

**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 Resources Wales** and refers only to the state of the habitat/species in **Wales** - 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.

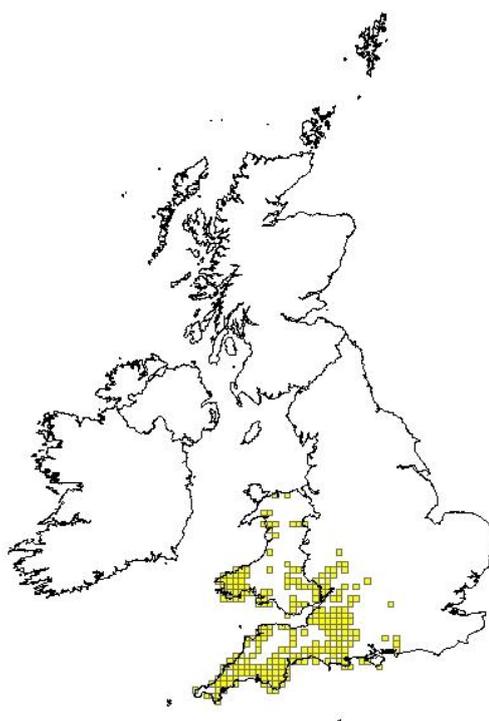
As of 1 April 2013, the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales became Natural Resources Wales/Cyfoeth Naturiol Cymru

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

### 1.1 Maps

<b>1.1.1 Distribution map</b>		<b>Sensitive</b>	<b>False</b>
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<b>1.1.2 Method used - map</b>	<p><b>Complete survey/Complete survey or a statistically robust estimate</b></p> <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, particularly in north Wales and the Welsh borders. There have been more such records in recent years, but it is not yet clear if these represent established populations. E.g. one individual ringed in the Forest of Dean as a juvenile was been recorded at a hibernation site in north Wales for over 10 year. Ref Bat News. Occasional isolated records of individuals were not</p>
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	<p>considered as evidence of occupation in the data for the 10km square distribution maps. Some squares previously omitted may have been included if there is evidence of continued occupation.</p> <p>Data have been collected as part of long-term studies and structured 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.</p> <p>The horseshoe bats are easily identifiable using visual or bat detector identification. Their habit of roosting in the open (within the roost site), rather than in crevices means that the presence of colonies is likely to be noticed. Confusion is possible with the more common and widespread lesser horseshoe bat if roosting bats are not seen close up (e.g. in mines or cave chambers). In such circumstances, records are not considered as valid unless confirmed using another method.</p>
<b>1.1.3 Year or period</b>	<b>2000-2012</b>
	As this is a well-studied species, data collected from 2000 onwards are believed to represent its distribution very well.
<b>1.1.4 Additional distribution map</b>	<b>False</b>
<b>1.1.5 Range map</b>	

<b>2.1 Biogeographical region &amp; marine regions</b>	<b>ATL</b>
<b>2.2 Published sources</b>	<p><b>"ANDREWS, P.T.(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.</b></p> <p><b>BARR, C.J. &amp; GILLESPIE, M.K. 2000. Estimating hedgerow length and pattern characteristics in Great Britain using Countryside Survey data. Journal of Environmental Management, 60, 23-32.</b></p> <p><b>BAT CONSERVATION TRUST, 2012. The National Bat Monitoring Programme. Annual Report 2011. Bat Conservation Trust, London. (www.bats.org.uk)</b></p> <p><b>BATTERSBY, J (Ed.). 2005. UK Mammals: Species Status and Population Trends. JNCC/Tracking Mammals Partnership. JNCC, Peterborough</b></p> <p><b>BILLINGTON, G. &amp; RAWLINSON, M.D. (2006) Report on horseshoe bat flightlines and feeding areas. CCW Science Report No. 75. CCW, Bangor.</b></p> <p><b>DUVERGE, P.L. &amp; JONES, G. 1994 Greater Horseshoe Bats - activity foraging behaviour and habitat use. British Wildlife 6: 69-77.</b></p> <p><b>ENGLISH NATURE 2000. Managing landscapes for the greater horseshoe bat. English Nature, Peterborough.</b></p> <p><b>FLANDERS, J. &amp; JONES, G. (2009) Roost use, ranging behaviour and diet of the greater horseshoe bat using non-breeding roosts in Dorset. Journal of Mammalogy 90 888-896</b></p> <p><b>FOX, R., CONRAD, K.F., PARSONS, M.F., WARREN, M.S. &amp; WOIWOD, I.P. 2006. The state of Britain's larger moths. Butterfly Conservation and Rothamsted Research, Wareham, Dorset.</b></p> <p><b>HARRIS, S., MORRIS, P., WRAY, S. and YALDEN, D. 1995. A</b></p>

