European Site Conservation Objectives: Supplementary Advice on Conserving and Restoring Site Features

Thursley, Ash, Pirbright and Chobham Special Area of Conservation (SAC) Site code: UK0012793

View across Frensham Common © Natural England

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Thursley, Ash, Pirbright and Chobham SAC. This advice should therefore be read together with the SAC Conservation Objectives available here.

Where this site overlaps with other European Site(s), you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites.

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. Any proposals or operations which may affect the site or its qualifying features should be designed so they do not adversely affect any of the attributes listed in the objectives and supplementary advice.

This supplementary advice to the Conservation Objectives describes in more detail the range of ecological attributes on which the qualifying features will depend and which are most likely to contribute to a site's overall integrity. It sets out minimum targets for each qualifying feature to achieve in order to meet the site's objectives.

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	Thursley, Ash, Pirbright and Chobham Special Area of Conservation
Location	Surrey
Site Maps	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	April 2005
Qualifying Features	See section below
Designation Area	5138 hectares
Designation Changes	n/a
Feature Condition Status	Condition assessment information relating to this site can be found using Natural England's Designated Sites search tool.
Names of component Sites of Special Scientific Interest (SSSIs)	Ash to Brookwood Heaths SSSI; Colony Bog and Bagshot Heaths SSSI; Chobham Common SSSI; Thursley, Hankley and Frensham Commons SSSI.
Relationship with other European or International Site designations	The SAC overlaps with Thames Basin Heaths SPA and Thursley, Hankley and Frensham Commons (Wealden Heaths Phase 1) SPA and includes Thursley and Ockley Bog Ramsar site.
Other information	Natura 2000 Standard Data Form for Thursley, Ash, Pirbright and Chobham SAC

Site background and geography

Thursley, Ash, Pirbright and Chobham SAC is an extensive complex of heaths in the south east of England with extensive areas of wet and dry heath, acid mire and bog pools. The complex is situated in the Surrey Hills Area of Outstanding Natural Beauty (AONB) and is part of the Weald National Character Area.

The underlying geology of the site is composed of Lower Greensand age marine deposits laid down in the Cretaceous period. This formation is made up of alternating sandstones and mudstones containing chert and ironstone, and the formation includes the distinct layers of the Folkestone Beds, Sandgate Beds and Bargate Beds. The Folkestone Beds make up the high ground in parts of the complex. These are mostly relatively free-draining sandstones but also include occasional 'lenses' of clay which impede drainage resulting in localised surface wetness and seepages. The Folkestone Beds are a base-poor formation and so water percolating through the beds generally remains nutrient and base-poor. The underlying Sandgate Beds are mostly made up by finer-grained materials and have a higher clay content and so are generally less free-draining.

It is this impeded drainage which gives rise to the formation of the mire systems. A further aspect of the geology is the influence of the Bargate Beds which are lower in the geological sequence. The Bargate Beds are fossiliferous calcareous sandstones with a high content of calcium carbonate. Water percolating through these deposits can develop a high base-status and this is thought to be the reason

for a relatively high alkalinity in the water feeding the west side of the mire system on Thursley Common. Surface peat is present in the lower-lying waterlogged areas, which varies in thickness from 1-10cm over much of Ockley Common to a maximum depth of about 1.5 metres on parts of Thursley Common. The site is set in a landscape of extensive farmland, broadleaved woodland, pine woodland and small villages.

The complex includes outstanding examples of valley mire vegetation which supports very rich assemblages of wetland invertebrates, bryophytes and scarce plants, and which provide a habitat for breeding birds including curlew and snipe. Parts of the complex are managed as nature reserves with open public access. Other parts have military training ranges and have limited or no public access.

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:

- **H7150 Depressions on peat substrates of the Rhynchosporion**

In the UK, depressions on peat substrates of the *Rhynchosporion* occur on humid, bare or recently exposed peat surfaces in complex mosaics with lowland wet heath and valley mire vegetation, in transition mires, and on the margins of bog pools and hollows in both raised and blanket bogs. On lowland heaths in southern and eastern England this habitat occurs in and around the edges of seasonal bog pools and valley mires in heathlands. It can also be associated with areas that are artificially disturbed, such as along footpaths and trackways, and in old peat-cuttings and abandoned ditches.

