

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 :

**H6210: Semi-natural dry grasslands and scrubland
facies: on calcareous substrates (*Festuco-
Brometalia*)**

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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H6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)*

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

*Note. This Annex I type has an unusual status in the Directive, in that a subset only ('important orchid sites') is given priority status. In the UK we have given this subtype a separate code (6211) for convenience, but for conservation assessment purposes the two components are dealt with together.

This paper and accompanying Technical Notes contain background information and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the EC Guidance "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 correspondence with NVC and other habitat types

Table 1.1.1 provides a summary description of H6210 (including H6211) and its relations with UK classifications.

Semi-natural dry grasslands, which were once widespread in Europe, are now a scarce and threatened habitat. The 6210 *Semi-natural dry grasslands* Annex 1 type is a widespread but localised habitat type in England on well-drained calcareous soils. It also occurs more rarely in Wales, Northern Ireland and Scotland. Swards are generally maintained by grazing. Conspicuous suits of calcicole plants are a characteristic feature and variation in vegetation floristics and structure is related to contrasts in climate, both regionally and more locally with differences in topography, in soil depth and fertility and in the kind of impacts which stock and wild herbivores make.

The habitat definition in the EU Interpretation Manual is a phytosociological one, based on the order *Festuco-Brometalia*. In the UK, representation of the Mesobromion and Xerobromion alliances both occur, and this habitat was originally interpreted as corresponding exclusively to the NVC types CG1-CG9 (including grasslands corresponding to CG9 in Northern Ireland). Subsequently it was agreed, on the basis of the Corine habitat classification, that it should also include the 'Scottish Mesobromion' (Birse 1980) which is a very localised form of CG10 on limestone in the eastern Highlands, with Mesobromion species such as *Helianthemum nummularium*, *Avenula pratensis* and *Briza media* represented. CG10 with Mesobromion species also occurs in Wales.

The 'important orchid sites' sub-type is characterised by populations of specific rare and scarce orchids as described in McLeod *et al.* (2005) and is restricted in the UK to parts of England. The UK has used sub-habitat 6211 to include such sites based on the occurrence of *Aceras anthropophorum*, *Herminium monorchis*, *Himantoglossum hircinum*, *Ophrys fuciflora*, *O. sphegodes*, *Orchis militaris*, *O. purpurea*, *O. simia* and *O. ustulata* (McLeod *et al.* 2005). These species are good Bromion indicators, all scarce or rare plants in the UK, though widespread on the Continent and not always so threatened there.

Table 1.1.1 Summary description of habitat H6210 (including H6211) and its relations with UK vegetation/habitat classifications.

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	34.31 – 34.34	
NVC	<p>CG1 <i>Festuca ovina</i> – <i>Carlina vulgaris</i> grassland (all forms)</p> <p>CG2 <i>Festuca ovina</i> – <i>Avenula pratensis</i> grassland (all forms)</p> <p>CG3 <i>Bromus erectus</i> grassland (all forms)</p> <p>CG4 <i>Brachypodium pinnatum</i> grassland (all forms)</p> <p>CG5 <i>Bromus erectus</i> – <i>Brachypodium pinnatum</i> grassland (all forms)</p> <p>CG6 <i>Avenula pubescens</i> grassland (all forms)</p> <p>CG7 <i>Festuca ovina</i> – <i>Hieracium pilosella</i> – <i>Thymus praecox/pulegioides</i> grassland (all forms)</p> <p>CG8 <i>Sesleria albicans</i> – <i>Scabiosa columbaria</i> grassland (all forms)</p> <p>CG9 <i>Sesleria albicans</i> – <i>Galium sternerii</i> grassland (all forms)</p> <p>CG 10 <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Thymus praecox</i> grassland (subset)</p> <p>W21d <i>Crataegus monogyna</i>-<i>Hedera helix</i> scrub, <i>Viburnum lantana</i> sub-community (scrubland facies). Fringe vegetation of the <i>Trifolio-Geranietea</i> MG1e <i>Arrhenatherum elatius</i> grassland <i>Centaurea nigra</i> sub-community MG2 <i>Arrhenatherum elatius</i>-<i>Filipendula ulmaria</i> tall-herb grassland (subset)</p>	See section 1.1
BAP priority habitat type	<p>Lowland calcareous grassland (all forms)</p> <p>Upland calcareous grassland (subset)</p>	In terms of BAP priority habitats in the UK, type 6210 includes all forms of ‘Lowland calcareous grassland’, together with a subset of ‘Upland calcareous grassland’ which includes upland stands of CG9 in Northern England and Northern Ireland, and stands of the ‘Mesobromion’ form of CG10 on limestone in parts of Scotland. Most other areas of CG10 not on limestone fall within the Annex I type 6230 <i>Species-rich Nardus grasslands, on siliceous substrates in mountain areas</i> .

The ‘scrubland facies’ (or scrub and thermophilous fringe vegetation) which is included in the H6210 definition is a transitory stage that develops when grazing is relaxed, often corresponding to open forms of NVC type W21d *Crataegus monogyna*-*Hedera helix* scrub, *Viburnum lantana* sub-community. This

