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:

S1312 - Noctule (*Nyctalus noctula*)

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	**1312**
1.3 Species scientific name	**Nyctalus noctula**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Noctule

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	Arnold H. 1993. Atlas of Mammals in Britain. Institute of Terrestrial Ecology Research Publication no. 6, London. 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 Bat Conservation Trust. 2018a. The National Bat Monitoring Programme. Annual Report 2017. Bat Conservation Trust, London. Available at www.bats.org.uk/pages/nbmp_annual_report.html Battersby J. (Ed.). 2005. UK Mammals: Species Status and Population Trends. JNCC/Tracking Mammals Partnership. Boye P, Dietz M. 2005. Research Report No 661: Development of good practice guidelines for woodland management for bats. English Nature, Peterborough. Carey PD, Wallis SM, Emmett BE, Maskell LC, Murphy J, Norton LR, Simpson IC, Smart SS. 2008. Countryside Survey: UK headline messages from 2007. Centre for Ecology & Hydrology, Wallingford. Dietz C, Kiefer A. 2016. Bats of Britain and Europe. Bloomsbury, United Kingdom. Harris S, Morris P, Wray S, Yalden D. 1995. A review of British Mammals: population estimates and conservation status of British mammals other than cetaceans. JNCC, Peterborough. Jones G. 1995. Flight performance, echolocation and foraging behaviour in noctule bats Nyctalus noctula. Journal of Zoology, 237(2), 303-312. Lehnert LS, Kramer-Schadt S, Schonborn S, Lindecke O, Niermann I, Voigt CC. 2014. Wind farm facilities in Germany kill noctule bats from near and far. PLoS One, 9(8), e103106. Mathews F, Kubasiewicz LM, Gurnell J, Harrower C, McDonald RA, Shore RF.

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Mackie IJ. 2002. Aspects of the conservation biology of the noctule bat (Nyctalus noctula). PhD, University of Aberdeen.

Mackie IJ, Racey PA. 2007. Habitat use varies with reproductive state in noctule bats (Nyctalus noctula): Implications for conservation. Biological Conservation, 140(1-2), 70-77.

Mackie IJ, Racey PA. 2008. Noctule (Nyctalus noctula). Pp 338-342 In Harris S, Yalden DW. Mammals of the British Isles: Handbook, 4th edition. The Mammal Society, Southampton.799pp.

Mitchell-Jones TMJ, Carlin C. 2009. TIN051 Bats and onshore wind turbines Interim Guidance. 2nd edition, February 2012. http://publications.naturalengland.org.uk/file/490077

Natural Resources Wales. 2013. Supporting documentation for the Third Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2007 to December 2012. Conservation status assessment for Species: S1312 - Noctule bat (Nyctalus noctula).

Petit E, Mayer F. 2000. A population genetic analysis of migration: the case of the noctule bat (Nyctalus noctula). Molecular Ecology, 9(6), 683-690.

Richardson P. 2000. Distribution atlas of bats in Britain and Ireland 1980-1999. Bat Conservation Trust, London

Rodrigues L, Bach L, Dubourg-Savage MJ, Karapandza D, Kovac D, Kervyn T, Dekker J, Kepel A, Bach P, Collins J, Harbusch C, Park K, Micevski B, Minderman J. 2015. Guidelines for consideration of bats in wind farm projects - Revision 2014. EUROBATS Publication Series No. 6. UNEP/EUROBATS Secretariat, Bonn, Germany, 133pp.

Rydell J, Bach L, Dubourg-Savage MJ, Green M, Rodrigues L, Hedenstrom A. 2010. Bat mortality at wind turbines in northwestern Europe. Acta Chiropterologica 12, 261-274.

Sluiter JW, van Heerdt PF. 1966. Seasonal habits of the noctule bat (Nycalus noctula). Archives Neerlandaises de Zoologic, 16, 423-439.

Speakman JR. 1991. The impact of predation by birds on bat populations in the British Isles. Mammal Review, 21, 123-142.

