



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

**Hackpen Hill Special Area of Conservation (SAC)
Site Code: UK0030162**



Photo © Andrew Smith

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Hackpen Hill SAC.

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

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

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

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Hackpen Hill Special Area of Conservation (SAC)
Location	Oxfordshire Vale of White Horse District
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	35.83 hectares
Designation Changes	n/a
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	Hackpen, Warren and Gramp's Hill Down SSSI
Relationship with other European or International Site designations	n/a

Site background and geography

Hackpen Hill is situated in the rolling downland landscape of the North Wessex Downs in south Oxfordshire between Newbury and Swindon. The site is in the Berkshire and Marlborough Downs National Character Area ([NCA Profile 116](#)) and the local landscape is very typical of the area in having agriculturally unimproved grassland on the steeper slopes of the Chalk escarpment and on the sides of deeply incised dry chalk valleys, and with arable fields and improved pastures on the flatter land on the plateau and valley bottoms. The Chalk escarpment gives way to the broad, largely flat expanse of the Oxford Clay Vale to the north. The surrounding area is predominantly rural in character, with widely scattered small settlements and isolated farms and there is minimal intrusion of roads or other infrastructure. This is a landscape of mixed farming although there has been a significant decline in the area of land which is managed using traditional grazing methods over the past 100 years.

The soils underlying the site are free-draining, highly alkaline and mostly shallow, although there are pockets of deeper and more clay-rich soils in less steeply sloping parts and in the valley bottom. Hackpen Hill incorporates a striking geomorphological feature known as the Devil's Punchbowl, a steep-sided, west to east orientated dry valley which is thought to have formed through processes of erosion during cold periods when the ground would have remained frozen for most of the year. The chalk grasslands of the North Wessex Downs receive intermediate levels of rainfall in comparison with the relatively oceanic climate experienced by the Wiltshire Downs and the drier Chilterns Downs and this is borne out in the composition of the plant communities. Hackpen Hill is a privately-owned site and part of a larger farm enterprise. The site is mapped as 'Access Land' which means that the public have a right to access the area on foot.

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:

This SAC includes a single qualifying habitat but this is not a primary reason for SAC selection:

- **H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)**

Hackpen Hill SAC includes extensive areas of species-rich, agriculturally unimproved chalk grassland which supports a wide range of characteristic downland plants including several orchid species. The grassland is remarkably uniform in character and includes a wide diversity of associated plants and invertebrates. The vegetation present is highly characteristic of 'mesobromion' type grassland which is typified by the presence of plants which show a preference for moderately nutrient-rich chalk soils. The grass tall brome *Bromopsis erecta* is a characteristically prominent component of the vegetation together with plants such as common knapweed *Centaurea nigra*, rough hawkbit *Leontodon hispidus*, fairy flax *Linum catharticum*, small scabious *Scabiosa columbaria* and dwarf thistle *Cirsium acaule*. A variety of typical downland orchids is present including frog orchid *Coeloglossum viride*, fragrant orchid *Gymnadenia conopsea*, twayblade *Listera ovata*, autumn lady's-tresses *Spiranthes spiralis* and bee orchid *Ophrys apifera*.

The grassland type present corresponds closely to National Vegetation Classification type CG3 *Bromus erectus* grassland.

The UK is an important stronghold for this grassland types and holds a significant proportion of the resource in the wider European context. The habitat is dependent upon regular grazing management and maintenance of low nutrient levels.

Qualifying Species:

This SAC has a single qualifying species which is a primary reason for SAC selection:

- **S1654 Early gentian *Gentianella anglica***

Hackpen Hill SAC supports a significant population of the UK endemic plant early gentian *Gentianella anglica*. This is an annual or short-lived perennial plant which is restricted to calcareous soils. The species has undergone a significant decline in both distribution and population size as a result of habitat destruction, lapses in grazing management and habitat fragmentation. *Gentianella anglica* is dependent upon low levels of competition from surrounding vegetation, and requires the availability of bare areas or broken turf for seedling establishment. It appears to be able to survive in the seed bank for several years if conditions for germination become unsuitable. However, the species is thought to have poor powers of dispersal and so populations may be lost as a result of increased isolation. *Gentianella anglica* is intolerant of shading and is usually restricted to warm, sunny, locations which are maintained in an unshaded condition by heavy rabbit, sheep or cattle grazing.

