

## Reeth Low Moor

### 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 Reeth Low Moor site was surveyed 20 – 21 March 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

Reeth Low Moor is located in North Yorkshire and covers 500 ha. It is part of Arkengarthdale, Gunnerside and Reeth Moors SSSI, and the North Pennine Moors SAC and SPA. Much of the vegetation (54% of sample points; Figure 1) comprises heather heath (H12 *Calluna vulgaris* - *Vaccinium myrtillus* heath), which is impoverished and almost entirely dominated by heather, with bilberry locally prominent on steeper slopes. Rough acid grassland and bent-fescue grassland account for much of the remainder of the site, particularly on extensive lower-lying north-eastern slopes either side of a minor road. This is likely to reflect heavier browsing by livestock (at least historically) in these areas, given their proximity to farms fringing the northern side of the moor. heather was in the building growth stage at just under half of the sample points where it was recorded, with the remainder in pioneer and mature growth stages in approximately equal amounts (Figure 3c). The most commonly dominant graminoids was *Juncus squarrosus* and *Nardus stricta* (Figure 3h).

It is grazed by sheep and managed for grouse by controlled burning in small patches, which has created a patchwork of different ages. Heather also appeared to have been affected locally by rabbit

grazing, much evidence of which was seen in places. Red grouse, lapwing, curlew and golden plover were all seen in significant numbers during the survey.

## 2.2 Site management

Following past concerns of overgrazing, graziers were required to graze within their registered rights. In 1997, stocking densities were approximately 1.5 ewes ha<sup>-1</sup>, and 1.2 ewes ha<sup>-1</sup> in winter. The site entered the Countryside Stewardship Scheme (CSS) in 2000 and Higher Level Stewardship (HLS) in November 2010. No information is available on CSS stocking rates but the summer stocking levels specified in the HLS agreement were slightly lower than in 1997<sup>1</sup>, being c. 1.3 sheep ha<sup>-1</sup> (ewes with single lambs at foot or hogs), but were substantially reduced in winter (November to April) to c. 0.45 sheep ha<sup>-1</sup>. Graziers were also required to avoid localised heavy grazing and damage from supplementary feeding.

A number of surveys have taken place over the last 20 or so years, and are summarised in Table 1. Early overgrazing surveys focussed on grazing pressure on dwarf shrub, deriving a heather grazing index (GI) from shoots collected in the field, which was converted to a measure of Biomass Utilisation (BU) using a mathematical function. This conversion was dropped in the 2000 survey, reverting 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 Reeth Low Moor are set out in Table 1.

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

Years	Survey type	Main variables	Sampling Strategy	Sample numbers
1996, 1997, 1998, 1999	Overgrazing	GI, BU (+sward heights in 1999)	grid	c133
2000	Overgrazing	GI, sward heights	grid	136
2003	Surveillance	GI, Sward heights	grid	136

## 2.3 Condition and grazing pressure in 2014

There was some evidence of high levels of grazing on the heather heath vegetation type and other target types, as well as fragmented heath. The mean GI in heather heath was relatively high (36.2%; Table 1) and even more so in the other target habitats (50.3%). Overall, 55% of samples failed to meet the CSM GI target of less than 33%, above which level grazing is likely to be damaging (Figure 2, Table 1, Map 1). These heavily grazed points were spread throughout the site, but most points in the eastern half were above the 33% level. Heavily grazed features (Figure 3d, Map 2) and sheep droppings were recorded at approximately half the sample points in heather heath, and substantially more in other target habitats, with droppings at 66% of points overall (Figure 3f). The mean sward height at 36% of sample points where graminoid height could be measured, and 17% of samples overall, indicated that heavy grazing was likely in these areas (Map 2). Heavily grazed features and short swards were again fairly well distributed throughout the site.

<sup>1</sup> Note that LU equivalents have varied among different schemes

In the heather heath vegetation type, only a small percentage (6%) of sample points had been burned in the previous 12 months, but almost one third (30%) had been burnt in the previous 3-4 years. No burning was recorded in the other target vegetation types. Frequencies for the site are given in Figure 3e).

The dry heath habitat did not meet the condition assessment threshold (targets to be passed at 90% of sample points) for levels of browsing on dwarf shrubs, the presence of indicator species and the presence of lower plants and lichens. If the measure of dwarf shrub cover is taken as indicator species cover, which is a reasonable assumption for Reeth Low Moor as no *Racomitrium lanuginosum* was recorded, this threshold is similarly not met, despite a mean dwarf shrub cover of over 60%. Condition assessment thresholds are however exceeded for dwarf shrub composition, in terms of the proportion of dwarf shrub cover made up of group (i) and group (ii) indicators.

