

Ousby 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 Ousby Moor site was surveyed during 24 – 26 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

Ousby Moor is located in Cumbria and covers 1450 ha. It is part of Moor House and Cross Fell SSSI, Moor House- Upper Teesdale SAC and the North Pennine Moors SAC. Much of the vegetation on site (54% of sample points in 2014; Figure 1) comprises blanket mire (M19 *Calluna vulgaris* - *Eriophorum vaginatum* blanket mire), generally with a relatively high cover of heather and with *Empetrum nigrum* also prominent, but with rather impoverished *Sphagnum* flora. Locally, this community grades into M20 *Eriophorum vaginatum* blanket mire. There are also areas of fen, flush and swamp (13% of sample points). On the higher slopes of Green Fell, there are areas of rough acid grassland (12% of sample points; mainly U6 *Juncus squarrosus* - *Festuca ovina* grassland), grading into montane and grass heath on the rocky plateau above, at about 600 metres a.s.l. in the south-western part of the site. Heather was in the building growth stage at over 60% of sample points where it was recorded, with the remainder either building or pioneer (Figure 3c). *Eriophorum vaginatum* was the dominant graminoid at more than half of the sample points, and *Juncus squarrosus* and *Nardus stricta* at just over 10% each (Figure 3h).

The site is grazed mainly by sheep, but is managed for grouse by controlled burning in small patches on a 12-15 year rotation, which has created a patchwork of heather of different ages. Grip blocking has also been carried out.

2.2 Site management

In 1996, the site was subjected to stocking densities of up to 4.5 ewes ha⁻¹, although it was not grazed during the winter from November to April, and stocking densities were gradually increased during the summer to the maximum level in September and October. All livestock were removed from Ousby during the foot and mouth disease outbreak in 2001, and there was no grazing on the site until April 2002. The site was then entered into a Countryside Stewardship Scheme agreement, and from October 2011 has been in Higher Level Stewardship (HLS)¹. The HLS agreement has a requirement to graze cattle for a minimum of 17 weeks between 15th May and 31 October. Outside these dates, there was flexibility for the agreement holder to graze, providing severe poaching did not occur on the fell. Maximum and minimum numbers of cattle to be grazed on the adjacent Skirwith and Blencarn fells were included in the agreement, but with numbers of cattle to be reviewed annually throughout the agreement depending on management issues and impacts on vegetation.

There had been two detailed surveys on Ousby Moor prior to the 2014 re-survey. The original survey to investigate overgrazing in 2000 focussed on grazing pressure on dwarf shrub, deriving a heather grazing index (GI) from shoots collected in the field. A repeat assessment took place in 2002 to investigate the effects of de-stocking during the Foot and Mouth (FMD) outbreak. Each of these surveys followed a grid sampling approach, with a sample size of 167 quadrats. The Surveillance Survey approach developed more recently and forming the basis of this re-survey includes the measurement of sward heights, which can be compared to threshold heights for broad habitats, below which a sample area is deemed to be heavily grazed.

2.3 Condition and grazing pressure 2014

There was only sparse evidence of grazing, with no heavily grazed features recorded on the blanket bog and only sparse records of sheep and cattle droppings in this vegetation type. The mean GI on blanket bog was at a moderate level (23.6%; Table 1) and well below the threshold indicating heavy grazing likely to cause damage, i.e. meeting on average the CSM GI target of less than 33%. Of individual samples with heather present however, 33% failed to meet the CSM GI target, (Figure 2, Table 1, Map 1), with 5% above the 66% level. Heavily-grazed samples were mainly found in the north and east of the moor. Across the whole site, the frequency of heavily grazed features (Figure 3d, Map 2) and detached heather or other vegetation (Figure 3g) was negligible and sheep droppings were only recorded at 10% of sample points (Figure 3f). The mean graminoid sward height at 12% of sample points indicated that heavy grazing was likely (Map 2), found mainly in the west of the site on the slopes of Stony Rigg and Green Fell.

In the blanket bog vegetation type, only a small percentage of sample points (6%) had been burnt in the last 3-4 years, and even less (3%) in the previous 12 months, indicating a relatively extensive burning regime.

The mires habitat was above CSM condition assessment thresholds (targets to be passed at 90% of sample points) for levels of browsing on dwarf shrubs, *Sphagnum* cover, drainage and disturbance, but failed those relating to species composition and burning. This provides further evidence that browsing or grazing by livestock was at an acceptably low level but the burning regime, although not intensive in terms of frequency, was sufficient to cause some potential damage to the bryophyte layer and other sensitive areas.

