

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

**Tyne and Allen River Gravels Special Area of Conservation (SAC)  
Site code: UK0012816**



Photo credit: Dave Mitchell

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## **About this document**

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Tyne and Allen River Gravels SAC. This advice should therefore be read together with the [SAC Conservation Objectives](#).

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

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](mailto:HDIRConservationObjectivesNE@naturalengland.org.uk)**

## About this site

### European Site information

<b>Name of European Site</b>	Tyne and Allen River Gravels Special Area of Conservation (SAC)
<b>Location</b>	Northumberland
<b>Site Maps</b>	The designated boundary of this site can be viewed <a href="#">here</a> on the MAGIC website
<b>Designation Date</b>	1 <sup>st</sup> April 2005
<b>Qualifying Features</b>	See section below
<b>Designation Area</b>	36.84 ha
<b>Designation Changes</b>	Not applicable
<b>Feature Condition Status</b>	Details of the feature condition assessments made at this site can be found using Natural England's <a href="#">Designated Sites System</a>
<b>Names of component Sites of Special Scientific Interest (SSSIs)</b>	Burnfoot River Shingle and Wydon Nab SSSI, Lambley River Shingles SSSI, Ninebanks River Shingle SSSI, Wharmley Riverside SSSI, Williamston River Shingle SSSI
<b>Relationship with other European or International Site designations</b>	Not applicable

### Site background and geography

The sites that make up the SAC are positioned on the flood plain areas of the River South Tyne and its tributary the River West Allen. These rivers occur within the [Tyne Gap and Hadrian's Wall National Character Area](#), a narrow, distinctive corridor centred on the River Tyne which separates the uplands of the North Pennines from the Border Moors and Forests to its north.

The sites are known locally as 'heavy metal shingles' and are the result of historical lead mining contamination, dating back to the 17<sup>th</sup>/18<sup>th</sup> centuries, when mineral extraction was achieved by washing and sedimentation processes which resulted in metals leaching into the local watercourses.

This vegetation on soils rich in heavy metals (or 'Calaminarian grassland') is mostly found on well-draining nutrient-poor soils containing high levels of heavy metals derived from mining waste such as lead, zinc and cadmium. The poor climate experienced in the 18<sup>th</sup> century in combination with the steep banks and dynamism of the River South Tyne meant that polluted flood water destroyed the local vegetation on the shingle banks and enabled Calaminarian species to become established, the seeds of which had been carried down stream alongside the metal pollutants.

Over time the sites have begun to re-vegetate and are in various stages of natural vegetation succession; early successional stages are characterised by a range of lichens/bryophytes, with mid-succession grassland supporting Mountain pansy *Viola lutea* and late-succession closed grassland supporting the rare Dune helleborine *Epipactis helleborine* var. *youngiana*.

The Tyne and Allen River Gravels SAC was designated in April 2005 covering an area of 36.84ha in Northumberland. The site encompasses the most extensive, structurally varied and species-rich examples of riverine Calaminarian grasslands in the UK. The river gravels contain a range of structural

types, ranging from a highly toxic, sparsely vegetated area with abundant lichens through to closed willow/alder woodland.

**Reference:** SIMPKIN, J. 2011. Calaminarian Grassland - Report for the North Pennines AONB Partnership.

## **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 on soils rich in heavy metals')**

'Calaminarian' grassland typically occurs on soils or substrates which have such high levels of heavy metals, such as lead, zinc, chromium and copper, that they are toxic to most plant species. The greatest extent of this habitat occurs on artificial sites associated with past mining activities. Near-natural examples in the UK are much more localised, being associated with natural outcrops of serpentine and river gravels rich in heavy metals.

Whilst the vegetation of this type of grassland is typically species-poor, it is very distinctive and 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 high toxicity of the soil.

