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

Castle Hill Special Area of Conservation (SAC)
Site Code: UK0012836

Early Gentian *Gentianella anglica* –
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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Castle 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	Castle Hill Special Area of Conservation (SAC)
Location	East Sussex
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	114.68 hectares
Designation Changes	Not applicable
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	Castle Hill SSSI
Relationship with other European or International Site designations	Not applicable

Site background and geography

Castle Hill SAC is approximately 114.68 hectares in size and is situated within both the South Downs National Character Area (NCA Profile 125) and National Park. The site is also a part of the Brighton and Lewes Downs Biosphere being on the North eastern periphery of the city of Brighton and Hove.

This is one of the best examples in East Sussex of the nationally uncommon chalk grassland habitat. The variation of plant and animal communities with aspect and slope is of special ecological interest. The chalk grassland consists of a mosaic of calcareous semi-natural dry grasslands, notably sheep's-fescue – meadow oat-grass (*Festuca ovina – Helictotrichon pratense*) grassland and upright brome *Bromopsis erecta* grassland, as well as the taller tor-grass *Brachypodium pinnatum* grassland which is valuable for grasshoppers and crickets.

Castle Hill's important assemblage of rare and scarce species includes early spider-orchid *Ophrys sphegodes* and burnt orchid *Orchis ustulata*. The colony of early spider-orchid is one of the largest in the UK. The site also supports a colony of Early Gentian *Gentianella angelica*. Scrub supports downland breeding birds such as yellowhammer, corn bunting, linnet and whitethroat. The rich orthopteran fauna includes the great green bush cricket *Tettigonia viridissima* and the nationally rare wart-biter grasshopper *Decticus verrucivorus*. Other invertebrate groups which are well represented include true bugs and butterflies.

Part of Castle Hill SAC is also designated as Castle Hill National Nature Reserve (NNR); information regarding its NNR designation is available at: https://www.gov.uk/government/publications/east-sussexs-national-nature-reserves/east-sussexs-national-nature-reserves .As an NNR Castle Hill has important education and research functions.

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:

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

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

This site also hosts the priority habitat type "orchid rich sites". This chalk grassland consists of a mosaic of calcareous semi-natural dry grasslands, notably CG2 *Festuca ovina – Avenula pratensis* grassland, CG3 *Bromus erectus* grassland and CG4 *Brachypodium pinnatum* grassland. Castle Hill's important assemblage of rare and scarce species includes early spider-orchid *Ophrys sphegodes* and burnt orchid *Orchis ustulata*. The colony of early spider-orchid is one of the largest in the UK.

Qualifying Species:

- **S1654. *Gentianella anglica*; Early gentian**

Early gentian Gentianella anglica is a flowering plant of dry chalk and limestone grasslands and cliff-tops. This plant is found in England and Wales and is not known to occur outside the UK.

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

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

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 H6210 semi-natural dry grassland and scrubland feature at 103.08 hectares.	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. Approximately 103.08 hectares of the site support the SAC feature H6210 habitat; the remainder of the site is comprised of chalk grassland and deciduous woodland.	JNCC. 2015. *Castle Hill Natura 2000 standard data form*. Available from: http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0012836.pdf Natural England. 2015a. *Priority Habitat Inventory*. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Extent and distribution of the feature	**Spatial distribution of the feature within the site**	Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat.	Natural England. 2015a. *Priority Habitat Inventory*. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england This attribute will be periodically monitored as part of Natural

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.	England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation community composition**	Ensure the component vegetation communities of the H6210 feature are referable to and characterised by the following National Vegetation Classification types: CG2 Festuca ovina – *Avenula pratensis* grassland CG3 *Bromus erectus* grassland CG4 *Brachypodium pinnatum* grassland CG5 *Bromus erectus* – *Brachypodium pinnatum* grassland	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation: proportion of herbs (including *Carex spp*)**	Restore the proportion of herbaceous species within the range 40%-90%	A high cover of characteristic herbs, including sedges (Carex species) is typical of the structure of this habitat type. In parts of the site restoration of the proportion of herbaceous species is required because insufficient grazing has led to an encroachment coarser grasses such as Tor grass. However some areas of the site are in pristine condition containing over 40 species per square metre.	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 This attribute will be periodically

