

**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 :
H6150: Siliceous alpine and boreal 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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H6150 Siliceous alpine and boreal 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 & 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 H6150 and its relations with UK classifications.

Siliceous alpine and boreal grasslands are one of the few predominantly near-natural habitats remaining in the UK. The habitat is the most extensive type of vegetation in the high mountain zone, i.e. above an altitude of about 750 m. It characteristically forms large continuous tracts, covering summit plateaux and the tops of the higher summits and ridges. The habitat comprises a range of grassland types whose composition is influenced by contrasting extremes of exposure and snow-lie. Late-lie snow-bed communities dominated by bryophytes and dwarf-herbs are also included within the definition of the habitat. The flora is characterised by a strong montane element which includes several uncommon vascular plants, mosses and liverworts. It is also the most important habitat for Eurasian dotterel *Charadrius morinellus*, Britain’s only montane wading bird. The habitat is vulnerable to nutrient inputs and physical damage such as occur due to dunging and urination by grazing animals, acid deposition, human and animal trampling, skiing and use of all-terrain vehicles.

There are seven main sub-types of H6150 recognised by the NVC, which are mostly referred to as ‘heath’ or snow-bed communities. These are:

- U7 *Nardus stricta* – *Carex bigelowii* grass-heath
- U8 *Carex bigelowii* – *Polytrichum alpinum* sedge-heath
- U9 *Juncus trifidus* – *Racomitrium lanuginosum* rush-heath
- U10 *Carex bigelowii* – *Racomitrium lanuginosum* moss-heath
- U11 *Polytrichum sexangulare* – *Kiaeria starkei* snow-bed
- U12 *Salix herbacea* – *Racomitrium heterostichum* snow-bed
- U14 *Alchemilla alpina* – *Sibbaldia procumbens* dwarf-herb community

U10 *Carex* – *Racomitrium* moss-heath occurs on windswept ground blown clear of snow during winter, and is the most extensive sub-type of the habitat across most of the UK. Where snow-lie builds up, such moss-heath gives way initially to U7 *Nardus* – *Carex* grass-heath, and then to U8 *Carex* – *Polytrichum* sedge-heath where snow-lie is more prolonged. The longest lying snow-beds (U11 *Polytrichum* – *Kiaeria* snow-bed, U12 *Salix* – *Racomitrium* snow-bed and U14 *Alchemilla* – *Sibbaldia* dwarf-herb community) are dominated by mosses and hardy herbs. These communities occur around the edges of high plateaux on steep slopes where a snow cornice develops in high corries or in gullies where deep snow accumulates. They can also occur in snow hollows on the highest summits. The *Alchemilla* – *Sibbaldia* dwarf-herb community requires a certain amount of base-rich flushing to develop its distinctive flora of small herbs. *Carex* – *Racomitrium* moss-heath grades into U9 *Juncus* – *Racomitrium* rush-heath where exposure is more severe or the substrate unstable, and the latter community represents the habitat type at its highest altitude.

There is much variation in the distribution of the different sub-types across the country. In the western Highlands, *Carex – Racomitrium* moss-heath is widely distributed and extensive. In the east, *Carex – Racomitrium* moss-heath is proportionately less abundant, and *Carex – Polytrichum* sedge-heath and *Juncus – Racomitrium* rush-heath become more common, especially on the highest hills. *Nardus – Carex* grass-heaths are extensive throughout the Scottish Highlands, but to the south of the Highlands they become very local and the dominant form of the habitat is *Carex – Racomitrium* moss-heath. The late-lie snow patch communities (*Polytrichum – Kiaeria* snow-bed, *Salix – Racomitrium* snow-bed and *Alchemilla– Sibbaldia* dwarf-herb community) are rare, being restricted almost exclusively to the higher hills of the Highlands.

The most common sub-type, *Carex – Racomitrium* moss-heath, varies in species composition depending on the base-richness and instability of the substrate. On relatively stable and acid siliceous rocks the flora is typically species-poor, though a few cushion herbs occur locally, such as moss campion *Silene acaulis* and thrift *Armeria maritima*. Localised bands of base-rich rocks support a more varied flora, and a species-rich sub-community develops, supporting a number of rare or local montane plants. The flora of this species-rich moss-heath includes dwarf willow *Salix herbacea*, alpine lady's-mantle *Alchemilla alpina*, moss campion *Silene acaulis*, thrift *Armeria maritima*, alpine bistort *Persicaria vivipara*, sibbaldia *Sibbaldia procumbens*, spiked wood-rush *Luzula spicata*, cyphel *Minuartia sedoides*, the rare montane calcicole mosses *Aulacomnium turgidum* and *Hypnum hamulosum*, and the rare foliose lichen *Nephroma arcticum*.

Open and unstable substrates can also produce an enrichment of the flora and give rise to a similar species-rich sub-type. This can develop on highly windswept ground but occurs most commonly on solifluction terracing in the Scottish Highlands. Alternate freezing and thawing of soil water forms the terracing. Many plants benefit from the instability, which stirs up the soils to release nutrients and counteracts the effects of leaching. A special feature in the UK is that strong winds at high altitude can keep the more exposed risers of the stair-like terraces open, resulting in distinctive bands of vegetation. Norwegian mugwort *Artemisia norvegica*, which is known from only two mountains in the North-west Highlands, is present in open *Carex – Racomitrium* moss-heath on solifluction terracing and on open basal rock surfaces.

