

**European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)**

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:

S1304 - Greater horseshoe bat (*Rhinolophus ferrumequinum*)

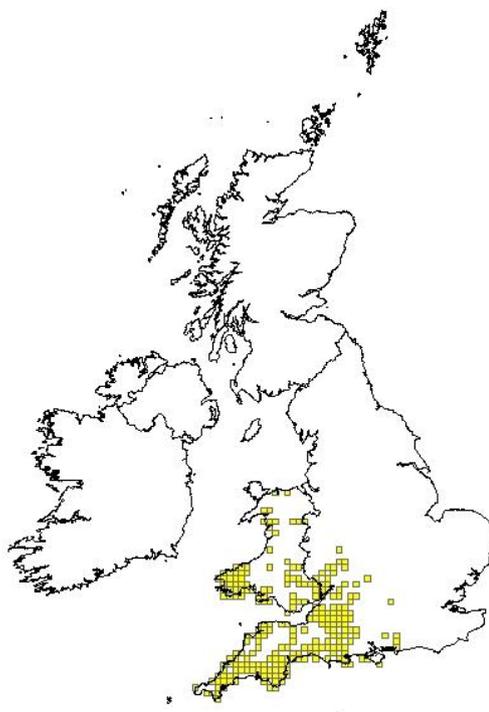
IMPORTANT NOTE – PLEASE READ

- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Natural England** and refers only to the state of the habitat/species in **England** - it does not constitute an assessment for the whole of the UK.
- The Article 17 UK Approach document provides details on how this information has been used and, combined with information supplied by other Statutory Nature Conservation Bodies
- The format of the document is closely aligned to that set out by the European Commission for Member State reporting – as a result, some of the fields are not applicable at a country-level and have deliberately been left blank – in addition, the content of most fields is constrained by the EC reporting categories.

Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

<i>Field name</i>	<i>Brief explanations</i>	
0.2 Species	0.2.1 Species code	S1304
	0.2.2 Species scientific name	<i>Rhinolophus ferrumequinum</i>
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	Greater horseshoe bat

1.1 Maps		
1.1.1 Distribution map		Sensitive False
	<p>R. ferrumequinum has a restricted and fragmented distribution in Great Britain, with populations scattered across south-west and southern England and south and south-west Wales. Individuals, perhaps vagrants or colonisers, have been recorded more widely, but do not appear to represent established populations.</p> <p>Surveillance well-covered by the NBMP with annual counts at all significant maternity sites and counts at many hibernation sites.</p>	



1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate
	Data have been collected as part of long-term monitoring as well as on an ad hoc basis. This is a well-studied species and data quality is considered to be good.

1.1.3 Year or period	2000-2012
	As this is a well-studied species, data collected from 2000 onwards are believed to represent its distribution very well.
1.1.4 Additional distribution map	False
1.1.5 Range map	

2.1 Biogeographical region & marine regions	ATL
2.2 Published sources	<p>"BARR, C.J. & GILLESPIE, M.K. 2000 Estimating hedgerow length and pattern characteristics in Great Britain using Countryside Survey data. <i>Journal of Environmental Management</i>, 60, 23-32.</p> <p>BAT CONSERVATION TRUST, 2012. The National Bat Monitoring Programme. Annual Report 2011. Bat Conservation Trust, London. (www.bats.org.uk)</p> <p>BATTERSBY, J (Ed.). 2005. UK Mammals: Species Status and Population Trends. JNCC/Tracking Mammals Partnership.</p> <p>DUVERGE, P.L. & JONES, G. 1994 Greater Horseshoe Bats - activity foraging behaviour and habitat use. <i>British Wildlife</i> 6: 69-77.</p> <p>ENGLISH NATURE 2000. Managing landscapes for the greater horseshoe bat. English Nature, Peterborough.</p> <p>FOX, R., CONRAD, K.F., PARSONS, M.F., WARREN, M.S. & WOIWOD, I.P. 2006. The state of Britain's larger moths. Butterfly Conservation and Rothamsted Research, Wareham, Dorset.</p> <p>HARRIS, S., MORRIS, P., WRAY, S. and YALDEN, D. 1995. A review of British Mammals: population estimates and conservation status of British mammals other than cetaceans. JNCC, Peterborough.</p> <p>RANSOME, R. D.1989. Population changes of greater horseshoe bats studies near Bristol over the past twenty-six years. <i>Biol. J. Linn. Soc.</i> 38:71-82.</p> <p>RANSOME, R. D. 2000. Monitoring diets and population changes of greater horseshoe bats in Gloucestershire and Somerset. English Nature Report 341. Peterborough.</p> <p>RANSOME, R.D. 1997. The management of greater horseshoe bat feeding areas to enhance population levels. English Nature Research Reports 241. Peterborough.</p> <p>RANSOME, R.D & JONES, G. 2008. Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>. Pp. 298-306 in HARRIS, S & YALDEN, D.W. <i>Mammals of the British Isles: Handbook</i>, 4th edition. The Mammal Society, Southampton.799pp.</p> <p>RANSOME, R. D. & MCOWAT, T. P. 1994. Birth timing and population changes in greater horseshoe bat colonies (<i>Rhinolophus ferrumequinum</i>) are synchronised by climatic temperature. <i>Zoological Journal of the Linnean Society</i>, 112, 337-351.</p> <p>RANSOME, R.D. 1990. <i>The Natural History of Hibernating Bats</i>. Christopher Helm.</p>

