Urban Mammals

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Surveying and monitoring urban mammals

• Indirect methods
  • Householders and volunteers
    • Sightings
    • Signs
  • Direct methods
Bristol

Most common species: bats, fox, grey squirrel, hedgehog, mice, voles

![Graph showing attractiveness scores for 10 principal species/species groups. Householders were asked to score each species on a scale of 1–10, where 1 = ‘really dislike’ and 9 = ‘really like.’](image)

Baker & Harris 2007
>20 individual species of wild mammal regularly identified, including many Species of Conservation Concern.

- **Commensals**
  - Brown rat
  - House mouse

- **Insectivores**
  - Hedgehogs
  - Mole
  - Shrews (common, pygmy, water)

- **Rodents**
  - Squirrels
  - Wood mouse
  - Bank vole
  - Field vole
  - Water vole

- **Bats**

- **Carnivores**
  - Fox
  - Badger
  - Cat

- **Mustelids**

- **Rabbits**

- **Deer**
  - Roe
  - Muntjac

First survey was in 2003

Number of different species and groups of species recorded from a combination of the sightings and sign surveys in 2003. Scarce species included hazel dormouse, red squirrel, water vole and pine marten.

Carter, Bright & Bowen 2003, PTES, Mammals Trust UK
Mean (± 1 SE) number of species of wild mammal recorded at each category of site type. 2003-2008 PTES.

Recorder effort differs at different times of the day. The median (horizontal lines), interquartile range (boxes) and maximum range (error bars) are shown.

Carter, Bright & Bowen 2003, PTES, Mammals Trust UK.
<table>
<thead>
<tr>
<th></th>
<th>Dawn</th>
<th>Day</th>
<th>Dusk</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedgehog</td>
<td>0.1</td>
<td>0</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Fox</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Grey squirrel</td>
<td>0.15</td>
<td>0.7</td>
<td>0.15</td>
<td>0</td>
</tr>
<tr>
<td>Badger</td>
<td>0.25</td>
<td>0</td>
<td>0.25</td>
<td>0.5</td>
</tr>
<tr>
<td>Roe deer</td>
<td>0.4</td>
<td>0.05</td>
<td>0.4</td>
<td>0.15</td>
</tr>
<tr>
<td>Muntjac</td>
<td>0.4</td>
<td>0.1</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Bats</td>
<td>0.1</td>
<td>0</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Rabbit</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Mice</td>
<td>0.2</td>
<td>0</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Voles</td>
<td>0.35</td>
<td>0.1</td>
<td>0.35</td>
<td>0.2</td>
</tr>
<tr>
<td>Brown rat</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Shrews</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Cats</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Probability of sighting mammal species during different times of the day and night. Dawn is defined as one hour before or after sunrise, dusk as one hour before or after sunset. Carter, Bright & Bowen 2003, PTES, Mammals Trust UK.

The percentage of sites at which particular species (or groups of species, such as deer and bats) were recorded in each year of the survey.
So, where are they found?

Note:
There are 3,267,174 gardens in Greater London, with an area of 37,942.09 ha.
common

Park

Allotment

Railway
Hedgehogs
The percentage of sites recording hedgehogs. The overall trend for the six years of the survey to date is shown by the grey line.

PTES 2008
Female hedgehogs prefer back gardens of semi-detached and terraced houses, rather than detached homes - these provide ample food, but are safer, as female hedgehogs are less likely to be attacked by urban badgers, or be disturbed by dogs or people.

Male hedgehogs take more risks and are more likely to roam across gardens of larger detached houses in search of new mates.

Hedgehogs prefer back gardens rather than front gardens.

Hedgehogs are more active after midnight than before, probably because of less human activity at this time.

Dangers:
- Roads
- Urban badgers
- Agricultural chemicals

Bats
The percentage of sites recording bat species.
PTES 2008

<table>
<thead>
<tr>
<th>Species</th>
<th>Conservation status in UK</th>
<th>Conservation status in London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater horseshoe bat</td>
<td>Endangered</td>
<td>Extinct</td>
</tr>
<tr>
<td>Lesser horseshoe bat</td>
<td>Endangered</td>
<td>Extinct</td>
</tr>
<tr>
<td>Whiskered/Brandt's bat</td>
<td>Both vulnerable</td>
<td>Both rare</td>
</tr>
<tr>
<td>Natterer's bat</td>
<td>Vulnerable</td>
<td>Scarcist</td>
</tr>
<tr>
<td>Daubenton's bat</td>
<td>Not Threatened</td>
<td>Locally frequent but declining</td>
</tr>
<tr>
<td>Serotine</td>
<td>Vulnerable; declining</td>
<td>Widespread but declining</td>
</tr>
<tr>
<td>Noctule</td>
<td>Vulnerable; declining</td>
<td>Widespread but declining</td>
</tr>
<tr>
<td>Leisler's bat</td>
<td>Vulnerable</td>
<td>Scarce</td>
</tr>
<tr>
<td>Common pipistrelle</td>
<td>Not Threatened</td>
<td>Common</td>
</tr>
<tr>
<td>Soprano pipistrelle</td>
<td>Not Threatened</td>
<td>Common</td>
</tr>
<tr>
<td>Natrixus's pipistrelle</td>
<td>Rare</td>
<td>Rare</td>
</tr>
<tr>
<td>Brown long-eared bat</td>
<td>Declining</td>
<td>Scarce</td>
</tr>
</tbody>
</table>

London’s bats

London Bat Group
http://www.londonbats.org.uk
Urban carnivores

Mustelids
The proportion (%) of all sites recording small mustelid species (stoat, weasel, polecat, otter and mink). There were no records of pine marten in 2009.
Foxes seem to prefer those cities and suburbs with:

- medium to large size back gardens, that provide:
  - a diverse array of food
  - cover during the daytime
  - den sites (hedges, scrub, compost heap, sheds)
  - an absence of stray dogs

In Britain foxes are very common in cities with residential areas of the type built in the 1930s, which have medium to large size back gardens.

