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:

S1331 - Leisler's bat (*Nyctalus leisleri*)

SCOTLAND

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 (Scotland information only)**
1.2 Species code	**1331**
1.3 Species scientific name	**Nyctalus leisleri**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Leisler's bat

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1995-2016
2.3 Distribution map	Yes
2.4 Distribution map Method used	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	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) 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. JNCC., 2013. Third Report by the United Kingdom under Article 17 on the implementation of the Habitats Directive from January 2007 to December 2012. 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. McAney, K., 2006. A conservation plan for Irish vesper bats, Irish Wildlife Manuals, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Newson, S.E., Evans, H.E., Gillings, S., Jarrett, D. & Wilson, M.W. 2017. A survey of high risk bat species across southern Scotland. Scottish Natural Heritage Commissioned Report No. 1008. Russ, J., Briffa, M., Montgomery, W., 2003. Seasonal patterns in activity and habitat use by bats (Pipistrellus spp. and Nyctalus leisleri) in Northern Ireland, determined using a driven transect. Journal of Zoology 259, 289-299 Russ, J.M., Hopkirk, A., Lucas, T., C, D, Gueguen, S., Boston, E., In Prep. Roost selection, activity and dispersal of Leisler's bat, Nyctalus leisleri (Kuhl, 1818) during the pre-hibernal and hibernal periods. Rydell, J., Bach, L., Dubourg-Savage, M.-J., Green, M., Rodrigues, L., Hedenstrom,

A., 2010. Bat mortality at wind turbines in northwestern Europe. Acta Chiropterologica 12, 261-274.

Shiel, C., Fairley, J., 1999. Evening emergence of two nursery colonies of Leisler's bat (Nyctalus leisleri) in Ireland. Journal of Zoology 247, 439-447.

Shiel, C., Shiel, R., Fairley, J., 1999. Seasonal changes in the foraging behaviour of Leisler's bats (Nyctalus leisleri) in Ireland as revealed by radio-telemetry. Journal of Zoology 249, 347-358.

Dietz, C., Kiefer, A., 2016. Bats of Britain and Europe. Bloomsbury, United Kingdom.

5. Range

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

6. Population

6.1 Year or period	2016-2017	
6.2 Population size (in reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	number of map 1x1 km grid cells (grids1x1)
6.3 Type of estimate	Minimum	
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		

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6.6 Population size Method used	Insufficient or no data available	
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	No change The change is mainly due to:	
6.17 Additional information		

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	
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	2007-2018	
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

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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
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

Threat	Ranking
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
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

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

Restore small landscape features on agricultural land (CA02)
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)

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Adapt/manage reforestation and forest regeneration (CB04)	
Adapt/change forest management and exploitation practices (CB05)	
Adapt/manage renewable energy installation, facilities and operation (CC03)	

