

# **Bowes Moor SSSI Site Restoration Plan**

**1<sup>st</sup> January 2018 – 31<sup>st</sup> December 2028**



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## Section 1 - Introduction

Bowes Moor SSSI is a common, registered as Bowes Moor Regulated Pasture, located in the North Pennines in south west Durham. The moor is 4,457.7 hectares in extent and is separated by the A66. The land to the north of the A66 is referred to as the North Moor and the land to the south as the South Moor. There are seven active stint holders/graziers on Bowes Moor and one sporting owner.

This site restoration plan will cover the full extent of Bowes Moor SSSI and all of the land covered in the CS agreement AG00724736. The plan aims to set out the following:

- Wildlife and conservation importance of the land
- Summary of the SSSI condition and management issues to be addressed under this CS agreement
- Consented actions / operations
- Restoration techniques
- Monitoring and review of the plan
- A list of damaging operations that will require separate consent from Natural England, out-with this plan.

## Section 2 – What is special about Bowes Moor?

### Conservation and Wildlife Designations

Bowes Moor was designated as a Site of Special Scientific Interest (SSSI) in 1989, as it supports an excellent and very extensive area of active blanket bog, together with areas of upland dry heath. These habitat types have very limited global distribution, with the UK uplands supporting between 9 – 15% of the total peatland area in Europe and about 13% of the global blanket bog resource (Uplands Management Group, 2017 Blanket Bog, Frequently asked questions).

The blanket bog supports typical bog vegetation, which comprises dwarf shrubs, cotton grasses, bog building mosses, including *Sphagnum capillifolium*, *Sphagnum magellanicum*, bog asphodel, bog rosemary, cranberry, round-leaved sundew. There are localised areas of acid grassland, flushes and small open water bodies, all adding to the diversity of the common. The open moorland also supports substantial populations of breeding birds, including golden plover, curlew, redshank, snipe and lapwing together with small numbers of dunlin, wigeon, merlin and short eared owl.

The considerable importance of the area is emphasised by international designations; Bowes Moor SSSI is a significant component of both the North Pennine Moors Special Area of Conservation (SAC) which recognises the blanket bog and dry heath habitats, and the North Pennine Moors Special Protection Area (SPA) for the upland breeding bird assemblage which includes, most notably, peregrine, hen harrier, merlin and golden plover. It also supports the migratory species curlew and dunlin.

### Landscape Designations

The outstanding landscape of the moor is recognised in its inclusion within the North Pennines Area of Outstanding Natural Beauty (AONB).

### **Section 3 – Summary of SSSI condition and Issues to be addressed**

A habitat survey was commissioned by the Bowes Forum in 2011. This was part way through the HLS agreement and aimed to establish a baseline for the SSSI and to highlight any issues that would need addressing. The main issues identified were historic and recent heather beetle damage to the heather, historic 'hot' damaging burns (still recovering), grazing distribution / suppression of heather and soft rush incursion.

#### **Natural England Integrated Site Assessment (ISA)**

In 2015 and 2016, Natural England undertook a detailed Integrated Site Assessment (ISA) across the moor, assessing the blanket bog and dry heath habitats. A summary report is detailed in Appendix 2.. This survey highlighted that there has been some recovery in the vegetation since the start of the HLS agreement, in particular around the north western part of the North Moor, Wytham and Sleightholme moors on the South moor. This recovery has been linked to changes in the management, particularly where off-wintering has occurred and foddering has ceased.

In general the species diversity of the blanket bog across the SSSI was excellent, with peat building sphagnum spp being present across the site. There was a good species diversity and age structure in the dry heath, particularly around Ravock Hill and along Whitestone Gill. Furthermore, cool burns are being achieved across the common. Despite the recovery, the survey highlighted that there are still a number of outstanding issues that need to be addressed as part of this CS agreement.

The main issues identified were:

- Moderate grazing pressure and localised heavy grazing pressure around foddering sites and where hefts congregate. This has led to damage to the dwarf shrubs and stunted heather growth forms of topiary and carpet growth.
- Continued loss of dry heath habitat and replacement with acid grassland. This was evident on parts of the North moor, Deadman's Gill, Deep Gill and Collinson's Hill. These areas occur where there is localised heavy grazing pressure, linked to foddering during the winter months and concentrated rabbit grazing (the latter is mainly adjacent to the gills).

- Lack of late mature heather across the moor, due to a combination of localised grazing pressure and increased frequency of burning.
- Burning across the blanket bog has increased in frequency over the last few years, often when the heather was not 30cm in height. Burns have also occurred within 'sensitive no burn areas' i.e across watercourses.
- Vehicle access damage on the blanket bog when flailing around burn sites, accessing grit stations, traps and shepherding. This issue was highlighted in the 2011 survey report.
- Evidence of frequent active grips across the moor. A small area of grips were blocked under the HLS agreement and it was assumed that this issue had been addressed. The ISA highlighted a number of active grips that requires either re-profiling and or blocking together with bare peat restoration.
- Soft rush encroaching into areas of dry heath and inappropriate rush control, particularly on the periphery of the blanket bog and naturally wet areas.

## Section 4 – Consented actions/operations

The following management is in addition to the UP3, UP5, UP6 and SP5 prescriptions. These actions have been agreed and consented by Natural England to deliver multiple objectives for all stakeholders and address the issues outlined in Section 3.

- **Grazing management** – Follow the requirements set out in the UP3 prescriptions, which details the agreed stocking calendars for each individual grazier and in the overall stocking calendars for the North Moor and the South Moor. The stocking calendars give the minimum and maximum numbers and types of livestock that can be grazed each month. Each calendar will be subject to regular review and the numbers of livestock may be changed i.e increased or decreased if the indicators of success, specified in the UP3 prescription are not being met. This will be agreed in consultation with the Administrators.
- **Immediate cessation of rotational burning on the blanket bog.** *Blanket bog is defined as having a peat depth of at least 40cm, regardless of the vegetation or the condition of the vegetation growing above.*
- The dry heath as shown on Map 1, outside the sensitive no burn areas (detailed in Appendix 3) will continue to be managed by rotational burning, as detailed in the UP3 prescription. All burning will be in accordance with the burning methodology detailed in Appendix 4.
- Burning on dry heath will not occur within 15m of any rush encroaching into the dry heath, as this will accelerate the spread of this species.
- **Merlin** – there are a number of merlin nest sites across the moor. The sporting owner works closely with experts to ensure that these birds continue to thrive on the moor by ensuring that sufficient areas of late mature heather are retained. The numbers will continue to be monitored and any changes in the management required to enhance the numbers will be discussed and agreed with the Administrators.
- **Vehicle access during the bird breeding season.** Care will be taken to minimise disturbance from vehicle access during the bird breeding season, 1<sup>st</sup> April – 12<sup>th</sup> July. Increased shepherding may be required in the first few days after the lambs have been turned out to identify any staggers. Where possible, vehicles will be confined to existing surfaced tracks, however if vehicles are required away from surfaced tracks, the same routes will be used as far as possible. The majority of the graziers gather mid July onwards. If gathering occurs in

June, it will not take place in windy and/ or wet weather. Where birds are showing signs of being alarmed / distressed, the grazier will move away from those areas.

