



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

Avon Gorge Woodlands Special Area of Conservation (SAC)  
Site Code: UK0012734



The Avon Gorge - Spiked Speedwell (*Veronica spicata*) St Vincent's Rocks (C Westcott 2011)

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## **About this document**

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Avon Gorge Woodlands SAC.

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

**This advice replaces a draft version dated 25 January 2019 following the receipt of comments from the site's stakeholders.**

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

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

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

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

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

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

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

**If you have any comments or queries about this Supplementary Advice document please contact your local Natural England adviser or email [HDIRConservationObjectivesNE@naturalengland.org.uk](mailto:HDIRConservationObjectivesNE@naturalengland.org.uk)**

## About this site

### European Site information

<b>Name of European Site</b>	Avon Gorge Woodlands Special Area of Conservation (SAC)
<b>Location</b>	City of Bristol and North Somerset
<b>Site Map</b>	The designated boundary of this site can be viewed <a href="#">here</a> on the MAGIC website
<b>Designation Date</b>	1 April 2005
<b>Qualifying Features</b>	See section below
<b>Designation Area</b>	151.07ha
<b>Designation Changes</b>	N/A
<b>Feature Condition Status</b>	Details of the feature condition assessments made at this site can be found using Natural England's <a href="#">Designated Sites System</a>
<b>Names of component Sites of Special Scientific Interest (SSSIs)</b>	Avon Gorge SSSI
<b>Relationship with other European or International Site designations</b>	N/A

### Site background and geography

The Avon Gorge Woodlands SAC is an important example of a *Tilio-Acerion* forest in south-west England. These are woods of Ash *Fraxinus excelsior*, Wych Elm *Ulmus glabra* and Lime (mainly Small-leaved Lime *Tilia cordata*, which is locally abundant here, but with a very few Large-leaved Lime *T. platyphyllos*). The habitat type is here found, typically, on calcareous substrates associated with the limestone cliffs and screes of a large river gorge, where inaccessibility has reduced human impact. It represents sub-community d of W8 *Fraxinus excelsior – Acer campestre-Mercurialis perennis* woodland. This also occurs as a series of scattered patches grading into other types of woodland on the level plateau and on slopes above. Differences in ground flora due to variations in slope, aspect and substrate add to the diversity of the habitat. The ground flora typically includes fern banks (especially Hart's-tongue *Asplenium scolopendrium*, soft shield-fern *Polystichum setiferum* and buckler-ferns *Dryopteris* spp.); stands of Ramsons *Allium ursinum* in the moister zones; Dog's-mercury *Mercurialis perennis* and Enchanter's-nightshade *Circaea lutetiana* on drier soils. A wide range of other herbs and grasses occur within these stands. Small groves of yew *Taxus baccata* also occur on some of the stonier situations. Part of the Leigh Woods side of the SAC is important remnant wood pasture which was managed for this feature for many hundreds of years. This is shown by the presence of large numbers of veteran pollards, which are important for saproxylic invertebrates.

The sites selected as SACs for *Tilio-Acerion* include the most extensive examples with good habitat structure and function. Transitions to scrub and grassland, and the presence of a mosaic of other woodland habitats, are important features of this site, which holds populations of many rare, scarce or declining species including five whitebeams *Sorbus* unique to the Avon Gorge (*S. avonensis*, *S. bristoliensis*, *S. houstoniae*, *S. leighensis* and *S. wilmottiana*) and other Nationally Scarce plants, such as Angular Solomon's-seal *Polygonatum odoratum*. The associated species-rich transitions to scrub and herb-rich calcareous open limestone grassland often found on cliff ledges, also support a high number of

Nationally Rare and Scarce species, such as Bristol Rock-cress *Arabis scabra*, Round-headed Leek ('Bristol onion') *Allium sphaerocephalon* and Honewort *Trinia glauca*.

The site additionally is important for Greater and Lesser Horseshoe bats *Rhinolophus spp.*, breeding Peregrine Falcon *Falco peregrinus* and Ravens *Corvus corax*, and rare invertebrates including the Silky Wave moth *Idaea dilutaria*, Chalkhill Blue *Polyommatus coridon* and Small Blue *Cupido minimus*. Many of these species rely on the SAC habitats for places to live and breed making their condition highly significant.

The underlying geology which ultimately has driven the development of the SAC habitats is nationally important and the rock formations show the complete local succession of Carboniferous Limestone.

