

Report under The Conservation of Habitats and
Species Regulations 2017 (as amended),
Regulation 9A

2019-2024

Conservation status assessment for the species:

S6216 - Slender green feather- moss

(Hamatocaulis vernicosus)

England



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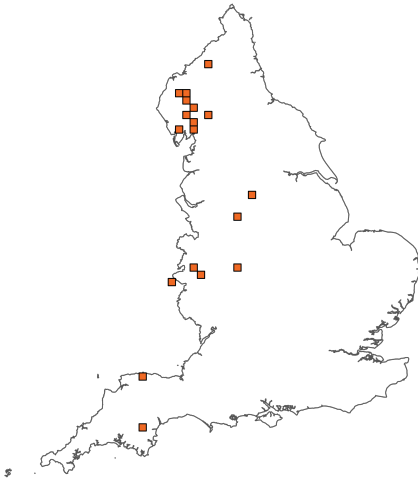
Important note - Please read

- The information in this document represents the England Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A, for the period 2019-2024.
- It is based on supporting information provided by Natural England, which is documented separately.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the species are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country reports.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was not relevant to this species (section 12 National Site Network coverage for Annex II species).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the [JNCC website](#).

Assessment Summary: Slender green feather- moss

Distribution Map



Range Map

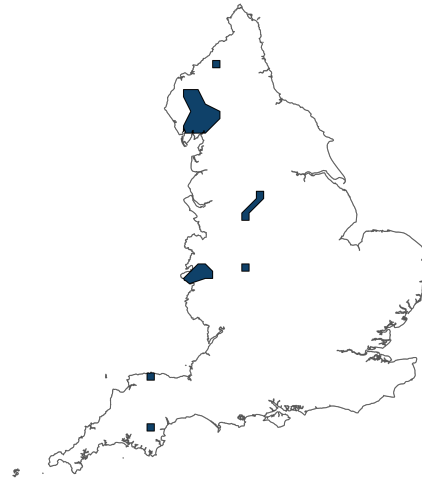


Figure 1: England distribution and range map for S6216 - Slender green feather- moss (*Hamatocaulis vernicosus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available species records within the current reporting period.

Table 1: Table summarising the conservation status for S6216 - Slender green feather- moss (*Hamatocaulis vernicosus*). Overall conservation status for species is based on assessments of range, population, habitat for the species, and future prospects.

Overall Conservation Status (see section 11)

Unfavourable-bad (U2)

Breakdown of Overall Conservation Status

Range (see section 5)	Unfavourable-bad (U2)
Population (see section 6)	Unfavourable-bad (U2)
Habitat for the species (see section 7)	Unfavourable-bad (U2)
Future prospects (see section 10)	Unfavourable-bad (U2)

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National Level

1. General information

1.1 Country	England
1.2 Species code	S6216
1.3 Species scientific name	<i>Hamatocaulis vernicosus</i>
1.4 Alternative species scientific name	Drepanocladus vernicosus
1.5 Common name	Slender green feather- moss
Annex(es)	II

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2010-2024
2.3 Distribution map	Yes
2.4 Distribution map; Method used	Complete survey or a statistically robust estimate

2.5 Additional information

The time period utilised here 2010-2024 is intended to provide a more complete distribution map for the species and consequently provide a reasonable level of confidence in the accuracy of the current distribution and range. Note, this time frame overlaps with the time periods for maps in the previous reporting round: UK (JNCC, 2018) time period 1989-2018; and the England level report (JNCC, 2018) where the distribution map was for records in the time period 2013-2018.

3. Information related to Annex V Species

3.1 Is the species taken in the wild / exploited?

3.2 What measures have been taken?

a) Regulations regarding access to property

b) Temporary or local prohibition on the taking of specimens in the wild and exploitation

c) Regulation of the periods and/or methods of taking specimens

d) Application of hunting and fishing rules which take account of the conservation of such populations

e) Establishment of a system of licences for taking specimens or of quotas

f) Regulation of the purchase, sale, offering for sale, keeping for sale, or transport for sale of specimens

g) Breeding in captivity of animal species as well as artificial propagation of plant species

Other measures

Other measures description

3.3: Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

Table 2: Quantity taken from the wild during the reporting period (see 3.3a for units). For species with defined hunting seasons, Season 1 refers to 2018/2019 (autumn 2018 to spring 2019), and Season 6 to 2023/2024. For species without hunting seasons, data are reported by calendar year: Year 1 is 2019, and Year 6 is 2024.

