Focus on bats:
discovering their lifestyle and habitats

NATURAL ENGLAND

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Focus on bats

This leaflet is designed to answer many common questions people have about bats. If, after reading it, you'd like to learn more about bats and their conservation, get in touch with your local bat group or the Bat Conservation Trust (see Contacts, page 22).

In England, all bats and their roosts are protected by law. If you wish to do anything that might disturb bats or affect their roosts you should seek advice from Natural England first. See Bats and the law, page 21.

What's special about bats?

Bats are the only true flying mammals. Like us, they are warm-blooded, give birth and suckle their young. They are also long-lived, intelligent and have a complex social life. Although they're often called flying mice, they're not closely related to mice but form a special group of their own called the Chiroptera (from the Greek words 'chiro' meaning 'hand, and 'ptera' meaning 'wing'). Worldwide, there are over 1,000 bat species, ranging from the tropical flying foxes, with a wing-span of almost two metres (six feet), down to the hog-nosed bat of south-east Asia, which is little bigger than a large bumblebee. In Britain, there are only 17 bat species, all of which are small and eat insects.

In many parts of the world, including Britain, bats have declined drastically in recent years. Although we don't have much historical information on their numbers, it's clear that our bats are under threat and many species are now much less common than they were. One species, the greater mouse-eared bat, is more or less extinct in Britain and several others are very rare.

Group of young brown long-eared bats. Melvin Grey/NHPA

Brown long-eared bat. F. Greenaway

Bat biology

Wings

Bats' wings are made out of a soft, elastic membrane of skin stretched over their arms and legs. Bats have the same types of bones in their arms as humans, but their hand bones are much longer. As their arms and legs help to support the wings, bats find it easiest to hang upside down when they're roosting. Some species wrap their wings around themselves like a cloak when they're asleep.

Sonar

Although bats are far from blind, their eyes aren't much use when hunting insects in the dark. To help them hunt, bats have developed a highly sophisticated echo-location system that allows them to catch tiny insects and avoid obstacles, even in complete darkness. When they're flying, bats produce a stream of high-pitched calls. By listening to the echoes of these calls, they can produce a highly accurate 'sound picture' of their surroundings. Most of these echo-location calls are too high pitched for us to hear, but relatively inexpensive electronic bat detectors are now available that can pick them up and turn them into sounds audible to the human ear.

Greater horseshoe bat, one of our largest species. Stephen Dalton/NHPA

Bechstein's bat. F. Greenaway

Feeding

Worldwide, bats eat many things. Some are vegetarian, eating only fruit or even nectar; while others hunt fish, frogs, mice, or even other bats. However, in countries with cool climates, such as Britain, bats eat only insects, which they catch in flight or pick off water, the ground or foliage. Some bats specialise in catching large insects such as beetles or moths, but others eat very small insects, such as gnats, midges and mosquitoes, catching thousands of them every night. Bats gather to feed wherever there are lots of insects, so the best places to find them include areas of traditional pasture, woodland, marshes, ponds and slow-moving rivers.

Hibernation

There aren't many insects around during the winter, so insectivorous animals like bats have to change their ways in the colder months. Birds change their diet or migrate south to

Bats in buildings

With the clearing of Britain's woodland, bats have had to adapt to living in buildings. Many species now rely heavily on buildings for roosting, so their conservation depends very much on our tolerance and goodwill. Bats are usually temporary seasonal visitors to houses, a little like house martins. They normally form maternity colonies during May or June and then leave during July or August once the young bats are independent. The colonies tend to be most obvious during early July, when the young are starting to fly, but soon after this the adults will start to leave, followed by the young. Of course, different species have slightly different habits, but this seasonal pattern is common to all. The average bat maternity colony in Britain contains about 50 bats and the largest colony ever found contained well over 1,000. Bats choose their roosts quite carefully. During the summer, they look for sites which are warmed by the sun, so they are most often found on the south or west sides of buildings. Most species prefer to roost in quite small spaces and they're not usually found in open, draughty areas.