5. Range

5.1 Surface area (km²)	
5.2 Short-term trend Period	
5.3 Short-term trend Direction	Uncertain (u)
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

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5.11 Change and reason for change in surface area of range	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

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	2900
	c) Maximum	304000
	d) Best single value	

6.5 Type of estimate	95% confidence interval
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	Unknown (x)

6.9 Short-term trend Magnitude	a) Minimum
	b) Maximum
	c) Confidence interval

6.10 Short-term trend Method used	Insufficient or no data available
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	Use of different method
	The change is mainly due to: Use of different method

6.17 Additional information	

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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 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 dead and dying trees, including debris (B07)	H
Removal of old trees (excluding dead or dying trees) (B08)	H
Clear-cutting, removal of all trees (B09)	H
Forest management reducing old growth forests (B15)	H
Wind, wave and tidal power, including infrastructure (D01)	H
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Conversion to other types of forests including monocultures (B02)	M
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	M
Use of other pest control methods in agriculture (excluding tillage) (A23)	M

Threat	Ranking
Removal of dead and dying trees, including debris (B07)	H
Removal of old trees (excluding dead or dying trees) (B08)	H
Clear-cutting, removal of all trees (B09)	H
Forest management reducing old growth forests (B15)	H
Wind, wave and tidal power, including infrastructure (D01)	H

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Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Conversion to other types of forests including monocultures (B02)	M
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	M
Use of other pest control methods in agriculture (excluding tillage) (A23)	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

Restore small landscape features on agricultural land (CA02)
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)
Stop forest management and exploitation practices (CB06)
Adapt/manage renewable energy installation, facilities and operation (CC03)
Other measures related to residential, commercial, industrial and recreational infrastructures, operations and activities (CF12)
Other measures related to agricultural practices (CA16)
Adapt/change forest management and exploitation practices (CB05)

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

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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

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	

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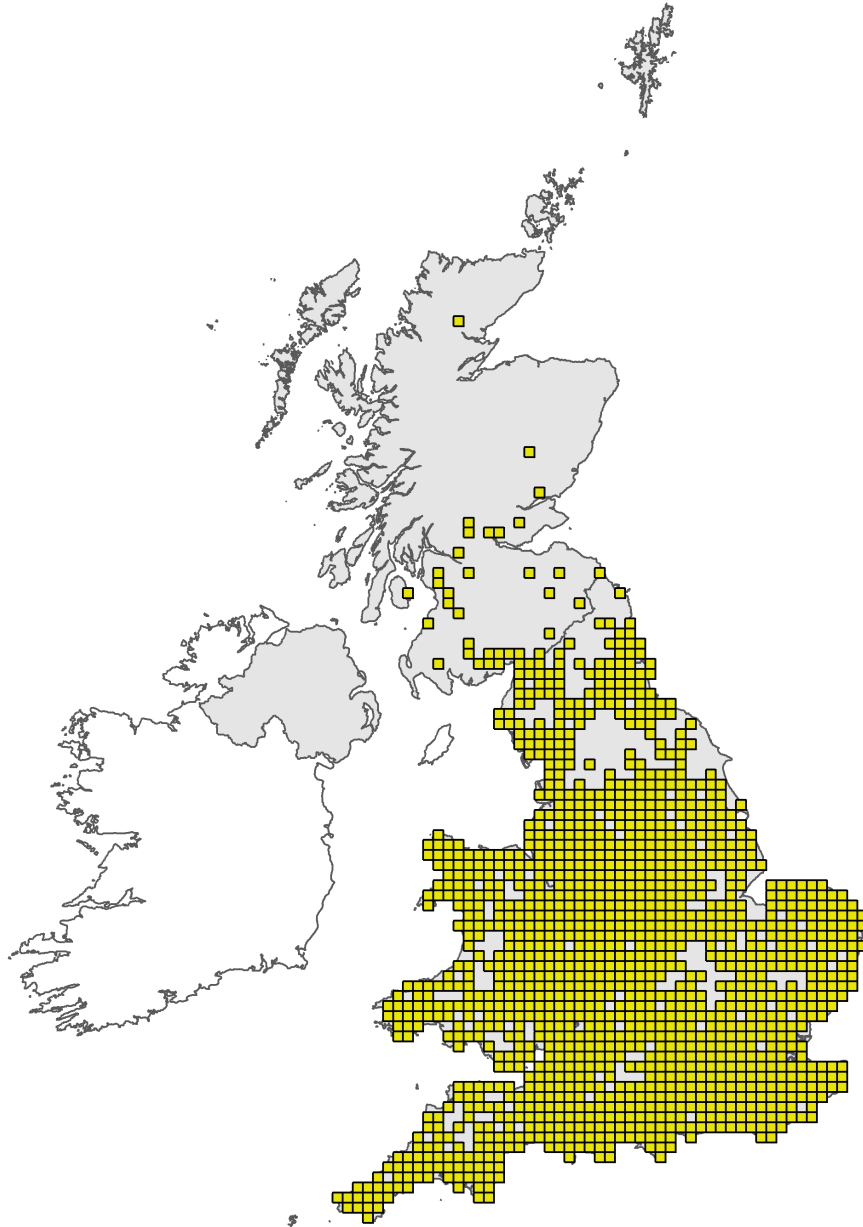
Distribution Map

