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

Newlyn Downs Special Area of Conservation (SAC)
Site Code: UK0030065

Newlyn Downs (photo: Beth Tonkin NE)

Date of Publication: 11 February 2019

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Newlyn Downs SAC.

This advice should therefore be read together with the SAC Conservation Objectives 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	Newlyn Downs Special Area of Conservation (SAC)
Location	Cornwall
Site Map	The designated boundary of this site can be viewed here on the MAGIC website
Designation Date	01/04/2005
Qualifying Features	See section below
Designation Area	115.71 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)	Newlyn Downs SSSI
Relationship with other European or International Site designations	N/A

Site background and geography

Newlyn Downs is located to the south of the village of St Newlyn East and to the west of Mitchell, immediately north of the main A30 at Carland Cross, and is flanked by wind turbines to the west and the east. The main part of the site lies in the valley bottom and adjacent slopes of one of the headwaters of the River Gannel, and extends westwards to the part of the site known as Penhallow Moor. The two small streams which rise in the valley at the southern end of the site, converge and flow northwards through the site.

The main part of the site is CROW Open Access land and there are two public footpaths (PROW) converging at the north-eastern end of the site, opposite the former golf course and Lappa Valley railway. From there the main access track runs north to south through the length of the main site, with several east-west tracks off the main track. The western part of the SAC known as Penhallow Moor does not have any public access.

The SAC lies within the Cornish Killas National Character Area (NCA 152). It is underlain by killas, a Cornish mining term for metamorphic rock strata of sedimentary origin which were altered by heat from the intruded granites. The soils are largely derived from slatey mudstones and siltstones with bare rock in places. There are extensive areas of mine soil on the main site, a remnant from the Cargol and East Wheal Rose metalliferous mines, the main production was lead ore (galena) but commercial quantities of silver and zinc were also mined until closure in 1886.

Newlyn Downs SAC supports the largest area of Temperate Atlantic wet heath with Dorset heath *Erica ciliaris* and Cross-leaved heath *Erica tetralix* in Cornwall. Dorset heath *Erica ciliaris* occurs on both wet and dry heath and some of the mire communities.

The steeper valley sides support dry heath, characterised by heather/ling *Calluna vulgaris*, western gorse *Ulex gallii*, bell heather *Erica cinerea*, Dorset heath *Erica ciliaris* and bristle bent *Agrostis curtisii.* The flatter areas in the valley bottom of the main site and on Penhallow moor to the west, particularly in the vicinity of streams and springs, support wet heath and mire vegetation, characterised by purple moor-grass *Molinia caerulea*, cross-leaved heath *Erica tetralix*, Dorset heath *Erica ciliaris*, bog myrtle *Myrica gale* and black-bog rush *Schoenus nigricans*.

Penhallow moor is generally wetter than the main part of Newlyn Downs and supports Molinia dominated wet heath and mire communities, characterised by Dorset heath *Erica ciliaris*, cross-leaved heath *Erica tetralix*, black-bog rush *Schoenus nigricans*, devil's bit scabious *Succisa pratensis*, saw-wort *Serratula tinctoria*, bog asphodel *Narthecium ossifragum* and bog myrtle *Myrica gale*.

Large expanses of metalliferous mine spoil are bare, where colonisation is occurring the dominant vascular plant species is heather/ling *Calluna vulgaris*, with occasional bell heather *Erica cinerea* forming a pioneer heath community which does not fit into a National Vegetation Classification (NVC) heathland type. Drier areas in the north of the main site support woodland and scrub characterised by birch *Betula* spp., ash *Fraxinus excelsior*, hazel *Corylus avellana*, hawthorn *Crateagus monogyna* and blackthorn *Prunus spinosa*, while wetter areas around springs and streams are dominated by grey willow *Salix cinerea*.

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:

- **H4020 Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix***

Newlyn Downs has the largest area in Cornwall of heath rich in Dorset heath *Erica ciliaris*. A significant proportion of the *E. ciliaris* occurs in wetter situations than at Carrine Common. The sites selected for *E*. *ciliaris* heath in Cornwall, where the habitat type is rarer and more fragmented than in Dorset, are important for the representation of the full geographical distribution of Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*.

