European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the habitat:

H7120 - Degraded raised bogs still capable of natural regeneration

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this habitat, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this habitat is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- 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 only relevant at UK-level (sections 10 Future prospects and 11 Conclusions).
- For technical reasons, the country-level future trends for Range, Area covered by habitat and Structure and functions are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Habitat code	**7120 - Degraded raised bogs still capable of natural regeneration**

2. Maps

2.1 Year or period	1979-2018
2.3 Distribution map	Yes
2.3 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.4 Additional maps	No

BIOGEOGRAPHICAL LEVEL

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	**Atlantic (ATL)**
3.2 Sources of information	Blackstock, T.H., Howe, E.A., Stevens, J.P., Burrows, C.R. & Jones, P.S. (2010). Habitats of Wales: a comprehensive field survey, 1979-1997. University of Wales Press, Cardiff. 229 pp. European Commission DG Environment (2013). Interpretation Manual of European Union Habitats. EUR28. Guest, D. (2012). Assessing N deposition as a pressure for Article 17 reporting on habitats. CCW HQ internal document. JNCC (2018). Nitrogen exceedance of Annex I habitats in SACs. Excel spreadsheet provided 29 May 2018. Jones, P.S., Birch, K.S. & Kay, L. (2018a). Art17_2018_H7120_Degraded_raised_bogs_ArcGIS database, Natural Resources Wales. Jones, P.S. (2018a). H7120_S6 Structure and functions, Excel s/s. Natural Resources Wales. Jones, P.S. (201b). Towards a National Action Plan for Welsh Peatlands. Written advice to Welsh Government, May 2018. Natural Resources Wales, Bangor. Jones, P.S., Bosanquet, S.D.S., Reed, D.K., Birch, K.S., Stevens, J. & Turner, A.J. (2011). The habitat composition and conservation of Welsh lowland mires: preliminary results from the Lowland Peatland Survey of Wales. In: Proceedings of a Memorial Conference for Dr David Paul Stevens 1958-2007: Grassland Ecologist and Conservationist. Eds: Blackstock, T.H., Howe, E.A., Rothwell, J.P., Duigan, C.A & Jones, P.S. pp. 103-115. CCW Staff Science Report 10/03/05, Countryside Council for Wales, Bangor. Jones, P.S., Stevens, J., Bosanquet, S.D.S., Turner, A.J., Birch, K.S. & Reed, D.K. (2012). Distribution, extent and status of Annex I wetland habitats in Wales: supporting material for the 2013 Article 17 assessment. Countryside Council for Wales, Bangor. Jones, P.S. & Birch, K.S. (in prep.). A New Inventory of Raised Bogs in Wales. Draft. Jones, P.S., Stevens, D.P., Blackstock, T.H., Burrows, C.R. & Howe, E.A. (2003). Priority Habitats of Wales - a Technical Guide. Countryside Council for Wales, Bangor. Kay, L. (2018). N deposition extent of exceedance of CL for article 17 all habitats 2018, Excel s/s/. Natural Resources Wales, Bangor. Limpens, J., Berendse, F. & Klees, H. 2003. N deposition affects N availability in

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NRW (2018a). SAC and SPA Monitoring Programme Results 2013-2018. Internal NRW Dataset (Excel spreadsheet).
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Stevens, J. (2012a). GIS layer - data processing notes - A17 reporting 2012 H7120. Internal file note, Countryside Council for Wales.
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4. Range

4.1 Surface area (in km²)		
4.2 Short-term trend Period		
4.3 Short-term trend Direction	Stable (0)	
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum

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4.5 Short-term trend Method used			
4.6 Long-term trend Period			
4.7 Long-term trend Direction			
4.8 Long-term trend Magnitude	a) Minimum	b) Maximum	
4.9 Long-term trend Method used			
4.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown No d) Method		
4.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data		
4.12 Additional information			

5. Area covered by habitat

5.1 Year or period	1979-2018		
5.2 Surface area (in km²)	a) Minimum	b) Maximum	c) Best single value 8.97
5.3 Type of estimate	Best estimate		
5.4 Surface area Method used	Based mainly on extrapolation from a limited amount of data		
5.5 Short-term trend Period	2007-2018		
5.6 Short-term trend Direction	Unknown (x)		
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used	Insufficient or no data available		
5.9 Long-term trend Period	1994-2018		
5.10 Long-term trend Direction	Decreasing (-)		
5.11 Long-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.12 Long-term trend Method used	Based mainly on expert opinion with very limited data		
5.13 Favourable reference area	a) Area (km²) b) Operator c) Unknown No d) Method		
5.14 Change and reason for change in surface area of range	Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data		
5.15 Additional information			

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum 0	Maximum 0
	b) Area in not-good condition (km²)	Minimum 5.03	Maximum 5.03
	c) Area where condition is not known (km²)	Minimum 3.94	Maximum 3.94
6.2 Condition of habitat Method used	Based mainly on extrapolation from a limited amount of data		

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6.3 Short-term trend of habitat area in good condition Period	2007-2018
6.4 Short-term trend of habitat area in good condition Direction	Increasing (+)
6.5 Short-term trend of habitat area in good condition Method used	Based mainly on expert opinion with very limited data
6.6 Typical species	Has the list of typical species changed in comparison to the previous reporting period? No
6.7 Typical species Method used	
6.8 Additional information	

