Mitigation for roosts in buildings
Workshop National Bat Conference 2009

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Outline of workshop

• Background
• Learning from mitigation licences
• Factors to consider in roost design planning
• What further information do we require.
Importance of buildings to bats

- Loss of woodland cover.
- Structure of woodland – few old trees.
- Many bats now rely on buildings.
- Conflicts: development, home owners.
- Building regulations – fewer potential roost sites in new buildings.
- BUT – Increasing awareness of bat conservation
Impacts of development on bats using licence returns

Looked at 1000+ licence returns and analysed 305.

Each scored according to following categories:

1 – Precautionary licences – feeding perch, no bats seen.

2 – Small number of bats – few droppings, 1 or 2 bats seen.

3 – breeding colony of brown long-eared or pipistrelle spp.

4 – breeding colony of *Myotis* or serotine bats.

5 – breeding colony of horseshoe bats.
### Results

- **Precautionary licences:** 8.2%
- **Small nos. of bats:** 70.2%
- **Maternity roosts of ble/pip:** 16.4%
- **Maternity *Myotis*/*Serotine* bats:** 4.3%
- **Maternity roosts of horseshoe bats:** 1.0%
# Impacts on bat roosts

<table>
<thead>
<tr>
<th>Roost type</th>
<th>%</th>
<th>Monitoring required</th>
<th>Impact on roost from development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor roosts</td>
<td>78.4</td>
<td>None</td>
<td>Mitigation ranged from bat boxes of to elaborate bat lofts. Some monitoring.</td>
</tr>
<tr>
<td>Maternity pips/ble</td>
<td>16.4</td>
<td>2 years preferred</td>
<td>Greatest impacts on these species from roost losses through development. Monitoring variable.</td>
</tr>
<tr>
<td>Maternity - rarer bat species</td>
<td>4.3</td>
<td>At least 2 years</td>
<td>Bridge repairs, church repairs, building renovations. Only one new roost. No impacts on whole.</td>
</tr>
<tr>
<td>Maternity - horseshoe bats</td>
<td>1.0</td>
<td>As long as possible</td>
<td>Minor disturbance through roof repairs. No lasting impacts. Good monitoring.</td>
</tr>
</tbody>
</table>
Impacts on brown long-eared bats

Typical roosts in large, uncluttered roof spaces

**Analysis of licence returns:**

• Retain roof space - bats return.
• Create new loft elsewhere in building or in existing building on site - good chance of success.
• Reduce loft space - bats may not return.
• Create loft in new house or over new garage – no evidence of success so far beyond a few droppings.
• **Why?** – don’t know.
Totterdown Farm, near Fairford, Gloucs
Totterdown Farm
Sure Start Centre, Langold, Notts
Sure Start Centre
Learning from mitigation successes and failures

- Secure best possible outcomes for bats
- Monitoring – ecological consultants
- Capturing data - Natural England
- Analysis of data
- Disseminating evidence via Natural England mitigation guidelines and good practice guidance
Retain or adapt the original roost
Retain flight paths and foraging habitat
Location, location, location

• Functional connection to suitable habitat for commuting and foraging – this various from species to species.
• Should preferably be on known existing and retained bat flight paths or close to foraging habitat.
• Must have appropriate solar radiation and therefore orientation - not too shaded by buildings or trees.
• Should not be adversely affected by adjacent land-use.
• Address practical long-term management.
Roost design and structure

- Requirements vary from species to species e.g. BLE, pipistrelles, horseshoes and natterers.
Temperature Regimes

• Bats select warm places for maternity roosts.
• How important is temperature for the different species compared to other factors in influencing roost selection?
• Current guidance in the Bat Mitigation Guidelines in effect says as hot as possible, but does not provide details of roosting temperatures regimes.
• What are the temperature ranges we should be targeting in new roosts?
• Is it possible/sensible to try and deliver all temperature requirements in a single roost?
Temperature ranges by species

<table>
<thead>
<tr>
<th>Species</th>
<th>Temperature regimes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipistrellus pipistrellus</td>
<td>Maternity roost 12.7 – 44.6°C – mean 23.9°C Mean daily temperatures 16.9 – 36°C. Roosts significantly warmer than random control buildings</td>
</tr>
<tr>
<td>Pipistrellus pygmaeus</td>
<td>10.9-38.60°C – mean 22.30°C. Mean daily temperatures16.2-34.50°C. Roosts not significantly warmer than random control buildings.</td>
</tr>
<tr>
<td>Plecotus auritus</td>
<td>Maternity roost  6.3 – 40.6°C – mean 17.9°C. Mean daily temperatures 10.7 – 26.6°C. The mean in random control buildings was 16.7°C.</td>
</tr>
<tr>
<td>Myotis mystacinus</td>
<td>Edwardian school building. 3.5- 47.9°C – mean 20.25°C. Mean daily temperature (June to August) 14.91 – 32.59°C. High temperature range and seem able to put up with very high temperatures?</td>
</tr>
</tbody>
</table>
## Temperature regimes

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<tr>
<td>Myotis nattereri</td>
<td>Attic roof - 10.8 - 46$^\circ$C - mean 21.7$^\circ$C. Mean daily temperature 22.5$^\circ$C. Attic mortise – 15.2 – 27$^\circ$C – mean 20.1$^\circ$C. Mean daily temperature 20.0$^\circ$C. Tree cavity – 10.3 – 25.6$^\circ$C – mean 17.2$^\circ$C. Mean daily temperature 17.3$^\circ$C.</td>
</tr>
<tr>
<td>Eptesicus serotinus</td>
<td>Attic roof s (SW Germany and Luxembourg). 11-43$^\circ$C. Mean daily temperature ranged between 22.1$^\circ$C and 23.2$^\circ$C at two different roost sites over 2 years.</td>
</tr>
<tr>
<td>Rhinolophus hipposideros</td>
<td>Roof apex mean temperature of 16.3$^\circ$C. Mean temperature at bat cluster point 30.9$^\circ$C. Once a cluster has fully formed mean temperature 34$^\circ$C.</td>
</tr>
</tbody>
</table>
Further information – what do we need to know?

“There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know”. Donald Rumsfeld
Questions and research needs

• Better understanding of the relative importance of location, design and temperature on roost selection by all species.
• Better guidance on factors influencing roost selection for each species.
• More information on roost temperature regimes.
• Stronger link between guidance on new roost design and the EPS licensing system, in particular setting targets for particular temperature regimes and monitoring to ensure they are delivered.
Questions and research needs

• Better understanding of why BLE new roost designs are not working.
• Other than the quality of the new roost design what other factors will influence the use of the new roost – e.g. Availability of suitable known alternatives to the colony.
Thank you
Temperature references

• Boonman, M (2000). Roost selection by noctules (Nyctalus noctula) and Daubenton’s bats (Myotis daubentonii)