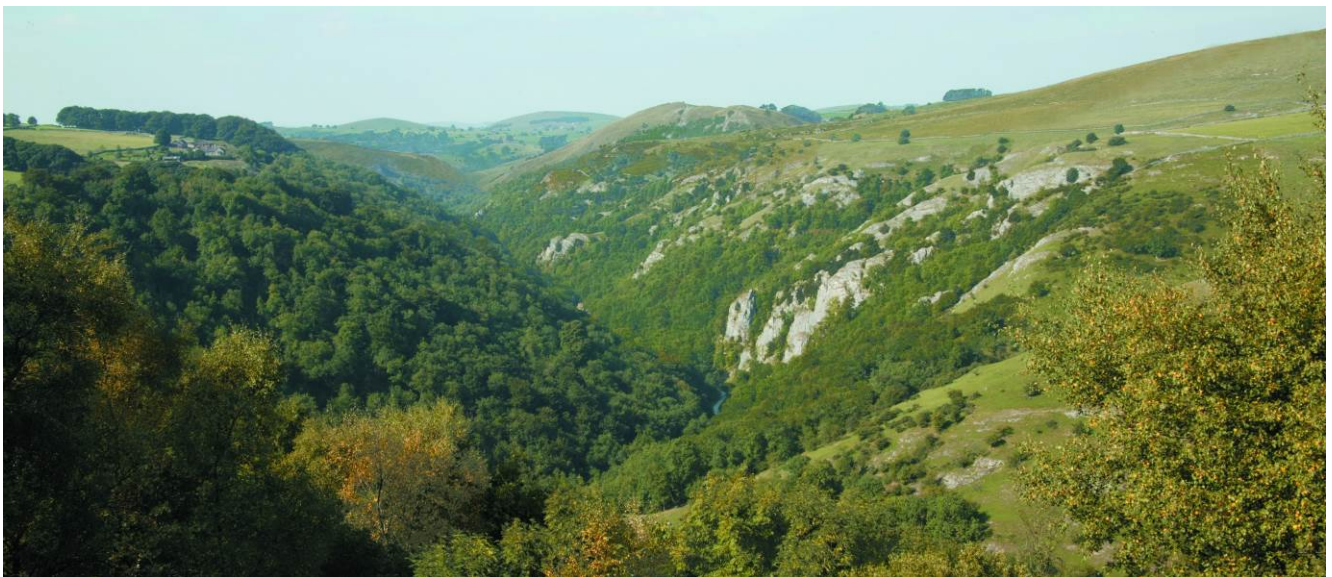




## **European Site Conservation Objectives: Supplementary advice on conserving and restoring site features**

**Peak District Dales Special Area of Conservation (SAC)  
Site Code: UK0019859**



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## **About this document**

This document provides Natural England's supplementary advice about the European Site Conservation Objectives relating to Peak District Dales 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](mailto:HDIRConservationObjectivesNE@naturalengland.org.uk)**

## About this site

### European Site information

|  |   |
|--|---|
| <b>Name of European Site</b>   | Peak District Dales Special Area of Conservation (SAC)  |
| <b>Location</b>  | Derbyshire, Staffordshire   |
| <b>Site Map</b>  | The designated boundary of this site can be viewed <a href="#">here</a> on the MAGIC website  |
| <b>Designation Date</b>  | 1 April 2005  |
| <b>Qualifying Features</b>   | See section below   |
| <b>Designation Area</b>  | 2326.33ha   |
| <b>Designation Changes</b>   | None  |
| <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>     | Ballidon Dale SSSI, Coombs Dale SSSI, Cressbrook Dale SSSI, Dove Valley and Biggin Dale SSSI, Hamps and Manifold Valleys SSSI, Lathkill Dale SSSI, Long Dale and Gratton Dale SSSI, Long Dale, Hartington SSSI, Matlock Woods SSSI, Monks Dale SSSI, The Wye Valley SSSI, Topley Pike and Deep Dale SSSI, Via Gellia Woodlands SSSI |
| <b>Relationship with other European or International Site designations</b> | N/A   |

### Site background and geography

The Carboniferous Limestone massif of the Peak District is one of the most important in Britain, lying in latitude and altitude between the Mendips and the Craven area of Yorkshire. The limestone is cut by valleys, the 'dales', which contain a wide range of wildlife habitats, particularly woodland, scrub and grassland. Taken together the ravine woods of the ravines and slopes of the Dales comprise the largest area of this habitat in Great Britain. There is also a great physical diversity due to rock outcrops, cliffs, screes and a variety of slope gradients and aspects. This mosaic of habitats and the transitions between them are of exceptional interest for a wide range of characteristic, rare and uncommon flora and fauna.

The SAC encompasses 13 Sites of Special Scientific Interest and is encapsulated within the [White Peak National Character Area \(NCA\)](#). It also lies mostly (but not entirely) within the [Peak District National Park](#). The SAC is visited and accessed by many thousands of visitors and locals for its spectacular scenery and wildlife, with famous iconic sites such as Dovedale, Lathkill Dale and Monsal Dale.

## 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:

- **H4030 European dry heaths** in places, an acidic heath grassland mosaic with heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus*, dwarf gorse *Ulex gallii* and many other calcifugous (lime-hating) species. This heath can grade into a taller scrub dominated by dwarf gorse.
- **H6130 Calaminarian grasslands of the *Violetalia calaminariae*. (Grasslands on soils rich in heavy metals)** Spoil heaps of old lead mines support assemblages of plants indicative of metal-rich soils (metallophytes), including spring sandwort *Minuartia verna*, rock hutchinsia *Hornungia petraea* and alpine pennycress *Thlaspi alpestre*. This grassland vegetation corresponds to the UK NVC type OV37 sheep's-fescue *Festuca ovina* – spring sandwort *Minuartia verna* community
- **H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*). (Dry grasslands and scrublands on chalk or limestone)** Peak District Dales includes one of the largest surviving areas in England of sheep's-fescue – meadow oat-grass (*Festuca ovina* – *Helictotrichon pratense*) grassland. Grasslands at this site range from hard-grazed short turf through to tall herb-rich vegetation, with transitions through to calcareous scrub and ravine woodland. Much of this habitat conforms to CG2 *Festuca ovina* – *Avenula pratensis* grassland, although the SAC feature also encapsulates CG6 *Avenula pubescens* grassland, CG7 *Festuca ovina* – *Hieracium pilosella* – *Thymus praecox* grassland, and scrub transitions MG1 *Arrhenatherum elatius* grassland and MG2 *Arrhenatherum elatius* – *Filipendula ulmaria* tall herb grassland, and mosaics and transitions between all these NVC communities.
- **H7230 Alkaline fens. (Calcium-rich springwater-fed fens)** At least one dale within the SAC supports fen vegetation associated with springs and flushes. This includes alkaline fen vegetation, which supports species such as the common butterwort *Pinguicula vulgaris* and corresponds to the UK NVC types M10, M37, M22 and MG8
- **H8120 Calcareous and calcshist scree of the montane to alpine levels (*Thlaspietea rotundifolii*). (Base-rich scree)** Many of the dales support open vegetated scree with affinity to OV38 *Gymnocarpium robertianum*-*Arrhenatherum elatius* community. *Gymnocarpium robertianum* itself is abundant at some sites, but absent from others.
- **H8210 Calcareous rocky slopes with chasmophytic vegetation. (Plants in crevices in base-rich rocks)** Chasmophytic vegetation at this site is located on cliff faces and outcrops, and generally conforms to OV39 *Asplenium trichomanes* - *Asplenium ruta-muraria* community or OV40 *Asplenium viride*-*Cystopteris fragilis* community, corresponding to sunlit and shady localities.
- **H9180 *Tilio-Acerion* forests of slopes, scree and ravines. (Mixed woodland on base-rich soils associated with rocky slopes) PRIORITY HABITAT** The site contains a large area of mixed woodland, currently dominated by ash *Fraxinus excelsior*. Locally, sycamore *Acer pseudoplatanus* is abundant. Lime *Tilia* spp. although not widely distributed can be a major component of some of the woods. The Dales provide good examples of woodland-scrub-grassland transitions, with associated rich invertebrate populations and plant communities. Among the uncommon plants present in the woods are mezereon *Daphne mezereum* and green hellebore *Helleborus viridis*, as well as whitebeams *Sorbus* spp. on the crags.

## Qualifying Species:

**Qualifying species: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:**

- **S1092 White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*** lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers. A major threat to the native white-clawed crayfish is posed by the introduction of non-native species of crayfish, which have been farmed in Britain since the late 1970s. Soon after this, crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) broke out and spread rapidly, causing drastic losses of native crayfish in rivers in England. It is believed that this disease was introduced and is spread by the most frequently farmed species, the North American signal crayfish *Pacifastacus leniusculus*, a carrier of the disease. Crayfish plague can be introduced into a waterbody not only by entry of signal crayfish but also by water, fish or equipment that has been in contact with signals. This greatly increases the risk to remaining white-clawed crayfish populations.
- **S1096 Brook lamprey *Lampetra planeri*:** A primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. Brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong.
- **S1163 Bullhead *Cottus gobio*** a small bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers.

**Table 1: Supplementary Advice for Qualifying Features: H4030. European dry heaths**

| Attributes                                    |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--|--|--|---|
| <b>Extent and distribution of the feature</b> | <b>Extent of the feature within the site</b>               | Maintain the total extent of the H4030 feature to 6.93ha.  | <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. The baseline-value of extent given has been generated using data gathered from the listed site-based surveys.</p> <p>Area measurements given may be approximate depending on the methods, age and accuracy of data collection, and as a result this value may be updated in future to reflect more accurate information. 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.</p> <p>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.</p> | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |
| <b>Extent and distribution of the feature</b> | <b>Spatial distribution of the feature within the site</b> | Maintain and where necessary restore the distribution and configuration of the H4030 feature, including where applicable its component vegetation types, across the site | <p>A contraction in the range, or geographic spread, of the feature (and its component vegetation and typical species, plus transitional communities) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes.</p> <p>This may also reduce and break up the continuity of a habitat within a site and how well its typical species are able to move around the site to occupy and use habitat. Such fragmentation can impact on their viability and the wider ecological composition of the Annex I habitat. Smaller fragments of habitat can typically support smaller and more isolated populations which are more vulnerable to extinction.</p> <p>These fragments also have a greater amount of open edge habitat which will differ in the amount of light, temperature,</p>  | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p>  |

| Attributes  |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--|---|---|---|
|   |  |   | 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. This feature occurs in a few areas across the SAC is small patches.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>            | <p>Ensure the component vegetation communities of the H4030 feature are referable to and characterised by the following National Vegetation Classification type:</p> <p>H9 <i>Calluna vulgaris</i> – <i>Deschampsia flexuosa</i></p> <p>Alone and in mosaics with calcareous and acid grasslands types.</p> | <p>This habitat feature will comprise a number of associated semi-natural vegetation types and their transitional zones, reflecting the geographical location of the site, altitude, aspect, soil conditions (especially base-status and drainage) and vegetation management. In the UK these have been categorised by the National Vegetation Classification (NVC).</p> <p>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).</p> | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>            | Maintain any areas of transition between this and communities which form other heathland-associated habitats, acid grasslands, scrub and woodland.  | <p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities.</p> <p>Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. 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.</p>   | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p>  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation structure: cover of dwarf shrubs</b> | Maintain OR Restore as appropriate an overall cover of dwarf shrub species which is typically between 25-90%  | Variations in the structure of the heathland vegetation (vegetation height, amount of canopy closure, and patch structure) is needed to maintain high niche diversity. Heather <i>Calluna vulgaris</i> or Bilberry <i>Vaccinium myrtillus</i> are often the only heath species present and may be of uniform age and height. Pockets of acid grassland may formerly have held heath.  | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |

| Attributes   |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--|---|--|--|
| 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 <i>Pteridium aquilinum</i> is not a particular problem at this site. Bracken has also some nature conservation value, for example as habitat for Dark Green Fritillary butterflies.  | BUCKINGHAM, H. (1989)<br>FRITH, J. (1996)<br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| Structure and function (including its typical species) | Vegetation structure: cover of gorse           | Maintain cover of common gorse <i>Ulex europaeus</i> at <25%  | Gorse as a component of heathland is a very valuable wildlife habitat. Both dense and spiny, it provides good, protected cover for many wildlife species: birds, mammals and reptiles; breeding habitat for rare or declining bird species, and excellent winter roosting.<br><br>The flowers, borne at a time of year when other sources of pollen or nectar are in short supply, are particularly good for insects and other invertebrate pollinators. However gorse may cause problems if unchecked by dominating an area, eliminating other typical heathland species.<br><br>Mature stands en masse may also be serious fire hazards. Gorse is not a particular problem at this site, and at some sites actually contributes to the SAC interest. | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a>  |
| Structure and function (including its typical species) | Vegetation: undesirable species                | Maintain the frequency/cover of 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<br><br>Undesirable species include: <i>Rhododendron ponticum</i> , <i>Gaultheria shallon</i> , <i>Fallopia japonica</i> , <i>Urtica dioica</i> , <i>Cirsium arvense</i>  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a>  |
| Structure and function (including its typical species) | Key structural, influential and/or distinctive | Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;  | 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;  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a>  |



| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|---|---|---|
|   | <b>species</b>                                      | <i>Calluna vulgaris</i> , <i>Vaccinium myrtillus</i> .  | <ul style="list-style-type: none"> <li>• <b>Structural</b> 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').</li> <li>• <b>Influential</b> 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)</li> <li>• <b>Site-distinctive</b> species which are considered to be a particularly special and distinguishing component of an Annex I habitat on a particular SAC.</li> </ul> <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> |   |
| <b>Structure and function (including its typical species)</b> | <b>Functional connectivity with wider landscape</b> | Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site | <p>This recognises the need at this site to maintain or restore the connectivity of the site to its wider landscape in order to meet the conservation objectives. These connections may take the form of landscape features, such as habitat patches, hedges, watercourses and verges, outside of the designated site boundary which are either important for the migration, dispersal and genetic exchange of those typical species closely associated with qualifying Annex I habitat features of the site.</p> <p>These features may also be important to the operation of the supporting ecological processes on which the designated site and its features may rely. In most cases increasing actual and functional landscape-scale connectivity would be beneficial. Where there is a lack of detailed knowledge of the connectivity</p>  | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>White Peak Opportunity Mapping (FRITH 2017)</p> |

| Attributes  |                                      | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--------------------------------------|---|--|---|
|   |                                      |   | requirements of the qualifying feature, Natural England will advise as to whether these are applicable on a case by case basis.  |   |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>     | Maintain and where necessary restore the H4030 feature's ability, and that of its supporting processes, to adapt or evolve to wider environmental change, either within or external to the site | <p>This recognises the increasing likelihood of 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 sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site.</p> <p>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.</p> <p>The overall vulnerability of this particular SAC to climate change has been assessed by Natural England as being low taking into account the sensitivity, fragmentation, topography and management of its habitats/supporting habitats. This means that this site is considered to be vulnerable overall but is a lower priority for further assessment and action. Individual species may be more or less vulnerable than their supporting habitat itself. In many cases, change will be inevitable so appropriate monitoring would be required.</p> <p>This SAC has been identified by Natural England as being in the top 10% of potential climate change refugia sites within England. These are areas which offer conditions for species to survive longer under extreme climate scenarios, and so the resilience of the SAC is of greater national significance.</p> | Natural England (2014a)<br>Natural England (2015) |
| <b>Structure and function (including its</b>                  | <b>Soils, substrate and nutrient</b> | Maintain the properties of the underlying soil types, including structure, bulk density, total  | 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   |   |

| Attributes   |                       | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|-----------------------|--|--|--|
| typical species)                                   | cycling               | carbon, pH, soil nutrient status and fungal: bacterial ratio, to within typical values for the habitat.  | 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.   |  |
| Supporting processes (on which the feature relies) | Conservation measures | Maintain and restore, as appropriate the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature                | Active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England.<br><br>This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.   | Natural England (2014b)  |
| Supporting processes (on which the feature relies) | Air quality           | Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> | 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.<br><br>There are critical levels for ammonia (NH <sub>3</sub> ), oxides of nitrogen (NO <sub>x</sub> ) and sulphur dioxide (SO <sub>2</sub> ), 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.<br><br>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 | 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 <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> |

| Attributes  |  | Targets | Supporting and Explanatory Notes  | Sources of site-based evidence (where available) |
|---|--|---------|---|--|
|   |  |         | timescales. This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018 |  |
| <b>Version Control</b><br>Advice last updated: N/A  |  |         |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b><br>The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is an extensive complex of geographically-separate component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |  |         |   |  |
| <b>Structure and function (including its typical species) - Vegetation structure: cover of gorse.</b> Reference to <i>Ulex gallii</i> deleted as it has low presence on the site and is a desirable component of the vegetation.  |  |         |   |  |
| <b>Structure and function (including its typical species) - Vegetation structure: tree cover</b> deleted as not appropriate to the scattered distribution of this feature on the site.  |  |         |   |  |
| <b>Structure and function (including its typical species) - Vegetation structure: heather age structure</b> deleted as heath on this site is a relatively small component and occurs in patches, offering little opportunity or requirement for age classes.  |  |         |   |  |
| <b>Supporting processes (on which the feature relies) - Conservation measures.</b> Requirement for bare ground for species deleted as the heath habitat is scattered and bare ground is more appropriately provided within the grassland.   |  |         |   |  |
| <b>Supporting processes (on which the feature relies) - Water quality</b> deleted as the feature is not dependent on surface or ground water.   |  |         |   |  |
| <b>Supporting processes (on which the feature relies) - Hydrology</b> deleted as the feature is not dependent upon hydrology.   |  |         |   |  |

**Table 2: 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)   |
|---|---|--|--|--|
| <b>Extent and distribution of the feature</b>                 | <b>Extent of the feature within the site</b>                  | Maintain the total extent of the H6130 feature to approximately 15 hectares and as part of a matrix with other vegetation types occurring within the site.   | See supporting notes for this attribute in Table 1 above.<br><br>The actual extent of this feature is very difficult to map accurately due to its isolated and small-scale nature. It is found on lead spoil in association with other calcareous, acid and neutral grassland habitats.  | BUCKINGHAM, H. (1989)<br><br>FRITH, J. (2012)<br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Extent and distribution of the feature</b>                 | <b>Spatial distribution of the feature within the site</b>    | Maintain the distribution and configuration of the H6310 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 processes in the system and the resiliency of the site and its features to changes or impacts. | BUCKINGHAM, H. (1989)<br><br>FRITH, J. (2012)  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>                       | Ensure the component vegetation communities of the H6130 feature are referable to and characterised by the following National Vegetation Classification type:<br><br>OV37 sheep's-fescue <i>Festuca ovina</i> – spring sandwort <i>Minuartia verna</i> grassland                       | See supporting notes for this attribute in Table 1 above.<br><br>This feature is commonly found in on lead spoil in a mosaic with other grassland habitats.  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a>  |
| <b>Structure and function (including its typical species)</b> | <b>Key structural, influential and/or distinctive species</b> | Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 H6130 habitat;<br><br>Spring sandwort <i>Minuartia verna</i> , Alpine penny-cress <i>Thlaspi caerulescens</i> , Mountain pansy <i>Viola lutea</i> , Moonwort | See supporting notes for this attribute in Table 1 above.  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a>  |

| Attributes  |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--|---|---|---|
|   |  | <i>Botrychium lunaria</i>   |   |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: undesirable species</b>       | 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. | See supporting notes for this attribute in Table 1 above.<br><br>Undesirable species include: <i>Anthriscus sylvestris</i> , <i>Cirsium arvense</i> , <i>Cirsium vulgare</i> , <i>Heracleum sphondylium</i> , <i>Urtica dioica</i> , coarse grasses e.g. <i>Arrhenatherum elatius</i> , <i>Holcus lanatus</i>   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>      | Maintain the pattern of natural vegetation zonation/transitions between the H6130 feature and other vegetation  | Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope.<br><br>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.  |   |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b> | 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 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 natural soil properties may therefore affect the ecological structure, function and processes associated with this Annex I feature.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Supporting off-site habitat</b>           | Maintain the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature   | 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. 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 prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.<br><br>There are significant lead rakes and H6130 outside the SAC in the wider landscape |   |

| Attributes  |   | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|---|--|---|--|
| <b>Structure and function (including its typical species)</b> | <b>Functional connectivity with wider landscape</b> | Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the H6130 feature  | See supporting notes for this attribute in Table 1 above.<br><br>There are significant lead rakes and H6130 outside the SAC in the wider landscape  | White Peak Opportunity Mapping, (FRITH 2017)   |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>                    | 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  | See supporting notes for this attribute in Table 1 above  | Natural England (2014a)<br><br>Natural England (2015)  |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Air quality</b>                                  | Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) | This habitat type is considered sensitive to changes in air quality.<br><br>See supporting notes for this attribute in Table 1 above<br><br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018           | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Conservation measures</b>                        | 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   | See supporting notes for this attribute in Table 1 above<br><br>Low intensity grazing is appropriate management. Higher grazing levels can cause considerable damage through enrichment and trampling/poaching. Recreational activity and vehicles can also cause damage. | Natural England (2014b)  |

**Version Control**

Advice last updated: N/A

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

**Structure and function (including its typical species) Hydrology:** Flooding regime deleted as the feature at this site is not dependent upon hydrology.

**Structure and function (including its typical species) Supporting off-site supply of heavy metals (river shingle sites)** deleted as the feature at this site is not a river shingle feature.

**Table 3: Supplementary Advice for Qualifying Features: H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*); Dry grasslands and scrublands on chalk or limestone**

| Attributes  |  | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--|--|--|---|
| <b>Extent and distribution of the feature</b>                 | <b>Extent of the feature within the site</b>               | <p>Maintain and where necessary restore the total extent of the H6210 grassland feature to 649.05ha, including mosaics and transitions with other grassland habitats, heath, scrub and woodland</p> <p>The location and extent of grassland communities may change over time as long as each community is present and not threatened.</p> <p>These grassland types are often found in association with scrub.</p> <p>Reduction in extent of up to 10% of total grassland resource is acceptable through natural processes if grassland is being lost to qualifying H9180 <i>Tilio-acerion</i> woodland and scrub</p> | <p>See supporting notes for this attribute in Table 1 above.</p> <p>The Peak District Dales SAC is a large diverse and dynamic site, therefore flexibility is needed in terms of NVC community hectares. It is acceptable that the location and balance of extent between the main habitat components of woodland, scrub and grassland should be allowed to change over time, so long as core extents and communities are maintained. This would allow for:</p> <ul style="list-style-type: none"> <li>a) grassland expansion at the expense of secondary woodland/scrub through the result of grazing, disease (ash dieback), or scrub clearance, and</li> <li>b) expansion of established woodland and scrub into grassland communities through natural processes.</li> </ul> <p>NVC surveys maps produced 1988-90 should be regarded as baseline for grassland. This survey was interpreted further in 2017, ground-truthed and digitised in GIS.</p> | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |
| <b>Extent and distribution of the feature</b>                 | <b>Spatial distribution of the feature within the site</b> | <p>Maintain the distribution and configuration of the H6210 grassland feature, including where applicable its component vegetation types, across the site.</p>   | <p>See supporting notes for this attribute in Table 1 above.</p> <p>It is acceptable that the location and balance of extent between the main habitat components of woodland, scrub and grassland should be allowed to change over time, so long as core extents and communities are maintained.</p>   | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p>  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>                    | <p>Ensure the component vegetation communities of the H6210 grassland feature are referable to and characterised by the following National Vegetation</p>  | <p>See supporting notes for this attribute in Table 1 above.</p> <p>SAC feature 6210 encapsulates all of the lowland limestone grassland communities e.g. CG2, CG6, CG7. The SAC habitat also includes scrub transitions that have similarities to NVC</p>   | <p>BUCKINGHAM, H. (1989)</p> <p>FRITH, J. (1996)</p> <p>This attribute will be periodically</p>   |