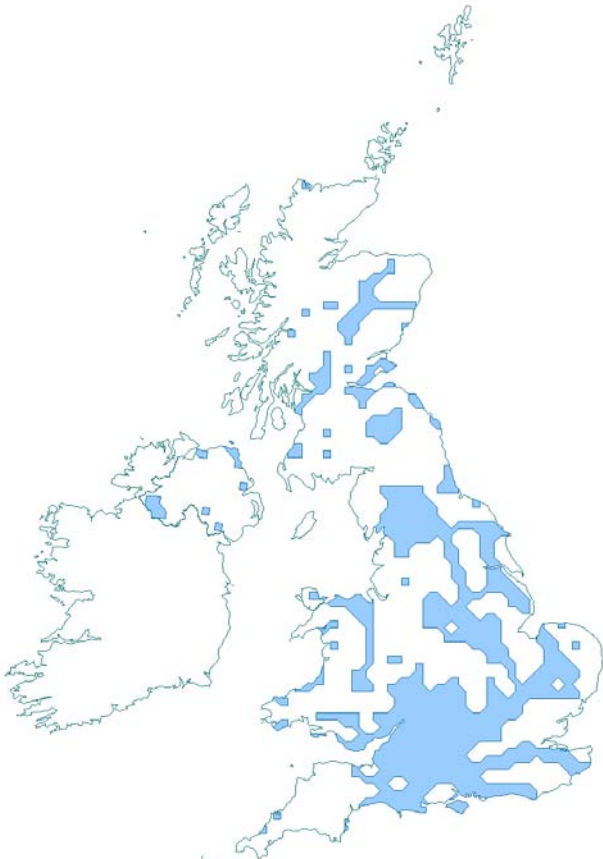
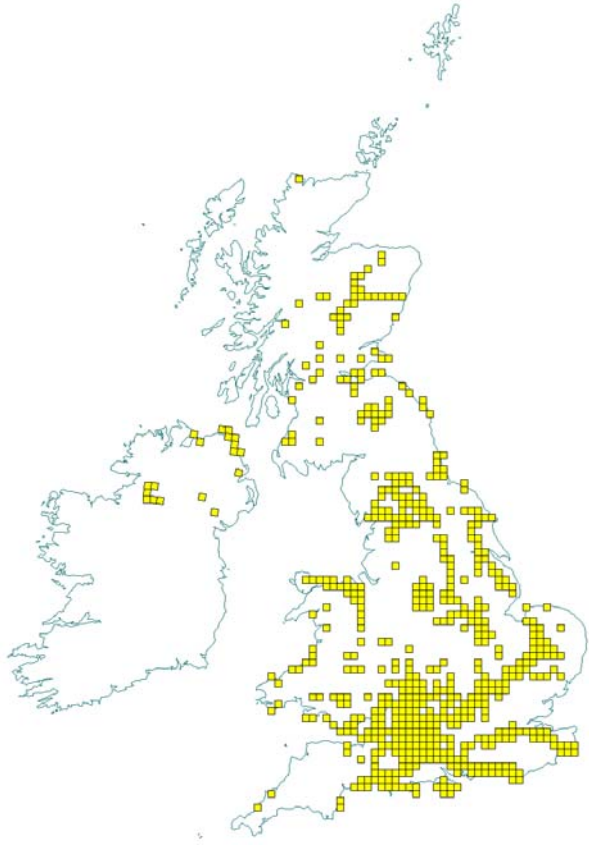
can be very species-rich and important for rare plants, notably *Himantoglossum hircinum* and *Orchis militaris* and insects, but without intervention is likely to develop rapidly into dense scrub, although semi-stable forms sometimes occur on very stony ground. In continental phytosociology, this vegetation is referred to as the *Trifolio-Geranietea*. Fringe vegetation was poorly covered in the NVC but Rodwell et al 1998 suggested the likely existence in Britain of two assemblages, an *Agrimonia eupatorium Origanum vulgare* community and the *Geranio-Coryletum*, the latter being subsumed into W21 scrub. The Derbyshire Dales calcareous grasslands are classic localities in the UK for the latter type.

Taller grasslands such as MG1 *Arrhenatherum elatius* grassland and MG2 *Arrhenatherum elatius-Filipendula ulmaria* tall-herb grassland may form a component in northern England.

2. Range ^{2.3}

2.1 Current range

Range surface area ^{2.3.1}: 71,682 km²
Date calculated ^{2.3.2}: May 2007
Quality of data ^{2.3.3}: Moderate

Map 2.1.1 Habitat range map ^{1.1} for H6210 (including H6211)	Map 2.1.2 Habitat distribution map ^{1.2} for H6210 (including H6211)
	
<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). See also Map 2.3.1.</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: 584</p>

It should be noted that the records cover a wide time period (approximately 20 years 1980-2000) and some locations may have been lost in the intervening period.

See Section 7.1 for data sources.

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). A reductive calculation of range was used (less than 8 km between joined points) to take account of the habitat's known dependence on calcareous rocks. Further, the alpha was clipped to include inland areas only.

Maps 2.1.1 and 2.1.2 show the range and distribution of H6210 (including H6211) in the UK. The distribution of this habitat by 10-km squares in the UK is given in Map 2.1.2, showing data from Rodwell *et al.* (2007). Although not comprehensive (in that it omits some of the 'Scottish mesobromion' mentioned in section 1.1), this is considered to be a good basis for the estimation of range for this habitat (Map 2.1.1).

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

In the last 10 – 15 years conservation programmes have helped to stem the recorded historic loss of this habitat and hence the range has probably stabilised. In addition there has been a large scale effort to revert arable land back to species rich chalk grassland under Defra's (formerly MAFF's) agri-environment schemes. However, the grassland resulting from these agri-environment agreements has been variable in quality and at present it is difficult to quantify how much could be accurately described as species-rich calcareous grassland.

There have been substantial historical losses in extent of this habitat around 1700 and especially since around 1940 due to ploughing and agricultural intensification (Keymer and Leach 1990; Barr 1997) which are likely to have caused a concurrent contraction in range. There is also some evidence that the historic declines continued into more recent times: declines in the range of species characteristic of this habitat provide further evidence. For example, *Orchis ustulata* has undergone a spectacular decline; having been recorded in 191 10-km squares pre- 1970 and just 55 in the period 1987 – 99. Losses are thought to be largely due to changes in agricultural practices such as ploughing and the cessation of grazing and through habitat destruction by building and quarrying. Similarly *Coeloglossum viride* has declined by 93 10-km squares particularly in Central England and East Anglia mainly due to the continued ploughing and improvement of pastures.

2.3 Favourable reference range

Favourable reference range^{2.5.1}: **71,682 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, 71,682 km², has been set as the favourable reference area. Reasons for this are discussed below.

