Results Based Agri-Environment Project within the Northern Upland Chain Local Nature Partnership

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1.0 Introduction

The Northern Upland Chain (NUC) Local Nature Partnership (LNP) was established in 2012. The LNP encompasses the Protected Landscapes of Northumberland National Park, North Pennines AONB, Yorkshire Dales National Park, Nidderdale AONB and the Forest of Bowland AONB. This chain of upland Protected Areas is broken only by the 'Tyne gap' between the North Pennines and the Northumberland National Park, containing the River Tyne that drains the surrounding catchments. The NUC LNP bridges this gap (Figure 1).

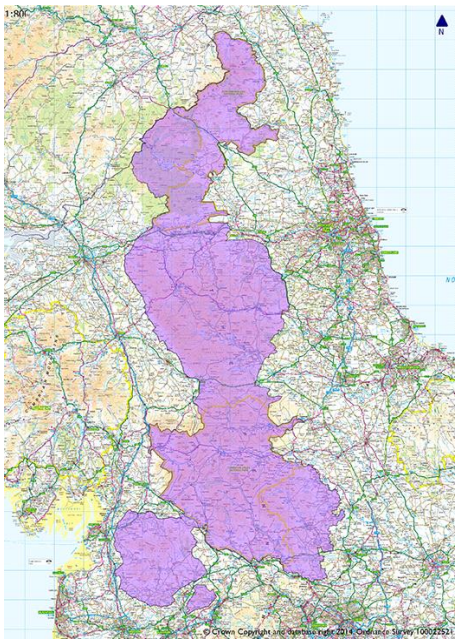

Figure 1 – NUC LNP area

The LNP works across 6 themes including Natural Capital, Ecological connectivity, woodland, hay meadows and High Nature Value Farming (HNVF). It is through the HNVF theme that the RBAPs work has been commissioned. The groups' connection with the European Forum for Nature Conservation and Pastoralism instigated the scoping work for an RBAP scheme, including exchange visits to Ireland and the Yorkshire Dales. This report details the results of that scoping exercise.

2.0 Rational for a grassland RBAPS in the NUCLNP

Declines in farmland biodiversity during the last century have been widely attributed to the intensification and expansion of modern agricultural practices (Krebs et al. 1999; Stoate et al. 2009). This is of particular concern in the United Kingdom (UK) where approximately 75% of land is classed as agricultural. The uplands did not escape this push (from government) for intensification with moorlands drained, meadows ploughed and reseeded, livestock numbers increased. It wasn't until the early 1980s that support was given to protect the English uplands from further change with the introduction of agri-environment schemes. The Environmentally Sensitive Area scheme (ESA) and the Countryside Stewardship Scheme (CSS) offered farmers financial support to secure good environmental management on meadows, pastures, woodland and allotments. These schemes maintained the status quo, protecting species rich habitats from further deterioration and supporting farming within a challenging landscape.

Since the end of the ESAs, there has been a slow, but steady rate of intensification on some of the more accessible grasslands within the LNP. This is partly due to these grasslands not qualifying for Environmental Stewardship Higher Level payments. Silage has replaced

traditional hay meadows as it produces a better quality feed and production is less dependent on the weather. Intensification of farmland in the lower parts of the LNP has increased. Breeding wader habitat is a lesser priority to other BAP habitats, and has therefore lost out on agri-environment support. The picture is of a more fragmented landscape leaving the core habitats and associated species at risk of further fragmentation and an inability to cope with the pressures of climate change.

Hay meadows

Upland hay meadows are precious not only in biodiversity terms but because they provide an important link to the socio-economic and cultural past of the Northern Upland Chain LNP. They are an entirely man-made habitat and are dependent on management by people year-in, year-out. Every hay meadow has a unique management history which depends upon its location relative to the farmstead, its aspect and altitude. These differences mean that each hay field will have been cut at a different time each year – fields closer to the farm will have tended to have been cut earlier, those at a higher altitude later. Fields closer to the farm would also be more likely to receive inputs such as farmyard manure and lime than those further away. Over the generations, these slight differences in management have resulted in fields with subtly different suites of species, each representing a unique 'fingerprint' of the field's management history.

The persistence of traditional management practices in the Northern Upland Chain LNP, coupled with the presence of national agri-environment schemes such as the Pennine Dales ESA and Higher Level Stewardship (HLS), have undoubtedly prevented the complete loss of hay meadows that has occurred in other parts of the country as a result of ploughing, re-seeding, fertilisation and drainage.