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Drainage (K02)	H
Extensive grazing or undergrazing by livestock (A10)	H
Problematic native species (I04)	H
Mixed source air pollution, air-borne pollutants (J03)	H
Intensive grazing or overgrazing by livestock (A09)	H
Other invasive alien species (other then species of Union concern) (I02)	M
Conversion to forest from other land uses, or afforestation (excluding drainage) (B01)	M
Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams) (B27)	M
Conversion into agricultural land (excluding drainage and burning) (A01)	M
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M

Threat	Ranking
Drainage (K02)	H
Extensive grazing or undergrazing by livestock (A10)	H
Problematic native species (I04)	H
Mixed source air pollution, air-borne pollutants (J03)	H
Other invasive alien species (other then species of Union concern) (I02)	M
Conversion to forest from other land uses, or afforestation (excluding drainage) (B01)	M
Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams) (B27)	M
Conversion into agricultural land (excluding drainage and burning) (A01)	M

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Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M
Droughts and decreases in precipitation due to climate change (N02)	H

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures

a) Are measures needed? Yes

b) Indicate the status of measures Measures identified, but none yet taken

8.2 Main purpose of the measures taken

8.3 Location of the measures taken

8.4 Response to the measures

8.5 List of main conservation measures

- Restore habitats impacted by multi-purpose hydrological changes (CJ03)
- Manage drainage and irrigation operations and infrastructures in agriculture (CA15)
- Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)
- Manage changes in hydrological and coastal systems and regimes for construction and development (CF10)
- Reduce/eliminate air pollution from agricultural activities (CA12)
- Reduce impact of mixed source pollution (CJ01)
- Adapt mowing, grazing and other equivalent agricultural activities (CA05)
- Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01)
- Manage drainage and irrigation operations and infrastructures (CB14)
- Implement climate change adaptation measures (CN02)

8.6 Additional information

9. Future prospects

9.1 Future prospects of parameters

a) Range

b) Area

c) Structure and functions

9.2 Additional information

10. Conclusions

10.1. Range

10.2. Area

10.3. Specific structure and functions (incl. typical species)

10.4. Future prospects

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10.5 Overall assessment of Conservation Status	
10.6 Overall trend in Conservation Status	
10.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
10.8 Additional information	

11. Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)	a) Minimum b) Maximum c) Best single value 5.602
11.2 Type of estimate	Best estimate
11.3 Surface area of the habitat type inside the network Method used	Based mainly on extrapolation from a limited amount of data
11.4 Short-term trend of habitat area in good condition within the network Direction	Increasing (+)
11.5 Short-term trend of habitat area in good condition within network Method used	Based mainly on expert opinion with very limited data
11.6 Additional information	

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

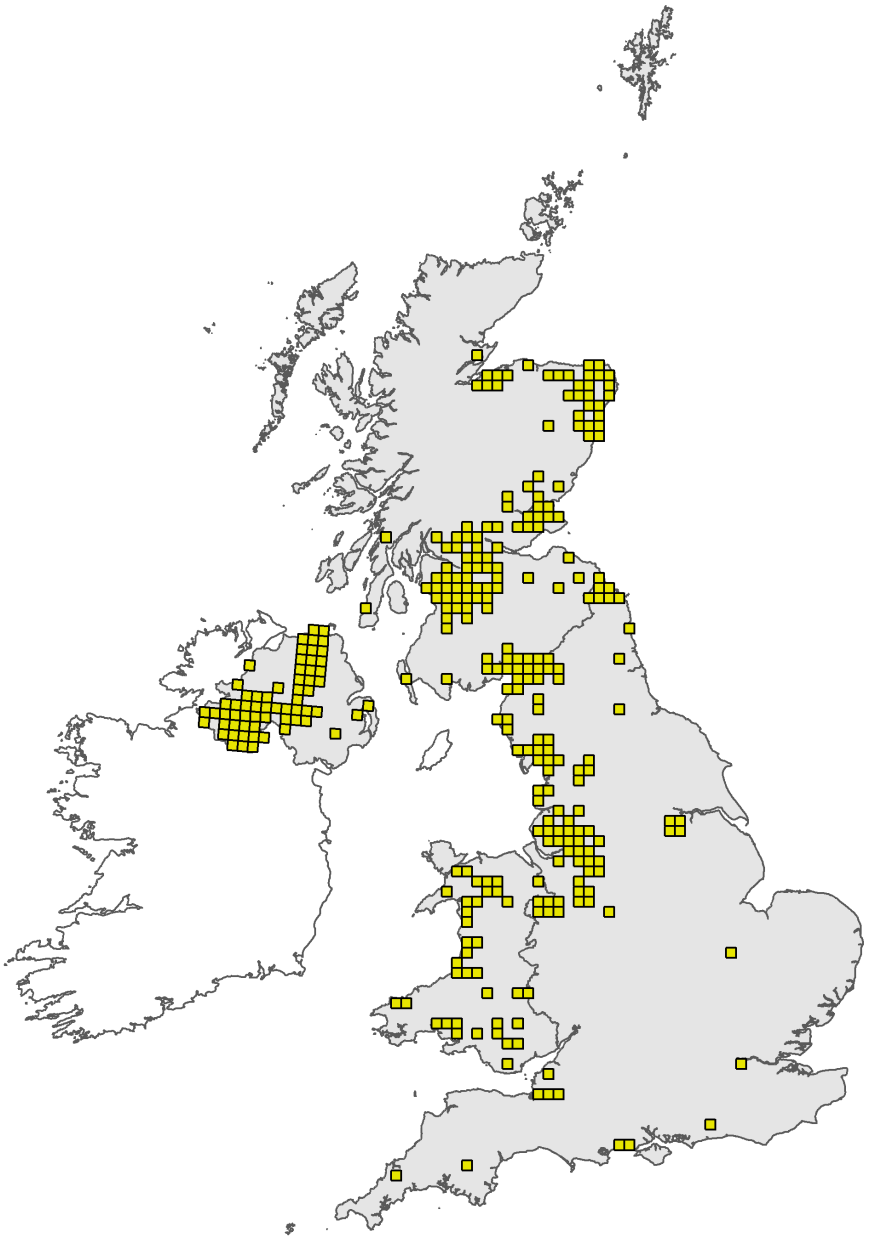

Figure 1: UK distribution map for H7120 - Degraded raised bogs still capable of natural regeneration. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period. For further details see the 2019 Article17 UK Approach document.