	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
b) Minimum	-	-	-	-	-	-
c) Maximum	-	-	-	-	-	-
d) Unknown	-	-	-	-	-	-

3.4: Hunting bag or quantity taken in the wild; Method used

3.5: Additional information

No additional information

Biogeographical Level

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs ATL

4.2 Sources of information

See section 14 References

5. Range

5.1 Surface area (km²) 3,445.26

5.2 Short-term trend; Period 2013-2024

5.3 Short-term trend; Direction Stable

5.4 Short-term trend;
Magnitude

a) Estimated minimum

b) Estimated maximum

c) Pre-defined range

d) Unknown

e) Type of estimate

f) Rate of decrease

5.5 Short-term trend; Method used Based mainly on extrapolation from a limited amount of data

5.6 Long-term trend; Period 2000-2024

5.7 Long-term trend; Direction Stable

5.8 Long-term trend;
Magnitude

a) Minimum

b) Maximum

c) Rate of decrease

5.9 Long-term trend; Method used Based mainly on extrapolation from a limited amount of data

5.10 Favourable Reference Range (FRR)

a) Area (km²) 3,377.26

b) Pre-defined increment

c) Unknown No

d) Method used Expert opinion

e) Quality of information moderate

5.11 Change and reason for change in surface area of range

a) Change Yes

b) Genuine change No

c) Improved knowledge or more accurate data Yes

d) Different method No

e) No information No

f) Other reason No

g) Main reason Improved knowledge/more accurate data

5.12 Additional information

Records for the time frame (2010-2024) provide a range value of 3445.26km² (Alpha Hull value 20) based on seventeen (max 18, including one offshore which is either genuinely on an island, or a error) occupied 10km² squares since 2010. The range for the UK was modelled in 2018 as 18765.48km² but no disaggregated range figure was given for England in 2018. Despite this it can clearly be seen simply by visually comparing the range maps in 2018 and in 2024 that the range is now larger in England. This is corroborated by the greater number of currently occupied 10km squares (17) than in the 2018 reports when there were just ten occupied 10km² squares in England even though this included records for a much longer time period (1989-2018) (JNCC UK, 2018). Despite the latter time frame being far longer than is used here, the number of

occupied 10km square and consequently range was smaller in 2018. The increase from 2018 to 2024 is reasoned as being non-genuine due to improved understanding of the species, including how to distinguish from other species and also its habitat preferences (Campbell, 2013 and Callaghan, 2015) in turn enabling more targeted recording to have taken place and more recorders being able to make reliable records. Looking at a longer period (2000-2024): there was a decrease in hectads between the 2013 report (13 hectads over the time period 2000-2012) to the 2019 report (ten hectads) which at the time was interpreted as non genuine due to a dip in recording effort post publication of the Bryophyte Atlas (2014), plus a genuine decrease due to losses especially in the lowlands (JNCC, 2018) eg East Anglia; followed by the increase to seventeen hectads in 2024 reasoned as a non genuine increase due to improved recording. This slightly confusing data was considered in the Red List review (Callaghan, 2023) which concludes the species is neither experiencing ongoing decline nor increase and being relatively widespread was assessed as Least Concern. In 2018 the Favourable Reference Range was estimated to be no less than 2% of the range value at the time (18765.48km²) for the UK, as the favourable reference range was considered to be approximately equivalent to the current range and no lower than when the Habitats Directive came into force. Utilising the same assumptions, and approach and given that there is now a calculation for the current range for England, the Favourable Reference Range value for England, should be no less than 2% lower than the current value of 3445.26km², ie no less than 3377.26km².