| Attributes  |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|---|--|--|---|
|   |   | <p>Classification types</p> <p>CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> grassland</p> <p>CG6 <i>Avenula pubescens</i> grassland</p> <p>CG7 <i>Festuca ovina</i> – <i>Hieracium pilosella</i> – <i>Thymus praecox/pulegioides</i> grassland</p> <p>MG1 <i>Arrhenatherum elatius</i> grassland</p> <p>MG2 <i>Arrhenatherum elatius</i> - <i>Filipendula ulmaria</i> tall-herb grassland</p> | <p>communities MG1 and MG2, so they are considered also part of the SAC feature.</p> <p>Many of the grassland types at this site are transitions and mosaics which results in very species-rich examples of high conservation value. Mosaics with and transitions between these the NVC communities above and other acid and neutral grassland communities are also considered part of the SAC feature e.g. CG2/Mg5/U4c.</p> | <p>monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p>                              |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: proportion of herbs (including Carex spp )</b> | Maintain the proportion of herbaceous species within the range 40%-90%   | A high cover of characteristic herbs, including sedges ( <i>Carex</i> species) is typical of the structure of this habitat type.   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Key structural, influential and/or distinctive species</b> | <p>Maintain and where necessary restore the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;</p> <ul style="list-style-type: none"> <li>Constant and preferential plant species of CG2, CG6 and CG7, MG1, MG2 NVC communities which are the main component of the H6210 feature within the SAC</li> </ul>                       | See supporting notes for this attribute in Table 1 above.  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--|---|--|---|
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: undesirable species</b>       | Maintain the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread. | <p>There will be a range of undesirable or uncharacteristic species which, if allowed to colonise and spread, are likely to have an adverse effect on the feature's structure and function, including its more desirable typical species. These may include invasive non-natives such as <i>Cotoneaster</i> spp, or coarse and aggressive native species which may uncharacteristically dominate the composition of the feature.</p> <p>Undesirable species include: <i>Chamaenerion angustifolium</i>, <i>Cirsium arvense</i>, <i>Cirsium vulgare</i>, <i>Plantago major</i>, <i>Rumex crispus</i>, <i>Rumex obtusifolius</i>, <i>Senecio jacobaea</i>, <i>Urtica dioica</i>.</p> | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>      | Maintain the pattern of natural vegetation zonations/transitions  | <p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities.</p> <p>Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna. Ecotones are a particular feature of these grasslands at this site.</p>  |   |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b> | 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 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.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Supporting off-site habitat</b>           | Maintain and where necessary restore the extent, quality and spatial configuration of land or habitat surrounding or adjacent to the site which is known to support the feature                               | <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. Changes in surrounding land-use may adversely (directly/indirectly) affect the functioning of the feature and its component species.</p> <p>This supporting habitat may be critical to the typical species of the feature to support their feeding, breeding, roosting, population dynamics ('metapopulations'), pollination or to</p>   |   |

| Attributes   |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|---|--|--|--|
|  |   |  | prevent/reduce/absorb damaging impacts from adjacent land uses e.g. pesticide drift, nutrient enrichment.  |  |
| <b>Structure and function (including its typical species)</b>  | <b>Functional connectivity with wider landscape</b> | Maintain and where necessary restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site   | See supporting notes for this attribute in Table 1 above. Some component parts of the SAC lie adjacent to near similar limestone habitats, but other component sites are more isolated. Restoring or enhancing resilience and connectivity would benefit both designated and undesignated areas.   | White Peak Opportunity Mapping, (FRITH 2017)   |
| <b>Structure and function (including its typical species)</b>  | <b>Adaptation and resilience</b>                    | 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  | See supporting notes for this attribute in Table 1 above.  | Natural England (2014a)<br>Natural England (2015)  |
| <b>Supporting processes (on which the feature relies)</b>  | <b>Air quality</b>                                  | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) | This habitat type is considered sensitive to changes in air quality.<br><br>See supporting notes for this attribute in Table 1 above<br><br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018  | 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 <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> |
| <b>Supporting processes (on which the feature relies)</b>  | <b>Conservation measures</b>                        | 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.<br><br>This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. | Natural England (2014b)  |
| <b>Version Control</b>   |   |  |  |  |
| Advice last updated: N/A   |   |  |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is an extensive complex of geographically-separate component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |   |  |  |  |

**Table 4: Supplementary Advice for Qualifying Features: H7230. Alkaline fens; Calcium-rich springwater-fed fens**

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
| <b>Extent and distribution of the feature</b>                 | <b>Extent of the feature within the site</b>               | Maintain the total extent of the H7230 feature to 0.6 hectares.   | See supporting notes for this attribute in Table 1 above.<br><br>Within the SAC this feature is found only at Monks Dale and is difficult to map as it is small-scale and composed of a number of different vegetation communities in a mosaic.  | Monks dale fen report (EADES & Tratt, 2014)<br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Extent and distribution of the feature</b>                 | <b>Spatial distribution of the feature within the site</b> | Maintain the distribution and configuration of the H7230 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 processes in the system and the resiliency of the site and its features to changes or impacts.   | Monks dale fen report (EADES & Tratt, 2014)  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>                    | Ensure the component vegetation communities of the H7230 feature are referable to and characterised by the following National Vegetation Classification types<br><br>M10 <i>Carex dioica</i> – <i>Pinguicula vulgaris</i> mire<br><br>M37 <i>Cratoneuron commutatum</i> – <i>Festuca rubra</i> spring<br><br>M22 <i>Juncus subnodulosus</i> – <i>Cirsium dissectum</i> fen-meadow<br><br>MG8 <i>Cynosurus cristatus</i> – <i>Caltha palustris</i> 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).<br><br>Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. | Monks dale fen report (EADES & Tratt, 2014)<br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Invasive, non-native and/or introduced species</b>      | Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the   | Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural  |  |

| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|---|---|---|
| species)  |   | H7230 feature   | diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).   |   |
| <b>Structure and function (including its typical species)</b> | <b>Presence/ cover of woody species</b>                       | Maintain a low cover of woody species of not more than 10% scrub/tree cover. No woody species in flushes or springs; low <i>Salix</i> sp acceptable more than 5m from edge of spring/flush feature.   | Native trees and shrubs occur naturally on fen surfaces but an abundance of scrub and trees on fens is sometimes regarded as detrimental because they are indicators and perpetrators of drying out and may cause damage to vegetation structure through shading effects. Birch, pine, willow and rhododendron (an invasive non-native species) are the main species of concern. The seeds of most invasive woody species are wind dispersed, so trees are able to establish on raised fen surfaces.                  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Browsing and grazing by herbivores</b>                     | Maintain appropriate levels of grazing,   | These habitat features are often preferentially grazed and may be vulnerable to significant overgrazing pressure associated with the management of the wider local landscape.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Exposed substrate</b>                                      | Maintain the exposure of the substrate to appropriate levels, which will typically be between 5% & 25% across feature.  | For this wetland habitat type, maintaining some continuous extent of exposed, open ground surface is required to support the establishment and supply of those component species which often rely on wet and sparsely-vegetated conditions. The open nature and sometimes skeletal nature of the substrate supporting these features requires a higher upper threshold than for some other wetlands.  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Integrity of tufa features</b>                             | Ensure that no more than 1% of the vegetation in which tufa is visible is showing signs of damage or disturbance  | Tufa is a fragile soft porous rock composed of calcium carbonate which is deposited as lime-rich subterranean water issues out from springs and chemically interacts with the air. It is easily damaged or disturbed.   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Key structural, influential and/or distinctive species</b> | Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat; <ul style="list-style-type: none"> <li>Constant and preferential plant species of M10, M37, M22 and MG8 NVC</li> </ul> | See supporting notes for this attribute in Table 1 above.<br><br>For this feature appropriate (i.e. those indicating a low nutrient status environment appropriate management regime) bryophytes and vascular plant species taken from core community constants and preferentials. Also include scarce species associated with the habitat, e.g. <i>Lycopodiella inundata</i> , <i>Rhynchospora fusca</i> . This Annex 1 habitat is not well-defined in the JNCC guidance and includes a wide range of 'transitional' | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|---|--|--|---|
|   |   | communities which are the main component of the H7230 feature within the SAC   | wetland vegetation.  |   |
| <b>Structure and function (including its typical species)</b> | <b>Hydrology</b>                          | At a site, unit and/or catchment level maintain or where necessary restore natural hydrological processes to provide the conditions necessary to sustain the feature within the site, including a high piezometric head and permanently high water table (allowing for natural seasonal fluctuations). | <p>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.</p> <p>Wheeler et al. (2009) provide range and mean for summer &amp; winter water levels for those wetland NVC types constituting Annex 1 habitats. This provides a rough guide to appropriate levels, but it is critical that individual sites and their needs are considered as there is considerable variation within the NVC communities listed and recorded water levels.</p> | <p>ENVIRONMENT AGENCY (2009)</p> <p>LRC (2016)</p> <p>Monks dale fen report (EADES &amp; Tratt, 2014)</p> |
| <b>Structure and function (including its typical species)</b> | <b>Water chemistry</b>                    | Maintain or where necessary restore the low nutrient status of irrigating water, ensuring it is rich in base ions, particularly calcium.   | UKTAG (2012) provides threshold values for nitrate concentration in groundwaters for different wetland types. The threshold values will mainly be used in the characterisation of GWDTE status for the WFD, primarily as a risk screening tool, to assess if sites are 'at risk' or 'not at risk' from groundwater mediated nutrient pressure. Due to the complex cycling of nutrients within many GWDTE, these threshold values are less well suited for application within sites but rather just to groundwater that is directly feeding the site.   | ENVIRONMENT AGENCY (2009)   |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>          | Maintain or where necessary restore 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   | See supporting notes for this attribute in Table 1 above.  | <p>Natural England (2015)</p> <p>Natural England (2014a)</p>  |
| <b>Structure and function (including its typical species)</b> | <b>Functional connectivity with wider</b> | Maintain or where necessary restore the overall extent, quality and function of any supporting   | Hydrological connectivity with the underground environment within and without the site are not altogether understood for this feature.   | White Peak Opportunity Mapping, (FRITH, 2017)   |

| Attributes  |                       | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|-----------------------|--|---|--|
| typical species)  | landscape             | features within the local landscape which provide a critical functional connection with the site   |   |  |
| 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) | See supporting notes for this attribute in Table 1 above.<br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018  | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) |
| 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. | Natural England (2014b)  |
| <b>Version Control</b><br>Advice last updated: N/A  |                       |  |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is an extensive complex of geographically-separate component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will able to provide further advice on request. |                       |  |   |  |

