European Site Conservation Objectives: supplementary advice on conserving and restoring site features

Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena Special Area of Conservation (SAC) Site code: UK0014794

Greater horseshoe bats in limestone cave ©Natural England/Michael Hammett

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC. This advice should therefore be read together with the SAC Conservation Objectives.

As this is a cross border site covering both England and Wales, you should contact Natural Resources Wales for their advice on the conservation objectives relating to the SAC in Wales.

Parts of this SAC lie very close to and functionally overlap with the Wye Valley Woodlands SAC (Conservation objectives and Supplementary Advice available here).

This version updates and replaces draft advice dated 5 October 2018.

You should use the Conservation Objectives, this Supplementary Advice and any case-specific advice given by Natural England, when developing, proposing or assessing an activity, plan or project that may affect this site.

This Supplementary Advice to the Conservation Objectives presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. Each attribute has a target which is either quantified or qualitative depending on the available evidence. The target identifies as far as possible the desired state to be achieved for the attribute.

The tables provided below bring together the findings of the best available scientific evidence relating to the site's qualifying features, which may be updated or supplemented in further publications from Natural England and other sources. The local evidence used in preparing this supplementary advice has been cited. The references to the national evidence used are available on request. Where evidence and references have not been indicated, Natural England has applied ecological knowledge and expert judgement. You may decide to use other additional sources of information.

In many cases, the attribute targets shown in the tables indicate whether the current objective is to 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. As new information on feature condition becomes available, this will be added so that the advice remains up to date.

The targets given for each attribute do not represent thresholds to assess the significance of any given impact in Habitats Regulations Assessments. You will need to assess this on a case-by-case basis using the most current information available.

Some, but not all, of these attributes can also be used for regular monitoring of the actual condition of the designated features. The attributes selected for monitoring the features, and the standards used to assess their condition, are listed in separate monitoring documents, which will be available from Natural England.

These tables do not give advice about SSSI features or other legally protected species which may also be present within the European Site.

If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email HDIRConservationObjectivesNE@naturalengland.org.uk

About this site

European Site information

Name of European Site	Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena Special Area of Conservation (SAC)
Location	Gloucestershire (England); Monmouthshire (Wales)
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	April 2005
Qualifying Features	S1303. *Rhinolophus hipposideros*; Lesser horseshoe bat S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat
Designation Area	142.70 hectares
Designation Changes	N/A
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	**England** – Blaisdon Hall SSSI, Buckshraft Mine and Bradley Hill Railway Tunnel SSSI, Caerwood and Ashberry Goose House SSSI, Dean Hall Coach House and Cellar SSSI, Devil's Chapel Scowles SSSI, Old Bow and Old Ham Mines SSSI, Sylvan House Barn SSSI, Westbury Brook Ironstone Mine SSSI, Wigpool Ironstone Mine SSSI. **Wales** –Llangovan Church SSSI, Mwyngloddfa Mynydd-Bach SSSI, Newton Court Stable Block SSSI,Wye Valley Lesser Horseshoe Bat Sites SSSI (comprising 4 separate sites): • Itton Court Stud • Penallt Old Church • Priory Llandogo • Tregeiriog Farm
Relationship with other European or International Site designations	The sites that make up this SAC lie very close to and functionally overlap with the Wye Valley Woodlands SAC.

Site background and geography

The Wye Valley and Forest of Dean Bat Sites SAC lies within the Forest of Dean and Lower Wye National Character Area which straddles the England-Wales border.

The SAC comprises 13 individual component sites all individually notified as SSSIs (9 in England and 4 in Wales) under the 1981 Wildlife and Countryside Act (as amended). These component SSSIs are a mixture of maternity roosts and hibernation sites in old buildings or mines/caves.

The Wye Valley and Forest of Dean is a heavily wooded area edged by farmland which is predominantly used for grazing. This combination of trees and grazed pastures together with old buildings and underground hibernation sites provides good conditions for both lesser horseshoe bats *Rhinolophus*

hipposideros and greater horseshoe bats *Rhinolophus ferrumequinum.* The area contains the greatest concentration of lesser horseshoe bats in the UK, including the largest recorded hibernation roost.

The bat population is further supported by a large number of other summer roosts (of varying types) and hibernation sites throughout the area which are not designated but form part of the wider ecological network supporting the integrity of the SAC. The flight-lines and feeding grounds of the wider ecological network are also critical in supporting this SAC. There is also evidence for much longer distance connections between the populations in the Wye Valley and Forest of Dean area and the Cotswolds to the east (Woodchester Park SSSI greater and lesser horseshoe bat maternity roost), the Malvern Hills to the north and also much further west into Wales.

The Conservation Objectives for the Wye Valley and Forest of Dean Bat Sites SAC (with regard to the qualifying features for which the site has been designated, and subject to natural change) are as follows:

> **Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:**

- **The extent and distribution of the habitats of qualifying species**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which the habitats of qualifying species rely**
- **The populations of qualifying species, and**
- **The distribution of qualifying species within the site.**

Although the designated areas associated with this site are small hectarages that comprise the area of buildings and mines/caves, favourable condition is measured against the survival of the population. Therefore a much wider area comprising of supporting habitat for other types of roost, and that provides food, access and mixing of the population, is critical to achieving favourable condition of the SAC.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying Species:

- **S1303 Lesser horseshoe bat *Rhinolophus hipposideros***

  The lesser horseshoe bat is one of the smallest bats in the UK. During the summer they form maternity colonies in old buildings and emerge to hunt in nearby woodland (Bontadina *et al* 2002). The species prefers sheltered valleys with extensive deciduous woods or dense scrub, close to roost sites. Where habitat is fragmented, linear features such as hedgerows are important corridors between roosts and foraging areas.