¹ Note that LU equivalents have varied among different schemes

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 was not possible. However, some general comparisons could be made. In 2000 the mean grazing index was 44% but had declined to 23% by 2002, which is very similar to the 2014 overall mean of 25%. In 2002, 22% of samples had grazing index greater than 33%, and only 3% had indices greater than 66%, which are slightly lower than the levels recorded in the 2014 assessment.

Comparison with the 2002 results suggest that the structure of heather had not changed notably, with 'building' still the most frequent growth stage and the mean height similar (18 cm in 2002 compared to the 2014 mean of 22 cm in blanket bog). In 2002, potentially damaging burning practices had been noted on some wet areas of blanket bog. Heather beetle damage was also recorded in 27% of samples containing heather, whereas none was recorded in the current survey.

The reduction in grazing levels following the foot and mouth disease outbreak in 2001 and subsequent entry of the site into agri-environment scheme agreements appears to have had a beneficial effect on the vegetation, with only low levels of grazing or browsing evident by 2002, and these low levels have been maintained at the time of the 2014 survey. However, blanket bog indicator species were still below the required threshold for favourable condition, which is probably a legacy, at least in part, of the formerly high intensity of grazing. The continued burning on the site, particularly on blanket bog, is also potentially detrimental and likely to inhibit recovery of the full blanket bog species complement.

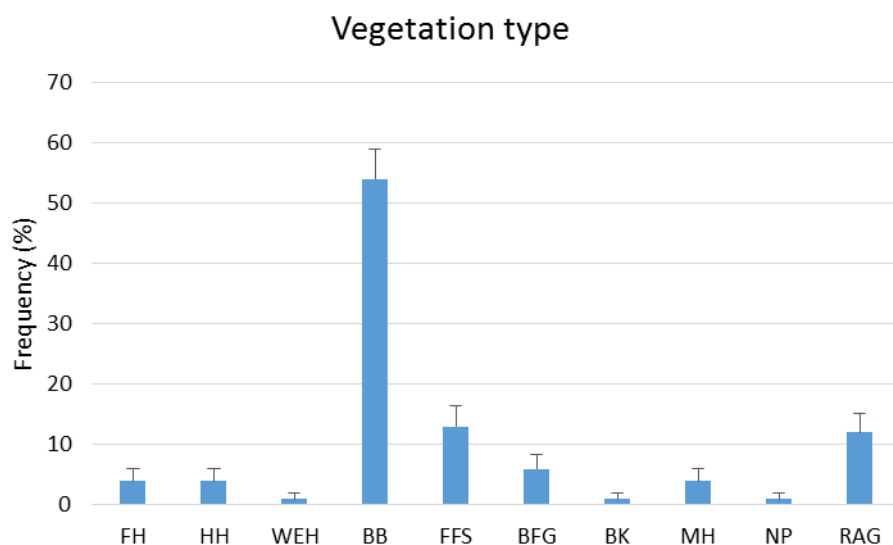


Figure 1. Frequency of vegetation types across the site in 2014. Bars are standard deviations. FH – fragmented heath; HH – heather heath; WEH – wet heath; BB – blanket bog; FFS – flush, fen & swamp; BFG – bent-fescue grassland; BK – bracken; MH – montane heath; NP – non-productive; RAG – rough acid grassland.

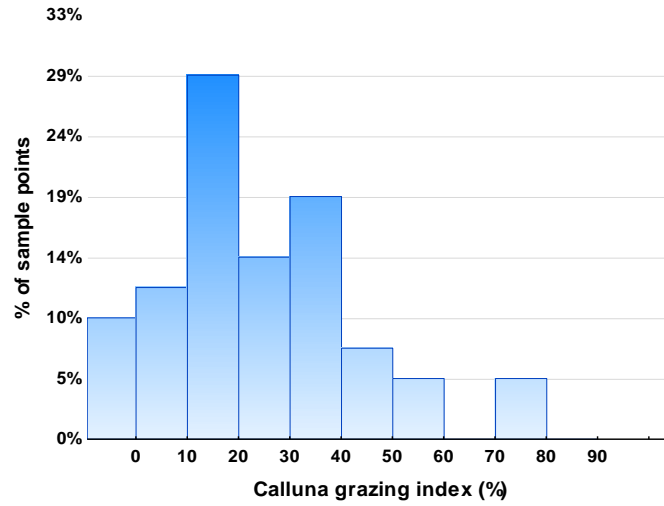


Figure 2. Frequency distribution of heather Grazing Index from sample points containing heather at whole site level in 2014.