The communities of the longest-lying snow patches (*Polytrichum – Kiaeria* snow-bed, *Salix – Racomitrium* snow-bed and *Alchemilla – Sibbaldia* dwarf-herb community) are dominated by a range of mosses and hardy herbs tolerant of prolonged snow-cover. Many rare species are found in these snow-beds, including hare's-foot sedge *Carex lachenalii*, starwort mouse-ear *Cerastium cerastoides*, curved wood-rush *Luzula arcuata*, the bryophytes *Conostomum tetragonum*, *Anthelia juratzkana* and *Moerckia blyttii*, and many lichens growing on rocks or on the ground.

In the Scottish Highlands the sub-types of this habitat type tend to form intimate mosaics with other habitats, the elements of which are ecologically interdependent. For example, U18 *Cryptogramma crisper – Athyrium distentifolium* snow-bed community (a form of H8110) is often associated with snow-bed sub-types of H6150. Similarly, U13 *Deschampsia cespitosa – Galium saxatile* grasslands, a non-Annex I habitat, can develop on slopes in association with moderately prolonged snow-cover and below areas of melting snow. A sub-type of this grassland with an abundance of the large hypnaceous moss *Rhytidiadelphus loreus* characteristically occurs in association with *Carex – Racomitrium* moss-heath on the edges of plateaux in the far north and west. Where there is a transition to more strongly base-rich soils H6170 occur, including CG12 *Festuca ovina – Alchemilla alpina – Silene acaulis* dwarf-herb community and CG14 *Dryas octopetala – Silene acaulis* ledge community. The development of such associated communities adds to the diversity of sites supporting H6150.

Table 1.1.1 Summary description of habitat H6150 and its relations with UK vegetation/habitat classifications.

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	PAL.CLASS.: 36.11, 36.32, 36.34 Boreo-alpine formations of the higher summits of mountains in the Alps and Scandanavia with outliers elsewhere such as the Tatra, with <i>Juncus trifidus</i> , <i>Carex bigelowii</i> , mosses and lichens. Also included are associated snowbed communities.	Based on CORINE classifications.
NVC	U7 <i>Nardus stricta-Carex bigelowii</i> grass heath U8 <i>Carex bigelowii-Polytrichum alpinum</i> sedge heath U9 <i>Juncus trifidus-Racomitrium lanuginosum</i> rush heath U10 <i>Carex bigelowii-Racomitrium lanuginosum</i> moss heath U11 <i>Polytrichum sexangulare-Kiaeria starkei</i> snow-bed U12 <i>Salix herbacea-Racomitrium heterostichum</i> snow-bed U14 <i>Alchemilla alpina-Sibbaldia procumbens</i> dwarf-herb community	Snow-bed communities (NVC types U11, U12 and U14) are included in this Annex I type (agreed at Scientific Working Group meeting of 16 February 2001). (Appendix II Jackson & McLeod 2000)
BAP priority habitat type	Mountain heaths and willow scrub (proposed new BAP priority habitat)	Category will cover the resource of H6150 but will also contain many other upland Annex I habitats.
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	Alpine summit communities of moss, sedge and three-leaved rush (JNCC 2005b www.jncc.gov.uk/page-2237)	Close correspondence to H6150