  During the summer, Schofield (2008) found that lesser horseshoe bats tend to forage within 2-3km of their roost, though they can sometimes travel 4km and further from their roosts to suitable foraging grounds. Radio-tracking of a maternity roost in North Somerset (Knight 2006) estimated a foraging density of 0.13 bats / ha within 2km of the maternity roost, after which density declined sharply within the next kilometre, however in a high quality landscape in the Forest of Dean / Wye valley around Brockweir, there was a steadier rate of decline in density though-out the range.

  Lesser horseshoe bats typically have between two and four feeding bouts per night, with 75% of bats in one study using night roosts, usually barns and out-buildings, between bouts (Knight & Jones 2009). The authors consider these roosts to be integral to core foraging areas and that the loss of night roosts could limit the availability of foraging areas to the bats. Ideally, maternity roost sites offer a range of temperature conditions in different parts of a single site, allowing the bats to change location; otherwise breeding females are likely to change site during the summer.

  Additional 'satellite' (day) roosts can be used during the summer. 'Transitional' (day) roosts have also been identified as an important part of the annual cycle, used by bats prior to moving to and from hibernation sites (Kunz 1982 and see Schofield 2008).

  Summer and winter roosts are usually less than 5-10 km apart but can be up to 22km, sometimes further. The bats are vulnerable to the loss or disturbance of both summer and winter roost sites and the removal of linear habitat corridors.

  In winter lesser horseshoe bats hibernate in caves, mines and other underground sites. Bats enter a state of torpor when, during the day when the animal is in its normal daytime refuge, they temporarily drop their body temperature and metabolism at between 5 and 11ºC. Nevertheless lesser horseshoe bats periodically require forage and water during the winter, therefore access to good feeding areas close to the hibernacula is important. During December to February, bats emerge around dusk only on mild nights (Schofield & McAney 2008). The winter foraging range is thought to be about half the distance covered in the summer months (BCT/BMT Cordah 2005).

  This complex of sites on the border between England and Wales contains by far the greatest concentration of lesser horseshoe bat in the UK, totalling about 26% of the national population at the time of designation (JNCC). It has been selected on the grounds of the exceptional breeding population, and the majority of sites within the complex are maternity roosts.

  The bats also hibernate in the many disused mines in the area and rely on the surrounding extensive woodland and grazed pastures with good quality hedgerows for their flight-lines and feeding grounds.

  The lesser horseshoe bat is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations

2017, making it a 'European Protected Species'. A Licence may therefore be required for any activities likely to harm or disturb lesser horseshoe bats.

- **S1304 Greater horseshoe bat *Rhinolophus ferrumequinum***

The greater horseshoe bat is one of the largest bats in the UK. During the summer, they form maternity colonies, generally in large old buildings, and forage in permanently grazed pasture, edges of mixed deciduous woodland and hedgerows. Such mixed land-use, especially on south-facing slopes, favours the dung beetles, moths and other insects on which the bats feed. A balance of woodland to pasture of about 50% and 50% provides optimum resources for these bats (Ransome 1996).

Greater horseshoe bats from the Dean Hall maternity roost have been shown to forage up to 9 km from the roost using a number of night roosts during the feeding period (Billington 2008 & 2009), although a number of studies have shown the maximum foraging range for most bats is 4km (Duvergé & Jones 1994). Night roosts such as porches and open buildings are also used during foraging. Transitional roosts, spring and autumn staging posts between maternity and hibernation roosts occupied by a number of bats, are integral to their life cycle (Flanders & Jones, 2009). The authors suggest that transitional roosts may be important mating sites for these bats since adult males are present at a time when other bat species are displaying reproductive 'swarming' behaviour. The other known mating strategy is where individuals males occupy underground sites in spring and autumn, which they appear to defend and where they are visited by a number of breeding (Ransome 2008; Rossiter et al. 2000). Females begin breeding annually at around 2-5 years, and have single births (Ransome,1995).This can result in a relatively slow recovery from a population crash. At Dean Hall, following a crash in 1985/86, the population took 16 years to recover to pre-crash values (Ransome 1989). Summer and winter roosts are usually less than 20-30 km apart but can be up to 50km and exceptionally further (Ransome 2008).

In winter greater horseshoe bats depend on caves, abandoned mines and other underground sites for undisturbed hibernation. A system or series of sites is required, offering a range of temperatures and air-flow patterns. Three types of hibernacula are recognised according to age and sex groups of occupants (Ransome 2008). The bats also need to drink and feed periodically during the winter, therefore, access to good feeding areas close to the hibernacula is important.

This complex of sites on the border between England and Wales represents greater horseshoe bat in the northern part of its range, with about 6% of the UK population at the time of designation (JNCC). The SAC contains the main maternity roosts for bats in this area. The bats also hibernate in the many disused mines in the area and rely on the surrounding extensive woodland and grazed pastures with good quality hedgerows for their flight-lines and feeding grounds.

The bats are vulnerable to the loss of insect food supplies due to insecticide use, urbanisation, changing farming practices and the loss of broad-leaved tree-cover, and to the loss or disturbance of underground roost sites. The greater horseshoe bat is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017, making it a 'European Protected Species'. A Licence may therefore be required for any activities likely to harm or disturb greater horseshoe bats.

