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

Kingley Vale Special Area of Conservation (SAC) UK0012767

Yew tree *Taxus baccata* at Kingley Vale ©Peter Wakely 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 Kingley Vale SAC.

This advice should therefore be read together with the SAC Conservation Objectives available here.

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

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

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Kingley Vale Special Area of Conservation (SAC)
Location	West Sussex
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	208.5 hectares
Designation Changes	Not applicable
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)	Kingley Vale SSSI
Relationship with other European or International Site designations	Not applicable

Site background and geography

Kingley Vale SAC is approximately 208.5 hectares in size and is situated within both the South Downs National Character Area (NCA Profile 125) and National Park. The site has great archaeological significance, hosting 14 scheduled ancient monuments including Bronze Age and Roman earthworks such as: burial mounds, cross dykes, a camp and a field system.

The Yew *Taxus baccata* woodlands of Kingley Vale are considered to be among the largest and best in Europe; it also contains an important grove of ancient Yews some of which are at least 500 years old. The Yew woodland is considered to be of such high quality in part because of the presence of successional stages from scrub grassland to mature woodland, which are provide a high variation in woodland structure and function, which is important for many breeding birds and invertebrates including: Red kites *Milvus milvus*, the forester moth *Adscita statices* and the nationally rare fly *Doros Sonopseus*.

The remainder of woodland which is not pure yew woodland is a mixed woodland chiefly comprised of yew, ash and oak.

In addition to woodland the site contains three nationally uncommon habitats: chalk grassland, juniper scrub and Yew scrub. The chalk grassland in particular is rich in flowering plants dominated by sheep's fescue *Festuca ovina*, meadow oat *Avenula pratensis* and salad burnet *Sanguisorba minor*. Several uncommon plants are also present, including: autumn gentian *Gentianella amarella*, roundheaded rampion *Phyteuma tenerum*, bee orchid *Ophrys apifera*, autumn lady's tresses *Spiranthes spiralis* and fly orchid *Ophrys insectifera*.

Most of Kingley Vale SAC is also designated as Kingley Vale National Nature Reserve (NNR); information regarding its NNR designation is available here. As an NNR Kingley Vale provides important education and research functions to the local, national community and international community.

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:

- **H91J0 *Taxus baccata* woods of the British Isles**

A priority Annex I habitat feature, H91J0 yew *Taxus baccata* woodland occurs on shallow, dry soils usually on chalk or limestone slopes, but in a few areas stands on more mesotrophic soils are found. The habitat corresponds to NVC type W13 *Taxus baccata* woodland (Rodwell, 1991). Within this community yew tends to be overwhelmingly dominant and is usually associated with a very sparse shrub and tree layer. Only a few species, such as dog's mercury *Mercurialis perennis*, can survive beneath the dense shade cast by the canopy of mature yew trees. Association with beech *Fagus sylvatica* and holly *Ilex aquifolium* is less common than in mainland Europe. Stands of yew woodland frequently form mosaics with scrub and grassland, including H6210 semi-natural dry grasslands and scrubland facies on calcareous substrates.

Kingley Vale is one of the only sites representing yew *Taxus baccata* woods on chalk, in the central southern part of its UK range. It has been selected primarily because of its size, as it is the largest area of yew woodland in Britain. It also shows excellent conservation of the full range of habitat structure and function.

- **H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco Brometalia)* (important orchid sites); Dry grasslands and scrublands on chalk or limestone (important orchid sites)**

In the UK, examples of this feature are generally found on thin, well-drained, lime-rich soils associated with chalk and limestone. They occur predominantly at low to moderate altitudes in England and Wales, extending locally into upland areas in northern England, Scotland and Northern Ireland. Most of these agriculturally-unimproved calcareous grasslands are maintained by grazing. A large number of rare plants are associated with this habitat and its associated invertebrate fauna can also be noteworthy

The chalk grassland at Kingley Vale is particularly rich in flowering plants and features several nationally uncommon plants, including: autumn gentian *Gentianella amarella*, roundheaded rampion *Phyteuma tenerum*, bee orchid *Ophrys apifera*, autumn lady's tresses *Spiranthes spiralis* and fly orchid *Ophrys insectifera*

This species is present as a qualifying feature of this site, but not as a primary reason for site selection despite this it is still a very important feature of the site.

