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

Fourth Report by the United Kingdom
under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1326 - Brown long-eared bat (*Plecotus auritus*)

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.

- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.

- The UK Report on the conservation status of this species is provided in a separate document.

- The reporting fields and options used are aligned to those set out in the European Commission guidance.

- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.

- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).

- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.

- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL	

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Species code	**1326**
1.3 Species scientific name	**Plecotus auritus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Brown long-eared bat

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1995-2016
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)	a) Unit						

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used	
3.5. Additional information	

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs	**Atlantic (ATL)**
4.2 Sources of information	Anderson ME, Racey PA. 1991. Feeding behaviour of captive brown long-eared bats, Plecotus auritus. Animal Behaviour 42, 489-493.

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5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data Use of different method	
	The change is mainly due to: Use of different method	
5.12 Additional information		

6. Population

6.1 Year or period	2016-2017

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6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	5400
	c) Maximum	228000
	d) Best single value	
6.5 Type of estimate	95% confidence interval	
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2006-2017	
6.8 Short-term trend Direction	Uncertain (u)	
6.9 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate	
6.11 Long-term trend Period		
6.12 Long-term trend Direction		
6.13 Long-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.14 Long-term trend Method used		
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	
	c) Unknown	
	d) Method	
6.16 Change and reason for change in population size	Improved knowledge/more accurate data	
	Use of different method	
	The change is mainly due to:	Use of different method
6.17 Additional information		

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Yes

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7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on expert opinion with very limited data
7.3 Short-term trend Period	1999-2016
7.4 Short-term trend Direction	Unknown (x)
7.5 Short-term trend Method used	Insufficient or no data available
7.6 Long-term trend Period	
7.7 Long-term trend Direction	
7.8 Long-term trend Method used	
7.9 Additional information	

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Logging without replanting or natural regrowth (B05)	H
Removal of dead and dying trees, including debris (B07)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	H
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	H
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Conversion from mixed farming and agroforestry systems to specialised (e.g. single crop) production (A03)	M
Conversion to other types of forests including monocultures (B02)	M
Clear-cutting, removal of all trees (B09)	M
Forest management reducing old growth forests (B15)	M

Threat	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Logging without replanting or natural regrowth (B05)	M
Removal of dead and dying trees, including debris (B07)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	H
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	H
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M

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Conversion from mixed farming and agroforestry systems to specialised (e.g. single crop) production (A03)	H
Conversion to other types of forests including monocultures (B02)	M
Clear-cutting, removal of all trees (B09)	M
Forest management reducing old growth forests (B15)	M

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken

9.2 Main purpose of the measures taken	Maintain the current range, population and/or habitat for the species
9.3 Location of the measures taken	Both inside and outside Natura 2000
9.4 Response to the measures	Long-term results (after 2030)

9.5 List of main conservation measures

Reduce impact of transport operation and infrastructure (CE01)
Restore small landscape features on agricultural land (CA02)
Other measures related to residential, commercial, industrial and recreational infrastructures, operations and activities (CF12)
Adapt/change forest management and exploitation practices (CB05)
Stop forest management and exploitation practices (CB06)
Adapt/manage reforestation and forest regeneration (CB04)
Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Reduce impact of outdoor sports, leisure and recreational activities (CF03)
Manage conversion of land for construction and development of infrastructure (CF01)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters	a) Range
	b) Population
	c) Habitat of the species

10.2 Additional information

11. Conclusions

11.1. Range

11.2. Population

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11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit b) Minimum c) Maximum d) Best single value
12.2 Type of estimate	
12.3 Population size inside the network Method used	
12.4 Short-term trend of population size within the network Direction	
12.5 Short-term trend of population size within the network Method used	
12.6 Additional information	