The distribution of this habitat is dependent on underlying geology, and it is useful in considering a favourable reference range to compare the distribution of calcareous rocks (Map 2.3.1) to the range calculated in Map 2.1.1. This shows that the estimated range in Map 2.1.1 is probably a fairly accurate depiction of the range.

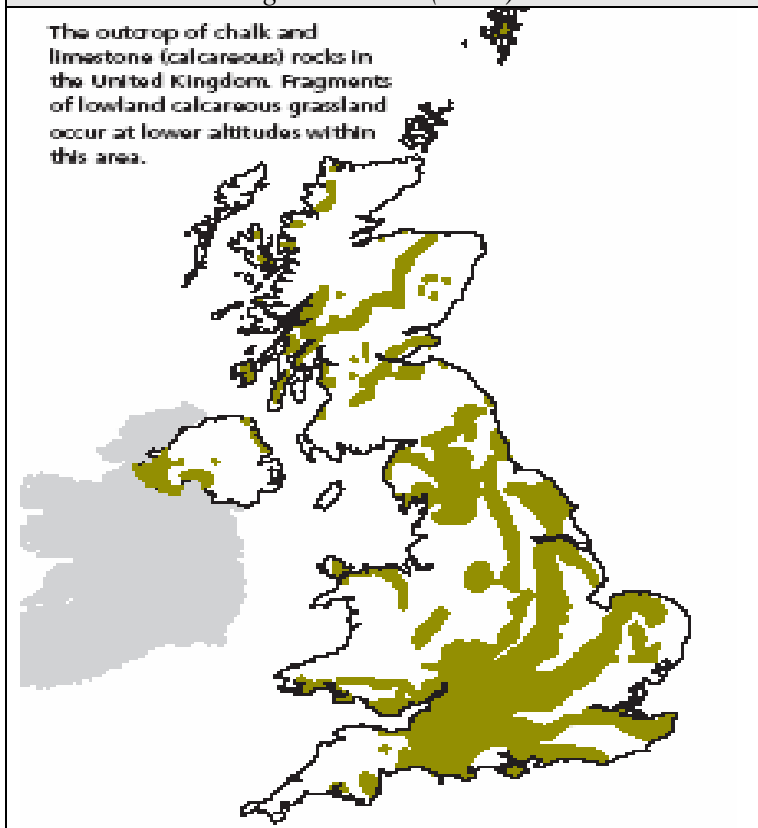
The range is thought to have remained stable since 1994. The range shown in Map 2.1.1 is the best available estimate for the range in 1994 and is supported by information provided in Map 2.3.1. The current range is, therefore, taken as the favourable reference range.

2.4. Conclusions on range

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

In the last 10 – 15 years conservation programmes have helped to stem the loss of this habitat and hence the range has probably stabilised. The range which is currently mapped is considered to be viable for the habitat, in the absence of evidence to the contrary. Therefore, the conclusion for this parameter is Favourable.

Map 2.3.1 Distribution of chalk and limestone rocks in the UK. *From: English Nature (2001)*



3. Area^{2.4}

3.1 Current area

Total UK extent^{2.4.1}:	513 km²
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 H6210 (including H6211) in the UK. The most recent estimated total UK extent is 51,300 ha and is based mainly on NVC and Phase 1 surveys undertaken over the last 15-20 years, together with a range of other sources. These surveys are thought to have been reasonably comprehensive except for the uplands of England and Scotland. Approximately 95% of the habitat occurs within England.

Countryside Survey 2000 gave an estimate of 37,800 ha for the extent of calcareous grasslands in the lowlands of England and Wales in 1998, which corresponds reasonably well with the figures from the more detailed surveys, although there is a large standard error associated with this estimate because of the sampling approach. The extent of this habitat in the uplands is not adequately measured in the Countryside Survey.

Of this total extent, 33,687 ha (>63%) is estimated to occur within SACs (including 2,122 ha of the orchid-rich type). One site, Salisbury Plain SAC, accounts for 21,438 ha (~58% of the total resource). The habitat is also represented on a large number of SSSIs and ASSIs although the total number and extent of representation is not currently known.

The current estimate does not take into account the recent declines recorded in the Countryside Survey (Haines-Young *et al.* 2000) and, although the magnitude of the decline is not known (see 3.2, Trend in Area), it does suggest that the current area is probably less than the estimated 51,300ha.

Table 3.1.1 Area of H6210 (including H6211) in the UK. These are the best current estimates, rounded to the nearest 100 hectares

	Area (ha)	Method ^{2.4.3}	Quality of data ^{2.4.4}
England	48,700	1	Poor
Scotland	300	1	Poor
Wales	1,100	3	Good
Northern Ireland	1,100	3	Good
Total UK extent ^{2.4.1.}	51,300	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

The figures provided are based on a large number of data sources, including expert opinion. Other significant sources were MacKintosh *et al.* (2004), Natural England's habitat inventories and their supporting datasets, and the lowland grassland survey of Wales. For the priority sub-type H6211, because of the complex definition of this habitat type, it is not possible to provide data on its extent in the UK at present.

3.2 Trend in area since c.1994

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

Trend magnitude^{2.4.6}: **Unknown**

Trend period^{2.4.7}: **1990-1998**

Reasons for reported trend^{2.4.8}: **Unknown**

The trend measured by the Countryside Survey (Haines-Young *et al.* 2000) suggests a decline of > 1% a year between 1990 and 1998 with an overall decline of 19% during that period. However, this is based on a very small sample and may not be representative of the total habitat. There is also the perception of experts that recent conservation initiatives including agri-environment schemes have stemmed the decline in area. The magnitude of the trend is, therefore, recorded as Unknown at present.

3.3 Favourable reference area

Favourable reference area^{2.5.2}: **513 km²**

The most recent estimate for area is based on an expert interpretation of survey data from a period of 15-20 years and is the closest available to a surrogate for the area in 1994. For this reason it probably predates the measured decline and has been set as the favourable reference area.