Avon Gorge Woodlands SAC is part of the Bristol, Avon Valleys and Ridge National Character ([NCA Profile 118](#)).

## 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:

- **H9180 *Tilio-Acerion* forests of slopes, screes and ravines \* Priority feature**

*Tilio-Acerion* ravine forests are woods of ash *Fraxinus excelsior*, wych elm *Ulmus glabra* and lime (mainly small-leaved lime *Tilia cordata* but more rarely large-leaved lime *T. platyphyllos*). Introduced sycamore *Acer pseudoplatanus* is often present and is a common part of the community in mainland Europe, where it is native. The habitat type typically occurs on nutrient-rich soils that often accumulate in the shady micro-climates towards the bases of slopes and ravines. Therefore it is found on calcareous substrates associated with coarse scree, cliffs, steep rocky slopes and ravines, where inaccessibility has reduced human impact. It often occurs as a series of scattered patches grading into other types of woodland on level valley floors and on slopes above, or as narrow strips along stream-sides. More extensive stands occur on limestone and other base-rich rocks. However, this habitat type is ecologically variable, particularly with respect to the dominant tree species.

Avon Gorge is representative of *Tilio-Acerion* forests in south-west England on the limestone cliffs and screes of a large river gorge. It is important because of the high concentration of Small-leaved Lime *Tilia cordata*, compared with other sites in the region, the presence of rare whitebeams *Sorbus* spp., including five which are unique to the Avon Gorge (*S. avonensis*, *S. bristolensis*, *S. houstoniae*, *S. leighensis* and *S. wilmottiana*), and other uncommon plants, such as green hellebore *Helleborus viridis*. Other characteristic species include Soft Shield-fern *Polystichum setiferum* and Hart's-tongue *Asplenium scolopendrium*. Species-rich transitions to scrub and grasslands are associated with the woodland. Small groves of Yew, *Taxus baccata* also occur on some of the stonier situations.

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

*Festuco-Brometalia* grasslands are found on thin, well-drained, lime-rich soils associated with chalk and limestone. They occur predominantly at low to moderate altitudes in England and Wales, extending locally into upland areas in northern England, Scotland and Northern Ireland. Many of these calcareous grasslands require grazing in order to maintain them. All forms of *Festuco-Brometalia* grassland comprise mixtures of grasses and herbs, in which there is at least a moderate representation of calcicolous species. The structural and floristic characteristics of the habitat are strongly influenced by climatic factors and management practices.

A large number of rare plants are associated with this habitat within the Avon Gorge, including Dwarf Sedge *Carex humilis*, Spring Cinquefoil *Potentilla tabernaemontani*, Dwarf Mouse-ear *Cerastium pumilum* and Rock Stonecrop *Sedum forsterianum*. Bristol rock-cress *Arabis scabra* and Round-headed Leek (or 'Bristol Onion') *Allium sphaerocephalon* grow within this habitat type in the Gorge and nowhere else in the UK. The various species of whitebeam are often associated with the areas of open limestone grassland habitat.

### Qualifying Species:

None

**Table 1: Supplementary Advice for Qualifying Features: H9180. *Tilio-Acerion* forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes \***

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
<b>Extent and distribution of the feature</b>	<b>Extent of the feature within the site</b>	Maintain or where necessary restore the total extent of the feature to 105.75 hectares.	<p>There should be no measurable reduction in the extent and area of this feature. The baseline-value of extent given has been generated using data gathered from the listed 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.</p> <p>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.</p> <p>Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>For this feature tree roots (particularly of veteran trees) can extend a considerable distance beyond the boundary of the site - they can be impacted by soil compaction (such as caused by vehicles or construction works); agricultural operations or other soil disturbance (like trenches); and agro chemicals or other chemicals which get into the soil. Any loss of woodland area - whether at the edge or in the middle of a site will reduce the core woodland area where woodland conditions are found - these support significant assemblages of species dependent on woodland conditions (e.g. lichens and bryophytes). Fragmentation of the woodland into different parts will clearly disrupt the movement of species between the remaining parts of the woodland.</p> <p>It should be noted that the area defined as H9180 habitat</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p> <p>C Westcott pers. com. 2018.</p>



