Long Mynd

1. Introduction

Natural England (NE) and its predecessors has carried out a series of monitoring programmes on many upland sites in England that contain Priority Habitats, including dry and wet heath, blanket bog and calcareous grassland. These sites have been managed under agri-environment schemes for up to two decades or more, and some were formerly also subject to grazing restrictions under Environmental Cross Compliance (ECC) regulations. Monitoring focussed initially on the condition of heather (*Calluna vulgaris*) in relation to grazing pressure, and latterly also on the overall condition of the vegetation across the range of habitats present on a site.

The aim of this project was to re-survey a selection of these sites using standardised methods, and to provide a series of individual site reports describing their current and changing habitat condition, along with a separate overview of the findings from the complete set of sites. Data from the surveys have also been provided to NE to allow more detailed examination of individual sites to help guide local management inputs.

Each site comprised a whole moorland grazing unit and encompassed a range of vegetation types. A range of variables was recorded at 100 randomly located sample points in each site. Variables to be recorded were agreed with NE prior to the survey, to assess heather grazing and the condition of key habitats. The methodology was based on a modified version of the NE overgrazing surveillance methodology (including laboratory assessment of a heather Grazing Index) and the Common Standards Monitoring (CSM) Guidance for Upland Habitats. Full details of the project objectives and methodology are given in the main overview report - Defra, UK - Science Search.

The Long Mynd site was surveyed during 23 – 25 April 2014. Results of the survey are presented in a standard format in the following sections. Management information (particularly grazing) is also summarised from reports provided by NE. An assessment is then made of change in vegetation since the previous surveys and this is considered in the context of current and past management practices.

2. Overview

2.1 General description

The Long Mynd is located in Shropshire and covers 2230 ha. The survey area is unenclosed moorland, forming the Long Mynd SSSI. The vegetation on the moorland plateau comprises mainly heather heath dominated by mature heather, although burning and more recent cutting (presumably for grouse) has produced a patchwork of different ages in places. This gives way to heath dominated by *Vaccinium myrtillus* (especially prominent on the higher north-facing slopes of eastern valley spurs), through a transitional zone of mixed heather and bilberry heath (H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath). During the field survey, sheep appeared to be concentrated mainly on the heather dominated heath on the plateau, and a small herd of ponies was also present there. Together, these heathland vegetation types constitute 46% of sample points in 2014 with fragmented heath accounting for a further 13% of the total sample (Figure 1).

On the lower slopes and on Plush, Nover's and Bodbury Hills in the north-eastern part of the site, much of the vegetation comprises bent-fescue grassland, relatively large areas of which have been invaded by bracken with woodland ground flora species evident. Again, levels of sheep grazing

appear to be relatively high in these areas. Scrub, including *Ulex gallii*, *U. europaeus* and *Crataegus monogyna* is patchily abundant on some of the steeper south-facing slopes.

Across the site as a whole, where heather is present, the dominant growth stage was mature at over half of the sample points, with degenerate in approximately one quarter of the sample, and the remainder building or pioneer (Figure 3c). The most commonly dominant graminoid was *Deschampsia flexuosa* (Figure 3h).

2.2 Site management

A number of graziers have common rights to graze stock on the Long Mynd and overgrazing was first investigated in 1990 and 1992. Stocking densities were reduced from 5.5 ewes ha^{-1} (0.825 Livestock Units (LU ha^{-1}) in 1992 to 2.5 ewes ha^{-1} (0.375 LU ha^{-1}) in 1998. The owner and most graziers then entered into an agri-environment agreement in 1999 under Tier 1D of the Shropshire Hills Environmentally Sensitive Area (ESA). This requires a maximum summer stocking rate of 1.5 ewes ha^{-1} (0.225 LU ha^{-1}) and a maximum winter rate of 1.125 ewes ha^{-1} (0.17 LU ha^{-1})[1]. At that time a heather burning programme was re-introduced and supplementary feeding stopped. Stocking on the Long Mynd was affected in 2001 by the restrictions on stock movement during the Foot and Mouth disease outbreak. It is possible that stock numbers may have exceeded the prescribed ESA limits on parts of the site at that time. In 2009, the site entered a Higher Level Stewardship (HLS) agreement, which specified a summer (March – October) stocking rate of 0.116 LU ha^{-1} and winter (November - February) of 0.038 LU ha^{-1}, with a detailed stocking calendar with monthly maximum and minimum numbers of sheep and Welsh ponies.

