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

## Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC) Site code: UK0012809

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# About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Minsmere to Walberswick Heaths and Marshes SAC. This advice should therefore be read together with the SAC Conservation Objectives available here.

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

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

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

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

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

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

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

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

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

# About this site

## European Site information

| | |
|---|---|
| **Name of European Site** | Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC) |
| **Location** | Suffolk |
| **Site Maps** | 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** | 1265.52 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)** | Minsmere-Walberswick Heaths and Marshes SSSI |
| **Relationship with other European or International Site designations** | Minsmere-Walberswick Ramsar<br>Minsmere-Walberswick SPA |

## Site background and geography

This composite site is situated on the coast of Suffolk between Southwold in the north and Sizewell in the south, lying within the Suffolk Coast and Heaths National Character Area (NCA 82). The northern section of the SAC forms a large part of the Suffolk Coast National Nature Reserve.

This composite site between Henham and Southwold in the north and Sizewell in the south contains a complex series of habitats, notably mudflat, shingle beach, reedbed, heathland and grazing marsh. The SSSI overlaps the SAC boundary on heathland and shingle habitat, and extends beyond it at Henham, Southwold Town Marshes, Norman Gwatkins Reserve, Blyth Estuary, Delacroix and Tinkers Marshes, Westwood Marsh, Point Marsh, Dingle Marshes, Old Town Marshes, Sandymount Covert, Hoist, East Hill Field, Old Covert, Sallow Walks Covert and Eastbridge Levels. Southwold Town Marshes, Norman Gwatkins Reserve north/Hen, Eastbridge Levels and Delacroix Marshes are SSSI only.

Shingle beach forms the coastline at Walberswick and Minsmere. This is subject to sea erosion and human disturbance but, nevertheless, it supports a variety of scarce shingle plants including sea pea *Lathyrus japonicus*, sea campion *Silene maritima* and small populations of sea kale *Crambe maritima*, grey hair-grass *Corynephorus canescens* and yellow horned-poppy *Glaucium flavum*.

High land at Minsmere, Westleton and Walberswick forms part of the East Suffolk Sandlings and is composed of infertile sands and gravels. This supports large areas of lowland heath, bracken, dry acidic grassland, woods and scrub.

Lowland heath, dominated by heather *Calluna vulgaris* but also containing bell heather *Erica cinerea* and cross-leaved heath *E. tetralix*, occupies a large continuous tract of about 400 ha at Minsmere, Dunwich and Westleton Heath with smaller areas at Walberswick. This heathland provides a valuable habitat for two nationally decreasing birds, the nightjar and woodlark. Patches of unimproved acid grassland in which red fescue *Festuca rubra* and common bent *Agrostis capillaris* predominate, occur through the site but areas dominated by wavy hair-grass *Deschampsia flexuosa*, purple moor-grass *Molinia caerulea* and sand sedge *Carex arenaria* also occur.

A variety of other acid grassland plants is also present, of which heath bedstraw *Galium saxatile* and sheep's sorrel *Rumex acetosella* are common. Scarce species include bird's-foot clover *Trifolium ornithopodioides* and mossy stonecrop *Crassula tillaea* together with a small colony of red-tipped cudweed *Filago lutescens*. There are also substantial areas dominated by bracken *Pteridium aquilinum* or gorse *Ulex europaeus* and western gorse *U. gallii*.

# 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:

- **H1210 Annual vegetation of drift lines**

This site is one of two representatives of Annual vegetation of drift lines on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort *Honckenya peploides* and shingle plants such as sea beet *Beta vulgaris* ssp*. maritima*.

This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species, notably *Atriplex* spp.

- **H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves**

There are only a few extensive examples of Perennial vegetation of stony banks in Europe, and the UK hosts a significant part of the European resource of this habitat in Scotland and the east and south east.

Perennial shingle vegetation is present in a narrow band between Walberswick and Sizewell above the high tide line with characteristic species present, such as yellow horned-poppy *Glaucium flavum*, sea beat *Beta vulgaris* ssp. *maritima*, sea-kale *Crambe maritima* and sea pea *Lathyrus japonicus*, with thrift *Armeria maritima,* sea campion *Silene uniflora* and lichens further back. Classic structure of shingle ridges and lows (as present on Orford Ness) is limited due to the narrow width of beach, however natural dynamic coastal processes are allowing the beach to roll over and widen in places, notably at Dingle Marshes. To the south between Minsmere sluice and Sizewell the vegetated shingle widens with transitions into heather *Calluna vulgaris* and scrub at the rear of the beach.

