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 :

S1320: *Myotis brandtii* - Brandt's bat

S1320 *Myotis brandtii* Brandt's bat

Audit trail compiled and edited by JNCC and the UK 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]

Myotis brandtii is found throughout England, Wales and south Scotland. It is absent from Northern Ireland.

1.1 Surface area of range[2.3.1]

127,379km^2

The above surface area estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in Map 1.1 below). The value of alpha was set at 45 km to reflect the mobility of this species. Occasional records of vagrants that were clearly outside the species range were excluded from the calculation.

1.2 Date of range determination[2.3.2]

1980 – 2006

The date range indicated has been selected 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 1980 to the present 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.

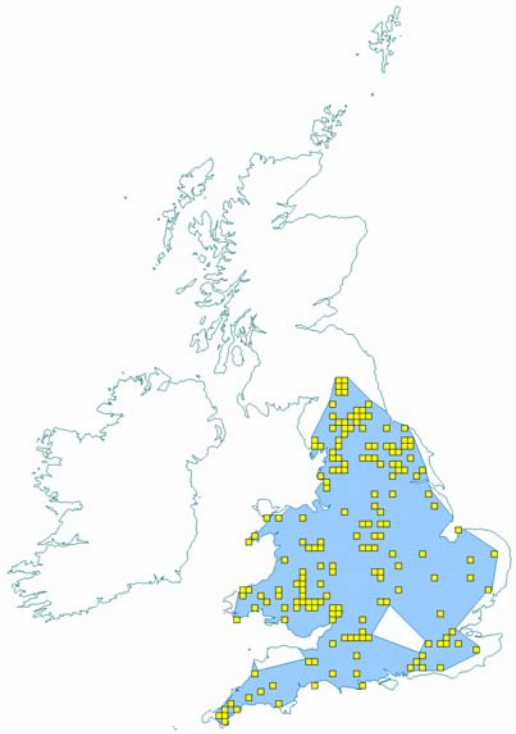
1.3 Quality of range data[2.3.3]

Poor

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 a growing interest in wider conservation issues. However, 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. Furthermore, this species was not distinguished from *Myotis mystacinus* until 1970 (Harris *et al.* 1995), and many records do

not separate the two species. Therefore, there is still relatively little information on its distribution, and trend analysis is constrained by historic under-recording. The quality of data is therefore considered to be poor.

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



Data sources provided in Section 6

1.4 Range trend[2.3.4] & Range trend magnitude[2.3.5]

Stable

No surveys have been carried out to assess change in distribution or range for this species since 1994. However, there is no evidence to suggest the range is declining and it is as extensive as it was pre-1994, from available data (see Map 1.2). The range is, therefore, considered stable.

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. Historic information is provided to set the current situation in a historic context.

1.6 Reasons for reported trend in range[2.3.7]

Not applicable

The trend is stable over the time period considered.

1.7 Favourable reference range[2.7.1]

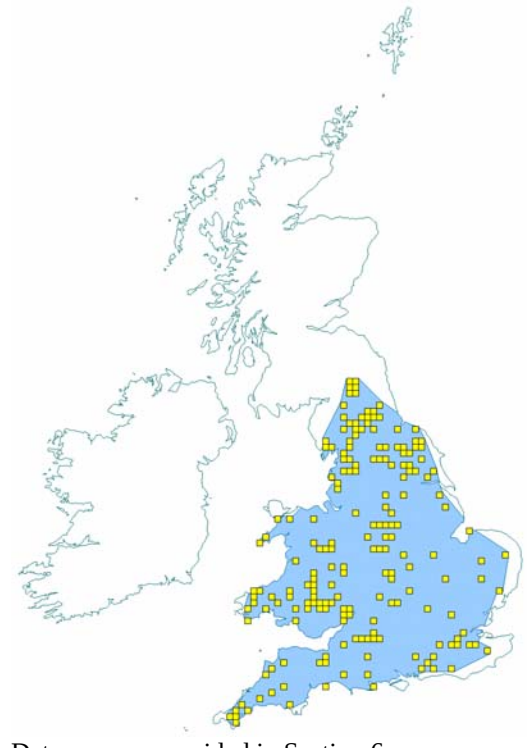
127,379km^2 (Equal to current estimate)

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.