A number of surveys have taken place over the last 20 or so years, and are summarised in Table 1. Early surveys focussed on grazing pressure on dwarf shrub, deriving a heather grazing index (GI) from shoots collected in the field. In ESA monitoring surveys the GI was converted to a measure of Biomass Utilisation (BU) using a mathematical function. Overgrazing surveys reverted to the more objective measure of GI. The development of the Surveillance Survey saw a more holistic approach to the assessment of grazing pressure and added the measurement of sward heights, which could be compared to threshold heights for broad habitats, below which a sample area is deemed to be heavily grazed. Other variables including dwarf shrub heights, the presence of suppressed heather growth features, bare ground, animal droppings etc are measured as part of these surveys. Surveillance surveys were often carried out on land where overgrazing measures had been implemented, but has subsequently entered an agri-environment agreement. The various types of grazing assessment survey undertaken on Long Mynd are set out in Table 1.

Table 1: Past surveys of grazing pressure and impacts on Long Mynd, with the type of survey and sampling strategy followed.

Years	Survey type	Main variables	Sampling Strategy	Sample numbers
1995	ESA monitoring	GI, BU	Random within heather	76
1994 -2000 annually	Overgrazing	GI	Grid, on heather area	
2002	Overgrazing	GI, Sward heights	Grid, on heather area	266
2006	Surveillance	GI, Sward heights	random	108

[1] Note that LU equivalents have varied among different schemes

2.3 Condition and grazing pressure in 2014

The overall mean GI for the site is relatively high (34%, Table 2), especially in fragmented heath where it is just on the threshold value that is likely to be damaging. In terms of individual samples, GI values at 48% of points throughout the heather area did not meet the CSM target of 33%, above which level grazing is likely to be damaging, (Figure 2, Table 2, Map 1), and 6 % were above a GI of 66%. These most heavily grazed points were around Callow Hollow, south east of Round Hill. Heather is relatively sparse in the fragmented heath but heavily grazed features were recorded at all sample points where it was present in that vegetation type; they were also recorded at 20% of sample points in heather heath, and 31% overall (Figure 3d, Map 2). As with the points with highest proportions of grazed shoots, there was a concentration of heavily-grazed features, which indicated longer-term grazing pressure, around Callow Bottoms and Round Hill, but also on the northern edge of the site. Detached heather stems or vegetation were also present at relatively high frequencies in both vegetation types (Figure 3g). Sheep droppings were recorded at half of the sample points on heather heath and slightly less on fragmented heath, while cattle / pony droppings were also recorded in both vegetation types at low frequencies (Figure 3f). The mean sward height at 8% of sample points where graminoids could be measured, or 6% overall, indicated that heavy grazing of grasses was likely in these areas (Map 2). There is a small concentration of such points in Callow Hollow, consistent with high levels of grazed heather shoots and heavily grazed features.

There was evidence of recent burning at one fifth of the sample points in heather heath (confined to heather-dominated heath on plateau) (Figure 3e) and a small amount of heather beetle damage was also present (Figure 3d).

The dry heath habitat failed condition assessment thresholds (targets to be passed at 90% of sample points) for levels of browsing on dwarf shrubs and number of indicator species. If the measure of dwarf shrub cover is taken as the indicator species cover attribute, which for the Long Mynd is a reasonable assumption as no *Racomitrium lanuginosum* was recorded, this threshold is similarly not met, despite an average dwarf shrub cover of around 50%, including bilberry, and including lower cover fragmented heath quadrats. This indicates that high grazing levels, both currently and in the past are an important issue on the site, but impacts are greater in some areas than others. Current burning practices, however, do not appear to be a concern and condition assessment thresholds for dwarf shrub composition are met.