At Hackpen Hill plants are often associated with small gaps in the turf created by downslope soil creep. The plant has a restricted distribution in the UK with a relatively small number of populations. Most of these are associated with chalk or limestone grassland in south and south east England but the plant also occurs on sandy, coastal grassland in Cornwall and south Wales. *Gentianella anglica* is protected under Schedule 8 of the Wildlife & Countryside Act 1981, with special protection against picking, uprooting, destruction and sale. Despite this protection the species is thought to be continuing to decline. Both *Gentianella anglica* and slender bedstraw *Galium pumilum* (which has also been recorded at the

site) are listed in Section 41 of the Natural Environment and Rural Communities Act 2006 meaning that they are priorities for action to secure an improvement in their status.



Gentianella anglica photo © Natural England/Peter Wakely

References

Anon 2006 Early gentian *Gentianella anglica* – briefing sheet. Plantlife. Salisbury.

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

Table 1: Supplementary Advice for Qualifying Features: H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia); Dry grasslands and scrublands on chalk or limestone

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Maintain the total extent of the feature to a baseline level of 35.57 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 survey. The area measurement is therefore indicative and intended as a guide. given may be approximate depending on the methods, age and</p> <p>The objective is to seek to ensure that there is no overall reduction in the extent of species-rich grassland corresponding to the H6210 habitat type. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and includes transitions and mosaics with other closely-associated habitat features.</p> <p>Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations.</p>	Steven G & Biron EM 1993 Oxfordshire Chalk Grassland. Botanical Survey and Evaluation 1991/1992. English Nature.
Extent and distribution of the feature	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	<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 conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p>	Steven G & Biron EM 1993 Oxfordshire Chalk Grassland. Botanical Survey and Evaluation 1991/1992. English Nature.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type:</p> <p>NVC type CG3 <i>Bromus erectus</i> grassland</p>	<p>This habitat feature is comprised of a number of associated semi-natural grassland 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>Note that the character and the composition of the vegetation varies across the site which is reflected in transitions toward NVC types CG2 and MG5. This variation is natural and should not be interpreted as indicating a negative change.</p>	Rodwell, JS. (ed.) 1992. British Plant Communities. Volume 3. Grassland and montane communities. Cambridge University Press.
Structure and function (including its typical species)	Vegetation: proportion of herbs (including sedges) to grasses	Maintain the proportion of herbs to grasses 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. High or increasing cover of grasses may indicate insufficient levels of grazing and/or nutrient input.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat:</p> <ul style="list-style-type: none"> Constant and preferential plant species of CG3 <i>Bromus erectus</i> grassland NVC community which is the main component of the H6210 feature within the SAC Vascular plant assemblage 	<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"> Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. 	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>including Early gentian <i>Gentianella anglica</i>; Chalk milkwort <i>Polygala calcarea</i>; Frog orchid <i>Coeloglossum viride</i>; Henbane <i>Hyoscyamus niger</i>; Slender bedstraw <i>Galium pumilum</i></p> <ul style="list-style-type: none"> Lepidoptera populations including Chalkhill blue <i>Polyommatus coridon</i>; Brown argus <i>Aricia agestis</i>; Dingy skipper <i>Erynnis tages</i> and chalk carpet <i>Scotopteryx bipunctaria</i> 	<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.</p> <p>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>	
Structure and function (including its typical species)	Vegetation: undesirable species	<p>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:</p> <p>Tor grass <i>Brachypodium pinnatum</i> False oat <i>Arrhenatherum elatius</i></p>	<p>'Undesirable' species are those which, if allowed to spread and increase in abundance, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These will include both invasive non-native plants and coarse and aggressive native species which may uncharacteristically dominate the composition of the feature if not kept in check.</p>	<p>This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments</p>
Structure and function (including its typical species)	Vegetation community transitions	<p>Maintain the pattern of natural vegetation zonation/transitions</p>	<p>Many of the special and distinctive species associated with the grassland habitat at this site are found in or utilise the variations in habitat type which occur across the area, related to changes in gradient, aspect, soil depth and soil characteristics. The retention of this variation will be achieved through good pasture management, avoidance of the use of fertilisers (including organic manures) and avoidance of sward damage such as through excessive grazing.</p>	
Structure and function (including its typical species)	Soils, substrate and nutrient	<p>Maintain the properties of the underlying soil types, including structure, bulk density, total</p>	<p>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</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)	cycling	carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	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)	Supporting off-site habitat	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature.	<p>The structure and function of the qualifying habitat, including its typical species, 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. In this case, the maintenance of a consistent grazing regime is of critical importance.</p> <p>This is dependent upon the availability of additional grazing land and stock handling facilities in close proximity to the grassland feature. If these are lost grazing may become unsustainable. Areas of adjacent undeveloped land may also be of importance in protecting the habitat from damaging influences such as pesticide drift, nutrient enrichment or recreational pressure.</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 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.</p> <p>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>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Adaptation and resilience	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	<p>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 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 habitat. This means that this site is considered to be vulnerable overall but at 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 may be advisable.</p>	NATURAL ENGLAND, 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	Maintain the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	<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 (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 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 (www.apis.ac.uk).