2. Range ^{2.3}

2.1. Current range

Range surface area ^{2.3.1}: **41,056 km²**

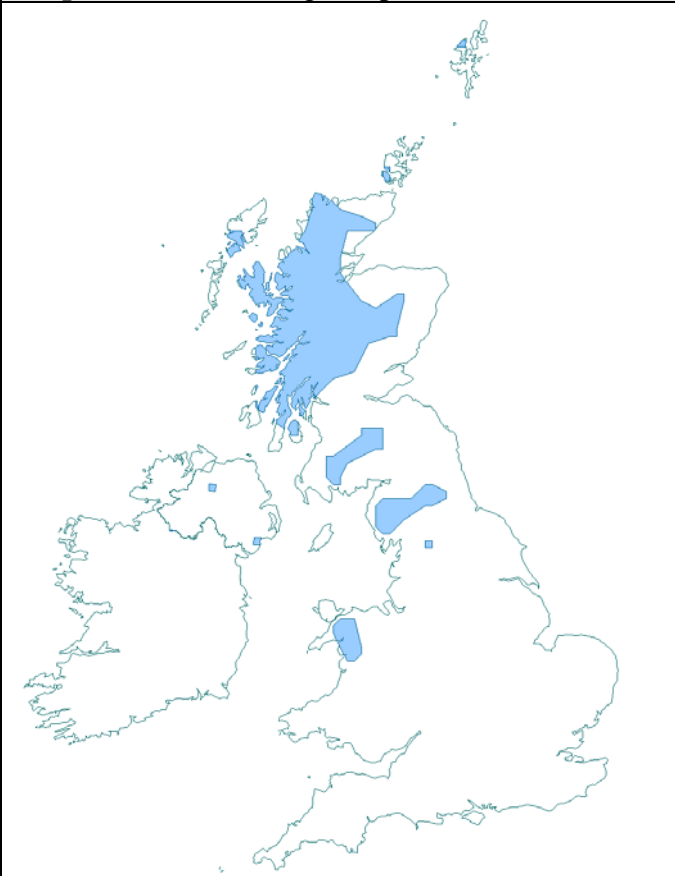
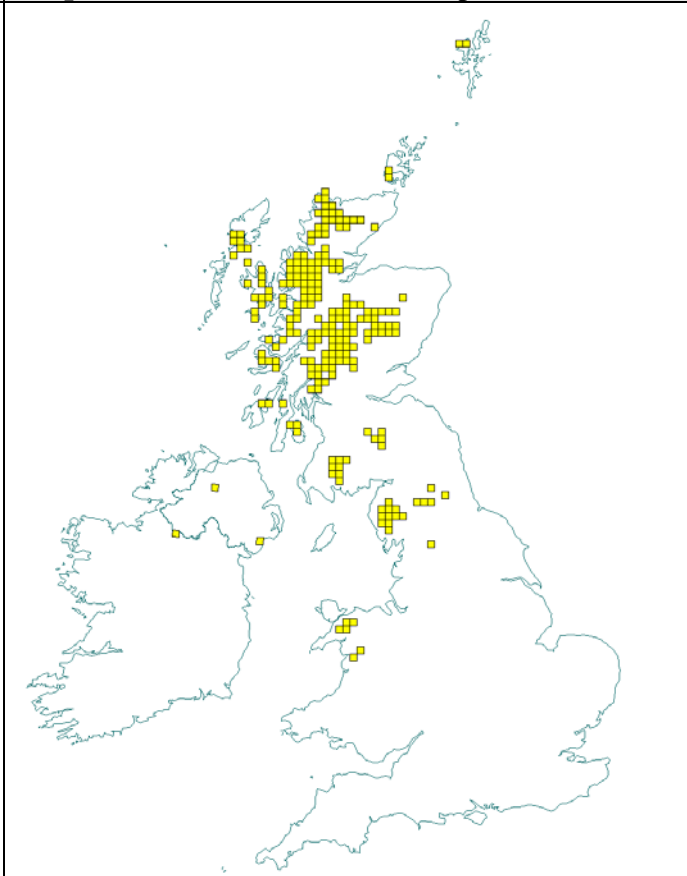
Date calculated ^{2.3.2}: **May 2007**

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 H6150 in the UK. Siliceous alpine and boreal grasslands have a restricted distribution in the EU. The UK and Ireland support the only examples of this vegetation within the Atlantic Biogeographical Region.

In the UK extensive areas of H6150 occur chiefly in Scotland, but there are important southern outliers in northern England, north Wales and Northern Ireland, where the southern limit of the habitat in the EU is reached. In many of the southern outliers the extent of the habitat is smaller than on sites in Scotland and the degree of modification is often greater. (Jackson & McLeod 2000).

Map 2.1.1 Habitat range map ^{1.1} for H6150	Map 2.1.2 Habitat distribution map ^{1.2} for H6150
	
<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 10x10km square of the National Grid and shows the known and/or predicted occurrence of this habitat 10-km square count: 222</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

There is no readily available quantitative evidence or information on any trend in range for H6150 since 1994.

2.3 Favourable reference range

Favourable reference range^{2.5.1}: 41,056 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, 41,056 km², has been set as the favourable reference area. Reasons for this are discussed below.

The potential range of H6150 is naturally limited by altitude, climatic and hydrological requirements as described in section 1.1. These requirements mean that the resource has a naturally fragmented

distribution within the overall UK range. There is no quantifiable evidence that the range has declined since 1994, nor that the current UK range is not viable in the long-term. Current range has, therefore, been set as the favourable reference range.

2.4 Conclusions on range

Conclusion^{2.6.i}: **Favourable**

There is no evidence of range decline since 1994 for this habitat and the current range is equal to the favourable reference range. The conclusion for range is, therefore, Favourable. However, this conclusion has been made with low confidence and could be revised in the future if better information becomes available.

3. Area^{2.4}

3.1 Current area

Total UK extent^{2.4.1}: **700km²**
Date of estimation^{2.4.2}: **May 2007**
Method^{2.4.3}: **1 = only or mostly based on expert opinion**
Quality of data^{2.4.4}: **Poor**

Table 3.1.1 provides information on the area of H6150 in the UK.

The exact area of H6150 outside SACs is poorly known, and the range of values given in Table 3.1.1 are estimates based upon the opinion of upland experts in each country agency and represented on the Uplands Lead Co-ordination Network. The extent in England is not known, but it is thought to be less than 200ha.

Although the median value for the UK extent of H6150 has been used for the purposes of calculations elsewhere in this assessment, expert opinion attaches more credence to the range of values given.

Table 3.1.1 Area of H6150 in the UK.

