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:

H6520 - Mountain hay meadows

ENGLAND

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 (England information only)**
1.2 Habitat code	**6520 - Mountain hay meadows**

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	Rodwell, J.S., Morgan, V., Jefferson, R.G. and Moss, D., 2007. The European Context of British Lowland Grasslands. JNCC Report 394. Joint Nature Conservation Committee, Peterborough. Natural England and RSPB 2014 Climate Change Adaptation Manual: Evidence to support nature conservation in a changing climate. Natural England Commissioned Research Report no. 546. Janssen, J.A.M. and 48 others 2016 European Red List of habitats. Part 2. Terrestrial and freshwater habitats. European Union, Luxembourg. JNCC reporting data for H6520 submittted to EU for the 2013 Article 17 reporting round. Bullock, J.M., Jefferson, R.G., Blackstock, T.H., Pakeman, R. J., Emmett, B. A., Pywell, R. J., Grime, J. P. and Silvertown, J. W. 2011. Chapter 6: Semi-natural grasslands. In: The UK National Ecosystem Assessment Technical Report. UK National Ecosystem Assessment, UNEP-WCMC, Cambridge. Hewins, E.J., Pinches, C., Arnold, J., Lush, M., Robertson, H. and Escott, S. 2005. The condition of lowland BAP priority grasslands: results from a sample survey of non-statutory stands in England. English Nature Research Reports 636. English Nature, Peterborough. Jefferson, R.G. (2005) The conservation of upland hay meadows in Britain: a review. Grass and Forage Science, Volume 60, Issue 4, 322 -331 Pinches, C.E., Gowing, D. Stevens, C., Fagan, K & Brotherton, P. (2013) Upland Hay Meadows: What management regimes maintain the diversity of meadow flora and populations of breeding birds. Natural England Evidence Review 005. Natural England Commissioned Report 138 (2014) Long term effectiveness of Environmental Stewardship in conserving upland hay meadows in the Pennine Dales. Natural England. Natural England Commissioned Report 139 (2014) Upper Teesdale: changes in upland hay meadow vegetation over the past twenty to thirty years - results presented from botanical surveys. Natural England. Natural England CMSi condition data Wheeler, B. & Wilson, P. (2014) The effectiveness of Higher Level Stewardship for maintaining and restoring species-rich grasslands:a resurvey of a sample of grasslands under HLS options HK6 and HK7. LM0443. Report to Defra.

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

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			
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 10	c) Best single value 8.7
5.3 Type of estimate	Best estimate		
5.4 Surface area Method used	Complete survey or a statistically robust estimate		
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			
5.10 Long-term trend Direction			
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 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 1.6	Maximum 1.6

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

	b) Area in not-good condition (km²)	Minimum 1	Maximum 1	
	c) Area where condition is not known (km²)	Minimum 6.1	Maximum 6.1	
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	2007-2018			
6.4 Short-term trend of habitat area in good condition Direction	Decreasing (-)			
6.5 Short-term trend of habitat area in good condition Method used	Complete survey or a statistically robust estimate			
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	The figures show that 69% is in good condition and 31% are in unfavourable condition on SSSIs, however within H6520 SACs only 26% of the habitat is determined to be in favourable condition, with a further 36% in unfavorable recovering conditin and 5% in unfavourable condition. The remaining 33% had not been condition assessed perhaps helping to explain the mismatch between SSSI and SAC condition. However, despite significant coverage of AESs and high levels of designation) numerous other studies have also revealed declines in previously high quality mountain meadows. Pacha & Petit, (2008) showed a significant decline in quality of a sample of meadows in the Yorkshire Dales, and reduction in the frequency of the wood cranesbill. Botanical quality was negatively correlated with fertiliser inputs, grazing intensity and degree of isolation. O'Reilly (2010) surveyed 500 meadows as part of the North Pennines AONB Partnership 'Hay Time' project. Comparison with Nature Conservancy Council (NCC) surveys from the 1980's band revealed that only 20% of those originally deemed highest quality still remained species-rich with around half of SSSI meadows having declined significantly. Analysis of scheme monitoring data found that application of nitrogen and early cutting were the most important management effects on vegetation quality, whilst the strongest soil gradient explaining differences in botanical composition was extractable phosphate, separating species associated with unimproved and improved grassland. In a targeted study of meadows in Teesdale, Starr-Keddle, (2012) also found an association between declining botanical quality and higher phosphate levels and long-term use of inorganic fertilisers. Whilst nitrogen is often seen as the key nutrient that can give a rapid increase in productivity and yield, evidence suggests that vegetation responses are largely dictated by whichever macro nutrient is in shortest supply and is limiting growth. In 2013 Natural England undertook a systematic evidence review (Pinches et al. 2013) to determine what types, rates of application and timing/periodicity of nutrient and lime applications maintain the floristic diversity and breeding bird populations of upland hay meadows. Key to this review were the findings of a Defra funded experiment which ran over 12 years and sought to identify sustainable nutrient regimes on upland and lowland hay meadow vegetation. The findings suggest that the rates previously allowed under ESA Tier 1 management (up to 12.5 tonnes of farm yard manure (FYM) per hectare per year plus up to 25 kg nitrogen, 12.5 kg phosphate and 12.5 kg potassium per hectare per year) and even Tier 2 inputs (FYM at a maximum rate of 12.5 tonnes per hectare per year) were too high, although some farmers have argued that limits on fertiliser use			

