



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

**Aston Rowant Special Area of Conservation (SAC)
Site code: UK0030082**



Sheep grazing on downland with juniper at Aston Rowant. Photo ©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 Aston Rowant SAC. This advice should therefore be read together with the [SAC Conservation Objectives](#).

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	Aston Rowant Special Area of Conservation (SAC)
Location	Oxfordshire, Buckinghamshire.
Site Maps	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	127.75 ha
Designation Changes	<i>n/a</i>
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)	Aston Rowant SSSI
Relationship with other European or International Site designations	The boundary of this site coincides with the boundary of the Chilterns Beechwoods SAC .

Site background and geography

Aston Rowant SAC is situated in a prominent position on the scarp of the southern [Chilterns National Character Area](#) in Oxfordshire. The site has a wide range of habitats including species-rich chalk grassland, mixed chalk scrub and ash and beech woodland.

Of particular note is the occurrence of one of the largest surviving populations of juniper in the south east of England. The site is on the Middle and Upper Chalk, giving rise to predominantly highly calcareous, free-draining soils but there are also more clay-rich and moisture-retentive soils in the valley bottoms and on the plateau.

The landscape character of Aston Rowant is typical of the Chilterns National Character Area (NCA), with moderate to steep downland slopes, and a mixture of woodland, grassland and scrub, set in a wider landscape of improved pasture and arable fields surrounded by large hedges. The surrounding landscape is predominantly rural, with scattered small settlements, but the M40 motorway cuts through the centre of Aston Rowant SAC creating a major visual impact.

A large proportion of the SAC is owned and directly managed as a [National Nature Reserve](#) by Natural England and has open public access. Aston Rowant SAC is situated in the Chilterns Area of Outstanding Natural Beauty (AONB).

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:

- **H5130. *Juniperus communis* formations on heaths or calcareous grasslands; Juniper on heaths or calcareous grasslands**

Aston Rowant SAC supports stands of botanically-rich scrub characteristic of chalk downland in southern Britain with varying amounts of juniper *Juniperus communis*. This site is included to provide an example of the habitat type on Chalk in the south of England. Juniper is a rare and declining species in lowland England with highly specific requirements at all stages of its development, which are increasingly difficult to provide in a modern agricultural landscape. The vegetation in which juniper occurs on the Chalk has a distinctive character and represents a seral stage in the succession from bare chalk through the scrub stage to woodland.

Aston Rowant SAC represents *Juniperus communis* formations near the northern edge of the habitat's range on the chalk of southern England where it is rare and declining. The juniper population at this site has been estimated to be between 1,000 and 2,000 individuals of various age-classes. It is one of the best remaining examples in the UK of lowland juniper scrub on chalk.

The mixed chalk scrub in which juniper is a component at Aston Rowant SAC is an example of National Vegetation Classification type W21, characterised by a large number of thorny shrubs including hawthorn *Crataegus monogyna*, dog rose *Rosa canina*, sweet briar *Rosa rubiginosa*, blackthorn *Prunus spinosa*, bramble *Rubus fruticosus* and dewberry *Rubus caesius*, together with other shrubs including wild privet *Ligustrum vulgare*, wild clematis *Clematis vitalba*, dogwood *Cornus sanguinea* and buckthorn *Rhamnus catharticus*. Tree species commonly associated with these stands include ash *Fraxinus excelsior*, whitebeam *Sorbus aria* and yew *Taxus baccata*. Rare plant species which occur in these areas include deadly nightshade *Atropa belladonna* and wild candytuft *Iberis amara*.

- **H9130. Asperulo-Fagetum beech forests; Beech forests on neutral to rich soils**

This Annex I habitat type typically occurs on neutral to calcareous soils. In the UK it mostly corresponds to NVC vegetation types W12 *Fagus sylvatica* – *Mercurialis perennis* woodland and W14 *Fagus sylvatica* – *Rubus fruticosus* woodland. The two NVC types often occur together on a site. Each community has a different associated suite of species which change according to slope and soil type.

Aston Rowant SAC has a range of woodland types in which beech *Fagus sylvatica* and ash *Fraxinus excelsior* are major components. These represent good examples of southern beech and ash woodlands characteristic of the south east of England on the Chalk. Beech and ash woodland in the Chilterns are of particular interest in supporting a diverse range of species and form distinctive habitat types.