	Area (ha)	Method^{2.4.3}	Quality of data^{2.4.4}
England	Unknown	1	Poor
Scotland	65-75 000	1	Poor
Wales	60	1	Poor
Northern Ireland	40-60	1	Poor
Total UK extent^{2.4.1}	65-75 000 (70 000)	1	Poor

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}: **Decreasing**
Trend magnitude^{2.4.6}: **<1% per annum**
Trend period^{2.4.7}: **1994-2006**
Reasons for reported trend^{2.4.8}: **4 – Indirect anthropogenic or zoogenic influence**

There is no readily available evidence or information on any trend in area for H6150 since 1994. However expert opinion is that the extent of the habitat at a UK level has decreased since 1994, but at less than 1% p.a. Losses in extent, due to high levels of grazing, are likely to have been larger in the outlying parts of the range, particularly in England and Wales. Expert opinion is that high grazing levels in the UK

uplands have led to the replacement of H6150 by impoverished grassland communities not referable to the Annex I type, particularly in outlying parts of the range in Wales and England. Furthermore, even given a relaxation in grazing levels many of these stands are unlikely to recover to any vegetation communities that could be ascribed to H6150 in the foreseeable future.

3.3 Favourable reference area

Favourable reference area^{2.5.2}: 720 – 840 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 favourable reference area has been identified as greater than the current extent, but not by a factor of more than 10%. Reasons for this are discussed below.

The potential area of H6150 is naturally limited by specific environmental conditions as described in section 1.1. There is no readily available information on the historic area of H6150 before 1994. However expert opinion suggests that the area occupied by H6150 probably decreased in the past when high levels of grazing were introduced to the UK uplands. This grazing pressure has either led to replacement by vegetation communities not corresponding to H6150 altogether or left degraded forms of H6150; stands of intact vegetation do remain on areas inaccessible to grazing animals. Both the total area and patch size of stands of H6150 are likely to have decreased (and fragmentation increased), particularly in outlying parts of the range in England and Wales, due to grazing pressure.

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 areas. However given that the total extent in England and Wales is always likely to have been much smaller than in Scotland, (partly due to the absence of the necessary natural environmental conditions required for H6150) any necessary increase in England and Wales to offset the effects of fragmentation and small patch size is likely to be no more than 110% of the current UK extent.

3.4 Conclusions on area covered by habitat

Conclusion^{2.6.ii}: Unfavourable - Inadequate and deteriorating

The exact area of H6150 in the UK is poorly known, and there is no readily available quantitative data on either trends in area since 1994 or historically. Expert opinion is that high grazing levels in the uplands have led to declines in extent at a UK level, with particular impacts on outlying parts of the resource in England and Wales; however these are likely to amount to a decrease of less than 1% p.a. since 1994 of the total UK area.

Overall the current extent of H6150 is considered to be at less than both its potential area and favourable reference area; as the majority of the resource of H6150 lies in Scotland, the favourable reference area is unlikely to be more than 110% of the current area. Consequently the judgement on area for H6150 is Unfavourable – Inadequate and deteriorating.

4. Specific structures and functions (including typical species)

4.1 Main pressures

The following list of main pressures for H6150 has been derived from the six year Common Standards Monitoring results for SACs designated for their representation of H6150 and results from the 2005 UK BAP reporting. The related EC codes are shown in brackets:

- Grazing (**140 Grazing**)

Over-grazing is the most important factor affecting structure and function in SACs supporting H6150 in the Scottish uplands. Excessive grazing, trampling and nutrient 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 *Racomitrium lanuginosum* with thin grassy swards. Soil erosion occurs in some areas of heavy grazing.

- **Fragmentation (990 Other natural processes)**

H6150 is naturally limited by specific environmental requirements (see section 1.1) leading 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 (180 Burning)**

Burning of adjoining associated habitats has led to damage to isolated patches of H6150 on some parts of the SAC series.

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

Based on an assessment of the exceedence 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 <http://www.jncc.gov.uk/page-2199>) provide a means to assess the structure and functioning of H6150 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

SACs include about 22% (32,830 ha) of the extent of H6150 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 H6150. 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:

- 40% of the area and 75% of the number of assessments was Unfavourable;
- at least 16% of the total UK habitat area was in Unfavourable condition.

Table 4.2.1 Common Standards Monitoring condition assessment results for UK SACs supporting H6150. 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	1,928	5
	No change	8,337	8
	Unclassified	32	1
	Recovering	854	4
	Total	11,150	18
	<i>% of all assessments</i>	40%	75%
	<i>% of total UK resource</i>	16%	unknown
Favourable	Maintained	16,655	6
	Recovered		
	Unclassified		
	Total	16,655	6
	<i>% of all assessments</i>	60%	25%
	<i>% of total UK resource</i>	24%	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

Table 4.2.2 and Maps 4.2.2 and 4.2.3 summarise the Common Standards Monitoring condition assessments that were judged to be either strongly or weakly indicative of the condition of the Annex I habitat on SSSI/ASSIs (see Technical note II for details of methodology behind this). 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 maps are given in Section 7.2). The combined condition assessments show that of the SSSI/ASSI assessments considered:

- 75% of strongly indicative assessments and 75% weakly indicative assessments were Unfavourable.

Table 4.2.2 Common Standards Monitoring condition assessment results for UK SSSI/ASSIs that were judged to be either strongly or weakly indicative of the condition of H6150 on SSSI/ASSIs. See notes below table and Technical note II for further details.

