



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

**Salisbury Plain Special Area of Conservation (SAC)
Site code: UK0012683**



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About this document

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

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

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

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Salisbury Plain Special Area of Conservation (SAC)
Location	Wiltshire
Site Maps	The designated boundary of this site can be viewed here on the MAGIC website.
Designation Date	April 2005
Qualifying Features	See section below.
Designation Area	21465.94 ha
Designation Changes	On Porton Down, 'The Bowl' covering 322.42 ha, was added to the SSSI, SAC and SPA designated area in 1999.
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)	Salisbury Plain, Porton Down and Parsonage Down.
Relationship with other European or International Site designations	Salisbury Plain SPA and Porton Down SPA boundaries overlap with the SAC.
Other information	Natura 2000 Standard Data Form for Salisbury Plain SAC

Site background and geography

Salisbury Plain SAC is located in central Wiltshire, within the [Salisbury Plain and West Wiltshire Downs National Character Area](#) (NCA), in southern England.

Salisbury Plain is an extensive and open rolling chalk plateau, with Parsonage Down on the southern edge of this and Porton Down to the south-west. The three constituent sites are located on chalk geology, cut by the tributaries of the Hampshire Avon.

The soils are generally alkaline and free-draining, apart from places with overlying clay-with flints and long-term rainwater leaching and lessivage, which are more acidic.

The defining habitat type is chalk grassland, also some secondary and ancient woodland is present. Juniper scrub is significant on parts of Salisbury Plain and much of Porton Down.

Salisbury Plain is managed as part of an extensive military [Training Area](#) (SPTA). Porton Down forms part of the wider Porton Down Defence Science & Technology Laboratory (Dstl). Parsonage Down is part of a [National Nature Reserve](#) run by Natural England.

About the qualifying features of the SAC

The following section gives you additional, site-specific information about this SAC's qualifying features. These are the natural habitats and/or species for which this SAC has been designated.

Qualifying habitats:

- **H6210 and 6211 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)**

These grasslands are typically found on thin, well-drained, lime-rich soils associated with chalk and limestone. They occur predominantly at low to moderate altitudes in England and Wales, extending locally into upland areas in northern England, Scotland and Northern Ireland. Most of these calcareous grasslands are maintained by grazing.

A large number of rare plants are associated with this habitat, including, on Salisbury Plain SAC: purple milk-vetch *Astragalus danicus*, dwarf sedge *Carex humilis*, bastard-toadflax *Thesium humifusum* and the early gentian *Gentianella anglica*, as well as various bryophytes and lichens. The invertebrate fauna is also noteworthy, and includes rarities such as the marsh fritillary butterfly *Euphydryas aurinia*, adonis blue butterfly *Lysandra bellargus* and silver-spotted skipper *Hesperia comma*.

Salisbury Plain in central southern England is believed to be the largest surviving semi-natural dry grassland within the European Union and is therefore the most important site for this habitat in the UK. It supports extensive examples of CG3 *Bromus erectus* grassland, which is the most widespread chalk grassland found in the UK; and also supports significant areas of other types e.g. extensive CG2 *Festuca ovina-Avenula pratensis* grassland on Parsonage Down and extensive CG7 *Festuca ovina – Hieracium pilosella – Thymus praecox* grassland on Porton Down.

This SAC is also distinctive in hosting the priority habitat type "orchid rich sites". This priority habitat type comprises calcareous grasslands which contain either a rich suite of orchid species, important populations of at least one nationally uncommon orchid species or one or several orchid species considered to be rare, very rare or exceptional in the UK.

- **H5130 *Juniperus communis* formations on heaths or calcareous grasslands**

Salisbury Plain represents common juniper *Juniperus communis* formations near the southern edge of the habitat's range on chalk in southern England, where it is particularly rare. This site is the best remaining example in the UK of lowland juniper scrub on chalk. The juniper is juxtaposed with extensive H6210 semi-natural dry grassland and chalk heath.

In some cases the scrub has developed recently by invasion of open chalk grassland and contains few typical shrub species. However, most of the scrub is of the southern mixed scrub type and is enriched by roses *Rosa* spp., wild privet *Ligustrum vulgare*, dogwood *Cornus sanguinea*, wayfaring tree *Viburnum lantana* and other species characteristic of the type.

Both Salisbury Plain and Porton Down components of the SAC hold important populations of juniper; it is not present on the Parsonage Down component.

Qualifying Species:

- **S1065 Marsh fritillary butterfly *Euphydryas aurinia***

The marsh fritillary butterfly *Euphydryas aurinia* is typically 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 in both wet and dry situations is predominantly by low-intensity cattle or pony grazing.

