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:

S1322 - Natterer's bat (*Myotis nattereri*)

ENGLAND

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.

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NATIONAL LEVEL	
1. General information	
1.1 Member State	**UK (England information only)**
1.2 Species code	**1322**
1.3 Species scientific name	**Myotis nattereri**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Natterer's bat

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1999-2016
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	Bat Conservation Trust (2018). The State of the UK's Bats 2017. Bat Conservation Trust, London. Available at (http://www.bats.org.uk/pages/results_and_reports.html) Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C., McDonald, R.A., Shore, R.F (2018). A review of the population and conservation status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Parsons, K. N. & Jones, G. (2003). Dispersion and habitat use by Myotis daubentonii and Myotis nattereri during the swarming season: implications for conservation. Animal Conservation, 6, 283-290 Smith, P. G. & Racey, P. A. (2008). Natterer's bats prefer foraging in broad-leaved woodlands and river corridors. Journal of Zoology, 275, 314-322 Zeale, M. R., Bennitt, E., Newson, S. E., Packman, C., Browne, W. J., Harris, S., Jones, G. & Stone, E. (2016). Mitigating the Impact of Bats in Historic Churches: The Response of Natterer's Bats Myotis nattereri to Artificial Roosts and Deterrence. PLoS One, 11, e0146782. Swift, S. M. (1997). Roosting and foraging behaviour of Natterer's bats (Myotis nattereri) close to the northern border of their distribution. Journal of Zoology, 242, 375-384. Mortimer, G. (2006). Foraging, roosting and survival of Natterer's bats, Myotis nattereri, in a commercial coniferous plantation. PhD, University of St Andrews. Smith, P. G. & Racey, P. A. (2005). The itinerant Natterer: physical and thermal characteristics of summer roosts of Myotis nattereri (Mammalia: Chiroptera). Journal of Zoology, 266, 171-180. Boughey, K. L., Lake, I. R., Haysom, K. A. & Dolman, P. M. (2011). Effects of

landscape-scale broadleaved woodland configuration and extent on roost location for six bat species across the UK. Biological Conservation, 144, 2300-2310.

Dietz, C. & Keifer, A. (2016). Bats of Britain and Europe, London, Bloomsbury Publishing.

Smith, P. G. (2001). Habitat preference, range use and roosting ecology of Natterer's bats (Myotis nattereri) in a grassland-woodland landscape. PhD, University of Aberdeen.

Boye, P. & Dietz, M. (2005). Research Report No661: Development of good practice guidelines for woodland management for bats. English Nature, Peterborough.

Fensome, A. G. & Mathews, F. (2016). Roads and bats: a meta-analysis and review of the evidence on vehicle collisions and barrier effects. Mammal Review, 46, 311-323.

Briggs, P. (2000). A study of barn conversions in Hertfordshire commissioned by Hertfordshire BRC and Hertfordshire County Council.

Plummer, K. E., Hale, J. D., O'Callaghan, M. J., Sadler, J. P. & Siriwardena, G. M. (2016). Investigating the impact of street lighting changes on garden moth communities. Journal of Urban Ecology, 2

Bat Conservation Trust, 2018. The National Bat Monitoring Programme. Annual Report 2017. Bat Conservation Trust, London. Available at http://www.bats.org.uk/pages/nbmp_annual_report.html

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)	126502
	b) Operator	
	c) Unknown	
	d) Method	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

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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.

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	The range is slightly smaller than that given in the 2013 Article 17 report; this difference is likely to reflect the use of different methodology.

6. Population

6.1 Year or period	1995-2016	
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	11700
	c) Maximum	2040000
	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	Increasing (+)	
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		

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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	Genuine change Improved knowledge/more accurate data Use of different method The change is mainly due to: Use of different method
6.17 Additional information	Genuine change (BCT, 2018), but also the different methodology used by Mathews et al (2018).

