1.1 *Data sources and explanations:*

- *"Site Name and Designation" is accompanied by site-specific information on vulnerability taken from the relevant JNCC SAC / SPA data forms.*
- *"Component SSSI and condition 2010" is taken from SSSI information supplied by Natural England North East, and the Natural England on-line database of SSSI condition survey results*
- *"Environmental conditions needed to support site integrity" for SACs and SPAs are taken from the component SSSI Favourable Conditions Tables supplied by Natural England North East*
- *"Vulnerabilities and threats to qualifying habitats / species" for SACs are taken from the relevant habitats and species reports in the series: JNCC. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006.*
- *"Vulnerabilities and threats to qualifying habitats / species" for SPAs are taken from the relevant SPA and European Marine Site data forms / citations.*

1

Allendale Moors SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for populations of Annex 1 species+ of European importance, with particular reference to:

- Upland Moorland
- + Golden Plover, Merlin

to maintain in favourable condition the habitats for the populations of migratory bird species+ of European importance, with particular reference to:

- Upland Moorland
- Upland Pasture
- + Curlew.

to maintain***,** in favourable condition, the:

- Blanket bogs
- European dry heath
- North Atlantic wet heaths with *Erica tetralix*

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket Bog

Targets set to maintain favourable condition within Allendale Moors SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum

- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature

- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very
sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of
blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

<u>Targets set to maintain favourable condition within Allendale Moors SSSI</u>

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.

- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland component (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

North Atlantic Wet Heaths with Erica Tetralix

Targets set to maintain favourable condition within Allendale Moors SSSI

- No reduction in area and any consequent fragmentation.

- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.
- Total cover of graminoids should not exceed 50%.
- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.
- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.
- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow

range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition Summary February 2010

- **% Area meeting PSA target:** 100.00%
- **% Area favourable:** 19.82%
- **% Area unfavourable recovering:** 80.18%
- **% Area unfavourable no change:** 0.00%
- **% Area unfavourable declining:** 0.00%
- **% Area destroyed / part destroyed:** 0.00%

2

Alston Shingle Banks SSSI - Tyne & Nent SAC

The Conservation Objectives for the European interest features on the SSSI are:

to maintain*, in favourable condition, the:

- Calaminarian grasslands of the *Violetalia calaminarie*

*maintenance implies restoration if the feature is not currently in favourable condition.

Calaminarian grasslands of the *Violetalia calaminarie*

Targets set to maintain favourable condition within Alston Shingle Banks SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa more than occasional throughout the sward or singly or together forming more than 5% cover
- No more than 5% cover negative indicator species
- 20%-90% bare ground
- Average sward height - 5cm or less

Main pressures and future threats on this habitat, nationally

- **Under management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** sometimes removed as a source of contamination
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity.

For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

SSSI Condition Summary February 2010

- **% Area meeting PSA target:** 63.03%
- **% Area favourable:** 0.00%
- **% Area unfavourable recovering:** 63.03%
- **% Area unfavourable no change:** 0.00%
- **% Area unfavourable declining:** 36.97%
- **% Area destroyed / part destroyed:** 0.00%

Reasons for Unfavourable Condition

- Over-wintering cattle and associated ring-feeding
- Lack of metallophyte species

3

Appleby Fells SSSI - Moorhouse Upper Teesdale SAC - North Pennine Moors SPA

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of the regularly occuring bird species[+], with reference to:

- Upland moorland
- Upland pasture
- + Golden Plover, Hen Harrier, Merlin, Peregrine and Curlew

to maintain*, in favourable condition, the:

- Blanket bog (active only)
- European dry heaths
- Alpine and boreal heaths
- Siliceous alpine and boreal grasslands
- Alkaline fens
- Petrifying springs with tufa formations (*Cratoneurion*)
- Alpine pioneer formations of *Caricion bicoloris- atrofuscae*
- Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
- Calaminarian grasslands of the *Violetalia calaminariae*
- Limestone pavement
- Calcareous rocky slopes with chasmophytic vegetation.
- Siliceous rocky slopes with chasmophytic vegetation
- Calcareous and calcshist screes of the montane to alpine levels
- Siliceous scree of the montane to snow levels
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

to maintain*, in favourable condition, the habitats for the population of:

- Marsh saxifrage (*Saxifraga hirculus*)

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket Bog

Targets set to maintain favourable condition within Appleby Fells SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England.

New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.

- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

Targets set to maintain favourable condition within Allendale Moors SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Alpine and Boreal Heaths

Targets set to maintain favourable condition within Appleby Fells SSSI

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the major reported pressure on stands of this habitat, leading to loss of vegetation structure and the failure of more palatable or vulnerable to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna, and to the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare soil and erosion.
- **Burning** - Accidental burning by fires spreading upslope from managed fires of submontane tall heaths is another widespread factor affecting the habitat
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change.

Siliceous alpine and boreal grassland

Targets set to maintain favourable condition within Appleby Fells SSSI (as for Alpine and Boreal Heaths)

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the most important factor affecting structure and function in SACs supporting this habitat in the Scottish uplands. Excessive grazing, trampling and nutirent inputs from dunging and urination results in a reduction in cover and eventual elimination of characteristic species. This can lead to the replacement of thick swards of Racometrium lanuginosum with grassy swards. Soil erosion occurs in some areas of heavy grazing.
- **Fragmentation** - This habitat is naturally limited by specific environmental requirements leading to scattered distribution and small extent of individual patches, particularly in outlying parts of England and Wales. However, fragmentation has been exacerbated by past grazing pressure
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alkaline Fens

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Maintenance of high Piezometric Head

- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Water abstraction** - Past and continuing loss of area by drainage and conversion to intensive agriculture. Excessive water abstraction from aquifers has dried up or reduced spring line flows, and generally lowered water tables. Abstractions also have affected the natural balance between the differing water qualities of ground water and surface water
- **Grazing** - Both under and over0grazing have been recorded as reasons for adverse condition in the SAC series
- **Burning** - Although used as a management tool for some stands of the habitat, particularly but not exclusively in the uplands, burning can also damage the regeneration potential at certain sites.
- **Fragementation** - Small total area of habitat and critically small population sizes of several key species dependent on the habitat
- **Absence of appropriate management** - Lack of or inappropriate management of existing fens leading to drying, scrub encroachement and succession to woodland

- **Pollution** - Valley fens supporting this habitat are particularly susceptible to agricultural run-off within the catchment. Enrichment or hypertrophication can result in substantial adverse changes to key plant communities
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Petrifying springs with tufa formations (*Cratoneurion*)

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant
- No **one** species more than **10%**
- No more than **rare**
- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna

- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alpine pioneer formations of *Caricion bicoloris- atrofuscae*

Targets set to maintain favourable condition within Appleby Fells SSSI (as for Alkaline Fens)

- No loss without prior consent
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**

- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the more accessible stands. This leads to loss of vegetation structure and the failure of the more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna. However, some grazing may be necessary for their survival to keep competition from more vigorous species in check.
- **Fragmentation and connectivity** - This is a highly fragmented habitat occurring on isolated hills in small stands probably mainly less that 0.1 ha in size and only on a few favoured sites do stands occur in any numbers. Many of the rare arctic-alpine species that characterise these stands survive at the limits of viability. Given such fragmentation the characteristic species of this habitat are susceptible to chance events.
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Water management** - The habitat is dependent on snowmelt flushing the habitat in early spring. Changes to the length of snow lie and the amount of water can lead to adverse changes to this naturally variable habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

Targets set to maintain favourable condition within Appleby Fells SSSI

- No reduction in area and any consequent fragmentation without prior consent
- **30-90%** of non-graminae (herbs) in sward, measured in period mid-may to end of July
- Sesleria albicans at least **frequent** throughout the sward, mid-May to end of July

- At least **two** other positive indicator species (listed for this habitat at over 500m) **occasional** throughout the sward
- From all relevant positive indicator lists combined, at least **two** species **frequent** and **fouroccasional** throughout the sward
- No negative indicator species/taxa more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or shrubs (*excluding Juniperus communis*)
- No more than **10%** cover *Pteridium aquilinium*
- **2-10** cms average sward height
- Total extent of litter no more than **25%** of the sward
- Bare ground no more than **10%** of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmenetd state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.
- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are priving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**
- **Air pollution** - based on an assessment of relevant critical loads, air pollution is condsidered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Calaminarian grasslands of the *Violetalia calaminariae*

Targets set to maintain favourable condition within Appleby Fells SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa of negative indicator species more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or scrub
- **20% - 90% bare ground** (can include thin crust of lichens)
- Sward **5 cm** or less

Main pressures and future threats on this habitat, nationally

- **Under-management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** habitatsometimes removed as a source of contamination to livestock, as well as in land reclamation schemes
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity. For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

Limestone pavement

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss of pavement
- Emergent and clint-top plants on 25% of pavement area.
- Non-native confers and beech species no more than rare on any site.
- Spear thistle, creeping thistle, nettle and ragwort no more than occasional on pavement.

- The presence / extent of the following rare species should be recorded (targets not set): *Dryopteris submontana, Ribes spicatum, Actaea spicata, Epipactis atrorubens, Polygonatum odoratum, Gymnocarpium, robertianum, Carex digitata, Carex ornithopoda, Cardamine impatiens, Arenaria anglica, Hypericum montanum , Dryas octopetala, Salix myrsinites, Galium sterneri, Sesleria caerulea, Potentilla neumanniana, Geranium sanguineum , Thalictrum minus, Trollius europaeus, Crepis paludosa*
- Woody species occasional and present on at least 5% of the whole pavement. Not exceeding a cover of 25% of the whole pavement. The sycamore and blackthorn component must be less than 10% when combined

Main pressures and future threats on this habitat, nationally

- **Removal of surface stone**- This practice continues to affect the habitat. It is minor in extent and has reduced significantly since 1995. However, as the habitat will not recover following physical damage it is still a live issue swith the conservation of the habitat. Illegal damage and loss due to development are the causal factors. Pressure to extend deep quarries still exists but has so far been resisted due to strong development control policies
- **Grazing** - In the uplands pavement is affected by over-grazing and by grazing with inappropriate stock type. Historical agricultural support has leg to long term intensive management largely by sheep. This has led to a reduction in the vegetation structure with a loss of clint-top and emergent vegetation (plants growing up and out of the grikes or cracks). the characteristic vegetation is therefore confined to deep within grikes or as trees growing above the browse line. Pavement become species poor losing broadleaved herbs that are so characteristic of the habitat. Grazing by cattle seems to tbe the key to optimal management of the habitat. Examples in Britain and Ireland of pavement in favourable condition often relate to cattle grazing. This type of management has been lost in the past 40 years and much of the conservation focus on the habitat is related to re-establishment of traditional cattle at a low grazing density.
- **Agricultural operations** - Intensive management leads to further problems with agricultural weeds, nutrient enrichment due to use of fertilisers and in some cases loss of areas to stock feeding. Use of fern-specific herbicide to control bracken is a threat to the species interests of upland pavements
- **Lack of remedial management** - In some cases in the lowlands, pavements are threatened by neglect. This can take the form of scrub encroachment and canopy closure on species-rich pavements. In some cases grazing needs to be re-established.
- **Forestry operations** - Pavements that have a woodland canopy are an important part of the ecological expression of the habitat. These wooded pavements often have areas where the surface is cloaked in bryophytes and other areas that are kept open by the physical nature of the pavement surface or by management practices. Woodlands with a uniform canopy or poor structure lead to a loss of diversity and poorly demonstrate structure and function. Continued management practices (coppice or thinning) is required to maintain the interest of these sites. Woodland management needs to be accompanied by control or management of deer populations. In some cases high levels of deer browsing degrade structure and function. Wooded pavements have also been adversely affected by commercial forestry. Conifer plantations and dense beech blocks have shaded out the habitat and in some cases caused eutrophication by needle fall.

- **Invasive species** - Non-native species are an increasing problem for limestone pavement management. Cotoneaster spp are the most widespread but Buddleia sp. are also a local problem.
- **Air pollution** - Based on an assessment of relevant literature, this habita is potentially sensitive to air pollution, but it has not been possible to undertake as assessment of potential impact based on critical loads because of the poor equivalence between this habitat and those for which critical loads are set.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change.

Calcareous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- No more than 5% of the stable scree area
- At least **two positive indicator** species **occasional**, or **one** species **frequent** in suitable fissures

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration

- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change

Siliceous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area.
- (Positive indicator species yet to be determined)

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased

incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change

Calcareous and calcshist screes of the montane to alpine levels

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- Frequency of positive indicator species: at least two species occasional, or one species within the OV40 list frequent over the scree.
- Frequency of negative indicator speceies: no species more than occasional over the scree
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus*: no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree
- Extent of visible rocks (the majority of plants should be growing through gaps between rocks, not forming a mat of vegetation over the rocks): At least 33%
- Cover of *Arrhenatherum elatius* : No more than 50% cover across the scree

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of scree but some grazing is necessary to maintain open screes, preventing scrub or woodland regeneration
- **Invasive species** - The spread of non-native plants especially New Zealand Willow Herb Epilobium brunnei is a factor in the moister, mainly western scree
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic

features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Siliceous scree of the montane to snow levels

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- *Cryptogramma crispa* and *Racomitrium* spp. on moderately stable to stable substrates: both positive indicator species at least occasional over the scree slope or rock outcrop. (NB Some high altitude talus / boulder fileds often lack Cryptogramma and should not be assessed using this attribute.)
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus:* no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - especially by sheep and red deer may cause instability in screes resulting in a slowing down of recolonisation by plant growth. More widely, grazing may remove grazing sensitive species and favour unpalatable species such as ferns.
- **Recreational activities** - Recreational disturbance such as scree running can result in localised acceleration of erosion of scree
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. The loss of Cryptogramma crispa, a key species for this habitat in the UK, from scree in the south Pennines has been attributed to atmospheric pollution
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial

impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- **50%** tall herbs
- At least one positive indicator species abundant
- At least one additional positive indicator species frequent and one species occasional
- **50%** of potentially flowering stems turning to flowering / seed production
- No more than **50%** of stems, of any species of tall herb, show signs of grazing by the end of the growing season. Light grazing impact overall.
- **20 cm** average vegetation height

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - Overgrazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the few more open stands. This leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna.
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of or inappropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- Burning - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial

impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Marsh saxifrage (*Saxifraga hirculus*)

Targets set to maintain favourable condition within Appleby Fells SSSI

- Maintain existing population and longer-term population fitness. Estimated by counts of ramets along with an assessment of flowering/fruiting success
- Maintain open calcareous flushes and rills in light to moderately grazed grassland or grass/heath
- Sward height of 5-c25 cms
- No modification to natural hydrological pattern.
- Trees and shrubs should be absent (to prevent shade)

Main pressures and future threats on this species, nationally

- **Drainage**
- **Planting**
- **Grazing**

SSSI Condition Summary February 2010

- **%** Area meeting PSA target: 91.73%
- % Area favourable:3.22%
- **%** Area unfavourable recovering:88.51%
- % Area unfavourable no change:7.71%
- % Area unfavourable declining:0.56%
- % Area destroyed / part destroyed:0.00%

Reasons for unfavourable condition

Overgrazing, drainage, moor-burning, agriculture, livestock trampling

4

Arkengarthdale, Gunnerside & Reeth Moors SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland moorland
- + Golden Plover, Hen Harrier, Merlin, Peregrine

to maintain*, in favourable condition, the habitats for the migratory bird species + of European importance, with particular reference to:

- Upland moorland
- Upland pasture
- + Curlew.

to maintain*, in favourable condition, the:

- Blanket bog;
- Calaminarian grassland of the *Violetalia calaminariae*;
- European dry heath;
- Northern Atlantic wet heaths with *Erica tetralix*;

* maintain implies restoration if the feature is not currently in favourable condition

Blanket Bog

Targets set to maintain favourable condition within Arkengarthdale, Gunnerside & Reeth Moors SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.

- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.

- Agricultural improvement (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Calaminarian grassland of the Violetalia calaminariae

Targets set to maintain favourable condition within Arkengarthdale, Gunnerside & Reeth Moors SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa of negative indicator species more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or scrub
- **20% - 90% bare ground** (can include thin crust of lichens)
- Sward **5 cm** or less

Main pressures and future threats on this habitat, nationally

- **Under-management and successional change**
- **Agricultural improvement, including supplementary feeding**

- **Mineral re-working and land reclamation -** habitatsometimes removed as a source of contamination to livestock, as well as in land reclamation schemes
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity. For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

European dry heath

Targets set to maintain favourable condition within Arkengarthdale, Gunnerside & Reeth Moors SSSI

- No reduction in area from reference level
- Minimum of 75% cover of dwarf-shrubs [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent - across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25% in the late mature/ degenerate age class or excluded from the burning rotation
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0ha showing graduation in ageranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.

- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Northern Atlantic wet heaths with *Erica tetralix*

Targets set to maintain favourable condition within Allendale Moors SSSI

- No reduction in area and any consequent fragmentation.
- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.
- Total cover of graminoids should not exceed 50%.
- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.
- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.

- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 84.17%
- % Area favourable: 17.51%
- % Area unfavourable recovering: 66.66%
- % Area unfavourable no change: 15.83%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condtion

Drainage, overgrazing, moor burning

5

Arkle Beck Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objectives for the European interests on the the SSSI are:

to maintain*, in favourable condition, the:

- Mountain hay meadows

* maintain implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Arkle Beck Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 87.71%
- % Area unfavourable recovering: 12.29%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

6

Bowes Moor SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- upland moorland
- + Golden Plover, Hen Harrier, Merlin

to maintain*, in favourable condition, the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- upland moorland
- + Curlew

to maintain*****, in favourable condition, the:

- Blanket bogs
- European dry heaths
- Petrifying springs with tufa formation (Cratoneurion)
- Siliceous scree of the montane to snow levels

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket bogs

Targets set to maintain favourable condition within Bowes Moor SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent

- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)

- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European dry heaths

Targets set to maintain favourable condition within Bowes Moor SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Petrifying springs with tufa formations (*Cratoneurion*)

Targets set to maintain favourable condition within Bowes Moor SSSI

- No loss without prior consent
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant
- No **one** species more than **10%**
- No more than **rare**

- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change.

Siliceous scree of the montane to snow levels

Targets set to maintain favourable condition within Bowes Moore SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area

- *Cryptogramma crispa* and *Racomitrium* spp. on moderately stable to stable substrates: both positive indicator species at least occasional over the scree slope or rock outcrop. (NB Some high altitude talus / boulder fileds often lack Cryptogramma and should not be assessed using this attribute.)
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus:* no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - especially by sheep and red deer may cause instability in screes resulting in a slowing down of recolonisation by plant growth. More widely, grazing may remove grazing sensitive species and favour unpalatable species such as ferns.
- **Recreational activities** - Recreational disturbance such as scree running can result in localised acceleration of erosion of scree
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. The loss of Cryptogramma crispa, a key species for this habitat in the UK, from scree in the south Pennines has been attributed to atmospheric pollution
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 100.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

7

Bowlees & Friar House Meadows SSSI - North Pennine Dale Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Bowlees & Friar House Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

8

Castle Eden Dene SSSI - Castle Eden Dene SAC

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the:

- *Taxus baccata* wood

* maintenance implies restoration if the feature is not currently in favourable condition.

***Taxus baccata* wood**

Targets set to maintain favourable condition on Castle Eden Dene SSSI

- No loss of ancient semi-natural stands
- At least current area of recent semi-natural stands maintained, although their location may alter.
- At least the current level of structural diversity maintained (Age/size class variation within and between stands; presence of open space and old trees; dead wood lying on the ground; standing dead trees)
- At least 20 trees per ha left to grow on to become veterans
- Signs of seedlings growing through to saplings to young trees at sufficient density to maintain canopy density over a 20 yr period (or equivalent regrowth from coppice stumps).
- At least the current level of site-native species maintained
- At least 90% of cover in any one layer of site-native or acceptable naturalised species.
- At least 50% of canopy or understorey comprised of Yew
- Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors not more than 10% by number or area in a five year period.
- Distinctive elements (e.g. open space and other woodland types) maintained at current levels and in current locations (where appropriate).

