



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

**Culm Grasslands Special Area of Conservation (SAC)
Site Code: UK0012679**



Marsh fritillary © Natural England/Allan Drewitt 2004

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Culm Grasslands SAC. This advice should therefore be read together with the SAC Conservation Objectives available [here](#).

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

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

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

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Culm Grasslands Special Area of Conservation (SAC)
Location	Devon
Site Map	The designated boundary of this site can be viewed here on the MAGiC website
Designation Date	1 April 2005
Qualifying Features	See section below
Designation Area	768.69 ha
Designation Changes	n/a
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	Bradworthy Common SSSI Bursdon Moor SSSI Dunsdon Farm SSSI Hare's Down, Knowstone & Rackenford Moors SSSI Hollow Moor & Odham Moor SSSI Kismeldon Meadows SSSI Mambury and Stowford Moors SSSI Thorne and Doves Moors SSSI The SSSI boundaries are coincident with the SAC boundary
Relationship with other European or International Site designations	n/a

Site background and geography

'Culm grassland' is the name given to a distinctive suite of semi-natural, predominantly wet, vegetation communities that occur on the poorly drained acid soils of the Culm measures (Carboniferous shales and sandstones) of North-East Cornwall and North-West Devon. It is in fact a slight misnomer since the main vegetation communities include wet heath, purple moor-grass and rush pasture, fen meadow, mire and scrub, which often occur together in intimate mosaics. The Culm grassland has resulted from the combination of an oceanic climate, poorly draining, acid soils and a long history of management as pasture. It supports an outstanding assemblage of plants and animals, including a number of rare species, such as the marsh fritillary butterfly *Euphydryas aurinia*.

The Culm Grasslands SAC comprises eight discrete Culm grassland sites spread across 600 km² of North-West Devon, stretching from Holsworthy in the west to Rackenford in the East. All of the sites fall within the Culm National Character Area ([NCA 149](#)) and one of them forms part of Dunsdon National Nature Reserve.

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:

- **H6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 'Purple moor-grass meadows'**

Molinia meadows are found mainly on moist, moderately base-rich, peats and peaty gley soils, often with fluctuating water tables. They usually occur as components of wet pastures or fens, and often form mosaics with dry grassland, heath, mire and scrub communities. This habitat type includes the most species-rich *Molinia* grasslands in the UK, in which purple moor-grass *Molinia caerulea* is accompanied by a wide range of associated species, including rushes, sedges and tall-growing herbs. The more impoverished forms of *Molinia* pasture on acidic substrates are excluded from the Annex I definition.

In the UK these grasslands are represented by two NVC types:

- M24 *Molinia caerulea* – *Cirsium dissectum* fen-meadow
- M26 *Molinia caerulea* – *Crepis paludosa* mire

M24 *Molinia* – *Cirsium* fen-meadow is the more widespread and diverse community. It comprises a heathy form found mainly in south Wales, south-west England and Northern Ireland, a form with tall herbs in the fen systems of East Anglia, and a more widespread 'typical' form widely but locally distributed in southern Britain. M26 *Molinia caerulea* – *Crepis paludosa* mire occurs more locally in wet grasslands and fens in uplands and upland margins of northern England and north Wales, and as small scattered stands throughout Scotland as far north as Moray.

Culm Grasslands SAC represents *Molinia* meadows in south-west England. This site contains extremely diverse examples of the heathy type of M24 *Molinia caerulea* – *Cirsium dissectum* fen-meadow, ranging from short, grazed swards through to stands that are transitional to scrub. Structural diversity accounts for the conservation of a wide range of flora and fauna, particularly of species characteristic of south-western Europe, such as meadow thistle *Cirsium dissectum* and whorled caraway *Carum verticillatum*.

- **H4010 Northern Atlantic wet heaths with *Erica tetralix*; 'Wet heathland with cross-leaved heath'**

Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and *Sphagnum* bog-mosses.

In the UK this vegetation corresponds to the following NVC types:

- H5 *Erica vagans* – *Schoenus nigricans* heath
- M14 *Schoenus nigricans* – *Narthecium ossifragum* mire
- M15 *Scirpus cespitosus* – *Erica tetralix* wet heath
- M16 *Erica tetralix* – *Sphagnum compactum* wet heath

M15 *Scirpus* – *Erica* wet heath is found in areas with a moderate to high rainfall, and is the typical form of wet heath in the north and west of the UK. *E. tetralix* and *Calluna* are typically accompanied by abundant deergrass *Trichophorum cespitosum* and purple moor-grass *Molinia caerulea*.

M16 *Erica* – *Sphagnum* wet heath is characteristic of drier climates in the south and east, and is usually dominated by mixtures of *E. tetralix*, *Calluna* and *Molinia*. The bog-moss *Sphagnum compactum* is typically abundant.

Wet heath is an important habitat for a range of vascular plant and bryophyte species of an oceanic or Atlantic distribution in Europe, several of which have an important part of their EU and world distribution

in the UK. Northern Atlantic wet heaths with *Erica tetralix* are restricted to the Atlantic fringe of Europe between Norway and Normandy. A high proportion of the EU resource occurs in the UK.

Culm Grasslands SAC contains extensive stands of wet heath: M16 *Erica tetralix* – *Sphagnum compactum* is the dominant type of wet heath community but M15 *Scirpus cespitosus* – *Erica tetralix* is also present.