#### 2.4 Change since previous surveys

Previous surveys of the site used a different sampling regime from that in 2014 so formal analysis of change is not possible. However, some general comparisons can be made. Assessments between 1996 and 1999 indicated that 62% – 85% of heather was suppressed. In 2000, the grazing index was 49% and in 2003 was 39.5%, which is not notably different from the 2014 mean (37.6%). The percentage of samples with grazing index greater than or equal to 33.3% (55% overall in 2014) is also similar to that recorded in 2003 (55%), although the percentage with a GI greater than or equal to 66.6% is slightly lower (18% in 2003 and 9% in 2014).

Cover of heather (35% overall in 2014) appears to have declined since 2003 (54% overall). Comparison with the 2003 results suggests that the dominant growth stage of heather has shifted from ‘mature’ to ‘building’, although mean height of heather is similar (18 cm in 2003). This might be explained by an increase in frequency of burning, supported by the finding that 30% of samples showed burning in the previous 3-4 years compared to 15% of sample locations in 2003. Increased burning frequency is likely to inhibit establishment and spread of indicator species and hence the overall condition of the vegetation.

There do not appear to have been major changes in grazing levels on heather since the last survey in 2003, despite the more restrictive grazing requirements in winter agreed in HLS. However, the HLS prescriptions had only been in place for four years by 2014. Major changes in vegetation composition and structure might not be expected to occur in that time, although a decline in grazing levels would be expected through winter grazing reductions. There did appear to be some reduction in the number of locations that are heavily grazed since 2003, which is encouraging. The high levels of browsing are probably attributable to sheep, although rabbits may also have been contributing, at least locally, while the lack of indicator species (including lower plants and lichens at some locations) probably also reflects historical management, including high stocking levels and inappropriate burning.

Table 1. Heather 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 <sup>1</sup> ( <i>n</i> =56)	Heather Heath ( <i>n</i> =50)	Other <sup>2</sup> ( <i>n</i> = 5)
Grazing Index	37.6 ±22.36	36.2 ±21.47	50.3 ±31.49
Samples ≥ 33.3%	55.4%	52.0%	80.0%
Samples ≥ 66.6%	8.9%	8.0%	20.0%

<sup>1</sup> non-target habitats *n*=1

<sup>2</sup> wet heath *n*=1, fragmented heath *n*=4

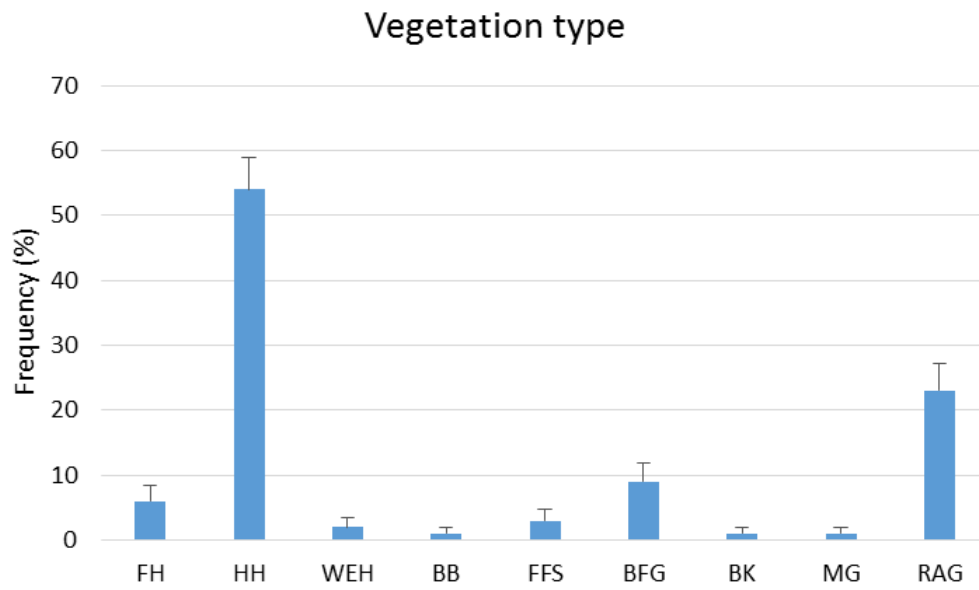


Figure 1. Frequency of vegetation types across the site in 2014. Bars are standard deviations. FH – fragmented heath; HH – heather heath; WEH – wet heath; BB – blanket bog; FFS – flush, fen, & swamp; BFG – bent-fescue grassland; BK – bracken; MG – mesotrophic grassland; RAG – rough acid grassland.