Table 1: Supplementary Advice for Qualifying Features: H91J0. *Taxus baccata* woods of the British Isles; Yew-dominated woodland *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature to 60.28 ha	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. For this feature, this attribute includes the extent of semi-natural wood-pasture mosaic area; tree'd area; the number of veteran trees (except through natural causes), including dead and living trees. Tree roots (particularly of veteran trees) may extend a considerable distance beyond the boundary of the site. A reduction of woodland/wood-pasture area - whether at the edge or in the middle of a site will reduce the core area where wood-pasture conditions are found - these support significant assemblages of species dependent on woodland conditions (e.g. lichens and bryophytes - being one example). Loss of any woodland area which fragments a site into different parts may interrupt the movement of species between the remaining parts of the woodland, especially those with limited powers of dispersal.	JNCC. 2015. *Kingley Vale Natura 2000 standard data form*. Available from: http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0012767.pdf
Extent and	**Spatial**	Maintain the distribution and	A contraction in the range, or geographic spread, of the feature	Natural England. 2015a. Priority

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
distribution of the feature	**distribution of the feature within the site**	configuration of the feature, including where applicable its component vegetation types, across the site	(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.	Habitat Inventory. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the feature are referable to and characterised by the National Vegetation Classification type W13 - *Taxus baccata* woodland	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). 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).	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical	**Vegetation structure - canopy cover**	Maintain an appropriate tree canopy cover across the feature, which will typically be between 40-90% of the site	Canopy cover is the overall proportion of vegetative cover consisting of any woody layer ranging from established regeneration to mature and veteran stages. Woodland canopy density and structure is important because it affects ecosystem	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)			function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil. Open canopies with just scattered trees will have less of a woodland character and reduced diversity of woodland-dependent species (although they may be still be important as a form of woodland-pasture). Completely closed canopies across the whole woodland are not ideal either however, as they cast heavier shade and support fewer species associated with edges, glades and open grown trees, and have little space where tree regeneration could occur. In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well.	of the site are available here
Structure and function (including its typical species)	**Vegetation structure - open space**	Maintain areas of permanent/temporary open space within the woodland feature, typically to cover approximately 10% of area	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. The targets set within this attribute should reflect the most appropriate structure for the woodland feature on a particular site, taking account of its: known interest, history, past management and the landscape context. Having some open, sunlit and largely tree-less areas as part of the woodland community is often important to facilitate natural tree and shrub regeneration and also to provide supporting habitat for specialist woodland invertebrates, birds, vascular and lower plants. Such open space can be permanent or temporary and may consist of managed grazed areas, linear rides and glades, or naturally-produced gaps caused by disturbance events such as windthrow/fire/tree falling over/snow damage.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Vegetation structure - old growth**	Maintain the extent and continuity of undisturbed, mature/old growth stands (typically comprising at least 50% of the feature at any one time)	Good woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. The targets set within this attribute should reflect the most appropriate structure for the woodland feature on a	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		and the assemblages of veteran and ancient trees (typically >10 trees per hectare).	particular site, taking account of its known interest, history, past management and the landscape context. For this habitat type, old or over-mature elements of the woodland are particularly characteristic and important features, and their continuity should be a priority.	
Structure and function (including its typical species)	**Vegetation structure - dead wood**	Maintain the continuity and abundance of standing or fallen dead and decaying wood, typically between 30 - 50 m3 per hectare of standing or fallen timber or 3-5 fallen trees >30cm per hectare	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. The targets set within this attribute should reflect the most appropriate structure for the woodland feature on a particular site, taking account of its known interest, history, past management and the landscape context. Dead and actively decaying wood, either as part of a standing tree or as a fallen tree on the woodland floor, is an important component of woodland ecosystems, and supports a range of specialist invertebrates, fungi, lichens and bryophytes, and associated hole-nesting birds and roosting bats, all of which may be very typical of the feature.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Vegetation structure - age class distribution**	Maintain at least 2 age classes (e.g. pole stage, mature, veteran) spread across the average life expectancy of the trees - which can be hundreds of years.	A distribution of size and age classes of the major site-native tree and shrub species that indicate the woodland will continue in perpetuity, and will provide a variety of the woodland habitats and niches expected for this type of woodland at the site in question. While there are at least 2 age classes of yew present in the site heavy deer browsing in many areas has left only veteran and mature trees. Efforts should be made to control deer populations and ensure that younger age classes can flourish within the site.	Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096 This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical	**Vegetation structure - shrub layer**	Maintain an Understorey of shrubs that is sparse under the Yew canopy, with occasionally present (e.g. holly, hawthorn,	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		elder, box) (this will vary with light levels and site objectives)	While the shrub layer in yew woodland's is typically sparse it may include, amongst others: scattered ash, juniper, holly and sycamore.	of the site are available here
Structure and function (including its typical species)	**Vegetation structure - Woodland edge (graduated edge; buffered; mosaics with other habitats)**	Maintain a graduated woodland edge into adjacent semi-natural open habitats, other woodland/ wood-pasture types or scrub.	Woodland structure includes variations in age, tree form, layering, the distribution and abundance of open space and dead wood. It plays a critical role in woodland ecosystem functioning. Woodland edge is defined as being the transitional zone between the forest feature and adjacent but different habitat types - the best woodland edges will have a varied structure in terms of height and cover. Many typical forest species make regular use of the edge habitats for feeding due to higher herb layer productivity and larger invertebrate populations.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the resilience of the feature by ensuring a diversity of site-native tree species; although Yew dominates, this can be provided by a scattering of one or more of whitebeam, ash, beech, sycamore and oak.	This recognises the increasing likelihood of natural habitat features needing 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. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being Low. Despite having a lower vulnerability to climate change 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.	Natural England. 2015c. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs. Available from http://publications.naturalengland.org.uk/publication/4954594591375360
Structure and	**Regeneration**	Restore the potential for	The regeneration potential of the woodland feature must be	Natural England. 2015b Site

