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

2019-2024

Conservation status assessment for the habitat:

H7110 - Active raised bogs

Wales

Cyfoeth Naturiol Cymru
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This report was produced by JNCC in collaboration with Natural Resources Wales.

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Important note - Please read

- The information in this document represents Wales 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 Resources Wales, 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 habitat 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 habitat (section 11 National Site Network coverage for Annex I habitats).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the JNCC website.

Assessment Summary: Active raised bogs

Distribution Map

Range Map

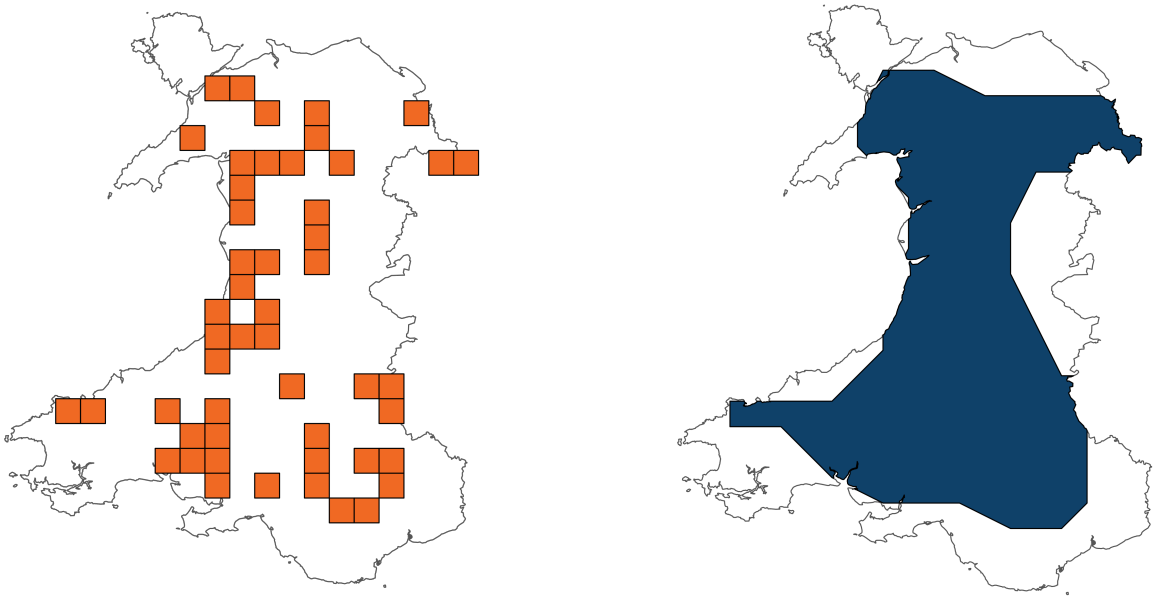

Figure 1: Wales distribution and range map for H7110 - Active raised bogs. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available habitat records within the current reporting period.

Table 1: Table summarising the conservation status for H7110 - Active raised bogs. Overall conservation status for habitat is based on assessments of range, area covered by habitat, structure and functions, and future prospects.

Overall Conservation Status (see section 10)

Unfavourable-bad (U2)

Breakdown of Overall Conservation Status

Range (see section 4)	**Favourable (FV)**
Area covered by habitat (see section 5)	**Unfavourable-bad (U2)**
Structure and functions (see section 6)	**Unfavourable-bad (U2)**
Future prospects (see section 9)	**Unfavourable-bad (U2)**

List of Sections

National Level

1. General information

1.1 Country	Wales
1.2 Habitat code	H7110 - Active raised bogs

2. Maps

2.1 Year or period	1979-2018
2.2 Distribution map	Yes
2.3 Distribution map; Method used	Based mainly on extrapolation from a limited amount of data

