

**European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)**

**Second Report by the United Kingdom under
Article 17
on the implementation of the Directive
from January 2001 to December 2006**

**Conservation status assessment for :
H6170: Alpine and subalpine calcareous
grasslands**

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

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H6170 Alpine and subalpine calcareous grasslands

Audit trail compiled and edited by JNCC and the UK statutory nature conservation agencies Upland Lead Co-ordination Network.

This paper and accompanying appendices contain background and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the document entitled “Assessment, monitoring and reporting under Article 17 of the Habitats Directive, Explanatory Notes and Guidelines, Final Draft 5, October 2006.” The superscript numbers below cross-reference to the headings in the corresponding Annex D reporting form. This supporting information should be read in conjunction with the UK approach for habitats (see ‘Assessing Conservation Status: UK Approach’).

1. National-biogeographic level information

1.1 General description and correspondance with NVC and other habitat types

Table 1.1.1 provides a summary description of H6170 and its relations with UK classifications.

This habitat occurs on lime-rich soils and consists of short, often grazed, species-rich mixtures of mountain avens *Dryas octopetala*, arctic-alpine cushion herbs, grasses and sedges. In the UK this habitat occurs close to sea level, as well as at high altitudes. This is unusual in a European context and is due to the harsh northern oceanic climate of north-west Scotland. At low altitude, colonisation of the grasslands by trees and shrubs is prevented by a combination of exposure and grazing. At high altitude the grasslands are maintained by the harsh climate, though grazing may also alter species composition. This is one of the most important upland habitats in the UK for rare arctic-alpine plants and other rare montane or northern plants and animals, including the endemic Scottish primrose *Primula scotica*. Indeed, areas with this habitat form a large proportion of the localities in the Highlands traditionally regarded as important for their arctic-alpine flora.

Arctic-alpines that are characteristic of this habitat include moss campion *Silene acaulis*, alpine lady’s-mantle *Alchemilla alpina*, sabbaldia *Sibbaldia procumbens*, spiked wood-rush *Luzula spicata*, cyphel *Minuartia sedoides*, purple saxifrage *Saxifraga oppositifolia*, dwarf willow *Salix herbacea*, alpine bistort *Persicaria vivipara*, hair sedge *Carex capillaris*, yellow saxifrage *Saxifraga aizoides*, alpine meadow-rue *Thalictrum alpinum*, net-leaved willow *Salix reticulata* and green spleenwort *Asplenium viride*. The habitat also supports populations of nationally rare species, such as alpine mouse-ear *Cerastium alpinum*, rock sedge *Carex rupestris*, hoary whitlowgrass *Draba incana*, rock whitlowgrass *D. norvegica*, dark-red helleborine *Epipactis atrorubens*, alpine forget-me-not *Myosotis alpestris*, purple oxytropis *Oxytropis halleri*, alpine meadow-grass *Poa alpina*, alpine cinquefoil *Potentilla crantzii*, alpine speedwell *Veronica alpina* and rock speedwell *Veronica fruticans*. There are also rare or uncommon calcicolous bryophytes, including *Aulacomnium turgidum*, *Amblystegium compactum*, *Seligeria trifaria* and *Lescuraea incurvata*.

Alpine and subalpine calcareous grasslands comprise three NVC types, one of which is confusingly referred to as heath. They are:

- CG12 *Festuca ovina* – *Alchemilla alpina* – *Silene acaulis* dwarf-herb community
- CG13 *Dryas octopetala* – *Carex flacca* heath
- CG14 *Dryas octopetala* – *Silene acaulis* ledge community

Variation within the habitat type is due to differences in altitude, climate and the intensity of grazing. The low-altitude CG13 *Dryas* – *Carex* grasslands are dominated by mountain avens *Dryas octopetala*. This community occurs in the north and west of Scotland from near sea level up to an altitude of 500 m, mainly on Durness limestone and wind-blown shell-sand. Within *Dryas* – *Carex* heath, mountain avens occurs mixed with lowland species and a relatively small complement of other arctic-alpine species. In

some forms of the community the calcifuge (lime-hating) arctic-alpines crowberry *Empetrum nigrum* ssp. *nigrum*, hermaphrodite crowberry *E. nigrum* ssp. *hermaphroditum* and bearberry *Arctostaphylos uva-ursi*, occur mixed with calciphile (lime-loving) species such as mountain avens. This is highly unusual and is perhaps due to surface leaching in the wet climate.

At high altitudes the habitat type occurs in two forms with a much larger assemblage of arctic-alpine species. Dominance of mountain avens is maintained on steep rocky ground, on rock ledges, and among boulders out of reach of grazing animals, forming CG14 *Dryas – Silene* ledge community. Within this sub-type, mountain avens occurs mixed with a wide range of arctic-alpine species. On open slopes, montane cushion herbs, especially moss campion *Silene acaulis*, and other small herbs replace mountain avens to form CG12 *Festuca – Alchemilla – Silene* dwarf-herb community. Arctic-alpines also dominate here, usually moss campion and alpine lady's-mantle, sometimes with cyphel.

