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

Tyne and Nent Special Area of Conservation (SAC)
Site code: UK0030293

River Nent at Blagill SSSI

Date of Publication: 24 June 2016

About this document

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Tyne and Nent SAC. This advice should therefore be read together with the SAC Conservation Objectives which are available here.

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

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

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

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

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

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

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

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

About this site

European Site information

Name of European Site	Tyne and Nent Special Area of Conservation (SAC)
Location	Cumbria
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	36.84ha
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)	Alston Shingle Banks SSSI, Haggs Bank SSSI, River Nent at Blagill SSSI, Whitesyke Mine and Flinty Fell SSSI
Relationship with other European or International Site designations	n/a

Site background and geography

This SAC is made up of the four SSSIs listed above, all occurring within a 5-mile radius of Alston in the Cumbrian North Pennines. Haggs Bank and Whitsyke Mine and Flinty Fell are former mine sites, where the lead mine spoil remains in situ and directly influences the composition of the vegetation.

Alston Shingle Banks and the River Nent at Blagill show Calaminarian grasslands developed on river sediments/shingles enriched with heavy metals. These sediments are also derived from former miningactivity, and were carried downstream in flood events (for example from the extensive Nenthead mines) and deposited on the floodplains of the Tyne at Alston Shingle Banks, and on the Nent at Blagill. These two river sites are also individually notified as SSSI as examples of dynamic river systems with a detailed recorded history.

Typically, the vegetation cover is sparse and species-poor where high levels of heavy metals remain near the soil/spoil surface: these metals are preventing the colonisation of dominant species such as grasses, and in turn a succession into a different grassland vegetation type. This succession has occurred in some cases, for example the Alston Shingle Banks site exhibits a reduced Calaminarian grassland extent than formerly. Where Calaminarian grassland is showing less successional change, then lichens may be a significant feature of the vegetation.

Haggs Bank and Whitesyke Mine are also important archaeological sites, and represent the rich mining history of this area in the North Pennines.

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:

- **H6130 Calaminarian grasslands of the *Violetalia calaminariae* ('Grasslands rich in heavy metals')**

  Calaminarian grasslands occur on soils that contain levels of heavy metals, such as lead, zinc, chromium and copper, which are toxic to most plant species. The greatest extent of the habitat occurs on artificial sites associated with past mining activities. Natural limestone outcrops supporting species typical of Calaminarian grasslands are rare and small, with a distinctive but very impoverished flora.

  The vegetation of this type of grassland is typically species-poor but distinctive, typically corresponding to the UK NVC type OV37 sheep's-fescue *Festuca ovina* – spring sandwort *Minuartia verna* community. It often contains a number of plant species principally found only in this habitat, most notably spring sandwort *Minuartia verna* and alpine penny-cress *Thlaspi caerulescens*, which are able to tolerate the toxicity of the soil (also known as 'metallophytes'). Many of the species typical of this Annex I habitat type are likely to be genetically distinct types adapted to soils rich in heavy metals. The heavy metal toxicity of the soils, perhaps combined with a low nutrient status, is believed to prevent succession and to maintain the characteristically sparse, open cover of vegetation. The rarer species are favoured by this lack of competition from more vigorousplant species.

  This SAC supports an example of Calaminarian grassland in an anthropogenic (man-made) context in northern England. At this site in the north-west Pennines, Calaminarian grassland occurs in association with lead mine waste and river shingles of the rivers South Tyne and Nent. This site supports a rich metallophyte flora with substantial populations of six species of higher plant metallophytes: thrift *Armeria maritima*, moonwort *Botrychium lunaria*, Pyrenean scurvygrass *Cochlearia pyrenaica*, spring sandwort *Minuartia verna*, alpine penny-cress *Thlaspi caerulescens* and mountain pansy *Viola lutea*.

  The site is also of great importance for its lichen communities associated with both spoil and river shingle. A number of rare and scarce species are present, including *Peltigera venosa*, *P. neckeri* and *Sarcosagium campestre* var. *macrosporum*.

  The site shows the full succession from open sparsely vegetated shingle and spoil to closed turf. Notable transitions from Calaminarian grassland to both calcareous grassland and dry heath also occur.

Qualifying Species:

Not applicable.

References:

RODWELL, J.S. (ed.) 1991. *British Plant Communities Volume 2: Grasslands and Montane Communities*. Cambridge University Press

RODWELL, J.S. (ed.) 2000. *British Plant Communities Volume 5: Open Habitats*. CUP (note – this is the volume that describes OV37)

SIMKIN, J.M. 2007. *The vegetation and management of calaminarian grassland in the North Pennines*. PhD thesis, Newcastle University

SIMKIN, J.M. 2011. *Calaminarian grassland*, Report for North Pennines AONB.

.

