



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

**Mells Valley Special Area of Conservation (SAC)
Site Code: UK0012658**



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 Mells Valley SAC.

This advice should therefore be read together with the SAC Conservation Objectives available [here](#).

This advice replaces a draft version dated February 2019 following the receipt of comments from the site's stakeholders.

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	Mells Valley Special Area of Conservation (SAC)
Location	Somerset
Sit Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	28.22ha
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)	Old Ironstone Works, Mells SSSI (100% is SAC); St. Dunstan's Well Catchment SSSI (approximately 2/3 is SAC); Vallis Vale SSSI (less than 10% is SAC)
Relationship with other European or International Site designations	This SAC is functionally linked with the Mendip Limestone Grassland SAC , Mendip Woodlands SAC , North Somerset and Mendip Bats SAC and Bath and Bradford on Avon Bats SAC .

Site background and geography

The Mells Valley SAC lies at the eastern end of the [Mendip Hills National Character Area](#) in the County of Somerset. The site has three component parts: The Old Ironstone Works, Mells; St. Dunstan's Well Catchment and Vallis Vale. The Old Ironstone Works formerly supported an outstanding breeding colony of the greater horseshoe bat and was also a hibernation site but was damaged by a fire bats have moved to a nearby location outside of the SAC. St Dunstan's Well Catchment and Vallis Vale support cave systems. These systems are a qualifying feature of the site and are also used as hibernacula by greater horseshoe bats. There is a small area of limestone grassland in St Dunstan's Well Catchment.

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 habitats:

- **H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)**

Festuco-Brometalia grasslands are found on thin, well-drained, lime-rich soils associated with chalk and limestone. They occur predominantly at low to moderate altitudes in England and Wales, extending locally into upland areas in northern England, Scotland and Northern Ireland. Most of these calcareous grasslands are maintained by grazing.

This Annex I category includes various forms of calcareous grassland referable in European terms to the Mesobromion and Xerobromion alliances. All forms of Festuco-Brometalia grassland comprise mixtures of grasses and herbs, in which there is at least a moderate representation of calcicolous species. The structural and floristic characteristics of the habitat are strongly influenced by climatic factors and management practices, in particular the intensity of grazing.

This SAC supports a small component of CG2 - *Festuca ovina* – *Avenula pratensis* grassland.

CG2 *Festuca ovina* – *Avenula pratensis* grassland is widely distributed in grazed calcareous pastures throughout the lowlands of England and Wales. Typical Mesobromion calcicoles, such as meadow oat-grass *Avenula pratensis*, quaking-grass *Briza media*, common rock-rose *Helianthemum nummularium*, salad burnet *Poterium sanguisorba* ssp. *sanguisorba* and small scabious *Scabiosa columbaria*, are well-represented, and are usually accompanied by species with a more Continental distribution, including dwarf thistle *Cirsium acaule* and squinancywort *Asperula cynanchica*. Many of the best-known 'chalk grassland' rarities occur in this type of Festuco-Brometalia, and some examples are strikingly species-rich.

- **H8310 Caves not open to the public**

Caves are formed by the erosion of soluble rocks, such as limestones. They typically form the subterranean components of a distinctive 'karst' landscape, and are associated with various topographic features, including gorges, dry valleys, 8240 Limestone pavements, and dolines (surface depressions and hollows). Caves not open to the public is interpreted as referring to natural caves which are not routinely exploited for tourism, and which host specialist or endemic cave species or support important populations of Annex II species.

Caves lack natural illumination, and therefore support species which are adapted to living in the dark. Microclimatic conditions vary widely within and between caves, and this determines the composition of the fauna and flora. This site includes caves that are important hibernation sites for bat species.

Only natural caves have been selected. Sites that are entirely artificial in origin, e.g. mines and tunnels, are excluded from the Annex I definition, even though in some cases the species present may be similar to those of more natural sites.

The St Dunstan's Well catchment caves contain the most abundant and best preserved calcite deposits in the Mendip karst. They contain an abundance and variety of cave formations (speleothems) on a scale unmatched elsewhere in Mendip and equalled by only a few other sites in Britain.

Qualifying Species:

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

The greater horseshoe bat *Rhinolophus ferrumequinum* is one of the largest bats in the UK. During the summer, they form maternity colonies, generally in large old buildings, and forage in pasture, edges of mixed deciduous woodland and hedgerows. Such mixed land-use, especially on south-facing slopes, favours the beetles, moths and other insects on which the bats feed. In winter they 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. Summer and winter roosts are usually less than 20-30 km apart. The bats are vulnerable to the loss of insect food supplies due to insecticide use, changing farming practices and the loss of broad-leaved tree-cover, and to the loss or disturbance of underground roost sites.