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. 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, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</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 maintain 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. 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>In this case, the maintenance of consistent grazing regimes using appropriate numbers and types of stock are of critical importance. Chalk grassland is dependent upon grazing in order to prevent the accumulation of 'thatch', control the spread of undesirable species, maintain small-scale structural diversity and to prevent the loss of low-growing species through shading.</p> <p>Further details about the necessary conservation measures for this site can be provided by contacting Natural England.</p>	Natural England Views about Management document for Hackpen, Warren and Gramp's Hill Downs SSSI
Version Control				
Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: S1654. *Gentianella anglica* Early gentian

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	Population presence	Maintain the presence of <i>Gentianella anglica</i> (including any putative hybrids).	<p>It is important that the population at this site is maintained in order to ensure that favourable conservation status is achieved for the UK population as a whole. Given the annual or biennial nature of this species the size of populations may vary significantly from year to year, in response to population dynamics, habitat suitability, weather conditions and management.</p> <p>At some sites the population of early gentian can include morphologically distinct plants which has given rise to speculation that these may represent hybrids with <i>Gentianella amarella</i>. This has yet to be confirmed as the difference in flowering times of the two species would appear to make this unlikely. Nevertheless, the presence of morphologically distinct plants may represent adaptation to local environmental conditions which should be conserved.</p>	Lambrick CR 1997 A Review of the Status of Early Gentian at SSSIs in Berkshire and Oxfordshire. English Nature.
Population (of the feature)	Population size	<p>Maintain the abundance of the population at a level which is above the baseline population size known or estimated at or soon after the time of SAC designation, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.</p> <p>The estimated baseline population level is in the range 1000-10,000 plants.</p>	<p>Accurate counts of <i>Gentianella anglica</i> at this site are difficult to achieve without risk of damaging non-flowering plants. Surveys indicate that plants occur over a large area of the site at varying density, mostly in areas with a short turf associated with strong calcicoles such as <i>Thymus praecox</i> and <i>Polygala calcarea</i>.</p> <p>However, plants also occur in slightly longer turf amongst tall grasses and in these areas plants can be difficult to detect, particularly if not in flower. Therefore a sample-based count extrapolated to account for the likely extent of the population is likely to be the most appropriate means of estimating population size.</p> <p>The baseline value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this</p>	Lambrick CR 1997 A Review of the Status of Early Gentian at SSSIs in Berkshire and Oxfordshire. English Nature.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>feature.</p> <p>Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment.</p>	
Supporting habitat: extent and distribution	Distribution of supporting habitat	Maintain the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation) 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. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site.	<p>Lambrick CR 1997 A Review of the Status of Early Gentian at Sites of Special Scientific Interest in Berkshire and Oxfordshire. English Nature.</p> <p>[Provides information on the distribution and population size of early gentian at Hackpen Hill.]</p>
Supporting habitat: extent and distribution	Extent of supporting habitat	Maintain the total extent of the habitat which support the feature at a baseline level of 35.57 hectares.	<p>In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain the extent of supporting habitat and their range within this SAC. The distribution of early gentian on the site may vary from year to year subject to the effects of grazing, size of the local rabbit population or in response to longer-term changes in weather patterns.</p> <p>The maintenance of the baseline level of species-rich grassland will be important to allow this natural re-distribution of the population within the site and to ensure that plants do not become restricted to small areas of suitable habitat.</p>	Steven G & Biron EM 1993 Oxfordshire Chalk Grassland. Botanical Survey and Evaluation 1991/1992. English Nature.
Supporting habitat: structure/	Habitat structure and bare ground:	Maintain patches of bare ground and an open-textured sward to provide creating suitable	<i>Gentianella anglica</i> requires the availability of patches of bare soil for seedling establishment and young plants are intolerant of shading from surrounding vegetation. So it will generally not	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