have in fact contributed to declining botanical quality, as well as agricultural productivity. As a consequence under the new scheme Countryside Stewardship inputs are limited to a maximum of 12 tonnes of FYM per hectare annually, or 9kg N, 10kg P and 69 Kg K per hectare, with the option of less frequent application (Pinches et al, 2013). The need to tailor inputs based on soil nutrient status, past fertility management and conservation objectives, such as the potential for further restoration for each individual meadow is emphasised to help imporve botanical condition. Changes in other management factors, for example the duration and intensity or spring grazing has also been determined to impact on meadow condition. Closing meadows before mid-May, and maintaining a spring sward height of at least 5cm has been found to maintain floristic diversity, to maintain populations of annual species such as yellow-rattle (Rhinanthus minor) and allow the development of ripe seed before cutting. Research indicates that vigorous spring grazing in warm, wet springs when plant growth and development is highest is likely to have a greater impact than in cool springs. Note that the figures given in section 6.2 are based on data from the UHM Priority habitat with which H6520 has direct correspondence. The figure used in 5.2c derives from a different source which is judged to be more accurate for use as an area estimate. Thus the condition figures given under 6.2 for H6520 have been scaled so that they align with the habitat area figure given under 5.2c and are considered to be representative of its condition.

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Intensive grazing or overgrazing by livestock (A09)	H
Reseeding of grasslands and other semi-natural habitats (A13)	M
Application of natural fertilisers on agricultural land (A19)	H
Application of synthetic (mineral) fertilisers on agricultural land (A20)	M
Use of plant protection chemicals in agriculture (A21)	M
Drainage for use as agricultural land (A31)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Mowing or cutting of grasslands (A08)	H
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	H
Increases or changes in precipitation due to climate change (N03)	M

Threat	Ranking
Intensive grazing or overgrazing by livestock (A09)	H
Reseeding of grasslands and other semi-natural habitats (A13)	M
Application of natural fertilisers on agricultural land (A19)	H
Application of synthetic (mineral) fertilisers on agricultural land (A20)	M
Use of plant protection chemicals in agriculture (A21)	M

Drainage for use as agricultural land (A31)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Mowing or cutting of grasslands (A08)	H
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	H
Increases or changes in precipitation due to climate change (N03)	M

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified 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)
Maintain existing extensive agricultural practices and agricultural landscape features (CA03)
Adapt mowing, grazing and other equivalent agricultural activities (CA05)
Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
Manage drainage and irrigation operations and infrastructures in agriculture (CA15)
Implement climate change adaptation measures (CN02)
Recreate Annex I agricultural habitats (CA07)
Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)
Adopt climate change mitigation measures (CN01)

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	

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

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)	a) Minimum b) Maximum c) Best single value 5.15
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	Decreasing (-)
11.5 Short-term trend of habitat area in good condition within network Method used	Based mainly on extrapolation from a limited amount of data
11.6 Additional information	