13. Complementary information

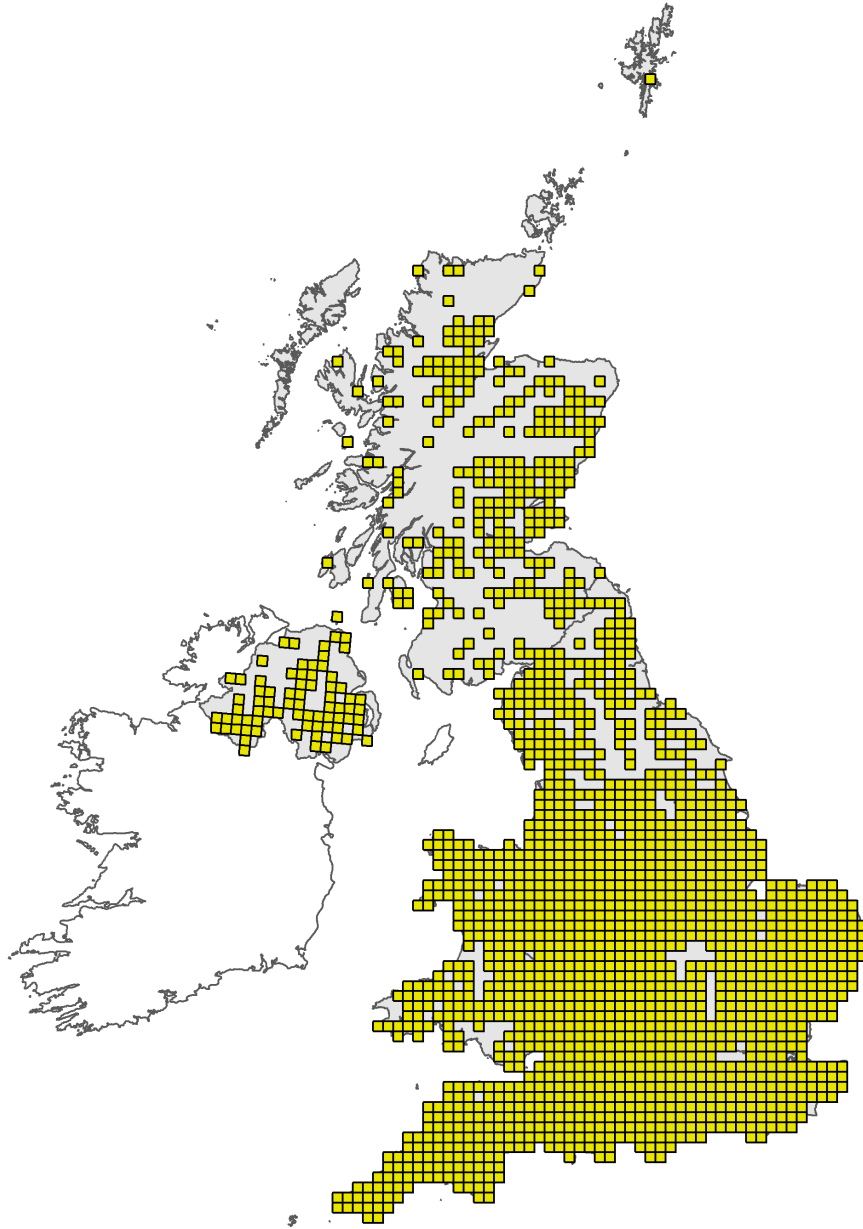|	
13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	
13.3 Other relevant Information	