2.4 Additional information

No additional information

Biogeographical Level

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	ATL

3.2 Sources of information

See section 13 References

4. Range

4.1 Surface area (km²)	12,801.4
4.2 Short-term trend; Period	2013-2024
4.3 Short-term trend; Direction	Stable
4.4 Short-term trend; Magnitude	

a) Estimated minimum

b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
4.5 Short-term trend; Method used	Based mainly on expert opinion with very limited data
4.6 Long-term trend; Period	2000-2024
4.7 Long-term trend; Direction	Decreasing
4.8 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Rate of decrease	
4.9 Long-term trend; Method used	Based mainly on expert opinion with very limited data

4.10 Favourable Reference Range (FRR)

a) Area (km²)	
b) Pre-defined increment	Current range is less than 2% smaller than the FRR
c) Unknown	No
d) Method used	Reference-based approach
e) Quality of information	moderate

4.11 Change and reason for change in surface area of range

a) Change	No
b) Genuine change	
c) Improved knowledge or more accurate data	

d) Different method	
e) No information	
f) Other reason	
g) Main reason	

4.12 Additional information

No additional information

5. Area covered by habitat

5.1 Year or period	1979-2018
5.2 Surface area (km²)	
a) Minimum	
b) Maximum	
c) Best single value	15.89
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	
5.6 Short-term trend; Direction	Unknown
5.7 Short-term trend; Magnitude	
a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
5.8 Short-term trend; Method used	Based mainly on expert opinion with very limited data
5.9 Long-term trend; Period	2000-2024

5.10 Long-term trend; Direction	Decreasing
5.11 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Confidence interval	
d) Rate of decrease	
5.12 Long-term trend; Method used	Based mainly on expert opinion with very limited data
5.13 Favourable Reference Area (FRA)	
a) Area (km²)	
b) Pre-defined increment	Current area is between 26% and 50% smaller than the FRA
c) Unknown	No
d) Method used	Expert opinion
e) Quality of information	

5.14 Change and reason for change in surface area of range

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

5.15 Additional information

No additional information

6. Structure and functions

6.1 Condition of habitat (km²)	
Area in good condition	
ai) Minimum	2.86
aii) Maximum	2.86
Area not in good condition	
bi) Minimum	10.49
bii) Maximum	10.49
Area where condition is unknown	
ci) Minimum	2.59
cii) Maximum	2.59
6.2 Condition of habitat; Method used	Based mainly on extrapolation from a limited amount of data
6.3 Short-term trend of habitat area in good condition; Period	2013-2024
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

Typical species were not used directly in the assessment of conservation status for habitat structure and function as a comprehensive list of typical species for each habitat was not available. However, the status of typical species was considered when the

condition of individual sites was assessed using Common Standards Monitoring Guidance. Common Standards Monitoring (CSM) data was used to assess the area of habitat in ‘good’ and ‘not good’ condition (field 6.1). Species were a component of the attributes assessed under CSM. Therefore, an assessment of species is considered to have formed part of the reporting under field 6.1 which supported the Habitats Structure and Function assessment (field 10.3).

7. Main pressures

7.1 Characterisation of pressures

Table 2: Pressures affecting the habitat, 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
PL02: Drainage (mixed or unknown drivers)	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)
PI03: Problematic native species	Ongoing and likely to be in the future	High (H)
PA08: Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	High (H)
PK03: Mixed source air pollution, air-borne pollutants	Ongoing and likely to be in the future	High (H)
PF14: Modification of flooding regimes, flood protection for built-up areas	Ongoing and likely to be in the future	High (H)
PA01: Conversion into agricultural land (excluding drainage and burning)	Ongoing and likely to be in the future	Medium (M)
PJ04: Sea-level rise due to climate change	Ongoing and likely to be in the future	Medium (M)
PB01: Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Medium (M)
PB23: Physical alteration of water bodies for forestry (including dams)	Ongoing and likely to be in the future	Medium (M)