Qualifying Species:

- **S1065 Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia***

The marsh fritillary butterfly *Euphydryas aurinia* is found in a range of habitats in which its larval food plant, devil's-bit scabious *Succisa pratensis*, occurs. Marsh fritillaries are essentially grassland butterflies in the UK, and although populations may occur occasionally on wet heath, bog margins and woodland clearings, most colonies are found in damp acidic or dry calcareous grasslands. Management is predominantly by low-intensity cattle or pony grazing. Sheep selectively graze devil's-bit scabious and are therefore generally detrimental to marsh fritillary populations. Burning and mowing are also known to have caused the extinction of populations.

Populations of marsh fritillary vary greatly in size from year to year, and, at least in part, this is related to cycles of attack from parasitic wasps. Adults tend to be sedentary and remain in a series of linked metapopulations, forming numerous temporary sub-populations, which frequently die out and recolonise. Where unable to do this, populations do not seem to be able to persist in habitat fragments. It is therefore essential to conserve a cluster of sites in close proximity.

The marsh fritillary butterfly has declined dramatically in Europe and is regarded as endangered or vulnerable in most of its European range. On the basis of existing knowledge, the UK and Spain constitute the European strongholds for this species.

Culm Grasslands SAC provides an important stronghold for the marsh fritillary butterfly in the south-west peninsula.

Table A: Presence of qualifying SAC features within component SSSIs

Component SSSI	SAC feature		
	H4010 Northern Atlantic wet heaths with <i>Erica tetralix</i> ;	H6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)	S1065 <i>Euphydryas</i> (<i>Eurodryas</i> , <i>Hypodryas</i>) <i>aurinia</i> ; Marsh fritillary butterfly
Bradworthy Common		Y	Y
Bursdon Moor	Y	Y	Y
Dunsdon Farm	Y	Y	Y
Hare's Down, Knowstone & Rackenford Moors	Y	Y	Y
Hollow Moor & Odham Moor	Y	Y	Y
Kismeldon Meadows	Y	Y	Y
Mambury and Stowford Moors	Y	Y	Y
Thorne and Doves Moors		Y	Y

Table 1: Supplementary Advice for Qualifying Features: H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Restore the total extent of the H4010 wet heath feature.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information.</p> <p>The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features.</p> <p>Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>H4010 wet heath is present in six of the component SSSIs. However, the total area of wet heath across the site is not known. This is principally because of the continuous gradation between wet heath and fen meadow on the Culm, which makes delineating boundaries between M16 and M24 (and consequently estimates of the area of each community) somewhat arbitrary. In addition the vegetation maps available for some of the SSSIs are not very detailed. In order to provide a measure of the extent of semi-natural Culm vegetation, the area of a combined group of 'Culm' vegetation communities is given below for each SSSI. This is considered relatively robust because it is not dependent on discriminating between extremely similar communities and should also be a more repeatable measure.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p><i>Bradworthy Common</i> CHAMBERLAIN, P., HEATH, J., MUDDAMAN, J., THYMIDES, A. & WOLTON, R.J. 1990 <i>Bradworthy Common Culm Grasslands Survey</i>. Unpublished. Available from Natural England on request</p> <p>NATURE CONSERVANCY COUNCIL. <i>Bradworthy Common Phase 1 vegetation map</i>. Unpublished. Available from Natural England on request</p> <p><i>Bursdon Moor</i> NATURE CONSERVANCY COUNCIL. <i>Bursdon Moor NVC map</i>. Unpublished. Available from Natural England on request</p> <p>CASHMAN, P.B. 1987 <i>Bursdon Moor Habitat Map</i>. Unpublished. Available from Natural England on request</p> <p>RURAL SURVEYS RESEARCH UNIT. Biological Survey of Common Land Department of Environment. Available from</p>