Pipistrelles, our smallest and most common species, are almost always found roosting in the eaves of houses, or under hanging tiles or wooden cladding on the outside of buildings, rather than in the loft. Pipistrelles colonise new buildings quite readily, so many colonies are in houses built since the 1960s. By contrast, brown long-eared bats, another widespread species, prefer older buildings where they are most often seen inside the loft in a small cluster at the top of the roof ridge.

Important hibernation sites can be protected with specially designed grilles.
Tony Mitchell-Jones/Natural England

Whiskered bat and Natterer's bat in hibernation. The bats are so cold that condensation forms on their fur. Tony Mitchell-Jones/Natural England

warmer climates, but our bats have perfected a different technique – they hibernate. During the autumn, bats put on weight and then, as the weather gets colder, they let their body temperature drop to close to that of their surroundings. They also slow their heart rate to only a few beats per minute. This helps their fat reserves last as long as possible. In this state, bats can't wake up quickly to move out of danger, so they choose undisturbed places to hibernate in.

Surprisingly, bats don't sleep right through the winter but may wake up and go out to feed and drink on mild evenings when some insects are about. Even on very cold nights, bats may be seen on the wing as they move to more sheltered roosts. Flying in winter uses up energy which the bats can't easily replace. Hibernating bats should not, therefore, be disturbed as this might affect their chances of surviving into the spring. Bats have much better control over their body temperature than other hibernating animals, such as hedgehogs or dormice. Even during the summer they can conserve energy by letting their body temperature drop when they're in their roosts. In this way, bats can sleep through periods of bad weather when other small animals might starve to death.

Breeding

Our bats have a unique and fascinating way of fitting their breeding cycle in with hibernation. They mate during the autumn or winter, but the female stores the sperm alive in her body and becomes pregnant the following spring. Pregnancy lasts for six to nine weeks and can vary in length depending on the weather. Usually, only one baby is born each year. This is looked after carefully and suckled for between four and five weeks until it is old enough to fly out and hunt for itself. Bats don't bring food back to the roost to feed their young, so the baby lives only on its mother's milk until it is old enough to fly.

Pipistrelle bat in flight. Hugh Clark/FLPA

Lifespan

Compared with other small mammals such as shrews and mice, bats are amazingly long-lived. They can live for over 25 years in the wild – a remarkable feat for an animal weighing less than 10 grams! Part of the reason for this long life-span might be the fact that they can conserve energy by hibernating. They also breed slowly, producing one baby a year, or every other year. In contrast, a wild mouse will live less than two years, producing up to 100 young in that time.

How do bats live?

Most bats form social colonies for at least part of the year. Female bats gather together in maternity colonies for a few weeks during the summer to give birth and rear their babies (a female bat will usually only give birth to a single baby each year). Once the babies are independent, the colony breaks up and the bats generally move to other roosts. Bats from a wide area may gather together to form these colonies, so any disaster at a summer breeding site can wipe out all the local females.

During the winter, bats aren't often seen, but clusters of hibernating bats are occasionally found in hollow walls when buildings are being demolished, and sometimes turn up in buildings such as churches. Underground places such as caves, mines and cellars can house important numbers of bats during the winter and a few special sites are used by several hundred bats for hibernation.

Where do bats live?

During the summer, bats fly out to feed on insects at night and then spend the day in their roosts. In winter, they hibernate for long periods in sheltered places. Although bats can be found in all sorts of places, there are three main types of roost:

- Buildings, including houses, churches, farms, ancient monuments, fortifications and all sorts of industrial buildings. These are most important in summer, but some are used throughout the year.

