

European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)

**Second Report by the United Kingdom under
Article 17**

**on the implementation of the Directive
from January 2001 to December 2006**

Conservation status assessment for :

S1326: *Plecotus auritus* - Brown long-eared bat

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

Please cite as: Joint Nature Conservation Committee. 2007. *Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006*. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17

S1326 *Plecotus auritus* Brown long-eared bat

Audit trail compiled and edited by JNCC and the Inter-Agency Mammal Working Group

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

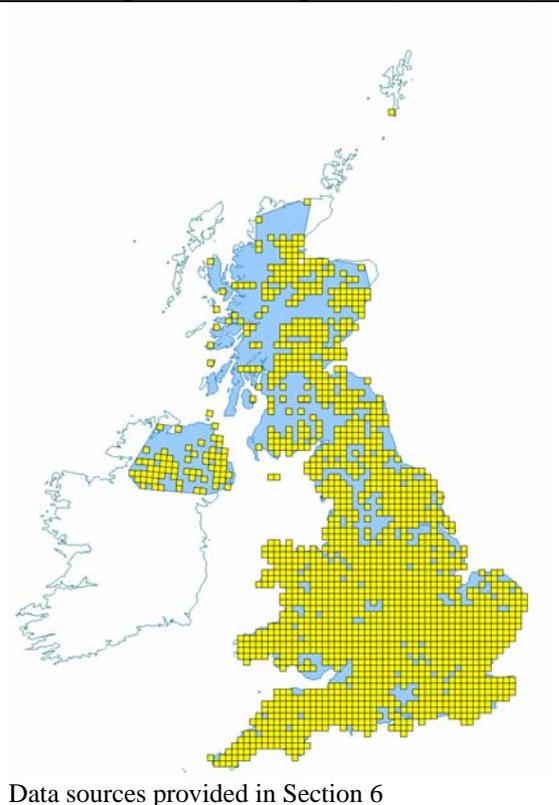
1. Range Information^{2,3}

Plecotus auritus is widespread across the UK, with the exception of the Scottish islands.

1.1 Surface area of range^{2,3,1} 234,142km²

The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (see Map 1.1). The value of alpha was set at 45 km to reflect the mobility of this species.

Map 1.1 Current extent of occurrence
and occupied 10-km squares (1980-2006)



1.2 Date of range determination^{2,3,2} 1980 – 2006

1980-2006 has been selected as the date range to reflect current range/surface area for the species for the following reasons:

- There are limitations in the quality of the data available. The largest dataset used, Distribution atlas of bats in Britain and Ireland (Richardson, 2000) has data ranging from 1980-1999 but the year of recording for individual records within this dataset is not known, making it impossible to divide the data into different date ranges. Deviating from this time period would mean having to exclude these records, and since other datasets may not be fully comprehensive in isolation of these, such exclusion would be inappropriate.
- The greatest level of change affecting populations of this species probably occurred prior to 1980, and so this time range is likely to reflect current distribution and range.
- International treaties and national protective legislation affecting all European bat species came into force from 1980 onwards and is likely to have had an effect on their status.

1.3 Quality of range data^{2.3.3}

Moderate

Since the early 1980s there has been an increase in the level of survey effort afforded to UK bat species following the increased level of protection in wildlife legislation, such as the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, &c) Regulations 1994 (and equivalent legislation in Northern Ireland), and a growing interest in wider conservation issues. There have been no structured distribution surveys for this species and records are based on ad-hoc recording in the field, bat roost visits following enquiries to the statutory nature conservation agencies (SNCOs) and data from surveillance schemes. However, this species is often found in buildings and its presence is recorded when advice is sought regarding building renovation or development, so level of recording is likely to be high. The species has also been the subject of several extensive research projects (Stebbing 1966; Entwistle *et al.*, 1996, 1997; Swift 1998).

1.4 Range trend^{2.3.4} & Range trend magnitude^{2.3.5}

Stable

Recording effort prior to 1980 was very sparse, and it is difficult to know the true extent of the species range in the past. However, recent recording effort is much more comprehensive for the reasons already stated and there is no evidence of a range change (see 1.7). In fact, recent records suggest that the species has expanded its range northwards into northern parts of Scotland where it was not recorded prior to 1980. This may be an early indication of climate change effects or that the recording effort has increased.

1.5 Range trend period^{2.3.6}

1980 – 2006

The time period selected is considered to reflect the current situation regarding range change for this species and incorporates the time period since the Habitats Directive came into force.

