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*)

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	**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)
Bat Conservation Trust., 2010. Leisler's bat, Nyctalus leisleri. Bat Conservation Trust, London.
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.
Mathews, F., Roche, N., Aughney, T., Jones, N., Day, J., Baker, J., Langton, S., 2015. Barriers and benefits: implications of artificial night-lighting for the distribution of common bats in Britain and Ireland. Phil. Trans. R. Soc. B 370, 20140124.
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.
MITCHELL-JONES, T.J. 2010. Bats in houses - the conservation challenge. Pp 365-378 in Species Management: challenges and solutions for the 21st century.
Rodrigues, L., Bach, L., Dubourg-Savage, M.-J., Karapandza, B., Kovac, D., Kervyn, T., Dekker, J., Kepel, A., Bach, P., Collins, J., Harbusch, C., Park, K.J., Micevski, B.,

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Minderman, J., 2014. Guidelines for consideration of bats in wind farm projects - Revision 2014
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)	68353
	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.
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	1995-2016	
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	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 expert opinion with very limited data	
6.7 Short-term trend Period	1995-2016	
6.8 Short-term trend Direction	Uncertain (u)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Based mainly on expert opinion with very limited 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 d) Method	
6.16 Change and reason for change in population size	No change The change is mainly due to:	

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6.17 Additional information	Limited accurate data for this species means that it is not possible to provide an assessment of changes in population size for this species at this time.

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	1995-2016	
7.4 Short-term trend Direction	Stable (0)	
7.5 Short-term trend Method used	Based mainly on expert opinion with very limited 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
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
Use of other pest control methods in agriculture (excluding tillage) (A23)	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
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	M

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
Use of other pest control methods in agriculture (excluding tillage) (A23)	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)	M
Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (F02)	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

Restore small landscape features on agricultural land (CA02)
Maintain existing extensive agricultural practices and agricultural landscape features (CA03)
Other measures related to agricultural practices (CA16)
Adapt/change forest management and exploitation practices (CB05)
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)

9.6 Additional information

10. Future prospects

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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	
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	

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13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