Nonetheless, the hay meadow resource in the Northern Upland Chain LNP is declining in quality and extent, albeit at a slower rate. Surveys undertaken by the North Pennines AONB Partnership since 2006 indicate that many formerly species-rich meadows have lost their key indicator species such as wood crane's-bill. Wetter meadows are tending to be dominated by one species, marsh marigold. In addition rush cover is on the increase and soils are becoming more acidic – potentially from atmospheric deposition of nitrate, affecting species diversity. Old field drains are collapsing due to age and the use of modern farming machinery and a wetter climate has led to problems with soil husbandry and nutrient leaching.

Unfortunately, agri-environment schemes and tighter inspection requirements have also played their part in the decline. Farmer's knowledge on hay meadow management tends to be ignored and in its place a range of research science based management requirements are imposed. The main areas of contention surround the closing up date and subsequent cutting date which should vary season by season, year by year. Diaries held by farmers within Swaledale that go back more than 50 years illustrate the full range of dates these activities occurred on, which were principally guided by the weather conditions in Spring and Summer. The approach to hay meadow management imposed by the national schemes - standard cutting dates, quantifying manure inputs, regulating spring grazing and placing administrative hurdles in front of other practices such as liming has removed the decision making from the farmer about hay meadow management and imposed a more uniform regime at a landscape scale. This does not benefit wildlife, the farmers or support traditional HNVF practices.

Moorland fringe breeding wader habitat

The moorland fringe is a transitional area, resulting in a mosaic of habitats but also suffering from increased pressure from farming, grouse moors and plantation woodland. It contains

the majority of the breeding wader population due to its diverse habitat and structure of rush pasture, rough acidic allotments, species rich grassland and improved grassland. The fringe acts as a natural extension of the moorland habitats thereby forming a buffer area to the North Pennine Moors SPA. This area can be defined as the land between the semi-improved fields in the bottom of the dale and the heather moorland at the top. It is made up of a mosaic of habitats and has probably fluctuated in size over the years with the improvement and abandonment of agricultural areas. As the moorland fringe is a transitional area it is not usually managed for one objective and is sometimes left unmanaged, which leads to the mix of habitats found there.

A traditional hill farm in the LNP will use the in bye and the enclosed rough grazing land of the moorland fringe to provide seasonal grazing for livestock being moved up and down the hill in spring and autumn. The adjacent moor will then be used for grazing during the summer. The enclosed rough grazing will be grazed by both beef cows (or drying off dairy cows) and 'hardy' sheep such as Swaledales. The moorland fringe is an essential part of the hill farm system and is possibly the area under the most pressure from grazing livestock.

Between the 1950s and 1970s, much of the enclosed rough grazing land was drained to try and increase production in a post war Britain. Coupled with increases in sheep numbers during the 1980s and a gradual decline in cattle numbers, this led to a decline in biodiversity of the wet moorland fringe habitat. (Krebs et al 1999, Stoate et al 2009)

Between 1990 and 1998 the uplands of England and Wales exhibited greater levels of land-use change than lowland zones (Haines-Young et al., 2003). Agricultural land management resulted in a 7% increase in the area of improved grassland, indicating a continuation of agricultural intensification in the uplands that is less apparent in lowland areas. The British Trust for Ornithology's Breeding Bird Survey (BBS) indicates curlew declines of 55% and 32% respectively between 1995 and 2013 (Harris et al. 2015). These sharp declines are accompanied by range contraction: in the 40 years up to 2007–11, the breeding range in mainland Great Britain declined by 17%. The parlous state of the Curlew is probably also an indicator of the decline in both the extent and the quality of the UK's semi-natural habitats that support breeding Curlews, including upland grassland and moorland and lowland wet grasslands.

Since the late 1990s, agri-environment schemes and changes to Pillar 1 CAP payments have supported reductions in sheep numbers and encouraged retention of cattle by offering grazing management agreements and associated payments for in bye grassland and enclosed rough grazing. This, in some cases, has had a positive effect on the quality of the habitat and in turn for the wildlife. However, in others, it has led to a decline in habitat quality due to under grazing – particularly on in bye grassland, which in turn has affected habitat quality and breeding wader success.

Environmental Stewardship has helped to address some of these issues and the uptake of scheme options relating to these habitats has been high within the LNP. However management prescriptions within the national agri-environment schemes have focused more on livestock numbers and timing of grazing rather than encouraging the farmer to understand what the breeding waders require in terms of habitat structure and variance in habitat type. Specific grazing periods, as required by the national schemes, for small parts of the farm also puts pressure on the rest of the holding to cope with the additional grazing pressure, making it harder to farm and off putting from the farmer's perspective. The focus should be on the whole farm, understanding livestock movement during key periods of the year and how that creates a diverse habitat structure over a range of areas that support all four breeding waders (curlew, snipe, lapwing and redshank). The farmer, with some additional training, would be best placed to regulate this for a set of achievable outcomes.

