



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

Singleton and Cocking Tunnels Special Area of Conservation (SAC)
Site Code: UK0030337



Barbastelle bat © Chris Damant

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Singleton and Cocking Tunnels SAC.

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

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 | Singleton and Cocking Tunnels Special Area of Conservation (SAC) |
| Location | West Sussex |
| Site 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 | 2.45 ha |
| 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) | Singleton and Cocking Tunnels The SSSI and SAC boundaries are co-incident |
| Relationship with other European or International Site designations | Ebernoe Common SAC (13 km north-east) supports maternity colonies of barbastelle <i>Barbastella barbastellus</i> and Bechstein's bats <i>Myotis bechsteinii</i> and The Mens SAC (15 km north-east) supports maternity colonies of barbastelle. |

Site background and geography

Singleton and Cocking Tunnels are two disused brick railway tunnels located in rural Sussex, just over 2 miles south of Midhurst. They once formed part of the Chichester to Midhurst railway line. The majority of the tunnels lie within the South Downs National Character Area ([NCA 125](#)) but the northern entrance of Cocking tunnel is within the Wealden Greensand National Character Area ([NCA 120](#)).

The disused tunnels are one of the most important sites for hibernating bats in south-east England. In total eight species have occurred in the tunnels: In addition to barbastelle and Bechstein's bat the most regular species are Natterer's bat *Myotis nattereri*, Daubenton's bat *Myotis daubentoni*, Brown long-eared bat *Plecotus auritus* and Brandt's *Myotis brandti*/Whiskered bats *Myotis mystacinus*.

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:

N/A

Qualifying Species:

- **S1308 Barbastelle *Barbastella barbastellus***

The barbastelle is a medium-sized bat unlike any other in Europe. The fur is almost black, usually with very pale or golden brown tips to the hairs. The ears are very broad with the inner edges joined together across the forehead.

Barbastelle ecology is relatively poorly-known. In Europe it is believed to be mainly an upland and forest species; in the UK it seems to prefer wooded river valleys. The species forages in mixed habitats, usually over water. Barbastelles appear to select cracks and crevices in wood for breeding, mostly in old or damaged trees, but cracks and crevices in the timbers of old buildings may also be used. Maternity colonies may move between suitable crevices within a small area, such as a piece of woodland or a complex of buildings. Caves and underground structures may be used for hibernation. The species is very sensitive to disturbance, together with the loss of roost-sites and food resources.

The barbastelle is one of the UK's rarest mammals. Very few breeding sites are currently known in the UK and it is important that surrounding environments of these and winter hibernation sites are maintained. It is thought that they prefer pastoral landscapes with deciduous woodland, wet meadows and water bodies, such as woodland streams and rivers. The great majority of other records come from caves or abandoned mines, which are important hibernation sites for a range of bat species. The barbastelle is distributed across southern England and across Wales but is likely to have been significantly under-recorded within its range. Individual bats are sometimes discovered in buildings during summer.

The barbastelle is distributed throughout Europe, except Iceland, Northern Ireland, Scotland, most of Scandinavia, Estonia and much of southern Europe. The highest population density is probably in central Europe. It is one of the rarest bats in western Europe, and is regarded as endangered in several countries. A population decrease has been reported over most of its European range.

- **S1323 Bechstein's bat *Myotis bechsteinii***

Bechstein's bat is a medium-sized species, with very long ears and a long, pointed, bare, pink face. It has shaggy light-to reddish-brown fur on its back and contrasting greyish white-tipped fur on its underside. The species is closely associated with mature deciduous woodland and appears to select old woodpecker holes or rot holes in trees for breeding. It also occurs in coniferous woodland in some areas. Maternity colonies may move between suitable crevices within a small area, such as a piece of woodland. It is believed to hibernate in hollow trees and sometimes in underground localities.

Bechstein's bats tend to forage in woodland within a kilometre or two of their roost site, generally high up in the canopy although they are occasionally observed flying nearer the ground, perhaps when drinking, commuting or socialising.

It is one of the UK's rarest mammals, recorded from only a small number of sites in southern England and Wales. Very few maternity roosts are currently known, one of which is in a bat-box. The great majority of other records come from caves or abandoned mines, which are important hibernation sites for a range of bat species.

It is also one of the rarest bats in western Europe, and is regarded as endangered in several countries. A population decrease has been reported over most of its European range. The species occurs from the Iberian peninsula east to the Ukraine and Moldova. Local populations in southern England, Wales, southern Sweden and Bornholm mark the northern border of the range.

Site-specific seasonality of SAC feature

The table below highlights in grey those months in which significant numbers of each mobile 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.