1.6 Reasons for reported trend in range^{2.3.7}

Not applicable

1.7 Favourable reference range^{2.7.1}

234,142km² (Equal to current)

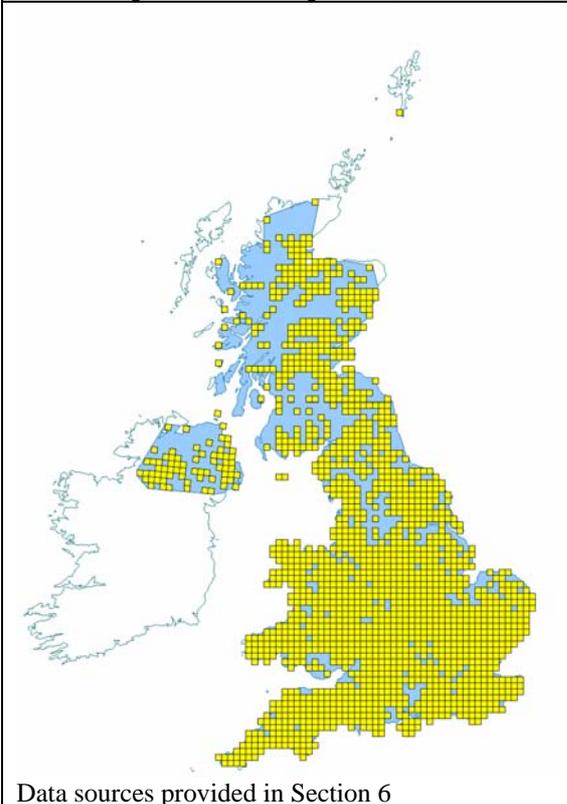
The favourable reference range value has been derived using 1994 as the baseline and making a judgement on whether the range in 1994 was sufficient to allow the long-term survival of the species, using the decision tree in Note 1 (see 'Assessing Conservation Status: UK Approach') as a guide. Historic and current information on range size and trends have been

used to assess this and, if the 1994 level was not sufficient, then consideration has been given to what would constitute a large enough range.

Range of this species is widespread across the UK and appears to be stable with very little difference between current (see Map 1.1) and historic area (calculated at 234,142km² using Alpha Hull software and an alpha value of 45 km. See Map 1.2). The range is of sufficient size to support a viable population of the species in the long-term and is also large enough to allow for increase in distribution within the range. The current estimated range, which is effectively all 10-km squares in mainland UK below 500 m, not including Scottish offshore islands (Outer Hebrides, Orkneys or Shetlands) is, therefore, set as the favourable reference range.

The recorded current range does not exactly reflect this distribution, but this is due to an artefact of the alpha mapping tool and the fact that there has been no comprehensive distribution survey to complete the recording information.

Map 1.2 Historic extent of occurrence and occupied 10-km squares (1900-2006)



The rationale for including all records in the historic range estimate, and not only those obtained prior to 1980, is that we have assumed a decline over time for this species was more likely than an increase and that where the species occurs currently it would also have occurred historically, but historic recording was not comprehensive enough to provide sufficient information. Data prior to the 1900s has been excluded for the analysis of historic range on the basis that it is unlikely to be numerous or reliable. Historic range has been calculated from the total of the data accumulated over the longer period, is not adjusted for natural fluctuations in range, and could exceed the maximum actual range occupied by the species at any given time during that period.

1.8 Range conclusion^{2.8}

Favourable

P. auritus is found throughout the UK, and range appears to have remained stable since the early 1900s. The favourable reference range is equal to the current range and the assessment is, therefore, Favourable.

2. Population of the species^{2.4}

2.1 Population estimate^{2.4.1}

245,000 individuals

155,000 in England; 27,500 in Scotland; 17,500 in Wales (Harris *et al.* 1995) and 45,000 in Northern Ireland (Russ 1999).

2.2 Date of population estimate^{2.4.2}

1999

UK population estimate reported in Battersby & Tracking Mammals Partnership (TMP) (2005).

2.3 Method of population estimate^{2.4.3}

2 = extrapolation from surveys of part of the population, sampling

The estimates were based on expert judgement and extrapolation from limited field surveys. The 1995 population estimate for Great Britain (GB) was based on very limited information, extrapolating from known size and distribution of *Pipistrellus pipistrellus* colonies in Scotland following the methods described by Speakman (1991) and Harris *et al.* (1995). Population estimates for Northern Ireland were based on extrapolation of survey results and were added to the GB estimates to give UK totals (Russ 1999).