	<p>review of <b>British Mammals: population estimates and conservation status of British mammals other than cetaceans</b>. JNCC, Peterborough.</p> <p><b>PRIDDIS, D., RANSOME R.R. &amp; MATTHEWS, J.E. (2007) Long-distance horseshoes</b>. <i>Bat News</i>, Issue 83, Summer 2007. Bat Conservation Trust, London.</p> <p><b>RANSOME, R.D. 1989. Population changes of greater horseshoe bats studied near Bristol over the past 26 years</b>. <i>Biological Journal of the Linnean Society</i>, 38, 71-82</p> <p><b>RANSOME, R.D. 1990. The Natural History of Hibernating Bats</b>. Christopher Helm.</p> <p><b>RANSOME, R.D. 1997. The management of greater horseshoe bat feeding areas to enhance population levels</b>. <i>English Nature Research Reports 241</i>. Peterborough.</p> <p><b>RANSOME, R. D. 2000. Monitoring diets and population changes of greater horseshoe bats in Gloucestershire and Somerset</b>. <i>English Nature Report 341</i>. Peterborough.</p> <p><b>RANSOME, R.D &amp; JONES, G. 2008. Greater horseshoe bat <i>Rhinolophus ferrumequinum</i></b>. Pp. 298-306 in <b>HARRIS, S &amp; YALDEN, D.W. Mammals of the British Isles: Handbook, 4th edition</b>. The Mammal Society, Southampton.799pp.</p> <p><b>RANSOME, R. D. &amp; MCOWAT, T. P. 1994. Birth timing and population changes in greater horseshoe bat colonies (<i>Rhinolophus ferrumequinum</i>) are synchronised by climatic temperature</b>. <i>Zoological Journal of the Linnean Society</i>, 112, 337-351.</p> <p><b>RICHARDSON, P. 2000. Distribution atlas of bats in Britain and Ireland 1980-1999</b>. Bat Conservation Trust, London.</p> <p><b>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 &amp; CRICK H.Q.P. 2005 Climate change and migratory species</b>. BTO, Thetford.</p> <p><b>SPENCER, J.W. &amp; KIRBY, K.J. 1992. An inventory of ancient woodland for England and Wales</b>. <i>Biological Conservation</i>, 62, 77-93</p> <p><b>STEBBINGS, R.E. 1989. Conservation of the greater horseshoe bat: is the long term survival of the greater horseshoe bat a viable concept?</b> <i>British Wildlife</i>, 1, 14-19."</p>
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2.3 Range	
2.3.1 Surface area Range	
2.3.2 Method used Surface area of Range	<p><b>Complete survey/Complete survey or a statistically robust estimate</b></p> <p>See Note 1.1.2</p>
2.3.3 Short-term trend Period	
2.3.4 Short term trend Trend direction	See Notes 1.1.2 and 2.3.10

<b>2.3.5 Short-term trend Magnitude</b>	<b>a) Minimum</b>	
	See Note 1.1.2	
	<b>b) Maximum</b>	
	See Note 1.1.2	
<b>2.3.6 Long-term trend Period</b>		
	See Note 1.1.2	
<b>2.3.7 Long-term trend Trend direction</b>		
	See Note 1.1.2	
<b>2.3.8 Long-term trend Magnitude</b>  Optional	<b>a) Minimum</b>	
	See Note 1.1.2	
	<b>b) Maximum</b>	
<b>2.3.9 Favourable reference range</b>	<b>a) Value in km<sup>2</sup></b>	
	<b>b) Operator for FRR</b>	
	<b>c) FRR is unknown (indicated by "true")</b>	<b>False</b>
	<b>d) Method used to set FRR</b>	
<b>2.3.10 Reason for change</b>  Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to...	<b>a) Genuine change?</b>	<b>True</b>
	See also Note 1.1.2. An increasing number of records of small numbers of animals at the edge of their range indicates that the range may be expanding. There is better more recording effort for bats generally due in part to the requirement to survey in advance of developments and better co-ordination of data through the LRC network in Wales. However there does appear to be a genuine change as the sites where individuals or small numbers of animals are recorded are often sites that have been monitored for many years or their lesser horseshoe bat colonies and where the presence of greater horseshoe bats would have been recorded if observed.	