	<p>RANSOME, R.D. 1989. Population changes of greater horseshoe bats studied near Bristol over the past 26 years. Biological Journal of the Linnean Society, 38, 71-82</p> <p>RICHARDSON, P. 2000. Distribution atlas of bats in Britain and Ireland 1980-1999. Bat Conservation Trust, London.</p> <p>ROBINSON, R. A., LEARMONTH, J. A. HUTSON A. M. , MACLEOD, C. D., SPARKS T. H., LEECH D I., PIERCE G. J., REHFISCH M. M. 1 & CRICK H.Q.P. 2005 Climate change and migratory species. BTO, Thetford. SPENCER, J.W. & KIRBY, K.J. 1992. An inventory of ancient woodland for England and Wales. Biological Conservation, 62, 77-93</p> <p>STEBBINGS, R.E. 1989. Conservation of the greater horseshoe bat: is the long term survival of the greater horseshoe bat a viable concept? British Wildlife, 1, 14-19."</p>

2.3 Range	
2.3.1 Surface area Range	
2.3.2 Method used Surface area of Range	Complete survey/ Complete survey or a statistically robust estimate
2.3.3 Short-term trend Period	Monitoring of all known maternity colonies has been undertaken since the early 1980's with co-ordinated monitoring of summer roosts taking place since 2000. Hibernation site monitoring has taken place since 1997. However, there has not been a full survey of every 10km square within the species range, so its possible that the species range may be greater than that reflected in this report.
2.3.4 Short term trend Trend direction	There is no information to suggest that there has been a decline in range for this species for the specified time period 2001 - 2012.
2.3.5 Short-term trend Magnitude	a) Minimum
	b) Maximum
2.3.6 Long-term trend Period	
2.3.7 Long-term trend Trend direction	
2.3.8 Long-term trend	

Magnitude Optional	a) Minimum	
	b) Maximum	
2.3.9 Favourable reference range	a) Value in km²	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	False
	d) Method used to set FRR	
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to...	a) Genuine change?	False
	b) Improved knowledge/more accurate data?	False
	c) Use of different method (e.g. "Range tool")?	False

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	a) Unit	number of individuals
	The minimum population estimate is the number of bats counted at maternity sites (E: 15 sites, W:5 sites) in July 2010 (2009 for 1 site in Wales). These bats will be predominantly breeding females. Assuming 25% - 30% of the bats are males (R. Ransome, pers. comm.) and that the sex ratio in the population is 1:1, this gives the population estimate shown in the Maximum box. This latter estimate is sensitive to the assumptions made and there are few data about the sex ratio present	

	at a wide range of maternity sites.	
	b) Minimum	4746
	c) Maximum	7120
2.4.2 Population size estimation (using population unit other than individuals) Optional (<i>if 2.4.1 filled in</i>)	a) Unit	
	b) Minimum	
	c) Maximum	
2.4.3 Additional information on population estimates / conversion Optional	a) Definition of "locality"	
	b) Method to convert data	
	c) Problems encountered to provide population size estimation	
2.4.4 Year or period	2010-	
2.4.5 Method used Population size	Complete survey/Complete survey or a statistically robust estimate	
	<p>The minimum population estimate (b) is the actual number of bats counted at maternity sites (E: 15 sites, W:5 sites) in July 2010 (2009 for 1 site in Wales). These bats will be predominantly breeding females, so this figure underestimates the total population. Assuming 25% - 30% of the bats present are males (R. Ransome, pers. comm.) and that the sex ratio in the general population is 1:1, this gives the population estimate shown in the Maximum box (c). Worked example for England: No of females at breeding roosts, assuming 30% are males = $4746 \times 0.7 = 3322$, so total population = $3322 \times 2 = 6644$.</p> <p>This latter estimate is sensitive to the assumptions made and there are few data about the sex ratio present at a wide range of maternity sites. Figures are given for an assumed proportion of males of 25 and 30%.</p>	
2.4.6 Short-term trend Period	2001-2012	
2.4.7 Short-term trend Trend direction	unknown	
2.4.8 Short-term trend Magnitude	a) Minimum	

	b) Maximum	
	c) Confidence interval	
2.4.9 Short-term trend Method used	Absent data	
2.4.10 Long-term trend – Period		
2.4.11 Long-term trend Trend direction		
2.4.12 Long-term trend Magnitude Optional	a) Minimum	
	b) Maximum	
	c) Confidence interval	
2.4.13 Long term trend Method used		
2.4.14 Favourable reference population	a) Number of individuals/agreed exceptions/other units	
	b) Operator	
	c) FRP is unknown indicated by "true"	False

	d) Method used to set FRP	
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	a) Genuine change?	False
	b) Improved knowledge/more accurate data?	False
	c) Use of different method (e.g. "Range tool")?	False