The vegetation of this habitat type is typically very open and sparsely-vegetated. It is usually characterised by an abundance of white beak-sedge *Rhynchospora alba*, often with well-developed algal mats, the bog moss *Sphagnum denticulatum*, round-leaved sundew *Drosera rotundifolia* and, in relatively base-rich sites, brown mosses such as *Drepanocladus revolvens* and *Scorpidium scorpioides*.

This SAC contains good examples of Depressions on peat substrates of the Rhynchosporion in south-east England, where it occurs as part of a mosaic associated with valley mire and wet heath. These areas support a wide range of characteristic plants including white beaked-sedge, bog asphodel *Narthecium ossifragum*, early marsh-orchid *Dactylorhiza incarnata* and oblong-leaved sundew *Drosera intermedia*. These areas are typically rich in bog-mosses including *Sphagnum auriculatum*, *S. magellanicum*, *S. tenellum* and *S. cuspidatum*.

- **H4030 European dry heaths**

European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common of these is heather *Calluna vulgaris*, which often occurs in combination with gorse *Ulex* spp., bilberry *Vaccinium* spp. or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning.

This SAC contains a series of large fragments of once-continuous heathland. It is selected as a key representative of the NVC type H2 *Calluna vulgaris – Ulex minor* dry heathland. This heath type has a marked south-eastern and southern distribution in the UK. There are transitions to wet heath and valley mire, scrub, woodland and acid grassland, including types rich in annual plants.

The European dry heath feature supports an important assemblage of animal species, including numerous rare and local invertebrate species, European nightjar *Caprimulgus europaeus*, Dartford warbler *Sylvia undata*, sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*.

- **H4010 Northern Atlantic wet heaths with *Erica tetralix***

Wet heath typically occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and Sphagnum bog-mosses.

This SAC supports representative examples of lowland northern Atlantic wet heaths in south-east England. The wet heath vegetation corresponds with NVC type M16 *Erica tetralix – Sphagnum compactum* wet heath and includes several rare plants, including brown beak-sedge *Rhynchospora fusca,* marsh clubmoss *Lycopodiella inundata* and marsh gentian *Gentianella pneumonanthe*. There

are transitions to valley mire and dry heath.

Table 1: Supplementary Advice for Qualifying features: H7150 Depressions on peat substrates of the Rhynchosporion

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 H7150 feature at approximately 35.3 hectares.	There should be no measurable net reduction (excluding any trivial loss) in the extent and area of the feature, and in some cases, the full extent of the feature may need to be restored, for example by reversing the effects of past drainage. The baseline value of extent is approximate and based upon surveys of varying age and accuracy. 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 includes transitions and mosaics with other closely-associated habitat features. The feature is susceptible to natural dynamic processes, and 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. The 'Rhynchosoporion' is a vegetation alliance which incorporates a range of habitat types including bog pools, runnels, seepage areas, valley mire and quaking bog. The feature is often present as small, transitory patches within other habitats. As a result, the extent of the H7150 feature is difficult to map and measure with a high degree of accuracy.	
	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H7150 feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts.	EPR, 2002a. EPR, 2002b. EPR, 2002c. EPR, 2000.
Structure and function (including its	Vegetation community composition	Ensure the component vegetation communities of the H7150 feature are referable to	This habitat feature is comprised of a number of associated vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and	RODWELL, 1991; 1992