3.4 Conclusions on area covered by habitat

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

The decline measured by the Countryside Survey (see section 3.2) suggests losses of >1% a year between 1990 and 1998, which justifies a judgement of 'Unfavourable – Bad' and of a deteriorating state.

However, the perception of experts is that recent conservation initiatives including agri-environment schemes have reduced the rate of decline in area. The favourable reference area has been set at the closest available surrogate for the area in 1994.

4. Specific structures and functions (including typical species)

4.1 Main pressures

140 Grazing

702 Air pollution

950 Biocenotic evolution

101 Modification of cultivation practices

120 Fertilisation

162 Artificial planting

141 Abandonment of pastoral systems

954 Invasion by a species

- Grazing (This is mainly under-grazing, which affects 157 SSSI/ASSIs and 18 SACs, but over-grazing affects some 51 sites)
- Lack of remedial management (132 A/SSSI and 17 SAC)
- Invasive species (46 A/SSSI and 8 SAC)
- Agricultural operations (45 A/SSSI and 8 SAC)
- Air pollution: Based on an assessment of the exceedence of relevant critical loads (see *Technical note III, Air Pollution Assessment for Conservation Status Reporting*), 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-2233>) provide a means to assess the structure and functioning of H6210 (including H6211) in the UK. The following attributes were examined for all CSM assessments relevant to the habitat:

- Extent
- Grass:herb ratio
- Positive indicator species
- Negative indicator species
- Indicators of local distinctiveness
- Height
- Litter
- Bare ground

SAC condition assessments

Table 4.2.1 and Map 4.2.1 summarise the Common Standards Monitoring condition assessments for UK SACs supporting habitat H6210 (including H6211). 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:

- 99% of the area and 84% of the number of assessments was Unfavourable;
- at least 58% of the total UK habitat area was in Unfavourable condition.

When interpreting these figures it is important to bear in mind that they include Salisbury Plain SAC, the biggest single area of this habitat in Western Europe, which alone accounts for around 58% of the total

UK area for H6210. Although large areas (c 60%) of this site are in Favourable condition, the rules which have been used to aggregate the results for UK reporting mean that the whole site is recorded as 'Unfavourable' – this significantly skews the picture for the habitat in the UK as a whole. Correcting for this effect for the single site gives the following revised figures:

- 60-70% of the area and 84% of the number of assessments was Unfavourable;
- at least 38% of the total UK habitat area was in Unfavourable condition.

Table 4.2.1 Common Standards Monitoring condition assessment results for UK SACs supporting H6210 (including H6211). 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	390	6
	No change	647	7
	Unclassified	32	1
	Recovering	29,437	22
	Total	30,507	36
	% of all assessments	99%	84%
	% of total UK resource	58%	unknown
Favourable	Maintained	06	1
	Recovered		
	Unclassified	303	6
	Total	309	7
	% of all assessments	1%	16%
	% of total UK resource	1%	unknown

Notes

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.

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).

Only assessments made for qualifying interest features on SAC have been included in this analysis.

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:

- 72% of strongly indicative assessments were Unfavourable. There were no weakly indicative assessments.

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 H6210 (including H6211) 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	122	
	No change	106	
	Unclassified		
	Recovering	462	
	Total	690	
	% of all assessments	72%	%
Favourable	Maintained	8	
	Recovered		
	Unclassified	261	
	Total	269	
	% of all assessments	28%	%

Notes

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.

The data included are from CSM assessments carried out between April 1998 and December 2006.

No attempt has been made to correct these figures for the skewing effect of Salisbury Plain as has been done for SAC results, because they relate to numbers of assessments not areas, and because the extent of representation on SSSI is not known. However the same aggregation rules have been applied, which suggests that the overall condition of the habitat on SSSI is likely to be better than these figures indicate, to an unquantifiable degree.

For non-designated sites, data are available for lowland calcareous grasslands, in England only, from a sample survey of lowland BAP priority grasslands (Hewins *et al.* 2005). As part of this project the CSM approach was applied to a stratified random sample of 96 non-statutory stands of lowland calcareous grassland across England. Using the same thresholds as for SSSIs, 22% of sites were classed as Favourable; using reduced thresholds for certain attributes 28% were classed as Favourable.

Comparable data for the English uplands and for Wales, Northern Ireland and Scotland are not available. Critchley *et al.* (2003) reviewed botanical monitoring of agri-environment schemes across the UK. The sites they analysed included lowland calcareous grassland but the sample was very small, though it may be worth investigating whether further data are available from this source. Countryside Survey 2000 gave evidence for botanical change in 'infertile grasslands' reflecting widespread increases in nitrogen though the sample size for calcareous grasslands is small. The next Countryside Survey may be able to give better evidence.

Current Condition of H6210 (including H6211) 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>Not applicable</p>
<p>Key</p> <p>Red = Unfavourable, i.e. the square contains at least one SAC where this feature is present and has been judged to be Unfavourable</p> <p>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 Favourable SAC features</p> <p>Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported</p> <p>Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type</p>	<p>Key*</p> <p>Green – 80 – 100% of assessed features on 10-km square are Favourable</p> <p>Yellow - 50 – 80% of assessed features on 10-km square are Favourable</p> <p>Orange - 20 – 50% of assessed features on 10-km square are Favourable</p> <p>Red - 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}:

Hippocrepis comosa, *Gentianella amarella*, *Helianthemum nummularium*, *Orchis ustulata*, *Ophrys sphegodes*, *Thymelicus acteon*, *Hesperia comma*, *P. bellargus*, *Polyommatus coridon*

Typical species assessment^{2.5.4}:

Change in 10 km square occupancy across UK over last 25 years

A tentative selection has been made from the list of characteristic species, which have a strong affinity for the habitat and whose status in terms of distribution and abundance is likely to depend on the conservation status of the habitat. Assessment of typical species forms a small part of the assessment of structures and functions for this habitat, in that it suggests a long-term decline in some species. This does not contradict the overall assessment of structures and functions which is principally based on site condition monitoring.