- **H4030 European dry heaths**

Lowland European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 *Calluna vulgaris – Ulex gallii* heath, usually more characteristic of western parts of the UK. This type is dominated by heather *Calluna vulgaris*, western gorse *Ulex gallii* and bell heather *Erica cinerea*.

European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather *Calluna vulgaris*, which often occurs in combination with gorse *Ulex spp*., bilberry *Vaccinium spp*. or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most dry heaths are managed as extensive grazing for livestock or, in upland areas, as grouse moors.

## Table 1: Supplementary Advice for Qualifying Features: H1210. Annual vegetation of drift lines

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **Extent and distribution** | **Extent of the feature within the site** | Restore the total extent of the annual (H1210) and perennial (H1220) vegetated shingle features to 59 hectares. Note that annual vegetation is a linear feature along the strandline and has the potential to extend to approximately 8,800m in length (Walberswick to Dunwich and Dunwich Heath to Sizewell frontages)<br><br>**The target includes both H1210 Annual vegetation of drift lines and H1220 Coastal shingle vegetation because the distinction between perennial and annual shingle vegetation is often not clearly defined.** | There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information.<br><br>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. The feature is susceptible to natural dynamic processes, there will 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.<br><br>This habitat is visible in the form of plants during the growing season (June to September, but variable depending on local conditions) but will exist in the form of a seedbank within the beach sediments and in coastal waters for the rest of the year. It may form overlapping transitions with some elements of Perennial Vegetation of Stony Banks.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location.<br><br>Habitat extent derived from English Nature Lifescapes project data from 2001 (English Nature 2001). | ENGLISH NATURE, 2001.<br><br>NATURAL ENGLAND, 2014.<br><br>This attribute will be periodically monitored as part of Natural England's Site Condition Monitoring Integrated Site Assessments (ISA) Surveys (Units 84, 85, 86, 87, 88, 103, 104, 110, 111, 112, 113) |
| **Extent and distribution** | **Future extent of habitat within the site and ability to respond to seasonal** | Restore the ability of this habitat to re-establish itself in response to coastal processes and re-colonise after natural events | This recognises the need to allow for natural fluctuations in the extent and the distribution of this habitat feature, often during particular seasons and usually as a result of natural coastal processes. The habitat must be able to re-establish on newly-deposited beach formations of suitable sediment. | GUTHRIE, JGL. 2009,<br><br>CALI, M., PARSONS, BATTY, L., DUGGAN, S, MILLER, P., PONTEE, N. 2008. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | **changes** | | The area is subject to dynamic coastal process including beach lowering and rolling back of shingle. The shingle should be allowed to function in a natural way with no artificial obstructions (such as seawall/flood defences) that could lead to squeezing out of habitat.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | ENVIRONMENT AGENCY, 2007.<br><br>PYE, K. and BLOTT, S.J. 2006a.<br><br>PYE, K. and BLOTT, S.J. 2006b.<br><br>PYE, K. and BLOTT, S.J. 2009.<br><br>PONTREE, N and PYE, K. and BLOTT, S.J.<br><br>Burningham & French 2016. |
| **Extent and distribution** | **Spatial distribution of the feature within the site** | Restore the distribution and continuity of suitable beach conditions such that this habitat has the greatest opportunity to colonise annually | 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. The conditions for annual establishment of this feature need to be secured for the whole beach frontage of a site to enable it to reach favourable condition. The distribution may change if the beach is responding to coastal processes.<br><br>This linear feature is found on the strandline from Walberswick to Dunwich and Dunwich Heath to Sizewell. Spatial distribution is limited to the strandline (see 'Future extent of habitat feature' attribute).<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | As for 'Future extent of habitat feature' attribute. |
| **Structure and function (including its typical** | **Key structural, influential and distinctive** | Maintain the abundance of the species listed to enable each of them to be a viable component of the Annex I habitat feature; | Some plant or animal species (or related groups of such species) make a particularly important contribution to the necessary structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; | See Site Condition Monitoring (ISA) Surveys listed in 'Extent of feature' attribute |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **species)** | **species** | *Honckenya peploides*, *Cakile maritima*, *Atriplex prostrata*, *A. glabriuscula, A.laciniata*, | • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition').<br><br>• **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)<br><br>• **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC.<br><br>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.<br><br>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.<br><br>Species diversity of strandline vegetation at Minsmere-Walberswick is limited, often to just *Atriplex* spp. with *Honckenya peploides* in sandier areas.<br><br>For this habitat feature, the vegetation will re-colonise each year so stable stands are unlikely, and these are limited in species due to the requirement for plants to be adapted to this environment.<br><br>Characteristic species include *Honkenya peploides; Cakile maritima; Atriplex prostrata; A. glabrisucula* and *Salsola kali.* Changes in the relative abundance of species can indicate changes in sediment size or processes. | |
| **Structure and function** | **Niches for seedling** | Restore the availability of niches which provide the potential for | Disturbance of wave-deposited sediment reduces potential niches for seed germination, changes the arrangement of wave-sorted sediment | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **(including its typical species)** | **establishment** | seedling establishment | and can lead to burial of seeds to a greater depth which suppresses germination.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | |
| **Structure and function (including its typical species)** | **Nutrient availability** | Maintain the input of nutrients from tidally-derived organic matter and ensure these are able to break down *in situ* | Tidal litter is an essential element to provide both nutrients and shelter for the germination of seeds. The combination of inorganic and organic substrate is an important pre-curser to development of the habitat and its successful establishment of its component vegetation on an annual basis. Both elements will be regulated by coastal processes. | |
| **Structure and function (including its typical species)** | **Sediment size range and type** | Maintain the availability and size range of those sediments typical of the feature at the site | Sediment size influences the establishment of vegetation and types of vegetation, and natural sorting of material by wave action maintains the optimum conditions. Some sites will have different sediment size ranges and material, but should generally be in the range of 2-200mm and the material must reflect the local geology and natural sources of sediment to the beach. | |
| **Structure and function (including its typical species)** | **Vegetation community composition** | Restore the component vegetation communities of the feature to the following characteristic National Vegetation Classification type; SD2 - *Honkenya peploides* - *Cakile maritima* strandline community. Note that vegetated shingle communities do not always fit well with the NVC. | This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature.<br><br>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). There may be a poor match with NVC types (SD2 or SD3 in the north) or Sneddon and Randall classification with driftline vegetation. Some locations with greater stability may resemble the MC6 vegetation type, but these perennials may be short-lived as a result of storm events.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | CADBURY, C. J. 2004.<br><br>CADBURY, C. J. 1996. Vegetation Survey of Coastal Grazing Marshes and Dunes at Minsmere RSPB Nature Reserve, Suffolk (NVC) Available from Natural England on request.<br><br>CADBURY, C. J. 2015.<br><br>ABREHART, T 2000.<br><br>ECOLOGICAL SERVICES LIMITED. 1997. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | | |
| **Structure and function (including its typical species)** | **Vegetation structure: zonation and transitions** | Restore the natural patterns of zonation across the drift line and between this and vegetation of more stable shingle landward that reflect the coastal processes and substrate type typical of the site. | This habitat is only generally found in a narrow fringing strip at and above MHW, but it can occur with perennial vegetation such as *Crambe maritima*.<br><br>Zonation is not always clear between perennial and annual shingle vegetation. Active coastal process mean that shingle habitat is very mobile, notably at Dingle, with active landward roll over and occasional breaching meaning a variety of zonations and transitions are present including shingle to saltmarsh and lagoon. Further south towards Sizewell there are transitions from annual shingle vegetation to perennial shingle vegetation and heath and scrub. Abandonment of bulldozing the shingle ridge between Walberswick and Dunwich as a flood defence has allowed for more natural zonation.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | As for 'Vegetation community composition' attribute. |
| **Structure and function (including its typical species)** | **Vegetation: undesirable species** | 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; ; *Centranthus ruber, Cirsium vulgare*, *Lupinus arboreus*, *Senecio jacobaea* and *Tamarix gallica* | 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. There is limited data on invasive undesirable species of this habitat type. The planting of species such as Tamarisk in an attempt to stabilise foreshores is detrimental to this habitat type. | |
| **Supporting processes (on which the feature relies)** | **Aeolian (wind-blow) processes** | Maintain the operation of natural sedimentary processes within the site | Within a site, providing the continuity of the natural beach system will promote a favourable status by maximising opportunities for the establishment of the habitat. These processes will also allow the movement of seed around the site. | |
| **Supporting processes (on which the feature relies)** | **Beach morphology and structure** | Maintain a natural profile, elevation and slope of the beach and foreshore within the site. | This is important as the shape and form of the beach provides optimum conditions for the establishment and completion of the annual cycle of flowering, fruiting and seed dispersal of the feature's typical component species. | As for 'Future extent of habitat feature' attribute. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | Abandonment of bulldozing the shingle ridge between Walberswick and Dunwich as a flood defence has allowed for more natural zonation. | |
| **Supporting processes (on which the feature relies)** | **Conservation measures** | Restore the recreational access 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 feature. | Active and ongoing conservation management to manage recreational access is needed to protect, maintain and 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.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | See Site Condition Monitoring (ISA) reports listed in 'Extent of feature' attribute.<br><br>ENGLISH NATURE, 2005.<br><br>Suffolk Wildlife Trust, 2016<br><br>NATURAL ENGLAND, 2014.<br><br>NATURAL ENGLAND 2017 |
| **Supporting processes (on which the feature relies)** | **Functionality and sediment supply including connectivity with the wider coastal sediment system** | Maintain adequate sediment supplies to and across the site from source (the beach, offshore deposits, eroding cliffs etc.) | This recognises the potential need at this site to ensure the continuous supply of sediment (from features such as soft eroding cliffs, dunes, offshore sand banks) to conserve this qualifying Annex I habitat feature. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. Sediment will be transported to the beach ridges by wave action and storms. Longshore drift will move sediment through a system and activities outside a site can have an impact on site integrity if inputs are reduced. | As for 'Future extent of habitat feature' attribute. |
| **Supporting processes (on which the feature relies)** | **Water quality** | Where the feature 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.<br><br>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 | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. | |
| **Version Control:** N/A | | | | |
| **Variations from national feature-framework of integrity-guidance**:<br><br>Some of the attributes include targets for both H1210 Annual vegetation of drift lines and H1220 Coastal shingle vegetation because the distinction between perennial and annual shingle vegetation is often not clearly defined. | | | | |