Temperate Atlantic wet heath with *Erica ciliaris* and *Erica tetralix* it is a particularly rare type of heathland, and in the UK it is restricted to Dorset and Cornwall. The total extent of this heathland type within the UK is estimated to be less than 1,000 hectares. It occurs in a warm oceanic climate on moist soils. At Newlyn Downs this heathland type is represented by NVC types M14 black bog-rush *Schoenus nigricans* - bog asphodel *Narthecium ossifragum*, M25 purple moor-grass *Molinia caerulea - tormentil Potentilla erecta*, and also in drier heath types H4 western gorse *Ulex gall*i - bristle bent *Agrostis curtisii* heath.

- **H4030 European dry heaths**

European dry heaths occur on free-draining generally acidic soils which are nutrient-poor and dominated by dwarf shrubs of the heather family, most commonly heather or ling *Calluna vulgaris*.

Newlyn Downs supports large tracts of dry heath characterised by heather/ling *Calluna vulgaris*, bell heather *Erica cinerea*, western gorse *Ulex gallii* and bristle bent *Agrostis curtisii.* Dorset heath *Erica ciliaris* occurs in both dry and wet heath/mire communities at Newlyn Downs. Dry heath NVC types are H4 western gorse *Ulex gallii* - bristle bent *Agrostis curtisii* heath and H8 heather/ling *Calluna vulgaris* - western gorse *Ulex gallii* heath.

Table 1: Supplementary Advice for Qualifying Features: H4020. Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*; Wet heathland with Dorset heath and cross-leaved heath *

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Extent and distribution of the feature	**Extent of the feature within the site**	Maintain the total extent of the feature to the 2016 NVC survey baseline, a total area of 61.9 hectares: • H4 *Ulex gallii - Agrostis curtisii* heath 50.76 ha • M14 *Schoenus nigricans - Narthecium ossifragum* mire 3.18 ha • M25 *Molinia caerulea - Potentilla erecta* mire 7.96 ha	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. 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. The baseline extent of Temperate Atlantic wet heath is based on the 2016 NVC survey.	BEARD M. 2016 *Newlyn Downs Site of Special Scientific Interest (SSSI): Habitat (NVC) Mapping Project*, 2016 Natural England Field Unit (field survey by Mark Beard & Rob Large) (Available on request from Natural England) Hocking, S. & Stewart, J. (2000) *The Status of Dorset Heath Erica ciliaris in Cornwall*. England Nature Research Report (ENRR) No. 353 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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. 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	BEARD M. 2016 HOCKING S. 1997 *The Status of Dorset Heath (Erica ciliaris) in Cornwall* Volumes I & II Cornwall Wildlife Trust, Truro

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.	
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. Such environmental changes may include changes in precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are 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 advisable.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England

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	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat; • Constant and preferential plant species of the H4, M14 and M25 NVC vegetation types at this SAC	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; • **Structural** species which form a key part of the Annex I habitat's structure or help to define that habitat on a particular SAC (see also the attribute for 'vegetation community composition'). • **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. 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.	BEARD M. 2016 HOCKING S. 1997