**Table 5: Supplementary Advice for Qualifying Features: H8120. Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*); Base-rich scree**

| Attributes  |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|--|---|--|--|
| <b>Extent and distribution of the feature</b>                 | <b>Extent of the feature within the site</b>               | Maintain the total extent of the feature to 24.04 hectares.   | See supporting notes for this attribute in Table 1 above.  | FRITH, J. (2016)   |
| <b>Extent and distribution of the feature</b>                 | <b>Spatial distribution of the feature within the site</b> | Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site  | See supporting notes for this attribute in Table 1 above. Scree is restricted in its distribution due to the geology/morphology of the site.   | FRITH, J. (2016)   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>                    | <p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification type:</p> <p>Predominantly the OV38 <i>Gymnocarpium robertianum</i> – <i>Arrhenatherum elatius</i> NVC type.</p> | <p>This habitat feature comprises a number of associated semi-natural vegetation types and their transitional zones. In the UK these have been categorised by the National Vegetation Classification (NVC). At this site, this is principally OV38 <i>Gymnocarpium robertianum</i> – <i>Arrhenatherum elatius</i>, with elements of CG2, MG1 and W8. Maintaining or restoring these characteristic and distinctive vegetation types, and the range of types as appropriate, will be important to sustaining the overall habitat feature. This will also help to conserve their typical plant species (i.e. the constant and preferential species of a community), and therefore that of the SAC feature, at appropriate levels (recognising natural fluctuations).</p> <p>Calcareous screes are colonised by a range of pioneer species and provide shelter for many species sensitive to frost or grazing. Both Calcareous and calcshist screes and 8110 Siliceous scree of the montane to snow levels are important for their rich fern flora and act as refugia for a number of rare species. OV38 is a scarce vegetation type in England with an estimate of only 400ha.</p> <p>This feature type consists of assemblages of calcicole and basiphilous species, the composition of which is heavily influenced by altitude. At this site, these screes (OV38) support limestone fern <i>Gymnocarpium robertianum</i>, herb-robert <i>Geranium robertianum</i> and wall lettuce <i>Mycelis muralis</i>. A large number of calcicolous mosses occur in the habitat type.</p> | <p>FRITH, J. (2016)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |



| Attributes  |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|---|---|--|---|
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>               | Maintain the pattern of natural vegetation zonation/transitions   | <p>Transitions/zonations between adjacent but different vegetation communities are usually related to naturally-occurring changes in soil, aspect or slope. Such 'ecotones' retain characteristics of each bordering community and can add value in often containing species not found in the adjacent communities. Retaining such transitions can provide further diversity to the habitat feature, and support additional flora and fauna.</p> <p>This habitat type occurs in close association with Annex I type H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>). (Dry grasslands and scrublands on chalk or limestone).</p> | FRITH, J. (2016)  |
| <b>Structure and function (including its typical species)</b> | <b>Invasive, non-native and/or introduced species</b> | Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature   | Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides).  |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation composition: trees and scrub</b>        | Maintain scrub and tree cover to less than 25% of the ground cover  | 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 grassland vegetation. Usually active management of bracken and scrub is required to reduce or contain its cover. Although bracken and scattered native trees and scrub can naturally occur as part of this community, if they become dominant they can compromise the interest of this feature and key species will disappear.  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation: undesirable species</b>                | Maintain the frequency/cover of the following undesirable species to within acceptable levels and prevent changes in surface condition, soils, nutrient levels or hydrology which may encourage their spread: | <p>Undesirable non-woody and woody vascular plants species may require active management to avert an unwanted succession to a different and less desirable state. Often they may be indicative of a negative trend relating to another aspect of a site's structure and function. These species will vary depending on the nature of the particular feature, and in some cases these species may be natural/acceptable components or even dominants.</p> <p>Undesirable species include: <i>Arrhenatherum elatius</i>, <i>Cirsium</i></p>  |   |

| Attributes  |   | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|--|---|---|
|   |   |  | <i>arvense</i> , <i>Cirsium vulgare</i> , large docks (excluding <i>Rumex acetosa</i> ), <i>Rubus fruticosus</i> , <i>Senecio jacobaea</i> , or <i>Urtica dioica</i> .  |   |
| <b>Structure and function (including its typical species)</b> | <b>Physical structure: ground disturbance</b>                 | Significant areas of disturbed scree should not be present.<br><br>Where present, the affected areas should not exceed 1% of the total feature, and be considered a temporary stage.   | Whilst this is a habitat where vegetation cover can be sparse, significant disturbance of the scree by herbivores or humans can cause damage.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b>                  | 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.   | Calcareous and calcshist screes consist of base-rich rocks including limestone, calcareous-schists and the more basic igneous rocks, such as serpentine and basalt. The soils are coarse grained, with fragmentary accumulation of humus. 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. |   |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>                              | 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  | See supporting notes for this attribute in Table 1 above.   | Natural England (2014a)<br><br>Natural England (2015)   |
| <b>Structure and function (including its typical species)</b> | <b>Key structural, influential and/or distinctive species</b> | Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;<br><br><i>Asplenium adiantum-nigrum</i> ,<br><i>Convallaria majalis</i> , <i>Geranium robertianum</i> , <i>Gymnocarpium robertianum</i> , <i>Helianthemum nummularium</i> , <i>Hieracium spp</i> , <i>Mercurialis perennis</i> , <i>Mycelis muralis</i> , <i>Oxalis acetosella</i> , <i>Rubus</i> | See supporting notes for this attribute in Table 1 above.<br><br>The 2017 scree survey suggested that some OV39/OV40/CG14 indicator species <i>Helianthemum nummularium</i> , <i>Hieracium spp</i> , <i>Thymus praecox</i> and also <i>Convallaria majalis</i> and <i>Rubus saxatilis</i> be added to the positive indicator list, as these are distinctive of scree-based situations in the Peak District.   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes   |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|---|--|--|--|
|  |   | <i>saxatilis</i> , <i>Teucrium scorodonia</i> ,<br><i>Thymus praecox</i>   |  |  |
| <b>Supporting processes (on which the feature relies)</b>                    | <b>Air quality</b>                                  | Restore the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) | See supporting notes for this attribute in Table 1 above.<br><br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018   | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) |
| <b>Supporting processes (on which the feature relies)</b>                    | <b>Functional connectivity with wider landscape</b> | Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site   | See supporting notes for this attribute in Table 1 above.<br><br>Calcareous scree occurs as this site as a distinct and important part of part of the limestone dale landscape alongside calcareous rocky slopes, woodlands, and variety of grassland communities. It is sometimes difficult to successfully accommodate the management needs of all these features. This mosaic however is very important and a key part of the nature conservation interest of the site.         |  |
| <b>Supporting processes (on which the feature relies)</b>                    | <b>Conservation measures</b>                        | Maintain the management measures which are necessary to Maintain the structure, functions and supporting processes associated with the feature   | See supporting notes for this attribute in Table 1 above.<br><br>Although rock based this is a fragile habitat and susceptible to human activity and land management change. Low levels of grazing help to maintain the interest of this feature which would otherwise be lost through increase in grass species and woodland colonisation. Threats to the habitats include removal of grazing, heavy trampling, nitrogen deposition, recreation (scree running), and vehicle use. |  |
| <b>Version Control:</b> Advice last updated: N/A                             |   |  |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> N/A |   |  |  |  |

**Table 6: Supplementary Advice for Qualifying Features: H8210. Calcareous rocky slopes with chasmophytic vegetation; Plants in crevices in base-rich rocks**

| Attributes  |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|--|---|---|---|
| <b>Extent and distribution of the feature</b>                 | <b>Extent of the feature within the site</b>               | Maintain the total extent of the feature  | See supporting notes for this attribute in Table 1 above.<br><br>This habitat occurs in characteristically small patches on cracks and fissures of rock faces, is poorly described in the NVC and is often in locations where rope access is necessary. For these reasons, no figure for habitat extent is available.   | FRITH, J. (2018)  |
| <b>Extent and distribution of the feature</b>                 | <b>Spatial distribution of the feature within the site</b> | Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site  | See supporting notes for this attribute in Table 1 above. Difficult to map due to inaccessibility.  | FRITH, J. (2018)  |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b>                    | Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification types:<br><br>OV39 <i>Asplenium trichomanes</i> - <i>Asplenium ruta-muraria</i><br><br>OV40 <i>Asplenium viride</i> - <i>Cystopteris fragilis</i> | The type of plant community that develops is largely determined by the base-status of the rock face, such as limestone and calcareous schists. Ferns and mosses are the most prominent plant constituents. Depending on the situation, the vegetation may range from being quite sparse to quite dense, but it is usually fragmented and limited in extent. It can occur over a wide range of altitudes.<br><br>Both forms of chasmophytic vegetation in the UK correspond to the rock fissure communities described from continental Europe ( <i>Asplenieta trichomanis</i> ). Some forms of the calcareous type correspond to NVC types OV39 <i>Asplenium trichomanes</i> – <i>Asplenium ruta-muraria</i> community and OV40 <i>Asplenium viride</i> – <i>Cystopteris fragilis</i> community, but other forms are not described by the NVC.<br><br>The vegetation is characterised by bryophytes such as <i>Tortella tortuosa</i> , <i>Anoetangium aestivum</i> and <i>Ctenidium molluscum</i> . Associated vascular plants include brittle bladder-fern <i>Cystopteris fragilis</i> , green spleenwort <i>Asplenium viride</i> (although rare in the Peak District). H8210 is a rare habitat in England with | FRITH, J. (2018)<br><br>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |   | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|--|---|---|
|   |   |  | an estimated 300ha.   |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community transitions</b>               | Maintain the pattern of natural vegetation zonations/transitions   | Calcareous rocky slopes with chasmophytic vegetation may occur in close association with. H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates.   | FRITH, J. (2018)  |
| <b>Structure and function (including its typical species)</b> | <b>Invasive, non-native and/or introduced species</b> | Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature  | Invasive or introduced non-native species can be a serious potential threat to the structure and function of these habitats, because they are able to exclude, damage or suppress the growth of their associated typical species, reduce structural diversity of the habitat and prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation composition: trees and scrub</b>        | Maintain scrub and tree cover to less than 25% of the ground cover   | 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 grassland vegetation. Usually active management of bracken and scrub is required to reduce or contain its cover.<br><br>Although bracken and scattered native trees and scrub can naturally occur as part of this community, if they become dominant they can compromise the interest of this feature and key species will disappear.                  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Physical structure: ground disturbance</b>         | Ensure there are no significant areas of disturbed rocky slope.<br><br>Where present, the affected areas should not exceed 1% of the total feature, and should be considered as a temporary stage. | Whilst this is a habitat where vegetation cover can be sparse, significant disturbance of the rocky slopes by herbivores or humans can cause damage.  |   |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b>          | Maintain the properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal: bacterial ratio, to                                    | Chasmophytic vegetation consists of plant communities that colonise the cracks and fissures of rock faces. The type of plant community that develops is largely determined by the base-status of the rock face. Calcareous sub-types develop on lime-rich rocks such as limestone and calcareous schists. Soil is the   |   |

| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|---|---|---|--|
|   |   | within typical values for the habitat.  | 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. |  |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>        | 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   | See supporting notes for this attribute in Table 1 above.   |  |
| <b>Structure and function (including its typical species)</b> | <b>Typical species: flora and fauna</b> | Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;<br><br><i>Arenaria serpyllifolia, Asplenium adiantum-nigrum, Asplenium ruta-muraria, Asplenium trichomanes, Asplenium viride, Carex capillaris, Carex pulicaris, Ceterach officinarum, Cystopteris fragilis, Helianthemum nummularium, Hieracium spp., Koeleria macrantha, Polystichum aculeatum, P. setiferum, Sedum acre</i> | See supporting notes for this attribute in Table 1 above.   |  |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Air quality</b>                      | 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  | See supporting notes for this attribute in Table 1 above.<br><br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018  | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) |

| Attributes   |   | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available) |
|--|---|--|---|--|
|  |   | Pollution Information System ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> )  |   |  |
| <b>Supporting processes (on which the feature relies)</b>                    | <b>Functional connectivity with wider landscape</b> | Maintain the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site | See supporting notes for this attribute in Table 1 above.<br><br>Calcareous rocky slopes normally occurs as a distinct and important part of part of the wider limestone dale landscape alongside calcareous scree, woodlands, and variety of grassland communities. This mosaic can be very important and the rocky slopes can act as a refugia for those plants that require increased humidity and shade, and those that are intolerant of heavy grazing pressure. |  |
| <b>Supporting processes (on which the feature relies)</b>                    | <b>Conservation measures</b>                        | Maintain the management measures which are necessary to maintain the structure, functions and supporting processes associated with the feature                       | Although rock based this a fragile habitat and susceptible to human activity. Threats to the habitats include heavy grazing and trampling, nitrogen deposition, recreation (rock climbing).<br><br>Rock ledges can act as an important refugia for many plants that are intolerant to heavy grazing. Fencing and/or stock management to lower grazing levels may allow these plants to expand their distribution on the site.   |  |
| <b>Version Control</b><br>Advice last updated: N/A                           |   |  |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> N/A |   |  |   |  |