Distribution Map

Figure 1: UK distribution map for S1326 - Brown long-eared bat (*Plecotus auritus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.
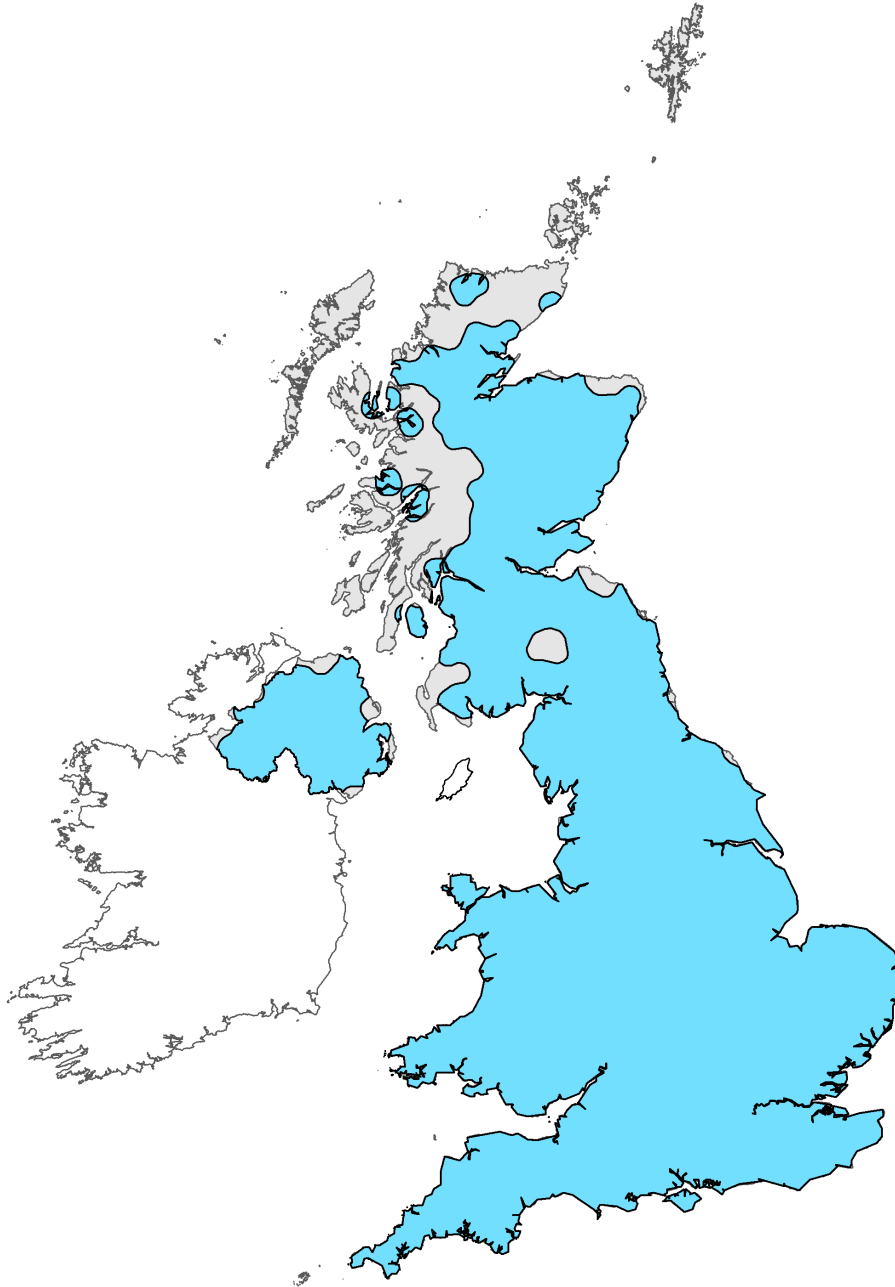
Range Map

Figure 2: UK range map for S1326 - Brown long-eared bat (*Plecotus auritus*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by The Mammal Society applying a range mapping tool as outlined in Matthews et al. (2018), to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Plecotus auritus (1326)

Field label	Note
2.2 Year or Period	This time period has been selected as distribution has been calculated using data from Mathews et al. 2018.
2.4 Distribution map; Method used	P. auritus is a common and widespread species, found throughout Wales. Gaps in distribution probably reflecting an absence of survey data rather than an absence of the species, though it may be less common in upland areas. 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 structured surveillance schemes. However, this species is often found in buildings and is easily recognised, so level of recording is likely to be high. The species has also been the subject of several extensive research projects (Stebbings 1966; Entwistle et al., 1996, 1997; Swift 1998). It is a low-intensity echolocator, so bat detector surveys have limited value because of short detection range. Other survey methods (counts at breeding and hibernation sites) are more resource-intensive and less statistically robust.