6. Population

6.1 Year or period 2010-2024

6.2 Population size (in reporting unit)

a) Unit number of map 10x10 km grid cells

b) Minimum

c) Maximum

d) Best single value 17

6.3 Type of estimate Best estimate

6.4 Quality of extrapolation to reporting unit moderate

6.5 Additional population size (using population unit other than reporting unit)

a) Unit

b) Minimum

c) Maximum

d) Best single value

e) Type of estimate

6.6 Population size; Method used Complete survey or a statistically robust estimate

6.7 Short-term trend; Period 2013-2024

6.8 Short-term trend; Direction Stable

6.9 Short-term trend; Magnitude

a) Estimated minimum

b) Estimated maximum

c) Pre-defined range

d) Unknown

e) Type of estimate

f) Rate of decrease

6.10 Short-term trend; Method used Based mainly on extrapolation from a limited amount of data

6.11 Long-term trend; Period 2000-2024

6.12 Long-term trend; Direction Stable

6.13 Long-term trend; Magnitude

a) Minimum

b) Maximum

c) Confidence interval

d) Rate of decrease

6.14 Long-term trend; Method used

6.15 Favourable Reference Population (FRP)

ai) Population size	19
a ii) Unit	number of map 10x10 km grid cells
b) Pre-defined increment	
c) Unknown	No
d) Method used	Expert opinion
e) Quality of information	moderate

6.16 Change and reason for change in population size

a) Change	Yes
b) Genuine change	No
c) Improved knowledge or more accurate data	Yes
d) Different method	No
e) No information	No
f) Other reason	No
g) Main reason	Improved knowledge/more accurate data

6.17 Additional information

The FRP for the UK was set in 2013 at 75 10x10km squares which was considered to be large enough to support a viable population and no less than when the Habitats Directive came into force in the UK, and this value was retained in the 2018 reporting round (JNCC UK, 2018). No FRP was given for England alone in 2018, but at which time there were ten occupied 10x10km grid cells, actually a decrease from 2013 when there were 13 occupied 10x10km grid cells, although this difference was concluded to be a non genuine decrease due to reduced recording effort (JNCC, 2018 England report). Records show that losses have been observed in the English lowlands (two hectads prior to 1990), a genuine decline but prior to the short term trend period (2007-2015) reported in 2018 and prior to when the Habitats Directive came into force, and since then the increase in hectads is likely to be non genuine due to improved recording. This is validated by expert elicitation in the Red List review for Bryophytes (Callaghan, 2023) which concluded that there is no ongoing increasing trend, and less than 30% decline, and overall the species was assessed as Least Concern. It is plausible to use the

currently occupied 17 hectads as the FRP for England. The recommendation by JNCC was to use the operator not 'less than 5% smaller' (JNCC Audit spreadsheet) which would equate to one hectad less (16) than the current number of occupied hectads (17).

6.18 Age structure, mortality and reproduction deviation No deviation from normal

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat (for long-term survival)

a) Is area of occupied habitat sufficient? Yes

b) Is quality of occupied habitat sufficient? Unknown

c) If No or Unknown, is there a sufficiently large area of unoccupied habitat of suitable quality? Yes

7.2 Sufficiency of area and quality of occupied habitat; Method used

a) Sufficiency of area of occupied habitat; Method used Based mainly on extrapolation from a limited amount of data

b) Sufficiency of quality of occupied habitat; Method used Based mainly on expert opinion with very limited data

