



European Site Conservation Objectives: Supplementary Advice on Conserving and Restoring Site Features

**Cumbrian Marsh Fritillary Site Special Area of Conservation (SAC)
UK00300126**



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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Cumbrian Marsh Fritillary Site Special Area of Conservation (SAC).

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

This advice replaces a draft version dated 24 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.

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.

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.

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	Cumbrian Marsh Fritillary Special Area of Conservation (SAC)
Location	Cumbria
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	22.96 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)	Middlesceugh Woods and Pastures SSSI Skelton Pastures SSSI
Relationship with other European or International Site designations	N/A

Site background and geography

The Cumbrian Marsh Fritillary Site comprises two sites that support purple moor-grass and rush pasture mire which in turn is the habitat for devil's-bit scabious (*Succisa pratensis*), the sole food plant of the marsh fritillary butterfly. Middlesceugh Woods and Pastures and Skelton Pastures SSSIs lie 5 km north-west of the village of Skelton and 11 km north-west of Penrith at an altitude of about 180 metres. They are situated in the catchment of the River Caldew, in the Eden Valley National Character Area ([NCA Profile 009](#)). They lie on slightly base-rich soils derived from glacial drift that overlies mudstones, sandstones and limestones of Carboniferous age. They are situated on private land.

Middlesceugh and Skelton are situated largely within a landscape of agriculturally improved grassland with the remainder of the area given over to small blocks of ancient and semi-natural woodland and conifer plantations. The marsh fritillary butterfly for which the site were notified became extinct at this site and in Cumbria as a whole in 2004 when the last caterpillar web was collected and brought into captivity for breeding up and cross-breeding with populations collected from western Scotland. These were then reintroduced to this SAC and to other sites in Cumbria, including Braithwaite Moss Site of Special Scientific Interest for which the butterfly is a SAC feature for the River Derwent and Tributaries SAC, in 2007.

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:

N/A

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. In Northern Ireland it occurs in fens and on sand dunes. Management in both wet and dry situations is predominantly by low-intensity cattle or pony grazing. Sheep selectively graze devil's-bit scabious and are therefore detrimental to marsh fritillary populations, except at very low stocking rates. 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.

Euphydryas aurinia 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.

The marsh fritillary butterfly for which the site were notified became extinct at this site in 2004 and is the subject of a reintroduction programme. The site is vulnerable to a further extinction as it is so isolated both from the other introduction sites and any habitat that could support its larval food plant. In addition, the relatively high altitude of the site means that it is subject to late springs which can be detrimental to caterpillars emerging from hibernation.

References:

Porter, Keith (2007). Reintroduction of the Marsh Fritillary *Euphydryas aurinia* to Cumbria, Atropos. Spring 2007.

Porter, K. 2012. Restoring the Marsh Fritillary butterfly to Cumbria. *Antenna*, 36(1): 42-49.

Porter, K. and Ellis, S. (2011). Securing viable metapopulations of the Marsh Fritillary butterfly, *Euphydryas aurinia*, (Lepidoptera:Nymphalidae) in Northern England. *J. Insect Conservation* 15:11-119.

RODWELL, J.S. (ed.) 1991. *British Plant Communities. Volume 1: Woodlands and Scrub*. Cambridge University Press

Table 1: 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 abundance of the population to sustainable levels to be determined.	This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature. Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment. Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean 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.	This attribute will be periodically monitored as part of Natural England's site condition assessments Porter, K. and Ellis, S. (2011). Securing viable metapopulations of the Marsh Fritillary butterfly, <i>Euphydryas aurinia</i>, (Lepidoptera:Nymphalidae) in Northern England. J. Insect Conservation 15:11-119. Other references available for Natural England on request.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			For this feature counting the conspicuous larval webs is a good measure of population density; as well as the more standardised transect counts of adults. The marsh fritillary butterfly became extinct at this site in 2004 when the last caterpillar feeding webs were collected and brought into captivity for breeding up and cross-breeding with populations collected from western Scotland. These were then reintroduced in 2007 and population size has been monitored ever since. The level at which populations will be considered sustainable needs to be determined.	
Supporting habitat: extent and distribution	Distribution of supporting habitat	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	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. The S1065 marsh fritillary feature is supported by a suite of habitats found within the SAC that support it through its life cycle including Purple Moor-grass and Rush Pasture for the larval food plant and adult nectaring sites and other wetland communities and areas of scrub for nectaring and shelter. Target is Restore as scrub levels in parts of the site has increased beyond levels that are sustainable for the feature.	Natural England (2012) Definition of Favourable Condition: Middlesceugh Woods and Pastures SSSI (Available from Natural England on request) Natural England (2013) Definition of Favourable Condition – Skelton Pasture SSSI (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's site condition assessments
Supporting habitat: extent and distribution	Extent of supporting habitat	Restore the total extent of the habitat which support the feature to 17.8 hectares.	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection,	Natural England (2012) Definition of Favourable Condition: Middlesceugh Woods and Pastures SSSI (Available from Natural England on request) Natural England (2013) Definition of Favourable Condition –

