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:

H7110 - Active raised bogs

NORTHERN IRELAND

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 (Northern Ireland information only)**
1.2 Habitat code	**7110 - Active raised bogs**

2. Maps

2.1 Year or period	2013-2018
2.3 Distribution map	Yes
2.3 Distribution map Method used	Complete survey or a statistically robust estimate
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	Cooper, A. & McCann, T. (2001). The Northern Ireland Countryside Survey 2000. Environment and Heritage Service, Belfast Cooper, A., McCann, T. and Rogers, D. (2009) Northern Ireland Countryside Survey 2007: Broad Habitat Change 1998-2007. Northern Ireland Environment Agency. Northern Ireland Environment Agency Research and Development Series No. 09/06. Belfast. 58 pp. McCann, T., Rogers, D. and Cooper, A. (2009) Northern Ireland Countryside Survey 2007: Field methods and technical manual. Northern Ireland Environment Agency. Northern Ireland Environment Agency, Research and Development Series No 09/07. Belfast. Murray, R., McCann, T. and Cooper, A. (1992). A Land Classification and Landscape Ecological Study of Northern Ireland. Department of the Environment NI and Department of Environmental Studies, University of Ulster, Coleraine. Rodwell, J.S. (1991). British Plant Communities. Volume 2, Mires and heaths. Cambridge: Cambridge University Press NIEA. Internal Condition Assessment Reports (various sites and years). Rodwell, J.S., Dring, J.C., Averis, A.B.V., Proctor, M.C.F., Malloch, A.J.C., Schaminee, J.H.J & Dargie, T.C.D. 1998. Review of Coverage of the National Vegetation Classification. Lancaster: Unit of Vegetation Science report to the Joint Nature Conservation Committee. Data on aerial Nitrogen deposition taken from Air Pollution Information System website - http://www.apis.ac.uk/ Lindsay, R.A. (1995). Bogs: The ecology, classification and conservation of ombrotrophic mires. Scottish Natural Heritage. Battleby. Leach S. J. & Corbett, P. McM. (1987). A preliminary survey of raised bogs in Northern Ireland. Glasra, 10, 57-73. Corbett, P. McM. & Seymour, G. R. (1997). The conservation of peatland in Northern Ireland. In: Conserving Peatlands; Eds.: L. Parkyn, R.E. Stoneman and H.A.P. Ingram. CAB International, Wallingford, pp 348-356.

4. Range

4.1 Surface area (in km²)	
4.2 Short-term trend Period	

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

4.3 Short-term trend Direction	Stable (0)		
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum	
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	No change		
	The change is mainly due to:		
4.12 Additional information			

5. Area covered by habitat

5.1 Year or period	2013-2018		
5.2 Surface area (in km²)	a) Minimum	b) Maximum	c) Best single value 44.62
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	Decreasing (-)		
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data		
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 extrapolation from a limited amount of 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	No change		
	The change is mainly due to:		
5.15 Additional information			

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum	6.2953	Maximum	6.2953
	b) Area in not-good condition (km²)	Minimum	8.4196	Maximum	8.4196
	c) Area where condition is not known (km²)	Minimum	29.9051	Maximum	29.9051

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	2013-2018
6.4 Short-term trend of habitat area in good condition Direction	Stable (0)
6.5 Short-term trend of habitat area in good condition Method used	Based mainly on extrapolation from a limited amount of 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
Burning for agriculture (A11)	H
Agricultural activities generating air pollution (A27)	M
Drainage for use as agricultural land (A31)	M
Peat extraction (C05)	H
Droughts and decreases in precipitation due to climate change (N02)	M
Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams) (B27)	M
Intensive grazing or overgrazing by livestock (A09)	M
Other invasive alien species (other then species of Union concern) (I02)	M

Threat	Ranking
Burning for agriculture (A11)	H
Agricultural activities generating air pollution (A27)	H
Drainage for use as agricultural land (A31)	M
Peat extraction (C05)	H
Droughts and decreases in precipitation due to climate change (N02)	H
Modification of hydrological conditions, or physical alteration of water bodies and drainage for forestry (including dams) (B27)	M
Intensive grazing or overgrazing by livestock (A09)	M
Other invasive alien species (other then species of Union concern) (I02)	M

7.2 Sources of information	
7.3 Additional information	

8. Conservation measures

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

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	Maintain the current range, population and/or habitat for the species	
8.3 Location of the measures taken	Both inside and outside Natura 2000	
8.4 Response to the measures	Medium-term results (within the next two reporting periods, 2019-2030)	
8.5 List of main conservation measures		

