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:

H7220 - Petrifying springs with tufa formation (*Cratoneurion*)

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	**7220 - Petrifying springs with tufa formation (Cratoneurion)**

2. Maps

2.1 Year or period	2013-2018
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	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/ NIEA. Internal Condition Assessment Reports (various sites and years). NIEA. Fen Survey Of Counties Down and Armagh

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
4.5 Short-term trend Method used		
4.6 Long-term trend Period		

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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 d) Method	No	
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 0.01
5.3 Type of estimate	Best estimate		
5.4 Surface area Method used	Based mainly on expert opinion with very limited data		
5.5 Short-term trend Period	2007-2018		
5.6 Short-term trend Direction	Stable (0)		
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			
5.10 Long-term trend Direction	Unknown (x)		
5.11 Long-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.12 Long-term trend Method used			
5.13 Favourable reference area	a) Area (km²) b) Operator c) Unknown d) Method	No	
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	0.005	Maximum	0.005
	b) Area in not-good condition (km²)	Minimum	0	Maximum	0
	c) Area where condition is not known (km²)	Minimum	0.005	Maximum	0.005
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				

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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
Extensive grazing or undergrazing by livestock (A10)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Agricultural activities generating air pollution (A27)	H
Active abstractions from groundwater, surface water or mixed water for agriculture (A30)	M
Wind, wave and tidal power, including infrastructure (D01)	M
Droughts and decreases in precipitation due to climate change (N02)	H
Agricultural activities generating point source pollution to surface or ground waters (A25)	H
Intensive grazing or overgrazing by livestock (A09)	M
Drainage for use as agricultural land (A31)	M

Threat	Ranking
Extensive grazing or undergrazing by livestock (A10)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Agricultural activities generating air pollution (A27)	H
Active abstractions from groundwater, surface water or mixed water for agriculture (A30)	M
Wind, wave and tidal power, including infrastructure (D01)	M
Droughts and decreases in precipitation due to climate change (N02)	H
Agricultural activities generating point source pollution to surface or ground waters (A25)	H
Intensive grazing or overgrazing by livestock (A09)	M
Drainage for use as agricultural land (A31)	M

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes

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

Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)

Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10)

Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)

Reduce/eliminate air pollution from agricultural activities (CA12)

Adapt/manage renewable energy installation, facilities and operation (CC03)

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

Implement climate change adaptation measures (CN02)

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

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	

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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 0.005
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	Stable (0)
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