On most upland sites, H6170 form intimate mosaics with other upland Annex I habitats, and there are complex transitions to a range of montane communities. They are often associated with H4080 (Sub-Arctic *Salix* spp. scrub) and H6430 (Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels) on inaccessible rocky ground. On more siliceous soils, they give way to H6230 (Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas in continental Europe) or more species-poor forms of *Nardus* grassland. Where snow lies late they give way to late snow-bed communities, and on the more windswept and leached summits they are replaced by moss-heaths, both habitats belonging to H6150 (Siliceous alpine and boreal grasslands). Where there is strong base-rich flushing they grade into H7240 (Alpine pioneer formations of the *Caricion bicoloris-atrofuscae*) and on rocky ground to H8210 (Calcareous rocky slopes with chasmophytic vegetation) or H8220 (Siliceous rocky slopes with chasmophytic vegetation).

Table 1.1.1 Summary description of habitat H6170 and its relations with UK vegetation/habitat classifications.

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	36.41 - Closed calciphile alpine grasslands Mesophile, mostly closed, vigorous, often grazed or mowed, grasslands on deep soils of the subalpine and lower alpine levels of the Alps, the Pyrenees, the mountains of the Balkan peninsula, and, locally, of the Apennines and the Jura. 36.42 - Wind edge naked-rush swards Mesoxerophile, relatively closed and unsculptured swards of <i>Kobresia myosuroides</i> (<i>Elyna myosuroides</i>) forming on deep, fine soils of protruding ridges and edges exposed to strong winds in the alpine and nival levels of the Alps, the Carpathians, the Pyrenees, the Cantabrian Mountains, Scandinavian mountains and, very locally, the Abruzzi and the mountains of the Balkan peninsula, with <i>Oxytropis jacquinii</i> (<i>Oxytropis montana</i>), <i>Oxytropis pyrenaica</i> , <i>Oxytropis carinthiaca</i> , <i>Oxytropis foucaudii</i> , <i>Oxytropis halleri</i> , <i>Antennaria carpatica</i> , <i>Dryas octopetala</i> , <i>Draba carinthiaca</i> , <i>Draba siliquosa</i> , <i>Draba fladnizensis</i> , <i>Draba aizoides</i> , <i>Gentiana tenella</i> , <i>Erigeron uniflorus</i> , <i>Dianthus glacialis</i> , <i>Dianthus monspessulanus</i> ssp. <i>sternbergii</i> , <i>Potentilla nivea</i> , <i>Saussurea</i>	These are the PAL.CLASS sub-types of H6170, found in the British Isles, based on CORINE classifications.

	<i>alpina</i> , <i>Geranium argenteum</i> , <i>Sesleria sphaerocephala</i> , <i>Carex atrata</i> , <i>Carex brevicollis</i> , <i>Carex foetida</i> , <i>Carex capillaris</i> , <i>Carex nigra</i> , <i>Carex curvula</i> ssp. <i>rosae</i> and <i>Carex rupestris</i> . Scandinavian <i>Kobresia</i> grasslands with <i>Carex rupestris</i> are included. 36.43 - Calciphilous stepped and garland grasslands	
NVC	CG12 <i>Festuca ovina</i> - <i>Alchemilla alpina</i> - <i>Silene acaulis</i> dwarf herb community CG13 <i>Dryas octopetala</i> - <i>Carex flacca</i> heath CG14 <i>Dryas octopetala</i> - <i>Silene acaulis</i> ledge community	
BAP broad habitat type	Calcareous grassland (Jackson 2000 / Web version www.jncc.gov.uk/page-2433)	H6170 is included in this much broader category
BAP priority habitat type	Upland Calcareous grassland (UK Biodiversity Group 1999 web version http://www.ukbap.org.uk/ukplans.aspx?id=13)	H6170 is included in this much broader category
JNCC CSM reporting categories, for SAC feature and ASSI/SSSI feature types	Montane grasslands and heaths (See Williams 2006 www.jncc.gov.uk/page-3520)	A broader category which covers the following Annex I feature types: H4060 Alpine and boreal heaths H6170 Alpine and subalpine calcareous grasslands H6150 Siliceous alpine and boreal grasslands H4080 Sub-Arctic <i>Salix</i> spp. scrub
JNCC CSM Guidance feature types	Calcareous grassland (upland) (JNCC 2005b www.jncc.gov.uk/page-2237)	A broader category which covers the following Annex I feature types: H6170 Alpine and subalpine calcareous grasslands H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) H6230 Species-rich <i>Nardus</i> grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe)