**Table 7: Supplementary Advice for Qualifying Features: H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes \***

| Attributes                                    |  | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|--|--|---|--|
| <b>Extent and distribution of the feature</b> | <b>Extent of the feature within the site</b>               | <p>Maintain the total extent of the feature to 979.39 hectares.</p> <p>Core ravine woodland; Species-rich hazel scrub: No loss of area</p> <p>Secondary Woodland; Disturbed stands; Scrub: Reduction in extent of up to 10% is acceptable if woodland/scrub habitat is being lost to qualifying grassland communities.</p> <p>Opportunities for woodland/scrub establishment on the dale tops and in the valley bottoms should be explored. It is desirable here to see the development of woodland/scrub at the expense of species-poor acid/neutral grassland (non-interest feature)</p> | <p>See supporting notes for this attribute in Table 1 above.</p> <p>For this feature tree roots (particularly of veteran trees) can extend a considerable distance beyond the boundary of the site - they can be impacted by soil compaction (such as caused by vehicles or construction works); agricultural operations or other soil disturbance (like trenches); and agro chemicals or other chemicals which get into the soil. Any loss of woodland area - whether at the edge or in the middle of a site will reduce the core woodland area where woodland conditions are found - these support significant assemblages of species dependent on woodland conditions (e.g. lichens and bryophytes - being one example).</p> <p>This is particularly pertinent at this site where the woodlands are long and thin, so any loss of width in particular can be more significant. Loss of any woodland area which fragments a site into different parts will clearly disturb the movement of species between the remaining parts of the woodland.</p> | <p>FRITH (1996)</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |
| <b>Extent and distribution of the feature</b> | <b>Spatial distribution of the feature within the site</b> | <p>Maintain the distribution and configuration of the feature, including where applicable its component vegetation types, across the site</p>  | <p>See supporting notes for this attribute in Table 1 above.</p> <p>There are 5 distinct stand types within the SAC which reflect past intervention.</p> <p><b>Core Ravine Woodland</b> where there appears to have been very little intervention in the past, and the woodland is mature with a varied structure and a wide range of age classes. It includes frequent outcrops and natural screes. <i>Fraxinus excelsior</i> is almost always the most abundant tree though the canopy. Much of the upper margins generally show a gradual thinning of the canopy and transition to scrub, and then grassland. On these upper slopes there can be a suggestion towards W9 <i>Fraxinus-Sorbus</i> woodland or even W10 <i>Quercus robur-Pteridium aquilinum-Rubus fruticosus</i> woodland.</p> <p><b>Secondary woodland</b> characterised by a lack of mature trees, the low</p>   | <p>FRITH (1996)</p>  |



| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|---|---|---|
|   |   |   | <p>canopy suggesting re-establishment following an interruption to the woodland cover. The shrub layer is not quite as diverse as the Core Ash Woodland.</p> <p><b>Disturbed stands:</b> Semi-natural stands that have suffered haphazard disturbance but probably never cleared entirely. They have recovered spontaneously, but principally with abundant or dominant sycamore in the canopy and understorey.</p> <p><b>Scrub</b> Significant stands dominated by shrubs, not necessarily with abundant hazel, but often hawthorn or gorse dominated. Canopy trees absent or sparse. Significant for associated species groups distinct from closed woodland which may include birds and invertebrates. Structure, with varying height and age classes and mosaic with grassland (not necessarily species-rich) is important.</p> <p><b>Species-rich hazel scrub</b> Semi-natural stands dominated by shrubs and with hazel usually abundant. Canopy trees sparse or absent. Usually in mosaic with species-rich grassland. Of particular interest for "saum" habitat and associated species such as <i>Epipactis atrorubens</i>, <i>Rubus saxatilis</i>, <i>Trollius europaeus</i> etc</p> |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation community composition</b> | <p>Ensure the component vegetation communities of the feature are referable to and characterised by the following National Vegetation Classification (NVC) types</p> <p><i>W8 Fraxinus excelsior - Acer campestre - Mercurialis perennis</i> woodland</p> <p><i>W9 Fraxinus excelsior - Sorbus aucuparia - Mercurialis perennis</i> woodland</p> <p><i>W10 Quercus robur - Pteridium aquilinum - Rubus fruticosus</i> woodland</p> <p><i>W11 Quercus petraea - Betula pubescens - Oxalis acetosella</i></p> | <p>See supporting notes for this attribute in Table 1 above.</p> <p>Much of the H9180 feature at this site is categorised as W8g, a very rare woodland type in Britain, for which the Peak District Dales holds the largest resource. This woodland type is distinctive for its rich shrub layer and characteristic ground flora.</p>   | <p>FRITH, (1996) Peak District Dales SAC NVC Surveys. Unpublished report for Natural England</p> <p>This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a></p> |

| Attributes  |                             | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|-----------------------------|--|--|---|
|   |                             | woodland<br><br><i>W12 Fagus sylvatica - Mercurialis perennis</i> woodland   |  |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation structure</b> | <p><b>Core Ash Woodland; Secondary ash woodland</b><br/>Natural processes (i.e. dynamic screes, windthrow, accumulation of deadwood, natural regeneration in gaps etc) prevail in the structural development of the native woodland, therefore no specific target has been identified.</p> <p>However to maintain woodland conditions (shade, humidity, soil moisture etc) a minimum canopy cover of 30% should be maintained across all SSSI units with at least 30 cu m of deadwood/ha (standing and/or fallen)</p> <p><b>Disturbed stands</b></p> <ul style="list-style-type: none"> <li>• Canopy present over 30-100% of stand area</li> <li>• Understorey (2-5m) cover at least 30%</li> <li>• At least 3 age classes spread across average life expectancy of commonest species</li> <li>• At least 3 veteran trees per ha; future veterans identified with space for crown development</li> <li>• &gt;30 cu m dead wood per ha</li> </ul> | <p>Canopy cover is the overall proportion of vegetative cover consisting of any woody layer ranging from established regeneration to mature and veteran stages. Woodland canopy density and structure is important because it affects ecosystem function and in particular microclimate, litterfall, soil moisture, nutrient turnover and shading; this in turn influences the composition of plants and animals in lower vegetation layers and soil.</p> <p>Open canopies with just scattered trees will have less of a woodland character and reduced diversity of woodland-dependent species (although they may be still be important as a form of woodland-pasture). Completely closed canopies across the whole woodland are not ideal either however, as they cast heavier shade and support fewer species associated with edges, glades and open grown trees, and have little space where tree regeneration could occur. In general, the woodland canopy of this feature should provide a core of woodland interior conditions with some open and edge habitat as well. At this site, the woodland is left as minimal intervention to develop its own structure through natural processes. Management would largely be limited to diversification of the canopy, control of invasive non-native trees, principally sycamore and beech (see composition targets) and to maintaining areas of disturbance for vascular plants. These interventions are regarded necessary to ensure woodland conditions (shade, humidity, moisture) are maintained and to maintain populations of woodland plants forming a component of the SAC woodland community</p> | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|---|---|---|
|   |   | <p><b>Species rich hazel scrub; Scrub</b></p> <ul style="list-style-type: none"> <li>• Tree canopy cover not to exceed 20% of the stand area.</li> <li>• Understorey (2-5m) present over 33-66% of stand area.</li> <li>• Open space to vary between short-cropped (&lt;5cm) and taller (&gt;30cm) grassland</li> </ul> |   |   |
| <b>Structure and function (including its typical species)</b> | <b>Vegetation structure - woodland edge</b> | Maintain and where necessary restore graduated woodland edge into adjacent semi-natural open habitats, other woodland/wood-pasture types or scrub.  | <p>Woodland edge is defined as being the transitional zone between the forest feature and adjacent but different habitat types - the best woodland edges will have a varied structure in terms of height and cover. Many typical forest species make regular use of the edge habitats for feeding due to higher herb layer productivity and larger invertebrate populations.</p> <p>Transitions between habitats (primarily scrubby transitions with CG2, MG1, MG2, U4 and open cliff ledges) are maintained, or allowed to develop. Transitions generally occur on the upper edges of the woodland, where the woodland thins onto the flatter plateau. It is important that transitions through from woodland, to scrub, to grassland or plateau woodland is maintained, and that there are no barriers inhibiting the dynamic nature of these transitions to develop.</p> <p>Grasslands / arable fields managed with high doses of agro-chemicals could potentially not allow this gradation of woodland edge and could have other impacts on the integrity of the site (pollution/ nutrient enrichment etc).</p> | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Adaptation and resilience</b>            | Restore the resilience of the feature by ensuring a diversity of site-native trees e.g. ash/ small-leaved lime/large-leaved lime/ aspen/ alder/rowan/oak/ bird cherry/ birch) is present across the site at sufficient densities to allow the maintenance of a diverse canopy   | This recognises the increasing likelihood of natural habitat features needing 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 sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The   |   |

| Attributes  |   | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|---|--|---|---|
|   |   |  | <p>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.</p> <p>A particular threat is the presence of ash dieback caused by <i>Hymenoscyphus fraxineus</i> which is significantly affecting this habitat.</p>   |   |
| <b>Structure and function (including its typical species)</b> | <b>Browsing and grazing by herbivores</b> | Maintain browsing at a (low) level that allows well developed understorey with no obvious browse line, & lush ground vegetation with some grazing sensitive species evident (bramble, ivy etc), and tree seedlings and sapling common in gaps.   | <p>Herbivores, especially deer, are an integral part of woodland ecosystems. They are important in influencing woodland regeneration, composition and structure and therefore in shaping woodland wildlife communities. In general, both light grazing and browsing is desirable to promote both a diverse woodland structure and continuous seedling establishment.</p> <p>Short periods with no grazing at all can allow fresh natural regeneration of trees, but a long-term absence of herbivores can result in excessively dense thickets of young trees which shade out ground flora and lower plant species. However, heavy grazing by deer or sheep, or even gamebirds such as pheasants prevent woodland regeneration, and can cause excessive trampling and/or poaching damage, canopy fragmentation, heavy browsing, barkstripping and a heavily grazed sward.</p> | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Regeneration potential</b>             | Maintain the potential for sufficient natural regeneration of desirable trees and shrubs; typically tree seedlings of desirable species (measured by seedlings and <1.3m saplings - above grazing and browsing height) should be visible in sufficient numbers in gaps, at the wood edge and/or as regrowth as appropriate ; | <p>The regeneration potential of the woodland feature must be maintained if the wood is to be sustained and survive, both in terms of quantity of regeneration and in terms of appropriate species. This will include regeneration of the trees and shrubs from saplings or suckers, regrowth from coppice stools or pollards, and where appropriate planting. Following the principal of minimum intervention, no specific targets are being set for regeneration, these are left to the dynamics of the woodland.</p> <p>There should, however, be no limitation on regeneration from grazing, introduced fauna (game rearing, grey squirrels etc) or other factors e.g. disease, pathogens within these stand types.</p>   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |   | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|---|---|--|---|
|   |   |   | With the advent of ash dieback, it should not be assumed that natural regeneration will be sufficient to maintain the structure and composition throughout the SSSI. Planting of local provenance stock to maintain the scarce species of trees and shrubs or to diversify poor canopies to meet the canopy composition target is acceptable |   |
| <b>Structure and function (including its typical species)</b> | <b>Typical species: flora and fauna</b>               | <p>Maintain the abundance of the typical species listed below to enable each of them to be a viable component of the Annex 1 habitat;</p> <ul style="list-style-type: none"> <li>In W8g (not scrub), a rich understorey should be maintained e.g. <i>Acer campestre</i>, <i>Cornus sanguinea</i>, <i>Corylus avellana</i>, <i>Cratageus monogyna</i>, <i>Euonymus europaeus</i>, <i>Ilex aquifolium</i>, <i>Prunus padus</i>, <i>Prunus spinosa</i>, <i>Rhamnus catharticum</i>, <i>Taxus baccata</i>, <i>Viburnum opulus</i>.</li> <li>Populations of distinctive species e.g. <i>Cardamine impatiens</i>, <i>Carex digitata</i>, <i>Convallaria majalis</i>, <i>Daphne mezereum</i>, <i>Gagea lutea</i>, <i>Geranium sanguineum</i>, <i>Melica nutans</i>, <i>Polygonatum odoratum</i>, <i>Ribes alpinum</i>, <i>Rubus saxatilis</i>, <i>Trollius europaeus</i> maintained</li> </ul> | <p>See supporting notes for this attribute in Table 1 above.</p> <p>The W8g sub-community is characterised by its distinctive shrub layer which must be maintained.</p> <p>The woodland feature as a whole supports a vast range of distinctive species which must be maintained.</p>  | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |
| <b>Structure and function (including its typical species)</b> | <b>Invasive, non-native and/or introduced species</b> | Ensure invasive and introduced non-native species are either rare or absent, but if present are causing minimal damage to the feature   | Invasive or introduced non-native species are a serious potential threat to the biodiversity of native and ancient woods, because they are able to exclude, damage or suppress the growth of native tree, shrub and ground species (and their associated typical species), reduce structural diversity and                                   | This attribute will be periodically monitored as part of Natural England's <a href="#">SSSI Condition Assessments</a> |

