



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

**St Albans Head to Durlston Head Special Area of Conservation (SAC)  
Site Code: UK0019863**



M. Low (Natural England) 2016.

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## **About this document**

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to St Albans Head to Durlston Head SAC.

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

Where this site overlaps with other European Sites, you should also refer to the separate European Site Conservation Objectives and Supplementary Advice (where available) provided for those sites.

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

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

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

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

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

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

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

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

## About this site

### European Site information

|  |   |
|--|---|
| <b>Name of European Site</b>   | St Albans Head to Durlston Head Special Area of Conservation (SAC)  |
| <b>Location</b>  | Dorset  |
| <b>Site Map</b>  | The designated boundary of this site can be viewed <a href="#">here</a> on the MAGIC website  |
| <b>Designation Date</b>  | 1 April 2005  |
| <b>Qualifying Features</b>   | See section below   |
| <b>Designation Area</b>  | 287.22 ha   |
| <b>Designation Changes</b>   | Not applicable  |
| <b>Feature Condition Status</b>  | Details of the feature condition assessments made at this site can be found using Natural England's <a href="#">Designated Sites System</a> |
| <b>Names of component Sites of Special Scientific Interest (SSSIs)</b>     | South Dorset Coast SSSI<br>Townsend SSSI  |
| <b>Relationship with other European or International Site designations</b> | <a href="#">Isle of Portland to Studland Cliffs SAC</a> is situated adjacent to this SAC at its eastern and western ends.                   |

### Site background and geography

This site runs contiguously with the Isle of Portland to Studland Cliffs SAC, and together they form a single unit of principally hard cliffed coastline some 40 km in length that combines internationally important geological interest with a rich range of wildlife habitats. At this site the cliffs are formed of hard Jurassic limestones. The species-rich calcareous grasslands found along this coast support communities of species that have become scarce in the UK. Of particular note are the long-standing populations of early gentian *Gentianella anglica* numbering several thousands of plants. These are found in extensive species-rich examples of tor-grass *Brachypodium pinnatum* calcareous grassland which are equally important for the largest UK population of early spider-orchid *Ophrys sphegodes*. This species has declined very dramatically in the UK since the 1950s, in both population size and range. Townsend, a small satellite site, supports both these species within a matrix of calcareous grassland and scrub.

South Purbeck has a very long history of quarrying. Both Purbeck and Portland Stone were quarried from beneath the surface in galleried tunnels called quarrs. The landscape around much of this SAC was dominated by the entrances to the tunnels as well as the extensive areas of spoil which surrounded each quarry entrance. The industry ceased in the 1960s (switching to open cast quarrying) but the surviving underground galleries and associated quarry entrances now provide important winter roosting sites for bats, including the rare greater horseshoe bat *Rhinolophus ferrum-equinum*.

The maritime vegetation of the cliff faces and former quarried ledges includes species such as golden-samphire *Inula crithmoides*, rock samphire *Crithmum maritimum* and sea spleenwort *Asplenium marinum*.

The SAC lies within the [Dorset AONB](#), Purbeck Heritage Coast and the [Jurassic Coast World Heritage Site](#). Geologically the underlying rocks of the WHS are from the Triassic, Jurassic and Cretaceous Periods. This geology, the geomorphological process that act upon it and the fossils it yields are recognised as being of outstanding universal value under the [UNESCO World Heritage Site](#) designation.

This SAC is entirely within National Character Area [136 South Purbeck](#).

This SAC is covered by the [Durlston Head to Rame Head Shoreline Management Plan](#) (SMP, Version 2, June 2011), a document which assesses coastal processes and change and makes recommendations for future action, broken down into small coastal 'Policy Units'. This SAC is covered by Policy Unit 5g01 Durlston Head to St Alban's Head.

## **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:**

- **H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts**

St Albans Head to Durlston Head, with Isle of Portland to Studland Cliffs, form a single unit of cliffed coastline some 40 km in length. The cliffs are formed of hard limestones, with chalk at the eastern end, interspersed with slumped sections of soft cliff of sand and clays. The cliffs support species-rich calcareous grassland with species that are rare in the UK, such as wild cabbage *Brassica oleracea* var. *oleracea*, early spider-orchid *Ophrys sphegodes* and Nottingham catchfly *Silene nutans*.

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

This site hosts the priority habitat type "orchid rich sites". This site contains extensive species-rich examples of CG4 *Brachypodium pinnatum* calcareous grassland. The site holds the largest UK population of early spider-orchid *Ophrys sphegodes*. This species has declined very dramatically in the UK since the 1950s, in both population size and range

### **Qualifying Species:**

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

*Gentianella anglica* is endemic to the UK. Early gentian *Gentianella anglica* is an annual plant, occurring in calcareous grassland, mainly on steep, south-facing slopes. It grows on bare ground or in thin turf that is kept open by a combination of rabbit or sheep-grazing and trampling by livestock on thin droughted soils. In dense turf it becomes shaded out and unable to compete with other more vigorous species. It is found on a variety of substrates and in different habitats, but is particularly frequent in coastal grasslands. At most of its localities the vegetation is referable to 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*).

There has been a marked decline in *G. anglica* since 1970, largely because of the ploughing of old chalk grassland and the abandonment of grazing on some of the remaining grasslands. The species is very much associated with a short grazed sward.

This site on the Dorset coast, together with Isle of Portland to Studland Cliffs SAC, supports important long-standing populations the species.

- **S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat**

The greater horseshoe bat *Rhinolophus ferrumequinum* is one of the largest bats in the UK. During the summer, they form maternity colonies, generally in large old buildings, and forage in pasture, edges of mixed deciduous woodland and hedgerows. Such mixed land-use, especially on south-facing slopes, favours the beetles, moths and other insects on which the bats feed. In winter they depend on caves, abandoned mines and other underground sites for undisturbed hibernation. A system or series of sites is required, offering a range of temperatures and air-flow patterns. Summer and winter roosts are usually less than 20-30 km apart. The bats are vulnerable to the loss of insect food supplies due to insecticide use, changing farming practices and the loss of broad-leaved tree-cover, and to the loss or disturbance of underground roost sites.

The greater horseshoe bat occurs throughout central and southern Europe and extends eastwards across Asia as far as Japan. However, it is a rare species in Europe, and has suffered a considerable



decline in central Europe. It has suffered a loss of over half its range in the UK. In the UK populations are close to the climatic limits for this species. The total UK population of approximately 12,900<sup>1</sup>, (with upper limit of 18,500 and a lower limit of 9,200) can be divided into about twelve discrete populations, based on maternity (summer) roosts and their associated hibernation sites (hibernacula). Populations range in size from about 80 to 600 breeding females and there is relatively little interchange between populations. Until the early 20th century, the species occurred as far east as Kent, and the bats benefited from abandoned mine workings, but the sealing of old mines is likely to have seriously reduced its population.

The species' distribution within the SAC is spread between coastal caves created by past quarrying activity and, inland at various abandoned underground quarries (quarrrs). Many of these are known and were the basis for adding this feature to the SAC. However, it is clear that there are currently unknown sites outside and possibly within the SAC boundary. It is also clear that the Greater Horseshoe bat meta-population extends beyond the SAC boundary with individuals commuting into and out of the SAC on an (in some recorded cases) daily basis. It is also evident that the SAC boundary does not cover the extent of foraging and commuting landscape features which are essential to the function of the meta-population. This population could be considered a recovering one, as a catastrophic timber treatment in the 1950s resulted in the destruction of a maternity roost, reportedly of some 13,000 GHB.

<sup>1</sup>Britain's Mammals 2018: The Mammal Society's Guide to their Population and Conservation Status

The SAC has been selected for classification as an example of a Greater Horseshoe Bat hibernation colony, although the species is recorded at the site throughout the year. Activity in the autumn suggests that the species may also use the SAC for mating. However, nothing is known about how many bats hibernate at the site or how they use the quarries/caves outside of the breeding season.

All species of bat present in the UK, including the Greater Horseshoe Bat, are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017, making it a 'European Protected Species'. A Licence may therefore be required for any activities likely to harm or disturb individual bats at any time of year.