Attributes		Targets	Supporting and Explanatory Notes			Sources of site-based evidence (where available)																					
			<table border="1"> <thead> <tr> <th>Site</th> <th>Approximate area (ha)</th> <th>Vegetation Communities</th> </tr> </thead> <tbody> <tr> <td>Bursdon moor</td> <td>89</td> <td>M16/M24/M25</td> </tr> <tr> <td>Dunsdon Farm</td> <td>22</td> <td>M16/M24/M25/M27</td> </tr> <tr> <td>Hare's Down, Knowstone & Rackenford Moors</td> <td>147.8</td> <td>M16/M23/M24/M25</td> </tr> <tr> <td>Hollow Moor & Odham Moor</td> <td>150</td> <td>M16/M3/M24/M25/M27</td> </tr> <tr> <td>Kismeldon Meadows</td> <td>19.15</td> <td>M16/M24/M25</td> </tr> <tr> <td>Mambury and Stowford Moors</td> <td>20.73</td> <td>M16/M24/M25</td> </tr> </tbody> </table>			Site	Approximate area (ha)	Vegetation Communities	Bursdon moor	89	M16/M24/M25	Dunsdon Farm	22	M16/M24/M25/M27	Hare's Down, Knowstone & Rackenford Moors	147.8	M16/M23/M24/M25	Hollow Moor & Odham Moor	150	M16/M3/M24/M25/M27	Kismeldon Meadows	19.15	M16/M24/M25	Mambury and Stowford Moors	20.73	M16/M24/M25	<p>Natural England on request</p> <p><i>Dunsdon Farm</i> NATURE CONSERVANCY COUNCIL. <i>Dunsdon Farm Phase 1 vegetation map</i>. Unpublished. Available from Natural England on request</p> <p><i>Hare's Down, Knowstone & Rackenford Moors</i> ENGLISH FSU. <i>Hares Down and Knowstone Moors Site Report</i>. Nature Conservancy Council.</p> <p>NATURE CONSERVANCY COUNCIL. <i>Hare's Down, Knowstone & Rackenford Moors NVC map</i>. Unpublished. Available from Natural England on request</p> <p>RURAL SURVEYS RESEARCH UNIT. Biological Survey of Common Land. Department of Environment. Available from Natural England on request</p> <p>WHEELER, B. & WILSON, P. <i>Piloting Priority Habitat Mapping 2015/16 Site Report</i>. Unpublished. Available from Natural England on request.</p> <p><i>Hollow Moor & Odham Moor</i> BROOKHOUSE, J. 1984. <i>Hollow Moor vegetation map</i>. Unpublished. Available from Natural England on request</p>
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				<p>COBBING, P. 1991. <i>Hollow Moor vegetation map</i>. Unpublished. Available from Natural England on request.</p> <p><i>Kismeldon Meadows</i> NATURE CONSERVANCY COUNCIL. <i>Kismeldon Meadows NVC map</i>. Unpublished. Available from Natural England on request</p> <p><i>Mambury and Stowford Moors</i> NATURE CONSERVANCY COUNCIL. <i>Mambury and Stowford Moors habitat map</i>. Unpublished. Available from Natural England on request</p> <p><i>Thorne and Doves Moors</i> MARTIN, B.E. 1990. <i>Thorne and Doves Moors NVC map</i>. Unpublished. Available from Natural England on request</p> <p>NATURE CONSERVANCY COUNCIL. <i>Thorne and Doves Moor extension vegetation map</i>. Unpublished. Available from Natural England on request</p>
Extent and distribution of the feature	Spatial distribution of the feature within the site	Restore the distribution and configuration of the feature, including where applicable its component vegetation types, across the site	A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>See references for 'Extent and</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.</p> <p>H4010 wet heath is present in all eight of the component SSSIs. However, the precise distribution of H4010 wet heath is not fully understood. This is principally because of the continuous gradation between wet heath and fen meadow on the Culm, which makes delineating boundaries between M16 and M24 somewhat arbitrary. In addition, the vegetation maps available for some of the SSSIs are not very detailed.</p> <p>Target set to Restore because some areas of wet heath have been encroached by gorse and scrub.</p>	distribution of the feature'.
Structure and function (including its typical species)	Vegetation community transitions	Restore any areas of transition between this and communities which form other heathland-associated habitats, such as dry and humid heaths, mires, acid grasslands, scrub and woodland.	<p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle.</p> <p>Target set to Restore because some areas of wet heath have been encroached by scrub.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>See references for 'Extent and distribution of the feature'.</p> <p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types:</p> <p>M15 - <i>Scirpus cespitosus</i> - <i>Erica tetralix</i> wet heath</p> <p>M16 - <i>Erica tetralix</i> - <i>Sphagnum compactum</i> wet heath</p> <p>Wet heath often occurs in an intimate mosaic with other wet communities on the Culm, in particular:</p> <p>M24 - <i>Molinia caerulea</i> - <i>Cirsium dissectum</i> fen meadow</p> <p>M25 - <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. 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>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p>
Structure and function (including its typical species)	Vegetation structure: cover of dwarf shrubs	<p>Restore an overall cover of dwarf shrub species which is typically between 25-90%. There are specific targets for the component SSSIs:</p>	<p>Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heathers, including members of the <i>Ericaceae</i> and <i>Empetraceae</i> families). The ericaceous species heather or ling <i>Calluna vulgaris</i>, bell heather <i>Erica cinerea</i>, cross-leaved heath <i>Erica tetralix</i>, Dorset heath <i>Erica ciliaris</i>,</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)														
			<p>Cornish heath <i>Erica vagans</i>, bilberry or blaeberry <i>Vaccinium myrtillus</i> and cowberry <i>Vaccinium vitis-idaea</i> are the commonest and most characteristic dwarf-shrubs. Hybrids of Dorset and crossleaved heath and of bilberry and cowberry can be locally abundant. <i>Calluna</i> is usually the most abundant. Crowberry <i>Empetrum nigrum</i>, another common species in some coastal and transitional heaths, is not strictly ericaceous but is often treated as an ericoid species.</p> <table border="1"> <thead> <tr> <th>Site</th> <th>% dwarf shrub cover</th> </tr> </thead> <tbody> <tr> <td>Bursdon moor</td> <td>40-90%</td> </tr> <tr> <td>Dunsdon Farm</td> <td>40-90%</td> </tr> <tr> <td>Hare's Down, Knowstone & Rackenford Moors</td> <td>25-75% (40-75% in unit 2)</td> </tr> <tr> <td>Hollow Moor & Odham Moor</td> <td>60-90%</td> </tr> <tr> <td>Kismeldon Meadows</td> <td>40-90%</td> </tr> <tr> <td>Mambury and Stowford Moors</td> <td>30-50%</td> </tr> </tbody> </table> <p>A lower target is set for Hare's Down, Knowstone & Rackenford Moors because it is considered that the Atlantic influence (the site lies on the fringe of Exmoor) gives western humid conditions that result in greater cover of <i>Molinia</i> within a mosaic of wet heath.</p> <p>Target includes Restore because the dwarf shrub cover is below the target level in some areas.</p>	Site	% dwarf shrub cover	Bursdon moor	40-90%	Dunsdon Farm	40-90%	Hare's Down, Knowstone & Rackenford Moors	25-75% (40-75% in unit 2)	Hollow Moor & Odham Moor	60-90%	Kismeldon Meadows	40-90%	Mambury and Stowford Moors	30-50%	
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Structure and function (including its typical species)	Vegetation structure: heather age structure	Maintain a diverse age structure amongst the ericaceous shrubs typically found on the site	<p>Each phase of growth associated with the characteristic heathers which dominate this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Therefore, it is important to maintain a mosaic of heather in different phases of growth.</p> <p>Typically this age structure will consist of between 10-40% cover of (pseudo) pioneer heathers; 20-80% cover of building/mature heathers; <30% cover of degenerate heathers and less than <10% cover of dead heathers.</p>	This attribute will be periodically monitored as part of Natural England's site condition assessments .														