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 | Stage | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Barbastelle | Hibernation | | | | | | | | | | | | |
| Bechstein`s bat | Hibernation | | | | | | | | | | | | |

Table 1: Supplementary Advice for Qualifying Features: S1308. *Barbastella barbastellus*; Barbastelle bat

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|------------------------------------|--|--|---|---|
| Population (of the feature) | Population abundance - hibernation site | Maintain the presence of hibernating barbastelle at the site | <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 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</p> | <p>This attribute will be periodically monitored as part of Natural England's site condition assessments</p> <p>Hibernation counts are undertaken by Sussex Bat group every year as part of the National Bat Monitoring Programme</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|--|---|---|--|---|
| | | | stated are the best available. | |
| Supporting habitat: extent and distribution | Distribution of supporting habitat | Maintain 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 | Barbastelle use both Singleton and Cocking tunnels. See also comments in 'Extent of supporting habitat' above. | National Bat Monitoring Programme (BCT) – State of UK Bats 2017 |
| Supporting habitat: extent and distribution | Extent of supporting habitat | Maintain the total extent of the habitats which support the S1308 barbastelle feature at 2.45 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, and may be subject to periodic review in light of improvements in data. The SAC includes two broad habitat types: disused railway tunnels and woodland. Both railway tunnels are approximately 650 m long. All of the tunnel entrances are under woodland cover. The SAC includes approximately 1 ha of woodland, spread across the four tunnel entrances. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/ function | External condition of building - hibernation site | Maintain the structural integrity and weatherproofing of the tunnels and their entrances, | Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/ function | Flightlines from roost into surrounding habitat and foraging areas | Restore the presence, structure and quality of any linear landscape features which function as flightlines. Flightlines should remain unlit, functioning as dark corridors. | Generally forages within woodland canopy and margins, though will feed in more open areas i.e. orchards, suburban parks. Commutes along linear landscape features such as woodland edge, hedgerows etc, though will cross extensive open areas (i.e. arable fields) to reach foraging grounds and may feed to a certain extent within these more open areas. | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|--|--|---|---|--|
| | | | <p>Typical flightlines used by these species include linear hedgerows, waterways, blocks of scrub, wooded rides and tracks. Flightlines will extend beyond the designated site boundary into the wider local landscape.</p> <p>Target set at Restore because some commuting routes are fragmented, for example by breaks in hedgerows.</p> | |
| Supporting habitat: structure/function | Supporting off-site habitat (foraging areas) | Restore any core areas of feeding habitat outside of the SAC boundary that are critical to Barbastelles during their hibernation period | <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>Radio-tracking and other surveys have demonstrated significant use of the wider countryside around the SAC for foraging and commuting during the breeding season. There are also likely to be roost sites outside of the SAC woodland, particularly for male barbastelle. In addition to the SACs containing their roosting sites the bats also require access to habitats outside the boundary of the SACs. This habitat is integral to supporting bats associated with the SACs and is often referred to as functionally-linked habitat. Such functionally linked habitat includes the following:</p> <ul style="list-style-type: none"> • Flightlines – these are key commuting routes from roosts to foraging (or feeding) areas used by the bats. The barbastelle flightlines around Ebernoe Common and The Mens have been investigated through survey and are shown in Map 1. The routes to Singleton and Cocking Tunnels are less well known. • Foraging areas – these are the areas of land where bats feed. Barbastelle bats can forage 10-15 kilometres from the roosting sites and they prefer wet meadows and riparian habitats. Bechstein's tend to forage in and around the woodland where they roost with limited outward travel. | <p>South Downs National Park & Natural England (2015) Sussex Bat Special Area of Conservation Planning and Landscape Scale Enhancement Protocol</p> <p>https://www.southdowns.gov.uk/wp-content/uploads/2018/04/TLL-15-Draft-Sussex-Bat-SAC-Protocol.pdf</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | The land within the West Weald which encompasses Ebernoe Common SAC; The Mens SAC and Singleton & Cocking Tunnels SAC should be regarded as a single landscape utilised by bats from all three SACs. | |
| Supporting habitat: structure/function | Internal condition of building - hibernation | Maintain appropriate light levels, humidity, temperature and ventilation. | The requirements of barbastelle vary throughout the hibernation period and they will shift their roost sites accordingly. The fact that there are two tunnels available for hibernation at this location means that they can be managed to provide a range of microclimates and the bats can shift between the two tunnels during the period of hibernation. 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 period. | This attribute will be periodically monitored as part of Natural England's site condition assessments Downs <i>et al.</i> (2003) |