7.3 Short-term trend; Period 2013-2024

7.4 Short-term trend; Direction Stable

7.5 Short-term trend; Method used Based mainly on extrapolation from a limited amount of data

7.6 Long-term trend; Period

7.7 Long-term trend; Direction

7.8 Long-term trend; Method used

7.9 Additional information

The species is more or less obligate to vegetation referable to H7230 alkaline fen and H7140 transition mire and quaking bog in England. The EUNIS type ‘intermediate fen and soft water springs’ probably describes its main remaining habitat more accurately but UK does not recognise/map this vegetation. It is also found in topogenous/rheo-topogenous wetlands, where it would have been present in East Anglian sites, and its recent Northumberland site. Both Annex 1 types in England have geographically distinct fortunes, driven by the same factors. Of the few that remain in the lowlands they are universally threatened and many have been lost, with the apparent total loss of this species from the south and east of England. Major locus now is spring-fen vegetation in the upland fringe (e.g. Staffs, Shropshire, Somerset Devon) and unenclosed uplands. The species was recently found in Northumberland in a base-rich fen in a wetland complex that forms part of the Border Mires SAC. Non-protected sites in the upland fringe remain vulnerable to agricultural intensification with losses of likely habitat still occurring.

8. Main pressures

8.1 Characterisation of pressures

Table 3: Pressures affecting the species, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Pressure	Timing	Ranking
PA01: Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	High (H)
PA22: Drainage for use as agricultural land	Ongoing and likely to be in the future	High (H)
PA18: Agricultural activities generating air pollution	Ongoing and likely to be in the future	High (H)
PB01: Conversion to forest from other land uses, or afforestation (excluding drainage)	In the past but now suspended due to measures	Medium (M)
PA17: Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	High (H)
PL05: Modification of hydrological flow (mixed or unknown drivers)	Ongoing and likely to be in the future	High (H)

PK04: Atmospheric N-deposition	Ongoing and likely to be in the future	High (H)
PK01: Mixed source pollution to surface and ground waters (limnic and terrestrial)	Ongoing and likely to be in the future	High (H)
PJ14: Other climate related changes in abiotic conditions	Ongoing and likely to be in the future	High (H)

8.2 Sources of information

See section 14 References

8.3 Additional information

No additional information

9. Conservation measures

9.1: Status of measures

a) Are measures needed?

Yes

b) Indicate the status of measures

Measures identified, but none yet taken

9.2 Main purpose of the measures taken

9.3 Location of the measures taken

9.4 Response to measures

9.5 List of main conservation measures

Table 4: Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Conservation measure	Ranking
MA01: Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land	High (H)
MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities	High (H)

MB01: Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation	High (H)
MA11: Reduce/eliminate air pollution from agricultural activities	High (H)
MB04: Adapt/manage reforestation and forest regeneration	High (H)
MB10: Reduce diffuse or point source pollution to surface or ground waters (incl. marine) from forestry activities	High (H)
MB14: Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats)	High (H)
MK03: Restoration of habitats impacted by multi-purpose hydrological changes	High (H)

9.6 Additional information

No additional information

10. Future prospects

10.1a Future trends of parameters

ai) Range	Negative - decreasing $\leq 1\%$ (one percent or less) per year on average
bi) Population	Overall stable
ci) Habitat for the species	Negative - slight/moderate deterioration

10.1b Future prospects of parameters

aii) Range	Bad
bii) Population	Poor
cii) Habitat for the species	Bad

10.2 Additional information

Future prospects for range probable slow decline as non-protected sites in upland fringe possibly lost to agricultural intensification. Populations on most sites stable, but high N deposition across majority of habitat occurrence is a major pressure on characteristic bryophyte assemblage, inc Hv.

11. Conclusions

11.1 Range Unfavourable-bad (U2)

11.2 Population Unfavourable-bad (U2)

11.3 Habitat for the species Unfavourable-bad (U2)

11.4 Future prospects Unfavourable-bad (U2)

11.5 Overall assessment of Conservation Status Unfavourable-bad (U2)

11.6 Overall trend in Conservation Status Deteriorating

11.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.8 Additional information

Unfavourable bad due to loss of species from major part of its range, condition of habitats it's part/typical of, and ongoing and future atmospheric deposition.

12. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network

a) Unit number of map 1x1 km grid cells

b) Minimum

c) Maximum

d) Best single value 8

12.2 Type of estimate	Best estimate
12.3 Population size inside the network; Method used	Complete survey or a statistically robust estimate
12.4 Short-term trend of population size within the network; Direction	Increasing
12.5 Short-term trend of population size within the network; Method used	Complete survey or a statistically robust estimate
12.6 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Direction	Stable
12.7 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Method used	Complete survey or a statistically robust estimate

12.8 Additional information

Increase due to new records (so increase in number of 1kmx1km) for species in SAC sites rather than genuine increase. New records in SACs for which S6216 is not listed as feature.