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation structure: cover of gorse	Cover of common gorse is low typically at <10%	<p>Gorse as a component of heathland is a very valuable wildlife habitat, and often a marker of relict heath and common. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species, and excellent winter roosting. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands en masse may also be serious fire hazards.</p> <p>Regular gorse cutting is required to prevent its cover increasing.</p>	This attribute will be periodically monitored as part of Natural England's site condition assessments .
Structure and function (including its typical species)	Vegetation structure: tree cover	Restore the open character of the feature, with a typically scattered and low cover of trees and scrub (<10% cover)	<p>Scrub (mainly trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. If scrub is locally important for any associated species with their own specific conservation objectives, then a higher level of cover will be acceptable. The area of scrub/tree cover should be stable or not increasing as a whole.</p> <p>Target includes Restore because some areas of wet heath have been encroached by scrub.</p>	This attribute will be periodically monitored as part of Natural England's site condition assessments .
Structure and function (including its typical species)	Vegetation composition: bracken cover	Maintain a cover of dense bracken which is low, typically at <5%	The spread of bracken <i>Pteridium aquilinum</i> is a problem on many lowland heathlands. The unpalatable nature and density of bracken as a tall-herb fern, and its decomposing litter, can smother and shade out smaller and more characteristic heathland vegetation. Usually active management of bracken is required to reduce or contain its cover across this habitat feature. But this fern has also some nature conservation value, for example on sites where fritillary butterflies occur and utilise	This attribute will be periodically monitored as part of Natural England's site condition assessments .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			bracken litter habitat.	
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature:</p> <p>The Culm Grasslands support a suite of scarce plants with an oceanic distribution in the UK. These plants are a distinctive component of the Culm communities:</p> <p><i>Carum verticillatum</i> Whorled caraway</p> <p><i>Cirsium dissectum</i> Meadow thistle</p> <p><i>Hypericum undulatum</i> Wavy St John's-wort</p> <p><i>Pinguicula lusitanica</i> Pale butterwort</p> <p><i>Scutellaria minor</i> Lesser skullcap</p> <p><i>Whalenbergia hederacea</i> Ivy-leaved bellflower</p> <p>The Culm Grasslands also support a number of rare invertebrates:</p> <p>Marsh fritillary <i>Euphydryas aurinia</i></p>	<p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include:</p> <ul style="list-style-type: none"> • Structural species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>DRAKE, C.M. 1990. <i>A survey of the invertebrates of eight Culm grasslands, Devon. England Field Unit Project Number 120.</i> English Nature. Available from Natural England on request</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>The fly <i>Microdon mutabilis</i></p> <p>The fly <i>Sapromyza albiceps</i></p> <p>Fairy shrimp <i>Chirocephalus diaphanous</i></p>		
Structure and function (including its typical species)	Vegetation: undesirable species	<p>Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread:</p> <p>All invasive non-native species, including <i>Impatiens glandulifera</i> Himalayan balsam rare or absent</p> <p>Other Species <1%</p>	<p>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.</p> <p>Target set to Restore because Himalayan balsam is present on the site.</p> <p>Other species include: <i>Apium nodiflorum</i> Fool's water-cress; <i>Cirsium arvense</i> Creeping Thistle; <i>Digitalis purpurea</i> Foxglove; <i>Epilobium</i> spp. Willowherbs (excl. Marsh <i>E. palustre</i>); <i>Glyceria fluitans</i> Floating sweet-grass; <i>Juncus effusus</i> Soft Rush; <i>Juncus squarrosus</i> Heath Rush; <i>Oenanthe crocata</i> Hemlock water-dropwort; <i>Phragmites australis</i> Common reed; <i>Ranunculus repens</i> Creeping buttercup; <i>Rumex obtusifolius</i> Broad-leaved Dock; <i>Senecio jacobaea</i> Common ragwort; <i>Typha</i> spp Bulrushes; <i>Urtica</i> spp. Nettles; Acrocarpous mosses; 'coarse grasses'</p> <p>The other species listed are natural components of a range of vegetation types within the SAC and may benefit a number of invertebrates. However, in certain circumstances (such as when they encroach on stands of rare plants or become particularly abundant) they can be undesirable and/or indicate negative pressures on the site.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Functional connectivity with wider landscape	Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	<p>This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.</p> <p>There are six SSSIs within 1.5 km of the SAC that also support Culm Grassland vegetation: Deptford Farm Pastures; Small Brook; Whiddon Moor, Luckroft and Odham Marshes; Coombe Meadow; Ribsons Meadows; Common Moor.</p> <p>Target set to Restore because patches of wet heath have become fragmented, e.g. by road construction, intensive agriculture and coniferisation.</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040
Structure and function (including its typical species)	Adaptation and resilience	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>This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary.</p> <p>Using best available information, any necessary or likely</p>	NATURAL ENGLAND. 2015. <i>Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England</i> Available at http://publications.naturalengland.org.uk/publication/4954594591375360