Figure 1: UK distribution map for S1312 - Noctule (*Nyctalus noctula*). 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 S1312 - Noctule (*Nyctalus noctula*).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: Nyctalus noctula (1312)

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	The noctule is widespread in England, but is absent from the uplands of northern England. Although there has been no structured distribution surveys, this species has been reasonably well recorded by local bat groups and during monitoring surveys organised by the National Bat Monitoring Programme due to the relatively long distance over which their calls can be heard (226530m) and their high altitude flight in open space (Dietz and Keifer 2016). There is considerable overlap in the call parameters with the other Nyctaloid bat, N. leiseri and Eptesicus serotinus. Many acoustic records are not supported by regional records of bats identified in the hand (or by molecular analysis of droppings), raising doubts about their validity, but the noctule is considered to be the most widespread of these species.

Species name: Nyctalus noctula (1312) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	Given the significant change to the method for range determination we are uncertain of the nature and degree of change in short-term range trend for this species.
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 20,627 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.

6.4 Additional population size	Based on Mathews et al. 2018 methodology: a) Unit = Individuals b) Minimum = 2,880 c) Maximum = 304,000 d) Best Single Value: 91,900 (value for spreadsheet reporting) 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 within the range. 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) The density of maternity roosts accross Wales is uncertain as it is highly likely large numbers of roosts are unreported. Further, a colony may make use of multiple roosts and switch between them, meaning that there is likely to be high variability in counts at individual sites. There is a lack information available from the literature indicating that that there is little or no understanding of noctule bat roost (or colony) density. No information is available on the sex ratio within maternity colonies pre-breeding. The calculations presented by Mathews et al. 2018 are based on an assumption that all individuals in recorded sites are female. If half of the individuals are male, this would halve the estimates presented. Given the large effect on the total population size, further research is required. The main population size estimates provided by Mathews et al. (2018) are an order of magnitude greater than those in Harris et al. 1995 and the previous Article 17 Report (Natural Resources Wales. 2013). Nevertheless, the values previously estimated do fall within the plausible limits. The estimates by Harris et al. 1995 were based on expert judgement and extrapolation from limited field surveys. The 1995 population estimates were based on very limited information, extrapolating from known size of Pipistrellus pipistrellus colonies in relation to size of N. noctula colonies following the methods described by Speakman (1991), and taking into account the relative frequency of species in bats submitted for rabies testing. Harris et al. 1995 reliability rating of the estimate was 3, meaning that the error margins around the estimate are thought to be +/- 50%.
6.8 Short term trend; Direction	No trend data is available for Wales and therefore unknown has been selected. The National Bat Monitoring Programme roost count data (BCT 2018a) states that the population of noctule in Great Britain is considered to have been stable since 1999. It is monitored through the Field Survey and is a loud echolocator with identifiable call, so very suitable for structured bat detector surveys. The main issue is maintaining adequate sampling intensity to show trends at the UK level and increasing the number of sites monitored to provide country level trend data. There has been increased survey effort due to surveys for developments and more systematic survey methodology using advanced bat detectors capable of recording bat calls.
6.10 Short term trend; Method used	A reliable trend cannot be drawn for Wales due to insufficient available data.