The butterfly flies in late May and June. The female lays batches of eggs on the underside of large Devil's-bit Scabious plants. From August until late September the brown, spiny caterpillars feed together on Scabious leaves inside a silken web. During the winter they hibernate together in a small web, hidden in grass tussocks. The caterpillars emerge in February or early March and separate; sometimes wandering several metres to find fresh Scabious leaves. By late April the caterpillars pupate and emerge as adult butterflies 2 to 3 weeks later.

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 meta-populations, forming numerous temporary sub-populations, which frequently die out and re-colonise. 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.



Marsh fritillary (Natural England/Allan Drewitt)

Salisbury Plain represents marsh fritillary *Euphydryas aurinia* in chalk grassland in central southern England, and contains a cluster of large sub-populations where the species breeds on dry calcareous grassland. The site extends the range of ecological variability included in the SAC series.

The butterfly is mainly present on the Salisbury Plain part of the SAC, with Porton Down and Parsonage Down being less suitable for the species, although it does occur in small numbers.

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

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	<p>Maintain the total extent of the H6210/11 feature on Salisbury Plain at 13,247.86 ha and on Porton Down at 855 ha</p> <p>Restore the total extent of the H6210/11 feature at Parsonage Down to 186.27 ha</p>	<p>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 and/or measured using GIS.</p> <p>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. 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>Grassland restoration at Parsonage Down is required. This extent target includes Hundred Acres (under restoration) and all the grassland/scrub areas, but excludes the small beech plantation.</p>	<p>PYWELL 1998 WILSON & REED 2007 WILD 1988</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H6210/11 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.</p> <p>This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction.</p> <p>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>*Salisbury Plain is a large, dynamic site, therefore some flexibility is needed in terms of the distribution of its component vegetation types; as long as each community type is present and not threatened, and the overall quantity of H6210 grassland does not decline. On Porton Down, the lichen-rich grasslands (CG7b), which arose from bare, impoverished ground, are disappearing due to natural, successional processes; therefore a plan is needed for some limited re-setting of this process, through the creation of bare, recovering ground at appropriate locations. On Parsonage Down, the extensive, high quality CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> grassland must be protected from encroachment by upright brome (and decline to CG3) through sufficient grazing.</p>	PYWELL 1998 WILSON & REED 2007 WILD 1988
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>CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> grassland</p>	<p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant</p>	PYWELL 1998 WILSON & REED 2007 WILD 1988