The woodlands at Aston Rowant SAC vary in composition and character in relation to substrate and soil depth. Those areas of woodland on thin, chalky soils generally have a higher proportion of ash in the canopy and have a ground flora characteristically dominated by dog's mercury *Mercurialis perennis*, together with less common plants such as sanicle *Sanicula europaea* and yellow archangel *Lamium galeobdolon*. On deeper soils where there are deposits of clay-rich material over the chalk beech is generally the dominant tree species with occasional oak *Quercus petraea*, cherry *Prunus avium* and rowan *Sorbus aucuparia*. The ground flora in these areas typically has frequent bramble *Rubus fruticosus* but with a wide range of other associates including violet helleborine *Epipactis purpurata*, wood barley *Hordelymus europaeus*, wood melick *Melica uniflora*, wood anemone *Anemone nemorosa* and bluebell *Hyacinthoides non-scripta*.

References

Rodwell JS (ed) 1991 British Plant Communities. Volume 1. Woodlands and scrub. Cambridge University Press.

Rodwell, JS. (ed.) 1992. British Plant Communities. Volume 3. Grassland and montane communities. Cambridge University Press.

Table 1: Supplementary Advice for Qualifying Features: H5130. *Juniperus communis* formations on heaths or calcareous grasslands; Juniper on heaths or calcareous grasslands

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	Restore the total extent of the H5130 feature to at least an area of 46.58ha.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of juniper scrub, whilst accepting that this is a highly dynamic, seral habitat.</p> <p>There is evidence of a substantial decline in both the size and distribution of the juniper population at Aston Rowant. Comparative studies undertaken in the 1960s and 2005 indicate that a decline of around 90% in the overall number of bushes occurred during this period, although there has been a partial recovery since then as a result of planting of bushes raised from cuttings. The aims of juniper conservation at this site are to seek to prevent further decline in overall numbers of plants and its distribution across the site and, ultimately, to re-establish a self-sustaining population.</p> <p>The baseline value of population size and distribution has been generated using data gathered at the time of SAC classification, based on a calculation of the total extent of mixed scrub including juniper or potentially suitable for juniper and areas of grassland supporting juniper. The figure is considered to represent a minimum level for the extent of the juniper scrub feature to remain as a significant component of the habitat mosaic and as a viable, self-sustaining population. Juniper occurs in a variety of habitat types at Aston Rowant but there is good quality data on population size and distribution. It is also important to note that juniper scrub is a highly dynamic feature and population size and distribution will be affected by a wide range of factors. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations.</p> <p>At Aston Rowant SAC, in common with many other locations in South East England much of the juniper occurs in a highly modified 'unnatural' setting with scattered, isolated bushes in regularly grazed chalk grassland. Its natural habitat, the thorny scrub seral stage, has a more restricted distribution. It is desirable that the extent of the mixed chalk scrub with juniper habitat is increased. However, there are potential conflicts in seeking to promote the establishment of</p>	<p>NATURAL ENGLAND. Aston Rowant National Nature Reserve Management Plan.</p> <p>NATURAL ENGLAND. Aston Rowant Juniper Management Plan</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>scrub where there is the additional objective of maintaining the extent and quality of species-rich chalk grassland. Opportunities for the creation of new areas of habitat may arise on-site following the clearance of areas of dense scrub or secondary woodland of low nature conservation value or off-site on former arable land or land which becomes available as a result of road construction or similar development.</p> <p>Where there are potential conflicts between the objectives of promoting the creation of new areas of juniper scrub and the maintenance of existing habitats of high wildlife importance Natural England will advise on an appropriate course of action.</p>	
Extent and distribution of the feature	Spatial distribution of the feature within the site	Restore the distribution and configuration of the H5130 feature, including where applicable its component vegetation types, across the site	<p>Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site.</p> <p>In the case of juniper scrub, which is a highly dynamic habitat, the distribution of the feature across the SAC will be liable to change in relation to the availability and location of suitable conditions for seedling establishment and survival of young bushes.</p>	Natural England, 2014. Site Improvement Plan: Aston Rowant
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the feature are broadly referable to and characterised by the National Vegetation Classification type:</p> <p><i>W21 Crataegus monogyna – Hedera helix scrub</i></p>	<p>It is important to note that Aston Rowant is designated as SAC for “<i>Juniperus communis</i> formations on heaths or calcareous grasslands”. This means that the feature of importance is the habitat in which juniper is a primary component, not juniper itself, i.e. this is a habitat feature, not a species feature. So conservation objectives should consider the condition of the habitats in which juniper occurs, not just the number or health of individual juniper bushes.</p> <p>The habitat feature is comprised of a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</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</p>	JNCC (2009) NVC floristic tables. Accessed via the JNCC website: http://jncc.defra.gov.uk/page-4265

