys looking at Ravenmeols LNR.

The surveys followed typical transect methods, i.e. predetermined routes including stopping points, which covered variable habitats. After analysing the survey results using a combination of Kaleidoscope and Bat Sound software, five species were identified with the following observations. **Common pipistrelle** commuting took place along the woodland edge and fire breaks into the open dunes. Activity along the shoreline and intertidal saltmarsh was frequently encountered including forays over the open seaward sands to approximately 30m away from the frontal dunes. The activity was more frequent in the open frontal dunes as opposed to the rear fixed dunes where the habitat is more variable - in the form of scrub and small pockets of deciduous trees. Deciduous woodland was bypassed in favour of coniferous foraging. **Noctules** were recorded commuting but also foraged

over the open dunes, slacks and a large lake on the peripheries of the coastal habitat. The recording of **Daubenton's** in the open dune system well away from water and woodland habitat was particularly interesting. There was a single recording of a **Nathusius' pipistrelle** at the woodland edge adjoining the dune system. Nathusius' pipistrelle is not a species that is frequently recorded in the Northwest of England but it is interesting to note that the coastal recordings have been in autumn, which may suggest the coast forms part of their migratory patterns, particularly in relation to migration across the Irish Sea.

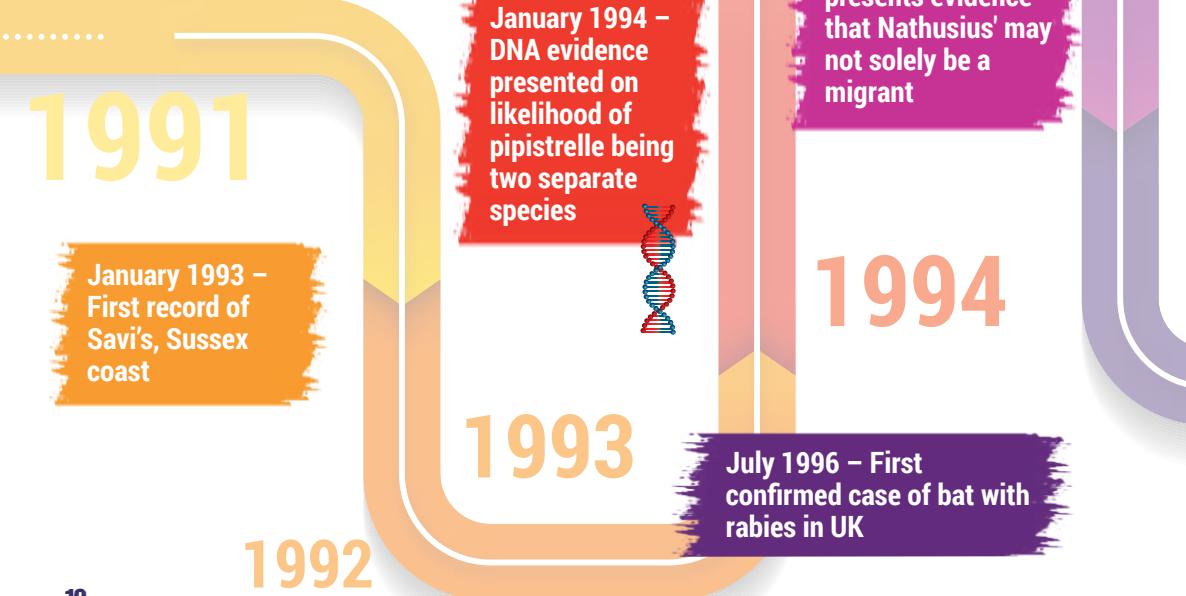


Ainsdale NNR Common pipistrelle commuting and dispersal



Intertidal salt marsh

Bat discoveries over the last 30 years





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2005



2004

2006

2007

2008

2009

2010

2011

2012

2014

2013

2015

2016

2017

2018

2019

2020

2021

October 2005 – Early article on impact of wind turbines on bats

Summer 2008 – Bats announced as UK biodiversity indicators

Winter 2014/2015 – common pipistrelles were found to hibernate in a block of flats in Utrecht, Netherlands

Summer 2010 – Alcathoe added to UK bat species list

2016 – research showed that urbanisation negatively affects even the most common species like common and soprano pipistrelles, with the latter being the most sensitive of the two

2016 – The greater horseshoe bat has been researched in the UK for 60 years by Dr Roger Ransome at Woodchester Mansion. His is the longest single mammal species research project by a single person in the world. This project is still ongoing

2018 – scientific evidence that the Ussurian tube-nosed bat hibernates in snow

2020 – reports suggest that Kuhl's pipistrelle may now be breeding in the UK (it was previously only occasionally recorded in the UK and is classed as vagrant)

2021 – record breaking migration of a female *Nathusius' pipistrelle* who flew from London to Russia (2,018km)



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Discover, Act, Inspire

Discover

- In 1942 the UK had identified 12 species of resident bats, and we now know 17 native bat species breed here. The list is likely to change in response to climate change and other factors over the coming years (Did you read about the Kuhl's pipistrelle in the Winter 2020 issue?)
- BCT started its National Bat Monitoring Programme (NBMP) 25 years ago, it now produces population trends for 11 species
- Currently all 11 species monitored are either stable or increasing, which suggests current legislation and conservation actions are proving successful in helping with the recovery of their significant historical declines
- Data collected by nearly 1000 NBMP volunteers has been used in scientific research and has helped us understand more about bats by enabling us to look at what drives bat populations to change and the impact of human activities
- We now know one of the UK's bat species is a long-distance flyer. The Natusius's pipistrelle migrates across Europe travelling distances of approximately 2,000km
- The Vincent Weir Scientific Award which was established in 2010 to reward and encourage research on the conservation biology of bats by new researchers. This year's winner was R Domhnall Finch for his work on the landscape scale management of greater horseshoe bats.
 - The Kate Barlow Award was set up in honour of the late Dr Kate Barlow and aims to encourage postgraduate students to conduct a substantive bat research project. It was first awarded in 2016 and the latest winner was Laura Torrent who is investigating bat diversity of Equatorial Guinea, one of the most important biodiversity hotspots in Africa.