There has been no apparent change in the range for this species during the time period considered and it is likely that the current estimated range is the same as it was in 1994. *M. brandtii* historical extent of occurrence (1900-2006), which has been calculated at 133,668 km^2 (using Alpha Hull software and an alpha value of 45 km) shows a 5% difference between the current and historic extent of occurrence. This suggests that range extent has changed very little since historic times and that the current range is of sufficient size to support a viable population of the species in the long-term. Furthermore, it is large enough to allow for increase in distribution within the current range.

The current estimated range is, therefore, set as the favourable reference range. Improved recording and identification methods should help to differentiate between *M. brandtii* and *M. mystacinus* and provide a more robust assessment of range in the future.

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



Data sources provided in Section 6

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

The range of *M. brandtii* is stable and is the same as the favourable reference range. For these reasons, it is assessed as Favourable.

2. Population of the species[2.4]

2.1 Population estimate[2.4.1]

30,000 individuals

22,500 in England; 500 in Scotland and 7,000 in Wales (Harris *et al.* 1995).

2.2 Date of population estimate[2.4.2]

1995

2.3 Method of population estimate[2.4.3]

1 = based on expert opinion

The population estimates are based on subjective estimates of relative abundance because there are few density estimates and little quantified data on bat numbers in relation to habitat associations and patterns of land use.

2.4 Quality of population data[2.4.4]

Poor

Harris *et al*. (1995) gave the population estimate quoted a reliability rating of five, meaning that it was a "species for which there was so little information on its distribution and/or abundance in different habitat types, and for which the data were so inadequate or biased, that it was not possible to scale its abundance relative to other species reliably. For these species the estimate was believed on subjective criteria to be within the right order of magnitude, but no greater degree of accuracy was thought to have been achieved."

Actual population counts are problematic because *M. brandtii* tends to switch frequently between roosts and expert identification is required to distinguish between *M. brandtii* and *M. mystacinus*. Colonies are usually fewer than 100 individuals, with research in northern England showing the mean size of maternity roosts to be 28.3 individuals (n= 5) (Jones & Altringham 1996). It has been recognised that maternity colony counts may be an underestimate, due to the fact that they are often small and out of view (e.g. under roof tiles etc.) There is also the potential for under recording of *M. brandtii* and *M. mystacinus* at nursery roosts as they can be mistaken for pipistrelles or may not be accurately identified (Battersby & Tracking Mammals Partnership (TMP) 2005).

2.5 Population trend[2.4.5] & Population trend magnitude[2.4.6]

Stable

(+25% overall, but not statistically significant)

It is very difficult to separate this species from *M. mystacinus* in hibernation sites, because they are morphologically very alike and positive identification would require disturbance of the bats. The UK National Bat Monitoring Programme (NBMP) Hibernation Survey considered data on *M. mystacinus* and *M. brandtii* together for the purpose of analysis. Using this approach, no significant changes have been identified for the two species since 1997 (Bat Conservation Trust (BCT) 2006). A 25% overall increase has been recorded, representing a

3.3% annual increase, but this is not statistically significant. This is only one surveillance scheme with very small sample sizes and caution should be used in applying the results with confidence to *M. brandtii*, because the results could reflect the population status of *M. mystacinus* (Battersby & TMP 2005).

2.6 Population trend period[2.4.7]

1997 – 2006

In the absence of any robust historic information for this species, the trend period reflects currently available information from surveillance schemes.

2.7 Reasons for reported trend in population[2.4.8]

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

Requirements of this species are largely unknown, but it has probably been subject to the same pressures as other bat species, i.e. the loss of roost sites, foraging habitats and insect prey (Battersby & TMP 2005). The species is negatively affected by habitat isolation and may be particularly vulnerable to increased forest patchiness (Ekman & DeJong 1996). However, at present the best evidence available suggests the population is stable.

2.8 Justification of % thresholds for trends[2.4.9]

The 3.3% annual increase recorded here is not significant because of small sample sizes and wide confidence limits and is, therefore, not reported as an increase even though it is above the 1% threshold. For this reason the trend is considered currently stable.

2.9 Main pressures[2.4.10]

110 Use of pesticides
141 Abandonment of pastoral systems
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
401 continuous urbanisation
502 routes, autoroute
624 mountaineering, rock climbing, speliology
701 water pollution
803 infilling of ditches, dykes, ponds, pools, marshes or pits

2.10 Threats[2.4.11]

110 Use of pesticides
141 Abandonment of pastoral systems
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
401 continuous urbanisation
502 routes, autoroute

624 mountaineering, rock climbing, speliology
701 water pollution
803 infilling of ditches, dykes, ponds, pools, marshes or pits

2.11 Favourable reference population[2.7.2]

Unknown

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.