Main pressures and future threats on this habitat, nationally

- **Deer browsing and other forms or mixed forms of inerspecific faunal competition** - Several species of deer occur in the lowland landscape fo Britain. In some cases, stands of this habitat are adversely affected by deer browsing which limits the capacity for natural regeneration via seedlings and saplings. Despite having a reputation as a toxic plant, yew is frequently browsed by deer, as are other palatable plants associated with yew woodland
- **Lack of diversity of stand structure** - many stands are in older age classes that are relatively uniform in composition. This is compounded because of lack of interest, expertise, resources or incentives for appropriate management
- **Air pollution** - based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potential significant threat to the future condition of this habitat. This conclusion is uncertain because research to establish critical loads is based on other woodland communities and may not be strictly applicable to yew woodland. Howeve, is may well be the case that nitrogen loading is encouraging nitrophile species, such as bramble to develop stronly in more open parts of such woodland. The Appropriate Assessment of the Regional Spatial Strategy for the North East examined data from the Air Pollution Information System 2006 which indicates that Castle Eden Dene SSSI / SAC had been receiving loads of acid deposition, nitrogen deposition and tropospheric ozone above the critical load / threshold for the most relevant APIS habitat (Ash and Yew Woodland).

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 6.79%
- % Area unfavourable recovering: 93.21%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

9

Catton Lea Meadow SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

To maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition.

Mountain hay meadows

Targets set to maintain favourable condition within Catton Lea Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure)
  and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

10

Cornriggs Meadow SSSI - North Pennnine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition.

Mountain hay meadows

Targets set to maintain favourable condition within Cornriggs Meadow SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications

- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum
- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considered a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species such as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

11

Cotherstone Moor SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland Moorland
- + Golden Plover, Hen Harrier, Peregrine and Merlin.

to maintain*, in favourable condition, the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- Upland Moorland
- + Curlew.

to maintain*, in favourable condition, the:

- Blanket bogs
- European dry heaths
- Siliceousrocky slopes with chasmophytic vegetation
- to maintain*, in favourable condition, the habitats for the population of:
- Marsh saxifrage (*Saxifraga hirculus*)

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket bogs

Targets set to maintain favourable condition within Cotherstone Moor SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.

- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.

- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European dry heaths

Targets set to maintain favourable condition within Cotherstone Moor SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Siliceous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Appleby Fells SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- (Positive indicator species yet to be determined)

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Marsh saxifrage (*Saxifraga hirculus*)

Targets set to maintain favourable condition within Cotherstone Moor SSSI

- Maintain existing population and longer-term population fitness. Estimated by counts of ramets along with an assessment of flowering/fruiting success
- Maintain open calcareous flushes and rills in light to moderately grazed grassland or grass/heath
- Sward height of 5-c25 cms
- No modification to natural hydrological pattern.
- Trees and shrubs should be absent (to prevent shade)

Main pressures and future threats on this species, nationally

- **Drainage**

- **Planting**
- **Grazing**

SSSI Condition February 2010

- % Area meeting PSA target: 0.48%
- % Area favourable: 17.67%
- % Area unfavourable recovering: 52.81%
- % Area unfavourable no change: 26.73%
- % Area unfavourable declining: 2.78%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Moor burning, over-grazing, inappropriate ditch management

12

Cowpen Marsh SSSI - Teesmouth & Cleveland Coast SPA

The conservation objectives for the European interest on the SSSI are:

to maintain* in favourable conditionthe habitats for the populations of migratory bird species + of European importance, with particular reference to:

Intertidal sand and mudflats

- saltmarsh
- freshwater marsh
- + Redshank

to maintain* in favourable condition the habitats for the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

Intertidal sand and mudflats

- saltmarsh
- freshwater marsh

* maintenance implies restoration if the feature is not currently in favourable condition.

SEETEESMOUTH & CLEVELANDCOAST SPA CONDITIONS TABLE

SSSI Condition February 2010

- % Area meeting PSA target 46.82%
- % Area favourable 0%
- % Area unfavourable recovering 46.82%

- % Area unfavourable no change 53.18%
- % Area unfavourable declining 0%
- % Area destroyed / part destro**yed 0%**

Reasons for Unfavourable Condition

Inappropriate water levels, Planning permission - other minerals and waste

13

Durham Coast SSSI - DurhamCoast SAC - Northumbria Coast SPA - Teesmouth & Cleveland Coast SPA

The conservation objectives for the European interest on the SSSI are:

to maintain* in favourable conditionthe habitats for the populations of Annex 1 species + of European importance, with particular reference to :

Intertidal sand and mudflats

- sand dunes
- coastal waters
- + Little Tern

to maintain*in favourable conditionthe habitats for the populations of migratory bird species + of European importance, with particular reference to :

- Intertidal sand and mudflats
- Rocky shores with associated boulder and cobble beaches
- Artificial high tide roost sites
- + Knot, Purple Sandpiper, Turnstone

to maintain in favourable condition the habitats for the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

- Intertidal sand and mudflats
- Subject to natural change, to maintain*, in favourable condition, the:
- vegetated sea cliffs of the Atlantic and BalticCoasts

* maintenance implies restoration if the feature is not currently in favourable condition.

Vegetated sea cliffs of the Atlantic and Baltic Coasts

Targets set to maintain favourable condition within Durham Coast SSSI

- The overall length and/or area of the cliff habitat of the site is maintained taking into account natural variation (Approximately 30% of sea cliff supporting or capable of supporting vegetated sea cliff communities)
- No increase in linear extent or area constrained by introduced structures or landforms.
- Maintain the range of physical conditions arising from variation in geology and geomorphology, profile, stability, degree of maritime exposure, drainage, aspect, geographical location and history of management.
- Maintain range of maritime grassland communities, taking account of natural variation.
- Maintain range of transitions and other communities previously recorded on the site, taking account of natural variation
- No further increase in species not typically associated with the communities that define the feature

Main pressures and future threats on this habitat, nationally

- **Erosion** - Erosion is a highly significant factor in soft cliffs. High rates of erosion do not imply a loss of the cliff resource, either in geological or biological terms. Cliff face communities are able to retreat with the cliff line, and erosion is fital for constantly renewing geological exposures and recycling the botanical succession on soft cliffs. However, cliff-top vegetation may be destroyed where it is squeezed between a receding cliff face and cultivated land. Cliff erosion in many places provides an essential supply of sediment to coasts lying down drift of the cliffs
- **Coastal protection** - Coastal protection systems have been built on many soft cliff coasts in order to slow down or stop the rate of erosion and thus protect capital assets behind the cliff line. Cliff faces may also be re-profiled and sown with hardy grasses of little value for nature conservation. All such works have the effect of stabilising the cliff face, resulting in geological exposures being obscured, bare soil and early pioneer stages being progressively overgrown, and wet flushes drying out. Soft cliffs require a certain amount of natural erosion to maintain their interest, but unprotected soft cliff is now a relatively scarce habitat.
- **Built development** - There have been many instances in the UK of urban and industrial development and holiday accommodation being built too close to cliff-tops. Where the cliffs are subsequently discovered to be eroding, there is often political pressure to build the type of defensive works dexcribed above. Built development also prevents cliff-top biological communities from retreating in response to cliff erosion, subjecting them to a form of 'coastal squeeze'.
- **Agriculture** - In traditional low-intensity grazing systems, livestock were grazed on cliff grasslands where they maintained open maritime grassland vegetation. Post-war intensification of agriculture has led to maritime grassland on more level terrain being ploughed out, while that on sloping ground has been abondoned and, where not maintained by exposure, is frequently overgrown by scrub. Localised eutrophication can be caused by fertiliser run-off from arable land above and this encourages coarse, vigorous 'weed' species at the expense of the maritime species. Agricultural land drains discharging on the cliff face may cause local acceleration of erosion.
- **Recreational use** - The siting of holiday accommodation on cliff-tops not only reduces the landscape value of a site, but can also cause heavy localised erosion and disturbance to nesting birds. An increase in the number of walkers and dogs along some coastal footpaths has increased livestock worrying and even losses and forced a number of farmers to remove their stock from these sites. Consequently some of the sites are now suffering from a lack of appropriate grazing, and scrub encroachment is likely to become a problem.

- **Introduced species** - Predators, susch as cats and rats, can have a significant impact on populations of cliff or burrow nesting seabirds, particularly on island sites. Also the spread of certain alien, invasive plants, especially members of the flowering plant family Aizoaceae such as Hottentot fig Carpobrotus edulis, can have a devastating impact on indigenous maritime plant communities.
- **Grazing** - Lack of grazing or use of inappropriate stock leading to encroachment of scrub/bracken onto maritime grassland is another factor. Overgrazing may be a problem in some places (including that by rabbits), leading to reduction in habitat diversity
- **Air pollution** - Based on an assessment of relevant literature, this habitat is potentially sensitive to air pollution, but it has not been possible to undertake an assessment of potential impact based on critical loads because of the poor equivalence between this habitat and those for which critical loads are set.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 62.80%
- % Area unfavourable recovering: 37.20%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

14

Far High House Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition.

Mountain hay meadows

Targets set to maintain favourable condition within Far High House Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

15

Fothering Holme SSSI - North Pennine Dales Meadows SAC

The conservation objectives for the European interests on the the SSSI are:

to maintain*, in favourable condition, the:

- Mountain hay meadow habitat.

* maintain implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Fothering Holme SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications

- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum
- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

16

Gingerfields SSSI - North Pennine Dales Meadows SAC

The conservation objectives for the European interests on the the SSSI are:

to maintain*, in favourable condition, the

- Mountain hay meadows

* maintain implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Gingerfields SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

17

Grains O'th' Beck Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Grains O'the Beck Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

18

Haggs Bank SSSI - Tyne & Nent SAC

The Conservation Objectives for the European interest features on the SSSI are:

to maintain*, in favourable condition, the:

- Calaminarian grasslands of the *Violetalia calaminarie*

*maintenance implies restoration if the feature is not currently in favourable condition

Calaminarian grasslands of the *Violetalia calaminarie*

Targets set to maintain favourable condition within Haggs Bank SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa more than occasional throughout the sward or singly or together forming more than 5% cover
- No more than 5% cover negative indicator species
- 20%-90% bare ground
- Average sward height - 5cm or less

Main pressures and future threats on this habitat, nationally

- **Under management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** sometimes removed as a source of contamination
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity.

For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

19

Hannah's Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in a favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Hannah's Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levels of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation.However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

20

Harkers House Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objectives for the European interests on the the SSSI are:

to maintain*, in favourable condition, the:

- Mountain hay meadow habitat.

* maintain implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Harkers House Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

21

Helbeck Wood SSSI - Helbeck & Swindale Woods SAC

The Conservation Objectives for the European interest features on the SSSI are:

to maintain*, in favourable condition, the:

- *Tilio-Acerion* forests of slopes, screes and ravines

*maintenance implies restoration if the feature is not currently in favourable condition

***Tilio-Acerion* forests of slopes, screes and ravines**

- No loss of ancient semi-natural stands
- At least current area of recent semi-natural stands maintained, although their location may alter.
- At least the area of ancient woodland retained.
- At least the current level of structural diversity maintained.
- Understorey (2-5m) present over at least 20% of total stand area.
- Ground flora present over at least ***80%*** of area.
- Canopy cover present over 30-90 % of stand area.
- Age class structure appropriate to the site, its history and management.
- A minimum of 3 fallen lying trees >20 cm diameter per ha and 4 trees per ha allowed to die standing.
- At least the current level of site-native species maintained.
- At least 90% of cover in any one layer of site-native or acceptable naturalised species.
- Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors not more than 10% by number or area in a five year period.
- 80% of ground flora cover referable to relevant NVC community (mainly W9, but also W10 and W11)
- Patches and transitions maintained in extent and where appropriate location. In particular: transitions to species rich limestone grasslands
- Distinctive elements, maintained at current levels and in current locations (where appropriate): Base rich flushes with *Primula farinosa*; *Carex ornithopoda; Cephalanthera longifolia; Epipactis atrorubens*

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - This habitat has and continues to suffer from over-grazing by sheep, deer and rabbits in the western and northern uplands and expansion of deer in southern districts. This impoverishes the ground flora, creates difficulties for regeneration and may alter the woodland structure with impacts on many components of the woodland flora and fauna
- **Invasion by non-native species** - Invasion by sycamore, beech and other species, which are generally not native to these woods in most of Britain, is a widespread issue. Where such species are successful, they displace native counterparts and change the composition of the wood and its associated wildlife.
- **Dutch elm disease** - Since its arrival in Britain in the early 1970s Dutch elm disease has changed the structure and composition of many ravine ashwoods. It causes croawn deterioration and can kill mature elm trees outright. In many woods it has removed or nearly removed elm from the over-storey. Although the disease has a very long history, the latest strain is particularly virulent and was transported to the UK by people.
- **Unsympathetic forestry practices** - these have yhad an impact on a number of woods. This includes planting of inapropriate conifer or broadleaved trees and methods of working and felling rates that do not reflect published guidelines. Some effort has already been made to restore damaged stands, but in other cases the legacy of such activities continues to impact.
- **Lack of appropriate management** - Cessation of traditional management practices in upland ash woods, notable coppicing, is a problem because this results in changes to the environmental and structural conditions and the availability of long-standing habitats. Often this leads to a decline in species richness. Then problem is compounded because there is a lack of interest, expertise and incentives amongst some woodland owners to undertake management
- **Impacts from intensive agriculture** - Ash woods can be negatively affected by nutrient enrichment arising from spray drift or run-off from adjacent agricultural land. This can lead to changes in soils and ground flora. Another issue is where agricultural intensification results in the loss of hedges, trees and small patches of ash-rich scrub in fields. This increases fragmentation and isolation amongst the remaining woodland.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 100.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

22

Hexhamshire Moors SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland Moorland
- + Golden Plover and Merlin.

to maintain*, in favourable condition, the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- Upland Moorland
- Upland Pasture
- + Curlew.

to maintain, in favourable condition, the following features:

- Blanket bogs
- European dry heaths
- North Atlantic wet heaths with *Erica tetralix*

* maintenance implies restoration if the feature is not currently in favourable condition

Blanket bogs

Targets set to maintain favourable condition within Hexhamshire Moors SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent

- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)

- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European dry heaths

Targets set to maintain favourable condition within Hexhamshire Moors SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat

- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

North Atlantic Wet Heaths with Erica Tetralix

Targets set to maintain favourable condition within Allendale Moors SSSI

- No reduction in area and any consequent fragmentation.
- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.
- Total cover of graminoids should not exceed 50%.

- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.
- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.
- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 91.67%

- % Area favourable: 11.44%
- % Area unfavourable recovering: 80.23%
- % Area unfavourable no change: 8.33%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Moor burning, over-grazing, inappropriate ditch management

23

Low Redford Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Harkers House Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

24

LuneForest SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species +, of European importance, with particular reference to:

- Upland Moorland
- + Golden Plover, Merlin.

to maintain*, in favourable condition, the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- Upland Moorland
- Upland Pasture
- + Curlew.

to maintain, in favourable condition, the:

- Blanket bogs
- European dry heaths
- Petrifying springs with tufa formation (Cratoneurion)
- Alkaline fens
- Calcareous rocky slopes with chasmophytic vegetation
- Semi-natural dry grasslands and scrubland facies on calcareous substrates

* maintenance implies restoration if the feature is not currently in favourable condition

Blanket bogs

Targets set to maintain favourable condition within Lune Forest SSSI

- No reduction in area of active blanket bog

- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature

- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European dry heaths

<u>Targets set to maintain favourable condition within Lune Forest SSSI</u>

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Petrifying springs with tufa formations (*Cratoneurion*)

Targets set to maintain favourable condition within Lune Forest SSSI

- No loss without prior consent
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant

- No **one** species more than **10%**
- No more than **rare**
- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alkaline Fens

Targets set to maintain favourable condition within Lune Forest SSSI

- No loss without prior consent
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)

- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Water abstraction** - Past and continuing loss of area by drainage and conversion to intensive agriculture. Excessive water abstraction from aquifers has dried up or reduced spring line flows, and generally lowered water tables. Abstractions also have affected the natural balance between the differing water qualities of ground water and surface water
- **Grazing** - Both under and over0grazing have been recorded as reasons for adverse condition in the SAC series
- **Burning** - Although used as a management tool for some stands of the habitat, particularly but not exclusively in the uplands, burning can also damage the regeneration potential at certain sites.
- **Fragementation** - Small total area of habitat and critically small population sizes of several key species dependent on the habitat
- **Absence of appropriate management** - Lack of or inappropriate management of existing fens leading to drying, scrub encroachement and succession to woodland
- **Pollution** - Valley fens supporting this habitat are particularly susceptible to agricultural run-off within the catchment. Enrichment or hypertrophication can result in substantial adverse changes to key plant communities
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining

future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Calcareous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Lune Forest SSSI

No loss without prior consent

No more than 5% of the stable scree area

At least **two positive indicator** species **occasional**, or **one** species **frequent** in suitable fissures

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial

impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

Targets set to maintain favourable condition within Lune Forest SSSI

- No reduction in area and any consequent fragmentation without prior consent
- **30-90%** of non-graminae (herbs) in sward, measured in period mid-may to end of July
- Sesleria albicans at least **frequent** throughout the sward, mid-May to end of July
- At least **two** other positive indicator species (listed for this habitat at over 500m) **occasional** throughout the sward
- From all relevant positive indicator lists combined, at least **two** species **frequent** and **fouroccasional** throughout the sward
- No negative indicator species/taxa more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or shrubs (*excluding Juniperus communis*)
- No more than **10%** cover *Pteridium aquilinium*
- **2-10** cms average sward height
- Total extent of litter no more than **25%** of the sward
- Bare ground no more than **10%** of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmenetd state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.
- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are priving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**

- **Air pollution** - based on an assessment of relevant critical loads, air pollution is condsidered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 99.97%
- % Area favourable: 11.54%
- % Area unfavourable recovering: 88.43%
- % Area unfavourable no change: 0.03%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Inappropriate css / esa prescription

25

Mallerstang-Swaledale Head - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland moorland
- + Golden Plover, Hen Harrier, Merlin and Peregrine.

to maintain*, in favourable condition, the habitats of the migratory bird species + of European importance, with particular reference to:

- Upland moorland
- Upland pasture
- + Curlew.

to maintain*, in favourable condition, the:

- Blanket bog;
- European dry heath;
- Petrifying springs with tufa formation;
- Alkaline fen;
- Northern Atlantic wet heaths with *Erica tetralix*;
- Semi-natural dry grasslands and scrubland facies on calcareous substrates;
- Siliceous alpine and boreal grasslands.

to maintain*, in favourable condition, the habitat for the population of:

- Marsh saxifrage (*Saxifraga hirculus*)

* maintain implies restoration if the feature is not currently in favourable condition

Blanket bogs

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.

- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European dry heaths

<u>Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI</u>

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]

- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Petrifying springs with tufa formations (*Cratoneurion*)

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No loss without prior consent
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant
- No **one** species more than **10%**
- No more than **rare**
- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alkaline Fens

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No loss without prior consent
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Water abstraction** - Past and continuing loss of area by drainage and conversion to intensive agriculture. Excessive water abstraction from aquifers has dried up or reduced spring line flows, and generally lowered water tables. Abstractions also have affected the natural balance between the differing water qualities of ground water and surface water
- **Grazing** - Both under and over0grazing have been recorded as reasons for adverse condition in the SAC series
- **Burning** - Although used as a management tool for some stands of the habitat, particularly but not exclusively in the uplands, burning can also damage the regeneration potential at certain sites.
- **Fragementation** - Small total area of habitat and critically small population sizes of several key species dependent on the habitat

- **Absence of appropriate management** - Lack of or inappropriate management of existing fens leading to drying, scrub encroachement and succession to woodland
- **Pollution** - Valley fens supporting this habitat are particularly susceptible to agricultural run-off within the catchment. Enrichment or hypertrophication can result in substantial adverse changes to key plant communities
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

North Atlantic Wet Heaths with Erica Tetralix

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No reduction in area and any consequent fragmentation.
- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.
- Total cover of graminoids should not exceed 50%.
- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.

- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.
- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No reduction in area and any consequent fragmentation without prior consent
- **30-90%** of non-graminae (herbs) in sward, measured in period mid-may to end of July
- Sesleria albicans at least **frequent** throughout the sward, mid-May to end of July
- At least **two** other positive indicator species (listed for this habitat at over 500m) **occasional** throughout the sward
- From all relevant positive indicator lists combined, at least **two** species **frequent** and **fouroccasional** throughout the sward
- No negative indicator species/taxa more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or shrubs (*excluding Juniperus communis*)

- No more than **10%** cover *Pteridium aquilinium*
- **2-10** cms average sward height
- Total extent of litter no more than **25%** of the sward
- Bare ground no more than **10%** of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmenetd state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.
- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are priving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**
- **Air pollution** - based on an assessment of relevant critical loads, air pollution is condsidered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Siliceous alpine and boreal grassland

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the most important factor affecting structure and function in SACs supporting this habitat in the Scottish uplands. Excessive grazing, trampling and nutirent inputs from dunging and urination results in a reduction in cover and eventual elimination of characteristic species. This can lead to the replacement of thick swards of Racometrium lanuginosum with grassy swards. Soil erosion occurs in some areas of heavy grazing.
- **Fragmentation** - This habitat is naturally limited by specific environmental requirements leading to scattered distribution and small extent of individual patches, particularly in outlying parts of England and Wales. However, fragmentation has been exacerbated by past grazing pressure
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Marsh saxifrage (*Saxifraga hirculus*)

Targets set to maintain favourable condition within Mallerstang-Swaledale Head SSSI

- Maintain existing population and longer-term population fitness. Estimated by counts of ramets along with an assessment of flowering/fruiting success

- Maintain open calcareous flushes and rills in light to moderately grazed grassland or grass/heath
- Sward height of 5-c25 cms
- No modification to natural hydrological pattern.
- Trees and shrubs should be absent (to prevent shade)

Main pressures and future threats on this species, nationally

- **Drainage**
- **Planting**
- **Grazing**

SSSI Condition February 2010

- % Area meeting PSA target: 95.78%
- % Area favourable: 9.70%
- % Area unfavourable recovering:86.08%
- % Area unfavourable no change:4.22%
- % Area unfavourable declining:0.00%
- % Area destroyed / part destroyed:0.00%

Reasons for Unfavourable Condition

Overgrazing, moor burning, inappropriate ditch management

26

Mere Beck Meadows SSSI - North Pennine Dale Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition.

Mountain hay meadows

Targets set to maintain favourable condition within Mere Beck Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when
coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

27

Middle Crossthwaite SSSI - North Penine Dale Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Middle Crossthwaite SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

28

Middle Side & Stoneygill Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Middle Side & Stoneygill Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 73.92%
- % Area favourable: 73.92%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 26.08%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Agriculture - other, lack of species diversity and frequency

29

Moorhouse & Cross Fell SSSI - Moorhouse Upper Teesdale SAC - North Pennine Moors SPA

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of the regularly occuring bird species[+], with reference to:

- Upland moorland
- Upland pasture
- + Golden Plover, Hen Harrier, Merlin, Peregrine and Curlew

to maintain*, in favourable condition, the:

- Blanket bog (active only)
- European dry heaths
- Alpine and boreal heaths
- Siliceous alpine and boreal grasslands
- Alkaline fens
- Petrifying springs with tufa formations (*Cratoneurion*)*
- Alpine pioneer formations of *Caricion bicoloris- atrofuscae**
- Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
- Calaminarian grasslands of the *Violetalia calaminariae*
- Calcareous rocky slopes with chasmophytic vegetation.
- Siliceous rocky slopes with chasmophytic vegetation
- Calcareous and calcshist screes of the montane to alpine levels
- Siliceous scree of the montane to snow levels
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

to maintain*, in favourable condition, the habitats for the population of:

- Marsh saxifrage (*Saxifraga hirculus*)

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket Bog

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England.

New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.

- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Alpine and Boreal Heaths

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the major reported pressure on stands of this habitat, leading to loss of vegetation structure and the failure of more palatable or vulnerable to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna, and to the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare soil and erosion.
- **Burning** - Accidental burning by fires spreading upslope from managed fires of submontane tall heaths is another widespread factor affecting the habitat
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Siliceous alpine and boreal grassland

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI (as for Alpine and Boreal Heaths)

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the most important factor affecting structure and function in SACs supporting this habitat in the Scottish uplands. Excessive grazing, trampling and nutirent inputs from dunging and urination results in a reduction in cover and eventual elimination of characteristic species. This can lead to the replacement of thick swards of Racometrium lanuginosum with grassy swards. Soil erosion occurs in some areas of heavy grazing.
- **Fragmentation** - This habitat is naturally limited by specific environmental requirements leading to scattered distribution and small extent of individual patches, particularly in outlying parts of England and Wales. However, fragmentation has been exacerbated by past grazing pressure
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alkaline Fens

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- Maintenance of high Piezometric Head

- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Water abstraction** - Past and continuing loss of area by drainage and conversion to intensive agriculture. Excessive water abstraction from aquifers has dried up or reduced spring line flows, and generally lowered water tables. Abstractions also have affected the natural balance between the differing water qualities of ground water and surface water
- **Grazing** - Both under and over0grazing have been recorded as reasons for adverse condition in the SAC series
- **Burning** - Although used as a management tool for some stands of the habitat, particularly but not exclusively in the uplands, burning can also damage the regeneration potential at certain sites.
- **Fragementation** - Small total area of habitat and critically small population sizes of several key species dependent on the habitat
- **Absence of appropriate management** - Lack of or inappropriate management of existing fens leading to drying, scrub encroachement and succession to woodland

- **Pollution** - Valley fens supporting this habitat are particularly susceptible to agricultural run-off within the catchment. Enrichment or hypertrophication can result in substantial adverse changes to key plant communities
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change.

Petrifying springs with tufa formations (*Cratoneurion*)

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant
- No **one** species more than **10%**
- No more than **rare**
- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alpine pioneer formations of *Caricion bicoloris- atrofuscae*

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI (as for Alkaline Fens)

- No loss without prior consent
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**

- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the more accessible stands. This leads to loss of vegetation structure and the failure of the more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna. However, some grazing may be necessary for their survival to keep competition from more vigorous species in check.
- **Fragmentation and connectivity** - This is a highly fragmented habitat occurring on isolated hills in small stands probably mainly less that 0.1 ha in size and only on a few favoured sites do stands occur in any numbers. Many of the rare arctic-alpine species that characterise these stands survive at the limits of viability. Given such fragmentation the characteristic species of this habitat are susceptible to chance events.
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Water management** - The habitat is dependent on snowmelt flushing the habitat in early spring. Changes to the length of snow lie and the amount of water can lead to adverse changes to this naturally variable habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No reduction in area and any consequent fragmentation without prior consent
- **30-90%** of non-graminae (herbs) in sward, measured in period mid-may to end of July
- Sesleria albicans at least **frequent** throughout the sward, mid-May to end of July
- At least **two** other positive indicator species (listed for this habitat at over 500m) **occasional** throughout the sward
- From all relevant positive indicator lists combined, at least **two** species **frequent** and **fouroccasional** throughout the sward
- No negative indicator species/taxa more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or shrubs (*excluding Juniperus communis*)
- No more than **10%** cover *Pteridium aquilinium*
- **2-10** cms average sward height
- Total extent of litter no more than **25%** of the sward
- Bare ground no more than **10%** of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmenetd state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.
- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are priving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**
- **Air pollution** - based on an assessment of relevant critical loads, air pollution is condsidered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance

location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Calaminarian grasslands of the *Violetalia calaminariae*

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa of negative indicator species more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or scrub
- **20% - 90% bare ground** (can include thin crust of lichens)
- Sward **5 cm** or less

Main pressures and future threats on this habitat, nationally

- **Under-management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** habitatsometimes removed as a source of contamination to livestock, as well as in land reclamation schemes
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity. For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

Calcareous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent

- No more than 5% of the stable scree area
- At least **two positive indicator** species **occasional**, or **one** species **frequent** in suitable fissures

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Siliceous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- (Positive indicator species yet to be determined)

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Calcareous and calcshist screes of the montane to alpine levels

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- Frequency of positive indicator species: at least two species occasional, or one species within the OV40 list frequent over the scree.
- Frequency of negative indicator speceies: no species more than occasional over the scree
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus*: no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree
- Extent of visible rocks (the majority of plants should be growing through gaps between rocks, not forming a mat of vegetation over the rocks): At least 33%
- Cover of *Arrhenatherum elatius* : No more than 50% cover across the scree

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of scree but some grazing is necessary to maintain open screes, preventing scrub or woodland regeneration
- **Invasive species** - The spread of non-native plants especially New Zealand Willow Herb Epilobium brunnei is a factor in the moister, mainly western scree
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Siliceous scree of the montane to snow levels

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- *Cryptogramma crispa* and *Racomitrium* spp. on moderately stable to stable substrates: both positive indicator species at least occasional over the scree slope or rock outcrop. (NB Some high altitude talus / boulder fileds often lack Cryptogramma and should not be assessed using this attribute.)
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus:* no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - especially by sheep and red deer may cause instability in screes resulting in a slowing down of recolonisation by plant growth. More widely, grazing may remove grazing sensitive species and favour unpalatable species such as ferns.
- **Recreational activities** - Recreational disturbance such as scree running can result in localised acceleration of erosion of scree

- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. The loss of Cryptogramma crispa, a key species for this habitat in the UK, from scree in the south Pennines has been attributed to atmospheric pollution
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- No loss without prior consent
- **50%** tall herbs
- At least one positive indicator species abundant
- At least one additional positive indicator species frequent and one species occasional
- **50%** of potentially flowering stems turning to flowering / seed production
- No more than **50%** of stems, of any species of tall herb, show signs of grazing by the end of the growing season. Light grazing impact overall.
- **20 cm** average vegetation height

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - Overgrazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the few more open stands. This leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna.
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of or inappropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment

- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Marsh saxifrage (*Saxifraga hirculus*)

Targets set to maintain favourable condition within Moorhouse & Cross Fell SSSI

- Maintain existing population and longer-term population fitness. Estimated by counts of ramets along with an assessment of flowering/fruiting success
- Maintain open calcareous flushes and rills in light to moderately grazed grassland or grass/heath
- Sward height of 5-c25 cms
- No modification to natural hydrological pattern.
- Trees and shrubs should be absent (to prevent shade)

Main pressures and future threats on this species, nationally

- **Drainage**
- **Planting**
- **Grazing**

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 2.68%
- % Area unfavourable recovering: 97.32%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

30

Muggleswick, Stanhope & EdmundbyersCommons & Blanchland Moors SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland moorland
- + Golden Plover, Peregrine, Hen Harrier and Merlin.

to maintain* in favourable condition the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- Upland Moorland
- Upland Pasture
- + Curlew

to maintain, in favourable condition, the:

- Blanket bogs
- European dry heaths
- North Atlantic wet heaths with *Erica tetralix*

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket Bog

Targets set to maintain favourable condition within Muggleswick, Stanhope & Edmundbyers Commons & Blanchland Moors SSSI

- No reduction in area of active blanket bog

- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature

- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

<u>Targets set to maintain favourable condition within Muggleswick, Stanhope & Edmundbyers Commons & Blanchland Moors SSSI</u>

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

North Atlantic Wet Heaths with Erica Tetralix

Targets set to maintain favourable condition within Muggleswick, Stanhope & Edmundbyers Commons & Blanchland Moors SSSI

- No reduction in area and any consequent fragmentation.
- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.

- Total cover of graminoids should not exceed 50%.
- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.
- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.
- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change.The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 2.85%
- % Area unfavourable recovering: 97.15%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

31

NinebanksRiver Shingle SSSI - Tyne & AllenRiver Gravels SAC

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the:

- Calaminarian grassland

* maintenance implies restoration if the feature is not currently in favourable condition

Calaminarian grasslands of the *Violetalia calaminarie*

Targets set to maintain favourable condition within Ninebanks River Shingle SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa more than occasional throughout the sward or singly or together forming more than 5% cover
- No more than 5% cover negative indicator species
- 20%-90% bare ground
- Average sward height - 5cm or less

Main pressures and future threats on this habitat, nationally

- **Under management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** sometimes removed as a source of contamination
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity.

For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

SSSI Condition February 2010

- % Area meeting PSA target: 24.17%
- % Area favourable: 24.17%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 75.83%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Inappropriate scrub control

32

Peckriding Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Peckriding Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

33

Rigg Farm & Stake Hill Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within Rigg Farm & Stake Hill Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications

- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum
- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 100.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

34

River Eden & Tributaries SSSI - River Eden SAC

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the:

- Floating formations of water crowfoot (*Ranunculus*) of plain and sub-mountainous rivers
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorellerea uniflorae* and/or of the *Isoeto-Nanojuncetea*
- Residual alluvial forests with *Alnion glutinoso-incanae*

to maintain*, in favourable condition, the habitats for the population of:

- Atlantic salmon (*Salmo salar*)
- Bullhead (*Cottus gobio)*
- Brook lamprey (*Lampetra planeri*)
- River lamprey (*Lampetra fluviatilis*)
- Sea lamprey (*Petromyzon marinus*)
- White-clawed crayfish (*Austropotamobius pallipes*)
- Otter (*Lutra lutra*)

* maintenance implies restoration, if the feature is not currently in favourable condition.

35.1 River Eden &Tributaries SSSI: notes on distribution of features within the site

35.2 The River Eden candidate SAC covers 410km and, along with the main channel, includes twelve tributary systems. The features of interest are not evenly spread across the site. In addition, the main channel and the tributary systems differ in their natural characteristics, for example, flow regime, aquatic and marginal flora and substrate types. Further fine tuning of the objectives may be required to take account of this variation.

Species	Distribution
Ranunculus habitat	This habitat is found on the main channel of the River Eden, the River Eamont, River Caldew and on many of the smaller streams, particularly those draining off the limestone and Pennines. The most extensive areas are found on the River Eamont and on the River Eden downstream from Appleby. However, the smaller limestone streams also have outstanding examples of this habitat. At present there is no mapped data on the extent of this habitat on the River Eden or on the dynamics of individual stands and their associated species. The objective for habitat extent is, therefore, fairly imprecise at present.
Atlantic salmon	Atlantic salmon are found throughout the site. Spawning occurs or has occurred in all twelve of the tributary systems and the main channel downstream to Carlisle. In recent decades, catch returns suggest a major change in run timing on the river with a shift from pre-June to post-June runs. The reasons for this are unclear. Ongoing research into the movement of salmon within the catchment may inform further development of the objectives for this species.
Bullhead	Bullhead are found mainly in the smaller headwaters of the River Eden and in the upper part of the main channel. This species is a particular feature of the limestone headwaters in association with white-clawed crayfish. Quantitative data on populations is restricted to abundance classes in the NRA/Environment Agency strategic coarse fish surveys. There is no data on recruitment.
Sea brook and river lamprey	Sea lampreys Petromyzon marinus are found in the lower reaches of the River Eden main channel with records upstream to Armathwaite and Lazonby. They may also enter the Irthing system. River lampreys Lampetra fluviatilis have been recorded from the same places as sea lampreys and also more widely across the catchment in the larger tributaries and main channel. Brook lampreys Lampetra planeri have been recorded from many of the smaller tributaries, headwaters and the upper part of the main channel. There is no quantitative data on the strength of populations, numbers of spawning adults or recruitment. It is therefore not possible to set targets for these attributes.
White-clawed crayfish	White-clawed crayfish are found in the limestone headwaters of the River Eden, notable the streams between Scandal Beck and the River Lowther. They are also found in the River Eamont, Dacre Beck, the main channel of the Eden around and upstream from Appleby and some of the streams on the Pennine side of the catchment. Densities vary between sites and types of streams with the pure limestone streams of Potts Beck and Scandal Beck appearing to support particularly high densities.

Otter	After a long period of restricted distribution, otters are currently spreading into the headwaters of the River Eden from the area around Carlisle and the Irthing catchment. There are now records of presence of otters from most of the lower catchment and into the upper catchment around Appleby, Ullswater and the Lowther catchment. There is no data on otter densities on the River Eden and most of the survey information is based on otter signs.
Oligotrophic and mesotrophic standing waters	The River Eden SAC includes Ullswater. This is the second largest lake in Cumbria with an area of 8.94 sq. km and a mean depth of 25.3 metres. The lake is classed as transitional oligotrophic-mesotrophic in terms of mean Chlorophyll A and Total Phosphorous. The aquatic flora of Ullswater suggests there are both oligotrophic and mesotrophic elements. Data from 1997 suggests the lake falls between Type 3 and Type 5a with a Mean Trophic Ranking Score of 6.8. There are at least eight species of pondweed present and notable species include Elatine hexandra. As yet, the invasive Crassula helmsii has not been recorded. Ullswater is one of four lakes in the Lake District supporting a population of schelly. Arctic charr was also present but became extinct sometime before 1940, possibly because its spawning grounds in an inflow stream were vulnerable to pollution and silt deposition from lead mines. Sediment core records give some evidence of past conditions and recent changes. Tentative estimates of recent sedimentation rates suggest a slight increase between the 1920s and 1970s. There is also evidence of recent inputs of lead-enriched material associated with past mining activities in the catchment. Since about 1900, changes in the diatom flora suggest some nutrient enrichment.

35

General river targets for floating formations of water crowfoot (*Ranunculus*) of plain and sub-mountainous rivers, Atlantic salmon, bullhead, sea/river/brook lamprey, white-clawed crayfish, otter

- Limits on licensed abstractions: flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should be maintained throughout the site at all times of year.

- Flow criteria already laid down for the river (e.g. for passage of migrating salmon) should also be complied with.
- Biological river water quality class: for the River Eden SAC the general target will be Class A.
- River Ecosystem Class: for the River Eden SAC the general target will be Class RE1
- Suspended solids (annual average): since salmon are found throughout the site, the general target for this attribute is =<10mg/l (see notes).
- Soluble reactive phosphorous (annual mean): 0.02mg/l - upland streams; 0.06mg/l rivers on limestone and sandstone

- Silt content (Silt content targets also apply to Residual Alluvial Forest and Oligotrophic Lake habitats):
  Channels should be dominated by clean gravels
  Maximum silt content:
  Ranunculus beds - <20% in top 10cm of mid-channel gravels;
  salmon and lamprey spawning areas -<10% in top 30cm of spawning substrates;
  Since salmon are found throughout the areas where lampreys, bullhead and crayfish are found, <10% will be the general target.

-

Extra targetsfor floating formations of *Ranunculus* of plain and sub-mountainous rivers

- Presence of characteristic aquatic and marginal plant species; absence of indicators of unfavourable condition.
- No net loss of the habitat within each river stretch.
- *Ranunculus* should be able to flower and set seed, in suitable habitat. No net loss of flowering Ranunculus.
- Channels should be generally characteristic of river type and appropriate to naturalised flow conditions (avoid or remove artificial structures within river

Main pressures and future threats on this habitat, nationally

- **Pollution** - The habitat suffers from a wide range of pollution impacts, including organic pollution, eutrophicatio, siltation, acidificationand other forms of toxic pollution (industrial discharges, sheep dip and other agorchemicals). Pollution may arise from atmospheric sources, consented effluents, catchment land uses (particularly agriculture) or small point sources such as septic tanks. Post of these impacts act more on certain sub-types of the habitat, and on certain parts of the biota, than others.
- **Hydrological interventions** - These include major upland impoundments, which have flooded the habitat and severely affected the hydrological and thermal regime of the habitat downstream, and abstractions (either direct from the river habitat or from groundwaters supplyiong them) that intensify ecological stress at times of natural low flows> Headwater impoundment is widespread in upland catchments, whilist abstraction stress is significant across most of England.

- **Physical interventions** - The habitat resource has been subject to extensive physical modification, including channel widening, channel deepening, channel straightening, and the construction of in-channel structures that impound flows, enhance siltation and prevent movement of species. Overall, there has been a widespread loss of habitat niches for characteristic flora and fauna, involving loss of characteristic diversity in currnet velocities, water depth and substrates, direct loss of coarse substrates through dredging, loss of riparian hydrological transition zone and loss of floodplain connectivity. Even in relatively unmodified examples of the habitat type, river channels are frequently fossilises by an on-going programme of bank reinforcement and repair that prevents movement within the floodplain.
- **Biological interventions** - So far, no national strategic response to these invasive species has been mounted. Site-specific mitigation has been attempted, but has generally had little effect. Strategic approaches to the control of mthe most invasive plant species are being piloted in the catchments of certain SAC reivers, involving the establishment of a coordinating project officer and the marshalling of local volunteer effort. However, biological control agents may be the only way in which these species can be effectively countered, necessitating focussed research. Fish stocking guidelines are being established for SAC rivers in England and Wales to prevent adverse effects on the habitat type and associated Annex II species, including salmon, crayfish, bullhead, twaite and assis shads. A nationally applicable trout stocking policy has also been put in place to avoid any further intensification of stocking into rivers, although the potential of this policy to reduce stocking intensity appears limited.
- **Climate change** - Based on the literature review, climate change is considered a major threat to the future condition of this habitat especially in the long term. Predicted climate change will add further drought and thermal stress on rivers already suffering from multiple stressors. More intense rainfall events will deliver greater amounts of fine sediment and phosphorous from the catchment, adding to siltation and eutrophication pressures. They will also increase the pressure for the maintenance and enhancement of channel modifications for flood risk management that degrade physical habitat. To counter these prospects, there is an increasing emphasis on catchement-based solutions to freshwater management and a focus on restoring natural hydrological processes as a means of increasing the ability of catchments to cope with climate change. This should provide a drive towards targeted river restoration and floodplain re-wetting in strategic parts of catchment where flooding can be accepted, in order to prevent flooding in other parts of the catchment to protect people and property.
  However, there is a great deal of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation, CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other dirvers of environmental change.