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			and may be subject to periodic review in light of improvements in data. The area has been derived from the total area of Skelton Pasture SSSI and that part of Middlesceugh Pasture which contain a suite of habitats that support the marsh fritillary through its life cycle including Purple Moor-grass and Rush Pasture for the larval food plant and adult nectaring sites and other wetland communities and areas of scrub for nectaring and shelter. Target is Restore as scrub levels in parts of the site has increased beyond levels that are sustainable for the feature.	Skelton Pasture SSSI (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's site condition assessments Natural England (2014) Cumbrian Marsh Fritillary Site SAC Site Improvement Plan.
Supporting habitat: structure/ function	Ground moisture	Grazing regime should allow for a sufficiently long sward during the summer months to avoid dessication of the <i>Succisia</i> plants on which the larvae feed.	Sward height should be long enough during spring/ summer months that the larval foodplant does not become dessicated (especially important on calcareous grassland sites).	
Supporting habitat: structure/ function	Soils, substrate and nutrient cycling	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial ratio, within typical values for the supporting habitat	Soil supports basic ecosystem function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex II feature.	
Supporting habitat: structure/ function	Vegetation composition - presence of foodplants	Maintain an abundance of devil's-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	Maintain and where necessary restore appropriate sward conditions, with a typical sward height of 15-30 cm on average (during summer months)	The sward height should be long enough to ensure the <i>Succisa</i> is usable by the larvae which is taller for purple moor-grass and rush pastures as at this site (15-30cm) and shorter for calcareous grasslands (8-20cm) The target is set at Maintain and Restore to reflect the different structural condition of the component SSSIs.	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)
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	This recognises the increasing likelihood of supporting habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being high, taking into account the sensitivity, fragmentation, topography and management of its supporting habitats. This means that this site is considered to be the most vulnerable sites overall and are likely to require the most adaptation action, most urgently. A site based assessment should be carried out as a priority. This means that action to address specific issues is likely, 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. Target set to Restore because component sites of the SAC are fragmented and isolated from other sites that support the habitats in Cumbria largely by intensive agriculture and because the marsh fritillary butterfly feature became extinct at this site in 2004 and is subject to a restoration programme. The site is also vulnerable as it is the highest location for the species in the County and so is at risk from late springs which	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] References available for Natural England on request.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			can reduce survival rate for caterpillars.	
Supporting processes (on which the feature and/or its supporting habitat relies)	Air quality	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).	The supporting habitat of this feature is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition (including food-plants) and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The target is set at Restore because nitrogen and acid deposition critical loads are exceeded for the moist and wet oligotrophic grasslands (<i>Molinia</i> Meadows) found on the site that support the S1065 marsh fritillary feature.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).
Supporting processes (on which the feature and/or its supporting habitat relies)	Conservation measures	Maintain 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 S1065 marsh fritillary	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or	This attribute will be periodically monitored as part of Natural England's site condition assessments. Natural England (2014) Cumbrian Marsh Fritillary Site SAC Site Improvement Plan.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		feature and/or its supporting habitats.	management agreements. Purple Moor-grass and Rush pasture, which is the habitat that supports the marsh fritillary butterfly, 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 Purple Moor-grass and Rush Pasture and so additional scrub control is also required. Target includes Restore because some areas of Purple Moor-grass and Rush Pasture meadow require scrub control.	ENGLISH NATURE. 2005. Middlesceugh Woods and Pastures Views About Management. ENGLISH NATURE 2005 Skelton Pastures Views About Management.
Supporting processes (on which the feature and/or its supporting habitat relies)	Grazing pressure	Maintain and where necessary restore cattle or pony-dominated grazing regime. Stock may be removed May-September, but light continuous cattle grazing is more beneficial than short-term heavy grazing, as long as the correct sward structure is maintained and sites do not become overgrazed.	Cattle grazing is preferable as it produces a less uniform sward. Sheep are inappropriate graziers for these grasslands as they tend to selectively graze the <i>Succisa</i> and create a uniformly short sward both of which are detrimental to marsh fritillary populations.	
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 maintain 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 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.	

Attributes	Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Version Control Advice last updated: 14 March 2019: Following stakeholder feedback, target amended in Vegetation structure - sward height attribute to reflect vegetation characteristic off purple moor grass habitat at this site; explanatory text for Grazing Pressure attribute amended to reflect impacts of grazing with different livestock types.			
Variations from national feature-framework of integrity-guidance: Vegetation structure – sward height (neutral grassland): 'Neutral grassland' has been amended to 'purple moor-grass and rush pasture' as this is the habitat that supports the feature on this SAC and it is a mire habitat rather than a grassland (e.g. Rodwell (1991), British Plant Communities. Mires and Heaths. CUP). Target revised up to reflect FCT for component SSSI. The targets for some attributes listed above include both 'maintain' and 'restore' objectives. This is because the Cumbrian Marsh Fritillary Site SAC is comprised of two geographically-separate component sites which are currently in different states of condition. 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 specific advice on request.			