Table 1: Supplementary Advice for Qualifying Features: H6130 Calaminarian grasslands of the *Violetalia calaminariae* (‘grasslands rich in heavy metals’)

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 H6130 feature at approximately 15 hectares and as part of a matrix with other vegetation types occurring within the site	There should be no measurable net reduction (excluding losses from natural river processes) 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 taking into account appropriate local, regional and national contextual data At this SAC, areas of spoil tend to merge into more mesotrophic or neutral grassland, with notable elements of the NVC type MG3 sweet vernal-grass *Anthoxanthum odoratum* – wood cranesbill *Geranium sylvaticum* grassland occurring on the Haggs Bank and Whitesyke Mine. Standar description of OV37 exist in Rodwell, which may not accurately describe more local conditions. Fluvial processes operating on the rivers Tyne and Nent continue to have significant impacts on the distribution of Calaminarian grassland through the ongoing erosion and deposition of sediments and shingle. This should not be viewed as a negative impact on the site.	SIMKIN, J. Unpublished information, Newcastle University SIMKIN, J.M 2007 and 2011 (as above) NATURAL ENGLAND. River Nent at Blagill SSSI and Alston Shingle Banks SSSI. Unpublished information
	Spatial distribution of the feature within the site	Maintain the distribution and configuration of the H6130 feature, including where applicable its component vegetation types, across the site	Distribution includes the spatial pattern or arrangement of this habitat feature, and its component vegetation types, across the site. Changes in distribution may affect the nature and range of the vegetation communities present, the operation of the physical, chemical, and biological	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			processes in the system and the resiliency of the site and its features to changes or impacts. River processes on the Tyne and Nent continue to have significant impacts on the distribution of Calaminarian grassland through the ongoing erosion and deposition of sediment and shingle. Further to this, succession to non-designated vegetation remains a risk to site integrity.	
Structure and function (including its typical species)	Vegetation community composition	Ensure the component vegetation communities of the H6130 feature are referable to and characterised by the following National Vegetation Classification type; OV37 sheep's-fescue *Festuca ovina* – spring sandwort *Minuartia verna* grassland*	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). Typical or 'pure' stands of the OV37 grassland type are of limited extent and all sites show merging vegetation types from bare gravel/spoil, through more obvious OV37, into MG3 or semi-natural grassland and dry heath. *It should be noted that the formal description of OV37 in the NVC does not fully encompass the range in heavy metal vegetation in England.	SIMKIN, J. 2016. Calaminarian Grassland Habitats Regulations Assessment; Mitigation on the South Tyne and Nent, Feb 2016. Report to Natural England.
Structure and function (including its typical species)	Key structural, influential and/or distinctive species	Maintain the abundance of the species listed below to enable each of them to be a viable component of the H6130 habitat; Thrift *Armeria maritima,* Pyrenean scurvy-grass *Cochleria pyrenaica,* spring sandwort *Minuartia verna,* sea campion *Silene uniflora (= Silene vulgaris ssp maritima),* alpine penny-cress *Thlaspi caerulescens,* mountain pansy *Viola lutea,*	Some plant or animal species (or related groups of such species) make a particularly important contribution to the structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include; – Structural species which form a key part of the habitat's structure or help to define an Annex I habitat on a site (see also the attribute for 'vegetation community composition'). – Influential species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat). – Site-distinctive species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		moonwort *Botrychium lunaria* Assemblage of lichens associated with river shingle and metal-rich spoil	particular site. There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary. The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available. At this SAC, lichen-rich communities are present with scattered *Calluna vulgaris* in some locations where exposed conditions at high altitude with high precipitation has led to leaching of the surface soil. Unless trampled by stock *Cladonia rangiformis, C. chlorophaea, C. pyxidata, C. portentosa, C. gracilis, C. arbuscula* and *Cetraria aculeata* are all frequent. *Bryum pallens* may also be common.	
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. Cow parsley *Anthriscus sylvestris*, thistles *Cirsium arvense, Cirsium vulgare,* Hogweed *Heracleum sphondylium,* Common nettle *Urtica dioica*, coarse grasses eg *Arrhenatherum elatius*, *Holcus lanatus;* woody species	Undesirable non-woody (herbaceous) and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. 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. *Ulex europeus* (common gorse) is also a major threat to Calaminarian grasslands on the South Tyne.	
	Vegetation community transitions	Maintain the pattern of naturally-occurring zonations and transitions between the H6130 feature and other vegetation	Transitions/zonations between the SAC feature and adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain the characteristics of each bordering community and can add value in often containing species not found in the adjacent	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			communities. Retaining such transitions can provide further diversity to the SAC habitat feature, and support additional flora and fauna. Haggs Bank and Whitesyke Mine both show transitions into MG3 grassland on stable soils. The Tyne and Nent rivers may create natural community change, and 'space' within the designation needs to remain for dynamic change	
	Soils, substrate and nutrient cycling	Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status, heavy metal concentration and fungal:bacterial ratio, to within typical values for the H6130 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 soil and substrate properties may therefore affect the ecological structure, function and processes associated with this Annex I feature. River-borne heavy metal levels may decline over time so proactive work to 'renew' soils and sediments where metal toxicity is declining may be required. Soil development is a threat to the calaminarian grasslands and often follows quickly from the spread of large pleurocarpous mosses in response to flooding, scrub invasion and nitrogen inputs. Once there is a thin soil over the contaminated mineral substrate more competitive grasses can establish and the mosses thrive, and the metallophytes and lichens are soon lost.	SIMKIN, 2007
	Hydrology: Flooding regime	Maintain the timing, frequency, extent and duration of surface flooding as appropriate to the maintenance/restoration of the H6130 feature	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 precisely determine the necessary flood regime and/or the likelihood of impacts. Some river shingle sites may be prone to flooding under extreme meteorological conditions. Depending on their frequency, timing and duration, such flood events have the potential to cause significant structural/geomorphological change and sediment deposition will also influence heavy metal levels in the underlying substrate/soil	Environment Agency flood records. Local owner-occupier knowledge of flood incidents and extent.
Structure and function (including its	Functional connectivity with wider	Maintain the overall extent, quality and function of any supporting features within the	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	