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat; • Constant and preferential plant species of CG2, CG3, CG4 and CG5 NVC communities which are the main component of the H6210 feature within the SAC • Early spider orchid *Ophrys sphegodes* no loss in population extent >10% • Wart-biter cricket *Decticus verrucivorus*	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; • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available. Wart-biters need a mosaic of vegetation, including bare ground/short turf, grass tussocks, and a sward rich in flowering forbs. They prefer areas that are not heavily grazed. Cattle grazing is preferable to sheep grazing as this helps to reduce „thatching" of sward and creates a more diverse sward structure. Sheep grazing should be avoided between April and July as sheep eat the larvae. The wart-biter lays its eggs in the soil; these eggs normally hatch after two winters. It then passes through seven instar stages between April and June. The adult stage is reached in the beginning of July. Wart-biter	Natural England. 2013. *Definitions of Favourable Condition for designated features of interest at Castle Hill*. FCT. (Available from Natural England on request) 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)
			populations peak in late July and early August.	
Structure and function (including its typical species)	**Vegetation: undesirable species**	Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread: • Undesirable species should be no more than occasional throughout the sward or singly or together more than 5% cover • Coarse grasses individually or collectively, should be no more than 10% cover • Tree and scrub cover should be approximately 5%	There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as Cotoneaster spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature. Undesirable species include: *Cirsium arvense, Cirsium vulgare, Rumex crispus, Rumex obtusifolius, Senecio jacobaea, Urtica dioica, Brachypodium pinnatum, Bromopsis erecta* and all tree and shrub species excluding *Juniperus communis.* Coarse grasses include *Arrhenatherum elatius, Brachypodium pinnatum, Bromopsis erecta* and *Dactylis glomerata*, Reduction of the cover of gorse to 5% cover and coarse grasses including Tor grass to less than 10% cover, is required as insufficient grazing and nutrient inputs have resulted in the encroachment of these undesirable species. Other undesirable species, particularly nettle, bramble, willowherb and sycamore are increasing in cover and require further mechanical or manual clearance to avoid loss of species rich grassland.	Natural England. 2013. *Definitions of Favourable Condition for designated features of interest at Castle Hill*. FCT. (Available from Natural England on request) Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain any patterns of natural vegetation zonations/transitions that are beneficial for the H6210 habitat feature	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical	**Soils, substrate and nutrient cycling**	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status	Soil is the foundation of basic ecosystem function and its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a	Natural England. 2015b. Site Improvement Plan: Castle Hill (SIP039). SIP. Available from http://publications.naturalengland.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
species)		and fungal: bacterial ratio, to within typical values for the habitat.	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. A particular threat to the H6210 habitat feature of this SAC is fertiliser use on bordering pastures sloping down towards the site, posing a potential threat through erosion and leaching/run-off. This could lead to loss of species diversity due to soil enrichment. The land is currently in an appropriate agri-environment option to facilitate grazing and low nutrient inputs thereby reducing this threat at present. The valley bottom area of the NNR has previously been ploughed and fertilised meaning that there is a tendency for bramble and rose-bay willowherb to invade, this leads to loss of species diversity and needs regular mowing and removal of arisings / grazing to prevent encroachment.	org.uk/publication/6241234389565440
Structure and function (including its typical species)	**Supporting off-site habitat**	Maintaining the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature Surrounding farmland habitats if managed unsuitably could cause a loss of species due to soil enrichment.	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use such as increased fertilizer use, may adversely (directly/indirectly) affect the functioning of the feature and its component species.	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Functional connectivity with wider landscape**	Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.	
