

**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 :
H7110: Active raised bogs**

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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H7110 Active Raised Bogs

Audit trail compiled and edited by JNCC and the JNCC Lowland wetland Lead Coordination Network

This paper and accompanying appendices contain background information and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the commission document “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 National Vegetation Classification (NVC) and other habitat types

Table 1.1.1 provides a summary description of H7110 and its relations with UK classifications.

Active raised bogs are peat-forming ecosystems that have developed during thousands of years of peat accumulation, to such an extent that the depth of peat isolates them from the influence of groundwater. Typically, lowland raised bogs form a raised dome of peat irrigated solely by rainfall. Such rainwater-fed ecosystems are very acid and poor in plant nutrients and typically support a restricted range of species, some of which are otherwise abundant only in the cooler and wetter uplands of the UK. In line with the Interpretation manual of European habitats (European Commission DG Environment 2003), ‘active’ is defined as ‘supporting a significant area of vegetation that is normally peat-forming’. Such vegetation includes plants such as the bog-mosses *Sphagnum* spp., cottongrasses *Eriophorum* spp., heather *Calluna vulgaris* and other ericaceous plants, and the carnivorous sundews *Drosera* spp. Under some circumstances purple moor-grass *Molinia caerulea* is also peat-forming. Northern sites are richer in the reindeer-moss lichen *Cladonia* spp. Active bog vegetation is characteristic of intact (primary) bog surfaces, but peat-forming communities also occur frequently on bogs which have previously been cut for peat (secondary surfaces) but have since become revegetated.

Within the raised bog ecosystem the bog surface typically displays a distinctive microtopography, with patterns of hummocks and hollows rich in *Sphagnum* and other peat-forming species. Around bog pools there may sometimes be patches of H7150 (Depressions on peat substrates of the *Rhynchosporion*). Classical descriptions of the ecosystem show raised bogs as having a discrete lens-shaped dome of peat with flat or imperceptibly sloping topography with a halo of fen vegetation in the zone where water draining the bog meets that from adjoining mineral soils. This is known as the lagg. A characteristic of the lagg zone is that normally it has more available plant nutrients, is more alkaline and hence shows greater species diversity, with a preponderance of sedge *Carex* spp. As a result of peat-digging and other activities, no example of raised bog that conforms exactly to this model is now known in Europe.

Table 1.1.1 Summary description of habitat H7110 and its relations with UK vegetation/habitat classifications

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	7110 * Active raised bogs PAL.CLASS.: 51.1 1) Acid bogs, ombrotrophic, poor in mineral nutrients, sustained mainly by rainwater, with a water level generally higher than the surrounding water table, with perennial vegetation dominated by colourful Sphagna hummocks allowing for the growth of the bog (<i>Erico-Sphagnetalia magellanici</i> , <i>Scheuchzerietalia palustris</i> p., <i>Utricularietalia intermedio-minoris</i> p., <i>Caricetalia fuscae</i> p.). The term "active" must be taken to mean still supporting a significant area of vegetation that is normally peat forming, but bogs where active peat formation is temporarily at a standstill, such as after a fire or during a natural climatic cycle e.g., a period of drought, are also included.	
NVC	M1 <i>Sphagnum auriculatum</i> bog pool community M2 <i>Sphagnum cuspidatum/recurvum</i> bog pool community M3 <i>Eriophorum angustifolium</i> bog pool community M17 <i>Scirpus cespitosus</i> - <i>Eriophorum vaginatum</i> blanket mire M18 <i>Erica tetralix</i> - <i>Sphagnum papillosum</i> raised and blanket mire M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire M20a <i>Eriophorum vaginatum</i> blanket and mixed mire - species poor sub-community	This list is not exhaustive. M15 <i>Scirpus cespitosus</i> – <i>Erica tetralix</i> wet heath and M16 <i>Erica tetralix</i> – <i>Sphagnum compactum</i> wet heath are also found on raised bogs, but are typically found on shallower peats (<0.5 m depth) and are generally referable to Annex I type H4010. With M1 and M2 forms partial overlap with H7150 Depressions on peat substrates of the <i>Rhynchosporion</i> ; and with M18 and M20, partial overlap with H7120.
BAP priority habitat type	Lowland Raised Bogs	Wholly contained within this BAP type together with H7120.
CSM reporting categories	Lowland Raised Bogs	Wholly contained within this category together with H7120.

