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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 :

H8240: Limestone pavements

H8240 Limestone pavements

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

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

1. National-biogeographic level information

1.1 General description and correspondance with National Vegetation Classification (NVC) and other habitat types

Table 1.1.1 provides a summary description of H8240 and its relations with UK classifications.

Limestone pavements are outcrops of rock, typically horizontal or gently inclined, although a few are steeply inclined. The surface has been dissolved by water over millions of years into 'paving blocks', known as clints, with a complex reticulate pattern of crevices, known as grikes, between them. A range of calcareous rock, heath, grassland, scrub and woodland NVC types can occur on limestone pavement. The vegetation of limestone pavements is unusual because of the combinations of floristic elements, including woodland and woodland edge species, such as hart's-tongue *Phyllitis scolopendrium* and dog's mercury *Mercurialis perennis*. On the clint surfaces or the upper walls of the grikes there are plants of rocky habitats, such as wall-rue *Asplenium ruta-muraria* and maidenhair spleenwort *Asplenium trichomanes*. The grikes provide a shady, humid environment favouring woodland plants.

Grazing pressure is a key factor in determining ecological variation in limestone pavements. Where grazing pressure is low, woodland may cover the pavement and woodland vegetation may mask the limestone surface. Here only the massive areas of pavement may be exposed as clearings. Where there is heavy grazing pressure, vegetation may be found only in the grikes, but, where grazing is lighter, dwarf trees, herbs and ferns may protrude from the grikes. Grikes that are about 60 cm deep provide shelter without unduly limiting light and are usually the best floristically.

One rare species, the rigid buckler-fern *Dryopteris submontana*, has its main centre of population in limestone pavement and, in common with two other rare species, dark-red helleborine *Epipactis atrorubens* and angular Solomon's-seal *Polygonatum odoratum*, flourishes in the low- to mid-altitude pavements. Other rare species, such as baneberry *Actaea spicata* and green spleenwort *Asplenium viride*, occur in more montane pavements.

Table 1.1.1 Summary description of habitat H8240 and its relations with UK vegetation/habitat classifications

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	PAL.CLASS.: 62.3	Based on CORINE classifications.
NVC	W8, W9, W13, W19, W21 CG9, CG10, OV38, OV39 and OV40	Limestone pavements are not well covered by the NVC. They are considered to be a mosaic of a number of woodland, scrub, grassland and open vegetation community types. The habitats listed are those typically associated with H8240 but are not exclusive to it.
BAP priority habitat type	Limestone pavement	Includes H8240 within a broader habitat definition.
CSM reporting categories, for: feature types; ASSI/SSSI feature types	Limestone pavement, inland cliffs and screes (See Willliams 2006 www.jncc.gov.uk/page-3520)	A broader category which covers the following Annex I feature types: H6130 Calaminarian grasslands of the *Violetalia calaminariae* H8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) H8210 Calcareous rocky slopes with chasmophytic vegetation H8310 Caves not open to the public H6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels H8240 Limestone pavements H8220 Siliceous rocky slopes with chasmophytic vegetation H8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
JNCC CSM Guidance feature types	Limestone pavement (JNCC 2005b www.jncc.gov.uk/page-2237)	Close correspondence to H8240.

2. Range [2.3]

2.1 Current range

Range surface area [2.3.1]: 16,804 km²
Date calculated [2.3.2]: May 2007
Quality of data [2.3.3]: Good