References

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Site-specific seasonality of qualifying SAC features

The table below highlights in grey those months in which significant numbers of each qualifying feature are most likely to be present at the SAC during a typical calendar year. This table is provided as a general guide only. The presence of the features may vary depending on weather conditions.

Unless otherwise indicated, the months shown below are primarily based on information relating to the general months of occurrence of the feature in the UK. Where site-based evidence is available and has been used to indicate below that significant numbers of the feature are typically present at this SAC outside of the general period, the site-specific references have been added to indicate this.

Applicants considering projects and plans scheduled in the periods highlighted in grey would benefit from early consultation with Natural England given the greater scope for there to be likely significant effects that require consideration of mitigation to minimise impacts to qualifying features during the principal periods of site usage by those features. The months which are *not* highlighted in grey are not ones in which the features are necessarily absent, rather that features may be present in less significant numbers in typical years. Furthermore, in any given year, features may occur in significant numbers in months in which typically they do not. Thus, applicants should not conclude that projects or plans scheduled in months not highlighted in grey cannot have a significant effect on the features. There may be a lower likelihood of significant effects in those months which nonetheless will also require prior consideration.

Any assessment of potential impacts on the features must be based on up-to-date count data and take account of population trends evident from these data and any other available information. Additional site-based surveys may be required.

Feature	Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Site-specific references where available
Greater horseshoe bat	Breeding													Based on annual roost counts
Lesser horseshoe bat	Breeding													
Greater horseshoe bat	Hibernation													
Lesser horseshoe bat	Hibernation													

Table 1: Supplementary Advice for Qualifying Features: S1303. *Rhinolophus hipposideros*; Lesser Horseshoe Bat

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain and restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain and restore the structure, functions and supporting processes associated with Lesser horseshoe bats and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Management for this bat SAC includes maintaining and/or restoring • grills to hibernation entrances, • wooded cover around entrances • flight-lines and feeding grounds • associated night roosts • associated satellite and transitional roosts • swarming sites and associated flight-lines Management of the wider landscape is also integral to the condition of the SAC, such as keeping farmland in appropriate management to support the food supplies for the bat population (maintain grazing).	NATURAL ENGLAND, 2015. *Wye Valley and Forest of Dean Bat Sites SAC Site* Improvement Plan (SIP). Available from: https://designatedsites.naturalengland.org.uk FORESTER'S FOREST HLF LANDSCAPE PARTNERSHIP Batscape Project (reports available on request from Natural England or Forester's Forest www.forestersforest.uk 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. DAVIDSON, S.P. AND THOMAS, R.J. 2017, Apparent spring swarming behaviour of Lesser Horseshoe Bats (*Rhinolophus*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				hipposideros), *Barbastella 10(1).* VARIOUS May 2006 - *A Strategy for the Conservation of Horseshoe Bats in the Wye Valley and Forest of Dean,* Available from: https://www.fdean.gov.uk/media/5420/wye-valley-and-forest-of-dean-bat-strategy-may-2016.pdf
Supporting habitat: extent and distribution	**Extent of supporting habitat within the SAC**	England only: Maintain the total extent of the habitat(s) which support the feature at; Devil's Chapel Scowles - Inland Rock: Old iron mine workings 44.79 ha (consists of 20.09ha below ground only + 24.7ha above and below ground). Buckshraft Mine and Bradley Hill Railway Tunnel SSSI - Inland Rock: Old iron mine workings & railway tunnel (both disused) 5.66 ha (consists of 0.75ha below ground only + 4.9ha above and below ground). Old Bow and Old Ham Mines - Inland Rock: Old iron mine workings 40.3 ha (consists of	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or, if appropriate, restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data. For the English maternity sites, the area designated as the SAC is just the roost sites (curtilage of the buildings), the Welsh maternity sites include a small area of land around the buildings. Some of the hibernation sites include small areas of woodland in the designated area. Largely, supporting habitat is not included within the area of the SAC designation, however the supporting habitats of woodland, fields and hedgerows and additional non- designated roosts all contribute to maintaining the favourable conservation status of the SAC. Note that there may be slight discrepancies in the area quoted on the citation map versus that in the FCT where the area has now been calculated from GIS mapping systems.	NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request NATURAL ENGLAND Citation Maps – scans of originals available on request. The figures for Old Bow and Old Ham are from the original citation map rather than the FCT.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		38.93ha below ground only + 1.37 ha above and below ground. Broadleaved, Mixed and Yew woodland 1.37 ha surface area) Westbury Brook Ironstone Mine - Inland Rock: Old iron mine workings 15.69 ha (consists of 15.53ha below ground + 0.16ha above and below ground). Wigpool Ironstone Mine - Inland Rock: Old iron mine workings 34.88 ha (consists of 28.25ha below ground + 6.63ha above and below ground). Blaisdon Hall - Built-up Areas and Gardens 0.09 ha Caerwood House and Ashberry Goose House - Built-up Areas and Gardens 0.01 ha Sylvan House Barn - Built-up Areas and Gardens 0.005 ha		
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the SAC	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within	SHERWIN HA, MONTGOMERY WI & LUNDY M.G. 2013.The Impact and Implications of Climate Change for Bats, *Mammal Review*, *43*, p171-182.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats/supporting habitats. These sites are considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In terms of lesser horseshoe bat response to climate change, increasing winter temperatures may result in less time in torpor/hibernation e.g. more frequent awakening or earlier spring emergence. Therefore needing more frequent winter feeding and food to be available earlier in the year. The availability of both food and water may change. Water availability is particularly important for lactating females. Temperature regulation within roost/hibernation sites or the availability of roosts with a variety of temperature and humidity regimes is important to ensure the continued availability of suitable roosts. There may be a decrease in hunting ability with an increase in wet weather as bats avoid hunting in heavy rain due to increased energy costs (Voigt et al 2011). Changing vegetation around caves/mines may affect humidity of the hibernation site and the availability of food during winter emergence. Wider landscape changes in vegetation may also affect food availability and flight-lines between foraging areas. Climate change resilience will be aided by the protection and maintenance/restoration of quality feeding habitat close to the roosts and the identification and protection of satellite roosts and their surrounding habitat to enable sufficient feeding to occur during sub-optimal weather conditions.	VOIGT CC *et al.* 2011. Rain Increases the Energy Cost of Bat Flight, *Biology Letters*, *7*, p793-795. NATURAL ENGLAND, 2015. *Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments* ('NBCCVAs') for SACs and SPAs in England Available at http://publications.naturalengland.org.uk/publication/4954594591375360.

Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain concentrations and deposition of air pollutants within the site-relevant Critical Load or Level values given for the supporting habitat of this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants, and thus may impact the invertebrate community) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The supporting habitat of broadleaved, mixed and yew woodland is considered to be sensitive to air quality. The average recorded value for nitrogen is within the critical range of 10-20 kg/ha/year however, the maximum value is just outside this range, additional deposition could tip the levels into exceeding the limits. Deposition for the other measured pollutants is within the limits given for this habitat.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on APIS. Another tool available on SCAIL: http://www.scail.ceh.ac.uk/
Supporting habitat: structure/ function	**Internal condition of maternity colony**	Maintain appropriate levels of light, temperature and ventilation within the roost to support breeding lesser horseshoes	The preferred internal temperature within a maternity roost for lesser horseshoe bats is approximately 34ºC (Schofield, 2008). Changes to light levels, through-draught, ventilation, noise levels, vibration and water penetration may adversely alter summer roost conditions.	NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request
	Internal condition of underground site – hibernation	Maintain the structural integrity of roost spaces within the SAC to provide consistently cool, humid and dark conditions suitable for hibernation.	Lesser horseshoe bats roost mainly in underground sites during winter, often communally. Where there is a limited choice of sites, they may form clusters in hibernation. At more optimum sites they normally hibernate spread out, at levels ranging from close to the floor to high in the roof. The temperature range of hibernation sites where lesser horseshoe bats are found ranges between 5-11ºC (Schofield & McAney 2008) with humidity approaching 100% (Schofield, 2008), Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of	SCHOFIELD, H. 2008. *The Lesser Horseshoe Bat: Conservation Handbook*. Vincent Wildlife Trust. SCHOFIELD, H., & McAney, K. 2008. In Mammals of the British

			the roost. There should be no recent collapses/falls or signs of geological instability. Depends greatly on history of the site. Requires internal inspection by a bat worker with a hibernation licence. Significant changes may require management. The variation between hibernation sites and the strong adherence of the bats to their traditional sites makes it important to refer to file notes on the condition of the site.	Isles, Handbook, 4th Edition, Eds S Harris and D.W. Yalden. The Mammal Society.
Supporting habitat: structure/ function	**External condition of underground site - hibernation**	Maintain the external un-lit condition of the site, with vegetation present close to roost entrances but not obstructing it.	Trees and shrubs are required close to the entrance to enable bats to feel secure enough to leave soon after sunset rather than delaying until fully dark. Any lights shining on the entrance are likely to deter the bats from leaving (Downs *et al* 2003). Horseshoe and *Myotis* bats are more light averse than some other UK bat species. The woodland surrounding the SSSI mines' entrances (as mentioned in the SSSI citations and reasons for notification) is important for the maintenance of optimal humidity conditions inside mine system and also as foraging areas. The surrounding woodland structure should be maintained.	DOWNS N.C, *et al.* 2003. The effects of illuminating the roost entrance on the emergence behaviour of *Pipistrellus pygmaeus*, *Biological Conservation*, 111, p247-252, STONE E.L, JONES G AND HARRIS, S. 2009. Street Lighting Disturbs Commuting Bats, *Current Biology*, 19, p1123-1127. STONE E.L. 2013. *Bats and lighting: Overview of current evidence & mitigation.* University of Bristol. NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request