## Table 2: Supplementary Advice for Qualifying Features: H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves

| 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** | See target for this attribute in Table 1. | See explanatory notes for this attribute in Table1<br><br>For this feature, this habitat may form overlapping transitions with H1210 Annual Vegetation of drift lines at the seaward extent. Increases in extent at the seaward edge due to accretion of sediment may occur, the spatial extent objective must allow for natural changes: increase at the seaward edge does not mean that losses can occur elsewhere.<br><br>Habitat extent derived from English Nature Lifescapes project data from 2001 (English Nature 2001). The target includes both H1210 Annual vegetation of drift lines and H1220 Coastal shingle vegetation because the distinction between perennial and annual shingle vegetation is often not clearly defined.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | ENGLISH NATURE, 2001.<br><br>NATURAL ENGLAND, 2014. |
| **Extent and distribution of the feature** | **Spatial distribution of the feature within the site** | Restore the distribution and continuity of the habitat and its natural transitions within the site that enable the full succession from older to younger ridges to be represented. | 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.<br><br>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.<br><br>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, | CADBURY, C. J. 2004<br><br>CADBURY, C. J. 1996.<br><br>CADBURY, C. J. 2015<br><br>ABREHART, T 2000<br><br>NORFOLK WILDLIFE TRUST. 2014.<br><br>ECOLOGICAL SERVICES LIMITED. 1997.<br><br>This attribute will be periodically monitored as part of Natural |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | 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.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | England's site condition assessments (ISA) Surveys (Units 83, 84, 88, 103, 104, 106, 110, 111, 112, 113) |
| **Extent and distribution of the feature** | **Future extent of habitat within the site and ability to respond to seasonal changes** | Restore the ability to respond to natural seasonal or longer term changes in extent of habitat. | This recognises the need to allow for natural fluctuations in the extent and the distribution of this habitat feature, often during particular seasons and usually as a result of natural coastal processes. This habitat depends on supplies of shingle at the seaward edge and the maintenance of older deposits at the landward edge. Systems can be dynamic with new ridges, bars or spits forming or re-forming, so features may migrate beyond designated boundaries, but still form the Annex I feature.<br><br>The area is subject to dynamic coastal process including beach lowering and rolling back of shingle. The shingle should be allowed to function in a natural way with no artificial obstructions (such as seawall/flood defences) that could lead to squeezing out of habitat.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | See 'Spatial distribution of the feature within the site' attribute. |
| **Structure and function (including its typical species)** | **Vegetation structure: zonation and transitions** | Restore the range of vegetation communities and transitions characteristic of this feature with other habitats present on the site (such as saltmarsh, wetland, lagoons). | The coastal shingle ecosystem has a characteristic range of natural features, representing different stages of natural succession. The full representation of these stages should be maintained or where appropriate restored. Transitional habitats between shingle and other habitats can have distinctive characteristics due to the more freely draining underlying shingle.<br><br>These can support some of the rarer species associated with this habitat type.<br><br>Target set to Restore because the habitat is extensively | See 'Spatial distribution of the feature within the site' attribute. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | adversely impacted by recreational trampling as it is a popular beach location. | |