2. Range ^{2.3}

2.1 Current range

Range surface area ^{2.3.1}: **35,992 km²**

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

Quality of data ^{2.3.3}: **Good**

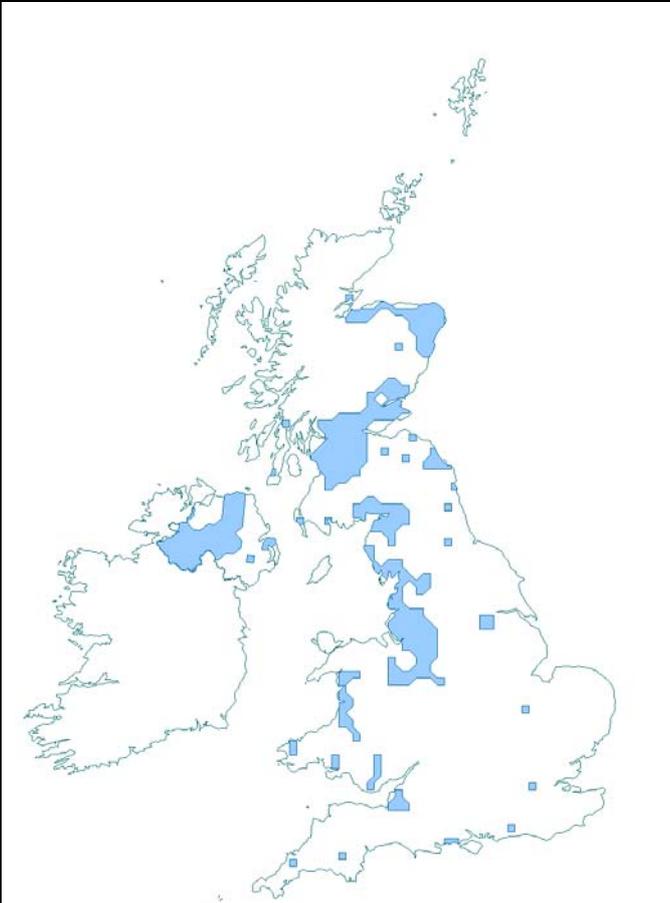
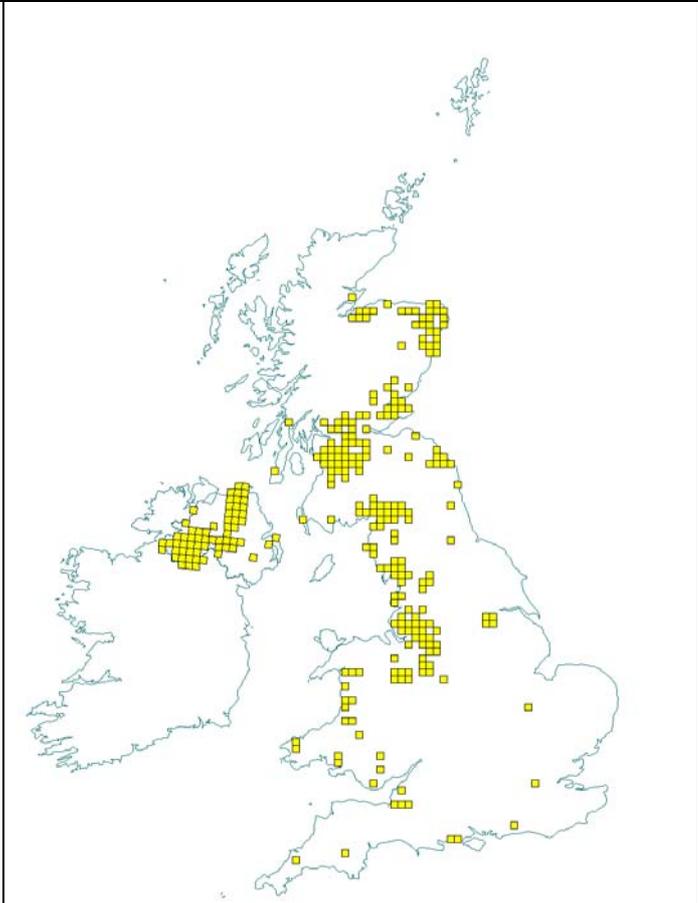
The surface area estimate was calculated within alpha hull software, using extent of occurrence as a proxy measure for range (see Map 2.1.1). The value of alpha was set at 8 km; the alpha was clipped to include inland areas only.

Maps 2.1.1 and 2.1.2 show the range and distribution of H7110 in the UK.

The map shows the distribution of both active and degraded raised bogs (H7120) including Special Areas of Conservation (SACs) supporting this Annex I type. It is not possible to separate the two Annex I habitat types using existing information sources. However, H7110 is less extensive within this range than H7120

Raised bogs are widespread but unevenly distributed in the UK. There are notable concentrations in several areas, including the Central Belt in Scotland, the Solway region on the England/Scotland border, north-west England, Northern Ireland and mid Wales.

