

Molland Moor Heather Survey Year 6

5th and 26th April 2018

Introduction

This is the 6th Heather survey that has now been completed over 2 days on the 5th and 26th April in light of the Winter cattle grazing project on Molland Moor (now 'Graze the Moor' in light of a successful grant bid and will be referred to by this name from now). This is a collaboration of the Landowner, Moorkeeper, Heather Trust, Natural England and Exmoor National Park. This survey is the sixth monitoring survey that comes after 2012 baseline survey which was to assess the current condition of the moorland Dwarf species vegetation, this survey will measure the impacts of the 2017/18 winter grazing regime.

Historically, Molland Moor was managed with winter stocking, this involved animals grazing the moor during the daylight hours and then being taken off overnight to be housed or placed on in-bye land and fed. The 'Graze the Moor' project looks at implementing this or something similar on a trial basis looking to establish a sustainable grazing regime for the future based on solid evidence and without compromising the conservation interest of the moor, a 681ha Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC). The Moor has entered into a Higher Level Stewardship (HLS) agreement in 2009 and is at present grazed during the months of May to October with a mix of Cattle, Ponies and Sheep with the Ponies grazed all year round. The survey will be carried out each year between March and May with each survey point will be revisited to establish the effect of the winter grazing.

Methodology

Twenty eight random points have been chosen to assess where dwarf species, in particular Heather, is present. Attributes looked at included Dwarf species present, Heather height, condition of the heather, grazing pressure, flowering and whether it has had a recent burn. Photos have been taken at each stop to provide photographic evidence and will be taken again each year during the project too record changes.

The random stops have been selected from ariel photography where heather looks to be present (see annex 1) and have been selected to cover the whole moorland and in particular as near to gateways where possible where the cattle come on to the moorland.

In each sample site a 2m x 2m quadrat was used but for certain attributes such as grazing pressure, flowering and burns an approximate 10metre radius look around was used.

The same twenty eight points have again been visited and the results below records any changes that have occurred.

Results

Individual stop summaries from the 2018 survey are recorded in Annex 2 along with the 2013 to 2017 data for comparisons. For these results I have compared each of the twenty eight stops and below summarises differences from these surveys.

Grazing pressure – It was found in this year's survey that fifteen of the twenty eight stops recorded heavier grazing, this is up from the 2017 survey of eleven stops. This is compared to fourteen stops in 2016, nine stops in 2015, eleven for 2014 and four for 2013. Of the fifteen stops that recorded heavier grazing, thirteen of the stops fell within the overgrazing criteria, this is defined as overgrazing classed within the common standards monitoring assessment guidelines of 'no more than 33% of heather showing signs of grazing'. Of these thirteen, nine of these stops were classed as overgrazed during the 2017 survey (Stops 10, 11, 13, 15, 17, 18, 22, 25 and 27) the other four stops that move up to overgrazing were 12, 21, 24 and 26. Six stops in all showed an upward trend of grazing pressure (i.e. this can be from minimal to within the threshold) this is up from the four during the 2017 survey.

Only stop 1 showed a reduction in grazing pressure and this had moved from below the threshold to minimal and before this it had been overgrazed for three years. This is down from the 2017 survey where four stops showed a reduction on grazing pressure.

Nineteen stops showed no discernible change in their grazing pressure, this of course includes the nine stops that have been deemed as overgrazed. Six stops showed minimal grazing down from eight in 2017.

Heather condition – Due to management burning that has taken place during the projects lifetime the results in the condition and growth stage of the heather is included as this can be used on where to target burn areas. In 2013 12 stops were deemed to have stands of heather that were either and or, leggy, predominantly degenerate and dead. Since then it was found in this survey that there are now 7 stops that were found in poor condition. The 5 stops that are no longer in poor condition have all received a management burn.

Burning – There were two burn sites on Molland that affected the survey results, stops 2 and 3. Of the 28 stops these two could have nothing recorded except that the areas were grazed off well to allow for heather regeneration.

Discussion

For this survey and subsequent ones to have any meaning all management activity will need to be recorded. This will need to include animal grazing numbers throughout the year (see below), where scrub, Molinia and bracken control has taken place and management burns. This information is essential so further vegetation surveys in following years can look at trends and be able to inform suitable grazing regimes that does not damage the special designations of the site but also utilises to the maximum available fodder.

At entry/exit points especially on the southern boundary of the moor there is significant amounts of gorse which in all probability is down to past winter grazing practices. Poaching and over grazing around these areas will need particular monitoring to ensure invasive species such as European Gorse does not occur. This will also need yearly monitoring and has been mapped and photographed in January 2013 as a baseline survey.