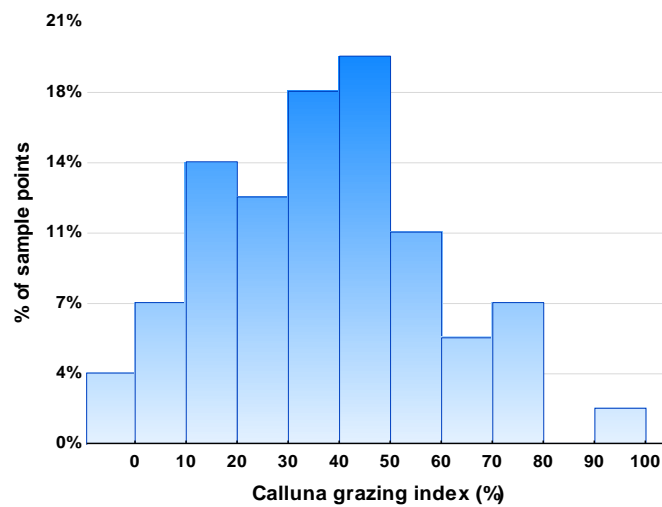


Figure 2. Frequency distribution of heather Grazing Index from sample points containing heather at whole site level in 2014.

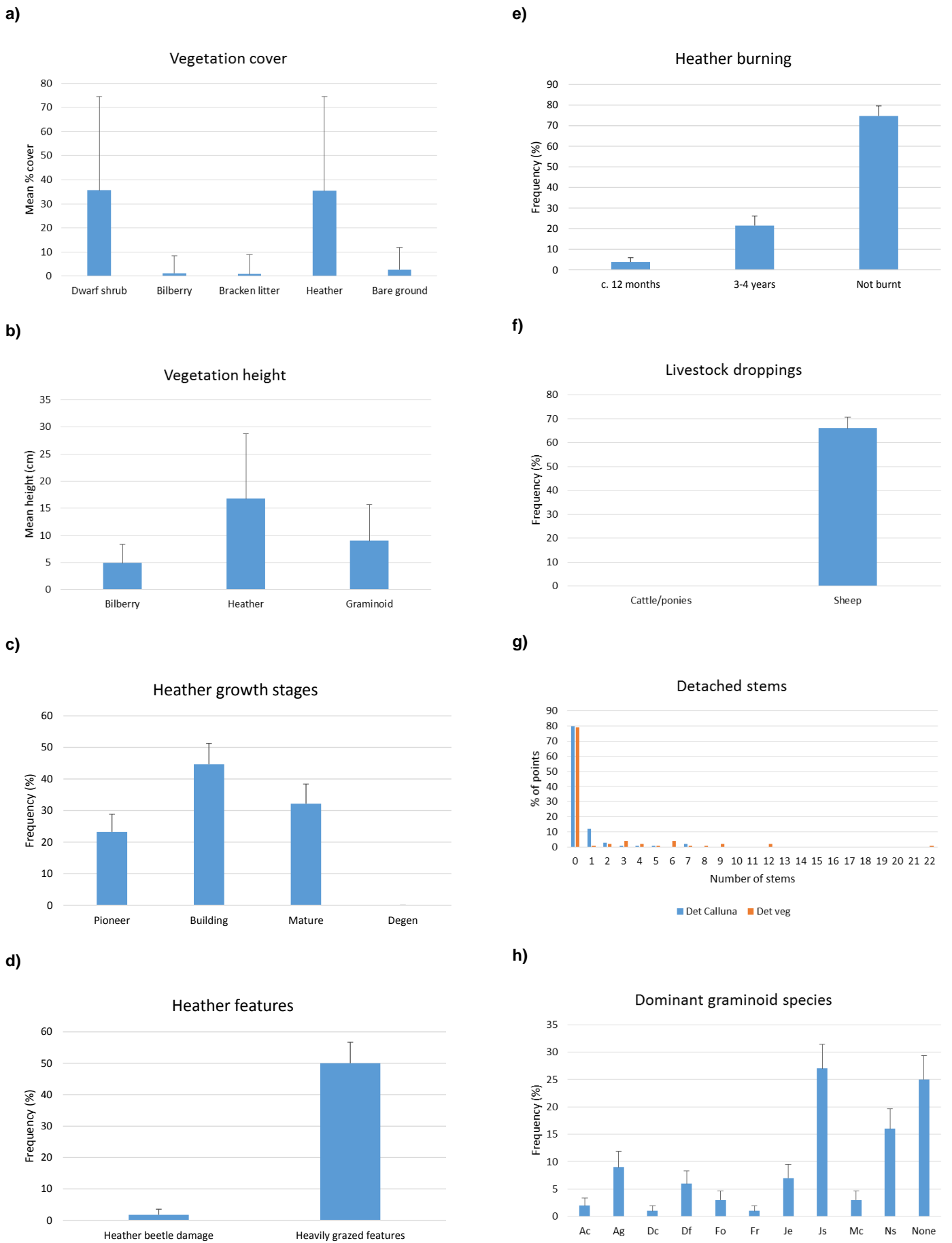


Figure 3. Surveillance variables at whole site level in 2014 (bars are standard deviations).

### 3. Overgrazing surveillance variables 2014

Category	Variable	Heather Heath ( <i>n</i> = 54)			Other Target Types* ( <i>n</i> = 12)		
		Mean	SD	<i>n</i>	Mean	SD	<i>n</i>
Peat	Peat depth (cm)	12	6.1	48	25	12.8	10
Vegetation cover	Dwarf shrub cover (%)	63	31.8	54	13	27.9	12
	Bilberry cover (%)	2	9.6	54	1	2.9	12
	Bracken litter cover (%)	0	0.0	54	0	0.0	12
	Calluna cover (%)	62	32.2	54	13	27.9	12
	Bare ground (%)	3	8.8	54	0	0.0	12
Vegetation height	Bilberry height (cm)	5	3.8	20	6	3.2	3
	Calluna height (cm)	17	12.3	51	15	8.8	5
	Graminoid height (cm)	8	4.3	27	13	11.7	11
Heather growth stages	Pioneer (% of points)	24	5.9	51	20	17.9	5
	Building (% of points)	47	7.0	51	20	17.9	5
	Mature (% of points)	29	6.4	51	60	21.9	5
	Degenerate (% of points)	0	0.0	51	0	0.0	5
Heather features	Heather beetle damage (% of points)	2	1.9	51	0	0.0	5
	Heavily grazed features (% of points)	47	7.0	51	80	17.9	5
Heather burning	Burnt (c. 12 months) (% of points)	6	3.1	54	0	0.0	6
	Burnt (3-4 years) (% of points)	30	6.2	54	0	0.0	6
Droppings	Cattle / ponies (% of points)	0	0.0	54	0	0.0	12
	Sheep (% of points)	54	6.8	54	67	13.6	12
Detached stems	Detached Calluna (no.)	0.7	1.6	54	0.3	0.9	12