Range Map

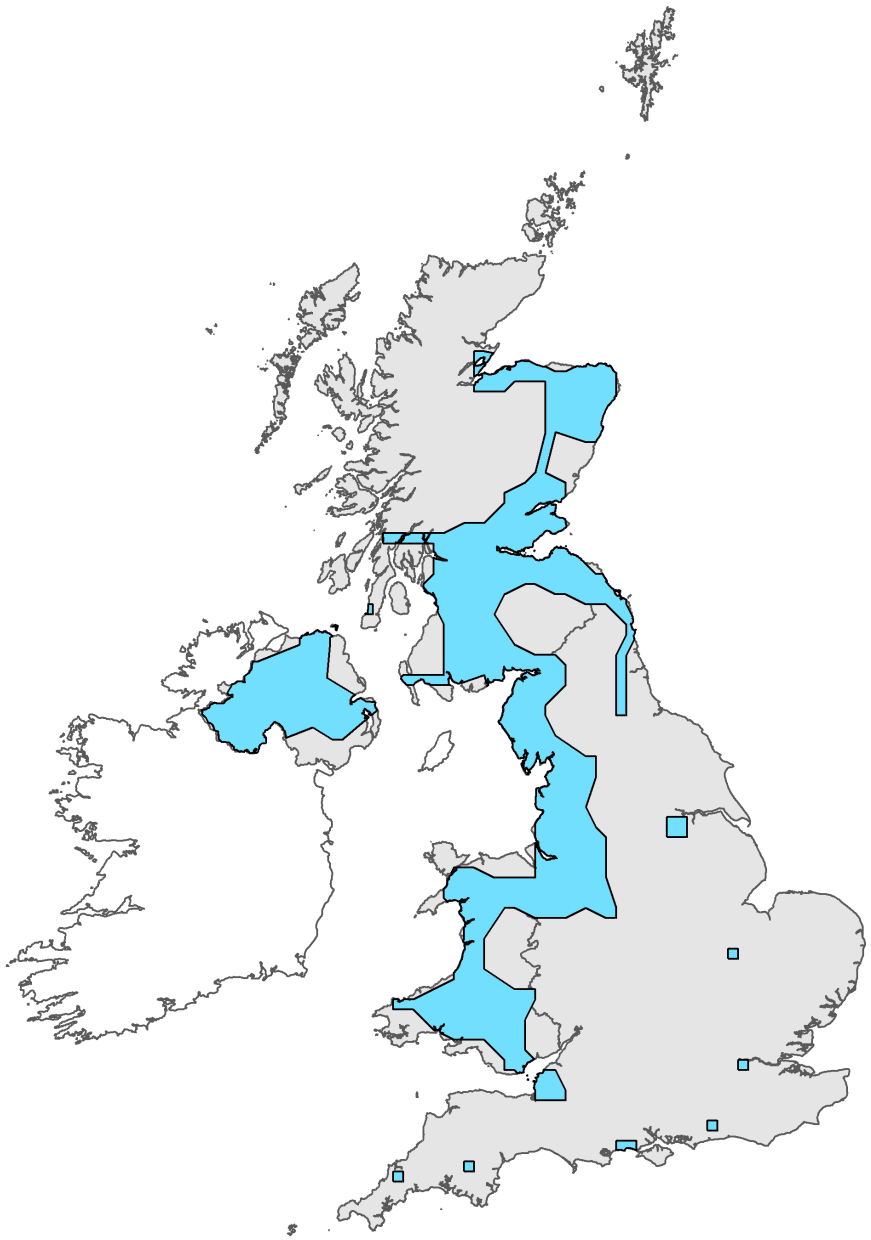

Figure 2: UK range map for H7120 - Degraded raised bogs still capable of natural regeneration. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this habitat was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Habitat code: 7120