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)?	
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	1995-2016	
7.4 Short-term trend Direction	Stable (0)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
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
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Use of other pest control methods in agriculture (excluding tillage) (A23)	M
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	H

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Use of plant protection chemicals in forestry (B20)	M
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (F24)	H

Threat	Ranking
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Use of other pest control methods in agriculture (excluding tillage) (A23)	M
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	H
Use of plant protection chemicals in forestry (B20)	M
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (F24)	H

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	Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02)

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Maintain existing extensive agricultural practices and agricultural landscape features (CA03)

Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)

Other measures related to agricultural practices (CA16)

Manage the use of chemicals for fertilisation, liming and pest control in forestry (CB09)

Reduce diffuse pollution to surface or ground waters from forestry activities (CB10)

Manage/reduce/eliminate noise, light and other forms of pollution from transport (CE05)

Reduce/eliminate noise, light, heat or other forms pollution from industrial, commercial, residential and recreational areas and activities (CF09)

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	The future prospects for range for this species is thought to be stable and any changes since the 2013 report are likely to be due to changes to methodology. The NBMP data (BCT, 2018) shows a steady population increase between 1999 and 2010, with relative stabilty from then onwards. However, a lack of data on population densities, size, and the conflicting effects of drivers of population change mean that the reported stable range size is not considered to be sufficient evidence for a stable population. The future prospects for population size for this species are therefore uncertain. Increased interest in afforestation means that the total area of broadleaved woodland is likely to continue to increase. However, the current trajectory of increase is modest once the loss of existing woodlands is taken into account; and the available statistics do not adjust for woodland recently converted into another land use (Forestry Commission 2017, Forestry Commission 2016). The rate of new planting of woodland (conifer and broadleaved combined) has fallen over the past 20 years, whilst the rate of restocking has remained approximately stable in all countries. Climate change may also impact on habitat availability and quality for this species. Overall, the future prospects for habitat for this species are thought to be stable.

11. Conclusions

11.1. Range

11.2. Population

11.3. Habitat for the species

11.4. Future prospects

11.5 Overall assessment of Conservation Status

11.6 Overall trend in Conservation Status

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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

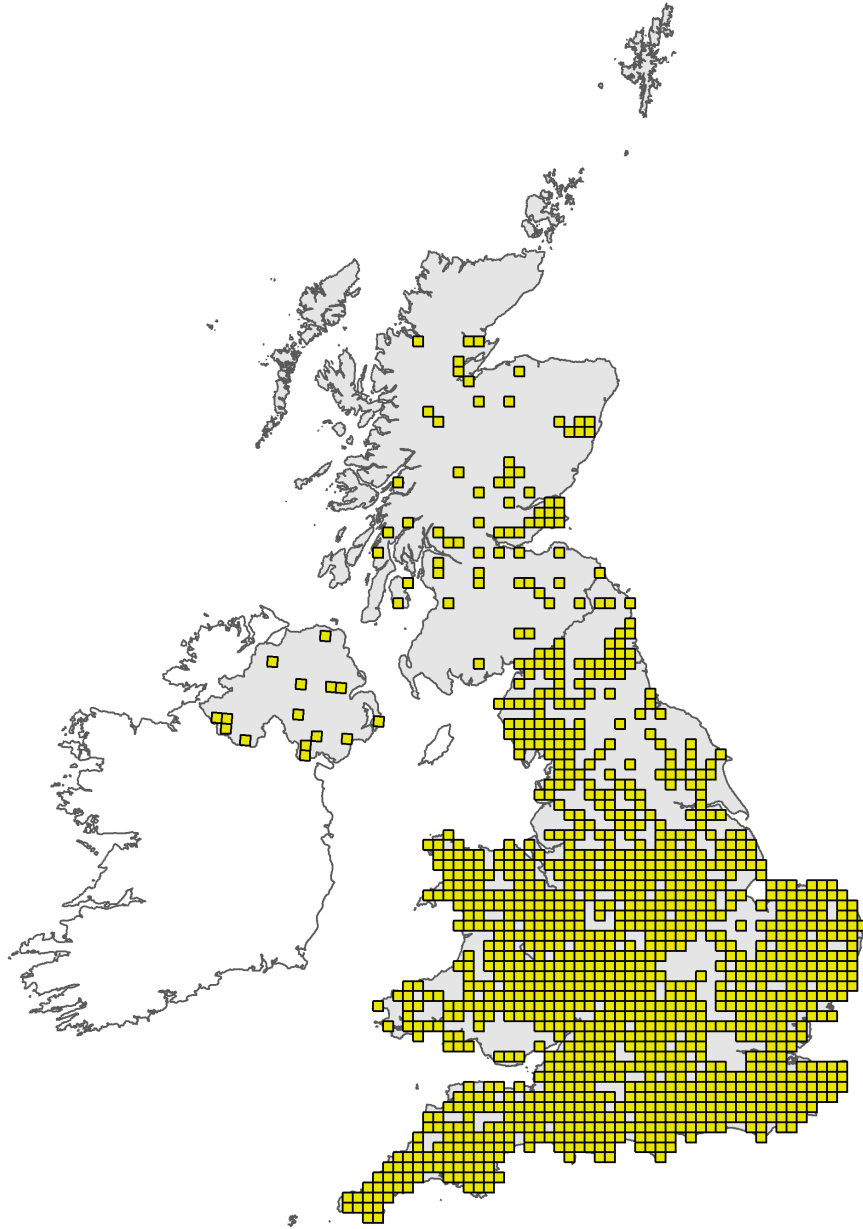| 13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	
13.3 Other relevant Information	