function	regeneration/colonisation niches	regeneration/colonisation niches. Bare ground should be in range of 5-10%, but not in the form of regularly disturbed or trampled soil such as that associated with rabbit warrens or tracks.	<p>persist where there is a dense, closed sward or a carpeting layer of mosses. Suitable bare patches may be very small and scattered through the sward and may be persistent, such as in areas of broken turf on the crest of embankments, or transitory such as on the edge of soil creep features ('terraces') on steep slopes. Patches of suitable vegetation often occur in mosaics with less suitable areas, and are generally associated with a southerly aspect, poor soil, and localised heavy grazing.</p> <p>Many localities of this species are described as sparsely vegetated. In some circumstances <i>Gentianella anglica</i> may appear following disturbance of the soil surface as the species has the ability to survive as buried seed for at least 15 years. However, it does not generally persist in places which are subject to frequent soil disturbance unlike many other annual plants.</p>	
Supporting habitat: structure/function	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, within typical values for the supporting habitat	<p>Soil supports basic ecosystem function and is 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 the supporting habitat of this Annex II feature.</p> <p><i>Gentianella anglica</i> has highly specific habitat requirements relating to soil type and soil characteristics. The plant is strongly associated with soils with a low nutrient status prone to becoming parched, but which remain damp through late autumn and winter. Plants may germinate in late summer or autumn and then survive as seedlings through the winter, or may germinate in early spring, before growing quickly and flowering in May to early June. It is suspected that in common with many gentians this species may have a mycorrhizal association with soil-dwelling fungi. Therefore activities which may alter soil characteristics, soil structure, soil biota, nutrient levels or soil chemistry are likely to be damaging to <i>Gentianella anglica</i> populations.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/function	Vegetation composition: negative indicators	Maintain the frequency/cover of the following undesirable species at or to acceptable levels and are not encouraged by changes in surface condition, soils or nutrient levels	<p>This feature can be adversely affected by changes to the grass: herb ratio (increased grassiness), often in tandem with sward becoming 'thicker' (less bare ground) or more rank.</p> <p>Cover of tall, coarse grasses should typically not exceed about 10% except where kept short by grazing. Other species likely to be favoured by increased soil fertility/agricultural improvement such as <i>Lolium perenne</i>, <i>Holcus lanatus</i>, <i>Cynosurus cristatus</i> and <i>Trifolium repens</i> should be rare or absent.</p> <p>Equally, 'agricultural weeds' such as <i>Cirsium arvense</i>, <i>Cirsium vulgare</i>, <i>Galium aparine</i>, <i>Plantago major</i>, <i>Rumex obtusifolius</i>, <i>Senecio jacobaea</i> and <i>Urtica dioica</i>, are likely to be indicators of bad management and loss/degradation of suitable habitat, so should be rare or absent.</p>	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting habitat: structure/function	Vegetation structure and composition	Maintain the extent of suitable supporting habitat which is short (2-5 cm), tightly-grazed and trampled calcicolous grassland with typically 5-10% bare ground.	<p>Indicators of supporting habitat for <i>Gentianella anglica</i> being in good condition to maintain the population will include the presence of short turf, availability of bare ground, lack of taller competing plants, absence of shading, and the presence of plants with similar habitat requirements such as <i>Cirsium acaule</i>, <i>Thymus praecox</i>, <i>Polygala vulgaris</i>, <i>Polygala calcarea</i>, <i>Carex flacca</i>, <i>Hippocrepis comosa</i>, <i>Blackstonia perfoliata</i>, <i>Linum catharticum</i>, <i>Leontodon hispidus</i>, <i>Pilosella officinarum</i> and <i>Festuca ovina</i>.</p> <p>At Hackpen Hill Lambrick (1997) noted that <i>Gentianella anglica</i> was present outside of the SAC boundary as well as inside, on former arable land restored to grassland, which is an unusual occurrence.</p>	Lambrick CR 1997 A Review of the Status of Early Gentian at Sites of Special Scientific Interest in Berkshire and Oxfordshire. English Nature.
Supporting processes (on which the feature and/or its supporting habitat relies)	Adaptation and resilience	Maintain the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site	<p>See explanatory notes for this attribute in Table 1.</p> <p>The likely response of <i>Gentianella anglica</i> to climate change is difficult to predict. Given that the species shows a preference for very short, drought-prone places with high cover of bare ground and the plant's growth strategy of germinating in late autumn and surviving as seedlings through the winter it could be expected that the species may respond well to mild winters and warm, dry spring weather. However, the species will be adversely affected by changes in grazing management or type</p>	NATURAL ENGLAND, 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].

