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:

H6150 - Siliceous alpine and boreal grasslands

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this habitat, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this habitat is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was only relevant at UK-level (sections 10 Future prospects and 11 Conclusions).
- For technical reasons, the country-level future trends for Range, Area covered by habitat and Structure and functions are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

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

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

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Habitat code	**6150 - Siliceous alpine and boreal grasslands**

2. Maps

2.1 Year or period	1989-2012
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	Averis, A. 2001. Vegetation survey of selected proposed extensions to the Eryri SAC comprising parts of the Glyderiau and Carneddau SSSI, Gwynedd, Wales. CCW Science Report 448. Averis, A., 2002. Vegetation survey of the eastern part of the Carneddau SSSI and cSAC, Conwy, Summer 2001. CCW Science Report 535. Averis, B. 2002. Vegetation survey of parts of the Migneint-Dduallt area, North Wales 2001. CCW Science Report 533. Averis, A.B.G. and Averis, A.M., 2000. Vegetation survey of Cadair Idris National Nature Reserve, Gwynedd Wales: August - September 1999. Averis, B. & Averis, A., 2002. Vegetation survey of the western part of the Carneddau, Eryri Site of Special Scientific Interest and candidate Special Area of Conservation NW Wales 2002. CCW Science Report 577. Averis A. & Averis, B, 2004. Vegetation survey of Rhinog Site of Special Scientific Interest, 2003. CCW Science Report 654. Burn, A.M., 1989. Upland Vegetation Survey, Site Report No.23: Eryri (Glydeiriau, Carneddau, Y Wyddfa & Cwm Dwythch). Chater, A.O. 2010. Flora of Cardiganshire. Gray, D.A., 2002. NVC Survey of proposed extensions to Eryri cSAC (Glydeirau and Y Wyddfa). CCW Contract Science Report 517. Guest, D. 2012. Assessing N deposition as a pressure for Article 17 reporting on habitats. CCW HQ internal document. Harrison, T. 2010. Eryri SAC. 6150: Siliceous alpine and boreal grasslands. SAC Monitoring report. Harrison, T. In prep. Eryri SAC Monitoring Summary report. Siliceous alpine and boreal grassland. Monitoring Round 2013 to 2018. Leishman, R.G. 2007. The distribution of Salix herbacea on the Glyderau and evaluation of habitat quality. CCW Contract Science Report 828. Bangor: Countryside Council for Wales. NRW. 2015. Natura 2000 Thematic Action Plan. Air pollution: Nitrogen deposition. LIFE Natura 2000 Programme for Wales. NRW. 2017. Actions Database. NRW internal database. NRW. 2018. Briefing Note. Article 17, 2013-18: Pressures, threats and conservation measures guidance. Internal NRW document. Prosser M.V. & Wallace H.L. 1996. Cwm Idwal NNR : NVC Survey 1995.

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Stevens, J., Sherry J. & A Turner. 2012. H6150 Siliceous Alpine and Boreal Grassland Inventory.
Sutton, M. 2012. Survey of Summit Vegetation on Pumlumon SSSI. CCW Report.
Turner, A. CCW, 1996-1998 Glyderiau (GIS data, no report).
Turner, A. 2012. Changes in the composition of low-alpine grassland and heath on the Carneddu Mountain Group, North Wales over the period 1951-2011. CCW Staff Science Report Final Draft
Wales Audit Office. 2012. Annual Improvement Report. Snowdonia National Park Authority
Welsh Government. 2018. Woodlands for Wales: The Welsh Government's Strategy for Woodlands and Trees.

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	Improved knowledge/more accurate data	
	The change is mainly due to:	Improved knowledge/more accurate data
4.12 Additional information		

5. Area covered by habitat

5.1 Year or period	1989-2012		
5.2 Surface area (in km²)	a) Minimum	b) Maximum	c) Best single value 0.84
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	2003-2017		
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	1951-2017		
5.10 Long-term trend Direction	Stable (0)		
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)		

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	b) Operator	
	c) Unknown	No
	d) Method	
5.14 Change and reason for change in surface area of range	Improved knowledge/more accurate data	
	The change is mainly due to:	Improved knowledge/more accurate data
5.15 Additional information		