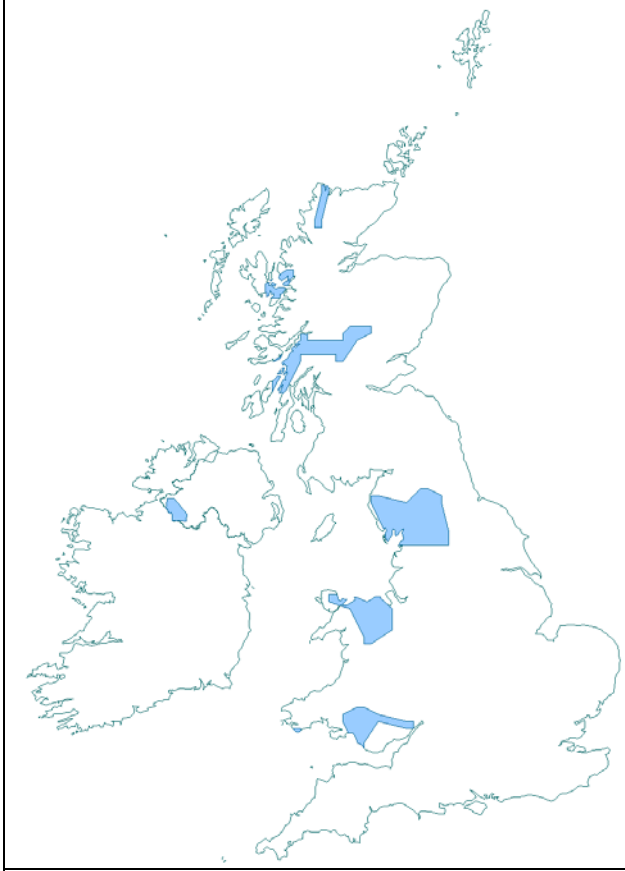
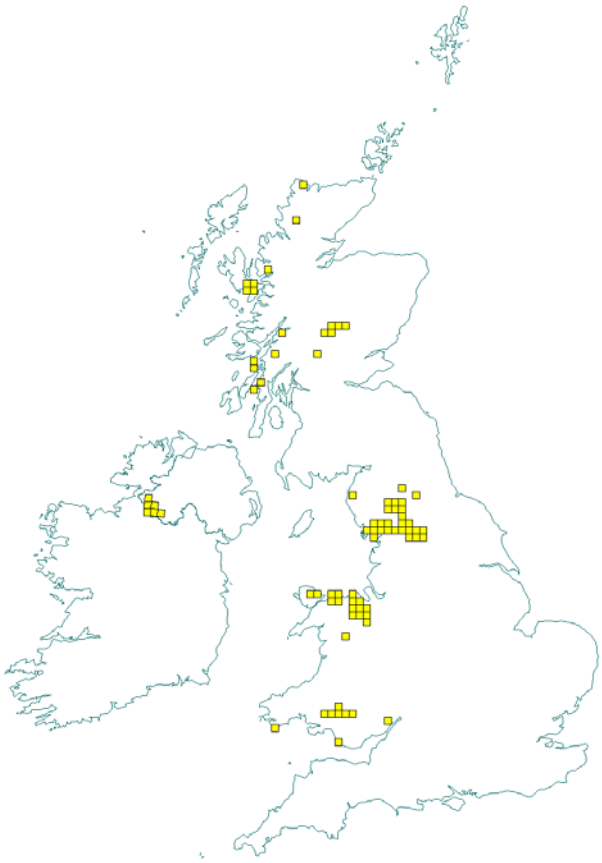
The surface area estimate was calculated within alpha hull software, using extent of occurrence as a proxy measure for range (see Map 2.1.1). The value of alpha was set at 25 km; the alpha was clipped to include inland areas only.

Maps 2.1.1 and 2.1.2 show the range and distribution of H8240 in the UK. Within the Atlantic Biogeographical Region, H8240 occurs in the UK, Ireland and Sweden. Elsewhere in Europe there are believed to be only fragmentary occurrences in high alpine limestone areas.

Nevertheless, it is widespread in the UK, being found from south Wales and the Forest of Dean, to northern Scotland on three different limestone formations – the Carboniferous in England, Wales and Northern Ireland; and the Dalradian and Durness (Pre-Cambrian to Cambro-Ordovician) in Scotland. The most extensive limestone pavements occur on the Carboniferous limestone of northern England, from

Morecambe Bay to the Pennines. Elsewhere, the exposures in Wales and Northern Ireland and the Dalradian of Scotland are of limited extent.