PI02: Other invasive alien species (other than species of Union concern)	Ongoing and likely to be in the future	Medium (M)
PA17: Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Medium (M)
PF07: Residential and commercial activities and structures generating pollution to surface or ground waters	Ongoing and likely to be in the future	Medium (M)
PC05: Peat extraction	Ongoing and likely to be in the future	Medium (M)
PJ03: Changes in precipitation regimes due to climate change	Ongoing and likely to be in the future	High (H)
PK04: Atmospheric N-deposition	Ongoing and likely to be in the future	High (H)
PA05: Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	Medium (M)

7.2 Sources of information

See section 13 References

7.3 Additional information

No additional information

8. Conservation measures

8.1: Status of measures

a) Are measures needed?	Yes
b) Indicate the status of measures	Measures identified and taken
8.2 Main purpose of the measures taken	Restore the structure and functions, including the status of typical species (related to ‘Specific structure and functions’)
8.3 Location of the measures taken	Both inside and outside National Site Network

8.4 Response to measures	Medium-term results (within the next two reporting periods, 2025–2036)

8.5 List of main conservation measures

Table 3: 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
MK03: Restoration of habitats impacted by multi-purpose hydrological changes	High (H)
MA13: Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	High (H)
MA04: Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures	High (H)
MF08: Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats).	High (H)
MA11: Reduce/eliminate air pollution from agricultural activities	High (H)
MK01: Reduce impact of mixed source pollution	High (H)
MA06: Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)	High (H)
MA05: Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning)	High (H)
MM01: Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change	Medium (M)
MB14: Manage drainage and water abstraction for forestry (inc. restoration of drained or hydrologically altered habitats)	Medium (M)
MJ02: Implement climate change adaptation measures	Medium (M)
MB05: Adapt/change forest management and exploitation practices	Medium (M)
MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities	Medium (M)

MA01: Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land	Medium (M)
MC09: Manage/reduce/eliminate air pollution from resource exploitation and energy production	Medium (M)

8.6 Additional information

No additional information

9. Future prospects

9.1a Future trends of parameters

ai) Range	Negative - decreasing <=1% (one percent or less) per year on average
bi) Area	Negative - decreasing <=1% (one percent or less) per year on average
ci) Structure and functions	Negative - slight/moderate deterioration

9.1b Future prospects of parameters

aii) Range	Poor
bii) Area	Bad
cii) Structure and functions	Bad

9.2 Additional information

No additional information

10. Conclusions

10.1 Range	Favourable (FV)
10.2 Area	Unfavourable-bad (U2)
10.3 Specific structure and functions (incl. typical species)	Unfavourable-bad (U2)
10.4 Future prospects	Unfavourable-bad (U2)

10.5 Overall assessment of Conservation Status	Unfavourable-bad (U2)
10.6 Overall trend in Conservation Status	Stable

10.7 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.

10.7 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.

10.8 Additional information

No additional information

11. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (km²)

a) Minimum	
b) Maximum	
c) Best single value	13.92
11.2 Type of estimate	Best estimate
11.3 Habitat area inside the network; Method used	Based mainly on extrapolation from a limited amount of data
11.4 Short-term trend of habitat area within the network; Direction	Increasing

11.5 Short-term trend of habitat area within the network; Method used	Based mainly on expert opinion with very limited data
11.6 Short-term trend of habitat area in good condition within the network; Direction	Increasing
11.7 Short-term trend of habitat area in good condition within the network; Method used	Based mainly on extrapolation from a limited amount of data

11.8 Additional information

No additional information

12. Complementary information

12.1 Justification of percentage thresholds for trends

No justification information

12.2 Other relevant information

No other relevant information

13. References

Biogeographical and marine regions

3.2 Sources of information

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Lindsay, R.A & Immirzi, P. (1996). An inventory of lowland raised bogs in Great Britain. SNH Research, Survey and Monitoring Report No. 78, Scottish Natural Heritage, Edinburgh.

