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

Conservation status assessment for the species:

S1303 - Lesser horseshoe bat (*Rhinolophus hipposideros*)

UNITED KINGDOM

IMPORTANT NOTE - PLEASE READ

- The information in this document represents 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.
- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.
- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Maps showing the distribution and range of the species are included (where available).
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level reports.
- 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; and/or (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species).
- The UK-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**
1.2 Species code	**1303**
1.3 Species scientific name	**Rhinolophus hipposideros**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Lesser horseshoe 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	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

England

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 (2017). The National Bat Monitoring Programme. Annual Report 2016. Bat Conservation Trust, London. Available at (www.bats.org.uk/pages/nbmp_annual_report.html)

Billington G, Rawlinson MD (2006). Report on horseshoe bat flight lines and feeding areas. CCW Science Report No. 75. CCW, Bangor

Boye P, Dietz M. 2005. Research Report No 661: Development of good practice guidelines for woodland management for bats. English Nature, Peterborough.

Fensome AG, Mathews F. (2016). Roads and bats: a meta-analysis and review of the evidence on vehicle collisions and barrier effects. Mammal Review, 46(4), 311-323.

Forestry Commission (2017). Forestry Statistics 2017. Forest Research. Edinburgh.

Forestry Commission (2016). Preliminary estimates of the changes in canopy cover in British woodlands between 2006 and 2015. National Forest Inventory, Edinburgh.

Knight T, Jones G. (2009). Importance of night roosts for bat conservation: roosting behaviour of lesser horseshoe bat Rhinolophus hipposideros. Endangered Species Research. Vol. 8: 79-86. www.int-res.com

Mathews F, Kubasiewicz LM, Gurnell J, Harrower C, McDonald RA, Shore RF. 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.