Field label	Note
2.3 Distribution map; Method used	The distribution map is based primarily on GIS analysis of Phase 2 (plant community level) and Phase 1 data contained in an Arc GIS database (Jones et al., 2018a). Phase 2 mapping yields polygon records assigned to NVC communities/sub-communities and non-NVC units mapped to 1:2500 and transferred to a Mapinfo and then subsequently an ArcGIS platform. Polygons (whether relating to individual vegetation types or mosaics) for plant communities/sub-communities judged as conforming to this habitat have been selected and used to create a GIS inventory for this habitat. The definition of this habitat is considered in more detail in Stevens (2012) and Jones et al. (2012). The distribution map provided for this habitat is a revised version of that used for the 2013 Article 17 reporting round. The new map contains the following groups of records ('records' in this context refer to individual pure or mixed polygons containing this habitat and based on field mapping evidence). 1. Data resulting from NRWs Lowland Peatland Survey of Wales (Jones et al., 2011), amounting to 4465 records for 25 sites surveyed between 2004 and 2017. This includes data for 5 of the 7 LIFE project sites. 2. Data from the Habitat Survey of Wales (Blackstock et al., 2010) for 40 records. 3. Data for Cors Caron and Cors Fochno based on estimates derived from a range of surveys for the New LIFE for Welsh Raised Bogs LIFE Project. 4. Data provided by Natural England for Fenns', Whixall, Bettisfield, Wem & Cadney Mosses SAC. 5. Data for three further sites scheduled for inclusion in the Lowland Peatland Survey or else surveyed but survey reports not yet completed, namely Llyn Alwen, Covert Coch and Afon Lafar peatlands. Phase 1 data was only used where NVC survey information was lacking and the overwhelming majority of records are based on high quality Phase 2 (plant community [NVC] level) survey, mostly undertaken in-house as part of the LPSW programme. The LPSW is still ongoing and further significant lowland records for this habitat will arise leading up to completion of the Lowland Peatland Survey of Wales programme. Together these sources provide records for 39 hectads in Wales and a reasonable impression of the distribution of this habitat, but for the reasons identified here the overall dataset is not regarded as comprehensive.

Habitat code: 7120 Region code: ATL

Field label	Note
4.3 Short term trend; Direction	There is no quantitative evidence on which to assess changes in range or surface area over the short or long term. However, changes in the actual 10 km2 distribution over the last 12 years are considered unlikely requiring either the loss of all the examples within a given hectad or the gain of a new site within a previously unoccupied hectad. It is important to recognise that for this habitat gains in extent or distribution are likely to represent adverse change, resulting from degradation of H7110 active raised bog. Conversely losses may be the product of restoration (converting H7120 back to H7110), although in this case
4.11 Change and reason for change in surface area of range	The change is due to further records for this habitat resulting from the Lowland Peatland Survey of Wales coupled with re-evaluation and in some cases deletion or earlier records used in the 2012 reporting round.

5.2 Surface area	The extent estimate for H7120 is a new estimate prepared for the 2018 reporting round. This figure has a complex derivation based on the following sources. 1. Revised estimates for H7120 extent on SAC sites included within the New LIFE for Welsh Raised Bogs project (NRW, 2016b) based on Lowland Peatland Survey of Wales survey data. During preparation of the LIFE bid the opportunity was taken to re-examine the H7110 and H7120 extent figures for the project sites, resulting in a revised total area of 19.7 ha for H7120 for Cernydd Carmel, Cors Goch, Trawsfynydd, Esgyrn Bottom, Rhosgoch and Waun Ddu. Data for all of these sites are based on recent high quality NVC survey undertaken since 2004 by the Lowland Peatland Survey of Wales (LPSW, Jones et al., 2011). 2. Data for LIFE project sites not includes in the Lowland Peatland Survey of Wales. These data were assessed by D.K. Reed from a range of sources, including contracted NVC survey and the expert opinion of site managers: the resultant totals are 114.16 ha for Cors Caron and 217.7 ha for Cors Fochno. 3. Data from the Habitat Survey of Wales (Blackstock et al., 2010), totalling 256.5 ha. 4. Lowland Peatland Survey of Wales sites (103.1 ha). These data cover 20 sites surveyed since 2004. 5. Extent data for H7120 at Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses SAC (167.6 ha). These data were supplied by Natural England in 2018 and relate to the Welsh resource of the cross-border site only. 1. Extent data for three further sites (totalling 18.3 ha) scheduled for inclusion in the Lowland Peatland Survey or else surveyed but survey reports not yet completed, namely Llyn Alwen, Covert Coch and Afon Lafar peatlands. These data appear collectively in the revised inventory for H7120 (Jones et al., 2018a) and amount to a total area of 897 ha. Inevitable uncertainty surrounds this extent estimate. - The derivation of the Natural England figure for Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses SAC is unclear and may not have used the same criteria used for the SAC sites wholly in Wales: this figure needs critical re-examination. - Data for the two large wholly Welsh SAC sites (Cors Fochno and Cors Caron) require critical examination, being based currently on a mixture of expert judgement and out-sourced NVC survey. - Other sites known to or suspected to support H7120 occur in Wales (Jones & Birch, 2018a) but are not included in the inventory of Jones et al. (2018): Phase 2 data for some of these still await formal release whilst others of these sites remain un-surveyed.
5.6 Short term trend; Direction	There is no quantitative evidence on which to assess changes in range or surface area over the short or long term.
5.10 Long term trend; Direction	This assessment reflects the impact of long-standing restoration projects at the three largest SAC sites (Cors Caron, Cors Fochno, and Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses) which commenced prior to 1994. However, there are insufficient data to be able to assess the magnitude of this trend. This decrease represents the restoration of H7120 to H7110* and is likely to exceed any changes in the opposite direction.
5.14 Change and reason for change in surface area	The extent estimate used for the 2013 report was 7.51 km2; the current estimate is larger than this figure due to the use of revised data.
6.1 Condition of habitat	The derivation of these figures in based on Jones (2018a). The area judged as being in not good condition is based on SAC monitoring evidence for the four SACs supporting this habitat at C grade or higher, all of which indicate unfavourable condition. There is no evidence to indicate any of the Welsh resource is in good condition, though in practice some is likely to be recovering towards H7110*. The area recorded here as unknown is the difference between the total area of this habitat in Wales (see section 5, 897 ha) and the area in not good condition.