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			feature, at appropriate levels (recognising natural fluctuations).	
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Restore the abundance of the species listed below to enable each of them to be a viable component of the Annex 1 habitat:</p> <p>Trees and shrubs Juniper <i>Juniperus communis</i> Hawthorn <i>Crataegus monogyna</i> Dog rose <i>Rosa canina</i> Dewberry <i>Rubus caesius</i> Wild privet <i>Ligustrum vulgare</i> Dogwood <i>Cornus sanguinea</i> Wild clematis <i>Clematis vitalba</i> Wayfaring tree <i>Viburnum lantana</i> Spindle <i>Euonymus europaeus</i> Yew <i>Taxus baccata</i></p> <p>Other plants Deadly nightshade <i>Atropa belladonna</i> Dark mullein <i>Verbascum nigrum</i> Twayblade <i>Listera ovata</i> Spurge laurel <i>Daphne laureola</i> Candytuft <i>Iberis amara</i></p> <p>Assemblage of juniper-associated invertebrates including Juniper pug moth <i>Eupethecia pusillata</i> Juniper carpet <i>Thera juniperata</i> Juniper webber moth <i>Dichomeris marginella</i> Chestnut-coloured carpet moth <i>Thera cognata</i></p> <p>Assemblage of juniper-associated frugivorous birds including Blackbird <i>Turdus merula</i></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"> • <i>Structural species</i> 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'). • <i>Influential species</i> 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) • <i>Site-distinctive species</i> which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. <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>The latest condition assessment of the SSSI which underpins this SAC</p> <p>Ward LK 1977 The Conservation of Juniper: the associated fauna with special reference to southern England. Journal of Applied Ecology 14 pp81-120.</p> <p>Ward LK & Jennings RD 1990 Succession of Disturbed and Undisturbed Chalk Grassland at Aston Rowant National Nature Reserve: Dynamics of Species Changes. Journal of Applied Ecology 27, pp897-912.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Song thrush <i>Turdus philomelos</i> mistle thrush <i>Turdus viscivorus</i> ring ouzel <i>Turdus torquatus</i>		
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: <i>Ash Fraxinus excelsior</i> <i>Yew Taxus baccata</i> <i>Bramble Rubus fruticosus</i> <i>Sycamore Acer pseudoplatanus</i>	Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	Vegetation structure: canopy cover	Maintain an appropriate balance between scrub canopy and open field layer, with no more than 50% comprising closed-canopy juniper scrub.	Juniper scrub is a highly dynamic habitat which is liable to change significantly in character over periods of a few years. It is undesirable for all areas of the habitat to proceed through the natural succession process to closed scrub to woodland at the same rate and some management intervention is likely to be required to maintain the open, unshaded conditions required by juniper.	
Structure and function (including its typical species)	Vegetation structure - age class	Restore a population of Juniper comprising plants at each different life stage; this should comprise phases of old growth (>100 years old), building to mature and pioneer/seedling (<5cm girth)	Juniper regeneration can be infrequent and episodic, resulting in populations with few age classes. Populations with full and wider age range tend to be associated with conditions providing regular opportunities for establishment, such as continual exposure of bare soils on steep slopes. These will be more self-sustaining in the longer term. It is important to have a high proportion of young bushes present as the viability of juniper seed has been shown to decline significantly on bushes over 50 years old. In addition, older bushes can be more susceptible to disease, windthrow, heavy snow fall and other damaging influences.	Ward LK 1982 The Conservation of Juniper: Longevity and Old Age. Journal of Applied Ecology 19, pp 917-928.
Structure and function (including its typical species)	Vegetation community transitions	Restore expected patterns of natural vegetation zonation or transitions	Transitions and zonation 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			feature, and support additional flora and fauna. In this case, the transitions between regularly grazed chalk grassland to more lightly grazed, tall grassland through to scrub provide a valuable structural element of importance for a variety of plants and invertebrates. These ecotones have become less extensive over time at this site.	
Structure and function (including its typical species)	Physical structure: ground disturbance	Restore areas of disturbed and eroding bare ground to a level which is compatible with maintaining or restoring the regeneration potential of the H5130 feature	<p>The ability to provide some areas of exposed, bare ground is important to encourage natural regeneration of juniper plants in order to sustain the feature into the longer-term.</p> <p>Juniper seedlings establish most successfully in places where there is bare or sparsely-vegetated ground and young plants remain no more than a few centimetres tall for several years, and so are highly vulnerable to competition and shading from surrounding vegetation.</p>	<p>WARD LK & SHELLSWELL CH (2017). <i>Looking After Juniper. Ecology, Conservation & Folklore</i>. Plantlife, Salisbury</p> <p>Wilkins T & Duckworth J (2011) <i>Breaking new ground for juniper - A management handbook for lowland England</i>. Plantlife, Salisbury.</p>
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	<p>This recognises the potential need at this site to maintain 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 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.</p> <p>In most cases increasing actual and functional landscape-scale connectivity would be beneficial. In this case, it is particularly desirable that the site remains part of a wider habitat network supporting chalk grassland and mixed scrub which provides opportunities for the natural spread of juniper across the wider landscape.</p>	<p>Damant C (1998) <i>Juniperus communis</i> in the Chilterns. Unpublished report for Buckinghamshire County Council.</p> <p>Cuthbertson S (2003) <i>Juniper Assessment</i>. Unpublished report for Buckinghamshire County Council. [provides detailed information on juniper population size and distribution at key sites in the Chilterns]</p>
Structure and	Adaptation	Maintain the H5130 feature's ability,	This recognises the increasing likelihood of natural habitat features to	NATURAL ENGLAND,

