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:

S1317 - Nathusius' pipistrelle (*Pipistrellus nathusii*)

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.

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 (England information only)**
1.2 Species code	**1317**
1.3 Species scientific name	**Pipistrellus nathusii**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Nathusius' pipistrelle

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	Based mainly on extrapolation from a limited amount of data
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

Barlow, K., D. Hargreaves and F. Mathews (2016). Understanding the ecology, current status and conservation threats for Nathusius' pipistrelle in Great Britain - a pilot study. Final Report to the People's Trust for Endangered Species, People's Trust for Endangered Species.
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)
Dietz, C., Helversen, O. von and Nill, D. (2009). Bats of Britain, Europe & Northwest Africa. A & C Black Publishers Ltd, London.
Hutson, A.M., F. Spitzenberger, J.Juste, S. Aulagnier, J. Palmeirim, A. Karatas and Paunovic (2008) Pipistrellus nathusii. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013. 1.
Hutterer, R. (2005). Bat migrations in Europe; a review of banding data and literature. BfN, Bonn, Naturschutz und Biologische Viefalt 28.
Ijas, A., A. Kahliainen, V.V. Vasko and T.M. Lilley (2017). Evidence of the Migratory Bat, Pipistrellus nathusii, Aggregating to the Coastlines in the Northern Baltic Sea. Acta Chiropterologica., 19, 127-139
Lundy, M., Montgomery, I and Russ, J. (2010). Climate change - linked range expansion of Nathusius' pipistrelle bat, Pipistrellus nathusii (Keyserling & Blasius, 1839). Journal of Biogeography, 37, 2232-2242
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.
Moussy, C., D.J. Hosken, F. Mathews, G.C. Smith, J.N. Aegerter and Bearhop

(2013). Migration and dispersal patterns of bats and their influence on genetic structure. Mammal Review, 43 (3), 183-195

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Increasing (+)	
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)	70285
	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 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. It is important to note that for this species range represents all records, most of which are acoustic. Given the species great mobility, the range may not correspond with the roost range (Mathews et al, 2018)
5.11 Change and reason for change in surface area of range	Genuine change Improved knowledge/more accurate data Use of different method	
	The change is mainly due to:	Use of different method
5.12 Additional information		

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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	
	b) Minimum	
	c) Maximum	
	d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2007-2018	
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	Based mainly on extrapolation from a limited amount of data	
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	x
	d) Method	It has not been possible to determine a Favourable reference population for this species as there is too little data available for this species to be able to set a value.
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:	Improved knowledge/more accurate data
6.17 Additional information	In the previous Article 17 reporting round (Jan 2007-Dec 2012), population was recorded as unknown. Due to increased observer effort, the National Nathusius'	

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Pipistrelle Project and improved acoustic detection more generally, records of Nathusius' pipistrelle have increased to an extent, which would infer a genuine increase. However, it is unclear the extent to which records reflect individual migrants and vagrants rather than larger populations.

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)?	Unknown
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Unknown
7.2 Sufficiency of area and quality of occupied habitat Method used	Insufficient or no data available	
7.3 Short-term trend Period	1995-2016	
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
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Use of plant protection chemicals in agriculture (A21)	M
Drainage for use as agricultural land (A31)	H
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Clear-cutting, removal of all trees (B09)	M
Wind, wave and tidal power, including infrastructure (D01)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	H

Threat	Ranking
Conversion from one type of agricultural land use to another	M

(excluding drainage and burning) (A02)	
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Use of plant protection chemicals in agriculture (A21)	M
Drainage for use as agricultural land (A31)	H
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Clear-cutting, removal of all trees (B09)	M
Wind, wave and tidal power, including infrastructure (D01)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	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: Long-term results (after 2030)

9.5 List of main conservation measures

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Restore small landscape features on agricultural land (CA02)
Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
Manage drainage and irrigation operations and infrastructures in agriculture (CA15)
Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)
Adapt/manage reforestation and forest regeneration (CB04)
Adapt/change forest management and exploitation practices (CB05)
Adapt/manage renewable energy installation, facilities and operation (CC03)
Reduce impact of transport operation and infrastructure (CE01)

9.6 Additional information: Legal and administrative measures continue to be required to ensure that the protection provided by the legislation is effective. However, although a few measures have been identified for the species, the list is likely to be incomplete

as several knowledge gaps persist for this species and further research is needed to identify further measures and the practical implementation of those measures for this species. There is a particular need to determine the resident and breeding status of the species and the main migratory routes that it uses. There is also a need to quantify the risk posed by offshore and onshore wind turbines to this species.