Extra targets for Atlantic salmon (*Salmo salar*)

- Area of spawning habitat: Maintain and where necessary restore

- Area of nursery habitat: Maintain and where necessary restore
- Number of adult holding areas: Maintain and where necessary restore
- Area of submerged and marginal plants: Maintain patchy cover and restore where necessary.
- Extent of bankside tree cover with submerged tree root systems: Maintain existing extent ans restore where appropriate for the river type.
- River form: Maintain and where necessary restore the characteristic physical form of the river channel and its natural processes.
- No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds, and smolts from reaching the sea.
- The salmon population should be naturally self-sustaining. There should be no stocking unless it is agreed to be necessary as an emergency interim measure to maintain a viable population whilst underlying ecological problems are addressed
- No stocking of other species at excessively high densities in salmon spawning and nursery areas.
- Effective screening on all fish farm intakes and discharges.
- Steps taken to ensure that exploitation (fishing) does not interfere significantly with the ability of the river to achieve its Minimum Biological Acceptable Limit (see biological criteria in the annexe '*Guidance on verifying favourable condition*').

Main pressures and future threats on this species, nationally

- Fish and shellfish aquaculture
- Fixed location fishing
- Drift-net fishing
- Leisure fishing
- Trapping, poisoning, poaching
- Sand and gravel axtraction
- Water pollution
- Management of aquatic and bank vegetation for drainage purposes
- Canalisation
- Modification of hydrographic functioning, general
- Modifying structures of inland watercourses
- Management of water levels
- Silting up
- Drying out
- Eutrophication
- Acidicication

- Competition (mainly with other salmonids)
- Parasitism
- Introduction of disease
- Genetic pollution

Extra targets for bullhead (*Cottus gobio*)

- Extent of gravel/pebble-dominated substrate: Maintain and where necessary restore
- Extent of slack-water refuges: Maintain and where necessary restore
- Extent of high canopy tree cover: Maintain existing intermittent cover and where appropriate restore.
- Extent of submerged higher plants : Maintain patchy cover where appropriate for the river type.
- Extent of woody debris : Should be retained where characteristic of the river type/reach.
- Maintain and, where necessary, restore the characteristic physical form of the river channel.
- Artificial obstructions : No significant impediment to essential fish movement between reaches.
- No stocking/transfers of bullhead unless agreed by English Nature to be in the best interests of the population.
- No stocking of other fish species at excessively high densities.
- Effective screening on all fish farm intakes and discharges
- Absence of non-native crayfish

Main pressures and future threats on this species, nationally

- Fish and shellfish aquaculture
- Sand and gravel extraction
- Water pollution
- Management of aquatic bank vegetation for drainage purposes
- Canalisation
- Modification of hydrographic functioning, general
- Modifying structures of inland water courses
- Management of water levels
- Erosion
- Silting up

- Competition - for habitat, particularly with the introduced signal crayfish
- Predation - particularly by introduced signal crayfish

Extra targets for brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*)

- Area of spawning habitat: Maintain and where necessary restore
- Area of nursery habitat: Maintain and where necessary restore
- Area of emergent marginal vegetation: Maintain a high extent throughout the river system
- Extent of bankside tree cover: Maintain existing extent characteristic of the river type and, where appropriate, restore.
- Maintain and where necessary restore the characteristic physical form of the river channel
- No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds.
- No stocking/transfers of lampreys unless agreed by English Nature to be in the best interests of the population.
- No stocking of other fish species at excessively high densities.
- Zero exploitation until further notice

Main pressures and future threats on this species, nationally

- Bait digging
- Sand and gravel extraction
- Water pollution
- Management of aquatic bank vegetation for drainage purposes
- Removal of sediments (mud…)
- Canalisation
- Modification of hydrographic functioning, general
- Modifying structures of inland water courses
- Managemnet of water levels
- Drying out / accumulation of organic material
- Eutrophication
- Acidification
- Invasion by a species (brook lamphrey)
- Competition (brook lamphrey)

- Introduction of a disease (brook lamphrey)
- Discharges (river lamphrey, sea lamphrey)

Extra targets for white-clawed crayfish (*Austropotamobius pallipes*)

- Extent of cobbles/ boulders: Maintain to an extent characteristic of the river type
- Extent of large woody debris: Retainwhere characteristic of the river type
- Density of bankside refuges: Submerged tree root systems and/or crevices in banksides should be available at intervals
- Extent of submerged and marginal vegetation : Maintain patchy cover where characteristic of the river type.
- Extent of overhanging riparian vegetation : Should be present intermittently along the bank throughout the year.
- Extent of bankside tree cover : Maintain existing extent characteristic of the river type and restore where appropriate.
- Maintain and, where necessary, restore the characteristic physical form of the river channel
- No stocking/transfers of white-clawed crayfish unless agreed by English Nature to be in the best interests of the population.
- No stocking of fish species at excessively high densities or of fish from catchments with non-native crayfish or crayfish plague.
- Effective screening on all fish farm intakes and discharges
- Absence of non-native crayfish species
- Absence of individuals infected with crayfish plague
- Thelohaniasis (Porcelain Disease) should not affect more than 10% of the population

Main pressures and future threats on this species, nationally

- Water pollution
- Modifying structures of inland water courses
- Introduction of disease (crayfish plague)
- Competion (esepcially from introduced, non-native crayfish spp)

Extra targets for otter (L*utra lutra*)

- No net loss of bankside habitats suitable for otter holts and lying up areas : Thick vegetation cover, riverside woodland and vegetated islands are important holt habitats and areas for otters to shelter and rest during the day.
- See also common targets for river form and bankside cover.
- No significant decline in fish biomass or species diversity characteristic for the River Eden.: Refer to Environment Agency for sample data

- No net loss in quiet river stretches not affected by access or disturbance of riparian habitats.: Although otters are found in close proximity to public areas, they still need quiet areas for resting and breeding.
- No evidence of a decrease in extent of populations in a five year period.

Main pressures and future threats on this species, nationally

- Use of pesticides
- Trawling
- Hunting, fishing or collecting activities not referred to above
- Pollution
- Fixed location fishing
- Routes, autoroutes
- Infilling of ditches, dykes, ponds, pools, marshes or pits
- Drainage
- Management of aquatic and bank vegetation for drainage purposes
- Canalisation
- Flooding
- Modification of hydrographic functioning, general
- Modifying structures of inland water courses
- Management of water levels

Additional parameters to consider within appropriate assessments

A range of specific parameters may be relevant to the assessment of the likely impact of a plan or project in addition to those specified in the favourable condition table. This should not be considered as an exhaustive list but indicates some keys areas of concern.

Water column parameters

Consideration of the effects of **heavy metals**, **herbicides**, **pesticides** (particularly **sheep dip chemicals**) and **hydrocarbons** is essential. In particular, species such as white-clawed crayfish and salmon are highly susceptible to even very low concentrations of sheep dip. The risks of impact on *Ranunculus* habitat of riparian applications of atrazine and isoproturon on maize crops are also of particular concern.

Water hardness is a key issue for a number of species, particularly pearl mussel and white-clawed crayfish. Pearl mussel almost always occurs in waters with a hardness of <10mg $CaCO_3$ l^{-1}, whilst white-clawed crayfish is invariably found in waters greater than this value. The activity most likely to interfere with water hardness is the mass transfer of water from areas with different geologies.

Effects on **temperature regime** may have important consequences for a number of species. For instance, crayfish breeding is initiated by an extended period of water temperatures below 10 deg C during the autumn, and may be adversely affected by heated discharges.

Substrate quality

Elevated **sediment phosphorus** levels may lead to excessive growths of tolerant rooted-macrophytes and benthic algae, and may also result in enhanced release of soluble phosphorus to the water column.

Sediment oxygen levels are important to the survival of salmon eggs and fry, lamprey eggs and ammocoetes and probably juvenile pearl mussels. Inorganic silt can interfere with aeration within coarse substrate, but in both coarse and fine substrate the sediment oxygen demand is a key consideration, driven by the presence of degradable organic matter. In siltbeds, levels of organic matter that generate anoxia or near-anoxia will make the habitat unsuitable for lampreys.

Guidance on verifying favourable condition in relation to designated species

Assessment of the population will help to determine whether the measures taken within the site to protect the population and its habitat are adequate. The following criteria are suggested for determining whether a population is in a favourable state both within SACs and in its wider range. This guidance may also be useful when considering possible effects on site integrity (in relation to the potential for off-site impacts to affect the population within the SAC). This guidance will be refined, when further planned research into monitoring and population assessment protocols has been undertaken. *[N.B. See SSSI favourable condition table for this additional info]*

Targets for Oligotrophic to mesotrophic standing waters of plains to sub-alpine levels (Ullswater)

- The plant community should remain stable in extent and composition and in accordance with Type 3 and Type 5a., and there should be no deterioration from the survey of 1997.
- Maintain water quality of annual mean total P not more than 20 Fg/1*
- Maintain present range of fluctuation in lake levels, avoiding excessive drawdown in summer months.
- No increases in sediment inputs

Main pressures and future threats on this species, nationally

- **Nutrient enrichment** - much has been done to reduce major point sources, but diffuse sources (e.g. agriculture) and small point sources (e.g. septic tanks) remain a problem. Fish stocking may also put pressure on lake systems.
- **Invasive non-native species** - Crassula helmsii is a particular problem
- **Hydrology** - abstraction for potable water supply or hydro-electic generation
- **Air pollution** - based on an assessment of relevant literature, this habitat is potentially sensitive to air pollution, but it has not been possible to undertake an assessment of potential impact based on critical loads because of the poor equivalence between this habitat and those for which critical loads are set.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Targets for Residual Alluvial Woodland

- There is an estimated 60ha of residual alluvial woodland in the River Eden SAC. Most of this is on the River Irthing in association with sedge swamp, exposed river gravels and actively migrating channels. There are aslo smaller areas on Briggle Beck.
- No loss of ancient semi-natural stands
- At least current area of recent semi-natural stands maintained, although their location may alter.
- At least the current level of structural diversity maintained.
- Understorey (2-5m) present over at least 20% of total stand area
- Ground flora present over at least 50% of area excluding temporary pool areas
- Canopy cover present over 30-90 % of stand area
- Age class structure appropriate to the site, its history and management.
- A minimum of 3 fallen lying trees or major branches per ha and 4 trees per ha allowed to die standing.
- At least the current level of natural hydrological features should be maintained (channels, pools, periodic flooding)
- Signs of seedlings growing through to saplings to young trees at sufficient density to maintain canopy density over a 10 yr period (or equivalent regrowth from coppice stumps).

- No more than 10% of areas regenerated by planting.
- All planting material of locally native stock
- No planting in stands where it has not occurred in the last 15 years.
- At least the current level of site-native species maintained.
- At least 90% of cover in any one layer of site-native or acceptable naturalised species.
- Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors not more than 10% by number or area in a five year period.
- 80% of ground flora cover referable to relevant NVC wet woodland community (W 1-7)
- Distinctive elements of ground flora maintained at current levels and in current locations (where appropriate).
- Patches (of associated habitats) and transitions (to other habitat) maintained in extent and where appropriate location.

Main pressures and future threats on this species, nationally

- **Water management and pollution** - This is an important pressure that takes several forms. (i) lowering of water tables through drainage or water abstraction, which results in a transition to drier woodland types; (ii) flood prevention measures, river control and canalisation, which leads to a loss of dynamic disturbance-succession systems and invertebrate communities, and possible reductions in the extent of individual sites; and (iii) poor water quality arising from eutrophication, industrial effluents or rubbish dumping, whic changes the composition of the ground flora and invertebrate communities
- **Cessation of traditional management** - Some alluvial forests, particularly those with alder-dominated stands, have a history of coppice management. Cessation of such management reduces their wildlife value and may encourage succession to drier types of woodland
- **Inappropriate grazing regimes -** Inappropriate grazing levels and poaching of the soil by sheep, cattle and deer is a major pressure on some alluvial forest sites. This has lead to changes in the woodland structure, impoversished the ground flora, damaged the soil structure, and created difficulties for regeneration.
- **Invasion by non-native species -** Several invasive non-native species have invaded or been introduced into these habitats. These include Himalayan Balsam Impatiens glandulifera; Giant hogweed Heracleum mantegazzianum, and Japanese knotweed Fallopia janponica. Non-native hybrid poplars have also been introduced in places for forestry purposes: these can be difficult to irradicate and spread via suckers
- **Clearance and conversion -** Clearance and conversion of alluvial forests for other land-uses remains an issue particularly for secondary woods recently established on wetland sites
- **Constraints on expansion -** At some alluvial forst sites, constraints are imposed from agriculture, industrial or residential development on the spread of woodland onto adjacent ground. This reduces opportunities to diversify the forest age structure
- **Disease -** A Phytpophthora root disease has badly affected some alluvial forest stands. This affects alder and can in some cases kill outright
- **Air pollution -** This habitat is not consiedered sensitive to nutirent nitrogen deposition or acidification. However, the assessment did not explicitly consider concentrations of atmospheric pollution from ammonia and oxides of nitrogen, which are considered to have potentially

damaging impacts on the bryophyte and lichen communities of wet woodland habitats. Parts of the range of the habitat are certainly within areas where high levels of these substances occur.

SSSI Condition February 2010

- % Area meeting PSA target: 20.82%
- % Area favourable: 20.01%
- % Area unfavourable recovering: 0.81%
- % Area unfavourable no change: 79.17%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

- Inland flood defence works
- Invasive freshwater species
- Overgrazing
- Agriculture - other
- Water pollution - agriculture/run off
- Water pollution - discharge
- Siltation
- Fertiliser use
- Water abstraction
- Other - specified in comments

36

River Nent at Blagill SSSI - Tyne & Nent SAC

The Conservation Objectives for the European interest features on the SSSI are:

to maintain*, in favourable condition, the:

- Calaminarian grasslands of the *Violetalia calaminarie*

*maintenance implies restoration if the feature is not currently in favourable condition

Calaminarian grasslands of the *Violetalia calaminarie*

Targets set to maintain favourable condition within River Nent at Blagill SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa more than occasional throughout the sward or singly or together forming more than 5% cover
- No more than 5% cover negative indicator species
- 20%-90% bare ground
- Average sward height - 5cm or less

Main pressures and future threats on this habitat, nationally

- **Under management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** sometimes removed as a source of contamination
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity.

For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 100.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

37

Seal Sands SSSI - Teesmouth & Cleveland Coast SPA & European Marine Site (EMS)

The conservation objectives for the European interest on the SSSI are:

to maintain* in favourable conditionthe habitats for the populations of Annex 1 species+ of European importance, with particular reference to :

- Intertidal sand and mudflats
- Coastal waters
- + Little Tern and Sandwich Tern

to maintain* in favourable conditionthe habitats for the populations of migratory bird species + of European importance, with particular reference to :

- + Redshank and Knot

to maintain* in favourable condition the habitats for the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

- Intertidal sand and mudflats
- Saltmarsh

* maintenance implies restoration if the feature is not currently in favourable condition.

Favourable Condition Tables for SPA and EMS are included below

Listed vulnerabilities from Natura 2000 Data Form

The natural incursion of coarse marine sediments into the estuary and the eutrophication of sheltered mudflats leading to the spread of dense Enteromorpha beds may impact on invertebrate density and abundance, and hence on waterfowl numbers. Indications are that the observed sediment changes derive from the reassertion of natural coastal processes within the context of an estuary much modified by human activity. An extensive long-term monitoring programme is investigating the effects of the Tees Barrage, while nutrient enrichment from sewage discharges should be ameliorated by the planned introduction of improved treatment facilities and the Environment Agency's acceptance of Seal Sands as a

candidate Sensitive Area to Eutrophication. Aside from the eutrophication issue, water quality has shown considerable and sustained improvement, leading to the re-establishment of migratory fish populations and the growth of cormorant and common seal populations. The future development of port facilities in areas adjacent to the site, and in particular of deep water frontages with associated capital dredging, has the potential to cause adverse effect; these issues will be addressed through the planning system/Habitats Regulations, as will incompatible coastal defence schemes. Other issues on this relatively robust site include scrub encroachment on dunes (addressed by Site Management Statements with owners) and recreational, bait-gathering and other disturbance/damage to habitats/species (addressed by WCA 1981, NNR Byelaws and the Tees Estuary Management Plan).

SSSI Condition February 2010

- % Area meeting PSA target: 85.74%
- % Area favourable: 3.31%
- % Area unfavourable recovering: 82.43%:
- % Area unfavourable no change: 9.91%
- % Area unfavourable declining:0.00%
- % Area destroyed / part destroyed: 4.34%

Reasons for Unfavourable Condition

Inappropriate coastal management

Land claim for industry

37.1 SPA Favourable Condition Targets

OPERATIONAL FEATURE	CRITERIA FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS

All Habitats:	Waterfowl assemblage including Annex 1 and migratory populations of European importance.	Extent and distribution of habitat	Area (ha) of habitat measured once during the reporting cycle	No significant decrease in extent from an established baseline, subject to natural change.	All qualifying species
Coastal waters, Intertidal sand and mudflats, Saltmarsh, Sand dunes, Freshwater marsh.					Important breeding, feeding and roosting areas.
					Baseline level to be determined.
					Methodology for assessing target to be determined
		Disturbance in nesting, roosting and feeding areas	Reduction in or displacement of birds, measured periodically (frequency to be determined).	No significant reduction in numbers or displacement of birds from an established baseline, subject to natural change.	All qualifying species.
					Excessive disturbance can result in reduced food intake and/or increased energy expenditure.
					Methodology for assessing targets and baseline levels to be determined.

		Landscape	Open terrain, relatively free of obstructions (feeding, anti-predator, roosting), measured periodically (frequency to be determined).	No significant reduction in view-lines in feeding and roosting areas from an established baseline, subject to natural change.	Redshank and knot need areas with unrestricted views over > 200m and an effective field size of >10 ha. Lapwing need unrestricted views over > 500m with an effective field size 16 ha.
					Methodology for assessing targets to be determined.
Coastal waters	Annex 1 populations of European importance: populations: Species: Little Tern and Sandwich Tern	Food availability	Abundance of fish, crustaceans, worms and molluscs, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Important prey species for Little Tern during the breeding season include crustacea, annelids, sandeels and clupeidae. Prey species for Sandwich Tern include sandeel and sprat 5 -13cm (July - August).
					Baseline to be determined. Methodology for assessing target to be determined.

Intertidal sand and mudflats, Saltmarsh.	Migratory species of European and national importance: Redshank, Knot	Food availability	Abundance of surface and sub-surface invertebrates, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Redshank- prey species include Hydrobia, Macoma, Corophium, Nereis.Knot- prey species include Macoma, Mytilus/Cerastoderma spat, Hydrobia. Sanderling - prey species include Bathyporeia and Mytilus spat, wrack flies, sandhoppers.
	Winter assemblage: Sanderling, Ringed Plover				Baseline to be determined. Methodology for assessing target to be determined.
Saltmarsh	Migratory species of International importance: Redshank, Knot	Vegetation characteristics	Open, short vegetation or bare ground predominating (roosting), measured periodically (frequency to be determined).	No significant change in extent of open, short vegetation or bare ground throughout areas used for roosting, from an established baseline, subject to natural change.	Vegetation of < 10cm is required throughout areas used for roosting.
	Winter assemblage: Sanderling, Lapwing, Ringed plover				Baseline to be determined. Methodology for assessing target to be determined.