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum	0	Maximum	0
	b) Area in not-good condition (km²)	Minimum	0.775	Maximum	0.775
	c) Area where condition is not known (km²)	Minimum	0.062	Maximum	0.062
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	2007-2017				
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	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					

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Intensive grazing or overgrazing by livestock (A09)	H
Mixed source air pollution, air-borne pollutants (J03)	H
Sports, tourism and leisure activities (F07)	M

Threat	Ranking
Intensive grazing or overgrazing by livestock (A09)	H
Mixed source air pollution, air-borne pollutants (J03)	H

7.2 Sources of information	
7.3 Additional information	

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
8.2 Main purpose of the measures taken	Restore the habitat of the species (related to 'Habitat for the species')	

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8.3 Location of the measures taken	Only inside 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	

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

Maintain existing extensive agricultural practices and agricultural landscape features (CA03)

Reduce impact of mixed source pollution (CJ01)

Reduce impact of outdoor sports, leisure and recreational activities (CF03)

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 0.82
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

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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

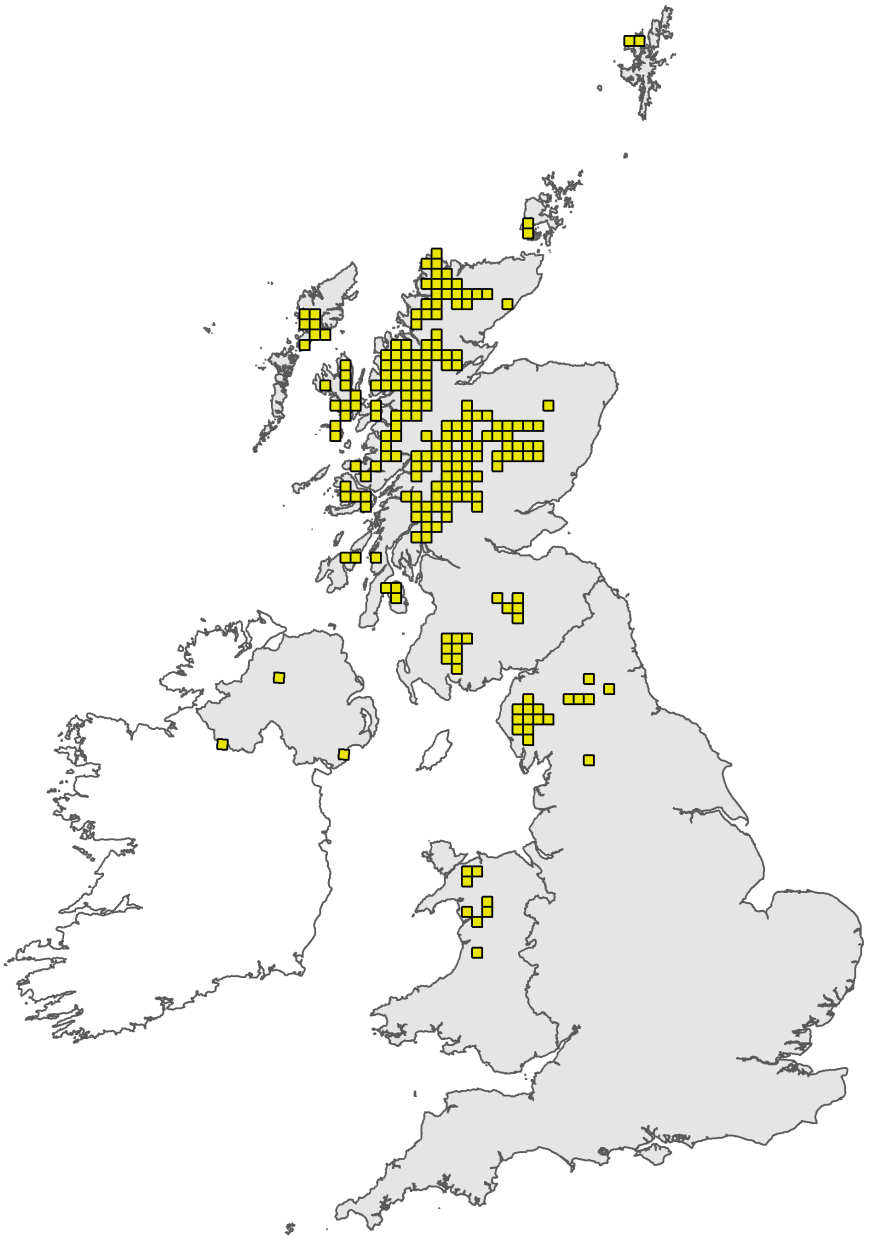

Figure 1: UK distribution map for H6150 - Siliceous alpine and boreal grasslands. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