The restricted occurences on the Durness and Dalradian limestones of Scotland are valuable because they represent an extremely unusual geological and floristic variant (Jackson and McLeod 2000).

Map 2.1.1 Habitat range map [1.1] for H8240	**Map 2.1.2** Habitat distribution map [1.2] for H8240
	
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).	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: 79

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**

Despite extensive loss of the habitat in the UK (best summarised by Ward and Evans 1976) there is no evidence that the range has reduced since 1994.

The majority of loss of limestone pavement occurred prior to 1994 in northern England in the centre or core of the range for H8240. Whilst there has been some local and even regional reduction in extent of the habitat, it is considered that H8240 still occurs across its full potential range in the UK.

2.3 Favourable reference range

Favourable reference range[2.5.1]: **16,804 km^2**

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, 16, 804 km^2, has been set as the favourable reference area. Reasons for this are discussed below.

The potential range of limestone pavement is primarily determined by the distribution of suitable hard limestone in the British Isles and by the limits of glacial scouring in the last ice-age (some 15,000 years ago). Both of these physical limits are well mapped. Limestone pavement is considered to be a sub-alpine habitat but suitable limestone in the UK does not in any case reach high altitudes.

Limestone pavement forms by weathering of the bedrock under a soil cover - a process taking many thousands of years. Once the pavements are physically damaged there is no potential to re-create them, and similarly to extend their range.

In the UK the habitat distribution is determined by a number of factors. Limestone pavements only form on hard, well bedded (layered) limestones and need glacial scouring to initiate their formation. The characteristic vegetation (and habitat) is sub-alpine and anthropogenic in its nature (Webb and Glading 1998).

Expert opinion suggests that the current distribution of H8240 as shown in Map 2.1.2 appears to occupy most of the potential range, and that the favourable reference range and distribution is likely to match closely the current range and distribution.

2.4 Conclusions on range

Conclusion[2.6.i]: Favourable

The full range of distribution of limestone pavements in the UK is still complete. The impacts of agriculture, deep quarrying or removal of surface stone have led to significant local losses but there is no data to suggest that there has been any change in the overall historic or potential range. The current range is considered to be close to potential range for the habitat and to its favourable reference range, and so the judgement on range for H8240 is 'Favourable'.

3. Area [2.4]

3.1 Current area

Total UK extent [2.4.1]: 28.18km^2
Date of estimation [2.4.2]: May 2007
Method [2.4.3]: 3 = ground based survey
Quality of data [2.4.4]: Good

Table 3.1.1 provides information on the area of H8240 in the UK.

Table 3.1.1 Area of H8240 in the UK

	Area (ha)	Method [2.4.3]	Quality of data [2.4.4]
England	2228	3	Good
Scotland	300	3	Good
Wales	70	3	Good
Northern Ireland	220	3	Good
Total UK extent [2.4.1]	2,818	3	Good

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.

Limestone pavement is a rare and restricted habitat in the UK, and the current extent is estimated at 2,818 ha. The data sources for this figure are shown in the table below.

The survey of Ward and Evans (1976) provides the key data for England, Scotland and Wales. This survey data is limited in that pavement with a woodland cover was not included. A small number of isolated sites were also not visited. The Ward and Evans data has therefore been updated to cover these pavements by various surveys as shown in the table below.

The data sources are generally derived from inventories of the resource. The data with the greatest degree of certainty is that of England where accurate mapping has been completed.

- The England data is derived from the 1976 Ward and Evans Survey. In Cumbria and Lancashire the data has been updated by the 1995 survey (Webb 1995) and by a 2006 re-digitisation. Both of these sources are derived from field mapping and measurement. Future digital measurement of Yorkshire Dale National Park data may update this figure but it is unlikely to signifiicantly change.