- **Vehicle use across sensitive areas.** Vehicles will not cross areas that are waterlogged or where rutting damage and exposure of bare peat is occurring. Where there is evidence of rutting damage occurring and or the exposure of bare peat, the issue will be raised with the Administrators and a solution will be sought.
- **Infrastructure or construction works** required on the moor will be undertaken outside the bird breeding season. The bird breeding season is from 1<sup>st</sup> April – 12<sup>th</sup> July.
  - The exception to this is maintenance works to the surfaced, stoned tracks and heather burning on the dry heath. Heather burning will be in accordance with the Heather and Grass etc Regulations 1986 (as amended; MAFF 'Heather and Grass Burning Code'). All burning will follow the Regulations and is to be in accordance with the Code (and any future revisions thereof). Note that maintenance works to the track does not include upgrade and extension to the width of the tracks.

The existing surfaced tracks will continue to be maintained and repaired. This may involve topping with local sandstone. The creation of new tracks and or upgrade to existing tracks is likely to require planning permission. If it is ascertained that planning permission is not required, this work will require separate consent from The Bowes Moor Field Reeves and Natural England.

- **The maintenance of drains** along walls or established tracks (surfaced tracks where drains currently exist) can be maintained but not deepened, widened or improved. This work will be undertaken outside the bird breeding season (1<sup>st</sup> April – 12<sup>th</sup> July).
- **Existing lines of grouse butts or hurdles** will continue to be maintained. Heather / bilberry or acid grassland turves may be cut to cap the grouse butts. Heather turves from the blanket bog will no longer be used.
- **Grit** will be distributed following good practice, as specified by GWCT i.e lidded grit boxes of strong plastic will be used and they will not be raised more than 50cm above the surrounding vegetation. The grit stations will not be located where they could contaminate small bodes of standing water, watercourses or ground water.

- The lawful control of all legitimate 'pest' species may be carried out e.g fox, carrion crow, stoat, magpie, mink, rabbit and weasel.
- Any additional operations will require separate permission from the Field Reeves and consent from Natural England. The latter may be subject to a charge through Natural England's Discretionary Advice Service (DAS) or details will be supplied by the Administrators. DAS will be subject to proposals for new or modifications to the infrastructure requirement on Bowes Moor.

## Rush, thistles and weed control

- Rush control will focus on preventing rush encroachment into areas of dry heath, so that stands of rush do not cover more than 20% of the area of dry heath in each parcel area. Figure 1 shows examples where the rush is starting to encroach into areas of dry heath.



Figure 1: Rush encroachment into the dry heath on the north moor

- There are also areas of rush encroaching into the blanket bog across the moor. There are areas of degraded blanket bog where rush control would be desirable, for example where the bog is dominated by star moss, as shown in figure 2. However on good quality blanket bog, where there is a high cover of bog mosses (*Sphagnum* spp), controlling rushes would be detrimental to the habitat. This type of bog is shown in figure 3. Due to the sensitivity of the blanket bog habitat, it is agreed that a feasibility study, funded through PA2 will be undertaken to clearly map the areas of blanket bog where it would be beneficial for the rushes to be controlled. The outcomes of this study will be discussed with the Administrators to agree additional areas of rush control that will be undertaken on the blanket bog.



Figure 2: Rush encroaching onto areas of degraded blanket bog, dominated by star moss.



Figure 3, rushes occurring on good quality blanket bog, where rush control would be detrimental

### Methodology for rush control

- The UP3 prescription states that rushes may be managed via grazing and or cutting. In addition to these methods, rushes may be controlled using a weed wiper. A knapsack

**sprayer or quadbike and sprayer will not be used.** Where weed wiping occurs, the height of the weed wiper will be adjusted to ensure that only the top of the rush plant receives the herbicide application.

- Blocks of treatment in dense rush stands should be limited to 1 hectare in size, with at least 25 metres left untreated between blocks.
- Areas of flush and mire where rushes occur naturally, along watercourses and adjacent to boundary walls will be left untreated.
- Burning will not occur within 15m of any rushes encroaching into areas of dry heath, as burning can accelerate the spread of this species.
- Following the rush control, a heather seed mix may be spread across areas of dry heath and a blanket bog seed mix, including sphagnum pellets may be spread across areas of blanket bog.

### **Thistles**

Spot spraying or weed wiping will be used to control thistles or noxious weeds.

### **Funding for rush control**

Funds for a rush control budget will be generate pro rata as to gross stint ownership.

## Management of Heather Beetle affected areas

Annual outbreaks of heather beetle (*Lochmaea suturalis*) are a serious issue on Bowes Moor. Following an outbreak of heather beetle, it results in the heather plants turning a foxy red colour in late July/August, after which the plant may turn grey and die, as shown in figure 4. Whilst good quality blanket bog doesn't necessarily have to support extensive areas of heather, it can be a component of the bog and is extremely important for the sheep and grouse moor management.



Figure 4: Foxy red colour showing the outbreak of heather beetle

Heather beetle was first raised as a concern with English Nature in 1990 and has been reported frequently on the moor since. It appears from reports that it has been spreading more widely in recent years. However, in some areas, the foxy red colour and the loss of heather may not always be attributed to heather beetle. Raising the water table, initially through grip blocking, frost damage or an increase in nutrients from nesting birds i.e gulls could stress the heather and turn it a foxy red colour.

A severe attack of heather beetle can kill older plants, whilst the growth of younger plants may be affected for a few years until it recovers by producing new shoots from dormant buds (Defra, 2007). Older plants will need to be replaced from the seed bank. Burning management has been used in many cases to tackle an outbreak of heather beetle, however there is no evidence to suggest that burning is an effective intervention to prevent outbreaks of heather beetle. Furthermore, from a DEFRA evidence review, 2015 it concluded that burning did not encourage the regeneration of damaged areas of heather following an outbreak.

**Addressing grazing** around a heather beetle attack has been found to be fundamental to the recovery of these areas. Inappropriate grazing after an attack can lead to the loss of heather cover and a replacement with coarse grasses (Defra, 2007). Figure 5 shows an area of localised overgrazing occurring on heather that has been killed as a result of a heather beetle outbreak.



Figure 5: Supplementary feeding and localised grazing pressure on a heather beetle damaged area on Bowes Moor, taken in 2012

**Agreed action that will be taken by the Forum following an outbreak:**

- The keeper or farmer to report any new areas affected by the heather beetle to the Administrators. These areas will be mapped by GF White as ‘**sensitive areas**’.
- The farmers will shepherd sheep away from heather beetle ‘**sensitive areas**’ at least 4 times a week in the period 12<sup>th</sup> July – 31<sup>st</sup> March. There will be no shepherding during the bird nesting season. The shepherding outside the bird breeding season will continue for at least 2 to 3 years.
- If shepherding does not occur or is proving to be ineffective, the shepherding supplement will be removed from the agreement and the Administrators will consider alternative options, including erecting temporary fencing around the most severely affected heather beetle areas, removal of stock.
- The UP3 prescription does not allow supplementary feeding and therefore this is no longer an issue on the heather beetle affected areas.