| **Structure and function (including its typical species)** | **Vegetation structure: patterns of vegetation with naturally bare ground** | Restore temporal and spatial zonation of vegetation that reflects pattern of beach ridges across the site, from the active beach ridge, to recently accreted ridges and through to the different-aged more stable ridges and the ongoing natural succession of these communities over time. | Patterns of vegetation that are related to the underlying geomorphology and sediment size are important aspects of this habitat. Some sites have this more clearly defined than others, with nearby Orford Ness having a well-described sequence of vegetation development that can be clearly seen on older to younger deposits. Here the sequence of vegetation is less impressive or defined, zonation not always clear between perennial and annual shingle vegetation.<br><br>Active coastal process mean that shingle habitat is very mobile, notably at Dingle, with active landward roll over and occasional breaching meaning a variety of zonations and transitions are present including shingle to saltmarsh and lagoon. Further south towards Sizewell there are transitions from annual shingle vegetation to perennial shingle vegetation and heath and scrub. Abandonment of bulldozing the shingle ridge between Walberswick and Dunwich as a flood defence has allowed for more natural zonation.<br><br>Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | See 'Spatial distribution of the feature within the site' attribute. |
| **Structure and function (including its typical species)** | **Vegetation community composition** | Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type; SD1 - *Rumex crispus* - *Glaucium flavum* shingle community. Note that vegetated shingle communities do not always fit well with the NVC. | 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).<br><br>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 | SNEDDON, P. and RANDALL, R.E. 1993.<br><br>See also 'Spatial distribution of the feature within the site' attribute. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | fluctuations).<br><br>Communities present usually include several of the following types (as described in the Sneddon and Randall shingle classification: some of these communities correspond to NVC types across a range of habitats) depending on the size and age of the shingle system: Pioneer communities near the sea, with *Crambe maritima* and *Lathyrus japonicus*, occasionally affected by wave action and can grade into annual driftline vegetation; *Arrhenatherum elatius* dominated grasslands on ridges near the sea, subject to maritime exposure/sea spray but limited wave action, often open and with little fine matrix, but closing as this develops over time and other species can colonise; scrub on mature ridges including prostrate *Prunus spinosa*, *Ulex europaeus* and *Rubus fruticosus*; Calcifuge grasslands on mature ridges with high bryophyte/lichen cover and perennial species; Heath communities with *Calluna vulgaris* and lichen heath; Wetlands and transitions to saltmarsh or other grassland habitats; Mature communities becoming more exposed to maritime conditions due to coastal change, these are often distinctive as older ridges are truncated by coastal change, and include species such as *Geranium robertianum*. Losses of mature shingle vegetation to coastal processes should not be a reason to stabilise these locations. | |
| **Structure and function (including its typical species)** | **Vegetation: undesirable species** | 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; *Centranthus ruber, Cirsium vulgare*, *Lupinus arboreus*, *Senecio jacobaea* and *Tamarix gallica.* | This will include undesirable weed species indicative of changes in the physical and chemical properties of the substrate, nutrient enrichment, and introduction or expansion of non-natives and garden escapees (including *Centranthus ruber*, *Lupinus arboreus, Tamarix gallica*). | This attribute will be periodically monitored as part of Natural England's site condition assessments Integrated Site Assessment (ISA) Surveys (Units 83, 84, 88, 103, 104, 106, 110, 111, 112, 113) |
| **Structure and function** | **Key structural,** | Restore the abundance of the species listed to enable each of | See explanatory notes for this attribute in Table 1. | See 'Vegetation: undesirable species' and 'Spatial distribution |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **(including its typical species)** | **influential and distinctive species** | them to be a viable component of the Annex I habitat feature:<br><br>*Beta vulgaris* ssp. *maritima*, *Crambe maritima*, *Glaucium flavum, Helminthotheca echioides*, *Lathyrus japonicus, Silene uniflora,* | Target set to Restore because the habitat is extensively adversely impacted by recreational trampling as it is a popular beach location. | of the feature within the site' attributes. |
| **Structure and function (including its typical species)** | **Nutrient availability** | Maintain the low nutrient status of the sediment and soils that support the specialised vegetation communities. | The combination of inorganic and organic substrate is an important precursor to the development of this habitat and its successful establishment of its component vegetation. Both elements will be regulated by coastal processes. | See 'Vegetation: undesirable species' and 'Spatial distribution of the feature within the site' attributes. |