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.</p> <p>Wet heath vegetation is sensitive to climate change being dependent on wet or water-logged soils, it is sensitive to changes in the water table and to flooding. A reduction in summer rainfall could potentially promote a transition to drier habitats.</p> <p>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats and supporting habitats. This means that this site is considered to be vulnerable overall but moderately so. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation, creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be advisable.</p> <p>Target set to Restore because component sites of the SAC are fragmented e.g. by roads, intensive agriculture and conifer plantations.</p>	
Supporting processes (on which the feature relies)	Conservation measures	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Restore the structure, functions and supporting processes associated with the feature	<p>Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England.</p> <p>This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>NATURAL ENGLAND. 2014. Culm Grasslands Site Improvement Plan v1.0. Natural England. Available from:</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>management agreements.</p> <p>Target includes Restore because some areas of wet heath (both within and outside the SAC) require scrub control and/or changes to grazing.</p>	<p>ENGLISH NATURE. 2004. Bursdon Moor Views About Management.</p> <p>ENGLISH NATURE. 2005. Dunsdon Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Hare's Down, Knowstone and Rackenford Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Hollow Moor & Odham Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Kismeldon Meadows Views About Management.</p> <p>ENGLISH NATURE. 2004. Mambury & Stowford Moors Views About Management.</p>
Supporting processes (on which the feature relies)	Soils, substrate and nutrient cycling	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. This Annex 1 habitat has essentially raw soils with little humus and low nutrient status.	
Supporting processes	Air quality	Restore as necessary, the concentrations and deposition of	This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants	More information about site-relevant Critical Loads and Levels

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(on which the feature relies)		air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	<p>may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH₃), oxides of nitrogen (NO_x) and sulphur dioxide (SO₂), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for 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>Target set to Restore because the minimum critical loads are exceeded for nutrient nitrogen deposition, acid deposition (nitrogen) and ammonia composition</p>	for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature relies)	Water quality	Where the feature is dependent on surface water and/or groundwater, Restore water quality and quantity to a standard which provides the necessary conditions to support the feature.	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. 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	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>may be required to establish appropriate water quality standards for the SAC.</p> <p>Target set to Restore because field drainage from adjacent farmland is impacting the SAC in some areas, which may result in drying out patches of wet heath</p>	
Supporting processes (on which the feature relies)	Hydrology	At a site, unit and/or catchment level (as necessary, restore the natural hydrological regime to provide the conditions necessary to sustain the feature within the site	<p>Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts.</p> <p>Target set to Restore because field drainage in adjacent farmland is disrupting natural hydrological processes.</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040
Version Control				
Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 2: Supplementary Advice for Qualifying Features: H6410. *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); Purple moor-grass meadows

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Restore the total extent of the H6410 purple moor-grass meadow feature.	<p>There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations.</p> <p>Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>H6410 purple moor-grass meadows is present in all eight of the component SSSIs. However, the total area of purple moor-grass meadow across the site is not known. This is principally because of the continuous gradation between purple moor-grass – tormentil mire, purple moor-grass meadow and wet heath on the Culm, which makes delineating boundaries between M24, M25 and M16 (and consequently estimates of the area of each community) somewhat arbitrary. In addition the vegetation maps available for some of the SSSIs are not very detailed. In order to provide a measure of the extent of semi-natural Culm vegetation, the area of a combined group of ‘Culm’ vegetation communities is given below for each SSSI. This is considered relatively robust because it is not dependent on discriminating between extremely similar communities and</p>	<p>This attribute will be periodically monitored as part of Natural England’s site condition assessments.</p> <p>See references for ‘Extent and distribution of the feature’ for H4010 wet heath.</p> <p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)																											
			<p>should also be a more repeatable measure.</p> <table border="1"> <thead> <tr> <th>Site</th> <th>Approximate area (ha)</th> <th>Vegetation Communities</th> </tr> </thead> <tbody> <tr> <td>Bradworthy Common</td> <td>12.5</td> <td>M24/M25</td> </tr> <tr> <td>Bursdon moor</td> <td>89</td> <td>M16/M24/M25</td> </tr> <tr> <td>Dunsdon Farm</td> <td>22</td> <td>M16/M24/M25/M27</td> </tr> <tr> <td>Hare's Down, Knowstone & Rackenford Moors</td> <td>147.8</td> <td>M16/M23/M24/M25</td> </tr> <tr> <td>Hollow Moor & Odham Moor</td> <td>150</td> <td>M16/M23/M24/M25/M27</td> </tr> <tr> <td>Kismeldon Meadows</td> <td>19.15</td> <td>M16/M24/M25</td> </tr> <tr> <td>Mambury and Stowford Moors</td> <td>20.73</td> <td>M16/M25/M25/S27</td> </tr> <tr> <td>Thorne and Doves Moors</td> <td>78.85</td> <td>M24/M25</td> </tr> </tbody> </table> <p>Target set to Restore because some areas of purple moor-grass meadow have been encroached by gorse and scrub.</p>	Site	Approximate area (ha)	Vegetation Communities	Bradworthy Common	12.5	M24/M25	Bursdon moor	89	M16/M24/M25	Dunsdon Farm	22	M16/M24/M25/M27	Hare's Down, Knowstone & Rackenford Moors	147.8	M16/M23/M24/M25	Hollow Moor & Odham Moor	150	M16/M23/M24/M25/M27	Kismeldon Meadows	19.15	M16/M24/M25	Mambury and Stowford Moors	20.73	M16/M25/M25/S27	Thorne and Doves Moors	78.85	M24/M25	
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Extent and distribution of the feature	Spatial distribution of the feature within the site	Restore the distribution and configuration of the H6410 purple moor-grass feature, including where applicable its component vegetation types, across the site	<p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>See references for 'Extent and distribution of the feature' for H4010 wet heath.</p> <p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>																											