	Detached vegetation (no.)	0.1	0.6	54	1.3	3.0	12

\* Other target types = Fragmented heath (*n*=6); Wet heath (*n*=2); Blanket bog (*n*=1); and Flushes, fens & swamps (*n*=3).

#### 4. Habitat condition assessment results 2014

##### 4.1 Dry heath

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

<b>Dry heath (n=54 heather heath + 6 fragmented heath)</b>		
Target	% of points passed	Habitat pass or fail
Presence of moss, liverworts and non-crustose lichens <sup>1</sup>	87	Fail
At least 50% of vegetation cover made up of Table 1 indicator species <sup>2</sup>	68	Fail
At least 25% of dwarf shrub cover should be made up of Group (i) indicator species	100	Pass
Less than 50% of dwarf shrub cover made up of Group (ii) indicator species	100	Pass
At least two indicator species from group (i)	43	Fail
Cover of weeds < 1%	100	Pass
Cover of soft rush < 10%	95	Pass
Dwarf shrub browsing < 33%	55	Fail
Disturbed bare ground < 10%	93	Pass

<sup>1</sup> assessed in 1 x 1 m quadrat

<sup>2</sup> assessed as total dwarf shrub cover, excluding dead and pioneer heather and recent burns

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	Fail

Indicator species frequencies (n = 60):

Species	Frequency (%)	SD
<i>Calluna vulgaris</i>	95	2.8
<i>Erica tetralix</i>	0	0.0
<i>Erica cinerea</i>	0	0.0
<i>Vaccinium myrtillus</i>	45	6.4
<i>Vaccinium oxycoccus</i>	0	0.0
<i>Vaccinium vitis-idaea</i>	2	1.7
<i>Empetrum nigrum</i>	2	1.7
<i>Racomitrium lanuginosum</i>	0	0.0
<i>Ulex gallii</i>	0	0.0
<i>Myrica gale</i>	0	0.0