| **Structure and function (including its typical species)** | **Sediment size range and type** | Maintain the availability and size range of those sediments typical of the feature at the site. | Sediment size influences the establishment of vegetation and types of vegetation. The amount of fine material determines vegetation composition: this should be allowed to develop naturally and not have any additions of soil or other fine material or organic matter. | See 'Vegetation: undesirable species' and 'Spatial distribution of the feature within the site' attributes. |
| **Structure and function (including its typical species)** | **Functionality and sediment supply including connectivity with the wider coastal sediment system** | Maintain adequate sediment supplies to and across the site from source (the beach, offshore deposits, eroding cliffs *etc*). | 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 outside of the designated site boundary which are either important for the continuous supply of sediment (such as soft eroding cliffs, dunes, offshore sand banks) or the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site.<br><br>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.<br><br>Sediment will be transported to the beach ridges by wave | See 'Vegetation: undesirable species' and 'Spatial distribution of the feature within the site' attributes. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | action and storms. Longshore drift will move sediment through a system and activities outside a site can have an impact on site integrity if inputs are reduced. | |
| **Supporting processes (on which the feature relies)** | **Shingle morphology** | Maintain the natural surface morphology and elevation of the shingle structure. | Alteration to the surface morphology and elevation will disturb and mix the sediments and alter the ratio of coarse to fine material. This can bring the water table closer to the surface and affect the species composition. The typical species of the habitat feature may be replaced by others with higher nutrient and water demands and which are less characteristic of the feature. | GUTHRIE, JGL. 2009<br><br>ENVIRONMENT AGENCY, 2007.<br><br>PYE, K. and BLOTT, S.J. 2006<br><br>PYE, K. and BLOTT, S.J. 2006<br><br>PYE, K. and BLOTT, S.J. 2009. PONTREE, N and PYE, K. and BLOTT, S.J. 2004.<br><br>Burningham & French 2016 |
| **Supporting processes (on which the feature relies)** | **Sedimentary processes** | Maintain the natural sedimentary processes that sustain the form of the shingle structure, including the natural supply of sediment from outside the site. | Small differences or changes in elevation and topography (e.g. just centimetres in elevation) may affect many marsh functions, from flooding and nutrient cycling to draining of the marsh interior. This micro-topography is critical for the development and maintenance of this habitat feature and its typical species, as are the wider sedimentary processes that influence this topography. | See 'Shingle morphology' attribute. |
| **Supporting processes (on which the feature relies)** | **Air quality** | Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). | 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.<br><br>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia ($NH_3$), oxides of nitrogen ($NO_x$) and sulphur dioxide ($SO_2$), and critical loads for nutrient nitrogen deposition and acid deposition. | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | 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.<br><br>Target set to Restore because the current levels of nitrogen and acid deposition (APIS accessed 20/12/2018) are exceeding the critical loads for the H1220 feature. | |
| **Supporting processes (on which the feature relies)** | **Conservation measures** | Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Restore the structure, functions and supporting processes associated with the feature. | 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.<br><br>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. Direct habitat management of this feature would typically take the form of preventing disturbance, removal of non-organic tidal litter and selective removal of invasive species. | See Site Condition Monitoring (ISA) reports listed in 'Extent of feature' attribute.<br><br>ENGLISH NATURE, 2005.<br><br>SWT, 2016<br><br>NATURAL ENGLAND, 2014.<br><br>NATURAL ENGLAND 2017 |
| **Version Control**<br>Advice last updated: N/A | | | | |
| **Variations from national feature-framework of integrity-guidance**: N/A<br><br>'Water quality' and 'Hydrology' attributes removed because they are not relevant to the H1220 Coastal shingle feature on the site.<br><br>Some of the attributes include targets for both H1210 Annual vegetation of drift lines and H1220 Coastal shingle vegetation because the distinction between perennial and annual shingle vegetation is often not clearly defined. | | | | |