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Main pressures

7.2 Sources of information

No sources of information

14. Explanatory Notes

Field label	Note
2.1: Year or period	New survey evidence since 2018 not incorporated.
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 7746 records for 41 sites surveyed between 2004 and 2017. 2. Data from the Habitat Survey of Wales (Blackstock et al., 2010) for 12 records. 3. Data from NVC survey of Migneint-Arenig-Dduallt SAC (Averis, 2002); 10 records. 4. Data for the Welsh SAC sites included in the New LIFE for Welsh Raised Bogs LIFE Project (namely Cors Caron, Cors Fochno, Cors Goch Trawsfynydd, Cernydd Carmel,

	Waun Ddu and Esgyrn Bottom). 5. Data provided by Natural England for Fenns', Whixall, Bettisfield, Wem & Cadney Mosses SAC. 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 50 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. No new survey evidence since 2018 has been incorporated.
3.2: Sources of information	This section has not been updated and is based on the 2012 and 2018 information.
4.3: Short-term trend; Direction	No evidence of any contraction in range over time period.
5.1: Year or period	Date range covers the period between the start of the Habitat Survey of Wales (actually the Upland Vegetation Survey in 1979) and the end date of the previous reporting round.
5.2: Surface area	The extent estimate for H7110 was a new estimate prepared for the 2018 (3rd) reporting round but does not incorporate evidence collected since that time. This figure has a complex derivation based on the following sources. 1. Revised estimates for H7110 extent on SAC sites included within the New LIFE for Welsh Raised Bogs project (NRW, 2016b). During preparation of the bid the opportunity was taken to re-examine the H7110 and H7120 extent figures for the project sites, resulting in revised H7110 figures of 445.03 ha for Cernydd Carmel, Cors

Fochno, Cors Goch, Trawsfynydd, Esgyrn Bottom, Rhosgoch and Waun Ddu. Data for all of these sites with the exception of Cors Fochno are based on recent high quality NVC survey undertaken since 2004 by the Lowland Peatland Survey of Wales (LPSW, Jones et al., 2011).

2. Phase 2 upland survey. Data for Rhyd y Fen (47.2 ha) are based on the NVC survey of Migneint-Arenig-Dduallt SAC undertaken in 2001 (Averis, 2002). This site has now been surveyed by the Lowland Peatland Survey of Wales but these data were not finalised in time for the current reporting round.

3. Data from the Habitat Survey of Wales (Blackstock et al., 2010), totalling 61.2 ha.

4. Lowland Peatland Survey of Wales sites (167.8 ha) additional to those include in the LIFE project. These data cover 41 sites surveyed since 2004.

5. Extent data for H7110 at Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses SAC (507 ha). These data were supplied by Natural England in 2018 and relate to the Welsh resource of the cross-border site only.

These data appear collectively in the revised inventory for H7110 (Jones et al., 2018a) and amount to a total area of 1228.2 ha. This figure excludes the estimate of 360.4 ha of H7110 at Cors Caron (category 2 above) which was not initially added to the main inventory because of data formatting issues. Adding this figure to the 1228 ha yields a grand total of 1588.6 ha, this representing the current best estimate for the extent of H7110 in Wales.

Inevitable uncertainty surrounds the extent estimate of 15.89 km2.- this is summarised below.

• 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. It may include areas which would have been regarded elsewhere in Wales as conforming to H7120. • 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. At least 9 further sites known to or suspected to support H7110 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 term. Some expansion is likely to have occurred as a result of the two EU-LIFE funded initiatives which occurred in Wales over this timeframe (namely the Marches Mosses BogLIFE Project LIFE15/NAT/UK/000786 and the LIFE for Welsh Raised Bogs Project LIFE16/NAT/UK/000646), but there will also have been a counter trend of loss of H7110 to H7120 and other degraded peatland ecosystems. However much of the expansion referred to here will actually have been improvements in the condition of habitat already referred to H7110.
5.10: Long-term trend; Direction	This assessment reflects the impact of loss of this habitat due to scrub encroachment and agricultural reclamation set against the 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, and also the impact of the LIFE Welsh Raised Bogs Project between 2017 and 2024. However, there are insufficient data to be able to assess the magnitude of this trend.