2.4 Change since previous surveys

Several surveys of heather condition have been carried out on the site since the 1990s. These used different sampling regimes from that in 2014 (e.g. targeted at areas of heather) so formal analysis of change is not possible. However, some tentative comparisons can be made. A survey in 1994-95 when the ESA was first introduced concluded that heather growth was suppressed by grazing at 70% of locations sampled, within heather dominated areas. Subsequent surveys in 2002 and 2006 showed an increase in cover of bilberry but not heather. The incidence of heavily grazed features declined from 34% to 18% between 2002 and 2006 (the 2006 level being similar to that in heather heath in 2014), but changes in the GI were inconclusive due to differences in the timing of the surveys. In the heather dominated area, the proportion of sample points assessed as heavily grazed was 36% in 2002 and 43% in 2006, based on sward heights less than 5 cm and on growth forms. Where heather was dominant in the April 2002 survey, mean height was 6.4 cm, compared to the current mean of 40 cm in heather heath (the 2006 survey was done in January so is not comparable). Surveys by the National Trust from 1997 to 2012 showed an overall decline in the percentage of heather shoots grazed in that period, with steeper declines apparent after entry into the ESA agreement and again after entry into HLS.

Overall, these results suggest that management under agri-environment schemes has been relatively successful in improving the condition of dry heath on the site. However, the initial condition

was very poor, and with very high stocking levels. Collectively, the results of the current survey suggest that there has been some continuing development of heather since the previous survey in 2006. This might be partly attributable to the burning regime in place but current grazing levels, although substantially reduced over the years, are still higher than required to achieve good habitat condition. Field observations suggest that heather is continuing to decline in areas of heather heath and fragmented heath around the fringes of the plateau where it continues to be preferentially grazed despite, perhaps, improvements in heather condition on the plateau.

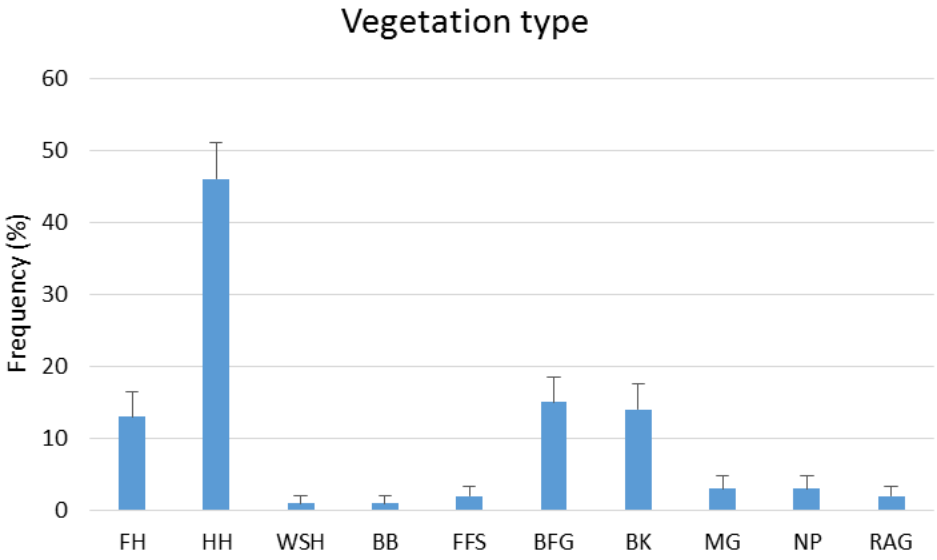


Figure 1. Frequency of vegetation types across the site in 2014. Bars are standard deviations. FH – fragmented heath; HH – heather heath; WSH – western heath; BB – blanket bog; FFS – flush, fen, & swamp; BFG – bent-fescue grassland; BK – bracken; MG – mesotrophic grassland; NP – non-productive; RAG – rough acid grassland.