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>the typical and more specialist species associated with the Annex I habitat feature.</p> <p>H6410 purple moor-grass meadows is present in all eight of the component SSSIs. However, the precise distribution of H6410 purple moor-grass meadows is not fully understood. This is principally because of the continuous gradation between purple moor-grass – tormentil mire, purple moor-grass meadow and wet heath on the Culm, which makes delineating boundaries between M24, M25 and M16 somewhat arbitrary. In addition, the vegetation maps available for some of the SSSIs are not very detailed.</p> <p>Target set to Restore because some areas of purple moor-grass meadow have been encroached by gorse and scrub.</p>	
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the H6410 purple moor-grass feature are referable to and characterised by the following National Vegetation Classification type:</p> <p>M24 <i>Molinia caerulea</i> – <i>Cirsium dissectum</i> fen-meadow</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).</p>	This attribute will be periodically monitored as part of Natural England's site condition assessments .
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature;</p> <p>Vascular plants:</p> <p><i>Carum verticillatum</i> Whorled</p>	<p>See explanatory notes for this attribute in Table 1.</p> <p>The Culm Grasslands support a suite of scarce plants with an oceanic distribution in the UK. These plants are a distinctive component of the Culm communities:</p>	This attribute will be periodically monitored as part of Natural England's site condition assessments .

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>caraway; <i>Cirsium dissectum</i> Meadow thistle; <i>Hypericum undulatum</i> Wavy St John's-wort; <i>Pinguicula lusitanica</i> Pale butterwort; <i>Scutellaria minor</i> Lesser skullcap; <i>Whalenbergia hederacea</i> Ivy-leaved bellflower</p> <p>Assemblage of rare grassland invertebrates including Marsh fritillary <i>Euphydryas aurinia</i>; Pearl-bordered fritillary butterfly <i>Boloria Euphrosyne</i>; Small pearl-bordered fritillary butterfly <i>Boloria selene</i>; Wood white butterfly <i>Leptidea sinapis</i>; Dingy Mocha moth <i>Cyclophora pendularia</i>; Narrow-bordered Bee Hawkmoth <i>Hemaris tityus</i></p> <p>The fly <i>Microdon mutabilis</i></p> <p>The fly <i>Sapromyza albiceps</i></p> <p>Fairy shrimp <i>Chirocephalus diaphanous</i></p>		
Structure and function (including its typical species)	Vegetation: undesirable species	<p>Restore the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread:</p> <p>All invasive non-native species, including <i>Impatiens glandulifera</i> Himalayan balsam rare or absent</p>	<p>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.</p> <p>Target set to Restore because Himalayan balsam is present on the site.</p>	<p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>Other species:</p> <p><i>Cirsium arvense</i> Creeping thistle <i>Cirsium palustre</i> Marsh thistle <i>Cirsium vulgare</i> Spear thistle <i>Deschampsia cespitosa</i> Tufted hair-grass; <i>Phragmites australis</i> Common reed; <i>Rumex crispus</i> Curled dock; <i>Rumex obtusifolius</i> Broad-leaved dock; <i>Senecio aquaticus</i> Marsh ragwort <i>Urtica dioica</i> Common nettle</p>	<p>The other species listed are natural components of a range of vegetation types within the SAC and may benefit a number of invertebrates. However, in certain circumstances (such as when they encroach on stands of rare plants or become extremely abundant) they can be undesirable and/or indicate negative pressures on the site.</p>	
Structure and function (including its typical species)	Vegetation community transitions	<p>Restore the pattern of natural vegetation zonation/transitions.</p> <p>The principal zonation/transition is from wet to dry, with purple moor-grass – tormentil mire grading through purple moor-grass meadow to wet heath and other mires and swamps. This can occur on a very fine scale with small changes in microtopography, or along longer gradients.</p>	<p>Transitions/zonation between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.</p> <p>Target set to Restore because some areas of purple moor-grass meadow have been encroached by gorse and scrub, disrupting the transitions between communities.</p>	<p>See references for 'Extent and distribution of the feature' for H4010 wet heath.</p> <p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>
Structure and function (including its typical species)	Soils, substrate and nutrient cycling	<p>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> <p>For this feature, soil P index should typically be index 0 (< 9 mg l⁻¹)</p>	<p>Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Water quality	Where the feature is dependent on surface water and/or groundwater, Restore 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. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type.</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 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> <p>Target set to Restore because field drainage from adjacent farmland is drying out the purple moor-grass meadows in some areas.</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040