Mells Valley was selected on the basis of the size of an exceptional breeding population of greater horseshoe bat (approximately 12% of the UK population) that it formerly supported. Unfortunately a fire has rendered the site unsuitable and the colony has moved to a nearby location outside of the SAC. Greater horseshoe bats hibernate in the site in the cave systems at St Dunstan's Well Catchment and Vallis Vale.

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 bat.

Site-specific seasonality of 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													
Greater horseshoe bat	Hibernation													

Presence of qualifying SAC features within component SSSIs

SSSI	SAC feature		
	H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)	H8310 Caves not open to the public	S1304 Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>
Old Ironstone Works, Mells			X
St Dunstan's Well Catchment	X	X	X
Vallis Vale		X	X

Table 1: Supplementary Advice for Qualifying Features: H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*); Dry grasslands and scrublands on chalk or limestone

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Restore the total extent of the feature to approximately 1 ha.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>The baseline extent of H6210 grassland is not fully understood but is estimated at 0.5 – 1 ha.</p> <p>Condition Assessments indicate an ongoing decline in the extent of this feature from undergrazing leading to scrub encroachment and the dominance of coarse grasses.</p>	<p>JNCC, 2016. <i>Natura 2000 – Standard Data Form – Mells Valley</i>. Available at: http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0012658.pdf</p> <p>NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i>. Available from Natural England on request</p> <p>Condition Assessments of St Dunstan's Well Catchment SSSI, available from https://designatedsites.naturalengland.org.uk/</p>
Extent and distribution of the feature	Spatial distribution of the feature within the site	Restore the distribution and configuration of the feature.	<p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability</p>	<p>NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i>. Available from Natural England on request</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p> <p>Target set to Restore because undergrazing is leading to scrub encroachment and the dominance of coarse grasses.</p>	
Structure and function (including its typical species)	Adaptation and resilience	Restore the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	<p>This recognises the increasing likelihood of natural 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 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.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats/supporting habitats. This means that this site is considered to be vulnerable overall but moderately so. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species</p>	<p>Condition assessments of St Dunstan's Well Catchment SSSI, available from https://designatedsites.naturalengland.org.uk/</p> <p>NATURAL ENGLAND. 2015. <i>Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England</i>. Available at: http://publications.naturalengland.org.uk/publication/4954594591375360</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>Target set to Restore because the resilience of the site is severely degraded by scrub encroachment and the dominance of coarse grasses.</p>	
Structure and function (including its typical species)	Functional connectivity with wider landscape	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.	
Structure and function (including its typical species)	Soils, substrate and nutrient cycling	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature.	British Geological Society UK Soil Observatory: http://mapapps2.bgs.ac.uk/ukso/home.html
Structure and function (including its typical species)	Key structural, influential and/or distinctive	Restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature:	Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;	NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i> . Available from Natural England on request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	species	The constant and preferential plants of the CG2 - <i>Festuca ovina</i> - <i>Avenula pratensis</i> grassland which forms a key component of the H6210 feature.	<ul style="list-style-type: none"> • Structural species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p> <p>Target set to Restore because the H6210 grassland is becoming dominated by coarse grasses.</p>	
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type:</p> <p>CG2 - <i>Festuca ovina</i> - <i>Avenula pratensis</i> grassland</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of</p>	NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i> . Available from Natural England on request