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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.	
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. For this feature typical pH values are 3.5-5.5 and bulk density 0.5-1.5 g/ml;	Soil is the foundation of basic ecosystem function and a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. The underlying soil types, particularly on the main part of Newlyn Downs, are influenced by past metalliferous mining activity, as evidenced by extensive mine spoil tips, a remnant of Cargol and East Wheal Rose mines (the main production was lead ore, with commercial quantities of silver and zinc).	
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 (s) • H4 *Ulex gallii* - *Agrostis curtisii* heath • M14 *Schoenus nigricans* - *Narthecium ossifragum* mire • M25 *Molinia caerulea* - *Potentilla erecta* mire	This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC). Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations). *Erica ciliaris* occurs in both wet and dry heaths and mire communities at Newlyn Downs, occurring in varying amounts in NVC communities H4, M14 and M25.	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			At Newlyn Downs (as with most Cornish sites) *Erica ciliaris* - *Erica tetralix* heath (Annex I priority habitat) occurs on drier substrates than is typically found in Dorset. At Newlyn Downs the H4 NVC community is also representative of the European dry heath SAC feature. H4 heath - *Erica tetralix* is abundant in this NVC community, while the cover of *Erica ciliaris* varies, being dominant in many stands, more scattered or sparse in others and entirely absent from some stands. M14 mire - *Erica ciliaris* is present in variable amounts, but is generally frequent. *Erica tetralix* is present but in smaller amounts than *Erica ciliaris*. M25 mire -*Erica ciliaris* occurs in variable amounts, and is frequent in some stands. *Erica tetralix* is frequently present in variable amounts in more open grazed heath. **NVC Types not included in within the Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*:** H8 *Calluna vulgaris - Ulex gallii* heath has not been included as an NVC type within the Temperate Atlantic wet heathland with *Erica ciliaris* and *Erica tetralix* because *Erica tetralix* is absent and *Erica ciliaris* is no more than occasional and was absent from some stands altogether. M16 *Erica tetralix - Sphagnum compactum* wet heath has not been included as an NVC type within the Temperate Atlantic wet heathland with *Erica ciliaris* and *Erica tetralix*, because although *Erica tetralix* was present, *Erica ciliaris* was absent.	
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 60-90%	Variations in structure of the heathland vegetation (vegetation height and age, amount of canopy closure, and patch structure) is needed to maintain high niche diversity and hence high species richness of characteristic heathland plants and animals. Many	This attribute will be periodically monitored as part of Natural England's SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			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). The ericaceous species heather or ling *Calluna vulgaris*, bell heather *Erica cinerea*, cross-leaved heath *Erica tetralix* and Dorset heath *Erica ciliaris*, are the commonest and most characteristic dwarf-shrubs. Hybrids of Dorset heath and cross-leaved heath can be locally abundant. *Calluna* is usually the most abundant.	Condition Assessments
Structure and function (including its typical species)	**Vegetation structure: cover of gorse**	Maintain cover of common gorse *Ulex europaeus* to below 25% cover	Gorse as a component of heathland is a very valuable wildlife habitat, and often a marker of relict heath and common. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species, and excellent winter roosting. The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species. Mature stands en masse may also be serious fire hazards.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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. 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	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure: tree cover**	Maintain 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, food plants, perches, territorial markers and sources of prey for typical heathland invertebrates and	This attribute will be periodically monitored as part of Natural England's SSSI

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover. The area of scrub/tree cover should be stable or not increasing as a whole.	Condition Assessments
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. Bracken cover should ≤ 5%.	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. The target to 'restore' applies to Buddleia and Cotoneaster which are particularly invasive; management of non-native species should target the removal of these species from the SAC. There are extensive areas of Budldleia immediately adjacent to the SAC hence effective control measures would need to include both SAC and non-SAC land. At present Buddleia, and Cotoneaster are not an immediate threat as they have not been recorded from within the Atlantic Temperate wet heath with *Erica ciliaris* and *Erica tetralix,* but they pose a potential threat and due to their invasive nature they should be targeted for management. Undesirable species include: Butterfly-bush *Buddleja davidii*, Cotoneaster *Cotoneaster horizontalis*, Montbretia *Crocosmia x crocosmiflora*, Pampas grass *Cortaderia selloana*, Rosebay willowherb *Chamerion angustifolium* , Virginia creeper *Parthenocissus quinquefolia* , Bracken *Pteridium aquilinum*, Bramble *Rubus fruticosus* , Ragwort *Senecio jacobaea*, Nettle *Urtica dioica*, Thistles *Cirsium spp* 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	BEARD M. 2016 Natural England (2014) Site Improvement Plan – Newlyn Downs (SIP Profile 149) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			vegetation. Usually active management of bracken is required to reduce or contain its cover across this habitat feature.	
Supporting processes (on which the feature relies)	**Air quality**	Restore as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (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. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The critical loads for nitrogen (nutrient nitrogen deposition) and for ammonia NH^3 are exceeded at this SAC for this heathland type (www.apis.ac.uk). Where the concentration and/or deposition measurements of air pollutants are higher than the site-relevant minimum Critical Load or Level values, then it may be necessary to adjust management to counteract them, e.g.; by cutting and/or increasing grazing pressure. Critical levels for oxides of nitrogen (NOx) and sulphur dioxide (SO2) and acid deposition are not exceeded at this SAC for this habitat type.	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). Natural England (2014) Site Improvement Plan – Newlyn Downs (SIP Profile 149)