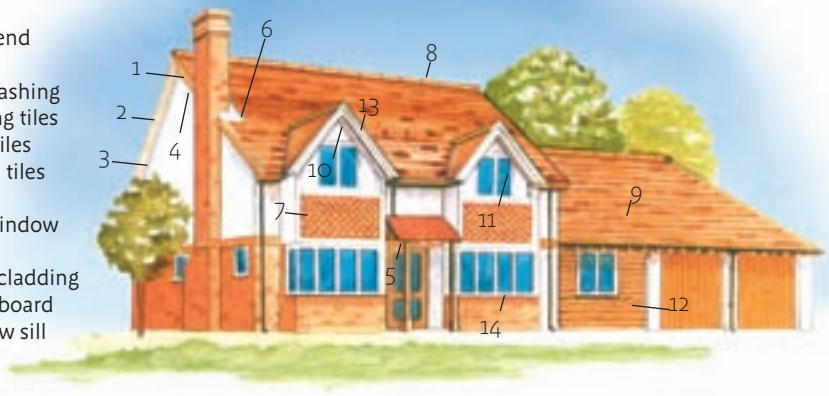
- Caves, mines and other underground places like cellars, ice houses and tunnels. These are most important for hibernation as they give the sheltered and stable conditions that bats need.

- Hollow or damaged trees. Bats roost in cracks, cavities or under loose bark throughout the year.

Each species has its own preferred types of roost. Some are almost always found in buildings, others rely on buildings during the summer and caves or mines during the winter, whilst others prefer trees. Bats are creatures of habit and tend to return to the same sites at the same time year after year. For this reason, roosts are legally protected even if bats don't seem to be living there when you look.

However, bats rarely use the same roosting place all year round as they need different conditions for breeding and hibernating. If bats are present during the summer, it's often possible to see them fly out at dusk, or perhaps even hear them inside the roost on hot days or before they emerge in the evening. Often, though, you will have to look for signs of bats rather than the animals themselves. The most characteristic signs are droppings. These are roughly the size and shape of mouse droppings but, unlike mouse droppings, they crumble to a powder when dry. They're generally found stuck to walls, in small piles beneath where the bats hang, or beneath the roost exit.

1 End tiles
2 Barge board
3 Soffit
4 Gable end
5 Porch
6 Lead flashing
7 Hanging tiles
8 Ridge tiles
9 Broken tiles
10 Eaves
11 Sash window frame
12 Wood cladding
13 Fascia board
14 Window sill



Conservation

Most bat colonies live quite happily with their human landlords, but occasionally problems or concerns arise. However, most bats are seasonal visitors and will leave of their own accord within a few weeks.

If you are unsure about having bats in your roof, you should ask for advice from Natural England before doing anything yourself (see Contacts, page 22). We'll give you free advice on how to solve any problems you might have. You can also download a leaflet *Living with bats* from the Bat Conservation Trust website or request a hard copy from their National Bat Helpline (0845 1300 228).

Droppings

Bat droppings can be unsightly, though in Britain there is no known health risk associated with them. In the loft, the simplest and most cost-effective measure is to cover stored goods with dust sheets, which can be brushed off every now and again. Outside, droppings stuck to walls and windows are usually a temporary seasonal problem, but deflector boards fitted above doors or windows can provide a solution.

Disease

British bats have few diseases that could affect humans and problems are very rare indeed. In recent years, a tiny number of bats have been detected with a rabies-like virus called European bat lyssavirus, which can infect humans. For this reason, you are advised to avoid skin contact with bats or their saliva. Bats rarely come into contact with people, but if you are bitten or scratched by a bat you must seek immediate medical advice. Having bats in your roof carries no risk from this virus.

Noctule bat, a tree-dwelling species. Hugh Clark/FLPA

Pipistrelle nursery colony in a house roof. The young bats are grey. R. E. Stebbings/NHPA

Bats in rooms

Bats generally come and go from their roosts without any trouble, but occasionally turn up inside the house. This seems to be most common when baby bats, which are tiny and grey, crawl out of their roost and find their way into a room. However, there are also cases of young, inexperienced, bats flying in through windows by mistake.

If a bat is flying inside a room, open the doors or windows to allow it to escape. If it has settled, remember that you are advised to avoid direct contact with bats and seek advice from your nearest Natural England office (see Contacts, page 22).