Grazing

The stocking calendar takes into account the grazing of cattle, sheep, ponies and deer (the Red Deer numbers are an estimate but are included to highlight that their grazing attributes cannot be ignored). The average stocking level based on the figures in the case study final report, shows the numbers from May 2017 to April 2018 was 0.16 Livestock units/ha/yr this is lower from last year's 0.19 Livestock units/ha and from the previous years 0.21. The peak stocking level was between the start of June and to the end of September. June's average of 0.19 could be considered a little too low considering this should be the peak Molinia growing time and when it is at its most palatable. It was encouraging to see that the levels in October (0.13Lu's) had dropped considerably from the previous year's 0.22Lu's as this level of grazing could have an impact on the seeding heather being grazed off. Over this peak four month period the stocking average was at 0.21 slightly down on the previous year's peak five month period of 0.22 livestock units/ha and this is much lower than the peak of last year that ran from the months of July to September and was at 0.28 livestock units/ha a shorter but more intense grazing period (See table 2). The ideal grazing peak should occur during the summer months between May and August to optimise the available Molinia when it is at its most palatable and plentiful.

The grazing levels for the period of this year's survey results have been consistent throughout the year with cattle numbers rising in June to stay at the same level through to the end of September and dropping off to stay at winter levels right through until the end of March. The dip in LU's during the peak summer period and throughout the grazing year can be attributed to the drop in sheep numbers with no sheep grazing the moor throughout the winter season. A breakdown of animals grazing Molland Moor can be found on the next page (Table 1).

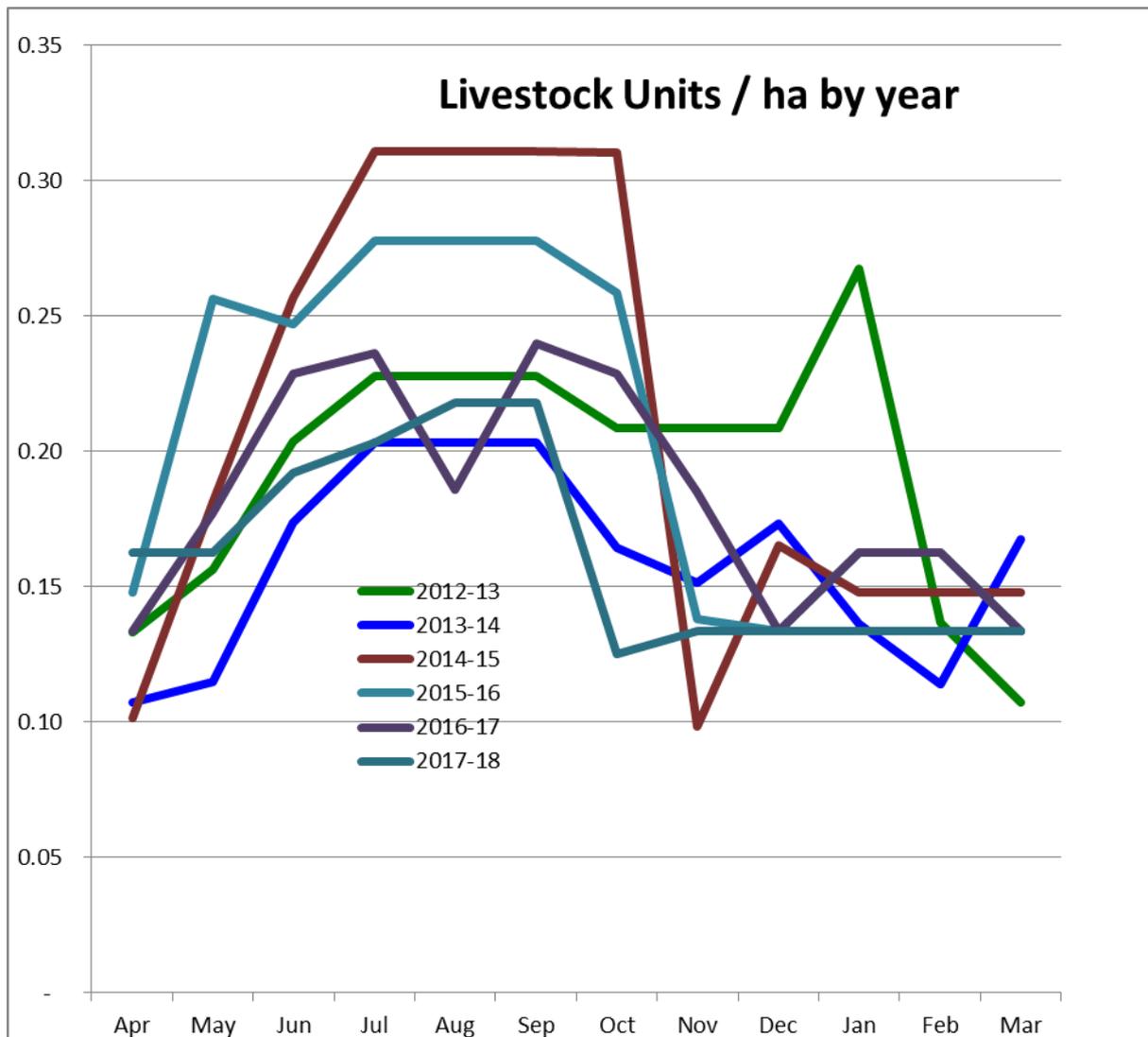
Molinia

On walking between each stop it was observed that there was still large areas of Molinia that has been ungrazed where a management burn has not taken place. This raises the question on whether there is enough grazing livestock during the growing season between May and September or that a more targeted shepharding regime needs to be implemented. This could also be the same during the winter months where it still appears that cattle and sheep are not grazing the Molinia. The livestock, at present, certainly target, as expected the more recently burnt areas during the growing season.