Structure and function (including its typical species)	**Adaptation and resilience**	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features 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 overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable. Despite this the Early-spider orchid could still be impacted by climate change as the flower is not synchronised with its pollinator due to global warming (as the female bee now emerges before the flower in the majority of years). A survey in	Natural England. 2015c. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs Available from http://publications.naturalengland.org.uk/publication/4954594591375360 Natural England. 2018. *Early spider orchid survey*. Held by Natural England field unit.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			2018 has shown that the orchid is declining in numbers and therefore is under threat of further decline. This is one example of how, despite having a lower vulnerability to climate change, using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.	
Supporting processes (on which the feature relies)	**Air quality**	Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 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	**Conservation measures**	Maintain the management measures within and the site boundary as appropriate) which	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	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		are necessary to restore within the relevant areas the structure, functions and supporting processes associated with the H6210 feature	can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Management measures must be maintained to restore H6210 feature as insufficient grazing has resulted in the encroachment of undesirable species in part of the site which out-compete positive species. The principal management measures on this site are: Establishing and maintaining appropriate grazing with a variety of animals and manual and mechanical controlling of invasive and undesirable species including soil scrapes and in places re-seeding.	http://publications.naturalengland.org.uk/publication/6241234389565440 Natural England. 2016. *Castle Hill NNR Full Management Plan CSMi report 2016 to 2021*. NNR Management Plan. (Available on request from Natural England)
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 abundance**	Maintain the abundance of the population at a level which is above minimum viable population, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	Some populations may be too large/extensive, or too widely dispersed, to be easily counted. In such cases, broken log scale estimates of each sub-population or sub-site may be sufficient. This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-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 feature. 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. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean	Natural England. 2013. *Definitions of Favourable Condition for designated features of interest at Castle Hill*. FCT. (Available on request from Natural England)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.	
Population (of the feature)	**Population structure: presence of *Gentianella amarella, Gentianella x davidii* and 'intermediates'**	Maintain as appropriate, the presence of both *G. anglica* and *G. amarella*, and the putative hybrid between the two (*G. x davidii*)	Intermixed populations have been recorded from many sites, with the hybrid recorded especially from sites near edge of range of *G. anglica*. Phenological differences (flowering time) usually helpful in distinguishing between *G. anglica* and autumn gentian *G. amarella*. Note: there is still some uncertainty about the extent to which these two species hybridise, or indeed whether the two species are actually one. Survey for early spider orchid in 2018 identified early gentian as present on site close to the orchid population. Autumn gentian are generally abundant on site.	Natural England. 2018. *Early spider orchid survey*. Held by Natural England (Available on request from Natural England)
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. Such fragmentation may 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 this feature and this may affect its viability.	Natural England. 2015a. *Priority Habitat Inventory*. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england
Supporting habitat: extent and distribution	**Extent of supporting habitat**	Maintain the total extent of the habitat which support the feature chiefly H6210 semi-natural dry grasslands at a value of 103.08 hectares	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 or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate	JNCC. 2015. *Castle Hill Natura 2000 standard data form*. Available from: http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0012836.pdf