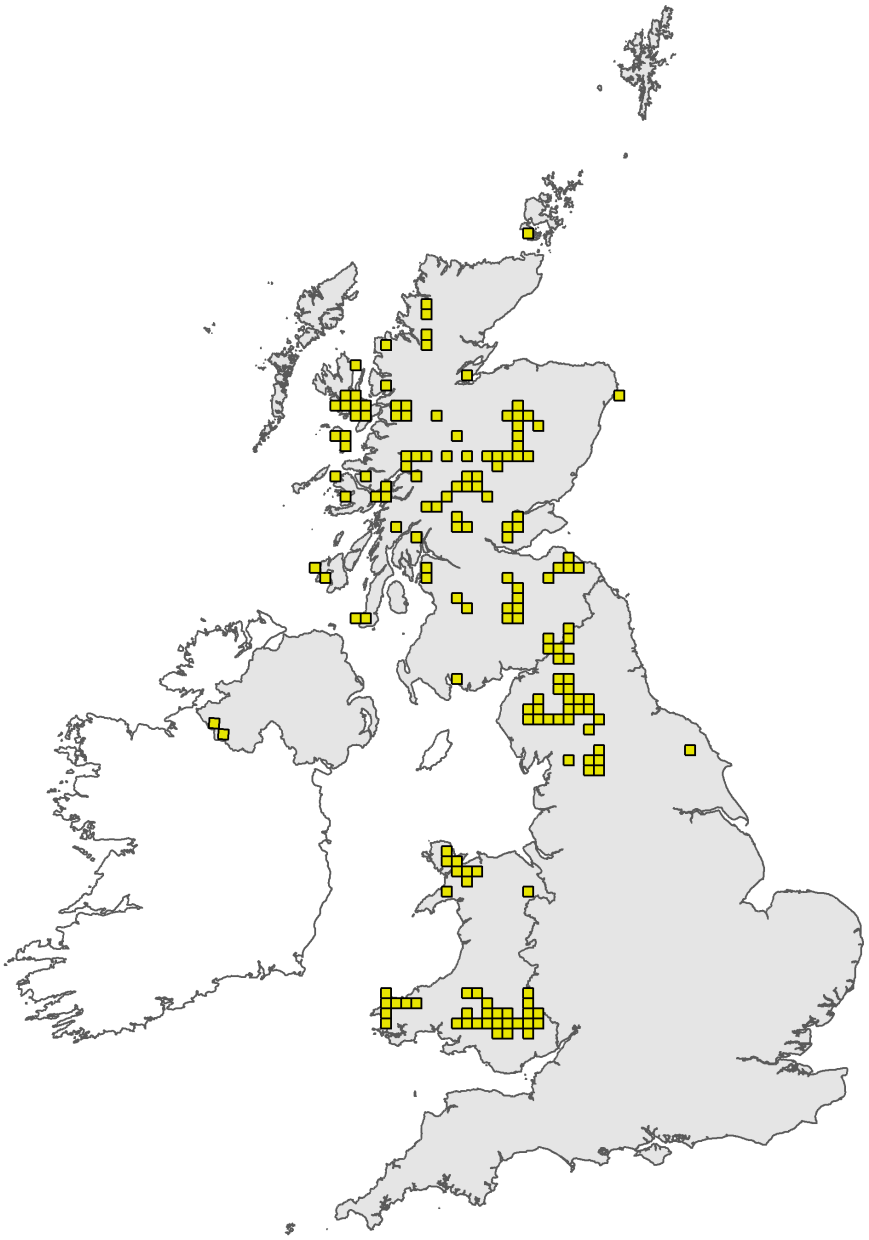

Figure 1: UK distribution map for H7220 - Petrifying springs with tufa formation (*Cratoneurion*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