Act

- BCT continues to provide guidance to professionals to raise standards in bat conservation. Throughout the years BCT has produced guidelines on a number of areas such as bat surveying, lighting, mitigation, bat care, onshore wind turbines, thermal imaging, designing for biodiversity and more.
- Partnership work is central to everything we do and BCT collaborates regularly with other organisations including all the bat groups across the UK. By pooling resources and expertise we aim to have a strong and effective voice for bat conservation.

- BCT started working on the topic of Bats in Churches in 1991. The current collaborative project funded by the National Lottery Heritage Fund which was launched in 2017 and is working closely with over 100 churches to provide guidance and find ways for bats and people to harmoniously use these valuable places of worship.
- BCT's work preventing and investigating bat crime started in 2001. We work with police forces across the UK providing assistance, advice and support to them. In 2020 a company was handed the largest ever fine in relation to a bat crime.
- We run training for professionals, volunteers and many different audiences. Recent examples include bat roost mitigation, masterclasses on tree management, mitigation, historic buildings and ecology guidance.



- In 2020 we launched a new Roost website resource. This aims to promote best practice through the sharing of bat roost mitigation and enhancement case studies, showcasing exemplar work through the Awards and through the Partnership scheme improving products to enhance the built environment for our bats.



Inspire

- There is a continuing need to educate and inform more people about bats. In 2020-21 this has become even more important as misunderstanding around COVID-19 and bats has fuelled fear of bats and threatens to undermine conservation efforts. We have worked with experts nationally and internationally to counter misinformation.
- BCT has answered questions from the public since it was founded in 1991 but it wasn't until 2001 that the first full-time Helpline Officer was hired, 20 years on and the National Bat Helpline now answers approximately 15,000 queries every year, helping callers help thousands of bats and their roosts.
- BCT set up the Pete Guest Award for "Outstanding voluntary contribution to bat conservation" in honour of Pete Guest who was an inspirational figure in the bat conservation movement for more than 20 years. Every year the recipient receives a bronze sculpture of a brown long-eared bat carrying the names of previous award winners. The 2021 winner was Tony Atkinson from the Cornwall Bat Group.
- Long before BCT was created, the bat conservation movement was fuelled by a small number of dedicated individuals across the UK. There are currently more than 80 local bat groups in the UK and they are the mainstay of bat conservation across the country, undertaking vital front-line conservation work.
- 30 years ago, BCT had around 300 members and now we have nearly 5,000.



Celebrating 25 years of UK bat monitoring – past, present and looking to the future

by Parvathy Venugopal

The National Bat Monitoring Programme (NBMP) has been run by the Bat Conservation Trust since 1996 and is a world-leading part of the UK's bat conservation actions. The NBMP is made up of an annual series of bat surveys undertaken by thousands of dedicated volunteers, which allow us to monitor changes in the UK's bat populations.

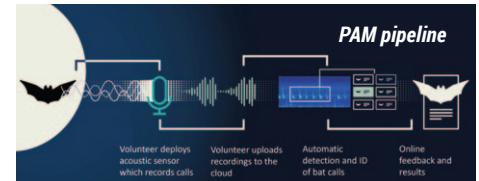
It is the longest running nationwide multi-species mammal monitoring programme in the UK, and it currently provides sufficient data to produce GB level population trends for 11 of the UK's 17 breeding bat species. Every summer, thousands of volunteers – from beginners to experts – venture out to experience the wonder of bats in their natural environment. Our volunteer family has grown more than five times in number since the 1996 pilot year.



We are currently exploring new approaches to bat monitoring within the NBMP which will complement the existing monitoring and fill in gaps in our knowledge of how some of our species are faring.

Passive acoustic bat monitoring surveys

We are developing and piloting a series of exciting new citizen science surveys using Passive Acoustic Monitoring (PAM). PAM



This infographic illustrates the pipeline developed for passive acoustic monitoring, from recording to uploading files to automated classification to

surveys involve deploying static bat detectors which are left out in the field and programmed to trigger recordings of calls from bats flying past. They offer a convenient and consistent way to detect, identify species and measure bat activity over a large spatial scale. We are using AudioMoths, low cost, credit card-sized bat detectors, which are instrumental in enabling us to carry out a UK-wide PAM project. The surveys are very inclusive, since volunteers do not need to have any bat ID skills to take part in PAM surveys. They simply need to set up and install an AudioMoth and then upload the recordings to the cloud where they are processed by two classification algorithms developed at University College London; the first sorts out bat calls from non-bat sounds, while the second classifies the bat calls to species level (where possible).