Table 4.3.1 Typical species

Typical species* considered:	Trend in BSBI Atlas (Preston <i>et al.</i> 2002) :	Trend in Braithwaite <i>et al.</i> 2006:
<i>Anthyllis vulneraria</i>	Stable	Decline
<i>Arabis hirsuta</i>	Decline	Decline
<i>Brachypodium pinnatum</i>	Stable (slight increase)	Stable
<i>Campanula glomerata</i>	Decline	Decline
<i>Carex caryophyllea</i>	Decline	Decline (slight)
<i>Carlina vulgaris</i>	Decline	Decline
<i>Centaurea scabiosa</i>	Decline	Decline
<i>Leontodon hispidis</i>	Stable (slight decline)	Decline
<i>Medicago sativa ssp. falcata</i>	Decline	-
<i>Ophrys apifera</i>	Increase	Increase
<i>Ophrys insectifera</i>	Decline	-
<i>Orchis mascula</i>	Decline	Decline
<i>Orchis militaris</i>	Stable	-
<i>Orchis morio</i>	Decline	-
<i>Orchis purpurea</i>	Stable	-
<i>Primula veris</i>	Stable	Stable
<i>Sanguisorba minor</i>	Stable	Decline
<i>Scabiosa columbaria</i>	Decline	Decline
<i>Bromopsis erecta</i>	Stable	Decline
<i>Hippocrepis comosa</i>	Decline	Decline
<i>Silene otites</i>	Decline	-

* Includes species with a strong affinity for the community and not normally occurring in other habitat types.

Calcareous grasslands have a very rich flora with many distinctive and restricted plant species, some of which could serve as powerful indicators of the status of habitat 6210 and 6211, particularly orchid species. Some species, or combinations of species, can usefully be used to assess the condition of H6210 across its whole range. Examples of species which might be suitable include *Hippocrepis comosa*, *Gentianella amarella* (not for N and W) and *Helianthemum nummularium*. *Orchis ustulata* and *Ophrys sphegodes* could also be useful but are rather rare. Evidence from the BSBI atlases (Preston *et al.* 2002) and monitoring scheme data (Braithwaite *et al.* 2006) provide clear evidence of decline in a number of characteristic species of H6210 over the last 40 years, as displayed in Table 7 many of these declines are associated with under grazing or a lack of management in addition to direct loss of habitat.

Fragmentation is an issue of great concern for this habitat (Barr 1997) and a threat to the sustainability of many species populations. Theoretical models of habitat loss suggest that the processes of loss and fragmentation may have produced an “extinction debt” (Tilman 1994): habitat specialists will eventually go extinct unless semi-natural habitats and appropriate management are reinstated. Furthermore, for long-lived or clonal species fragmentation effects may be obscured and delayed.

Chalk and limestone grasslands are very important for their insect fauna, notably butterflies, which could serve as useful indicators of both habitat distribution and condition, including fragmentation and connectivity. Several species are more or less restricted to this habitat (although with a smaller range) and might be particularly suitable, including Lulworth skipper *Thymelicus acteon*, silver-spotted skipper *Hesperia comma*, chalkhill blue *Polyommatus coridon* and Adonis blue *P. bellargus*. As well as needing particular larval foodplants e.g. *Hippocrepis comosa* for the Adonis blue, butterflies such as these have specific microhabitat requirements such as turf height and shelter from scrub. Different species have varied requirements e.g. for grazing levels a combination of species could be used to inform judgements about structure and function of this habitat.

The national butterfly monitoring scheme and the butterfly mapping scheme have given high quality monitoring data relevant to this habitat and will continue to do so. Asher *et al.* (2001) present and analyse information on the distribution, habitat requirements and changes in distribution and abundance of butterflies such as those listed previously, which clearly indicate declines in distribution and condition since the 1970s, though with limited recovery recently in some cases. Further work is required to assess these data.

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

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

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.

CSM site condition assessments for SACs and SSSI/ASSIs show that a large part of this habitat is classed as in Unfavourable condition. The value for assessed SACs is at least 60-70% of the area/number sites, whilst for relevant categories on SSSI/ASSIs it is 72%. These data clearly demonstrate that much more than 25% of the habitat is Unfavourable, that the necessary structures and functions for the habitat are not in place, and that significant pressures exist. The judgement is therefore ‘Unfavourable-Bad’. However, approximately 60% of the total resource and 97% of the resource in SACs is assessed as Unfavourable recovering. Therefore, the conclusion for specific structures and functions for H6210 is Unfavourable – Bad but improving.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

This habitat is covered by a national action plan under the UK BAP (see www.ukbap.org.uk/UKPlans.aspx?ID=12), with targets to maintain, improve, restore and expand the resource.

Relevant actions under the BAP include:

- programmes to facilitate and encourage grazing of semi-natural grasslands for conservation
- socio-economic/marketing research and initiatives to investigate and promote the benefits of food produced from such grasslands.

The habitat is also covered by agri-environment schemes in the UK, most notably the Higher Level Environmental Stewardship in England, which can contract landowners to maintain, restore and create this type of grassland. Around two-thirds of designated sites (by number) are managed under agri-environment schemes or other management agreements (63% of SSSI/ASSI; 64% of SAC).

Research to determine the long-term requirements of lowland calcareous grassland has been proposed by the JNCC lowland grassland LCN and the HAP steering group. In the absence of better information the

latter group is recommending a series of targets for increasing the extent of Lowland calcareous grassland by targeting existing patches of related vegetation.

5.1.2 Main future threats^{2,4,11}

The most obvious major future threats to H6210 (including H6211) are listed below, several of which are referred to in Section 4.1.