	Winter assemblage of International importance: Teal	Food availability	Abundance of seed-bearing plants, measured periodically (frequency to be determined).	No significnat reduction in abundance of food species from an established baseline, subject to natural change.	Important food species for teal include Salicornia and Atriplex
					Baseline to be determined. Methodology for assessing target to be determined.
Sand dunes	Annex 1 species of International importance: Little Tern	Vegetation characteristics	Predominantly open ground with sparse vegetation and bare surfaces (colonial nesting), measured periodically (frequency to be determined).	No significant change in extent of open ground with sparse vegetation and bare surfaces throughout areas used for nesting and roosting, from an established baseline, subject to natural change.	Little Tern require < 10% vegetation cover throughout the areas used for nesting during the breeding season.
					Baseline to be determined. Methodology for assessing target to be determined.
Freshwater marsh	Winter assemblage of International importance: Lapwing	Vegetation characteristics	Predominantly short grassland swards (feeding), measured periodically (frequency to be determined).	No significant change in vegetation height throughout areas used for feeding in relation to reference level.	Lapwing require a vegetation height of < 15 cm throughout areas used for feeding.

					Reference level to be determined.Methodology for assessing target to be determined.
	Migratory species of International importance: Redshank	Food availability	Redshank- Abundance of soil invertebrates	No significant reduction in presence and abundance of food species in relation to reference level.	Important prey species for redshank and lapwing include earthworms and leatherjackets.
			Lapwing- Abundance of surface and near-surface invertebrates		
	Winter assemblage of International importance: Lapwing, Ringed Plover				Reference level to be determined. Methodology for assessing target to be determined.
Freshwater marsh	Migratory species of International importance: Redshank	Hydrology/ flow	Wet fields with many surface pools (feeding), measured periodically (frequency to be determined).	No significant reduction in extent of shallow water in relation to reference level.	Redshank ideally require 20-40% of the area soggy or flooded with shallow water of < 6cm. Lapwing require shallow flooded areas of irregular shapes <10 cm in depth ideally across 30-50% of the area.

	Winter assemblage: Lapwing				Reference level to be determined. Methodology for assessing target to be determined.
Standing water	Winter assemblage species of International importance: Teal	Food availability	Abundance of aquatic invertebrates and seed bearing plants, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species in relation to reference level.	Teal - Prey species include; Hydrobia, flies, caddisfly, beetles, bugs. Seed bearing plants include Polygonum, Eleocharis, Rumex and Ranunculus. 25% cover of one or more of the above species should be retained.
					Reference level to be determined. Methodology for assessing target to be determined.
	Winter assemblage species of International importance: Teal	Water depth	Extensive shallow water (feeding), measured periodically (frequency to be determined).	No significant reduction in extent of shallow water (feeding), in relation to reference level.	Teal requires a water depth of < 30cm.

					Reference level to be determined. Methodology for assessing target to be determined.

37.2 EMS Favourable Condition Targets

FEATURE	SUB-FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
Internationally important populations of regularly occurring Annex 1 bird species (little tern, sandwich tern)	All habitats	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change	Significant disturbance attributable to human activities can result in increased energy expenditure (flight and/or reduced food intake, displacement to areas of poorer feeding conditions)
		Extent and distribution of habitat	Area (ha) measured once during reporting cycle	No decrease in extent from an established baseline, subject to natural change	These habitats provide both breeding and roosting sites for terns

	Sand and shingle	Vegetation characteristics	Predominantly open ground with sparse/short vegetation and bare surfaces (colonial nesting)	Vegetation height and density at nesting sites should not deviate significantly from an established baseline, subject to natural change	Vegetation cover of <10% required throughout the areas used for nesting by little tern
	Intertidal sand and mudflats	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Sandwich tern require views>200m to allow early detection of predators at roost sites
	Shallow coastal waters	Food availability	Presence and abundance of marine fish, crustaceans, worms and molluscs. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate dignificantly from an established baseline, subject to natural change	Crustaceans, annelids, sandeel and sprats are important for feeding little and Sandwich terns
Internationally important populations	All habitats	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or	Significant disturbance attributable to human

of regularly occurring migratory species (Knot (winter), redshank (autumn) and of the internationally important assemblage of waterbirds				displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change	activities can result in reduced food intake and/or increased energy expenditure
		Extent and distribution of habitat	Area (ha) measured once during reporting cycle	No decrease in extent from an established baseline, subject to natural change	Rocky shores have particular significance for feeding knot at Teesmouth. Existing saltmarsh habitats are mere remnants of those of the original Tees Estuary.
	Rocky shores	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Waders require views over >200m to allow early detection of predators when feeding and roosting during the non-breeding season (at Teesmouth July-March inclusive)

		Food availability	Presence and abundance of surface and sub-surface invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Mytilus spat are important prey for Knot
	Intertidal sand and mudflats				
		Absence of obstructions to bird sight lines	Openess of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Waders require views over 200m to allow early detections of predators when feeding and roosting
		Food availability	Presence and abundance of surface and sub-surface invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey sp should not deviate significantly from an established baseline, subject to natural change	Prey: Hydrobia, Macoma, Corophiuim, Nereis (redshank / shelduck), Macoma, Mytilus / Cerastoderma spat, Hydrobia (knot) Bathyporeia, Nerine, Mytilus, wrack flies, sandhoppers (sanderling)

Internationally important populations of regularly occurring migratory species (knot (winter), redshank (autumn) and of the internationally important assemblage of waterbirds	Saltmarsh	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Waders require views over 200m to allow early detection of predators when feeding and roosting
		Vegetation characteristics	Open, short vegetation or bare ground predominating (feeding and roosting)	Vegetation height throughout areas used for roosting should not deviate significantly from an established baseline, subject to natural change	Vegetation of <10cm is required throughout areas used for roosting
		Food availability	Presence and abundance of aquatic invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Hydropbia, Carophium are important for redshank, shelduck and teal. These habitats provide supplementary feeding opportunities especially at high water
			Presnece and abundance of seed-bearing plants. Measured periodically (frequency to be determined)	Presence and abundance of food species should not deviate significantly from an established	Salicornia and Atriplex are important for teal during the non-breeding season (November – March), while Salicornia

				baseline, subject to natural change	seeds may be taken by Shelduck

38

Seaton Dunes & Common SSSI - Teesmouth & Cleveland Coast SPA

The conservation objectives for the European interest on the SSSI are:

to maintain* in favourable conditionthe habitats for the populations of Annex 1 species + of European importance, with particular reference to :

- Intertidal sand and mudflats
- Sand dunes
- Coastal waters
- + Little Tern and Sandwich Tern

to maintain* in favourable conditionthe habitats for the populations of migratory bird species+ of European importance, with particular reference to :

- + Redshank and Knot.

to maintain* in favourable condition the habitats of the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

- Intertidal sand and mudflats
- saltmarsh
- freshwater marsh
- coastal waters

* maintenance implies restoration if the feature is not currently in favourable condition.

FAVOURABLE CONDITION TABLE IS INCLUDED IN TEESMOUTH & CLEVELAND COAST SPA SECTION

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 38.54%
- % Area unfavourable recovering: 61.46%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

39

South Gare & Coatham Sands SSSI - Teesmouth & Cleveland SPA

The conservation objectives for the European interest on the SSSI are:

to maintain* in favourable conditionthe habitats for the populations of Annex 1 species + of European importance, with particular reference to :

- Intertidal sand and mudflats
- sand dunes
- coastal waters
- + Little Tern and Sandwich Tern

to maintain* in favourable conditionthe habitats for the populations of migratory bird species + of European importance, with particular reference to:

- + Knot and Redshank.

to maintain* in favourable condition, the habitats for the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

- Rocky shores
- intertidal sand and mudflats
- sand dunes
- coastal waters

* maintenance implies restoration if the feature is not currently in favourable condition

FAVOURABLE CONDITION TABLE IS INCLUDED IN TEESMOUTH & CLEVELAND COAST SPA SECTION

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 23.95%
- % Area unfavourable recovering: 76.05%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

40

Swindale Wood SSSI - Helbeck & Swindale Woods SAC

The Conservation Objectives for the European interest features on the SSSI are:

to maintain*, in favourable condition, the:

- *Tilio-Acerion* forests of slopes, screes and ravines

*maintenance implies restoration if the feature is not currently in favourable condition

***Tilio-Acerion* forests of slopes, screes and ravines**

Targets set to maintain favourable condition within Swindale Wood SSSI

- No loss of ancient semi-natural stands
- At least current area of recent semi-natural stands maintained, although their location may alter.
- At least the area of ancient woodland retained.
- At least the current level of structural diversity maintained.
- Understorey (2-5m) present over at least 20% of total stand area.
- Ground flora present over at least ***80%*** of area.
- Canopy cover present over 30-90 % of stand area.
- Age class structure appropriate to the site, its history and management.
- A minimum of 3 fallen lying trees >20 cm diameter per ha and 4 trees per ha allowed to die standing.
- At least the current level of site-native species maintained.
- At least 90% of cover in any one layer of site-native or acceptable naturalised species.
- Death, destruction or replacement of native woodland species through effects of introduced fauna or other external unnatural factors not more than 10% by number or area in a five year period.
- 80% of ground flora cover referable to relevant NVC community (mainly W9, but also W10 and W11)
- Patches and transitions maintained in extent and where appropriate location. **In particular: transitions to species rich limestone grasslands**
- Distinctive elements, maintained at current levels and in current locations (where appropriate).

- ***- Carex ornithopoda***
- ***- Cephalanthera longifolia***
- ***- Epipactis atrorubens***

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - This habitat has and continues to suffer from over-grazing by sheep, deer and rabbits in the western and northern uplands and expansion of deer in southern districts. This impoverishes the ground flora, creates difficulties for regeneration and may alter the woodland structure with impacts on many components of the woodland flora and fauna
- **Invasion by non-native species** - Invasion by sycamore, beech and other species, which are generally not native to these woods in most of Britain, is a widespread issue. Where such species are successful, they displace native counterparts and change the composition of the wood and its associated wildlife.
- **Dutch elm disease** - Since its arrival in Britain in the early 1970s Dutch elm disease has changed the structure and composition of many ravine ashwoods. It causes crown deterioration and can kill mature elm trees outright. In many woods it has removed or nearly removed elm from the over-storey. Although the disease has a very long history, the latest strain is particularly virulent and was transported to the UK by people.
- **Unsympathetic forestry practices** - these have yhad an impact on a number of woods. This includes planting of inapropriate conifer or broadleaved trees and methods of working and felling rates that do not reflect published guidelines. Some effort has already been made to restore damaged stands, but in other cases the legacy of such activities continues to impact.
- **Lack of appropriate management** - Cessation of traditional management practices in upland ash woods, notable coppicing, is a problem because this results in changes to the environmental and structural conditions and the availability of long-standing habitats. Often this leads to a decline in species richness. Then problem is compounded because there is a lack of interest, expertise and incentives amongst some woodland owners to undertake management
- **Impacts from intensive agriculture** - Ash woods can be negatively affected by nutrient enrichment arising from spray drift or run-off from adjacent agricultural land. This can lead to changes in soils and ground flora. Another issue is where agricultural intensification results in the loss of hedges, trees and small patches of ash-rich scrub in fields. This increases fragmentation and isolation amongst the remaining woodland.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.

SSSI Condition February 2010

- % Area meeting PSA target: 79.53%
- % Area favourable: 52.34%

- % Area unfavourable recovering: 27.19%
- % Area unfavourable no change: 20.47%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Overgrazing

41

Tees & Hartlepool Foreshore & Wetlands SSSI - Teesmouth & Cleveland Coast SPA - DurhamCoast SAC

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the habitats for populations of Annex 1 species + of European importance, with particular reference to :

- Intertidal sand and mudflats
- Sand dunes
- Coastal waters
- + Little Tern

to maintain*, in favourable condition, the habitats for the populations of migratory bird species + of European importance, with particular reference to:

- Rocky shores
- Intertidal sand and mudflats
- Saltmarsh
- Freshwater marsh
- + Redshank and Knot

to maintain*, in favourable condition, the habitats for the populations of waterfowl that contribute to the wintering waterfowl assemblage of European importance, with particular reference to:

- Rocky shores
- Intertidal sand and mudflats
- Saltmarsh
- Freshwater marsh
- Standing water

* maintenance implies restoration if the feature is not currently in favourable condition.

FAVOURABLE CONDITION TABLE IS INCLUDED IN TEESMOUTH & CLEVELAND COAST SPA

SSSI Condition February 2010

- % Area meeting PSA target: 72.65%
- % Area favourable: 72.60%
- % Area unfavourable recovering: 0.05%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 27.35%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Decrease in population of notified species (particularly sanderling)

42

Thrislington Plantation SSSI - Thrislington Plantation SAC

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the:

- unimproved calcareous grassland, with particular reference to semi-natural dry grasslands and scrubland facies on calcareous substrates (CG8 grasslands)

* maintenance implies restoration if the feature is not currently in favourable condition.

Semi-natural dry grasslands and scrubland facies on calcareous substrates (CG8 grasslands)

Targets set to maintain favourable condition within Thrislington Plantation SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Proportion of non-Graminae ("herbs"), in period mid May-end July should be 30-90%. (Low proportion outside target indicates eutrophication, usually from fertilisers, or insufficient removal of biomass, leading to dominance by grasses.)
- *Sesleria albicans* frequent plus at least two positive indicator species frequent and four occasional throughout the sward
- No more negative indicator species taxa more than occasional throughout the sward or singly or together more than 5% cover
- No more than 5% tree or scrub cover.
- No more than 10% cover of *Rosa*spp
- Sward height in period mid May-end July should be 2-15 cm
- Total litter extent no more than 25% of the sward
- Bare ground no more than 10% of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmented state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management

problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.

- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are proving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**
- **Air pollution** - based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed:0.00%

43

Upper Teesdale SSSI - Moorhouse Upper Teesdale SAC - North Pennine Moors SPA

The conservation objectives for the European interest on the Upper Teesdale SSSI are:

to maintain*, in favourable condition, the habitats for the populations of Annex 1 species + of European importance, with particular reference to:

- Upland moorland
- + Golden Plover, Hen Harrier, Merlin, Peregrine

to maintain*, in favourable condition, the habitats for the migratory bird species + of European importance, with particular reference to:

- Upland moorland
- Upland pasture
- + Curlew
- + Dunlin

to maintain*, in favourable condition, the:

- Blanket bog
- European dry heaths
- Alpine heath
- Siliceous alpine grassland
- Alkaline fens
- Petrifying springs
- Alpine pioneer formations (flushes)
- Calcareous grassland
- Calaminarian grasslands
- Calcareous rocky slope
- Siliceous rocky slope
- Calcareous scree

- Tall-herb vegetation
- *Juniperus communis* formation on heaths
- Mountain hay meadowsMolinia meadows on calcareous, clayey or peaty soils
- Standing water

to maintain*, in favourable condition, the habitat for the populations of:

- Vertigo genesii
- Saxifraga hirculus

* maintenance implies restoration if the feature is not currently in favourable condition.

Blanket Bog

Targets set to maintain favourable condition within Upper Teesdale SSSI (favourable condition information taken from table for the same habitats in neighbouring SSSIs, as favourable condition table for Upper Teesdale was not available, apart from data on extent of habitats)

- No reduction in area of active blanket bog (7404.74 ha)
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.
- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.
- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance

location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in area of heath (1019.6 ha)
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across

ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

Alpine and Boreal Heaths

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in area or consequent fragmentation (1.13 ha)
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the major reported pressure on stands of this habitat, leading to loss of vegetation structure and the failure of more palatable or vulnerable to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna, and to the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare soil and erosion.
- **Burning** - Accidental burning by fires spreading upslope from managed fires of submontane tall heaths is another widespread factor affecting the habitat
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in

habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Siliceous alpine and boreal grassland

Targets set to maintain favourable condition within Upper Teesdale SSSI (as for Alpine and Boreal Heaths)

- No reduction in area or consequent fragmentation
- In *Carex bigelowii -Racomitrium lanuginosum* moss-heath the cover of *Racomitrium* should exceed 66% over the whole stand
- In *Carex bigelowii-Racomitrium lanuginosum* moss-heath the mean depth should exceed 5cm and 7cm in *Vaccinium myrtillus - Cladonia arbuscula* moss heath
- In *Vaccinium myrtilus - Cladonia arbuscular* lichen heath should contribute >50% of the vegetation cover over the whole stand.
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing.

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing is the most important factor affecting structure and function in SACs supporting this habitat in the Scottish uplands. Excessive grazing, trampling and nutirent inputs from dunging and urination results in a reduction in cover and eventual elimination of characteristic species. This can lead to the replacement of thick swards of Racometrium lanuginosum with grassy swards. Soil erosion occurs in some areas of heavy grazing.
- **Fragmentation** - This habitat is naturally limited by specific environmental requirements leading to scattered distribution and small extent of individual patches, particularly in outlying parts of England and Wales. However, fragmentation has been exacerbated by past grazing pressure
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial

impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alkaline Fens

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (85.85 ha)
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush
- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Water abstraction** - Past and continuing loss of area by drainage and conversion to intensive agriculture. Excessive water abstraction from aquifers has dried up or reduced spring line flows, and generally lowered water tables. Abstractions also have affected the natural balance between the differing water qualities of ground water and surface water
- **Grazing** - Both under and over0grazing have been recorded as reasons for adverse condition in the SAC series

- **Burning** - Although used as a management tool for some stands of the habitat, particularly but not exclusively in the uplands, burning can also damage the regeneration potential at certain sites.
- **Fragementation** - Small total area of habitat and critically small population sizes of several key species dependent on the habitat
- **Absence of appropriate management** - Lack of or inappropriate management of existing fens leading to drying, scrub encroachement and succession to woodland
- **Pollution** - Valley fens supporting this habitat are particularly susceptible to agricultural run-off within the catchment. Enrichment or hypertrophication can result in substantial adverse changes to key plant communities
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with
other drivers of environmental change.