Many of the species typical of this 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 or hamper natural succession and maintain a characteristically sparse, open cover of vegetation. The rarer species are favoured by this lack of competition from more vigorous colonists. Spring sandwort *Minuartia verna* and thrift *Armeria maritima* are particularly abundant, and there are several rare species, including dune helleborine *Epipactis helleborine* var. *youngiana*, which has its main UK population at this site. The site is also of great importance for its associated lichen communities, which include a number of rare and scarce species, including the Red Data Book-listed *Peltigera venosa*.

This site in north-east England encompasses the most extensive, structurally varied and species-rich examples of riverine Calaminarian grasslands in the UK. The river gravels contain a range of structural types, ranging from a highly toxic, sparsely vegetated area with abundant lichens through to closed willow/alder *Salix/Alnus* woodland.

### **Qualifying Species:**

Not applicable

**Table 1: Supplementary Advice for Qualifying Features: H6130. Calaminarian grasslands of the *Violetalia calaminariae*; ‘Grasslands on soils 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 8.3 hectares.	<p>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.</p> <p>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.</p> <p>The extent of an Annex I habitat feature covers the sum extent of all of the component vegetation communities present and may include transitions and mosaics with other closely-associated habitat features. Where a reduction in the extent of a feature is considered necessary to meet the Conservation Objective for another Annex I feature, Natural England will advise on this on a case-by-case basis.</p> <p>8.3ha of the 5 component SSSIs comprises SAC H6130 Calaminarian grassland feature. The remaining habitat is mostly comprised of Birch woodland, broadleaf woodland, scrub and water.</p> <p>This H6130 Calaminarian grassland is a transitional habitat due to the declining metal toxicity of the substrate. The Tyne and Allen grasslands are at varying degrees of transition and display different flora species as the accumulation of organic matter covers the cobble and toxic substrate declines. Maintenance is supported over restoration. Investigation into the removal of vegetation and the exposure of original bare earth/cobble is designed to re-expose the metal rich substrate and a possible dormant seed bank. This work is ongoing from 2016.</p>	<p>NATURAL ENGLAND. Phase 1 survey maps supporting SSSI designation. Held by Natural England</p> <p>Lambley = Total = 1.18 ha.  Ninebanks Total = 2.4 ha  Burnfoot = 1.2ha  Williamston = 0.1ha  Wharmley = 2.8 ha</p>
	Distribution of the feature within the site	Maintain the current 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. This H6130 Calaminarian grassland site is fragmentary in nature due to unusually high flood events coinciding with the peak mining period of the North Pennines. These flood events distributed pollutants (and created Calaminarian grassland sites) both within and without the flood plain of the South Tyne and related tributaries. These objectives are set subject to natural change. Changes in the distribution of the H6130 feature are therefore allowable as a result of naturally dynamic fluvial processes.	NATURALENGLAND. Phase 1 survey maps supporting SAC designation. Held by Natural England