Table 1. Heather Grazing Index at site level and by target vegetation type in 2014 (mean \pm standard deviation; n is number of sample points with heather stems).

	Overall* ($n = 42$)	Blanket Bog ($n = 36$)
Grazing Index	24.9 \pm 19.07	23.6 \pm 19.46
Samples \geq 33.3%	33.3%	30.6%
Samples \geq 66.6%	4.8%	5.6%

* heather heath $n=3$, fragmented heath $n=1$, non-target habitats $n=2$

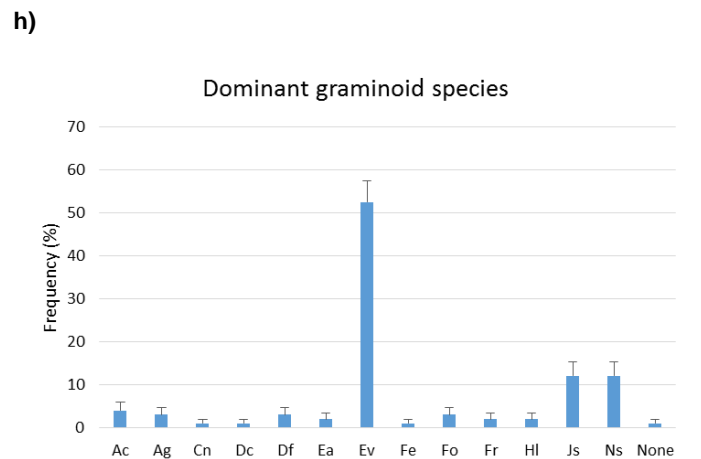
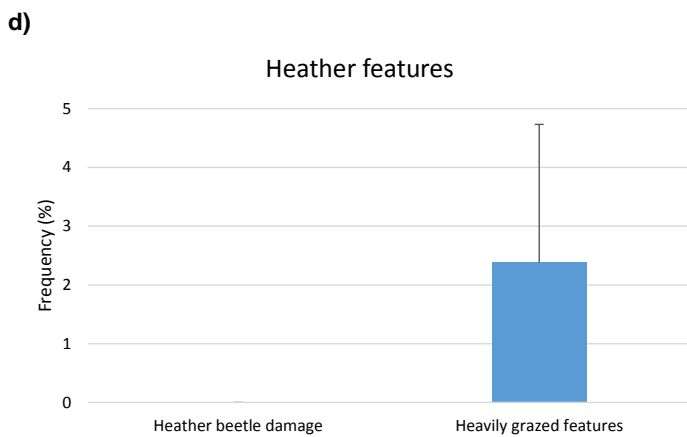
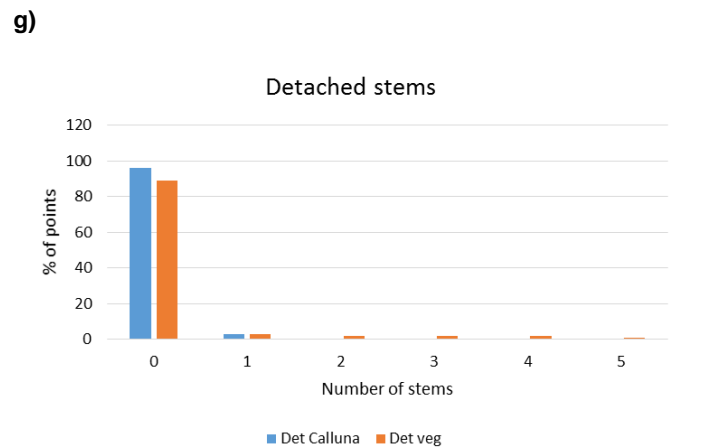
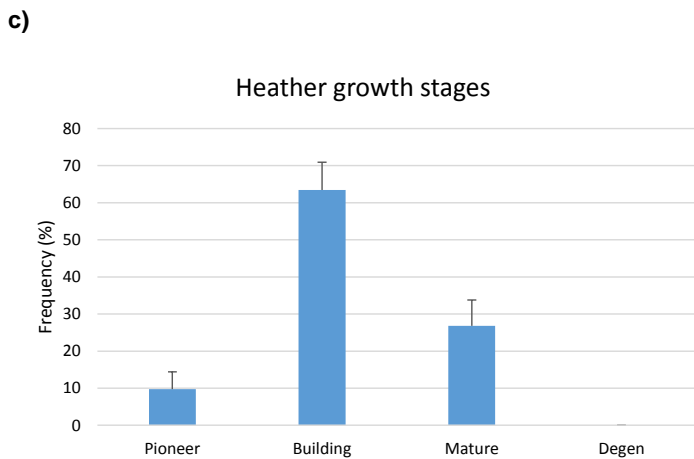
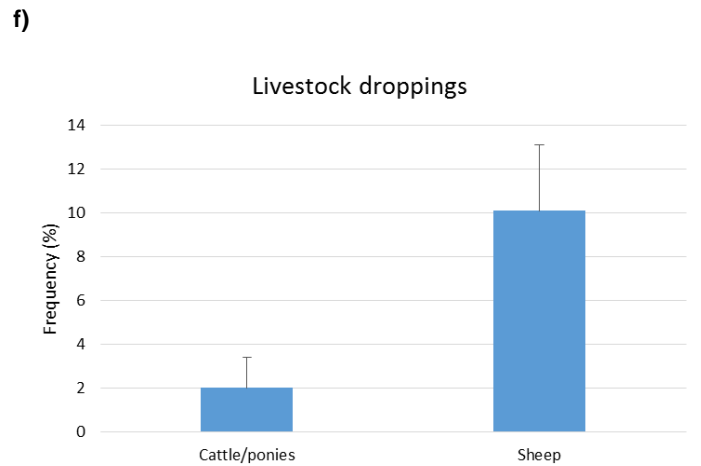
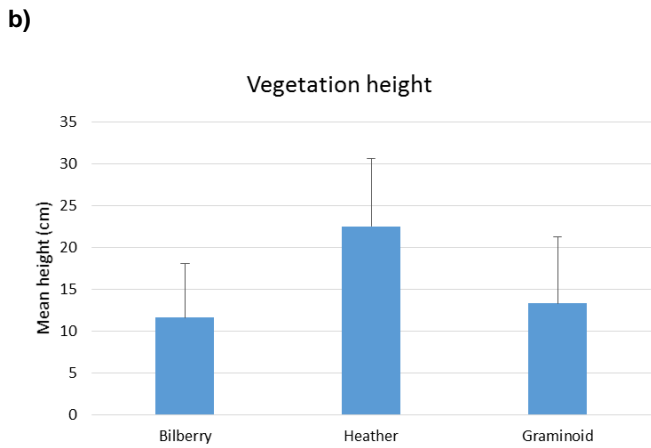
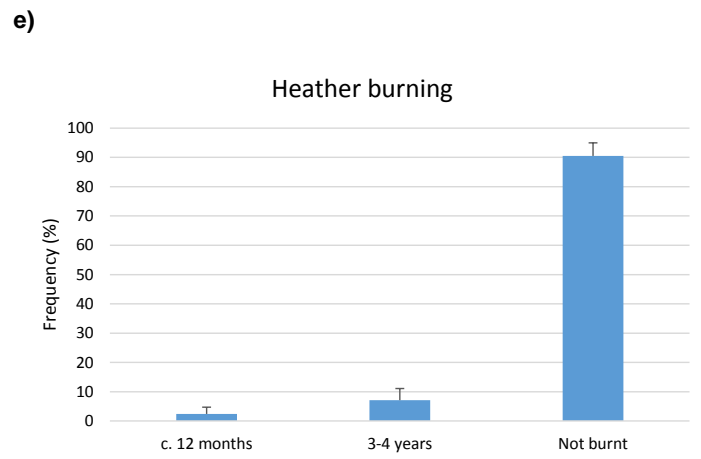
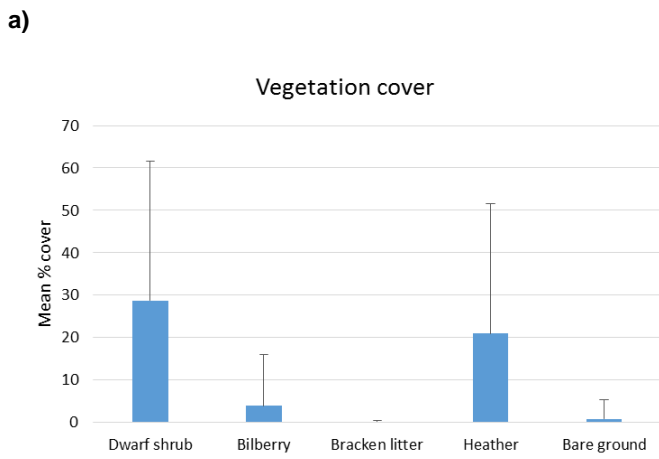


Figure 3. Surveillance variables at whole site level in 2014 (bars are standard deviations).