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)

Adapt mowing, grazing and other equivalent agricultural activities (CA05)

Reduce/eliminate air pollution from agricultural activities (CA12)

Manage drainage and irrigation operations and infrastructures in agriculture (CA15)

Manage drainage and irrigation operations and infrastructures (CB14)

Management, control or eradication of other invasive alien species (CI03)

Implement climate change adaptation measures (CN02)

Adapt/manage exploitation of energy resources (CC02)

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	
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	

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

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	 14.4971
11.2 Type of estimate		Best estimate
11.3 Surface area of the habitat type inside the network Method used		Complete survey or a statistically robust estimate
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		Complete survey or a statistically robust estimate
11.6 Additional information		

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

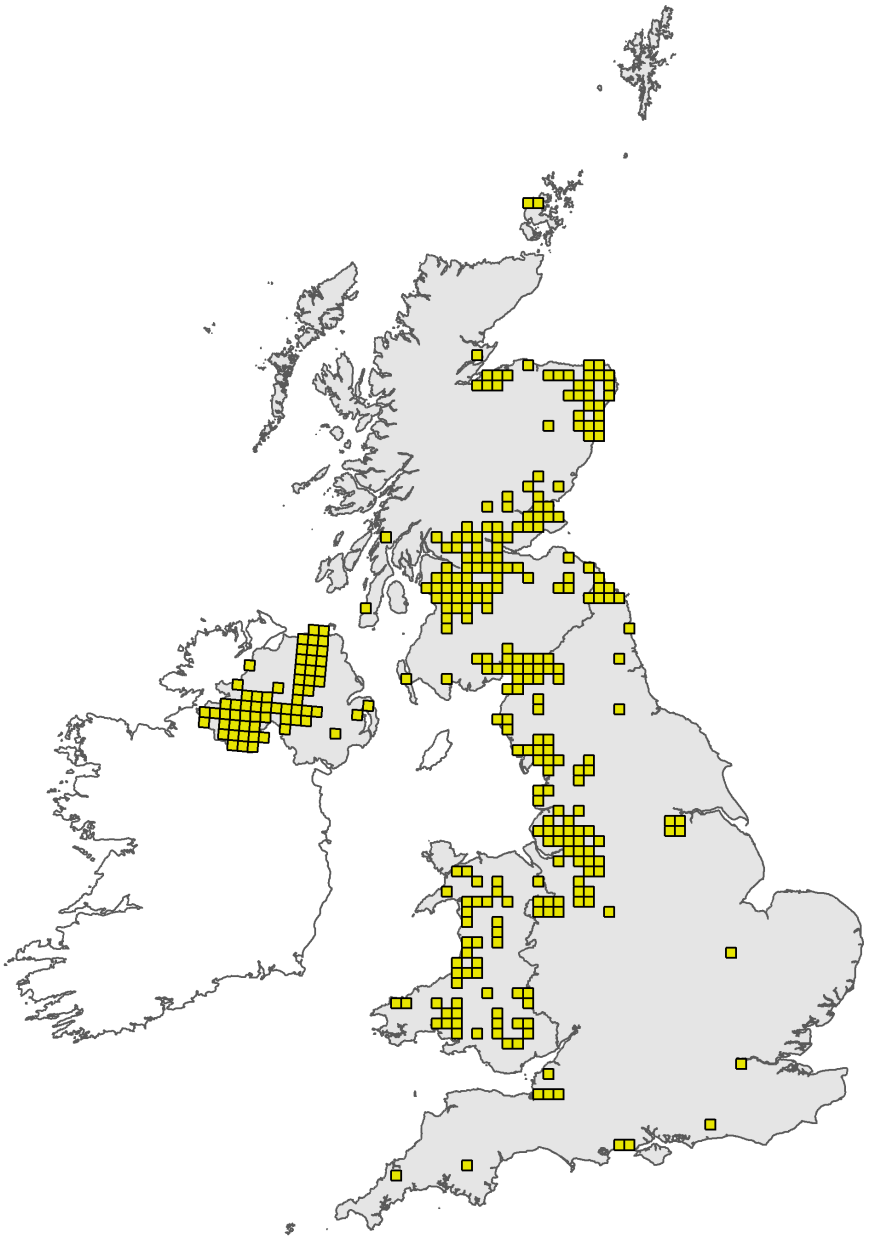

Figure 1: UK distribution map for H7110 - Active raised bogs. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available habitat records 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