**Table A: Specific seasonality of SAC feature**

The table below highlights in grey those months in which significant numbers of each mobile qualifying feature are most likely to be present at the SAC during a typical calendar year. This table is provided as a general guide only.

Unless otherwise indicated, the months shown below are primarily based on information relating to the general months of occurrence of the feature in the UK. Site-based evidence is available and has been used to indicate below that significant numbers of the feature are typically present at this SAC throughout the year.

Applicants considering projects and plans scheduled in the periods highlighted in grey would benefit from early consultation with Natural England given the greater scope for there to be likely significant effects that require consideration of mitigation to minimise impacts to qualifying bat features during the principal periods of site usage by those features. Thorough consideration should also be given to the impacts of activities that, whilst not directly affecting the SAC, will have an impact on functionally linked sustenance and commuting habitat/landscape features. The months which are *not* highlighted in grey are not ones in which the feature is necessarily absent, rather that the feature may be present in less significant numbers in typical years.

Furthermore, in any given year, features may occur in significant numbers in months in which typically they do not. Thus, applicants should not conclude, without recourse to further advice, that projects or plans scheduled in months not highlighted in grey cannot have a significant effect on the features. There may be a lower likelihood of significant effects in those months which nonetheless will also require prior consideration. Any assessment of potential impacts on the features must be based on up-to-date count data and take account of population trends evident from these data and any other available information. Additional site-based surveys may be required.

| Feature               | Season      | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Site-specific references where available |
|-----------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Greater horseshoe bat | Hibernation |     |     |     |     |     |     |     |     |     |     |     |     | Pers comm local bat surveyors            |

**Table 1: Supplementary Advice for Qualifying Features: H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts**

| Attributes                     |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--------------------------------|--|--|--|---|
| <b>Extent and distribution</b> | <b>Extent of hard or soft cliff capable of supporting sea cliff vegetation</b> | Maintain and where appropriate, restore the total extent of the cliff system which is capable of supporting H1230 sea cliff vegetation of at least 7.8 Km. | <p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, <b>the full extent of the feature may need to be restored</b> from areas which are suitable for the feature but do not, for a variety of reasons, currently support it. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements, where given, may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information.</p> <p>The extent of the 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.</p> <p>The whole cliff system acts to provide the range and variation of vegetation types and mosaics including bare ground. Extent may be measured in different ways but there are issues with measuring area of vertical cliffs. Reduction in extent can include smothering cliff slope, cliff foot or cliff top surfaces by engineered or dumped materials or invasion by native or non-native plant species.</p> <p>The extent attribute has been calculated from measuring the length of the SAC on GIS systems.</p> |   |
| <b>Extent and distribution</b> | <b>Spatial distribution of the feature within the site</b>                     | Maintain and where necessary restore the distribution and continuity of the habitat and any associated transitions which reflects the natural              | 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  | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature. |



| Attributes                     |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--------------------------------|--|--|--|--|
|                                |  | functioning of the cliff system  | <p>environmental changes.</p> <p>This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. 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.</p> <p>These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature. Transitions include cliff top and cliff foot transitions to terrestrial or marine habitats.</p> <p>The extent and distribution of this feature is overwhelmingly currently dictated by the geomorphological processes acting upon the coast/cliffs. Maintaining coast where these processes are intact and functioning must be a priority while restoration of processes to areas where these have been disrupted should be pursued whenever possible.</p> |  |
| <b>Extent and distribution</b> | <b>Future extent of habitat within the site and ability to respond to seasonal changes</b> | Maintain and where necessary restore active processes such that the system can adjust to longer-term natural change, including landward recession, and that fluctuations in the extent of vegetated areas to bare rock occur over time and space within the site | <p>This recognises the need to allow for natural fluctuations in the extent and the distribution of this habitat feature, often during particular seasons and usually as a result of natural coastal processes.</p> <p>The need to allow the feature's communities to adapt to the landward recession of the cliffs requires that they are not hindered by inappropriate development/land use. Suitable land use should be secured in areas where recession is likely, through for example, agri-environment schemes or planning gain.</p> <p>Similarly, management of sediment availability and movement along the entire SAC, and beyond where functionally connected (sediment cells etc), must consider the impact(s) upon the</p>   | South Devon and Dorset Coastal Advisory Group (SDADCAG), 2011 Shoreline Management Plan Review (SMP2) Durlston Head to Rame Head Shoreline Management Plan (Final) |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
|   |  |   | function of the cliffs' geomorphological processes.  |  |
| <b>Structure and function (including its typical species)</b> | <b>Geo-morphological naturalness</b>       | Maintain and where necessary restore the geomorphological naturalness of the sea cliff system (from cliff top to foreshore connection with the intertidal zone.   | <p>The physical landforms associated with this habitat feature, and the processes that shape them, will be a primary influence on sea-cliff habitat.</p> <p>A key criteria for selecting SACs for this habitat feature was that they had no or minimal artificial modification and so demonstrate good geomorphological naturalness. Having a well-developed sea-cliff structure, shaped by natural geomorphological processes, will ensure the full range of natural variation can occur.</p> <p>Existing and new structures may interrupt natural geomorphological processes both at the structure's location and along the entire feature extent.</p> | <p>South Devon and Dorset Coastal Advisory Group (SDADCAG), 2011 Shoreline Management Plan Review (SMP2) Durlston Head to Rame Head Shoreline Management Plan (Final)</p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p>  |
| <b>Structure and function (including its typical species)</b> | <b>Presence of mosaic of microhabitats</b> | Maintain and Restore the diversity and range of microhabitats and bare areas resulting from active coastal processes/landslips  | <p>Each site will have a different configuration of geology and hydrology and maritime exposure, which will also change over time and space.</p> <p>The key aim is to maintain the full, naturally expected range of these in as natural a state as possible. Natural geomorphological processes drive the creation of most of these microhabitats (such as large and small scale landslipping, cracking, mudsliding, vegetation collapse temporary pool creation, etc). Some discussion of the processes is contained within the Shoreline Management Plan.</p>   | <p>South Devon and Dorset Coastal Advisory Group (SDADCAG), 2011 Shoreline Management Plan Review (SMP2) Durlston Head to Rame Head Shoreline Management Plan (Final)</p> <p>Rodwell, J. S. 1992 British Plant Communities Volume 3 – Grasslands and Montane Communities</p> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>    | <p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types</p> <p>CG1 - <i>Festuca ovina</i> - <i>Carlina vulgaris</i> lowland calcareous grassland</p> | <p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also</p>   | <p>DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.</p> <p>Rodwell, J. S. 1992 British Plant Communities Volume 3 – Grasslands and Montane Communities</p>                          |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
|   |  | <p>CG3 - <i>Bromus erectus</i> grassland</p> <p>CG4 - <i>Brachypodium pinnatum</i> grassland</p> <p>CG5 - <i>Bromus erectus</i> - <i>Brachypodium pinnatum</i> grassland</p> <p>MC1 <i>Crithmum maritimum</i> – <i>Spergularia rupicola</i> crevice community</p> <p>MC5 <i>Armeria maritime</i> – <i>Cerastium diffusum</i> therophyte community</p> <p>MC8 <i>Festuca rubra</i> – <i>Armeria maritime</i> maritime grassland</p> <p>MC11 <i>Festuca rubra</i> – <i>Daucus carota</i> maritime grassland</p> <p>W21 <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub</p> <p>W22 <i>Prunus spinosa</i> – <i>Rubus fruticosus</i> scrub</p> | <p>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>The presence, composition, location and extent of maritime scrub, heath and/or grassland plus mosaics of the three, on cliff slopes or cliff tops will be determined by the interaction of natural geomorphological processes with exposure and soil characteristics and management where relevant.</p> <p>Areas of cliff that do not support these NVC communities should not be regarded as of a secondary level of importance. It is likely that lack of suitable management and/or past interventions (engineering, drainage, planting etc) have adversely affected the (semi) natural vegetation and restoration should be viewed as both possible and desirable.</p> <p>Natural community succession should allowed to evolve without human interference/intervention. Any areas where succession has been checked by a reversible intervention should be prioritised for remedial, restorative works.</p> <p>For a full understanding of the NVC communities listed left, see the relevant volumes of Rodwell's British Vegetation Communities.</p> <p>However, in the absence of these works, see the <a href="#">Wiki on NVC</a></p> |  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: undesirable species</b> | Maintain or reduce 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 non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants.  | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--|---|--|---|
|   |  |   | It is not apparent that there is an issue with invasive native or non-native species on the cliffs of this SAC.  |   |
| <b>Structure and function (including its typical species)</b> | <b>Key structural, influential and distinctive species</b> | <p>Maintain and where necessary restore the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat</p> <ul style="list-style-type: none"> <li>Constant and preferential plant species of CG1 - CG3 CG4 CG5 MC1 MC5 MC8 MC11 W21 &amp; W22 NVC communities which are the main component of the H1230 feature within the SAC</li> <li><i>Limonium recurvum</i>: subsp. <i>recurvum</i> Rock Sea-lavender</li> <li><i>Limonium recurvum</i> subsp. <i>portlandicum</i> Portland Sea-lavender</li> <li><i>Gentianella anglica</i> Early Gentian</li> <li>Vascular plant assemblage(1)</li> <li>Lichen and bryophyte assemblage (2)</li> </ul> | <p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;</p> <ul style="list-style-type: none"> <li><b>Influential</b> species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat)</li> <li><b>Site-distinctive</b> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC.</li> </ul> <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary.</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> | <p>Bryan Edwards, DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey for English Nature.</p> <p>(1) &amp; (2) Natural England. Draft Favourable Condition Table for South Dorset Coast SSSI</p> |
| <b>Structure and function (including its typical)</b>         | <b>Regeneration potential</b>                              | Maintain and where necessary restore semi-natural vegetation on the cliff-top (within and/or beyond the site boundary as  | This is important to ensure that there is a continuous supply of seed-rich semi-natural vegetation material from the clifftops to feed the sea-cliff system below.   |   |