- The Scotland data is derived from Ward and Evans data. This has been updated as new sites have been discovered and assessed. The actual figure is an estimation from survey data and the knowledge of Stephen Ward, Scottish Natural Heritage (SNH) 2003. The Scottish figure included additional cartographic areas around the limestone pavements and therefore is likely to be an overestimate. Accurate measurements have still to be made of Scottish pavements (*Pers. Comm.* Dave Horsfield, SNH 2006).

- The Wales data is derived from Ward and Evans with additional information from a Countryside Council for Wales (CCW) contract completed by Deacon (1997).

- The Northern Ireland data is an estimate of the Northern Ireland Earth Science Review, Environment and Heritage Service (EHS). This is derived from field mapping but pavement was not mapped as a feature. The largest units of pavement have been visited by Webb 2006 and the 220 ha is considered to be a significant over-estimate. Recent air photo imagery should allow more accurate measurement of the distribution in Northern Ireland.

The cartographic area measurement for limestone pavement is difficult to obtain accurately. Limestone pavements are often set in a mosaic of other habitats such as grassland, scree and heath. Re-digitisation of the Cumbria and Lancashire pavements have increased the accuracy of measurement in these two counties. Ward and Evans (1976) showed that up to 97% of pavements have been damaged in some way. It is difficult to measure pavements that have been damaged by removal of surface stone and to judge whether to exclude damaged areas from a measurement of area.

Despite the caveats and difficulties described above it is considered that there is a complete and reliable estimate of the extent of the habitat in the UK and NI.

3.2 Trend in area since c.1994

Trend in area[2.4.5]: **Stable**
Trend magnitude[2.4.6]: **Not applicable**
Trend period[2.4.7]: **1994-2006**
Reasons for reported trend[2.4.8]: **Not applicable**

There is no evidence of any significant loss in extent of H8240 in the UK since 1994.

Protective Limestone Pavement Orders (LPOs) introduced under the provisions of the 1981 Wildlife and Countryside Act now make removal in England, which holds the largest extent of H8240 in the UK, illegal. This has largely stemmed the loss in this country; a small amount of loss still occurs due to illegal

extraction or associated with built development but this is thought to be negligible in terms of the UK extent.

3.3 Favourable reference area

Favourable reference area[2.5.2]: 28km^2

Section 3.2.2.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference area estimates have been determined in the UK. Based on this approach, the current extent, approximately 28 km^2, has been set as the favourable reference area. Reasons for this are discussed below.

Potential area is not a factor of relevance to the conservation of limestone pavement. The habitat forms by a combination of glacial scouring and weathering under a soil cover for many thousands of years. It is not possible to re-create limestone pavement once damaged. Consequently it is considered that the potential area is equal to the current extent.

The historic trend in the area of H8240 is of significant reduction in extent over the past 40 years. The greatest extent of pavement (in northern England) has suffered the greatest loss, and it is possible that as much as 50% of the area has already been lost.

The best measurement of the historic loss of H8240 is provided by Ward and Evans (1976), which calculated that, 40% of limestone pavement area has been destroyed. The remaining 60% is also affected and only 3% of the pavements visited were unaffected by damage. Although the Ward and Evans report did not survey all pavements, the English Nature survey work completed in 1995 (Webb 1995) covered all pavements and found similar levels of damage in sites not surveyed by Ward and Evans.

The pattern of damage in Wales, Scotland and Northern Ireland is different with little evidence of systematic pavement removal for rockery stone. These areas have clearly been affected by removal of surface stone but this is associated with agricultural clearance or deep quarrying.

In conclusion the habitat has had known large losses in extent in the past; however these losses have been relatively negligible at a UK scale since 1994 and the losses due to past removal for horticulture. Consequently the expert judgement is that at a UK level the favourable reference area is likely to equate to the current area, which is similar to the 1994 UK extent.