Species name: Plecotus auritus (1326) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	P. auritus is a widely distributed species, found in all wooded landscapes but tree-roosts are critically under-recorded and acoustic surveys are also likely to substantially under-record the species because it has very quiet calls (Russ 2012). There is also potential for the species to be overlooked in open habitat surveys, such as those for wind farms, as its calls are substantially different from those used in more enclosed areas (Mathews et al. 2018); and because the calls can also be confused with those of Myotis spp., particularly when heterodyne detectors are used (Russ 2012). Because the species uses open areas such as parks and gardens, as well as woodland, habitable area within the range is expected to include all habitats except montane. Whilst this potentially overestimates the true habitable area, this broad habitat use suggests the range has not changed in the short-term.
5.11 Change and reason for change in surface area of range	Area of land (including unsuitable habitat) contained within the range is given as 20,643 km2 for Wales (Mathews et al. 2018). Range is based on presence data collected between 1995-2016. Areas that contain very isolated records may not have been included in the area of distribution. The range has been taken from Mathews et al. 2018, whereby an alpha hull value of 20km was drawn around the presence records, which represented the best balance between the inclusion of unoccupied sites (i.e. where records are sparse but close enough for inclusion) and the exclusion of occupied areas due to gaps in the data (i.e. where records exist but are too isolated for inclusion). An additional 10km buffer was added to the final hull polygon to provide smoothing to the hull and to ensure that the hull covered the areas recorded rather than intersecting them. This differs from the approach taken in 2013 and 2007 whereby a 45km alpha hull value was used for all species with a starting range unit of individual 10km squares. The new method has led to much finer detail maps being produced underpinned by data gathered at a much finer resolution, leading to the production of a more accurate FRR. Added to which acoustic detectors have changed considerably over the years in both accuracy and sensitivity, which also adds to the production of this value. Whilst the increased use of advanced / full spectrum bat detectors is likely to have resulted in increased detector records of this species, it undoubtedly remains significantly under-recorded during detector surveys due to its quiet echolocation call.