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. The main population size estimates provided by Mathews et al. (2018) are an order of magnitude greater than those in Harris et al. 1995 and the previous Article 17 Report (Natural Resources Wales. 2013). Nevertheless, the values previously estimated do fall within the plausible limits. The estimates by Harris et al. 1995 were based on expert judgement and extrapolation from limited field surveys. The 1995 population estimates were based on very limited information, extrapolating from known size of Pipistrellus pipistrellus colonies in relation to size of N. noctula colonies following the methods described by Speakman (1991), and taking into account the relative frequency of species of bats submitted for rabies testing. Harris et al. 1995 reliability rating of the estimate was 3, meaning that the error margins around the estimate are thought to be +/- 50%. The new estimate, taken from Mathews et al. 2018 is considered to be more robust.
7.1 Sufficiency of area and quality of occupied habitat	Area: 20,600 km2. Habitable area as given by Mathews et al. 2018 has been used as a proxy for occupied habitat. 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: Although we do not have a reliable measure of the quality of the occupied habitat the GB population trend for the species is stable and therefore the area and quality of occupied habitat is likely to be sufficient to maintain the species at FCS and this is also likely to be the situation in Wales. N. Noctula 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. Foraging areas may be in several parts of the landscape, all of which host a high abundance of insect fauna and offer the space needed by the fast flying N. Noctula. Large water bodies, valley pastures and broadleaved woodland are preferred, but the bats also forage in other habitats and even above harvested fields and urban street lights. The species emerges early, particularly during lactation (Jones 1995, Mackie and Racey 2007), and is therefore sometimes thought to benefit from artificial night lighting. However there is no evidence of higher noctule activity in areas that are lit compared with dark control sites (Mathews et al. 2015). N. Noctula can easily make foraging flights more than 10 kilometres away from the roost site, up to a maximum of 20 kilometres. However, the main activity of a maternity colony is within a radius of about 2 kilometres from the colony's roost. Summer roosts are predominantly in woodlands and parks. Deciduous and flood forests with a high percentage of old and dead trees are of highest importance. Roosts are mostly in woodpecker holes in broad-leaved trees. Maternity colonies use several roost sites in a network, which means that the individuals often change from one roost to another. Associations of males, which change their roost sites on average every second or third day, need at least eight tree holes suitable for roosting per square kilometre of forest. Besides tree holes, the bats also roost in bat boxes (flat constructions are preferred) and small spaces behind wall coverings of buildings or in houses. Winter roosts are mainly in forest and park trees, but large hibernation colonies also roost in buildings or rock crevices. Tree holes must provide a lot of space for a large number of bats in order to be a good hibernaculum for the species. Additional information on habitat quality would improve the confidence in this assessment. The specific area of habitat occupied by this species in the UK is unknown. It is suspected that the amount of habitat in the UK is sufficient to support a viable population of the species. Overall = Yes