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		CG3 <i>Bromus erectus</i> grassland CG4 <i>Brachypodium pinnatum</i> grassland CG5 <i>Bromus erectus</i> – <i>Brachypodium pinnatum</i> grassland CG6 <i>Avenula pubescens</i> grassland CG7 <i>Festuca ovina</i> – <i>Hieracium pilosella</i> – <i>Thymus praecox/pulegioides</i> grassland	and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).	
Structure and function (including its typical species)	Vegetation: proportion of herbs	Maintain and, in places, restore the proportion of herbaceous species typical of the H6210/11 feature at or to within the range 40-90%.	A high cover of characteristic herbs, including sedges (<i>Carex</i> species) is strongly typical of the structure of this habitat type. The exact targets will vary between localities and NVC types as presented in the SSSI Favourable Condition Tables.	NATURAL ENGLAND. 2016. <i>Salisbury Plain SSSI Integrated Site Assessment 2014-15</i> . Natural England. WILSON, PW AND REED, M. 2009. <i>Porton Down SSSI Condition Assessment 2009</i> . Natural England, 2009.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	<p>Maintain and, in places, restore the abundance of the species listed below to enable each of them to be a viable component of the Annex 1 habitat;</p> <p>Constant and preferential vascular plants associated with the CG2 – CG7 communities at this site</p> <p>Assemblage of rare chalk grassland plants; <i>Astragalus danicus</i> Purple Milk-vetch; <i>Cirsium tuberosum</i> Tuberous thistle; <i>Carex humilis</i> Dwarf Sedge; <i>Cerastium pumilum</i> Dwarf Mouse ear; <i>Dianthus armeria</i> Deptford Pink; <i>Galeopsis angustifolia</i>-Red Hemp-nettle; <i>Galium pumilum</i>-Slender Bedstraw; <i>Gentianella anglica</i>-Early Gentian, <i>Iberis amara</i>-Wild Candytuft, <i>Minuartia hybrida</i>-Fine-leaved Sandwort, <i>Neotinea ustulata</i>-Burnt Orchid, <i>Phyteuma orbiculare</i>-Round-headed Rampion, <i>Salvia pratensis</i>-Meadow Clary; <i>Tephrosieris integrifolia</i>-Field Fleawort and <i>Thesium humifusum</i>-Bastard Toadflax and <i>Vulpia unilateralis</i> – mat-grass</p>	<p>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;</p> <ul style="list-style-type: none"> – <i>Structural</i> 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’). – <i>Influential</i> 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). – <i>Site-distinctive</i> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular site. <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary.</p> <p>The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p> <p>Burnt orchid – <i>Neotinea ustulata</i>- the SAC Citation says: ‘largest UK population’. The species is widespread across much of Parsonage Down (SSSI units 2 and 3), although there is no good estimate of the population number but in the order of tens of thousands flowering in a good year. On Salisbury Plain, the species is less frequent, being recorded as scattered individuals or small groups, in nine (out of 100) SSSI units on the West, Centre and East. On Porton Down, there is a small population in Roche Court Down, SSSI Unit 12.</p> <p>Lady orchid – <i>Orchis purpurea</i> is now present on Porton Down, possibly as an introduction, although this is not certain. It is not mentioned on the SAC Citation.</p> <p>The fairy shrimp <i>Chirocephalus diaphanus</i> is dependent on temporary pools created by military training on the Plain.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>fescue</p> <p>Assemblage of chalk grassland invertebrates</p> <p>Population of fairy shrimp <i>Chirocephalus diaphanus</i></p> <p>Population of European or common rabbit <i>Oryctolagus cuniculus</i></p>	<p>The rabbit population on Porton Down is important, being relied on for grazing rather than farmed livestock. The close cropped grazing, bio-perturbation, nutrient depletion and bio-deposition services of the rabbit have been found to aid not only the maintenance of open, short-swards and areas of bare ground but also nutrient cycling, mineralisation and water infiltration in desert and dry grassland habitats</p>	
Structure and function (including its typical species)	Vegetation: undesirable species	<p>Maintain 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>Thistles <i>Cirsium arvense</i>, <i>Cirsium vulgare</i>, docks <i>Rumex crispus</i>, <i>Rumex obtusifolius</i>, ragwort <i>Senecio jacobaea</i>, common nettle <i>Urtica dioica</i>.</p> <p>Tor-grass <i>Brachypodium pinnatum</i> on all grassland types except CG4 and 5.</p> <p>Upright brome <i>Bromopsis erecta</i> on CG2 grassland.</p> <p>Rank grasses e.g. false oat-</p>	<p>There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as <i>Cotoneaster</i> species, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature.</p>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>grass <i>Arrhenatherum elatius</i>, cock's-foot <i>Dactylis glomerata</i> and Yorkshire fog <i>Holcus lanatus</i> that indicate under-grazing.</p> <p>On CG7c, the cover of mat-like branching (pleurocarpous) mosses</p>		
Structure and function (including its typical species)	Vegetation community transitions	Maintain the full range and pattern of zonations and transitions across vegetation types associated with the H6210 feature.	<p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope.</p> <p>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>Bare ground, the different chalk grassland communities and scrub, and ecotones between these, tend to flux naturally on Salisbury Plain and Porton Down (which are large sites), less so on Parsonage Down, with conservation management varying on a temporal and spatial scale, using a 'landscape-scale ecology' approach.</p>	<p>NATURAL ENGLAND, 2016. <i>Salisbury Plain SSSI Integrated Site Assessment 2014-15</i>. Natural England, 2016.</p> <p>NATURAL ENGLAND, 2016. <i>Porton Down SSSI Site Checks 2016</i>, Natural England, November 2016.</p>
	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 H6210/11 habitat.	<p>Soil is the foundation of basic ecosystem function and its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms.</p> <p>Soil biodiversity has a vital role to recycle organic matter.</p> <p>Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature.</p>	Contact Defence Infrastructure Organisation for Salisbury Plain, Dstl for Porton Down, Natural England for Parsonage

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
				Down, for past soil sample results.
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 to support the H6210/11 feature.	<p>The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround but are outside of the designated site boundary ('functionally-linked land').</p> <p>Changes in surrounding land-use may adversely (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 ('meta-populations'), pollination or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.</p> <p>Salisbury Plain SSSI and surrounding SSSIs and County Wildlife Sites on the chalk, are considered to be multiple 'grassland ecological networks' at a 250m species dispersal level e.g. marsh fritillary butterfly, and a single, much larger network at the 2,500m dispersal level (Large & Hales, 2015).</p> <p>As part of this model, Porton Down and surrounds are a separate network, at either dispersal scale; whilst Parsonage Down and surrounds are an individual network at the 250m dispersal scale, and part of the single much larger network at the 2,500m scale. For further detail see Large and Hales, 2015.</p> <p>Large and Hales (2015) reviewed previous studies and suggest that chalk downland plants have very limited dispersal due to animal vectors being limited by fencing, although some are wind dispersed e.g. grasses. Six butterfly species - marsh fritillary, small blue, dingy skipper, Duke of Burgundy, chalkhill blue and adonis blue – were estimated to travel 250m in a majority of dispersal events in optimum habitat, but much less than this (12.5m) in 'impermeable' habitats e.g. arable. For rare, long-distance dispersal events, the model used 2,500m, but much</p>	LARGE, R. & HALES, S. 2015. <i>Mapping connectivity of species-rich grassland habitat in the Wiltshire Chalk landscape</i> . Natural England