6.4 Additional population size	Based on Mathews et al. 2018 methodology: a) Unit = Individuals b) Minimum = 5,370 c) Maximum = 228,000 d) Best Single Value: 96,600. Mathews et al. 2018 population estimates were derived by first calculating the adult bat density (bats/km2) within poor, average and good habitat and then multiplying this with the total habitable area within their range to give lower, median and upper population estimates. Habitable area was defined as all habitats within the range excluding montane habitats since these are unlikely to provide suitable locations for roosts. Because of the landscape-wide movements of bats and their dependency on a matrix of habitats and roosting locations, it is not currently possible to make more refined estimates of the area of suitable habitat to be used for population calculations. Details of calculations are as follows: Adult bat density (bats/km2) Median density=[(median n. bats/roost[1]) * (p female [2]) * (n roosts/typical km2 average habitat)]* 2 Lower limit=[(lower plausible n. bats/roost) * (p female min) * (plausible n. roosts/typical km2 poor habitat)]* 2 Upper limit = [(upper plausible n. bats/roost) * (p female max) * (plausible n. roosts/typical km2 good habitat)]* 2 [1] roost is typical maternity roost in the pre-parturition period. n. is number of adults. [2] p female : proportion female. p female min and p female max are lowest and highest plausible proportions of adult females in typical maternity roost Population size Total Adult Population = Median adult density (bats/km2) * total habitable area within range (km2) Lower Limit=Lower limit adult density (bats/km2) * total habitable area within range (km2) Upper Limit=Upper limit adult density (bats/km2) * total habitable area within range (km2) There is uncertainty surrounding the population estimates for this species as demonstrated by the relatively wide confidence intervals. Given the absence of data on roost density in trees, it is difficult to compute a more accurate total population estimate. It is considered unlikely that most maternity roosts in Britain are known and therefore it was also not possible to make a total count. No population genetics study has been conducted to estimate regional or national population sizes, and therefore no alternative metrics of population size were available. Although a population estimate of approximately 17,500 individuals was given in Harris et al. 1995 this estimate was graded as having very poor reliability (score 4/5) and was largely derived from expert opinion on the ratio of Brown long-eared to pipistrelle bats (roosts and individuals). Direct comparison with current estimates is therefore not possible.
6.8 Short term trend; Direction	The National Bat Monitoring Programme (BCT 2018a) draws trends for Wales based on hibernation survey data. The 12-year trend index is has risen by 19.2 however it is not statistically significant and there has been a slight dip since 2014. It is also only based on hibernation data. The smoothed index is currently 30.9% above the 1999 base year value, equivalent to an annual increase of 1.5%. The smoothed index has increased steadily since 2002 with a slight dip since 2014, but as a result of the low precision associated with this trend there has been no significant change in the smoothed index since 1999. Given the overall lack of statistical significance we are uncertain of the short-term trend in population.
6.16 Change and reason for change in population size	The difference in population size between reporting rounds is most attributable to a change in methodology, although more data are also available. In NRW 2013, population was reported as individuals however the given EU reporting unit is 1x1km grid squares. This is based on the updated range estimates produced by Mathews et al. 2018. The reported Alternative Population (see 6.4) is also based on Mathews et al. 2018 with a best estimate that differs markedly from that provided by Harris et al. 1995 (value 17,500). The change in value is principally due to the use of a different method, though the Harris value does fall within the boundary estimates of Mathews et al. 2018. The new estimate, taken from Mathews et al. (2018) is considered to be more robust.
6.17 Additional information	The following information corresponds to section 6.18: There is no evidence to suggest reproduction, mortality or age structure is deviating from normal given the population data.

| 7.1 Sufficiency of area and quality of occupied habitat | a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)? YES/NO/Unknown Area: 20,600 km2. Habitable area as given by Mathews et al. 2018 has been used as a proxy for occupied habitat and is considered sufficient. The habitable area calculation defined all the area within the range as habitable excluding montane habitat since this is unlikely to include suitable locations for maternity roosts. Quality: Whilst we do not have a reliable measure of the quality of the occupied habitat, the population trend is not showing a decline and the species continues to be widespread across a mosaic of habitats. It is therefore assumed that quality is sufficient to support a viable population of the species and maintain FCS. 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. The species is commonly associated with trees, particularly broadleaved and mixed woodland, but less structured woodlands (including the edges of coniferous forests), forest edges, bushes and hedges, orchards, parks and gardens are used for foraging (Dietz and Keifer 2016, Entwistle et al. 1996). It is adapted to foraging in cluttered habitats and makes extensive use of sight, passive listening, and short duration echolocation (Anderson and Racey 1991, Anderson and Racey 1993, Eklof and Jones 2003). P. auritus gleans approximately half its prey from vegetation, with the remainder being caught in the air (Swift and Racey 1983, Anderson and Racey 1991, Anderson and Racey 1993). The species has highly manoeuvrable flight and gleaning is facilitated by its capability to hover in addition to using slow horizontal flight (Norberg 1976). It has been reported to use linear features such as treelines and large hedgerows to move between roosts and alternative foraging areas (Howard 1995, Murphy et al. 2012). 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. Maternity roosts are located in trees, bat boxes and buildings - predominately barns, churches and dwelling houses with large internal flight spaces, preferably with a source of water nearby (Boyd and Stebbings 1989, Dietz and Keifer 2016). There is a high degree of fidelity to building roosts by both sexes (Entwistle et al. 2000; Park et al. 1998), with evidence of natal philopatry, yet colonies do not appear to be inbred (Burland et al. 1999; 2001). Swarming sites, and associated genetic exchange, therefore appear particularly critical for Brown long-eared bat conservation (Burland et al. 2001; Furmankiewicz & Altringham 2007; Veith et al. 2004) yet the species forms only a very low proportion of total captures at swarming sites (Glover & Altringham 2008; Parsons et al. 2003). Winter roosts are in caves, mines and cellars, where animals prefer a temperature around 7oC, and occasionally in tree holes (Boye and Dietz 2005). P. auritus flies very frequently during the winter (sometimes daily (Hays et al. 1992) so habitat quality around hibernacula is therefore likely to be very important to their conservation. Individual home ranges are related to habitat structures and prey abundance and vary between one and forty hectares (Boye and Dietz 2005). Individual foraging areas may 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 kilometres from the roost. In England, females in the maternity period have been found to return repeatedly to non-overlapping core foraging areas which averaged 2.1ha (range 0.7-5.4; Murphy et al. 2012). There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species. In order to obtain an estimate of actual occupied habitat, 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. However the population trend is stable and the species is widespread, using a mosaic of habitats; it is therefore assumed that quality is sufficient to support a viable population of the species and maintain FCS. Overall = Yes |