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function (including its typical species)	and resilience	and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	<p>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.</p> <p>The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The susceptibility of juniper to the effects of climate change in the south of the UK are as yet poorly understood but it is likely that increasing extremes in weather patterns, warmer winter temperatures and changes in growth patterns of associated species will all have important influences.</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 habitat]. 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>	2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360].
Supporting processes (on which the feature relies)	Air quality	Restore the concentrations and deposition of air pollutants to within the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	<p>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 (NH₃), oxides of nitrogen (NO_x) and sulphur dioxide (SO₂), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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 (it has been suggested that dust particles may interfere with sexual reproduction in juniper). 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.</p> <p>It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</p> <p>The Critical Load for nitrogen is currently being exceeded at this SAC (September 2018).</p>	
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 restore the structure, functions and supporting processes associated with the H5130 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 and Site Management Plans.</p> <p>For this feature, at present, the establishment and survival of juniper at this site requires high levels of management intervention but the long-term aim is to achieve higher levels of natural juniper reproduction. This is dependent upon a wide range of physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts. In particular, there should be provision of areas of bare or sparsely-vegetated ground in the vicinity of existing patches of juniper, low levels of soil nutrient status (to ensure that seedlings and small juniper bushes are not subject to excessive shading by surrounding vegetation), very low levels of grazing by livestock, rabbits, voles and deer. As bushes mature, it is then important that grazing of surrounding vegetation is re-established to prevent loss through competition. For these reasons, juniper populations often show evidence of cyclical or episodic establishment, associated with major climatic events, abandonment of grazing, disease outbreaks in wild mammals and other major impacts. Processes which replicate these influences may</p>	<p>Looking After Juniper. Ecology, Conservation & Folklore. Ward LK & Shellswell CH (2017) Plantlife, Salisbury</p> <p>Fitter AH & Jennings RD 1975 The Effects of Sheep Grazing on the Growth and Survival of Seedling Junipers (<i>Juniperus communis</i> L.) Journal of Applied Ecology 12 pp 637-642.</p> <p>Natural England, 2014. Site Improvement Plan: Aston Rowant</p> <p>Views About Management document for Aston Rowant SSSI</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>be important in creating suitable conditions for juniper survival.</p> <p>Conservation measures can therefore include grazing, cutting, scrub management, creation of bare ground, weed control, promotion of seedling establishment, protection of seedlings and young bushes from grazing, rabbit population control and the propagation of 'new' plants from cuttings. Also of importance is the retention of suitable land use infrastructure/patterns to enable site management e.g. pastoral livestock farming, management of volunteers and monitoring.</p>	<p>Broome A 2003 Growing Juniper: Propagation and Establishment Practices. Forestry Commission Information Note. Forest Research.</p>
<p>Version Control Advice last updated: N/A</p>				
<p>Variations from national feature-framework of integrity-guidance: N/A</p>				