McCracken DI (1993). The potential for avermectins to affect wildlife. Vet Parasitol, 48 (1-4), 273-280
Ransome, R.D. (1989). Population changes of Greater horseshoe bats studied near Bristol over the past twenty-six years. Biological Journal of the Linnean Society, 38, 71-82.
Ransome, R.D. (1996). The management of feeding areas for greater horseshoe bats. English Nature Research Report No. 174. English Nature.
Schofield HW. (1984). The ecologyand conservation biology of Rhinolophus hipposideros, the lesser horseshoe bat. PhD, University of Aberdeen.
Schofield HW, McAney K (2008). Lesser horseshoe bat Rhinolophus hipposideros. Pp. 306-310 in Harris S & Yalden DW. Mammals of the British Isles: Handbook, 4th edition. The Mammal Society, Southampton. 799pp.
Zarzoso-Lacoste D, Jan PL, Lehnen L, Girard T, Besnard AL, Peuchmaille SJ, Petit EJ (2017). Combining non invasive genetics and a new mammalian sex-linked marker provides new tools to investigate population size, structure and individual behaviour: An application to bats.'
Wales
Andrews PT. 2011. Monitoring of Horseshoe Bats through the use of automatic bat counters. Report on nursery roosts in Wales, 2009. Unpublished Report to CCW. CCW, Bangor.
Barr CJ, Gillespie MK. 2000. Estimating hedgerow length and pattern characteristics in Great Britain using Countryside Survey data. Journal of Environmental Management, 60, 23-32.
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. 2017. The National Bat Monitoring Programme. Annual Report 2016. Bat Conservation Trust, London. Available at (www.bats.org.uk/pages/nbmp_annual_report.html)
Bat Conservation Trust. 2017. The National Bat Monitoring Programme. Raw Data provided to NRW. Bat Conservation Trust, London
Battersby J. (Ed.). 2005. UK Mammals: Species Status and Population Trends. JNCC/Tracking Mammals Partnership. JNCC, Peterborough
Billington G, Rawlinson MD. 2006. Report on horseshoe bat flight lines and feeding areas. CCW Science Report No. 75. CCW, Bangor.
Bontadina F, Schofield H, Naef-Daenzer B. 2002. Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland. Journal of Zoology, 258(3), 281-290.
Boye P, Dietz M. 2005. Research Report No 661: Development of good practice guidelines for woodland management for bats. English Nature, Peterborough.
Catherine Bickmore Associates. 2003. Review of work carried out on trunk road network in Wales for bats. Report prepared for the Welsh Assembly Government Transport Directorate and Countryside Council for Wales.
Dietz C, Helversen OV, Nill D. 2009. Bats of Britain, Europe & Northwest Africa. A & C Black Publishers Ltd., London.
Dietz C, Keifer A. 2016. Bats of Britain and Europe. London, Bloomsbury Fensome AG, Mathews F. 2016. Roads and bats: a meta-analysis and review of the evidence on vehicle collisions and barrier effects. Mammal Review, 46(4), 311-323.
Fox R, Conrad KF, Parsons MF, Warren MS, Woiwod IP. 2006. The state of Britain's larger moths. Butterfly Conservation and Rothamsted Research, Wareham, Dorset.
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.
Knight T, Jones G. 2009. Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat Rhinolophus hipposideros. Endangered Species Research. Vol. 8:79-86. www.int-res.com
Mathews F, Kubasiewicz LM, Gurnell J, Harrower C, McDonald RA, Shore RF. 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.
McCracken DI. 1993. The potential for avermectins to affect wildlife. Vet Parasitol, 48(1-4), 273-280.
Matthews JE, Halliwell EC. 2008. Lesser Horseshoe Bat summer roost surveillance, 29 May to 17 June, 2002 - 2006. CCW Staff Science Report No.06/9/1, CCW, Bangor.
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: S1303 - Lesser horseshoe bat (Rhinolophus hipposideros).
Priddis D, Ransome RD & Matthews JE. 2007. Long-distance horseshoes. Bat News, Issue 83, Summer 2007. Bat Conservation Trust, London.
Ransome RD. 1990. The Natural History of Hibernating Bats. Christopher Helm.
Richardson P. 2000. Distribution atlas of bats in Britain and Ireland 1980-1999. Bat Conservation Trust, London.
Robinson RA, Learmonth JA, Hutson AM, Macleod CD, Sparks TH, Leech DI, Pierce GJ, Rehfisch MM, Crick HQP. 2005 Climate change and migratory species. BTO, Thetford.
Russ J. 2012. British bat calls: a guide to species identification. Exeter, Pelagic Publishing.
Schofield HW. 1984. The ecology and conservation biology of Rhinolophus hipposideros, the lesser horseshoe bat. PhD, University of Aberdeen.
Schofield HW, McAney K. 2008. Lesser horseshoe bat Rhinolophus hipposideros. Pp. 306-310 in Harris S & Yalden DW. Mammals of the British Isles: Handbook, 4th edition. The Mammal Society, Southampton.799pp.
Spencer JW, Kirby KJ. 1992. An inventory of ancient woodland for England and Wales. Biological Conservation, 62, 77-93
Stone EL, Jones G, Harris S. 2009. Street Lighting Disturbs Commuting Bats. Current Biology, 19(13), 1123-1127.
Theobald C. Elston D. 2008. Numbers of lesser horseshoe bats in Wales: a statistical appraisal for the Countryside Council for Wales. Unpublished report to CCW. Biomathematics and Statistics Scotland.
Williams C. 2001. The Winter Ecology of Rhinolophus hipposideros, the lesser horseshoe bat. PhD, Open University.
Zarzoso-Lacoste D, Jan PL, Lehnen L, Girard T, Besnard AL, Puechmaille SJ, Petit EJ. 2017. Combining noninvasive genetics and a new mammalian sex-linked marker provides new tools to investigate population size, structure and individual behaviour: An application to bats. Molecular Ecology Resources 18 (2), 217-228.

5. Range

5.1 Surface area (km²)	53334
5.2 Short-term trend Period	2013-2018

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5.3 Short-term trend Direction	Increasing (+)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used	Complete survey or a statistically robust estimate	
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)	53334
	b) Operator	
	c) Unknown	
	d) Method	The FRR has changed since 2013. The new value is considered to be large enough to support a viable population and no lower than the range estimate when the Habitats Directive came into force in the UK. For further information see the 2019 Article 17 UK Approach document. The 2013 FRR value has been revised and is equal to the current range. The current range surface area has been calculated using the method outlined in Mathews et. al., (2018) and 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 new, more robust method of calculating range has reduced estimated range size for this species since 2013. This does not represent a real reduction in range.
5.11 Change and reason for change in surface area of range	Genuine change Improved knowledge/more accurate data Use of different method	
	The change is mainly due to:	Use of different method
5.12 Additional information	Short term trend in range has been assessed by using the 2019 distribution data and the 2013 method for calculating range and comparing the result with range surface area in 2013. For further information see the 2019 Article 17 UK Approach document and country assessments.	