9.6 Additional information

10. Future prospects

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

10.2 Additional information

11. Conclusions

11.1. Range

11.2. Population

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	

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13. Complementary information
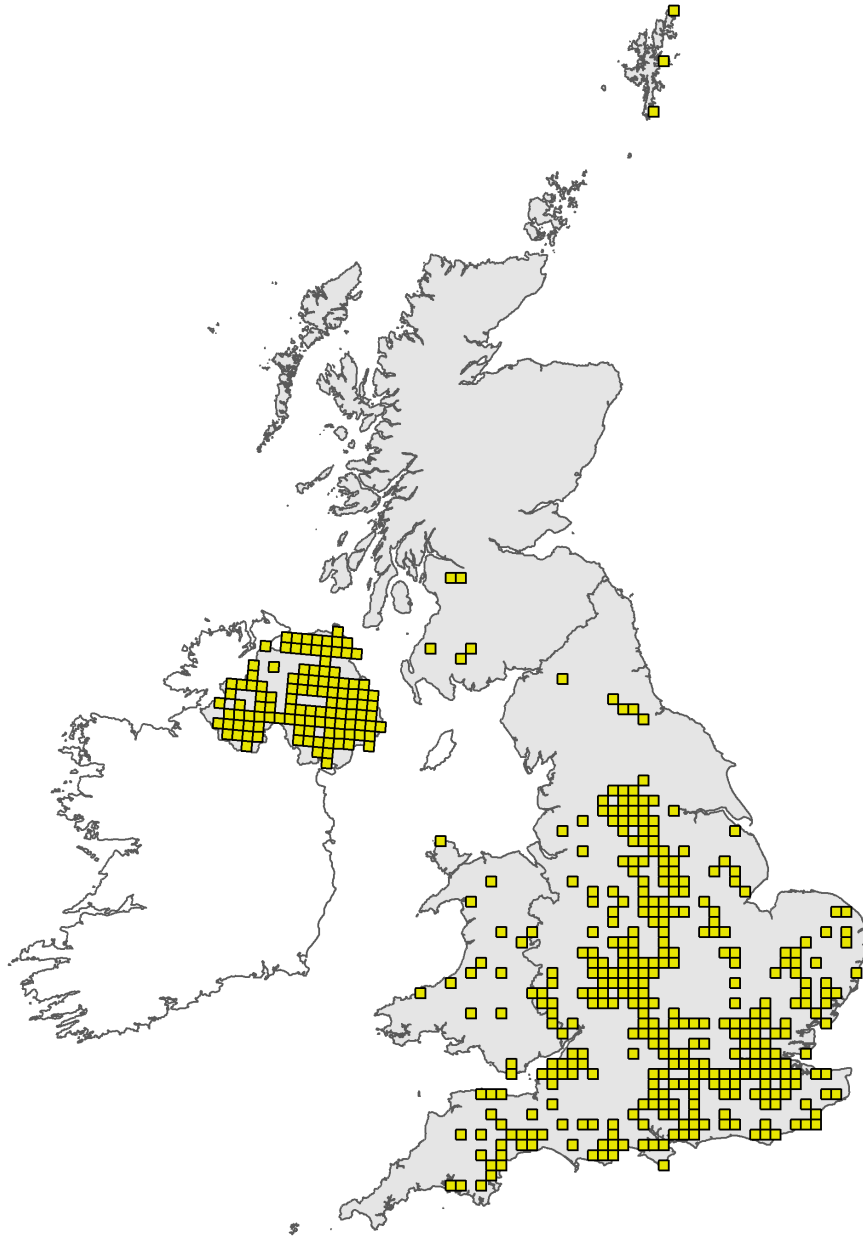
Distribution Map

Figure 1: UK distribution map for S1331 - Leisler's bat (*Nyctalus leisleri*). 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.
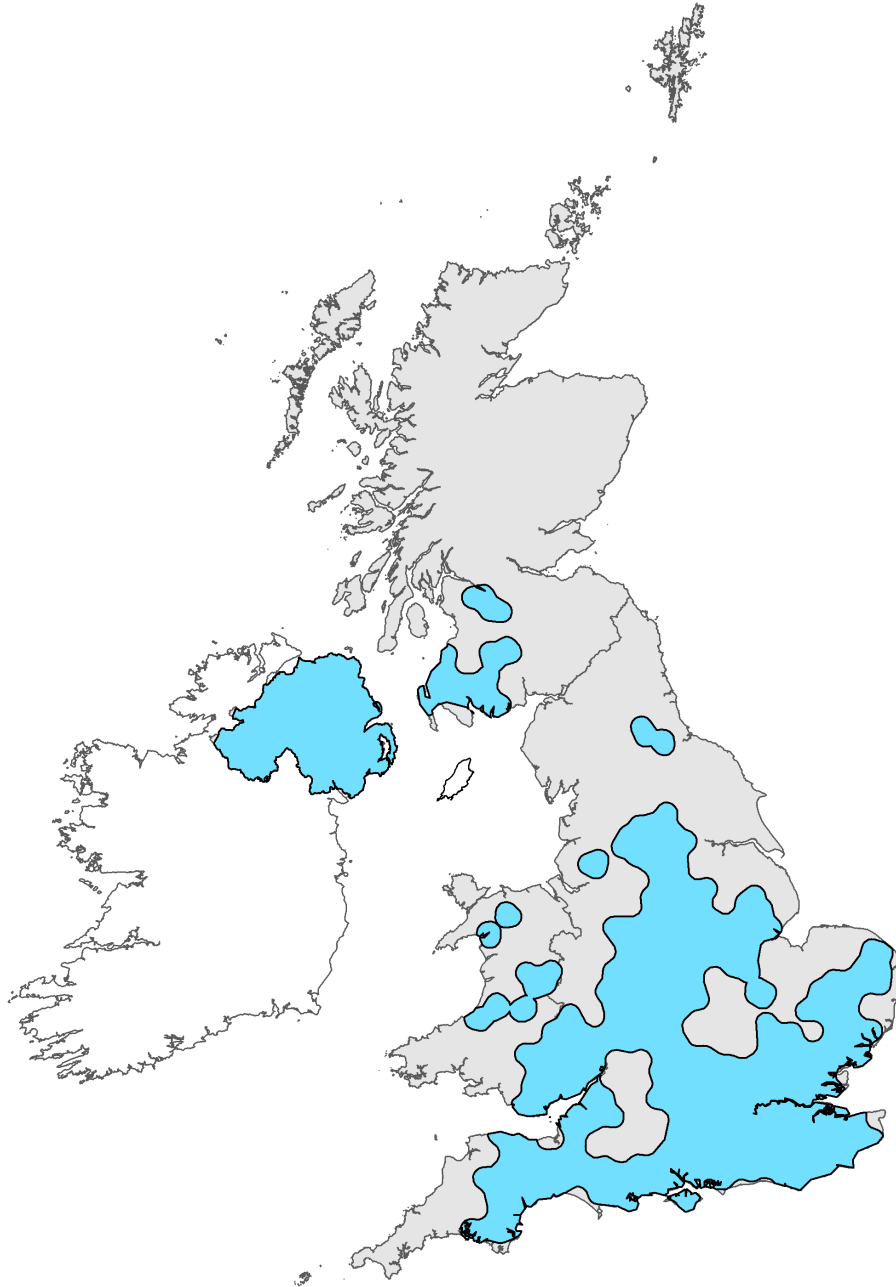
Range Map