- The introduction of off-wintering over the majority of Bowes Moor, will help to promote the recovery of the heather in the heather beetle affected areas.

**Action for those areas currently affected by heather beetle:**

- Map 3 shows the current '**sensitive areas**' affected by heather beetle, as mapped by the sporting owner. The farmers will shepherd sheep at least 4 times a week from 12th July – 31<sup>st</sup> March. This additional shepherding will continue for at least 2 to 3 years.
- The effectiveness of the shepherding will be monitored by Natural England at least annually using a random sampling technique. The results of which will be reviewed and discussed with the Administrators.

Where there is evidence (agreed by Natural England) of damage from the grazing of sensitive areas in the context of the Restoration Plan and its objectives, on notification of such evidence action will be taken by Natural England to prevent such damage from continuing which could include fencing, removal of stock, and/or the withholding of shepherding payments.

## Section 5 – Restoration techniques

### Blanket bog

Blanket bog is defined as having a peat depth of at least 40cm, regardless of the vegetation or the condition of the vegetation growing above. On Bowes Moor the majority of the land comprises blanket bog in varying states. The blanket bog ranges from very good quality wet mire vegetation occurring over a large proportion of the moor to areas where the bog has lost its typical vegetation and is now covered with either acid grassland (dominated by star moss) and or dominated by dense heather stands (the latter occurs only in a few areas).

The Uplands Management Group has produced Blanket Bog, Land Management Guidance. A copy of this guidance can be obtained from Natural England or downloaded from [www.moorsforthefuture.org.uk](http://www.moorsforthefuture.org.uk). This guidance details the varying states of blanket bog nationally and if and what type of intervention may be required.

The states most relevant to Bowes Moor are as follows:

- **State 2 Bare peat:** this will be addressed through bare peat restoration work, funded under the FM2 prescription.
- **State 3 Dwarf shrub dominated blanket bog with other species scarce or absent (largely inactive):** Map 2 shows the areas of dry modified bog recorded in the 2011 and 2015/16 vegetation surveys.
- **State 4 Grass/sedge dominated blanket bog (potentially active):** On Bowes moor, these areas comprise dense tussocks of star moss together with an infrequent cover of cotton grass.
- **State 5 Modified blanket bog with high dwarf shrub cover but with sphagnum and other mire species (active)**
- **State 6 Active hummock/hollow/ridge bog blanket bog (very active)**

The majority of Bowes moor comprises state 5 and 6. Where state 5 occurs, there is a high cover of sphagnum peat building species including *Sphagnum capillifolium*, *Sphagnum papillosum*, *Sphagnum magellanicum* together with common and hare's tail cotton grass, bog rosemary, cranberry, crowberry and cloudberry. These areas are considered to be state 5, as the blanket bog on Bowes Moor lacks the natural hummock and hollow structure. This has been lost due to a combination of

trampling from year round sheep grazing and frequent burning. The result is a very flat bog structure, with some areas being saturated and waterlogged; this is particularly evident around Red Gill, Glasgow Gill and The Ings.

### **Restoration measures**

#### **1. Grip blocking and bare peat restoration – state 2, 3, 4, 5**

The blanket bog on Bowes Moor has been modified, influenced by past policies including paying for drainage in the uplands to increase food production. A network of grips are present over a large proportion of the blanket bog. This has produced erosion channels and has resulted in peat loss as the grips have deepened and widened.

Sphagnum mosses and cotton grasses are the key to an active blanket bog. Whilst there is an excellent cover of Sphagnum mosses on Bowes Moor, the network of active grips has resulted in lowering the water table in some areas. This combined with trampling from the sheep and burning has resulted in losing the blanket bog structure across the site.

The grazing level was reduced under the HLS and it will be further reduced under this CS agreement. The changes that have occurred under the agri-environment schemes area shown in Table 1. Rotational burning will cease across the blanket bog and the next stage is to ensure that all the grips are blocked and any areas of bare peat are restored.

A feasibility study (funded through CS) has been undertaken to survey all active grips and areas of bare peat across the moor, the report is detailed in Appendix 5. The report from the study details that 99.2km of active drains requires blocking and 6 hectares of bare peat could be restored by re-profiling hagg edges, building stone dams, installing coir rolls and spreading with heather brash / sphagnum inoculation.

Concerns have been raised by the sporting owner that re-wetting will lead to the loss of heather cover. The aim of raising the water table is to promote the cover of peat building Sphagnum mosses and associated blanket bog species. This together with changes in the grazing and burning management should help promote the development and spread of sphagnum hummocks. Once a more natural blanket bog structure develops, the heather will grow through the sphagnum hummocks, as the hummocks will raise the heather plants above the water table. The result is that the blanket bog will comprise a mosaic of heather interspersed with cotton grasses and other bog forming plants, as shown in figure 6.



Figure 6: Fully functioning bog with sphagnum hummocks and a mosaic of heather, cowberry, cranberry and cotton grasses.

Where Natural England identify that grazing is no longer occurring or is significantly reduced in particular areas due to the grip blocking works, and that this is increasing grazing pressure on other parts of the Moor to inappropriate levels, Natural England will respond as necessary to prevent damage through over-grazing.

There will be no rotational burning or cutting on areas of wet heath or blanket bog where the peat depth is over 40cm, as detailed in the UP3 prescription.

## 2. Heather Management

### State 3: Dry modified bog

There may be localised areas of dry modified bog on Bowes Moor, as shown in figure 7. This is where the peat depth is still greater than 40cm and the vegetation is entirely dominated by heather with an understorey of feathermosses and very little peat building sphagnum. The vegetation

appears to be dry heath, however it occurs on deep peat. This type of habitat is classified as degraded blanket bog.

Natural England will work with the Administrators to identify areas of dry modified bog and to agree how to restore these areas and reduce the dominance of the heather cover. This is extremely important as the heather can dry out the blanket bog. Cutting is an effective option followed by Sphagnum inoculation. It will be important to monitor any restoration management of this habitat to see how effective the restoration techniques have been.

It is agreed that no such works reducing heather dominant areas are undertaken until it is proven that other restored areas are indeed improving in accordance with the targets of Natural England and providing a diverse habitat in line with UP3 across the moor as a whole.



Figure 7: Dry modified bog on Bowes Moor

#### **Stage 4: Grass and/or sedge dominated blanket bog, dominated by star moss**

On the periphery of the blanket bog and along Wytham moor, there are areas of deep peat dominated by star moss, (*Polytrichum commune*) where historic hot burns have occurred, as shown

in figure 8. Star moss is very vigorous and burning or cutting these areas has accelerated the spread of this prolific seeding moss. Other techniques such as trialling the application of Iron Sulphite has also been found to be ineffective.