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>(105.76ha) has been obtained from the SAC standard data form, this covers the majority of the woodland area on the North Somerset side of the Avon Gorge. The full extent of Small-leaved lime dominated woodland has not been fully formally assessed, but it is known that there are further areas of Lime dominated woodland which are outside of the SAC (and SSSI) and additionally areas like the wood pasture block within the Leigh Woods NNR (inside the SAC boundary) that do not contain indicators of H9180 habitat (C Westcott pers. Comm. 2018).</p> <p>Corner. T and Edmondson. R. 1999 gives some further context of parts of the SAC but this is not a full survey of the designated area and needs updating and assessing in further detail.</p> <p>The Bristol side of the Avon Gorge does not contain this SAC feature. The woodland here is secondary in nature covering many areas of previously species rich calcareous grassland, these woodlands and blocks of scrub do contain a number of the rare whitebeam species.</p>	
<b>Extent and distribution of the feature</b>	<b>Spatial distribution of the feature within the site</b>	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	<p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes.</p> <p>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.</p> <p>These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature,</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p> <p>Recreational pressure on the SAC habitats and sensitive rare species are significant and in places increasing. Further work is required to understand the scale of this impact and possible remedies / solutions required.</p>	
<b>Structure and function (including its typical species)</b>	<b>Vegetation community composition</b>	<p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types</p> <p>Broadleaved, mixed and yew woodland</p> <p>W7 <i>Alnus glutinosa</i> - <i>Fraxinus excelsior</i> - <i>Lysimachia nemorum</i> woodland</p> <p>W8 <i>Fraxinus excelsior</i> - <i>Acer campestre</i> - <i>Mercurialis perennis</i> woodland</p> <p>W10 <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland</p> <p>The main NVC type of Tilio-Acerion forests being W8d.</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). 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.</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Structure and function (including its typical)</b>	<b>Vegetation structure - canopy cover</b>	<p>Maintain an appropriate tree canopy cover across the feature, which will typically be between 40-90% of the site.</p>	<p>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</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p>



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
<b>species)</b>			<p>function and in particular microclimate, leaf litter fall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil.</p> <p>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.</p> <p>In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well.</p>	<p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - open space</b>	Maintain or where necessary restore 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.	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - old growth</b>	Maintain the extent and continuity of undisturbed, mature/old growth stands (typically comprising at least 20% 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	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p>

