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

Thorne and Hatfield Moors Special Protection Area (SPA)
Site code: UK9005171

Photograph: Neil Pike/Natural England

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About this document

This document provides Natural England's supplementary advice for the European Site Conservation Objectives relating to Thorne and Hatfield Moors SPA. This advice should therefore be read together with the SPA's Conservation Objectives available here.

This site overlaps with other European Sites. You should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites. This advice should therefore be read together with the SAC Conservation Objectives available for Thorne Moor SAC here and for Hatfield Moor SAC 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	Thorne and Hatfield Moors Special Protection Area (SPA)
Location	Doncaster, East Riding of Yorkshire and North Lincolnshire
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	16 August 2000
Qualifying Features	See section below
Designation Area	2,449.2 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)	Hatfield Moors SSSI, Thorne, Crowle and Goole Moors SSSI
Relationship with other European or International Site designations	Thorne and Hatfield Moors Special Protection Area (SPA) overlaps with Thorne Moors SAC and Hatfield Moors SAC

Site background and geography

Thorne and Hatfield Moors SPA lies within the flat, low-lying and large scale agricultural landscape of the Humberhead Levels National Character Area. Thorne Moor is England's largest area of raised bog, lying a few kilometres from the smaller Hatfield Moors, both within the former floodplain of the rivers feeding the Humber estuary (Humberhead Levels), and includes the sub-components Goole Moors and Crowle Moors.

The SPA is managed as a National Nature Reserve.

Although management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in species of bog-mosses *Sphagnum* spp., common and hare's-tail cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*

Hatfield Moors is a remnant of an extensive lowland raised bog which once occupied the Humberhead levels. Hatfield is unique in having developed directly upon nutrient deficient gravels without an initial reed-swamp phase. Much of the bog has been cut for peat yet a restricted representative flora and fauna persists within a mosaic of mire and dry heath habitats beneath birch scrub. The mire communities are dominated by cottongrasses *Eriophorum vaginatum* and *E. angustifolium*, cross-leaved heath *Erica tetralix* and bog-mosses *Sphagnum* spp., but include locally rare species such as cranberry *Vaccinium oxycoccus*, bog myrtle *Myrica gale* and bog rosemary *Andromeda polifolia*.

In addition to breeding nightjars, the site also supports small numbers (at non-qualifying levels) of other Annex 1 species: Hen Harrier *Circus cyaneus*, Merlin *Falco columbarius* and Short-eared Owl *Asio flammeus* hunt over the site in winter and at least one pair of Hobbies *Falco subbuteo* feed over the site in summer. Also notable are Nightingales *Luscinia megarhynchos* which breed at one of their most northerly regular sites in Britain.

About the qualifying features of the SPA

The following section gives you additional, site-specific information about this SPA's qualifying features. These are the individual species of wild birds listed on Annex I of the European Wild Birds Directive, and/or the individual regularly-occurring migratory species, and/or the assemblages (groups of different species occurring together) of wild birds for which the SPA was classified for.

Qualifying individual species listed in Annex I of the Wild Birds Directive

During the breeding season the SPA regularly supports:

A224 Nightjar (*Caprimulgus europaeus)*

At the time of its classification, the SPA supported 66 pairs of nightjar, representing at least 1.9% of the breeding population in Great Britain.

Nightjars are nocturnal birds and can often be seen hawking for food at dusk and dawn. With pointed wings and a long tails their shape is similar to a kestrel or cuckoo. They are ground nesters, and their cryptic, grey-brown, mottled, streaked and barred plumage provides ideal camouflage in the daytime. They are insectivorous birds, feeding primarily on moths and beetles.

Nightjars are migratory, generally arriving in the UK to breed in May and spending the winter months feeding in parts of Africa. The species is considered to be vulnerable to the effects of long-term climate change on drought-prone areas of Africa.

The Nightjar population on Thorne & Hatfield Moors SPA has been surveyed annually since 2005. Numbers of singing or 'churring' males has varied from 71 to 95 during this time. Breeding nightjar territories are located on suitable habitats across Thorne, Hatfield and Crowle Moors. Although one or two pairs annually nest on high tussocks of vegetation on the lowland raised bog habitat, the majority of the population is situated on those drier parts of the site with mature trees and a mosaic of scrub and dry heath.