Figure 8: examples of degraded blanket bog dominated by Star moss

There are a number of possible actions that could be trialled to reduce the dominance of the star moss. These include:

- Sowing Sphagnum pellets and a blanket bog seed mix.
- Planting Sphagnum plugs within several of the star moss beds (very labour intensive).
- Burning followed by treating with glyphosate and sowing sphagnum pellets.

Prior to undertaking any of the above techniques, discussion with experts such as the North Pennines AONB, [REDACTED] etc and Natural England must occur to see what the most appropriate methods are and to agree and GPS the treatment areas. Fixed point photography will be established after a technique is trialled and the results will be appended to this plan.

#### Stage 4: Grass and/or sedge blanket bog dominated by heath rush and mat grass



Figure 9: Taken from ISA, unit 3 2015. This quadrat occurred on peat, over 1metre in depth.

This type of degraded bog is mainly found to the north of the track on Middle Moor. It is important to promote the growth of bog building species as this habitat is no longer functioning as an active bog, as there are no peat building species present as shown on figure 9.

#### **To restore this habitat the following actions could be undertaken:**

- Restore the hydrology of the bog by ensuring all active grips are blocked. This will be undertaken as part of the FM2 capital works.
- Following the grip blocking work, a blanket bog seed mix with cotton grass, heather and crowberry should be sown together with Sphagnum pellets across the area.

#### **OR**

- Handfuls of peat forming Sphagnum (predominantly *S.papillosum* and *S.capillifolium*) will be collected from the bogs close by and planted into the acid grassland sward. No more than 10% of a Sphagnum patch should be taken. Handfuls will be taken from the edge of patches. This technique has been trialled elsewhere and figure 10 shows an example of where a handful of sphagnum has been planted in acid grassland.

- Where either of these techniques are carried out, the location and technique will be recorded and appended to this plan.



Figure 10: a planted handful of *Sphagnum palustre* on Whitfield Estate

### 3. Grazing – all blanket bog states

In general, blanket bog does not require any form of management i.e grazing or burning. It can however tolerate low levels of grazing without detriment. Light summer grazing can be important to help reduce heather and cotton grass domination when the bogs are recovering.

Under this CS agreement, further changes to the summer and winter grazing levels have been agreed. Table 1 provides a brief summary of what changes have been made under HLS and will be made in the CS agreement. Significant stock reductions are being made during the winter when the blanket bog is most susceptible to grazing pressure. The sheep numbers will be reduced from 1,337 during the winter to a maximum of 300 on the north moor only. There will be no more supplementary feeding occurring on the moor. These positive changes will accelerate the recovery of the blanket bog habitat. During the Natural England ISA in 2015/2016, a diverse range of blanket bog species were identified across the moor. These species should thrive under the new grazing management regime. Summer grazing may be important to reduce the dominance of the competitive grasses and rush dominated areas.

Table 1: Summary of the changes in the grazing levels under HLS and CS

Grazier	Rights as per Durham Common's register 2015	Summer Grazing level under HLS	Summer Grazing level under CS	Winter grazing under HLS	Winter grazing under CS	Overall reduction from grazing rights
	646.25	465	250 building to 350	150	0	296.25
	997.25	765	400 building to 600	458	300 max (average 200)	337.25
	236.5	195	0	145	0	236.5
	51.5	34	34	0	0	17.1
	657.5	565	500	312	0	157.5
	1841.5 (906 + 400 Sleightholme + 535.5)	762	575	0	0	731
	846.42	646	646	272	0	200.42
<b>Total</b>	<b>5,276.92</b>	<b>3,432</b>	<b>2705</b>	<b>1,337</b>	<b>200 average</b>	<b>1975.6</b>

Where there is evidence (agreed by Natural England) of damage from the grazing of sensitive areas in the context of the Restoration Plan and its objectives, on notification of such evidence action will be taken by Natural England to prevent such damage from continuing which could include fencing, removal of stock, and / or the withholding of shepherding payments.

## Restoration techniques for degraded dry heath

The area of dry heath has receded over the years on Bowes Moor; in particular around Collinson's Hill, Wytham Moor and on the periphery of Ravock Rigg. Map 1 highlights the main areas where the dry heath has been fragmented as a result of historic grazing and burning practices.



Figure 11: Heavily grazed heather subject to sheep and rabbit grazing alongside Deep Gill



Figure 12: Heavily grazed area of dry heath on the north moor, 2015

The CS scheme will reduce the grazing levels across the moor, in particular during the winter. All of the hefts will off-winter with the exception of one heft on the north moor, where a light winter stocking level will occur. This management will promote the restoration of the degraded areas of dry heath, enabling the new heather shoots to remain ungrazed during the winter months. A light summer grazing level will be key to the management, ensuring that the grasses do not become too dominant and out-compete the new heather and bilberry shoots from developing.

It is envisaged that these areas will recovery naturally, however the sporting owner may wish to see these areas restored at a quicker rate to meet their sporting objectives. There are a number of restoration techniques that could be undertaken to accelerate the recovery of the dry heath areas.

**Possible restoration techniques:**

- Obtain a suitable dry heath seed mix, using native species only and of local provenance. It is important that bilberry seed is included within the mix, as this species is frequent across Bowes Moor.
- Sow the heather seed on the acid grassland areas and fragmented dry heath areas, as shown on Map 1.
- The most appropriate time for sowing the seed is autumn/early winter, as this provides a period of cold over the winter to break the heather seed dormancy.

- Prior to sowing the dry heath mix, the keeper/contractor will first check that the underlying substrate does not comprise peat of any depth. The dry heath mix should only be sown on dry mineral soils. Where the substrate is peat, a blanket bog seed mix will be sown.
- The areas where dry heath mix are sown will be mapped by the keeper/contractor, taking a GPS reading. The success of this method will be monitored by the Administrators, to establish whether the heather germination has been successful. This technique has been found to be very effective on a number of other heather moorland sites.

**OR**

- Plug plants of heather may be planted. The locations will be agreed with the Administrators prior to any works taking place. This is very labour intensive and expensive and it is not clear whether this is as effective as the above measures.



**Table 2. Summary of the Restoration Actions for Bowes Moor**

<b>Dates</b>	<b>Action</b>	<b>Lead for the work</b>	<b>Parties to be involved</b>	<b>Funding</b>	<b>Essential/ Discretionary</b>
November 2018	Replace existing fenceline, this has been agreed with John Addison. Obtain permission from the Field Reeves.	Administrators	Administrators, ██████ (farmer), sporting Owner, Field Reeves	N/A	Essential
November 2018	Organise fencing contractor to commence work immediately in January 2018 – 31 March 2018 (weather permitting) on the section replacing existing fenceline.	Administrators		CS capital works	Essential
July 2018	Agree and mark line of new fence between Lartington and North Moor. Obtain permission from the Field Reeves.	Administrators	Administrators, ██████ (farmers), Sporting Owner, Field Reeves	N/A	Essential
July 2018	Organise fencing contractor to commence work from mid Oct 2018 – 31 <sup>st</sup> March 2019. Agree exact date to commence work with the sporting owner.	Administrators		CS capital work	Essential
August – Sept 2017	Using the bare peat specification from the Feasibility Study, obtain 3 quotes for the work	Administrators	NE to approve quote.	FM2 CS capital works	Essential
January 2018 – March 2019	Contractor to manage and commence bare peat restoration work.	To be agreed once quotes have been received	Administrators	FM2 CS capital works	Essential
August – Sept	Using the grip blocking and re-profiling specification from the	Administrators	NE to approve quote	FM2 capital	Essential