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.	Natural England. 2009a. Natural England. 2009b. Natural England, 2015a.
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - dead wood</b>	Maintain or where necessary restore the continuity and abundance of standing or fallen dead and decaying wood, typically between 30 - 50 m <sup>3</sup> per hectare of standing or fallen timber or 3-5 fallen trees >30cm per hectare, and >10 standing dead trees 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.	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a.
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - age class distribution</b>	Maintain or where necessary restore at least 3 age classes (pole stage/ medium/ mature) spread across the average life expectancy of the commonest trees.	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.	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a.
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - shrub layer</b>	Maintain or where necessary restore an understorey of shrubs cover 20 - 60% of the stand area (this will vary with light levels and site objectives).	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.	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				Natural England. 2009b. Natural England, 2015a.
<b>Structure and function (including its typical species)</b>	<b>Vegetation structure - woodland edge</b>	Maintain or where necessary restore a graduated woodland edge into adjacent semi-natural open habitats, other woodland/wood-pasture types or scrub.	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. Grasslands / arable fields managed with high doses of agro-chemicals could potentially not allow this gradation of woodland edge and could have other impacts on the integrity of the site (pollution/ nutrient enrichment etc.).  Where blocks of woodland are directly adjacent to previously or currently open calcareous grassland blocks, or areas of open rock/scree, the objective should be to manage these area to provide a larger areas of open / better connected extent of calcareous grassland habitat. The woodland edge should be managed to reduce scrubby shrubs and invasive plants (see below section) from encroaching this sensitive habitat.	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a. C Westcott pers. com. 2018.
<b>Structure and function (including its typical species)</b>	<b>Adaptation and resilience</b>	Maintain or where possible restore the resilience of the feature by ensuring a diversity of site-native trees (at least 4 site native tree species) e.g. Ash, Small-leaved lime, Alder, Rowan Birch, English Oak (Q robur) and Sessile Oak (Q petraea) and particularly Whitebeam spp. are present across 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. Using best available information, any necessary or likely adaptation or	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015b) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats.</p> <p>This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>Understanding the current and likely possible effects of climate change on the SAC habitats within the Avon Gorge is a key priority.</p> <p>Many of the rare species are already struggling and sensitive habitats are fragmented. In places the site is particularly negatively affected by lack of management and invasive species which might become or more frequent in a changing climate.</p>	
<b>Structure and function (including its typical species)</b>	<b>Browsing and grazing by herbivores</b>	Maintain browsing at a low level that allows well developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc.), and tree seedlings and sapling common in gaps.	<p>Herbivores, especially deer, are an integral part of woodland ecosystems. They are important in influencing woodland regeneration, composition and structure and therefore in shaping woodland wildlife communities.</p> <p>In general, both light grazing and browsing is desirable to promote both a diverse woodland structure and continuous seedling establishment. Short periods with no grazing at all can allow fresh natural regeneration of trees, but a long-term absence of herbivores can result in excessively dense thickets of young trees which shade out ground flora and lower plant species.</p> <p>However, heavy grazing by deer prevents woodland</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>regeneration, and can cause excessive trampling and/or poaching damage, canopy fragmentation, heavy browsing, barkstripping and a heavily grazed sward.</p> <p>Projects to introduce grazing / browsing animals to help restore priority habitats within the SAC have been introduced e.g. the introduction of cattle grazing with the wood-pasture are of Leigh Woods and goat grazing of the Bristol side.</p>	
<b>Structure and function (including its typical species)</b>	<b>Regeneration potential</b>	<p>Maintain or where necessary restore the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and &lt;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.</p>	<p>The regeneration potential of the woodland feature must be 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.</p> <p>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. Positive management associated with the veteran trees may include halo-ing and identifying / possibly planting / creating new and replacement veterans.</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Structure and function (including its typical species)</b>	<b>Key structural, influential and/or distinctive species</b>	<p>Maintain or where necessary restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;</p> <p>Small-leaved lime – <i>Tilia cordata</i>; Whitebeam spp. – <i>Sorbus spp.</i>, Soft Shield-fern - <i>Polystichum setiferum</i>; Hart's-tongue - <i>Asplenium scolopendrium</i>.</p> <p>Less typical species but particularly distinctive or special</p>	<p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;</p> <ul style="list-style-type: none"> <li>• <b>Structural</b> species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition').</li> <li>• <b>Influential</b> 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)</li> </ul>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. 2015.</p> <p>Houston. 2016.</p> <p>Houston. L. 2018.</p> <p>Lovett. 1982.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>of the Annex I habitat include:- Angular Solomon's-seal - <i>Polygonatum odoratum</i>; Green-flowered Helleborine - <i>Epipactis phyllanthes</i>; Stinking Hellebore - <i>Helleborus foetidus</i>;</p> <p>Diversity of whitebeam <i>Sorbus sp</i> present within the Gorge.</p> <p>See explanatory notes for further species information.</p>	<p>• <b>Site-distinctive</b> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC.</p> <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p> <p>There is good evidence to suggest that <i>Sorbus</i> taxa in the Gorge are in a state of contemporary evolution, which results in many closely related species and hybrids occurring within this discrete geographical area. Some of the taxa are Nationally Rare or Scarce, but Common Whitebeam <i>Sorbus aria</i>, in other instances presumed to be of low conservation concern is an important element of the evolutionary processes occurring here. The proper conservation of the Gorge's whitebeams should aim to encompass sufficient suitable habitat to allow the evolutionary process to continue.</p> <p>Whitebeam species present include: Common whitebeam <i>Sorbus aria</i>; English whitebeam <i>S. anglica</i>; Bristol Whitebeam <i>S. bristoliensis</i>; 'Round-leaved Whitebeam <i>S. eminens</i>; A whitebeam <i>S. porrigentiformis</i>; Wilmott's Whitebeam <i>S. wilmottiana</i>; White's Whitebeam <i>S. whiteana</i>; A whitebeam <i>S. leighensis</i>; Wild service tree – <i>S. torminalis</i>; <i>S. anglica</i>; A whitebeam - <i>S. spectans</i>; The Avon Gorge whitebeam - <i>S. avonensis</i>.</p> <p>It should be noted that there are other species of whitebeam, (including Houston's whitebeam <i>Sorbus x houstoniae</i>) which are evolving and as these described they should be considered as part of the sites importance.</p>	<p>Natural England, 2015a.</p> <p>University of Bristol. 1972.</p> <p>C Westcott pers. com. 2018.</p>