British Bat Survey (BBatS) – This will be our core PAM survey, designed to produce additional population trends for a range of species. Pilots in Scotland (2018) and South West of England (2019) successfully tested administration of the project, assessed the usability, sensitivity and recording quality of the AudioMoths and the performance of the call classification algorithms.

Woodland bat monitoring – two pilot projects using AudioMoths and the classification algorithms focussing on large-scale acoustic monitoring of bats in woodlands. BCT is collaborating with both Forestry England and Forest Research on these projects.

Nightwatch – this is a simple, night-time wildlife acoustic survey which will be open to all but is currently being piloted in a couple of urban areas. Volunteer Nightwatchers will simply need to put out AudioMoths in their gardens or local greenspaces overnight, then share their wildlife sightings and AudioMoth recordings via a custom app.



© Shirley Thompson

Identification of the calls will be carried out via the classification algorithms. Nightwatch data will be shared with participants, local conservationists, researchers, and policy makers.

Get involved!

Anyone can help to monitor the UK's bats by taking part in our surveys and observing these fascinating mammals in your local area. In this way, you provide us with the information needed to find out how our bat species are faring and discover the factors that are important for their survival. Find out more about how you can get involved at www.bats.org.uk/our-work/national-bat-monitoring-programme.

Future bat monitoring projects of NBMP

The future is exciting! We are planning to design and deliver next generation citizen science monitoring programmes with the aid of the latest cutting-edge scientific tools. Here are glimpses of the innovative methods we are currently looking at embracing:

- BioDAR** – this is a pioneering method to use weather radar data to monitor, detect and differentiate communities of bats in flight and provide relative measures of their abundance, diversity, and their changes in time. We will be aiming to collaborate and conduct parallel observations from the ground and with radar observations to calibrate measures of relative changes in aerial to ground bat communities.
- Genetic monitoring of cryptic bat species** – species identification and distinction among bats, particularly cryptic species such as the "small Myotis" group (whiskered, Brandt's and Alcathoe bat), is often challenging because of their overlapping morphological and acoustic characters. To accurately identify these species and confirm their distribution, we are planning to collect genetic data using bat wing biopsies and droppings surveys. These data will also help us to understand the past changes and to predict the future changes in bat populations in the UK.
- Passive acoustic directional monitoring of UK bats** – Motion tracking or directional monitoring could be used for automated emergence counts from roosts. This is also beneficial to activity surveys by showing precise foraging and commuting landscape areas used by bats and the direction of their commuting. By using a simple method by deploying a conventional static sound recorder that provides tracking information as well as sound recordings. Using two or more microphones and complex computer modelling we can track bats in space by comparing how the signal differs between each microphone: using phase shift (difference in the frequency of the calls) and time shift (difference in timing of the calls)

What have bats done for us?

By Shirley Thompson

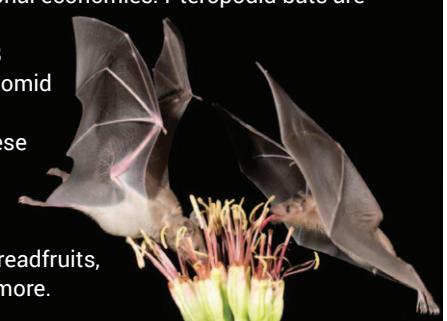
Bats are essential members of many types of ecosystems, ranging from rain forests to deserts. By fulfilling their ecological roles, bats promote biodiversity and support the health of their ecosystems, as well as providing economically important services. Ecosystem services are the benefits obtained from the environment that increase human well-being. As bat enthusiasts we know that bats are special but further studies will allow the wider world to see bats as the complex, fascinating and special animals that we already know they are.

Pest control

All UK bat species and over two-thirds of all bats worldwide eat insects. It has been estimated that, globally, 50% of insect species that eat crops have become pests because chemicals used against them have killed their natural predators. By contrast, bats are natural predators, consuming many crop-eating insects and thereby reducing farmers' need for pesticides. According to a 2011 study, published in *Science*, insect consumption by bats reduces the pesticide bill of the agriculture industry in the United States by roughly \$22.9 billion per year on average.

Pollination

As pollinators, tropical bats provide invaluable support to many local and national economies. Pteropodid bats are known to pollinate flowers of about 168 species and phyllostomid bats of about 360 species. Many of these are cash crops, important for fruit, food, and drinks, including mangos, breadfruits, agave, durians, and more.



© Daniel Hargreaves

Bats as bioindicators

Monitoring habitat loss alone is insufficient to help us understand the response of biological communities to climate change and habitat loss, and the wider-scale impacts on biodiversity. Due to their size, mobility, longevity and global distribution, bats have enormous potential as bioindicators to both disturbance and the existence of contaminants. They are sensitive to accumulations of pesticides and other toxins, and high fatalities observed in bats may provide an early warning of environmental links among contamination, disease prevalence, and mortality.

Bat droppings

Bat droppings (or bat guano) plays an important ecological role in soil fertility and nutrient distribution. Guano from bats has long been mined from caves for use as fertiliser on agricultural crops due to its high concentrations of limiting nutrients like nitrogen and phosphorous, providing some of the world's finest natural fertilisers.

Seed dispersal

Bats are crucial to the survival of the world's tropical forests; as forest is cleared for logging and agriculture fruit-eating bats disperse the seeds of "pioneer plants". These are the first to grow in freshly cleared forest or where a large tree has fallen, enabling a diverse and healthy forest to re-emerge. A single bat may eat as many as 60,000 seeds in one night.