	Roost access	Maintain the number of access points to the roost at an optimal size and in an unlit and unobstructed state, with surrounding vegetation providing sheltered flyways without obstructing access(es)	This will prevent any negative internal climatic changes within the roost and maintain the ability of bats to freely enter and leave the roost as necessary. Standard minimal dimensions for horseshoe access points given by JNCC (2004) are 300 x 200mm. Later work by Schofield (2008) recommends entrances that have an area of 2500cm2, which can be a square 50 x 50cm or rectangular opening with a minimum height of 20cm covering the same overall area. The actual size or shape of an artificial entrance will depend on the risk of predation from mammals or access by humans. Entrances can be predator proofed in a number of ways including metal sheeting (Schofield 2008).	Location maps are held by Natural England, Surveys are carried out by licenced persons and organisations for NE – This info is sensitive and requirements for it must be discussed with NE JNCC. 2004. *Common Standards Monitoring Guidance for Mammals* Version August 2004 SCHOFIELD, H. 2008. *The Lesser Horseshoe Bat: Conservation* Handbook. Vincent Wildlife Trust.
Supporting habitat: structure/ function	**Supporting off-site habitat (flight-lines and foraging areas)**	Maintain the presence, structure and quality of any linear landscape features which function as flight-lines between the SAC and surrounding foraging areas used by lesser horseshoe bats Maintain core areas of feeding habitat outside of the SAC boundary that are critical to Lesser Horseshoe bats during their breeding and hibernation periods	Roost choice, and the presence of bats within the SAC, is likely to be influenced by the site's ability to provide bats with food and shelter. The provision of rich feeding areas around a roost, as well as connecting commuting routes and the availability of suitable night roosts, will be an important element in sustaining the SAC population. Water availability is particularly important for lactating females. Hibernating bats also need a water source close to the hibernation site. Towards the lower reaches, below Bigsweir, the Wye is tidal and the Severn is tidal to just north of Gloucester. Freshwater is largely supplied by ponds and small streams. Measures to improve water retention, e.g. ponds, re-wetting bogs and slowing the flow of water from the land to the main rivers will help to maintain a fresh water supply for the bats. The concept of Core Sustenance Zones (BCT 2016) can be used to take account of the supporting habitat within the area of highest bat activity surrounding the roost. The NE SSSI officers are currently evaluating the appropriate size to set CSZs for lesser and greater horseshoes within the Wye valley and Forest of Dean. During the summer lesser horseshoe bats tend to forage within 2-3km of their	BAT CONSERVATION TRUST (2016), *Core Sustenance Zones: Determining zone size* http://www.bats.org.uk/data/files/Core_Sustenance_Zones_Explained_-_04.02.16.pdf FORESTER'S FOREST HLF LANDSCAPE PARTNERSHIP Batscape Project (reports available on request from Natural England or Forester's Forest) WILLIAMS C, SALTER L & JONES G, The Winter Diet of the

			roost, though they can travel up to 4km from their roosts to suitable foraging grounds (Schofield, 2008). Lesser horseshoes commute and forage along linear features over wet grassland and woodland, They feed on midges, small moths, caddis flies, lacewings, beetles, crane-flies, small wasps and spiders. Permanent pasture and ancient woodland linked with an abundance of tall bushy hedgerows is ideal supporting habitat for this species. Flight-lines extend well beyond the designated site boundary into the wider local landscape and are also important for the commute between summer and winter roost sites. Flightlines should remain unlit, functioning as dark corridors (Stone, Jones & Harris 2009). Within the winter, their foraging range is reduced, with a mean foraging radius of 1.2 km around hibernation sites reported. During the winter they emerge every couple of weeks for food and water, therefore habitat within the immediate vicinity of hibernation sites is important. Winter prey (e.g. crane-flies, winter gnats, midges, dung flies) is often associated with damp woodland with decaying wood, and grazed pasture with abundant dung. Feeding areas used by SAC bats may be outside of the SAC boundary but be critical to successful hibernation (these undesignated areas are sometimes referred to as 'sustenance zones' or 'functionally-linked land'). In addition to the designated sites, there are also many undesignated supporting roosts such as day and night roosts, but also additional maternity roosts and hibernacula which are critical to support the SAC population.	Lesser Horseshoe Bat (*Rhinolophus hipposideros*) in Britain and Ireland. *Hystrix the Italian Journal of Mammalogy*, 22, p159-166 NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request STONE E.L, JONES G AND HARRIS, S. 2009. Street Lighting Disturbs Commuting Bats, *Current Biology*, 19, p1123-1127. WILLIAMS, C., SALTER, C., & JONES, G. 2011, The winter diet of the lesser horseshoe bat (*Rhinolophus hipposideros*) in Britain and Ireland, *Hystrix - Italian Journal of Mammals* 22, p159-166. KNIGHT, T., JONES, G. 2009. Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*. *Endang Species Res 8*:79-86

Supporting processes (on which the feature and/or its supporting habitat relies)	**Disturbance from human activity**	Control and minimise unauthorised public access to roost sites within the SAC	When in torpor or hibernating, bats are very vulnerable to disturbance. They cannot respond quickly to danger or stimuli and the waking-up process causes some of the valuable fat reserves to be used. They may then need to forage to replenish the fat reserves but cold winter conditions may limit both their ability to forage and the availability of prey. Disturbance of hibernating bats is, therefore, a significant risk to their survival. Hibernation sites should be secured against unauthorised access where possible as this, can result in disturbance to bats at critical times of year and can affect their population viability and use of the site. Grilles on site access points should be maintained where present. Baseline access level is described in 2005 report by Forest of Dean Caving Conservation Access Group (FoDCCAG).	NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request NATURAL ENGLAND, 2014. *Wye Valley and Forest of Dean Bat Sites SAC Site Improvement Plan* (SIP). Available from: https://designatedsites.naturalengland.org.uk FoDCCAG Access report 2005 "Bat SSSI baseline assessment"
Population (of the feature)	**Population abundance-maternity colony**	England-only: Maintain the abundance of the breeding population of lesser horseshoe bats at not less than 1155 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Maternity colony baseline (5 year average) peak adult emergence counts (June/July) from 2000 to 2004 SAC notification: • Blaisdon Hall = 452 • Caerwood & Ashberry = 282	NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request Monitoring data is held by Natural England Gloucestershire Team
	Population abundance - hibernation colony	England-only: Maintain the abundance of the hibernating lesser horseshoe bat population at not less than 1256		

		individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	• Sylvan House Barn = 421 • **Total for English part of the SAC= 1155** Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available. Hibernation Roost Baseline Counts (5 year average) between the time of SSSI notification (or soon after), to SAC notification (2004): • Buckshaft Mine and Bradley Hill notified SSSI March 1998 Av. count from 1999-2004 = 42 • Old Bow and Old Ham Mines, notified SSSI March 1998 Av. count from 2000-2004 = 464 • Devil's Chapel Scowles notified SSSI March 1998 Av. count from 2000, 01, 02 & 04 = 100 • Westbury Brook Ironstone Mine notified SSSI March 1998 Av. count from 2002, 02 & 04 = 341 • Wigpool Ironstone Mine notified SSSI March 1998 Av. count from 2000, 02, 03, 04 = 309 • **Total average for English part of the SAC=1256**	

Version Control
Advice last updated: n/a

Variations from national feature-framework of integrity-guidance:

Not applicable:

Supporting habitat: extent and distribution- - Distribution of supporting habitat– Because this is referring to within SAC habitat this is not really applicable, The roosts are covered by more specific condition targets and the designation does not extend beyond the small hectarage of the roosts. Wider supporting habitat covered by flighlines and feeding ground section.
Internal condition of - maternity and hibernation – the hibernation bit is not relevant so deleted. Moved the text about temperature of hibernation site to the box below (internal condition underground hibernation site)
Deleted External condition of building - hibernation site – as not relevant
External condition of underground site – this is incorrect, target relates to internal condition (have corrected), also no row for external condition so have added one in.
Deleted soils as nothing specific relating to soils

Table 2: Supplementary Advice for Qualifying Features: S1304. *Rhinolophus ferrumequinum*; Greater Horseshoe Bat

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Management for this SAC includes maintaining grills to hibernation entrances, maintaining appropriate wooded cover around entrances, maintaining and restoring flight-lines and feeding grounds. Management of the wider landscape is also integral to the condition of the SAC, such as keeping farmland in appropriate management to support the food supplies for the bat population (maintain grazing, particularly cattle)	NATURAL ENGLAND, 2014. *Wye Valley and Forest of Dean Bat Sites SAC Site Improvement Plan* (SIP). Available from: https://designatedsites.naturalengland.org.uk VARIOUS May 2006 - *A Strategy for the Conservation of Horseshoe Bats in the Wye Valley and Forest of Dean*. Available from: https://www.fdean.gov.uk/media/5420/wye-valley-and-forest-of-dean-bat-strategy-may-2016.pdf RANSOME, R., HUTSON, A.M.,2000. *Action Plan for the Conservation of the Greater Horseshoe Bat in Europe* (*Rhinolophus Ferrumequinum*), Council of Europe.
Supporting habitat: extent and distribution	**Extent of supporting habitat within the SAC**	England only: Maintain the total extent of the habitat(s) which support the feature:	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of	NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Buckshraft Mine & Bradley Hill Railway Tunnel- Inland Rock: Old iron mine workings & disused railway tunnel 5.66 Ha Dean Hall Coach House & Cellar - Built-up Areas and Gardens 0.02ha	improvements in data. For the English maternity sites, the area designated as the SAC is limited to the roost sites (curtilage of the buildings). Some of the hibernation sites include small areas of woodland in the designated area. Largely, supporting habitat is not included within the area of the SAC designation, however the supporting habitats of woodland, fields and hedgerows and additional non-designated roosts all contribute to maintaining the favourable conservation status of the SAC (see 'supporting off-site habitat attribute' below). The woodland surrounding the mine entrances (as mentioned in the citation) is important for the maintenance of optimal light conditions inside the mine system and also as foraging areas for periodic winter feeding.	RANSOME, R.D., 2002. Winter feeding studies on greater horseshoe bats. *EnglishNature Research Reports, No. 449*, 1-47.
Supporting processes (on which the feature and/or its supporting habitat relies)	**Adaptation and resilience**	Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	See the notes for this attribute in table 1 above. Spring/summer temperature affect when greater horseshoes give birth, warm springs resulting in earlier average birth date. However, it may also impact birth sex ratios.	SHERWIN HA, MONTGOMERY W.I., & LUNDY, M.G. 2013, The Impact and Implications of Climate Change for Bats, *Mammal Review*, 43, p171-182. RANSOME R.D. & McOWAT, T.P. 1994. Birth timing and population changes in greater horseshoe bat colonies are synchronised by climatic temperature. *Zoological Journal of the Linnean Society*, 112: 337-351. VOIGT C.C. *et al.* 2011. Rain Increases the Energy Cost of Bat Flight, *Biology Letters*,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				7, p793-795.
	Air quality	Maintain concentrations and deposition of air pollutants at within the site-relevant Critical Load or Level values given for the supporting habitats of this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	Same as notes for this attribute in Table 1 above.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on APIS. Another tool is available on SCAIL: http://www.scail.ceh.ac.uk/
Supporting habitat: structure/ function	**External condition of building - maternity colony**	Maintain the structural integrity and weatherproofing of the building, including roof, walls and rainwater goods, with no significant shading of the main roost area by trees/vegetation or artificial structures.	Excess damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost space provided by buildings.	
Supporting habitat: structure/ function	**Internal condition of building - maternity and hibernation**	Maintain appropriate levels of light, humidity, temperature and ventilation within the roost space	Changes to light levels, through-draught, ventilation, noise levels, vibration and water penetration may adversely alter the necessary roost conditions. The preferred internal temperature within a maternity roost for greater horseshoe bats is approximately 25ºC (Ransome, 1998). Greater horseshoe bats roost mainly in underground sites during winter, often communally. They are usually found in hibernation sites with relative humidity over 90% (Ransome 1968:1971). Artificial heating (Incubators) added to roosts may be beneficial.	RANSOME, R.D. 1998. The impact of maternity roost conditions on populations of greater horseshoe bats. *English Nature Research Reports No. 292*, 1-80. RANSOME, R.D. 1968. The distribution of the Greater horseshoe bat, *Rhinolophus ferrumequinum,* during hibernation, in relation to environmental