5.14: Change and reason for change in surface area	The area data have not been updated for this reporting round so we are unable to detect whether there are any changes to the surface area.
6.1: Condition of habitat	This assessment has not been updated since the 2018 reporting round. The derivation of these figures in based on Jones (2018a). The area judged as being in good condition is based on expert judgement, with 280 ha estimated to be in good condition at Cors Fochno (Mike Bailey, pers.comm) and 6.5 ha at Cors Caron (P.S. Jones, based on a conservative estimate of the area of H7110 in good condition on the North-east bog component of Cors Caron. SAC monitoring undertaken by NRW prior to the 2018 reporting round had actually recorded overall assessments of unfavourable for the active raised bog feature at both these sites, so the area in favourable condition has been subtracted from these figures. Judgements of condition have been made for a further 6 SSSI sites supporting this feature, with a total area of unfavourable habitat of 26.97 ha noted across these sites (and no habitat in good condition). The difference between the area of habitat in good and unfavourable condition and the total resource has to be regarded as being in unknown condition due to lack of data. The LIFE Welsh Raised Bogs project has undertaken restoration work benefitting an estimated 730.54 ha of H7110 : this will have included some of the habitat included under (a) above, but it is not possible to provide a revised figure for (a) at the present time.
6.2: Condition of habitat; Method used	This assessment has not been updated since the 2018 reporting round. Assessment of structure and function within SACs is based on the results of common standards monitoring visits undertaken between 2007 and 2012 (NRW, 2018a). The spreadsheet cited as NRW (2018a) has been analysed to extract monitoring data for SAC sites for H7110. 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 7 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): Afon Eden – Cors Goch Trawsfynydd (September 2015), Afonydd Cleddau [Esgyrn Bottom] (October 2012), Cernydd Carmel (July 2016), Cors Caron (October 2011), Cors Fochno (December 2009), Rhosgoch Common (August 2015), Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses (August 2007). Only three of these sites have been monitored since the 2012 reporting round. In each case it is assumed that the SAC monitoring assessment relates to the whole H7110 resource. Condition for the non-SAC sites is based on a combination of experience of the sites gained during the survey, expert specialist judgement, and the expert judgement of local NRM team officers: all assessments are based on site visits undertaken since the last (2nd) reporting round. The assessment of the area of this habitat in good condition is based on the rationale given above under 6.1.
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, Rhosgoch and Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses) which commenced prior to 1994. However, there are insufficient data to quantify this trend. On many other sites, however, condition is strongly suspected - on the basis of expert opinion – to be declining.
7.1: Characterisation of pressures	Overview This analysis is based largely upon the 2018 analysis of Pressures and Threats which used f NRWs Action

Database (NRW, 2018c) as a critical resource. Some updated comments have been made, however. The analysis provides information on 'issues' affecting habitats and species within the protected sites series in Wales and contains a total of 92 management issue entries against the Active Raised Bog feature description, of which 74 remain categorised as 'C' and requiring ongoing control. These apply across a total of 18 management units (many units have more than one management issue recorded) on 7 SSSI, including all of the SACs for which this habitat is a feature. Restricting the search term to 'Active Raised Bog' means that only data for SAC 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]). NRWs Prioritised Implementation Plans for SAC sites (NRW, 2016a) have also been consulted.

Pressures:

PL02 Drainage (including some PA22. Drainage for use as agricultural land)

Adverse hydrological regimes remain the key pressure and threat for H7110 in Wales. NRWs Actions Database has three categories relevant to this pressure/threat. For H7110, 'Drainage' is noted as a current issue for 4 units on

3 SSSI, with 'Ditch management' affected 6 units on 3 SSSI and 'Water levels' 8 units on 3 SSSI. Taken together, these pressures affect 8 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 high or medium priority pressure and threat in the Prioritised Improvement Plans (PIPs) for 5 SACs, with ditch management cited as a high priority and urgency issue for 3 SAC and drainage as a high priority and urgency issue for 2 sites. 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. PA22) is estimated to affect a minimum of 25 (55%) of the 45 sites assessed to-date as supporting H7110 in Wales (Jones & Birch, in prep.), with drainage for other purposes also affecting 9 of these sites together with a further 6 sites with no or un-diagnosed agricultural drainage pressures. Drainage pressures are judged as likely to have been under-recorded in the Actions Database and PIPs. NRWs LIFE Welsh Raised Bogs project did not focus on addressing marginal drainage for agriculture (PA22) or flood management (included under PL02) and this remains a significant issue for many sites across Wales.