Structure and function (including its typical species)	Hydrology: Water table	Restore a hydrological regime that provides a sub-surface water table during the summer (range - 2 to -48 cm below ground level) and a winter water table \pm at the surface. Inundation should be absent or only occasional to a minor degree in winter	<p>Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present. This target is generic and as precise tolerances are not known, further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts.</p> <p>Target set to Restore because field drainage in adjacent farmland is disrupting the hydrological regime of some sites.</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040
Structure and function (including its typical species)	Supporting off-site habitat	Restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the H6410 purple moor-grass meadows feature.	<p>The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary.</p> <p>Changes in surrounding land-use may adversely</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>(directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.</p> <p>There are six SSSIs within 1.5 km of the SAC that also support Culm Grassland vegetation: Deptford Farm Pastures; Small Brook; Whiddon Moor, Luckroft and Odham Marshes; Coombe Meadow; Ribsons Meadows; Common Moor.</p> <p>Target set to Restore because some patches of purple moor-grass meadow require scrub control and/or changes to grazing and burning practices.</p>	3040
Structure and function (including its typical species)	Maintaining integrity of hydrological catchment	Restore the full range of hydrological/hydrogeological aspects of a site's catchment that contribute to its functioning and the maintenance of the feature	<p>The movement, quality and distribution of water within a site's wider catchment and outside of the site's boundary will affect its ability to support this wetland habitat feature. Catchment size will vary.</p> <p>A site's water table and other hydrological aspects may be affected by changes in the use of the land surface, water abstraction, flood alleviation, development and mineral extraction in the wider catchment.</p> <p>Target set to Restore because field drainage in adjacent farmland is disrupting the hydrological regime of some component sites.</p>	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040
Structure and function (including its typical species)	Functional connectivity with wider landscape	Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the 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	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.</p> <p>There are six SSSIs within 1.5 km of the SAC that also support Culm Grassland vegetation: Deptford Farm Pastures; Small Brook; Whiddon Moor, Luckroft and Odham Marshes; Coombe Meadow; Ribsons Meadows; Common Moor.</p> <p>Target set to Restore because patches of purple moor-grass meadows have become fragmented, e.g. by road construction, intensive agriculture, afforestation with conifers and by agricultural abandonment, which has led to succession to scrub.</p>	
Structure and function (including its typical species)	Adaptation and resilience	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>See explanatory notes for this attribute in Table 1.</p> <p>Purple Moor-grass is sensitive to climate change being dependent on wet or water-logged soils, it is sensitive to changes in the water table and to flooding. A reduction in summer rainfall could potentially promote a transition to drier habitats.</p> <p>Target set to Restore because component sites of the SAC are fragmented e.g. by roads, intensive agriculture, afforestation with conifers and by agricultural abandonment, which has led to succession to scrub.</p>	NATURAL ENGLAND (2015) Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360]
Supporting processes (on which the feature relies)	Air quality	Restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System	<p>See explanatory notes for this attribute in Table 1.</p> <p>Target set to Restore because the minimum critical loads for nutrient nitrogen deposition and acid deposition (nitrogen) are currently being exceeded.</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		(www.apis.ac.uk).		
Supporting processes (on which the feature relies)	Conservation measures	Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature	<p>See explanatory notes for this attribute in Table 1.</p> <p>Conservation measures for this feature typically include grazing, cutting, scrub management, weed control, recreation/visitor management. Also covered is maintenance of surface drainage features such as drains, grips, gutters and foot drains. Retention of suitable land use infrastructure/patterns to enable site management e.g. pastoral livestock farming</p> <p>Target includes Restore because some areas of purple moor-grass meadow require scrub control and/or changes to grazing.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>NATURAL ENGLAND. 2014. Culm Grasslands Site Improvement Plan v1.0. Natural England. Available from: ENGLISH NATURE. 2004. Bursdon Moor Views About Management.</p> <p>ENGLISH NATURE. 2005. Dunsdon Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Hare's Down, Knowstone and Rackenford Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Hollow Moor & Odham Moor Views About Management.</p> <p>ENGLISH NATURE. 2004. Kismeldon Meadows Views About Management.</p> <p>ENGLISH NATURE. 2004. Mambury & Stowford Moors Views About Management.</p>
Version Control: Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

