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

Rex Graham Reserve Special Area of Conservation (SAC) (UK0019866)

Military Orchid *Orchis militaris*

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About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Rex Graham Reserve SAC. This advice should therefore be read together with the SAC Conservation Objectives available here.

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

This advice updates and replaces a previous version dated 19 May 2015.

This supplementary advice to the Conservation Objectives describes in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity and the minimum targets each qualifying feature needs to achieve in order to meet the site's objectives. 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. Any proposals or operations which may affect the site or its qualifying features should be designed so they do not adversely affect any of the attributes listed in the objectives and supplementary advice.

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 HDIRConservationObjectives@naturalengland.org.uk

About this site

European Site information

Name of European Site	Rex Graham Reserve Special Area of Conservation
Location	Suffolk
Site Maps	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	June 1995
Qualifying Features	See below
Designation Area	2.67 hectares
Designation Changes	Not applicable
Feature Condition Status	Details of the feature condition assessments made at this site can be found using Natural England's Designated Sites System
Names of component Sites of Special Scientific Interest (SSSIs)	Rex Graham Reserve SSSI
Relationship with other European or International Site designations	The entire site lies within and is surrounded by the Breckland Special Protection Area

Site background and geography

Covering approximately 2.67 hectares and situated within the Brecks National Character Area, Rex Graham Reserve comprises a small disused chalk pit, together with surrounding grassland and woodland, which supports a large number of military orchids *Orchis militaris.* Only two other wild populations of this plant are known in the UK and the Rex Graham Reserve population is by far the largest, comprising more than 95% of the current total UK population.

The SAC sits within Thetford Forest, the largest lowland conifer forest in England, in an area where light, sandy acid and calcareous soils overlie chalk, on a gently south-facing slope in the valley of the River Lark. The digging of the pit pre-dates the planting of Thetford Forest in the 1920s and 1930s, and probably ceased to be actively worked in the early Twentieth Century. Military orchids were first found in the pit in the 1950s, and since then conservation management has maintained a high population.

The open sides and floor of the pit are covered with a mixture of plants typical of calcareous grassland and scrub transitions such as mouse-ear hawkweed *Pilosella officinarum*, twayblade *Listera ovata*, adder's-tongue fern *Ophioglossum vulgatum*, ploughman's spikenard *Inula conyza,* mullein *Verbascum thapsus*, and hemp agrimony *Eupatorium cannabinum.* The pit also contains a large number of bushes of mezereon *Daphne mezereum* which occurs here as a wild plant.

Management aims to keep the pit largely free of scrub and trees, control coarse herbaceous vegetation, and create small bare chalk surfaces to aid the regeneration of military orchid. The browsing of orchids is prevented by a deer-and rabbit-proof fencing, which also limits damage to the vulnerable plants from

human damage from trampling and picking. A second small separately-fenced pit, created in 1999/2000, allows visitors closer access to see military orchids throughout the summer.

Grassland is maintained around the pits to attract pollinating insects which aid the reproduction of military orchids, and these are in turn surrounded by coniferous and deciduous woodland within and outside the SAC, which give some screening from the adjacent trunk road.

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.

Habitats:

- **H6210/H6211 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites)**

  This habitat type comprises dry calcareous grasslands on chalk or limestone soils which contain important orchid assemblages and/or individual populations of rare orchids. Priority status is afforded to examples of this habitat type which meet these criteria.

  Rex Graham Reserve SAC is a disused chalk pit with developing dry grassland characterised by false oat-grass *Arrhenatherum elatius*. The site has been selected as a SAC as it supports the largest population of military orchid *Orchis militaris* in the UK, comprising more than 95% of the current total population.

  This wild plant is also afforded special protection under the 1981 Wildlife and Countryside Act (as amended) and it is an offence to deliberately pick, collect, cut, uproot or destroy any of these wild plants. It is also an offence for any purpose to possess, sell or exchange such a plant.

  A Licence may therefore be required from Natural England for any activities likely to harm or disturb the plant.

Table 1: Supplementary Advice for Qualifying Features: H6210/H6211 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Maintain the total extent of the H6210/11 grassland feature at 0.15 hectares.	There should be no measurable net 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 its component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis. Approximately 0.15ha of the site supports the SAC feature in a chalk grassland-scrub transition, in two chalk pits on the site. The remainder of the site comprises approximately 0.85ha of grassland, and 1.67ha of woodland	Aerial photo 2013 (held by Natural England) This attribute will be periodically monitored as part of Natural England's site condition assessments.
	Distribution of the feature within the site	Maintain the distribution and continuity of the H6210/11 feature, 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 and typical species) 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 the typical and more specialist species associated with the Annex I habitat feature.	Aerial photo 2013 (held by Natural England)

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
			The open area of the two pits should be maintained at least at the extent cited above, with suitable vegetation conditions to maintain the population of military orchids, to avoid habitat fragmentation.	
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	Maintain the abundance of the species listed below to enable each of them to be a viable component of the H6210/11 Annex 1 habitat; Military Orchid *Orchis militaris* at or above an average of 400 flowering plants	Some plant or animal species (or related groups of such species) make a particularly important contribution to the structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; – Structural species which form a key part of the habitat's structure or help to define an Annex I habitat on a site (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 site. 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.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
	Vegetation: undesirable species	Maintain the frequency/cover of the following undesirable species at acceptable levels and are not encouraged by changes in surface condition, soils, nutrient levels or changes to hydrology; *Cirsium arvense, Cirsium vulgare, Rumex crispus,*	There will be a range of undesirable or uncharacteristic species which, if allowed or encouraged to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as Cotoneaster spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature. The species selected here are coarse species which will naturally spread and dominate without ongoing management, and left unchecked will lead to a decline in the population of *Orchis militaris* and the open, sparse vegetation which supports it.	This attribute will be periodically monitored as part of Natural England's site condition assessments.