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	It is thought that the range of this species has been expanding in recent years, possibly linked with climate change (Lundy et al., 2010) in addition to the evident increase in observer effort, as such the future prospects for this species for continued range expansion, at least in the short term would appear to be good. Whilst there would appear to be an increase in the population of Nathusius' pipistrelle bats due to increased observer effort and improved technology i.e improved acoustic detectors the extent to which records reflect individual migrants and vagrants rather than larger populations is still unclear and continued survey effort needs to be undertaken to be able to establish what the future prospects for this species might be in terms of the population parameter. There is little information on occupancy for this species within geographic regions and across differing habitat types so it is not yet possible to determine the future prospects in terms of the habitat parameter for this species.

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	
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

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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

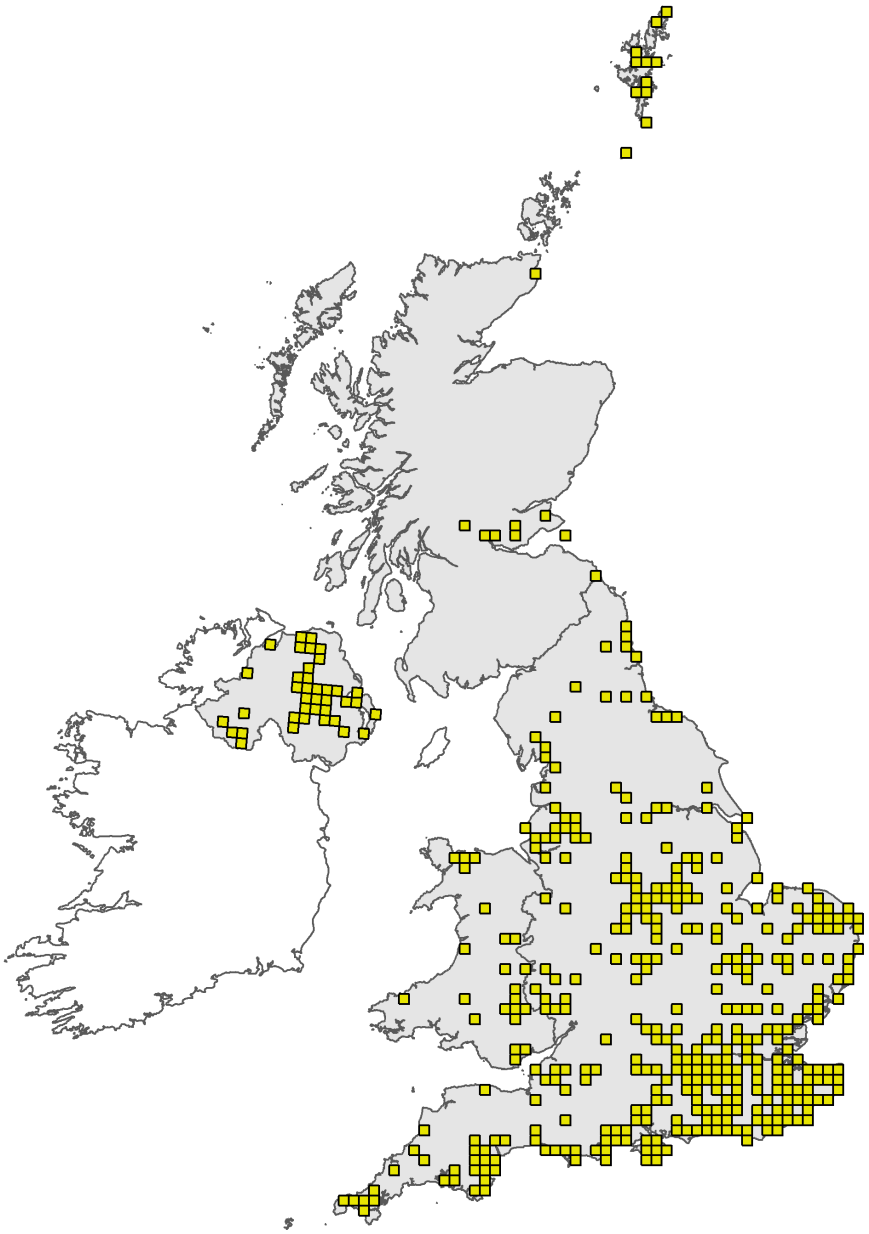

Figure 1: UK distribution map for S1317 - Nathusius' pipistrelle (*Pipistrellus nathusii*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