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)		and characterised by the following National Vegetation Classification types: M21 *Narthecium ossifragum-Sphagnum papilosum* valley mire M14 *Schoenus nigricans-Narthecium ossifragum* mire M1 *Sphagnum auriculatum* bog pool M2 *Sphagnum cuspidatum* bog pool M6 *Carex echinata – Sphagnum recurvum* mire.	vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, are important to sustaining the overall habitat feature. Not all community types are present at all sites – the composition of the vegetation varies across the complex in relation to a wide range of factors. The basic principle of conservation is to seek to ensure that the characteristic vegetation types representative of the feature are maintained in their current location, subject to natural change.	
Structure and function (including its typical species)	Key structural, influential and distinctive species	Maintain the abundance of the species listed below to enable each of them to be a viable component of the H7150 habitat: Flora; Heather *Calluna vulgaris,* cross-leaved heath *Erica tetralix,* purple moor-grass *Molinia caerulea,* common cotton-grass *Eriophorum angustifolium,* bog asphodel *Narthecium ossifragum,* white beak-sedge *Rhynchospora alba,* meadow thistle *Cirsium dissectum,* round-leaved sundew *Drosera rotundifolia,* intermediate sundew *D intermedia,* bog myrtle *Myrica gale,* cranberry *Vaccinium oxycoccos,* royal fern *Osmunda*	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; – **Structural species** which form a key part of the habitat's structure or help to define an Annex I habitat on a site (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 site. – 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.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		regalis, black bog-rush *Schoenus nigricans,* lesser bladderwort *Utricularia minor.* Assemblage of mosses: *Calypogeia sphagnicola, Cephalozia macrostachya, Sphagnum auriculatum, S. cuspidatum, S. capillifolium, S. papillosum, S. magellanicum, S.tenellum,* Fauna*;* Raft spider *Dolomedes fimbriatus,* small red damselfly *Ceriagrion tenellum,* curlew *Numenius arquata,* Assemblage of reptiles including smooth snake *Coronella austriaca*	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.	
Structure and function (including its typical species)	Invasive, non-native and/or introduced species	Ensure invasive, non-native and introduced non-native species are either rare or absent, but if present are causing minimal damage to the H7150 feature	Invasive native or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (eg use of broad spectrum pesticides). Species in this category include *Rhododendron ponticum, Sarracenia* spp, *Kalmia* spp, bamboos etc.	
Structure and	Presence/cover	Maintain (or restore where	Native trees and shrubs occur naturally on mire surfaces. Indeed, bog	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	of woody species	habitats are degraded or neglected) a very low cover of scrub or trees (ie <1% of the area of any single stand).	woodland is a nationally rare habitat type. However, an abundance of encroaching scrub is usually indicative of undesirable change such as drying out, unnatural variation in groundwater level and/or nutrient input. It will tend to cause damage to vegetation structure and loss of plant diversity through shading effects. Birch, pine, willow and *Rhododendron* are the main species of concern but alder buckthorn, bog myrtle and common gorse can also be invasive in certain situations.	
	Exposed substrate	Maintain (or restore where habitats are degraded or suffering excessive disturbance) a low cover of exposed substrate of between 1-10% across the H7150 feature.	For this wetland habitat type, maintaining some continuous or scattered extent of exposed, open ground surface is required to support the establishment and survival of those component species which rely on bare, wet peat, shallow water or sparsely-vegetated bog surface.	
	Hydrology	At a site, unit and/or catchment level, maintain (or restore where habitats are suffering from effects of drainage) natural hydrological processes to provide the conditions necessary to sustain the H7150 feature within the site	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. Where the structure and composition of the vegetation shows evidence of damaging impacts of hydrological change the objective should be to restore more natural hydrological conditions. Detailed site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. The hydrological status of the feature is largely dependent on the overall hydrological integrity of the larger heathland complex in which it is found.	PENDLETON, 2013. HYDROGEOLOGICAL SERVICES INTERNATIONAL, 2003.
Structure and function (including its typical species)	Water chemistry	Maintain (or restore where habitats are suffering from changes in water flow or chemistry) the surface water and groundwater supporting the hydrology of the bog at a low nutrient status and within natural	The H7150 feature is a type of wetland which critically depends on groundwater flows and /or chemistries. This feature is typically found in base-poor, oligotrophic conditions. The defining species of this feature – white-beaked sedge *Rhyncospora alba* is an indicator of extremely infertile soils. Change in nutrient status may be indicated by establishment of plants typical of tall fen such as bulrush *Typha*	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		variation of pH levels.	*latifolia*, reed *Phragmites australis* and soft rush *Juncus effusus*. The pH ranges of communities supporting H7150 vegetation have mean pH values of 4-4.5, but range from 3.5 to 6.	
	Hydrology	Maintain (or restore where water supply has been modified) a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations).	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. Some examples of this feature may be wholly or partly groundwater dependent, whilst others have a greater dependence on surface water or rain water inputs. It is important to understand the eco-hydrological context of all sites.	
	Adaptation and resilience	Maintain (or restore where the resilience of the feature is degraded) the H7150 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing requirement for 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 precipitation and temperature, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. Climate change modelling predicts significant changes in rainfall patterns, including increased frequency of prolonged droughts and more frequent storm events. These effects are likely to impose significant stress on mire systems through drying out, increased risk of fire, threat of erosion and increased variation in water levels. The vulnerability and response of features to such changes will vary. Using	NATURAL ENGLAND, 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its 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.	
Structure and function (including its typical species)	Supporting off-site habitat	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the H7150 feature	The structure and function of the qualifying habitat, including its typical species, will in some cases rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species, particularly by reducing groundwater supply or disrupting groundwater flow characteristics.	
Supporting processes (on which the feature relies)	Air quality	Restore the concentrations and deposition of air pollutants to 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).	This habitat type is considered sensitive to changes in air quality, particularly nitrogen and acid deposition. Exceedance of 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 associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are	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)
			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.	
Supporting processes (on which the feature relies)	Conservation measures	Maintain (or restore where appropriate) the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain or restore the structure, functions and supporting processes associated with the H7150 feature	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 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, 2014, Site Improvement Plan: Thames Basin (SIP237).
Version Control Advice last updated: not applicable				
Variations from national feature-framework of integrity-guidance: not applicable				

