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:

S5009 - Soprano pipistrelle (*Pipistrellus pygmaeus*)

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	**5009**
1.3 Species scientific name	**Pipistrellus pygmaeus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Soprano pipistrelle

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1997-2016
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

Barratt, E.M., R. Deaville, T.M. Burland, M.W. Bruford, G. Jones, P.A. Racey and R.K. Wayne (1997). DNA answers the call of pipistrelle bat species. Nature, 387 (6629), 138-139
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)
Boye, P and Dietz, M. (2005). Research Report No 661: Development of good practice guidelines for woodland management for bats. English Nature, Peterborough.
Davidson-Watts, I. and Jones, G. (2006). Differences in foraging behaviour between Pipistrellus pipistrellus (Schreber, 1774) and Pipistrellus pygmaeus (Leach, 1825). Journal of Zoology, 268 (1), 55-62
Fuentes-Montemayor, E., Goulson, D., Cavin, L., Wallace, J.M., and Park, K.J. (2013). Fragmented woodlands in agricultural landscapes: The influence of woodland character and landscape context on bats and their insect prey. Agriculture, Ecosystems and Environment, 172, 6-15
Jones, G and Racey, P.A. (2008). Common pipistrelle Pipistrellus pipistrellus, Soprano pipistrelle Pipistrellus pygmaeus. Pages 343-351 In Harris, S and Yalden, D.W. Mammals of the British Isles: Hnadbook, 4th edition. The Mammal Society, Southampton. 799pp.
Kirkpatrick, L. (2017). Bat exploitation of Sitka Spruce plantations: impacts of management on bats and their invertebrate prey. PhD University of Stirling.
Lintott, P.R., Barlow, K., Bunnefeld, N., Briggs, P., Gajas Roig, C., and Park, K.J. (2016). Differential responses of cryptic bat species to the urban landscape. Ecology and Evolution, 6 (7), 2044-2052

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Mathews, F., Richardson, S.M., and Hosken, D.J. (2016). Understanding the risks to bat populations posed by wind turbines - Phase 2 - WC0753, Defra.
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.
Mitchell-Jones, T.J. (2010). Bats in houses - the conservation challenge. Pp 3965-378 in Species Management : challenges and solutions for the 21st century. Baxter, J.M. and Galbraith, C.A. TSO Scotland, Edinburgh
Nicholls, B. and Racey, P (2006a). Habitat selection as a mechanism of resource partitioning in two cryptic bat species Pipistrellus pipistrellus and pipistrellus pygmaeus. Ecography, 29, 697-708
Nicholls, B. and Racey, P (2006b). Contrasting home-range size and spatial partitioning in cryptic and sympatric bats. Behavioural Ecology and Sociobiology, 61, 131-142
Waring, S.D., Essah, E., Gunnell, K, and Bonser, R (2013). Double jeopardy: the potential for problems when bats interact with breathable roofing membranes in the United Kingdom. Architecture and Environment, 1 1-3

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)	128458
	b) Operator	
	c) Unknown	
	d) Method	Range is based on presence data collected between 1997-2016. 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.
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: Improved knowledge/more accurate data
5.12 Additional information	As P. pygmaeus is a widespread species occupying a wide variety of habitat types it is assumed that the range is equal to the favourable reference range.

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		
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	1260000
	c) Maximum	5360000
	d) Best single value	2980000
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		
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	
	c) Unknown	

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	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: Genuine change
6.17 Additional information	Also, improved knowledge. Acoustic detectors used to record bat activity in the field have changed considerably over time and have become much more sensitive. Data from the NBMP indicates that there has been a slight increase in population for this species every year since the last Article 17 reporting round.

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	1997-2016	
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
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
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Wind, wave and tidal power, including infrastructure (D01)	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
Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (F24)	H
Industrial or commercial activities and structures generating noise, light, heat or other forms of pollution (F25)	H

Threat	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
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Wind, wave and tidal power, including infrastructure (D01)	M
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
Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (F24)	H
Industrial or commercial activities and structures generating noise, light, heat or other forms of pollution (F25)	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)
Restore small landscape features on agricultural land (CA02)
Other measures related to agricultural practices (CA16)
Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)

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Adapt/manage reforestation and forest regeneration (CB04)

Adapt/manage renewable energy installation, facilities and operation (CC03)

Reduce impact of transport operation and infrastructure (CE01)

Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities (CF05)

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

9.6 Additional information	Legal and administrative measures continue to be required to ensure that the protection provided by the legislation is effective. If roosts are to be destroyed, damaged or lost due to development, adequate mitigation/compensation methods must be put in place to maintain the favourable conservation status of the species. Road design construction and operation need to take into account the likely impact on bats, for example, in relation to the provision of safe crossing structures and the loss and severance of bat habitat and lighting. 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.