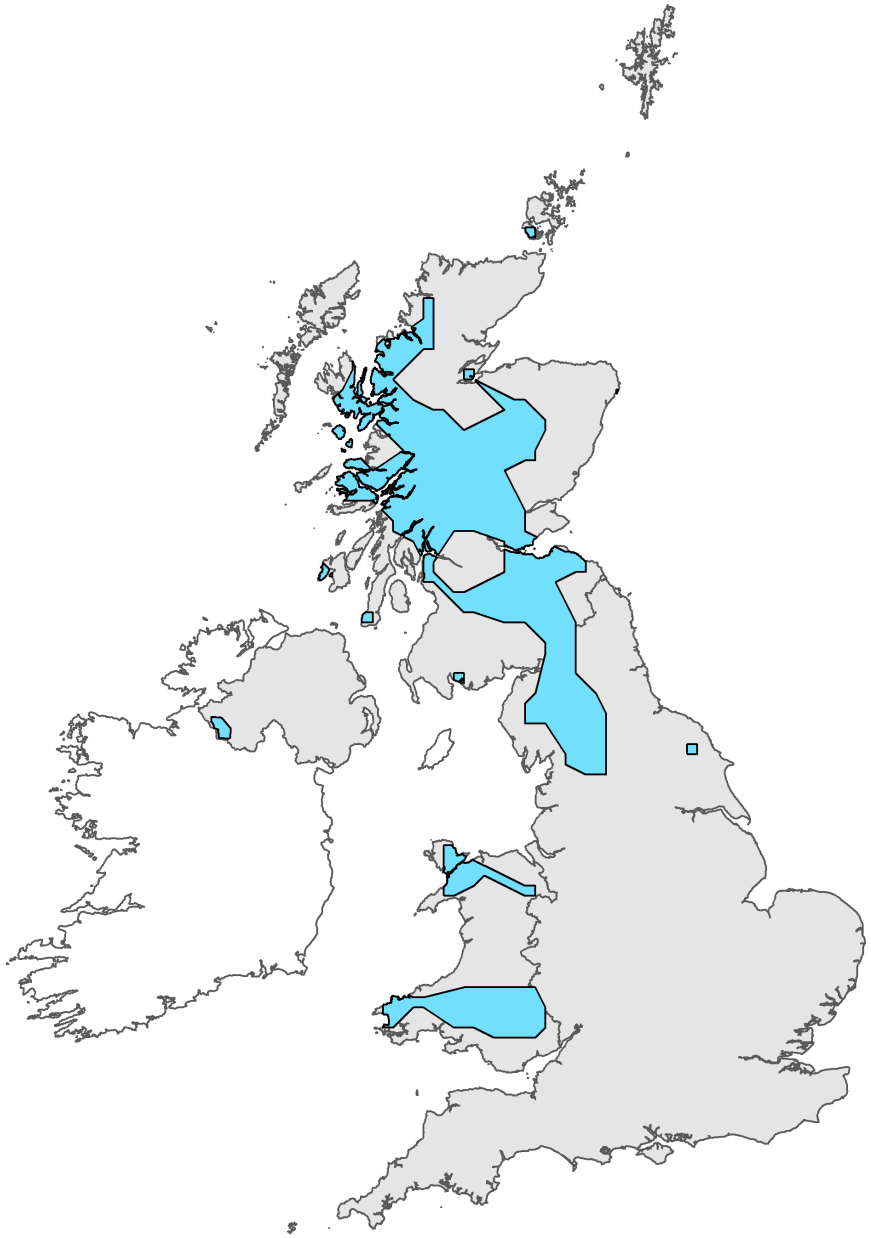

Figure 2: UK range map for H7220 - Petrifying springs with tufa formation (*Cratoneurion*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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: 7220

Field label	Note
2.2 Distribution map	Tufa formation is associated with hard-water springs, where groundwater rich in calcium bicarbonate comes to the surface. On contact with the air, carbon dioxide is lost from the water and a hard deposit of calcium carbonate (tufa) is formed. These conditions occur most often in areas underlain by limestone or other calcareous rocks, and particularly in the uplands of northern England and the Scottish Highlands. Tufa-forming spring-heads are characterised by the swelling yellow-orange mats of the mosses Cratoneuron commutatum and C. filicinum. There are two main NVC types associated with tufa formation: M37 Cratoneuron commutatum - Festuca rubra spring and M38 Cratoneuron commutatum - Carex nigra spring. The former community is widely distributed, while the latter is found only at moderate to high altitudes generally in upper Teesdale and the Scottish Highlands. Tufa-forming springs are often associated with 7230 Alkaline fens, where they may form prominent upwelling masses of short open vegetation around the spring-heads that feed the fen system. There may also be transitions to a wide range of other habitats, particularly calcareous grassland, acid grassland, heath, H8240 Limestone pavements, and calcareous cliff and scree. The habitat is not well-known in NI; the only SAC listed for the habitat is West Fermanagh Scarplands. It is also recorded from two ASSIs - Ballycastle Coalfield in Co Antrim and Marlbank ASSI in Co Fermanagh, although there may be very small occurrences at other sites (e.g. Carey Valley in Co Antrim; Cliffs of Magho in Co Fermanagh). In NI, the habitat does ot tend to be associated with scarce higher plants - with the possible exception of Saxifrga aizoides.
2.3 Distribution map; Method used	Information on the distribution of the habitat comes from surveys undertaken by NIEA, either in-house or through contract. During the reporting period, NIEA staff have visited SACs and ASSIs known to contain the habitat. However, coverage of the habitat in the wider countryside is very patchy, as the habitat often occurs in tiny fragmented stands.

Habitat code: 7220 Region code: ATL

Field label	Note
4.1 Surface area	The current range of the habitat is naturally limited by rainfall, temperature and rock chemistry. Although data on distribution is limited, 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	Although there is a scarcity of data on the habitat, expert opinion would suggest tha the range is unlikely to have declined over the short term, as there has been limited habitat loss from the group of semi-natural habitats that generally host Petrifying springs. Hence judgement is stable for short term range.
5.2 Surface area	The surface area of this habitat has been estimated very approximately at 1 ha. This is in the absence of any definitive data from outside the SAC and ASSI series.
5.4 Surface area; Method used	The habitat is regularly monitored on SACs and ASSIs, but there is virtually no data from outside the protected sites network. Hence reported as Based mainly on extrapolation from a limited amount of data
5.6 Short term trend; Direction	Regular monitoring of protected sites has not noted any decline in extent of petrifying springs. Hence reported as Stable, but Based mainly on extrapolation from a limited amount of data.
5.10 Long term trend; Direction	The overall extent of the habitat is not known and although regular monitoring of protected sites has not noted any decline in extent of petrifying springs, over the longer time period it is impossible to indicate a trend - hence reported as unknown.