2. Range ^{2.3}

2.1 Current range

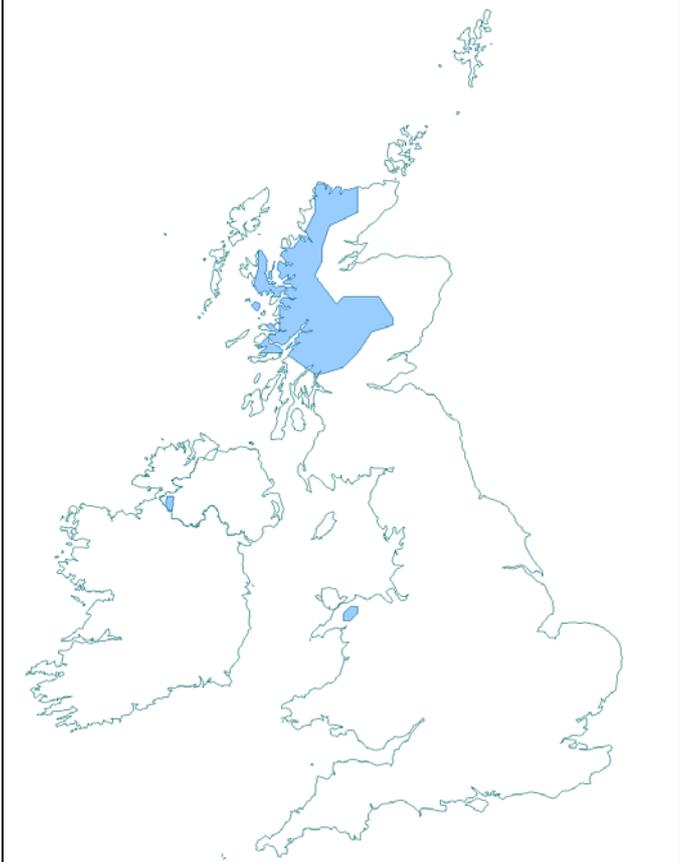
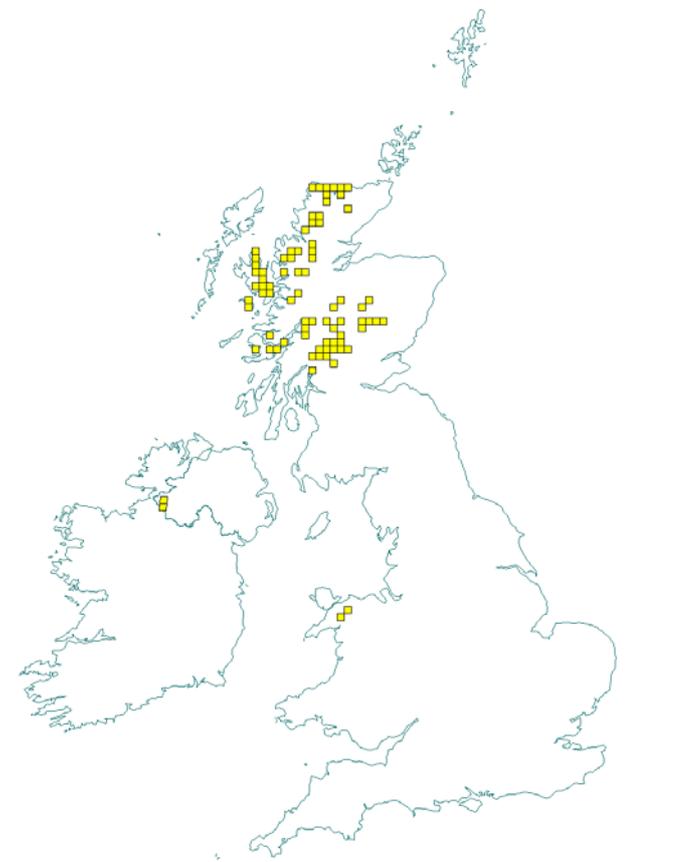
Range surface area ^{2.3.1}: 22,465 km²

Date calculated ^{2.3.2}: May 2007

Quality of data ^{2.3.3}: Moderate

The surface area estimate was calculated within alpha hull software, using extent of occurrence as a proxy measure for range (see Map 2.1.1). The value of alpha was set at 25 km; the alpha was clipped to include inland areas only.

Maps 2.1.1 and 2.1.2 show the range and distribution of H6170 in the UK. In the EU, H6170 is largely restricted to the Alpine and Boreal Biogeographical Regions. The UK examples represent western and oceanic outliers of this habitat type. High-altitude alpine calcareous grassland is almost entirely restricted to those upland areas in the central and north-western Highlands where base-rich rocks are found. Examples of the habitat at low altitude are very localised, being largely restricted to calcareous rocks in north-west mainland Scotland and on Skye (Jackson and McLeod 2000).

Map 2.1.1 Habitat range map ^{1.1} for H6170	Map 2.1.2 Habitat distribution map ^{1.2} for H6170
	
<p>Range envelope shown in blue/grey shade in above map is a minimum convex polygon constructed using JNCC Alpha Shapes tool (see Technical note I for details of methodology)</p>	<p>Each yellow square represents a 10x10-km square of the National Grid and shows the known and/or predicted occurrence of this habitat 10-km square count: 79</p>

See Section 7.1 for data sources

2.2 Trend in range since c.1994

Trend in range ^{2.3.4} :	Stable
Trend magnitude ^{2.3.5} :	Not applicable
Trend period ^{2.3.6} :	1994-2006
Reasons for reported trend ^{2.3.7} :	Not applicable

Although there is no readily available evidence or information on any trend in range for H6170 since 1994, expert opinion is that the range of the habitat has remained stable since that time.

2.3 Favourable reference range

Favourable reference range^{2.5.1}: **22,465 km²**

Section 3.2.1.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference range estimates for habitats have been determined in the UK. Based on this approach, the current surface area, 22,465 km², has been set as the favourable reference area. Reasons for this are discussed below.