Table 2: Supplementary Advice for Qualifying Features: H9130. Asperulo-Fagetum beech forests; Beech forests on neutral to rich soils

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 H9130 feature to the baseline extent (which is taken to be the extent of the woodland at the time of SAC designation) of 29.35 hectares.	See the supporting notes for this attribute in Table 1	NATURAL ENGLAND. Aston Rowant NNR Management Plan.
Extent and distribution of the feature	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H9130 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. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat.</p> <p>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.</p>	NATURAL ENGLAND. Aston Rowant NNR Management Plan.
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the feature are broadly referable to and characterised by the following National Vegetation Classification type (s):</p> <p>NVC W12 <i>Fagus sylvatica</i> – <i>Mercurialis perennis</i> woodland.</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.	JNCC (2009) NVC floristic tables. Accessed via the JNCC website: http://jncc.defra.gov.uk/page-4265
Structure and function (including its typical species)	Vegetation structure - canopy cover	Maintain an appropriate tree canopy cover across the H9130 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 function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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.</p> <p>Completely closed canopies across the whole woodland are not desirable, as the heavy shade cast will tend to limit the number of associated species able to tolerate the conditions, and will tend to limit tree regeneration. In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well. In this case it is desirable that a range of canopy densities is available across the extent of the feature as the range of light conditions will favour different species. For example, the Nationally Scarce wood barley tends to increase in abundance where there are gaps in the canopy whilst violet helleborine favours areas of mature, dense canopy.</p>	
Structure and function (including its typical species)	Vegetation structure - open space	Maintain areas of permanent/temporary open space within H9130 the woodland feature, typically to cover approximately 5% of its 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. Having some open, sunlit and largely tree-less areas as part of the woodland community is 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 temporary and may consist of managed grazed areas, linear rides and glades, or naturally-produced gaps caused by disturbance events such as windthrow/tree collapse.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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 5% of the feature at any one time) and the assemblages of veteran and ancient trees (typically around 1 tree per hectare).	<p>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. In beech woodland, old or over-mature elements of the woodland are important features, often supporting assemblages of rare fungi, saproxylic (wood-decay) invertebrates and bryophytes.</p> <p>At Aston Rowant, the mature/veteran tree element is mainly associated with open-grown beech and trees with large, spreading canopies which may have been planted as boundary markers. Such trees require careful management to prolong their life and may be particularly sensitive to damaging influences.</p>	
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 m ³ per hectare of standing or fallen	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. 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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		timber, or 3-5 fallen trees >30cm per hectare, and >10 standing dead trees per hectare).	<p>specialist invertebrates, fungi, lichens and bryophytes, and associated hole-nesting birds and roosting bats, all of which may be very typical of the feature.</p> <p>As is typical of many Chilterns Beechwoods, the woodlands at Aston Rowant have relatively low levels of dead and decaying wood, as beech trees have a tendency to collapse rather than remain standing as in the case of ash and oak. Nevertheless, the representation and retention of dead and decaying wood can be promoted through careful management planning, such as by reducing vulnerability to strong winds.</p>	
Structure and function (including its typical species)	Vegetation structure - age class distribution	Maintain at least 3 age classes (pole stage/ medium/ mature) spread across the average life expectancy of the commonest trees.	<p>'Natural' woodland structure typically has a broad range of tree age-classes which is often absent in woods which have been modified by human intervention. A natural age-class diversity will generally offer a greater variety of niches and hence support a higher biodiversity.</p> <p>The woodlands at Aston Rowant are typical of many Chilterns beechwoods in having a predominantly mature beech canopy, a legacy of historic management for timber production. The long-term aim is to promote a more natural structure.</p>	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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 (such as hazel dormouse) make regular use of the edge habitats for feeding due to higher herb layer productivity and larger invertebrate populations. Many of the more notable plants associated with woodland glades and ride edges are commonly found in the transitional zone between woodland and grassland.	
Structure and function (including its typical species)	Regeneration potential	Maintain the potential for 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 re-growth	<p>The regeneration potential of the woodland must be maintained into the long term 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, re-growth from coppice stools, and where appropriate, planting.</p> <p>Browsing and grazing levels must permit regeneration at least at sufficient level to maintain a continuity of canopy cover, i.e. browsing and grazing should not be so high and over such long periods that it is creating gaps in the canopy.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		as appropriate to maintain canopy cover.	Regeneration can be adversely affected by grazing/browsing by a variety of mammals such as deer, rabbits, voles and hares, and bark stripping by species such as grey squirrel and edible dormouse.	