Table 2: Supplementary Advice for Qualifying features: H4030 European dry heaths

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 H4030 feature to baseline value of approximately 1830 hectares.	See notes for this attribute in table 1 above. Figure based on estimated extent recorded during site condition assessment monitoring by Natural England staff. The figure given is an estimate because the feature is part of a complex habitat mosaic at many of the locations	
	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H4030 feature, including where applicable its component vegetation types, across the site	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 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.	EPR, 2002a; 2002b; 2002c EPR, 2000
Structure and function (including its typical species)	Vegetation community composition	Ensure the component vegetation communities of the H4030 feature are referable to and characterised by the following National Vegetation Classification type(s):	This habitat feature is comprised of a number of associated vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions and management. In the UK these have been categorised by the National Vegetation Classification (NVC). 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	RODWELL, 1991, 1992

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Calluna vulgaris-Ulex minor heath H2, *Ulex minor-Agrostis curtisii* heath H3, with transitions to acid grasslands including *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland U1, *Deschampsia flexuosa* grassland U2, *Agrostis curitsii* grassland U3 and *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland U4.	typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). Not all community types are present at all sites – the composition of the vegetation varies across the complex in relation to a wide range of factors. In some stands, particularly at Chobham Common, the characteristic vegetation composition has become masked by increasing dominance of purple moor-grass *Molinia caerulea*. In these areas restoration of more typical vegetation types is desirable.	
Structure and function (including its typical species)	Vegetation community transitions	Maintain (or restore where habitats are degraded) areas of transition between this and communities which form other heathland-associated habitats, such as 'humid' heath, wet heath, mire, acid grassland, scrub and woodland.	Transitions and zonations between adjacent but different vegetation communities in a heathland context are an important component of the overall habitat mosaic. These areas are often of critical importance for specialised animals including reptiles, which may use different vegetation types during different stages of their life cycle.	
	Vegetation structure: cover of dwarf shrubs	Maintain (or restore where habitats are degraded or neglected) an overall cover of dwarf shrub species which is typically between 25-90% (except in areas of acid grassland where grasses are naturally dominant)	Variation in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heather). These should be prominent components of the habitat and factors which might result in a reduction in	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			their cover, such as excessive trampling, grazing or nutrient input should be regarded as damaging.	
Structure and function (including its typical species)	Vegetation composition: bracken cover	Maintain (or restore where habitats are degraded or neglected) a cover of dense bracken which is low, typically at <5%	The spread of bracken *Pteridium aquilinum* is a problem on many lowland heathlands. Where it forms a continuous canopy and deep litter layer it can smother and shade out lower growing plants, changing the nature of the vegetation. Active management of bracken is usually required to reduce or contain its cover.	
	Vegetation structure: cover of gorse	Maintain cover of all gorse species at or below 25%, in each continuous block of dry heath	Gorse is a natural component of heathland and is a valuable wildlife habitat. It provides cover for many species of birds, mammals and reptiles, and breeding habitat and shelter for rare birds such as Dartford warbler. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly valuable for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands can increase fire risk.	
	vegetation structure: tree cover	Maintain (or restore where habitats are neglected) the open character of the H4030 feature, with a scattered cover of trees and scrub at or below 10% cover in each continuous block of dry heath	Scrub (meaning trees, bushes and saplings above 1 m in height) and isolated trees are important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. Overall cover of scrub and trees across the habitat should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heath vegetation as ground cover. If scrub is locally important for associated species with their own specific requirements, then a higher level of cover may be acceptable in places. The area of scrub/tree cover should be stable or not increasing as a whole.	