| 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 state, with surrounding vegetation providing sheltered flyways without obstructing accesses | 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. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/function | 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, within typical values for the supporting habitat | Soil supports basic ecosystem function and is a vital part of the natural environment. 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 the supporting habitat of this Annex II feature. | |
| Supporting processes (on which the feature and/or its supporting | 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 | 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 | Natural England (2015a) Sherwin <i>et al.</i> (2013) Voigt <i>et al.</i> (2011) |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|--------------------|---|---|---|
| habitat relies) | | | <p>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 (2015a) as being low, taking into account the sensitivity, fragmentation, topography and management of its supporting habitats. This means that this site is 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 many cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>Target set to Restore because some commuting routes are fragmented, for example by breaks in hedgerows.</p> | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Air quality | 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). | 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 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 (NH ₃), oxides of nitrogen (NO _x) and sulphur dioxide (SO ₂), 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 | 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). |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|------------------------------|--|---|---|
| | | | <p>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 nitrogen deposition currently exceeds the critical load for broad-leaved woodland which is an important supporting habitat for barbastelle at the site.</p> | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Conservation measures | 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 and/or its supporting habitats. | <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>Management measures are required both within and outside the SAC boundary.</p> <p>The tunnels require occasional repairs to maintain their structural integrity (and the specific environmental conditions that they provide). In addition, the grills/gates which prevent unauthorised access to the tunnels need to be maintained.</p> <p>Removal of vegetation is sometimes required around the tunnel entrances to prevent access becoming obstructed. This needs to be done sensitively to retain sheltered flyways.</p> <p>Disused railway tunnels to the north and south of the site support significant numbers of hibernating bats and together with Singleton and Cocking tunnels are likely to form part of a suite of hibernacula used by bats in the area. In addition, the surrounding area is used for foraging during the hibernation</p> | <p>This attribute will be periodically monitored as part of Natural England's site condition assessments</p> <p>English Nature (2004)</p> <p>Greenaway (2004)</p> <p>Greenaway (2008)</p> <p>Greenaway & Hill (2004)</p> <p>Natural England (2015b)</p> <p>Stone <i>et al.</i> (2009)</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|--|---|--|---|
| | | | <p>period (barbastelle are more active during the hibernation period than many bat species) and swarming in the autumn (including directly outside the tunnels). A range of management measures are required in the wider countryside to maintain and restore commuting routes and foraging areas, such as hedgerow planting and low intensity pasture and hedgerow management.</p> <p>Target set to Restore because commuting routes between sites are fragmented, for example by breaks in hedgerows.</p> | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Disturbance from human activity | Control and minimise human 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. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Water quantity/ quality | Where the feature or its supporting habitat 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. 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 to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.</p> <p>The hibernation site itself is not dependent on surface water or groundwater.</p> <p>However, important barbastelle foraging areas are often associated with wetland features, particularly streams and rivers. Barbastelle are more active in the winter than many bat</p> | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|--|--|---------|---|--|
| | | | species and so foraging habitat is required to support the hibernation site. The structure and diversity of floodplain habitats, and consequently their invertebrate (prey) populations, depend on good water quality. A number of aquatic invertebrates also depend on good water quality. | |
| Version Control | | | | |
| Advice last updated: N/A | | | | |
| Variations from national feature-framework of integrity-guidance: N/A | | | | |