The potential range for H6170 is limited by the requirements for harsh climatic conditions, base-rich rocks and lime-rich soils. Expert judgement is that the current distribution of H6170 shown in Map 2.1.2 is likely to be occupying most of its potential natural range, and that the current range and distribution is viable. The favourable reference range and distribution is likely to match closely the current range and distribution.

There is no readily available information on historic trends in range for H6170. Expert opinion is that whilst there may have been local losses in extent of the habitat due to grazing pressure and agricultural land improvement; there is unlikely to have been any significant change in range at a UK level for at least the last 50 years.

2.4 Conclusions on range

Conclusion^{2.6.1}: **Favourable**

H6170 in the UK is restricted to areas of base-rich rocks in the uplands, with the core of the range in the Highlands of Scotland. There is no empirical information on any changes in range for H6170 since 1994, nor any previous historical data on extent or changes. However expert opinion suggests that the current range is considered to be close to potential range for the habitat and to its favourable reference range, and so the judgement on range for H6170 is 'Favourable'.

3. Area^{2.4}

3.1 Current area

Total UK extent^{2.4.1}: **Approx 6.8km²**

Date of estimation^{2.4.2}: **May 2007**

Method^{2.4.3}: **3 = ground based survey**

Quality of data^{2.4.4}: **Moderate**

Table 3.1.1 provides information on the area of H6170 in the UK. However there is no accurate information on the extent of H6170 beyond the SAC series: the figures given below for Scotland and Northern Ireland, and the UK total, are totals of the area of H6170 recorded on relevant SACs, whilst those for England and Wales are expert estimates. The opinion of upland experts from the country conservation agencies represented on the Uplands Lead Co-ordination Network is that the total UK extent given is likely to represent the minimum UK extent of H6170, and has been used as the basis for other calculations in this assessment. Expert judgement is that a very high proportion of the total UK resource of the habitat is located in the statutory site series, primarily in the Scottish Highlands.

Table 3.1.1 Area of H6170 in the UK.

	Area (ha)	Method^{2.4.3}	Quality of data^{2.4.4}
England	10	1	Moderate
Scotland	676	3	Moderate
Wales	3	1	Moderate
Northern Ireland	0.1	3	Moderate
Total UK extent^{2.4.1}	Approx. 680	3	Moderate

Method used to estimate the habitat surface area: 1 = only or mostly based on expert opinion; 2 = based on remote sensing data; 3 = ground based survey. Only the most relevant class is given if more than one applies.

Quality of habitat surface area data: 'Good' e.g. based on extensive surveys; 'Moderate' e.g. based on partial data with some extrapolation; 'Poor' e.g. based on very incomplete data or on expert judgement.

3.2 Trend in area since c.1994

Trend in area^{2.4.5}: **Stable**

Trend magnitude^{2.4.6}: **Not applicable**

Trend period^{2.4.7}: **1994-2006**

Reasons for reported trend^{2.4.8}: **Not applicable**

There is no readily available quantitative evidence or information on any trend in area for H6170 since 1994. However, the extent of the habitat is likely to have remained stable since 1994, certainly within the Scottish uplands that represents the core region for the habitat.

Expert judgement suggests that the extent of H6170 may have reduced over the last 50 years due to increases in grazing intensity in the Scottish Highlands and there may be loss of the habitat due to conversion to other vegetation types.

3.3 Favourable reference area

Favourable reference area^{2.5.2}: 6.8 km²

Section 3.2.2.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference area estimates have been determined in the UK. Based on this approach, the current extent, 6.8 km², has been set as the favourable reference area. Reasons for this are discussed below.

The potential extent of H6170 is naturally limited by the need for base-rich substrates and lime-rich soils. There is no readily available information on the historic area of H6170 before 1994. However expert opinion suggests that historically (perhaps since the introduction of higher grazing levels into the Scottish uplands in the 1800s) the area occupied by H6170 has probably reduced with the replacement of the Annex I habitat by other, usually more species-poor montane communities (but sometimes by other Annex I types such as H6230 species-rich *Nardus* grasslands). Both the total area and patch size of stands of H6170 are likely to have decreased (and fragmentation increased), particularly in outlying parts of the range in England, Wales and Northern Ireland, due to increases in grazing intensity.

Although still relatively extensive within its centre of distribution in Scotland, with relatively fewer issues of fragmentation and patch size, losses in England and Wales mean that it is likely to be currently at less than its favourable reference area in these countries. However given that the total extent in England and Wales is always likely to have been very limited (partly due to the absence of the necessary natural environmental conditions required for H6170), any necessary increase in England and Wales to offset the effects of fragmentation and small patch size is likely to be extremely small and less than 1% of the current UK extent of H6170. Hence the expert judgement is that at a UK level the favourable reference area for H6170 is likely to equate to the current area.

3.4 Conclusions on area covered by habitat

Conclusion^{2.6.ii}: Favourable

The exact area of H6170 in the UK is poorly known, and there is no readily available quantitative data on trends in area since 1994. Most of the UK resource of H6170 lies in the Scottish uplands, where the extent is judged to have changed little since 1994 and is considered viable. Consequently the UK favourable reference area is likely to be very close to the current UK extent, even allowing for any increases in extent in England and Wales necessary to counter small patch size and fragmentation in that part of the resource. Hence the judgement on area for H6170 is 'Favourable'.