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Immune systems

Like people, bats live in large, dense groups so make good hosts for viruses. However, unlike humans, bats have an immune system which tolerates many viruses that cause havoc when they spread to humans. Scientists are now looking to genomes of bats for clues about how these animals fight off viruses.

Medical research

One of the most famous examples of the impact of bat research on humans is the study of the common vampire bat and the anti-coagulant properties of its saliva; the salivary plasminogen activator (DSPA) is used to treat strokes.

18 of the 19 mammal species that are longer lived than humans are bats. Exciting discoveries, that could help in the study of human age-related illnesses, suggest bats possess mechanisms that allow them to resist age-related stresses and to repair damaged cells. Research being conducted might contribute to better understanding and management of a number of conditions, including deafness and blindness, in humans.

Inspiration for high-tech innovations

Although bat echolocation was only recognised in the late 1930s, the development of sonar for ships and ultrasound was partly inspired by the navigation system used by bats to find and follow their prey at night. Subsequent research has led to advances in biomedical ultrasound, sensors for autonomous systems, and wireless communication.

Ongoing research about the structure of bat wings and the mechanics of bat flight may ultimately lead to the development of technologies that improve the manoeuvrability of airplanes.

Speech and language

Bat communication is being studied to help our understanding of speech and language in humans. Babbling is seen as a very early signpost on the road to language, and juveniles of some species of bat demonstrate babbling and learned songs. Studying how bats can copy noises could help us learn more about humans' unique capacity for speech and language.

Human echolocation

Orientation and mobility training has been developed through research into echolocation. It is helping people who are blind or visually impaired to move through the world with greater independence and safety by learning to use their hearing, including echolocation, more efficiently.



30 years of bat detecting

By Alan Wragg

Portable bat detectors appeared in the mid-1980s, but my introduction to them came in 1990. That summer, I went out with Derbyshire Bat Conservation Group (DBCG), and not long after, I bought a copy of *Bats* by Phil Richardson, my first bat detector, a QMC II mini, and *The Bat Tape* – a booklet and cassette tape of bat calls produced by Northants Bat Group. This was the first comprehensive guide to identifying British bats from their calls using a bat detector.



As I got more involved with DBCG I became closely acquainted with a range of bat detectors. Handheld detectors are all somewhat similar, having a microphone, speaker, and power supply; they pick up the sound of bats echolocating, convert that into something a human can hear and play it back. Early detectors were fairly large and heavy, not fun to carry round on a walk! They used heterodyne to make the bats audible, and while the sound reproduction was usually good, they often included a lot of background noise.

Back in the late 1980s there was a trend of building your own by converting Tandy Sports Radios into bat detectors, bright yellow with a good loudspeaker and a cord to hang around your neck – if you could do the re-engineering, they worked well enough. The Limberick detector which appeared in the mid-1980s, was not tuneable, so you

could only hear whichever species was loudest at the time. The QMC II allowed for some tuning, but with lots of hiss. By today's standards the sensitivity was limited, though the calibration was consistent, and the microphone was OK for the louder *Nyctalus* and pipistrelles or *Pipistrellus*; *Myotis* were difficult unless you knew their location and you would miss brown long-eared entirely unless they were very close. Stag Electronics produced the Bat Box III in the early 1990s, which was a very popular detector having more sensitivity and almost no background hiss. Also from Stag Electronics circa 1993 came the 'Bat Ears', created by Dave King. These were essentially a bat detector in a pair of Sennheiser headphones, which could be tuned to 25khz and 45khz. I loved mine, and they were well used. The 'Bat Ears' were the first detector that I was able to pick up brown long-eared bats with.

Most early bat detectors were heterodyne, great for hearing bats and differentiating the species, but not so good for recording or analysing the calls. Frequency Division and Time Expansion however are different approaches to converting bat sounds to something a human can hear, but they also produce



Early bat detectors

sonograms that can be analysed. In 1996, David Bale's 'Tranquility' was the first portable time expansion detector that DBCG bought, but at that time we had no way to analyse the calls so it was really just a nice noise! The QMC Mini III appeared at about the same time. When one of our group took it to Cornwall to watch greater horseshoes, the Cornwall Bat Group thought it looked like a shampoo bottle.

Around 2004, DBCG became aware of a company called Magenta Electronics, who were based in an old butcher's shop selling heterodyne detectors at an affordable price. The Magenta heterodyne detector used three AAA batteries, was small, light, tuneable, durable and had an incredibly sensitive microphone, and all that for under £100. Initially, we bought 5 Magenta-3s and now have around 40 Magenta-5s. This is still the detector we use for public events and recommend to anyone who asks about buying their first detector.

When I got involved in the National Bat Monitoring Programme (NBMP), I was loaned a Bat Box Duet broadband detector and a mini disk recorder, so I began recording NBMP surveys and using BatSound to look at the sonograms. In 2008, courtesy of another DBCG purchase, I met 'Ulrika', a Pettersson 240 that I still use now. This is a heterodyne/time expansion



The 'Bat Ears' detector

detector which can be connected to a recording device. I have recorded most of the UK species using 'Ulrika' over the years, and I still use BatSound to review the sonograms.

Handheld detectors have changed over time, many are able to work as both heterodyne and broadband devices with integrated recording capabilities, and technology continues to develop. We have devices that fit on mobile phones and can display sonograms in real time like the Echo Meter Touch, detectors that produce a stereo signal good enough to tell you where the bat is and which direction it is going, as well as static devices like the AudioMoth, small and robust enough to record bat activity in all manner of locations. The changes in technology, and the ability to record and analyse large volumes of data has had a huge impact on bat research, but handheld heterodyne detectors have brought bats alive to so many people. How would we manage without them?