6.2 Condition of habitat; Method used	Assessment of structure and function within SACs is based on the results of common standards monitoring visits undertaken between 2007 and 2016 (NRW, 2018a). The spreadsheet cited as NRW (2018a) has been analysed to extract monitoring data for SAC sites for H7120. The related spreadsheet NRW (2018b) has then been checked to see if any monitoring results have been reported which do not figure in NRW (2018b). SAC monitoring data indicates this feature is in unfavourable condition on the 4 Welsh SACs where it occurs as a B-C graded feature: these sites are as follows (with the most recent condition assessment date given in brackets): Cors Caron (October 2003), Cors Fochno (December 2009), Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses (August 2007), and Usk Bat Sites (for Waun Ddu) (August 2016). Only one of these sites has been monitored since the 2012 reporting round, though this is planned for Fenn's & Whixall in the present year. In each case it is assumed that the SAC monitoring assessment relates to the whole H7120 resource. Area estimates are based on the information provided above in section 5.
6.4 Short term trend of habitat area in good condition; Direction	This is based on same rationale as 5.10 above and reflects the impact of long-standing restoration projects at the SAC sites (Cors Caron, Cors Fochno and Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses) which commenced prior to 1994. However, there are insufficient data to quantify this trend. Note that any increase of the area of this habitat in good condition actually equates to a gain in the area of H7110* and loss of H7120 area, so in the long-term the area of H7120 should decline!

7.1 Characterisation of pressures/ threats

Overview Analysis of Pressures and Threats has utilised a number of data sources, with NRWs Action Database (NRW, 2018c) serving as a critical resource. This provides information on 'issues' affecting habitats and species within the protected sites series in Wales and contains a total of 209 management issue entries against the Degraded Raised Bog feature description, of which 184 remain categorised as 'C' and requiring ongoing control, with 18 resolved, 4 withdrawn and 3 unclassified. The current issues apply across a total of 57 management units (many units have more than one management issue recorded) on 4 SSSI, including all of the SACs for which this habitat is a C feature or higher. Restricting the search term to 'Degraded Raised Bog' means that only data for SAC SSSI are reported here - these data are thus not wholly representative of the wider resource as it is to be expected that conservation measures would better mitigate pressures and threats inside the SAC series. Data for the more general SSSI feature of 'raised bog' has also been extracted from the Actions Database: this yields a total of 395 management issue entries against the Raised Bog feature description, of which 303 remain categorised as 'C' and requiring ongoing control. These apply across a total of 91 management units (many units have more than one management issue recorded) on 22 SSSI. However, 2 of these sites (Ffrondeg and Rhos Cilcennin) are unlikely to support raised bog, while other raised bogs on SSSI are not formally recognised as features (e.g. the Nant Ffrancon mires of Eryri [Gwynedd] and Cors Caranod [Ceredigion]). These data have been used to supplement the more meagre data for H7120 where necessary. NRWs Prioritised Implementation Plans for SAC sites (NRW, 2016a) have also been consulted. Pressures: K02 Drainage (including some A31. Drainage for use as agricultural land) Adverse hydrological regimes remain the key pressure and threat for H7120 in Wales. NRWs Actions Database has three categories relevant to this pressure/threat. For the H7120 feature specifically, 'Drainage' is noted as a current issue for 20 units on 3 SSSI, with 'Ditch management' affected 16 units on 3 SSSI and 'Water levels' 8 units on 2 SSSI. Taken together, these pressures currently affect 32 units on 3 SSSI. For the wider Raised Bog SSSI feature, the equivalent figures are 17 units and 3 SSSI for drainage, 20 units on 5 SSSI for ditch management, and 21 units on 6 SSSI for water levels. Water levels figure as a medium priority pressure in the Prioritised Improvement Plans (PIPs) for just 1 SAC, with ditch management and drainage cited as high or medium priority issues for 3 SACs. In dealing with figures on the number of units affected by hydrological pressures, it is sometimes difficult to disentangle the root cause of (i.e. the original requirement for) drainage, though the primary driver is likely to be drainage for agricultural purposes. Drainage impacts resulting from past or ongoing drainage for agriculture (i.e. A31) is estimated to affect a minimum of 22 (54%) of the 41 sites assessed to-date as supporting H7120 in Wales (Jones & Birch, in prep.), with drainage for other purposes also affecting 9 of these sites together with a further 7 sites with no or un-diagnosed agricultural drainage pressures. A10 Extensive grazing or undergrazing by livestock Grazing is a key means of controlling Molinia and scrub, though its requirement should decline as hydrological restoration progresses. Management neglect is a locally important issue for this habitat and relates chiefly to areas with a significant cover of Molinia caerulea; this is often a symptom of past or ongoing drainage and/or peat cutting, with atmospheric deposition as likely to be reinforcing its dominance (Limpens et al., 2003; Tomassen et al., 2003, 2004). The issue of insufficient grazing was recorded in NRWs Actions Database (NRW, 2018c) as a current issue for H7120 on only 1 unit; the equivalent figures for the wider raised bog feature is 14 units on 9 sites (note though that this includes 2 of the SSSI where raised bog is actually unlikely to occur). Insufficient grazing may have been under-recorded in the Prioritised Implementation Plans (NRW, 2016a), being un-recorded, the closely related issue of 'grazing type and/or timing' ranges from a low to high priority issue for all SACs, being cited as a current issue for 14 units on 2 sites. This is likely to be a more widespread and pressing problem for non-statutory sites supporting H7120. I04 Problematic native species Scrub invasion is cited as a current issue for 27 units on 3 sites for H7120, and on 37 units across 11 sites for the wider feature of raised bog. This