2017	Feasibility Study, obtain 3 quotes for the work.			works	
January 2018 – 31 <sup>st</sup> Dec 2020	Contractor to oversee grip blocking and re-profiling works	To be agreed once quotes have been received	Administrators	FM2 capital works	Essential
2018	Trial heather re-seeding on areas of degraded dry heath. A dry heath seed mix will be spread across areas of acid grassland. The peat depth will be checked prior to the work to ensure that it is only spread on a shallow substrate and not blanket bog (>40cm of deep peat).	Sporting owner	Administrators, Natural England	Part of annual payment	Discretionary
2018	Trial new techniques to reduce the dominance of star moss and restore areas of degraded bog. To be done through discussion with appropriate experts such as Geoff Ayre, the North Pennines AONB and Natural England.	Sporting Owner & appropriate experts	Administrators, Natural England	Part of annual payment	Discretionary
2018 - 2019	Identify any areas of dry modified bog for restoration management and agree methodology.	Administrators	Sporting Owner / Natural England	Part of annual payment	Discretionary



## **Section 7 – Monitoring**

The Administrators will organise a Bowes Forum meeting at least two times a year to discuss and review progress of the CS agreement. All stakeholders involved in the management of the moor should try and attend at least one of the meetings a year. One meeting a year will be on site to look at and discuss the recovery of the moor.

Monitoring the recovery of the heather beetle damage will need to be done at least annually, together with areas where re-seeding has occurred. Natural England / contractors can monitor the agreement more frequently. Where Natural England is requested to do this work, this will be subject to the Discretionary Advice Service.

Two main habitats, blanket bog and dry heath, will be monitored according to the Natural England Integrated Site Assessment criteria used to monitor the success of land in the Countryside Stewardship scheme (Appendix 2). Surveys should be carried out at least twice during the lifespan of the scheme ( year 5 and year 10).

Peat restoration will be monitored through the requirements of the CS scheme which will measure number of dams and lengths of grips either dammed or re-profiled and area of bare peat that will be re-vegetated.

## Appendix 1: Operations likely to damage the special interest (OLD)

Site name: Bowes Moor, Teesdale, Durham

OLD1001397

### Ref. No. Type of Operation

- 1 Cultivation, including ploughing, rotovating, harrowing, and re-seeding.
- 2 Grazing and changes in the grazing regime (including type of stock, intensity or seasonal pattern of grazing and cessation of grazing).
- 3 Stock feeding and changes in stock feeding practice.
- 4 The introduction of mowing or other methods of cutting vegetation and changes in the mowing or cutting regime.
- 5 Application of manure, fertilisers and lime.
- 6 Application of pesticides, including herbicides (weedkillers).
- 7 Dumping, spreading or discharge of any materials.
- 8 Burning and changes in the pattern or frequency of burning.
- 9 The release into the site of any wild, feral or domestic animal\* (excluding sheep), the introduction of any plant or seed.
- 10 The killing or removal of any wild animal\*, excluding pest control and game species.
- 11 The destruction, displacement, removal or cutting of any plant or plant remains, including any dwarf shrub, herb, sedge, rush, moss, lichen, fungus, or turf.
- 12 The introduction of and changes in tree and/or woodland management including afforestation and planting.
- 13a Drainage (including moor-gripping and the use of mole, tile, tunnel or other artificial drains).
- 13b Modification of the structure of watercourses (eg rivers, streams, springs, ditches, drains), including their banks and beds, as by re-alignment, re-grading and dredging.
- 13c Management of aquatic and bank vegetation for drainage purposes.
- 14 The changing of water levels and tables and water utilisation (including irrigation, storage and abstraction from existing water bodies and through boreholes).

- 15 Infilling of ditches, drains, tarns, bog-pools and marshes.
- 16a The introduction of and changes in freshwater fishery production and/or management, including sporting fishing and angling.
- 20 Extraction of minerals, including peat.
- 21 Construction, removal or destruction of roads, tracks, walls, fences, hardstands, banks, ditches or other earthworks, or the laying, maintenance or removal of pipelines and cables, above or below ground.
- 22 Storage of materials.
- 23 Erection of permanent or temporary structures, or the undertaking of engineering works, including drilling.
- 24 Modification of natural or man-made features, clearance of boulders, large stones, loose rock or scree and battering, buttressing or grading rock-faces.
- 26 Use of vehicles or craft likely to damage or disturb features of interest.
- 27 Recreational or other activities likely to damage or disturb features of interest.
- 28 Changes in game and waterfowl management and hunting practices.

\* 'animal' includes any mammal, reptile, amphibian, bird, fish or invertebrate.

## Appendix 2

### Bowes Moor Natural England Condition Assessment Summary of Report – July 2016

#### **Bowes Moor SSSI Interest Features**

Bowes Moor was designated as a SSSI in 1989 for the following interest features:

- Blanket bog
- Dry dwarf shrub heath
- Flushes
- Assemblages of breeding birds

#### **Method**

Bowes Moor is divided into a series of 'monitoring units'. These reflect the heft boundaries given to Natural England during the notification of the SSSI.

For each monitoring unit, a series of sample points are generated using GI software for each habitat type. This is to ensure that samples are random, they have a good coverage of each unit and there is no observer bias. For Bowes Moor, the sample points concentrated on either blanket bog or dry heath and for each habitat type, at least 10 sample points were assessed (this was the minimum number).

No attempts were made to re-find the exact locations of previous survey points (i.e from the 2011 survey). There are several reasons for this. Primarily, GPS units can have a 10m margin of error so the exact location would be unlikely to be found. Moorlands can change significantly over such a distance, that it would give an impression that a direct comparison could be made, which would be misleading.

The Common Standards Monitoring (CSM) guidance produced by Joint Nature Conservancy Council in 2006 was followed for each habitat type. This is a detailed assessment that sets targets for a number of attributes. The targets for blanket bog and dry heath as show below.