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	**potential**	sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and <1.3m saplings - above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate.	maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. This will Include regeneration of the trees and shrubs from saplings or suckers, regrowth from coppice stools or pollards, and where appropriate planting. Browsing and grazing levels must permit regeneration at least in intervals of 5 years every 20. The density of regeneration considered sufficient is less in parkland sites than in high forest. Regeneration from pollarding of veteran trees should be included where this is happening. Natural regeneration potential needs to be restored because as highlighted in the Site Improvement Plan due to deer over grazing little or no regeneration of yew has been recorded. This is further supported by the latest site condition assessment which found in some areas little to no yew regrowth.	*Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096 This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Tree and shrub species composition**	Maintain a canopy and under-storey of which 95% is composed of site native trees and shrubs including: Juniper *Juniperus communis*, Holly Ilex aquifolium, Beech *Fagus sylvatica* and Pedunculate oak *Quercus robur.*	Native trees and shrubs in general support a greater diversity of associated species than non-native species, especially amongst groups of invertebrates which depend directly on trees for food and shelter. There are many plants and animals which use or co-exist with non-native trees, but many rare and threatened woodland species are specialists adapted to one or a few native trees or shrub species (birches, willows and oaks, are examples of trees that host many specialist insect species).	Natural England. 2008. *Definitions of Favourable Condition for designated features of interest at Kingley Vale*. FCT. (Available from Natural England on request) This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here JNCC. (2009). *NVC floristic tables*. Available from: http://jncc.defra.gov.uk/page-4265
Structure and function (including its typical	**Key structural, influential and/or**	Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1	Some plant or animal species (or related groups of such species) make a particularly important contribution to the structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;	English Nature. 2005a. *Kingley Vale SAC Citation.* Available from: http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)	**distinctive species**	habitat; yew *Taxus baccata*, beech *Fagus sylvatica* , juniper *Juniperus communis*, dogs mercury *Mercurialis perennis*, upright brome *Bromopsis erecta* and wild strawberry *Fragaria vesca*	• 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. 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.	org.uk/publication/5727834794360832 This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Invasive, non-native and/or introduced species**	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature	Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity 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 (e.g. use of broad spectrum pesticides). Such species can include Rhododendrons, snowberry, Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and 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.	
Supporting processes (on which the feature relies)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis. As mentioned in the SIP securing the uptake of agri-environmental agreements on neighbouring land could serve to improve the quality of the landscape surrounding Kingley Vale.	Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.	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)
		Pollution Information System (www.apis.ac.uk).	Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Restoration of air quality required as SIP indicates that air pollution, especially atmospheric nitrogen exceeds site relevant critical loads.	Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096
Supporting processes (on which the feature relies)	**Hydrology**	At a site, unit and/or catchment level (as necessary, Maintain natural hydrological processes to provide the conditions necessary to sustain the 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. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. This attribute and target are included because disruption/ damage to hydrological processes could be caused by activities at some distance from the site boundary. e.g. through extraction of ground or surface waters; diverting or damming	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			river channels; pollution of water source; channel alignment that disrupts natural geomorphological processes; tunnelling etc.	
Supporting processes (on which the feature relies)	**Illumination**	Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site.	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia); Dry grasslands and scrublands on chalk or limestone