PA08 Extensive grazing or undergrazing by livestock & PA05 Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming

H7110 in good condition should require no or only the lightest of grazing regimes. However, past peat cutting and drainage coupled with atmospheric deposition mean that grazing often is warranted. 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 H7110 on 6 units for 2 SSSI: 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 recorded as a high priority/high urgency issue for just one site (Cernydd Carmel). This is reflected in the fact that grazing actions (namely its restoration and/or or modification of existing practices) features as an action for four of the seven project sites (NRW, 2016b). The closely related issue of 'grazing type and/or timing' is cited as a current issue for H7110 for 3 units on 2 SSSI and for raised bog for 20 units on 6 SSSI (including the dubious Frondeg site). This issue seems again to be under-represented in the PIPs for the raised bog sites, being cited as a low and high priority issue for Cors Caron and Cors Goch, Trawsfynydd respectively. This is likely to be a more widespread and pressing problem for non-statutory sites supporting H7110.

PI03 Problematic native species

This pressure is closely linked to PA08 and is often a case of drainage coupled with under-management and atmospheric nutrient deposition (Tomassen et al., 2003). Scrub invasion is noted as a current issue for H7110 for 4 units on 3 SSSI and for raised bog on 37 units on 11 SSSI (including Frondeg). It is noted as a low priority issue for Cors Caron and Cors Fochno but a High Priority issues at Fenn's & Whixall Mosses; urgency is classed as medium or high for all three sites. This is likely to be a more widespread and pressing problem for non-statutory sites

supporting H7110. 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 H7110 for 3 units on 2 SSSI, and for raised bog 13 units on 5 SSSI, with characterising as a medium priority/medium urgency issue in the Prioritised Implementation Plans (NRW, 2016a), in this case for Rhosgoch common.

PK04: Atmospheric N-deposition and PK03 Mixed source air pollution, air-borne pollutants

Air pollution is cited as a current issue for H7110 for only 10 units across 3 SSSI 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 and high or medium urgency issue for H7110 in NRWs Prioritised Improvement Plans (NRW, 2016a) for the seven SACs on which this habitat occurs as a feature. The extent of the H7110 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 agreed approach and using updated deposition data based on the updated extent estimate of 15.88 km2. 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.

PA01. 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 H7110 to agricultural land (some of which is now H7120), rather than

the ongoing or future loss of H7110 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. Much of the 1638 ha should probably be referred to H7120 and a review to determine this is required.

PF14. Modification of flooding regimes, flood protection for residential or recreational development – linked to PJ04. Sea-level rise due to climate change.

This pressure concerns modification to the hydrological regime of Cors Fochno SAC as a result of flood defence infrastructure and its ongoing maintenance. This largely affects the Cors Fochno resource only (403.7 ha), though the raised bog at Arthog (Mawddach Estuary SSSI) is also subject to these pressures to some extent.

PB01 Conversion to forest from other land uses, or afforestation (excluding drainage) & PB23 Physical alteration of water bodies 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 3 units on 2 SAC in NRW (2018c).

PI02 Other invasive alien species (other than species of Union concern)

Terrestrial non-native species are a current issue for H7110 on 3 units on 3 SAC: the species concerned include conifers, and Rhododendron. 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.

PA17 Agricultural activities generating diffuse pollution to surface or ground waters (including marine).

For H7110, this only affects 2 units on 2 SAC, but may be an under-reported pressure.