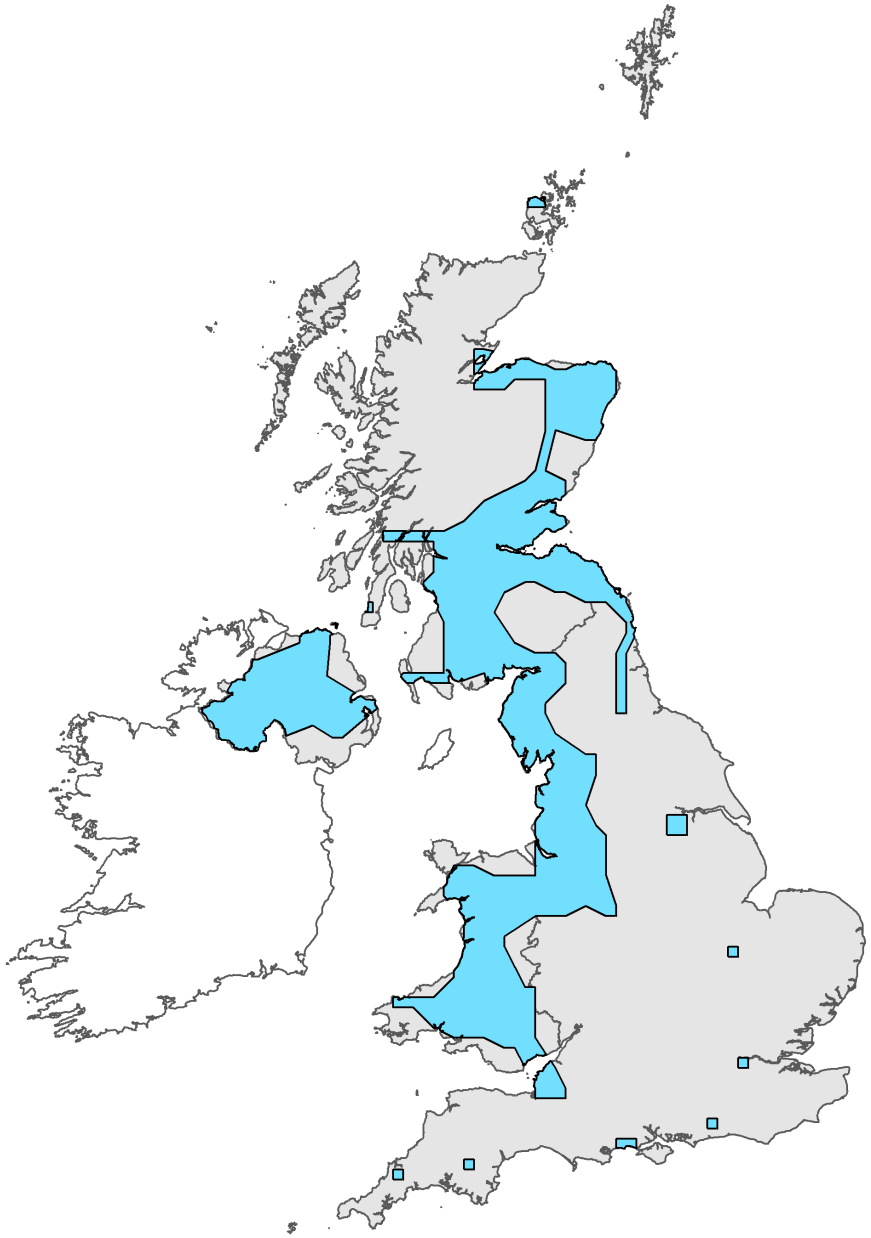

Figure 2: UK range map for H7110 - Active raised bogs. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 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: 7110