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				factors. *Journal of Zoology*, 154, 77-112. RANSOME, R.D.1971. The effect of ambient temperature on the arousal frequency relation to site selection and the hibernation state. *Journal of Zoology*, 164, 357-371. NATURAL ENGLAND SSSI condition assessment available from https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND.2014. *Wye Valley and Forest of Dean Bat Sites SAC Site Improvement Plan* (SIP). Available from: https://designatedsites.naturalengland.org.uk NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/ function	**Internal condition of underground site - hibernation**	Maintain the structural integrity of the roost space to provide consistently cool, humid and dark conditions suitable for hibernation	Whilst fairly high humidity levels and good airflow are important for hibernating bats, excessive damp, strong draughts and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost. There should be no recent collapses/falls or signs of geological instability. Depends greatly on history of the site. Requires internal inspection by a bat worker with a hibernation licence. Significant changes may require management. The variation between hibernation sites and the strong adherence of the bats to their traditional sites makes it important to refer to file notes on the condition of the site.	Natural England site monitoring notes.
	External condition of underground site - hibernation	Maintain the external un-lit condition of the site, with vegetation present close to roost entrances but not obstructing it.	Trees and shrubs and other vegetation is required close to the entrance to enable bats to feel secure enough to leave at dusk rather than delaying until fully dark. Any lights shining on the entrance are likely to deter the bats from leaving (Downs et al 2003; Stone, Jones & Harris 2009). The woodland surrounding the Old Bow and Old Ham SSSI mine entrances (as mentioned in the SSSI citation) is important for the maintenance of optimal humidity conditions inside mine system and also as foraging areas. The woodland structure should be maintained.	DOWNS N.C., et al. 2003. The effects of illuminating the roost entrance on the emergence behaviour of *Pipistrellus pygmaeus*,*Biological Conservation,* 111, p247-252. STONE E.L., JONES, G. and HARRIS, S. 2009.Street Lighting Disturbs Commuting Bats,*Current Biology,* 19, p1123-1127. NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request
Supporting habitat: structure/ function	**Roost access**	Maintain the number of access points to the roost at an optimal size and in an unlit and unobstructed	This will prevent any negative internal climatic changes within the roost and maintain the ability of bats to freely enter and leave the roost as necessary. Standard minima recommended dimensions for greater horseshoe access points are 400 x 300mm. However, locally, horizontal grill bars are normally about	Access point maps are held by Natural England, Surveys are carried out by licenced

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		state, with surrounding vegetation providing sheltered flyways without obstructing access	175mm apart (165mm gaps) and bats fly through these provided vertical bars leave gaps of 350-400mm (D Priddis, pers. comm). The narrower gaps are better at preventing human access, and these dimensions are preferred. The risk of predation from mammals should be considered and entrances predator proofed with metal sheeting or other methods if necessary (guidance as for lesser horseshoe bats in Schofield 2008).	persons only. JNCC, 2004. *Common Standards Monitoring Guidance for Mammals* Version August 2004. SCHOFIELD, H. 2008. *The Lesser Horseshoe Bat: Conservation Handbook*. Vincent Wildlife Trust.
	Supporting off-site habitat (flight-lines and foraging areas)	Maintain the presence, structure and quality of any linear landscape features which function as flight-lines between the SAC and surrounding foraging areas used by greater horseshoe bats Maintain core areas of feeding habitat outside of the SAC boundary that are critical to greater horseshoe bats during their breeding and hibernation periods	Roost choice, and the presence of bats within the SAC, is likely to be influenced by the site's ability to provide bats with food and shelter. The provision of rich feeding areas around roosts, and the available commuting routes (or flight-lines) between them, will be an important element in sustaining the SAC population. The concept of a Roost Sustenance Zone (Ransome 1996) and Core Sustenance Zones (BCT 2016) can be used to take account of the supporting habitat within the area of highest bat activity surrounding the roost. Natural England is currently evaluating the appropriate size to set CSZs for lesser and greater horseshoes within the Wye valley and Forest of Dean. During the summer, greater horseshoe bats from Dean Hall forage up to 9-10km from the roost, making use of a number of night roosts to rest during the feeding period (Billington 2008; 2009). They feed on chafers, dung beetles, noctuid moths, crane-flies and caddis flies. During the winter they emerge periodically for food and water, therefore habitat within the immediate vicinity of hibernation sites is important (Park, Jones & Ransome 2000). Greater horseshoes commute and forage along linear features, over grazed pasture and in woodland. Permanent pasture and ancient woodland linked with an abundance of tall bushy hedgerows is ideal supporting habitat for this species. Flightlines should remain unlit, functioning as dark corridors (Stone, Jones & Harris 2009). They will extend beyond the designated site boundary into the wider	RANSOME, R.D. 1996. The management of feeding areas for greater horseshoe bats. English Nature Research Report, No. 174: 1-74. BAT CONSERVATION TRUST 2016, *Core Sustenance Zones: Determining zone size* http://www.bats.org.uk/data/files/Core_Sustenance_Zones_Explained_-_04.02.16.pdf PARK K.J., JONES G., & RANSOME R.D. 2000. Torpor, arousal and activity of hibernating Greater Horseshoe Bats