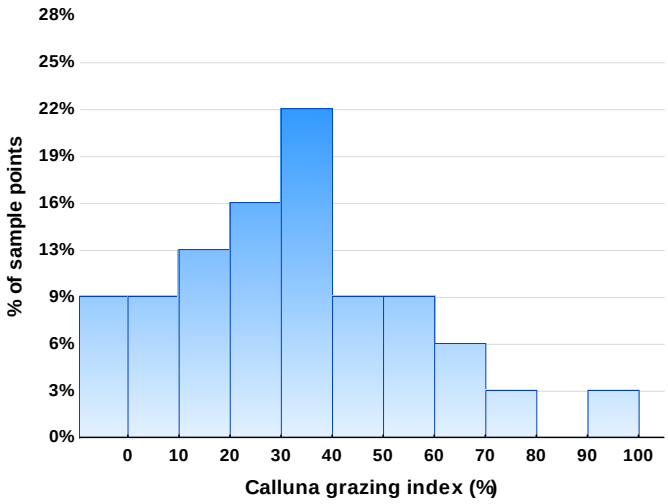
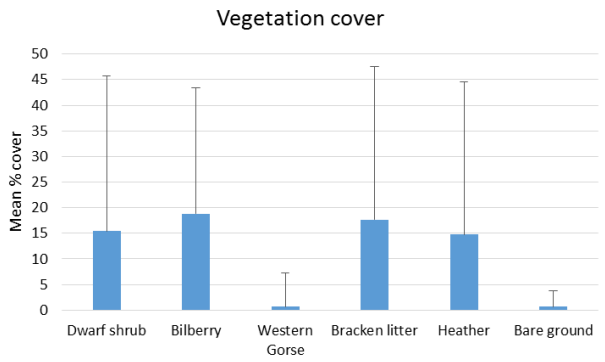


Figure 2. Frequency distribution of heather Grazing Index from sample points containing heather at whole site level in 2014.

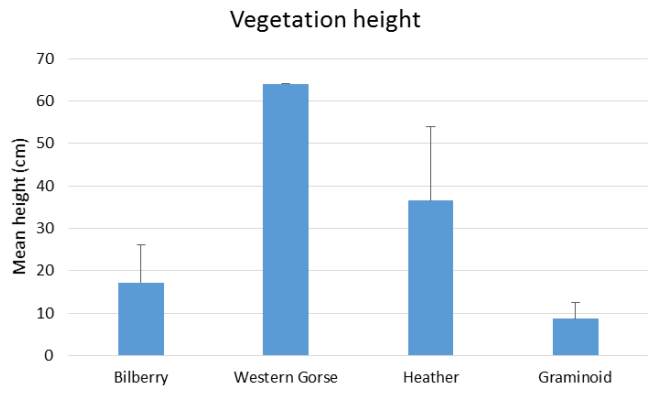
Table 2. Grazing index at site level and by target vegetation type in 2014 (mean ± standard deviation; *n* is number of sample points with heather stems).

	Overall (*n* = 32)	Fragmented Heath (*n* = 4)	Heather Heath (*n* = 25)
Grazing Index	34.0 ±23.90	48.5 ±26.42	29.4 ±19.30
Samples ≥ 33.3%	43.8%	50.0%	40.0%
Samples ≥ 66.6%	6.3%	25.0%	0.0%

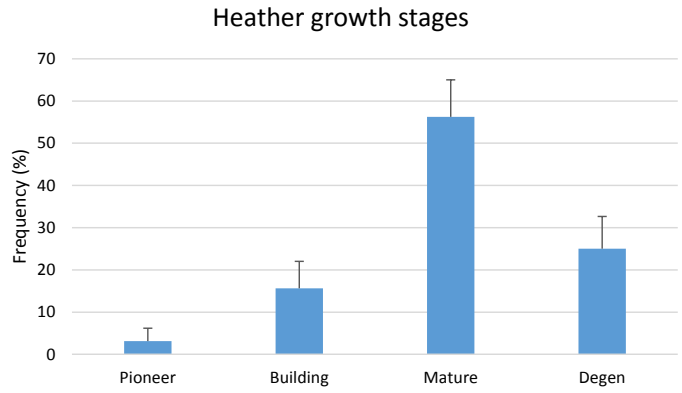
a)



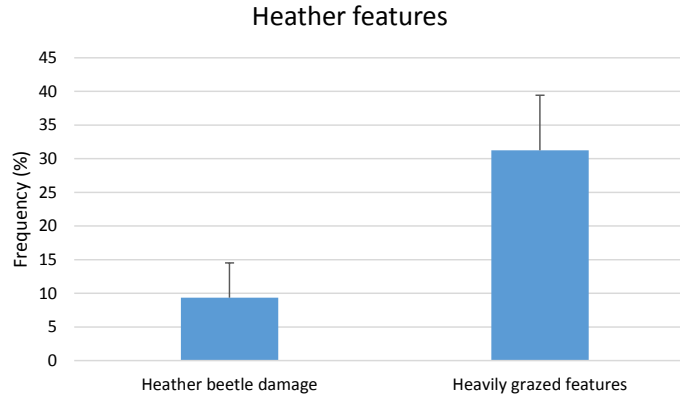
b)