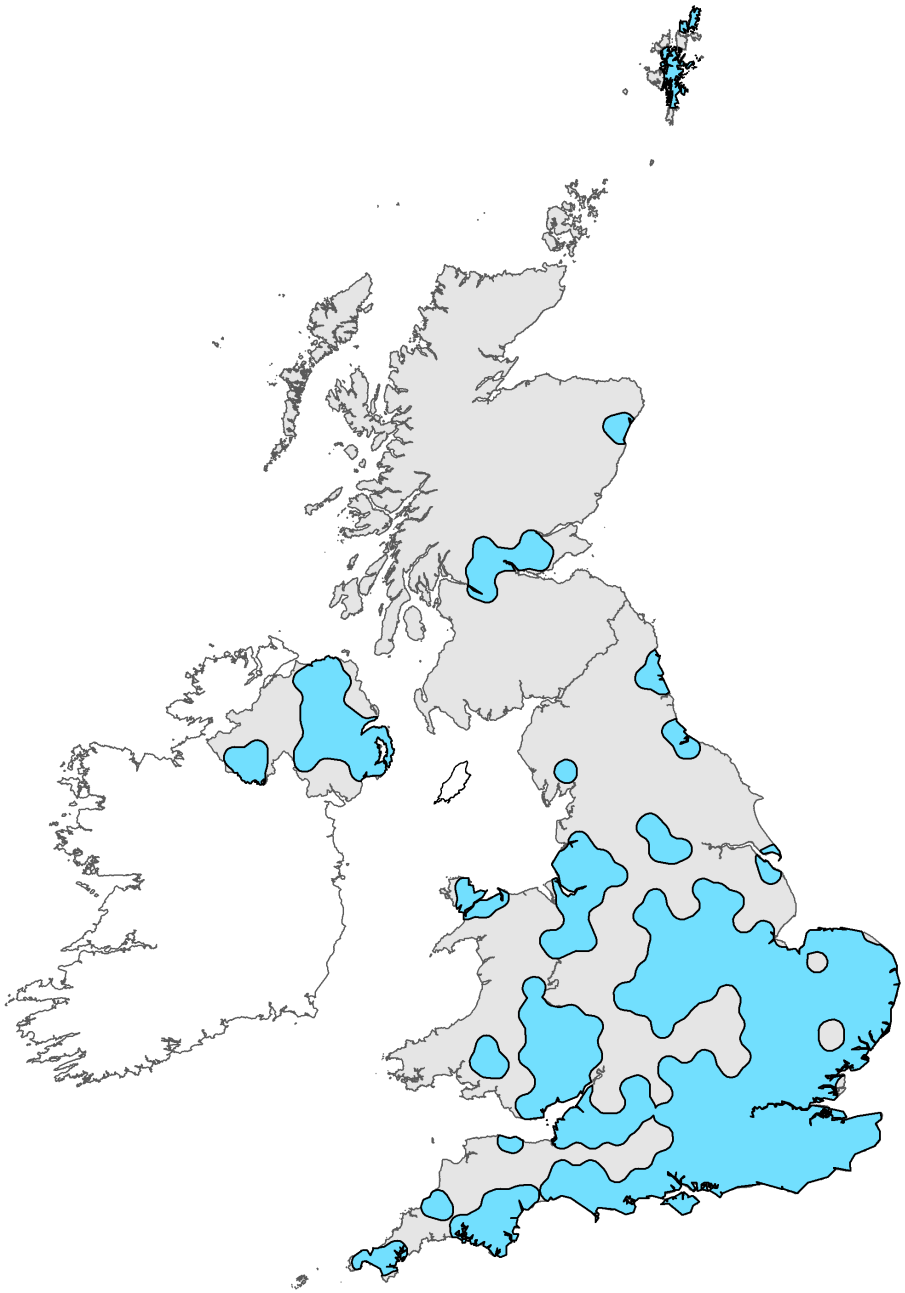

Figure 2: UK range map for S1317 - Nathusius' pipistrelle (*Pipistrellus nathusii*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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: Pipistrellus nathusii (1317)

Field label	Note
1.5 Common name	Records for Nathusius' pipistrelle bats are highly dispersed. This reflects the relatively short time for which appropriate acoustic recording equipment has been widely available and also the localised nature of concentrated survey effort. The extent to which records reflect individual migrants and vagrants rather than larger populations is unclear (Mathews et al, 2018). Nathusius' pipistrelle bat is widespread across Europe, though its abundance is unclear. It is known to undertake large-scale migrations, with most breeding in north eastern regions and hibernating in the south and west (Hutson et al., 2008, Moussy et al., 2013). Whilst, the migration patterns of Nathusius' pipistrelle bat are relatively well known in continental Europe from long-term, large-scale ringing studies (Hutterer, 2005, Ijas et al., 2017) the geographical origins of individuals found in the UK and their migration routes are much less well defined. Records from grounded bats and acoustic detectors show peaks of activity, particularly in autumn but also in spring suggesting migration into GB. It is thought that the range of this species has been expanding in recent years, possibly linked with climate change, in addition to the increase in observer effort (Lundy et al., 2010). Only five maternity roosts have been identified in England.