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
		Rumex obtusifolius, Senecio jacobaea, Urtica dioica; Chamerion angustifolium, Calamagrostis epigejos, Pteridium aqulinum, tall Umbelliferae (i.e. > 50cm high); coarse grasses e.g. *Dactylis glomerata, Holcus lanatus, Deschampsia flexuosa; Brachypodium sylvaticum; Hedera helix, Rubus fruticosus* agg. All tree and scrub species		
Structure and function (including its typical species)	Vegetation community transitions	Maintain the following pattern of natural vegetation zonations or transitions with the H6210/11 grassland feature: at least 10% bare ground, as relatively firm chalky soil, scattered throughout the site and /or as manually created scrapes. at least 0.8 hectares of open flower-rich grassland around the pits to support insect pollinators a woodland/scrub belt between the main pit and the A11 trunk road of at least 50 metres.	These transitions/zonations are usually related to changes in soil, aspect or slope. Competition from ground vegetation is detrimental especially with respect to regeneration. The constant presence of small patches of bare ground may be important for *Orchis militaris* seedling establishment. Bare soil may be present through vegetation management, and/or or through the creation of 1m2 “scrapes” scattered through the site. Thick carpets of moss are also likely to be detrimental to orchid regeneration, but a thin cover of moss regenerating on bare soil may aid orchid establishment, in retaining moisture for germination. Insect pollination is an important aspect of *Orchis militaris* reproduction; maintaining an open area of grassland around the pits may attract potential pollinators (such as bees and flies) and aid the maintenance of a viable population. The open grassland also limits shading to the two pits. Woodland within the SAC, to the north of the main pit, acts as a buffer and screens the core of the site from the adjacent road.	

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	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 H6210/11 habitat	Soil and substrate 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 or substrate properties may therefore affect the ecological structure, function and processes associated with this Annex I feature.	
Supporting processes (on which the feature relies)	Air quality	Maintain or restore as necessary concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this H6210/11 feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This habitat type is considered sensitive to changes in air quality, but in particular atmospheric nitrogen. Exceedance of critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The type of air pollutants derived from the use of the adjacent A11 trunk road, and their potential effects on *Orchis militaris* either directly or indirectly, are not yet fully determined.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on APIS.
Structure and function (including its typical species)	Supporting off-site habitat	Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known or likely to support the H6210/11 feature;	The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may	

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
		coniferous and deciduous woodland which surround the site and may serve to buffer the effects of the A11 trunk road.	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.	
	Functional connectivity with wider landscape	Any supporting features within the local landscape which provide a critical functional connection with the site are maintained in terms of their overall extent, quality and function; Forest rides which lead into the site may serve as corridors for insect pollinators to arrive at the site should be maintained in an open sunlit condition.	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.	
	Adaptation and resilience	Maintain the H6210/11 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site	This recognises the increasing likelihood of natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its habitats. 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 required.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs [both available at http://publications.naturalengland.org.uk/publication/4954594591375360].

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
			This SAC is a small site, supporting a population of a very rare species, which is isolated from nearby suitable habitat into which to spread, and so is vulnerable to change. Evidence shows that *Orchis militaris* can spread into newly created suitable habitat (i.e. fresh chalk pits) within 10 years. This population could have greater resilience with the creation of new chalk surfaces both within and immediately adjacent to this SAC.	
Supporting processes (on which the feature relies)	Conservation measures	Maintain management or other measures (within and/or outside the site boundary as appropriate) necessary to maintain the structure, functions and supporting processes associated with the H6210/11 feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. The principal management measures on this site are: • Keep shading to a minimum through scrub/tree control; • Reduce the competition from coarse species e.g. through regular cutting and removal; • Create regeneration niches through the exposure of small areas of bare chalk soil; • Prevent grazing and browsing by wild mammals with fencing; • Prevent intentional and unintentional human damage through fencing and visitor management.	NATURAL ENGLAND, 2014. Site Improvement Plan: Rex Graham Reserve (SIP183) Natural England's Views about the Management of the SSSI which underpin this SAC are available from http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm

Version Control
Advice last updated: 27 May 2016; adaptation and resilience attribute updated with additional supporting notes; 'typical species' attribute replaced with 'key structural, influential and/or distinctive species' attribute; 'conservation measures' attribute updated with link to SIP

Variations from national feature-framework of integrity-guidance: At this site the vegetation which supports the population of *Orchis militaris* is not directly attributable to recognised communities in the National Vegetation Classification, but has the characteristics of chalk grassland-scrub transition, of the type described in the SAC feature description for H6210 as providing important habitats for a wide range of rare and local British species. The "vegetation community composition" attribute is not therefore relevant, along with the "vegetation: proportion of herbs" attribute, since it is the overall structural characteristics of the vegetation, rather than the abundance of certain component species, which are important in maintaining the SAC feature.

The indirect attributes for CG3 *Bromus erectus* grassland (JNCC Common Standards Monitoring) are a useful proxy for the key vegetation and physical attributes required for successful growth and regeneration of *Orchis militaris* and have been used with some adaptation in the SSSI-specific Definitions of Favourable Condition, and repeated

Attributes	Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
here where relevant.			

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