2.4 Quality of population data^{2.4.4}

Poor

The above GB estimate was not supported by quantitative data and was an expert judgement based on field experience. Harris *et al.*'s (1995) reliability rating of the above estimate was four, meaning that it is "based on a very limited amount of information on the species". The Northern Ireland estimate is thought likely to be an overestimate (Battersby & TMP 2005). For this reason the quality of data is assessed as poor.

2.5 Population trend^{2.4.5} & Population trend magnitude^{2.4.6}

Stable

Trend analysis of the UK National Bat Monitoring Programme (NBMP) Hibernation and Colony surveys undertaken since 1997 and 2001 respectively indicated no significant trend for the species across the UK (Bat Conservation Trust (BCT) 2006). These are quite short-term datasets, but indicate currently stable populations.

2.6 Population trend period^{2.4.7}

1997 – 2005

This time period has been selected because it allows consideration of the most recent trend data from surveillance schemes and is most relevant for assessing the effectiveness of the Habitats Directive.

2.7 Reasons for reported trend in population^{2.4.8}

1. Improved knowledge/more accurate data

3. Direct human influence (restoration, deterioration, destruction)

4. Indirect anthropo(zoo)genic influence

2.8 Justification of % thresholds for trends^{2.4.9}

Not applicable

2.9 Main pressures^{2.4.10}

151 Removal of hedges and copses

160 General Forestry management

164 Forestry clearance

165 Removal of undergrowth

166 Removal of dead and dying trees

167 Exploitation without replanting

490 Other urbanisation, industrial and similar activities: development, renovation of barns and old buildings, timber treatment

502 routes, autoroutes

624 mountaineering, rock climbing, speliology

803 infilling of ditches, dykes, ponds, pools, marshes or pits

2.10 Threats^{2.4.11}

151 Removal of hedges and copses

160 General Forestry management

164 Forestry clearance

165 Removal of undergrowth

166 Removal of dead and dying trees

167 Exploitation without replanting

490 Other urbanisation, industrial and similar activities: development, renovation of barns and old buildings, timber treatment

502 routes, autoroutes

624 mountaineering, rock climbing, speliology

803 infilling of ditches, dykes, ponds, pools, marshes or pits

2.11 Favourable reference population^{2.7.2}

200,000 individuals (Equal to 1995 GB estimate)

The favourable reference population value has been derived using 1994 as the baseline and making a judgement on whether the population in 1994 was viable in the long-term, using the decision tree in Note 1 (see 'Assessing Conservation Status: UK Approach') as a guide. Historic and current information on population size, distribution and trends have been used in order to assess viability and, if the 1994 level was not viable, then consideration has been given to what would constitute a viable population.

Population trends are currently stable for this species and the species is widespread across the UK and at relatively high abundance. The species is, therefore, judged to have been viable in 1994 and the favourable reference population is set at the 1994 level of 200,000 individuals.

This figure does not include the more recent estimate for the Northern Ireland population and has been set with limited information. It could be revised in the future if better information becomes available.

2.12 Population conclusion^{2.8}

Favourable

The current population is equal to the favourable reference population and has stable trends at present. The assessment is, therefore, Favourable.

3. Habitat for the species in the Biogeographic region or sea^{2.5}

P. auritus requires a complex mosaic of habitats to support foraging, roosting and commuting behaviour. Boye & Dietz (2005) provide a good overview of this species' habitat requirements.

Deciduous forests with different ages of trees are preferred as foraging habitats, but less structured woodlands (including coniferous forests), forest edges, bushes and hedges, orchards, parks and gardens are used for insect hunting, where the highly manoeuvrable species can glean insects from the foliage. The species also likes to have a source of water nearby maternity roosts.

Individual home ranges are related to habitat structures and prey abundance and vary between one and 40 hectares. Individual foraging areas overlap to a minor extent and during foraging flights bats usually stay close to the roost, travelling a maximum distance of about 3 kilometres, with core areas up to 1.5 km from the roost.

P. auritus is a woodland bat that naturally roosts in tree holes, but has adapted very well to using loft spaces of large old buildings such as churches, barns and old houses. The species is also frequently found in bat boxes where they are located in woodland. Colonies move roosts regularly throughout the summer when roosting in woodlands, but tend to be highly philopatric to building roosts.

Winter roosts are in caves, mines and cellars, where, animals prefer a temperature around 7°C, and occasionally in tree holes.

3.1 Surface area of habitat^{2.5.2}

Unknown

The species is found in woodlands of varying quality and size, both deciduous and coniferous and is not restricted by latitude in the UK, except exposed regions of north and north-west Scotland and the offshore islands. It is therefore, probably found in most woodlands, at varying densities. However, no studies have been carried out to estimate densities of bats in different types of woodland, so it is very difficult to estimate the area of habitat required to support the UK population.