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the SAC feature, at appropriate levels (recognising natural fluctuations).	
Structure and function (including its typical species)	Vegetation community transitions	Restore the pattern of natural vegetation zonations/transitions	<p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.</p> <p>Target set to Restore because the encroachment of scrub and coarse grasses have disrupted the pattern of zonations/transitions.</p>	
Structure and function (including its typical species)	Vegetation: proportion of herbs (including <i>Carex</i> spp.)	Restore the proportion of herbaceous species within the range 40%-90%	A high cover of characteristic herbs, including sedges (<i>Carex</i> species) is typical of the structure of this habitat type.	NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i> . Available from Natural England on request
Structure and function (including its typical species)	Vegetation: undesirable species	Maintain the frequency/cover of the following undesirable species to within acceptable levels (No species/taxa more than occasional throughout the sward or singly or together more than 5% cover) and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread.	<p>There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as <i>Cotoneaster</i> spp., or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature.</p> <p>Undesirable species include: Creeping thistle <i>Cirsium arvense</i>, Spear thistle <i>Cirsium vulgare</i>, Curled-leaved dock <i>Rumex crispus</i>, Broad-leaved dock <i>Rumex obtusifolius</i>, Common ragwort <i>Senecio jacobaea</i>, Common nettle <i>Urtica dioica</i></p>	NATURAL ENGLAND, 2014. <i>St Dunstan's Well Catchment SSSI Favourable Condition Table (FCT)</i> . Available from Natural England on request
Supporting processes (on which the feature relies)	Air quality	Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air	This habitat type 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 and causing the loss of sensitive typical species	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>Pollution Information System (www.apis.ac.uk).</p>	<p>associated with it.</p> <p>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 (NO_x) 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.</p> <p>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.</p> <p>Target set to Restore because current levels of nitrogen deposition (APIS accessed on 14/12/2018) exceed the critical load for H6210 grassland.</p>	<p>(www.apis.ac.uk).</p> <p>NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural England. Available at: http://publications.naturalengland.org.uk/publication/4665580590202880</p>
Supporting processes (on which the feature relies)	Conservation measures	<p>Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Restore the structure, functions and supporting processes associated with the feature</p>	<p>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.</p> <p>Target set to Restore because management is required to reduce the extent of scrub and the dominance of coarse grasses.</p>	<p>ENGLISH NATURE, 2005. <i>A statement of English Nature's views about the management of St. Dunstan's Well Catchment Site of Special Scientific Interest (SSSI).</i> Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1000377.pdf</p>

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
<p>Version Control Advice last updated: N/A</p>			
<p>Variations from national feature-framework of integrity-guidance: 'Supporting off-site habitat' attribute removed because there is not considered to be relevant.</p>			

Table 2: Supplementary Advice for Qualifying Features: H8310. Caves not open to the public