BAT CONSERVATION SINCE 1991

by Tony Hutson

In 1991, we opened an office of two staff and a volunteer in Covent Garden with funds for three months – and a plan. Parts of the plan have gone well, others not so well, but we did not envisage the BCT office becoming staffed with the 35 people it is today. BCT was one of the first such organisations dedicated to the conservation of bats; there are now many all around the world.

Conservation issues for bats and their value are increasingly recognised and new threats identified. The conservation of bats relies on knowledge of the animals and their requirements. Advances in techniques that allow previously impossible studies include the development of bat detectors that record and analyse, the development of marking and tracking techniques, equipment allowing remote observation and monitoring of behaviour, and the ability to take tissue that can be used in the laboratory in studies from taxonomy to diseases.

One remarkable change has been in the number of species. In the UK the number of residents has increased from 16 (plus three vagrant species) in 1993 to 18 (plus 7 vagrant species) while the Europe of 1993 included 30 bat species compared with c.55 now. Similarly c.930 species were recognised for the world in 1993, with over 1400 now. Coupled with this increase in diversity, recently developed means of study, including molecular phylogeny, have resulted in major realignments in the classification of bats.

Conservation work has developed in a continuous progression. BCT's National Bat Monitoring Programme (NBMP) initiated in the 1990s, continues to evolve, clearly showing that while some species show slow recovery, others are still on the decline. Such studies need a central body and co-ordination between organisations, so we have seen the development of co-ordinating bodies such as BatLife Europe and RELCOM for Latin American countries. Europe also has EUROBATS, an inter-governmental Agreement, now with 37 national Parties. The global network of the IUCN/SSC Bat Specialist Group produced an action plan for Old World fruit bats in 1992, an outline plan for the rest of the bats in 2001, and continues to act for concerns of global significance.

A number of issues have arisen unexpectedly. The introduction of wind power in the late 1990s is a serious problem for many bats, particularly migratory species. Concern and research has grown globally with the development of guidelines on the siting and use of wind turbines.

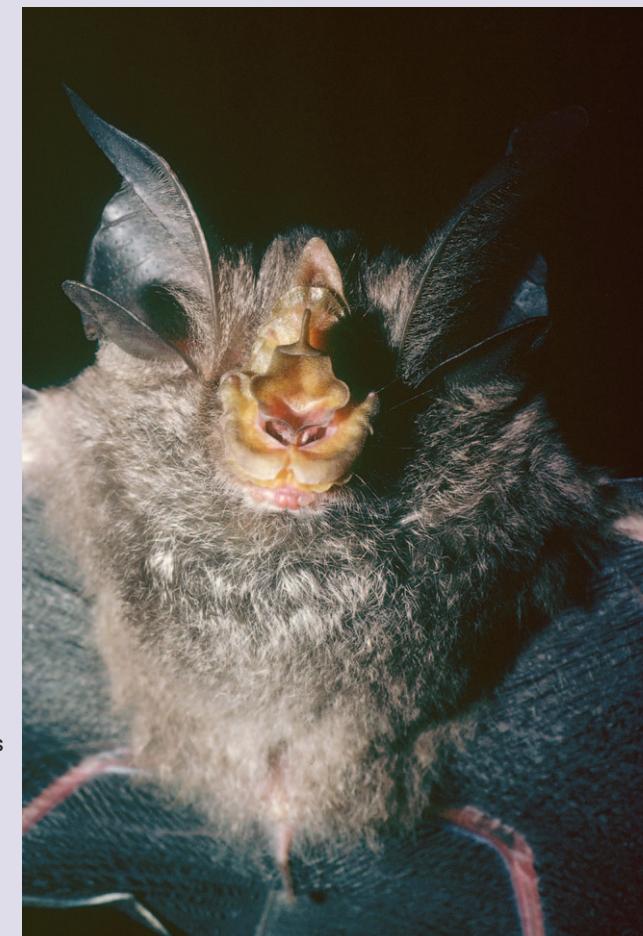
Similarly, climate change was not taken too seriously until the mid-2000s when the ability to model change improved, enabling scientists to investigate its effect on bat species.

Another new threat for bats, White-Nose Disease, has killed millions of bats in North America. It appears to have been a recent introduction from Europe, where its associated fungus is widespread but not a problem to bats. With increasing movement of goods and people, it is likely that other such problems will arise. Bat conservationists have worked with medics and vets for many years to study and monitor the occurrence of viruses in bats. Following the emergence of COVID-19, which is a human disease not a bat disease, campaigns have been waged in various areas of the world against whatever bat colonies are the easiest target.

Nathusius' pipistrelle represents a significant change in the UK. In 1991 with 30 or so records, it was considered a scarce migrant. By 2001 when records had increased to well over 100, and maternity sites had been located, it was classed as a regular migrant and partial resident. A recent national project, including ringing and linked to wider projects, has demonstrated it to be a widespread migrant here with a significant resident population, mainly males, and some breeding. A mix of traditional and novel technology (ringing and tagging) has recently added greatly to our knowledge of this species' migrations, showing extension of the migratory flight to well over 2000km and giving indications of rates of movement and the ability to cross wide expanses of open sea – over 200km across the North Sea.