Field label	Note
2.2 Distribution map	H7110 and H7120 (active and degraded raised bog) are often not separated in standard habitat mapping, and may often be difficult to distinguish in the field. Lowland raised bog includes both Annex 1 habitats and covered 25,196 ha (NI Peatland Survey, 1988). It was estimated that 2,270 ha of this (about 9% of all lowland raised bog) was still intact, with most of the remainder being cut, principally by hand. Lowland raised bogs occur all over NI, but are generally very scarce in Counties Down and Armagh, where the majority have been totally destroyed by a combination of turf-cutting and agricultural reclamation (e.g. Brown, 1968). They tend to be of two broad types, with the typical raised bog (Lindsay, 1995) generally confined to flood-plains in the major river valleys in Antrim and Londonderry, and along the southern shores of Lough Neagh. In fact, the topography and climate of NI have made this a rather uncommon type. The majority of lowland bogs share some, but not all, of the characteristics of intermediate mire (Lindsay, 1995), where peat formation has occurred in depressions and spread out from these to coalesce in the form of large and irregularly shaped bogs. This is particularly apparent in the west, with its higher rainfall, especially in the drumlin belt of Tyrone and to a lesser extent Fermanagh, but is also a feature of many sites in Antrim and Londonderry. The eastern/western sub-division is accompanied by floristic changes, as a number of plant species occur more frequently on bog surfaces in the west, notably Carnation Sedge Carex panicea, White Beak-sedge Rhynchospora alba, the moss Racomitrium lanuginosum and the liverwort Pleurozia purpurea. A number of NVC communities have been recorded from intact bog surfaces: M1 Sphagnum auriculatum bog pool community - generally an oceanic community, this tends to be more common on blanket bog in NI; M2 S. cuspidatum/recurvum bog pool community - typical of pools and lawns on more undisturbed sites; M3 Eriophorum angustifolium bog pool community - generally more common on blanket bogs and in old cuttings around the margins of lowland raised bogs; M18 Erica tetralix - Sphagnum papillosum raised and blanket mire. This is the main vegetation community on the surface of intact raised bogs, and is often found in regenerating areas of cutover where suitable conditions exist. In addition, a number of communities are found on raised bogs which have been subject to disturbance such as drainage or peat-cutting - e.g. M15 Scirpus cespitosus - Erica tetralix wet heath, M20 Eriophorum vaginatum blanket and raised mire, M25 Molina caerulea - Potentilla erecta mire and W4 Betula pubescens - Molinia caerulea woodland. The priority habitat (Lowland raised bog) includes the two Annex 1 habitats: Active raised bogs Degraded raised bogs (still capable of natural regeneration)
2.3 Distribution map; Method used	Map based upon NI Peatland Survey (Cruickshank and Tomlinson, 1988) with additional fieldwork by NIEA staff at other sites - SACs, ASSIs and other locations. During the reporting period, NIEA staff have generally visited SACs and ASSIs, with coverage of the habitat in the wider countryside more patchy.

Habitat code: 7110 Region code: ATL

Field label	Note
4.1 Surface area	The complete resource has not been surveyed since 1988, but we have no reason to believe that there has been a loss in range; certainly no loss in range has been recorded in the habitat on SACs or ASSIs since the condition assessment programme was introduced in 2002.
4.5 Short term trend; Method used	Based upon regular condition monitoring of protected lowland raised bog sites. These cover just under 10% of the habitat in NI.