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Maintain the total extent of the feature.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features.</p> <p>Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>Approximately 4 miles of passage have been mapped, but some passages have not been mapped yet.</p>	<p>NATURE CONSERVANCE COUNCIL, 1986. St. Dunstan's Well Catchment SSSI citation. Available at: https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1000377.pdf</p> <p>WALTHAM, A.C., SIMMS, M.J., FARRANT, A.R. & GOLDIE, H.S. 1997. <i>Karst and Caves of Great Britain</i>. Geological Conservation Review Series, No. 12. London. Chapman and Hall. 358 pp.</p>
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature:</p> <p>Diverse cave fauna assemblage</p>	<p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;</p> <ul style="list-style-type: none"> • Structural species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, 	<p><i>The Caves of Fairy Cave Quarry, the Case for Conservation, Appendix 3: The Biological Significance of the Caves of Fairy Cave Quarry</i>. Speleological Society, STNC, 1981, pp. 32-35</p> <p>SMITH, D.I. & DREW, D.P. (Eds.). 1975. <i>Limestones and Caves of the Mendip Hills</i>, Newton Abbott: David & Charles, ISBN 071536572X</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>predators or other species with a significant functional role linked to the habitat)</p> <ul style="list-style-type: none"> • Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p> <p>Cavernicoles or cave-dwelling species associated with this Annex I habitat can include bacteria, algae, (often as key biofilms) fungi and various groups of invertebrates (e.g. insects, spiders and crustaceans). The list of typical species given for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available or if our understanding of the term 'typical species' changes.</p> <p>A diverse cave fauna assemblage has been recorded, including: <i>Polymicrodon polydesmoides</i>, <i>Scutigerella causeyae</i>, <i>Neanura muscorum</i>, <i>Anurida granaria</i>, <i>Onychirus fimetarius</i>, <i>Folsomia candida</i>, <i>Heteromurus nitidus</i>, <i>Arrhopalites caecus</i>, <i>Halesus</i> sp., <i>Trechoblemus micros</i>, <i>Ancyrophorus aureus</i>, <i>Philonthus</i> sp., <i>Culex pipiens</i>, <i>Leria serrata</i>, <i>Limosina racovitzae</i>, <i>Crumomyia nigra</i>, <i>Exephanes ischioxanthus</i>, <i>Androniscus dentiger</i>, <i>Eugamasus lericatus</i>, <i>Rhagidia spelea</i>, <i>Rhagidia gias</i>, <i>Meta merianae</i>, <i>Meta menardi</i>, <i>Porrhomma convexum</i>, Actinomycetes fungi.</p>	
Structure and function (including its	Naturalness	Maintain the natural structure of the cave feature, retain and prevent damage to cave	This should be interpreted as referring to natural caves which are not routinely exploited for tourism, and which host specialist or endemic cave species or features.	WALTHAM, A.C., SIMMS, M.J., FARRANT, A.R. & GOLDIE, H.S. 1997. <i>Karst and Caves of Great</i>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		features, and ensure the caves and their features can continue to evolve naturally	The St Dunstan's Well Catchment set of caves includes nationally significant examples of speleothems	<i>Britain</i> . Geological Conservation Review Series, No. 12. London. Chapman and Hall. 358 pp.
Structure and function (including its typical species)	Sedimentation	Natural cave sediments are undisturbed and Restored to an unmodified form, and increased sediment loadings from alterations of inflowing watercourses are avoided.	<p>Whilst some fine sediments exist and are actively used by cave faunas, excessive and muddy waters seem to deplete populations.</p> <p>Target set to Restore because blockages in the system have resulted in flooding of caves that do not normally hold water, which has damaged cave features through erosion/abrasion and deposition of sediments. Some sediments of value to research exist and should be preserved. Some disturbance of natural sedimentation occurs through caving activity, which is in part necessary to monitor and report on condition.</p>	
Supporting processes (on which the feature relies)	Cave water quality	Avoid or reduce any metal-ion contamination into interstitial and cave waters	Though little data exists, there is some evidence which points to major impacts on the characteristic subterranean fauna from metal contamination. Impacts on the biofilms may be significant.	
Supporting processes (on which the feature relies)	Hydrology	At a site, unit and/or catchment level (as necessary), Restore natural hydrological processes to provide the conditions necessary to sustain any relevant hydrological features within the site and also prevent damage to other features.	<p>Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. Important to maintain natural geomorphological processes and to provide supporting habitat for cave flora and fauna; use of groundwater monitoring may be used as a partial proxy for cave water quality.</p> <p>Target set to Restore because blockages in the system have resulted in flooding of caves that do not normally hold water, which has damaged cave features through erosion/abrasion and deposition of sediments.</p>	Condition assessment of St Dunstan's Well Catchment SSSI, available from https://designatedsites.naturalengland.org.uk/

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature relies)	Illumination	Maintain naturally-occurring light levels within the cave body, whilst minimising any artificial light.	Caves lack natural illumination, and therefore support species which have evolved or are adapted to living in the dark. Microclimatic conditions vary widely within and between caves, and this determines the composition of the fauna and flora at each site. Disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology.	
Supporting processes (on which the feature relies)	Water quality	Where the feature is dependent on surface water and/or groundwater, Maintain water quality and quantity to a standard which provides the necessary conditions to support the feature.	<p>For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type.</p> <p>Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. Although nutrients are critical to the fauna associated with this feature as effectively the only decent N source, high initial inputs deplete the fauna, and whilst it subsequently recovers (and thrives) it raises the possibility of seriously damaging rare genotype populations in the first nutrient wave.</p> <p>Target set to Restore because there are areas of low water quality in the catchment. Poor water quality is likely to damage the diverse cave assemblage.</p>	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: 'Woody debris' attribute removed as there is no known importance related to this and what debris is transported during high rainfall events into the cave system is likely to be a potential source of damage either directly or in causing blockages.				