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

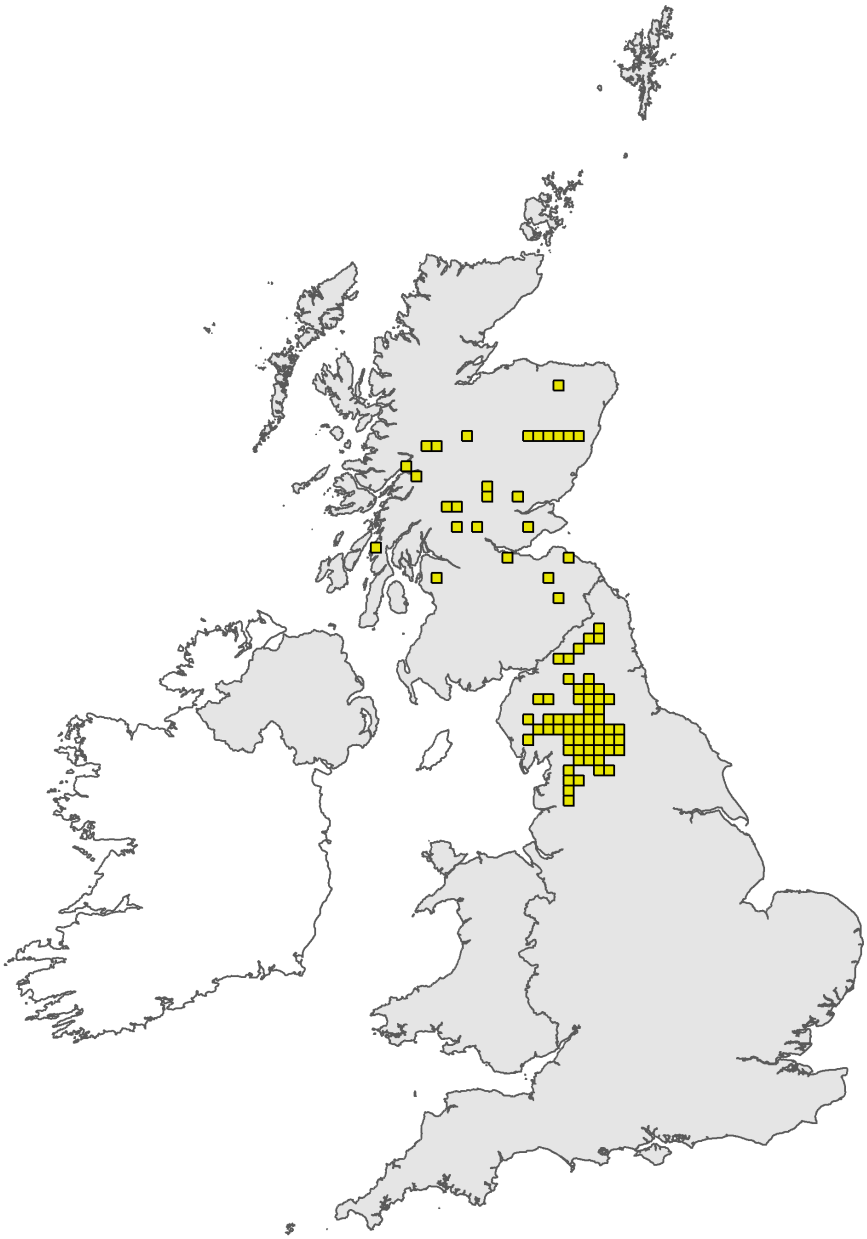

Figure 1: UK distribution map for H6520 - Mountain hay meadows. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

