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 :

S1393: *Hamatocaulis (Drepanocladus) vernicosus* - Slender green feather-moss

S1393 *Hamatocaulis (Drepanocladus) vernicosus* Slender green feather-moss

Audit trail compiled and edited by JNCC and the Plant Conservation Working Group

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

1. Range Information[2.3]

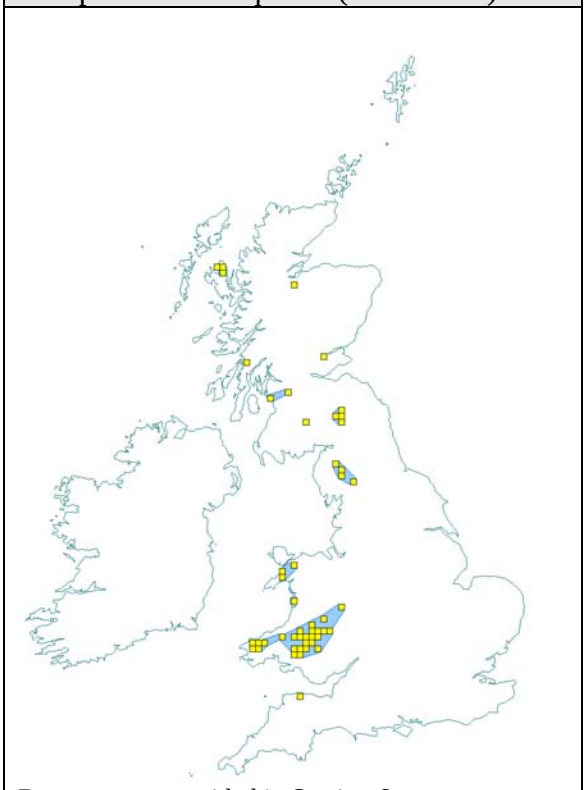
The core range for this species appears to be in Wales. There are also populations in the Lake District and Scotland.

1.1 Surface area of range[2.3.1]

8,729km^2

The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in the map below). Alpha was set at 20 km to reflect the dispersal capacity of this species. The alpha hull (range area) was clipped to include terrestrial habitats only.

Map 1.1 Current extent of occurrence and occupied 10-km squares (1990-2006)



Data sources provided in Section 6

1.2 Date of range determination[2.3.2]

1990 – 2006

Records held in the Threatened Bryophyte Database, dated from 1990 onwards, were used to calculate current range; these records provide the best available representation of current range as it is understood by species specialists.

1.3 Quality of range data[2.3.3]

Good

The Threatened Bryophyte Database aims to be a comprehensive inventory of all records available. There may be gaps due to delay in records being sent for input or lack of recent survey in particular areas, but generally coverage and quality of data held in the database are good.

1.4 Range trend[2.3.4] and range trend magnitude[2.3.5]

Stable

No significant contractions of range have been noted in recent years.

There is some evidence to suggest a contraction of range in North Wales and the Peak District, with an extension of range in South Wales. These apparent changes have to be interpreted cautiously, however. There has been a considerable increase in survey effort in South Wales since the late-1990s, whilst on the other hand many of the historic North Wales sites have apparently not been re-surveyed for this species since the late 1970s.

The situation is further complicated by the fact that the taxonomy of the species was not clarified until 1989 and a general ability of British bryologists to recognise the species was not established until much later than that.

1.5 Range trend period [2.3.6]

1989 – 2006

The reported trend is based on information gathered after the taxonomic status of *H. vernicosus* was formally clarified in 1989.

1.6 Reasons for reported trend in range[2.3.7]

Not applicable

1.7 Favourable reference range[2.7.1]

8,729km^2

The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

The current range is stable, this fact is not especially due to conservation care, and the range is not highly restricted. Therefore, it is reasonable to assume that the range in 1994 was viable, and hence the favourable reference range has been set as equal to the current range, which includes the range as in 1994.

This species was formerly found in East Anglia, but was last recorded there in 1973. Due to habitat loss and degradation it is now considered extinct in this part of the UK. This represents a significant decline in range prior to the period considered here (1989-2006). The loss from East Anglia occurred some time ago and restoration there is unlikely to be feasible

due to habitat degradation. Given that the taxonomy has only recently been clarified, and therefore that the historical dataset is not entirely reliable, and also that the species is currently relatively widespread and not threatened, it seems appropriate to use the current range as the favourable reference range.

1.8 Range conclusion[2.8]

Favourable

The current range has been identified as a suitable favourable reference range. Furthermore, it is stable. On these grounds (and hence in accordance with Annex C), the assessment is Favourable.

2. Population of the Species[2.4]

2.1 Population estimate[2.4.1]

49 occupied 10-km squares

Local populations of *H. vernicosus* can vary in size considerably from a few tens of shoots to tens of thousands (estimated). Precise population sizes are usually difficult to make because of the small size and tangled growth form making it difficult to count individual plants. Population size estimates have only been given for a fraction of the UK populations reported and there is no current estimate of the total population size for the UK. For this reason, the number of occupied 10-km squares has been used as a surrogate measure.

2.2 Date of population estimate[2.4.2]

1990 – 2006

In the absence of more complete data, the number of occupied 10-km squares represented in the current range date class has been used as a proxy.

2.3 Method of population estimate[2.4.3]

3 = from comprehensive inventory

At the coarse scale reported, the Threatened Bryophyte Database aims to be a comprehensive inventory of all records available.

2.4 Quality of population data[2.4.4]

Moderate

Although the Threatened Bryophyte Database is fairly comprehensive, reporting populations at this coarse scale is not ideal. Quality of data is therefore reported as moderate.