	Vegetation structure: heather age	Maintain (or restore where habitats are degraded or neglected) a diverse age	Each phase of growth associated with the characteristic heathers which dominate dry heath also represents different microclimatic conditions and microhabitats which provide shelter or food to other organisms. Ideally, this	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	structure	structure amongst the ericaceous shrubs typically found on the site	age structure will consist of between 10-40% cover of (pseudo) pioneer heather; 20-80% cover of building/mature heather; <30% cover of degenerate heather and <10% cover of dead heather.	
Structure and function (including its typical species)	Vegetation: undesirable species	Maintain the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread: Piri-pir bur *Acaena* spp., Rhododendron *Rhododendron ponticum,* Gaultheria *Gaultheria shallon,* Japanese knotweed *Fallopia japonica,* creeping thistle *Cirsium arvense,* foxglove *Digitalis purpurea,* willowherb *Epilobium* spp., creeping buttercup *Ranunculus repens,* ragwort *Senecio jacobaea,* dock *Rumex obtusifolius,* nettle *Urtica dioica*.	Undesirable exotic or native non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. Some of these species may be valuable as minor components of the heathland mosaic but their presence may indicate undesirable influences such as increasing nutrient levels, damage by fire or excessive disturbance. In most cases 'acceptable levels' means less than 1% cover or no more than rare and localised.	
Structure and function (including its typical species)	Key structural, influential and distinctive species	Maintain (or restore where habitats are degraded) the abundance of the 'typical' species listed below to enable each of them to be a viable component of the H4030 Annex 1 habitat:	See notes for this attribute in table 1 above	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Higher plants: Heather *Calluna vulgaris,* bell heather *Erica cinerea,* dwarf gorse *Ulex minor,* bilberry *Vaccinium myrtillus,* petty whin *Genista anglica,* sand sedge *Carex arenaria,* Assemblage of mosses; *Hypnum jutlandicum, Dicranum scoparium, Polytrichum juniperinum,* Assemblage of lichens;*Cladonia floerkeana, C. fimbriata, C. furcata, C. portentosa,* Fauna: Assemblage of native reptiles including smooth snake *Coronella austriaca,* and sand lizard *L. agilis.* Silver-studded blue *Plebejus argus,* heath tiger-beetle *Cicindela sylvatica,* mottled bee-fly *Thyridanthrax fenestratus,* heath grasper *Haplodrassus dalmatensis .*		
Structure and	Functional	Maintain (or restore where	This recognises the desirability of maintaining or restoring the connectivity	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	connectivity with wider landscape	habitats are fragmented or isolated) the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site, such as critical habitat 'corridors' and habitat patches.	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 whether these are applicable on a case by case basis.	
	Adaptation and resilience	Maintain (or restore where the resilience of the feature is degraded) the H4030 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See notes for this attribute in table 1 above Modelling studies predict that heathland habitats are likely to come under increasing stress as a result of more frequent and prolonged droughts, high summer temperatures and increased susceptibility to uncontrolled fires. These effects may contribute towards a tendency for grasses to become more prominent than dwarf shrubs, with consequent changes in associated species.	NATURAL ENGLAND, 2015.
	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	Soil is the foundation of basic ecosystem function and 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 this Annex I feature. Soil	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		H4030 habitat.	types and characteristics vary across the complex which has significant influence on the vegetation. Soils range from predominantly sandy and free-draining at Frensham Common to clay-rich and poorly drained at Chobham Common. Soils are characteristically acidic and nutrient-poor across the complex.	
Supporting processes (on which the feature relies)	Conservation measures	Maintain (or restore where sites are neglected) the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain or restore the structure, functions and supporting processes associated with the H4030 feature	Active and ongoing conservation management is needed to protect, maintain or restore dry heath. Further details about the necessary conservation measures for this site can be provided by contacting Natural England or by consulting 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. The necessary conservation measures will include management to control scrub and tree encroachment, spread of bracken, establishment and spread of non-native species, and maintenance of low nutrient levels. Maintenance of the feature is also dependent upon management to keep the dwarf shrub component in good condition, such as by rotational cutting, controlled burning or grazing, and measures to create scattered patches of bare ground.	NATURAL ENGLAND, 2014.
	Air quality	Maintain 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 Pollution Information System (www.apis.ac.uk).	See notes for this attribute in table 1 above	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Version Control Advice last updated: not applicable			
Variations from national feature-framework of integrity-guidance**:** not applicable			