The habitat has very specific requirements in terms of rainfall, topography, geomorphology and hydrology. Consequently a smaller Alpha value (see Technical note I) has been used to construct the range polygon shown in Map 2.1.1 to reflect these precise requirements.

Map 2.1.1 Habitat range map ^{1.1} for H7110	Map 2.1.2 Habitat distribution map ^{1.2} for H7110
	
<p>Range envelope shown in blue/grey shade in above map is a minimum convex polygon constructed using JNCC Alpha Shapes tool (see Technical note I for details of methodology).</p>	<p>Each yellow square represents a 10x10km square of the National Grid and shows the known and/or predicted occurrence of this habitat. 10-km square count: 284</p>

2.2 Trend in range since c.1994

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

There is no readily available evidence or information on any trend in range for H7110 since 1994.

2.3 Favourable reference range

Favourable reference range^{2.5.1}: 35,992km²

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, 35, 992 km², has been set as the favourable reference area. Reasons for this are discussed below.

The range of H7110 is naturally restricted by its hydrological and geomorphological requirements, and so the occupation of the range shown in Map 2.1.2 and more notably Map 2.1.1 is naturally fragmented. The current distribution shown in Map 2.1.2 has also been affected by human activities, particularly afforestation and exploitation of peat. In Scotland the range of the broader habitat of lowland mire (including both H7110 and H7120) is estimated to have contracted from around 230 km² in the 1940s to 130 km² in the 1980s; this trend is thought to be representative of the change in range for other countries in the UK over the same period.

Although there are opportunities to expand the habitat, including onto archaic peat deposits, these are often limited to areas where this habitat or H7120 are known to occur. With these restrictions on the habitat, the range envelope shown in Map 2.1.1 is considered to encapsulate both potential and known historic range; is thought to be sufficient to allow for the long-term survival of the habitat; and has been taken to equate to the surface area of favourable reference range.

2.4 Conclusions on range

Conclusion^{2.6.1}: Favourable

Although the information on range contraction for lowland mires infers a substantial historic contraction in the range for raised bogs overall (H7110 and H7120 combined), there is no information on any changes in range for H7110 since 1994, nor any previous historical data on extent or changes. Furthermore it is not possible to distinguish between the range and historic for this habitat and H7120. However, the current range as mapped is considered to be close to potential range for both H7110 and H7120 and to the favourable reference range for both, and so the judgement on range for H7110 is Favourable.

3. Area^{2.4}

3.1 Current area

Total UK extent^{2.4.1}: 129.41 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}: Moderate

Table 3.1.1 provides information on the area of H7110 in the UK.

The information sources which are currently available in the UK on the extent of raised bog do not separate 'active' and 'degraded' forms of bogs (H7110 and H7120) as defined by the Directive.

For England, Scotland and Wales, Lindsay and Immirzi (1996) calculated area figures for near-natural (P1), drained (P2) and degraded (P3) primary raised bog for England, Scotland and Wales. However, Lindsay and Immirzi did not calculate area figures for secondary re-vegetated or regenerating raised bog (S1) which accounts for a significant proportion of the total resource of active bog. For Northern Ireland, the figures are derived from the Northern Ireland Peatland Survey (Cruickshank and Tomlinson 1988). Hence the final figures on current area given in Table 3.1.1 are derived from additional expert interpretation of these information sources.

Table 3.1.1 Area of H7110 in the UK

	Area (ha)	Method ^{2.4.3}	Quality of data ^{2.4.4}
England	3727	1	Moderate
Scotland	3325	1	Moderate
Wales	1427	1	Moderate
Northern Ireland	4462	1	Moderate
Total UK extent ^{2.4.1}	12,941	1	Moderate

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

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

3.2 Trend in area since c.1994

Trend in area ^{2.4.5}: **Unknown**
Trend magnitude ^{2.4.6}: **Not applicable**
Trend period ^{2.4.7}: **1994-2006**
Reasons for reported trend ^{2.4.8}: **Not applicable**

There is no readily available information on UK trends in the area of H7110 since 1994.

3.3 Favourable reference area

Favourable reference area ^{2.5.2}: **371km²**

There is no quantitative information on the historic area or trends in area for H7110 specifically, in part due to the difficulties of distinguishing this habitat accurately from degraded raised bogs (H7120).

However, the companion habitat H7120 is regarded as an unusual 'special case' under the Habitats Directive as that habitat is by definition restorable to H7110. The specialised physical requirements mean that the habitat cannot readily be restored or created where no raised bog resource exists. Consequently the favourable reference area at a UK scale has been set as the total of the current area for this habitat (129.41km²) and H7120 (242km²).