Table 3: Supplementary Advice for Qualifying Features: S1065. *Euphydryas (Eurodryas, Hypodryas) aurinia*; Marsh fritillary butterfly

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Population (of the feature)	Population abundance	Restore the natural abundance of the marsh fritillary population.	<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. 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 stated are the best available. For this feature counting the</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>conspicuous larval webs is a good measure of population density; as well as the more standardised transect counts of adults.</p> <p>Marsh fritillary has bred in all eight of the component SSSIs. However, the size of the marsh fritillary population is not known.</p> <p>Marsh fritillary occurs as a meta-population across the Culm, with an extensive network of sites, both within and outside of the SAC. In addition, the butterfly is prone to large fluctuations in numbers, both within sites and across the meta-population as a whole. A number of years of coordinated monitoring across a large proportion of the culm is required to establish a robust population estimate. Counts of larval webs are the most reliable measure of population size.</p> <p>Target set to Restore because a number of patches of Culm Grassland (predominantly outside of the SAC, but within the wider Culm marsh fritillary meta-population) require scrub control and/or changes to grazing and burning practices to provide optimum marsh fritillary habitat.</p>	
Supporting habitat: extent and distribution	Distribution of supporting habitat	Restore the distribution and continuity of the feature's 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 component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.</p> <p>The vast majority of vegetation communities within the SAC provide supporting habitat for marsh fritillary: eggs are laid on devil's-bit scabious, predominantly in M16, M24 and M25</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>See references for 'Extent and distribution of the feature' for H4010 wet heath (Table 1) and H6410 purple moor-grass meadows (Table 2).</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>vegetation while the adult butterflies nectar on a variety of flowers throughout the site and scrub provides important shelter.</p> <p>Target set to Restore because some areas of wetland vegetation have been encroached by gorse and scrub and some are inappropriately grazed.</p>	
Supporting habitat: extent and distribution	Extent of supporting habitat	Restore the total extent of the habitats which support the feature to: 768.69 hectares	<p>In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate 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 total area of the SAC has been used as the extent target because the vast majority of the site provides supporting habitat for marsh fritillary: eggs are laid on devil's-bit scabious, predominantly in M16, M24 and M25 vegetation while adult butterflies nectar on a variety of flowers throughout the site and scrub provides important shelter.</p> <p>Target set to Restore because some areas of wetland vegetation have been encroached by gorse and scrub and some are inappropriately grazed.</p>	<p>This attribute will be periodically monitored as part of Natural England's site condition assessments.</p> <p>See references for 'Extent and distribution of the feature' for H4010 wet heath (Table 1).</p>
Supporting habitat: structure/function	Ground moisture	Maintain a sufficiently long sward during the summer months to avoid desiccation of the food-plants on which the butterfly larvae feed.	Grassland sward height should be long enough during spring/summer months that the larval foodplant (<i>Succisa pratensis</i>) does not become desiccated) but not so tall that food-plants become out-competed by <i>Molinia</i> (see 'Vegetation structure – sward height' attribute).	
Supporting habitat: structure/function	Soils, substrate and nutrient cycling	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		and fungal:bacterial ratio, within typical values for the supporting habitat	habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/function	Vegetation composition - presence of foodplants	Maintain an abundance of devil-bit scabious <i>Succisa pratensis</i> within supporting habitat	As the feature's larval foodplant, <i>Succisa</i> should be common enough in the sward that there will always be a good and continuous number of suitable plants for egg-laying; this is particularly important on calcareous grassland sites, which are more prone to drought.	This attribute will be periodically monitored as part of Natural England's site condition assessments .
Supporting habitat: structure/function	Vegetation structure - sward height	Restore appropriate sward conditions, with an uneven patchwork of short and long vegetation with a typical sward height of between 8-25 cms by the end of the grazing period.	By the end of the summer grazing season (September) the sward should be diverse and well structured, with a mosaic of short and long vegetation with a range of heights between 8 cm and 25 cm, with <i>Succisa</i> growing among <i>Molinia</i> tussocks. These conditions provide suitable sheltered niches for overwintering larvae. Target includes Restore because grazing intensity in some areas needs to be adjusted to achieve the sward height target.	NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i> . Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040 BUTTERFLY CONSERVATION. <i>Marsh Fritillary Factsheet</i> . Available to download from Butterfly Conservation website: https://butterfly-conservation.org/our-work/reports-and-factsheets/butterfly-factsheets
Supporting processes (on which the feature and/or its supporting habitat relies)	Adaptation and resilience	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	See explanatory notes for this attribute in Table 1. Target set to Restore because component sites of the SAC are fragmented e.g. by roads, intensive agriculture and conifer plantations.	NATURAL ENGLAND (2015) Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England [Available at http://publications.naturalengland.org.uk/publication/4954594591375360]

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting processes (on which the feature and/or its supporting habitat relies)	Air quality	Maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	See explanatory notes for this attribute in Table 1. Target includes Restore because nitrogen, acid deposition and ammonia concentration critical loads are exceeded for a range of supporting habitats.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	Conservation measures	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 S1065 marsh fritillary feature and/or its supporting habitats.	See explanatory notes for this attribute in Table 1. Culm grassland requires low intensity grazing management to maintain suitable structure and foodplant density for the marsh fritillary. If grazing is too intensive then the sward becomes uniform and the abundance of devil's-bit scabious is reduced. Conversely, if grazing is insufficient then vegetation becomes too coarse. Optimum grazing regimes alone are not sufficient to control scrub and maintain open areas of Culm grassland and so additional scrub control is also required. Target includes Restore because some areas of purple moor-grass meadow require scrub control and/or changes to grazing.	This attribute will be periodically monitored as part of Natural England's site condition assessments . NATURAL ENGLAND. 2014. Culm Grasslands Site Improvement Plan v1.0. Natural England. ENGLISH NATURE. 2004. Bursdon Moor Views About Management. ENGLISH NATURE. 2005. Dunsdon Moor Views About Management. ENGLISH NATURE. 2004. Hare's Down, Knowstone and Rackenford Moor Views About Management. ENGLISH NATURE. 2004. Hollow Moor & Odham Moor Views About Management. ENGLISH NATURE. 2004. Kismeldon Meadows Views About Management.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				ENGLISH NATURE. 2004. Mambury & Stowford Moors Views About Management.
Supporting processes (on which the feature and/or its supporting habitat relies)	Grazing pressure	Restore a cattle or pony-dominated grazing regime.	<p>Cattle grazing is preferable as it produces a less uniform sward and (unlike sheep) cattle do not selectively graze the Succisa, which would be detrimental to marsh fritillary populations. Cattle/ pony grazing during summer from May to September/October is appropriate if at a low stocking density.</p> <p>Target includes Restore because grazing needs to be reintroduced or grazing levels adjusted on some areas.</p>	<p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p> <p>BUTTERFLY CONSERVATION. <i>Marsh Fritillary Factsheet</i>. Available to download from Butterfly Conservation website</p>
Supporting processes (on which the feature and/or its supporting habitat relies)	Water quantity/ quality	Where the feature or its supporting habitat is dependent on surface water and/or groundwater, restore 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. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type.</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 but in some cases more stringent standards may be needed to reflect the ecological needs of the species feature. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.</p> <p>Target set to Restore because field drainage from adjacent farmland is drying out wetland supporting habitats (including H4010 wet heath and H6410 purple moor-grass meadows).</p>	<p>NATURAL ENGLAND. 2014. <i>Culm Grasslands Site Improvement Plan v1.0</i>. Natural England. Available from: http://publications.naturalengland.org.uk/publication/6121678480343040</p>
Version Control:				
Advice last updated: 20 March 2019: Following stakeholder feedback, additional text about grazing levels and sward structure added to various attributes.				
Variations from national feature-framework of integrity-guidance: N/A				