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature to 40.19 hectares.	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.	JNCC. 2015. *Kingley Vale Natura 2000 standard data form*. Available from: http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0012767.pdf
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the 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.	Natural England. 2015a. Priority Habitat Inventory. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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 composition**	Ensure the component vegetation communities of the H6210 feature are referable to and characterised by the following National Vegetation Classification types : CG2 *Festuca ovina – Avenula pratensis* grassland CG3 *Bromus erectus* grassland CG4 *Brachypodium pinnatum* grassland CG5 *Bromus erectus – Brachypodium pinnatum* grassland	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). 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).	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Vegetation: proportion of herbs (including Carex spp)**	Maintain the proportion of herbaceous species within the range 40%-90%	A high cover of characteristic herbs, including sedges (Carex species) is typical of the structure of this habitat type.	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat; • Constant and preferential	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 Annex I habitat's structure or help to define that habitat on a particular	JNCC. (2006). *Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006*. Available from: http://jncc.defra.gov.uk/pdf/Article17/FCS2007-H6210-audit-

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		plant species of CG2, CG3, CG4 and CG5 grassland NVC vegetation types which comprise the H6120 feature within this SAC	SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available	Final.pdf This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
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;	There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as Cotoneaster spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature. Undesirable species include: *Cirsium arvense, Cirsium vulgare, Rumex crispus, Rumex obtusifolius, Senecio jacobaea, Urtica dioica, Brachypodium pinnatum, Bromopsis erecta* and all tree and shrub species excluding *Juniperus communis*	This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain the pattern of natural vegetation zonations/transitions Maintain a graduated woodland edge with the neighbouring H91J0 Taxus baccata woodland	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities.	English Nature. 2005a. *Kingley Vale SAC Citation.* Available from: http://publications.naturalengland.org.uk/publication/572783479436

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. Kingley Vale's designation is in part due to the full range of habitat structure of the H92J0 woodland; maintaining a graduated woodland edge between H6210 and H91J0 ensures this range of structures is maintained.	0832 This attribute is monitored as part of Natural England's site condition assessments. Details of the latest condition assessment of the site are available here
Structure and function (including its typical species)	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. As mentioned in the SIP securing the uptake of agri-environmental agreements on neighbouring land and preventing drift of fertilisers and pesticides could serve to improve the soil quality within Kingley Vale.	Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case	Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from: http://publications.naturalengland.org.uk/publication/6393220716036096

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			basis. As mentioned in the SIP securing the uptake of agri-environmental agreements on neighbouring land could serve to improve the quality of the wider landscape surrounding Kingley Vale and increase functional connectivity.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features needing 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. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being Low. Despite having a lower vulnerability to climate change 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.	Natural England. 2015c. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs. Available from http://publications.naturalengland.org.uk/publication/4954594591375360
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary, 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).	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species 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	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). Natural England. 2015b Site *Improvement Plan: Kingley Vale (SIP114).* SIP. Available from:

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. Restoration of air quality required as SIP indicates that air pollution, especially atmospheric nitrogen exceeds site relevant critical loads.	http://publications.naturalengland.org.uk/publication/6393220716036096
Supporting processes (on which the feature relies)	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Maintain the structure, functions and supporting processes associated with the feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	English Nature. 2005b. *Kingley Vale: Views About Management*. Available from: https://designatedsites.naturalengland.org.uk/PDFsForWeb/VAM/1002819.pdf
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The attribute **Structure and function (including its typical species): Supporting off-site habitat** has been removed as Kingley Vale SAC is not reliant upon any offsite habitat.				