2.5 Population trend[2.4.5] and population trend magnitude[2.4.6]

Unknown

Taxonomic difficulties and biases in survey effort make calculation of population trends difficult, and although there is some evidence to suggest increases in recent years in some areas (based on 1-km square data in the Threatened Bryophyte Database), this is attributed to improved knowledge and more accurate data rather than population increases.

2.6 Population trend period[2.4.7]

1994 – 2006

2.7 Reasons for reported trend in population[2.4.8]
Not applicable

2.8 Justification of % thresholds for trends[2.4.9]
Not applicable

2.9 Main pressures[2.4.10]
120 Fertilisation
141 Abandonment of pastoral systems i.e. insufficient grazing
162 Artificial planting - conifer plantation in the uplands
701 Water pollution
810 Drainage
952 Eutrophication
953 Acidification
730 Military manoeuvres

2.10 Threats[2.4.11]
120 Fertilisation
141 Abandonment of pastoral systems i.e. insufficient grazing
162 Artificial planting
701 Water pollution
810 Drainage
952 Eutrophication
953 Acidification
730 Military manoeuvres

2.11 Favourable reference population[2.7.2]
49 occupied 10-km squares (Equal to current)
The decision tree in Note 1 has been used as a guide in determining the favourable reference population estimate (see 'Assessing Conservation Status: UK Approach').

Given the difficulties of estimating population sizes for this species and the fact that there has never been any reliable overall population size assessment, favourable reference population has been set in terms of number of 10 km squares occupied. Due to taxonomic difficulties in the past there is no reliable historic baseline even for this measure. This value as determined in the period 1990-2006 is considered reasonably high and this is the best candidate for a favourable reference population value that we have.

2.12 Population conclusion[2.8]
Favourable
Since the current population is equal to the favourable reference population, and there is no evidence for problems in population structure, the population has been judged to be Favourable.

3. Habitat for the Species in the Biogeographic Region or Sea[2.5]
A plant of neutral flushes and fens, often with *Calliergonella cuspidata*, *Sphagnum contortum* and *Warnstorfia exannulata*. It particularly likes domed springheads, where alkaline water breaks through an acid peatland, or areas where alkaline flushes

spread on to acid flushed ground. Although more frequent in the uplands, it does not reach very high altitudes, generally below 450 m.

3.1 Surface area of habitat[2.5.2]
Unknown

3.2 Date of estimation[2.5.3]
Not applicable

3.3 Quality of data on habitat area[2.5.4]
Poor
Although the habitat requirements have been relatively well documented, habitat area at this fine scale is unknown.

3.4 Habitat trend[2.5.5]
Stable
Since current habitat area is unknown, it is difficult to quantify trends in habitat, but neutral flushes and fens will almost certainly have suffered a net loss since the turn of the 20th Century. Over the past decade this decline is thought to have been curbed and possibly even reversed slightly, due to active management and protection of sites that support this species.

3.5 Habitat trend period[2.5.6]
1994 – 2006
The reported trend is based on expert opinion of habitat changes over the past decade.

3.6 Reasons for reported trend in habitat[2.5.7]
3 = Direct human influence (restoration, deterioration, destruction)
4 = Indirect anthropo(zoo)genic influence
Degradation of lowland habitat due to lowering of the water table, water pollution and lack of active management leading to scrub and coarse vegetation encroachment. Upland flushes are often over-run by coarse vegetation if grazing pressure is reduced.

3.7 Suitable habitat for the species (in km^2)[2.7.3]
Unknown

3.8 Habitat conclusion[2.8]
Favourable
Despite historic declines in neutral flushes and fens more generally, *H. vernicosus* habitat is currently managed effectively within protected areas, and much of this can be reported as being in Favourable condition.

4. Future Prospects[2.6]
Good prospects
Species expected to survive and prosper.

In the UK, *H.vernicosus* is protected under Schedule 8 of the Wildlife and Countryside Act 1981, as amended. There appear to be no major threats to this species at present, and immediate prospects are good since the upland flush habitat is not generally threatened at

present. However, there are some indications at some upland sites that sheep grazing might be reduced in the future which might lead to succession and loss of habitat for *H. vernicosus*. How significant a threat this might be is difficult to assess at present.

4.1 Future prospects conclusion[2.8]

Favourable

The overall conclusion is given as Favourable, despite the uncertainty over the grazing pressure. This conclusion is given with low confidence.

5. Overall Conclusion [2.8]

Range, habitat and future prospects are Favourable; population is Unknown. Therefore, in accordance with Annex C the overall judgment is Favourable.

Table 5.1 Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Favourable	Current range is stable and not smaller than the favourable reference range	2
Population	Favourable	Population is not lower than favourable reference population	3
Habitat	Favourable	Area of habitat is sufficiently large, and habitat quality is suitable, for the long term survival of the species	3
Future Prospects	Favourable	Main pressures and threats to the species not significant; species will remain viable on the long-term	3
Overall Assessment	Favourable	Three Favourable and one Unknown	3

*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as good; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is unknown, on the basis of insufficient reliable information

6. References

BOSANQUET, S.D.S., HALE, A.D., MOTLEY, G.S. AND WOODS, R.G. 2006. Recent work on *Hamatocaulis vernicosus* in mid and south Wales. *Field Bryology*, 90:228.

CHURCH, J.M., HODGETTS, N.G., PRESTON, C.D. & STEWART, N.F. 2001. *British Red Data Books mosses and liverworts*. Joint Nature Conservation Committee.

Map Data Source

Threatened Bryophyte Database, British Bryological Society (via the NBN Gateway)