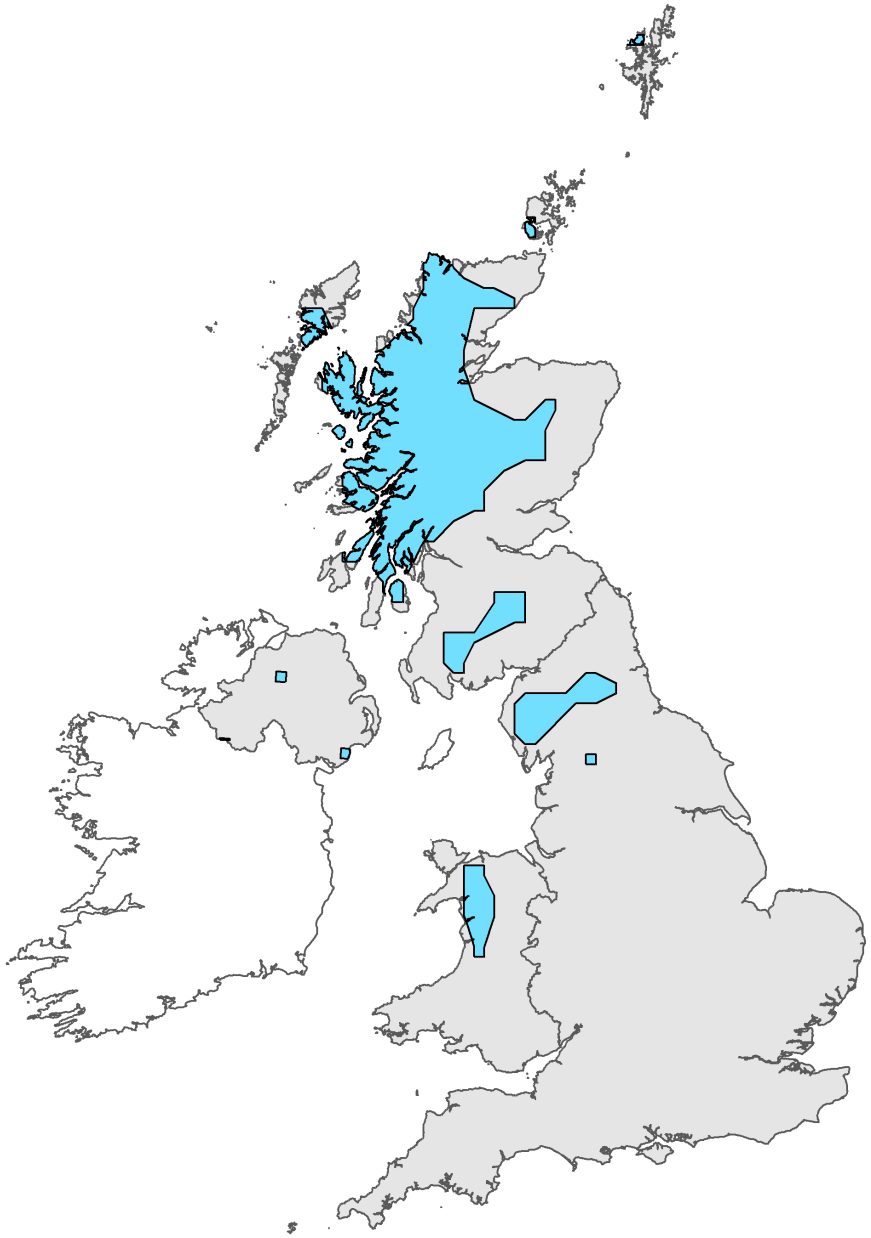

Figure 2: UK range map for H6150 - Siliceous alpine and boreal grasslands. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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: 6150