PF07 Residential and commercial activities and structures generating pollution to surface or ground waters This is listed as a low priority pressure for Cors Fochno in NRWs PIPs (NRW, 2016).

PC05 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.

PJ03 - Changes in precipitation regimes due to climate change

PJ01 - Temperature changes and 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. 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.
8.1: Status of measures	While the majority of the most important measures required to restore/maintain this habitat to FCS in Wales have been identified, many outside the LIFE Welsh Raised Bogs operational suite of six SAC sites (hydrological restoration was not undertaken at the seventh site, Waun Ddu) have yet to be fully implemented. Many measures remain needed even within the LIFE Welsh Raised Bogs suite of focus sites.
8.5: List of main conservation measures	Much of the narrative here is based on material submitted for the 2018 reporting round. The majority of measures are not fully implemented. A total of 1391.8 ha of this habitat is included within this SAC series (this figure is based on overlap of the GIS habitat layer on the SAC series and not the N2K data-forms areas), (Milner, 2018), with 1177 ha being NNR. The LIFE for Welsh Raised Bogs measures has implemented measures to benefit 730.5 ha (45.9% of the Welsh resource of H7110) on six sites (all SAC, with the Marches Mosses project covering work at a seventh. MK03 and MA13, hydrological interventions. A significant number of hydrological pressures remain to be addressed. However, better mechanisms are needed to address drainage at the margins of or beyond the boundaries of protected sites. Hydrological restoration was a key element of the New LIFE for Welsh Raised Bogs project and the expertise developed needs to be applied to other Welsh H7110 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 (Rhosgoch Common and Covert Coch being prime examples). Better resourcing of NNRs will be required to both enable maintenance of hydrological restoration infrastructure in the after-LIFE phase for the two projects, and also enable this work on non-SAC NNRs, such as Cors Goch, Llanllwch.

Land management actions relating to grazing (MA04, MA05, MM01).

Only 8.3 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 drop in activity since 2012 when the area of H7110 in SSSI with 'raised bog' as a feature and under a Land Agency agreement was 38 ha. This is likely to reflect financial and staff resource pressures on management agreements. 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 MA05 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.

MA05 Adapt mowing, grazing and other equivalent agricultural activities (e.g. burning) & MA06 Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats).

Rewetting of highly modified peatland adjacent to extant raised bog sites supporting H7110 will be needed to restore this habitat at some sites. NRWs National Peatland Action programme offers one avenue for achieving this, with the adoption of wetter agriculture practices one option.

MK01 Reduce impact of mixed source pollution, MC09 Manage/reduce/eliminate air pollution from resource exploitation and energy production, & MA11 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 (MC09) and locally increasing ammonia pollution from expansion of poultry units (MA11).

Air quality limit values set out in the Air Quality Strategy (AQS) are transposed into national legislation by the Air Quality Standards Regulations 2010. Nitrogen deposition continues to impact semi-natural habitats in Wales. These regulations are not habitat-specific, however with introduction of The Environment (Air Quality and Soundscapes) (Wales) Act 2024 in Wales, brings in new national targets for air quality pollutants, with the potential of directly influencing habitat protection.

This key legislative advancement requires mandatory targets for fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) to be established by February 2027, including new powers for Welsh Ministers to set pollutant-specific targets in future years (e.g., ammonia, nitrogen dioxide) linked to biodiversity outcomes, potentially enabling future habitat-sensitive thresholds.

Welsh Government have also introduced The Agriculture (Wales) Act in 2023. It aims to establish a framework of Sustainable Land Management (SLM) objectives to underpin agricultural support, including the Sustainable Farming Scheme (SFS). The Act provides Welsh Ministers

with the power to provide support (financial or otherwise) for or in connection with 15 purposes, including 'Improving air quality'. Welsh Government published a consultation on the SFS which closed in March 2024. Welsh Ministers will not be making final scheme design decisions until further stakeholder work is undertaken.

Addressing forestry impacts – MB05.

Resolution of this threat demands a new approach for afforested peatlands, with a more explicit focus on the restoration of Annex 1 habitats.