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			less (125m) in arable land.	
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.</p> <p>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>Large & Hales (2015), in their modelled scenarios, predicted that Salisbury Plain – East is currently disconnected from the Centre and West, for average butterfly dispersals; similarly, Parsonage Down SSSI/NNR and the SSSIs on the northern perimeter of the military training area are disconnected from Salisbury Plain SSSI, for average butterfly dispersals. The land between these sites may provide critical functional connection for marsh fritillary butterfly and should be restored.</p> <p>Similarly, the northern edge of Porton Down has scope for connecting to the nearby RSPB reserve, Winterbourne Downs, where extensive chalk grassland creation is already underway.</p>	LARGE, R. & HALES, S. 2015.
	Adaptation and resilience	Maintain the feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site.	<p>This recognises the increasing likelihood of a need for 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.</p> <p>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>	LARGE R. AND HALES, S. 2015. NATURAL ENGLAND, 2015.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>The overall vulnerability of this SAC to climate change has been assessed by Natural England as being <i>low</i>, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but is a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required.</p> <p>Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.</p> <p>The chalk grassland feature is maintained by the right balance of grazing, rainfall/drought and scrub management; and on Salisbury Plain, military vehicle disturbance, shell craters and wild fires.</p> <p>Changing precipitation and/or temperature are likely to affect vegetation structure and ultimately community type, along with associated species populations and distributions. As above, increasing the connectivity of the component sites to each other and surrounds, is likely to increase resilience to environmental change.</p>	
Supporting processes (on which the feature relies)	Air quality	Maintain the concentrations and deposition of air pollutants 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>This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH₃), oxides of nitrogen (NO_x) and sulphur dioxide (SO₂), and critical loads for nutrient nitrogen deposition and acid deposition. These levels are currently not being exceeded for these features at this site.</p> <p>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</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on www.apis.ac.uk

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>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>	
Supporting processes (on which the feature relies)	Conservation measures	<p>Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain or restore the structure, functions and supporting processes associated with the H6210/11 feature.</p>	<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. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.</p> <p>The chalk grassland feature is maintained by the right balance of grazing, rainfall/drought and scrub management; and on Salisbury Plain, military vehicle disturbance, shell craters and wild fires.</p> <p>Military vehicle disturbance must be kept at the right balance, with both a lower and upper threshold for bare ground, currently agreed as 2-4% cover. Bare ground is valuable in its own right and leads to early successional habitats e.g. CG7, with important plant populations e.g. Fine-leaved sandwort <i>Minuartia hybrida</i> and Dwarf mouse-ear <i>Cerastium pumilum</i>.</p> <p>The coverage and intensity of grazing must ideally reflect the chalk grassland communities and associated species present, and respond to annual variation in rainfall and drought, although the ease of achieving these varies between the component sites. Parsonage Down is a National Nature Reserve managed by Natural England, with its own livestock; Salisbury Plain is a military training area, with farming tenants; and Porton Down is a defence experimental site, with a generally large rabbit population but no other grazing livestock.</p> <p>Scrub control and management will be an on-going requirement, particularly on Salisbury Plain and Porton Down where the grazing pattern tends not to control scrub.</p>	<p>NATURAL ENGLAND, 2015.</p> <p>DEFENCE INFRASTRUCTURE ORGANISATION (DEO), 2010.</p> <p>DEFENCE SCIENCE & TECHNOLOGY LABORATORY, 2016.</p> <p>NATURAL ENGLAND, 2016.</p>