is a direct symptom of other pressures creating suitable conditions for scrub expansion, including drainage, past peat cutting and very probably atmospheric nutrient deposition (Tomassen et al., 2003). Scrub invasion is noted as a high or medium priority pressure in the PIPs for 3 SACs (NRM, 2016a). Molinia domination is the other main issue to list here. This pressure is closely linked to A10 and is often a case of drainage coupled with under-management and atmospheric nutrient deposition (Tomassen et al., 2003). This is likely to be a more widespread and pressing problem for non-statutory sites supporting H7120. The related NRW Actions Database pressure of 'Terrestrial [species] - native and archaeophyte' is also considered here as this appears to relate to scrub encroachment in some instances - chiefly due to under-grazing; this was cited as a current issue for H7120 for 8 units on 2 SSSI, and for raised bog 13 units on 5 SSSI. Insufficient cutting or mowing is highly relevant to this issue and is cited for 2 units each at Cors Caron and Cors Fochno. JO3 Mixed source air pollution, air-borne pollutants Air pollution is cited as a current issue for H7120 for only 4 units across 2 SACs in NRWs Actions Database (NRW, 2018c). Searching for this issue in NRW (2018c) for the more generic SSSI feature of raised bog reveals it has been recorded as a current issue on 12 units on four SSSI. Air pollution is cited as a high priority issue for H7120 in NRWs Prioritised Improvement Plans (NRW, 2016a) for the four SACs on which this habitat occurs as a feature at C grade or higher. The extent of the H7120 resource in Wales subject to N deposition in excess of the critical load for this habitat (5 kg N/ha/yr) has been assessed using the approach of Guest (2012) and using updated deposition data based on the updated extent estimate of 897 ha. Using a data overlay method in ARC GIS (Kay, 2018), 100% of the habitat by area (polygon data) was recorded at or above the relevant lower Critical Load limit. NRWs Actions Database needs to be updated to ensure this issue is correctly recorded as a current issue for all SAC and SSSI units. A09 Intensive grazing or overgrazing by livestock This is a current issue on 3 units on 2 SAC and reaches its most extreme levels at Waun Ddu, parts of Usk Bat Sites SAC (see cover photo). More generally for the wider raised bog feature, this is listed as a current issue on 6 units across 5 SAC. This issue is known to be a current and ongoing pressure for at least two other sites, the non-statutory Cors Blaenduad (Carmarthenshire), and the tiny raised bogs of the Afon Lafar (Carneddau). I02 Other invasive alien species (other than species of Union concern) Terrestrial non-native species are a current issue for H7120 on 3 units on 3 SAC: the species concerned include conifers, Rhododendron and Japanese knotweed. More widely, for the raised bog feature, this is reported as a current issue for 13 units on 7 SSSI. This issue is only recorded as a low priority pressure in the relevant PIPs. B01 Conversion to forest from other land uses, or afforestation (excluding drainage) & B27 Modification of hydrological conditions, or physical alternation of water bodies and drainage for forestry (including dams). These two pressures are closely linked and relate to ongoing impacts resulting from the past afforestation of a number of raised bogs, with at least three sites included (two sites at Llanbrynmair and Fenn's & Whixall Mosses). The need to remove trees from the peat body of raised mire sites, and the need to remove conifer seedlings from unafforested bog flanked by conifer plantations, is captured to some extent in the issue category 'insufficient tree management' which is noted as a current issue for 22 units on 2 SAC in NRW (2018c). The Actions Database category 'Habitat loss & fragmentation) relates to both this issue (as conifer plantations causing fragmentation of semi-natural peatland habitats within peat bodies) and also loss of semi-natural habitat to agricultural improvement; for H7120 this issue was noted as current for 11 units on 2 SAC, being recorded as a medium priority pressure on both sites (Cors Fochno and Fenn's and Whixall Mosses) in the relevant PIPs (NRW, 2016). A01. Conversion into agricultural land (excluding drainage and burning) The context of this pressure is the ongoing legacy of impacts relating to the past conversion of lowland raised bog to agricultural land, rather than the ongoing or future loss of this ecosystem to this pressure. The extent of this issue is demonstrated by comparing the sum total area of H7110* and H7120 (2485 ha) with the estimated original extent of raised bog ecosystems in Wales (4123 ha)