140 Grazing

702 Air pollution

950 Biocenotic evolution

101 Modification of cultivation practices

120 Fertilisation

162 Artificial planting

141 Abandonment of pastoral systems

954 Invasion by a species

- **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 (Barr 1997). It is a threat to the sustainability of many species populations (see section 4), 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 designated 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. Includes scrub control.**

- **Invasive Species**

- **Agricultural operations**

- **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 threat to the future condition of this habitat.

- **Climate change:**

Based on the literature review (see 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.

Recent experimental research in calcareous grassland shows significant and unpredicted changes in botanical composition and also shifts in the relevant abundance of gastropod species.

(http://www.tau.ac.il/lifesci/plant_sciences/USR/marcelos/PE_1999.pdf,
www.tau.ac.il/lifesci/plant_sciences/USR/marcelos/ER_2000.pdf).

Habitat fragmentation and isolation also reduce the ability of species to respond to climatic change because there is less potential for a species to colonise (migrate) from distant sites (Poschlod *et al.* 1998; Walker *et al.* 2004a; Bullock *et al.* 2002). This problem is confounded by the loss of farming practices that formerly transported and dispersed propagules between sites (e.g. shepherding, folding, hay strewing).

The importance of good management in off-setting population extinction over the short to medium term should not be underestimated. Research by Cooper *et al.* (1994) and Pacha (2005) has shown that the most important factor influencing the diversity of grassland fragments was the continuation of good management rather than parcel size. Similarly, long-term monitoring of isolated populations of *Orchis morio* on very small grassland SSSIs in Cambridgeshire has shown that populations have remained remarkably stable for over 30 years under stable management (Wells 1998).

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 H6210 (including H6211) 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 H6210 (including H6211) 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:

- 3% of the area and 33% of the number of assessments fall within the future-favourable category;
- at least 57% of the total UK habitat area falls within the future-favourable category.

Table 5.2.1 Predicted future condition of UK SACs supporting H6210 (including H6211) 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	390	6
	Unfavourable no change	647	7
	Unfavourable unclassified	32	1
	Total	1,070	14
	% of assessments	03%	33%
	% of total UK extent	2%	Unknown
Future-favourable	Favourable maintained	06	1
	Favourable recovered		
	Unfavourable recovering	29,437	22
	Favourable unclassified	303	6
	Total	29,746	29
	% of assessments	97%	67%
	% of total extent	57%	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:

- (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.

SSSI/ASSI condition assessments

Table 5.2.2 and Maps 5.2.2 and 5.2.3 summarise the predicted potential future condition of H6210 (including H6211) 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:

- 76% of strongly indicative assessments fall within the future-favourable category. There are no weakly indicative assessments.

Table 5.2.2 Predicted future condition of H6210 (including H6211) 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	122	
	Unfavourable no change	106	
	Unfavourable unclassified		
	Total	228	
	% of assessments	24%	%
Future-favourable	Favourable maintained	8	
	Favourable recovered		
	Unfavourable recovering	462	
	Favourable unclassified	261	
	Total	731	
	% of assessments	76%	%

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.

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

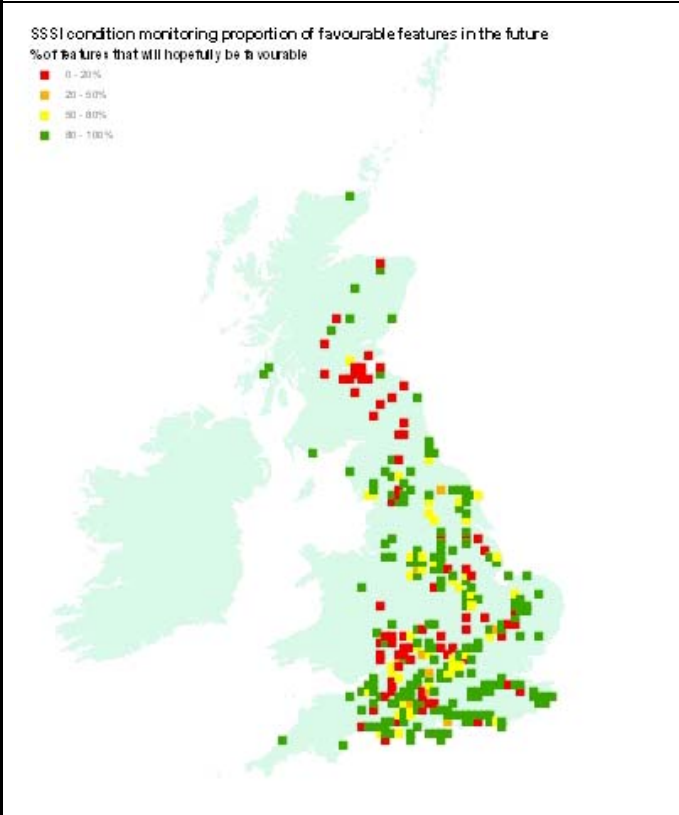
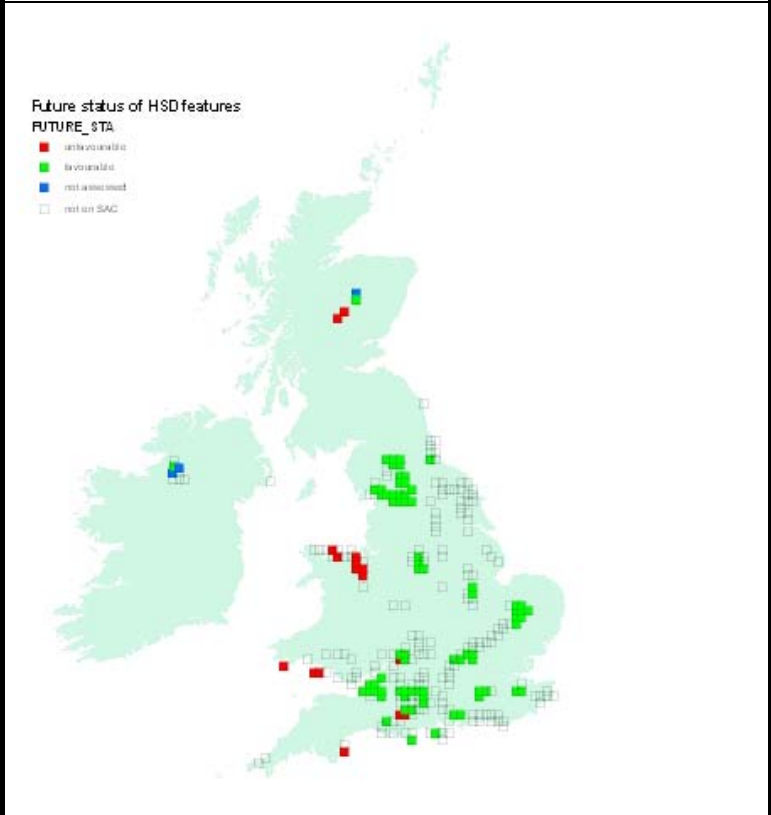
Conclusion^{2.6.iv}: Favourable