Version Control

Advice last updated: n/a

Variations from national feature-framework of integrity-guidance: n/a

Table 2: Supplementary Advice for Qualifying Features: H5130 *Juniperus communis* formations on heaths or calcareous grasslands.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	Extent of the feature within the site	Maintain the total extent of the H5130 feature.	<p>See the supporting/explanatory notes for this attribute in Table 1.</p> <p>Maintaining the coverage of juniper is central to this attribute. Juniper tends to occur on shallow soils, on steep slopes and on north to west aspects (Ward, 1973). On Salisbury Plain, there were 11,100 juniper bushes in 2002, with the distribution and frequency of bushes compared to 1996 not appearing to show any significant differences - no systematic count has been done since 2002. Juniper is present in SSSI units 129, 130, 131, 132, 134, 135, 136, 138, 155 and 171 i.e. mainly Beacon Hill and Bulford Ranges, also A303 Road Verge.</p> <p>On Porton Down, a survey by Dr. Lena Ward in 1969-71 estimated 15,870 live juniper bushes (pers comm). A Wiltshire Botanical Society survey was completed in 2012/13, which found 12,306 juniper bushes; the plant has undergone a significant reduction on Battery Hill, from 700 in the 1970s down to about 50 bushes now.</p> <p>There is no juniper present on Parsonage Down.</p>	<p>ASH D. (2000)</p> <p>DEFENCE ESTATES, 2005.</p> <p>SALISBURY PLAIN CONSERVATION GROUP.</p> <p>WARD, L.K. (1973).</p>
Extent and distribution of the feature	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H5130 feature, including where applicable its component vegetation types, across the SAC.	<p>Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological processes in the system and the resiliency of the site and its features to changes or impacts.</p> <p>Ward (1977) found that the size of gaps between juniper stands is likely to be important for invertebrate dispersal, suggesting a maximum distance of 200m to aid movement between stands.</p> <p>This habitat type occurs as part of chalk grassland communities and as part of W21d <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub, <i>Viburnum lantana</i> sub-community, with juniper.</p> <p>Juniper is found across the site, in nearly all the SSSI units – not units 4, 6 and 22.</p>	As above
Structure and function (including its typical species)	Vegetation community composition	Ensure the component vegetation communities of the H5130 feature are	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).	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>referable to and characterised by the following National Vegetation Classification type (s):</p> <p>CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> grassland; CG3 <i>Bromus erectus</i> grassland; CG7 <i>Festuca ovina</i> – <i>Hieracium pilosella</i> – <i>Thymus praecox/pulegioides</i> grassland; and W21d <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub, <i>Viburnum lantana</i> sub-community, with juniper.</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>	
Structure and function (including its typical species)	Key structural, influential and/or site-distinctive species	<p>Maintain the abundance of the species listed below to enable each of them to be a viable component of the Annex 1 habitat:</p> <p>Population of Juniper</p> <p>Assemblage of invertebrates associated with juniper</p>	<p>See the supporting and explanatory notes for this attribute in table 1 above.</p> <p>Large juniper populations such as the one present at this SAC are more likely to support a juniper-specific invertebrate fauna. Ward (1977) listed 27 species in southern England, of which eight were introduced.</p> <p>Over 40 species of fungi are entirely or partially dependant on juniper (Wilkins, 2011).</p>	<p>WARD L.K. (1977)</p> <p>WARD L. K. AND K. H. LAKHANI (1977)</p> <p>WILKINS T.C. & J.C. DUCKWORTH (2011).</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	<p>Vegetation: undesirable species</p>	<p>Maintain 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><i>Cirsium arvense,</i> <i>Cirsium vulgare,</i> <i>Rumex crispus,</i> <i>Rumex obtusifolius,</i> <i>Senecio jacobaea,</i> <i>Urtica dioica.</i></p> <p><i>Brachypodium pinnatum</i> on all grassland types except CG4 and 5.</p> <p><i>Bromopsis erecta</i> on CG2 grassland.</p> <p>Rank grasses e.g. <i>Arrhenatherum elatius,</i> <i>Dactylis glomerata</i> and <i>Holcus lanatus</i> that indicate under-grazing.</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>	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation structure: canopy cover	Maintain an appropriate balance between scrub canopy and open field layer, with no more than 75% comprising closed juniper scrub.	<p>This structure objective seeks to ensure some areas of open ground are provided germination and establishment sites for juniper.</p> <p>On Porton Down, juniper occurs with scrub, pine and as almost pure stands.</p> <p>On Salisbury Plain, the densest areas of juniper are in units: 155, 136 and 138. In 2014-15, the condition assessment found that in the southern half of unit 136, the large block of juniper (2-3000 bushes) is approaching closed scrub (also at the expense of chalk grassland).</p>	<p>DEFENCE ESTATES. 2005</p> <p>ASH D. (2000),</p>
Structure and function (including its typical species)	Vegetation structure: shading	Ensure that juniper is promoted at the expense of any surrounding scrub, and not over-topped by scrub or trees casting heavy shade.	<p>Juniper is vulnerable to shading, especially from trees with a dense foliage e.g. yew and beech, whilst those with lighter shade e.g. <i>Pinus sylvestris</i> may allow it to persist for longer (Ward, 1973).</p> <p>Over-topping species should be no more than occasional within juniper stands.</p>	WARD, L.K. (1973).