3.4 Conclusions on area covered by habitat

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

Although the current area of H7110 in the UK is known, and there is information on the historic trends for the habitat (if merged with H7120), there is no reliable information on any trends in area since 1994.

The favourable reference area for H7110 has been set as the total of the current extent of both this habitat and H7120 as the latter is restored back to active raised bog. Although conservation effort since 1994 has restored some habitat to H7110, almost two-thirds of the current UK total extent of raised bog is currently referable to H7120 rather than H7110 (24,203 ha and 12,941 ha respectively). Consequently the conclusion for the area parameter for H7110 is Unfavourable - Bad but improving.

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

4.1 Main pressures ^{2.4.10}

The following list of main pressures for H7110 has been derived from the six year Common Standards Monitoring (CSM) results for SACs designated for their representation of H7110 and results from the 2005 UK Biodiversity Action Plan (BAP) reporting (see <http://www.ukbap.org.uk/GenPageText.aspx?id=104> for further details):

There are three key conditions which have to be maintained if lowland raised bogs are to retain their characteristic features. Firstly, they are waterlogged systems so alterations to the rate of water loss will

destabilise them. Secondly, water inputs are from precipitation alone and are therefore low in solutes, so significant increases in the base or nutrient status of the system will alter the vegetation cover in favour of non-bog species. Thirdly, the living layer of vegetation acts as a 'natural' regulator for water loss, so destruction or alteration of the vegetation will have significant implications for the long-term stability of the ecosystem as a whole. Factors which currently either disrupt the balance of these conditions, or which lead more immediately to the destruction of raised bog habitats and their remnants, include:

- **Water abstraction (810 Drainage, 802 Reclamation of land form sea, estuary or marsh, 890 Other human induced changes in hydraulic conditions)**

Past and continuing loss of area by drainage and conversion to intensive agriculture has adversely affected the UK resource of H7110. Lowland raised bogs frequently occur in drained agricultural landscapes. Perimeter drainage and water abstraction from underlying aquifers may limit the rewetting potential of certain sites. Raised bogs drained either directly or indirectly (e.g. via historical domestic peat cutting) degenerate without conservation management.

- **Grazing (140 Grazing)**

A lack of grazing coupled with drier conditions has favoured the expansion of scrub and tall heather to the detriment of bog species. However, over-grazing can lead to trampling and compaction as well as contamination.

- **Peat extraction (310 Peat extraction, 312 Mechanical removal of peat)**

The extraction of peat and/or underlying mineral deposits both in existing and proposed new areas.

- **Burning (180 Burning)**

Burning was once a management tool used to open the open bog landscape and create a diverse surface structure. Burning on lowland raised bogs is now not encouraged with the consequential losses in bog vegetation.

- **Built development (402 Discontinuous urbanisation, 421 Disposal of household waste, 490 Other urbanisation, industrial and similar activities)**

Linear developments and other land reclamation for built development (including waste disposal) affect many areas. Such developments have long-term repercussions on the stability of the ecosystem. In addition, raised bogs and the scope for their expansion onto archaic peat are vulnerable to windfarm developments.

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

On a local scale lowland raised bog was more extensive and continuous in the past, but since the 19th Century this habitat has become more fragmented. It is not realistic that these bogs will once again become reconnected, but it is important that they do not become isolated islands within intensively drained landscapes. To this end water margins, and other wetlands play an important role in connectivity.

- **Absence of or inappropriate management (141 Abandonment of pastoral systems, 920 Drying out, 950 Biocenotic evolution)**

Lack of or inappropriate management of existing bogs leads to drying out, scrub encroachment and succession to woodland.

- **Forestry operations (162 Artificial planting)**

In addition to the direct impacts of existing plantations on deep peat, successive rotations dry out neighbouring areas and act as an invasive seed source.

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

Based on an assessment of the exceedence of relevant critical loads (see Appendix II), 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 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 H7110 in the UK. The following attributes were examined for all CSM assessments relevant to the habitat:

- Extent.
- Composition (habitat and vegetation).
- Structure.
- Positive and negative indicator species.
- Indicators of local distinctiveness.

SAC condition assessments

Table 4.2.1 and Map 4.2.1 summarise the CSM condition assessments for UK SACs supporting habitat H7110. 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:

- 87% of the area and 75% of the number of assessments was unfavourable; and
- at least 51% of the total UK habitat area was in unfavourable condition.