3.2 Date of estimation^{2.5.3}

2006

3.3 Quality of data on habitat area^{2.5.4}

Poor

Relatively good information is available on *P. auritus* habitat requirements (as can be seen above). However, attempts have not been made to calculate the combined area of habitat features that are currently in use.

3.4 Habitat trend^{2.5.5}

Unknown

Only approximately 6% of the UK is currently covered by broadleaved woodland, (Haines-Young *et al.* 2000), the most suitable habitat for this species, and approximately 6% is covered by coniferous woodland, giving a total woodland cover of 12%. Indications are that broadleaved, mixed and yew woodland have increased by about 5% in the UK since 1990 and there has been a small increase in tree lines and hedgerows, and some loss of pasture (Haines-Young *et al.* 2000). However, this is still very limited information on which to base an assessment of trend in habitat suitable for this particular species. The assessment is, therefore, Unknown.

3.5 Habitat trend period^{2.5.6}

1990 – 1998

The time period selected reflects the results of two Countryside Surveys carried out in 1990 and 1998 (Haines-Young *et al.* 2000).

3.6 Reasons for reported trend in habitat^{2.5.7}

Not applicable

3.7 Suitable habitat for the species (in km²)^{2.7.3}

Unknown

Studies have shown that extensive areas of woodland or woodland patches with high levels of connectivity and with sources of water are favoured by this species (Entwistle *et al.* 1996; Battersby 1999). However, current area of habitat is unknown and it is not possible to suggest an area of 'suitable habitat'.

3.8 Habitat conclusion^{2.8}

Unknown

The habitat requirements for this species have been studied, but there has been no attempt to correlate population density with suitable habitat availability. The low percentage of woodland cover across the UK means that the area of suitable habitat available for this species is relatively small. Recent improvements in woodland extent in all countries suggest that the situation is improving and area and quality of wetland habitat are also improving. However, the information on habitat area used and required by a favourable population of the species is not known. The conclusion is, therefore, Unknown at present.

4. Future Prospects^{2.6}

Good prospects

The species is expected to survive and prosper.

Factors likely to affect the species over the next 12-15 years are considered below.

Legislation. *P. auritus* is listed on Schedules 5 & 6 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, &c.) Regulations 1994 (and equivalent legislation in Northern Ireland) and is listed on Annex IVa of the Habitats Directive.

Conservation action. The species has been listed as a priority species and it is recognised that conservation action is required to improve the suitable habitat available and increase connectivity of habitat patches.

Threats. *P. auritus* is generally restricted to woodland and hedgerows as its preferred foraging habitat, although it will forage in other habitats. It is likely to have suffered historically from loss and fragmentation of woodland, caused by deforestation and land-use changes. Furthermore, it does not like to cross open spaces and is affected by habitat fragmentation. The construction of major roads and motorways that can form barriers to the species mobility and cause mortality is, therefore, still a problem, as are the use of pesticides and the loss of landscape connectivity. The low percentage of woodland cover across the UK means that the area of habitat available for this species is relatively low and could be limiting population recovery.

Its preference for roosting in buildings means that there are many potential roost sites available, but has made it susceptible to conflicts with people during building renovations and timber works (Battersby & TMP 2005). A study undertaken in 2000 showed that of 40 barns where bats had been recorded, 26 were identified as being used by *P. auritus*. Of these, 20 had been developed and the bats had disappeared from 14, a loss of 70%. All six of the unconverted buildings remained occupied by brown long-eared bats (Briggs 2002). Successful mitigation for brown long-eared bats has been noted as difficult to achieve (Mitchell-Jones 2004).

From available information it is likely that the species will survive in the long term, but there are still threats to its survival that need to be addressed.

4.1 Future prospects conclusion^{2,8}

Favourable

The species is likely to survive and prosper in the long term, although there are still important threats that could have an impact. The conclusion is, therefore, Favourable at present.

5. Overall Assessment^{2,8}

Favourable

Range, population and future prospects are considered Favourable, but habitat status for the species is Unknown at present. The overall assessment is, therefore, Favourable.