3.4 Conclusions on area covered by habitat

Conclusion[2.6.ii]: Favourable

The potential extent of H8240 is naturally limited by the occurrence of suitable limestone strata near or at the soil surface. Expert judgement is that extent at a UK scale has remained stable since 1994, and that the current area should be taken as the favourable reference area. Hence the judgement for area for H8240 is Favourable.

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

4.1 Main pressures [2.4.10]

The following list of main pressures for H8240 has been derived from the six year Common Standards Monitoring (CSM) results for Special Areas of Conservation (SACs) designated for their representation of H4010 and results from the 2005 UK Biodiversity Action Plan (BAP) reporting (see http://www.ukbap.org.uk/GenPageText.aspx?id=104 for further details):

- Removal of surface stone **(301 Quarries, 402 Discontinuous urbanisation)**

Removal of surface stone continues to affect the habitat. This is minor in extent and has reduced significantly since 1995. However, as the habitat will not recover following physical damage it is still a

live issue with the conservation of the habitat. Illegal damage and loss due to built development are the casual factors. Pressure to extend deep quarries still exists but has so far resisted due to strong development control policies.

- Grazing **(140 Grazing)**

In the uplands pavement is affected by over-grazing and by grazing with inappropriate stock type. Historical agricultural support has led to long term intensive management largely by sheep. This has led to a reduction in the vegetation structure with a loss of clint-top and emergent vegetation (plants growing up and out of the grikes or cracks). The characteristic vegetation is therefore confined to deep within grikes or as trees growing above the browse line. Pavements become species poor loosing broadleaved herbs that are so characteristic of the habitat.

Grazing by cattle seems to be the key to optimal management of the habitat. Examples in Britain and Ireland of pavement in favourable condition often relate to cattle grazing. This type of management has been lost in the past 40 years and much of the conservation focus on the habitat is related to re-establishment of traditional cattle at a low grazing intensity.

- Agricultural operations **(110 Use of pesticides, 120 Fertilisation, 171 Stock feeding)**

Intensive management leads to further problems with agricultural weeds, nutrient enrichment due to use of fertilisers and in some cases loss of areas to stock feeding. Use of fern-specific herbicide to control bracken is a threat to the species interests of upland pavements

- Lack of remedial management **(141 Abandonment of pastoral systems)**

In some cases in the lowlands, pavements are threatened by neglect. This can take the form of scrub encroachment and canopy closure on species-rich pavements. In some cases grazing needs to be re-established.

- Forestry operations **(160 General forestry management)**

Pavements that have a woodland canopy are an important part of the ecological expression of the habitat. These wooded pavements often have areas where the surface is cloaked in bryophytes and other areas that are kept open by the physical nature of the pavement surface or by management practices. Woodlands with a uniform canopy or poor structure lead to a loss of diversity and poorly demonstrate structure and function. Continued management practice (coppice management or thinning) is required to maintain the interest of these sites.

Woodland management needs to be coupled with control or management of deer populations. In some cases high levels of deer browsing degrade structure and function.

Wooded pavement has also been adversely affected by commercial forestry. Conifer plantations and dense beech blocks have shaded out the habitat and in some cases caused eutrophication by needle fall.

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

Non-native species are an increasing problem for limestone pavement management. *Cotoneaster* spp. are the most widespread but *Buddleja* sp. are also a local problem.

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

Based on an assessment of relevant literature, this habitat is potentially sensitive to air pollution, but it has not been possible to undertake an assessment of potential impact based on critical loads because of the poor equivalence between this habitat and those for which critical loads are set (see Technical Note III).

4.2 Current condition

4.2.1 CSM condition assessments

Condition assessments based on CSM (see http://www.jncc.gov.uk/page-2199) provide a means to assess the structure and functioning of H8240 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 81% (2,467 ha) of the extent of H8240 in the UK in a well dispersed network across its range

Table 4.2.1 and Map 4.2.1 summarise the CSM condition assessments for UK SACs supporting habitat H8240. 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:

- 97% of the area and 78% of the number of assessments was unfavourable; and
- at least 82% of the total UK habitat area was in unfavourable condition.