2.5 Habitat for the species	
2.5.1 Area estimation	<p>17200</p> <p>R. ferrumequinum mainly occupies lowlands, usually below 800m. The species requires a mosaic of grazed pasture and woodlands within a radius of 4km from roost sites. This should provide enough food during the spring and summer months for pregnant and lactating females, as well as for the young on their early foraging flights; usually within 1km from the roost. The ideal habitat is a landscape mosaic of permanent pasture and ancient, deciduous woodland, linked with an abundance of tall bushy hedges with a good supply of insect food (Ransome 1997; 2000). A study on the preferred habitat of R. ferrumequinum carried out over a number of different sites suggests in order of preference, habitats most often visited are: Cattle pastures (39%) > Ancient semi-natural woodland (19%) > Meadows (10%) = Other pastures (10%) > Broad leaved woodlands > Others (Ransome & McOwat 1994). The order of preference changes throughout the seasons with woodlands being utilised more frequently in cooler months, possibly as they maintain a 1-1.5C higher temperature than open pasture which may be enough to encourage insect flight.</p> <p>R. ferrumequinum has quite specific roosting requirements. Maternity roosts are usually in attics of old buildings but caves and mines will also be utilised. The species hibernates underground in caves and disused mines and occasionally cellars and tunnels. It prefers warmer sites than those chosen by other bat species, 11C in October down to 7C in February (Ransome, 1990) ideally with a high humidity >90% (Harris et al. 1995). If temperature fluctuates individuals will awake from hibernation to search for a more suitable site. When hibernating they are especially prone to arousal by lights or noises when at 9C or above, or at dusk (Ransome & Jones, 2008). R. ferrumequinum is very faithful to its roosts and hibernation sites are generally close to maternity roosts.</p>

	There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species.	
2.5.2 Year or period	2012-	
2.5.3 Method used Habitat for the species	Estimate based on expert opinion with no or minimal sampling	
2.5.4 Quality of the habitat	a) Habitat quality	Unknown
	b) Assessment method	<p>There is some detailed information on the habitat requirements/limitations of this species, but the total area of suitable habitat is unknown as the species depends on a matrix of habitats in a landscape. 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.</p> <p>However, as this species is a generalist species, using a mosaic of habitats, using the JNCC guidance for suitable habitat it is assumed that suitable habitat is equivalent to the area that the species occupies per 10km square in the distribution map.</p>
2.5.5 Short-term trend Period	2001-2012	
2.5.6 Short-term trend Trend direction	unknown	
2.5.7 Long-term trend Period		
2.5.8 Long-term trend Trend direction		
2.5.9 Area of suitable habitat for the species	a) Value in km²	17200
	<p><i>R. ferrumequinum</i> mainly occupies lowlands, usually below 800m. The species requires a mosaic of grazed pasture and woodlands within a radius of 4km from roost sites. This should provide enough food during the spring and summer months for pregnant and lactating females, as well as for the young on their early foraging flights; usually within 1km from the roost. The ideal habitat is a landscape mosaic of permanent</p>	

	<p>pasture and ancient, deciduous woodland, linked with an abundance of tall bushy hedges with a good supply of insect food (Ransome 1997; 2000). A study on the preferred habitat of <i>R. ferrumequinum</i> carried out over a number of different sites suggests in order of preference, habitats most often visited are: Cattle pastures (39%) > Ancient semi-natural woodland (19%) > Meadows (10%) = Other pastures (10%) > Broad leaved woodlands > Others (Ransome & McOwat 1994). The order of preference changes throughout the seasons with woodlands being utilised more frequently in cooler months, possibly as they maintain a 1 – 1.5°C higher temperature than open pasture which may be enough to encourage insect flight.</p> <p><i>R. ferrumequinum</i> has quite specific roosting requirements. Maternity roosts are usually in attics of old buildings, but caves and mines will also be utilised. The species hibernates underground in caves and disused mines and occasionally cellars and tunnels. It prefers warmer sites than those chosen by other bat species, 11°C in October down to 7°C in February (Ransome, 1990) ideally with a high humidity >90% (Harris et al. 1995). If the temperature fluctuates individuals will awake from hibernation to search for a more suitable site. When hibernating they are especially prone to arousal by lights or noises when at 9°C or above, or at dusk (Ransome & Jones, 2008). <i>R. ferrumequinum</i> is very faithful to its roosts and hibernation sites are generally close to maternity roosts.</p>	
	b) Absence of data indicated as '0'	
<p>2.5.10 Reason for change Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to</p>	<p>a) Genuine change?</p>	<p>False</p>
	<p>b) Improved knowledge/more accurate data?</p>	<p>False</p>
	<p>c) Use of different method (e.g. "Range tool")?</p>	<p>False</p>