| Attributes  |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|---|--|--|--|
|   |   |  | prevent the natural regeneration of characteristic site-native species. Once established, the measures to control such species may also impact negatively on the features of interest (e.g. use of broad spectrum pesticides). Such species can include Rhododendrons, snowberry, Japanese knotweed, giant hogweed and Himalayan balsam, for example. Similarly, this would include pheasants, rabbits and non-native invertebrate 'pest' species.   |  |
| <b>Structure and function (including its typical species)</b> | <b>Soils, substrate and nutrient cycling</b>        | 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.  |  |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Functional connectivity with wider landscape</b> | Restore the overall extent, quality and function of any supporting features within the local landscape which provide a critical functional connection with the site  | See supporting notes for this attribute in Table 1 above.<br><br>There are very few woodlands of any note or size outside the designated site. Therefore efforts should be sought to try and buffer the site, increase habitat patch size and improve connectivity through whatever means necessary.   | White Peak Opportunity Mapping (FRITH 2017)  |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Air quality</b>                                  | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) | See supporting notes for this attribute in Table 1 above.<br><br>This feature currently exceeds the site-relevant critical loads for Nitrogen deposition. Website accessed 1/10/2018   | 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 ( <a href="http://www.apis.ac.uk">www.apis.ac.uk</a> ) |
| <b>Supporting processes (on which the feature relies)</b>     | <b>Hydrology</b>                                    | At a site, unit and/or catchment level (as necessary, maintain and where necessary restore 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. This is included as disruption/ damage to |  |

| Attributes   |                     | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available) |
|--|---------------------|--|--|--|
|  |                     |  | hydrological processes could be caused by activities at some distance from the site boundary. E.G. through extraction of ground or surface waters; diverting or damming river channels; pollution of water source; channel alignment that disrupts natural geomorphological processes; tunnelling etc. This is particularly pertinent to the valley bottoms where the watercourses tend to be. Some parts of the site are affected by historic mine drainage which has altered water levels within the catchment.  |  |
| <b>Supporting processes (on which the feature relies)</b>  | <b>Illumination</b> | Ensure artificial light is maintained to a level which is unlikely to affect natural phenological cycles and processes to the detriment of the feature and its typical species at this site. | Woodland biodiversity has naturally evolved with natural patterns of light and darkness, so disturbance or modification of those patterns can influence numerous aspects of plant and animal behaviour. For example, light pollution (from direct glare, chronically increased illumination and/or temporary, unexpected fluctuations in lighting) can affect animal navigation, competitive interactions, predator-prey relations, and animal physiology. Flowering and development of trees and plants can also be modified by un-natural illumination which can disrupt natural seasonal responses. |  |
| <b>Version Control</b><br>Advice last updated: N/A   |                     |  |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is an extensive complex of geographically-separate component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. |                     |  |  |  |
| Amalgamated all the vegetation structure attributes into a single attribute which is consistent with the SSSI Favourable Condition Tables (FCTs)   |                     |  |  |  |

**Table 8: Supplementary Advice for Qualifying Features: S1092. Austropotamobius pallipes; White-clawed (or Atlantic stream) crayfish**

| Attributes                         |                             | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)                |
|------------------------------------|-----------------------------|--|---|---|
| <b>Population (of the feature)</b> | <b>Population abundance</b> | <p>Where population assessments are carried out, the following targets should be applied:</p> <p>Shallow water (handsearching):<br/>A mean of at least 5 out of 100 refuges containing white-clawed crayfish within a unit of assessment (but see comments)</p> <p>Deep water (trapping):<br/>At least 1 individual caught per trap on average</p> | <p>Freshwater species are dependent for their survival upon maintenance of their supporting habitats. Site condition targets for designated species therefore follow a habitats-led approach, with the aim of ensuring a naturally functioning river ecosystem with low levels of human impact, within which all species can thrive to a degree characteristic of that habitat. Targets for river habitat attributes (biological, physical, hydrological and chemical) are set according to river type – catchment geology, altitude, flow (headwater, river or large river), and nutrient targets for each river type have been set to reflect near natural or background conditions, limiting enrichment to levels at which adverse effects upon characteristic biodiversity are unlikely.</p> <p>This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population’s size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years).</p> <p>The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature.</p> <p>Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site’s population, as derived from the latest known or estimated level</p> | <p>AQUASCIENCE (2014)</p> <p>DAVID ROGERS ASSOCIATES (2002)</p> |



| Attributes                         |                          | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)                      |
|------------------------------------|--------------------------|--|--|---|
|                                    |                          |  | <p>established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment.</p> <p>Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.</p> <p>In general, crayfish densities may be lower than these generic targets for some assessment units due to natural factors. Generic targets should be used in the interim. Determination of unfavourable condition should only be made where low densities are known to be related to an impact of some kind, or where historical data suggest higher densities should be present.</p> |   |
| <b>Population (of the feature)</b> | <b>Population health</b> | Restore an absence of non-native crayfish species from the site and the catchment surrounding the site | Once non-native crayfish species (such as signal, red-swamp and spiny-cheeked crayfish) are established in a waterbody, native populations of crayfish may be eliminated rapidly by them through direct competition for food, predation or the transfer of disease. These species can also cause physical damage to supporting habitat. The presence of non-native species within or close to the SAC poses a risk of adversely affecting the abundance and health of the feature.   | AQUASCIENCE (2014)<br><br>Site specific survey data available from EA |
| <b>Population (of the feature)</b> | <b>Population health</b> | Restore an absence of individuals within the site infected with crayfish plague or porcelain disease   | Non-native crayfish species (such as signal crayfish) carry a fungal infection called the crayfish plague ( <i>Aphanomyces astaci</i> ), which is lethal to European crayfish (including our native white-clawed crayfish) and has resulted in their   |   |

| Attributes                                     |                          | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--------------------------|---|--|--|
|  |                          |   | eradication from a number of waters in England. The presence of this disease within the native crayfish population, either within or close to the SAC, may adversely affect the abundance and health of the feature.   |  |
| <b>Population (of the feature)</b>             | <b>Population health</b> | Ensure human activities within or around the site do not pose a significant risk of plague transfer             | Non-native crayfish species (such as signal crayfish) carry a fungal infection called the crayfish plague ( <i>Aphanomyces astaci</i> ), which is lethal to European crayfish (including our native white-clawed crayfish) and has resulted in their eradication from a number of waters in England. Human activities, such as angling and fish farming, is able to facilitate the spread of non-native species and the spread of this disease if legislative controls and best management practice are not followed.  |  |
| <b>Supporting habitat: structure/ function</b> | <b>River morphology</b>  | Maintain OR Restore (as necessary) the physical structure of the river channel and its banks in a natural state | Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable<br><br><b>A natural channel morphology</b> provides a diversity of water depths, velocities, substrate types, refuge and feeding opportunities for white-clawed crayfish, bullhead and brook lamprey. The close proximity of different habitats facilitates foraging and the movement of individuals to new preferred habitats with age. Operations that widen, deepen and/or straighten the channel reduce variations in habitat. New operations that would have this impact are not acceptable within an SAC, whilst restoration may be needed in some reaches. | AQUASCIENCE (2014)<br>EADES, P. (2011)<br>JACKLIN T. (2009)<br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br>RICE S.P. And TOONE J.A. (2011).<br>TRENT RIVERS TRUST (2015) |
| <b>Supporting habitat: structure/ function</b> | <b>River bed</b>         | Maintain an abundance of naturally-occurring cobbles, rubble and boulders on the river bed                      | Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable.<br><br><b>Extent of cobbles/ boulders:</b> where they occur naturally, cobbles and boulders are used extensively by crayfish as refuge. Engineering works can result in the loss of large material – any works should at least replace the pre-works availability of such refuges.   | AQUASCIENCE (2014)<br>EADES, P. (2011)<br>JACKLIN T. (2009)<br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br>RICE S.P. And TOONE J.A. (2011).                              |

| Attributes                                    |                                   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|---|-----------------------------------|--|--|--|
|   |                                   |  |  | Trent Rivers Trust (2015)  |
| <b>Supporting habitat: structure/function</b> | <b>Woody debris</b>               | Maintain OR Restore (as necessary) an abundance of large woody debris within the channel or water body                   | <p>Woody debris is an important component of river habitat for white-clawed crayfish as well as the wider biological community. White-clawed crayfish are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative spawning substrate.</p> <p>Dead woody material that falls into streams plays an important role in increasing habitat diversity, providing shelter for fish, food source for invertebrates and slowing the passage of nutrients downstream. Large woody debris (whole trees, trunks or branches swept downstream and lodged in the channel or banks” is a key feature of healthy rivers. Where they are present, fallen branches and trunks are used extensively by crayfish as refuge. Woody debris is typically removed during maintenance operations, but it is important to retain as much as possible, particularly where other forms of refuge are in short supply.</p> | <p>Trent Rivers Trust (2015)</p> <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>JACKLIN T. (2009)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p> |
| <b>Supporting habitat: structure/function</b> | <b>River/waterbody vegetation</b> | Maintain the extent of submerged and marginal vegetation within the river channel / standing water body (as appropriate) | <p>Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of coarse substrates on which white-clawed crayfish depend.</p> <p><b>Extent of submerged and marginal vegetation:</b> submerged higher plants provide cover away from the banks, and also</p>   | <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>JACKLIN T. (2009)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p>                                  |

| Attributes                                    |                          | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|--------------------------|--|--|---|
|   |                          |  | represent a valuable food source for crayfish. Marginal emergents also provide important cover and feeding opportunities.  |   |
| <b>Supporting habitat: structure/function</b> | <b>River banks</b>       | Maintain and where necessary restore the full extent of bankside tree cover including their root systems   | <p>Habitat conditions for white-clawed crayfish vary naturally in rivers. Some river sections may provide optimal habitat whilst others may be largely unsuitable. Optimal conditions typically occur in relatively shallow, fast flowing reaches with coarse substrates. A characteristically diverse biotope mosaic allows the white-clawed crayfish and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species. Impounding structures in particular can have a dramatic effect on white-clawed crayfish habitat, generating heavy siltation and loss of the coarse substrates on which white-clawed crayfish depend.</p> <p><b>Extent of bankside tree cover:</b> overhanging trees provide valuable shade and food sources for crayfish and, in addition, supply woody debris to the river. Submerged tree-root systems provide important cover and refuges from flood flows. For bullhead, the relative importance of shade compared with the provision of woody debris is unclear, but the maintenance of intermittent tree cover in conjunction with retention of woody debris ensures that habitat conditions are suitable. In areas without any riparian trees, it may be desirable to introduce a limited amount of cover.</p> | <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>JACKLIN T. (2009)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p> |
| <b>Supporting habitat: structure/function</b> | <b>Shoreline refugia</b> | Maintain the extent and diversity of shoreline refuges associated with the water body, such as submerged tree roots, bank crevices and marginal vegetation | <p>White-clawed crayfish of all ages need refuges, or places to shelter or hide. Juvenile crayfish are especially vulnerable to predation by fish, ducks and other water birds, otter and mink, carnivorous dragonfly larvae and other predatory invertebrates, including adult crayfish. Crayfish are also vulnerable to high flows in watercourses, when they can be washed away from favourable habitats and stranded, crushed or eaten. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species.</p> <p><b>Density of bankside refuges:</b> these provide important crayfish refuges and are often lost during engineering operations. Any</p>  | <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>JACKLIN T. (2009)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p>                                  |