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Levels of nutrient nitrogen deposition and ammonia (NH3) are known to exceed the minimum critical loads / levels for Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix* heaths at this SAC. Based upon this, the target is set to restore to at or below minimum critical loads / thresholds of air pollutants for this habitat.	
Supporting processes (on which the feature relies)	**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 feature	Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Conservation measures that may be necessary on this site include: • Maintain low nutrient levels to maintain high numbers of species through the management activities of grazing, controlled burning, mowing, sod-cutting and scrub/tree cutting. • Management of succession is a critical aspect of management for this habitat. • A range of invertebrates and plants require bare ground where it is not too frequently disturbed by vehicles or feet.	Hocking, S. & Stewart, J. (2000) *The Status of Dorset Heath Erica ciliaris in Cornwall*. England Nature Research Report (ENRR) No. 353
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. This target is generic and further site-specific investigations may be required to fully inform conservation measures and/or the likelihood of impacts.	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
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, particularly relating to nutrient inputs.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: Generic target for **Air quality** - additional text, about changes to management in the event of raised CL levels, was added on advice of Isabel Alonso, Natural England Heathland specialist.(email 24/10/2018).				

Table 2: 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 to the 2016 NVC survey baseline, a total area of 55.09 hectares. H4 *Ulex gallii - Agrostis curtisii* heath 50.76 ha H8 *Calluna vulgaris - Ulex gallii* heath 4.33 ha	There should be no measurable reduction (excluding any trivial loss) in the extent and area of this feature, and in some cases, the full extent of the feature may need to be restored. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys. Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a feature is susceptible to natural dynamic processes, there may be acceptable variations in its extent through natural fluctuations. 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. The baseline extent of European dry heath is based on the 2016 NVC survey.	BEARD M. 2016 *Newlyn Downs Site of Special Scientific Interest (SSSI): Habitat (NVC) Mapping Project*, 2016 Natural England Field Unit (field survey by Mark Beard & Rob Large) (Available from Natural England on request) This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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. 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.	BEARD M. 2016 HOCKING S. 1997 *The Status of Dorset Heath (Erica ciliaris) in Cornwall* Volumes I & II Cornwall Wildlife Trust, Truro