13. Complementary information

13.1 Justification of percentage thresholds for trends

No justification information

13.2 Trans-boundary assessment

No trans-boundary assessment information

13.2 Other relevant information

No other relevant information

14. References

Biogeographical and marine regions

4.2 Sources of information

Atherton, I., Bosanquet, S. & Lawley, M. (eds). 2012. Mosses and Liverworts of Britain and Ireland: A Field Guide. British Bryological Society.

British Bryological Society website species account (Accessed May 2025) <https://www.britisshyologicalsociety.org.uk/learning/species-finder/hamatocaulis-vernicosus/>

Blockeel, T.L., Bosanquet, S.D.S., Hill, M.O. & Preston, C.D. 2014. Atlas of British & Irish Bryophytes. Pisces Publications, Newbury.

Callaghan, D. 2015. Notes on Bryophytes of the Long Mynd, Shropshire, Field Bryology No. 114, Nov. 15 pp17-31.

Callaghan DA. 2023. A new IUCN Red List of the bryophytes of Britain, 2023. Journal of Bryology. 44(4):271-389.

Campbell, C., Hodgetts N. & Lockhart, N., 2013 Hamatocaulis vernicosus (Mitt.) Hedenäs (Slender Green feather-moss) in the Republic of Ireland Article 17 Report Backing Document 2013

JNCC Article 17 Habitats Directive Report 2013. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the UK under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S6216 - Slender green feather- moss (Hamatocaulis vernicosus) for ENGLAND. https://webarchive.nationalarchives.gov.uk/ukgwa/20180804115353mp_/http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1393_ENGLAND.pdf

JNCC Article 17 Habitats Directive Report 2019. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the UK under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S6216 - Slender green feather- moss (Hamatocaulis vernicosus) for UNITED KINGDOM. <https://jncc.gov.uk/jncc-assets/Art17/S6216-UK-Habitats-Directive-Art17-2019.pdf>

JNCC Article 17 Habitats Directive Report 2019. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) Fourth Report by the UK under Article 17 on the implementation of the Directive from January 2013 to December 2018 Conservation status assessment for the species: S6216 -

Slender green feather- moss (*Hamatocaulis vernicosus*) for ENGLAND. <https://jncc.gov.uk/jncc-assets/Art17/S6216-EN-Habitats-Directive-Art17-2019.pdf>

NBN Atlas, accessed 2025, <https://species.nbnatlas.org/species/NHMSYS0000310012>
overview

O'Reilly, J. (2020) Survey of wetland habitats at Lampert, Northumberland. A report for Natural England.

Branson, A. (2023) Some unexpected mires and flushes in Exmoor. Field Bryology No 130 November 2023.

Main pressures

8.2 Sources of information

No sources of information

15. Explanatory Notes

Field label	Note
1.4: Alternative species scientific name	Drepanocladus vernicosus
1.5: Common name	The species has the alternative common name of Varnished Hook-moss.
2.1: Sensitive species	A small and inconspicuous species that is not considered to be at risk from collecting, hence not sensitive.
2.2: Year or Period	Time period 2010-2024 (rather than restricted to the reporting period 2019-2024) was used to provide a more complete distribution map.
2.3: Distribution map	The distribution map is derived from records maintained by the British Bryological Society and accessed via the NBN Atlas portal (NBN Atlas, 2025). The most recent date of these records at the time of download was 2021 so there may be other more recent records for the species that have not yet reached the NBN Atlas and therefore could not be included in this report. Despite this, and although bryophytes are generally not as frequently recorded as other taxa due to the level of expertise and diligence required in searching, the map is considered to be representative of the current known distribution, as a result of the recording activity of the current UK bryological experts.
5.1: Surface area	Current range in England is 3445.26km ² (modelled with Alpha Hull value 20) for the time frame (2010-2024) based on records from seventeen (or possibly 18 including one offshore which is either genuinely on an island, or a error) occupied 10km ² grid cells since 2010.
5.2: Short-term trend; Period	2013-2024
5.3: Short-term trend; Direction	Concluded to be stable but in the absence of an absolute value for range for England only, in 2013 and 2018, the trend in range over the short term period was deduced by comparing range maps and hectad occupation. Despite the decrease in number of 10km ² grid cells from 13