| Attributes                                    |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|---|--|--|---|
|   |   |  | works should at least replace the pre-works availability of refuges.   | TRENT RIVERS TRUST (2015)   |
| <b>Supporting habitat: structure/function</b> | <b>Water quality: biological and chemical</b> | Maintain and where necessary restore supporting habitat to ensure compliance with relevant Biological and Chemical General Quality Assessment Class and Environmental Quality Standards throughout the site. | <p>Good water quality is important to this feature to ensure sufficient availability of prey which includes worms, insect larvae, snails, small fish, macrophytes and algae. 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 supporting habitat type.</p> <p>Meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) alone will not be sufficient to support the achievement of SAC Conservation Objectives, which require compliance with more stringent standards.</p> | Data on water quality is obtained via publicly available sources on EA website                                    |
| <b>Supporting habitat: structure/function</b> | <b>River flow</b>                             | Ensure more than 90% of the naturalised daily mean flow remains in the river all year round  | The natural flow regime both shapes and sustains characteristic biotope mosaics, affecting factors such as current velocities and bed hydraulics, water levels and depths, wetted area, temperature regime and dissolved oxygen regime, All parts of the natural flow regime are important, including flushing flows, seasonal baseflows and natural low flows. Natural seasonal flow recession is critical in supporting the full expression of supporting habitats (marginal and riparian vegetation, exposed riverine sediments, ephemeral headwaters). Any significant impacts on the natural flow regime should be rectified sustainably by reducing flow modifications, not by artificial augmentation, or by altering channel form to fit reduced levels of flow.   | <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> |
| <b>Supporting habitat: structure/function</b> | <b>Un-ionised Ammonia</b>                     | <p>Maintain ammonia levels at or less than:</p> <p>Total ammonia – 0.25mg/l (90th percentile)</p> <p>Un-ionised ammonia – 0.021mg/l</p>  | <p>High level of ammonia in watercourses, derived from organic pollution, is highly toxic to white-clawed crayfish. This target is the same as the EQS used by the EA.</p> <p>Generally water quality should not be injurious to any life stage.</p>   | Data on water quality is obtained via publicly available sources on EA website                                    |

| Attributes                             |                             | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|-----------------------------|--|--|---|
| Supporting habitat: structure/function | Oxygen levels               | Maintain supporting rivers and waterbodies in/to a well-oxygenated state, with a dissolved oxygen standard of 85% (10 percentile)                  | Good water quality, reflected in high oxygen levels, is important to ensure availability of food which includes worms, insect larvae, snails, small fish, macrophytes and algae  | Data on water quality is obtained via publicly available sources on EA website  |
| Supporting habitat: structure/function | Turbidity: rivers           | Maintain and where necessary restore an annual mean level of typically less than 25 mg/l of suspended solids throughout the site                   | The supporting riverine habitat of the feature should be characterised by clean gravels; excess siltation can obstruct crayfish gills  | Data on water quality is obtained via publicly available sources on EA website  |
| Supporting habitat: structure/function | Pollution                   | Ensure supporting habitat is not at risk of effluent discharges from agricultural or fish farms from within the site's wider catchment             | Native crayfish are particularly susceptible to pollution incidents, and the transfer of diseases from other sources   | Data on water quality is obtained via publicly available sources on EA website<br><br>Diffuse Water Pollution Plan for the River Wye (EA, in preparation) |
| Supporting habitat: structure/function | Calcium levels              | Maintain calcium levels at or to above 5mg/l   | Because of their thick exoskeletons and regular moult cycles, freshwater crustaceans such as crayfish have high calcium needs. When calcium levels drop, their exoskeletons become weaker reducing the abundance, size, and weight of these crustaceans. A reduction in size can slow the onset of sexual maturity, making them more vulnerable to predators. This, in turn, may further affect the overall size of their population. Finally, affected crustaceans may become less tolerant of other factors such as temperature, toxic metals, and Ultra Violet radiation. | Data on water quality is obtained via publicly available sources on EA website  |
| Supporting habitat: structure/function | Supporting off-site habitat | Maintain the quality of any supporting habitat present beyond the site boundary upon which the white-clawed crayfish population of the site depend | White-clawed crayfish populations within the designated boundary of the SAC may be dependent on the continued or restored integrity of sections of river channel and riparian areas that lie outside of the site boundary. For example, headwater areas and tributaries may not fall within the site boundary, yet white-clawed crayfish may use these areas for spawning and juvenile development and be critical for sustaining populations in the SAC further downstream.   | AQUASCIENCE (2014)<br><br>RICE, S.P. and TOONE J.A (2011)   |
| Supporting habitat: structure/function | Biological connectivity     | The movement of white-clawed crayfish within the site should not be artificially constrained.  | Vertical drops are sufficient to prevent upstream movement of adult white-clawed crayfish. Even low weirs will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes or drought, and more generally will also lead   | AQUASCIENCE (2014)<br><br>EADES, P. (2011)  |

| Attributes  |                                     | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|---|-------------------------------------|---|--|---|
|   |                                     |   | to constraints on life cycle movements and genetic interactions throughout the river that may have adverse consequences.   | JACKLIN T. (2009)<br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br>RICE S.P. And TOONE J.A. (2011).<br>TRENT RIVERS TRUST (2015)) |
| <b>Supporting habitat: structure/ function</b>  | <b>Water temperature</b>            | Maintain water temperature at naturally-occurring levels  | Good water quality is important to ensure availability of food which includes worms, insect larvae, snails, small fish, macrophytes and algae  | Data on water quality is obtained via publicly available sources on EA website  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Fish density</b>                 | Maintain fish populations at or to densities low enough to avoid significant predation of juvenile crayfish   | Predatory fish species may include chub, eel, perch, pike and trout  | Data available from routine EA electrofishing surveys   |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Conservation measures</b>        | Maintain the management measures (either within and/or outside the site boundary as appropriate) which are necessary to restore the structure, functions and supporting processes associated with the feature and/or its supporting habitats. | 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.            | TRENT RIVERS TRUST (2015)   |
| <b>Supporting habitat: extent and distribution</b>                                      | <b>Extent of supporting habitat</b> | Maintain the total extent of the habitats which support the feature at the current extent of riverine and riparian habitat  | In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data. | AQUASCIENCE (2014)<br>RICE S.P. And TOONE J.A. (2011).<br>TRENT RIVERS TRUST (2015)   |
| <b>Supporting habitat:</b>  | <b>Distribution of supporting</b>   | Maintain the distribution and continuity of the feature and its   | A contraction in the range, or geographic spread, of the feature (and its component vegetation) across the site will reduce its  |   |

| Attributes   |                                  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available) |
|--|----------------------------------|---|--|--|
| <b>extent and distribution</b>   | <b>habitat</b>                   | supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site   | overall area, the local diversity and variations in its structure and composition, and may undermine its resilience to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may 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 this feature and this may affect its viability. |  |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b>  | <b>Adaptation and resilience</b> | Maintain and where necessary restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site | See supporting notes for this attribute in Table 1 above.  |  |
| <b>Version Control</b><br>Advice last updated: N/A   |                                  |   |  |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> The targets for some attributes listed above include both 'maintain' or 'restore' objectives. This is because this SAC is an extensive complex of geographically-separate component sites. Overall, both objectives will be applicable to the SAC but these will differ between each component site depending on its particular circumstances. Natural England will be able to provide further advice on request. Supporting processes – Water quantity/quality: deleted as this attribute is dealt with in a previous section. |                                  |   |  |  |
| <b>Supporting processes – Air Quality:</b> deleted as not appropriate for this feature   |                                  |   |  |  |



**Table 9: Supplementary Advice for Qualifying Features: S1096 *Lampetra planeri*; Brook lamprey, S1163 *Cottus gobio*; Bullhead**

| Attributes                         |                             | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available) |
|------------------------------------|-----------------------------|--|---|--|
| <b>Population (of the feature)</b> | <b>Juvenile densities</b>   | Maintain or restore as necessary juvenile densities to those expected under unimpacted conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations  | Impacts on physical, chemical or hydrological integrity, or from non-native species, may suppress juvenile densities.   |  |
| <b>Population (of the feature)</b> | <b>Population abundance</b> | Maintain or restore as necessary the abundance of the population at/to a density which is close to that expected under unimpacted conditions throughout the site (subject to natural habitat conditions and allowing for natural fluctuations), whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent. | <p>This will ensure there is a viable population of the feature which is being maintained at or increased to a level that contributes as appropriate to its Favourable Conservation Status across its natural range in the UK. Due to the dynamic nature of population change, the target-value given for the population size or presence of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. This minimum-value may be revised where there is evidence to show that a population's size or presence has significantly changed as a result of natural factors or management measures and has been stable at or above a new level over a considerable period (generally at least 10 years).</p> <p>The values given here may also be updated in future to reflect any strategic objectives which may be set at a national level for this feature.</p> <p>Given the likely fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. This advice accords with the obligation to avoid deterioration of the site or significant disturbance of the species for which the site is designated, and seeks to avoid plans or projects that may affect the site giving rise to the risk of deterioration. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum target and its current level, the ongoing capacity of the site to accommodate the feature at such higher levels in future should also be taken into account in any assessment.</p> | DAVID ROGERS ASSOCIATES (2002)                   |

| Attributes   |   | Targets  | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)  |
|--|---|--|--|---|
|  |   |  | <p>Unless otherwise stated, the population size or presence will be that measured using standard methods, such as peak mean counts or breeding surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection.</p> <p>Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are the best available.</p>   |   |
| <b>Supporting habitat: extent and distribution</b> | <b>Distribution of supporting habitat</b> | Restore the distribution and continuity of the feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site | <p>A contraction in the range, or geographic spread, of the feature (and its component vegetation) 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. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site.</p> <p>Such fragmentation may 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 this feature and this may affect its viability.</p> | <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>JACKLIN T. (2009)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p> |
| <b>Supporting habitat: extent and distribution</b> | <b>Extent of supporting habitat</b>       | Maintain the total extent of the habitat (c17km river) which support the feature at current extent of riverine and riparian habitat  | <p>In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC.</p> <p>The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection, and may be subject to periodic review in light of improvements in data.</p>   |   |
| <b>Supporting habitat: structure/function</b>      | <b>Biological connectivity</b>            | The movement of characteristic biota should not be artificially constrained.   | Vertical drops of >18-20 cm are sufficient to prevent upstream movement of adult <b>bullheads</b> . They will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes or drought, and more generally will also lead to constraints on genetic interactions that may have adverse   | <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p>   |

| Attributes                                     |  | Targets   | Supporting and Explanatory Notes   | Sources of site-based evidence (where available)   |
|--|--|---|--|--|
|  |  |   | <p>consequences.</p> <p><b>Lampreys</b> can pass some potential barriers by attaching themselves to structures or river banks by their suckorial discs and creeping up by strong bursts of swimming. However, many in-channel structures are known to either completely or partially block access to historical spawning grounds. Whilst in-channel structures can artificially generate both siltbeds and clean gravels, both of value to lamprey species, this is not a justification for their continued existence or the construction of new structures. Suitable habitat for lamprey and other species can and should be generated by natural processes - where physical restoration of the channel is required this may involve changes in the distribution of species within the river system</p>   | RICE S.P. And TOONE J.A. (2011).   |
| <b>Supporting habitat: structure/ function</b> | <b>Biotope mosaic</b>                        | Restore (as necessary) the extent and pattern of in-channel and riparian biotopes (habitats) to that characteristic of natural fluvial processes.   | <p>Habitat conditions for bullhead and lamprey species vary naturally in rivers. Some river sections may provide optimal habitat for some or all life stages whilst others may be largely unsuitable. .</p> <p>Adult <b>lamprey</b> require spawning substrates of coarse material in which to deposit eggs in shallow scrapes (redds). Larval lamprey (ammocoetes) live in silt beds, which are often in channel margins but in relation to sea lamprey are known to occur in deep water in main river reaches</p> <p>Optimal conditions for <b>bullhead</b> typically occur in relatively shallow, fast flowing reaches with coarse substrates (used for egg-laying and juvenile/adult cover). A characteristically diverse biotope mosaic allows the bullhead and other species to move within the channel to locate optimal habitat conditions in the face of a fluctuating flow regime. Pools, exposed tree root systems and marginal shallows are important high-flow refugia for the species.</p> | <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p> |
| <b>Supporting habitat: structure/ function</b> | <b>Control of livestock grazing activity</b> | If grazing is desirable in the riparian zone, maintain grazing activity in the riparian zone and in the river channel at or to suitably low levels. | Over-grazing of riparian areas can have a dramatic effect on bullhead and lamprey habitat, trampling marginal siltbeds, eliminating marginal habitat and generating excessive loads of fine sediment on spawning gravels.  |  |