	Vegetation structure - age and sex ratios of juniper	<p>Maintain a population of Juniper comprising plants at all of its different life stages (old growth (>100 years old), building to mature, and pioneer/seedling (<5cm girth).</p> <p>Maintain the ratio of male to female juniper bushes at less than 2:1.</p>	<p>As a pioneer species, juniper regeneration can be infrequent and episodic, resulting in populations with few age classes. Populations with full and wider age range tend to be associated with conditions providing regular opportunities for establishment, such as continual exposure of bare soils on steep slopes. These will be more self-sustaining in the longer term.</p> <p>Pollination of juniper occurs by wind in the spring: male bushes produce small pollen cones whilst the cones of female bushes carry receptive droplets of fluid. Fertilised cones develop into berry-like fruits. Dispersal is mainly via migrant thrushes in the autumn. To sustain itself, a population therefore requires a balanced composition of male and female plants. Where one sex is predominant, this can reduce the opportunity for reproduction where populations are sparsely spread across a landscape.</p> <p>On Salisbury Plain, in 2005, the population was mostly mature individuals (20-48 years old); and over-mature, senile and collapsing bushes were rare throughout the survey area. Young bushes were recorded in only one compartment. Since 2005, regeneration has been occurring in most of the juniper exclosures identified in the management plan (numbered 1 to 18, with nos. 2 and 3 discontinued), although not in the two recently installed ones (16a and b). At least 50 seedlings and young trees</p>	SALISBURY PLAIN CONSERVATION GROUP.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>are now well established. In addition, some regeneration has occurred at the back of B Range, where grazing is light.</p> <p>On Porton Down, in 2012, the population was mostly mature (c.50%), senile (c.20%) and dead (c.30%), with no pioneer/seedlings recorded. In 2000, there were two cohorts: an old cohort at Blakes Firs established in the late 1800s and a younger one established between 1956-65. On Porton Down, in 2014-16, an investigation by several members of Porton Down Conservation Group, has recorded 50+ seedlings in an area east and south-east of 'Hard Target' (SSSI units 19, 14). Through careful marking, they have shown that there have been survivors, casualties and new germination within this period – and hypothesise that germination might be less of an issue than the on-going survival of seedlings.</p> <p>On Porton Down, the provision of rabbit exclosures for juniper regeneration was recommended by Ash in 2000 but this has not yet been implemented due to the practical challenges of controlling the rabbits. The 'Disturbed juniper population rejuvenation project' has taken >2000 cuttings; in 2016, 700 cuttings had survived, with the mature ones being planted out in Bottom Met Field and Townend Field (off the SSSI and SAC), and the smaller plants put into a nursery bed.</p>	
Structure and function (including its typical species)	Vegetation community transitions	Maintain expected patterns of natural vegetation zonations or transitions	<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.</p> <p>Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.</p>	As above.
	Regenerative potential	Maintain areas of disturbed and eroding bare ground at a level which is compatible with maintaining or restoring the regenerative potential of the H5130 feature.	<p>Although its seed is deeply dormant, requiring two cold winters to germinate, Juniper seeds appear only to remain viable in the soil for a few years. Seedlings take 4-9 years to reach sexual maturity.</p> <p>Having the ability to provide some areas of exposed bare ground may be required to encourage natural regeneration of juniper plants in order to sustain the feature into the longer-term. Episodes of intense bare ground creation need to be followed by periods of little or no disturbance (Wilkins, 2011).</p>	<p>DEFENCE SCIENCE & TECHNOLOGY LABORATORY. 2016</p> <p>WILKINS T.C. & J.C. DUCKWORTH (2011).</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	Maintain 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.</p> <p>These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial.</p> <p>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>Juniper populations in Britain retain a high degree of genetic variability, probably related to the mobility of the populations, due to colonisation through seed dispersed by birds (Plantlife <i>Juniperus communis</i> Species Dossier, 2007).</p> <p>On Porton Down, the 'Dstl juniper population rejuvenation project' has taken >2000 cuttings; in 2016, 700 cuttings had survived, with the mature ones being planted out in Bottom Met Field and Townend Field (off the SSSI and SAC), and the smaller plants put into a nursery bed.</p>	DEFENCE SCIENCE & TECHNOLOGY LABORATORY. 2016 PLANTLIFE, 2007.
	Adaptation and resilience	Maintain the H5130 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 the supporting/explanatory notes for this attribute in table 1 above.</p> <p>Juniper requires two cold winters to break seed dormancy and germinate; therefore, increasingly mild winters pose a risk to this process (Wilkins, 2011).</p> <p>Young seedlings are highly susceptible to summer drought.</p> <p>On Salisbury Plain, in 2015, approximately 50 mature bushes were found dying or dead on Beacon Hill. <i>Phytophthora austrocedri</i> was subsequently diagnosed by Forest Research as being present in the soil, potentially connected with the die-off. DIO have received a Plant Health Notice and are putting in place precautions for avoiding or minimising further spread on the Plain.</p>	WILKINS, T.C. & J.C. DUCKWORTH (2011).
Supporting processes	Air quality	Restore the concentrations and	See the supporting/explanatory notes for this attribute in table 1 above.	More information about site-relevant