Table 1.

Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
60	60	80	90	90	90	30	60	60	60	60	60
30	31	30	31	31	30	31	30	31	31	28	31
Cattle											
200	200	250	250	350	350	350					
30	31	30	31	31	30	15					
Ewes											
26	26	26	26	26	26	26	26	26	26	26	26
30	31	30	31	31	30	31	30	31	31	28	31
Ponies											
100	100	100	100	100	100	100	100	100	100	100	100
30	31	30	31	31	30	31	30	31	31	28	31
Deer											

Table 2.



Conclusion

The baseline survey was completed in April 2012 and this survey is the sixth to assess the impact of the winter 2017/18 grazing.

Unlike previous years the levels of grazing during the winter period has been reduced. In the period of six months from October to March 2016/17 the average LU's were 0.165 compared to the 2017/18 figure during the same period of 0.130LU's. However, even with this level of reduction in grazing there are now even more stops that have been deemed to be overgrazed in comparison to the previous grazing year.

The baseline survey showed that the heather throughout all age structures had been minimally grazed and only two stops (1 and 19) from the 2012/13 survey were overgrazed, however, this year thirteen stops (10, 11, 12, 13, 15, 17, 18, 21, 22, 24, 25, 26 and 27) fell below the Joint Nature Conservation Committee (JNCC)

guidelines of 'over 33% of shoots must not be grazed'. This equates to 46.5% of stops overgrazed and taking into account the 2 sites (2 and 3) that have received management burns the figure sits at 50% of stops classed as overgrazed this is substantially higher than the 38% of stops of last year classed as overgrazed and this is in light of the much lower winter grazing. There is not an encouraging picture emerging and is beginning to show that the cattle are increasingly targeting the heather during the winter period.

As observed in the discussion Molinia still dominates the moor with a majority of this in areas of mature/degenerate heath or predominantly Molinia areas. These areas have not been grazed off and this is more observed in the northern section of the moor. As expected the cattle and sheep are concentrating their summer and winter grazing on areas of recent burn sites off up to 4 years ago and during the winter months this is having an effect of heather regeneration.

Throughout the life of the project since 2012 management burning has now taken place to tackle the issue of leggy/degenerate/dead heather stands that have a Molinia understory and out of the 12 areas highlighted as suitable for burning there are now only seven that would benefit from management intervention. Of the 21 stops remaining that are deemed not to be in poor heather condition (leggy/degenerate/dead) 12 are overgrazed, of the remaining 9, two have received burns so cannot be recorded. This leaves 7 stops that are not overgrazed or in poor condition.

In conclusion, overgrazing of heather during the winter months is beginning to show through and to be a concern. Winter grazing from October to March was at their lowest levels and that 50% (13 stops, excluding the two burn sites) of the stops were deemed overgrazed. Of these 13 stops nine were classed as overgrazed the previous year. This rise in the overgrazing of heather during the winter months will need to be reversed in the next few years otherwise there may be a decline overall of heather stands. However, there still remains the seven stops of fragmented heath that holds leggy and often dead heather plants intersected with areas of Molinia where its dominance is still high, further management burning and cutting can still have a positive impact on the condition of heather stands and create larger areas of available forage that may minimise the impact on the areas that are overgrazed during winter.

The other main issue being the amount of ungrazed Molinia throughout the moor as the animals only target the recently burnt areas. To help negate the impact of Molinia in the spring summer months grazing levels do need to be maintained at their maximum levels to ensure as much Molinia is grazed off. There could be an argument that grazing levels could be raised during the summer months (cattle) to further graze down the Molinia but this would require targeted shepherding not just in winter but also during summer to ensure they are grazing the northern moor much more targeting the large areas of Molinia here.

ANNEX 1

Survey Maps

Map 1



Scale 1:7500 Map 1 of 1
0 100 200 300 400m
123 300 375.6

Drawn by: Mike Pearce
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Annex 2 – Individual stop summaries for 2013 to 2017 to judge comparisons

Stop 1 –	Heather height:	2013	2-6"
		2014	up to 6"
		2015	up to 10"
		2016	up to 10"
		2017	up to 12"
		2018	up to 12"
	Heather condition:	2013	High dieback in poor condition
		2014	Good improving picture
		2015	Good
		2016	Good
		2017	Good
		2018	Good
	Growth stages present:	2013	Pioneer (recent burn)
		2014	Pioneer/building
		2015	Pioneer/building
		2016	Pioneer/building
		2017	building/mature
		2018	Building mature
	Grazing pressure:	2013	a little heavy
		2014	overgrazed
2015		Borderline	
2016		Overgrazed	
2017		borderline	
2018		Min	
Flowering:	2013	None	
	2014	None	
	2015	Good	
	2016	Minimal	
	2017	minimal	
	2018	Good	
Habitat category:		Dry heath with Molinia	
	Dwarf species present:	Culluna and Bilberry	
Stop 2 –	Heather height:	2013	6-24"
		2014	up to 36"
		2015	up to 36"
		2016	up to 18"
		2017	up to 24"
		2018	March 2017 burn
	Heather condition:	2013	High dieback in old heather
		2014	High Dieback
		2015	High Dieback