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
<b>Structure and function (including its typical species)</b>	<b>Invasive, non-native and/or introduced species</b>	Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature.	<p>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.</p> <p>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 various plants and also Pheasant <i>Phasianus colchicus</i></p> <p>There are major issues within the Tilio-Acerion habitat with invasive alien species including but not limited to:- various <i>Cotoneaster spp.</i>, especially those with a horizontal and spreading growth pattern; <i>Quercus ilex</i> (Holm Oak); <i>Rhododendron ponticum</i> (Rhododendron) – on the sandstone only; <i>Prunus laurocerasus</i> (Cherry laurel), <i>Buddleja davidii</i> (Butterfly-bush) and <i>Viburnum tinus</i> (Laurestine).</p> <p>There are several locations within the SAC where non-native conifers have been planted (many years ago) along with Red oak <i>Quercus rubra</i> and these are within the SAC in areas where Tilio-Acerion forest should be present. Works are planned to remove these non-natives, but this need driving forward in a partnership based way. Once cleared planting programmes (including whitebeam spp and small leaved lime) should be considered.</p> <p>The consideration of what is 'introduced non-native' has become more complex in the light of the likely impacts of <i>Chalara</i> (ash dieback). It is likely that species such as Sycamore and Beech, whilst not usually considered a desired native component of ancient woodland in this area, may have to move to an accepted naturalised status to retain a broad enough mix of acceptable species and spread the risk of possible future diseases. A continuing watching brief should be the default on the status of <i>Chalara</i> and the possible impacts of</p>	C Westcott pers. com. 2018.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			these substitute species on individual sites.	
<b>Structure and function (including its typical species)</b>	<b>Soils, substrate and nutrient cycling</b>	Maintain or if necessary 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 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.	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a. British Geological Society UK Soil Observatory.
<b>Supporting processes (on which the feature relies)</b>	<b>Functional connectivity with wider landscape</b>	Maintain or if necessary restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	<p>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.</p> <p>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.</p> <p>Directly adjacent to the Avon Gore is Ashton Court SSSI which is nationally important for its rich saproxylic invertebrate fauna. These mainly associated with the ancient trees include ash</p>	Corner and Edmondson 1999. Houston. L. 2013. Houston. L. 2018. Natural England. 2009a. Natural England. 2009b. Natural England, 2015a. WENP. 2013. C Westcott pers. com. 2018. .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p><i>Fraxinus excelsior</i>, wych elm <i>Ulmus glabra</i> and beech <i>Fagus sylvatica</i> although the majority are oak <i>Quercus robur</i>.</p> <p>The continuity of parkland and woodland cover at Ashton Court over hundreds of years, with large and over-mature timber, has enabled the specialised saproxylic invertebrate fauna to survive. Such continuity and habitat conditions are now very rare within the UK. There is quite likely to be an important connection between Ashton Court SSSI and the North Somerset side of the Avon Gorge in terms of saproxylic invertebrate due to the presence of ideal habitat but this has not been fully explored.</p> <p>Numerous exercises have been undertaken recently to map existing and prospective ecological networks across the West of England Area and these show the extent and importance of woodland in the local area.</p>	
<b>Supporting processes (on which the feature relies)</b>	<b>Air quality</b>	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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).	<p>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 scientific understanding.</p> <p>There are critical levels for ammonia (NH<sub>3</sub>), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis.</p> <p>Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development,</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	
<b>Supporting processes (on which the feature relies)</b>	<b>Hydrology</b>	At a site, unit and/or catchment level as necessary, maintain or if necessary restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site	<p>Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present.</p> <p>This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. This is included as 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 river channels; pollution of water source; channel alignment that disrupts natural geomorphological processes; tunnelling etc.</p>	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Supporting processes (on which the feature relies)</b>	<b>Illumination</b>	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.	<p>Corner and Edmondson 1999.</p> <p>Houston. L. 2013.</p> <p>Houston. L. 2018.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England, 2015a.</p>
<b>Version Control</b>				
<b>4 March 2019:</b> Explanatory notes revised to make note of impacts from recreational pressure and vulnerability of habitats and rare plants to climate change.				
<b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' and 'restore' objectives. Overall, both maintain and restore objectives will be applicable to the SAC but these will differ between each component part of the site depending on its particular circumstances. Natural England will be able to provide further specific advice on request.				