4. Specific structures and functions ^(including typical species)

4.1 Main pressures ^{2.4.10}

The following list of main pressures for H6170 has been derived from the six year Common Standards Monitoring results for SACs designated for their representation of H6170 and results from the 2005 UK BAP reporting (see www.ukbap.org.uk/GenPageText.aspx?id=104 for further details). The related EC codes are shown in brackets:

- **Grazing (140 Grazing)**

Overgrazing has the main impact on this feature, leading to loss of structure and flowering and the invasion of more grazing tolerant or unpalatable species. On sites with CG13, generally grazing levels are too high and there is some evidence of soil erosion. In high altitude stands with CG12 and CG14 some are heavily grazed with short swards and soil erosion occurring. Erosion through overgrazing is also a

significant problem. Some of the alpine calcareous grasslands need minimal grazing to be maintained, making grazing impacts doubly problematical.

- Invasive species (**954 Invasion by a species**)

The invasive species, New Zealand Willow herb *Epilobium brunnescens* occurs on sites supporting H6170 in the moist soil conditions of western Scotland, especially where grazing has favoured open ground.

- Air pollution (**702 Air pollution**)

Based on an assessment of the exceedance of relevant critical loads (see Technical note III), air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.

4.2 Current condition

4.2.1 Common Standards Monitoring condition assessments

Condition assessments based on Common Standards Monitoring (see www.jncc.gov.uk/page-2199) provide a means to assess the structure and functioning of H6170 in the UK. The following attributes were examined for all CSM assessments relevant to the habitat:

- Feature (habitat) extent
- Vegetation composition: frequency of taxa which are indicators of Favourable condition; cover of taxa which are indicators of Favourable condition, and others which are indicators of Unfavourable condition
- Vegetation structure: growth stages, burning, grazing and disturbance.
- Physical structure: ground disturbance.

SAC condition assessments

Expert judgement is that SACs include the majority of the known extent (c.680 ha) of H6170 in the UK in a well-dispersed network across its range.

Table 4.2.1 and Map 4.2.1 summarise the Common Standards Monitoring condition assessments for UK SACs supporting habitat H6170. These data were collated in January 2007. The maps give an impression of the overall spread of where Unfavourable and Favourable sites exist (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- 76% of the area and 79% of the number of assessments was Unfavourable;
- at least 74% of the total UK habitat area was in Unfavourable condition.

Table 4.2.1 Common Standards Monitoring condition assessment results for UK SACs supporting H6170. See notes below table for details. Information on the coverage of these results is given in Section 7.2.

Condition	Condition sub-categories	Area (ha)	Number of site features
Unfavourable	Declining	44	1
	No change	453	9
	Unclassified	00	1
	Recovering		
	Total	498	11
	<i>% of all assessments</i>	76%	79%
	<i>% of total UK resource</i>	74%	unknown
Favourable	Maintained	158	3
	Recovered		
	Unclassified		
	Total	158	3
	<i>% of all assessments</i>	24%	21%
	<i>% of total UK resource</i>	23%	unknown

Notes

1. Data on features that have been partly-destroyed have been excluded from this table because they are not relevant to the consideration of present condition.
2. The data included are from CSM assessments carried out between April 1998 and December 2006. NB: these include additional and some up-date data from those used in the six year report produced by JNCC. (Williams, J.M., ed. 2006. *Common Standards Monitoring for Designated Sites: First Six Year Report*. Peterborough, JNCC).
3. Only assessments made for qualifying interest features on SAC have been included in this analysis.
4. Area figures for CSM assessments have been calculated using the data presented on the standard Natura 2000 data forms submitted to the EU.

SSSI/ASSI condition assessments

Not applicable

Current Condition of H6170 based on Common Standard Monitoring condition assessments (See Sections 4.2 and 7.2 for further information)

Map 4.2.1 SAC assessments	Map 4.2.2 Assessments strongly indicative of the condition on SSSI/ASSIs	Map 4.2.3 Assessments weakly indicative of the condition on SSSI/ASSIs
 <p>Current status of HSD features CURRENT_ST</p> <ul style="list-style-type: none"> ■ unfavourable ■ favourable ■ not assessed □ not on SAC 	<p>Not applicable</p>	<p>Not applicable</p>
<p>Key</p> <p><u>Red = Unfavourable</u>, i.e. the square contains at least one SAC where this feature is present and has been judged to be Unfavourable</p> <p><u>Green = Favourable</u>, i.e. the square contains at least one SAC where this habitat feature is present and has been assessed as Favourable but there are no Unfavourable SAC features</p> <p><u>Blue = SAC not assessed</u>, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported</p> <p><u>Transparent = SAC feature not present</u>, i.e. the square does not contain any SAC features of this habitat type</p>	<p>Key*</p> <p><u>Green</u> – 80 – 100% of assessed features on 10-km square are Favourable</p> <p><u>Yellow</u> - 50 – 80% of assessed features on 10-km square are Favourable</p> <p><u>Orange</u> - 20 – 50% of assessed features on 10-km square are Favourable</p> <p><u>Red</u> - 0 – 20% of assessed features on 10-km square are Favourable</p> <p>*This is the same key as was used for JNCC CSM Report 2006</p>	