		2016	Poor and leggy with dieback
		2017	Poor
		2018	N/A
	Growth stages present:	2013	Mature/degenerate, some building
		2014	Mature/degenerate, layering present
		2015	Mature/degenerate, some building
		2016	Mature/degenerate
		2017	Mature/Degenerate/dead
		2018	N/A
	Grazing pressure:	2013	Low
		2014	higher grazing level (within 33%)
		2015	Low
		2016	Overgrazed
		2017	Overgrazed
		2018	N/A but Molinia grazed off
	Flowering:	2013	some
		2014	None
		2015	some
		2016	minimal
		2017	good on ungrazed plants
		2018	N/A
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 3 –	Heather height:	2013	up to 15"
		2014	up to 12"
		2015	up to 18"
		2016	up to 24"
		2017	Burnt late March 2016 (illegal)
		2018	N/A
	Heather condition:	2013	poor
		2014	poor
		2015	good
		2016	poor
		2017	N/A
		2018	N/A
	Growth stages present:	2013	Mature
		2014	building/mature
		2015	Building/mature
		2016	Degenerate with dead heather
		2017	N/A
		2018	N/A
	Grazing pressure:	2013	Low
		2014	Overgrazed

		2015	Overgrazed
		2016	Overgrazed
		2017	Molinia grazed off
		2018	Molinia grazed off Bilberry present
	Flowering:	2013	some
		2014	none
		2015	some
		2016	none
		2017	N/A
		2018	N/A
	Habitat category:		Molinia dominant Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 4 –	Heather height:	2013	up to 30"
		2014	up to 30"
		2015	up to 36"
		2016	Site of March 2015 burn (overshot
stop)		2017	up to 36"
		2018	up to 6"
	Heather condition:	2013	Good
		2014	Good
		2015	Good
		2016	N/A
		2017	good but getting leggy
		2018	Poor poss heather beetle
	Growth stages present:	2013	Mature/degenerate
		2014	Mature/degenerate
		2015	Mature/degenerate min building
		2016	N/A
		2017	Mature/degenerate
		2018	P and B
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	March 2015 burn grazing evident on Molinia
		2017	minimal
		2018	grazed but within 33%
	Flowering:	2013	good
		2014	minimal
		2015	good
		2016	N/A
		2017	good

		2018	None
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna
Stop 5 –	Heather height:	2013	up to 30"
		2014	up to 36
		2015	up to 36
		2016	up to 30"
		2017	up to 36"
Burn Candidate		2018	up to 36"
	Heather condition:	2013	good
		2014	good but getting leggy in places
		2015	good
		2016	good but getting leggy
		2017	good but getting leggy
		2018	good but getting leggy
	Growth stages present:	2013	Mature/degenerate with some pioneer and building
		2014	Mature/degenerate
		2015	Mature/degenerate with some building
		2016	Mature/degenerate
		2017	Mature/degenerate
		2018	Mature/degenerate
	Grazing pressure:	2013	low
		2014	low
		2015	low
		2016	low
		2017	low
		2018	low
	Flowering:	2013	good
		2014	minimal
		2015	good
		2016	good
		2017	good
		2018	average
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and bilberry
Stop 6 –	Heather height:	2013	up to 30"
		2014	up to 30"
		2015	up to 24"
		2016	up to 30"
		2017	up to 30"

	Heather condition:	2018 up to 30"
		2013 good
		2014 20% dieback
		2015 average to good
		2016 good but leggy in places
		2017 average some leggy heather
		2018 average to good
	Growth stages present:	2013 Mature/degen with some pioneer
		2014 Mature/degenerate
		2015 Mature/degenerate
		2016 Mature/degenerate
		2017 Mature/degenerate
		2018 Mature/degenerate
	Grazing pressure:	2013 minimal
		2014 more grazing but below threshold
		2015 minimal
		2016 minimal
		2017 borderline but under threshold
		2018 borderline but under threshold
	Flowering:	2013 some
		2014 some
		2015 good
		2016 average
		2017 good
		2018 some
	Habitat category:	Dry Heath
	Dwarf species present:	Culluna and Bilberry
Stop 7 –	Heather height:	2013 up to 36"
		2014 up to 42"
		2015 up to 40"
		2016 up to 40"
		2017 up to 40"
		2018 up to 42"
	Heather condition:	2013 good
		2014 good
		2015 average to good
		2016 good but gaps letting Molinia in
		2017 good but getting leggy
		2018 good
	Growth stages present:	2013 Mature/degenerate
		2014 Mature/degenerate
		2015 Mature/mainly degenerate
		2016 Mature/degenerate