Table 4.2.1 CSM condition assessment results for UK SACs supporting H7110. 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	476	7
	No change	102	3
	Unclassified	1,044	7
	Recovering	5,009	22
	Total	6,631	39
	<i>% of all assessments</i>	87%	75%
	<i>% of total UK resource</i>	51%	unknown
Favourable	Maintained	878	11
	Recovered		
	Unclassified	153	2
	Total	1,032	13
	<i>% of all assessments</i>	13%	25%
	<i>% of total UK resource</i>	8%	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 March 2005, as used for the JNCC Common Standards Monitoring Report 2006.

Table 4.2.2 CSM condition assessment results for UK Sites of Special Scientific Interest (SSSI)/Area of Special Scientific Interest (ASSIs) that were judged to be either strongly or weakly indicative of the condition of H7110 on SSSI/ASSIs. See notes below table and Appendix I for further details

Condition	Condition sub-categories	Number of assessments	
		Strongly indicative assessments (Category 1)	Weakly indicative assessments (Category 2)
Unfavourable	Declining	25	
	No change	15	
	Unclassified	4	
	Recovering	27	
	Total	71	
	<i>% of all assessments</i>	75%	%
Favourable	Maintained	19	
	Recovered		
	Unclassified	5	
	Total	24	
	<i>% of all assessments</i>	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.

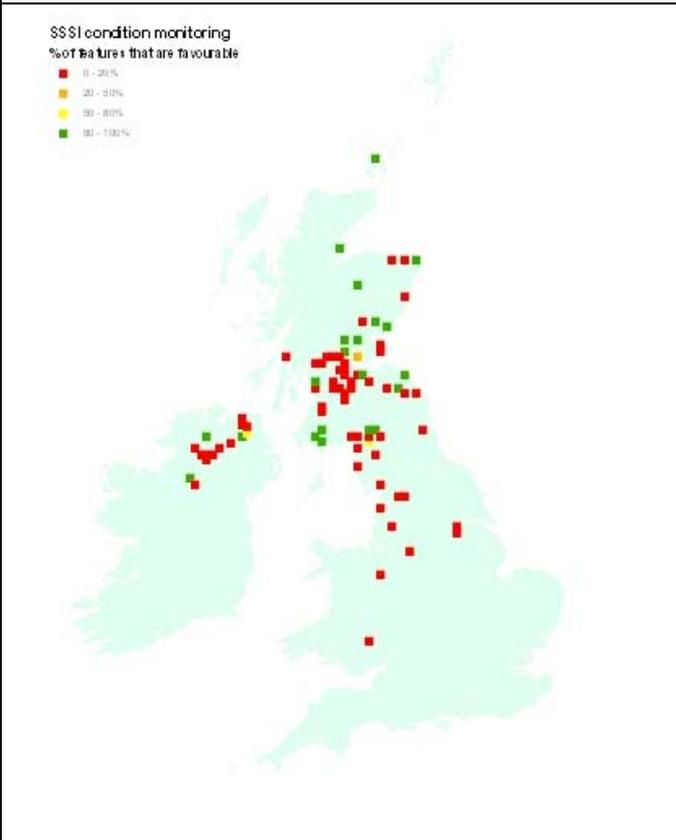
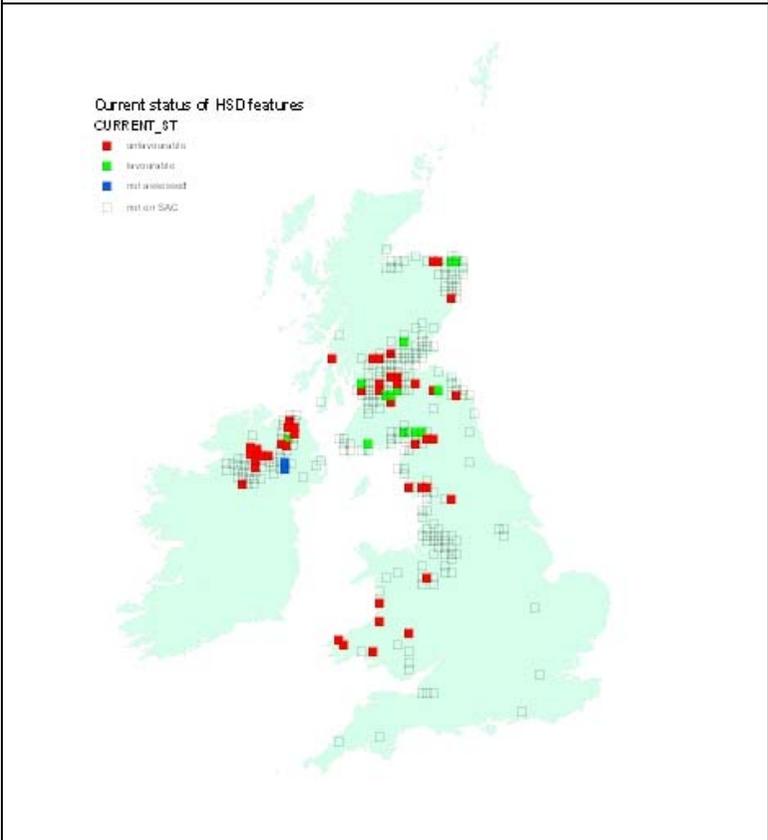
SSSI/ASSI condition assessments

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 Appendix I 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.