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
Structure and function (including its typical species)	Vegetation community composition	<p>Ensure the component vegetation communities of the H6130 habitat include and are characterised by the following National Vegetation Classification types;</p> <p>OV37 <i>Festuca ovina</i> – <i>Minuartia verna</i>.</p>	<p>This habitat feature is associated with a number of 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.</p> <p>In the UK this habitat is categorised by the National Vegetation Classification (NVC). Maintaining or restoring the 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 the typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).</p> <p>The number of lower plants listed for OV37 is far fewer than occurs on the Tyne and Allen River Gravels. The higher plant flora tends to receive most of the attention however the significance of the lichen and bryophyte communities is at least as great as that for the higher plants on the Calaminarian grasslands.</p>	<p>SIMKIN, J. 2008. Review of Calaminarian Grassland Management Options in the Tyne and Allen River Gravels SAC.</p> <p>RODWELL, J.S. (ed.) 2000. British plant communities. Volume 5. Maritime communities and vegetation of open habitats. Cambridge University Press.</p>
	Key structural, influential and site-distinctive species: flora and fauna	<p>Maintain the abundance of the species listed below to enable each of them to be a viable component of the H6130 habitat;</p> <p>Assemblage of lichens and bryophytes</p> <p>Thrift <i>Armeria maritima</i>, Pyrenean scurvey-grass <i>Cochleria pyrenaica</i>, Spring sandwort <i>Minuartia verna</i>, <i>Silene uniflora</i> (= <i>Silene vulgaris</i> ssp <i>maritima</i>), Alpine pennycress <i>Thlaspi</i></p>	<p>Some plant or animal species (or related groups of such species) make a particularly important contribution to the structure, function and/or quality of an Annex I habitat feature at a particular site. These species will include;</p> <p><input type="checkbox"/> <i>Structural</i> species which form a key part of the habitat's structure or help to define an Annex I habitat on a site (see also the attribute for 'vegetation community composition').</p> <p><input type="checkbox"/> <i>Influential</i> species which are likely to have a key role affecting the structure and function of the habitat (such as bioturbators (mixers of soil/sediment), grazers, surface borers, predators or other species with a significant functional role linked to the habitat).</p> <p><input type="checkbox"/> <i>Site-distinctive</i> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular site.</p> <p>There may be natural fluctuations in the frequency and cover of each of these species. The relative contribution made by them to the overall ecological integrity of a site may vary, and Natural England will provide bespoke advice on this as necessary.</p> <p>The list of species given here for this Annex I habitat feature at this SAC is not necessarily exhaustive. The list may evolve, and species may be added or deleted, as new information about this site becomes available.</p>	<p>NATURAL ENGLAND. Phase 1 survey maps supporting SAC designation and component SSSI FCT maps. Held by Natural England.</p> <p>NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a></p>

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		<i>caerulescens</i> , Mountain pansy <i>Viola lutea</i> , Dune helleborine <i>Epipactis helleborine</i> <i>var. youngiana</i> ,	For this feature, appropriate (i.e. those indicating adequate supply of low nutrient water and appropriate management regime) bryophytes and vascular species are taken from core community constants and preferential species. This Annex 1 habitat is not well-defined in the JNCC guidance and includes a wide range of 'transitional' wetland vegetation.	
Structure and function (including its typical species)	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; <i>Anthriscus sylvestris</i> , <i>Cirsium arvense</i> , <i>Cirsium vulgare</i> , <i>Heracleum sphondylium</i> , <i>Urtica dioica</i> , Coarse grasses eg <i>Arrhenatherum elatius</i> , <i>Holcus lanatus</i> , and Himalayan balsam ( <i>Impatiens glandulifera</i> ) or other non-native species.	Undesirable non-woody and woody vascular plants species will 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 and a change in soil composition, such as reduction in heavy metals in the surface soil and burying of cobble. If left unchecked these species will assist in the decline of the site condition.	NATURAL ENGLAND. Phase 1 survey maps supporting SAC designation and component SSSI FCT maps. Held by Natural England  NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a>
	Vegetation community transitions	Maintain the pattern of natural vegetation zonation associated with the H6130 feature.	Naturally-occurring transitions or zonation 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	Phase 1 survey maps supporting SAC designation and component SSSI FCT maps. Held by Natural England.