There are fewer foxes in large industrial towns and in modern housing developments with small back gardens.

Thus, the lack of gardens of suitable size, which provide cover for the foxes to hide during the day, is also the reason why foxes are rare in some cities.
Foxes hit the headlines for the wrong reasons

Foxes recovered dead on Bristol roads between 1977 and 1989 according to sex and age.

Foxes recovered dead on Bristol roads between 1977 and 1989 according to road type.

Baker et al. 2007
Urban badgers – another source of human-carnivore conflict, particularly damage caused by setts

Densities of setts can be high in urban areas and badgers tend to use fewer setts than their countryside counterparts.

Outlier setts particularly used for efficient and ‘safe’ travel throughout their ranges.

But the reverse! Mccullagh doesn’t live in the countryside. His home is a semi-detached house in downtown Cheshunt. And the tunnels, holes and mounds of earth that now make up his badger are shared by neighbours on both sides. “Ten years ago my garden was delightful,” he says. “But it took a while, my garage is unsuitable and the badgers have burrowed under my patio towards the house.”

He’s not alone in voicing his frustration. So many residents in his newly urban community are experiencing the same distress caused by badgers, that Conservative MP David Amess is taking up their cause in Parliament. For what all these residents share, as well as homesighted by damage, is a sense of hopelessness in the face of a law which prevents them from taking action.

“The foundations of garages are now beginning to shift,” says Amess. “They’re getting into properties and you can’t even go out in the garden.”

FIG 172. Home ranges of ten individual badgers from six different social groups, in the city of Brighton, UK. Capital letters (FR, WT etc.) denote different social groups. (From Davison et al., 2008b)
• In Brighton, individual badger range size is negatively correlated with the availability of garden habitat - good food resources provided by gardens enabled ranges to be small.

• Group ranges were mostly non-contiguous and there was no evidence of territorial scent marking

• Activity was mainly restricted to areas in the vicinity of main setts.

• It is clear that badgers can adapt successfully to urban habitats and that this process affects various aspects of their behaviour. Davison et al. 2009
Cat predation in urban areas

Bristol – 229 cats/sq km; area 4.2 km²; mean predation rate = 21 prey/cat/year

Baker et al. 2005
Some rodents can be a nuisance...or more than a nuisance!
Squirrels damage trees

Grey squirrels replace native red squirrels
1930

Sites of introduction 1876-1915

Grey

1944/45

Overlap

Red

Grey

From Middleton 1932

Greys continue to expand their range in Britain, and replace reds.

Source: Forestry Commission
Squirrels – colour varieties

Cambs, Beds and Herts – melanic or black squirrels
Grey squirrels are a nuisance in other ways.

Manchester News

Squirrels leave trail of chaos at hospital

A PAIR of squirrels scared the life out of a workman and left him dangling by his fingertips from a loft at a Cheshire hospital.

The two rodents caused mayhem at the Macclesfield Hospital by gnawing through computer cables - leaving five consultants and medical secretaries unable to use the computer system.

Hospital electrician, Terry Costello had to be rescued by a colleague after he went to investigate the damage.

When Terry climbed into the loft one of them jumped out and surprised him. He panicked, kicked his ladders away and was left dangling.

Terry scrambled back into the roof-space and phoned a colleague who came to his rescue half-an-hour later.
House mouse
Brown rat

Urban small mammals
Densities of four small mammal species in urban habitat patches in Oxford.

Dickman & Doncaster 1987

Some of the more unusual urban mammals
Water vole

“A brown little face with whiskers. A grave round face, with the same twinkle in its eye that had first attracted his notice. Small neat ears and thick silky hair. It was the water rat!"
(Kenneth Grahame, *The Wind in the Willows*, 1908)

Between 1988 and 1998, there has been an 88% loss in national population; 98% in some regions.

- Loss and fragmentation of habitats.
- Disturbance of riparian habitats.
- Predation by mink.
- Pollution of watercourses and poisoning by rodenticides

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Water vole in London
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Water voles in London
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Percentage of watercourse with water voles present on Dartford Marshes
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Groundworks 2002
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In UK, the garden resource is large:

- 23 million households have access to a garden (87% of households)
- Average garden size is 190 m² = 433,000 ha
- 48% of households provide food for birds – this will also attract mammals
- Gardens contain ~3 million ponds and 29 million trees

Add to this other green spaces:

- Parks and commons
- Allotments
- Cemeteries and golf courses
- Trees/woodland patches/scrub
- Road verges/railway verges/river banks/canal banks
- Water: rivers, canals, lakes and ponds

These form a network of habitat patches, many separated by housing, office blocks and roads
Urban networks of habitat patches:

- Can be detrimental to mammal species
  - Lack of food and nest/safe sites
  - Predators such as cats, foxes, badgers
  - Disturbance by humans, light and noise
  - Roads and habitat fragmentation

- Some species may be survive and even be more abundant than in the countryside
  - Absence of some predators
  - Abundance of food/ nest sites provided by humans (e.g. commensal rodents, foxes)

But mammals are negatively affected by increased fragmentation and reduced proximity of natural and semi-natural habitats, decreasing garden size and garden structure.

Baker & Harris 2007
Thus, the future of urban mammals and other wildlife very much depends on “green” spaces and the corridors between them.