Current Condition of H7110 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
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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}: *Andromeda polifolia*, *Betula nana*, *Vaccinium microcarpum*
Typical species assessment^{2.5.4}: **Change in 10 km square occupancy across UK over last 25 years**
 The trends of the following typical species are considered to indicative or informative on the structure and function of the UK resource of H7110.

Table 4.3.1 Trends and faithfulness of selected typical species for H7110

Typical species considered:	Faithfulness to habitat H7110 (based on analysis of NVC synoptic tables)	Trend over last 25 years from BSBI atlas - based on change in 10 km square occupancy across UK (see http://www.jncc.gov.uk/page-3254)
<i>Andromeda polifolia</i>	Medium	Significant increase, but less than 25% in 25yrs
<i>Betula nana</i>	Medium	No significant change
<i>Vaccinium microcarpum</i>	Medium	Significant increase, more than or equal to 25% in 25yrs

None of the other species listed as characteristic of this habitat in the EU Interpretation Manual are particularly faithful to this habitat so available trend data at the UK-level is not particularly meaningful and has not been utilised here. Overall the trends for these species suggest an improvement in the condition of the wider resource of H7110; however there are no trends for the species since 1994.

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.

At least 51% of the UK resource on SACs is currently judged unfavourable, although 39% is recovering compared to 4% declining. On SSSIs 75% of strongly indicative assessments were unfavourable with roughly equal proportions declining and recovering. Extrapolating to the wider resource of H7110 beyond statutory sites suggests that much more than 25% of the UK resource is likely to be unfavourable.

The principle reasons for sites supporting H7110 being in unfavourable condition are an adverse eco-hydrological regime and the need for follow-up management of the consequences of the negative eco-hydrological regime. Expert judgement suggests that sites should only be regarded as recovering if (i) palpable improvements in surface condition (i.e. vegetation) are occurring, and (ii) measures are actually in place around the edges to ensure a more sustainable and natural hydrological context for the feature.

Overall this suggests a judgement on structure and function of Unfavourable - Bad but improving.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

- Protection within SACs

Around 62% of the resource of H7110 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 H7110 also lies within the SSSI/ASSI series where similar management measures are in place.

In many of the larger sites specific major restoration programmes have been underway for several years to increase and restore the area of active raised bog.

- Specific conservation programmes for raised bogs resource

The English Nature (EN) Lowland Peatland Programme, launched in 1992, focused particular attention on the conservation of lowland raised bogs in England. Outcomes of this programme have included acquisition and after-use agreement on land worked by a major peat cutting company, declaration of three large raised bog National Nature Reserves (NNRs), resource assessment of English lowland raised bogs and prioritisation of sites for conservation and rehabilitation, production of rehabilitation management plans for priority sites, a review of monitoring and development of a computer database for data storage and interrogation.

The Scottish Wildlife Trust (SWT), with EU *Life* funding for a three-year project, accrued survey data for many of Scotland's lowland raised bogs. Under the same project the SWT also held an international Peatland Convention in 1995 the proceedings of which (*Conserving Peatlands*) were published in 1997. The project also published *Conserving Bogs: The Management Handbook*, a best-practice guide on management and rehabilitation of lowland raised bogs.

- Agri-environment measures

A suite of agri-environment measures are now in place in the lowlands which are addressing more appropriate management, particularly grazing levels, for an unknown proportion of the resource of H7110 outside the statutory site series.

- Water Framework Directive (WFD)

In addition to the drive for improvement generated by the SAC and SSSI network, the WFD is adding considerable impetus for widespread action on issues affecting the resource of H7110 such as abstraction licences and pollution.

Furthermore water level management plans are in place for much of the lowland raised bog resource to address water management in the immediate catchment of the bog.

- UK Biodiversity Action Plan (BAP)

The habitat is covered by the lowland raised bogs action plan under the UK Biodiversity Action plan (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. More specifically, the UK habitat action plan includes targets to rehabilitate 110km² (11,000 ha) of degraded bog habitat and restore 15km² (1,500 ha) to ensure a sustainable hydrological regime.