Table 4.2.1 CSM condition assessment results for UK SACs supporting H8240. 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	05	1
	No change	1,071	4
	Unclassified		
	Recovering	1,225	2
	Total	2,302	7
	% of all assessments	***97%***	***78%***
	% of total UK resource	***82%***	***unknown***
Favourable	Maintained	76	2
	Recovered		
	Unclassified		
	Total	76	2
	% of all assessments	***3%***	***22%***
	% of total UK resource	***3%***	***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 form those used in the six year report produced by JNCC. (Williams, J.M., ed. 2006. *Common Standards Monitoring for Designated Sites: First Six Year Report*. Peterborough, JNCC).
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.

Site of Special Scientific Interest (SSSI)/Area of Special Scientific Interest (ASSI) condition assessments

Table 4.2.2 and Maps 4.2.2 and 4.2.3 summarise the CSM 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 were unfavourable.

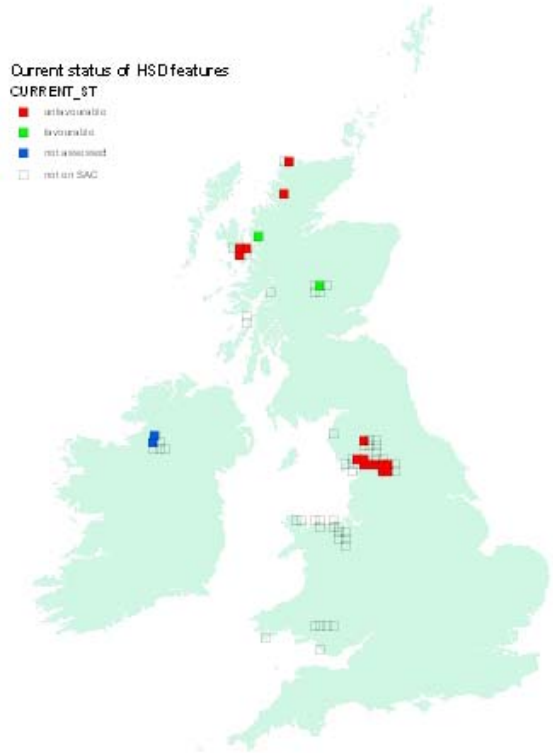
Table 4.2.2 CSM condition assessment results for UK SSSI/ASSIs that were judged to be either strongly or weakly indicative of the condition of H8240 on SSSI/ASSIs. See notes below table and Technical Note II for further details

Condition	**Condition sub-categories**	**Number of assessments**	
		Strongly indicative assessments (Category 1)	**Weakly indicative assessments (Category 2)**
Unfavourable	Declining	3	
	No change	4	
	Unclassified		
	Recovering	8	
	Total	15	
	% of all assessments	***75%***	***%***
Favourable	Maintained	3	
	Recovered		
	Unclassified	2	
	Total	5	
	% of all assessments	***25%***	***%***

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 H8240 based on CSM 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
		Not applicable
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]: None

Typical species assessment[2.5.4]: Not applicable

There are no species listed in the Interpretation Manual of European Habitats for H8240 (or through analysis of faithful species for the core NVC communities for H8240) whose UK trends are considered to be indicative or informative on the structure and function of H8240.

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 in unfavourable condition.

CSM data for 2000-2006 for SACs suggest 78% of the number of assessed SACs supporting H8240, and 97% of the assessed SAC area (equivalent to 87% of the UK total area for H8240) were unfavourable. Around 50% of the assessed SAC area is recovering and less than 1% is declining, suggesting a general improvement in the condition of H8240 in these sites.

For the smaller proportion of the resource of SSSI/ASSIs, 75% of strongly indicative feature assessments are unfavourable, with 40% of these recovering and 15% declining.