#### **Main points identified from survey (undertaken in March/April 2015 (North Moor) and March/April 2016(South Moor):**

<p><b>Units 1</b> [REDACTED]</p> <p><b>857ha</b> SSSI Interest Features: Blanket Bog Assemblage of upland breeding birds</p>	<p><b>Description of unit:</b> The area supports blanket bog with areas of rush dominated grassland. There are various types of blanket bog across of the unit, with very wet blanket bog (M18) occurring on the flat plateaus around the lngs and grading to slightly drier bog habitat with a good cover of heather (M19) around Beldoo Hill and degraded bog habitat (M20) around Sandy Hill and Spital Sike/Hill. There is extensive heather beetle occurring to the north of this unit.</p> <p><b>Draft Management Objectives:</b> Maintain and restore the areas of blanket bog to M18 or M19 blanket bog communities. Maintain the</p>
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	<p>diversity of breeding birds across the SSSI.</p> <p>25 sample points were assessed on the blanket bog across this unit.</p> <ul style="list-style-type: none"> <li>✓ In general the species diversity of the bog was excellent, with peat building sphagnum being present in the majority of the sample points.</li> <li>✓ Dominance of hare's tail cotton grass, particularly around Sandy hill, indicating degraded blanket bog. However this was showing signs of improvement and there was a good diversity of blanket bog species. With commencement of offwintering this will lead to further improvements in this area.</li> <li>✓ Cool burns achieved.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Grazing pressure assessed as being moderate, with a third to half of the shoots being grazed at each sample point.</li> <li>▪ Burning management: Several burns had occurred where the heather was not 1ft in height. Historic hot burns. Vehicle access damage apparent when flailing around burn sites and accessing grit stations and traps.</li> <li>▪ Active grips around Flat Moss.</li> </ul>
<p><b>Unit 2</b> [REDACTED] <b>697ha</b></p> <p>SSSI Interest Features: Blanket Bog Dry heath Assemblage of upland breeding birds</p>	<p><b>Description:</b> This unit comprises mainly blanket bog with dry heath occurring in the eastern part of the unit, around Ravock Hill. The blanket bog comprises areas of very wet blanket bog (M18) around Glasgow Gill, Red Bogs, Duckett Sike and Old Moss. Extensive areas of these bogs have been affected by heather beetle. Drier areas of bog occurs which supports a higher cover of heather. In some cases, the blanket bog reflects dry heath on deep peat. Fragmented dry heath occurs on the lower ground to the east and north of the unit. There is continuous cover of dry heath around Ravock and on some of the steeper slopes.</p> <p><b>Draft Management Objectives:</b> Maintain and restore the areas of blanket bog to M18 or M19 blanket bog communities. There should be no loss in the extent of dry heath, unless it is shown to occupy deep peat. Restore and enhance the extent, structure and species diversity of the dry heath habitat. Maintain the diversity of breeding birds across the SSSI.</p> <p>33 sample points were assessed in total: 22 on the blanket bog (including 4 on dry modified bog) and 11 on dry heath.</p> <ul style="list-style-type: none"> <li>✓ Majority of the blanket bog across this unit is fully functioning supporting key peat building species.</li> </ul>

	<ul style="list-style-type: none"> <li>✓ Blanket bog on Duckett Syke supports an excellent diversity of bog species.</li> <li>✓ There is a good species diversity and age structure in the dry heath on the slopes north of Ravock hill.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Cover of soft rush exceeding 10% across areas of dry heath.</li> <li>▪ Grazing pressure on the blanket bog was higher along the eastern and northern parts of the unit. The grazing pressure across the dry heath was moderate - high.</li> <li>▪ In some cases, heather appears to be in building phase but it is a mature stand that has been continually grazed back.</li> <li>▪ Vehicle damage from grouse moor management: flailing around burn sites was a particular issue on Old Moss. This was highlighted in the 2011 survey and this is still an issue.</li> <li>▪ Burning within sensitive areas. Burns had occurred across bogs with frequent bog pools, either side of a watercourse and across active grips.</li> <li>▪ Active grips on Old Moss.</li> </ul>
<p><b>Unit 3</b> [REDACTED] <b>113ha</b></p> <p>SSSI Interest Features: Blanket Bog Assemblage of upland breeding birds</p>	<p><b>Description:</b> This is a small unit consisting of an extensive area of blanket bog in the north and central area, part of Dry Rig Moss and Duckett Sike. These two areas comprise M18 blanket bog with an almost continuous cover of sphagnum species. There are localised areas of dry heath and degraded blanket bog in the eastern part of the unit. Acid grassland also occurs along the periphery of this unit and in particular below Ravock hill where the hefts of units 2 and 3 meet.</p> <p><b>Draft Management Objectives:</b> Maintain and restore areas of blanket bog.</p> <p>12 sample points were assessed; ten on the blanket bog and two on the dry heath.</p> <ul style="list-style-type: none"> <li>✓ Excellent species diversity and cover of blanket bog indicator species to the north of the unit, on Duckett Sike. There were little signs of grazing pressure across this area.</li> <li>✓ Cool burns achieved.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Localised heavy grazing pressure along southern and eastern boundaries, particularly where two hefts congregate below Ravock hill and nr Pasture end.</li> <li>▪ Evidence of topiary growth forms and heavy grazing pressure on the heather directly adjacent to foddering areas.</li> <li>▪ Vehicle access damage on wetter areas of bog, related to grit stations and traps.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Burning in sensitive no burn areas, across a watercourse and on the M18 blanket bog where there is an almost continuous cover of sphagnum and frequent bog pools.</li> <li>▪ Occasional Active grips.</li> <li>▪ Rush cover.</li> </ul>
<p><b>Unit 4</b> [REDACTED] [REDACTED] 782.51</p> <p>SSSI Interest Features: Blanket Bog Assemblage of upland breeding birds</p>	<p><b>Description:</b> Blanket bog covers the majority of this unit and it is extremely wet around Red Gill and Foddering Gill. Dry heath occurs on the very steep slopes adjacent to Deep Gill and Whitestone Gill. An area of acid grassland on deep peat and degraded blanket bog occurs to the north of Ay gill. There is extensive heather beetle around Red Gill and Foddering Gill affecting the condition of the heather.</p> <p><b>Draft Management Objectives:</b> Maintain and restore the condition of the blanket bog back to fully functioning blanket bog.</p> <ul style="list-style-type: none"> <li>✓ Excellent species diversity across the blanket bog area. In some areas there was between 7 and 11 individual species.</li> <li>✓ Good diversity of dry dwarf shrub heath with very little grazing pressure along Whitestone Gill.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Heavy grazing pressure around Little Black Hill, north of Ay Gill and from Foddering Gill to Collinson’s Hill.</li> <li>▪ Damage to dwarf shrubs as a result of foddering.</li> <li>▪ Rabbit grazing pressure affecting the condition of the dry heath adjacent to Deep Gill.</li> <li>▪ Active drains</li> <li>▪ Several recent hot burns leading to the exposure of bare peat. Flailing around the burns has led to incisions in the peat and rutting damage to the very wet vegetation.</li> <li>▪ Burning in sensitive no burn areas, across watercourses and active grips.</li> <li>▪ Vehicle access damage from accessing grit stations and traps.</li> <li>▪ Tree planting for black grouse along Ay Gill has been unsuccessful and it is now littered with tree guards.</li> </ul>
<p><b>Unit 5</b> [REDACTED] 580ha</p> <p>SSSI Interest Features: Blanket bog Assemblage of upland breeding birds</p>	<p><b>Description:</b> The blanket bog covers the flat plateau that stretches south of Collinson’s Hill, and across to Lower Bog Gill. Areas of blanket bog also occurs on the sloping ground to the east of Middle Moor. The dry heath habitat occurs along Deep Gill, Collinson’s Hill, north of Middle Moor and to the east of the unit.</p> <p><b>Draft Management Objectives:</b> Maintain the areas of blanket bog on the flat plateaus and restore areas of dry modified bog (dominated by heather) or acid grassland occurring on deep peat, to M18 or M19</p>