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	The range for P. pygmaeus is likely to have remained stable as the species continues to be widespread and appears to be covering roughly the same range as in the previous reporting round (2007-2012), even though different methods were used to perform this calculation. The population appears to show a slight increase annually through the National Bat Monitoring Programme (NBMP) trend data from field survey results. It is considered that the habitat for P. pygmaeus has remained stable as it is taken as the range as the species is widespread occupying a wide variety of habitats and habitat mosaics.

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

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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

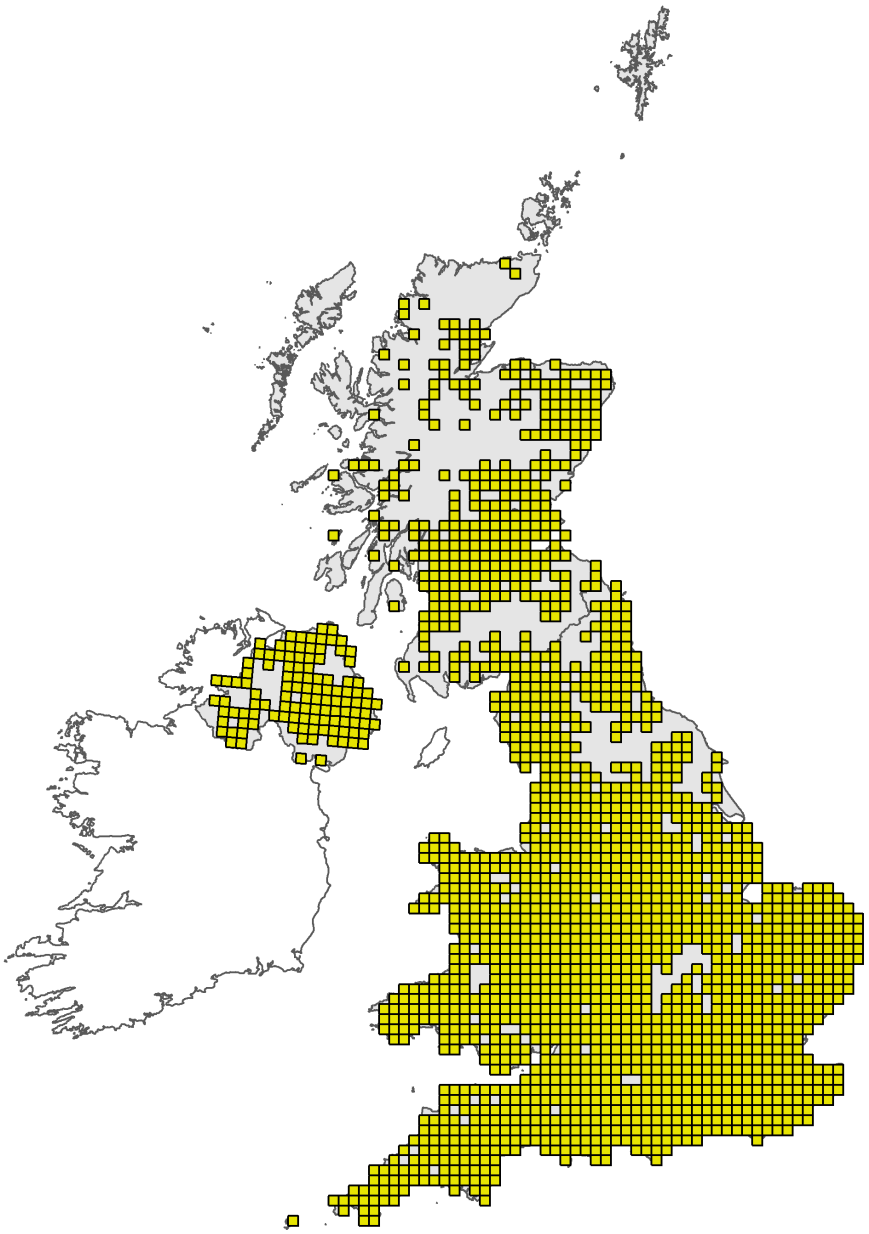

Figure 1: UK distribution map for S5009 - Soprano pipistrelle (*Pipistrellus pygmaeus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