**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)
<b>Extent and distribution of the feature</b>	<b>Extent of the feature within the site</b>	Maintain or if necessary restore the total extent of the feature to 6.93 hectares.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys.</p> <p>Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features.</p> <p>Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>It is problematic measuring the areas of H6210 / calcareous grassland on this site as patches are small (often very small) and often on steep inaccessible slopes, scree, cliffs or ledges. Therefore, the figure above does not account for the slopes found within the Gorge and have essentially been measured in 2D. The actual area of calcareous grassland is likely to be larger.</p> <p>The figure of 6.93ha for H6210 has been obtained from the SAC standard data form. It is believed that this figure is an under-estimation in the extent of potential calcareous grassland habitat across the Gorge and further work is needed to clarify this (C Westcott pers. Comm. 2018).</p>	<p>Natural England. 2015a.</p> <p>Natural England. 2009a.</p> <p>Lawrence and Higgins. 2003.</p> <p>C Westcott pers. com. 2018.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>An important part of this habitat are the areas of rock and open scree which often contain small isolated patches of calcareous grassland and rare species. Some of the rare species like <i>Hornungia petraea</i> – <i>Hutchinsia</i> grow on more open areas and on scree so these are very important. In the long term (100 years+) the areas of calcareous grassland habitat in the Gorge have declined greatly, though most had already gone by the time of notification under the Wildlife and Countryside Act as amended (1988).</p> <p>The open managed calcareous grassland habitat is key to providing habitat to support viable populations of rare plants (and insects) the area should ideally be increased and/or restored through selective removal of secondary woodland and scrub in some areas that are known to have recently held calcareous grassland.</p> <p>Key to maintaining and restoring calcareous grassland habitat is the control of invasive (non-native and native) species, which quickly grow and overtake open areas.</p> <p>As well as pressure from scrub and invasive species these sensitive habitats are threatened from damage caused by inappropriate access resulting in erosion and damage. Work is needed to understand, combat and reduce this.</p>	
<b>Extent and distribution of the feature</b>	<b>Spatial distribution of the feature within the site</b>	Maintain or if necessary restore the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	<p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat.</p> <p>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</p>	<p>Natural England. 2015a.</p> <p>Natural England. 2009a.</p> <p>Lawrence and Higgins. 2003.</p> <p>C Westcott pers. com. 2018.</p>