based on the analysis by Jones & Birch (in prep.). Much of the difference (1638 ha) consists of modified but sometimes semi-natural habitats on deep peat, as well as semi-improved and improved grassland. The significant modification of peat bodies which this figure represents constrains the long-term resilience of these ecosystems and represents an ongoing pressure. A26 Agricultural activities generating diffuse pollution to surface or ground waters. For H7120, this only affects 2 units on 1 SAC, but may be an under-reported pressure. F14 Other residential and recreational activities and structures generating point pollution to surface or ground waters This is listed as a current issue for 3 units at Cors Fochno. C05 Peat extraction Extant permission for peat extraction exists for a handful of sites and past extraction has significantly damaged many, with its after effects in terms of drainage impacts ongoing. Potential future or ongoing peat extraction affects 3 units at Fenn's & Whixall Mosses. N02 - Droughts and decreases in precipitation due to climate change N01 - Temperature changes (e.g. rise of temperature & extremes) due to climate change There is little specific evidence indicating impacts due to these pressures at the present time; any such impacts would, in any case, be difficult to disentangle from current drainage mediated impacts. Threats: These were assessed in a similar way to pressures. However, issues in the Actions Database which had been 'completed' or were 'underway' were not included in the assessment of threats. K02 Drainage (including some A31. Drainage for use as agricultural land) The New LIFE for Welsh Raised Bogs Project (NRW, 2016b) will deal with a significant range of drainage issues affecting the H7120 resource on the 7 project sites. The rather modest number of units for which drainage related issues have been resolved to-date (a single unit of a single SAC each for drainage and water levels and 3 units on 3 SAC for ditch management) underlines how difficult it is to effectively eliminate drainage pressures, particularly where these present at the edges or even beyond the boundary of protected sites. This argues for a new and more holistic ecosystems approach to defining and then managing hydrological protection zones around the margins of protected peatland sites. Non-statutory sites remain at significant risk from drainage, with a key existing mechanism (Glastir Advanced) showing no uptake of the rewetting option (403) at present (Milner, 2018). The Environmental Impact Assessment Regulations (Welsh Government, 2017), provide some protection against this pressure for all sites. Threats related to insufficient management or management neglect (A07 & I04) will continue for the foreseeable future due to the following principal factors: (i) lack of resources for promoting and funding management agreements on statutory sites under third party management, and (ii) the inadequacy of current mechanisms for promoting and where necessary enforcing the sustainable management of examples outside the protected sites series, particularly where these occur as small elements within otherwise intensively farmed contexts, and (iii) insufficient resources for bringing the whole NNR resource under restoration management. The New LIFE for Welsh Raised Bogs project should deliver sustainable grazing where needed on the project, though this will need to be maintained in the after-LIFE phase. I04 Problematic native species The issue of scrub invasion should reduce as implementation of NRWs New LIFE for Welsh Raised Bogs project progresses, though this will remain on threat across non-SAC SSSI and non-statutory sites. Mowing and grazing will also be used on the project sites, primarily to reduce the dominance of Molinia and to address young scrub. JO3 Mixed source air pollution, air-borne pollutants Despite modest projected reductions in the overall deposition rates for atmospheric nitrogen in the UK, air pollution is expected to remain a High pressure (threat) to the habitat in Wales. A provisional analysis using projected exceedance data for 2030 indicates that the area of SAC (on which H7120 is a feature) which falls in areas where deposition is above the relevant critical load will not fall at all from the 2013-2015 estimate by 2030 (JNCC, 2018). A09 Intensive grazing or overgrazing by livestock This isue should be resolved by the New LIFE for Welsh Raised Bogs Project (NRW, 2016b) at Waun Ddu (part of Usk Bat Sites SAC - see cover photo), though sustaining reductions in grazing level after the project ends in 2021 may be

quite challenging. This issue has not been resolved to-date on any of the SAC sites. B01 Conversion to forest from other land uses, or afforestation (excluding drainage) & B27 Modification of hydrological conditions, or physical alternation of water bodies and drainage for forestry (including dams). This pressure will continue as a future threat, particularly for the two non-statutory sites affected. This is because there is at present no financial mechanism for making peatland restoration after afforestation an attractive prospect relative to replanting. Whilst NRW has a programme of peatland restoration for afforested sites on land under its own management, limitations in funding restrict this restoration to a small number of priority sites (Vanguelova et al., 2012). I02 Other invasive alien species (other then species of Union concern) These will remain a threat whilst these species remain in the vicinity of raised bogs sites, though this can be mitigated by hydrological restoration to some degree. A26 Agricultural activities generating diffuse pollution to surface or ground waters Given the localised nature of this pressure its resolution should be feasible in the next two reporting rounds. C05 Peat extraction Extant permission for peat extraction exists for a handful of sites and may be exercised in the next two reporting rounds. The effects of past peat extraction will be ongoing and can only be partially mitigated by hydrological restoration because of the impact on surface profiles of sites. N02 - Droughts and decreases in precipitation due to climate change Modelling predicts that water table draw-down in peat bogs during summer will become more marked (Lindsay et al., 2014). Increased temperatures may lead to increased decomposition of peat-forming material in active, healthy bogs, although this is still an issue of debate. However, the resilience of ombrogenous bogs to climate change has been convincingly linked to the living surface (acrotelm) of 'active' bogs; thus restoration to sustain or restore this critical feature is the best approach for mitigating the effects of climate change.