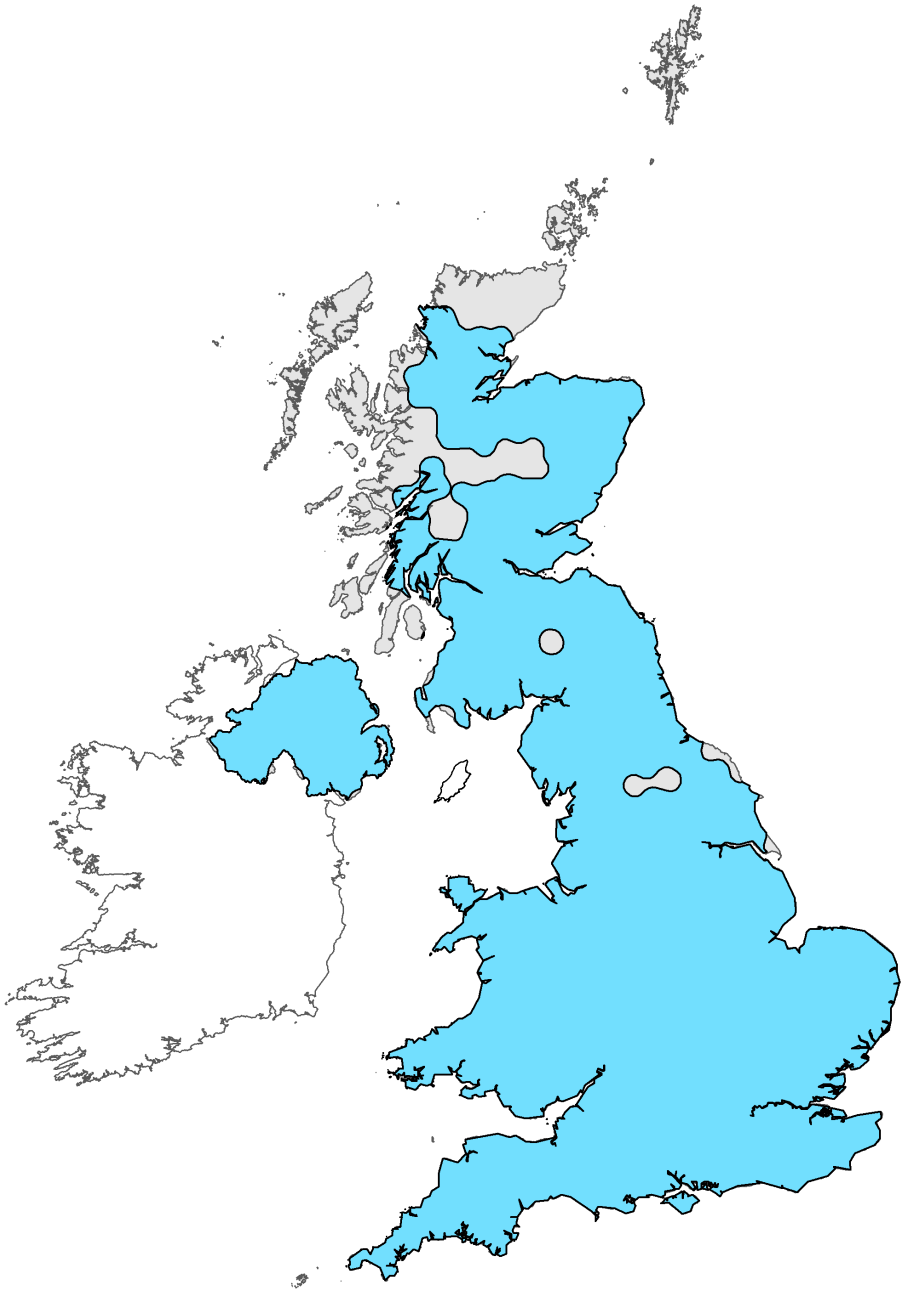

Figure 2: UK range map for S5009 - Soprano pipistrelle (*Pipistrellus pygmaeus*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 pygmaeus (5009)

Field label	Note
1.5 Common name	P. pygmaeus is widely distributed throughout England with gaps in distribution probably reflecting an absence of survey data rather than an absence of the species. P. pygmaeus bats are frequently reported to make particular use of riparian habitat (Davidson-Watts and Jones, 2006, Nicholls and A. Racey, 2006, Lintott et al., 2016). In woodlands, activity of P. pygmaeus is positively linked with the amount of habitat fragmentation, possibly because they utilise edge environments (Fuentes-Montemayor et al., 2013). P. pygmaeus usually roosts in buildings and can be found in a wide variety of constructions ranging from ancient churches to barns, warehouses, amenity buildings and modern bungalows, they can be found in bat boxes and will also roost in trees. Many records come from householder requests for information or advice. The widespread use of bat detectors and structured surveys for National Bat Monitoring Programme (NBMP) has increased the number of records in recent years. Pipistrellus pipistrellus (s.l) was divided into P. pipistrellus (s.s.) and P. pygmaeus in 1997, so field records prior to this cannot be assigned to either species with confidence (Barratt et al, 1997).