| Attributes   |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--|--|--|--|
| species)   |  | appropriate), and its connectivity with the lower cliff slopes.  | <p>As the top of the cliff slumps and recedes as a result of natural processes, the vegetation dropping onto the lower slopes should provide suitable material for their re-colonisation with native plant species from adjacent semi-natural habitats above.</p> <p>The creation of appropriate semi-natural habitat, without alien or exotic species, adjacent to the cliff zone can provide a buffer to the SAC feature.</p>  |  |
| Supporting processes (on which the feature relies) | Physical features supporting vegetation: crevices, ledges, isolated stacks etc | Maintain the associated physical components of the vegetated cliff feature (crevices, ledges, isolated stacks) with changes to them determined by natural processes only                             | <p>The cliff structure and geomorphological processes are major influences on sea-cliff vegetation. The SAC is a stretch of uninterrupted 'Hard' cliffs with vertical or very steep faces of sedimentary Portland and Purbeck Limestone rock.</p> <p>Modification of geomorphological processes on or adjacent to the cliff system may be detrimental to the continuation of natural processes.</p>  |  |
| Supporting processes (on which the feature relies) | Hydrology/ drainage  | At a site, unit and/or catchment level (as necessary, maintain and where necessary restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site | <p>Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for the St Albans Head to Durlston Head SAC and sustaining the H1230. Vegetated sea cliffs of the Atlantic and Baltic coasts.</p> <p>On these harder cliffs, hydrologically driven sliding and slumping are minor geomorphological drivers. The gradual erosion from moving water and the effects of freeze/thaw are significant mechanisms of cliff movement and fall. Erosion at the foot of the cliff by the sea is an additional major driver of cliff change.</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |
| Supporting processes (on which the feature relies) | Maritime exposure including salt spray effects                                 | Maintain an appropriate degree of exposure to maritime effects, such as salt spray, both from regular inputs and storm events  | <p>Excessive exposure to salt spray can cause episodic die-back of sea cliff vegetation in some circumstances.</p> <p>Such die back can be a useful component in the cycle of succession in some locations, bringing about early successional niches where geomorphological processes are either hindered or slow (such as on hard cliff areas).</p>   |  |

| Attributes   |               | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|--|---------------|---|---|---|
| Supporting processes (on which the feature relies) | Water quality | Where the feature is dependent on surface water and/or groundwater, maintain and where necessary restore water quality and quantity to a standard which provides the necessary conditions to support the feature  | <p>Elements of the St Albans Head to Durlston Head SAC features are dependent on wetland habitats, such as runnels and seepages, supported by surface and/or ground water. Maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Impacts upon the vegetated sea cliff feature will arise from localised inputs from small streams and/or surface water conditions (run off from fields, roads, leaking septic tanks etc). Main rivers do not play a role.</p> <p>Consideration must be given to any proposal's likely impact on very local water quality and quantity. Considerations should include, but not be limited to, nutrient status, chemicals pollution, silt/sediment content, biological oxygen demand (BOD), and impacts upon water availability.</p> <p>Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a>  |
| Supporting processes (on which the feature relies) | Air quality   | Concentrations and deposition of air pollutants should be maintained at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ). | <p>This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (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</p>   | <p>Air Pollution Information System (<a href="http://www.apis.ac.uk">www.apis.ac.uk</a>).</p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> |



| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
|   |  |   | <p>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> <p>Critical loads for this feature within the SAC are currently within acceptable limits however there are concerns about impacts of future increases in deposition levels on the feature.</p> <p>Any proposals within 10km of the St Albans Head to Durlston Head SAC should be assessed for their air quality impacts on the feature. Site specific critical loads and levels for features can be found here: <a href="http://www.apis.ac.uk/src1/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next">http://www.apis.ac.uk/src1/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next</a></p> <p>Note that as the Vegetated sea cliffs of the Atlantic and Baltic Coasts (H1230) comprises a variety of vegetation communities, it would be necessary to assess emissions against <u>each</u> NVC (National Vegetation Classification) community (see above) listed for this feature separately. This can be done here: <a href="http://www.apis.ac.uk/search-pollutant-impacts">http://www.apis.ac.uk/search-pollutant-impacts</a>.</p> |  |
| <b>Supporting processes (on which the feature relies)</b> | <b>Cliff morphology, slope and elevation</b> | Maintain the natural processes that determine cliff morphology, slope and elevation | <p>These physical components greatly influence the structure of this habitat type. Allowing natural dynamic processes to operate is crucial to providing optimal conditions which will allow the long-term conservation of this habitat feature.</p> <p>Though the hard vertical cliffs of the St Albans Head to Durlston Head SAC erode very gradually, interruption of these processes, through partial stabilisation or slowing of cliff erosion and recession rates, with artificial management of cliff slope (through, for example, pinning, bolting, meshing, drainage etc) does not produce naturally-occurring conditions which is likely to</p>  | South Devon and Dorset Coastal Advisory Group (SDADCAG), 2011 Shoreline Management Plan Review (SMP2) Durlston Head to Rame Head Shoreline Management Plan (Final) |

| Attributes   |  | Targets                                     | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|--|--|---|---|--|
|  |  |   | lead to undesirable changes in characteristic sea cliff vegetation  |  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b>  | <b>Disturbance from human activity</b> | Control and minimise human access to cliffs | <p>In some locations the level of access to the cliffs for mountaineering and coasteering may have reached levels at which a negative impact on the SAC feature (and other non-SAC interests – breeding seabirds for example) may be occurring.</p> <p>Climbing activity can damage ledges and the vegetation growing on them, scuffing of rock faces can have a deleterious effect on lichens and bryophytes.</p> <p>The type and frequency of activity needs to be monitored and action taken to reduce pressure where it is having an adverse impact on a feature's constituent vegetation communities.</p> <p>Climbing and some more 'offbeat' cliff activities (camping on suspended ledges) not only has an impact on the cliff face, but also (and possibly more importantly) on the area of cliff top immediately adjacent to the cliff, where trampling and abrasion from ropes etc is focussed.</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |
| <b>Version Control</b><br>Advice last updated: N/A   |  |   |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b><br>The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is made up of two component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |  |   |   |  |
| Additional attribute <b>Supporting Processes – Disturbance from human activity</b> has been added  |  |   |   |  |