		2017	Mature/degenerate
		2018	Mature/degenerate
	Grazing pressure:	2013	minimal
		2014	more grazing but in threshold
		2015	minimal
		2016	minimal
		2017	minimal
		2018	minimal
	Flowering:	2013	good
		2014	some
		2015	good
		2016	poor to average
		2017	average
		2018	good
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna
Stop 8 –	Heather height:	2013	up to 24”
		2014	up to 24”
		2015	up to 24”
		2016	up to 30”
		2017	up to 30”
		2018	up to 30”
	Heather condition:	2013	good with some dieback
		2014	average
		2015	average
		2016	average to good
		2017	average
		2018	average to good
	Growth stages present:	2013	Mature/degen with some building
		2014	Mature/degenerate
		2015	Building, Mature and degenerate
		2016	Mature/degenerate
		2017	Mature/degenerate
		2018	Mature/degenerate
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	borderline but under threshold
		2018	borderline but under threshold
	Flowering:	2013	good
		2014	minimal
		2015	average to good

		2016	average
		2017	average
		2018	average
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 9 –	Heather height:	2013	up to 30"
		2014	up to 36"
		2015	up to 36"
		2016	up to 36"
		2017	up to 40"
		2018	up to 40"
	Heather condition:	2013	poor/leggy
		2014	average but leggy
		2015	average to good
		2016	average but leggy
		2017	poor and leggy
		2018	average but leggy
	Growth stages present:	2013	Mature/degenerate
		2014	Mature/degenerate
		2015	Mature/degenerate
		2016	Mature/degenerate
		2017	Mature/degenerate
		2018	Mature/degenerate
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	minimal
		2018	minimal
	Flowering:	2013	average
		2014	good
		2015	average
		2016	poor to average
		2017	average to good
		2018	average
	Habitat category:		Dry heath with dominant molinia
	Dwarf species present:		Culluna and Bilberry
Stop 10 –	Heather height:	2013	up to 12"
		2014	up to 12"
		2015	up to 12"
		2016	up to 12"
		2017	up to 12"

		2018	up to 15"
	Heather condition:	2013	good
		2014	good
		2015	good
		2016	good
		2017	good
		2018	good
	Growth stages present:	2013	Pioneer and building
		2014	Pioneer and building
		2015	Pioneer and building with some mature
		2016	Building and mature
		2017	building and mature
		2018	building and mature
	Grazing pressure:	2013	Right level
		2014	slightly overgrazed
		2015	borderline
		2016	Overgrazed
		2017	overgrazed
		2018	overgrazed
	Flowering:	2013	some
		2014	some
		2015	good
		2016	minimal
		2017	good on ungrazed plants
		2018	good on ungrazed plants
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 11 –	Heather height:	2013	up to 24"
		2014	up to 24"
		2015	up to 24"
		2016	March 2015 burn
		2017	N/A
		2018	up to 3"
	Heather condition:	2013	average some dieback
		2014	good
		2015	good
		2016	N/A
		2017	N/A
		2018	poor
	Growth stages present:	2013	Mature/degen
		2014	building/mature
		2015	building/mature

		2016	N/A
		2017	N/A
		2018	Pioneer
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	March 2015 burn Molinia has been grazed down
		2017	Molinia being grazed
		2018	heavily overgrazed
	Flowering:	2013	good
		2014	some
		2015	average to good
		2016	N/A
		2017	N/A
		2018	none
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 12 –	Heather height:	2013	up to 24”
		2014	up to 30”
		2015	up to 24”
		2016	up to 24”
		2017	Burn site March 16
		2018	up to 5”
	Heather condition:	2013	good
		2014	good
		2015	good
		2016	good
		2017	N/A
		2018	poor
	Growth stages present:	2013	Mature with some building
		2014	Mature
		2015	Mainly mature some degenerate
		2016	Mature/degenerate
		2017	N/A
		2018	Pioneer
	Grazing pressure:	2013	Minimal
		2014	Minimal
		2015	Minimal
		2016	grazed more but within threshold
		2017	Molinia not grazed
		2018	Overgrazed
	Flowering:	2013	Average to good

		2014	average
		2015	good
		2016	minimal
		2017	N/A
		2018	None
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and Bilberry
Stop 13 –	Heather height:	2013	up to 24”
		2014	up to 24”
		2015	up to 24”
		2016	up to 24”
		2017	up to 24”
		2018	up to 18”
	Heather condition:	2013	good
		2014	poor
		2015	average to good
		2016	average
		2017	average to good
		2018	poor to average/leggy
	Growth stages present:	2013	All present with mature dominant
		2014	mature/degenerate
		2015	mature/degenerate
		2016	mature/degenerate
		2017	mature/degenerate
		2018	mature/degenerate
	Grazing pressure:	2013	minimal
		2014	grazing just about in the 33% threshold
		2015	slightly overgrazed
		2016	overgrazed
		2017	overgrazed
		2018	overgrazed
	Flowering:	2013	average
		2014	none
		2015	poor to average
		2016	minimal
		2017	minimal
		2018	minimal
	Habitat category:		Dry heath
	Dwarf species present:		Culluna and Bilberry
Stop 14 –	Heather height:	2013	up to 24”
		2014	up to 24”