Breeding concentrations will move on a year by year basis to exploit on-site habitat management but will always gravitate to locations with mature trees (used by males as 'churring' posts) and dry habitat mosaics. This combination of habitat features is located on both Hatfield Moor and Thorne Moors and breeding pairs are distributed fairly evenly across both sites. On-going survey of the nightjar populations on the SPA has revealed that feeding flights are not confined to the SPA, and birds will utilise the hinterland of the site, with birds flying up to 5km from the site for feeding purposes.

As a result of its extensive habitats, relatively few visitors, isolated location and management to support nature conservation objectives, nightjars on Thorne and Hatfield Moors suffer relatively little from disturbance and predation. Availability of suitable open, dry habitats, as well as general population trends are likely to be the primary population drivers for the species on Thorne and Hatfield Moors. This is supported by the fact that the nightjar population on site has remained relatively stable over recent years at levels consistently above that required to meet the conservation objectives for the SPA.

Qualifying individual species not listed in Annex I of the Wild Birds Directive: N/A

Qualifying assemblage of species: N/A

Site-specific seasonality of qualifying SPA features

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 SPA 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 SPA 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 bird 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	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Site-specific references where available
Nightjar	Breeding	Summer													

Guide to terms:
Breeding – present on a site during the normal breeding period for that species
Non-breeding - present on a site outside of the normal breeding period for that species (includes passage and winter periods).
Summer – the period generally from April to July inclusive
Passage - the periods during the autumn and spring when migratory birds are moving between breeding areas and wintering areas. These periods are not strictly defined but generally include the months of July – October inclusive (autumn passage) and March – April inclusive (spring passage).
Winter - the period generally from November to February inclusive.

Table 1: Supplementary Advice for Qualifying Features: A224. *Caprimulgus europaeus*; European nightjar (Breeding)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Breeding population (within the SPA)	**Population abundance**	Maintain the size of the breeding Nightjar population at a level which is above 66 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Annual population surveys carried out between 2005 and 2018 demonstrate a fluctuation in numbers on a year by year basis of between 71 (2005, 2008) and 95 (2017) churring males. Populations fluctuate based on habitat availability, the wetness of the site when birds arrive in April and factors external to site condition. This will sustain the site's population and ensures it contributes to a viable local, national and bio-geographic population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the abundance 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 has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period. The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current abundance 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 classified, 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. Maintaining or restoring bird abundance depends on the suitability of the site. However, factors affecting suitability can also determine other demographic rates of birds using the site including survival (dependent on factors such as body condition which influences the ability to breed or make foraging and / or migration movements) and breeding productivity. Adverse anthropogenic impacts on either of these rates	KOHLER, T, 2018. - Humberhead Peatlands NNR Management Plan (draft) – Natural England MIDDLETON BELL ECOLOGY, 2018. Nightjar breeding survey, Humberhead Peatlands NNR, 2018. Unpublished NE report BRIGHT, LANGSTON & BIERMAN, 2007. Habitat associations of nightjar *Caprimulgus europaeus* breeding on heathland in England - (RSPB). NATURAL ENGLAND, 2014. Site Improvement Plan: Thorne & Hatfield Moors (SIP246). (can be downloaded here) JNCC SPA citation for: Thorne & Hatfield Moors SPA. (Can be downloaded here)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			may precede changes in population abundance (e.g. by changing proportions of birds of different ages) but eventually may negatively affect abundance. These rates can be measured/estimated to inform judgements of likely impacts on abundance targets. Unless otherwise stated, the population size 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 on whether the figures stated are the best available.	
Supporting habitat (both within and outside the SPA): disturbance	**Minimising disturbance caused by human activity**	Reduce the frequency, duration and/or intensity of disturbance affecting nesting, roosting, foraging or feeding birds so that the breeding Nightjar population is not significantly disturbed	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures. The nightjar project associated with the LIFE+ programme on Thorne & Hatfield Moors has demonstrated that disturbance currently is not a significant factor in the success or otherwise of nightjar populations on-site. Although the SPA is managed as a nature reserve, the size, visitor infrastructure and scale of the habitats available to breeding nightjar means that disturbance impacts are insubstantial. This will need to be monitored over time.	BRIGHT, LANGSTON & BIERMAN, 2007.Habitat associations of nightjar *Caprimulgus europaeus* breeding on heathland in England - (RSPB). MIDDLETON BELL ECOLOGY, 2018– Nightjar breeding survey, Humberhead Peatlands NNR, Unpublished NE report KOHLER, T, 2018. Humberhead Peatlands NNR Management Plan (draft) – Natural England 2018
Supporting habitat (both within	**Extent and distribution of supporting**	Maintain the extent, distribution and availability of suitable breeding habitat which supports	Conserving or restoring the extent of supporting habitats and their range will be key to maintaining the site's ability and capacity to support the SPA population. The information available on the extent and	MIDDLETON BELL ECOLOGY, 2018.Nightjar breeding survey,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
and outside the SPA): extent and distribution	**breeding habitat**	Nightjar for all necessary stages of its breeding cycle (courtship, nesting, feeding).	distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. This target will apply to any supporting habitat which is known to occur outside the site boundary. Thorne and Hatfield Moors SPA overlaps with Thorne and Hatfield Moors SAC, the qualifying feature of which is lowland raised bog. The nightjar population on the SPA is far more reliant on European dry heath and successional woodland habitats than it is on lowland raised bog. Whilst nightjars will utilise larger hummocks of dry ground within raised bogs, the population density of nightjars on areas managed as raised bog is considerably lower than that on dry heathland. It is therefore important to balance the need to maintain sufficient habitat to support a healthy population of nightjars with the need to ensure that sufficient lowland raised bog habitat is maintained for the SAC to meet its condition targets. Continued habitat, population and distribution surveys will be necessary to ensure that habitat management for nightjars is successfully meeting this target, but also to ensure that habitat management for the SAC lowland raised bog qualifying feature is not detrimentally impacting on the nightjar population. The need to balance the requirements for SAC and SPA condition will be determined in the nature reserve management plan	Humberhead Peatlands NNR, 2018. Unpublished NE report RYAN, WHITE & ARNOLD, 2017.That's Life: Monitoring of European Nightjar 2015-2017. University of York 2017. Draft Natural England report KOHLER, T., 2018. Humberhead Peatlands NNR Management Plan (draft) – Natural England 2018
Supporting habitat (within the SPA): function/ supporting process	**Air quality**	Restore where necessary the concentrations and deposition of air pollutants to below the site-relevant Critical Load or Level values given for the supporting habitats of this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	The structure and function of the habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. 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	More information about site-relevant Critical Loads and Levels for this SPA is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk). KOHLER, T., 2018. - Humberhead Peatlands NNR Management Plan (draft) – Natural England