Table 3: Supplementary Advice for Qualifying features: H4010 Northern Atlantic wet heaths with *Erica tetralix*

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 H4010 feature to baseline extent of approximately 321 hectares.	See notes for this attribute in Table 1 above. Figure based on estimated extent recorded during site condition assessment monitoring by Natural England staff. The figure given is an estimate because the feature is part of a complex habitat mosaic at many of the locations.	
	Spatial distribution of the feature within the site	Maintain (or restore where habitats are degraded) the distribution and configuration of H4010 wet heath feature, including where applicable its component vegetation types, across the site	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 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.	
Structure and function (including its typical species)	Vegetation community transitions	Maintain (or restore where habitats are degraded) any areas of transition between this and communities which form other heathland-associated habitats, such as dry and humid heath, mire, acid grassland, scrub and	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil wetness. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		woodland.	during different stages of their life cycle.	
Structure and function (including its typical species)	Vegetation community composition	Ensure the component vegetation communities of the H4010 feature are referable to and characterised by the following National Vegetation Classification type (s): M16 *Erica tetralix* wet heath and/or as mosaics with wet grassland types such as M25 *Molinia caerulea-Potentilla erecta* mire.	This habitat feature is comprised of 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). 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 the SAC feature, at appropriate levels (recognising natural fluctuations). Not all community types are present in all parts of the SAC; the composition of the vegetation varies across the complex in relation to a wide range of factors. In some stands, particularly at Chobham Common, the characteristic vegetation composition has become masked by the increasing dominance of purple moor-grass *Molinia caerulea*. In these areas restoration to more typical wet heath vegetation types is desirable.	RODWELL, 1991, 1992
	Vegetation structure: cover of dwarf shrubs	Maintain (or restore where habitats are degraded) an overall cover of dwarf shrub species which is typically between 25-75%	Variation in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heather) but purple moor-grass *Molinia caerulea* can become overwhelmingly dominant in some stands of wet heath. Such stands	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			can be very species-poor and will generally indicate unfavourable condition. An increase in abundance of *Molinia caerulea* at the expense of heathers may be promoted by a range of factors including frequent uncontrolled fires, nutrient input and/or lapse of grazing or cutting management.	
Structure and function (including its typical species)	Vegetation structure: cover of gorse	Maintain a low cover of common gorse across the H4010 feature, typically at <10%	Gorse is a natural component of heathland and is a valuable wildlife habitat. It provides cover for many species of birds, mammals and reptiles. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly valuable for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands can increase fire risk.	
	Vegetation structure: tree cover	Maintain (or restore where habitats are neglected) the open character of the feature, with a scattered cover of trees and scrub at or below 10% cover in each continuous block of wet heath	Scrub (meaning trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, food-plants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. If scrub is locally important for associated species with specific requirements, then a higher level of cover may be acceptable. The area of scrub/tree cover should be stable or not increasing as a whole	
	Key structural, influential and site-distinctive species	Maintain (or restore where habitats are degraded) the abundance of the 'typical' species listed below to enable each of them to be a viable component of the H4010 Annex 1 habitat: Higher plants; Heather *Calluna*	See notes for this attribute in Table 2 above.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		vulgaris, bell heather *Erica tetralix,* creeping willow *Salix repens,* dwarf gorse *Ulex minor,* sedges *Carex spp.* common cotton-grass *Eriophorum angustifolium,* purple moor-grass *Molinia caerulea,* marsh clubmoss *Lycopodiella inundatum,* brown beak-sedge *Rhynchospora fusca,* deer grass *Trichophorum cespitosum,* round-leaved sundew *Drosera rotundifolia,* intermediate sundew *D. intermedia,* marsh gentian *Gentiana pneumonanthe,* Assemblage of mosses; *Aulocomnium palustre, Sphagnum capillifolium, S. compactum.* Fauna; assemblage of native reptiles including smooth snake *Coronella austriaca.*		