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>isolated populations which are more vulnerable to extinction.</p> <p>These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p>	
<b>Structure and function (including its typical species)</b>	<b>Vegetation community composition</b>	<p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types:</p> <p>CG1 <i>Festuca ovina</i> – <i>Carlina vulgaris</i> grassland</p> <p>CG3 <i>Bromus erectus</i> grassland</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).</p>	<p>Natural England. 2015a.</p> <p>Natural England. 2009a.</p> <p>Lawrence and Higgins. 2003.</p>
<b>Structure and function (including its typical species)</b>	<b>Vegetation: proportion of herbs (including Carex spp )</b>	Maintain or where necessary restore the proportion of herbaceous species within the range 40%-90%	A high cover of characteristic herbs, including sedges ( <i>Carex</i> species) is typical of the structure of this habitat type.	<p>Lovett. 1982.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Natural England. 2015a.</p> <p>University of Bristol. 1972.</p>
<b>Structure and function (including its typical species)</b>	<b>Key structural, influential and/or distinctive species</b>	Maintain or where necessary restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;	<p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;</p> <ul style="list-style-type: none"> <li>• <b>Structural</b> species which form a key part of the Annex I</li> </ul>	<p>Lovett. 1982.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>The constant and preferential plants of the CG1 and CG3 grassland NVC community types which forms a key component of the H6210 feature</p> <p>Vascular plant assemblage (see supporting notes)</p>	<p>habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition').</p> <ul style="list-style-type: none"> <li>• <b>Influential</b> 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)</li> <li>• <b>Site-distinctive</b> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC.</li> </ul> <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p> <p><b>Sorbus</b> There is good evidence to suggest that <i>Sorbus taxa</i> in the Gorge are in a state of contemporary evolution, which results in many closely related species and hybrids occurring within this discrete geographical area. Some of the taxa are Nationally Rare or Scarce, but Common Whitebeam <i>Sorbus aria</i>, in other instances presumed to be of low conservation concern is an important element of the evolutionary processes occurring here. The proper conservation of the Gorge's whitebeams should aim to encompass sufficient suitable habitat to allow the evolutionary process to continue.</p> <p><b>Vascular plant assemblage</b> The vascular plant assemblage includes <i>Allium sphaerocephalon</i> Round-headed Leek or 'Bristol Onion'; <i>Anisantha madritensis</i> Compact Brome; <i>Arabis scabra</i> Bristol</p>	<p>C Westcott pers. com. 2018</p> <p>Natural England. 2015a.</p> <p>University of Bristol. 1972.</p> <p>University of Bristol. 1991</p> <p>University of Bristol. 1993</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>Rock-cress; <i>Carex digitate</i> Fingered Sedge; <i>Carex humilis</i> Dwarf Sedge; <i>Cerastium pumilum</i> Dwarf Mouse-ear; <i>Gastridium ventricosum</i> Nit-grass; <i>Geranium purpureum</i> ssp. Little Robin; <i>Hornungia petraea</i> Hutchinsia; <i>Potentilla neumanniana</i> Spring Cinquefoil; <i>Scilla autumnalis</i> Autumn Squill; <i>Sedum forsterianum</i> Rock Stonecrop; <i>Sorbus anglica</i> a whitebeam; <i>Sorbus bristoliensis</i> Bristol Whitebeam; <i>Sorbus eminens</i> 'Round-leaved Whitebeam'; <i>Sorbus porrigentiformis</i> a whitebeam; <i>Sorbus wilmottiana</i> Wilmott's Whitebeam; <i>Trinia glauca</i> Honewort; <i>Veronica spicata</i> ssp. <i>hybrida</i> Western Spiked Speedwell;</p> <p>Other selected vascular plants of high wildlife value included as indicators of local distinctiveness are <i>Allium oleraceum</i> Field Garlic; <i>Cardamine impatiens</i> Narrow-leaved Bittercress; <i>Sorbus whiteana</i> A whitebeam; <i>Sorbus leighensis</i> a whitebeam; <i>Geranium sanguineum</i> Bloody Crane's-bill. Some of the key flower species of CG1 and CG3 grassland types are also particularly important for some rare invertebrate species that depend on them for their lifecycles.</p> <p>Within the Gully on the Northern face there is a sole <i>Thalictrum minus</i> - Lesser Meadow-Rue plant growing in an in horizontal rock crack. This is a famous plant in the Gorge, which has been known about since 1867. It last flowered in 1988.</p> <p>Detailed maps of some plant distribution are found within a number of specialist reports some of these are held by Natural England and various partner bodies which own and manage the site along with the Avon Gorge and Down Wildlife Project. In particular the University of Bristol Avon Gorge Project Reports nos. 16 and 17 are particularly useful. 16 – Avon Gorge rare plant counts 1987-9, and 17 - The Nationally Scarce Plants of the Avon Gorge and its environs. Due to the complexity and nature of the site there are however gaps in the knowledge base and further studies are required.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation: undesirable species	Maintain if necessary restore 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.	<p>There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as <i>Cotoneaster</i> spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature.</p> <p>Key to maintaining and restoring calcareous grassland habitat is the control of invasive (non-native and native) species, which quickly grow and overtake open areas. There are major issues within the H6210 / calcareous habitat with invasive alien species.</p> <p>Undesirable species include: <i>Cotoneaster</i> <i>Cotoneaster</i> spp.; Holm oak <i>Quercus ilex</i>; Turkey oak <i>Quercus cerris</i>; Rhododendron <i>Rhododendron ponticum</i>; Cherry laurel <i>Prunus laurocerasus</i>; <i>Buddleia</i> <i>Buddleja</i> spp; Broad-leaved Everlasting Pea <i>Lathyrus latifolius</i>; Mexican Daisy <i>Erigeron karvinskianus</i>; Winter Heliotrope <i>Petasites fragrans</i>; Stinking Iris <i>Iris foetidissima</i>; Laurestine <i>Viburnum tinus</i>; Cyclamen <i>Cyclamen</i> spp; Alexanders <i>Smyrniium olusatrum</i>; Red valerian <i>Centranthus ruber</i>.</p> <p>Alexanders <i>Smyrniium olusatrum</i> is a significant issue in the Gorge because of its size, frequency, and ability to dominate the open CG grassland areas. Work is being done to reduce the frequency of this plant by collecting seeds / flower heads before they are distributed but this needs to be applied across the site and completed annually. - Red valerian <i>Centranthus ruber</i> is also a growing issue and controlling this should be potentially considered across the site.</p> <p>Additionally native scrub species including clematis <i>clematis</i> spp; gorse spp <i>Ulex</i> spp.; bramble <i>Rubus</i> spp.; plus various thorn and other woody species which are a particular issue to CG grassland and the other rare species listed above.</p> <p>Within certain parts of the site control programs (including</p>	<p>Natural England. 2015a.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Lawrence and Higgins. 2003.</p> <p>C Westcott pers. com. 2018.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			grazing / browsing animals) have been introduced to try and address invasive plant issues, but consideration needs to be given to applying this much more widely across the site.	
<b>Structure and function (including its typical species)</b>	<b>Vegetation community transitions</b>	Maintain or if necessary restore the pattern of natural vegetation zonations/transitions.	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.	Natural England. 2015a. Natural England. 2009a. Natural England. 2009b. Lawrence and Higgins. 2003.
<b>Structure and function (including its typical species)</b>	<b>Soils, substrate and nutrient cycling</b>	Maintain or if necessary 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 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.	Natural England. 2015a. Natural England. 2009a Natural England. 2009b. Lawrence and Higgins. 2003.
<b>Structure and function (including its typical species)</b>	<b>Supporting off-site habitat</b>	Maintain or if necessary restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature.	<p>The structure and function of the qualifying habitat, including its typical species, may 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.</p> <p>This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.</p> <p>There are important areas of species rich grassland found within the direct vicinity of the SAC. The Downs and Ashton Court hold significant areas of calcareous grassland influenced habitat. These neighbouring sites are important for rare insects</p>	Natural England. 2015a. Natural England. 2009a. Natural England. 2009b. Lawrence and Higgins. 2003. C Westcott pers. com. 2018.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>(especially butterflies and deadwood invertebrates) and there is likely to be links with them and the SAC.</p> <p>Mobile species like Horseshoe bats (lesser and greater) which are present on SAC (and on adjacent / neighbouring sites) are also likely to forage and roost within the SAC.</p>	
<b>Structure and function (including its typical species)</b>	<b>Functional connectivity with wider landscape</b>	Maintain or if necessary restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site.	<p>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.</p> <p>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.</p>	<p>Natural England. 2015a.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Lawrence and Higgins. 2003.</p>
<b>Structure and function (including its typical species)</b>	<b>Adaptation and resilience</b>	Maintain or if necessary restore the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site.	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far	<p>English Nature Report 216.</p> <p>Natural England. 2015a.</p> <p>Natural England. 2015b.</p> <p>Natural England. 2009a.</p> <p>Natural England. 2009b.</p> <p>Lawrence and Higgins. 2003.</p> <p>University of Bristol. 1997.</p>