Field label	Note
2.3 Distribution map; Method used	H6150 has been mapped based on the occurrence of the following NVC communities; U10 Carex bigelowii - Racomitrium lanuginosum moss-heath, U7 Nardus stricta-Carex bigelowii grass-heath, and U8 Carex bigelowii-Polytrichm alpinum heath; and the Phase 1 Birks and Ratcliffe community E1 Racomitrium lanuginosum - Carex bigelowii heath. Additional records have been included for key species as described below. Distribution of H6150 has been derived from a number of data sources; mapped polygon information has been collated from a series of Upland NVC Survey reports (see published sources) undertaken on designated sites between 1996 to 2004 and from the Wales Field Unit Upland Vegetation Survey for Eryri (Burn, 1989); records for Carex bigelowii and Salix herbacea from the Flora of Cardiganshire were used to identify H6150 on Pumlumon (Chater, 2010) and from one personal observation for Aran Fawddy (Turner, 2012). A GIS-based inventory for the habitat was produced using both of these data sources (Stevens, Sherry & Turner, 2012). Most of the field data were collected before 2007. The continued presence of the habitat has been confirmed by SAC monitoring work in Eryri which includes the bulk of the habitat: on the Carneddau part of Eryri SAC in 2010 (Harrison, 2010) and the Glyderau part of the SAC in 2017 (Harrison, in prep.). In addition, in Eryri there has been a study of long-term change of low-alpine grassland and heath in the Carneddau Mountains in 2011 (Turner, 2012) and, in Pumlumon a survey of alpine and boreal vegetation (Sutton, 2012). This is considered a partial dataset and more work needs to map areas of habitat particularly in locations where species data have been used to identify its presence.

Habitat code: 6150 Region code: ATL

Field label	Note
4.3 Short term trend; Direction	See 4.11
4.11 Change and reason for change in surface area of range	The change is entirely due to an error made in the location of one of the 10km grids supplied in 2013. This has been rectified for this reporting round. There has been no additional survey in the intervening period and no reported changes to range during SAC monitoring.
5.3 Type of estimate	All extent data were collected pre-2007. The continued presence of the habitat has been confirmed by SAC monitoring work at locations in the Eryri SAC which supports the majority of the habitat in Wales (Harrison, 2010; Harrison, in prep.). In addition, in Eryri there has been a study of long-term change of low-alpine grassland and heath on the Carneddau Mountains in 2011 (Turner, 2012) and in Pumlumon a survey of alpine and boreal vegetation (Sutton, 2012). Area figures were calculated using polygon data from the Upland NVC surveys and Upland Field Unit Surveys (see published sources); this totals 80.13 hectares. The size of polygons varies from 0.001 ha to 13.39 ha. There are an additional nine locations where there is no polygon data. Based on the mean polygon size the total extent is estimated at 83.64 ha.
5.4 Surface area; Method used	see 2.3