Table 2: Supplementary Advice for Qualifying Features: S1323. *Myotis bechsteinii*; Bechstein's bat

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|------------------------------------|--|--|---|---|
| Population (of the feature) | Population abundance - hibernation site | Maintain the presence of hibernating Bechstein's bats at the site. | <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 natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as</p> | <p>This attribute will be periodically monitored as part of Natural England's site condition assessments</p> <p>Hibernation counts are undertaken by Sussex Bat group every year as part of the National Bat Monitoring Programme</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|--|--|---|---|---|
| | | | possible, local Natural England staff can advise that the figures stated are the best available. | |
| Supporting habitat: extent and distribution | Distribution of supporting habitat | Maintain 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 | <p>Bechstein's bats use both tunnels, but are recorded more regularly in Singleton tunnel.</p> <p>See also comments in 'Extent of supporting habitat' above.</p> | Hibernation counts are undertaken by Sussex Bat group every year as part of the National Bat Monitoring Programme |
| Supporting habitat: extent and distribution | Extent of supporting habitat | Maintain the total extent of the habitats which support the feature at 2.45 ha | <p>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.</p> <p>The SAC includes two broad habitat types: disused railway tunnels and woodland.</p> <p>Both railway tunnels are approximately 650 m long.</p> <p>All of the tunnel entrances are under woodland cover. The SAC includes approximately 1 ha of woodland, spread across the four tunnel entrances.</p> | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/function | External condition of building - hibernation site | Maintain the structural integrity and weatherproofing of the tunnels and their entrances | Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/function | Flightlines from roost into surrounding habitat and | Restore the presence, structure and quality of any linear landscape features which function as flightlines. Flightlines should remain unlit, functioning | <p>Generally forages within deciduous woodland which contain water bodies, occasionally feeding along woodland edge, treelines and hedgerows.</p> <p>Bechstein's bat generally commutes along linear landscape</p> | Natural England (2015b) |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|--|--|--|--|
| | foraging areas | as dark corridors. | <p>features such as woodland edge, hedgerows, however, they will cross open fields to reach roost sites and foraging areas. Flightlines will extend beyond the designated site boundary into the wider local landscape.</p> <p>Target set at Restore because some commuting routes are fragmented, for example by breaks in hedgerows.</p> | |
| Supporting habitat: structure/ function | Supporting off-site habitat (foraging areas) | Restore any core areas of feeding habitat outside of the SAC boundary that are critical to Bechstein's Bat during their hibernation period | <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>Radio-tracking and other surveys have demonstrated significant use of the wider countryside around the SAC This habitat is integral to supporting bats associated with the SACs and is often referred to as functionally- linked habitat. Such functionally linked habitat includes the following:</p> <ul style="list-style-type: none"> • Flightlines – these are key commuting routes from roosts to foraging (or feeding) areas used by the bats. The barbastelle flightlines around Ebernoe Common and The Mens have been investigated through survey and are shown in Map 1. The routes to Singleton and Cocking Tunnels are less well known. • Foraging areas – these are the areas of land where bats feed. Barbastelle bats can forage 10-15 kilometres from the roosting sites and they prefer wet meadows and riparian habitats. Bechstein's tend to forage in and around the woodland where they roost with limited outward travel. <p>The land within the West Weald which encompasses Ebernoe Common SAC; The Mens SAC and Singleton & Cocking Tunnels SAC should be regarded as a single landscape utilised by bats from all three SACs.</p> | <p>South Downs National Park & Natural England (2015) Sussex Bat Special Area of Conservation Planning and Landscape Scale Enhancement Protocol</p> <p>https://www.southdowns.gov.uk/wp-content/uploads/2018/04/TLL-15-Draft-Sussex-Bat-SAC-Protocol.pdf</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|--|---|
| Supporting habitat: structure/function | Internal condition of building - hibernation | Maintain appropriate light levels, humidity, temperature and ventilation. | The requirements of Bechstein's bats vary throughout the hibernation period and they will shift their roost sites accordingly. The two tunnels at the location are deliberately managed to provide a range of microclimates. 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 period. | This attribute will be periodically monitored as part of Natural England's site condition assessments Downs <i>et al.</i> (2003) |
| 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 state, with surrounding vegetation providing sheltered flyways without obstructing accesses | 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. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Supporting habitat: structure/function | 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, within typical values for the supporting habitat | Soil supports basic ecosystem function and is a vital part of the natural environment. 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 the supporting habitat of this Annex II feature. | |
| 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 | 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 | Natural England (2015a) Sherwin <i>et al.</i> (2013) Voigt <i>et al.</i> (2011) |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|--------------------|---|--|---|
| | | | <p>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 (2015a) as being low, taking into account the sensitivity, fragmentation, topography and management of its supporting habitats. This means that this site is 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 many cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>Target set at Restore because some commuting routes are fragmented, for example by breaks in hedgerows.</p> | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Air quality | 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>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 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> | 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). |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|------------------------------|--|--|---|
| | | | Target set to Restore because nitrogen deposition currently exceeds the critical load for broad-leaved woodland which is an important supporting habitat for Bechstein's bat at the site. | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Conservation measures | 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 and/or its supporting habitats. | <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>Management measures are required both within and outside the SAC boundary.</p> <p>The tunnels require occasional repairs to maintain their structural integrity (and the specific environmental conditions that they provide). In addition, the grills/gates which prevent unauthorised access to the tunnels need to be maintained.</p> <p>Removal of vegetation is sometimes required around the tunnel entrances to prevent access becoming obstructed. This needs to be done sensitively to retain sheltered flyways.</p> <p>Disused railway tunnels to the north and south of the site support significant numbers of hibernating bats and together with Singleton and Cocking tunnels are likely to form part of a suite of hibernacula used by bats in the area. In addition, the surrounding area is used for foraging during the hibernation period and swarming in the autumn (including directly outside the tunnels). A range of management measures are required in the wider countryside to maintain and restore commuting routes and foraging areas, such as hedgerow planting and low intensity hedgerow management.</p> | <p>This attribute will be periodically monitored as part of Natural England's site condition assessments</p> <p>English Nature (2004)</p> <p>Greenaway & Hill (2004)</p> <p>Natural England (2015b)</p> <p>Stone <i>et al.</i> (2009)</p> |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|--|--|--|---|
| | | | Target set to Restore because commuting routes between sites are fragmented, for example by breaks in hedgerows. | |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Disturbance from human activity | Control and minimise human 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. | This attribute will be periodically monitored as part of Natural England's site condition assessments |
| Version Control Advice last updated: N/A | | | | |
| Variations from national feature-framework of integrity-guidance: The ' Water quality/quantity ' attribute has not been used for Bechstein's bat because wet features are not significant for the species during the hibernation period. | | | | |

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