MF08 Manage changes in hydrological and coastal systems and regimes for construction and development (incl. restoration of habitats).

This requires a significant ecosystem-based initiative making full use of NRWs new remit and the legislative powers in Wales to 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.

MA10 Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities & MK01 Reduce impact of mixed source pollution.

Only localised action is required to address both diffuse and point-source nutrient impacts.

MA01 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. MJ02 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 H7110 sites in Wales.
9.1:Future trends and prospects of parameters	Range: Assessment based on effects of N deposition, climate change and assuming limited further notification activity. The limited size of examples outside the core SACs make this habitat particularly vulnerable to changes in range. Area: This assessment has changed from stable in the last (2018) reporting round to negative. This judgement is based on the multiple sites outside the SSSI series, (ii) ongoing effects of deep peripheral drainage, (iii) that the LIFE Welsh Raised Bogs project did not increase the extent of H7110, only improved its condition. At the present time there is no system in place for tracking what may be small-scale but nevertheless significant losses. Structure & function: This reflects the balance between the ongoing and long-running restoration programmes on the raised bog NNR SACs (notably Cors Fochno, Cors Caron, Rhosgoch

	Common and Fenns's and Whixall Mosses), and the predicted outcomes of the New LIFE for Welsh raised bogs project (NRW, 2016b) and the Marches & Mosses LIFE project which covers the Fenns & Whixall site complex, set against the situation elsewhere. In 2018, Glastir Advanced agreements only covered a maximum possible area of 169.5 ha (Milner, 2018 – this figure assumes no overlap in prescriptions and is the sum total of all prescriptions), with Glastir Entry covering a maximum possible area of 14.2 ha and Glastir Commons 30.7 ha; NRW management agreements extended to just 8.3 ha. Thus, despite the high proportion of this habitat included within the SSSI series, some decline in quality is anticipated. The Future prospects for Structure and functions takes into account that at least 25% of the habitat area is expected to be in unfavourable (not good) condition in c.2035 due to nutrient N critical load exceedance, unless additional measures are taken to reduce N deposition impacts.
10.1: Range	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range.
10.2: Area	Conclusion on Area reached because:(i) the short-term trend direction in Area is unknown; and (ii) the current Area is more than 10% below the Favourable Reference Area.
10.3: Specific structure and functions	Conclusion on Structure and function reached because: i) habitat condition data indicates that more than 25% of the habitat is in unfavourable (not good) condition; ii) short-term trend in area of habitat in good condition is increasing; and iii) expert opinion determines that there are significant issues for this habitat on sites other than those which have received restoration through LIFE funding.
10.4: Future prospects	Conclusion on Future prospects reached because: (i) the Future prospects for Range are poor; (ii) the Future prospects for Area covered by habitat are bad; and (iii) the Future prospects for Structure and function are bad.

10.5: Overall assessment of Conservation Status	Overall assessment of Conservation Status is Unfavourable-bad because three of the conclusions are Unfavourable-bad.
11.1: Surface area of the habitat type inside the pSCIs, SCIs and SACs network	This estimate is derived from digital overlay of SAC boundaries (see Milner, 2018) on the revised habitat inventory for H7110 described under section 5.2 above. The area is different to the figure used in 2012 (14.56 km2) due to recalculation of the area included within the New LIFE for Welsh Raised Bogs LIFE project – see 5.2.
11.4: Short-term trend of habitat area within the network; Direction	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 H7230 is required.
5.13: Favourable Reference Area (FRA)	The UK-level FRV for surface area was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. Following expert review, a Wales-level FRV was derived based on habitat extent and trend evidence specific to Wales, rather than adopting the UK-level value. The revised FRV has been set as between 26% and 50% smaller than the FRA as documented loss of H7110 (Lowland Raised bog inventory) in Wales, potentially could be a greater loss at the UK level.
4.10: Favourable Reference Range (FRR)	The UK-level FRV for range was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent

reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current distribution and trends.