5.8 Short term trend; Method used	This is an estimate based on partial data with some extrapolation and is based largely on assessment made in 2012. The assessment of changes to the habitat on the Carneddau (Turner 2012) suggest that the overall extent has remained stable since 2003. A similar pattern of no change in extent is believed to have occurred elsewhere across the range of the habitat. Since 2012, repeat monitoring of the habitat only on the Glyderau part of Eryri SAC has been undertaken (Harrison 2010; Harrison, in prep.) and does not show any change in extent.
5.12 Long term trend; Method used	The assessment of changes to the habitat on the Carneddau (Turner, 2012) suggests that the overall extent has remained stable since the 1950s. A similar pattern of no change in extent is believed to have occurred elsewhere across the range of the habitat. Since 2012, repeat monitoring of the habitat on the Glyderau part of Eryri SAC has been undertaken (Harrison 2010; Harrison, in prep.) and does not show any change in extent.
5.14 Change and reason for change in surface area	There has been no additional survey in the intervening period and no reported changes to extent during SAC monitoring.
6.2 Condition of habitat; Method used	Assessment of structure and function within SACs is based mainly on the results of common standards monitoring visits undertaken in 2010 and 2017 (Harrison 2010; Harrison, in prep.). Monitoring by Leishman (2007) and the Carneddau vegetation change work (Turner, 2012) are also utilised to inform condition and trends. Harrison (2010) reported that whilst at most locations positive indicator species were present, the cover of negative indicators, notably grasses and common sub-alpine forbs, did not meet the target of<10%. There is therefore a risk of the negative indicator species out-competing the distinctive alpine and boreal species as the former tend to be more resistant to grazing pressures. On the Glyderau, all other attributes passed, but on the Carneddau, 46% of points also failed for showing signs of excessive grazing. Overall, 33.3% of samples were considered to pass in Glyderau and12.4% in Carneddau (at least 90% pass is required for favourable condition to be achieved). Turner (2012) shows a relatively complex pattern of change since the 1950's with a significant decline in habitat quality followed by a partial recovery- Low cover of Racomitrium; this has significantly decreased in siliceous alpine and boreal grassland at the majority of Carneddau locations over the periods 1951/53 to 1993 and 1951/53 to 2003 and has shown only slight recovery over 1951/53 to 2011; Change in macrolichens is complex, with significant decreases between 1951/53 to 1993 at 3 locations but an increase at 2 of these locations over the period 2003 to 2011. However, where there has been an increase in macrolichens there has been a decline in the frequency and abundance of characteristic low-alpine Cetraria species and Cladonia subgenus Cladina. Cetraria islandica, for example, has disappeared almost completely at all sites; Initial increase in bare ground and rock and a subsequent decline- No consistent changes in the cover of graminoids and other arctic-alpine species e.g. Salix herbacea, Diphasiastrum alpinum and Carex bigelowii. Harrison (in prep.) monitored just the Glyderau section of Eryri SAC in 2017. This was found to still be in unfavourable condition, with increases in negative indicator species since 2007 (T. Harrison pers. com., 2018). Over-grazing still appears to be the main cause of poor condition. Eryri SAC has 93% of the habitat extent in Wales.
6.3 Short term trend of habitat area in good condition; Period	These are the years between the most recent two monitoring visits covering both the Carneddau and Glyderau parts of the SAC.
6.5 Short term trend of habitat area in good condition; Method used	Harrison (2010) concluded that the condition of the habitat was 'unlikely to have declined' between 2007 and 2010. Initial analysis of the monitoring of the Glyderau H6150 in 2017 (Harrison, in prep.) suggests an increase in negative indicators but a general increase in positive indicators. The Eryri SAC supports 93% of the total area of the habitat in Wales.