The EC Guidance states that where “habitat prospects are good with no significant impacts from threats expected and long-term viability assured”, the judgement should be Favourable. In the UK, this was generally taken to mean that range and/or area are stable or increasing, and more than 95% of the habitat area is likely to be in favourable condition in 12-15 years.

There remain concerns that under the current agricultural climate the opportunities and incentives for appropriate grazing management of the whole resource may not be adequate to achieve Favourable conservation status. Furthermore, over 24% of ASSI/SSSI features are set to remain Unfavourable and over 70% of a sample of undesignated sites (Hewins *et al.* 2005) are in poor condition. However, approximately 97% of the SAC area, representing 57% of the total UK area, is predicted to attain favourable status in the foreseeable future, and the same applies to 76% of ASSI/SSSI features. A substantial proportion of the habitat, especially on SACs, appears to be under appropriate conservation management or ownership and is expected to attain a Favourable condition in the foreseeable future. The conclusion is, therefore, Favourable.

Predicted Future Condition of H6210 (including H6211) based on Common Standard Monitoring condition assessments (See Sections 5.2 and 7.2)

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
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Not applicable

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

6. Overall conclusions and judgements on conservation status

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	Current range is stable and not less than the favourable reference range.	1
Area covered by habitat type within range	Unfavourable – Inadequate and deteriorating	Extent has declined by >1% a year between 1990 and 1998. Further measures are required to address threats to future extent for the overall UK resource.	3
Specific structures and functions (including typical species)	Unfavourable – Bad but improving	More than 25% of the habitat area is considered to be Unfavourable as regards its specific structures and functions. Significantly more of the resource in Unfavourable condition is improving than declining	1
Future prospects (as regards range, area covered and specific structures and functions)	Favourable	Habitat prospects over the next 12-15 years considered to be good with no significant impacts from threats expected and long-term viability assured.	2
Overall assessment of conservation status	Unfavourable – Bad but improving	One or more Unfavourable – Bad	1

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

7. Annexed material (including information sources used 2.2)

7.1 References

Air Pollution Information System. (2004). www.apis.ceh.ac.uk

ASHER, J., WARREN, M., FOX, R., HARDING, P., JEFFCOATE, G. & JEFFCOATE, S. 2001. *The Millennium Atlas of butterflies in Britain and Ireland*. Oxford University Press, Oxford.

BARR, C.J. (ed.). 1997. *Current status and prospects for key habitats in England. Part 2. Calcareous grassland landscapes*. DETR, London.

BIRSE, E.L. 1980. SCOTTISH plant communities – revised and additional tables. *Bulletin of the Soil Survey*, **4**. Macaulay Institute for Soil Research, Aberdeen.

BLACKSTOCK, T.H., RIMES, C.A, STEVENS, D.P., JEFFERSON, R.G., ROBERTSON, H.J., MACKINTOSH, J. & HOPKINS, J.J. 1999. The extent of semi-natural grassland communities in lowland England and Wales: a review of conservation surveys 1978-96. *Grass and Forage Science*, **54**, 1-18.

BOBBINK, R. & ROELOFS, J.G.M. 1995. Nitrogen critical loads for natural and semi-natural ecosystems: the empirical approach. *Water, Air and Soil Pollution*, **85**, 2413-2418.

BRAITHWAITE, M.E., ELLIS, R.W. & PRESTON, C.D. 2006. *Change in the British Flora 1987-2004*. Botanical Society of the British Isles, London, UK.

BULLOCK J. M. *et al.* 2002. Plant dispersal and colonization processes at local and landscape scales. In: BULLOCK J.M., KENWARD R.E. & HAILS R. (Eds.) *Dispersal Ecology*. Blackwell Scientific Publications, Oxford, pp. 279–302.

COOPER A., MCCANN T. & POWER J. 1994. Grassland diversity in relation to field parcel size and management. In: *Fragmentation in Agricultural Landscapes*. (ed. J.W. Dover), pp. 62-70. International Association for Landscape Ecology (UK).

COOPER, E.A., CRAWFORD, I., MALLOCH, A.J.C. & RODWELL, J.S. 1992. *Coastal vegetation survey of Northern Ireland*. (Contractor: University of Lancaster, Unit of Vegetation Science). Unpublished report to Northern Ireland Department of the Environment, Belfast.

CRITCHLEY, C.N.R., BURKE, M.J.W. & STEVENS D.P. 2004. Conservation of lowland semi-natural grasslands in the UK: a review of botanical monitoring results from agri-environment schemes. *Biological Conservation*, **115**, 263-278.

DAVISON, A.W. & BARNES, J.D. 1998. Effects of ozone on wild plants. *New Phytologist*, **139**, 135-151.