If you have to remove a bat from a room or anywhere else, place a small box or other container over the bat and slide a piece of cardboard underneath to trap it. Alternatively, cover the bat with a soft cloth or towel and gather it up carefully. In both cases you should wear gloves. Carry the bat outside, away from houses, cats and people, and release it, preferably at dusk.

If more than one bat turns up inside your house, it's most likely that they're crawling in from a nursery roost. In this case, block up any holes *inside* the house the bats might be using, such as the gaps around water pipes. However, you must never block external entrance and exit points used by bats. To do so would risk trapping the bats and this would be illegal. If you're not sure what to do, contact Natural England for advice.

Noise and smell

Bats rarely cause any problems with regards to noise or smell. Large colonies of pipistrelles can be noisy during the summer – especially if they're behind cladding outside a bedroom window – but this only lasts

Serotine bat. S.C. Bisserot/Nature Photographers

for a short time before the colony begins to move out. Bat droppings do not normally smell strongly, but can do if they get wet. This might be because the droppings are in a very confined space with little ventilation, or because a building defect is allowing the damp in. In either case, seek advice from Natural England before taking any action (see Contacts, page 22).

Damage

It's almost unknown for bats to cause damage to houses. Unlike birds, they don't bring in material to build nests and, unlike mice or squirrels, they don't gnaw wood or electric cables. Nor do they create entrance holes, they just take advantage of existing gaps. Once inside the roost, they cling on to the timbers or squeeze themselves into cracks and crevices. Most bat colonies are small, with the average colony of 50 bats weighing in at well under 500 grams (1 pound).

Repairs, re-roofing, insulation and alterations

As they depend so much on buildings, bats need our tolerance and help to survive. This is mostly just a matter of leaving the bats undisturbed, but repairs, maintenance and alterations to buildings can affect both bats and their roosts. In these cases, a little forethought can usually minimise the problems.

If you think you have a bat roost in your house and want to carry out work such as cavity wall insulation, re-roofing, roof repairs, alterations in the loft, wall repointing or making repairs to eaves or cladding that might affect bats, seek advice from Natural England before starting. In most cases, it's just a matter of organising the timing of the work to avoid the bats' breeding season and

Daubenton's bat, emerging from tree hole. Hugh Clark/FLPA

Brown long-eared bat in flight. Stephen Dalton/NHPA

Greater horseshoe bat in flight. Stephen Dalton/NHPA

leaving roosts and access points unaltered so the bats can return in following years. If you want to carry out works in a way or at a time that will affect bats or their roosts you will need a licence from Natural England (see Contacts, page 22).

Remedial timber treatment

Treatment for woodworm or rot can be a hazard to bats if carried out with the wrong sort of chemicals, or at the wrong time of year. Fortunately, the situation has improved greatly over the past decade with the introduction of new insecticides such as permethrin, which are much less poisonous to mammals. However, timber treatment still shouldn't be carried out where bats are present. If you think bats use your building, tell your timber treatment company and consult Natural England for advice about the types of chemicals to use and when to apply them (see Contacts, page 22).

Burglar alarms

Sometimes, bats flying in buildings can set off burglar alarms, including those that use light beams, microwave or ultrasonic detectors or passive infra-red (PIR) sensors. Persistent problems can usually be solved by moving the detectors, installing additional sensors or changing the system, for example to modern pulse-count detectors, which are resistant to false alarms.

Churches

Most churches, certainly those in southern England, are used by bats at some time of the year. However, despite the saying, bats are rarely found in belfries which are too exposed and draughty. In most cases, the number of bats is small and the only problem is a scattering of droppings, which can easily be swept away. Occasionally, urine spotting appears on brass, marble or polished surfaces. This staining can be minimised by treating floors or polished surfaces with an emulsion wax polish, and brass with a strippable lacquer. A few churches may have larger numbers of bats and, here, specific advice on the management of the colony may be needed.