Table 5.1 Summary of conclusions

| Parameter | Judgement | Grounds for Judgement (in accordance with Annex C) | Reliability* |
|---------------------------|------------------|--|---------------------|
| Range | Favourable | Range is stable and not smaller than the favourable reference range | 2 |
| Population | Favourable | Population(s) not lower than favourable reference population | 2 |
| Habitat | Unknown | No or insufficient reliable information available | N/A |
| Future Prospects | Favourable | Main pressures and threats to the species not significant; species will remain viable on the long-term | 3 |
| Overall Assessment | Favourable | Three Favourable and one Unknown | 2 |

*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as “good”; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is “unknown”, on the basis of insufficient reliable information

6. References

BARR, C.J. & GILLESPIE, M.K. 2000. Estimating hedgerow length and pattern characteristics in Great Britain using Countryside Survey data. *Journal of Environmental Management*, **60**, 23-32.

BAT CONSERVATION TRUST. 2006. *The National Bat Monitoring Programme Annual Report 2005*. Available to download from Bat Conservation Trust website (www.bats.org.uk) and Tracking Mammals Partnership website (www.trackingmammals.org).

BATTERSBY, J. 1999. *A comparison of the roost ecology of the brown long-eared bat Plecotus auritus and the serotine bat Eptesicus serotinus*. Unpublished PhD thesis, University of Sussex.

BATTERSBY, J (Ed.) & TRACKING MAMMALS PARTNERSHIP. 2005. *UK Mammals: Species Status and Population Trends*. JNCC/Tracking Mammals Partnership.

BOYE, P. & DIETZ, M. 2005. *Research Report No 661: Development of good practice guidelines for woodland management for bats*. English Nature, Peterborough.

BRIGGS, P. 2002 *A study of bats in barn conversions in Hertfordshire in 2000*. Hertfordshire Biological Records Centre, Hertford.

ENTWISTLE, A.C., RACEY, P.A. & SPEAKMAN, J.R. 1996. *Habitat exploitation by a gleaning bat, Plecotus auritus*. *Philosophical Transactions of the Royal Society, London B*, **351**: 921-931.

ENTWISTLE, A.C., RACEY, P.A. & SPEAKMAN, J.R. 1997. *Roost selection by the brown long-eared bat Plecotus auritus*. *Journal of Applied Ecology*, **34**: 399-408.

HAINES-YOUNG, R.H., BARR, C.J., BLACK, H.I.J., BRIGGS, D.J., BUNCE, R.G.H., CLARKE, R.T., COOPER, A., DAWSON, F.H., FIRBANK, L.G., FULLER, R.M., FURSE, M.T., GILLESPIE, M.K., HILL, R., HORNUNG, M., HOWARD, D.C., McCANN, T., MORECROFT, M.D., PETIT, S., SIER, A.R.J., SMART, S.M., SMITH, G.M., STOTT, A.P., STUART, R.C. & WATKINS, J.W. 2000. *Accounting for nature: assessing habitats in the UK countryside*. Countryside Survey 2000. DETR, HMSO, London.

HARRIS, S., MORRIS, P., WRAY, S. & YALDEN, D. 1995. *A review of British Mammals: population estimates and conservation status of British mammals other than cetaceans*. JNCC, Peterborough.

MITCHELL-JONES, A.J. 2004. *Bat Mitigation Guidelines*. English Nature, Peterborough.

RICHARDSON, P. (2000) *Distribution atlas of bats in Britain and Ireland 1980-1999*. Bat Conservation Trust, London.

RUSS, J.M. (1999) *The Microchiroptera of Northern Ireland: community composition, habitat associations and ultrasound*. Unpublished PhD thesis. Queen's University, Belfast.

SPEAKMAN, J.R. 1991. The impact of predation by birds on bat populations in the British Isles. *Mammal Review*, **21**, 123-142.

SPENCER, J.W. & KIRBY, K.J. 1992 An inventory of ancient woodland for England and Wales. *Biological Conservation*, **62**, 77-93.

STEBBINGS, R.E. 1966. A population study of the bats of the genus *Plecotus*. *Journal of Zoology, London*, **150**, 53-75.

SWIFT, S.M. 1998. *Long-eared bats*. T & A.D. Poyser Ltd, London.

Map Data Sources

BATS & The Millennium Link - Bat species distribution in Central Belt of Scotland (2000 to 2005); Biological Records Centre - Mammals Database 100m; Environment and Heritage Service - Species Dataset; Highland Biological Recording Group Mammals dataset; Natural England - Batsites inventory for Britain (via National Biodiversity Network (NBN) Gateway).

Scottish Natural Heritage bat records: update, J. Haddow (*pers. comm*).

Bat Conservation Trust - National Bat Monitoring Programme (NBMP) data to 2005 including: Colony survey (2000 -2005), Hibernation survey (1997-2005).

Bat Conservation Trust - Distribution atlas of bats in Britain and Ireland 1980-1999, GB data only.