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			local landscape and are also important for the commute between summer and winter roost sites. For example: Buckshraft Mine and Bradley Hill Railway Tunnel supports up to two-thirds of the juvenile population from Dean Hall and also individuals from Woodchester Park SSSI maternity roost in the Cotswolds 15km away come to hibernate here. The tunnel is used primarily in spring by Greater Horseshoe bats as a transition roost before they move to the Dean Hall maternity roost and then in autumn prior to hibernating in the mine (SSSI citation, 1998). In addition to the designated sites, there are also many undesignated supporting roosts such as day and night roosts, but also additional maternity roosts and hibernacula which are critical to support the SAC population. In particular the Symonds Yat complex, including caves on The Doward (Herefordshire) which are utilized by GH bats from Newton Court and also the Noxon Park mine complex near Bream. Water availability is also particularly important for lactating females (Sherwin, Montgomery & Lundy 2013). Hibernating bats also need a water source close to the hibernation site. Towards the lower reaches, below Bigsweir, the Wye is tidal and the Severn is tidal to just north of Gloucester. Freshwater is largely supplied by ponds and small streams. Measures to improve water retention, e.g. ponds, re-wetting bogs and slowing the flow of water from the land to the main rivers will help to maintain a fresh water supply for the bats.	(*Rhinolophus ferrumequinum*), 14, p580-588. FORESTER'S FOREST HLF LANDSCAPE PARTNERSHIP Batscape Project (reports available on request from Natural England or Forester's Forest) BILLINGTON,G. 2008.Radio-tracking Study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. *Natural England Research Report* NERR012 BILLINGTON G.2009. Radio Tracking Study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. *Natural England Commissioned Report* NECR021 NATURAL ENGLAND. Component SSSI Definitions of Favourable Condition. Available from Natural England on request
Supporting	**Disturbance**	Control and minimise	When in torpor or hibernating, bats are very vulnerable to disturbance. They	FoDCCAG 2005

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
processes (on which the feature and/or its supporting habitat relies)	**from human activity**	unauthorised human access to roost sites within the SAC	cannot respond quickly to danger or stimuli and the waking-up process causes some of the valuable fat reserves to be used. They may then need to forage to replenish the fat reserves but cold winter conditions may limit both their ability to forage and the availability of prey. Disturbance of hibernating bats is, therefore, a significant risk to their survival. Site should be secured against unauthorised access, which can result in repeated disturbance to bats at critical times of year. Disturbance can affect both population viability and use of the site. Grilles on site access points should be maintained where present. Baseline access level described in 2005 report (FODCCAG), including photographs showing state of access points & surrounding vegetation. Also notes presence & position of artificial lighting around accesses.	Baseline Access Report
Population (of the feature)	**Population abundance - maternity colony**	England-only: Maintain the abundance of the breeding greater horseshoe population at no less than 158 individuals, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	See notes for this attribute above in Table 1. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. The Dean Hall count in the year of the SSSI notification, 1987, was considered to be a low due to a UK-wide population crash caused by adverse weather conditions during the 1985/86 period (Ransome 1989). It took 15 years for the numbers of this slow-breeding, mammal to recover (in July 2018, 424 flying adults recorded). Maternity colony Baseline (5 year average) peak adult emergence counts (June/July) from 2000 to 2004 SAC notification: • Dean Hall = 158 GH bats. There are many other caves and mines across the Wye Valley and Forest of Dean that function as additional hibernation sites and contribute to supporting the total bat population within the area. Hibernation Roost Baseline Counts (5 year average) between the time of SSSI notification (or soon after) to SAC notification (2004):	Survey figures held by Natural England 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.
	Population abundance - hibernation site	England-only: Maintain the abundance of the hibernating greater horseshoe population at no less than 91 individuals across the SAC component English sites , whilst avoiding deterioration from its		Monitoring data is held by Natural England Gloucestershire Team

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		current level as indicated by the latest mean peak count or equivalent.	• Buckshraft Mine and Bradley Hill notified SSSI March 1998 Av. count from 2000-2004 = 68 • Old Bow and Old Ham Mines, notified SSSI March 1998 Av. count from 2000, 2002, 2003 & 2004 = 8 • Devil's Chapel Scowles notified SSSI March 1998 Av. count from 2000, 01, 02 & 04 = 12 • Westbury Brook Ironstone Mine notified SSSI March 1998 Av. count from 2002, 02 & 05 = 1 • Wigpool Ironstone Mine notified SSSI March 1998 Av. count from 2000-2004 = 2 • **Total average count for English sites 2000-2004 =91**	
Version Control Advice last updated: 11.2.2019. Missing attribute for 'external condition of building – maternity colonies' added.				
Variations from national feature-framework of integrity-guidance: Foraging distance - changed this as we have radio tracking data for Dean hall showing distances of up to 10km from juveniles and females that have bred				