Figure 2: UK range map for S1331 - Leisler's bat (*Nyctalus leisleri*).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 leisleri (1331)

Field label	Note
2.3 Distribution map	The map is based on Mathews et al (2018) but there are additional data from Newson et al 2018 (not included) that fill in some of the gaps in southern Scotland.

Species name: Nyctalus leisleri (1331) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	Range is based on presence data collected between 1995-2016 and a comparison of the 2018 range against 2013 range, combined with expert opinion.
5.11 Change and reason for change in surface area of range	The range is comparable with that given in the 2013 Article 17 Report, but recent surveys in relation to proposed wind farms and the Southern Scotland Bat Survey (Newson et al 2017) have improved the distribution information for this species in the south of Scotland. 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 addesd 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.
6.3 Type of estimate	Very few roosts are known and the species is under-recorded in Britain. There are no data on roost density estimates and it considered unlikely that most maternity roosts in Britain are known. No population genetics study has been conducted, and therefore no alternative metrics of population size were available. No recent population estimate is available for this species in Scotland. Harris et al (1995) suggested a figure of around 250 bats, but this estimate was based largely on expert opinion and is considered to have poor reliability. More recent survey information (e.g. Newson et al 2017) suggests that the actual Scottish population is likely to be in the thousands.
6.8 Short term trend; Direction	The limited data for this species means that it is not possible to provide an assessment of the population trend for this species at this time.
6.16 Change and reason for change in population size	As no recent population estimate is available for this species in Scotland, it is not possible to comment on population changes or trends.
7.1 Sufficiency of area and quality of occupied habitat	Although the population size is not known, enough is known about where the species occurs (from both recent and older field records) to conclude that a self-sustaining population exists and, based on what is known about habitat requirements, it can also be concluded that there is sufficient habitat available to continue to support this population.
7.2 Sufficiency of area and quality of occupied habitat; Method used	Leisler's bat shows no clear habitat associations. In order to obtain an estimate, 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

7.4 Short term trend; Direction	There are insufficient data on any change in the level of suitable habitat or any change in the quality of habitat for the species.
8.1 Characterisation of pressures/ threats	Leisler's bat is primarily a tree-roosting species (although it does also roost in buildings), so would be vulnerable to loss of roost opportunities in dead, dying or damaged trees. Leisler's bats have a high risk of collision with wind turbines as they fly and forage in open areas and are known to be killed by wind turbines in Europe (Rodrigues et al 2014, Rydell et al 2010).
9.1 Status of 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. Wind turbine design and operation needs to take into account the likely impact on bats, e.g. in relation to mortality and habitat fragmentation. Planning at landscape scale is required to conserve commuting routes and foraging areas.
10.1 Future prospects of parameters	The range for Leisler's bats is likely to remain stable as the species 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. There are insufficient data on any change in the level of suitable habitat or any change in the quality of habitat for the species, however given that the population appears to be stable and range is stable it is considered that the future prospects for habitat can also be considered to be stable.