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			timescales. 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.	
Supporting habitat (both within and outside the SPA): function/ supporting process	**Connectivity with supporting habitats**	Maintain the safe passage of breeding Nightjars moving between nesting and feeding areas	The ability of the feature to safely and successfully move between feeding and nesting areas using flight-lines and movement routes is critical to their breeding success and to adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. The foraging range of nightjar is known to extend up to several kilometres from their nest sites. The nightjar is insectivorous, feeding primarily on moths and beetles. The location of feeding areas which support the SPA's nightjar population is often not well understood and may require specific studies or research. Radio-tracking studies at other sites have shown that nightjars will often avoid some areas and instead travel to superficially similar habitat further away, suggesting that they exploit a few particularly rich feeding sites. Tagging data on the birds breeding on Thorne & Hatfield has demonstrated that some individuals will fly considerable distances from the SPA to feed – routes utilised in these cases often mirror linear features such as hedgerows and field drains. Although many birds did utilise habitat fringing the SPA, very few flew more than 3km from the site boundary. The hinterland around the edge of the SPA is therefore utilised by feeding birds extensively.	RYAN, WHITE & ARNOLD, 2017.That's Life: Monitoring of European Nightjar 2015-2017. University of York 2017. Draft Natural England report
Supporting habitat (both within and outside the SPA): function/ supporting	**Conservation measures**	Maintain management or other measures (whether within and/or outside the site boundary as appropriate) necessary to maintain the structure, function and/or the supporting processes associated with the breeding	Active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England.	KOHLER, T, 2018. - Humberhead Peatlands NNR Management Plan (draft) – Natural England 2018 MIDDLETON BELL