**Table 2: Supplementary Advice for Qualifying Features: H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) (important orchid sites)**

| Attributes                                    |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|--|--|--|
| <b>Extent and distribution of the feature</b> | <b>Extent of the feature within the site</b>               | Maintain and where necessary restore the total extent of the feature to the maximum extent possible this should be no less than 227hectares                        | <p>There should be no interventions that result in measurable reduction (excluding any trivial loss) in the extent and area of this feature. It is likely that the full potential extent of the feature will need to be restored as well as further habitat landward of the current SAC boundary (see below).</p> <p>The baseline-value of extent given has been taken from the Natura 2000 – Standard Data Form and represents the estimated feature extent at designation. The extent data was gathered from site-based surveys. Area measurements given are approximate and accuracy depends on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information.</p> <p>The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. This feature, like most on the coast, is susceptible to natural dynamic processes, there will be acceptable variations in its extent through natural fluctuations, especially through natural geomorphological processes resulting in cliff failure and collapse.</p> <p>Given the linear nature of this feature and the often narrow extent between cliff edge and other land uses it will be highly desirable to seek creation of further extent of this feature outside the SAC boundary to provide both a continuation of the connectivity of the feature along the coast and to provide ‘fall back’ habitat for certain of the SAC features and the communities that they comprise.</p> | <p><a href="#">Natura 2000 – Standard Data Form</a></p> <p>DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.</p> <p>Various surveys held by Natural England and the Dorset Environmental Records Centre (DERC)</p> |
| <b>Extent and distribution of the feature</b> | <b>Spatial distribution of the feature within the site</b> | Maintain and where necessary restore the distribution and configuration of the feature, including where applicable its component vegetation types, across the site | This feature forms by far the largest element of the entire SAC, some 227 ha of the total 283 ha (72% or so). This is due to suitable substrate occurring consistently along the entire length - limestones with smaller areas of acid clay caps and drift in valleys,   | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.  |

| Attributes  |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|---|---|--|--|
|   |   |   | <p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes.</p> <p>This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat.</p> <p>Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p> | Various surveys held by Natural England and the Dorset Environmental Records Centre (DERC)   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b> | <p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types</p> <p>CG1 <i>Festuca ovina</i> - <i>Carlina vulgaris</i> grassland</p> <p>CG3 <i>Bromus erectus</i> grassland</p> <p>CG4 <i>Brachypodium pinnatum</i> grassland</p> <p>CG5 <i>Bromus erectus</i> – <i>Brachypodium pinnatum</i> grassland</p> | <p>This habitat feature comprises a number of associated semi-natural calcareous vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining and/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>DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.</p> <p>Various surveys held by Natural England and the Dorset Environmental Records Centre (DERC)</p> |

| Attributes   |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|---|--|--|---|
| Structure and function (including its typical species) | Vegetation: proportion of herbs (including <i>Carex</i> spp ) | Maintain and where necessary restore the proportion of herbaceous species within the range 40%-90%   | <p>A high cover of characteristic herbs, including sedges (<i>Carex</i> species) is typical of the structure of this habitat type.</p> <p>The preferred and 'classic' mechanism by which this is achieved here is by extensive cattle, and sometimes, sheep grazing.</p> <p>Interventions or changes of use that may impinge upon or threaten the continuation of such management must be deterred. Conversely changes which will enhance the ability to graze and properly manage the constituent grasslands (as long as they do not have other negative impacts) should be encouraged.</p> | Natural England, Draft Favourable Condition Table, South Dorset Coast SSSI.   |
| Structure and function (including its typical species) | Key structural, influential and/or distinctive species        | <p>Maintain and where necessary restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat</p> <ul style="list-style-type: none"> <li>• Constant and preferential plant species of CG1, CG3, CG4 and CG5 NVC communities which are the main component of the H6210 feature within the SAC</li> <li>• Early Spider Orchid <i>Ophrys sphegodes</i></li> <li>• Early Gentian <i>Gentianella angelica</i></li> <li>• Vascular plant assemblage(1)</li> <li>• Key lepidoptera species including Lulworth Skipper</li> </ul> | See generic text for this feature in Table 1.  | <p>DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.</p> <p>Various surveys held by Natural England and the Dorset Environmental Records Centre (DERC)</p> <p>(1) &amp; (2) Natural England, Draft Favourable Condition Table, South Dorset Coast SSSI.</p> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
|   |  | <p><i>Thymelicus acteon</i> and Adonis Blue <i>Polyommatus bellargus</i></p> <ul style="list-style-type: none"> <li>Lichen and bryophyte assemblage (2)</li> </ul>  |  |  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: undesirable species</b> | <p>Reduce or eliminate 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>European gorse (when becomes too dense/dominant);</p> <p>Holm Oak;</p> <p>Tor grass (<i>Brachypodium pinnatum</i>)</p> | <p>There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as <i>Cotoneaster</i> spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature.</p> <p>Along the coast common or European gorse (<i>Ulex europaeus</i>) can be a major problem. It is a component of most of the coastal grasslands, especially where acidic 'clay with flints' or head deposits occur. If left unmanaged it can spread rapidly and take over entire parcels of land.</p> <p>Holm oak (<i>Quercus ilex</i>) is often a naturalised escapee of formal planting. In this SAC it is centred on the area around Durlston Castle and grounds and has encroached upon grassland areas. Management should seek to contain and in places push back Holm oak to encourage grassland regeneration.</p> <p>Tor grass is a complicated undesirable species as it also forms the key plant species in the life cycle of the rare and localised Lulworth Skipper (<i>Thymelicus action</i>). This species lays its eggs on, feed on and overwinters (as a caterpillar) within the dense tussocks of this grass. Its negative impacts are that it forms a dense tussocky mat of grass, spreading by aggressive rhizomes. It can smother other grasses and herbs leading to near monocultures. It is also only palatable to cattle early in the season.</p> <p>Consistent, spring grazing by cattle seems to keep the species</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |



| Attributes  |  | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available) |
|---|--|--|---|--|
|   |  |  | in check. There is ongoing research looking at reasons for its vigour and mechanisms to control it  |  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>      | Maintain and where necessary restore the pattern of natural vegetation zonations/transitions between the various NVC calcareous grassland communities which form the feature.                          | <p>The transitions/zonations between adjacent calcareous vegetation communities are, on this SAC, related to naturally-occurring changes in soil, aspect, slope and significantly the stress under which the community survives – this can be due to drought (thin soils) sea spray and wind (close to cliff edges and windy gullies etc).</p> <p>These 'ecotones' retain characteristics of each bordering community and add value in often containing species not found in the adjacent communities. They can also contain species found in other N2K features, in this case a transition between pioneer calcareous grassland communities and certain species of the vegetated sea cliff feature, including certain lichens and bryophytes. Retaining such transitions provides further diversity to the habitat feature, and can support additional distinctive flora and fauna, particularly invertebrates.</p>  |  |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b> | Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat. | <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 vegetation types, and therefore provides a habitat used by a wide range of organisms.</p> <p>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.</p> <p>This feature is generally characterised by thin, nutrient poor, highly porous soils. Some of the very best areas for key species (orchids, gentian etc) are at an early successional stage and comprise what are known as 'skeletal' soils having a low organic content and favouring annual or highly adapted species, especially where these occur in highly stressed clifftop locations.</p> <p>Threats to such soils are enrichment/eutrophication,</p> |  |

| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|---|---|---|
|   |   |   | <p>smothering under imported soils or waste etc. Additionally species such as common gorse can aggressively colonise such soils and relatively quickly significantly alter their nutrient status and chemistry (see above).</p> <p>While the overriding aim should be to retain the naturally occurring soils of this SAC through non-intervention, in some places it may be appropriate, after due consultation with Natural England, to restore the soil to an early state through mechanical intervention (turf stripping, soil stripping etc).</p>  |   |
| <b>Structure and function (including its typical species)</b> | <b>Supporting off-site habitat</b>        | Maintain and where necessary restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature | <p>The structure and function of the semi-natural dry grasslands and scrubland facies: on calcareous substrates habitat, including its typical species is, strengthened by a network of adjacent or nearby semi-natural habitats (mostly of similar calcareous grassland) some of these are remnant grassland Sites of Nature Conservation Interest (SNCIs) and may be of comparable quality to the SAC feature. Others are more recent, often created or restored through successive agri-environment scheme interventions.</p> <p>The SAC feature relies on the continued presence of these areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species.</p> <p>This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.</p> <p>In this coastal setting, these adjacent habitats are also the future coastal grassland and will provide refuge to the feature as the cliffs recede beyond the current landward boundary of the SAC designation.</p> | <p><a href="http://www.magic.gov.uk">www.magic.gov.uk</a><br/>(Agri-environment scheme and priority habitat layers)</p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> <p>SNCI data held by the Dorset Environmental Records Centre (DERC)</p> |
| <b>Structure and function (including its</b>                  | <b>Functional connectivity with wider</b> | Maintain and where necessary restore the overall extent, quality and function of any supporting   | There is a need at this site to maintain and restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. This need not only includes the  | <p><a href="http://www.magic.gov.uk">www.magic.gov.uk</a><br/>(Agri-environment scheme and priority habitat layers)</p>   |