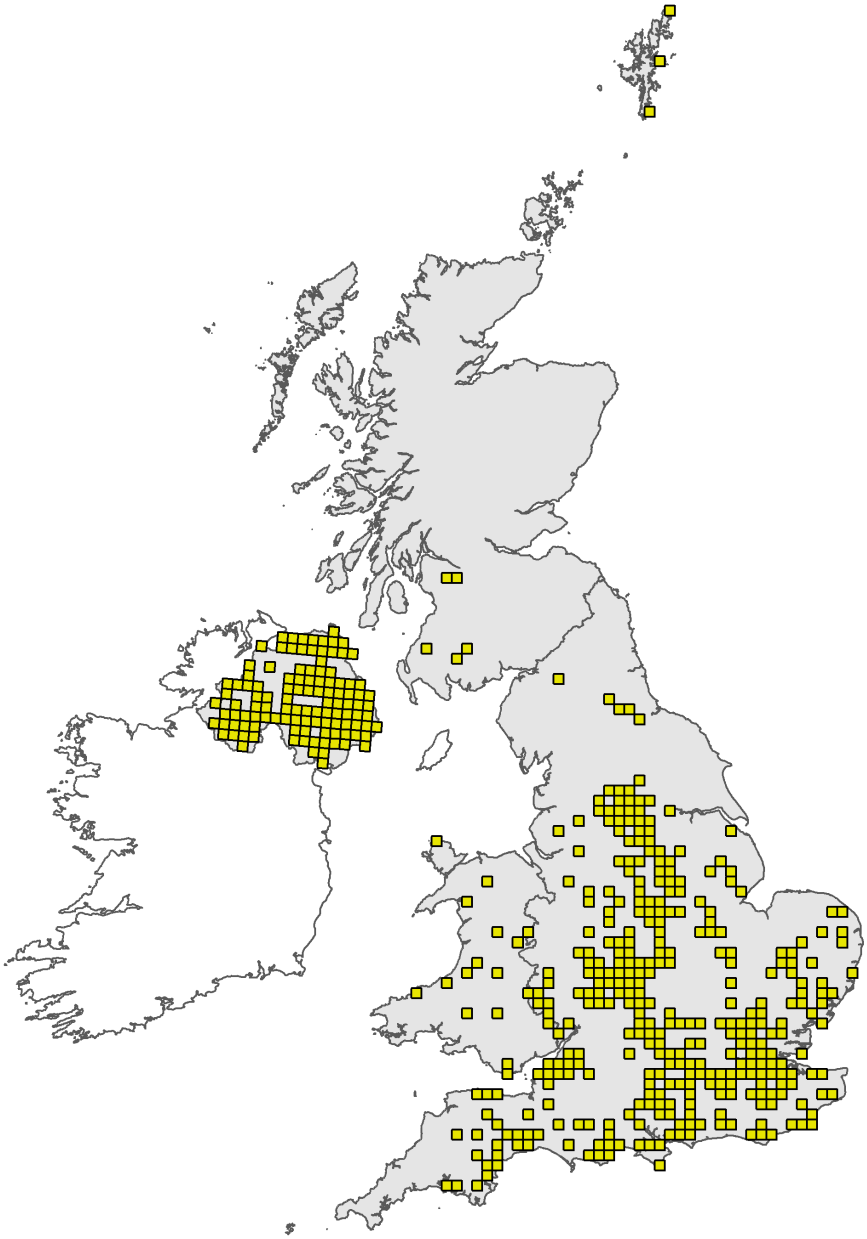

Figure 1: UK distribution map for S1331 - Leisler's bat (*Nyctalus leisleri*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