Structure and function (including its typical species)	Vegetation: undesirable species	Maintain or restore where habitats are degraded) the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition,	Undesirable exotic or native non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Some of these species may be valuable as minor components of the heathland mosaic but their presence may indicate undesirable influences such as increasing nutrient levels, damage by fire or excessive disturbance. In most cases 'acceptable levels' means less than 1%	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		soils, nutrient levels or hydrology which may encourage their spread: Rhododendron *Rhododendron ponticum, g*aultheria *Gaultheria shallon,* Japanese knotweed *Fallopia japonica,* creeping thistle *Cirsium arvense,* foxglove *Digitalis purpurea,* willowherb *Epilobium* spp. (excl. *E. palustre*), floating sweet-grass *Glyceria fluitans,* reed *Phragmites australis,* creeping buttercup *Ranunculus repens,* ragwort *Senecio jacobaea,* dock *Rumex obtusifolius,* nettle *Urtica dioica,* soft rush *Juncus effusus*.	cover or no more than rare and localised.	
	Functional connectivity with wider landscape	Maintain (or restore where habitats are fragmented or isolated) 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 desirability of maintaining or restoring 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			advise as to whether these are applicable on a case by case basis.	
Structure and function (including its typical species)	Adaptation and resilience	Maintain or restore the H4010 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See explanatory notes for this attribute in Table 1 above.	NATURAL ENGLAND, 2015.
Supporting processes (on which the feature relies)	Conservation measures	Maintain or restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain or restore the structure, functions and supporting processes associated with the H4010 feature	Active and ongoing conservation management is usually required to protect, maintain or restore wet heath. Further details about the necessary conservation measures for this site can be provided by contacting Natural England or by consulting 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, 2014
	Soils, substrate and nutrient cycling	Maintain or restore 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 H4010 habitat.	Soil is the foundation of basic ecosystem function and 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 this Annex I feature. Soil types vary across the complex but all are characteristically nutrient-poor and have low pH.	
Supporting processes (on which the	Air quality	Maintain or restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical	See notes for this attribute in Table 2 above.	More information about site-relevant Critical Loads and Levels for this SAC

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		Load or Level values given for the H4010 feature of the site on the Air Pollution Information System (www.apis.ac.uk).		is available by using the 'search by site' tool on the Air Pollution Information System.
	Water quality	Where the H4010 feature is dependent on surface water and/or groundwater, maintain or restore water quality and quantity to a standard which provides the necessary conditions to support the feature, ie permanently high water table, very low nutrient status, low base-status and low pH.	For SAC features which are dependent on surface and/or ground water, maintaining the quality and quantity of water supply will be critical. Poor water quality and inadequate quantities of water can adversely affect the structure and function of wet heath. 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.	
	Hydrology	At a site unit and/or catchment level as necessary, maintain or restore the natural hydrological regime to provide the conditions necessary to sustain the H4010 feature	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.	
Version Control Advice last updated: not applicable				

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Variations from national feature-framework of integrity-guidance**:** not applicable			

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