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction. These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for some of the typical and more specialist species associated with the Annex I habitat feature.	
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. Such environmental changes may include changes in precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability. The overall vulnerability of this SAC to climate change has been assessed by Natural England (2015) as being low, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that this site is considered to be vulnerable overall but are 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 advisable.	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting National Biodiversity Climate Change Vulnerability assessments ('NBCCVAs') for SACs and SPAs in England
Structure and function	**Functional connectivity**	Maintain the overall extent, quality and function of any	This recognises the potential need at this site to maintain or restore the connectivity of the site to its wider landscape in	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
(including its typical species)	**with wider landscape**	supporting features within the local landscape which provide a critical functional connection with the site	order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site. These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.	
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. 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. The underlying soil types, particularly on the main part of Newlyn Downs, are influenced by past metalliferous mining activity, as evidenced by extensive mine spoil tips, a remnant of Cargol and East Wheal Rose mines (the main production was lead ore, with commercial quantities of silver and zinc).	
Structure and function (including its typical species)	**Key structural, influential and/or distinctive species**	Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat Constant and preferential plant species of the H4 *Ulex gallii* - *Agrostis curtisii* heath and H8	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; • **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').	BEARD M. 2016 HOCKING S. 1997 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		Calluna vulgaris - Ulex gallii heath NVC vegetation types at this SAC	• **Influential** species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat) • **Site-distinctive** species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.	
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 (s) • H4 *Ulex gallii - Agrostis curtisii* heath • H8 *Calluna vulgaris - Ulex gallii* 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). 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). At Newlyn Downs (as with most Cornish sites) Temperate Atlantic wet heath with *Erica ciliaris* and *Erica tetralix* occurs on drier substrates than is typically found in Dorset. Hence at Newlyn Downs the H4 NVC communities are representative of	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			the European dry heath SAC feature as well as the Temperate Atlantic wet heath with *Erica ciliaris* and *Erica tetralix* Annex I priority habitat.	
Structure and function (including its typical species)	**Vegetation community transitions**	Maintain any areas of transition between this and communities which form other heathland-associated habitats, such as dry and humid heaths, mires, acid grasslands, scrub and woodland.	Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. This is an important attribute as many characteristic heathland species utilise the transitions between vegetation types or use different vegetation types during different stages of their life cycle.	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation composition: bracken cover**	Maintain a cover of dense bracken which is low, typically at <5%	The spread of bracken 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. 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.	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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 60-90%	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. 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). The ericaceous species heather or ling *Calluna vulgaris*, bell heather *Erica cinerea*, cross-leaved heath *Erica tetralix* and Dorset heath *Erica ciliaris*, are the commonest and	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			most characteristic dwarf-shrubs. Hybrids of Dorset and cross-leaved heath can be locally abundant. *Calluna* is usually the most abundant.	
Structure and function (including its typical species)	**Vegetation structure: cover of gorse**	Maintain 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. 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.	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
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. 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	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Structure and function (including its typical species)	**Vegetation structure: tree cover**	Maintain 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, food plants, perches, territorial markers and sources of prey for typical heathland invertebrates and vertebrates. But overall cover of scrub and trees across this habitat feature should be maintained or restored to a fairly sparse level, with a structurally complex edge and with characteristic heathland vegetation as ground cover The area of scrub/tree cover should be stable or not increasing as a whole	This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
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.	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. Undesirable species include: Butterfly-bush *Buddleja davidii*, Cotoneaster *Cotoneaster horizontalis*, Montbretia *Crocosmia x crocosmiflora*, Pampas grass *Cortaderia selloana*, Rosebay willowherb *Chamerion angustifolium*, Virginia creeper *Parthenocissus quinquefolia*, Bracken *Pteridium aquilinum*, Bramble *Rubus fruticosus*, Ragwort *Senecio jacobaea*, Nettle *Urtica dioica*, Thistles Cirsium spp The target to 'restore' applies to Buddleia and Cotoneaster which are particularly invasive; management of non-native species should target the removal of these species from the SAC. However there are extensive areas of Budldleia immediately adjacent to the SAC hence effective control measures would need to include both SAC and non-SAC land. At present Buddleia, and Cotoneaster only occur in a few isolated locations affecting European dry heath, but due to their invasive nature they should be targeted for management.	BEARD M. 2016 This attribute will be periodically monitored as part of Natural England's SSSI Condition Assessments
Supporting processes (on which the feature relies)	**Air quality**	Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (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. 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	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. The critical loads for nitrogen (nutrient nitrogen deposition) and for ammonia NH^3 are exceeded at this SAC for this heathland type (data source APIS). Critical levels for oxides of nitrogen (NOx) and sulphur dioxide (SO2) and acid deposition are not exceeded at this SAC for this habitat type. Levels of nutrient nitrogen deposition and ammonia (NH3) are known to exceed the minimum critical loads / levels for European dry heath at this SAC. Based upon this, the target is set to restore to at or below minimum critical loads / thresholds of air pollutants for this habitat. Where the concentration and/or deposition measurements of air pollutants are higher than the site-relevant minimum Critical Load or Level values, then it may be necessary to adjust management to counteract them, e.g.; by cutting and/or increasing grazing pressure.	
Supporting processes (on which the	**Conservation measures**	Maintain the management measures (either within and/or outside the site boundary as	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
feature relies)		appropriate) which are necessary to maintain the structure, functions and supporting processes associated with the feature	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. Conservation measures that may be necessary on this site include: • Maintain low nutrient levels to maintain high numbers of species through the management activities of grazing, controlled burning, mowing, sod-cutting and scrub/tree cutting. • Management of succession is a critical aspect of management for this habitat. • A range of invertebrates and plants require bare ground where it is not too frequently disturbed by vehicles or feet.	
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. 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 particularly relating to nutrient inputs.	For many SAC features which are dependent on wetland habitats supported by surface and/or ground water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year. Poor water quality and inadequate quantities of water can adversely affect the structure and function of this habitat type. Typically, meeting the surface water and groundwater	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the achievement of SAC Conservation Objectives but in some cases more stringent standards may be needed. Further site-specific investigations may be required to establish appropriate water quality standards for the SAC.	
Version Control Advice last updated: N/A				
Variations from national feature-framework of integrity-guidance: N/A				

References

Beard, M, (2016), *Newlyn Downs Site of Special Scientific Interest (SSSI): Habitat (NVC) Mapping Project, 2016.* Natural England Field Unit (Field Survey by Mark Beard & Rob Large) (Available from Natural England on request)

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