3 Overgrazing surveillance variables 2014

Category	Variable	Blanket bog (<i>n</i> =54)			Flushes, fens & swamps (<i>n</i> =13)		
		Mean	SD	<i>n</i>	Mean	SD	<i>n</i>
Peat	Peat depth (cm)	86	23.5	54	54	27.2	13
Vegetation cover	Dwarf shrub cover (%)	42	31.8	54	1	3.3	13
	Bilberry cover (%)	2	5.1	54	2	5.5	13
	Bracken litter cover (%)	0	0.0	54	0	0.0	13
	Calluna cover (%)	32	32.0	54	0	0.0	13
	Bare ground (%)	0	0.6	54	0	0.0	13
Vegetation height	Bilberry height (cm)	15	5.5	20	10	0.0	1
	Calluna height (cm)	22	7.9	36	0	0.0	0
	Graminoid height (cm)	17	8.0	54	8	3.0	12
Heather growth stages	Pioneer (% of points)	11	5.4	35	0	0.0	0
	Building (% of points)	60	8.3	35	0	0.0	0
	Mature (% of points)	29	7.6	35	0	0.0	0
	Degenerate (% of points)	0	0	35	0	0.0	0
Heather features	Heather beetle damage (% of points)	0	0.0	36	0	0.0	0
	Heavily grazed features (% of points)	0	0.0	36	0	0.0	0
Heather burning	Burnt (c. 12 months) (% of points)	3	2.7	36	0	0.0	0
	Burnt (3-4 years) (% of points)	8	4.6	36	0	0.0	0
Droppings	Cattle / ponies (% of points)	2	1.8	54	8	7.4	13
	Sheep (% of points)	4	2.6	54	0	0.0	13
Detached stems	Detached Calluna (no.)	0.1	0.2	54	0	0.0	13
	Detached vegetation (no.)	0	0.1	54	0.3	0.9	13

4 Habitat condition assessment results 2014

a. Dry heath

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

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

b. Wet heath

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.

c. Mires

Mires (n=54 blanket bog + 13 flushes, fens & swamps)		
Target	% of points passed	Habitat pass or fail
At least 6 indicator species present	46	Fail
At least 50% of vegetation cover made up of at least 3 indicator species	75	Fail
<i>Sphagnum</i> cover should not consist of only <i>Sphagnum fallax</i>	93	Pass
Any one of <i>Eriophorum vaginatum</i> , Ericaceous spp. collectively, or <i>Trichophorum</i> should not individually exceed 75% of veg cover	58	Fail
Less than 1% of vegetation cover to comprise of negative indicators	91	Pass
Dwarf shrub browsing < 33%	100 ²	Pass
Disturbed bare ground/ drainage < 10%	100	Pass
Broken / crushed <i>Sphagnum</i> < 10%	100 ³	Pass

¹ n= 40 (40 points with *Sphagnum* present)