| Attributes   |                           | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|---------------------------|---|--|---|
| typical species)                                       | landscape                 | features within the local landscape which provide a critical functional connection with the site  | <p>connection of the coast into its backing ecological hinterland, but also the retention and, in places, need for enhancement of the linear connectivity of the SAC itself where the area of semi-natural habitat is tightly 'squeezed' between cliff top and adjacent land use (this is down to a few tens of meters in places).</p> <p>These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely.</p> <p>In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.</p> | <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> <p>SNCI data held by the Dorset Environmental Records Centre (DERC)</p>   |
| Structure and function (including its typical species) | Adaptation and resilience | Maintain and where necessary restore the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site | <p>Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change while retaining the same basic structure and ways of functioning.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats.</p> <p>This means that this site is considered to be vulnerable overall but are a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable</p> <p>Such environmental changes here may include changes in sea</p>   | <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> <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 <a href="http://publications.naturalengland.org.uk/publication/4954594591375360">http://publications.naturalengland.org.uk/publication/4954594591375360</a></p> |

| Attributes  |                    | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--------------------|---|---|---|
|   |                    |   | <p>levels, storminess, precipitation and temperature all of which appear to already be increasing the rate at which the cliffs are eroding and cutting back into coastal habitat. This is already affecting the extent of some grassland and possibly the species feature (early gentian). Other impacts could include distribution, composition and functioning of this feature within the site.</p> <p>The vulnerability and response of features to such changes will vary, even within this single site. 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>   |   |
| <b>Supporting processes (on which the feature relies)</b> | <b>Air quality</b> | Concentrations and deposition of air pollutants should be maintained at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ). | <p>This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH<sub>3</sub>), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for 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> | <p>Air Pollution Information System (<a href="http://www.apis.ac.uk">www.apis.ac.uk</a>).</p> <p>Site specific critical loads and levels for features can be found <a href="#">here</a></p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
|   |  |   | <p>Critical loads for this feature within the SAC are currently within acceptable limits however there are concerns about impacts of future increases in deposition levels on the feature.</p> <p>Any proposals within 10km of the St Albans Head to Durlston Head SAC should be assessed for their air quality impacts on the feature. Site specific critical loads and levels for features can be found here: <a href="http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next">http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next</a></p> <p>Note that as the H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) (important orchid sites) comprises a variety of vegetation communities, it would be necessary to assess emissions against <u>each</u> NVC (National Vegetation Classification) community (see above) listed for this feature separately. This can be done here: <a href="http://www.apis.ac.uk/search-pollutant-impacts">http://www.apis.ac.uk/search-pollutant-impacts</a>.</p> |  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Disturbance from human activity</b> | Control and minimise excessive human access to grasslands | <p>In some locations the level of access along the clifftop grasslands by the public may have reached levels at which a negative impact on the SAC feature (and other non-SAC interests) may be occurring.</p> <p>The sheer volume of footfall in some locations, coupled with the limited 'depth' of the SAC (pinch points where break of cliff and landward boundary are as little as a couple of meters apart) can result in rapid destruction of sward to bare soil/chalk substrate in a matter of days. This is especially likely to occur when falls close sections of existing coast path/other access.</p> <p>The type and frequency of activity needs to be monitored and action taken to reduce pressure where it is having an adverse impact on a feature's constituent vegetation communities.</p> <p>Location of access points, signage, car parks capacity and charging and licencing of activity providers should all be considered as mechanisms which can create (or reduce) access pressure in specific locations.</p>   | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |

| Attributes   |                              | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|--|------------------------------|--|---|--|
| <b>hSupporting processes (on which the feature relies)</b>   | <b>Conservation measures</b> | Maintain and where necessary resume the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain and/or restore the structure, functions and supporting processes associated with the feature | <p>Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. This is undertaken by a range of landowners, charities and other bodies.</p> <p>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 management agreements and agri-environment scheme documents.</p> | <p>Durlston Country Park NNR Management Plan.<br/>DWT Townsend Nature Reserve Management Plan.</p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> |
| <b>Version Control</b><br>Advice last updated: N/A   |                              |  |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b><br>The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is made up of two component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |                              |  |   |  |
| Additional attribute <b>Supporting processes – disturbance</b> from human activity has been added  |                              |  |   |  |



**Table 3: Supplementary Advice for Qualifying Features: S1304. *Rhinolophus ferrumequinum*; Greater horseshoe bat**

| Attributes                         |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)                                    |
|------------------------------------|--|---|---|---|
| <b>Population (of the feature)</b> | <b>Population abundance - hibernation site</b> | At least maintain and, if possible, increase the abundance of the hibernating population to a level which is above 180 – 200 bats. Avoid deterioration from its current level as indicated by the latest mean peak count or equivalent. | <p>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.</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> <p>Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean 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</p> | This attribute is monitored by the Dorset Bat Group and periodically reported upon. |

| Attributes   |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|---|---|--|---|
|  |   |   | <p>stated are the best available.</p> <p>The meta-population of Greater Horseshoe Bats is spread across a number of sites both within and outside the SAC. Hibernation is the part of the life cycle most adequately represented by the SAC's component roosts.</p> <p>Counts in recent years indicate that somewhere around 180 – 200 GHB are using the SAC at the highest season of occupation (hibernation). This possibly represents a reduction in the longer term, due to improvements made at the main maternity roost to enhance its favourability as a hibernation roost.</p> <p>Outside the SAC boundary, but within South Purbeck, it is estimated that around 250 – 280 GHB are using the quarries outside the SAC</p>   |   |
| <b>Supporting habitat: extent and distribution</b> | <b>Distribution of supporting habitat</b> | Maintain and where necessary restore the distribution and continuity of the feature and its supporting habitat, across the site | <p>A contraction in the range, or geographic spread, of the feature across the site will reduce its overall distribution, and may undermine its resilience to adapt to future environmental changes.</p> <p>Contraction of supporting habitat(s) will also have a negative impact on how well the species feature is able to occupy and use the landscape within and outside the site.</p> <p>A major element of securing the favourable conservation status of the greater horseshoe bat feature is the ongoing research and restoration of roosts across South Purbeck. Many known sites (and doubtless some to be re-discovered) comprise abandoned underground quarries (quarrrs), most of which are in a state of general decay and require management to ensure their continued function as roosts.</p> <p>Planning applications which include old quarrrs within their boundary should ensure the continued availability of these sites to bats and if their state is deemed sub-optimal restoration should be conditioned into any permission as an element of 'net gain'.</p> | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature. |

| Attributes   |                                     | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|-------------------------------------|--|--|---|
|  |                                     |  | <p>In the wider countryside, proposals which sever the networks of hedges, streams etc which connect the various bat roosts together should be avoided or, if absolutely necessary, planning conditions should ensure there is a net gain for the GHB.</p> <p>Generally, the re-enforcement of hedges (gapping up, new hedges, thicker hedges), enhancement and planting of new copses and woodland belts, removal/reduction of unnecessary lighting (removal, cowls, timers etc) are all positive actions when taken under guidance from advisers with knowledge of bat requirements.</p> <p>In some cases, new bespoke roosts could be constructed to re-enforce the roost network.</p>  |   |
| <b>Supporting habitat: extent and distribution</b> | <b>Extent of supporting habitat</b> | Maintain and where necessary restore the total extent of the habitat which support the feature outside the immediate SAC boundary which merely reflects the location of some (but by no means all) roosts. | <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 or if appropriate restore the extent of supporting habitats and their range within this SAC.</p> <p>The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.</p> <p>The extent of the St Albans Head to Durlston Head SAC usefully incorporates important hibernation roosts, swarming areas and a limited coastal strip of foraging/commuting habitat. However, the nature of the greater horseshoe bat meta-population's distribution across South Purbeck (and beyond) means that the actual function and favourable conservation status of the bats is reliant on the maintenance/restoration and ongoing management of the network of low intensity grasslands, hedges, small copses and water bodies, not to mention the significant number of roosts found across South Purbeck</p> | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature. |