In the early 1990s the UK population of greater horseshoe bat was estimated to be c. 4000. Today it is reckoned to be over 13,000. Though a long way from the estimated populations of 100 years ago, this is a distinct improvement, largely due to conservation effort protecting roost sites and encouraging good foraging grounds. There is some evidence of a spread in the distribution including a small breeding colony established in the south-east (Sussex), the first for over 100 years and 100km east of its nearest neighbours in Dorset. Concentrated conservation effort here is matched by similar efforts in Belgium, Luxembourg and Germany to protect and encourage populations at the edge of the range.

So, there have been distinct improvements in the last 30 years, but there is still much left to do and new challenges to face.



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Queensland horseshoe bat, Rhinolophus achilles, a recently recognised species in northern Queensland and the Kai Islands (Indonesia). The horseshoe bat family includes one of the highest proportions of threatened species amongst its 110 recognised species. Mostly cave bats often forming large obvious colonies, which are affected by a wide range of problems.

A batty wish list

As BCT celebrates its 30th year, we wonder what the next 30 will hold. We already know some of the biggest challenges in tackling and restoring bat populations, whilst others remain less clear. But what do others think?

We have compiled a wish list from bat workers and researchers on what they would like to see for a better future for UK bat conservation. What do you think? Share your own ideas by tagging us on social media with the hashtag #BatsToTheFuture

First up, Professor Kirsty Park



, Chair of BCT's trustees highlights two desires:

For everyone to have a better appreciation for bats, and a recognition of the key role they play in providing services that we benefit from.

Prioritise landscape-scale habitat creation and restoration to benefit biodiversity in general and bats in particular.



Lisa Worledge, BCT's Head of Conservation Services suggests:

We must ensure bats continue to be protected under increasing pressure from certain lobbies who would like protections lifted from our more common species or in certain built environments.

Get the necessary financial support to achieve bat conservation.

Continue to make space for roosting and foraging bats, amid increasing development and landscape modification pressures.

Halt and reverse invertebrate declines.

We are likely to see new bat species spread to the UK in response to climate change, (eg Kuhl's pipistrelle). We should determine the impact of natural introductions of new species on other wildlife.

Professor Paul Racey, who has been working with the IUCN bat group to address misinformation, has called for the media to pay more attention to scientific accuracy and less to attention-grabbing headlines and straplines.

In a new paper, Prof Racey and team point out that science research is susceptible to miscommunication and misinterpretation – we have seen the consequences with human diseases, for example. Inaccurate communication and misunderstanding on bats and zoonoses has led to persecution and culling of bats globally. It hinders effective research, problem solving and public policy, can provoke unnecessary fear and have devastating effects on wildlife conservation.

Prof Racey's also wants to see the government adequately fund statutory nature conservation agencies.

Naomi Webster, training and conferences manager would like:

"UK Conservation to be more inclusive and engage more diverse audiences with bats, the natural world and its conservation. And we need to live more sustainably and ensure resources are shared equitably, not just across human populations but with the natural world too."



We must also defend and strengthen laws and policy to protect bats and habitats, says **Steve Lucas**, who works on species, policy and law at BCT:

"The protection afforded to bats from the Wildlife and Countryside Act 1981 heralded the start of a new approach to conservation. The Conservation of Habitats and Species Regulations 1994 brought further changes. However, following Brexit there are worrying signs that the current UK Government may be looking to change the way we protect species and manage nature conservation. Our challenge is to make sure bats and nature do not suffer as a result, and that we get support across all sectors of society."

Mark Goulding, wildlife crime project officer, said:

"I'd like to see offences against protected species and their habitats, which includes bats and their roosts, become recordable offences notifiable to the Home Office, with consistent penalties that act as a deterrent."



Jan Collins, head of biodiversity at BCT, said:

"We need a better planning and protected species licensing systems supported by well-resourced professional ecology teams; good quality and easily accessible ecological data; thorough compliance and enforcement procedures; consistent outcome monitoring to improve practice over time."



Dr Orly Razgour who works on climate change impacts on bats at the University of Exeter has called for better knowledge of bat populations at low, medium and high risk from climate change, and better knowledge on where to focus resources. Her work has recently highlighted a need to focus on the adaptive potential of wildlife and to increase landscape connectivity so that bats can shift their ranges.

FIND OUT MORE

A link to indepth analysis of drivers of European bat population changes and evidence gaps published in Mammal Review is on the BCT news web page: <https://www.bats.org.uk/news/2021/02/drivers-of-bat-declines>

A 2021 global review of what we know - and don't yet know - to be effective in bat conservation is available on the Conservation Evidence website: www.conervationevidence.com/synopsis/pdf/32

The Climbats.eu website identifies more climate change knowledge gaps.

Batman Forever!

By Ian Bond

I'd never been in a Spiritualist Church before and to be honest I was a little disappointed. I was expecting a big circular table, shrouds and occult paraphernalia. Instead there were "apple pie and motherhood" posters on the walls, doilies on the tables and the sort of weak tea that you only get in churches. Rather than relay any messages from the other side, the churchwarden merely asked if I wanted sugar in my tea and explained what she'd called me out for. It turned out that something was moving around in the church at night setting off the alarms. I'd have thought they would have been pleased! Instead they passed on the promotional opportunity and went for the more mundane explanation that the culprits were bats. As I clambered into the unlit attic and inched my way along, tapping my feet to feel for the joists under the insulation, I hoped that they were right.