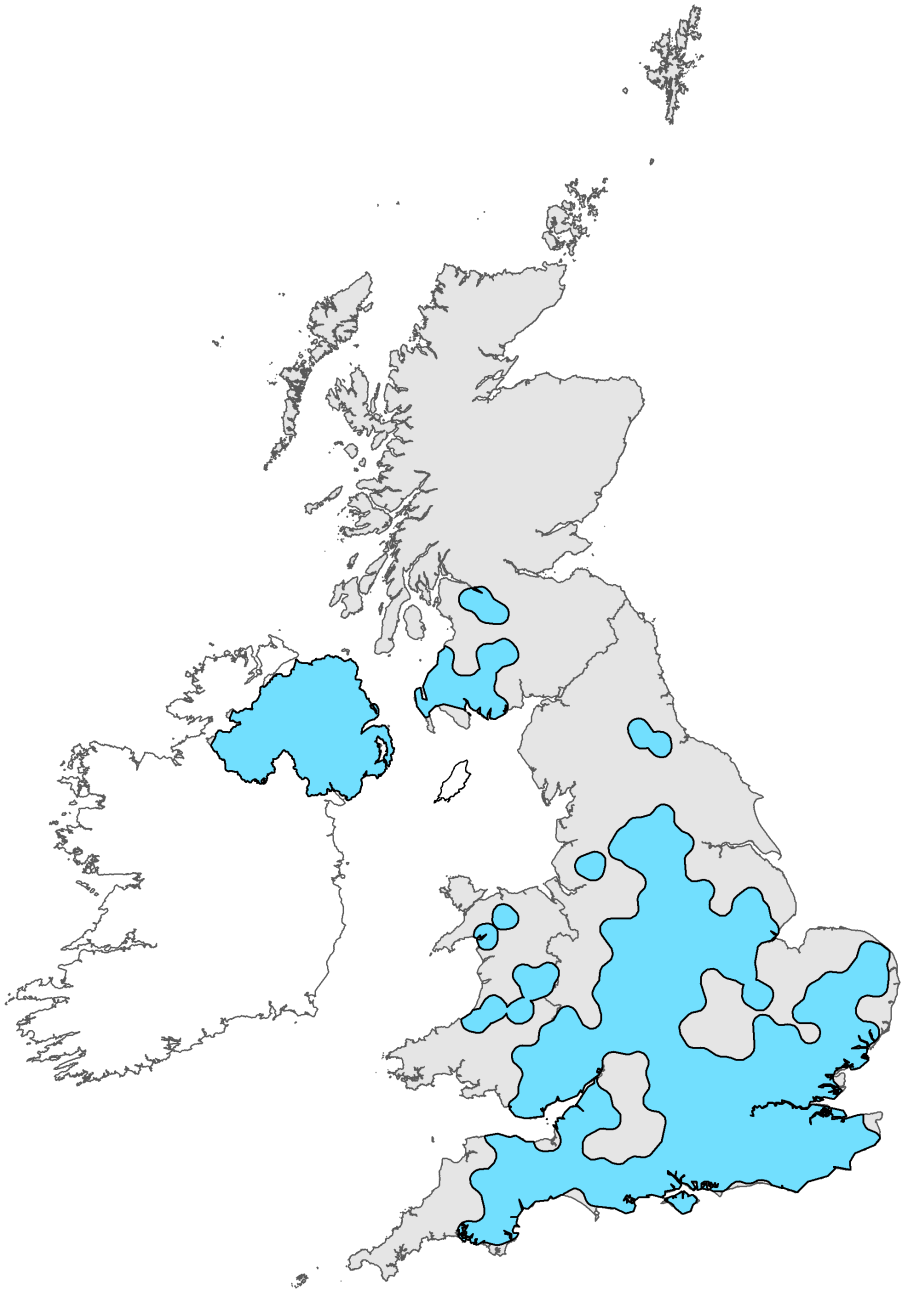

Figure 2: UK range map for S1331 - Leisler's bat (*Nyctalus leisleri*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 widespread use of broadband bat detectors has significantly increased the number of records and extended the known distribution of Leisler's bat. However, while the species makes loud echolocation calls that are readily recorded on modern broadband bat detectors, there is considerable overlap in the call parameters of the other Nyctaloid bats, N. noctula 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. Leisler's bat is considered migratory in Europe, but thought to undergo only local dispersal within the UK (Shiel et al 1999). It is widely distributed through central and southern England, rarer in the north and the south-west.

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

Field label	Note
5.11 Change and reason for change in surface area of range	Range is given by Mathews et al. (2018) as 68,353 km2 (area of suitable habitat within range). Range was not estimated for England in the previous Article 17 report (JNCC 2013). Habitable area was defined as all area within the range excluding montane habitat since this is unlikely to include suitable locations for maternity roosts
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	Very few roosts are known and the species is under-recorded in Britain. There are no data on roost density estimates and it is 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. The previous estimate by Harris et. al., (1995) was based largely on expert opinion, taking into account the ratio of Leisler's roosts to pipistrelle roosts or the ratio of Leisler's bats to serotines. The estimate was considered to have poor reliability. No data are available to update these estimates.
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. Although, Leisler's bat is included in the National Bat Monitoring Programme too few data are currently available to permit the calculation of a trend. The estimate by Harris et al (1995) was based largely on expert opinion, taking into account the ratio of Leisler's roosts to pipistrelle roosts or the ratio of Leisler's bats to serotines. The estimate was considered to have poor reliability. No data are available to update these estimates.

7.1 Sufficiency of area and quality of occupied habitat	Leisler's bats forage in woodland, pasture and riparian habitats and along woodland margins, even close to major roads and around street lights. It has been seen foraging over beaches and sand dunes and shows no clear habitat associations (Shiel and Fairley 1999, Shiel et al 1999, Waters et al 1999, Mathews et al 2015). The average home range area can approach 18 square km and foraging flights can be up to 13km from the roost. Leisler's bats are not as dependent on tree roosts as N. Noctula and use a wide range of buildings. Leisler's have occasionally been found in caves, tunnels and buildings during the hibernation period (BCT 2010, McAney 2006), but tree roosts are likely to be utilised the most with roosts in deciduous trees being used almost exclusively after November in Ireland (Russ et al in prep). 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. However, there is thought to be a sufficient amount of habitat in the UK to support a viable population of the species
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
8.1 Characterisation of pressures/ threats	Leisler's bat is primarily a tree-roosting species, so would be vulnerable to loss of roost opportunities in dead, dying or damaged trees. The species also utilises buildings as maternity sites, so could be vulnerable to roost loss through the demolition or alteration of buildings or changes to construction methods (Mitchell-Jones, 2010). Pressures that affect the biomass of flying insects, such as the widespread use of pesticides, could also affect this species. Despite the fact that Leisler's bats will forage high above the ground, when light levels are high on emergence from roosts, they will follow linear landscape elements such as hedgerows (Russ et al 2003), indicating the importance of these features within the landscape. Therefore the loss of these features might be expected to impact on the species. 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).
9.6 Additional information	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. Leisler's bats hunt over cattle-grazed pasture and in deciduous or mixed woodland. Environmental land management schemes in the agricultural and forestry sectors are now widely used to ensure 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.