		2015	up to 24"
		2016	up to 24"
		2017	up to 18"
		2018	up to 24"
	Heather condition:	2013	poor high dieback
		2014	average
		2015	average to good
		2016	poor to average
		2017	average
		2018	average
	Growth stages present:	2013	Building and mature
		2014	Mature/degenerate
		2015	Mature/degenerate
		2016	mature/degenerate
		2017	building/mature
		2018	mature/degenerate
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	minimal
		2018	minimal
	Flowering:	2013	some
		2014	some
		2015	average
		2016	average
		2017	average
		2018	average
	Habitat category:		Wet Heath with good areas of sphagnum
	Dwarf species present:		Culluna, cross leaved heather and bilberry
Stop 15 –	Heather height:	2013	up to 30"
		2014	up to 24"
		2015	up to 30"
		2016	up to 18"
		2017	up to 24"
		2018	up to 36"
	Heather condition:	2013	poor
		2014	poor
		2015	average a bit leggy
		2016	poor
		2017	poor

		2018	poor
	Growth stages present:	2013	All phases mainly mature
		2014	Mature
		2015	mature/degenerate
		2016	mature/degenerate
		2017	mature/degenerate
		2018	mature/degenerate
	Grazing pressure:	2013	minimal
		2014	heavier but within threshold
		2015	minimal
		2016	grazing within threshold
		2017	overgrazed
		2018	overgrazed but not the molinia
	Flowering:	2013	good
		2014	some
		2015	average
		2016	poor
		2017	some on ungrazed plants
		2018	little
	Habitat category:		Dry heath with dominant molinia
	Dwarf species present:		Culluna and Bilberry
Stop 16 –	Heather height:	2013	up to 24”
		2014	up to 24”
		2015	up to 24”
		2016	up to 18”
		2017	up to 30”
		2018	up to 18”
	Heather condition:	2013	good
		2014	good
		2015	average to good
		2016	average to good
		2017	good but getting leggy
		2018	average
	Growth stages present:	2013	All present mainly mature/degen
		2014	Mature
		2015	Building, mature and some degenerate
		2016	mature/degenerate
		2017	mature/degenerate
		2018	mature/degenerate
	Grazing pressure:	2013	minimal
		2014	heavier but within threshold
		2015	minimal

	2016	overgrazed
	2017	borderline but within threshold
	2018	borderline but within threshold
Flowering:	2013	good
	2014	good
	2015	average
	2016	some
	2017	average
	2018	some
Habitat category:		Dry heath
Dwarf species present:		Culluna and bilberry

Stop 17 – this stop has fallen on the edge of a burn site (winter 2014).

Heather height:	2013	up to 36"
	2014	up to 24?
	2015	up to 30"
	2016	up to 18"
	2017	up to 18"
	2018	up to 24"
Heather condition:	2013	average
	2014	average
	2015	average and leggy in places
	2016	poor to average
	2017	average
	2018	poor to average
Growth stages present:	2013	All but mainly mature/degenerate
	2014	building/mature
	2015	Building, mature and degenerate
	2016	mature/degenerate
	2017	mature/degenerate
	2018	mature/degenerate
Grazing pressure:	2013	minimal
	2014	minimal
	2015	overgrazing but close to burn site
	2016	overgrazed, close to burn site
	2017	overgrazed
	2018	overgrazed (sheep)
Flowering:	2013	average
	2014	average
	2015	poor to average
	2016	minimal
	2017	good on ungrazed plants
	2018	minimal

	Habitat category:	Fragmented dry heath with dominant Molinia
	Dwarf species present:	Culluna
Stop 18 –	Heather height:	2013 up to 30" 2014 up to 30" 2015 up to 30" 2016 up to 30" 2017 up to 24" 2018 up to 24
	Heather condition:	2013 poor 2014 poor 2015 poor 2016 poor 2017 poor/average 2018 poor
	Growth stages present:	2013 Mainly degen with some mature 2014 Mainly dead degen heather 2015 Mature/degenerate 2016 mature/mainly degenerate and leggy 2017 mature/degenerate 2018 mature/degenerate
	Grazing pressure:	2013 minimal 2014 overgrazed 2015 overgrazed 2016 overgrazed 2017 overgrazed 2018 very overgrazed
	Flowering:	2013 poor 2014 poor 2015 poor 2016 poor 2017 some 2018 minimum
	Habitat category:	Fragmented Dry heath
	Dwarf species present:	Culluna and bilberry
Stop 19 –	Heather height:	2013 up to 5" 2014 up to 12" 2015 up to 12" 2016 up to 15" 2017 up to 18" 2018 up to 18"
	Heather condition:	2013 poor (heather beetle and grazing)

		2014	good
		2015	good
		2016	good
		2017	good
		2018	good
	Growth stages present:	2013	pioneer (recent burn)
		2014	pioneer building
		2015	pioneer/building
		2016	pioneer/building and mature
		2017	building/mature
		2018	building/mature
	Grazing pressure:	2013	over grazed
		2014	minimal
		2015	within 33% threshold
		2016	minimal
		2017	minimal
		2018	minimal
	Flowering:	2013	none (possibly grazed off)
		2014	some
		2015	good
		2016	good
		2017	good
		2018	good
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and bilberry
Stop 20 –	Heather height:	2013	up to 24"
		2014	up to 24"
		2015	up to 36"
		2016	up to 30"
		2017	up to 30"
		2018	up to 30"
	Heather condition:	2013	poor (dieback)
		2014	average
		2015	poor to average
		2016	good
		2017	average getting leggy
		2018	poor
	Growth stages present:	2013	Mature/degen with some building
		2014	mature/degenerate
		2015	mature/degenerate
		2016	mature/degenerate getting leggy
		2017	mature/degenerate
		2018	mature/degenerate