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(on which the feature relies)		deposition of air pollutants to 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>For Salisbury Plain SAC, APIS currently provides the following figures:</p> <p><i>For Juniperus communis</i> formations on heaths or calcareous grasslands, the Critical Load is 15-25 kg N/ha/yr; with actual N deposition averaging 27.9 kg N/ha/yr i.e. the Critical Load is being exceeded.</p> <p>Exceedance impacts are: increase in tall grasses, decline in diversity, increased mineralization, N leaching and surface acidification.</p>	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).
	Conservation measures	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the H5130 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 management agreements.</p> <p>For this feature, conservation measures include grazing, cutting, scrub management, weed control. Retention of suitable land use infrastructure/patterns to enable site management e.g. pastoral livestock farming.</p> <p>On Salisbury Plain, on Beacon Hill, with steep slopes and thin soils, the predominant grazing animal is the rabbit, which maintains the chalk grassland and prevents scrub re-growth but at the same time inhibits juniper establishment. On the Bulford Ranges, cattlegrazing is now established. Since 1996, 16 exclosures were installed for juniper and marsh fritillary butterflies, covering 10.8 ha. These are now generally successful in excluding rabbits and cattle, and along with favourable conditions for seed survival and germination in certain years, have resulted in a new cohort of seedlings and young trees.</p> <p>On Salisbury Plain, Super Unit Management Plans 28 (Bulford Ranges) and 27 (Beacon Hill) cater for the juniper population, including 'improvement maps' which identify areas for clearing scrub and treating stumps, whilst retaining juniper bushes.</p> <p>On Porton Down, the 'Dstl juniper population rejuvenation project' has taken >2000 cuttings and collected and planted berries in mammal-proof cages.</p>	<p>ASH D. (2000), DEFENCE SCIENCE & TECHNOLOGY LABORATORY. 2016</p> <p>DEFENCE ESTATES 2005</p> <p>DEFENCE ESTATES. 1996.</p> <p>DEFENCE ESTATES. 2004</p> <p>DEFENCE ESTATES. 2004</p> <p>DEFENCE ESTATES. 2005 AND 2009</p> <p>DEFENCE INFRASTRUCTURE ORGANISATION. 2011</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			In 2016, 700 cuttings had survived, with the mature ones being planted out in Bottom Met Field and Townend Field (off the SSSI), and the smaller plants put into a nursery bed. Whilst some of the planted berries germinated (x84 in 2013) they failed later due to climate. The provision of rabbit exclosures for juniper regeneration was recommended by Ash in 2000 but this has not yet been implemented due to the practical challenges of controlling the rabbits.	