The majority of the resource of H8240 lies within SACs: extrapolating these tends to the wider resource of H8240 suggest that much more than 25% of the overall resource is likely to be in unfavourable condition. Overall the available information suggests a judgement of Unfavourable- Bad but improving for the structure and function parameter for H8240.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

- Protection within SACs

The majority of the known resource of H8240 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 H8240 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 H8240 outside the statutory site series.

- UK Biodiversity Action Plan (BAP)

H8240 is covered by the limestone pavement action plan under the UK BAP (see http://www.ukbap.org.uk), as well as under country and local biodiversity action plans and strategies, with targets to maintain, improve, restore and expand the resource.

5.1.2 Main future threats[2.4.11]

The most obvious major future threats to H8240 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:

- Removal of surface stone **(301 Quarries, 402 Discontinuous urbanisation)**
- Grazing **(140 Grazing)**
- Agricultural operations **(110 Use of pesticides, 120 Fertilisation, 171 Stock feeding)**
- Lack of remedial management **(141 Abandonment of pastoral systems)**
- Forestry operations **(160 General forestry management)**
- Invasive species **(954 Invasion by a species)**

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

Based on an assessment of relevant literature, this habitat is potentially sensitive to air pollution, but it has not been possible to undertake an assessment of its potential future impact based on critical loads because of the poor equivalence between this habitat and those for which critical loads are set (see Technical Note III).

- Climate change **(750 Other pollution or human impact/ activities)**

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 CO_2 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 structres and functions)**

5.2.1 CSM condition assessments

The CSM condition assessments reported in Sections 4.2.1-2 provide a basis to predict the potential future condition of H8240 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. There are a number of caveats to this approach, which are set out beneath this table.

Table 5.2.1 Predicted future condition of UK SACs supporting H8240 based on current CSM 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	05	1
	Unfavourable no change	1,071	4
	Unfavourable unclassified		
	Total	1,076	5
	% of assessments	***45%***	***56%***
	% of total UK extent	***38%***	***Unknown***
Future-favourable	Favourable maintained	76	2
	Favourable recovered		
	Unfavourable recovering	1,225	2
	Favourable unclassified		
	Total	1,301	4
	% of assessments	***55%***	***44%***
	% of total extent	***46%***	***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.

SAC condition assessments

Table 5.2.1 and Map 5.2.1 summarise the predicted potential future condition of H8240 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:

- 55% of the area and 44% of the number of assessments fall within the future-favourable category; and
- at least 46% of the total UK habitat area falls within the future-favourable category.

SSSI/ASSI condition assessments

Table 5.2.2 and Maps 5.2.2 and 5.2.3 summarise the predicted potential future condition of H8240 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:

- 65% of strongly indicative assessments fall within the future-favourable category.

Table 5.2.2 Predicted future condition of H8240 on SSSI/ASSIs based on CSM 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	3	
	Unfavourable no change	4	
	Unfavourable unclassified		
	Total	7	
	% of assessments	***35%***	***%***
Future-favourable	Favourable maintained	3	
	Favourable recovered		
	Unfavourable recovering	8	
	Favourable unclassified	2	
	Total	13	
	% of assessments	***65%***	***%***