Table 3: Supplementary Advice for Qualifying Features: S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	Population abundance - hibernation site	<p>Restore the abundance of the hibernating population.</p> <p>Avoid deterioration from its current level as indicated by the latest mean peak count or equivalent.</p>	<p>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 (generally at least 10 years). 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.</p> <p>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.</p> <p>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</p>	<p>BILLINGTON, G. 2000. <i>English Nature research report 403: Radio-tracking study of Greater horseshoe bats at Mells, near Frome, Somerset</i>, English Nature</p> <p>Natural England hold some monitoring data. These data are sensitive. Any requirements for data should be discussed with Natural England.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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.</p> <p>Target set to Restore because the Old Ironstone Works site was damaged by a fire and bats have moved to a nearby location outside of the SAC.</p> <p>70 Greater horseshoe bat were recorded within the Fairy Cave system at St Dunstan's Well Catchment SSSI in February 2010.</p> <p>Vallis Vale is only known to support very low numbers of hibernating/day roosting bats.</p>	
Population (of the feature)	Population abundance - maternity colony	<p>Restore the abundance of the breeding population.</p> <p>Avoid deterioration from its current level as indicated by the latest mean peak count or equivalent.</p>	<p>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 (generally at least 10 years). 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.</p> <p>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</p>	<p>BILLINGTON, G. 2000. <i>English Nature research report 403: Radio-tracking study of Greater horseshoe bats at Mells, near Frome, Somerset</i>, English Nature</p> <p>Natural England hold some monitoring data. These data are sensitive. Any requirements for data should be discussed with Natural England.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)																
			<p>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.</p> <p>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 whether the figures stated are the best available.</p> <p>Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC. Counts after 1988 in the table below refer to the new colony location, outside of the SAC.</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>June 1986</td> <td>130 (anecdotal roost)</td> </tr> <tr> <td>June 1986</td> <td>200 (anecdotal emergence)</td> </tr> <tr> <td>1987</td> <td>150 (estimate)</td> </tr> <tr> <td>25/07/1989</td> <td>240 (estimate)</td> </tr> <tr> <td>March 1995</td> <td>20</td> </tr> <tr> <td>04/06/2000</td> <td>120</td> </tr> <tr> <td>17/06/2000</td> <td>68</td> </tr> </tbody> </table>	Date	Count	June 1986	130 (anecdotal roost)	June 1986	200 (anecdotal emergence)	1987	150 (estimate)	25/07/1989	240 (estimate)	March 1995	20	04/06/2000	120	17/06/2000	68	
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Supporting habitat: extent and distribution	Extent of supporting habitat	Restore the total extent of the habitats which support the feature to 28.22 ha	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,	Natural England component SSSI Favourable Condition Tables (FCT), available from Natural England on request Condition assessment of component SSSIs, available from																

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>and may be subject to periodic review in light of improvements in data.</p> <p>Target set to the area of the whole site because this includes a range of caves and built features that provide suitable roosting habitat.</p> <p>Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC.</p>	<p>https://designatedsites.naturalengland.org.uk/</p> <p>NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural England. Available at: http://publications.naturalengland.org.uk/publication/4665580590202880</p> <p>BURROWS, L. 2016. <i>North Somerset Council Horseshoe Bat Mapping Project.</i></p> <p>DUVERGE, P. L. 1996. <i>Foraging activity, habitat use, development of juveniles and diet of the Greater Horseshoe bat in South West England.</i></p> <p>BILLINGTON, G. 2000. <i>English Nature research report 403: Radio-tracking study of Greater horseshoe bats at Mells, near Frome, Somerset,</i> English Nature</p>
Supporting habitat: extent and distribution	Distribution of supporting habitat	Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	See sources in 'Extent of supporting habitat' attribute