Petrifying springs with tufa formations (*Cratoneurion*)

<u>Targets set to maintain favourable condition within Upper Teesdale SSSI</u>

- No loss without prior consent (1.16 ha)
- Maintenance of high piezometric head
- Very base-rich waters.Tufa deposition obvious
- Low Fertility. NPK targets to be determined
- No more than **5%**
- Bryophytes abundant or dominant
- No **one** species more than **10%**
- No more than **rare**
- No more than **5%** of mire area
- No more than **occasional** over the mire as a whole
- Very **little or none**; if present found only after extensive searching

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing and associated trampling has been recorded as a reason for adverse condition of this habitat in the SAC series. This leads to lossof vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to a scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of appropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Alpine pioneer formations of *Caricion bicoloris- atrofuscae*

Targets set to maintain favourable condition within Upper Teesdale SSSI (as for Alkaline Fens)

- No loss without prior consent (area thought to be 5-15 ha))
- Maintenance of high Piezometric Head
- Spring water should be of low fertility
- No more than **5% damage to** tufa formation, (where present)
- At least **75%** combined cover of *Carex* spp., *Eleocharis* spp., *Eriophorum* spp., *Kobresia*, *Schoenus* and brown / pleurocarpus mosses. In stony flushes, these species should be at least frequent
- Brown / pleuropcarous mosses at least **frequent** and **widespread** throughout the flush
- **M10a:** At least **three** positive indicator species **frequent** throughout the flush : **M10b & c**: At least four positive indicator species **frequent** throughout the flush

- Frequency of negative indicators for **M10 and M11only**: *Holcus lanatus*, *Juncus acutiflorus*, *J. effusus*, *J. squarrosus:* no more than **one** species **frequent**, **no** species **abundant**
- Frequency of negative indicators *Cirsium arvense*, *Cirsium vulgare*, *Urtica dioica:* no more than **rare**
- No more than **5%** cover or more than **occasional** throughout the sward of saplings, small trees and shrubs
- No more than **10%** bare mud or peat visible without disturbing vegetation
- *Molinia caerulea* tussocks no more than **occasional**
- Litter in more or less continual layer, total extent no more than **10%** of the flush area
- At least **10cm** average vegetation height
- Hoofprints no more than **occasional** over the mire as a whole
- Presence / extent of vehicle tracks across mire surface no more than **rare**

Main pressures and future threats on this habitat, nationally

- **Grazing** - Over-grazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the more accessible stands. This leads to loss of vegetation structure and the failure of the more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna. However, some grazing may be necessary for their survival to keep competition from more vigorous species in check.
- **Fragmentation and connectivity** - This is a highly fragmented habitat occurring on isolated hills in small stands probably mainly less that 0.1 ha in size and only on a few favoured sites do stands occur in any numbers. Many of the rare arctic-alpine species that characterise these stands survive at the limits of viability. Given such fragmentation the characteristic species of this habitat are susceptible to chance events.
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Water managemen**t - The habitat is dependent on snowmelt flushing the habitat in early spring. Changes to the length of snow lie and the amount of water can lead to adverse changes to this naturally variable habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Semi-natural dry grassland and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in area and any consequent fragmentation without prior consent (135.83 ha)
- **30-90%** of non-graminae (herbs) in sward, measured in period mid-may to end of July
- Sesleria albicans at least **frequent** throughout the sward, mid-May to end of July
- At least **two** other positive indicator species (listed for this habitat at over 500m) **occasional** throughout the sward
- From all relevant positive indicator lists combined, at least **two** species **frequent** and **fouroccasional** throughout the sward
- No negative indicator species/taxa more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or shrubs (*excluding Juniperus communis*)
- No more than **10%** cover *Pteridium aquilinium*
- **2-10** cms average sward height
- Total extent of litter no more than **25%** of the sward
- Bare ground no more than **10%** of the sward

Main pressures and future threats on this habitat, nationally

- **Fragmentation** - the habitat has existed in a fragmenetd state for many centuries, so fragmentation per se should not be seen simply as Unfavourable. However, in some places fragmentation is extreme and it occurs only in very small and very isolated patches and fragmentation is thus an issue of great concern for this habitat. It is a threat to the sustainability of many species populations as well as causing management problems. A good many sites supporting this habitat may be too small to be considered viable. It is not clear what area, configuration and connectivity the habitat needs to be considered favourable.
- **Grazing** - This is predominantly under-grazing. Although over 60% of designates sites are under some form of conservation management agreements there are widespread continuing problems with securing conservation grazing, particularly in the lowlands. Measures to address this are priving slow to implement
- **Lack of remedial management** - including scrub control
- **Invasive species**
- **Agricultural operations**
- **Air pollution** - based on an assessment of relevant critical loads, air pollution is condsidered to be a potentially significant threat to the future condition of this habitat
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased

incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

Calaminarian grasslands of the *Violetalia calaminariae*

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in area and any consequent fragmentation without prior consent (32 ha)
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa of negative indicator species more than **occasional** throughout the sward or singly or together more than **5%** cover
- No more than **5%** cover of trees or scrub
- **20% - 90% bare ground** (can include thin crust of lichens)
- Sward **5 cm** or less

Main pressures and future threats on this habitat, nationally

- **Under-management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** habitatsometimes removed as a source of contamination to livestock, as well as in land reclamation schemes
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity. For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

Calcareous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (0.44 ha)
- No more than 5% of the stable scree area
- At least **two positive indicator** species **occasional**, or **one** species **frequent** in suitable fissures

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Siliceous rocky slopes with chasmophytic vegetation

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (19.38 ha)

- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- (Positive indicator species yet to be determined)

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of some chasms and gullies but some grazing is necessary to maintain open vegetation, preventing scrub or woodland regeneration. However, most of the UK resource of this habitat is out of the reach of grazing animals, occurring on inaccesible rock outcrops.
- **Recreation** - Rock climbing and related activities have been recorded as pressures on some SACs supporting this habitat
- **Burning** - Poorly controlled burning regimes can lead to damage to vegetation on skeletal soils in crevices, with poor opportunities for regeneration
- **Air pollution** - Based on an assessment of the exceedance of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Calcareous and calcshist screes of the montane to alpine levels

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (3.1 ha)
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- Frequency of positive indicator species: at least two species occasional, or one species within the OV40 list frequent over the scree.
- Frequency of negative indicator speceies: no species more than occasional over the scree

- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus*: no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree
- Extent of visible rocks (the majority of plants should be growing through gaps between rocks, not forming a mat of vegetation over the rocks): At least 33%
- Cover of *Arrhenatherum elatius* : No more than 50% cover across the scree

Main pressures and future threats on this habitat, nationally

- **Grazing** - Overgrazing may reduce the floristic diversity of scree but some grazing is necessary to maintain open screes, preventing scrub or woodland regeneration
- **Invasive species** - The spread of non-native plants especially New Zealand Willow Herb Epilobium brunnei is a factor in the moister, mainly western scree
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Siliceous scree of the montane to snow levels

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (42.06 ha)
- Extent of human or animal disturbance of naturally stable scree (e.g. use as path or bridleway, trampling by livestock or disturbance by rabbits) no more than 5% of the stable scree area
- *Cryptogramma crispa* and *Racomitrium* spp. on moderately stable to stable substrates: both positive indicator species at least occasional over the scree slope or rock outcrop. (NB Some high altitude talus / boulder fileds often lack Cryptogramma and should not be assessed using this attribute.)
- Frequency or cover of scrub/tree species except *Juniper communis* but including *Rubus fruticosus:* no more than *25% cover on Eutric scree or 10% on Siliceous scree*, or no more than occasional across the scree

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - especially by sheep and red deer may cause instability in screes resulting in a slowing down of recolonisation by plant growth. More widely, grazing may remove grazing sensitive species and favour unpalatable species such as ferns.
- **Recreational activities** - Recreational disturbance such as scree running can result in localised acceleration of erosion of scree
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. The loss of Cryptogramma crispa, a key species for this habitat in the UK, from scree in the south Pennines has been attributed to atmospheric pollution
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss without prior consent (0.19 ha)
- **50%** tall herbs
- At least one positive indicator species abundant
- At least one additional positive indicator species frequent and one species occasional
- **50%** of potentially flowering stems turning to flowering / seed production
- No more than **50%** of stems, of any species of tall herb, show signs of grazing by the end of the growing season. Light grazing impact overall.
- **20 cm** average vegetation height

Main pressures and future threats on this habitat, nationally

- **Overgrazing** - Overgrazing has been recorded as a reason for adverse condition of this habitat in the SAC series, principally of the few more open stands. This leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves. It can also lead to the loss of plant species and associated fauna.
- **Fragmentation** - The habitat is naturally limited by geological and hydrological requirements leading to scattered distribution and small extent of individual patches. Fragmentation has been exacerbated by past grazing pressure
- **Absence of or inappropriate management** - Lack of or inappropriate management of existing stands leading to drying and scrub encroachment
- **Burning** - Burning of adjoining associated habitats has led to damage to isolated patches of this habitat on some parts of the SAC series
- **Air pollution** - Based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat
- **Climate change** - Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change

Mountain hay meadows

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in area and any consequent fragmentation (197.42 ha)
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum
- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

***Juniperus communis* formation on heaths**

Targets set to maintain favourable condition within Upper Teesdale SSSI

N.B. This info taken from HRA of RSS seems to be for European Dry Heaths - Favourable Conditions Table is missing from the SSSI sheet obtained from NE

- No reduction in area of heath (104.15 ha)
- Minimum of 75% cover of dwarf-shrubs

- At least two species of dwarf-shrub should be widespread and frequent
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) and/or lichens should be frequent - across those areas in (or declining from) this condition at classification
- All age classes present with at least 25% in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Lack of regeneration** - This is seen as the main threat to the habitat. Juniper seed production declines with increasing age of the bush and with latitude. However the lifespan of Juniper may also be related to latitude, with slow-growing bushes at higher latitudes living longer than those in the South of England. Juniper regeneration can be infrquent and episodic, resulting in populations with few age classes, which suggests that the establishment of many stands was relatedto past events such as the decline in rabbit grazing following myxomatosis 1954-5. Populations with wide age ranges tend to be associated with conditions providing regular opportunities for establishment, such as continual exoposure of bare soil on steep slopes.
- **Over-grazing and under-grazing -** There is still a need to organise better the timing and intensity of grazing. Juniper is unable to tolerate heavy shading and cannot germinate and grow in dense, ungrazed vegetation. It requires bare ground or a short open sward in order to establish itself. However, it is also intolerant of heavy grazing. Practical management techniques for encouraging the establishment of Juniper include grazing, burning, soil disturbance, weeding and tree shelters. the difficulty of achieving the ideal grazing regime to allow germination and establishment is such that Barret (1997) recommends propagating material in nurseries for planting out. Broome (2003) found vegetative propagation to be more reliable and rapid than propagation from seed.
- **Forestry**
- **Fragmentation** - Ward (1973) considerd that sites with populations of at least 100 bushes are ecologically more valuable in terms of maintaining their invertebrate fauna and associated vegetation communities
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the
structure and function of this habitat
- **Burning -** Juniper has been found to be excluded from areas that had been repeatedly burnt. Otherwise, although locally damaging, burning does not apear to be a major threat to this habitat. Sullivan (2003) and Clifton et al (19997) found that relatively few individuals of Juniper had bee lost as a direct result of burning. Burning may create a long-lasting seed bed which remains open for longer than after simple disturbance. Small, isolated Juniper populations might be expected to have low levels of genetic variation but this is not the case and Juniper decline is not likely to be caused by genetic factors.
- **Outdoor sports and leisure activities**

Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No reduction in extent (1.4 ha)

Main pressures and future threats on this habitat, nationally

Under-grazing - this grassland type in the UK has been traditionally managed as rough grazing, particularly by cattle, and to a much lesser extent by cutting to maintain favourable structure and function. A major current problem is agricultural neglect leading to litter build up and scrub invasion.

Lack of remedial management - it is natural for open fens to change spontaneously into wooded fens, and management, such as scrub clearance and grazing, is required to prevent this.

Over-grazing - less prevalent that under-grazing, overgrazing by sheep is still sometimes reported, along with occasional poaching and trampling by livestock during wet periods

Water management and quality - The management of surface and groundwater is clearly crucial to providing the surface:groundwater requirements of each type of fen, as are its constituents, for example basic ions such as calcium, its pH, and quantity of the plant nutrients nitrogen and phosphorous

Agricultural improvement - this includes drainage, cultivation and fertiliser applications

Also reported, but probably less widespread are:

- Invasive species
- Too frequent burning
- Agricultural abandonment, leading to rankness and scrub encroachment through lack of grazing
- Fragmentation and disturbance for developments such as housing and road constructions
- Afforestation, especially in Northern Ireland and Scotland

Air quality - based on an assessment of the exceedence of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat

Climate change - based on the literature review, climate change is considered a major threat to the future condition of this habitat especially in the long-term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across eco-systems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled together with other drivers of environmental change.

Hard oligo-mesotrophic open waters with benthic vegetation of *Chara* spp

No reduction in extent (0.4 ha - all incorporated in Tub Tarn)

Main pressures and future threats on this habitat, nationally

Charophyte-dominated lakes are largely restricted to situation where the catchment or aquifer from which they are supplied with water remains relatively unaffected by intensive land-use or other sources of nutrients, and they are most often found in areas supporting mosaics of semi-natural vegetation. The main pressures affecting the habitat are listed below.

Pollution - nutrient enrichment is the major factor affecting lakes in the UK with evidence that over 80% of lakes in England are affected (Carvalho and Moss 1995). Palaeolimnological techniques have been applied to a number of lakes of this type with reference and and historic nutrient conditions inferred from diatom transfer functions. This work supports the kidely held view that many lakes in lowland UK have suffered considerable enrichment. The main driver of this eutrophication is phosphorous although there is increasing evidence that (in some lakes at least) nitrogen may also play a significant part (James et al 2005). This phosphorous has both point source and diffuse source origins. Significant progress has been made in reducing significant point sources through investment in phosphorous stripping at major waste water treatment works. However, there are few lakes that directly receive such discharges. Small discharges, many of which are unconsented, are generally of greater significance for smaller standing waters. Diffuse sources are more difficult to manage and this habitat type may be particularly susceptible to diffuse nutrient pollution due to the high porosity of sandy substrates. Recovery of sites impacted by elevated nutrient loads is generally slow due to the limited flushing potential of many smaller lakes and internal loading issues.

Air pollution - Nitrogen deposition is of particular concern for oligotrophic water bodies, especially where there are elevated phosphate levels. Hydrophyte species richness is negatively related to winter nitrate concentration in European shallow water lakes (James et al 2005). Acid deposition is thought to be a minimal risk for Chara lakes, which are generally very well buffered. Other air pollution threats have largely unknown impact, but are not generally viewed as being of major concern at present.

Sea level rise - (omitted, as not relevant to Upper Teesdale SSSI)

Climate change - Based on the literature review, climate change is considered a major threat to the future condition of this habitat especially in the long-term. The main foreseen effect will be tits contribution to erosion and coastal squeeze through increased sea-level rise and storminess. Climate change may affect this habitat type by altering ecosystem processes in such a way as to increase the probability of a forward switch to turbid, phytoplankton dominated conditions (Mooj et al 2005). Many sites are close to sea level and vulnerable to sea level rise. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across eco-systems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled together with other drivers of environmental change.

Marsh saxifrage (*Saxifraga hirculus*)

Targets set to maintain favourable condition within Upper Teesdale SSSI

- No loss >10% in population extent
- No loss of number of sub-populations, if distinct

Main pressures and future threats on this species, nationally

- **Drainage**
- **Planting**
- **Grazing**

Round-mouthed Whorl Snail (*Vertigo genesii*)

Targets set to maintain favourable condition within Upper Teesdale SSSI

Maintain species at all known sites and sub-sites within the SSSI (24 sites)

Main pressures and future threats on this species, nationally

The habitat (fen, marsh and swamp) for this species is fragile, and sensitive to: modification of site hydrology, heavy grazing, lack of grazing, supplementary feeding of livestock, scrub encroachment, eutrophication, herbicides, pesticides and trampling. Therefore, historically, pressures are likely to have included:

- Grazing
- Walking, horseriding and non-motorised vehicles
- Drainage
- Drying-out
- Biocentric evolution
- Eutropchication

SPA bird species occuring in Upper Teesdale SSSI

Targets set to maintain favourable condition within Upper Teesdale SSSI

- **Peregrine -** Dependent on suitable upland habitat mosaic. Maintain a population of at least one breeding pair
- **Merlin** - Dependent on suitable upland habitat mosaic. Maintain the population above 75% of the baseline value, i.e. Above 8 pairs
- **Hen-harrier** - Dependent on suitable upland habitat mosaic. No pairs breeding at time of survey, but target is to reduce disturbance which is affecting attempts to breed
- **Golden plover** - dependent on suitable upland habitat mosaic. Maintain the population above 75% of the baseline value, i.e. Above 452 pairs
- **Dunlin** - dependent on suitable bog habitat. Maintain the population above 75% of the baseline value, i.e. Above 27 pairs
- **Curlew** - dependent on suitable upland habitat mosaic. Maintain the population above 75% of the baseline value, i.e. Above 367 pairs

Further information on North Pennine Moors SPA favourable conditions is included in Section 51.

SSSI Condition October 2010

- % Area meeting PSA target: 97.78%
- % Area favourable: 10.55%
- % Area unfavourable recovering: 87.23%
- % Area unfavourable no change: 2.23%

- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

44

West Newlandside Meadows SSSi - North Pennine Dale Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within West Newlandside Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

45

WestPark Meadows SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows

* maintenance implies restoration if the feature is not currently in favourable condition

Mountain hay meadows

Targets set to maintain favourable condition within West Park Meadows SSSI

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum

- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 100.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

46

White Ridge Meadow SSSI - North Pennine Dales Meadows SAC

The conservation objective for the European interest on the SSSI is:

to maintain*, in favourable condition,the:

- Mountain hay meadows.

* maintenance implies restoration if the feature is not currently in favourable condition.

(From 2005 Document)

Conservation Objectives

The Conservation Objectives for this site are, subject to natural change, to maintain the following habitats and geological features in favourable condition (*), with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated (SSSI, SAC, SPA, Ramsar) as individually listed in Table 1.

Habitat Types represented (Biodiversity Action Plan categories)

- Neutral Grassland

Geological features (Geological Site Types)

- Not applicable

(*) or restored to favourable condition if features are judged to be unfavourable.

Mountain hay meadows

<u>Targets set to maintain favourable condition within West Park Meadows SSSI</u>

- No reduction in area and any consequent fragmentation
- Bare ground no more than 5% of the sward.
- Litter cover extent no more than 25% of the sward
- Average sward height 5 cms or above
- Sward composition 50-90% herbs
- Percentage cover of positive and negative indicators

Main pressures and future threats on this habitat, nationally

- **Grazing** - decline in aftermath grazing on much of the resource, coupled with unsustainable levles of aftermath grazing (often accompanied by other agricultural improvement) on other parts of the resource.
- **Inappropriate cutting regimes** - the decline of hay cutting on much of the resource in favour of earlier silage cutting
- **Air pollution** - based on an assessment of critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat. Atmospheric sources are likely to be adding to the levels of nutrient nitrogen from excess fertiliser applications
- **Habitat framentation** - the area of the habitat has also become more fragmented with increased isolation of sites in an unfavourable landscape context. This may have implications for ensuring favourable management regimes and the maintenance of key character species such as Geranium sylvaticum
- **Agricultural improvement** - excessive nutrient applications (particularly nitrogen) from both artificial and organicfertilisers leading to a loss of species diversity and increase in palatable grasses. Restoration or re-creation is also hampered by a lack of suitable sites with relatively low fertility soils
- **Climate change** - based on the literature review, climate change is considerd a potentially significant threat to the future condition of this habitat especially in the long term. There is evidence from other sources that climate change may, now and in the future, threaten populations of key sub-montane species sucsh as Geranium sylvaticum. Geranium sylvaticum is a Northern Montane plant with a striking lower altitudinal limit in Britain. This may be partly related to its vernalisation requirement but also important may be a need for low winter temperatures to prevent respiratory rundown of its carbohydrate and protein resources in the bulky rhizome, a reserve which it is able to draw on quickly after the temperature rises above the growing point in early May. Rising winter temperatures, already recorded in the Upland Hay Meadow landscape might be expected to threaten this plant's ability to retain such resources and its key role in this kind of vegetation. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems.Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

SSSI Condition February 2010

- % Area meeting PSA target: 0.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 0.00%
- % Area unfavourable no change: 100.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

Overgrazing

47

Whitfield Moor, Plenmeller & Ashholme Commons SSSI - North Pennine Moors SAC - North Pennine Moors SPA

The conservation objectives for the European interests on the SSSI are:

to maintain*, in favourable condition, the habitats for populations of Annex 1 species + of European importance, with particular reference to:

- Upland Moorland
- + Golden Plover, Merlin, Hen Harrier

to maintain*, in favourable condition the habitats for the populations of migratory bird species +of European importance, with particular reference to:

- Upland Moorland
- Upland Pasture
- + Curlew.

to maintain*, in favourable condition, the:

- Blanket bogs
- European dry heaths
- North Atlantic wet heaths with *Erica tetralix*
- *Juniperus communis* formation on heaths

* maintenance implies restoration if the feature is not currently in favourable condition

Blanket Bog

Targets set to maintain favourable condition within Whitfield Moor, Plenmeller & Ashholme Commons SSSI

- No reduction in area of active blanket bog
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) should be abundant and include Sphagnum
- Cover of dwarf-shrubs must be greater than 33% - on areas of blanket bog with dwarf-shrubs at classification.

- At least two species of dwarf-shrub should be widespread and frequent
- Total cover of graminoids should not exceed 50% except where Sphagnum is forming 'lawns' or where dwarf shrubs were absent at classification
- Little or no bare ground
- No significant erosion caused by human impacts, other than very localised instances (eg drainage, fire, peat extraction, livestock grazing, recreational activities.
- Gripping must not be more than localised and/or with visibly flowing water.
- Peat extraction absent, except small (hand-cut) areas within a peat body may be acceptable
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- No (recent) burning of active blanket bog (bog with >50% Sphagnum cover); of bog vegetation kept at <20-25cm by the climatic conditions; or near to eroding/hagging peat

Main pressures and future threats on this habitat, nationally

- **Grazing -** Over-grazing leads to loss of vegetation structure and the failure of more palatable or vulnerable species to reproduce and maintain themselves It can also lead to the loss of plant species and associated fauna, and the spread of rank, unpalatable plant species. In extreme cases, very heavy grazing and trampling can lead to exposure of bare peat and erosion. Trampling damage is very often associated with over-grazing and can make recovery times longer.
- **Burning -** Burning is used as part of agricultural and sporting management to modify moorland vegetation for the benefit of livestock, grouse and deer in particular. Poorly managed and/or accidental fires can be particularly damaging to blanket bog.
- **Water management** - Extensive tracts of blanket bog have been drained in the past in attempts to improve the quality of the grazing. There is a need to reinstate natural hydrology by blocking grips (lines cut through moorland for drainage purposes) on much of the resource. The problem of gripping on blanket bogs is a major cause of unfavourable condition that has not yet been fully reported on, particularly in England. New drains continue to be dug and old drains cleaned in some areas. Even without maintenance most drains continue to lower the adjacent water table and some initiate erosion.
- **Erosion -** High altitude bogs in particular, especially those in the Pennines and South Wales, are losing habitat through constant erosion of the peat mass. Some of this may be due to natural processes.
- **Agricultural improvement -** In addition to drainage, fertiliser application and conversion to pasture has occurred frequently in the past and can be of local significance
- **Forestry** - Although new planting may be relatively small scale, some existing plantations are having an impact on the hydrology and species composition of adjacent areas of blanket bog, notable as the trees mature
- **Peat extraction** - Commercial peat extraction, although relatively limited in extent can have important local effects. Domestic cutting, most of which occurs on common land, is locally extensive. Where mechanical methods are employed, these can have a significant impact, especially in Northern Ireland where the distinction between commercial and domestic activity can be difficult to determine.