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			of grazing stock used, factors which may be influenced by increasing variation in weather patterns and extreme weather.	
Supporting processes (on which the feature and/or its supporting habitat relies)	Air quality	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See explanatory notes for this attribute in Table 1.	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 and/or its supporting habitat relies)	Conservation measures	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature and/or its supporting habitats.	<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.</p> <p>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>Anon 2006 Early gentian <i>Gentianella anglica</i> – briefing sheet. Plantlife. Salisbury.</p> <p>Wilson PJ 1999 The Distribution and Status of <i>Gentianella anglica</i> (Pugsley) E. Warb. Species Recovery Report no 119. English Nature/Plantlife. [</p>
Supporting processes (on which the feature and/or its supporting habitat relies)	Grazing pressure	Maintain a grazing regime to keep the sward short (preferably 2-5cm)	<i>Gentianella anglica</i> requires unshaded conditions for growth and very low levels of competition to allow seedlings to germinate and establish. Preferred locations are generally short-grazed and have exposed, bare soil present as small patches interspersed through the turf. Therefore, to remain suitable grasslands generally require moderate to heavy grazing and/or trampling to keep them sufficiently short and open. Grazing may be by rabbits and/or sheep or cattle. In the North Wessex Downs there are indications that cattle grazing supplemented by rabbit activity creates better conditions than sheep grazing Wilson (1999). The grazing period at sites with strong populations of <i>Gentianella anglica</i> is most often between April and October, which means that the sward is kept short through the majority of the growing season.	Wilson PJ 1999 The Distribution and Status of <i>Gentianella anglica</i> (Pugsley) E. Warb. Species Recovery Report no 119. English Nature/Plantlife.
Version Control: Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: [adviser to give details of what has varied and why] Attribute for Water quality / quantity had been deleted as this is not relevant for this feature. Attribute for Substrate deleted as considered that it is adequately covered by the Soils, Substrates & Nutrient cycling attribute. Attribute for Sward Height deleted as considered this is adequately covered by the Grazing Pressure attribute.				