	<p>blanket bog communities.</p> <p>Restore and enhance the extent, species diversity and structure of the dry heath habitat. Maintain the diversity of breeding birds across the SSSI.</p> <p>29 sample points were assessed on the blanket bog and 20 sample points on the area of dry heath. Of the 20 sample points for dry heath, 3 occurred on bent/fescue acid grassland with no dwarf shrubs and these were excluded from the assessment.</p> <ul style="list-style-type: none"> <li>✓ The blanket bog on the flat plateau above Collinson Hill and extending across to Lower bog gill was in excellent condition. There was a good diversity of bog species, with little signs of grazing pressure, disturbance or damage to the vegetation.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Main areas of concern were the northern half of the unit on Collinson Hill and degraded blanket bog around Middle Moor and Burnt Gill.</li> <li>▪ Decline in species diversity and cover of positive indicator species for the blanket bog on the sloping ground on Middle Moor and on areas of dry heath.</li> <li>▪ Dry heath was dominated by heather or the heather had been lost altogether and the habitat converted to acid grassland.</li> <li>▪ High cover of hare's tail cotton grass on degraded areas of bog on sloping ground of Middle Moor and in valley mire around Burnt gill.</li> <li>▪ Burning had occurred within sensitive no burn areas: within 10m of watercourse and areas dominated by bog pools.</li> <li>▪ Heavy grazing pressure occurred on the areas of dry heath with over half of the dwarf shrub shoots being grazed in 7 out of the 13 sample points.</li> <li>▪ Lack of late mature heather across the unit.</li> </ul>
<p><b>Unit 6 – Wytham Moor</b>  <span style="background-color: black; color: black;">XXXXXXXXXX</span>  <b>186ha</b></p> <p>SSSI Interest Features:  Blanket Bog  Dry heath  Assemblage of upland breeding birds</p>	<p><b>Description:</b> This unit is dominated largely by dry heath and fragmented dry heath. Blanket bog occurs in the south west corner of the unit and adjoins the area of blanket bog from unit 5.</p> <p><b>Draft Management Objectives:</b> Maintain the areas of dry heath and restore the fragmented areas that have been subject to historic heavy grazing pressure. Maintain the area of blanket bog and restore those areas currently dominated by heather to fully functioning blanket bog with a high diversity of peat building species. Maintain the diversity of breeding birds across the SSSI.</p> <p>22 sample points were assessed on the dry heath and 19 sample points on the blanket bog. Of the 22 sample points for dry heath, 15 occurred</p>

	<p>on fragmented heath.</p> <ul style="list-style-type: none"> <li>✓ The blanket bog was a continuation of the bog from unit 5. It was generally in excellent condition, supporting a diverse range of positive indicator species. The maximum level recorded being 10 species.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ Lack of species diversity and cover of indicator species on areas of dry heath. It was dominated by heather. In 13 out of 22 sample points, there was less than 10% cover of dwarf shrubs.</li> <li>▪ Grazing pressure was moderate. Note that 16 sample points did not have any dwarf shrubs to assess.</li> <li>▪ High cover of rushes.</li> <li>▪ Lack of late mature heather across the unit.</li> <li>▪ On the blanket bog there was a direct correlation between increasing cover of heather and reduction in the number of positive bog species.</li> </ul>
<p><b>Unit 7 – Sleightholme moor</b> [REDACTED] 1,274ha</p> <p>SSSI Interest Features: Blanket bog Dry heath Upland breeding bird assemblage</p>	<p><b>Description:</b> This unit is dominated by an extensive area of blanket bog with two localised areas of dry heath. The largest area of dry heath occurs on Seven Hills and a very small area occurs adjacent to Tan hill and on the rocky slopes of Mirk Fell. Sleightholme moor has been subject to historic heavy grazing pressure by cattle and sheep.</p> <p><b>Draft Management Objectives:</b> Maintain and restore the areas of blanket bog to M18 or M19 communities. Maintain and enhance the extent, diversity and structure of the dry heath. Maintain the diversity of breeding birds across the site.</p> <p>22 sample points were assessed on the dry heath and 48 sample points on the blanket bog.</p> <ul style="list-style-type: none"> <li>✓ The dry heath to the west of the unit supported an excellent diversity of dwarf shrubs, comprising heather and bilberry heath. There was a good understorey of mosses.</li> <li>✓ Grazing pressure was generally low across the unit. There has been a noticeable improvement in the condition of the dry heath and blanket bog following the implementation of offwintering. The grazing pressure on the bog directly adjacent to the road before bar gap was very light.</li> <li>✓ Area of blanket bog to east of the unit is showing signs of recovery, with lots of pioneer dwarf shrubs developing. This suggests that the habitat is recovering. This area may benefit from restoration works i.e fencing exclosures to accelerate recovery.</li> </ul> <p>Concerns from survey:</p> <ul style="list-style-type: none"> <li>▪ The dry heath around Seven Hills lacked species diversity being</li> </ul>

	<p>dominated by heather. Cover of dwarf shrubs was below 50% in 4 of sample points on Seven Hills, as there were occasional areas of fragmented heath.</p> <ul style="list-style-type: none"> <li>▪ Active grips</li> </ul>
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**Issues / recommendations for the forthcoming CS agreement:**

There has been some recovery across the SSSI. In particular unit 1, some areas of unit 5 and unit 7 have seen the most recovery. There have been significant changes to the grazing management in each of these units.

- Re-assess summer and winter grazing levels across the north and south moor. Where offwintering has occurred under HLS – the vegetation has shown considerable improvement.
- Address grazing issues in relation to the north moor. The north moor is currently unfenced and there are issues with stock grazing from Lartington Moor. Could this be fenced and funded under CS.
- Develop a restoration plan to restore areas of degraded bog and fragmented dry heath
  - Working together develop a restoration programme. This will highlight areas to be fenced and totally excluded from grazing for at least 3-5 years. Grazing may then need to be re-introduced for summer only.
  - Sowing dry heath mix into areas of fragmented heath.
  - Sphagnum inoculation into areas dominated by star moss.
  - Cut or burn areas of dry modified bog, followed by Sphagnum inoculation.
  - Identify areas suitable for restoration burning or cutting management.
- Highlight areas of late mature heather to be retained for breeding merlin across the site.
- Grip blocking work and bare peat restoration work - commission AONB to undertake a detailed assessment of the grips across Bowes Moor.
- Rush control around the areas of dry heath. This should focus on prevent rushes from encroaching onto areas of dry heath.
- Vehicle access damage to very sensitive / wet areas of bog
- Tree planting, what happens to the tree guards.
- Measures to alleviate areas affected by heather beetle



Photograph 1: Example of the quadrat used to assess each sample point.



Photograph 2: Foddering on unit 3. There were signs of heavy grazing pressure on the adjacent heather vegetation.