5.2 Surface area	There is no comprehensive estimate of the extent of \'active\' raised bog in NI, as it is very difficult to accurately measure the extent of active and degraded raised bog. The habitats are often not separated in standard habitat mapping, and indeed the two may often be difficult to distinguish in the field. The 2007 Report estimated 4462 ha of H7110 for NI. This was based upon an estimate from the NI Peatland Survey (Cruickshank and Tomlinson, 1988), which is the only full inventory of the NI peatland resource. Note that, although the NI Peatland Survey estimated that just over 2000 ha of lowland raised bog was intact, some of this was probably not active, but that, because of NI's climate, a comparatively large amount of cut-over bog is active - i.e. peat-forming. The NI Countryside Survey estimated a figure of 8355 ha for wet bog habitat, which would appear to fit the active category. However, this figure is associated with a high standard error (i.e. the S.E. of the estimate is 45.5 km2.,) so it is suggested that further analysis is required to refine this estimate.
5.4 Surface area; Method used	There is no comprehensive estimate of the extent of \'active\' raised bog in NI, as it is very difficult to accurately measure the extent of active and degraded raised bog. The habitats are often not separated in standard habitat mapping, and indeed the two may often be difficult to distinguish in the field. Hence method used is described as Based mainly on extrapolation from a limited amount of data
5.6 Short term trend; Direction	The estimated decrease in the cover of wet bog between 1998 and 2007 was 53.1 km2 (-38.9%) with a S.E. of 35.1km2 (NI Countryside Survey 2007). This change was not statistically significant (p=0.05, 95%). Assume that this trend has continued.
5.8 Short term trend; Method used	Trend based upon NI Countryside Survey data for the period 1998 to 2007. Assumed that the trend has continued into the current reporting period. NI Countryside Survey data based on field mapping within 288 25ha sample squares. The figures are based upon the trend in the habitat wet bog, which is the nearest equivalent in the NI Countryside Survey to active bog.
5.10 Long term trend; Direction	NI Countryside Survey 2000 indicates a decline in wet bog habitat in the lowlands between 1991 and 1998 of 8%. Given the decline between 1998 and 2007, it is clear that there has been a long-term decline in the extent of the habitat.
5.12 Long term trend; Method used	NI Countryside Survey 2000 indicates a decline in wet bog habitat in the lowlands between 1991 and 1998 of 8%. Given the decline between 1998 and 2007, it is clear that there has been a long-term decline in the extent of the habitat. However, we have no data since 2007 (apart from condition assessment of SACs and ASSIs); hence data described as Based mainly on extrapolation from a limited amount of data.
6.1 Condition of habitat	Recent condition assessment data for SACs and ASSIs shows that a reasonably high proportion of the habitat is in favourable or unfavourable recovering condition. Combined data for SACs and ASSIs : 630 ha favourable (39%); 374 ha unfavourable recovering (23%) ; 468 ha unfavourable (29%); with about 9% recently declared ASSIs not yet assessed). However, the trend in the wider countryside is very different. NI Countryside Survey 2000 indicates a decline in wet bog habitat in the lowlands between 1991 and 1998 of 8%. This is largely due to a conversion from wet bog to dry bog - indicating drying out.
6.2 Condition of habitat; Method used	Condition has been partly assessed from data taken from the most recent Common Standards Monitoring of lowland raised bog SACs and ASSIs. However, a large part of the resource of H7110 lies outside the designated site network. General trends identified in the NI Countryside Survey 1998-2007 (Cooper, et al., 2009) suggest that a high proportion of the overall resource is likely to be in unfavourable condition. Although the latter survey is now somewhat out of date, it is likely that the broad trends identified are still valid.

7.1 Characterisation of pressures/ threats	Condition assessment for SACs and ASSIs suggests that a reasonable proportion of the habitat is in favourable or recovering condition. The most apparent pressures on designated sites are burning and the impacts of past turf-cutting and drainage (leading to long-term hydrological change, with associated surface drying, loss of Sphagnum cover and scrub encroachment, etc.). Outside the protected sites network, drainage and peat cutting remain as significant impacts on the habitat, as indicated by the NI Countryside Survey. More localised pressures include livestock grazing, impacts from adjacent forestry plantations and invasive species, such as Rhododendron. As far as threats are concerned, climate change will inevitably have some effects on the habitat, through changing patterns of rainfall. It is difficult to predict what the long-term effects of this will be, although if, as current projections suggest, there are prolonged periods of drought, this may well have an adverse impact on the health of Sphagnum bog-mosses. The habitat is sensitive to aerial Nitrogen deposition, with a critical load range listed in the APIS website as 5-10 kg N /ha/yr. Most of the habitat in NI receives above this - in some cases considerably higher than this. For example, Blaeberry Island Bog ASSI in the east of NI has a predicted annual rate of over 20 kg/N/ha/year (average figure), compared to Moneygal Bog in the extreme west, which has a figure of 13.7 kg/N/ha/year (average figure). Apart from nutrient enrichment and the associated impacts on species composition, some key bog species are particularly sensitive to the effects of ammonia (i.e. Cladonia portentosa and Sphagnum spp), and one NI SAC (Moninea Bog) has also experienced damaging effects from ammonia.
7.2 Sources of information	Threats and pressures assessed from the most recent Common Standards Monitoring of the habitat at protected sites (SACs and ASSIs), in addition to data from the NI Countryside Survey and expert judgement to assess pressures in the wider countryside - particularly from the APIS website. Threats based upon current pressures and expert judgement on future trends.
8.1 Status of measures	Recent monitoring on SACs and ASSIs has shown that there are still extensive areas of the habitat in unfavourable condition. However, specific site conservation measures have been put in place at several SACs and ASSIs to improve condition - e.g. drain blocking on Black Bog and Ballynahone Bog SACs to restore hydrology. More measures will be put in place under the Interreg Va programme, and the Environmental Farming Scheme (EFS). In addition, the Department is developing a road map to reduce atmospheric Nitrogen from agricultural sources.
8.2 Main purpose of the measures taken	Measures aimed at reducing damaging impacts from current pressures and future threats. The habitat is extensive across NI. Hence this is reported as Maintain the structure and functions, including the status of typical species (related to 'Specific structure and functions').
8.3 Location of the measures taken	Management measures have been taken at a number of sites - i.e. Ballynahone Bog SAC in Co. Londonderry, Black Bog SAC in Co Tyrone, Garry Bog SAC in Co. Antrim, etc. In addition, Interreg Va project will be developing conservation management plans and implementing management measures at several SACs, and Rural Development Plan (RDP) funds are being used to develop similar Conservation Management Plans at other raised bog SACs. Several areas of raised bog across NI - both within designated sites and outside - have been entered into the Environment Farming Scheme (EFS), which aims to implement sympathetic management.