There is very little historic or current information to determine a favourable reference population for this species. The only information on current trends suggests stable populations at present, but the time series is very short and the data are not robust because of potential confusion with the closely related *M. mystacinus*. More data are required to assess population trends and absolute abundance. For this reason the favourable reference population is Unknown at present.

2.12 Population conclusion[2.8]

Unknown

There is insufficient information to make a robust assessment on population status for this species. The assessment is, therefore, Unknown at present.

3. Habitat for the species in the Biogeographic region or sea[2.5]

M. brandtii requires a complex mosaic of habitats to support foraging, roosting and commuting behaviour. The species has wing morphology and echolocation calls which indicate that they forage in edge or cluttered habitats (Norberg & Rayner 1987) and in broadleaf forest with particularly damp areas, close to water. Coniferous woodland, forest edges and clearings also frequently used (Boye & Dietz 2005). The species is negatively affected by habitat isolation and may be particularly vulnerable to increased forest patchiness (Ekman & DeJong 1996). In England, a radiotracking study found the species had a maximum foraging distance of 2.3 km from the roost.

The species also swarms at underground sites August - October, with a peak in early August (Parsons *et al.* 2003). The purpose of this behaviour is not fully understood, but mating or information transfer are possible explanations (Parsons *et al.* 2003) and these sites should also be considered important habitat features for the species.

Loose bark and large holes in tree trunks are the original roost sites of *M. brandtii*, but tree holes and bat boxes are also used, especially by males during mating time. Maternity colonies are more commonly found in buildings in wall crevices or roof lofts, and more rarely in trees, bridges and bat boxes (Schober & Grimmberger 1989; Zahn & Rupp 2004). Winter roosts are commonly in disused mines and caves, occasionally in cellars (Schober & Grimmberger 1989).

3.1 Surface area of habitat[2.5.2]

Unknown

In order to obtain this estimate, it would be necessary to first identify all of the foraging and roosting habitat located within the current range boundary; determine whether or not each of these features were being used; and subsequently calculate the combined area of all currently used habitats. This process would require very detailed habitat information at a fine scale across the UK. We do not currently have this level of information. Therefore, area estimate is Unknown.

3.2 Date of estimation[2.5.3]

2006

3.3 Quality of data on habitat area[2.5.4]

Poor

Although information is available on *M. brandtii* habitat requirements, 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

We do not know enough about the habitat requirements of this species to assess trend in habitat extent and quality. Indications are that broadleaved, mixed and yew woodland have increased by about 4% in England and Wales 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 very limited information on which to base an assessment of trend in suitable habitat. 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

The trend of suitable habitat for this species during the time period considered is unknown and it is not appropriate to consider reasons for an unknown trend.

3.7 Suitable habitat for the species (in km^2)[2.73]

Unknown

Since current area of habitat is unknown, it would be inappropriate 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. There is evidence of recent improvements in habitat extent, but the information available is very limited. The conclusion is, therefore, Unknown at present. This judgement will need to be reviewed in the future depending on availability of information on habitat use and extent.

4. Future Prospects[2.6]

Unknown

This species is offered full protection under national and European legislation. However, the lack of information on distribution, abundance and habitat requirements and the inability at present to detect population trends separately from those of *M. mystacinus* means that it is difficult to plan conservation management action and to know if action planned for other species will be effective for this species. Roost sites are probably not a limiting factor, and being generalists, it is unlikely that diet is a limiting factor either. It is perhaps most important therefore to concentrate on the conservation of foraging habitats and swarming sites.

4.1 Future prospects conclusion[2.8]

Unknown

There is insufficient information on this species to make an assessment of future prospects.

5. Overall Assessment[2.8]

Unknown

Three out of four assessments for this species, population, habitat area and future prospects are unknown at present because of paucity of data. Range is the only assessment considered to be Favourable and the overall assessment is, therefore, Unknown.

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	3
Population	Unknown	No or insufficient reliable information available	N/A
Habitat	Unknown	No or insufficient reliable information available	N/A
Future Prospects	Unknown	No or insufficient reliable information available	N/A
Overall Assessment	Unknown	Two or more Unknown combined with Favourable	N/A

*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

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Map Data Sources

Biological Records Centre - Mammals Database 100m; Environment and Heritage Service - Species Dataset; Natural England - Batsites inventory for Britain (via National Biodiversity Network (NBN) Gateway).

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