2.6 Main pressures		
a) Pressure	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance L = low importance	
A04: grazing	H	
A10: Restructuring agricultural land holding	H	

E06: Other urbanisation, industrial and similar activities	H	
B03: forest exploitation without replanting or natural regrowth	M	
D01: Roads, paths and railroads	M	
E01: Urbanised areas, human habitation	M	
E02: Industrial or commercial areas	M	
G01: Outdoor sports and leisure activities, recreational activities	L	

Pressures can generally be divided into those that affect roosts and those that affect commuting and foraging (including prey availability). Although roosts are strictly protected, *R. ferrumequinum* has quite specific summer roosting requirements that are not provided by most modern buildings, so roost availability may eventually be limiting and current roosts must be maintained. For hibernation, *R. ferrumequinum* is dependent on underground sites, that may be subject to disturbance or loss. Modern extraction methods are unlikely to create suitable mines and galleries for future occupation.

R. hipposideros commute and forage along linear features, over grazed pasture and in woodland. Agricultural and forestry practices that remove or simplify these habitats, or affect the biomass of insect prey could negatively affect populations. Environmental land-management schemes have been used extensively to support this species.

2.6.1 Method used – Pressures	mainly based on expert judgement and other data
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2.7 Threats		
a) Threat	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance L = low importance	
A07: use of biocides, hormones and chemicals	H	
L10: other natural catastrophes	H	
B02: Forest and Plantation management & use	M	
C01: Mining and quarrying	M	
E01: Urbanised areas, human habitation	M	
G01: Outdoor sports and leisure activities, recreational activities	L	
H07: Other forms of pollution	L	
J02: human induced changes in hydraulic conditions	L	

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R. hipposideros commute and forage along linear features, over grazed pasture and in woodland. Agricultural and forestry practices that remove or simplify these habitats, or affect the biomass of insect prey could negatively affect populations. Environmental land-management schemes have been used extensively to support this species and their continuation is essential.

Long-term research has shown that the greatest threat to populations is mass starvation in late cold springs (Ransome, 1989). The impact of these is being ameliorated by providing good quality habitat close to hibernation sites.

2.7.1 Method used – Threats	expert opinion
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2.8 Complementary information

2.8.1 Justification of % thresholds for trends	
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2.8.2 Other relevant information	
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2.8.3 Trans-boundary assessment	
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2.9 Conclusions (*assessment of conservation status at end of reporting period*)

Please refer to the United Kingdom assessment for this species.

3 Natura 2000 coverage & conservation measures - Annex II species (*only applies to species listed under Annex II of the Directive*)

3.1 Population

3.1.1 Population size Estimation of population size included in the SAC network	a) Unit	number of individuals
	b) Minimum	2527

	2527 individuals have been counted in maternity sites that are within SAC's (40% of total counted). This includes Berry Head Caves, Dean Hall, Rock Farm Barn, Brockley Hall Stables, Chudleigh Caves and Newton Court.
	c) Maximum 3790
	3790 (applying the same methodology as in 2.4.1) At the latest assessment, 94% of the area of SAC (690ha) was considered to be in favourable or unfavourable recovering condition.
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate
3.1.3 Trend of population size within the network (short-term trend)	increase

3.2 Conservation measures

Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	3.2.2 Type					3.2.3 Ranking H = high importance M = medium importance L = low importance	3.2.4 Location where the measure is PRIMARILY applied			3.2.5 Broad evaluation of the measure					
	a) Legal/statutory	b) Administrative	c) Contractual	d) Recurrent	e) One-off		a) Inside	b) Outside	c) Both inside & outside	a) Maintain	b) Enhance	c) Long term	d) No effect	e) Unknown	f) Not evaluated
2.0: Other agriculture-related measures		Y		Y		H			Y	Y	Y				
2.1: Maintaining grasslands and other open habitats		Y		Y		H			Y	Y	Y				
2.2: Adapting crop production		Y		Y		M		Y			Y				

3.1: Restoring/improving forest habitats		Y		Y		H			Y			Y			
6.1: Establish protected areas/sites		Y				M			Y		Y				
6.3: Legal protection of habitats and species	Y				Y	M			Y	Y					
6.4: Manage landscape features		Y		Y		M			Y	Y	Y				

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