| Attributes                                    |   | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|---|---|---|---|--|
| <b>Supporting habitat: structure/function</b> | <b>Fisheries - introduction of fish species</b> | Ensure fish stocking /introductions do not interfere with the ability of the river to support self-sustaining populations of the feature  | <p>The presence of artificially high densities of fish can creates unacceptably high levels of predatory pressure on both species. The management aim is to provide conditions in the river that support a healthy, natural and self-sustaining salmonoid population, achieved through habitat protection/restoration and the control of exploitation as necessary.</p> <p>Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocked and naturally produced individuals, disease introduction and genetic alterations to the population</p> |  |
| <b>Supporting habitat: structure/function</b> | <b>Flow regime</b>                              | Restore (as necessary) the natural flow regime of the river, with daily flows as close to what would be expected in the absence of abstractions and discharges (the naturalised flow).                                      | The natural flow regime is critical to all aspects of the bullhead and lamprey life cycle, maintaining the high current velocities and substrate conditions that are optimal for the species. It shapes the characteristic biotope mosaic, maintains water in critical biotopes (including marginal siltbeds), and provides adequate flows for migratory passage (which is important not only for brook lamprey in its short distance migrations within the river).   | <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p>  |
| <b>Supporting habitat: structure/function</b> | <b>Integrity of off-site habitats</b>           | Habitats beyond the site boundary upon which characteristic biological communities of the site depend should be Maintained in a state that does not impair the full expression of the characteristic biota within the site. | Bullhead and lamprey populations within the SAC may be dependent on the integrity of sections of river channel and riparian areas that lie outside of the site boundary. Headwater areas and tributaries may not fall within the site boundary, yet both species may use these areas for spawning and juvenile development and be critical for sustaining populations within the site.  | <p>AQUASCIENCE (2014)</p> <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p> <p>RICE S.P. And TOONE J.A. (2011).</p> <p>TRENT RIVERS TRUST (2015)</p> |
| <b>Supporting habitat: structure/function</b> | <b>Riparian zone</b>                            | Maintain a patchy mosaic of natural woody and herbaceous (tall and short swards) riparian vegetation.   | Active marginal vegetation including riparian trees provides important cover for bullhead and lamprey ammocoetes as it encourages and stabilises the formation of silt beds in which ammocoetes burrow. Riparian trees also add substrate   | <p>EADES, P. (2011)</p> <p>RICE S.P, WORRAL, F. and TOONE, J.A (2010)</p>  |

| Attributes                                     |  | Targets   | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|--|--|---|---|---|
|  |  | The riparian zone should be sufficiently wide to act as a healthy and functional habitat zone within the river corridor.  | diversity and aid the formation of siltbeds and clean gravels. They also provide temperature gradients in the channel that improves the availability of suitable micro-habitat .A mosaic of vegetation types and sward heights provides suitable conditions for the whole characteristic biological community including bullhead.   | RICE S.P. And TOONE J.A. (2011).<br>TRENT RIVERS TRUST (2015)   |
| <b>Supporting habitat: structure/ function</b> | <b>Screening of intakes and discharges</b>                 | All intakes and discharges likely to trap a significant number of individuals of characteristic species are being adequately screened.  | Bullhead and lampreys can be entrained in intakes and discharges along with other fish species.   |   |
| <b>Supporting habitat: structure/ function</b> | <b>Sediment regime</b>                                     | Maintain the natural supply of coarse and fine sediment to the river  | Natural levels of coarse sediment supply are critical to the maintenance of high quality bullhead habitat and lamprey spawning habitat, maintaining bed substrates in optimal condition for egg-laying and juvenile and adult cover. Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, can cause siltation of egg-laying sites and juvenile and adult refugia. | Recommendations regarding Condition Assessment for SSSI units 89 (R Manifold) 93 (Hoo Brook) 90, 41, 42 and 43 (R Dove) (report for Natural England - RICE, WORRAL and TOONE 2010)<br><br>Fluvial Audit of the Upper Dove Catchment (report for Natural England - RICE and TOONE,<br><br>River Wye SSSI RHS and Walkover Survey (report for Natural England – EADES, 2011 |
| <b>Supporting habitat: structure/ function</b> | <b>Vegetation composition: invasive non-native species</b> | Ensure non-native species categorised as 'high-impact' in the UK under the Water Framework Directive are either rare or absent but if present are causing minimal damage to the feature | Species such as signal crayfish can have a serious effect on bullhead and lamprey habitat (by destabilising banks and enhancing fine sediment input), and can predate heavily on both species if present at high densities. Chinese mitten crab is also of concern not only in the lower reaches of main river but due to its potential to migrate long distances upstream.                                 | Data from site specific surveys available from EA   |
| <b>Supporting habitat: structure/ function</b> | <b>Vegetation structure: cover of submerged</b>            | Maintain a sufficient proportion of all aquatic macrophytes to allow them to reproduce in suitable habitat and unaffected by river  | In rivers where it naturally occurs, submerged and marginal vegetation can provide important cover for bullhead, particularly if coarse (cobble) substrates are in short supply for cover.  | AQUASCIENCE (2014)<br>EADES, P. (2011)  |

| Attributes  |                                  | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)  |
|---|----------------------------------|--|---|---|
|   | <b>macrophytes</b>               | management practices.  |   | JACKLIN T. (2009)<br><br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br><br>RICE S.P. And TOONE J.A. (2011).<br><br>TRENT RIVERS TRUST (2015)                          |
| <b>Supporting habitat: structure/function</b>   | <b>Water quality - nutrients</b> | Maintain the natural nutrient regime of the river, with any anthropogenic enrichment above natural/background concentrations limited to levels at which adverse effects on the feature are unlikely. | Nutrient enrichment can lead to loss of substrate condition for bullhead and lamprey due to benthic algal growth and associated enhanced siltation. Bullhead and lampreys are both susceptible to both episodic and chronic organic pollution. Episodic pollution causes direct mortalities whilst chronic pollution affects substrate condition through the build-up of excessive microbial populations. | Data on water quality is obtained via publicly available sources on EA website<br><br>Diffuse Water Pollution Plan for the River Wye (EA, in preparation)             |
| <b>Supporting habitat: structure/function</b>   | <b>Woody debris</b>              | Maintain the presence of coarse woody debris within the structure of the channel. In smaller watercourses, temporary debris dams should be a feature of channel dynamics.                            | Woody debris is an important component of river habitat for bullhead and lampreys as well as the wider biological community. Bullheads are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative spawning substrate.  | AQUASCIENCE (2014)<br><br>EADES, P. (2011)<br><br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br><br>RICE S.P. And TOONE J.A. (2011).<br><br>TRENT RIVERS TRUST (2015) |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Adaptation and resilience</b> | Restore the feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site   | See supporting notes for this attribute in Table 1 above.   |   |
| <b>Supporting processes (on which the feature and/or its supporting habitat relies)</b> | <b>Conservation measures</b>     | Restore the management measures (either within and/or outside the site boundary as appropriate) which are necessary to Maintain OR Restore the structure, functions and                              | 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                                       | AQUASCIENCE (2014)<br><br>EADES, P. (2011)  |

| Attributes   |  | Targets  | Supporting and Explanatory Notes  | Sources of site-based evidence (where available)   |
|--|--|--|---|--|
|  |  | supporting processes associated with the feature and/or its supporting habitats. | Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. | JACKLIN T. (2009)<br>RICE S.P, WORRAL, F. and TOONE, J.A (2010)<br>RICE S.P. And TOONE J.A. (2011).<br>TRENT RIVERS TRUST (2015) |
| <b>Version Control</b><br>Advice last updated: N/A   |  |  |   |  |
| <b>Variations from national feature-framework of integrity-guidance:</b> [adviser to give details of what has varied and why]<br><b>Supporting processes – Soils, substrate and nutrient cycling:</b> deleted as not appropriate for the feature<br><b>Supporting processes – Water quantity/quality:</b> deleted as covered by other attributes i.e. flow regime and water quality (nutrients)<br><b>Supporting processes – Air quality:</b> deleted as not appropriate for the feature |  |  |   |  |

## References

- AQUASCIENCE (2014) White Clawed Crayfish survey of the River Dove between Hollinsclough and Beresford Dale, Peak District National Park. Report for Natural England by Nick Mott (Available on request from Natural England)
- BUCKINGHAM, H. (1989) Peak District Grassland Survey. Unpublished report for English Nature full details
- DAVID ROGERS ASSOCIATES (2002) Aquatic SAC Species Survey Report for English Nature (Available on request from Natural England)
- EADES, P. & Tratt, R. (2014) Peak District Alkaline Fens report
- EADES, P. (2011) River Wye SSSI RHS and Walkover Survey. Unpublished report to Natural England. (Available on request from Natural England)
- ENVIRONMENT AGENCY (2009) Science report - A wetland framework for Impact Assessment at Statutory Sites in England and Wales (EA 2009) <https://www.gov.uk/government/publications/a-wetland-framework-for-impact-assessment-at-statutory-sites-in-england-and-wales>
- FRITH, J (1996) Peak District Dales SAC NVC Surveys. Unpublished report for Natural England
- FRITH, J. (2012) Peak District Calaminarian survey – Unpublished report for Natural England
- FRITH, J. (2016) Survey and characterisation of calcareous scree: 8120 Calcareous and calcshist scree of the montane to alpine levels (*Thlaspietea rotundifolii*) in the Peak District Dales SAC. Report to Natural England (Available on request from Natural England)
- FRITH, J. (2018) Survey & characterisation of 8210 calcareous rocky slopes with chasmophytic vegetation within the Peak District Dales SAC). Report to Natural England (Available from Natural England on request)
- JACKLIN T. (2009). Wild Trout Trust Advisory Visit - River Dove, Dovedale, Derbyshire
- LRC (2016) Hydrology of Monks Dale Springs: the water supply for M10 habitat. Unpublished report for Natural England.
- Natural England (2014a) Climate change refugia for the flora and fauna of England. Available at <http://publications.naturalengland.org.uk/publication/6659217335255040>
- Natural England (2015). Climate Change Theme Plan and supporting NBCCV Assessments for SACs and SPAs at <http://publications.naturalengland.org.uk/publication/4954594591375360>
- Natural England, (2014b). Peak District Dales Site Improvement Plan (SIP168) available at <http://publications.naturalengland.org.uk/publication/6524563861012480>
- Natural England (2017) White Peak Habitat Opportunity Mapping, unpublished report by FRITH, J.
- RICE S.P, WORRAL, F. & TOONE, J.A (2010) Recommendations regarding Condition Assessment for SSSI units 89 (R Manifold) 93 (Hoo Brook) 90, 41, 42 and 43 (R Dove). Unpublished report for Natural England.
- RICE S.P. & TOONE J.A. (2011). Fluvial audit of the Upper Dove Catchment. Loughborough University; Tratt, R. & EADES, P. (2015) Monks Dale Fen – Wetland Vegetation Survey and Assessment of Water Supply. Unpublished report to Natural England
- TRENT RIVERS TRUST (2015) River Dove Restoration Plan. Report to Letting the Dove Flow Steering Group (JP013). (Available from <http://publications.naturalengland.org.uk/file/5877629170221056>)