Photograph 3: Burning across a sensitive no burn area, the watercourse.

Favourable Condition Targets for Blanket bog– the following targets are assessed at each stop using a 2m x2m quadrat and undertaking a visual assessment, looking as far across the feature as is physically possible.

Feature	Attribute	Target
Blanket Bog	Vegetation composition - frequency of indicator species	Quadrat: At least 6 indicator species should be present. Indicator species relevant to Bowes Moor include: common and hare's tail cottong grass, sundew spp, crowberry, cowberry, bog asphodel, cranberry, heather, bog rosemary, cloudberry, deer grass, sphagnum spp, non crustose lichens and feather mosses.
	Vegetation composition - cover of indicator species.	Quadrat: At least 50% of vegetation cover should consist of at least 3 indicator species
		Quadrat: Any one of <i>Eriophorum vaginatum</i> , <i>Ericaceous</i> species collectively, or <i>Trichophorum</i> should not individually exceed 75% of the vegetation cover.
	Vegetation composition - cover of other species	Visual estimate: Less than 1% of vegetation cover should be made up of non-native species i.e conifers. <b>This is not an issue on Bowes Moor.</b>
		Visual estimate: Less than 10% of vegetation cover should be made up of a scattered native trees and scrub. <b>This is not an issue on Bowes Moor</b>
		Less than 1% of vegetation cover should consist of, collectively, yorkshire fog, bracken, creeping buttercup, common bent grass.
	Vegetation structure - indicators of browsing.	Quadrat: Less than 33% of the last complete growing season's shoots of dwarf-shrub species (collectively) i.e heather, cross leaved heath, bilberry, crowberry, cowberry should show signs of browsing.
	Vegetation structure - disturbance	Visual estimate: There should be no observable signs of burning into the moss, liverwort or lichen layer or <b>exposure of peat surface due to burning.</b>
Visual estimate: There should be no signs of burning or other disturbance (e.g. mowing) in the sensitive areas. Sensitive areas for Bowes includes: flushes and mires and those areas with abundant or almost continuous sphagnum cover, within 15m of hagsgs and 10m of erosion gullies, land above 600m, on shallow soils i.e scree slopes, eitherside of a watercourse or active grip, steep slopes and areas with very old heather stands.		
Physical structure - peat erosion.	Visual estimate: The extent of eroding peat should be less than the extent of stable re-deposited peat and new growth of bog vegetation within the feature.	
Physical structure -indicators of active drainage and/or ground disturbance due to herbivore and human	Visual estimate: Less than 10% of the total feature area, should be disturbed bare ground* and/or show signs of active drainage, resulting from ditches or heavy trampling or tracking.	

	activity.	Visual and quadrat: Less than 10% of the Sphagnum cover should be crushed, broken, and/or pulled-up.
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#### Favourable Condition Targets for Dry heath

Feature	Attribute	Target
Dry Heath	Frequency of bryophytes and lichens.	Quadrat: At least 1 species of moss or liverwort or non-crustose lichen should be present
	Composition - cover and frequency of dwarf shrubs.	Quadrat: At least two indicator species should be present. These include heather, bell heather, cross leaved heath, crowberry, bilberry.. This is not applicable to heath in sensitive areas which may go through prolonged phases of <i>Calluna</i> dominance.
		Quadrat: At least 50% of Vegetation cover should be made up of these positive indicator species.
		Less than 50% of dwarf shrub cover should be made up of Negative indicator species i.e gorse, willow, bog myrtle.
	Vegetation structure - indicators of heavy browsing	Quadrat: Less than 33% of the last complete growing season's shoots of dwarf-shrub species should shows signs of browsing
	Vegetation structure - indicators of Heavy browsing.	Quadrat: In pioneer stage regrowth, or where there is <i>Betula nana</i> or <i>Myrica gale</i> (at any stage of regrowth), less than 66% of the last complete growing season's shoots of the dwarf-shrubs (collectively) should show signs of browsing
	Vegetation composition - cover of other species: visual estimate for all.	Less than 1% of vegetation cover should be made up of non-native species i.e conifers. This does not apply to Bowes Moor.
		Less than 10% of the vegetation cover should be made up of bracken.
		Less than 20% of the vegetation cover should be made up of scattered native trees and scrub.
		Less than 10% of the vegetation cover should consist of <i>Juncus effusus</i> .
Vegetation structure - disturbance		There should be no signs of burning inside the boundaries of the sensitive areas . These include steep slopes 1 in 2, very old stands of heather, eitherside of watercourses and adjacent to bracken stands.
		On the remainder of the feature, outside sensitive areas identified, all growth phases of heather should occur throughout the area. At least 10% of the heather should be in the late mature growth phase.
Physical structure -indicators of ground Disturbance due to Herbivore and human activity.		Less than 10% of the ground cover should be made up of disturbed bare ground.

### Appendix 3: Sensitive areas to be excluded from the burning rotation on the dry heath areas

- There will be no burning within 5m either side of a watercourse, from the edge of the watercourse.
- Steep slopes and gullies greater than 1 in 2 on dry heath.
- Areas of recent burns where pioneer heather is still establishing (pioneer = heather shoots, up to approx 5 years old which are not fully developed).



- Areas with native trees or shrubs or immediately adjacent to planting enclosures.
- Areas with a noticeably uneven structure; in heathland this unevenness is most commonly found in very old heather stands, often comprising large and spreading heather plants.

## Appendix 4: Burning methodology

- Heather and Grass etc Regulations 1986 (as amended; MAFF 'Heather and Grass Burning Code'.) All burning will follow the Regulations and is to be in accordance with the Code (and any future revisions thereof). The Heather and Grass Burning Code and Regulations can be found on the DEFRA website [www.defra.gov.uk](http://www.defra.gov.uk).
- Burning is only allowed between 1 October and 15 April. Caution is to be followed during periods of dry weather and burning is not to be undertaken even within this period where bird nesting activity has been noted in proposed burn areas.
- Burning will be carried out only with quick, cool burns and when conditions allow for this. A cool burn is one which removes the dwarf-shrub canopy yet leaves behind a proportion of 'stick' and does not cause damage to the moss layer or expose the peat surface. [Hotter, slower burns can kill the moss and lichen layer and plants like cowberry and bilberry and if severe it can burn into the peat surface causing erosion and affecting the integrity of the sensitive habitat.] Any moss or lichen or litter layer should not be damaged by burning. When conditions do not allow for this, fires will not be started.
- **Heather will be burnt when it is at least 30cm in height.**
- Burn size will be managed with the objective of restricting individual burns to ideally less than 30 metres wide, however the maximum width will be 55 metres. This is consistent with guidance from the Game and Wildlife Conservancy Trust. The maximum area of each burn will be no more than one hectare in extent.
- Sufficient personnel and equipment will be available to control burning for example to extinguish any fires that prove to be too hot or that are in danger of getting out of control. A risk assessment should be carried out prior to burning to identify risks and strategies to alleviate them.

## **Appendix 5 Grip blocking and bare peat feasibility study**