² n= 50 as remaining points no DS present

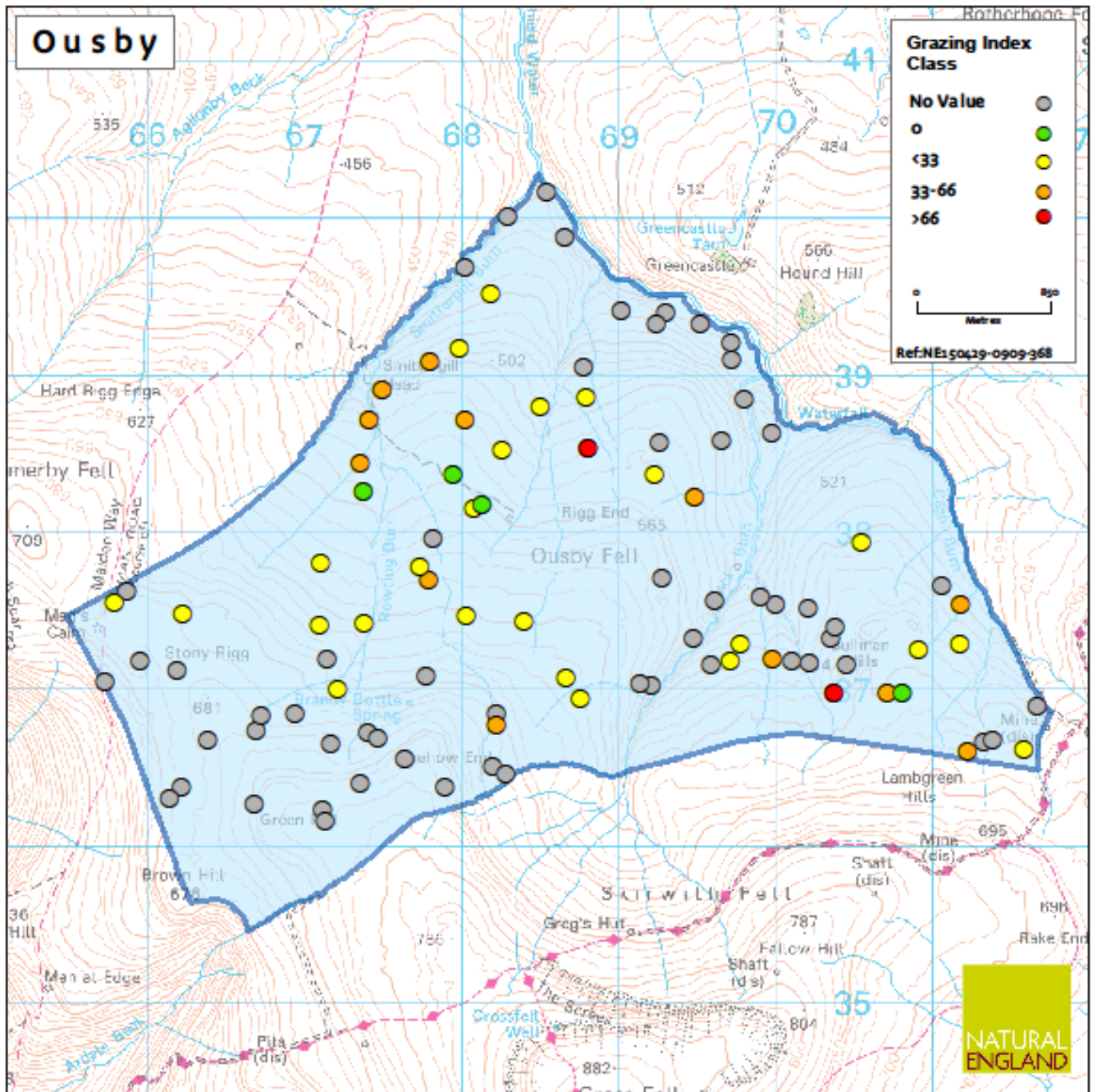
³ n= 40 as remaining points no *Sphagnum* present

Targets assessed at feature extent:

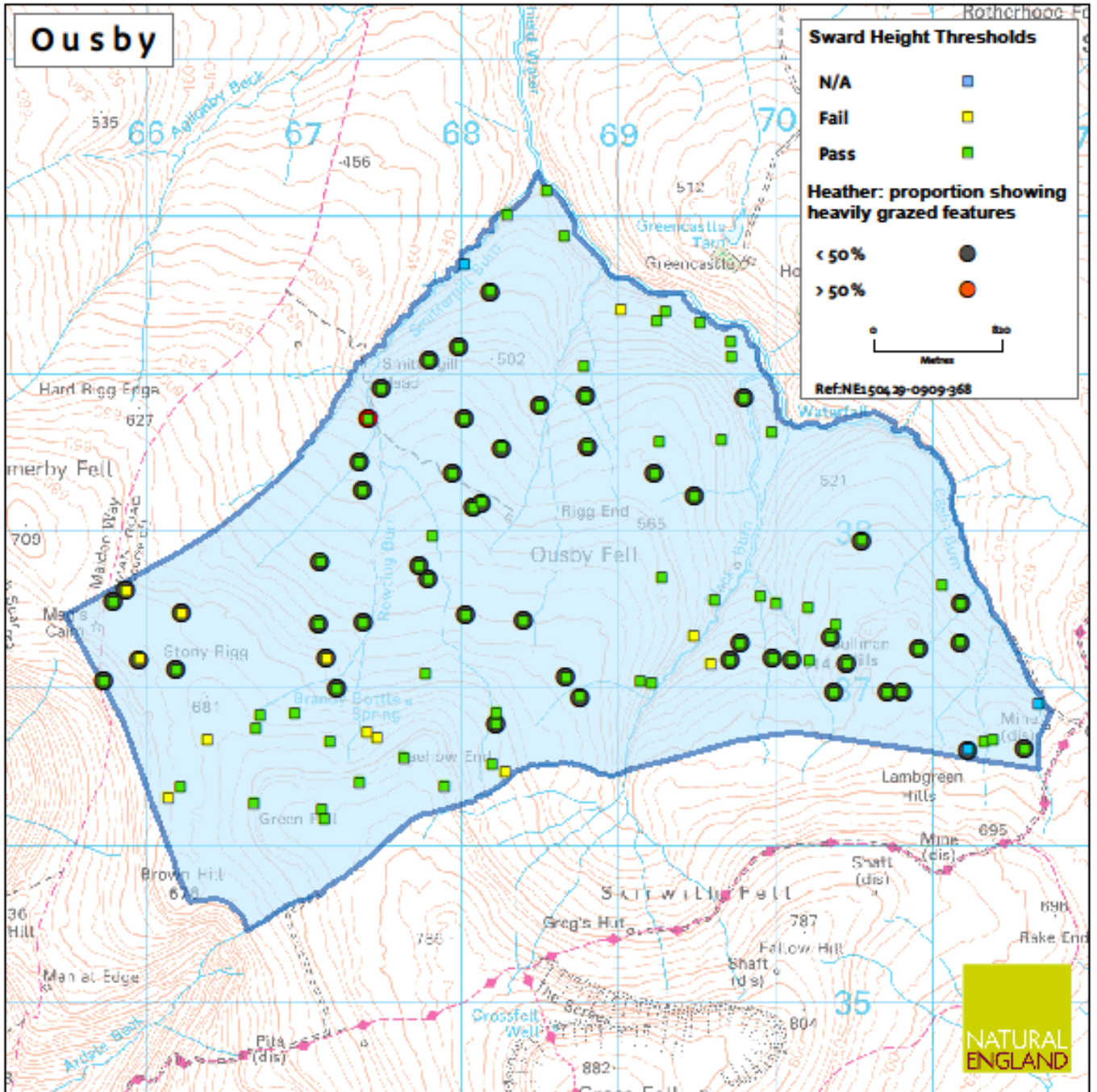
Target	Pass or fail
Cover of non-native species < 1%	Pass
Cover of native trees/ shrubs < 10%	Pass
Cover of negative indicators < 1%	Pass
Burning of bryophyte layer absent	Fail
Burning of sensitive areas absent	Fail
Extent of eroding peat	Pass
Disturbed bare ground < 10%	Pass

Indicator species frequencies ($n = 67$):

Species	Frequency (%)	SD	Species	Frequency (%)	SD
<i>Calluna vulgaris</i>	61	6.0	<i>E. vaginatum</i>	87	4.2
<i>Erica tetralix</i>	16	4.5	<i>Trichophorum cespitosum</i>	6	2.9
<i>Erica cinerea</i>	0	0.0	<i>Rhynchospora alba</i>	0	0.0
<i>Vaccinium myrtillus</i>	40	6.0	<i>Narthecium ossifragum</i>	0	0.0
<i>Vaccinium oxycoccus</i>	1	1.5	<i>Drosera</i> spp.	0	0.0
<i>Vaccinium vitis-idaea</i>	13	4.2	<i>Menyanthes trifoliata</i>	0	0.0
<i>Rubus chamaemorus</i>	12	4.0	<i>Sphagnum</i> spp.	60	6.0
<i>Empetrum nigrum</i>	66	5.8	<i>Racomitrium lanuginosum</i>	0	0.0
<i>Myrica gale</i>	0	0.0	Pleurocarpous mosses	87	4.2
<i>Andromeda polifolia</i>	0	0.0	Non-crustose lichens	10	3.7
<i>Eriophorum angustifolium</i>	43	6.1			



Map 1: Distribution of random sampling points on Ousby Moor 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 Ousby Moor 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 .

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Report number RP01639 Number 15
ISBN 978-1-78354-399-1