5.1.2 Main future threats^{2.4.11}

The most obvious major future threats to H7110 are listed below, several of which are referred to in Section 4.1. The measures identified in Section 5.1.1 are addressing many of these factors, with a greater proportion being addressed within the statutory site series, and their effects are likely to decrease:

- Peat extraction (**310 Peat extraction, 312 Mechanical removal of peat**)
- Burning (**180 Burning**)
- Built development (**402 Discontinuous urbanisation, 421 Disposal of household waste, 490 Other urbanisation, industrial and similar activities**)

- Fragmentation (**990 Other natural processes**)
- Absence of or inappropriate management (**141 Abandonment of pastoral systems, 920 Drying out, 950 Biocenotic evolution**)
- Forestry operations (**162 Artificial planting**)

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

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

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

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

5.2 Future condition (as regards range, area covered and specific structures 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 H7110 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.

SAC condition assessments

Table 5.2.1 and Map 5.2.1 summarise the predicted potential future condition of H7110 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:

- 79% of the area and 67% of the number of assessments fall within the future-favourable category; and
- at least 47% 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 H7110 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 Appendix I 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: 54% of strongly indicative assessments fall within the future-favourable category.

Table 5.2.1 Predicted future condition of UK SACs supporting H7110 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	476	7
	Unfavourable no change	102	3
	Unfavourable unclassified	1,044	7
	Total	1,622	17
	<i>% of assessments</i>	21%	33%
	<i>% of total UK extent</i>	13%	Unknown
Future-favourable	Favourable maintained	878	11
	Favourable recovered		
	Unfavourable recovering	5,009	22
	Favourable unclassified	153	2
	Total	6,040	35
	<i>% of assessments</i>	79%	67%
	<i>% of total UK extent</i>	47%	Unknown

Note that the scenario presented above is based on the same information as used to construct the Table 4.2.1. It is based on the following premises:

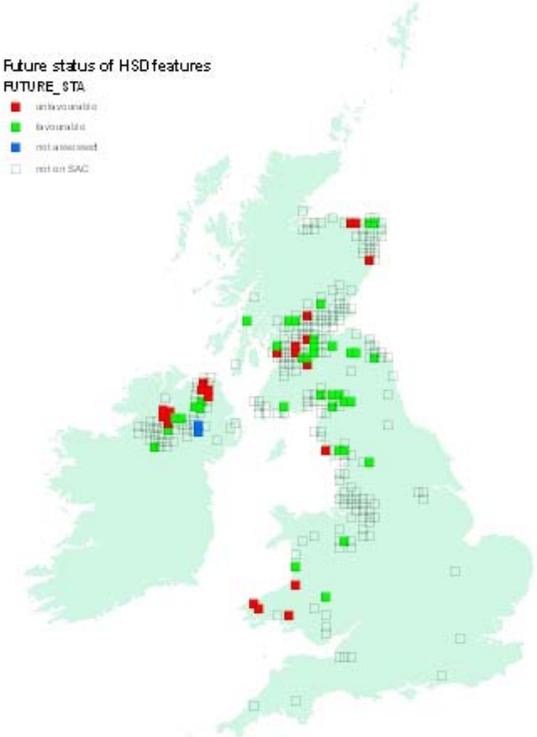
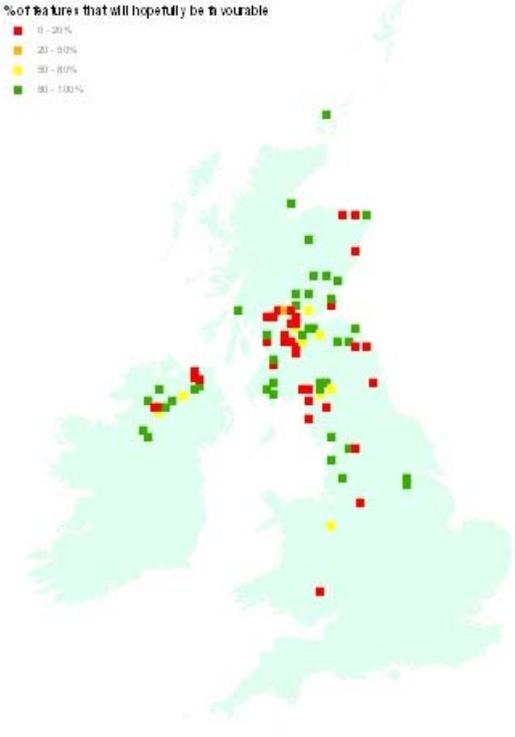
- (i) the unfavourable-recovering condition assessments will at some point in the future become favourable;
- (ii) all unfavourable-unclassified sites will remain unfavourable, which is probably overly pessimistic;
- (iii) sympathetic management will be sustained on sites already classified as favourable 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.