	<p>hectads in 2013 (JNCC, 2013 England report), to 10 in 2018 (JNCC, 2018 England report) and then a subsequent increase to 17 hectads currently, expert opinion considers the short term trend to be stable as the majority of the changes are thought to be non genuine due to vagaries in recording effort.</p>
5.6: Long-term trend; Period	2000-2024
5.7: Long-term trend; Direction	<p>Concluded to be stable but in the absence of an absolute value for range for England only, in 2013 and 2018, the trend in range over the longer term period was deduced by comparing range maps and hectad occupation. Despite the decrease in number of 10km² grid cells from 13 hectads in 2013 (JNCC, 2013 England report), to 10 in 2018 (JNCC, 2018 England report) and then a subsequent increase to 17 hectads currently, expert opinion considers the long term trend to be stable as the majority of the changes are thought to be non genuine due to vagaries in recording effort.</p>
5.10: Favourable Reference Range (FRR)	<p>In 2018 the Favourable Reference Range was estimated to be no less than 2% of the range value at the time (18765.48km²) for the UK, as the favourable reference range was considered to be approximately equivalent to the current range and no lower than when the Habitats Directive came into force. Utilising the same assumptions, and approach and given that there is now a calculation available for the current range for England, the Favourable Reference Range value for England, should be no less than 2% lower than the current value of 3445.26km², ie no less than 3377.26km².</p>
6.6: Population size; Method used	<p>Unit of measure for population is now aligned with the UK units deployed in 2018 (number of mapped 10x 10km grid cells). This is a more workable approach than the 1km x 1km grid cells used as the additional unit of measure of population in the England only report (JNCC, 2018).</p>
6.15: Favourable Reference Population (FRP)	<p>The FRP for the UK was set in 2013 at 75 10x10km squares which was considered to be large enough to support a viable population and no less than when the</p>

Habitats Directive came into force in the UK, and this value was retained in the 2018 reporting round (JNCC UK, 2018). No FRP was given for England alone in 2018, but at which time there were ten occupied 10x10km grid cells, actually a decrease from 2013 when there were 13 occupied 10x10km grid cells, although this difference was concluded to be a non genuine decrease due to reduced recording effort (JNCC, 2018 England report). Records show that losses have been observed in the English lowlands (two hectads prior to 1990), a genuine decline but prior to the short term trend period (2007-2015) reported in 2018 and prior to when the Habitats Directive came into force, and since then the increase in hectads is likely to be non genuine due to improved recording. This is validated by expert elicitation in the Red List review for Bryophytes (Callaghan, 2023) which concluded that there is no ongoing increasing trend, and less than 30% decline, and overall the species was assessed as Least Concern. It is plausible to use the currently occupied 17 hectads as the FRP for England. The recommendation by JNCC was to use the operator not 'less than 5% smaller' (JNCC Audit spreadsheet) which would equate to one hectad less (16) than the current number of occupied hectads (17).

6.18: Age structure, mortality and reproduction

Capsules (Sporophytes) are very rare throughout its range (Atherton, 2012), or even unknown in Britain (Campbell, 2013). Specialised vegetative propagules are also unknown, thus asexual reproduction must be the means of propagation and dispersal through gametophytic fragmentation with fragment dispersal usually effective only over short distances, unless the fragments are spread by birds or large mammals (Campbell, 2013). Once established the species forms patches or clumps from a few cm² to several m² in the base rich flushes where it occurs, comprising many shoots. Since these characteristics are similar throughout its range these characteristics are considered to be 'not deviating from normal' population structure.