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
			<p>support additional flora and fauna.</p> <p>The edges of the Calaminarian grassland habitat where the cobble/restricted grass growth are changes into rank grass and birch woodland offers a dappled shade area that provides a habitat for the <i>Epipactis helleborine</i> var. <i>youngiana</i>. Where tree and rank grass/tree encroachment has become too great, restoration will be required.</p>	NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a>
Structure and function (including its typical species)	Hydrology: Flooding regime	Maintain the timing, frequency, extent and duration of surface flooding commensurate with the maintenance of the H6130 feature	<p>Defining and maintaining the appropriate hydrological regime is problematic 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.</p> <p>Some river shingle sites may be prone to flooding under extreme meteorological conditions. Depending on the frequency, timing and duration, such flooding has the potential to cause deleterious vegetation change and unfavourable condition as the result of deposits of non-contaminated sediment. However, depending on the level and concentration of heavy metal pollutants and them being transferred and deposited throughout the tributaries and the South Tyne, new sites suitable for Calaminarian habitat may emerge on areas outside of the European designation area.</p> <p>Greater understanding is needed in relation to flood events, heavy metal contaminated and non-contaminated water/flood debris and the effects of these components on the feature.</p>	<p>Phase 1 survey maps supporting SAC designation and component SSSI FCT maps. Held by Natural England.</p> <p>NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a></p>
	Supporting off-site supply of heavy metals (river shingle sites)	Maintain a supply of heavy metal-enriched river-borne sediment to the SAC from within its surrounding catchment	<p>The structure and function of the qualifying habitat, including its typical species, may rely upon the continued presence of areas which surround and are outside of the designated site boundary.</p> <p>Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species. This supporting habitat may be critical to the typical species of the feature or to prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.</p>	<p>Phase 1 survey maps supporting SAC designation and component SSSI FCT maps. Held by Natural England.</p> <p>NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a></p>
	Functional connectivity	Maintain the overall extent, quality and	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	Phase 1 survey maps supporting SAC



Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
	<b>with wider landscape</b>	function of any supporting features within the local landscape which provide a critical functional connection with the site	<p>connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site.</p> <p>These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial.</p> <p>Where there is a lack of detailed knowledge of the connectivity requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.</p>	<p>designation and component SSSI FCT maps. Held by Natural England</p> <p>NATURAL ENGLAND, 2015.  <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a></p>
<b>Supporting processes (on which the feature relies)</b>	<b>Air quality</b>	Maintain the concentrations and deposition of air pollutants at below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ).	<p>This habitat type is considered sensitive to changes in air quality. Exceedance of these critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and causing the loss of sensitive typical species associated with it.</p> <p>Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (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.</p> <p>It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.</p>	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on APIS
	<b>Conservation measures</b>	Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain and/or restore the structure,	<p>Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England.</p> <p>This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Typical conservation measures include grazing, cutting, scrub management and weed control. Retention of suitable land use</p>	Phase 1 survey maps supporting SAC designation and component SSSI FCT maps owner/manager management plans and projects. Held by Natural England

Attributes		Targets	Supporting and Explanatory Notes	Sources of site-based evidence (where available)
		functions and supporting processes associated with the H6130 feature	<p>infrastructure/patterns to enable site management e.g. pastoral livestock farming. Maintenance of local rabbit populations where applicable.</p> <p>Restoration is an option on sites where it is constructive and practical. Soil clearance, tree and gorse removal are all positive methods of restoring the habitat. Grazing can be introduced on sites to improve condition.</p>	NATURAL ENGLAND, 2015. <a href="#">Tyne and Allen River Gravels Site Improvement Plan</a>

#### Version Control

Advice last updated: n/a

#### Variations from national feature-framework of integrity-guidance:

At this site the Soils substrate and nutrient recycling section of the feature framework has been removed. The ideal conditions for the OV37 species community is bare cobble with little or no soil. Soil biodiversity is not a feature of this site due to the high pollutants of Cadmium, Zinc and Lead which led to the establishment of the habitat during industrial mining in the Pennines. The heavy metal pollutants in flood water are now greatly reduced and non-polluted soil is more likely to be distributed on the site which has a negative impact to condition.

At this site the 'Supporting off site habitat' section of the feature framework has been removed. Reason = The site relies on heavy metal sediment deposits during high flood events. Surrounding land, unless exhibiting exposed river cobble is unlikely to be a supporting habitat or be critical to the designated flora.

At this site the 'Adaptation and Resilience' section of the feature framework has been removed. The metallophyte vegetation generally has little scope to adapt to any changes that relate to a decline in heavy metal concentrations in the substrate and reduction in metal concentration in floodwater without active intervention