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data. Early gentian occurs on calcareous grassland, mainly on steep south facing slopes, at most of its localities the vegetation is preferable to 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*).	Natural England. 2015a. *Priority Habitat Inventory*. Spatial Dataset Available from https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england JNCC. 2018. *Annex II species accounts Higher plant species 1654 Early gentian*. Early Gentian. Available from http://jncc.defra.gov.uk/protectedsites/sacselection/species.asp?FeatureIntCode=S1654
Supporting habitat: structure/ function	**Habitat structure and bare ground: regeneration/ colonisation niches**	Maintain patches of bare ground and an open-textured sward to provide creating suitable regeneration/colonisation niches. Bare ground should be in range c 5-10%, but may be higher in some vegetation communities (especially CG1 *Festuca ovina-Carlina vulgaris* grassland and CG7 *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland).	Patches of suitable vegetation often occur in mosaics with less suitable areas, and generally associated with steeper slopes, more southerly aspects, thinner soils, heavier grazing or trampling. All available evidence points to need for there being plenty of bare ground in a short/tightly grazed open-textured sward. Many sites best described as 'sparsely vegetated'). Some evidence suggests that *G. anglica* tends to occur in microsites recovering after disturbance (whereas autumn gentian *G. amarella* may also occur as a pioneer in recently disturbed sites).	
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	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	Natural England. 2015b. Site Improvement Plan: Castle Hill (SIP039). SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the supporting habitat of this Annex II feature. A particular threat to the H6210 habitat feature of this SAC is fertiliser use on bordering arable pastures sloping down towards the site, posing a potential threat through erosion and leaching/run-off. This could lead to loss of species diversity due to soil enrichment.	
Supporting habitat: structure/ function	**Substrate**	Maintain a substrate of skeletal drought-prone relatively infertile soils overlying calcareous bedrock (chalk or limestone), occasionally overlying lime-rich sand on coastal sand dunes, with a generally SE, S or SW aspect	See above for floristic indicators that may indicate changes in soil nutrient status (increase in fertility).	
Supporting habitat: structure/ function	**Vegetation composition: negative indicators**	Reduce the frequency/cover of the following undesirable species at or to acceptable levels and are not encouraged by changes in surface condition, soils, nutrient levels or changes to hydrology.; Site-based 'negative' indicator species include: *Brachypodium pinnatum, Bromopsis erecta, Dactylis glomerata, Cirsium Vulgare, Rumex crispus and Urtica dioica,*	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. Cover of tall grasses, e.g. *Brachypodium pinnatum, Bromopsis erecta, Avenula pubescens, Arrhenatherum elatius, Dactylis glomerata*, should typically not exceed about 10% (except the first two may locally occur at higher cover in stands of CG4a and CG3a respectively). Other species likely to be favoured by increased soil fertility/agricultural improvement, e.g. *Lolium perenne, Holcus lanatus, Cynosurus cristatus, Trisetum flavescens, Trifolium repens*, should be rare or absent. Equally, 'agricultural weeds' such *as Cirsium arvense, Cirsium vulgare, Galium aparine, Plantago major, Rumex obtusifolius, Senecio jacobaea and Urtica dioica*, are likely to be indicators of bad management and loss/degradation of suitable habitat, so should be rare or absent. Reduction of the cover of gorse to 5% cover and coarse grasses including Tor grass to less than 10% cover, is required	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 Natural England. 2013. *Definitions of Favourable Condition for designated features of interest at Castle Hill*. FCT. (Available from Natural England on request) 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)
			as insufficient grazing and nutrient inputs have resulted in the encroachment of these undesirable species. Other undesirable species, particularly nettle, bramble, willowherb and sycamore are increasing in cover and require further mechanical or manual clearance to avoid loss of species rich grassland.	
Supporting habitat: structure/ function	**Vegetation height**	Maintain a sward typically in the range of 2-5cm, but may also occur in slightly taller swards (5-20cm) as long as these still have plenty of bare ground and an absence of 'grassy' dominants.	Swards usually require moderate to heavy grazing and/or trampling to keep them sufficiently short and open; but on some coastal sites, drought and exposure may be sufficient on their own to maintain suitable sward conditions. Grazing may be by rabbits, ponies, sheep or cattle. Generally, rabbits and/or hardy sheep are preferred to cattle (see, e.g. Telfer 1994), although Wilson (2000) suggests for sites in Wilts that summer (April-October) cattle grazing at 1.5 animals/ha, plus less intensive grazing in the winter, is suitable for many sites, with sheep used in late summer to remove any excess grass growth. Winter cattle grazing is helpful to reduce cover of Tor grass Sward height may vary from year to year, depending not only on stocking rates and timing but also on the weather.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Telfer, S. 1994. A survey of early gentian (*Gentianella anglica*) the Isle of Wight Wilson P.J. 2000. Early gentian, *Gentianella anglica* (Pugsley) E. Warb. Survey and monitoring work in 1999