Species name: Pipistrellus pygmaeus (5009) Region code: ATL

Field label	Note
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 1,260,000 individuals (lower plausible limit) to 5,360,000 (upper plausible limit). The estimates excluded colonies that contained less than 30 bats in order to ensure that counts did not include individuals in formation roosts that were then counted again at maternity sites. This may have led to some under-estimation of population size. However, most data were derived from NBMP data and here all roosts were included regardless of size since they were part of a longitudinal monitoring programme. Given that the estimated roost size is close to expert opinion and published data, it is likely to be a reasonable basis for the calculations.
6.8 Short term trend; Direction	The National Bat Monitoring Programme (NBMP) trends record a slight increase in population for this species every year since the last Article 17 reporting round. There would seem to have been a significant decline in the short-term population trend for this species from roost counts. However, it is likely that for this species, frequent roost switching results in a negative bias in Roost Count data. The Roost Count trend is therefore not considered a reliable measure of population change for these species. Mathews et al (2018) records the trend as being unknown as acoustic detectors used to record bat activity in the field have changed considerably over time and have become much more sensitive. There is considerable misidentification between the common pipistrelle and soprano pipistrelle especially when using heterodyne detectors and there is also confusion with the Myotis species. The true trend probably lies between the trend that has been reported for the two phonic types (common and soprano pipistrelle).

6.17 Additional information	Genuine change and also improved knowledge. Acoustic detectors used to record bat activity in the field have changed considerably over time and have become much more sensitive. Data from the NBMP indicates that there has been a slight increase in population for this species every year since the last Article 17 reporting round.
7.1 Sufficiency of area and quality of occupied habitat	P. pygmaeus is an extremely widely distributed species and is found in almost any habitat type ranging from grasslands to urban and suburban environments. However, the species requires a complex mosaic of habitats to support foraging, roosting and commuting behaviour. Boye & Dietz (2005) and Jones & Racey (2008) provides a good overview of this species habitat requirements. Although, most maternity colonies are in buildings, forests of any type are used as roosting and foraging areas. P. pygmaeus bats are frequently reported to make particular use of riparian habitat (Davidson-Watts and Jones, 2006, Nicholls and A. Racey, 2006, Lintott et al., 2016). In woodlands, activity of P.pygmaeus is positively linked with the amount of habitat fragmentation, possibly because they utilise edge environments (Fuentes-Montemayor et al., 2013). P. pygmaeus home ranges are reported to be much larger than P. pipistrellus, P. pygmaeus lactating females have been reported to make flights of >10km, whilst using conifer plantations as their primary habitat (Kirkpatrick, 2017). P. pygmaeus roosts tend to be located in areas close to waterways (Jenkins et al., 1998, Oakley and Jones, 1998), particularly in the case of large roosts (Mathews et al, 2018). In summer the roost sites are predominantly in crevices in buildings, especially between tiles and the underlying roofing felt or behind boards on the gable. Furthermore, individuals and maternity colonies use tree holes, wood crevices and bird or bat boxes as roosts. The species disperses to temporary sites and mating roosts during the autumn post weaning period.
7.2 Sufficiency of area and quality of occupied habitat; Method used	The habitable area has been taken from Mathews et al (2018), which defined all the area within the range as habitable excluding montane habitat since this is unlikely to include suitable locations for maternity roosts. The habitable area within the range is 128,458 km2.
7.4 Short term trend; Direction	The trend would appear to be stable as the previous Article 17 report for this species calculated the habitat for the species at 109,500km2. The two estimates appear to be broadly in line with each other with the latest estimate being 128,458km2. The previous estimate was based on a simple calculation of the number of filled 10km squares on the distribution map. Whereas, the larger estimate presented here 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	Pressures can generally be divided into those that affect roosts and those that affect commuting and foraging (including prey availability). A02, A23,B02, B05, F11, - P. pygmaeus forage across a mosaic of habitat types, though they make particular use of riparian habitat (Davidson-Watts and Jones, 2006, Nicholls and A. Racey, 2006, Lintott et al., 2016). Agricultural and forestry practices that remove or simplify these habitats or affect the biomass of insect prey could negatively affect populations. D01, E01 - This is one of the primary species killed at wind turbine sites and in road collisions. It is unclear whether the scale of casualties is sufficient to impact on local populations, Mathews et al, 2016 and Fensome & Mathews, 2016. F02, F24, F25 - Although, roosts are strictly protected through legislation a variable number of licences are issued every year permitting exclusion, destruction and damage. Changes to building regulations and efforts to make buildings more energy-efficient have tended to reduce their accessibility and thermal suitability for bats. Breathable roofing membranes also pose a threat of entanglement, (Mitchell-Jones, 2010 and Waring et al, 2013).

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. If roosts are to be destroyed, damaged or lost due to development, adequate mitigation/compensation methods must be put in place to maintain the favourable conservation status of the species. Road design construction and operation need to take into account the likely impact on bats, for example, in relation to the provision of safe crossing structures and the loss and severance of bat habitat and lighting. 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.