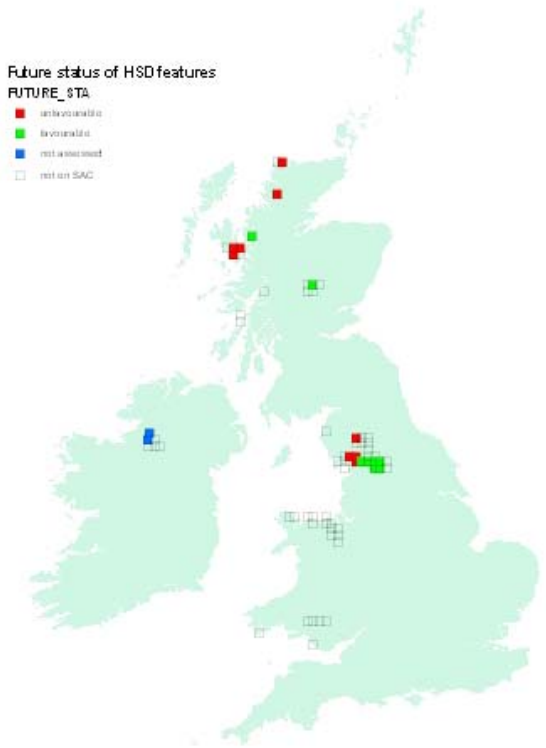
Note that the scenario presented above is based on the same information as used to construct the Table 4.2.2. It is based on the following premises:

(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 H8240 based on CSM 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
		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 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 structres and functions)

Conclusion[2.6.iv]: Unfavourable - Bad but improving

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

One of the principal future pressures on the condition of H8240 (grazing) is being addressed directly for the majority of the resource of H8240 that lies within the statutory site series; and (particularly through agri-environment measures) for the smaller proportion of the resource of H8240 lying outside the statutory site series.

Within the SAC series, 45% of the area of SAC (equivalent to 38% of the UK area of H8240) and 56% of the sites for the feature are assessed by CSM as "future – unfavourable". Given the high representation of H8240 on SACs, these figures can be extrapolated to suggest that at least 46% of the total UK resource of H8240 is unlikely to achieve favourable condition in the foreseeable future. The CSM results for SSSI/ASSIs suggest only 35% of the strongly indicative CSM assessments for SSSI/ASSIs are likely to be unfavourable in the foreseeable future.

As there is no evidence to suggest a future decline in the area or range of H8240 in the UK by more than 1% p.a., the evidence from conservation measures (particularly grazing management agreements) currently in place and predicted to operate over the next 15-20 years leads to a judgement of 'unfavourable- bad but improving' for the future prospects for H8240. However uncertainty over the effective extent of changes to grazing;, the resources required for other changes to agricultural practice; and the need for further changes to forestry practice may reduce the confidence associated with this judgement.

6. Overall conclusions and judgements on conservation status [2.6.]

Conclusion[2.6]: Unfavourable – Bad but improving

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

Table 6.1 Summary of overall conclusions and judgements

Parameter	Judgement	Grounds for Judgement	Confidence in judgement*
Range	Favourable	Current range is stable and not less than the favourable reference range.	1
Area covered by habitat type within range	Favourable	Current extent is stable and not less than the favourable reference area.	2
Specific structures and functions (including typical species)	Unfavourable – Bad 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)	Unfavourable – Bad but improving	Habitat prospects over next 12-15 years considered to be bad, with severe impact from threats expected and long term viability not assured. Measures are in place and planned to address threats to future range, extent and structure and function for the overall UK resource.	2
Overall assessment of conservation status	Unfavourable – Bad but improving	Two parameters judged as Unfavourable – Bad; two trends judged as improving.	3

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

7. Annexed material **(including information sources used 2.2)**

7.1 References

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7.2 Further information on CSM 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)	11
Number of SACs with CSM assessments (b)	9
% of SACs assessed (b/a)	82
Extent of feature in the UK – hectares (c)	2,818
Extent of feature on SACs – hectares (d)	2,467
Extent of features assessed – hectares (e)	2,377
% of total UK hectarage on SACs (d/c)	88
% of SAC total hectarage that has been assessed (e/d)	96
% of total UK hectarage that has been assessed (e/c)	84

Notes

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

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

Status	Number of squares	Proportion of all squares
Current – Unfavourable (red)	15	22%
Current – Favourable (green)	2	3%
On SAC but not assessed (blue)	2	3%
Not on SAC (transparent)	49	72%
Total Number of 10km squares (any colour)	68	
Future – Unfavourable (red)	9	13%
Future – Favourable (green)	8	12%