6. Population

6.1 Year or period	1995-2017	
6.2 Population size (in reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	36000
	c) Maximum	73000
	d) Best single value	50400
6.3 Type of estimate	Best estimate	

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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	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	50400 with unit number of individuals (i)
	b) Operator	
	c) Unknown	
	d) Method	The FRP has changed since 2013. The new value is considered to be large enough to support a viable population and no less than the population estimate when the Habitats Directive came into force in the UK. For further information see the 2019 Article 17 UK Approach document. The FRP is the same as the new population estimate (Mathews et. al. 2018). The previous FRP was thought to be an underestimate of the population, currently, and when the Habitats Directive came into force in the UK.
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	The UK National Bat Monitoring Programme (NBMP) has detected increases in both the maternity and hibernation indices and these changes have been consistent over this reporting period. For further information see the 2019 Article 17 UK Approach document.	

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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 (for long-term survival)?	Yes
	b) Is there a sufficiently large area of unoccupied habitat of suitable quality (for long-term survival)?	
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	The area of distribution is used as an estimate of habitat area and is assumed to be sufficient given the increasing population and range of the species.	

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)	H
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Livestock farming (without grazing) (A14)	H
Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (C01)	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
Sports, tourism and leisure activities (F07)	M

Threat	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Livestock farming (without grazing) (A14)	M

Conversion to other types of forests including monocultures (B02)	M
Logging without replanting or natural regrowth (B05)	M
Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (C01)	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
Sports, tourism and leisure activities (F07)	M
Other natural catastrophes (M10)	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)
Adapt mowing, grazing and other equivalent agricultural activities (CA05)
Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
Adapt/change forest management and exploitation practices (CB05)
Reduce impact of transport operation and infrastructure (CE01)
Manage/reduce/eliminate noise, light and other forms of pollution from transport (CE05)
Manage conversion of land for construction and development of infrastructure (CF01)
Reduce impact of outdoor sports, leisure and recreational activities (CF03)
Improvement of habitat of species from the directives (CS03)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters

a) Range Good

b) Population Good

c) Habitat of the species Good

10.2 Additional information: Future trend in Range is Positive - increasing <=1% (one percent or less) per year on average; Future trend in Population is Very Positive - increasing >1% (more

than one percent) per year on average; and Future trend in Habitat for the species is Overall stable. For further information on how future trends inform the Future Prospects conclusion see the 2019 Article 17 UK Approach document.

11. Conclusions

11.1. Range	Favourable (FV)
11.2. Population	Favourable (FV)
11.3. Habitat for the species	Favourable (FV)
11.4. Future prospects	Favourable (FV)
11.5 Overall assessment of Conservation Status	Favourable (FV)
11.6 Overall trend in Conservation Status	Improving (+)
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	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is increasing; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range. Conclusion on Population reached because: (i) the short-term trend direction in Population size is increasing; and (ii) the current Population size is approximately equal to the Favourable Reference Population. Conclusion on Habitat for the species reached because: (i) the area of occupied habitat is sufficiently large and (ii) the habitat quality is suitable for the long-term survival of the species; and (iii) the short-term trend in both area and quality of habitat is stable. Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; (ii) the Future prospects for Population are good; and (iii) the Future prospects for Habitat for the species are good. Overall assessment of Conservation Status is Favourable because all of the conclusions are Favourable. Overall trend in Conservation Status is based on the combination of the short-term trends for Range – increasing, Population – increasing, and Habitat for the species – unknown. The overall trend in Conservation Status was not reported for this species in 2013. However, from the information available the overall trend would have been improving in 2013 and so there has been no change since the last reporting round.

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The overall assessment of Conservation Status has not changed since 2013.

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	number of individuals (i)
	b) Minimum	
	c) Maximum	
	d) Best single value	6490
12.2 Type of estimate		Minimum
12.3 Population size inside the network Method used		Complete survey or a statistically robust estimate
12.4 Short-term trend of population size within the network Direction		Increasing (+)
12.5 Short-term trend of population size within the network Method used		Complete survey or a statistically robust estimate
12.6 Additional information		The population estimate within the SAC network is a UK minimum because it only includes data from Wales. In England although the species is widely studied, many of the SACs are dangerous to access cave sites, and are not subject to regular monitoring. Where sites have been partially monitored there is a continuing upward trend in population.