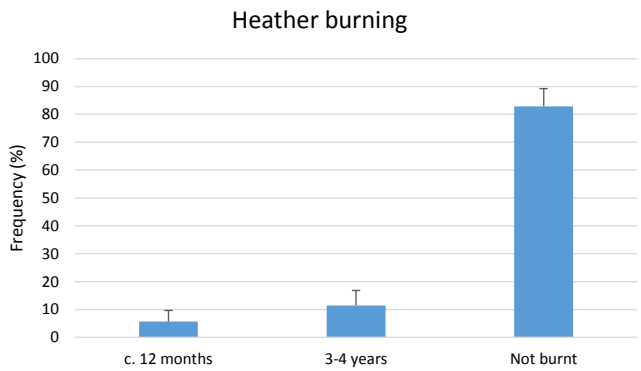
c)



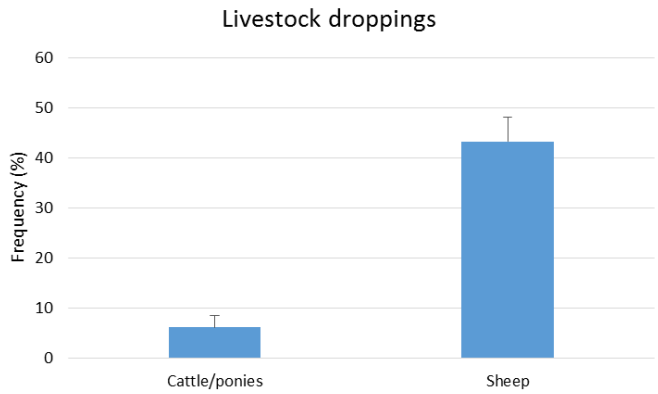
d)



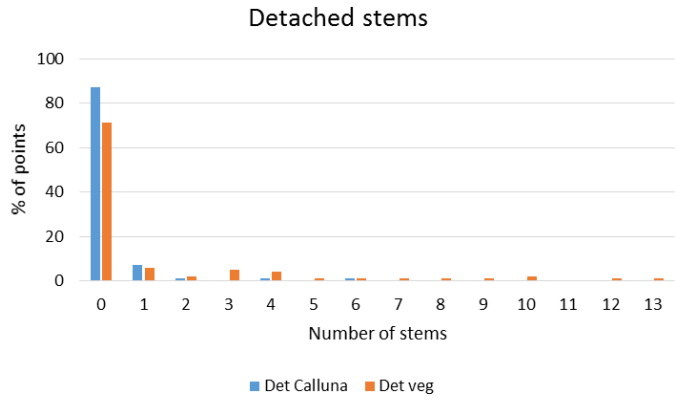
e)



f)



g)



h)

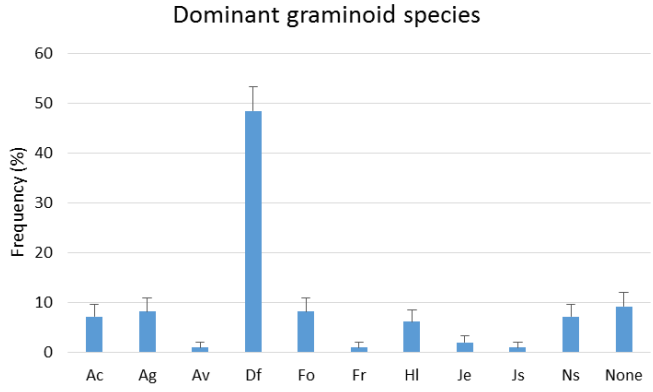


Figure 3. Surveillance variables at whole site level in 2014 (bars are standard deviations).