9.1 Future prospects of parameters	Future Prospects for Range reported as Overall Stable. Area reported as Negative - slow decline in area over time identified by NI Countryside Survey likely to have continued during the period of the report. Recent monitoring on SACs and ASSIs has shown that there are extensive areas of the habitat in unfavourable condition. Although specific site conservation measures have been put in place at several SACs and ASSIs to improve condition, and further measures will be put in place under the Interreg Va programme and the Environmental Farming Scheme (EFS), a large proportion of the habitat is outside the protected sites network. Furthermore, much of the habitat is receiving levels of atmospheric deposition of Nitrogen that are above the critical thresholds. Although the Department is developing a road map to reduce atmospheric Nitrogen from agricultural sources, until this initiative is implemented and its impacts evaluated, advice from JNCC is that the assessment of future prospects for Structure and Function should be assessed as Negative.
10.1 Range	Although the information on range contraction for lowland mires infers a substantial historic contraction in the range for raised bogs overall (H7110 and H7120 combined), there is no information on any changes in range for H7110 since 1994, nor any previous historical data on extent or changes. Within NI it is clear that there have been large historic losses in extent, but the habitat still occurs - albeit in fragmented state - in the east of the country (Co Down - Blaeberry Island ASSI), suggesting that the range has not contracted. Certainly, there are no indications that the range has declined since 1988.
10.2 Area	The favourable reference area for H7110 has been set as the total of the current extent of both this habitat and H7120, as the latter is restored back to active raised bog. For NI the figures have been approximately estimated as 4,400 ha of active bog and 4,400 ha of degraded raised bog capable of natural regeneration - so the FRA for NI is 8,800 ha. NI Countryside Survey 2000 indicates a decline in wet bog habitat in the lowlands between 1991 and 1998 of 8%. Given the decline between 1998 and 2007, it is clear that there has been a long-term decline in the extent of the habitat. Hence the judgement is Bad - declining.
10.3 Specific structure and functions	The condition of active raised bog on SACs and ASSIs in NI has generally shown improvement since designation. However, NI Countryside Survey suggests that the picture in the wider countryside is very different, with widespread conversion to drier bog communities - presumably as a result of long-term hydrological changes caused by cutting and drainage. Hence judgement is Bad-declining.
10.4 Future prospects	Designated sites are generally improving, although the resource in the wider countryside is declining. Given the uncertain future impacts of air pollution and climate change, future prospects are predicted as Unfavourable Bad.
10.5 Overall assessment of Conservation Status	Range is stable; extent is unfavourable bad due to probable rates of loss. Structure and function is bad. Future prospects are bad, with climate change impacts currently unpredictable and atmospheric Nitrogen deposition still a major threat. Hence an overall unfavourable bad assessment.
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	There are 15 SACs for the habitat in NI, covering nearly 1500 ha of the habitat.
11.3 Surface area of the habitat type inside the network; Method used	The habitat across NI was mapped by the NI Peatland Survey. Area estimates for SACs have been refined by field survey, although it is often difficult to separate active bog from degraded bog. CSM of SACs is undertaken on a regular basis and no recent loss in extent has been recorded.
11.4 Short term trend of habitat area in good condition within the network; Direction	Assessment of increasing based upon recent condition assessment data. Although the majority of the habitat in the SAC network reported as unfavourable, a significant amount of the habitat in SACs is in unfavourable recovering status. It should be note however, that the Condition Assessment methodology is generally not sensitive in detecting the impacts of atmospheric Nitrogen deposition.

11.5 Short term trend of habitat area in good condition within the network; Method used	Assessment based upon recent condition assessment data. Around two thirds of the habitat on SACs was recorded as favourable or unfavourable recovering, with proactive management in place on several SACs to improve condition. However, the Condition Assessment methodology is generally not sensitive in detecting the impacts of atmospheric Nitrogen deposition.