## Table 3: Supplementary Advice for Qualifying Features: H4030. European dry heaths

| 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 feature at 306 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.<br><br>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. 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.<br><br>The baseline is derived from NVC surveys and RSPB management plans (Dingle Marshes 2001-2006 and Minsmere 2003-2008). It is likely to include an element of acid grassland and therefore slightly overestimate the extent of H4030 dry heath. Acid grassland occurs in an intimate mosaic with the H4030 dry heath and the two communities can be difficult to separate. | NATURAL ENGLAND, 2014.<br><br>This attribute will be periodically monitored as part of Natural England's site condition assessments<br><br>RSPB. 2009. |
| **Extent and distribution of the feature** | **Spatial distribution of the feature within the site** | Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site | A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes.<br><br>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 | See sources in 'Extent' attribute, above. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | 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.<br><br>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. | |
| **Structure and function (including its typical species)** | **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 | 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.<br><br>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.<br><br>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.<br><br>The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being moderate, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but moderately so. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation, creating more | NATURAL ENGLAND. 2015. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | 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. | |
| **Structure and function (including its typical species)** | **Bare ground** | [Maintain the cover of bare ground within the H4010 feature to within 1-10% | Warm, dry, bare substrate close to or within heathland vegetation is important as basking, hunting, nesting and burrowing sites for certain plants, invertebrates, birds and amphibians typically associated with dry heaths.<br><br>Bare ground is defined here as soil (especially sandy, exposed soil in dry heaths and peaty soil besides open water in wet heaths, which is free of vegetation cover or litter and not subject to heavy and regular disturbance. It should be firm, sunlit, horizontal, sloping or vertical exposed bare ground. | |
| **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 | 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.<br><br>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.<br><br>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. | |
| **Structure and function** | **Key structural,** | Maintain the abundance of the species listed to enable each of | See explanatory notes for this attribute in Table 1. | NATURAL ENGLAND, 2014b. |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **(including its typical species)** | **influential and distinctive species** | them to be a viable component of the Annex I habitat feature:<br><br>Silver-studded blue *Plebeius argus*<br><br>Antlion *Euroleon nostras*<br><br>Dartford warbler *Sylvia undata* | | |
| **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, to within typical values for the habitat. | Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms.<br><br>Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. | |
| **Structure and function (including its typical species)** | **Vegetation community composition** | Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type; H1 - *Calluna vulgaris* - *Festuca ovina* heath | 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).<br><br>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). | See Extent and distribution of the feature attribute above. |
| **Structure and function (including its typical** | **Vegetation community transitions** | Maintain any areas of transition between this and communities which form other heathland-associated habitats, such as dry | 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 | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **species)** | | and humid heaths, mires, acid grasslands, scrub and woodland. | containing species not found in the adjacent communities.<br><br>Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle.<br><br>Heathland occurs in a mosaic with acid grassland on the site. | |
| **Structure and function (including its typical species)** | **Vegetation composition: bracken cover** | Restore a cover of dense bracken to a low level typically of less than <10%. | The spread of bracken *Pteridium aquilinum* is a problem on many lowland heathlands. The unpalatable nature and density of bracken as a tall-herb fern, and its decomposing litter, can smother and shade out smaller and more characteristic heathland vegetation.<br><br>Usually active management of bracken is required to reduce or contain its cover across this habitat feature. But this fern has also some nature conservation value, for example on sites where fritillary butterflies occur and utilise bracken litter habitat.<br><br>Target set to Restore because bracken encroachment is a problem throughout the heaths. | NATURAL ENGLAND, 2014b. |
| **Structure and function (including its typical species)** | **Vegetation structure: cover of dwarf shrubs** | Maintain an overall cover of dwarf shrub species which is typically between 25-90% | Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals.<br><br>Many species also utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle. The structural character of the heathland feature is strongly influenced by the growing habits of its dominant species which in most cases will be ericoids (i.e. plants that look like heathers, including members of the *Ericaceae* and *Empetraceae* families).<br><br>The ericaceous species heather or ling *Calluna vulgaris*, bell heather *Erica cinerea* and cross-leaved heath *Erica tetralix* are | NATURAL ENGLAND, 2014b |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | the commonest and most characteristic dwarf-shrubs. *Calluna* is usually the most abundant. | |