ELLIS, N.E. & Munro, K. (2004) A preliminary review of the distribution and extent of BAP priority habitats across Scotland. *Scottish Natural Heritage Commissioned Report*, No. **044** (ROAME No. F00NA02)

ENGLISH NATURE. 2001. Lowland Calcareous Grassland: a scarce and special resource. A5 booklet.

ENGLISH NATURE. 2003. *England's best wildlife and geological sites. The condition of Sites of Special Scientific Interest in England in 2003*. English Nature, Peterborough. www.english-nature.org.uk/pubs/publication/PDF/SSSICondfulldoc.pdf

EUROPEAN COMMISSION DG ENVIRONMENT. 2003. *Interpretation manual of European Union habitats* (version EUR25). European Commission DG Environment, Brussels. <http://europa.eu.int/comm/environment/nature/>

HAINES-YOUNG, R.H. *et al.* 2000. *Accounting for nature: assessing habitats in the UK countryside*. DETR, Rotherham.

HEWINS, E.J., PINCHES, C., ARNOLD, J., LUSH, M.J., ROBERTSON, H. & ESCOTT, S. 2005. The condition of lowland BAP priority grasslands: results from a sample survey of non-statutory stands in England. (Contractor: Just Ecology, Berkeley). Report to English Nature, Defra and JNCC. *English Nature Research Reports*, No. **636**. www.english-nature.org.uk/pubs/publication/PDF/636.pdf

HILLIER, S.H., Walton, D.W.H. & Wells, D.A. (eds.) 1990. *Calcareous grasslands – ecology and management*. Bluntisham Books, Huntingdon.

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. 2003. *2002 Reporting system for Lead Partners*.
Joint Nature Conservation Committee, Peterborough. www.ukbap.org.uk

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

JONES, P.S., STEVENS, D.P., BLACKSTOCK, T.H., BURROWS, C.R. & HOWE, E.A. (eds.) 2003.
Priority habitats of Wales: a technical guide. Countryside Council for Wales, Bangor.

KEYMER R.J. & LEACH, S.J. 1990. Calcareous grassland – a limited resource in Britain. In: *Calcareous
grasslands – ecology and management* edited by SH Hillier, DWH Walton & DA Wells, 11-19.
Bluntisham Books, Huntingdon.

MACKINTOSH, J., HAWKER, D., MUNRO, K. & SMITH, M. 2004. The distribution and extent of
lowland grassland National Vegetation Classification (NVC) types and Biodiversity Action Plan (BAP)
habitats in Scotland. *Scottish Natural Heritage Commissioned Report*, No. **009** (ROAME No.
F97AA100).

MCLEOD, C.R., YEO, M., BROWN, A.E., BURN, A.J., HOPKINS, J.J., & WAY, S.F. (eds.) 2007. *The
Habitats Directive: selection of Special Areas of Conservation in the UK*. 2nd edn.
Joint Nature Conservation Committee, Peterborough www.jncc.gov.uk/SACselection

POSCHLOD P. & BONN S. 1998. Changing dispersal processes in the central European landscape since
the last ice age – an explanation for the decrease of plant species richness in different habitats? *Acta
Botanica Neerlandica* 47, 27–44.

PRESTON, C.D., TELFER, M.G., ARNOLD, H.R., CAREY, P.D., COOPER J.M., DINES, T.D., HILL,
M.O., PEARMAN, D.A. & SMART, S.M. 2002. *The changing flora of the UK*. Defra, London.

RODWELL, J.R., MOSS, D., MORGAN, V. & JEFFERSON, R.G. 2007. The European Context of
British Lowland Grasslands. JNCC Report

RODWELL, J.S. (ed.) 1992. *British plant communities. Volume 3. Grasslands and montane communities*.
Cambridge University Press, Cambridge.

RODWELL, J.S., DRING, J.C., AVERIS, A.B.V., PROCTOR, M.C.F., MALLOCH, A.J.C.,
SCHAMINÉE, J.H.J & DARGIE, T.C.D. 1998. *Review of Coverage of the National Vegetation
Classification*. Lancaster: Unit of Vegetation Science report to the Joint Nature Conservation
Committee.

TILMAN D. *et al.* 1994. Habitat destruction and the extinction debt. *Nature* 371, 65–66.

WALKER K. J. *et al.* 2004. The restoration and re-creation of species-rich lowland grassland on land
formerly managed for intensive agriculture in the UK. *Biological Conservation* 119 (1), pp 1-18.

WELLS, T. C. E. , ROTHERY P., COX R. & BAMFORD, S. 1998. Flowering dynamics of *Orchis morio*
L. and *Herminium monorchis* (L.) R.Br. at two sites in eastern England. *Botanical Journal of the Linnean
Society*, 126, pp 39 -48.

UBA. 1996. *Manual on methodologies and criteria for mapping critical levels/loads and geographical areas where they are exceeded*. UN ECE Convention on Long-range Transboundary Air Pollution, Task Force on Mapping. Federal Environment Agency (Umweltbundesamt), Berlin.

Map data sources

Data used to compile RODWELL J. S., MORGAN V., JEFFERSON R.G. & MOSS D. 2007. The European context of British Lowland Grasslands. JNCC Report No. 394. Joint Nature Conservation Committee.

JNCC International Designations Database. Joint Nature Conservation Committee

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)	45
Number of SACs with CSM assessments (b)	43
% of SACs assessed (b/a)	96
Extent of feature in the UK – hectares (c)	52,640
Extent of feature on SACs – hectares (d)	31,296
Extent of features assessed – hectares (e)	30,816
% of total UK hectarage on SACs (d/c)	59
% of SAC total hectarage that has been assessed (e/d)	98
% of total UK hectarage that has been assessed (e/c)	59

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)	83	30%
Current – Favourable (green)	7	3%
On SAC but not assessed (blue)	3	1%
Not on SAC (transparent)	181	66%
Total Number of 10-km squares (any colour)	274	
Future – Unfavourable (red)	16	6%
Future – Favourable (green)	74	27%