Distribution Map

Figure 1: UK distribution map for S1322 - Natterer's bat (*Myotis nattereri*). 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.
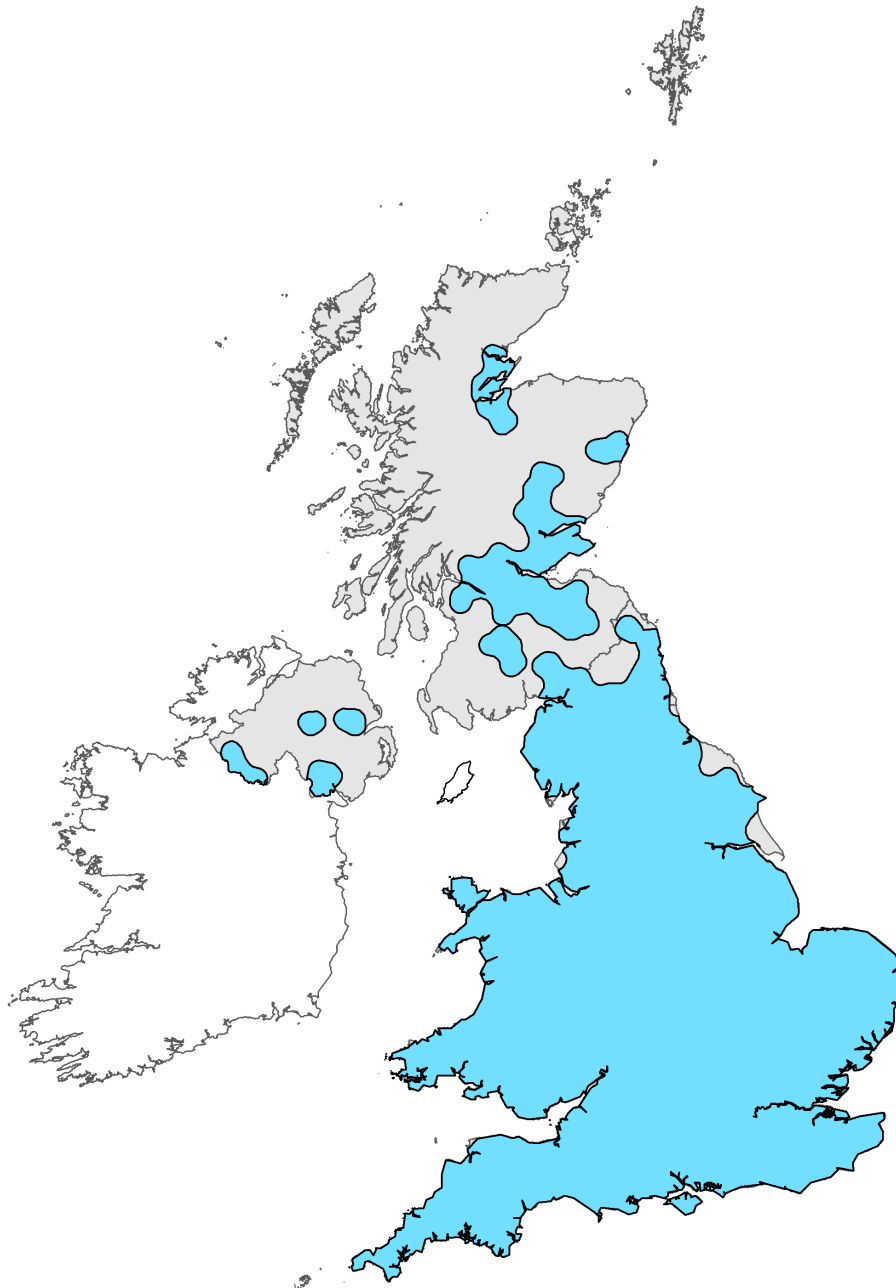
Range Map