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC.	
Supporting habitat: structure/function	External condition of building - maternity colony	Restore the structural integrity and weatherproofing of roof, walls and rainwater goods, with no significant shading of the main roost area by trees/vegetation or man-made structures.	Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost. Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC.	Condition assessment of component Old Ironstone Works, Mells SSSI, available from https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural England. Available at: http://publications.naturalengland.org.uk/publication/4665580590202880
Supporting habitat: structure/function	External condition of built structures - hibernation site	Maintain the structural integrity and weatherproofing of relevant structures.	Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roosts. Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC. Some parts of the Old Ironstone Works SSSI site may still be used as day roosts and/or hibernacula. Further investigation is needed but the precautionary approach should be applied to potentially suitable features.	
Supporting habitat: structure/function	External condition of underground site - hibernation	Maintain the structural integrity of the roost space, with no recent collapses/falls or signs of geological instability.	Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost. Several caves, tunnels and other underground features are used by the various colonies.	Condition assessment of component SSSIs, available from https://designatedsites.naturalengland.org.uk/ NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				England. Available at: http://publications.naturalengland.org.uk/publication/4665580590202880
Supporting habitat: structure/function	Supporting off-site habitat (flightlines)	Maintain the presence, structure and quality of any linear landscape features which function as flightlines. Flightlines should remain unlit, functioning as dark corridors.	<p>Non-breeding greater horseshoe adults can forage up to 4km from roost sites. For breeding females and juveniles, the distance tends to be roughly half this i.e. 2km (English Nature, 2003). 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. (English Nature, 2003). Flightlines will extend beyond the designated site boundary into the wider local landscape.</p> <p>Flightlines should remain unlit, functioning as dark corridors (Stone <i>et al.</i> 2009). They will extend beyond the designated site boundary into the wider local landscape and are especially important as a link between summer and winter roost sites.</p> <p>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. Building upon this Mendip District Council has published a guidance document for developers who are planning to build near to the SAC. This identifies Bat Consultation Zones around the SAC and bands within these zones reflect the likely importance of the habitat for bats and proximity to the maternity and other roost sites. Any development activity taking place within these zones has the potential to impact on the SAC. Special consideration is also to be given to habitat within the 1km Juvenile Sustenance Zone which is vitally important during spring and summer months for pregnant and lactating females, as well as their young, with bats spending about half their peak activity time within this zone.</p> <p>It has been concluded that the conservation of photophobic bat species such as the Greater Horseshoe bat should concentrate on both the improvement of foraging/commuting habitats as</p>	<p>BAT CONSERVATION TRUST, 2016, Core Sustenance Zones: Determining zone size. Bat Conservation Trust. Available at: http://www.bats.org.uk/data/files/Core_Sustenance_Zones_Explained_-_04.02.16.pdf</p> <p>BILLINGTON, G. 2000. <i>English Nature research report 403: Radio-tracking study of Greater horseshoe bats at Mells, near Frome, Somerset</i>, English Nature</p> <p>BURROWS, L. 2019. <i>Mells Valley SAC & North Somerset and Mendip Bats SAC Guidance on Development</i>. Mendip District Council</p> <p>FROIDEVAUX, S. P., BOUGHEY, K. L., BARLOW, K. E. & JONES, G. 2017. <i>Factors driving population recovery of the greater horseshoe bat (Rhinolophus ferrumequinum) in the UK: implications for conservation</i>. <i>Biodiversity and Conservation</i>, 26: pp 1601–1621</p> <p>STONE, E.L., JONES, G. & HARRIS, S. 2009. <i>Street Lighting Disturbs Commuting Bats</i>. <i>Current Biology</i> 19: pp</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>well as the creation of dark areas.</p> <p>Connectivity between sites is important as the bats navigate using linear features such as hedgelines, walls and ditches. They use many caves within Somerset and migrate quite large distances including flying to and from Gloucestershire and Devon. It was found that the Greater Horseshoe Bats used 76 different sites on Mendip in one year.</p> <p>Mapping has been undertaken to find where the distribution of ecological networks are fragmented to enable bodies to find funding to work on linking up habitats such as species rich grassland and woodland.</p> <p>Greater Horseshoe bats are known to shift their foraging sites over several nights so that any radio tracking survey at one point in time is not necessarily representative of the bats' foraging range. A circular radius is therefore too simplistic to be very accurate but gives an indication of their potential habitat.</p>	<p>1123-1127.</p> <p>See aerial photography for landscape features</p>
Supporting habitat: structure/function	Supporting off-site habitat (foraging areas)	Maintain any core areas of feeding habitat outside of the SAC boundary that are critical to greater horseshoe bats during their breeding and hibernation periods	<p>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. Key feeding areas around a roost, and the commuting routes (or flight-lines) between them, will be an important element of sustaining the SAC population.</p> <p>Flightlines will extend beyond the designated site boundary into the wider local landscape.</p> <p>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').</p> <p>Foraging habitat near to maternity roosts is largely not included within the area of the SAC designation. The supporting habitats of woodland, fields and hedgerows and additional non-designated roosts all contribute to maintaining greater</p>	See 'Supporting off-site habitat (flightlines)' attribute, above.