3. Overgrazing surveillance variables 2014

		Fragmented Heath (*n* = 13)			Heather Heath (*n* = 46)		
Category	**Variable**	**Mean**	**SD**	***n***	**Mean**	**SD**	***n***
Peat	Peat depth (cm)	14	3.7	6	13	5.3	34
Vegetation cover	Dwarf shrub cover (%)	5	13.9	13	28	37.1	46
	Bilberry cover (%)	18	15.0	13	34	26.5	46
	Western Gorse cover (%)	0	0.0	13	0	0.0	46
	Bracken litter cover (%)	19	26.2	13	3	6.0	46
	Calluna cover (%)	5	13.9	13	28	37.1	46
	Bare ground (%)	2	6.9	13	0	1.9	46
Vegetation height	Bilberry height (cm)	12	7.2	13	20	8.3	39
	Western Gorse height (cm)	0	0.0	0	0	0.0	0
	Calluna height (cm)	20	12.8	4	40	16.3	25
	Graminoid height (cm)	8	2.0	12	10	3.4	34
Heather growth stages	Pioneer (% of points)	0	0.0	4	4	3.9	25
	Building (% of points)	50	25.0	4	8	5.4	25
	Mature (% of points)	50	25.0	4	56	9.9	25
	Degenerate (% of points)	0	0.0	4	32	9.3	25
Heather features	Heather beetle damage (% of points)	0	0.0	4	8	5.4	25
	Heavily grazed features (% of points)	100	0.0	4	20	8.0	25
Heather burning	Burnt (*c.* 12 months) (% of points)	0	0.0	4	7	4.9	28
	Burnt (3-4 years) (% of points)	0	0.0	4	14	6.6	28
Droppings	Cattle / ponies (% of points)	8	7.4	13	9	4.2	46
	Sheep (% of points)	38	13.5	13	52	7.4	46
Detached stems	Detached Calluna (no.)	0.1	0.3	13	0.4	1.1	46
	Detached vegetation (no.)	1.6	3.5	13	0.9	2.4	46

4. Habitat condition assessment results 2014

4.1 Dry heath

Targets assessed at habitat level in 2 x 2 m quadrat:

Dry heath (*n*=46 heather heath + 13 fragmented heath + 1 western heath)		
Target	% of points passed	Habitat pass or fail
Presence of moss, liverworts and non-crustose lichens[1]	97	Pass
At least 50% of vegetation cover made up of Table 1 indicator species[2]	60	Fail
At least 25% of dwarf shrub cover should be made up of Group (i) indicator species	98	Pass
Less than 50% of dwarf shrub cover made up of Group (ii) indicator species	98	Pass
At least two indicator species from group (i)	63	Fail
Cover of weeds < 1%	100	Pass
Cover of soft rush < 10%	100	Pass
Dwarf shrub browsing < 33%	29[3]	Fail
Disturbed bare ground < 10%	100	Pass

[1] assessed in 1 x 1 m quadrat
[2]assessed as total dwarf shrub cover, excluding dead and pioneer heather and recent burns
[3] *n*=58 (2 points with no information)

Targets assessed at feature extent:

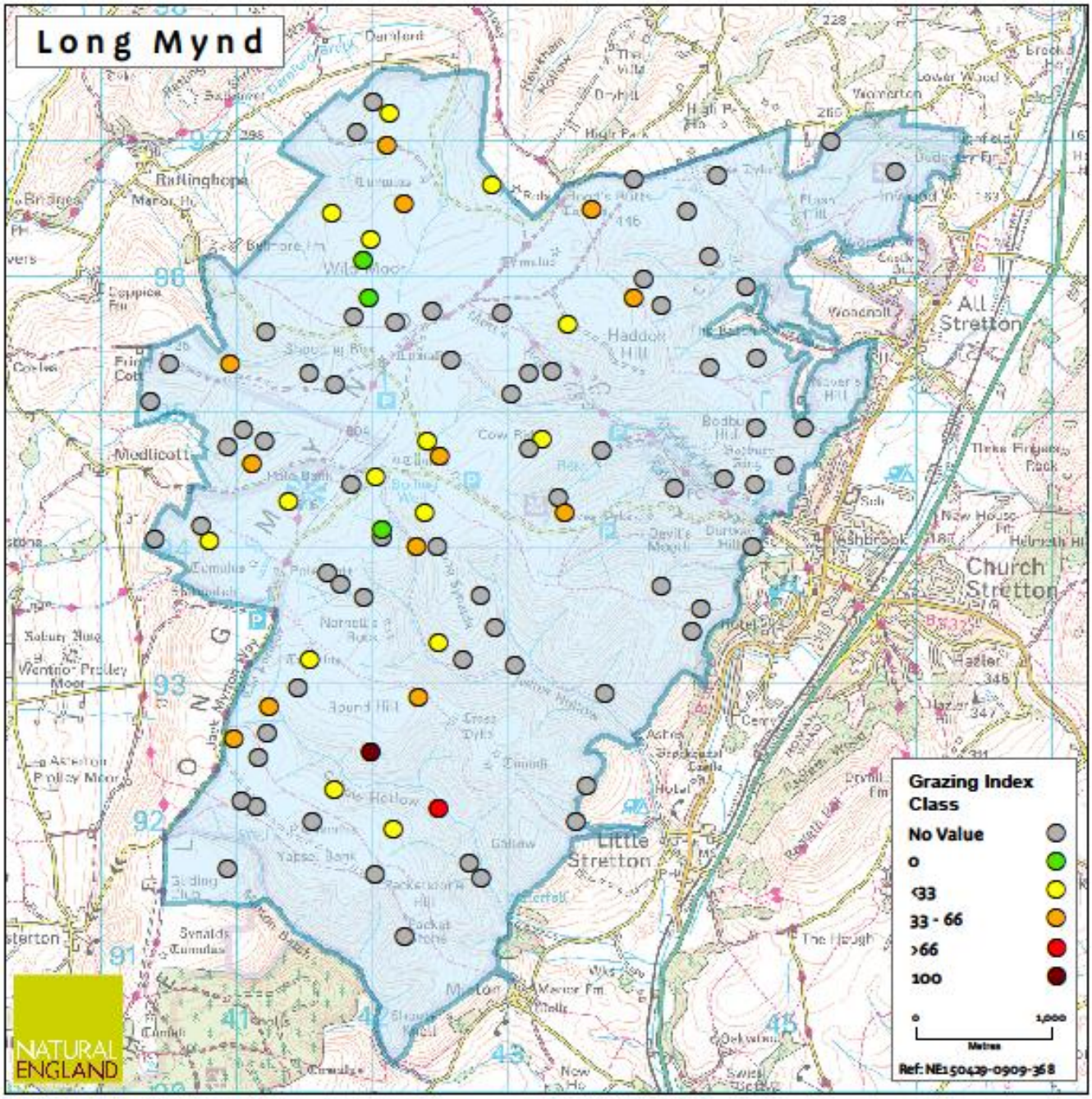
Target	**Pass or fail**
Cover of non-native species < 1%	Pass
Cover of bracken < 10%	Pass
Cover of native trees/ shrubs < 20%	Pass
Cover of weeds < 1%	Pass
Cover of soft rush < 10%	Pass
Burning of sensitive areas absent	Pass
Disturbed bare ground < 10%	Pass
Mature heather ≥10% & all growth phases present	Pass

Indicator species frequencies (*n* = 60):