Version Control

Advice last updated: n/a

Variations from national feature-framework of integrity-guidance: Inserted a row for 'shading' as this is a key problem for juniper.

Table 3: Supplementary Advice for Qualifying Features: S1065 marsh fritillary butterfly *Euphydryas aurinia*

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/function	Vegetation structure - sward height (calcareous grassland)	Maintain appropriate grassland sward conditions, with a typical sward height of approximately 20 cm (during summer months).	<p>The larval food-plant grows on calcareous, as well as neutral, grassland, but this habitat is drier and more prone to drought; so the sward height should be longer to ensure the <i>Succisa</i> is usable by the larvae.</p> <p>Botham et al. (2010) found that a sward height of 20cm, plus or minus, was optimal in the unfragmented landscape of Salisbury Plain for creating the right microclimate for larvae.</p> <p>The main marsh fritillary population occurs on Salisbury Plain, with only a small colony on the edge of The Bowl, near Tower Hill, on Porton Down, and occasional records for Parsonage Down.</p>	BOTHAM M.S. <i>et al.</i> (2010).
Supporting habitat: extent and distribution	Extent of supporting habitat	<p>Maintain the total extent of the habitat which supports the marsh fritillary feature at: 13,247.86 ha on Salisbury Plain and 855 ha on Porton Down.</p> <p>Restore the total extent of the habitat which supports the marsh fritillary feature to: 186.27 ha on Parsonage Down.</p>	<p>In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC.</p> <p>The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.</p>	
Supporting habitat: structure/function	Vegetation composition - presence of food-plants	Maintain an abundance of devil's-bit scabious <i>Succisa pratensis</i> within supporting grassland habitat.	<p>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.</p> <p>Providing both the sward structure to protect the butterfly and grazing sufficiently to promote species-richness, including occasional or localised bare ground for devil's-bit scabious regeneration, is needed.</p> <p>'Core' marsh fritillary habitat has been identified and mapped on Salisbury Plain, based on <i>Succisa</i> abundance.</p>	DEFENCE INFRASTRUCTURE ORGANISATION. Unpublished <i>Succisa pratensis</i> and butterfly distribution maps – including core areas and potential areas. PYWELL R.F. <i>et al.</i>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>The grazing system on the Plain involves temporary eight-hectare penning with a high stocking density, in place for two to three weeks before moving onto the next patch. The Farm Management Plans also cater for 'Grazing Special Restrictions' where some areas are grazed less frequently, only once every two or three years.</p> <p>Pywell <i>et al.</i> (2012) observed a varying density and seeming cyclicity of <i>Succisa</i>, changing from rare to abundant and vice versa in the monitoring plots, especially within burnt areas, during the relatively short study period (2007 -11).</p>	2012.
Supporting habitat: structure/ function	Ground moisture	Maintain high levels of ground moisture during the summer months to avoid desiccation of the <i>Succisa</i> plants on which the larvae feed.	Sward height should be long enough during spring/ summer months that the larval food-plant does not become excessively dry or desiccated (especially important on calcareous grassland sites).	
Supporting processes (on which the feature and/or its supporting habitat relies)	Grazing pressure	Maintain a cattle-dominated grazing regime on core areas for marsh fritillary.	<p>Cattle grazing is known to be preferable as it produces a less uniform sward; also sheep tend to selectively graze the <i>Succisa</i>, which is likely to be detrimental to marsh fritillary populations. Providing both the sward structure to protect the butterfly and grazing sufficiently to promote species-richness, including occasional or localised bare ground for devil's-bit scabious regeneration, is needed.</p> <p>The grazing system on the Plain involves temporary eight-hectare penning with a high stocking density, in place for two to three weeks before moving onto the next patch.</p> <p>DIO's Farm Management Plans set three levels of grazing: 'without restriction', 'within guidelines' and 'special restrictions'. The first requires long grass margins, otherwise no constraint on timing or stocking levels; the second requires long grass margins and specifies stocking levels; and the third requires long grass margins and sets specific management within mapped polygons e.g. grazing may be restricted to only 30 or 50% of that area per year. The basic stocking rate used is 0.3 LSU per ha per year, on the chalk grassland. Ultimately, grazing pressure depends on the number of temporary penning the farmers have out over the year, which is specified in the Farm Management Plans.</p>	
Population (of the feature)	Population abundance	Maintain the abundance of the SAC's marsh fritillary population at the	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.	HOBSON R. AND T. WIGGLESWORTH. 2001.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<p>levels below, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.</p> <p>The Centre = Extra large population (>10,000 larval webs) The West = Very large population (>1,000 larval webs) The East = Large population (>100 larval webs)</p>	<p>Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years). The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature.</p> <p>Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment.</p> <p>Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.</p> <p>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. Natural England is of the opinion that an investigative approach is more valuable than attempting wide-scale counts, given the size of the site and variation in population levels year on year.</p>	<p>BULMAN CR. 2002. PYWELL, R.F. et al. 2012.</p>
Population (of the feature)	Supporting meta-populations	<p>Maintain the connectivity of the marsh fritillary SAC population to its associated meta-populations (either within</p>	<p>Marsh fritillaries survive in 'meta-populations' formed by a number of subpopulations (linked by occasional migration) which may frequently die out and re-establish. Marsh fritillary colonies will move between sites or to different habitat patches within sites in response to changing ecological conditions.</p>	<p>BOTHAM, M.S. <i>et al</i>, 2010.</p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		or outside of the site boundary)	<p>These meta-populations are reliant on the conservation of a cluster of suitable sites in close proximity to enable this (re)colonisation.</p> <p>Adult butterflies tend to be sedentary but some individuals will disperse and have been known to move up to 15-20km away; and remain in a series of linked meta-populations, forming numerous temporary sub-populations, which frequently die out and re-colonise. 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.</p> <p>The connectivity of the wider local landscape to the SAC may therefore be important as this may help to ensure the survival of the overall population even if sub-populations are temporarily affected.</p>	

Version Control

Advice last updated: not applicable

Variations from national feature-framework of integrity-guidance:

Sward height target increased based on Botham *et al* (2010).

Grazing pressure: Text amended to better fit the temporary grazing pennings system on Salisbury Plain.

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