Table 5.2.2 Predicted future condition of H7110 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 Appendix I for further details

Future condition	Present condition	Number of assessments	
		Strongly indicative assessments (Category 1)	Weakly indicative assessments (Category 2)
Future-unfavourable	Unfavourable declining	25	
	Unfavourable no change	15	
	Unfavourable unclassified	4	
	Total	44	
	<i>% of assessments</i>	46%	%
Future-favourable	Favourable maintained	19	
	Favourable recovered		
	Unfavourable recovering	27	
	Favourable unclassified	5	
	Total	51	
	<i>% of assessments</i>	54%	%

Predicted Future Condition of H7110 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
		<p>Not applicable</p>

Key
Red = future-unfavourable, i.e. the square contains one or more SACs where this habitat feature is present and has been predicted to be future-unfavourable
Green = future-favourable, i.e. the square contains at least one SAC where this habitat feature is present and has been predicted to be future-favourable
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
Transparent = SAC feature not present, i.e. the square does not contain any SAC features of this habitat type

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

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

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

The EC Guidance states that where habitat prospects are intermediate between “good with no significant impacts from threats expected and long-term viability assured” and “bad with severe impacts from threats expected and long-term viability not assured”, the judgement should be Unfavourable – Inadequate. In the UK, this was generally taken to mean that range and/or area are stable or decreasing, and between 75-95% of the habitat area is likely to be in favourable condition in 12-15 years.

Many of the future threats and pressures (particularly grazing; lack of or inappropriate management; over-abstraction; and aquatic pollution) on H7110 are being addressed for the majority of the resource within the statutory site series; and (through WFD, agri-environment measures and similar positive management) for the smaller proportion of the resource of H7110 lying outside the statutory site series. Structure and function of the raised bogs will also improve due to improved hydraulic function and improved management. Some threats (particularly pollution and – to a lesser extent given the focus on the next 10-15 years – climate change) are less readily addressed.

The range for H7110 as shown in Map 2.1.1 is unlikely to change unless there are dramatic changes in rainfall patterns, which is unlikely in the next 10-15 years timescale under consideration. The surface area for H7110 should continue to increase due improved vegetation condition initiated by current and future restoration projects.

The evidence for future favourability for SACs from CSM suggest that 47% of the total UK extent is likely to achieve favourable condition. However, 13% of the UK extent on SACs will remain unfavourable as well as 46% of the strongly indicative features assessed on SSSIs. Even with all the measures taken so far and planned it is likely to be difficult to get more than 95% of the UK resource of H7110 in favourable condition in the foreseeable future; consequently an overall judgement of Unfavourable – Inadequate but improving is appropriate.

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

Conclusion^{2.6}: Unfavourable – Bad but improving

On the basis of the Area and Structure and Function 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.	3
Area covered by habitat type within range	Unfavourable – Bad but improving	Current extent is more than 10% below the Favourable Reference Area but is increasing.	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.	3

Future prospects (as regards range, area covered and specific structures and functions)	Unfavourable – Inadequate but improving	Habitat prospects considered to be intermediate between “good with no significant impacts from threats expected and long-term viability assured” and “bad with severe impacts 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.	3
Overall assessment of conservation status	Unfavourable – Bad but improving	Two parameters judged as Unfavourable-Bad; three parameters 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

CRUICKSHANK, M.M. & TOMLINSON, R.W. 1988. *Northern Ireland Peatland Survey*. Department of the Environment for Northern Ireland (Countryside and Wildlife Branch). Belfast.

EUROPEAN COMMISSION DG ENVIRONMENT. 2003. *Interpretation Manual of European Habitats EUR25*.

LINDSAY, R. & IMMIRZI, C.P. 1996. An inventory of lowland raised bogs in Great Britain *Scottish Natural Heritage Research, Survey and Monitoring Report No 78*.

Map data sources

JNCC International Designations Database. Joint Nature Conservation Committee.

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)	54
Number of SACs with CSM assessments (b)	52
% of SACs assessed (b/a)	96
Extent of feature in the UK – hectares (c)	12,509
Extent of feature on SACs – hectares (d)	7,719
Extent of features assessed – hectares (e)	7,663
% of total UK hectareage on SACs (d/c)	62
% of SAC total hectareage that has been assessed (e/d)	99
% of total UK hectareage that has been assessed (e/c)	61

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)	46	15%
Current – Favourable (green)	13	4%
On SAC but not assessed (blue)	2	1%
Not on SAC (transparent)	237	80%
Total Number of 10km squares (any colour)	298	
Future – Unfavourable (red)	23	8%
Future – Favourable (green)	36	12%