Structure and function (including its typical species)	Tree and shrub species composition	<p>Maintain a canopy and understorey of which 95% is composed of site native trees and shrubs</p> <p>Maintain a diversity (at least 3 species) of site-native trees (e.g beech, ash, oak, cherry, rowan, yew, hazel, holly, elder) across the site.</p>	<p>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.</p> <p>It is important to note that, in common with many Chilterns woodlands, the composition of the woodland at Aston Rowant has been heavily modified through historic planting of beech for timber production. Over time, it is likely that the prominence of beech in the canopy will decrease, particularly on thinner soils where ash is likely to have a natural advantage. However, this process may be affected by ash die-back making it more difficult to predict the long-term composition of these woodlands. It is possible that sycamore may increase in abundance by taking advantage of gaps in the canopy created by ash die-back – this would be considered an undesirable trend because sycamore often has damaging impacts on ground flora composition. Similarly, yew, which currently makes up a very small component of the woodland cover may increase in cover, particularly on thin, chalky soils.</p> <p>Although native to the Chilterns and a characteristic component of some woodland and scrub communities a significant shift towards canopy dominance by yew would be considered undesirable because of the profound impacts of the deep shade cast by this tree. Wherever possible, natural processes of tree regeneration should be allowed to proceed to promote a more natural tree composition, although some limited intervention may be required to control the spread or abundance of species which may cause damaging effects.</p>	<p>ENGLISH NATURE, 2003. The Implications of Climate Change for the Conservation of Beech Woodlands and Associated Flora in the UK. English Nature Research Report 528.</p>
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain the abundance of the species listed below to enable each of them to be a viable component of the Annex 1 habitat;</p> <p>The constant and preferential</p>	See the notes for this attribute given above in Table 1.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		plants of the W12 woodland type		
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 H9130 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.	
Structure and function (including its typical species)	Root zones of trees	Maintain the soil structure within and around the root zones of the mature and ancient tree cohort in an un-compacted condition	The management of land within and around woodlands can be crucial to their long-term continuity. The condition of the soil surrounding trees will affect their roots, associated mycorrhizal fungi and growth. Tree health may be affected as a result of soil compaction because chalk and/or clay particles are pressed together, leaving little space for air and water which are essential for root growth. Unless carefully managed, activities such as construction, forestry management and trampling by livestock and human feet may all contribute to excessive soil compaction around trees.	
Supporting processes (on which the feature relies)	Air quality	Restore the concentrations and deposition of air pollutants to within the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See the supporting notes for this attribute above in Table 1. At Aston Rowant the impacts of aerial pollution, such as chlorosis, may be interrelated with (and compounded by) climatic influences, especially summer drought, as trees suffering stress are generally more susceptible to pollution effects. It may also be the case that trees on different soil types have different responses to aerial pollution, with those on thin, nutrient-poor chalky soil more susceptible than those on deeper clay soils.	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).
Supporting processes (on which the feature relies)	Hydrology	Maintain natural hydrological processes to provide the conditions necessary to sustain the H9130 feature within the site	Defining and maintaining the appropriate hydrological regime is a key step in achieving the conservation objectives for this site and sustaining the feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. Where the feature is directly over free-draining chalk soils hydrology is less likely to be an issue of concern but where the woodland is developed over clay-rich soils surface water flow may be locally impeded and vulnerable to effects such as groundwater pollution and drainage. Beech trees are often very shallow-rooted and can be particularly susceptible to damage as a result of changes in water levels, both increases and decreases.	
Supporting processes	Illumination	Ensure artificial light is maintained to a level which is	Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(on which the feature relies)		unlikely to affect natural phenological cycles and processes to the detriment of the H9130 feature and its typical species at this site.	<p>numerous aspects of plant and animal behaviour.</p> <p>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>	
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 restore the structure, functions and supporting processes associated with the H9130 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 Plans and Site Management Plans.	<p>NATURAL ENGLAND. Aston Rowant NNR Management Plan.</p> <p>Views About Management document for Aston Rowant SSSI</p>
Structure and function (including its typical species)	Adaptation and resilience	Maintain the H9130 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	See the supporting notes for this attribute above in Table 1.	
Version Control Advice last updated: n/a				
Variations from national feature-framework of integrity-guidance: Attributes relating to wood pasture and parkland have been deleted as not relevant.				