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>horseshoe bat population. It is generally agreed that the juvenile sustenance zones are in the 1-2 km surrounding maternity roosts and are especially important in providing foraging habitats close to the roost for the adults. It is especially important that grazing of this area particularly with cattle continues to provide invertebrates for the bats to eat.</p> <p>Mendip District Council has published a guidance document for developers who are planning to build near to the SAC. This identifies Bat Consultation Zones around the SAC and bands within these zones reflect the likely importance of the habitat for bats and proximity to the maternity and other roost sites. Any development activity taking place within these zones has the potential to impact on the SAC. Special consideration is also to be given to habitat within the 1km Juvenile Sustenance Zone which is vitally important during spring and summer months for pregnant and lactating females, as well as their young, with bats spending about half their peak activity time within this zone.</p> <p>Greater horseshoe bats are known to shift their foraging sites over several nights so that any radio tracking survey at one point in time is not necessarily representative of the bats' foraging range. A circular radius is therefore too simplistic to be very accurate but gives an indication of their potential habitat.</p>	
Supporting habitat: structure/function	Internal condition of built structures - maternity and hibernation	Restore appropriate light levels, humidity, temperature and ventilation.	<p>There is currently insufficient information available in the academic press to provide specific targets on humidity, temperature, light levels and ventilation preferred by the species during the hibernation and maternity period.</p> <p>Changes to light levels, through-draught, ventilation, noise levels, vibration and water penetration may adversely alter the necessary roost conditions.</p> <p>Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost.</p>	<p>Condition assessment of component Old Ironstone Works, Mells SSSI, available from https://designatedsites.naturalengland.org.uk/</p> <p>NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural England. Available at: http://publications.naturalengland.org.uk/publication/466558059020</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC.	2880
Supporting habitat: structure/function	Roost access	Maintain the number of access points to the roosts at an optimal size and in an unlit and unobstructed state, with surrounding vegetation providing sheltered flyways without obstructing access	<p>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.</p> <p>Normal minimum dimensions for greater horseshoe bat access points: 400 x 300mm</p>	BILLINGTON, G. 2000. <i>English Nature research report 403: Radio-tracking study of Greater horseshoe bats at Mells, near Frome, Somerset</i> , English Nature
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	<p>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 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.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats/supporting habitats. This means that this site is considered to be vulnerable overall but moderately so. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many</p>	<p>LUNDY, M.G. 2013. <i>The Impact and Implications of Climate Change for Bats</i>. Mammal Review 43: pp 171-182.</p> <p>NATURAL ENGLAND. 2015. <i>Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England</i>. Available at: http://publications.naturalengland.org.uk/publication/4954594591375360</p> <p>FROIDEVAUX, S. P., BOUGHEY, K. L., BARLOW, K. E. & JONES, G. 2017. <i>Factors driving population recovery of the greater horseshoe bat (Rhinolophus ferrumequinum) in the UK: implications for conservation</i>. Biodiversity and Conservation, 26: pp 1601–1621</p> <p>VOIGT, C.C., SCHNEEBERGER,</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>The Greater Horseshoe bat in England is at the northern edge of its European range. With climate change it is expected that their range boundary may move further north. It has been shown that the recent population expansion of the Greater Horseshoe bat has been driven by climate change rather than any conservation or habitat management (Froidevaux <i>et al.</i> 2017).</p> <p>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 <i>et al.</i> 2011).</p> <p>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 flightlines 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.</p> <p>Target set to Restore because the Old Ironstone Works site was damaged by a fire (in 1988) and bats have moved to a nearby location outside of the SAC.</p>	<p>K., VOIGT-HEUCKE, S. & LEWANZIK, D. 2011. <i>Rain Increases the Energy Cost of Bat Flight</i>. <i>Biology Letters</i> 7: p793-795.</p>
Supporting processes (on which the feature and/or its supporting habitat relies)	Air quality	<p>Restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).</p>	<p>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 reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below</p>	<p>More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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 (NO_x) 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.</p> <p>Target set to Restore because current levels of nitrogen deposition (APIS accessed on 19/12/2018) are exceeding the critical loads for the woodland supporting habitat of greater horseshoe bat.</p>	
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.	Natural England component SSSI Views About Management (VAM), available from https://designatedsites.naturalengland.org.uk/
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	Site should be secured against unauthorised access, which can result in disturbance to bats at critical times of year and which can affect their population viability and use of the site. Grilles on site access points should be maintained where present.	Natural England component SSSI Favourable Condition Tables (FCT), available from Natural England on request NATURAL ENGLAND, 2015. <i>Site Improvement Plan for Mells Valley SAC. Version 1.0.</i> Natural

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				England. Available at: http://publications.naturalengland.org.uk/publication/4665580590202880
Version Control Advice last updated: 20 March 2019 : Following stakeholder feedback. Additional information on planning guidance added to ' Supporting off-site habitat (flightlines) ' and ' Supporting off-site habitat (foraging areas) ' attributes.				
Variations from national feature-framework of integrity-guidance: The following attributes have been removed on the grounds that only highly significant incidents are likely to impact the feature: ' Soils, substrate and nutrient cycling '; ' Water quality/quantity '				