| **Structure and function (including its typical species)** | **Vegetation structure: cover of gorse** | Restore cover of common gorse *Ulex europaeus* at <25% and the combined cover of *U. europaeus* and *U. gallii* at <50% | Gorse as a component of heathland is a very valuable wildlife habitat, and often a marker of relict heath and common. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species, and excellent winter roosting.<br><br>The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands *en masse* may also be serious fire hazards.<br><br>Target set to Restore because dense stands of gorse are encroaching the dry heath in some areas. | NATURAL ENGLAND, 2014b. |
| **Structure and function (including its typical species)** | **Vegetation structure: heather age structure** | Maintain a diverse age structure amongst the ericacerous shrubs typically found on the site | Each phase of growth associated with the characteristic heathers which dominate this feature also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms.<br><br>Therefore, it is important to maintain a mosaic of heather in different phases of growth. Typically this age structure will consist of between 10-40% cover of (pseudo) pioneer heathers; 20-80% cover of building/mature heathers; <30% cover of degenerate heathers and less than <10% cover of dead heathers. | NATURAL ENGLAND, 2014. |
| **Structure and function (including its typical species)** | **Vegetation structure: tree cover** | Restore the open character of the feature, with a typically scattered and low cover of trees and scrub (<15% cover) | Scrub (mainly trees or tree saplings above 1 m in height) and isolated trees are usually very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates.<br><br>But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland | NATURAL ENGLAND, 2014b |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | vegetation as ground cover. If scrub is locally important for any associated species with their own specific conservation objectives, then a higher level of cover will be acceptable. The area of scrub/tree cover should be stable or not increasing as a whole.<br><br>Target set to Restore because the open character of the heath needs to be restored in some areas through tree removal. | |
| **Structure and function (including its typical species)** | **Vegetation: undesirable species** | Restore the frequency / cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread.<br><br>There should be <1% of the following species: *Chamerion angustifolium, Cirsium arvense,* 'coarse grasses', *Digitalis purpurea, Epilobium* spp*. (*excluding *E. palustre)*, *Fallopia japonica, Gaultheria shallon*, *Juncus effusus, J. squarrosus, Ranunculus* spp*., Rhododendron ponticum*, *Rumex obtusifolius, Senecio* spp*., Urtica dioica* | Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state.<br><br>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.<br><br>Target set to Restore because efforts are being made to control the invasive plant piri piri burr *Acaena novae-zelandiae*. | NATURAL ENGLAND, 2014b |
| **Supporting processes (on which the feature relies)** | **Air quality** | Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). | See explanatory text for this attribute in Table 2<br><br>Target set to Restore because the current levels of nitrogen and acid deposition (APIS accessed 20/12/2018) are exceeding the critical loads for the H4030 dry heath 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** | **Conservation measures** | Maintain the management measures (either within and/or | Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further | ENGLISH NATURE, 2005 |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| **(on which the feature relies)** | | outside the site boundary as appropriate) which are necessary to Maintain the structure, functions and supporting processes associated with the feature | details about the necessary conservation measures for this site can be provided by contacting Natural England.<br><br>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.<br><br>Maintain low nutrient levels to maintain high numbers of species through the management activities of grazing, burning, mowing, sod-cutting and scrub/tree cutting. Management of succession is a critical aspect of management for this habitat, by a combination of active processes and grazing/cutting.<br><br>A range of invertebrates and plants require bare ground/peat where it is not too frequently disturbed by vehicles or feet. | NATURAL ENGLAND, 2014b. |
| **Supporting processes (on which the feature relies)** | **Hydrology** | At a site, unit and/or catchment level as necessary, Maintain natural hydrological processes to provide the conditions necessary to sustain the feature within the site. | Defining and maintaining the appropriate hydrological regime is a key step in moving towards achieving the conservation objectives for this site and sustaining this feature. Changes in source, depth, duration, frequency, magnitude and timing of water supply can have significant implications for the assemblage of characteristic plants and animals present.<br><br>This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts. | |
| **Supporting processes (on which the feature relies)** | **Water quality** | Where the feature 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.<br><br>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 | |

| Attributes | | Targets | Supporting and Explanatory Notes | Sources of site-based evidence (where available) |
|---|---|---|---|---|
| | | | the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC. | |
| **Version Control**<br>Advice last updated: | | | | |
| **Variations from national feature-framework of integrity-guidance**: | | | | |

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