Supporting habitat: structure/f unction	**Vegetation structure and composition**	Restore the area of suitable supporting habitat which is short (2-5 cm), tightly-grazed and trampled calcicolous grassland with typically 5-10% bare ground Early Gentian is most frequent in short species-rich CG2 *Festuca ovina-Avenula pratensis* grassland and and CG2b *Festuca ovina-Avenula pratensis* grassland, *Succisa pratensis-Leucanthemum vulgare* sub-community.	Vegetation composition of this feature can be variable, depending on habitat, aspect, management regime and underlying geology/soils, but the frequent presence of the following species tend to be positive indicators of suitable Early Gentian habitat in its usual CG2 NVC community: *Poterium sanguisorba, Cirsium acaule, Thymus praecox, Polygala vulgaris, Carex flacca, Hippocrepis comosa, Blackstonia perfoliata, Linum catharticum, Leontodon hispidus, Pilosella officinarum, Ranunculus bulbosus*. Grasses such as *Avenula pratensis, A. pubescens, Brachypodium pinnatum, B. sylvaticum and Bromopsis erecta* may be frequent as an open grassy 'overstorey', but never abundant or dominant. Early gentain may often occur with autumn gentian Gentianella amarella, but the two species usually occupy different	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		In CG1 *Festuca ovina-Carlina vulgaris* grassland and CG7 *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland, bare ground may be 10-30%.	microsites and seasonal timings, although there may be considerable overlap on some sites. A significant proportion of the area of CG2 habitat requires restoration because insufficient grazing and nutrient inputs have led to an encroachment and dominance of coarser grasses such as Tor grass in places.	
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	This recognises the increasing likelihood of supporting 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. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *Low*. Despite having a lower vulnerability to climate change using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.	Natural England. 2015c. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs. Available from http://publications.naturalengland.org.uk/publication/4954594591375360
Supporting processes (on which the feature and/or its supporting habitat relies)	**Air quality**	Maintain 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).	The supporting habitat of this feature 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 (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	
Supporting processes (on which the feature and/or its supporting habitat relies)	**Conservation measures**	Restore 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 feature and/or its supporting habitats.	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Management measures must be maintained to increase the population of Early gentian as insufficient grazing has resulted in the encroachment of undesirable species which shade out the less competitive Early gentian. The principal management measures on this site are : Establishing and maintaining appropriate grazing with a variety of animals and manual and mechanical controlling of invasive and undesirable species including soil scrapes and in places re-seeding.	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 Natural England. 2016. *Castle Hill NNR Full Management Plan CSMi report 2016 to 2021*. NNR Management Plan. (Available on request from Natural England)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	**Grazing pressure**	Restore a grazing regime to keep the sward short (preferably 2-5cm)	Swards usually require moderate to heavy grazing and/or trampling to keep them sufficiently short and open; but on some coastal sites, drought and exposure may be sufficient on their own to maintain suitable sward conditions. Grazing may be by (any combination of) rabbits, deer, sheep or cattle. Generally, rabbits and/or sheep preferred to cattle (see, e.g. Telfer 1994), although Wilson (2000) suggests for sites in Wilts that summer (April-October) cattle grazing at 1.5 animals/ha, plus less intensive grazing in the winter, is suitable for many sites, with sheep used in late summer to remove any excess grass growth. Restoration of a more appropriate grazing regime is required. The site improvement plan identifies that there is insufficient grazing where Tor grass dominates. 'Mob' grazing with sheep is helping to reduce the litter layer and targeting Tor grass.	Natural England. 2015b. Site *Improvement Plan: Castle Hill (SIP039)*. SIP. Available from http://publications.naturalengland.org.uk/publication/6241234389565440 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments Telfer, S. 1994: A survey of early gentian (Gentianella anglica) the Isle of Wight Wilson P.J. 2000: Early gentian, Gentianella anglica (Pugsley) E. Warb. Survey and monitoring work in 1999
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: The attribute **Water Quality / Quantity** has been removed as the H6210 feature at Castle Hill is not dependant on surface water and/or ground water.				