- **Agricultural improvement** - (Fertilisation, Agriculture and forestry activities not referred to above)
- **Recreation** - Many popular walking routes, some of which are also used by cyclists and horse-riders, traverse blanket bog areas which are very sensitive to such pressure. The increased use of all-terrain vehicles for recreational, agricultural and sporting activities can also result in local erosion.
- **Built development** - Wind farms and communication masts, together with their associated infrastructure, are increasingly being proposed on areas of blanket bog, especially those at high altitude. There are also threats from hydro-electric schemes in Scotland.
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change -** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. In particular, there are concerns about predicted winter-time increases in rainfall encouraging further erosion, while increased incidence of summer drought may well switch many systems to net emitters of carbon. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

European Dry Heaths

Targets set to maintain favourable condition within Whitfield Moor, Plenmeller & Ashholme Commons SSSI

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs. [Within defined heathland areas; excluding recently burnt stands]
- At least two species of dwarf-shrub should be widespread and frequent.
- Bryophytes (excl *Polytrichum*/ *Campylopus* spp) and/or lichens should be frequent -across those areas in (or declining from) this condition at classification [or as above]
- All age classes present with at least 25%in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Over-grazing -** Over-grazing is a particular issue for the upland component of this habitat
- **Under-grazing** - Under-grazing is a particular issue for the lowland component of this habitat
- **Invasive species -** The impacts of heather beetle (particularly in the upland component of this habitat) appear to be increasing and may become a bigger problem (possible linked to climate)
- **Burning -** Burning is traditionally used for game and agricultural management of the upland componest (moorland), but inappropriate burning regimes can lead to loss of interest.
- **Air pollution-** Based on an assessment of the exceedence of relevant critical loads air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.
- **Development** - Development pressures – both direct loss to development and secondary effects such as increased recreation, fragmentation and isolation and associated pressures from development close to the habitat – are a particular issue for the lowland component of this habitat. Renewable energy and other developments such as wind-farms and telecommunications masts are an increasing pressure on the upland part of the resource.

North Atlantic Wet Heaths with Erica Tetralix

Targets set to maintain favourable condition within Whitfield Moor, Plenmeller & Ashholme Commons SSSI

- No reduction in area and any consequent fragmentation.
- Minimum of 25% cover of species other than dwarf-shrubs
- Bryophytes (excluding *Polytrichum* spp and/or *Campylopus* spp) should be at least frequent and forming patches below or, in more open swards, between the dwarf-shrubs
- A maximum of 5% of the grazing unit may show signs of current moderate or heavy grazing
- Burns should be in small blocks of a maximum size of 1 hectare and showing a gradation in age ranges from 1 to 15 years.
- Total cover of graminoids should not exceed 50%.

- At least two species of dwarf-srub species should be widespread and frequent in the sward
- All age classes present with at least 33% of the management unit in the late mature/degenerate age class or 33% or more excluded from burning rotation

Main pressures and future threats on this habitat, nationally

- **Over-grazing** - Over-grazing is a particular issue for the upland component of this habitat. However wet heath tends to be less attractive to grazing animals than dry heath and this may have led to relatively smaller losses due to overgrazing.
- **Under-grazing/lack of management -** Lack of grazing is a particular issue for the lowland component of the resource.
- **Invasive species** - The impacts of heather beetle (particularly on the upland component of this habitat) appear to be increasing and may become a bigger problem (possibly linked to climate or atmospheric deposition).
- **Development** - Development pressures – both direct loss to development and secondary effects such asfragmentation and isolation, increased recreation and associated pressures from development closeto the habitat – are a particular issue for the lowland component of this habitat. Renewable energyand communication mast developments are a pressure on this habitat in the uplands.
- **Burning** - Burning is a traditional management tool for management of the upland component (moorland) of the resource, but can lead to damage to particular elements of the core habitat. Inappropriate burning management combined with inappropriate grazing can lead to loss of dwarf-shrubs from wet heath. There is evidence in the Scottish Highlands that intense burning may have converted blanket bog plant communities to wet heath.
- **Water management** - Lack of water due to drainage is a particular issue for H4010.
- **Air pollution** - Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.
- **Climate change-** Based on the literature review climate change is considered a major threat to the future condition of this habitat especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

***Juniperus communis* formation on heaths**

Targets set to maintain favourable condition within Whitfield Moor, Plenmeller & Ashholme Commons SSSI

N.B. This info taken from HRA of RSS seems to be for European Dry Heaths - Favourable Conditions Table is missing from the SSSI sheet obtained from NE

- No reduction in area of heath
- Minimum of 75% cover of dwarf-shrubs
- At least two species of dwarf-shrub should be widespread and frequent
- Bryophytes (excl *Polytrichum* / *Campylopus* spp) and/or lichens should be frequent - across those areas in (or declining from) this condition at classification
- All age classes present with at least 25% in the late mature/ degenerate age class or excluded from the burning rotation.
- A maximum of 5% of each grazing unit may show signs of current moderate or heavy grazing
- Burns should be small blocks between 0.5 and 2.0 hectares showing gradation in age ranges from 1 to 15 years

Main pressures and future threats on this habitat, nationally

- **Lack of regeneration** - This is seen as the main threat to the habitat. Juniper seed production declines with increasing age of the bush and with latitude. However the lifespan of Juniper may also be related to latitude, with slow-growing bushes at higher latitudes living longer than those in the South of England. Juniper regeneration can be infrquent and episodic, resulting in populations with few age classes, which suggests that the establishment of many stands was relatedto past events such as the decline in rabbit grazing following myxomatosis 1954-5. Populations with wide age ranges tend to be associated with conditions providing regular opportunities for establishment, such as continual exoposure of bare soil on steep slopes.
- **Over-grazing and under-grazing -** There is still a need to organise better the timing and intensity of grazing. Juniper is unable to tolerate heavy shading and cannot germinate and grow in dense, ungrazed vegetation. It requires bare ground or a short open sward in order to establish itself. However, it is also intolerant of heavy grazing. Practical management techniques for encouraging the establishment of Juniper include grazing, burning, soil disturbance, weeding and tree shelters. the difficulty of achieving the ideal grazing regime to allow germination and establishment is such that Barret (1997) recommends propagating material in nurseries for planting out. Broome (2003) found vegetative propagation to be more reliable and rapid than propagation from seed.
- **Forestry**
- **Fragmentation** - Ward (1973) considerd that sites with populations of at least 100 bushes are ecologically more valuable in terms of maintaining their invertebrate fauna and associated vegetation communities
- **Air pollution -** Based on an assessment of the exceedence of relevant critical loads, air pollution is considered to be a potentially significant pressure to the
  structure and function of this habitat

- **Burning -** Juniper has been found to be excluded from areas that had been repeatedly burnt. Otherwise, although locally damaging, burning does not apear to be a major threat to this habitat. Sullivan (2003) and Clifton et al (19997) found that relatively few individuals of Juniper had bee lost as a direct result of burning. Burning may create a long-lasting seed bed which remains open for longer than after simple disturbance. Small, isolated Juniper populations might be expected to have low levels of genetic variation but this is not the case and Juniper decline is not likely to be caused by genetic factors.
- **Outdoor sports and leisure activities**

SSSI Condition February 2010

- % Area meeting PSA target: 99.48%
- % Area favourable: 17.66%
- % Area unfavourable recovering: 81.82%
- % Area unfavourable no change: 0.51%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

Reasons for Unfavourable Condition

- Overgrazing
- Moor burning

48

WilliamstonRiver Shingle SSSI - Tyne & AllenRiver Gravels SAC

The conservation objectives for the European interest on the SSSI are:

to maintain*, in favourable condition, the:

- Calaminarian grassland

* maintenance implies restoration if the feature is not currently in favourable condition

Calaminarian grasslands of the *Violetalia calaminarie*

Targets set to maintain favourable condition within Williamstons River Shingle SSSI

- No reduction in area and any consequent fragmentation without prior consent
- Metallophyte species singly or together at least occasional thoughout the sward
- No species/taxa more than occasional throughout the sward or singly or together forming more than 5% cover
- No more than 5% cover negative indicator species
- 20%-90% bare ground
- Average sward height - 5cm or less

Main pressures and future threats on this habitat, nationally

- **Under management and successional change**
- **Agricultural improvement, including supplementary feeding**
- **Mineral re-working and land reclamation -** sometimes removed as a source of contamination
- **Modification of cultivation practices**
- **Air pollution**
- **Fragmentation** - In many areas stands are, and probably always have been, mostly small and somewhat fragmentary. Therefore, fragmentation should not necessarily lead to an assessment of unfavourable conservation status. That said, there is clearly a need for a degree of connectivity.

For example, some of the more characteristic plant special of this habitat (such as Minuartia verna and Thlaspi caerulescens) have relatively large seeds and correspondingly poor dispersal mechanisms over large distances.

SSSI Condition February 2010

- % Area meeting PSA target: 100.00%
- % Area favourable: 0.00%
- % Area unfavourable recovering: 100.00%
- % Area unfavourable no change: 0.00%
- % Area unfavourable declining: 0.00%
- % Area destroyed / part destroyed: 0.00%

49

Northumbria Coast European Marine Site (part of the SPA)

The conservation objective for the internationally important populations of the regularly occurring Annex 1 bird species:

Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 bird species:

- Little tern (*Sterna albifrons*), under the Birds Directive in particular:
- - Sandy beaches at Low Newton
- - Shallow inshore waters at Low Newton

The conservation objective for the internationally important populations of regularly occurring migratory bird species:

Subject to natural change, maintain in favourable condition[5] the habitats for the internationally important populations of regularly occurring migratory bird species:

- purple sandpiper *Calidris maritima* and turnstone *Arenaria interpres*, under the Birds Directive, in particular:
- - Rocky shores with associated boulder and cobble beaches
- - Artificial high tide roost sites

* maintenance implies restoration if the feature is not currently in favourable condition.

49.1 EMS Favourable Conditions Table

FEATURE	SUBFEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
Internationally important populations of regularly occurring	All habitats	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement	Significant disturbance attributable to human

Annex 1 and migratory bird species				of wintering birds attributable to disturbance from an established baseline, subject to natural change.	activities can result in reduced food intake and/or increased energy expenditure
					Disturbance is minimised through wardening of the tern breeding colony.
Internationally important populations of regularly occurring Annex 1 bird species	Shallow inshore waters	Extent of habitat	Area (ha) measured once during the reporting cycle.	No decrease in extent from an established baseline, subject to natural change.	Little terns feed in the shallow inshore waters and the Long Nanny estuary near the Low Newton colony.
		Food availability	Presence and abundance of marine fish, crustaceans, worms and molluscs. Measured periodically (frequency to be determined).	Presence and abundance of food species during the breeding period should not deviate significantly from established baseline, subject to natural change.	Crustacea, annelids, sandeel and clupeidae are important for little tern.
	Sandy beaches	Extent of habitat	Area (ha) measured once during the reporting cycle.	No decrease in extent from an established baseline, subject to natural change.	Little tern nest on the beach at Low Newton, near the estuary of the Long Nanny. Enough sand should be present to ensure adequate nesting areas for the colony so they do not have to risk flooding. A beach height grading to >30cm above

					water level would be suitable.
Internationally important populations of regularly occurring Annex 1 bird species	Sandy beaches	Vegetation cover	Open ground with sparse vegetation and bare surfaces	Vegetation height throughout areas used for breeding should not deviate significantly from established baseline, subject to natural change.	Open areas maintained naturally. Vegetation cover (<10%) is required throughout the areas used for nesting
Internationally important populations of regularly occurring migratory species	Rocky shores with associated boulder and cobble beaches	Extent of habitat	Area (ha) measured once during the reporting cycle.	No decrease in extent from an established baseline, subject to natural change.	Important for feeding and roosting purple sandpiper and turnstone.
		Food availability	Abundance of epibenthic invertebrates amongst rotting seaweed. Measured periodically (frequency to be determined).	Presence and abundance of food species during the wintering period should not deviate significantly from established baseline, subject to natural change.	Balanus, Mytilus, Carcinus, Gammarus, Littorina, Nucella, dipteran flies and kelp-fly larvae are important in the winter for purple sandpiper and turnstone.
		Vegetation characteristics	Open, short vegetation or bare ground predominating	Vegetation height throughout areas used for breeding should not deviate significantly from established baseline, subject to natural change.	Open areas maintained naturally. Vegetation cover of <10cm is required throughout the areas used for roosting purple sandpiper and turnstone.
		Absence of obstructions	Openness of terrain unrestricted by obstructions.	Visibility should not deviate significantly from	Areas with unrestricted views over >200m for

		to viewlines.		established baseline, subject to natural change.	purple sandpiper and turnstone to allow for early detection of predators when feeding and roosting.
	Artificial high tide roost sites	Extent	Presence of structure	No loss of favoured roost areas, subject to natural change.	Favoured artificial roost sites are River Tyne South pier and Seaham Harbour pier.

49.2 Assessment of the relative vulnerability of interest features and sub-features of Northumbria Coast European Marine site to different categories of operations. Table also incorporates relative sensitivity scores used in part to derive vulnerability. *(N.B. Vulnerability scores to be added after discussion with Natural England).*

Categories of operations which may cause deterioration or disturbance	**Internationally important populations of regularly occurring Annex 1 species**		**Internationally important populations of regularly occurring migratory species**	
	Sandy beaches	Shallow inshore waters	Rocky shore with associated boulder and cobble beaches	Artificial high tide roost sites
Physical Loss				
Removal (e.g. harvesting, land claim, coastal defence)	••••	••••	••••	••••
Smothering (e.g. artificial structures, disposal of dredge spoil)	••••	•••	••••	••

Physical Damage				
Siltation (e.g. run-off, channel dredging, outfalls)	••	••	••	•
Abrasion (e.g. boating, anchoring, trampling)	•	••	•••	•
Selective extraction (e.g. aggregate dredging)	•••	••	•••	•
Non-physical disturbance				
Noise (e.g. boat activity)	•••	••	•••	•••
Visual presence (e.g. recreational activity)	•••	•	•••	•••
Toxic contamination				
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	•••	•••	•••	••
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	•••	•••	•••	•••

Introduction of radionuclides	••	••	••	••
Non-toxic contamination				
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	•••	•••	•
Changes in organic loading (e.g. mariculture, outfalls)	••	•••	•••	•
Changes in thermal regime (e.g. outfalls, power stations)	•	•••	•	•
Changes in salinity (e.g. water abstraction, outfalls)	•	•••	••	•
Changes in turbidity (e.g. run-off, dredging)	•	•••	•	•
Biological disturbance				
Introduction of microbial pathogens	••	•••	••	•
Introduction of non-native species & translocation	••	••	•••	•

Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	••	•••	•••	•

49.3 Key (vulnerability codes to be added)

	High vulnerability	••••	High sensitivity
	Moderate vulnerability	•••	Moderate sensitivity
		••	Low sensitivity
		•	No detectable sensitivity

49.4 See English Nature's advice given under Reg 33(2) of the Habitats regulations 1994 for further detail

50

Teesmouth & Cleveland Coast EMS (part of SPA)

The conservation objective for the internationally important populations of the regularly occurring Annex 1 bird species: Little tern *Sternal albifrons* (breeding), Sandwich tern *Sterna sandvensis* (autumn)

Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 bird species, under the Birds Directive, in particular:

- Sand and shingle
- Intertidal sandflat and mudflat
- Shallow coastal waters

The conservation objective for the internationally important populations of regularly occurring migratory bird species, Knot *Calidris canutus* (winter), Redshank, *Tringa totanus* (autumn):

Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of regularly occurring migratory bird species, under the Birds Directive, in particular:

- Rocky shores
- Intertidal sandflat and mudflat
- Saltmarsh

The conservation objective for the internationally important assemblage of water birds (including 5509 knot, 1228 shelduck, 1351 teal, 1133 redshank, 259 sanderling (1991/92 – 1995/96):

Subject to natural change, maintain in favourable condition the habitats fort the internationally important assemblage of waterbirds, under the Birds Directive, in particular:

- Rocky shores
- Intertidal sandflat and mudflats
- Saltmarsh

* maintenance implies restoration if the feature is not currently in favourable condition.

50.1 EMS Favourable Condition Table

FEATURE	SUB-FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
Internationally important populations of regularly occurring Annex 1 bird species (little tern, sandwich tern)	All habitats	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change.	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure (flight and/or reduced food intake, displacement to areas of poorer feeding conditions)
		Extent and distribution of habitat	Area (ha) measured once during the reporting cycle.	No decrease in extent from an established baseline, subject to natural change.	These habitats provide both breeding and roosting sites for terns
	Sand and shingle	Vegetation characteristics	Predominantly open ground with sparse/short vegetation and bare surfaces (colonial nesting)	Vegetation height and density at nesting sites should not deviate significantly from an established baseline, subject to natural change	Vegetation cover of <10% required throughout the areas used for nesting be the tern

	Intertidal sand and mudflats	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by onstructions	No increase in obstructions to existing bird sight lines subject to natural change	Sandwich tern require views >200m to allow early detection of predators at roost sites.
	Shallow coastal waters	Food availability	Presence and abundance of marine fish, crustaceans, worms and mollusks. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from the established baseline, subject to natural change	Crustaceae, annelids, sandeel, and sprats are important for feeding little and sandwich terns
Internationally important populations of regularly occurring migratory species (knot (winter), redshank (autumn) and of the internationally important assemblage of waterbirds	All habitats	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline, subject to natural change.	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure (flight and/or reduced food intake, displacement to areas of poorer feeding conditions)
		Extent and distribution of habitat	No decrease in extent from an established baseline, subject to natural change.	No decrease in extent from an established baseline, subject to natural change.	Rocky shores have particular significance for feeding knot at Teesmouth. Existing saltmarsh habitats are

					mere remnants of those of the original Tees Estuary
	Rocky shores	Absence of obstruction to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Waders require views of over >200m to allow early detection of predators when feeding and roosting
		Food availability	Presence and abundance of surface and sub-surface invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from the established baseline, subject to natural change	Mytilus spat are important food species for Knot
	Intertidal sand and mudflats	Absence of obstruction to bird sight lines	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sight lines, subject to natural change	Prey items include Hydrobia, Macoma, Carophium, Nereis (redshank and shelduck), Macoma, Mytilus / Cerastoderma spat, Hydrobia (Knot), Bathyporeia, Nerine, Mytilus, wrack flies, sandhoppers (sanderling)

	Saltmarsh	Absence of obstructions to bird sight lines	Openness of terrain unrestricted by onstructions	No increase in obstructions to existing bird sight lines subject to natural change	Waders require views of over >200m to allow early detection of predators when feeding and roosting
		Vegetation characteristics	Open, short vegetation or bare ground predominating (feeding and roosting)	Vegetation height throughout areas used for roosting should not deviate significantly from an established baseline, subject to natural change	Vegetation of ,10 cm is required throughout areas used for roosting
		Food availability	Presence and abundance of aquatic invertebrates. Measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Hydrobia, Carophium are important for redshank, shelduck and teal. These habitats provide supplementary feeding opportunities, especially at high water.
			Presence and abundance of seed-bearing plants. Measured periodically (frequency to be determined)	Prensence and abundance of food species should not deviate significantly from an established baseline, subject to natural change	Salicornia and Atriplex are important for teal during the non-breeding season (Nov-March) while Salicornia seeds may be taken by shelduck

50.2 Assessment of the relative vulnerability of interest features and sub-features of Teesmouth & Cleveland Coast European Marine site to different categories of operations. Table also incorporates relative sensitivity scores used in part to derive vulnerability. *(N.B. Vulnerability scores to be added after discussion with Natural England).*