Bats out of doors

Underground

Many bats rely on underground sites such as caves, mines, tunnels, cellars and ice houses for hibernation or, occasionally, breeding. Unfortunately, these sorts of places are sometimes deliberately blocked up for safety reasons or accidentally blocked by people dumping rubbish. When this happens, bats lose a hibernation site or, worse still, are sealed up inside. If you're planning to block, cap, grille or demolish any sort of underground place which might be used by bats, consult Natural England before starting work (see Contacts, page 22). Also, try not to go into such places during the winter if you think bats may be hibernating there.

Bat grilles

Underground sites, such as caves, mines, cellars or tunnels, can be protected with specially designed grilles which will keep people out but allow bats in. These need to be built to a tested specification and fitted carefully. If you know of a site that needs protecting, contact Natural England for detailed advice.

Barbastelle bat, one of our rarest species. S.C. Bisserot/Nature Photographers

Hollow and damaged trees

Mature and dead (or dying) trees often have hollow trunks or branches, and these are important refuges for bats and other wildlife. However, they are often 'tidied up' without any thought for their value. Hollow trees should always be left standing if possible, or made safe by the lopping off of branches. Even hollow branches on healthy trees can be important for bats. The same applies to trees that have been damaged by high winds, fire or lightning – these often contain valuable roosting sites.

Bat boxes on trees in Cambridgeshire. David Warren/FLPA

Helping bats

Here are some ways in which people can give bats a helping hand.

Bats in the garden

Selective planting can help to attract the insects that bats feed on. Especially useful are ponds and night-scented flowers and shrubs. Examples of the latter include evening primrose *Oenathera biennis*, night-scented stock *Mattiola bicornia*, lemon balm *Melissa officinalis*, borage *Borago officinalis*, honeysuckles *Lonicera sp*, and ivy *Hedera helix* – there are many others.

You can download a leaflet *Encouraging bats – a guide for bat-friendly gardening and living* from the Bat Conservation Trust website, or request a hard copy from the National Bat Helpline (see Contacts, page 22).

House roosts

You can make your house accessible to bats by providing entrances in the right places, but it's just a matter of chance if bats find them. Access holes should be no larger than 20 mm wide and the best places to put them are along eaves near the corners of buildings or at gable apexes.

Bat Boxes

These are similar to bird boxes, but with an entrance specially designed for bats. Ideally, they should be placed in areas where there are a lot of insects for food, but few natural roosting places, for example, a conifer plantation. Bats will sometimes use boxes erected on houses, but don't be disappointed if the box appears to stay empty. Boxes should be put up as high as possible and face south to catch the sun. Your local bat group will be able to advise you, or you can contact the Bat Conservation Trust or Natural England for a leaflet on bat boxes (see Contacts, page 22).

Identifying bats

Even experts find bats difficult to identify, as most species look quite similar. The ones that stand out from the crowd are long-eared bats, whose ears are almost as long as their bodies, and horseshoe bats, which sleep hanging upside down.

Britain's bats (from most to least common)

Species in houses	Frequency	Main distribution	Main roosts
Common pipistrelle	Common	Throughout Britain	Buildings, trees
Soprano pipistrelle	Common	Throughout Britain	Buildings, trees
Brown long-eared bat	Common	Throughout Britain	Buildings, trees
Serotine	Local	Southern England	Buildings
Lesser horseshoe bat	Local	S-W England & Wales	Buildings, underground sites
Natterer's bat	Uncommon	Throughout Britain	Buildings, underground sites
Whiskered bat	Uncommon	England and Wales	Buildings, underground sites
Daubenton's bat	Uncommon	Throughout Britain	Buildings, underground sites
Noctule	Uncommon	England and Wales	Trees
Greater horseshoe bat	Rare	S-W England & Wales	Buildings, underground sites
Leisler's bat	Rare	England	Buildings
Brandt's bat	Rare	England and Wales	Buildings, underground sites
Barbastelle	Rare	England (south)	Trees, underground sites
Grey long-eared bat	Very rare	Southern England	Buildings
Bechstein's bat	Very rare	Southern England	Trees, underground sites
Nathusius' pipistrelle	Very rare	Throughout Britain?	Buildings
Greater mouse-eared bat	Extinct?	Southern England	Buildings, underground sites

Bats and the law

All bats and their roosts are fully protected by the Wildlife & Countryside Act 1981 (as amended) and the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).