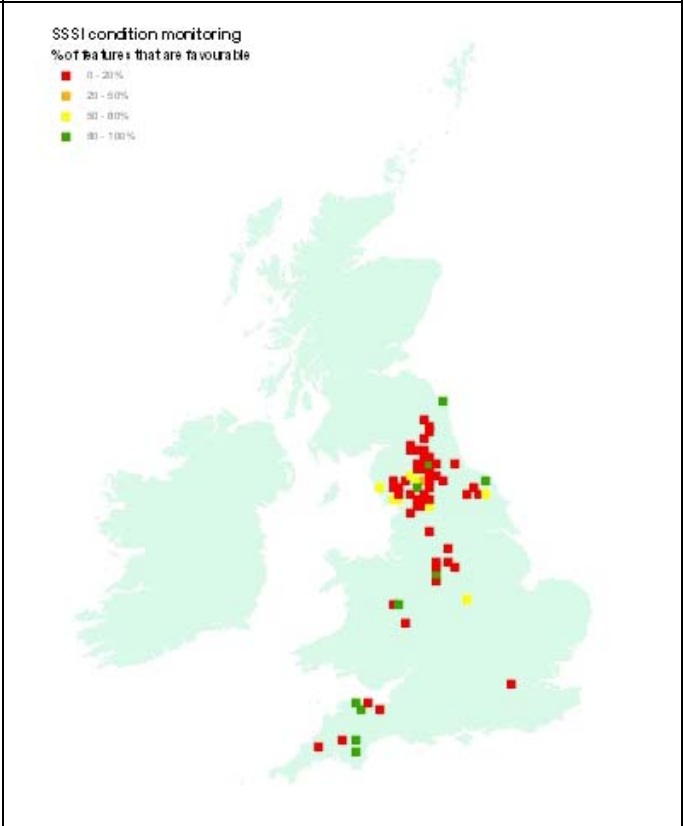
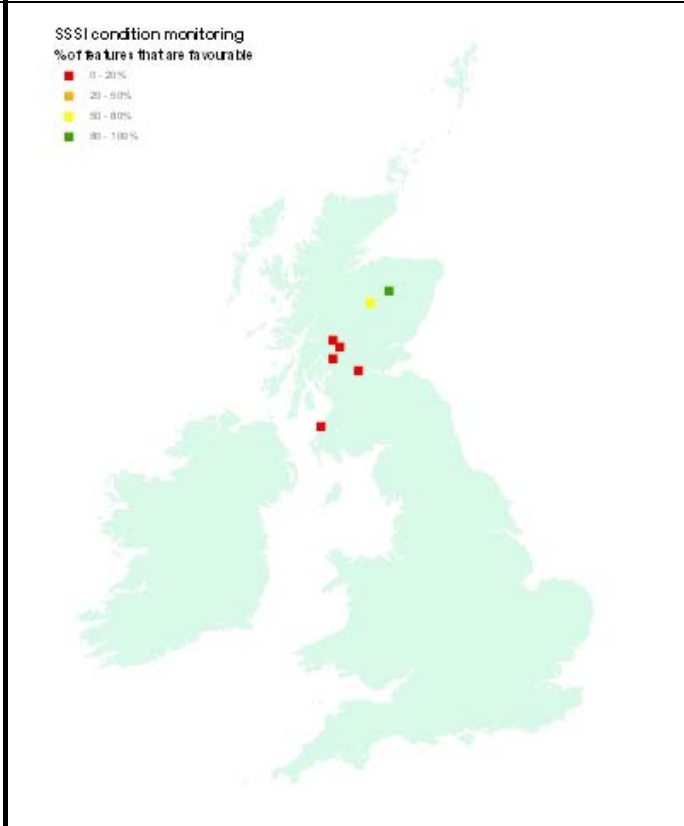
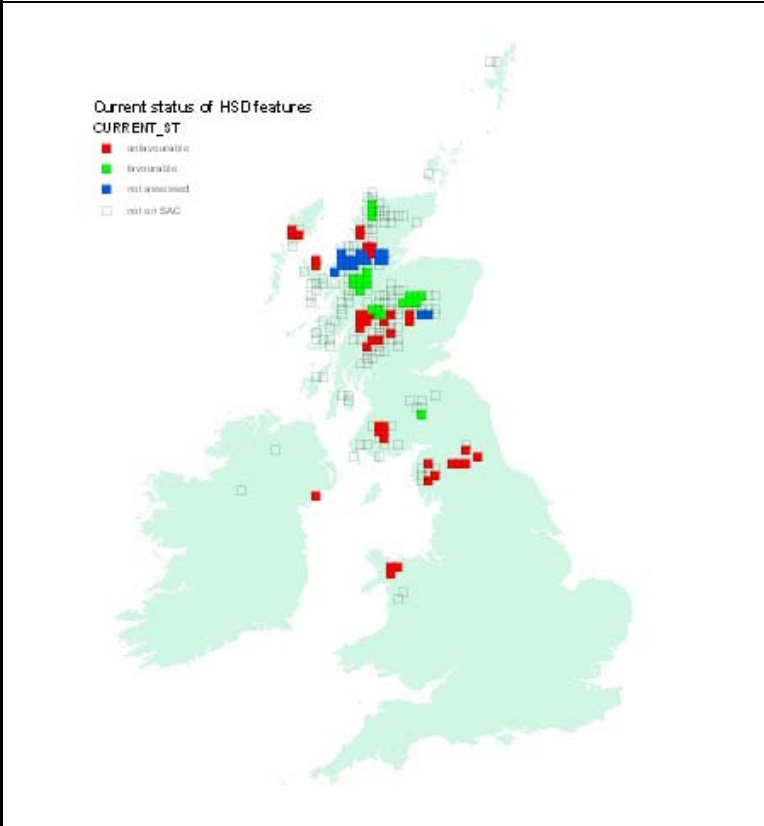
Condition	Condition sub-categories	Number of assessments	
		Strongly indicative assessments (Category 1)	Weakly indicative assessments (Category 2)
Unfavourable	Declining	2	5
	No change	4	25
	Unclassified		
	Recovering		42
	Total	6	72
	<i>% of all assessments</i>	<i>75%</i>	<i>75%</i>
Favourable	Maintained	2	
	Recovered		
	Unclassified		24
	Total	2	24
	<i>% of all assessments</i>	<i>25%</i>	<i>25%</i>