8.5 List of main conservation measures	The majority of measures are not fully implemented. A total of 560.2 ha of this habitat (see section 11.1 below) is included within this SAC series. CJ03 and CA15, hydrological interventions. A significant number of hydrological pressures remain to be addressed, with many of those within the SACs being subject to planned actions as part of the two current LIFE projects. However, better mechanisms are needed to address drainage at the margins of or beyond the boundaries of protected sites. Hydrological restoration is a key element of the New LIFE for Welsh Raised Bogs project and the expertise developed needs to be applied to other Welsh H7120 sites to ensure hydrological restoration yields a more sustainably managed suite of raised bog ecosystems, thus minimising or even preventing the need for repeated future interventions aimed at tackling recurring problems such as scrub invasion. Additional resources will be required to maintain hydrological restoration infrastructure within NNRs in the after-LIFE phase of the two LIFE projects, and to enable this work on non-SAC NNRs, such as Cors Goch, Llanllwch. Land management actions relating to grazing (CA03, CA05, CL01). Only 20.3 ha of this habitat are included under NRW land management agreements (Milner, 2018), which is a key mechanism for promoting effective sustainable grazing, and this appears to represent a very minor decrease since 2012 when the area of H7120 in SSSI with 'raised bog' as a feature and under a Land Agency agreement was 21.5 ha. Section 9.1c. demonstrates the rather restricted areas of this habitat under agri-environment agreements. Further effort is clearly needed to expand sustainable grazing across the resource (where needed) and the New LIFE for Welsh Raised Bogs project will generate important experience and demonstration sites for this purpose. Actions under CA05 should include the restoration of peat-forming conditions on land currently under purely agricultural management: this relates to substantial areas of deep peat under semi-improved and improved grassland (and other land-cover types) peripheral to many of our lowland raised bog sites. This action is essential in order to secure long-term ecosystem resilience. CC10 Manage/reduce/eliminate air pollution from resource exploitation and energy production, & CA12 Reduce/eliminate air pollution from agricultural activities. National regulations are in place but have been insufficient to prevent continued high levels of N deposition nationally (CC10) and locally increasing ammonia pollution from expansion of poultry units (CA12). The area of this habitat subject to critical load exceedance is not expected to reduce between now and 2030. Addressing forestry impacts - CB05. Resolution of this threat demands a new approach for afforested peatlands, with a more explicit focus on the restoration of Annex 1 habitats. CF10 Manage changes in hydrological and coastal systems and regimes for construction and development This requires a significant ecosystem-based initiative making full use of NRWs new remit and the legislative powers in Wales support the sustainable management of natural resources, the aim being to create more sustainable natural solutions to managing flood-risk which also create more natural marginal hydrological regimes for raised bog sites, with a strong focus at Cors Fochno but also Arthog Bog. CA11 Reduce diffuse pollution to surface or ground waters from agricultural activities & CJ01 Reduce impact of mixed source pollution. Only localised action is required to address both diffuse and point-source nutrient impacts. CA01. Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land. This is not thought to be a major threat but ongoing vigilance by NRW and WG EIA staff is essential to prevent further losses of this already diminished resource. CN02 Implement climate change adaptation measures A national action plan for achieve the restoration of this habitat has been proposed (Jones, 2018c) as part of a proposed national action plan for Welsh peatlands, with action LRB.1 stating \'Implement a national conservation/restoration programme to ensure all 55 Welsh raised bogs are resilient to future change and support the characteristic ecosystems of active raised bog, thus maximising the security of carbon stocks and enhancing the provision of core ecosystem services such as greenhouse gas regulation and natural flood management.\'. This plan needs to be implemented across the suite of raised bog sites (H7110* and H7120) in Wales.

9.1 Future prospects of parameters	9.1a Future prospects of -range. No significant change in range is expected. 9.1b Future prospects of -area The overall expected trend of a decline in habitat area is actually a positive outcome as this equates to a gain in area of H7110*. This assessment is based largely on (i) the ongoing and long-running restoration programmes on the raised bog NNR SACs (notably Cors Fochno, Cors Caron and Fenns's and Whixall Mosses), and (ii) the predicted outcome of the New LIFE for Welsh raised bogs project (NRW, 2016b) and the Marches & Mosses LIFE project which covers the Fenns & Whixall site complex. Increases in the area of H7110* will chiefly be 'at the expense' of H7120. Some expansion in the area of H7120 as a result of H7110* degradation is expected to occur on non-SAC SSSI and non-statutory sites, though the amount is unknown and could be prevented by an expanded programme of restoration effort. This has been identified (Jones, 2018b) as part of a proposed national action plan for Welsh peatlands, with action LRB.1 stating \'Implement a national conservation/restoration programme to ensure all 55 Welsh raised bogs are resilient to future change and support the characteristic ecosystems of active raised bog, thus maximising the security of carbon stocks and enhancing the provision of core ecosystem services such as greenhouse gas regulation and natural flood management\'. At the present time there is no system in place for tracking what may be small-scale but nevertheless significant losses. 9.1c Future prospects of -structure and function This reflects the (i) the ongoing and long-running restoration programmes on the raised bog NNR SACs (notably Cors Fochno, Cors Caron and Fenns's and Whixall Mosses), and (ii) the predicted outcome of the New LIFE for Welsh raised bogs project (NRW, 2016b) and the Marches & Mosses LIFE project which covers the Fenns & Whixall site complex. However, the situation away from these sites is less positive. Glastir Advanced agreements only cover a maximum possible area of 90.9 ha (Milner, 2018 - this figure assumes no overlap in prescriptions and is the sum total of all prescriptions), with no land entered in Glastir Entry and the maximum possible inclusion in Glastir Commons 20.6 ha; NRW management agreements extend to just 20.3 ha. Thus, despite the relatively high proportion of this habitat included within the SAC series, some decline in quality is possible, particularly on non-SAC SSSI and non-statutory sites. In the short term this is likely to be outweighed by the gains achieved by the two LIFE project mentioned above. While positive site management and in particular the restoration of suitable hydrological conditions are likely to have the most significant influence over structure and function in examples of this (by definition degraded) habitat, ongoing exceedance of the Critical Load will limit the scope for full restoration.
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	This estimate is derived from the sum total area of H7120 recorded on SAC sites in Wales and includes SAC examples where the habitat is not a feature.
11.4 Short term trend of habitat area in good condition within the network; Direction	This assessment would actually lead to a decrease in the area of H7120 because of its recovery to H7110*. This reflects the impact of long-standing restoration projects at the SAC sites (Cors Caron, Cors Fochno, Rhosgoch and Fenn`s, Whixall, Bettisfield, Wem and Cadney Mosses) which commenced prior to 1994. However, there are insufficient data to quantify this trend. This assessment is somewhat challenging due to the lack of condition data for large parts of the habitat resource across the SAC series. Current SAC monitoring infers broader condition based on plot assessments at a limited number of stands and a more systematic assessment of all key stands of H7120 is required.