I've been a guest in numerous attics over the years. It's just one of the very many odd situations that bat group members find themselves in and I have the privilege of being part

of both one of the oldest and perhaps the newest, bat groups in Britain. Durham Bat Group - which incidentally must have the best logo of any organisation, bats or otherwise, thanks to the serendipitous combination of a World Heritage Site and a major bat roost - started in 1982 and was soon adding considerably to our knowledge of bats "Up North". At the other end of the scale, Cleveland Bat Group only started as an independent group in 2019 but is already making new discoveries, most notably when a grounded *Nathusius' pipistrelle* turned up in the Station Pub in Loftus at the same time as the group's recorder, Les Bentley.

In common with dozens of other bat groups across the nation, we have been busy transforming the public image of bats from that of blind, blood-sucking, hair-tangling beasts of gothic nightmares to a more realistic appraisal of them as sentient, useful, fellow-mammals that could even be described as being cute (alright, even I don't think they *all* look cute but I get on a roll when I'm doing bat walks!). Bat walks are my favourite part of bat work. Bats always seem to draw a crowd, eager to know more about the little creature that flits briefly through their peripheral vision as they sit round the embers of the barbecue, then disappears back into the mysterious night. Invariably, bat walks are advertised by people who don't know what time it gets dark, so while we wait for night to fall I get the children to "echolocate" at the top of their voices at church walls, whilst the adults wince at the story of how vampire bats win the title of the world's most sociable mammals (the bat's prize-winning performance being to "sick-up" their meals of blood for unrelated vampire bats, as opposed to the kin selection



© Laura Haverson



© Laura Haverson

ethics that leave the rest of us social mammals scrabbling for the runner up spot). On these occasions education bats are a life-saver and my assistant for many years was "Dave the bat", a common pipistrelle who made hundreds of converts merely by sitting on my hand eating mealworms. One little girl, smitten with this tiny ball of fur, cooed, "He looks just like a little teddy bear"; I must have plagiarised that PR phrase on every bat walk since.

I usually start bat talks by pointing out that we aren't entirely sure how many species of bat are resident in Britain and don't even know for sure how many there are in our own county. I recently saw a post on Facebook about there being 1400 bat species worldwide. When I started doing bat work that figure was 982. Admittedly the others haven't all evolved in the intervening period but it does make you feel old. I joined Durham Bat Group around the time the soprano and common pipistrelle were first being recognised as separate species but it was some years before I encountered a soprano in the hand. I'd got a call to say that a bat had been found clinging to the inside of a toilet bowl. The owner of the house where the bat was found told me that it had spent two days down their toilet before they put it in a box and phoned someone for help (I guess they got to the point where they just couldn't cross their legs any longer!) The soprano, at least, made a full recovery.

These days, in my part of the bat world, our next questions to answer are: has Leisler's slipped under the radar and colonised the Northeast; when will we find our first Alcathoe; and, might barbastelles have somehow lingered on in some of our ancient wooded valleys? But bats don't do things in order of probability; bats surprise you! Both Durham and Cleveland bat groups have been involved in various types of bat survey but my favourite has got to be the "Bats and Roadside Mammals", which BCT/MTUK started in 2005. For the uninitiated this consisted of driving round country roads at 15mph in the middle of the night with a flashing, orange beacon on the roof; a bat detector, linked to GPS and a minidisk recorder, stuck out of a window and, our own slant, a spare volunteer clutching a heterodyne with frozen hand stuck out of another window. It was the best traffic control mechanism ever invented; no-one dared to get up even to 16mph to overtake us so we'd lead a slow conga of nervous motorists until we got to the next junction. It also proved to be an excellent way of finding bats, though the results for other mammals were less impressive. On the first survey we drove for an hour and a half around some of the most rural spots in East Durham and the only non-flying mammals that we encountered, alive or dead, were an escaped ferret and a bloke out walking his dog.

All bat workers will have their own stories about the strange places that bats turn up and the strange effects they can have on the people who find them, but the best story must surely go to one of Durham Bat Group's founder members, Ted Welding. Ted had a call late one night



© Ian Bond

from a distraught young woman who had found a bat flying around in her bedroom. She had no one to help her chase the bat out so, ever the gallant gentleman, Ted drove across the county and arrived in the insular, little mining village at one in the morning. All the curtains in the neighbourhood twitched as he knocked on the door. The young lady, still highly agitated, opened the door dressed in her nightie. "Thank God you've come" she shrieked, "I can't wait to get to bed!"

The National Bat Conference 2021

The National Bat Conference is taking place online (via Zoom) on Friday 29 – Sunday 31 October 2021.

We are delighted to announce that our Keynote speaker this year will be Professor Tigga Kingston of Texas Tech University who will open the conference on Friday afternoon.