6.1 Condition of habitat	Data based upon condition assessment of West Fermanagh Scarplands SAC which has been designated for the habitat. Results showed 0.5 ha Favourable. The habitat is also present at a number of ASSIs (including Marlbank, Ballycastle Coalfield and possibly several others), but it is not possible to provide a breakdown of condition by area for these sites, as the habitat occurs in tiny, fragmented stands.
6.2 Condition of habitat; Method used	Data based upon condition assessment of the only SAC listed for the habitat. The habitat is also present at some ASSIs and an unknown number of locations in the wider countryside. Hence Based mainly on extrapolation from a limited amount of data
7.1 Characterisation of pressures/ threats	This habitat is dependent upon a stable water regime with very high water quality. Although the delicate nature of tufa is very sensitive to trampling and therefore overgrazing represents a significant threat, the habitat does require a very light level of grazing to prevent encroachment by rank growth and scrub. As in most wetland ecosystems, when combined with a lack of grazing, the effects of succession can lead to drying, scrub encroachment and succession to woodland, with subsequent loss of characteristic species. As Petrifying springs require very high water quality, they are very sensitive to eutrophication of groundwater or surface waters (from point or diffuse sources), which can result in substantial adverse changes to key plant communities. Again, being highly dependent upon a stable water regime, water abstraction may be a signifcant threat. With a critical load of 15-30 kg/N/ha/yr, the habitat is sensitive to aerial Nitrogen deposition. Although the predicted average for West Fermanagh Scarplands is 9.2 kg N/ha/yr, it is possible that the thresholds are exceeded at some sites for the habitat. Hence, air pollution is considered to be a potential threat to the condition this habitat. In upland settings, the development of wind farms has the potential to disrupt water flows and impact the habitat. Climate change is still difficult to predict, but any tendency for precipitation to become more unpredictable - with extremes of drought and heavy rainfall - is likely to affect the delicate water balance that the habitat is dependent upon.
7.2 Sources of information	Threats and pressures assessed from the most recent Common Standards Monitoring of petrifying springs at protected sites (SACs and ASSIs), 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 of petrifying springs at West Fermanagh Scarplands SAC has shown that the habitat here is in favourable condition. However, the habitat has not been well surveyed across NI, and it is likely that measures will be required across other sites where the habitat occurs. A management plan for West Fermanagh Scarplands is being prepared under the RDP, and further measures may be put in place under the Environmental Farming Scheme (EFS). In addition, the Department is developing a road map to reduce atmospheric Nitrogen from agricultural sources, which may be a factor at some sites where the habitat occurs.
8.2 Main purpose of the measures taken	Measures aimed at reducing damaging impacts from current pressures - such as lack of management - and future threats. 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	Measures are required both inside and outside SACs. Rural Development Plan (RDP) funds are being used to develop Conservation Management Plans and to potentially implement management measures which will benefit the habitat at West Fermanagh Scarplands SAC, in addition to several other SACs which may contain the habitat. Several areas of the habitat across NI - both within designated sites and outside - may be entered into the Environment Farming Scheme (EFS), which aims to implement sympathetic management that should improve the condition of the habitat.

10.1 Range	The current range of the habitat is naturally limited by rainfall, temperature and rock chemistry. Although data on distribution is limited, no loss in range has been recorded in the habitat on SACs or ASSIs since the condition assessment programme was introduced in 2002 - hence Range assessment for H7220 is Favourable.
10.2 Area	Based upon monitoring of protected sites, there are no indications that the extent of this habitat has declined since 1988, but the resource has not been fully surveyed across NI. Hence the judgement is Unknown.
10.3 Specific structure and functions	CSM data for the only SAC for the habitat shows that the habitat here is in favourable condition. However, there is no accurate estimate of the total area of the habitat in NI, so it is doubtful if this single assessment can be judged to be representative of the overall NI resource. This suggests a judgement of Unknown for the structure and function parameter for H7220.
10.4 Future prospects	Given the poor information on the extent and condition of the habitat across NI, and the uncertain future impacts of air pollution and climate change, future prospects are predicted as Unknown.
10.5 Overall assessment of Conservation Status	Range is Favourable. Extent has been assessed as Unknown. Structure and function is Unknown. Future prospects are Unknown with climate change impacts currently unpredictable and atmospheric Nitrogen deposition still a threat. Hence an overall Unknown assessment.
11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network	The habitat is represented at 1 SAC in NI - West Fermanagh Scarplands. Note that the extent of the habitat at this site has been more accurately estimated at 0.5 ha, rather than the 1 ha that was estimated for the last Article 17 report.
11.3 Surface area of the habitat type inside the network; Method used	The habitat has been mapped at West Fermanagh Scarplands SAC. Reported as Complete survey.
11.4 Short term trend of habitat area in good condition within the network; Direction	Assessment of stable based upon recent condition assessment data for the habitat on the SAC, which has not changed since the previous assessments. Again, it should be noted that the Condition Assessment methodology is generally not sensitive in detecting the impacts of atmospheric Nitrogen deposition on the habitat.
11.5 Short term trend of habitat area in good condition within the network; Method used	Assessment based upon recent condition assessment data from West Fermanagh Scarplands SAC. It should be noted, however, that the Condition Assessment methodology is generally not sensitive in detecting the impacts of atmospheric Nitrogen deposition.