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
process		Nightjar population and its supporting habitats.	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. Habitat management should retain the open, mosaic structure of lowland wet and dry heath, ensuring all life cycles of heather are present. It may, in certain areas, be appropriate to maintain scrubby vegetation and occasional taller trees should be available for the nightjar to "churr" from. Population surveys have demonstrated that the habitats most frequently utilised by nightjars are in sufficient supply on site to maintain the population at the desired levels. Managing to ensure that the required habitat mosaic and open structure preferred by the species is included as part of the National Nature Reserve management plan.	ECOLOGY, 2018. – Nightjar breeding survey, Humberhead Peatlands NNR, 2018. Unpublished NE report BRIGHT, LANGSTON & BIERMAN, 2017. Habitat associations of nightjar *Caprimulgus europaeus* breeding on heathland in England - (RSPB), 2007
Supporting habitat (both within and outside the SPA): function/ supporting process	**Food availability within supporting habitat**	Maintain the distribution, abundance and availability of key prey items (e.g. moths, beetles) at prey sizes preferred by breeding Nightjar.	The availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. Tagging data on the birds breeding on Thorne & Hatfield has demonstrated that some individual Nightjars will fly considerable distances from the SPA to feed – routes utilised in these cases often mirror linear features such as hedgerows and field drains. Although many birds did utilise habitat fringing the SPA, very few flew more than 3km from the site boundary. The hinterland around the edge of the SPA is therefore utilised by feeding birds extensively	KOHLER, T, 2018. Humberhead Peatlands NNR Management Plan (draft) – Natural England. BRIGHT, LANGSTON & BIERMAN, 2007. Habitat associations of nightjar *Caprimulgus europaeus* breeding on heathland in England - (RSPB), 2007 RYAN, WHITE & ARNOLD, 2017. That's Life: Monitoring of European Nightjar 2015-2017. University of York. Draft Natural England report
Supporting habitat (both within and outside	**Water quality/ quantity**	Where the supporting habitats of the SPA feature are dependent on surface water, maintain water quality and	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle.	KOHLER, T, 2018. - Humberhead Peatlands NNR Management Plan (draft) – Natural England.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
the SPA): function/ supporting process		quantity at a standard which provides the necessary conditions to support the feature.	Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. 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 SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA. The nightjar population on Thorne and Hatfield is not dependent on water quality, however, there is a risk to the population from an over-abundance of water on site, One of the primary issues affecting the SAC lowland raised bog qualifying feature is the availability of water to re-wet degraded peat. The need for water to support the restoration of peat bog will have to be balanced against the risks of high water levels on the extent of dry habitats needed to support the nightjar population. The risk of this is reduced, but not entirely eliminated, by the recent improvement of the water control infrastructure on-site and so careful ongoing management is required.	
Supporting habitat (within the SPA): predation	**Predation**	Reduce the predation and disturbance of breeding Nightjars caused by native and non-native predators.	This will ensure that breeding productivity (number of chicks per pair) and survival are sustained at rates that maintain or restore the abundance of the feature. Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, and also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing and scaring or by direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features. Predation has not been identified as a significant factor in nightjar populations on Thorne & Hatfield moors SPA.	KOHLER, T, 2018. Humberhead Peatlands NNR Management Plan (draft) – Natural England.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat (both within and outside the SPA): structure	**Landscape**	Maintain the amount of open and unobstructed patches within nesting and foraging areas, including areas of clear-fell, windfall, wide tracks, open forest and heath.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	KOHLER, T, 2018. Humberhead Peatlands NNR Management Plan (draft) – Natural England 2018 RYAN, WHITE & ARNOLD, 2017. That's Life: Monitoring of European Nightjar 2015-2017. University of York. Draft Natural England report.
Supporting habitat (within the SPA): structure	**Vegetation characteristics**	Maintain sufficient ground vegetation in a suitable condition for nesting, mostly 20-60 cm tall with frequent bare patches of >2 m², 10-20% bare ground and <50% tree/scrub cover overall; trees <2 m in height) throughout the nesting area.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/ rearing/ concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	KOHLER, T - Humberhead Peatlands NNR Management Plan (draft) – Natural England.
Supporting habitat: Structure/ function	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting habitats, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of 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. The overall vulnerability of this particular SPA to climate change has been assessed by Natural England as being moderate, taking into	NATURAL ENGLAND (2015) Climate Change Theme Plan and National Biodiversity Climate Change Vulnerability Assessments (NBCCVAs). Available at: http://publications.naturalengland.org.uk/publication/4954594591375360

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			account the sensitivity, fragmentation, topography and management of its supporting habitats. 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 cases, change will be inevitable so appropriate monitoring would be required.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: none.				