| Attributes                                     |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--|--|--|--|
| <b>Supporting habitat: structure/ function</b> | <b>External condition of underground site – hibernation roost</b>          | Monitor, maintain and where necessary and practicable improve the structural integrity of the roost space.   | <p>Damp, draught and increases in light levels are likely to have a negative effect on the temperature and humidity of the roost.</p> <p>All the roosts within the SAC are within quarried caves, part of the now abandoned Purbeck stone underground quarrying industry (stone is now reached via open quarries). Many of these have been closed and unmaintained for decades and some have fallen into a poor state of repair (though currently this may be more a barrier for human access to monitor than access for the bats).</p> <p>The systems of caves (man-made) and quarrs that the bats use to hibernate and roost are not all fully understood in terms of connectivity and extent. In many cases there is always the chance of roof collapse and very little that can be done about it. However, maintaining the structural integrity of the slide and pit into which access to the quarry is gained is an important (and costly) intervention.</p> <p>Several of the quarries within the SAC (and further examples outside of it) have been, over the last 30 or so years, been externally structurally restored and a second round of projects aims to clear the often rubble and silt filled slide in the underground sections.</p> | This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a>                          |
| <b>Supporting habitat: structure/ function</b> | <b>Flight lines from roost into surrounding habitat and foraging areas</b> | Maintain and where necessary restore the presence, structure and quality of any linear landscape features which function as flight lines. Flight lines should remain unlit, functioning as dark corridors. | <p>Non-breeding greater horseshoe adults can forage up to 4km from roost sites. For breeding females and juveniles, the distance tends to be roughly half this i.e. 2km (English Nature, 2003). Greater horseshoes commute and forage along linear features, over grazed pasture and in woodland. Permanent pasture and ancient woodland linked with an abundance of tall bushy hedgerows is ideal supporting habitat for this species. (English Nature, 2003). Flight lines will extend beyond the designated site boundary into the wider local landscape.</p> <p>The coastal strip that the SAC covers is well provided with flight lines and landscape features, especially around Durlston Country Park. Small valleys running from the coast inland provide sheltered flying conditions, even in poor weather.</p>   | This attribute will be monitored using aerial photography to assess the connectivity afforded along flight lines and their continued function. |

| Attributes                                     |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|---|---|--|---|
|  |   |   | <p>All these features should be maintained and not compromised by changes in land management and/or developments.</p> <p>Beyond the SAC, South Purbeck is criss crossed by hedges, stone walls and trackways and small copses and areas of semi/unimproved grassland provide good foraging.</p> <p>Migration to and from maternity roosts some distance north (up to 35km) requires an extensive network of landscape features and could be considered vulnerable to inappropriate developments or land use changes.</p> <p>To ensure Favourable Conservation Status of this species in this part of Dorset, a strategic approach is needed which looks at the species' requirements for each stage of the life cycle.</p> |   |
| <b>Supporting habitat: structure/ function</b> | <b>Internal condition of cave - hibernation</b> | Maintain and restore where necessary the quarries/quarrrs which provide the appropriate range of light levels, humidity, temperature and ventilation.   | <p>The preferred internal temperature of greater horseshoe hibernation roosts is generally above 7°C between 7°-10°C (Dietz et al, 2010).</p> <p>The quarries and quarrrs of this SAC (and beyond) provide a range of temperature, humidity and light levels that suite the GHB population. Up until now, interventions have been based on removing accumulated debris/mud from the quarrr slides and entrances to enable access for monitoring which will also restore a degree of ventilation to the galleries in which the bats hibernate and roost.</p>  |   |
| <b>Supporting habitat: structure/ function</b> | <b>Roost access</b>                             | Maintain and where necessary restore the number of access points to the roost at an optimal size and in an unlit and unobstructed state, with surrounding vegetation providing sheltered flyways without obstructing accesses | The greater horseshoe bat populations within the SAC occupy abandoned quarries (quarrrs) which have access usually (as far as is understood) via the main original entrance to the quarrr. This is usually a 3-4 feet wide by 6-7 feet high entrance. Some of these are now smaller due to build-up of debris that has fallen into the entrance from the surrounding pit walls and down the trackway (slide) into the quarrr. The relative complexity of the galleries within the quarrr afford the bats the ability to move around depending on external weather conditions to maintain their desired temperature/humidity.   | This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--|---|---|---|
| <b>Supporting habitat: structure/function</b>   | <b>Soils, substrate and nutrient cycling</b> | 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.</p> <p>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>Treatment of the soil with certain insecticides will have an impact on the insect biomass available to the bats when foraging over those fields.</p> |   |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Adaptation and resilience</b>             | Maintain and where necessary restore 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 generic text for this attribute in Table 2</p> <p>Important aspects of this feature's resilience lies off of the SAC and within the wider South Purbeck landscape. Much of the South Purbeck landscape should be thought of as supporting, functionally linked habitat for the highly mobile Greater Horseshoe bat feature.</p> <p>Landscape scale infrastructure and development (for example new roads, housing estates, and industrial/agricultural structures) has the ability to sever habitats, as does the introduction of new lighting.</p>  | <p>Natural England 2015 <i>Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England</i>. Available at <a href="http://publications.naturalengland.org.uk/publication/4954594591375360">http://publications.naturalengland.org.uk/publication/4954594591375360</a></p> <p>SHERWIN, H.A., MONTGOMERY, W.I. &amp; LUNDY, M.G. 2013. <i>The Impact and Implications of Climate Change for Bats</i>. Mammal Review <b>43</b>, p171-182.</p> <p>VOIGT, C.C., SCHNEEBERGER, K., VOIGT-HEUCKE, S. &amp; LEWANZIK, D. 2011. <i>Rain Increases the Energy Cost of Bat Flight</i>. Biology Letters <b>7</b>, p793-795.</p> <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston</a></p> |



| Attributes  |                    | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--------------------|---|---|---|
|   |                    |   |   | <a href="#">(SIP178)</a>  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Air quality</b> | Concentrations and deposition of air pollutants should be maintained at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ). | <p>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 of prey) and reducing supporting habitat quality and population viability of this feature.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH<sub>3</sub>), oxides of nitrogen (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts.</p> <p>These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</p> <p>Air quality levels and loads for this SAC can be found here: <a href="http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next">http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next</a>. However, there are no specific levels or loads allocated to the Greater Horseshoe bat with the only figures being a proxy reached by using the Critical levels/Loads for the supporting habitats</p> <p>As general rules, processes that produce significant levels of air pollution should not be located close to <b>any</b> known or</p> | <p><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a></p> <p><a href="http://www.apis.ac.uk">www.apis.ac.uk</a></p> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--|---|--|---|
|   |  |   | <p>suspected Greater Horseshoe bat roost. This would include processes creating high levels of dust.</p>   |   |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Conservation measures</b>           | Maintain and where necessary 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. | <p>Active and ongoing conservation management is needed to protect, maintain and restore this feature at this site. Such measures may include, but are not restricted to, maintenance of cave entrances, establishing/maintaining sympathetic grazing regimes to ensure adequate supply of invertebrate prey or ensuring flyways are maintained across the landscape. 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>It is clear that the meta-population (i.e. the sum of the small individual but connected and inter-related populations) of greater horseshoe bat is dependent upon a good landscape scale structure to enable not only foraging from each roost, but also the essential movements between roosts.</p> <p>The state of the habitat networks outside the SAC area are variable in quality and actually contain roosts which are an integral component of the greater SAC bat feature population.</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a>  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Disturbance from human activity</b> | Control and minimise human access to roost sites  | <p>Human access, by suitably qualified and licenced ecologist, is useful to monitor the state of the hibernation population and to monitor conditions within the quarrs. However, there is also a danger from unregulated access to these quarrs which have, in recent years, received the attention of potholers and 'adventurers' who have illegally accessed the quarrs without any consideration (or probably knowledge of) their impact on any bats residing in the site – this is especially an issue if access is made in the winter when bats are hibernating.</p> <p>Some quarrs are gated/grilled but this is not always deterrent enough. These need regular checks to ensure their continued security.</p>   | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a><br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">site condition assessments</a> . |