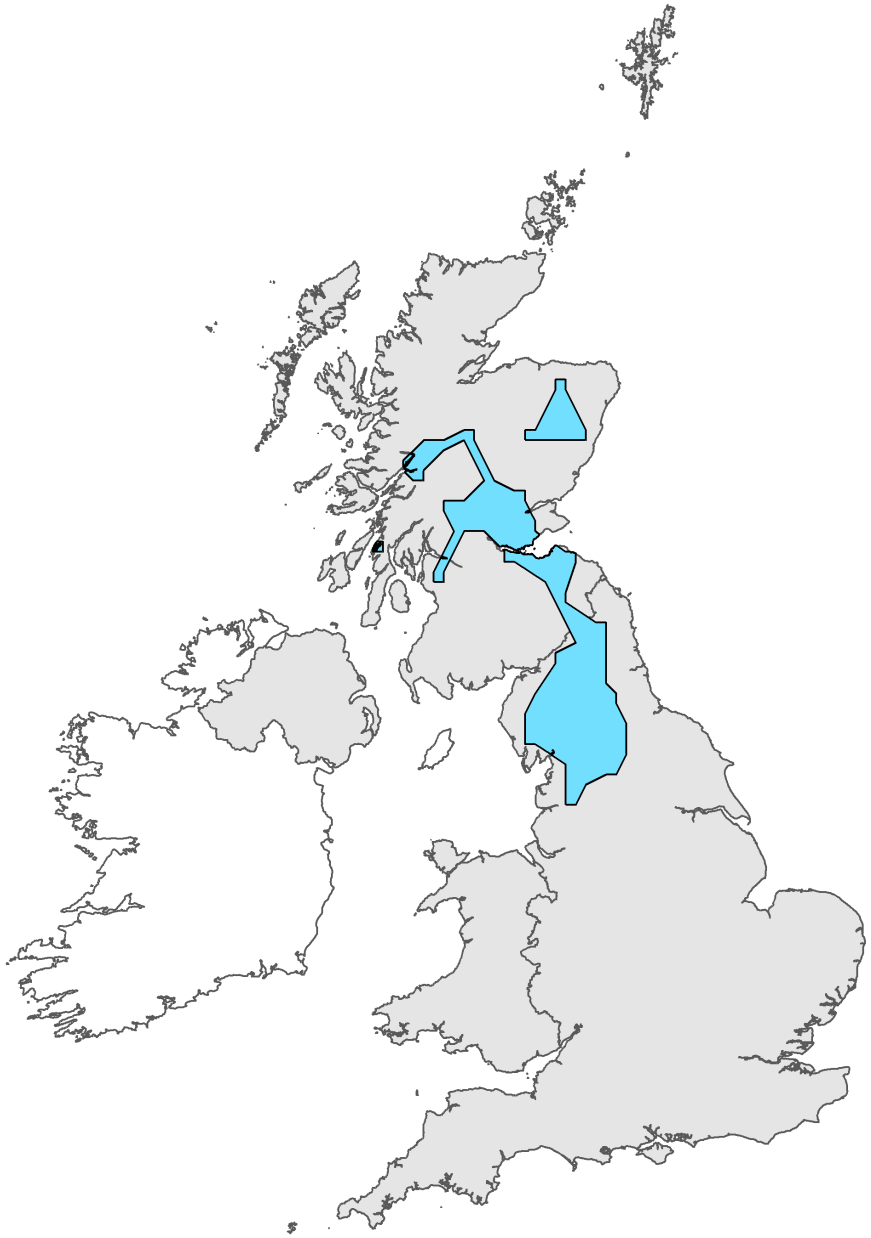

Figure 2: UK range map for H6520 - Mountain hay meadows. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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: 6520 Region code: ATL

Field label	Note
3.2 Sources of information	The data and information that underpin the assesments in sections 4-11 are drawn from a variety of sources including the sources listed in section 3.2 plus expert opinion and external intelligence. The data and assessments in section 6.1- 6.5 are drawn from data on statutory sites only (SSSIs including SACs) and are not deemed to be fully representative of the resource as a whole (i.e including resource outside of SSSIs). There is no recent data on the resource outside of statutory sites although an England-level sample survey is in under way and will provide condition and extent information on Mountain Hay Meadows later this year. Data on habitat area within N2K sites is taken from CMSi. In addition, the following sources have been used to populate the sections on range (4) and habitat area including trends (5),structure and function (6.8), pressures and threats (7) and conservation measures (8): i) Published documents as listed in section 3.2 ii) Expert opinion and informal 'specialist intelligence' including that derived from casework iii) Data from the previous 2013 Article 17 reporting round iv) Wide scale and geographic and site-based survey and monitoring data as listed in section 3.2