	In increase in change may be due in part to climate change as the species in Wales is on the northern and western edges of its range. It may also be due to more effective protection and management of lesser horseshoe bat roost sites and to increased breeding success promoting dispersal of young further afield.	
	<b>b) Improved knowledge/more accurate data?</b>	<b>True</b>
	See Note 2.3.10a	
	<b>c) Use of different method (e.g. "Range tool")?</b>	<b>False</b>

<b>2.4 Population</b>		
<b>2.4.1 Population size estimation</b> (using individuals or agreed exceptions where possible)	<b>a) Unit</b>	<b>number of individuals</b>
	<b>b) Minimum</b>	<b>1480</b>
	A species with restricted distribution. Surveillance well-covered by the NBMP, with annual counts at all significant maternity sites and counts at many hibernation sites. 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 = $3322 \times 2 = 6644$ .	
	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%. Also see note 2.4.5	
	<b>c) Maximum</b>	<b>2220</b>
See Note 2.4.1b & 2.4.5		
<b>2.4.2 Population size estimation</b> (using population unit other than individuals) Optional (if 2.4.1 filled in)	<b>a) Unit</b>	
	<b>b) Minimum</b>	
	<b>c) Maximum</b>	
<b>2.4.3 Additional information on population</b>	<b>a) Definition of "locality"</b>	

<b>estimates / conversion</b> Optional		
	<b>b) Method to convert data</b>	
	<b>c) Problems encountered to provide population size estimation</b>	
<b>2.4.4 Year or period</b>	<b>2010-2010</b>	
	See Note 2.3.1b	
<b>2.4.5 Method used</b> <b>Population size</b>	<b>Complete survey/Complete survey or a statistically robust estimate</b>	
	Data from the National Bat Monitoring Programme The minimum population estimate (b) is the actual number of bats counted at maternity sites (E: 15 sites, W:5 sites) in July 2010. 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 Wales: No of females at breeding roosts, assuming 30% are males = $1480 \times 0.7 = 1036$ , so total population = $1036 \times 2 = 2072$ .	
	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%. Also see note 2.3.1b	
<b>2.4.6 Short-term trend</b> <b>Period</b>	<b>2001-2012</b>	
<b>2.4.7 Short-term trend</b> <b>Trend direction</b>	<b>unknown</b>	
	See Note 2.4.5. Data from the NBMP indicate that the species is increasing. 2 methods are used - hibernation counts and maternity colony counts. The latter are considered to be more accurate as hibernation counts are subject to greater variation and may be more likely to be affected by changes in weather at the time of survey.	
<b>2.4.8 Short-term trend</b> <b>Magnitude</b>	<b>a) Minimum</b>	
	See note 2.4.7	
	<b>b) Maximum</b>	
	See note 2.4.7	
	<b>c) Confidence interval</b>	
	See note 2.4.7	

<b>2.4.9 Short-term trend Method used</b>	<b>Complete survey/ Complete survey or a statistically robust estimate</b>	
	See note 2.4.7	
<b>2.4.10 Long-term trend – Period</b>		
<b>2.4.11 Long-term trend Trend direction</b>		
	See Note also 2.4.5. Data from the NBMP for 1997 - 2011 indicate that the species is increasing, with the data from colony counts showing a significant increase (Average 6% pa). Data from hibernation counts are also increasing, but an average increase of 2.2%pa was not found to be significant.	
<b>2.4.12 Long-term trend Magnitude</b> Optional	<b>a) Minimum</b>	
	<b>b) Maximum</b>	
	<b>c) Confidence interval</b>	
<b>2.4.13 Long term trend Method used</b>		
	See Note 2.3.11	
<b>2.4.14 Favourable reference population</b>	<b>a) Number of individuals/agreed exceptions/other units</b>	
	<b>b) Operator</b>	
	<b>c) FRP is unknown indicated by "true"</b>	<b>False</b>
	<b>d) Method used to set FRP</b>	
<b>2.4.15 Reason for change</b> Is the difference between the	<b>a) Genuine change?</b>	<b>True</b>

value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	See Note 2.3.10a	
	<b>b) Improved knowledge/more accurate data?</b>	<b>True</b>
	<b>c) Use of different method (e.g. "Range tool")?</b>	<b>False</b>

<b>2.5 Habitat for the species</b>	
<b>2.5.1 Area estimation</b>	<p><b>6049</b></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%) &gt; Ancient semi-natural woodland (19%) &gt; Meadows (10%) = Other pastures (10%) &gt; Broad leaved woodlands &gt; Others (Ransome &amp; 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>Insert sustenance zone information – Billington or others?</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, 11°C in October down to 7°C in February (Ransome, 1990) ideally with a high humidity &gt;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 &amp; Jones, 2008). R. ferrumequinum is very faithful to its roosts and hibernation sites are generally close to maternity roosts.</p> <p>There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species.</p>
<b>2.5.2 Year or period</b>	<p><b>2012-2012</b></p> <p>See note 2.5.1</p>
<b>2.5.3 Method used</b>	<b>Estimate based on expert opinion with no or minimal sampling</b>