Categories of operations which may cause deterioration or disturbance	Internationally important populations of regularly occurring Annex 1 species			Internationally important populations of regularly occurring migratory species		
	Sand and shingle	Intertidal sandflat and mudflat	Coastal waters	Rocky shores	Intertidal sandflat and mudflat	Saltmarsh
Physical Loss						
Removal (e.g. harvesting, land claim, coastal defence)	••••	••••	••••	••••	••••	••••
Smothering (e.g. artificial structures, disposal of dredge spoil)	•••	•••	••	•••	•••	•••
Physical Damage						
Siltation (e.g. run-off, channel dredging, outfalls)	•	•	••	••	••	••
Abrasion (e.g. boating, anchoring, trampling)	••••	••••	••	•••	••	•••
Selective extraction (e.g. aggregate dredging)	••••	•••	••	•••	••	••
Non-physical disturbance						
Noise (e.g. boat activity)	••••	••••	••	••••	••••	••••

Visual presence (e.g. recreational activity)	••••	••••	••	••••	••••	••••
Toxic contamination						
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	•	•	•••	•••	•••	•••
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	•	•	•••	•••	•••	•••
Introduction of radionuclides	•	•	••	••	••	••
Non-toxic contamination						
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	•	•	••	•••	•••	••
Changes in organic loading (e.g. mariculture, outfalls)	•	•	••	•••	•••	••
Changes in thermal regime (e.g. outfalls, power stations)	•	•	•	•	•	•
Changes in salinity (e.g. water abstraction, outfalls)	•	•	••	••	••	•
Changes in turbidity (e.g. run-off, dredging)	•	•	•••	•	•	•
Biological disturbance						
Introduction of microbial pathogens	•	•	••	••	••	•
Introduction of non-native species & translocation	•	•	••	•••	•••	•••

Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	•	•	•••	•••	•••	•••

50.3 Key (vulnerability codes to be (added)

	High vulnerability	••••	High sensitivity
	Moderate vulnerability	•••	Moderate sensitivity
	Low vulnerability	••	Low sensitivity
		•	No detectable sensitivity

51.1 North Pennine Moors SPA: Favourable Conditions Table (*N.B. Information for Dunlin is still required. Dependent on appropriate bog habitat)*

OPERATIONAL	CRITERIA FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
Moorland	All species (Curlew, Golden Plover, Merlin, Peregrine, Hen Harrier)	Disturbance	Reduction or displacement of birds, periodically (frequency to be determined)	No significant displacement of birds attributable to human disturbance in relation to reference level	Potential sources of disturbance include heather burning, vehicles, stock, dogs and walkers, especially from April to mid-July.
Damp Moorland Fringe Pastures	Curlew				Disturbance caused by predation and the effects on the qualifying bird species is an area that requires further assessment.
					Methodology for assessing target to be determined. Reference level to be determined
Moorland	All species	Extent and distribution of habitat	Area (ha) measured once during reporting cycle.	No significant decrease from reference level	Reference level to be determined
Damp Moorland Fringe Pastures	Curlew				

Moorland	Golden Plover	Landscape	Open terrain relatively free of obstructions (feeding, anti-predator, roosting), measured periodically, frequency to be determined).	No significant reduction in view-lines in feeding and roosting areas in relation to reference level	Golden Plover and Curlew require views over >200m
	Curlew				
				Some loss of view, to trees and shrubs, acceptable in low density breeding areas to benefit other bird and habitat interests.	At least 80% of current moorland area (and all flatter plateaux) open, e.g. without new wall s or trees. New fences only where essential for conservation land management.
					Methodology for assessing target to be determined. Reference level to be determined
Moorland	Golden Plover	Vegetation Characteristics	Extent and proportions of short to medium vegetation, measured periodically	xxx% of moorland with short vegetation for feeding with patches of taller vegetation for nesting (short grassland, grasslands with	Using SAC targets, at least 75% of the shorter vegetation currently used by golden plovers can be retained. The requirement for 25% taller vegetation could

			(frequency to be determined). Extent and proportions of mix of short (for feeding) and taller (for nesting) vegetation, measured periodically (frequency to be determined)	bracken, burnt heather with patches of taller vegetation) for golden plover and short vegetation and long vegetation for curlew	be met away from high density breeding areas. Scattered tree/shrub is acceptable to meet other SPA and SAC objectives
	Curlew			Once a reference level has been established then there should be no significant reduction in extent from that level.	<5cm for feeding waders up to 15cm (golden plover nesting areas) and 25-100cm (curlew nesting areas)
				This needs to take account of the both the SAC and SPA objectives (see comments).	Burning management on grouse moors currently produces much of the short vegetation providing suitable habitat for golden plover. Reduced burning levels are required to be compatible with achieving favourable condition on blanket bog, which forms the majority of the moorland

					area on this site. In addition, the SAC objectives include restoration of degraded heathland/blanket bog (often short, grassy vegetation). Retention of areas of acidic grassland can provide valuable nesting habitat, compatible with SAC targets (eg 5% of area) as currently defined.
				Scattered tree/ shrub acceptable in low density breeding areas to meet other site objectives.	Methodology for assessing target to be determined. Reference levels (ie proportion of moorland with appropriate vegetation heights) to be determined.
Moorland	Merlin	Vegetation Characteristics	Extent and proportions of medium to tall vegetation, measured periodically	xxx% of moorland with medium to tall ground vegetation plus scattered trees (tall heather, low trees/scrub) for merlin	Some increases in native tree/shrub cover on areas of current tall heather acceptable. An increase in taller vegetation up to 25% in

			(frequency to be determined)		area is required to meet SAC objectives - an increase from 25ha to 250ha will benefit hen harrier and merlin
	Hen Harrier				
				xxx% of moorland with tall heather/young forestry (nesting and roosting), plus grasslands, bracken or low trees/shrub (feeding) for hen harrier.	A ground layer of 30-70cm plus trees 4-5m in 0.5-2ha clumps with <30% trees overall (for nesting Merlin). All gills with some trees and shrub (variable densities). Some patches of trees at moor boundary. Aim to increase areas of tall heather in locations suitable for merlin nesting (eg tops of slopes).
				Once a reference level has been established then there should be no significant reduction in extent from that level.	Only passage records known for Hen Harrier. However, the site objectives are to maintain suitable nesting habitat. i.e a ground layer of 60-100cm; conifers of

					<2m - where present in mosaic.
					Methodology for assessing target to be determined. Reference levels (ie proportion of moorland with appropriate vegetation heights) to be determined.
Wet Pastures	Curlew	Vegetation Characteristics	Extent and proportions of tall and medium vegetation, measured periodically (frequency to be determined)	xxx% of wet pasture with a mosaic of short (<5cm) and long (25-100cm) vegetation for nesting curlew.	Damp, rushy pastures on the moorland fringes support breeding curlew.
				Once a reference level has been established then there should be no significant reduction in extent from that level.	Methodology for assessing target to be determined. Reference levels (ie proportion of moorland with appropriate vegetation heights) to be determined.
Moorland	Merlin	Food Availability	Abundance of birds, day flying moths	No significant reduction in presence	Small sized mammals - voles to rabbit - and

			and mammals, measured periodically (frequency to be determined)	and abundance of prey species in relation to reference level.	birds - pipits to gamebirds are important for Hen Harrier
	Peregrine				
	Hen Harrier				Small birds - pipits to waders and moths are important for Merlin
					Small-medium sized birds - pipits to gamebirdsare important for Peregrine
					Methodology for assessing target to be determined. Reference level to be determined
Moorland and adjacent pastures		Food Availability	Abundance of soil and ground surface invertebrates, periodically (frequency to be determined)	No significant reduction in presence and abundance of food species in relation to reference level.	Earthworm, leatherjackets, beetles, spiders are important for golden plover
	Golden plover				
	Curlew				Earthworm and leatherjackets are important for curlew

					Maintain or increase existing areas of grassland (within 10-15km) without pesticide use.
					Methodology for assessing target to be determined. Reference level to be determined.
					Although important to the condition of the site, it may not prove possible to obtain a meaningful measure of prey availability by directly sampling invertebrate prey populations.
Wet pastures		Grazing animals	Low stock densities to reduce losses to trampling (nesting), periodically (frequency to be determined)	No significant increase in stocking density, in relation to reference level.	Identify a sustainable grazing regime which will maintain a suitable sward structure. This may vary on a site by site basis.
	Curlew				

51

Northumbria Coast SPA (Durham Coast SSSI)

Qualifying for internationally important breeding populations of:

- Little tern Sterna albicans: 1.7% of GB breeding population

Internationally important migratory populations of:

- Purple sandpiper Calidris maritima: 1.6% of the East Atlantic Flyway population
- Turnstone Arenaria interpres: 2.6% of the East Atlantic Flyway population

Listed vulnerabilities from Natura 2000 Data form

Little terns are vulnerable to disturbance from tourists in the summer causing reduced breeding success. The National Trust employs wardens each summer to protect the little tern colony at Beadnell Bay

52.1 SPA Favourable Conditions Table

52.2 (*N.B. Knot and overwintering assemblage of wildfowl are not qualifying criteria for the Northumbria Coast SPA sections of the Durham Coast SSSI but are included in the table because they are qualifying criteria for the Teesmouth & Cleveland Coast SPA section of the SSSI)*

OPERATIONAL FEATURE	CRITERIA FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
All Habitats:	Waterfowl assemblage including Annex 1 and	Extent and distribution of habitat	Area (ha) of habitat measured once	No significant decrease in extent from an established	All qualifying species
Coastal waters, Intertidal sand and					Important breeding, feeding and roosting areas.

mudflats, Sand dunes	migratory populations of European importance.		during the reporting cycle	baseline, subject to natural change.	
					Baseline level to be determined.
					Methodology for assessing target to be determined
		Disturbance in nesting, roosting and feeding areas	Reduction in or displacement of birds, measured periodically (frequency to be determined).	No significant reduction in numbers or displacement of birds from an established baseline, subject to natural change.	All qualifying species.
					Excessive disturbance can result in reduced food intake and/or increased energy expenditure.
					Methodology for assessing targets and baseline levels to be determined.
		Landscape	Open terrain, relatively free of obstructions (feeding, anti-predator, roosting), measured periodically	No significant reduction in view-lines in feeding and roosting areas from an established baseline, subject to natural change.	Knot and sanderling need areas with unrestricted views over > 200m and an effective field size of >10 ha.

			(frequency to be determined).		Methodology for assessing targets to be determined.
Coastal waters	Annex 1 populations of European importance: populations: Species: Little Tern	Food availability	Abundance of fish, crustaceans, worms and molluscs, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Important prey species for little tern during the breeding season include crustacea, annelids, sandeels and clupeidae.
					Baseline to be determined. Methodology for assessing target to be determined.
Intertidal sand and mudflats,	Migratory species of European and national importance: Knot	Food availability	Abundance of surface and sub-surface invertebrates, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Knot- prey species include Macoma, Mytilus /Cerastoderma spat, Hydrobia. Sanderling - prey species include Bathyporeia and Mytilus spat, wrack flies, sandhoppers.
	Winter assemblage: Sanderling				Baseline to be determined. Methodology for assessing target to be determined.
Sand dunes	Annex 1 species of European importance: Little Tern	Vegetation characteristics	Predominantly open ground with sparse vegetation and bare surfaces (colonial	No significant change in extent of open	Little Tern require < 10% vegetation cover throughout the areas used for nesting during the breeding season.

			nesting), measured periodically (frequency to be determined).	ground with sparse vegetation and bare surfaces throughout areas used for nesting and roosting, from an established baseline, subject to natural change.	Baseline to be determined. Methodology for assessing target to be determined.
Rocky shores with associated boulder and cobble beaches	Populations of regularly occurring migratory species or European importance	Extent of habitat	Area (ha) measured once during the reporting cycle.	No decrease in extent from an established baseline, subject to natural change.	Important for feeding and roosting purple sandpiper and turnstone.
		Food availability	Abundance of epibenthic invertebrates amongst rotting seaweed. Measured periodically (frequency to be determined).	Presence and abundance of food species during the wintering period should not deviate significantly from established baseline, subject to natural change.	Balanus, Mytilus, Carcinus, Gammarus, Littorina, Nucella, dipteran flies and kelp-fly larvae are important in the winter for purple sandpiper and turnstone.
		Vegetation characteristics	Open, short vegetation or bare ground predominating	Vegetation height throughout areas used for breeding should not deviate significantly from established baseline, subject to natural change.	Open areas maintained naturally. Vegetation cover of <10cm is required throughout the areas used for roosting purple sandpiper and turnstone.

		Absence of obstructions to viewlines.	Openness of terrain unrestricted by obstructions.	Visibility should not deviate significantly from established baseline, subject to natural change.	Areas with unrestricted views over >200m for purple sandpiper and turnstone to allow for early detection of predators when feeding and roosting.
	Artificial high tide roost sites	Extent	Presence of structure	No loss of favoured roost areas, subject to natural change.	Favoured artificial roost sites are River Tyne South pier and Seaham Harbour pier.

52

Teesmouth & Cleveland Coast SPA

Qualifying for internationally important breeding populations of:

- Little tern *Sterna albifrons*: 1.7% of the GB population
- Sandwich tern *Sterna sandvicensis* (on passage): 6.8% of the GB population

Internationally important overwintering populations of:

- Knot, *Calidris canutus*: 1.6% of the population
- Redshank, *Tringa totanus* (on passage): 1.1% of the East Atlantic Flyway population

- Ringed plover (on passage) is now a qualifying species, following the 2001 SPA review

Internationally important winter assemblage of waterbirds:

- 21312 waterfowl, including *Calidris canutus*

Listed Vulnerabilities (from Natura 2000 data form)

The natural incursion of coarse marine sediments into the estuary and the eutrophication of sheltered mudflats leading to the spread of dense Enteromorpha beds may impact on invertebrate density and abundance, and hence on waterfowl numbers. Indications are that the observed sediment changes derive from the reassertion of natural coastal processes within the context of an estuary much modified by human activity. An extensive long-term monitoring programme is investigating the effects of the Tees Barrage, while nutrient enrichment from sewage discharges should be ameliorated by the planned introduction of improved treatment facilities and the Environment Agency's acceptance of Seal Sands as a candidate Sensitive Area to Eutrophication. Aside from the eutrophication issue, water quality has shown considerable and sustained improvement, leading to the re-establishment of migratory fish populations and the growth of cormorant and common seal populations. The future development of port facilities in areas adjacent to the site, and in particular of deep water frontages with associated capital dredging, has the potential to cause adverse effect; these issues will be addressed through the planning system/Habitats Regulations, as will incompatible coastal defence schemes.

Other issues on this relatively robust site include scrub encroachment on dunes (addressed by Site Management Statements with owners) and recreational, bait-gathering and other disturbance/damage to habitats/species (addressed by WCA 1981, NNR Byelaws and the Tees Estuary Management Plan).

53.1 SPA Favourable Condition Table

OPERATIONAL FEATURE	CRITERIA FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
All Habitats:	Waterfowl assemblage including Annex 1 and migratory populations of European importance.	Extent and distribution of habitat	Area (ha) of habitat measured once during the reporting cycle	No significant decrease in extent from an established baseline, subject to natural change.	All qualifying species
Coastal waters, Intertidal sand and mudflats, Saltmarsh, Sand dunes, Freshwater marsh.					Important breeding, feeding and roosting areas.
					Baseline level to be determined.
					Methodology for assessing target to be determined
		Disturbance in nesting, roosting and feeding areas	Reduction in or displacement of birds, measured periodically	No significant reduction in numbers or displacement of birds from an established	All qualifying species.
					Excessive disturbance can result in reduced

			(frequency to be determined).	baseline, subject to natural change.	food intake and/or increased energy expenditure. Methodology for assessing targets and baseline levels to be determined.
		Landscape	Open terrain, relatively free of obstructions (feeding, anti-predator, roosting), measured periodically (frequency to be determined).	No significant reduction in view-lines in feeding and roosting areas from an established baseline, subject to natural change.	Redshank and knot need areas with unrestricted views over > 200m and an effective field size of >10 ha. Lapwing need unrestricted views over > 500m with an effective field size 16 ha. Methodology for assessing targets to be determined.
Coastal waters	Annex 1 populations of European importance: populations: Species: Little Tern and Sandwich Tern	Food availability	Abundance of fish, crustaceans, worms and molluscs, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Important prey species for Little Tern during the breeding season include crustacea, annelids, sandeels and clupeidae. Prey species for Sandwich Tern include

					sandeel and sprat 5 -13cm (July - August).
					Baseline to be determined. Methodology for assessing target to be determined.
Intertidal sand and mudflats, Saltmarsh.	Migratory species of European and national importance: Redshank, Knot	Food availability	Abundance of surface and sub-surface invertebrates, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species from an established baseline, subject to natural change.	Redshank- prey species include Hydrobia, Macoma, Corophium, Nereis.Knot- prey species include Macoma, Mytilus/Cerastoderma spat, Hydrobia. Sanderling - prey species include Bathyporeia and Mytilus spat, wrack flies, sandhoppers.
	Winter assemblage: Sanderling, Ringed Plover				Baseline to be determined. Methodology for assessing target to be determined.
Saltmarsh	Migratory species of International importance: Redshank, Knot	Vegetation characteristics	Open, short vegetation or bare ground predominating	No significant change in extent of open, short vegetation or bare ground throughout	Vegetation of < 10cm is required throughout areas used for roosting.

			(roosting), measured periodically (frequency to be determined).	areas used for roosting, from an established baseline, subject to natural change.	
	Winter assemblage: Sanderling, Lapwing, Ringed plover				Baseline to be determined. Methodology for assessing target to be determined.
	Winter assemblage of International importance: Teal	Food availability	Abundance of seed-bearing plants, measured periodically (frequency to be determined).	No significnat reduction in abundance of food species from an established baseline, subject to natural change.	Important food species for teal include Salicornia and Atriplex
					Baseline to be determined. Methodology for assessing target to be determined.
Sand dunes	Annex 1 species of International importance: Little Tern	Vegetation characteristics	Predominantly open ground with sparse vegetation and bare surfaces (colonial nesting), measured periodically (frequency to be determined).	No significant change in extent of open ground with sparse vegetation and bare surfaces throughout areas used for nesting and roosting, from an established baseline, subject to natural change.	Little Tern require < 10% vegetation cover throughout the areas used for nesting during the breeding season.
					Baseline to be determined. Methodology for assessing target to be determined.

Freshwater marsh	Winter assemblage of International importance: Lapwing	Vegetation characteristics	Predominantly short grassland swards (feeding), measured periodically (frequency to be determined).	No significant change in vegetation height throughout areas used for feeding in relation to reference level.	Lapwing require a vegetation height of < 15 cm throughout areas used for feeding.
					Reference level to be determined.Methodology for assessing target to be determined.
	Migratory species of International importance: Redshank	Food availability	Redshank- Abundance of soil invertebrates	No significant reduction in presence and abundance of food species in relation to reference level.	Important prey species for redshank and lapwing include earthworms and leatherjackets.
			Lapwing- Abundance of surface and near-surface invertebrates		
	Winter assemblage of International importance: Lapwing, Ringed Plover				Reference level to be determined. Methodology for assessing target to be determined.

Freshwater marsh	Migratory species of International importance: Redshank	Hydrology/ flow	Wet fields with many surface pools (feeding), measured periodically (frequency to be determined).	No significant reduction in extent of shallow water in relation to reference level.	Redshank ideally require 20-40% of the area soggy or flooded with shallow water of < 6cm. Lapwing require shallow flooded areas of irregular shapes <10 cm in depth ideally across 30-50% of the area.
	Winter assemblage: Lapwing				Reference level to be determined. Methodology for assessing target to be determined.
Standing water	Winter assemblage species of International importance: Teal	Food availability	Abundance of aquatic invertebrates and seed bearing plants, measured periodically (frequency to be determined).	No significant reduction in presence and abundance of food species in relation to reference level.	Teal - Prey species include; Hydrobia, flies, caddisfly, beetles, bugs. Seed bearing plants include Polygonum, Eleocharis, Rumex and Ranunculus. 25% cover of one or more of the above species should be retained.
					Reference level to be determined. Methodology

					for assessing target to be determined.
	Winter assemblage species of International importance: Teal	Water depth	Extensive shallow water (feeding), measured periodically (frequency to be determined).	No significant reduction in extent of shallow water (feeding), in relation to reference level.	Teal requires a water depth of < 30cm.
					Reference level to be determined. Methodology for assessing target to be determined.