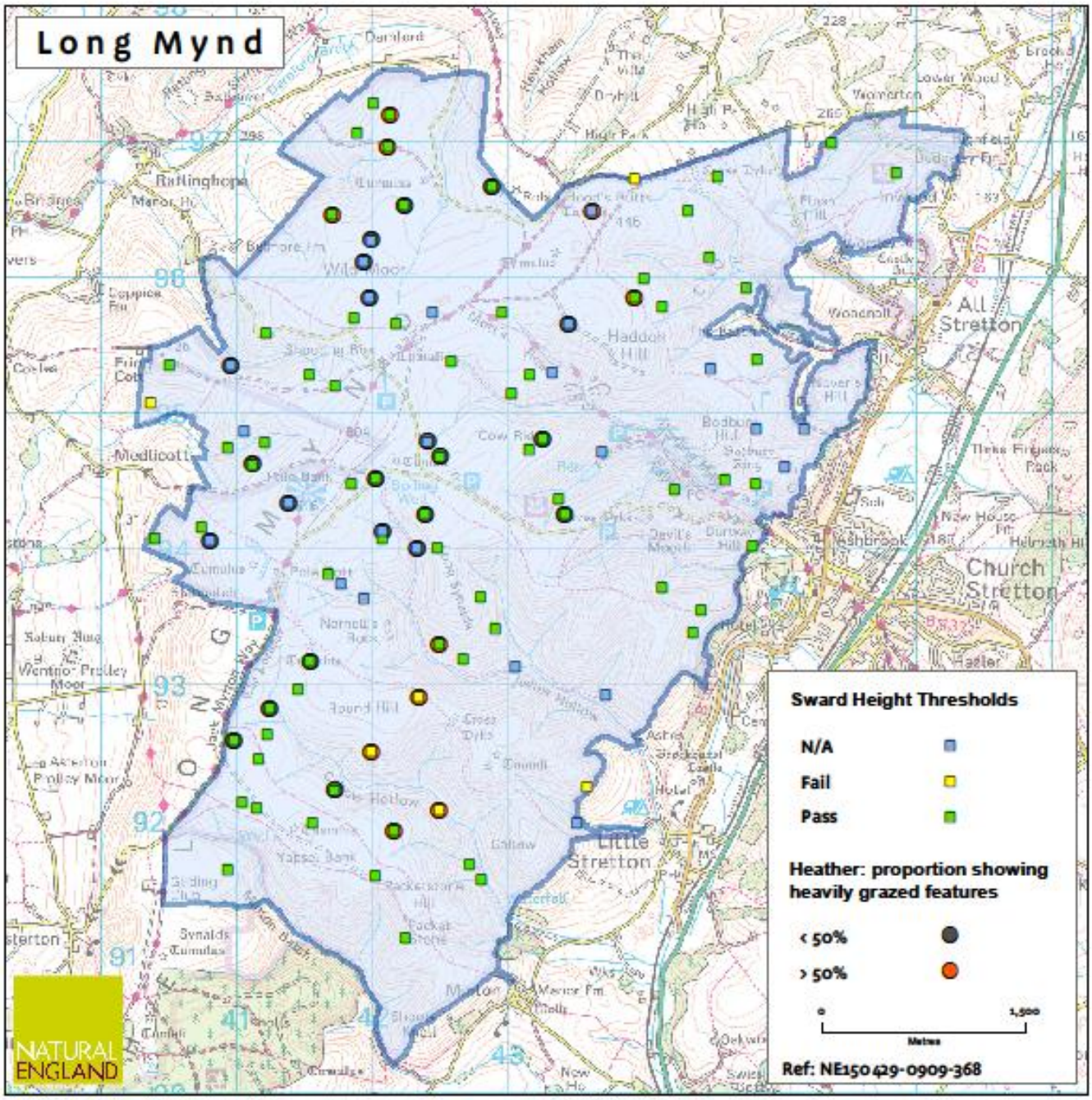
Species	**Frequency (%)**	**SD**
Calluna vulgaris	65	6.2
Erica tetralix	0	0.0
Erica cinerea	0	0.0
Vaccinium myrtillus	97	2.3
Vaccinium oxycoccus	0	0.0
Vaccinium vitis-idaea	0	0.0
Empetrum nigrum	0	0.0
Racomitrium lanuginosum	0	0.0
Ulex gallii	3	2.3
Myrica gale	0	0.0

4.2 Mires

This habitat type was recorded at less than 10 sample points so condition cannot be accurately assessed at 2 x 2m quadrat level or at feature extent.



Map 1: Distribution of random sampling points on Long Mynd in 2014, showing those where heather was present, along with heather grazing index (GI) class, derived from collected heather shoots.



Map 2: Distribution of sample points on Long Mynd in 2014 showing those which fall above (pass) or below (fail) habitat-related height thresholds indicative of heavy grazing, and with more or less than 50% of heather cover showing suppressed growth features.

Further information

Natural England evidence can be downloaded from our **Access to Evidence Catalogue**. For more information about Natural England and our work see **Gov.UK**. For any queries contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk** .

Report number RP01639 Number 11

ISBN 978-1-78354-395-3