Figure 2: UK range map for S1322 - Natterer's bat (*Myotis nattereri*).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: Myotis nattereri (1322)

Field label	Note
1.5 Common name	Myotis nattereri is commonly associated with trees, particularly broad-leaved woodland, but also tree-lined river corridors, parkland and hedgerows adjacent to pasture (Parsons & Jones, 2003; Smith & Racey, 2008; Zeale at al, 2016). They have also been observed along roadsides (Swift, 1997) and using mature Corsican pine plantations in Scotland (Mortimer, 2006). Maternity roosts are located in trees, bat boxes and buildings and tend to be located close to woodland habitats (Smith & Racey, 2005; Boughey et al, 2011). Underground sites, including tunnels, caves and ice-houses are used for hibernation and the extent of use of trees is unclear (Dietz & Keifer, 2016; Smith, 2001).

Species name: Myotis nattereri (1322) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	The range is slightly smaller than that reported in the 2013 Article 17 report, but this difference is likely to be due to methodolgy and not actual change (Mathews et al, 2018).
6.1 Year or Period	Presence data was collected between 1995-2016 at 10km resolution or higher, gathered from the NBN gateway, local records centres, individual species experts, national and local monitoring schemes and iRecord for each species for the 'Review of the Population and Conservation Status of British Mammals (Mathews et al, 2018) used to determine population status for the species for this report. However, the population was determined between 2016-2017 and only data that had been verified by the source organisation was included in the distribution maps.
6.4 Additional population size	Mathews et al, (2018) gives estimates of 11,700 individuals (lower plausible limit) to 2,040,000 (upper plausible limit) in England, with a main estimate of 321,000. The overall estimate was based on information on adult population density across mixed habitat types and multiplied by the available habitable area within the range of the species. Habitable area as defined as all habitats within the range, excluding montane habitats, since these are unlikely to provide suitable locations for roosts.The plausible range of the estimated population size for Natterer's bats is extremely wide. This is partly because of uncertainty about roost density.
6.8 Short term trend; Direction	The NBMP (BCT, 2018) data shows an increasing short-term trend direction (2006-2017) for the population of M. nattereri in England. Hibernation Survey data indicates that the smoothed index is currently 98.3% above the 1999 base year value, equivalent to an annual increase of 3.9%. The smoothed index value increased steadily between 1999-2010 but has been relatively stable since then. Overall there has been an increase during the short-term trend period.

7.1 Sufficiency of area and quality of occupied habitat	M. nattereri is commonly associated with trees, particularly broad-leaved woodland, but also tree-lined river corridors, parkland and hedgerows adjacent to pasture (Parsons & Jones, 2003; Smith & Racey, 2008; Zeale et al, 2016). They have also been observed along roadsides (Swift, 1997) and using mature Corsican pine plantations in Scotland (Mortimer, 2006). During the spring most foraging activity is in open habitats such as orchards, fields and pastures with hedgerows and trees, or near water bodies. However, in summer, forgaing activity moves more to woodlands, including dense coniferous forests (Boye & Dietz, 2005). Maternity roosts are located in trees, bat boxes and buildings and tend to be located close to woodland habitats (Smith & Racey, 2005; Boughey et al, 2011). Underground sites, including tunnels, caves and ice-houses are used for hibernation and the extent of use of trees is unclear (Dietz & Keifer, 2016; Smith, 2001).
7.2 Sufficiency of area and quality of occupied habitat; Method used	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 within the range. The habitable area within the range is estmated to be 126,502 km2.
7.4 Short term trend; Direction	Although the estimated area of suitable habitat for this species appears to have increased since the last Article 17 report, it is likely that this results from mapping species records at a finer scale, using an alpha hull value of 20km an adding an additional 10km buffer to the final hull polygon to provide smoothing to ensure that the hull covered the areas recorded. It is assumed that this species which can occupy a wide variety of habitat types could be present throughout the entire area, except for montane areas.
8.1 Characterisation of pressures/ threats	Drivers of change to the population include, the loss of viable roosts during barn and other building conversions (Briggs, 2000); urban development encroaching on traditional roost sites (Boughey et al, 2011); the negative impact of transport infrastructure; artificial night lighting potentially impacting on commuting routes and prey availability (Zeale et al, 2016; Plummer et al, 2016); and changes to the agricultural landscape, including the impact of avermectins on dung flora (Swift, 1997).