13. Complementary information

13.1 Justification of % thresholds for trends
13.2 Trans-boundary assessment
13.3 Other relevant Information

Distribution Map

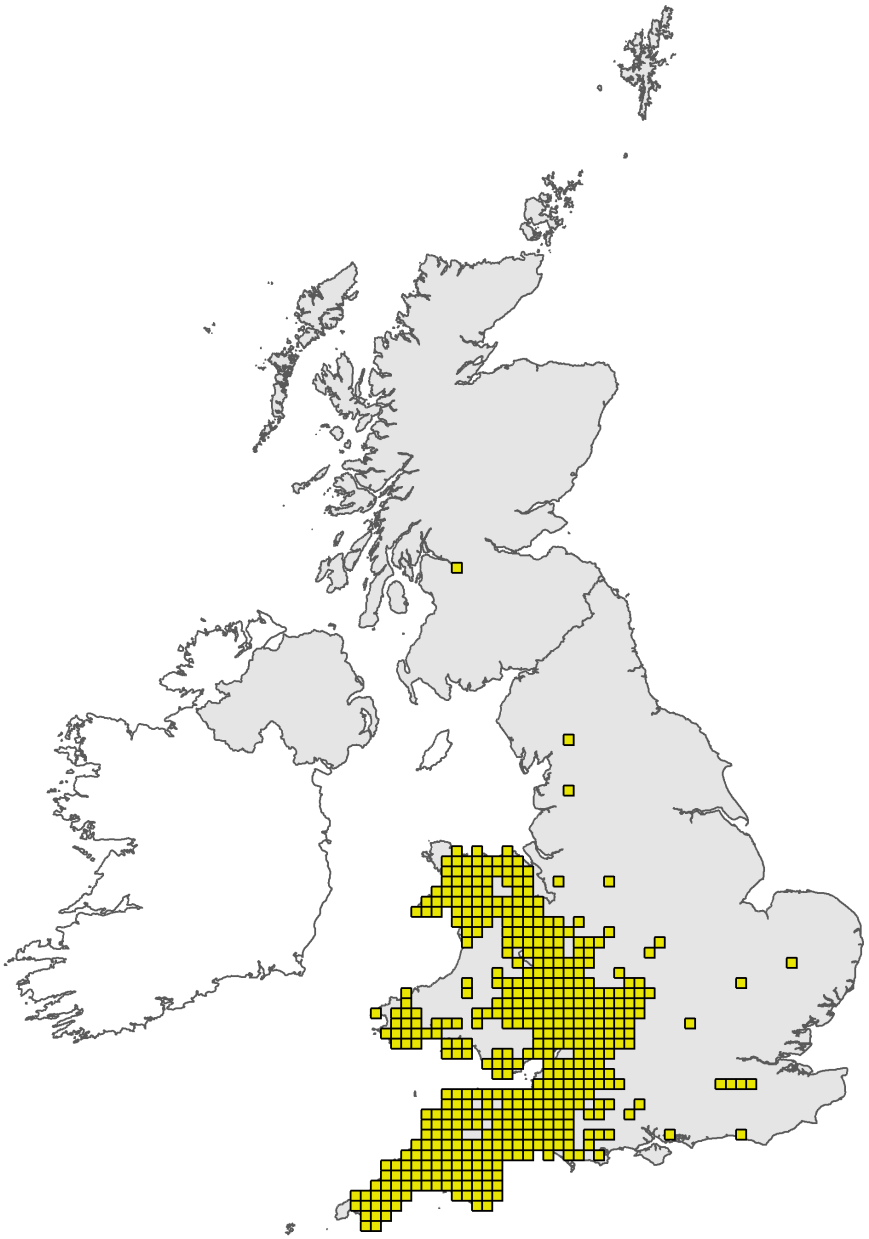

Figure 1: UK distribution map for S1303 - Lesser horseshoe bat (*Rhinolophus hipposideros*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 S1303 - Lesser horseshoe bat (*Rhinolophus hipposideros*).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.