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
typical species)	landscape	local landscape which provide a critical functional connection with the H6130 habitat	features, such as habitat patches, 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. Less management of the rivers Tyne and Nent (such as flood defence or river straightening) would allow wider deposition of sediments. There is the potential for this habitat to spread outside of the designated site if natural river processes were allowed to operate. Significant non-designated areas of calaminarian grassland occur at Leadgate and Nenthead, within the same ecological unit, and loss of condition in these areas may affect designated grasslands downstream.	
	Adaptation and resilience	Maintain the H6130 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 need for natural habitat features to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. 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 particular SAC to climate change has been assessed by Natural England as being *moderate*, taking into account the sensitivity, fragmentation, topography and management of its habitats. This means that some adaptation action for specific issues may be required, such as reducing habitat fragmentation,	NATURAL ENGLAND, 2015. Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs [both available at http://publications.naturalengland.org.uk/publication/4954594591375360].

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			creating more habitat to buffer the site or expand the habitat into more varied landscapes and addressing particular management and condition issues. Individual species may be more or less vulnerable than their habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required. Less-intensive management of the rivers Tyne and Nent would allow wider natural deposition of sediments. There is the potential for this habitat to spread outside of the designated site if natural river processes were allowed to operate, improving the feature's resilience.	
Supporting processes (on which the feature relies)	Air quality	Maintain 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. Air quality, and especially NOX and NH_4 levels, seem to be a major driver of change in local calaminarian sites, leading to rapid loss of extent as they succeed to grassland or scrub. The presence of cattle on site can also be very damaging for this reason. Greening due to higher CO_2 levels may be contributing to habitat loss.	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 SIMKIN, 2007
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 details about the necessary	NATURAL ENGLAND, 2014.

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 or restore the structure, functions and supporting processes associated with the H6130 feature	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. Typical conservation measures for this habitat feature can include grazing with livestock, mechanical cutting, scrub management, weed control and the maintenance of a local rabbit population where applicable. Low intensity grazing by sheep is appropriate management, but cattle congregate on stony ground and can do considerable damage through enrichment and trampling. Disruption of sensitive lichen communities by walkers and vehicles is a significant problem on Flinty Fell and Blagill shingles, and many of the best areas have already been lost from Nenthead Mines for the same reason. Plants are better able to tolerate trampling than the lichens (so Whitesyke and Haggs Bank have been less affected), but even the occasional dog walker through the River Nent at Blagill site does lasting damage to the lichens. The use of the old mine spreads on Flinty Fell by trail bikes has seen significant habitat loss. Allowing the ongoing disturbance from rivers or other mechanisms to prevent sediment enrichment and the transition into more mesotrophic conditions will remain necessary. It is conceivable there will be a future need to artificially undertake soil disturbance on some Calaminarian grasslands to 're-invigorate' soil toxicity due to a range of factors including sediment deposition and the build-up of organic material over time.	Site Improvement Plan: Tyne and Nent (SIP252) ENGLISH NATURE, 2005. Views about Management for Alston Shingle Banks SSSI, Haggs Bank SSSI, River Nent at Blagill SSSI, Whitesyke Mine and Flinty Fell SSSI. Available from NE Designated Sites System
Version Control Advice last updated: Draft advice updated on 24 June 2016 to take account of comments from local stakeholders.				
Variations from national feature-framework of integrity-guidance: Minor amendments made to generic text on the advice of national grassland specialist Dr Richard Jefferson				