We recommend that you consult Natural England before you do anything that might affect bats or their roosts (see Contacts, page 22).

You must not:

- **Deliberately kill, injure, catch or keep bats.**
- **Damage or destroy bat roosts.**
- **Deliberately disturb bats, for example, by entering known roosts or hibernacula.**
- **Sell, barter or exchange bats, alive or dead.**

Remember that, because bats return to the same places year after year, a bat roost is protected even if there aren't bats there all the time.

The law allows you to tend disabled bats or kill seriously injured ones. Other activities, such as catching, ringing or photographing bats or disturbing them whilst roosting, can be licensed by Natural England provided they are undertaken for scientific, educational or conservation reasons.

Activities that affect bats:

- **Blocking, filling or installing grilles over old mines or tunnels.**
- **Building, demolition, alteration or maintenance work.**
- **Getting rid of unwanted bat colonies.**
- **Removal of hollow trees.**
- **Re-roofing.**
- **Remedial timber treatment.**
- **Re-wiring or plumbing in roofs.**
- **Cavity wall insulation.**
- **Treatment of wasps, bees or cluster flies.**

Trees like this dead oak provide valuable roosting places for bats. Walter Rohdich/FLPA

Contacts

Natural England
1 East Parade
Sheffield, S1 2ET
Enquiry Service: 0845 600 3078
enquiries@naturalengland.org.uk
www.naturalengland.org.uk

Bat Conservation Trust
15 Cloisters House
8 Battersea Park Road
London, SW8 4BG
National Bat Helpline: 0845 1300 228
enquiries@bats.org.uk
www.bats.org.uk

The Bat Conservation Trust is the only organisation solely devoted to the conservation of bats and their habitats in the UK. A range of information leaflets is available to download from the website or upon request from the helpline.

Bat Groups
Most counties have local bat groups which are involved in a range of practical conservation projects to help bats. New members are always welcome. Contact the Bat Conservation Trust (details above) for the name of your local group.

The Mammals Trust UK
15 Cloisters House
8 Battersea Park Road
London, SW8 4BG
Tel:020 7498 5262
www.mtuk.org

The Vincent Wildlife Trust
Tel: 01531 636 441
www.vwt.org.uk

Bat Conservation International (BCI)
P.O.Box 162603, Austin, TX 78716 USA
www.batcon.org

Further Information

This is one of a range of wildlife gardening booklets published by Natural England. For more details, contact the Natural England Enquiry Service on 0845 600 3078 or e-mail enquiries@naturalengland.org.uk

Natural England also produces *Gardening with wildlife in mind*, an illustrated wildlife reference. Originally on CD but now also available on-line, *Gardening with wildlife in mind* has detailed information on 800 plants and animal species often found in our gardens, and shows how they are ecologically linked. See www.plantpress.com

Other titles

Bat boxes – a guide to their history, function, construction and use in the conservation of bats
Stebbings, R. E. & Walsh. S. T.
Bat Conservation Trust. 1991.

Living with Bats
Bat Conservation Trust

Brown long-eared bat in house roof. John Hawkins/FLPA

Encouraging bats – a guide for bat-friendly gardening and living.
Bat Conservation Trust

Bats in the garden
Shirley Thompson.
School Garden Company. 1996.

Bats
Phil Richardson.
Whittet Books. 2000.

Bats in houses
A. M. Hutson.
Bat Conservation Trust. 1993.

Natural England works for people, places and nature to conserve and enhance biodiversity, landscapes and wildlife in rural, urban, coastal and marine areas. We conserve and enhance the natural environment for its intrinsic value, the wellbeing and enjoyment of people, and the economic prosperity it brings.

www.naturalengland.org.uk

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