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>as practicable, in order to ensure the feature's long-term viability.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself</p> <p>The fragmentation of the habitats within this SAC, reliance of rare species on these fragments and difficulties in managing these habitats suggest that appropriate monitoring and action would be advisable.</p> <p>Understanding the current and likely possible effects of climate change on the SAC habitats within the Avon Gorge is a key priority.</p> <p>Many of the rare species are already struggling and sensitive habitats are fragmented. In places the site is particularly negatively affected by lack of management and invasive species which might become or more frequent in a changing climate.</p>	C Westcott pers. com. 2018.
<b>Supporting processes (on which the feature relies)</b>	<b>Air quality</b>	Maintain or if necessary 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).	<p>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.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH<sub>3</sub>), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts.</p> <p>These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</p>	
<b>Supporting processes (on which the feature relies)</b>	<b>Conservation measures</b>	Maintain or if necessary 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 feature	<p>Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.</p> <p>The open managed calcareous grassland habitat is key to providing habitat to support viable populations of rare plants (and insects) the area should ideally be increased through selective removal of secondary woodland, scrub and invasive non-natives in some areas that are known to have recently held calcareous grassland.</p> <p>Species recovery and reinforcement projects may be necessary to restore / enhance rare plant populations within the SAC. A number of projects have been undertaken, including work on <i>Veronica spicata ssp hybrida</i> Western Spiked Speedwell (successful) and <i>Scilla autumnalis</i> Autumn Squill (unsuccessful).</p> <p>Recreational pressure on the SAC habitats and sensitive rare species are significant and in places increasing. Further work is required to understand the scale of this impact and possible</p>	<p>Natural England. 2009a.</p> <p>Natural England. 2015a.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			remedies / solutions required.	
<b>Version Control</b>				
<b>4 March 2019:</b> Explanatory notes revised to make note of impacts from recreational pressure and vulnerability of habitats and rare plants to climate change.				
<b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' or 'restore' objectives. Overall, both maintain and restore objectives will be applicable to the SAC but these will differ between each component part of the site depending on its particular circumstances. Natural England will be able to provide further specific advice on request.				

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