| 7.4 Short term trend; Direction | There is insufficient data on any change in the level of suitable habitat or any change in the quality of habitat for the species. This is extremely difficult question to answer as this is a generalist species, using a mosaic of habitats across a large area. |

8.1 Characterisation of pressures/ threats	Pressures: Pressures can generally be divided into those that affect roosts and those that affect commuting and foraging (including prey availability). B05: Logging without replanting or natural regrowth, B07: Removal of dead and dying trees, including debris, F02: Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, B09: Clear-cutting, removal of all trees, B15: Forest management reducing old growth forests - Although roosts are strictly protected, a small number of licences permitting exclusion or roost destruction are issued every year. In addition, changes in building practices to improve energy efficiency mean that new buildings may offer fewer roosting opportunities (Mitchell-Jones 2010). P. auritus has quite specific summer roosting requirements that are not provided by newer buildings, so roost availability may eventually be limiting, and current roosts must be maintained. It is particularly susceptible to loss of roost sites through barn conversions and loft conversions. It avoids lit areas and is detrimentally affected by increased lighting, both directly on the roost access and also in the wider habitat. Roosts are also located with trees, so practices impacting potential roosts within trees are negative for the species. B05: Logging without replanting or natural regrowth, B07: Removal of dead and dying trees, including debris, F02: Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, B09: Clear-cutting, removal of all trees, B15: Forest management reducing old growth forests, E01: Roads, paths railroads and related infrastructure (e.g. bridges, viaducts, tunnels) - P. auritus forage along linear features, within woodland, over grazed pasture / grassland and wetland habitats. Agricultural and forestry practices that remove, modify or fragment these habitats, or affect the biomass of suitable insect prey can negatively affect populations as will developments that result in loss or severance of habitat (Murphy et al. 2012). E01: Roads, paths railroads and related infrastructure (e.g. bridges, viaducts, tunnels) - As a low, slow flying species, it is also vulnerable to mortality through collision with vehicles. Threats: Threats continue to generally be divided into those that affect roosts and those that affect commuting and foraging (including prey availability). B05: Logging without replanting or natural regrowth, B07: Removal of dead and dying trees, including debris, F02: Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, B09: Clear-cutting, removal of all trees, B15: Forest management reducing old growth forests - Although roosts are strictly protected, a small number of licences permitting exclusion or roost destruction are issued every year which will continue in the future. Future changes in building practices to improve energy efficiency mean that new buildings may offer fewer roosting opportunities (Mitchell-Jones 2010). P. auritus has quite specific summer roosting requirements that are not provided by newer buildings, so roost availability may eventually be limiting, and current roosts must be maintained. It is particularly susceptible to loss of roost sites through barn conversions and loft conversions. It avoids lit areas and is detrimentally affected by increased lighting, both directly on the roost access and also in the wider habitat; lighting is likely to increase in the future. Roosts are also located within trees, so practices impacting potential roosts within trees are negative for the species; these practices will continue in the future. B05: Logging without replanting or natural regrowth, B07: Removal of dead and dying trees, including debris, F02: Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, B09: Clear-cutting, removal of all trees, B15: Forest management reducing old growth forests, E01: Roads, paths railroads and related infrastructure (e.g. bridges, viaducts, tunnels) - P. auritus forage along linear features, within woodland, over grazed pasture / grassland and wetland habitats. Agricultural and forestry practices that remove, modify or fragment these habitats, or affect the biomass of suitable insect prey could negatively affect populations as will developments that result in loss or severance of habitat (Murphy et al. 2012). These practices are all likely to continue into the future. E01: Roads, paths railroads and related infrastructure (e.g. bridges, viaducts, tunnels) - As a low, slow flying species, it is also vulnerable to mortality through collision with vehicles. Infrastructure projetcts will continue into the