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.

Current Condition of H6150 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



Key
Red = Unfavourable, i.e. the square contains at least one SAC where this habitat feature is present and has been judged to be Unfavourable
Green = Favourable, 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
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type

Key*
Green – 80 – 100% of assessed features on 10km square are Favourable
Yellow - 50 – 80% of assessed features on 10km square are Favourable
Orange - 20 – 50% of assessed features on 10km square are Favourable
Red - 0 – 20% of assessed features on 10km square are Favourable
 *This is the same key as was used for JNCC CSM Report 2006

4.3 Typical species

Typical species^{2.5.3}: *Juncus trifidus*, *Salix herbacea*, *Gnaphalium supinum*, *Luzula spicata*, *Sibbaldia procumbens*

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 H6150.

Table 4.3.1 Trends and faithfulness of selected typical species for H6150

Typical species considered:	Faithfulness to habitat H6150 (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>Juncus trifidus</i>	High	Significant decline, but <25% in 25yrs
<i>Salix herbacea</i>	Medium	Significant increase, but <25% in 25yrs
<i>Gnaphalium supinum</i>	Medium	Significant decline, but <25% in 25yrs
<i>Luzula spicata</i>	Medium	Significant decline, but <25% in 25yrs
<i>Sibbaldia procumbens</i>	Medium	Significant decline, but <25% in 25yrs

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 decline in the condition of the wider resource of H6150; however there are no trends for the resource since 1994 and, particularly given changes in recording effort, the deterioration suggested by other evidence may not have been evident from trends over a longer time period.

4.4 Conclusions on specific structures and functions (including typical species)

Conclusion^{2.6.iii}: **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 is in Unfavourable condition.

Common Standards Monitoring data for 2000-2006 for SACs suggest 40% of the area of assessed SACs supporting H6150 (and 75% of the features) are Unfavourable. This equates to around 16% of the total UK resource for SSSI/ASSIs supporting features that are strongly or weakly indicative of H6150, 75% of features were assessed as Unfavourable. 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 41% of the assessed SAC area is recovering and only 4% is declining (with similar proportions on assessed SSSI/ASSIs), suggesting a general improvement in the condition of H6150 in these sites.

Around 22% of the UK resource of H6150 lies within SACs. In the absence of dates 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 40% of the UK area for H6150 is in Unfavourable condition. With 28% of the assessed SAC resource in the ‘Unfavourable’ category marked as ‘no change’ compared to 7% declining and 3% improving, this suggests a judgement of ‘Unfavourable – Bad’ for the structure and function parameter for H6150.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

- Protection within SACs

Around 22% of the known resource of H6150 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 significant proportion of the resource of H6150 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 an unknown proportion of the resource of H6150 outside the statutory site series.

- UK BAP

H6150 has been put forward as part of a new priority habitat type - mountain heaths and willow scrub. However it is not currently covered by any priority habitat action plan under the UK Biodiversity Action Plan.

5.1.2 Main future threats^{2.4.11}

The most obvious major future threats to H6150 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**)
- Fragmentation (**990 Other natural processes**)
- Burning (**180 Burning**)

- 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 H6150 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 H6150 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:

- 63% of the area and 42% of the number of assessments fall within the future-favourable category;
- at least 25% of the total UK habitat area falls within the future-favourable category.

Table 5.2.1. Predicted future condition of UK SACs supporting H6150 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	1,928	5
	Unfavourable no change	8,337	8
	Unfavourable unclassified	32	1
	Total	10,296	14
	<i>% of assessments</i>	37%	58%
	<i>% of total UK extent</i>	15%	Unknown
Future-favourable	Favourable maintained	16,655	6
	Favourable recovered		
	Unfavourable recovering	854	4
	Favourable unclassified		
	Total	17,509	10
	<i>% of assessments</i>	63%	42%
	<i>% of total extent</i>	25%	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

Table 5.2.2 and Maps 5.2.2 and 5.2.3 summarise the predicted potential future condition of H6150 on UK SSSI/ASSIs. This is based on the approach described above and utilises condition assessments that were judged to be either strongly or weakly indicative of the condition of the Annex I habitat on SSSI/ASSIs (see Technical note II for details of methodology behind this). The maps give an impression of the overall spread of where Unfavourable and Favourable sites exist (summary statistics for the maps are given in Section 7.2). The combined condition assessments show that of the SSSI/ASSI assessments considered:

- 25% of strongly indicative assessments and 69% weakly indicative assessments fall within the future-favourable category.