| Attributes   |                                | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--------------------------------|--|--|--|
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b>  | <b>Water quantity/ quality</b> | Where the feature or its supporting habitat is dependent on surface water and/or groundwater, maintain water quality and quantity to a standard which provides the necessary conditions to support the feature | <p>For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year.</p> <p>Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives</p> <p>While not directly affected by water quality or quantity, greater horseshoe bats make use of tree lined watercourses as part of their migrating and foraging network. Changes to riparian vegetation structure should be avoided without reference to expert advice and possibly monitoring of the location for bat usage.</p> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |
| <b>Version Control</b><br>Advice last updated: N/A   |                                |  |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b><br>The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is made up of two component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |                                |  |  |  |
| Attributes relating to <b>Population – maternity colony; External condition of buildings- hibernation site</b> and <b>External condition of building - maternity colony</b> have been removed as they are not relevant for the feature on this SAC.  |                                |  |  |  |

**Table 4: Supplementary Advice for Qualifying Features: S1654. *Gentianella anglica*; early gentian**

| Attributes                         |                              | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|------------------------------------|------------------------------|--|--|---|
| <b>Population (of the feature)</b> | <b>Population abundance</b>  | Maintain the abundance of the population at its current level, as indicated by the latest mean peak count or equivalent. Avoid a deterioration in population. Where necessary, restore to a viable population size, Additionally, seek to maintain abundance across distribution of suitable host habitat. | <p>The population of <i>G. anglica</i> on this SAC (and the contiguous Isle of Portland to Studland Cliffs SAC) is distributed in small populations along the coastal grasslands and, as such, is difficult to regularly count.</p> <p>It is known that counts do occur at certain locations, carried out by land owners but bringing these together to gain a detailed picture of the population is not easy.</p> <p>In 1997 approximately 11,000 plants were counted in 39 sub-populations in limestone grassland along 5km of the Purbeck coast between Seacombe and Durlston Head with outlying populations at Winspit and Swanage Townsend Reserve.(1)</p> <p>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.</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.</p> <p>Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection.</p> | <p><b>(1)</b> Wilson P.J. 1999 <i>The Distribution and Status of Gentianella anglica (Pugsley) E. Warb.</i> Plantlife Report no.119</p> <p>Edwards B 1997 <i>A Survey of Early Gentian (Gentianella anglica) in Dorset</i> Plantlife Rep 86</p> <p>Edwards B 1998 <i>A report on Gentianella anglica in Dorset (A supplement to the 1997 report )</i> Plantlife Rep 106</p> |
| <b>Population (of the</b>          | <b>Population structure:</b> | Maintain as appropriate, the presence of both <i>G. anglica</i> and  | Intermixed populations have been recorded from many sites, with the hybrid recorded especially from sites near edge of   | Edwards B 1997 <i>A Survey of Early Gentian (Gentianella</i>  |

| Attributes                                  |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|--|--|--|
| feature)                                    | presence of <i>Gentianella amarella</i> , <i>Gentianella x davidii</i> and 'intermediates' | <i>G. amarella</i> , and the putative hybrid between the two ( <i>G. x davidii</i> )   | <p>range of <i>G. anglica</i>. Phenological differences (flowering time) usually helpful in distinguishing between <i>G. anglica</i> and autumn gentian <i>G. amarella</i>. Note: there is still some uncertainty about the extent to which these two species hybridise, or indeed whether the two species are actually one.</p> <p>It is not clear whether this hybridisation has been observed or recorded on this SAC, certainly <i>G. anglica</i> and <i>G. amarella</i> are both present. It has been recorded on the Studland to Portland Cliffs SAC, within which this SAC sits.</p>  | <p><i>anglica</i>) in Dorset Plantlife Rep 86</p> <p>Edwards B 1998 <i>A report on Gentianella anglica in Dorset (A supplement to the 1997 report)</i> Plantlife Rep 106</p> |
| Supporting habitat: extent and distribution | Distribution of supporting habitat   | Maintain and where necessary restore 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. | <p>A contraction in the range, or geographic spread, of the feature and its supporting habitat across the site will reduce its overall area, the local diversity and variations in its structure and composition. It may also undermine its resilience to adapt to future environmental changes.</p> <p>Contraction may also reduce and break up the continuity of the supporting 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, and wind, that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.</p> <p>The supporting habitat for this feature is currently well distributed along the coastal strip and colonies of <i>G. anglica</i> occur along its length. The maintenance of the areas of suitable habitat is clearly the foremost aim, but given the potential for this species' frequency within the SAC (substrate and NVC community distribution is wider than the feature's distribution). Other factors constrain the feature's utilisation of the supporting habitat, which need investigating.</p> | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.                                    |
| Supporting habitat: extent and distribution | Extent of supporting habitat   | Maintain and where necessary restore the total extent of the habitats which support the feature H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) at no less                        | <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 or if appropriate restore the extent of supporting habitats and their range within this SAC.</p> <p>The information available on the extent and distribution of supporting habitat used by the feature may be approximate</p>   | DERC (1998). A National Vegetation Classification Survey of Portland to Studland Cliffs cSAC. Survey by Bryan Edwards for English Nature.                                    |

| Attributes                                     |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|---|---|--|--|
|  |   | than 227 hectares]  | <p>depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.</p> <p>27 ha is the figure given in the N2K Standard Data Sheet for this SAC. This will not, at any given time, mean that all this habitat feature is capable of supporting Early gentian. However, the cycles of bare ground creation and succession to mature grassland across the H6210 ensures the specific niches for the Early gentian occur.</p>   |  |
| <b>Supporting habitat: structure/ function</b> | <b>Habitat structure and bare ground: regeneration/ colonisation niches</b> | <p>Maintain and where necessary restore patches of bare ground and an open-textured sward to provide creating suitable regeneration/ colonisation niches.</p> <p>Bare ground should be in range 5-10%, but may be higher in some vegetation communities (especially CG1 and CG7).</p> | <p>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, proximity to cliff edge/salt influence or trampling.</p> <p>All available evidence points to the need for plenty of bare ground in a short/tightly grazed open-textured sward. Many sites best described as 'sparsely vegetated').</p> <p>It could be argued that both species occupy very similar niches within the intimate mosaic of microhabitat within a, at a large scale, stable mature grassland.</p> <p>At this SAC <i>G. anglica</i> has been seen growing in areas of bare chalk with very few other spp present in a very open exposed location (near Anvil Point LH) with virtually no soil.</p> | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report. |
| <b>Supporting habitat: structure/ function</b> | <b>Soils, substrate and nutrient cycling</b>                                | Maintain and where suitable, restore 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.</p> <p>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>This feature is generally characterised by thin, nutrient poor, highly porous soils. Some of the very best areas for <i>G. anglica</i>)</p>   | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report. |

| Attributes                                     |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|--|--|---|---|--|
|  |  |   | <p>are at an early successional stage and comprise what are known as 'skeletal' soils having a low organic content and favouring annual or highly adapted species, especially where these occur in highly stressed clifftop locations.</p> <p>There is a very strong correlation along the coast with the areas where chalk, Portland and Purbeck stones form the outcropping geology</p> <p>Threats to such soils are enrichment/eutrophication, smothering under imported soils or waste etc. Additionally species such as common gorse can aggressively colonise such soils and relatively quickly significantly alter their nutrient status and chemistry.</p> <p>While the overriding aim should be to retain the naturally occurring soils of this SAC through non-intervention, in some places it may be appropriate, after due consultation with Natural England, to restore the soil to an early state through mechanical intervention (turf stripping, soil stripping etc).</p> |  |
| <b>Supporting habitat: structure/ function</b> | <b>Substrate</b>                                   | Maintain and where necessary restore 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).   | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report.   |
| <b>Supporting habitat: structure/ function</b> | <b>Vegetation composition: negative indicators</b> | Control and where necessary, 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.<br><br><i>Brachypodium pinnatum</i> , | This feature can be adversely affected by changes to the grass: herb ratio (increased grassiness), often in tandem with sward becoming denser (less bare ground) or ranker ((thick layers of 'thatch etc generally indicating inadequate grazing and/or cutting). Cover of tall grasses, e.g. <i>Brachypodium pinnatum</i> , <i>Bromopsis erecta</i> , <i>Avenula pubescens</i> , <i>Arrhenatherum elatius</i> , <i>Dactylis glomerata</i> , should typically not exceed about 10% (except the first two may locally occur at higher cover in stands of CG4a and CG3a respectively).  | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report.<br><br><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |



| Attributes                                     |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|---|---|--|--|
|  |   | <i>Bromopsis erecta</i> , <i>Avenula pubescens</i> , <i>Arrhenatherum elatius</i> , <i>Dactylis glomerata</i> , <i>Ulex europaeus</i>   | <p>European gorse <i>Ulex europaeus</i> can, if left unchecked, rapidly colonise various calcareous grassland smothering existing vegetation. Its roots are able to concentrate nitrogen from the soil, leading to localised eutrophication and acidification. This can make re-colonisation after clearance of long standing growth more difficult.</p> <p>Other species likely to be favoured by increased soil fertility/agricultural improvement, e.g. <i>Lolium perenne</i>, <i>Holcus lanatus</i>, <i>Cynosurus cristatus</i>, <i>Trisetum flavescens</i>, <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> |  |
| <b>Supporting habitat: structure/ function</b> | <b>Vegetation height</b>                    | Maintain and, where necessary, restore 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.   | See below  | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report. |
| <b>Supporting habitat: structure/ function</b> | <b>Vegetation structure and composition</b> | <p>Maintain and where necessary 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 which corresponds to the following NVC communities: CG1a, 1b, 2a, 2b, 3a, 4a, 7d.</p> <p>Most frequent in short species-rich CG2 and CG2b. In CG1 and CG7, bare ground may be 10-30%.</p> | <p>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: <i>Poterium sanguisorba</i>, <i>Cirsium acaule</i>, <i>Thymus praecox</i>, <i>Polygala vulgaris</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>, <i>Ranunculus bulbosus</i>. Grasses such as <i>Avenula pratensis</i>, <i>A. pubescens</i>, <i>Brachypodium pinnatum</i>, <i>B. sylvaticum</i> and <i>Bromopsis erecta</i> may be frequent as an open grassy 'overstorey', but never abundant or dominant.</p> <p>Early gentain may often occur with autumn gentian Gentianella</p>   | Wilson, P.J. 2008. A SAMPLE SURVEY OF SITES FOR GENTIANELLA ANGLICA IN ENGLAND IN 2008. National Trust Report. |

| Attributes  |                                  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|----------------------------------|---|---|--|
|   |                                  |   | amarella, but the two species usually occupy different microsites and seasonal timings, although there may be considerable overlap on some sites.   |  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Adaptation and resilience</b> | Maintain and where necessary restore 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 generic text for this attribute in Table 2.</p> <p>Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change while retaining the same basic structure and ways of functioning. Such environmental changes here may include changes in sea levels, storminess, precipitation and temperature all of which appear to already be increasing the rate at which the cliffs are eroding and cutting back into coastal habitat. This is already affecting the extent of some grassland and possibly the species feature (early gentian). Other impacts could include distribution, composition and functioning of this feature within the site.</p> <p>The vulnerability and response of features to such changes will vary, even within this single site. 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> | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a>   |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Air quality</b>               | Concentrations and deposition of air pollutants should be maintained at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ). | <p>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.</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 (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for</p>  | <a href="http://www.apis.ac.uk">www.apis.ac.uk</a><br><br><a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|--|---|---|--|
|   |  |   | <p>other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. 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> <p>The basic grasslands in which the feature is found can be quite resilient in the face of certain pollutants (acidification for example). Critical loads for this feature within the SAC are currently within acceptable limits however there are concerns about impacts of future increases in deposition levels on the feature.</p> <p>Any proposals within 10km of the St Albans Head to Durlston Head SAC should be assessed for their air quality impacts on the feature. The current levels of airborne pollution and the critical loads/levels for the host habitats can be found on the Air Pollution Information System (APIS) here:<br/> <a href="http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next">http://www.apis.ac.uk/src/select-a-feature?site=UK0019863&amp;SiteType=SAC&amp;submit=Next</a>.</p> <p>The S1654. <i>Gentianella anglica</i>; Early gentian feature is found within a series of vegetation communities, it would be necessary to assess emissions against <u>each</u> NVC (National Vegetation Classification) community (see above) listed for this feature separately. This can be done here:<br/> <a href="http://www.apis.ac.uk/search-pollutant-impacts">http://www.apis.ac.uk/search-pollutant-impacts</a>.</p> |  |
| <b>Supporting processes (on which the feature and/or its supporting</b> | <b>Disturbance from human activity</b> | Control and minimise excessive human access to grasslands | In some locations the level of access along the cliff-top grasslands by the public may have reached levels at which a negative impact on the SAC feature (and other non-SAC interests) may be occurring.  | <a href="#">Site Improvement Plan: Portland-Studland &amp; St Albans-Durlston (SIP178)</a> |

| Attributes   |                       | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|--|-----------------------|--|---|---|
| habitat relies)  |                       |  | <p>The sheer volume of footfall in some locations, coupled with the limited 'depth' of the SAC (pinch points where break of cliff and landward boundary are as little as a couple of meters apart) can result in rapid destruction of sward to bare soil/chalk substrate in a matter of days. This is especially likely to occur when falls close sections of existing coast path/other access.</p> <p>The type and frequency of activity needs to be monitored and action taken to reduce pressure where it is having an adverse impact on a feature's constituent vegetation communities.</p> <p>Location of access points, signage, car parks capacity and charging and licencing of activity providers may be mechanisms which can create or reduce access pressure in specific locations.</p>  |   |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Conservation measures | Maintain and where necessary restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain and restore 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 and restore this feature at this site. Conservation grazing, using extensive cattle grazing is the prime mechanism by which this is achieved.</p> <p>Grazing is required to not only maintain a varied, but generally short, sward but also to have a mechanical input, creating an intimate mosaic of bare /disturbed ground within the grass matrix. This provides essential germination niches for <i>G. anglica</i> which is an annual.</p> <p>Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.</p> | <p>Natural England 2014 <i>Site Improvement Plan Portland-Studland &amp; St Albans-Durlston</i> Version 1.0</p> <p>Views About Management (VAM) for component SSSI</p> <p>Dorset County Council, 2017. Durlston Country Park Management Plan.</p> |
| Supporting processes (on which the feature and/or its supporting habitat relies) | Grazing pressure      | Maintain and, where necessary, restore a grazing regime to keep the sward short (preferably 2-5cm)   | <p>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.</p> <p>Grazing may be by (any combination of) rabbits, deer, sheep or</p>  | <p>Wilson P.J. 1999 <i>The Distribution and Status of Gentianella anglica (Pugsley) E. Warb.</i> Plantlife Report no.119</p> <p>Wilson, P.J. 2008. A SAMPLE</p>   |

| Attributes   |  | Targets | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)                                       |
|--|--|---------|--|--|
|  |  |         | <p>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.</p> <p>In areas where <i>G. anglica</i> is present or is to be introduced, maintain an overview of the sward conditions rather than slavishly adhere to grazing calendars. Variations in temperature, rainfall, sunshine etc all combine to alter the rate of growth, grazing habits and bare ground. Grazing should be managed to ensure conditions are as good as management will allow.</p> | SURVEY OF SITES FOR <i>Gentianella Anglica</i> in England 2008. National Trust Report. |
| <b>Version Control</b><br>Advice last updated: N/A   |  |         |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b><br>The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is made up of two component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |  |         |  |  |
| Attribute relating to <b>Water quality / quantity</b> has been deleted as Early Gentian is not dependent on surface or ground water.<br>Additional attribute <b>Supporting processes – disturbance from human activity</b> has been added  |  |         |  |  |