	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	minimal
		2018	within threshold
	Flowering:	2013	good on live plants
		2014	good
		2015	as 2013
		2016	good
		2017	good
		2018	good
	Habitat category:		Fragmented dry heath, Molinia dominant, in poor condition
	Dwarf species present:		Culluna, cross leave and bilberry
Stop 21 –	Heather height:	2013	up to 24”
		2014	up to 30”
		2015	up to 24”
		2016	up to 36”
		2017	up to 18”
		2018	up to 24”
	Heather condition:	2013	good
		2014	poor
		2015	poor and leggy
		2016	very poor
		2017	very poor
		2018	poor
	Growth stages present:	2013	Mature/degen with some building
		2014	Mature with mostly degen/dead plants
		2015	Mature/degenerate
		2016	mature/mainly degenerate
		2017	mature/degenerate
		2018	mature/degenerate
	Grazing pressure:	2013	yes but below threshold
		2014	yes but below threshold
		2015	slightly overgrazed
		2016	overgrazed
		2017	borderline but just in threshold
		2018	overgrazed
	Flowering:	2013	good
		2014	some
		2015	poor

		2016	poor
		2017	average
		2018	poor
	Habitat category:		Dry heath
	Dwarf species present:		Culluna
Stop 22 –	Heather height:	2013	up to 10" (Just in burn area)
		2014	up to 30" (Just outside burn area)
		2015	up to 18"
		2016	up to 12"
		2017	up to 12"
		2018	up to 30"
	Heather condition:	2013	good
		2014	average
		2015	average to good
		2016	good
		2017	good
		2018	good
	Growth stages present:	2013	Pioneer and building (recent burn)
		2014	All present but mainly mature/degenerate
		2015	Pioneer/Building and mature
		2016	building/mature
		2017	building/mature
		2018	Mature
	Grazing pressure:	2013	Just within threshold
		2014	minimal
		2015	just within threshold
		2016	overgrazed
		2017	overgrazed
		2018	overgrazed
	Flowering:	2013	good
		2014	average
		2015	good
		2016	minimal
		2017	minimal
		2018	minimal
	Habitat category:		Dry heath
	Dwarf species present:		Culluna and bilberry
Stop 23 –	Heather height:	2013	up to 30"
		2014	up to 30"
		2015	up to 36"
		2016	up to 36"

		2017	up to 36"
		2018	up to 40"
	Heather condition:	2013	good
		2014	good
		2015	average to good
		2016	good but getting leggy
		2017	good but leggy
		2018	good but leggy
	Growth stages present:	2013	Mature
		2014	Mature with some building and degenerate
		2015	mature/degenerate
		2016	mature/degenerate
		2017	mature/degenerate
		2018	mature/degenerate
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	within threshold
		2017	minimal
		2018	minimal
	Flowering:	2013	good
		2014	good
		2015	average to good
		2016	average
		2017	average
		2018	good
	Habitat category:		Dry Heath
	Dwarf species present:		Culluna and bilberry
Stop 24–	Heather height:	2013	up to 30"
		2014	up to 30"
		2015	up to 30"
		2016	up to 36"
		2017	Possible March 16 burn
		2018	up to 1"
	Heather condition:	2013	poor
		2014	poor
		2015	poor to average leggy
		2016	poor
		2017	N/A
		2018	N/A
	Growth stages present:	2013	Mature/degen
		2014	Mature/degen

		2015	Mature/degenerate
		2016	mature/mainly degenerate
		2017	N/A
		2018	pioneer
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	Molinia well grazed
		2018	what heather that is coming through Is grazed right down
	Flowering:	2013	some/average
		2014	some/average
		2015	poor/average
		2016	some (candidate for burn)
		2017	N/A
		2018	N/A
	Habitat category:		Dry heath with Molinia
	Dwarf species present:		Culluna and bilberry
Stop 25 –	Heather height:	2013	2-5"
		2014	up to 4"
		2015	up to 6"
		2016	up to 6"
		2017	up to 12"
		2018	up to 18"
	Heather condition:	2013	good
		2014	good
		2015	average
		2016	good
		2017	good
		2018	good
	Growth stages present:	2013	pioneer
		2014	pioneer
		2015	pioneer/building
		2016	pioneer/building
		2017	pioneer/building
		2018	building/mature
	Grazing pressure:	2013	heavy on dominant bilberry
		2014	Slight overgrazing
		2015	overgrazed
		2016	overgrazed
		2017	overgrazed
		2018	overgrazed