7.1 Characterisation of pressures/ threats	Pressures: Data held in NRW's Special Sites Actions Database (NRW, 2017), which provides information on 'issues' affecting habitats and species within the protected sites series in Wales, were used to provide a basis for quantifying pressures/threats relating to the habitat, following procedures outlined in NRW, 2018. Information in the SAC reports (Harrison 2010; Harrison, in prep.), Leishman (2007), and the study of the Carneddau (Turner, 2012) was also utilised. These sources identify two principal pressures: grazing (A09) and recreation (F07). The first of these is considered to have a high impact, being listed as an issue on 95% of SSSI units with the habitat, and the second a moderate impact (an issue on 33% of units) from analysing the data from the Actions Database. The 2010 and 2017 SAC Monitoring reports (Harrison 2010; Harrison, in prep.), also identified grazing as a major continuing issue on the alpine and boreal vegetation. A critical load level of 5 kg ha/year (lower level) of atmospheric nitrogen has been formally allocated to this habitat. Air pollution (N deposition) (J03) is assessed separately using a defined approach (Guest, 2012), using updated deposition data. Using a data overlay method in ARC GIS, 100% of the habitat by area (polygon data) was recorded at or above the lower Critical Load limit and the habitat is given a High ranking. The remaining Pressures are given Low risk ranking. They include burning (A11 and H04), which is far more likely to occur to heathland or scrub at lower altitudes but could, in very dry conditions, spread to examples of the habitat containing prominent woody plants. The impacts of climate change (N01 & N02) on the habitat are unclear, but increased temperature and droughts could eventually impact a range of montane plant communities. Threats: These were assessed in a similar way to pressures. However, issues in the Actions Database which were listed as 'complete' or 'underway' were excluded from the assessment of threats. The results are very similar to those for Pressures, but F07 receives a Low ranking using the set criteria (NRW, 2018), reflecting some recent success in dealing with this issue. Despite modest projected reductions in the overall deposition rates for atmospheric nitrogen, air pollution (J03) is expected to remain a High pressure (threat) to the habitat (Guest, 2012).
8.5 List of main conservation measures	Using data from the Actions Database, 100% of Actions relevant to the habitat are either Identified, Underway or Completed. 100% of SSSI management units have at least one Action. As 99.5% of the habitat falls within statutory sites, it is concluded that Conservation Measures are therefore largely identified or taken. 98.6% of H6210 total area occurs on SACs. On sites where the habitat is a SAC feature, Thematic Action Plans have been produced; these provide priorities for each theme. NRWs Actions Database (NRW, 2017) lists 21 management units with H6150 as a key feature, 18 of which have Actions expected to have a positive impact on the habitat in the next 12 years (Actions listed as Completed, Underway, Planned or Agreed in principle); 56% of these are listed as completed or underway. The principal Action recorded is CA05 (95% of all units), mainly aimed at reducing grazing management (Pressure/Threat A09). It should be noted, however, that grazing prescriptions are generally not specifically aimed at the habitat, as it often comprises only small proportions of grazing units; therefore, grazing on the habitat may remain higher than is appropriate for the habitat. CF03 is an Action on 33% of units. It is aimed at combating/preventing recreational damage (Pressure/Threat F07). SSSI management agreements and Glastir options help to maintain extensive agricultural practices (CA03). An estimated 30% by area of the habitat in Wales is covered by a Glastir grassland option aimed at reducing stocking. (Pressure/Threat A09). CJ01: The Natura 2000 Thematic Action Plan sets out the policy surrounding air pollution in Wales. There are various air quality strategies and initiatives in place to protect and enhance biodiversity. 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, however, is still a major issue on semi-natural habitats in the UK. These regulations are not habitat-specific (NRW, 2015). (Pressure/Threat J03).

9.1 Future prospects of parameters	9.1a Future prospects of - range Given the pressures and threats to this habitat and stability of area over the next 12 years, range is predicted to remain stable. 9.1b Future prospects of -area The evidence from SAC monitoring suggests the habitat on Eryri SAC has been stable in area over at least the past two monitoring rounds (see 5.3). This site comprises 93% of the habitat in Wales. There is limited knowledge of the other examples of the habitat however, and further information on these is highly desirable. 9.1c Future prospects of -structure and function The habitat is in poor condition on Eryri SAC, to a large extent due to over-grazing (see 6.2). Conservation measures are in place to deal with grazing across the statutory site network, but grazing management prescriptions are largely not specific to the habitat and may need tailoring (see 8.5). Nitrogen deposition levels are another major issue for the habitat as 100% of the habitat area in Wales currently exceeds the critical load (CL) for atmospheric nitrogen deposition and only a modest projected decrease in total deposition in the Principality is projected over the next 12 years.
11.4 Short term trend of habitat area in good condition within the network; Direction	The habitat on Eryri SAC was considered to be in unfavourable condition during the most recent monitoring in 2010 and 2017 (Harrison, 2010; Harrison, in prep.), although a portion of the plots recorded were in good condition (see 6.2). Monitoring of Eryri SAC concluded that the condition of the habitat was 'unlikely to have declined' between 2007 and 2010 (Harrison, 2010). Initial analysis of the monitoring of the habitat on just the Glyderau section in 2017 suggests an increase in negative indicators but a general increase in positive indicators (T. Harrison pers. com., 2018). See 6.5 for details. The Eryri SAC supports an estimated 93% of the total area of the habitat on SACs in Wales. No information is available for the remaining 7%.
11.5 Short term trend of habitat area in good condition within the network; Method used	Monitoring of the whole Eryri SAC last took place in 2010 (Harrison, 2010); monitoring of the Glyderau section took place in 2017 (Harrison, in prep.). The SAC holds an estimated 94% of the habitat extent within SACs in Wales.