	future.
9.5 List of main conservation measures	Legal and administrative measures continue to be required to ensure that the protection provided by the legislation is effective and that protected habitats for the species are managed appropriately. CE01: Reduce impact of transport operation and infrastructure: Road design, construction and operation need to take into account the likely impact on bats, e.g. in relation to the provision of safe crossing structures and the loss of and severance of bat habitat and lighting. CB04: Adapt/manage reforestation and forest regeneration, CB06: Stop forest management and exploitation practices, CF01: Manage conversion of land for construction and development of infrastructures, CA02: Restore small landscape features on agricultural land, CB05: Adapt/change forest management and exploitation practices, CB06: Stop forest management and exploitation practices, CA01: Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land: P. auritus forage along linear features, within woodland, over grazed pasture / grassland and wetland habitats. It roosts within buildings and trees. Environmental land management schemes and appropriate management practices in the agricultural and forestry sectors are now widely used to ensure these habitats are well-managed and provide appropriate insect food at the correct time of year and roosts and appropriately protected. Such practices are required to continue in order to achieve conservation goals. CF12: Other measures related to residential, commercial, industrial and recreational infrastructures, operations and activities: Planning at landscape scale is required to conserve commuting routes and foraging areas. CF03: Reduce impact of outdoor sports, leisure and recreational activities: Impacts of recreation (caving) on swarming and hibernation sites need to be limited.
10.1 Future prospects of parameters	10.1a Future prospects of -range. The future prospects of range for this species is considered to be overall stable in Wales. P. auritus range is widespread through Wales; no specific short-term drivers for expansion or contraction have been identified and therefore there is no reason to assume that range will vary significantly within the next 12 years unless population crashes occur. 10.1b Future prospects of -Population The future prospects of population for this species is considered to be uncertain in Wales. The population appears to be stable as shown continuously through the National Bat Monitoring Programme trend data however for Wales this is only based on hibernation data and a decline since 2014 has been noted. This, combined with uncertainty about population size estimates due to a lack of data on population densities within different habitats, and the lack of data regarding impacts of drivers of population change means that the reported stable range size is not considered to be sufficient evidence for a stable population to be expected over the next 12 years. The future prospects for population size for this species are therefore uncertain and unknown has been reported. 10.1c Future prospects of -Habitat of the species The future prospects of habitat of the species is considered to be overall stable in Wales. We do not have a reliable measure of the quality of the occupied habitat, however P. auritus is widespread and uses a mosaic of habitats and there are no specific identified drivers of change across these habitats. There is therefore no reason to assume that the current reported trend will not continue over the next 12 years.