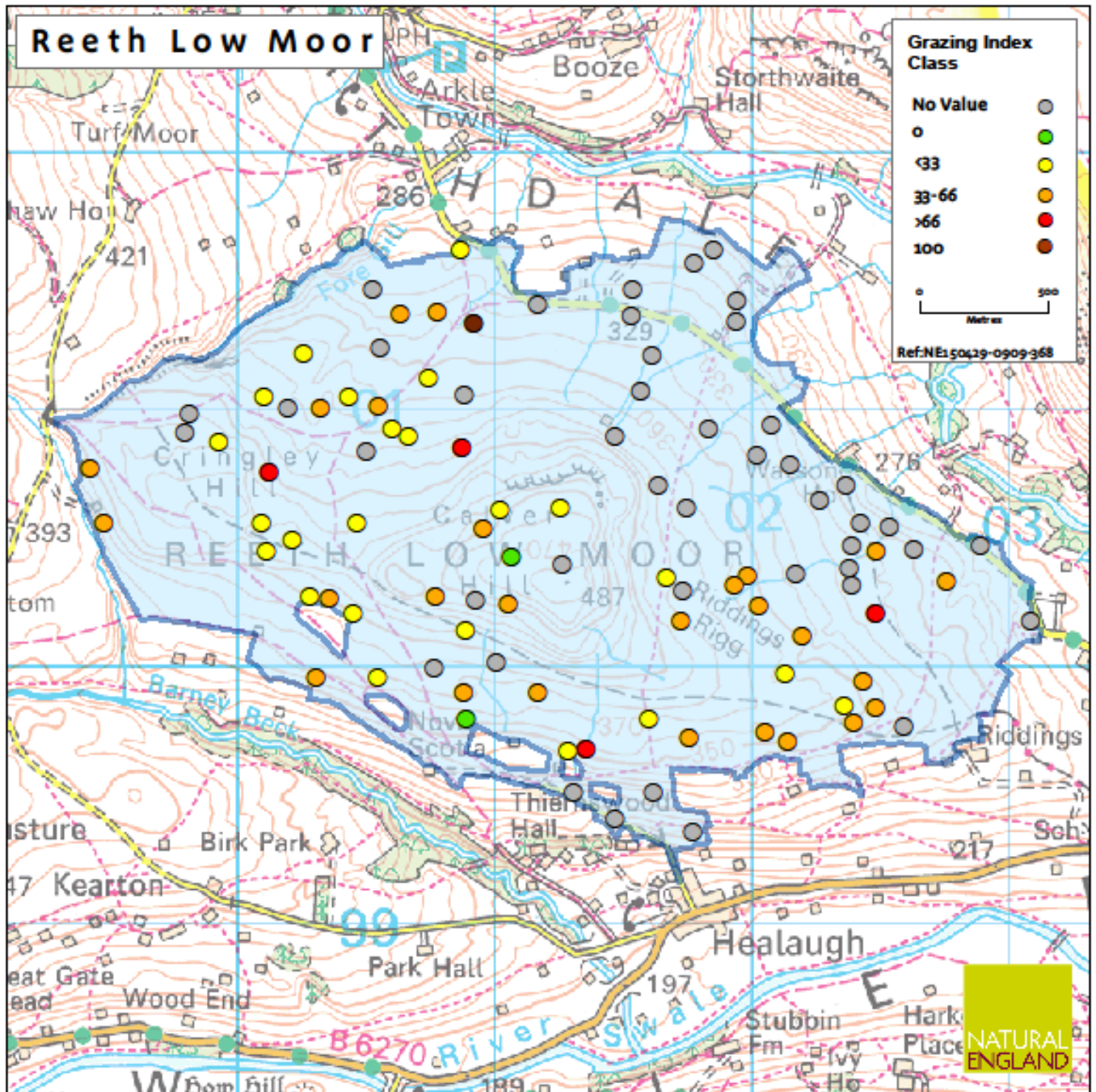


#### 4.2 Wet heath

This habitat type was recorded at less than 10 sample points, so condition cannot be assessed.

#### 4.3 Mires

This habitat type was recorded at less than 10 sample points, so condition cannot be assessed.



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





## 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](mailto:enquiries@naturalengland.org.uk) .

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