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, has been used as a proxy for occupied habitat. The habitable area within the range is noted as 20,600 km2, but it is unlikely that the entirety of this area forms suitable habitat. To obtain a proper estimate of suitable habitat used by the 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 the UK. We do not currently have this level of information.
7.3 Short term trend; Period	range information taken from Mathews et al. 2018
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: B02 - Conversion to other types of forests including monocultures, B07 - Removal of dead and dying trees, including debris, B08 - Removal of old trees (excluding dead or dying trees), B09 - Clear-cutting, removal of all trees, B15 - Forest management reducing old growth forests: The noctule is predominantly a tree-roosting species, so would be vulnerable to loss of roost opportunities in dead, dying or damaged trees. A05 - Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.), A06 - Abandonment of grassland management (e.g. cessation of grazing or of mowing), A23 - Use of other pest control methods in agriculture (excluding tillage): Pressures that affect the biomass of flying insects, such as the widespread use of pesticides, deterioration of water quality or the removal of uncultivated land, such as hedgerows or woodland, could also affect this species. F02 - Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, D01 - Wind, wave and tidal power, including infrastructure: Although primarily associated with tree roosts, this species occasionally roosts in man-made structures including dwellings making it vulnerable to issues connected to development. In addition, this species is one that is considered to be at high risk from fatalities associated with wind farms from studies in the European Continent (Rodrigues et al. 2015) and the impact at the population level was also considered to be high, Mitchell-Jones and Carlin, 2009. Threats: B02 - Conversion to other types of forests including monocultures, B07 - Removal of dead and dying trees, including debris, B08 - Removal of old trees (excluding dead or dying trees), B09 - Clear-cutting, removal of all trees, B15 - Forest management reducing old growth forests: The noctule is predominantly a tree-roosting species, so would be vulnerable to loss of roost opportunities in dead, dying or damaged trees which is a threat that will continue into the future. A05 - Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.), A06 - Abandonment of grassland management (e.g. cessation of grazing or of mowing), A23 - Use of other pest control methods in agriculture (excluding tillage): Threats that affect the biomass of flying insects, such as the widespread use of pesticides, deterioration of water quality or the removal of uncultivated land, such as hedgerows or woodland, will continue to affect this species. F02 - Construction or modification (of e.g. housing and settlements) in existing urban or recreational areas, D01 - Wind, wave and tidal power, including infrastructure: Although primarily associated with tree roosts, this species occasionally roosts in man-made structures including dwellings making it vulnerable to issues connected to development. In addition, this species is one that is considered to be at high risk from fatalities associated with wind farms from studies in the European Continent (Rodrigues et al. 2015) and the threat at the population level was also considered to be high, Mitchell-Jones and Carlin, 2009. Development of dwellings and of wind power 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. CB01 - Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation, CB04 - Adapt/manage reforestation and forest regeneration, CB06 - Stop forest management and exploitation practices, CB05 - Adapt/change forest management and exploitation practices, CA02 - Restore small landscape features on agricultural land, CA16 - Other measures related to agricultural practices: Noctule bats hunt over pastures and in deciduous or mixed woodland. Environmental land management schemes in the agricultural and forestry sectors are now widely used to ensure the protection of roosts/potential roosting locations and these habitats in the vicinity of roosts are well-managed and provide appropriate insect food at the correct time of year. Planning at landscape scale is required to conserve commuting routes and foraging areas. CC03 - Adapt/manage renewable energy installation, facilities and operation, CF12 - Other measures related to residential, commercial, industrial and recreational infrastructures, operations and activities: Wind turbine design and operation needs to take into account the likely impact on bats, e.g. in relation to mortality and habitat fragmentation.
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. N. noctula range currently covers all of Wales and there is no reason to assume that this will contract in the future. 10.1b Future prospects of -Population The future prospects of population for this species is considered to be overall stable in Wales. Although there is insufficient data to draw trends for Wales it is accepted that the species is relatively common and widespread and there is no reason to assume that Wales is not currently following the national GB trend. There is no reason to assume this will not continue into the future. 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. N. noctula uses a mosaic of habitats; currently available habitat is considered sufficient to maintain the species at FCS and there are no specific wide scale threats to the habitat for the species. There is therefore no reason to assume that the current reported trend will not continue over the next 12 years.