4.3 Typical species

Typical species^{2.5.3}: *Cerastium arcticum*, *Draba norvegica*, *Saxifraga nivalis*, *Dryas octopetala*, *Carex capillaris*, *Orthilia secunda*, *Galium boreale*, *Minuartia sedoides*, *Sagina saginoides*, *Botrychium lunaria*, *Cerastium alpinum*, *Potentilla crantzii*

Typical species assessment^{2.5.4}: Change in 10 km square occupancy across UK over last 25 years

The trends of the following typical species are considered to indicative or informative on the structure and function of the UK resource of H6170:

Table 4.3.1 Trends and faithfulness of selected typical species for H6170

Typical species considered ^{2.5.3} :	Faithfulness to habitat H6170 (based on analysis of NVC synoptic tables)	Trend over last 25 years from BSBI atlas - based on change in 10 km square occupancy across UK (see http://www.jncc.gov.uk/page-3254)
<i>Cerastium arcticum</i>	Very high	Significant decline, but less than 25% in 25yrs
<i>Draba norvegica</i>	Very high	No significant change
<i>Saxifraga nivalis</i>	Very high	Significant decline, but less than 25% in 25yrs
<i>Dryas octopetala</i>	Very high	No significant change
<i>Carex capillaris</i>	High	Significant. decline, but <25% in 25yrs
<i>Orthilia secunda</i>	Medium	Significant. decline, but <25% in 25yrs
<i>Galium boreale</i>	Medium	No significant change
<i>Minuartia sedoides</i>	Medium	Significant. decline, but <25% in 25yrs
<i>Sagina saginoides</i>	Medium	Significant decline, more than 25% in 25yrs
<i>Botrychium lunaria</i>	Medium	No data
<i>Cerastium alpinum</i>	Medium	Significant. decline, but <25% in 25yrs
<i>Potentilla crantzii</i>	Medium	No significant change

None of the other species listed as characteristic of this habitat in the EU Interpretation Manual are particularly faithful to this habitat so available trend data at the UK-level is not particularly meaningful and has not been utilised here. Overall the trends for these species suggest a slight decline in the condition of the wider resource of H6170; however there are no trends for the resource since 1994.

4.4 Conclusions on specific structures and functions (including typical species)^{2.6.iii}

Conclusion: Unfavourable – Bad

The EC Guidance states that where “more than 25% of the area of the habitat is Unfavourable as regards its specific structures and functions”, the conclusion should be Unfavourable – Bad. In the UK this was generally taken to mean that more than 25% of the habitat area in Unfavourable condition.

Common Standards Monitoring data for 2000-2006 for SACs suggest 76% of the area of assessed SACs supporting H6170 (and 79% of the features) are Unfavourable. This equates to around 74% of the total UK resource. The main reason for this decline in condition has been overgrazing and associated impacts of high numbers of grazing stock in the UK uplands. Around 69% of the assessed SAC area has not changed in reported condition category, 8% is recovering and none is recovering, suggesting stability in the condition of H6170 in these sites.

Expert judgement is that perhaps 95% of the UK resource of H6170 lies within SACs. In the absence of data from sites outside the statutory site series, the figures from CSM data for SACs have been extrapolated as being representative of the UK resource overall and this suggests that at least 76% of the UK area for H6170 is in Unfavourable condition. Extrapolating further, with much more of the assessed SAC resource in the 'Unfavourable' category marked as 'no change' compared to a small amount declining and none improving, this suggests a judgement of Unfavourable – Bad for the structure and function parameter for the UK resource of H6170.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

- Protection within SACs

The majority of the known resource of H6170 lies within SACs with management measures specifically aimed at maintaining and enhancing the features for which they are designated, and to address some of the pressures listed within section 4.1 and the future threats listed in section 5.1.2.

An unknown but smaller proportion of the resource of H6170 also lies within the SSSI/ASSI series where similar management measures are in place.

- Agri-environment measures

A suite of agri-environment measures are now in place in both the uplands and lowlands which are addressing more appropriate management, particularly grazing levels, for much of the resource of H6170, particularly within the statutory site series.

- UK BAP

H6170 is partly covered by the upland calcareous grassland action plan under the UK Biodiversity Action Plan (see www.ukbap.org.uk), as well as under country and local biodiversity action plans and strategies, with targets to maintain, improve, restore and expand the resource.

5.1.2 Main future threats^{2.4.11}

The most obvious major future threats to H6170 are listed below, several of which are referred to in Section 4.1. The measures identified in section 5.1.1 are addressing some of these factors, with a greater proportion being addressed within the statutory site series. The related EC codes are shown in brackets:

- Grazing (**140 Grazing**)
- Invasive species (**954 Invasion by a species**)
- Air pollution (**702 Air pollution**)

Based on an assessment of the exceedance of relevant critical loads (see Technical note III), air pollution is considered to be a potentially significant threat to the future condition of this habitat.

- Climate change (**750 other pollution or human impacts/ activities**)

Based on the literature review (Technical note IV) 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.