<b>Habitat for the species</b>	2.5.3 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. As this is a generalist species, using a mosaic of habitats, the area of distribution is used as an estimate of habitat area. This is calculated from the area of the filled 10km squares in the distribution map. This is a fairly crude assessment with low accuracy. The habitat was reported as unknown in the last reporting round.	
<b>2.5.4 Quality of the habitat</b>	<b>a) Habitat quality</b>	<b>Unknown</b>
	No or insufficient reliable information available	
	<b>b) Assessment method</b>	<b>No or insufficient information</b>
<b>2.5.5 Short-term trend Period</b>	<b>2001-2012</b>	
<b>2.5.6 Short-term trend Trend direction</b>	<b>unknown</b>	
<b>2.5.7 Long-term trend Period</b>		
<b>2.5.8 Long-term trend Trend direction</b>		
<b>2.5.9 Area of suitable habitat for the species</b>	<b>a) Value in km<sup>2</sup></b>	<b>0</b>
	Whilst the habitat requirements of the species have been well-studied the total extent of suitable habitat is currently unknown. It may be possible to model the area of suitable habitat for the species, but this has not yet been done. Ground truthing of any models would also be required. See Notes 2.5.1 and 2.5.3.	
	<b>b) Absence of data indicated as '0'</b>	
<b>2.5.10 Reason for change</b> Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to	<b>a) Genuine change?</b>	<b>True</b>
	See note 2.5.1	
	<b>b) Improved knowledge/more accurate data?</b>	<b>True</b>

	<b>c) Use of different method (e.g. "Range tool")?</b>	<b>False</b>

<b>2.6 Main pressures</b>		
<b>a) Pressure</b>	<b>b) Ranking</b>	<b>c) Pollution qualifier</b>
	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	

Abandonment of pastoral systems and lack of grazing, particularly of cattle grazing. Dung beetles form a key component of the species diet.

Increasing urbanisation results in loss of foraging habitat, severance of commuting routes and isolation of colonies. Demolition and conversion of buildings results in loss of roost sites. This species requires large open roof spaces with large access points which are easily lost when converted.

**2.6.1 Method used – Pressures**

**mainly based on expert judgement and other data**

This is a well-studied species. Expert judgement has been used based on the knowledge of the cause of the historical decline in greater horseshoe bat populations and current information on factors affecting survival and promoting conservation. Ransome and Jones (2008).

<b>2.7 Threats</b>		
<b>a) Threat</b>	<b>b) Ranking</b>	<b>c) Pollution qualifier</b>
	H = high importance M = medium importance L = low importance	
A07: use of biocides, hormones and chemicals	H	
B02: Forest and Plantation management & use	H	
E01: Urbanised areas, human	H	

habitation		
L10: other natural catastrophes	H	
C01: Mining and quarrying	M	
G01: Outdoor sports and leisure activities, recreational activities	M	
H07: Other forms of pollution	M	
J02: human induced changes in hydraulic conditions	L	

See also Note 2.6. Use of underground sites for recreational purposes (e.g. caving, adventure trips, coasteering) have the potential to cause disturbance to hibernating bats affecting their ability to survive the winter, or causing them to abandon sites. Re natural catastrophes, 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.

<b>2.7.1 Method used – Threats</b>	<b>expert opinion</b>
	See 2.6.1

## 2.8 Complementary information

### 2.8.1 Justification of % thresholds for trends

### 2.8.2 Other relevant information

### 2.8.3 Trans-boundary assessment

## 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	a) Unit	number of individuals
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Estimation of population size included in the SAC network	<b>b) Minimum</b>	<b>1378</b>
	See note 3.1.2	
	<b>c) Maximum</b>	<b>2067</b>
	See note 3.1.2	
<b>3.1.2 Method used</b>	<b>Complete survey/Complete survey or a statistically robust estimate</b>	
	Minimum count is number of individuals counted in SAC maternity roost sites. Maximum is assuming that 25% are males and 1:1 ratio of males to females (using same methodology as 2.4.1).	
<b>3.1.3 Trend of population size within the network</b> (short-term trend)	<b>increase</b>	
	Counts at maternity sites have increased in recent years indicating that the upward trend is in line with that of the GB population. There is insufficient data to determine the trend at hibernation sites.	

### 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				
2.1: Maintaining grasslands and other open habitats		Y		Y		H			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				H			Y		Y				
6.3: Legal protection of habitats and species	Y				Y	M			Y		Y				
6.4: Manage landscape features			Y		Y	H			Y		Y				

See also Note 2.6. 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. Road design, construction and operation need to take into account the likely impact on bats, e.g. in relation to the provision of safe crossing structures and the loss of and severance of bat habitat.

*R. ferrumequinum* hunts 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. All roosts are protected, many as Natura 2000 sites, and are managed to maintain appropriate conditions for the bats. This species is showing a significant increase in population.