	Flowering:	2013	none heather to young
		2014	as above
		2015	poor
		2016	good on uneaten heather
		2017	good on ungrazed plants
		2018	good on ungrazed plants
	Habitat category:		Dry heath
	Dwarf species present:		Bilberry dominant with some Culluna
Stop 26 –	Heather height:	2013	up to 36"
		2014	up to 30"
		2015	up to 30"
		2016	up to 24"
		2017	up to 18"
		2018	up to 6"
	Heather condition:	2013	poor
		2014	poor
		2015	poor mainly dead and leggy
		2016	poor
		2017	poor
		2018	poor
	Growth stages present:	2013	mature/degenerate
		2014	mature/degenerate
		2015	mature/mainly degenerate
		2016	mature/mainly degenerate
		2017	mature/degenerate
		2018	Was there a burn? Pioneer/building?
	Grazing pressure:	2013	minimal
		2014	minimal
		2015	minimal
		2016	minimal
		2017	minimal
		2018	overgrazed
	Flowering:	2013	low due to dieback
		2014	minimal
		2015	poor
		2016	minimal
		2017	poor
		2018	none
	Habitat category:		Dry heath
	Dwarf species present:		Culluna and Bilberry
Stop 27 –	Heather height:	2013	up to 3"
		2014	up to 3"

		2015	up to 6"
		2016	up to 6"
		2017	up to 10"
		2018	up to 12"
	Heather condition:	2013	average
		2014	good
		2015	average
		2016	good
		2017	good
		2018	good
	Growth stages present:	2013	pioneer (1 year burn site)
		2014	pioneer
		2015	pioneer and building
		2016	pioneer/building
		2017	pioneer/building
		2018	building/mature
	Grazing pressure:	2013	some grazing under threshold
		2014	minimal
		2015	overgrazed
		2016	within threshold
		2017	overgrazed
		2018	overgrazed
	Flowering:	2013	none
		2014	none
		2015	minimal
		2016	average to good
		2017	minimal
		2018	good on ungrazed shoots
	Habitat category:		Dry heath
	Dwarf species present:		Culluna and bilberry
Stop 28 –	Heather height:	2013	up to 3"
		2014	No heather present (Heather Beetle)
		2015	up to 6"
		2016	up to 6"
		2017	up to 4"
		2018	up to 12"
	Heather condition:	2013	average
		2014	Dead
		2015	very poor
		2016	average to good
		2017	poor
		2018	poor
	Growth stages present:	2013	Pioneer (2-3 year burn)

	2014	Dead
	2015	pioneer
	2016	pioneer
	2017	pioneer
	2018	building
Grazing pressure:	2013	minimal
	2014	Bilberry heavily grazed
	2015	minimal
	2016	minimal
	2017	minimal
	2018	minimal
Flowering:	2013	none
	2014	None
	2015	none
	2016	flowering on cross leave
	2017	none
	2018	none
Habitat category:		Dry Heath
Dwarf species present:		Culluna with Cross leaved and Bilberry.

Annex 3 – Results of 2012 Baseline survey shown as DAFOR

Dwarf species present

Heather (Culluna), as was expected, was dominant throughout and was present at every stop.

Bilberry was present at 65% (abundant) of the stops.

Erica species (Bell and Cross leaved) was present at 11% (occasional) of the stops.

Condition of the Heather (Culluna only)

Of the 28 stops, six (22% (occasional)) of them could be defined as the heather being in good health. The other 22 stops the heather showed signs of varied degrees of dieback with 48% (Frequent) with heather showing 0-50% dieback occurrence and 30% (Frequent) showing 51-99% dieback.

Growth Stages present

For the purposes of this report Heather growth stages are described in four stages Pioneer, Building, mature and degenerate.

Pioneer stage is when the heather develops from seed into small pyramid shaped plants. Building is when the heather forms a closed canopy. Mature is when the heather plant becomes woody, with thick stems and fewer green shoots, the canopy will begin to open up and other plant species, such as mosses, begin to establish, and Degenerate the central branches of the plant tend to die off, creating gaps in the centre of the bush in which heather seedlings may sometimes establish.

Pioneer stage is present in 38% (Frequent) of the stops of which four of these occurrences were on areas of recent burns (up to 5 years). Building stage is present on 14% (Occasional) of the stops. Mature stage is present on 73% (top end of Abundant) of the stops and degenerate stage is present on 44% (Frequent) of the stops.

Management Burning

Management burning in various degrees of times (up to 5 years ago) occurred on six (22%) of the stops and it was also noted that five (19%) of the stops could benefit from management burning.

Heather Height (as an average at each stop)

This attribute was grouped in increments of 10 inches, it was found that 5 out of the 28 stops fell in the 0-10ins range (Occasional), 4 stops in the 11-20ins range

(occasional), 14 stops in the 21-30ins range (frequent) and 5 in the 31-40ins range (occasional).

Occurrence of Flowering Heather

This was minimal throughout all the stops with only one stop showing good signs of flowering heather.

Grazing Pressure

In general the grazing pressure was very low with large areas of Molinia grassland not being grazed off and creating matting. It was found that at 25 (88%) of the stops that there was very little grazing pressure with large areas of ungrazed grass and little dunging. The other 3 (12%) stops there was higher grazing pressure with signs of grasses being grazed and more signs of dunging.