5.2 Future condition (as regards range, area covered and specific structures and functions)

5.2.1 Common Standards Monitoring condition assessments

The Common Standards Monitoring condition assessments reported in Sections 4.2.1-2 provide a basis to predict the potential future condition of H6170 in the UK. This involved treating all assessments currently identified as either Favourable or Unfavourable recovering as future-favourable: remaining categories were treated as future-unfavourable – see Table 5.2.1.1. There are a number of caveats to this approach, which are set out beneath this table.

SAC condition assessments

Table 5.2.1 and Map 5.2.1 summarise the predicted potential future condition of H6170 on UK SACs. This is based on the approach described above. The maps give an impression of the overall spread of where future-unfavourable and future-favourable sites are predicted to occur (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- 24% of the area and 21% of the number of assessments fall within the future-favourable category;
- at least 23% of the total UK habitat area falls within the future-favourable category.

Table 5.2.1 Predicted future condition of UK SACs supporting H6170 based on current Common Standards Monitoring condition assessments. See notes below table for details. Information on the coverage of these results is given in Section 7.2.

Future condition	Present condition	Area (ha)	Number of site features
Future-unfavourable	Unfavourable declining	44	1
	Unfavourable no change	453	9
	Unfavourable unclassified	00	1
	Total	498	11
	<i>% of assessments</i>	76%	79%
	<i>% of total UK extent</i>	74%	Unknown
Future-favourable	Favourable maintained	158	3
	Favourable recovered		
	Unfavourable recovering		
	Favourable unclassified		
	Total	158	3
	<i>% of assessments</i>	24%	21%
	<i>% of total extent</i>	23%	Unknown

Note that the scenario presented above is based on the same information as used to construct the Table in section 4.1. It is based on the following premises:

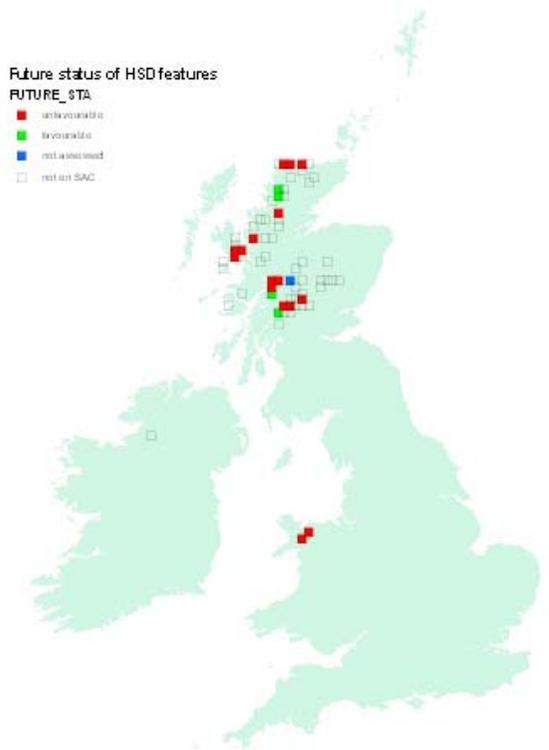
- the unfavourable-recovering condition assessments will at some point in the future become Favourable.
- all unfavourable-unclassified sites will remain Unfavourable, which is probably overly pessimistic;
- sympathetic management will be sustained on sites already classified as Favourable and these will not be seriously damaged by any unforeseen events.

IMPORTANT NOTE: we do not have information on the timescale of the predicted recovery, which may be influenced by many past, natural and human related factors. A sustained, sympathetic management regime is more likely to result in 'Favourable' condition being attained.

SSSI/ASSI condition assessments

Not applicable

Predicted Future Condition of H6170 based on Common Standard Monitoring condition assessments (See Sections 5.2 and 7.2 for further information on these maps)

Map 5.2.1 SAC assessments	Map 5.2.2 Assessments strongly indicative of the condition on SSSI/ASSIs	Map 5.2.3 Assessments weakly indicative of the condition on SSSI/ASSIs
	<p>Not applicable</p>	<p>Not applicable</p>
<p>Key <u>Red</u> = future-unfavourable, i.e. the square contains one or more SACs where this habitat feature is present and has been predicted to be future-unfavourable <u>Green</u> = future-favourable, i.e. the square contains at least one SAC where this habitat feature is present and has been predicted to be future-favourable <u>Blue</u> = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported <u>Transparent</u> = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type</p>	<p>Key* <u>Green</u> – 80 – 100% of assessed features on 10-km square are Favourable <u>Yellow</u> - 50 – 80% of assessed features on 10-km square are Favourable <u>Orange</u> - 20 – 50% of assessed features on 10-km square are Favourable <u>Red</u> - 0 – 20% of assessed features on 10-km square are Favourable *This is the same key as was used for JNCC CSM Report 2006</p>	

5.3 Conclusions on future prospects ^(as regards range, area covered and specific structures and functions)

Conclusion^{2.6.iv}: **Unfavourable – Bad but improving**

The EC Guidance states that where “habitat prospects are bad, with severe impacts from threats expected and long-term viability not assured”, the judgement should be Unfavourable – Bad. In the UK, this was generally taken to mean that habitat range and/or area are in decline, and/or less than 75% of the habitat area is likely to be in Favourable condition in 12-15 years.