See below a provisional programme and visit this page for more information and to book your place:

<https://www.bats.org.uk/our-work/conferences-symposia/national-bat-conference>

Friday 29 October – 2pm BST

- Keynote – Professor Tigga Kingston, Texas Tech University
- The role of landscape features in spatial activity patterns of greater horseshoe bats (*Rhinolophus ferrumequinum*): investigating landscape ecology with predictive spatial modelling - Thomas Foxley, University of the West of England
- Workshops (60 mins)
- 5pm – Networking opportunities
- 7pm – Virtual pub opens

Saturday 30 October – welcome at 10am BST

- Talks
 - ◆ Bat Conservation Trust Update - Kit Stoner, Bat Conservation Trust
 - ◆ Impacts of part-night lighting regimes on riparian bats – implications for current mitigation strategies – Jack Hooker, University of West of England
 - ◆ Roost Award 2021 Presentation – Chris Damant, Bernwood Ecology
 - ◆ A novel field survey method to inform the selection of dark corridors for bats – Morgan Hughes and Scott Brown, University of Wolverhampton & Birmingham and Black Country Bat Group
 - ◆ Using GIS methodology to describe and explain bat distribution at a coastal site – Nicky Wood, Nottingham Trent University

- ◆ Towards a field apparatus & method for real-time tracking of an echolocating bat in free space – Robert Chandler, University of Gibraltar
- Workshops (90 mins)
- 16:30 – Networking opportunities
- 19:00 – Big Batty Quiz (also open to non-conference attendees)

Sunday 31 October – welcome at 10:30am BST

- Talks
 - ◆ Advances in trail cameras for recording bats emerging from roosts – Gareth Lang, BSG Ecology
 - ◆ Better bat surveys; Using IR video for bats – Richard Crompton, Ecology on Demand
 - ◆ BCT Wildlife Crime Project – Mark Goulding, BCT
 - ◆ Vincent Weir Award Winner 2020 – Rana Khayat – The cause and effect of wing tears in the common pipistrelle (*Pipistrellus pipistrellus*)
 - ◆ Visual communication of bat facts and encouraging empathy for bats through illustration and storytelling – Emma Reynolds
 - ◆ Panel: Looking back over bat conservation, 30 years of the Bat Conservation Trust, then and now.
- Workshops (90 mins) – workshop details
- 17:00 - Conference closes

What's your most cherished memory of bats?



Perhaps being thrilled by their aerial acrobatics, eavesdropping on their echolocation calls, or meeting a new species for the first time?

With your help we can ensure magical encounters with our unique bats are not just a fading memory but continue to be experienced by all generations.

If you would like to discuss leaving a gift in your will please contact Andreia.

Tel: 020 7820 7164 – Email: andreiacdc@bats.org.uk

<https://www.bats.org.uk/support-bats/legacies-and-memory-giving/leave-a-gift-in-your-will>

State of Nature

Thank you to everyone for signing and/or sharing the State of Nature petition to call on the Prime Minister to make the UK the first country in the world to put nature's recovery in law. The petition was handed into Downing Street on 8th July and it gathered just over 208,000 signatures so thank you for signing and sharing. The Environment Bill returns to Parliament in September, when we hope the Government will listen and set a clear target to halt the decline of nature by 2030. Please continue to contact your MPs in the meantime and let them know why we so urgently need a "net zero for nature" in law.



'Olympian' bat smashes British record for long distance migration

A tiny Natusius' pipistrelle has been nicknamed the 'Olympic bat' by scientists after she beat all known British records and flew 2,018 km across Europe to Russia – one of the greatest ever known flights by a bat. This is one of the longest known bat travels globally, the furthest known record from Britain across Europe and the only long distance movement recorded like this from west to east. Sadly, this little one fell prey to a cat. She was found injured on the ground and rescued by a Russian bat rehabilitation group, but later died. The discovery was reported to the Bat Conservation Trust, which runs the National Natusius' Pipistrelle Project.



Non-Bitumen Coated Roofing Membranes

The Non-Bitumen Coated Roofing Membranes steering group is now aware of the TLX independent testing methodology results for their 'bat safe' membrane, the group is reviewing the results and drafting wording to help best advise the industry. The BCT website will be updated as soon as this is has been agreed.

Concerns about the 7th Quinquennial Review

BCT has signed an open letter to express our concerns over the change to the eligibility criteria by which species will be included on Schedules 5 and 8 of the Wildlife and Countryside Act (WCA). The letter, signed by 33 wildlife NGOs, calls for a public consultation on the decision to change the eligibility criteria. As they stand, the proposed changes would mean that species will only receive legal protection when they are in imminent danger of extinction. This could undermine decades of work to restore and protect threatened species. Under current proposals, bats would maintain their legal protection but the principle established during this review could be used to weaken protection in the future.

Birthday Time! 30 Years of Bats

This year Bat Conservation Trust celebrates 30 years and to mark this special anniversary we have organised a birthday bonanza, consisting of a whole month of batty themed activities for everyone! BatFest was launched on International Bat Night (28th August) and activities include a virtual batty sketch-a-long, a bats and months evening, bats and gardening workshops and more!

25 years of International Bat Night

Since 1997, the last weekend in August has been reserved for bats. Cultural prejudice is one of the important reasons why bats were (and still are) ill-treated. However, the main threat to them is habitat loss due to human activities. To dispel myths and enlighten the general public on the natural value of bats, the EUROBATS Secretariat called for the first International Bat Night in 1997. While in 1997 only 14 countries took part in this event, by 2021 there are over 46 participating states from Europe, Americas, Africa and the Middle East.



Positive signs for Britain's bat species

Five of Britain's 17 breeding bat species are showing positive signs of population increases while another six species appear to be stable, according to the latest results from the National Bat Monitoring Programme. The trends reveal that two of Britain's rarer bats are on rise: the greater horseshoe bat and lesser horseshoe bat; as are the common pipistrelle, soprano pipistrelle and Natterer's bat. None of the 11 species monitored showed any signs of declining. While the data indicate that bat species we monitor are stable or recovering, it should be remembered that these trends reflect relatively recent changes in bat populations.