Table 5.2.2 Predicted future condition of H6150 on SSSI/ASSIs based on Common Standards Monitoring assessments that were judged to be either strongly or weakly indicative of the condition. See notes below table and Technical note II for further details.

Future condition	Present condition	Number of assessments	
		Strongly indicative assessments (Category 1)	Weakly indicative assessments (Category 2)
Future-unfavourable	Unfavourable declining	2	5
	Unfavourable no change	4	25
	Unfavourable unclassified		
	Total	6	30
	% of assessments	75%	31%
Future-favourable	Favourable maintained	2	
	Favourable recovered		
	Unfavourable recovering		42
	Favourable unclassified		24
	Total	2	66
	% of assessments	25%	69%

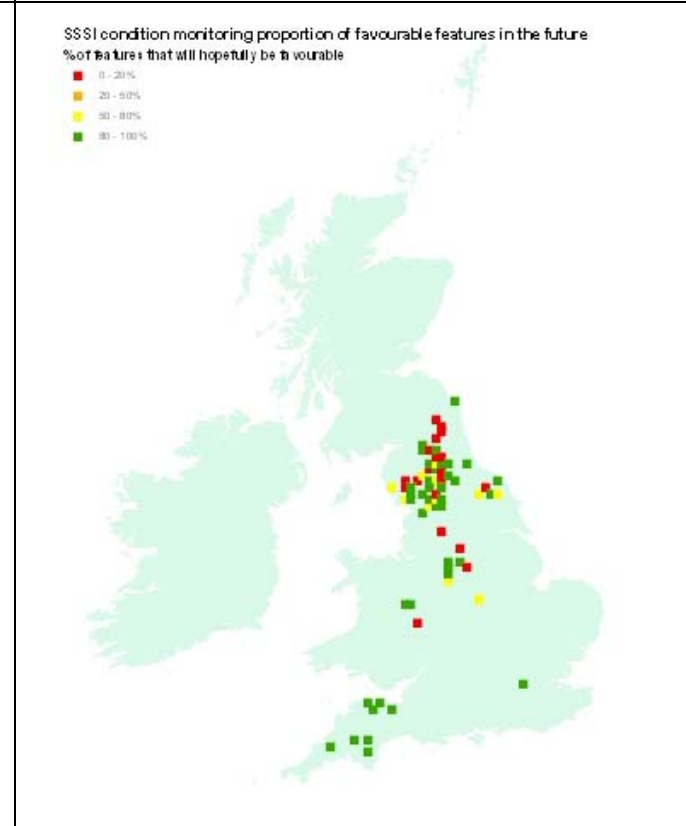
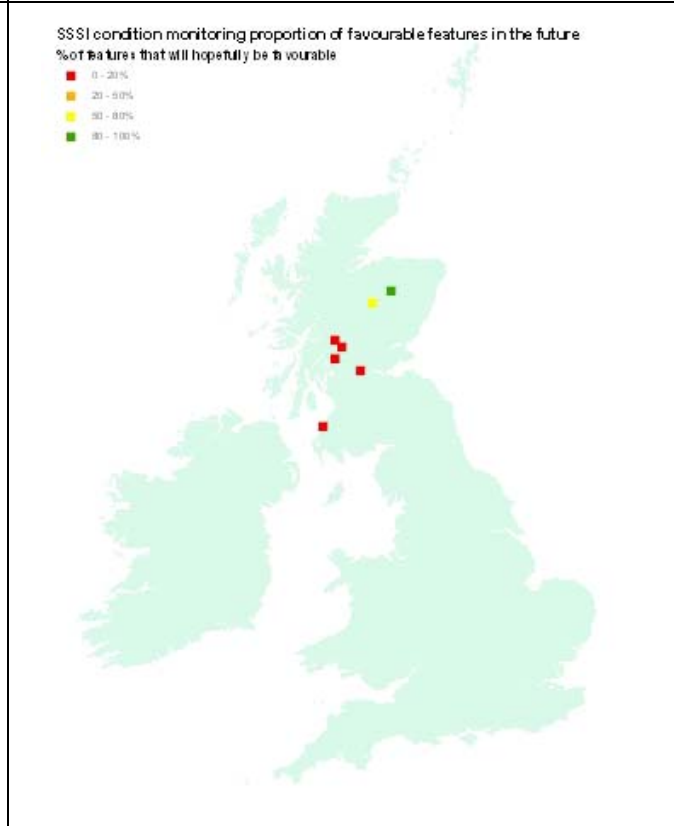
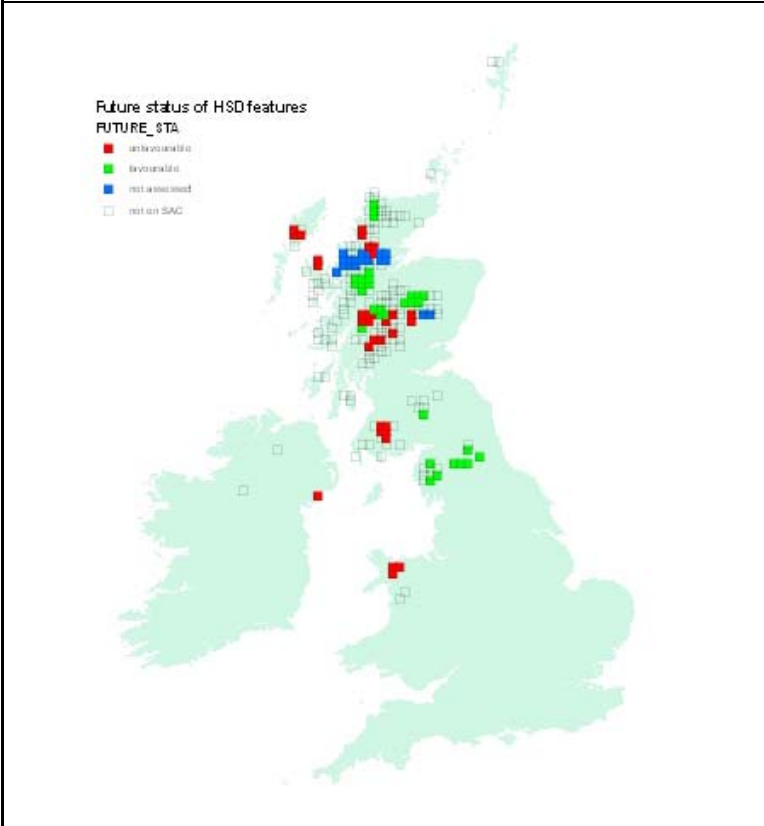
Note that the scenario presented above is based on the same information as used to construct the Table 4.2.2. It is based on the following premises:

- (i) the Unfavourable-recovering condition assessments will at some point in the future become Favourable.
- (ii) all Unfavourable-unclassified sites will remain Unfavourable, which is probably overly pessimistic;
- (iii) 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.

Predicted Future Condition of H6150 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



Key
Red = 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
Green = 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
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type

Key*
Green – 80 – 100% of assessed features on 10km square are Favourable
Yellow - 50 – 80% of assessed features on 10km square are Favourable
Orange - 20 – 50% of assessed features on 10km square are Favourable
Red - 0 – 20% of assessed features on 10km square are Favourable
 *This is the same key as was used for JNCC CSM Report 2006

5.3 Conclusions on future prospects (as regards range, area covered and specific structures and functions) 2.6.iv.

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

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.

Many of the future threats and pressures (particularly grazing and associated impacts) on H6150 are being specifically addressed for the 22% of the resource of H6150 that lies within the statutory site series; and (particularly through agri-environment measures) for the larger proportion of the resource of H6150 lying outside the statutory site series.

Within the SAC series 63% of the assessed SAC area (equivalent to 25% of the total UK area) is likely to achieve Favourable condition in the foreseeable future. In assessed SSSIs/ ASSIs, 25% and 69% respectively of the strongly and weakly indicative assessed features corresponding to H6150 are likely to become Favourable. However extrapolating beyond the statutory site series this suggests that more than 25% of the overall UK resource will still be in Unfavourable condition in the immediate future (the next 15-20 years).

Whilst there are prospects for further control of some of the future threats through extension of existing mechanisms, others (particularly pollution and - to a lesser extent given the focus on the next 10-15 years – climate change) are less readily addressed. The agri-environment and similar positive management mechanisms now in place and likely to be operating in the near future will need further strengthening to arrest a future decline in the area or range of H6150 in the UK; however given the evidence for future favourability from Common Standards Monitoring a judgement of ‘Unfavourable-Bad’ for the future prospects for H6150.

6. Overall conclusions and judgements on conservation status

Conclusion^{2.6}: **Unfavourable – Bad**

On the basis of Structure and Function, the overall conclusion for this feature is Unfavourable – Bad.

Table 6.1 Summary of overall conclusions and judgements

Parameter	Judgement	Grounds for judgement	Confidence in judgement*
Range	Favourable	Current range is stable and not less than the favourable reference range.	3
Area covered by habitat type within range	Unfavourable – Inadequate and deteriorating	Current extent is declining and less than the favourable reference area, but not by a factor greater than 10%. Further measures are required to address threats to extent for the overall UK resource.	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.	3
Future prospects (as regards range, area covered and specific structures and functions)	Unfavourable – Bad	Habitat prospects over next 12-15 years considered to be bad, with severe impact from threats expected and long term viability not assured.	2
Overall assessment of conservation status	Unfavourable – Bad	At least one Unfavourable – Bad judgement.	3

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

7. Annexed material (including information sources used in 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

Map Data Sources

JNCC International Designations Database. Joint Nature Conservation Committee.

Paul Corbett (personal communication) 2000. Environmental Heritage Service.

Richard Weyl (personal communication 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)	29
Number of SACs with CSM assessments (b)	24
% of SACs assessed (b/a)	83
Extent of feature in the UK – hectares (c)	70,300
Extent of feature on SACs – hectares (d)	32,830
Extent of features assessed – hectares (e)	27,805
% of total UK hectarage on SACs (d/c)	47
% of SAC total hectarage that has been assessed (e/d)	85
% of total UK hectarage that has been assessed (e/c)	40

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 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).

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)	41	19%
Current – Favourable (green)	22	10%
On SAC but not assessed (blue)	18	8%
Not on SAC (transparent)	139	63%
Total Number of 10km squares (any colour)	220	
Future – Unfavourable (red)	32	15%
Future – Favourable (green)	31	14%