The principal future pressure (grazing) on H6170 is being addressed directly for the majority of the resource of H6170 that lies within the statutory site series; and (particularly through agri-environment measures) for the smaller but unknown proportion of the resource of H6170 lying outside the statutory site series. However there are uncertainties over the effective extent of changes to grazing.

Within the SAC series, 76% of the area of SAC and 79% of the sites for the feature are assessed by CSM as “future – unfavourable”. Given the high representation of H6170 on SACs, these figures can be extrapolated to suggest that at least 76% of the total UK resource of H6170 is unlikely to achieve Favourable condition in the foreseeable future.

As there is no evidence to suggest a future decline in the area or range of H6230 in the UK by more than 1% p.a., the evidence from conservation measures (particularly grazing management agreements) currently in place and predicted to operate over the next 15-20 years leads to a judgement of ‘unfavourable- bad but improving’ for the future prospects for H6170.

6. Overall conclusions and judgements on conservation status ^{2.6}

Conclusion^{2.6}: **Unfavourable - Bad but improving**

On the basis of the Structure and Function and Future Prospects assessments, the overall conclusion for this habitat feature is Unfavourable – Bad but improving.

Table 6.1 Summary of overall conclusions and judgements

Parameter	Judgement	Grounds for Judgement	Confidence in judgement*
Range	Favourable	Range is stable and not less than the favourable reference range.	2
Area covered by habitat type within range	Favourable	Current extent is stable and not less than the favourable reference area.	2
Specific structures and functions (including typical species)	Unfavourable - Bad	More than 25% of the habitat area is considered to be Unfavourable as regards its specific structures and functions.	1
Future prospects ^(as regards range, area covered and specific structures and functions)	Unfavourable – Bad but improving	Habitat prospects over next 12-15 years considered to be bad, with severe impact from threats expected and long term viability not assured. Measures are in place and planned to address threats to future range, extent and structure for the overall UK resource.	2
Overall assessment of conservation status	Unfavourable - Bad but improving	At least one Unfavourable – Bad conclusion.	2

Key to confidence in judgement: 1 = High; 2 = Medium; 3 = Low

7. Annexed material (including information sources used 2.2)

7.1. References

JACKSON, D.L. 2000. Guidance on the interpretation of the Biodiversity Broad Habitat Classification (terrestrial and freshwater types): Definitions and the relationship with other habitat classifications. JNCC Report, No. 307. JNCC, Peterborough

JACKSON, D.L. & McLeod, C.R (eds.) 2002. Handbook on the UK status of EC Habitats Directive interest features: provisional data on the UK distribution and extent of Annex I habitats and the UK distribution and population size of Annex II species. JNCC Report, No. 312. Version 2. www.jncc.gov.uk/page-2447

JOINT NATURE CONSERVATION COMMITTEE. 2005a. Common Standards Monitoring (CSM). Joint Nature Conservation Committee, Peterborough www.jncc.gov.uk/page-2217

JOINT NATURE CONSERVATION COMMITTEE. 2005b. Common Standards Monitoring Guidance for Upland Habitats. Version May 2005, Peterborough. www.jncc.gov.uk/page-2237

WILLIAMS, J.M. (ed.) 2006. Common Standards Monitoring for Designated Sites: First Six Year Report. Peterborough, JNCC. www.jncc.gov.uk/page-3520

UK BIODIVERSITY GROUP. 1999. Tranche 2 Action Plans - Volume VI: Terrestrial and freshwater species and habitats. English Nature. Peterborough.

Map Data Sources

JNCC International Designations Database. Joint Nature Conservation Committee.

Richard Weyl (pers. Comm..) 1995. Environmental Heritage Service.

SNH Uplands Database, (18-12-98) 10KMVEG.XLS. Scottish Natural Heritage.

7.2 Further information on Common Standards Monitoring data as presented in Sections 4.2 and 5.2

Table 7.2.1 Summary of the coverage of the data shown in Tables 4.2.1 and 5.2.1

Data	Value
Number of SACs supporting feature (a)	15
Number of SACs with CSM assessments (b)	14
% of SACs assessed (b/a)	93
Extent of feature in the UK – hectares (c)	680
Extent of feature on SACs – hectares (d)	676
Extent of features assessed – hectares (e)	656
% of total UK hectarage on SACs (d/c)	99
% of SAC total hectarage that has been assessed (e/d)	96
% of total UK hectarage that has been assessed (e/c)	96

Notes

1. Extent of features on SACs (d) includes only those features that have been submitted on the official Natura 2000 data form as qualifying features. This figure is based on the habitat extent figures presented on standard Natura 2000 data forms.
2. The data included are from CSM assessments carried out between April 1998 and December 2006. NB: these include additional and some up-date data form those used in the six year report produced by JNCC (Williams, J.M., ed. 2006. *Common Standards Monitoring for Designated Sites: First Six Year Report*. Peterborough, JNCC).

Table 7.2.2 Summary of grid square map data shown in Maps 4.2.1-3 and 5.2.1-3

Status	Number of squares	Proportion of all squares
Current – Unfavourable (red)	16	24%
Current – Favourable (green)	4	6%
On SAC but not assessed (blue)	1	2%
Not on SAC (transparent)	45	68%
Total Number of 10-km squares (any colour)	66	
Future – Unfavourable (red)	16	24%
Future – Favourable (green)	4	6%