Species name: Pipistrellus nathusii (1317) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	The number of Nathusius' pipistrelle bat acoustic records has increased rapidly over the past decade. This is partly due to increased observer effort, coupled with the greater ease with which the species can be identified using modern equipment compared with heterodyne detectors (Mathews et al, 2018). Initiatives such as the National Nathusius' Pipistrelle Project, which was launched in 2014 have increased the number of records for this species and the geographical spread of the species, showing an increase in the recorded range.
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.
6.8 Short term trend; Direction	Since the last Article 17 reporting round (Jan 2007-Dec 2012) there has been a sustained effort to gain a better understanding of this species in GB, particularly its migratory status. In the last reporting round only two breeding roosts were known in England, that has now increased to five. The National Nathusius' Pipistrelle Project, launched in 2014 has added greatly to the number of records through trapping and ringing studies with the aid of acoustic lures, acoustic studies and targeted bat box checks. The extent to which records reflect individual migrants and vagrants rather than larger populations is unclear. However, the scale of the change is such that it seems reasonable to infer that there is a genuine increase in the number of Nathusius' pipistrelle bats in GB (Mathews et al, 2018).

7.1 Sufficiency of area and quality of occupied habitat	The area and quality of habitat for the species has been assessed as unknown as there is insufficient information available for this species to undertake this assessment. There is a general lack of information on Nathusius' pipistrelle in GB. Most detector records come from within a few km of large freshwater lakes and this is where recent capture efforts have focussed (Mathews et al, 2018). The species routinely forages in deciduous mixed woodlands, damp lowland forests, riparian forests but also coniferous forests, park landscapes and often over water bodies (Dietz et al, 2009). Roosting sites in Europe are primarily within trees, though the species adopts bat and bird boxes and can be found within residential buildings. This behaviour would seem to occur in England as well. However, in order to assess whether there is sufficient area and quality of habitat for this species, 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 England, which we do not currently have.
7.2 Sufficiency of area and quality of occupied habitat; Method used	The area and quality of habitat for the species has been assessed as unknown as there is insufficient information available for this species to undertake this assessment. There is a general lack of information on Nathusius' pipistrelle in GB. Most detector records come from within a few km of large freshwater lakes and this is where recent capture efforts have focussed (Mathews et al, 2018). The species routinely forages in deciduous mixed woodlands, damp lowland forests, riparian forests but also coniferous forests, park landscapes and often over water bodies (Dietz et al, 2009). Roosting sites in Europe are primarily within trees, though the species adopts bat and bird boxes and can be found within residential buildings. This behaviour would seem to occur in England as well. However, in order to assess whether there is sufficient area and quality of habitat for this species, 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 England, which we do not currently have.
7.4 Short term trend; Direction	As the area and quality of known occupied and unknown habitat cannot be assessed the short term trend direction is unknown.
7.5 Short term trend; Method used	There is insufficient information to assess the trend.
8.1 Characterisation of pressures/ threats	Pressures/threats can generally be divided into those that affect commuting and foraging (including prey availability). The species routinely forages in deciduous mixed woodlands, damp lowland forests, riparian forests but also coniferous forests, park landscapes and often over water bodies (Dietz et al, 2009). Roosting sites in Europe are primarily within trees, though the species adopts bat and bird boxes and can be found within residential buildings. This behaviour would seem to occur in England as well. Agricultural and forestry practices that remove or simplify these habitats or affect the biomass of insect prey could negatively affect populations. This is the only species in GB with clear evidence of considerable movement between GB and continental Europe. Recent capture and ringing effort has shown movement of the species between SW England and the Netherlands and between Latvia and Estonia and SE England. In addition, records of Nathusius' pipistrelle bat have been made in the English Channel using acoustic detectors installed on passenger ferries (Mathews et al, 2018). Stable isotope analyses of the fur samples collected as part of the Nathusius' Pipistrelle Project have provided evidence that at least part of the British population is derived from the far east of Europe (Barlow et al., 2016). The species is known to be at high risk of collision with wind turbines based on evidence elsewhere in Europe, though data in GB is lacking as few sites in coastal or other high-risk areas have been monitored and data is also lacking on migratory routes (Mathews et al, 2018).

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. Guidance is being developed and will shortly be available from the agencies to help planners, developers and ecological consultants to consider the potential effects of onshore wind energy developments on bats. Guidance is available for land managers on how to manage their land holdings for bats.