The LNP contains significant areas of designated habitats, but this does not include breeding wader habitat on semi improved grassland and enclosed rough grazing. As funding is reduced through CAP Pillar 1 and 2, there is more pressure on hill farmers to improve their current economic situation. The in bye and enclosed rough grazing could be under threat in the long term from lack of support through agri-environment schemes, principally because they lack SSSI status and therefore may not compete as well as those applications that do contain SSSI. The options available through the new mid tier Countryside Stewardship scheme for upland farmers are extremely limited and very prescriptive compared to the little incentive that is being offered. There is a high risk that agri-environment uptake will drop significantly over the next 5 years within this part of the LNP, this will have an impact on many habitats and species, but possibly will hit the breeding wader habitats and hay meadows the hardest.

3.0 RBAP design

Farmer involvement
Engaging farmers from the start of the design process ensures that their skills and understanding of land management are utilised within the formation of the indicators. It also gives opportunity to air issues of current management restrictions and discuss solutions.

The NUC HNVF working group is the main vehicle for farmer involvement as it has 6 farmer representatives on the group. The group meets quarterly, but engagement on the project has been constant via additional meetings, consultations and reviews of work produced. The group visited Ireland to experience first hand the results based approach in the Burren and also visit the new Shannon Callows RBAPs project.
The Burren provided the group with a well established farmer led example of such a scheme, showcasing the distinct benefits to the biodiversity and the farming system. The Shannon Callows, introduced the group to scheme development and the various stages that need to be followed to reach the suite of indicators. The group contributed to the development work and were able to visualise how such a scheme could work in England.

Farmer meetings
In order to increase awareness of the project and ensure that as many farmers were able to provide an opinion on the design of the indicators, a meeting was held in each protected area. The aims of the meetings were to:

- *Bring everyone up to the same level of understanding of the results based payment approach*
- *Agree what poor and excellent habitat looks like and the management requirements needed.*
- *Agree the type of results that we are looking for to maintain and improve the habitats and agree how they can be verified by the farmer and/or adviser.*
- *Decide upon the addition of payment for actions - should this be a separate payment or built into the scoring process. What 'actions' should be included e.g. wall restoration, adding wildflower seed or creating wet areas.*

The meetings were attended by 75 farmers – representative from all parts of the protected area, a common trait being they were all hill livestock farmers of varying scales. The meetings were informal with opportunities to comment and ask questions through out. The presentation (appendix 1) described the current agri-environment situation, the RBAPs development process, how such a scheme would work, what does excellent and poor habitat look like for both grassland elements (including management problems farmers are facing), how the results could be scored (or measured), what else should be included – for example capital works and an example payment structure.

With regards to the current agri-environment schemes, farmers felt that their opinions and knowledge of hill farming had been ignored during the agreement setting process. The inflexibility of the current schemes had made it really difficult to farm the land and in a number of cases had led to a decline in habitat quality.

Farmers responded very positively towards the way RBAPs is developed, particularly including farmers knowledge within the decision making and scheme design. If the RBAP scheme was launched, they would prefer it to be locally delivered by local organisations that have good working knowledge of the area and importantly, hill farming. This would then enable a high degree of trust to be developed between all parties, further ensuring the scheme is a success. It was felt that it was essential to have a capital grant element to enable certain works to be carried out that would support improvements to habitat quality and subsequent annual payments. Length of agreement was discussed with preference for a 10 year agreement voiced. Support for annual meetings between participants of the scheme would be a good way of sharing knowledge, rather than formal training events.

Their main concerns included:

- The risk of taking on more responsibility and how that would affect the payment each year – who has the final say – the farmer, the adviser or the inspecting authority?
- Worried that it could be negatively influenced and restricted in its flexibility by NE, RPA and Defra.
- Worried that extenuating circumstances like bad weather would affect final score for that year.
- It may become a really expensive scheme and difficult to budget for if every farmer is trying to get the highest score.

Upland wet grassland for breeding waders

Defining the objective

Wader research has covered a wide range of habitat and physiological attributes in order to set out the species requirements for survival and to enable successful breeding of a sustainable population. At a landscape and field scale, it is clear that wader species require sufficient good quality habitat to feed, nest, rear and fledge young. At a landscape scale, their breeding success is dependant upon many other factors that tend to be beyond the farmers control – for example afforestation causing fragmentation and deterioration of habitat quality.

The biodiversity objective for this example on upland wet grasslands is:
To provide suitable feeding, nesting and chick rearing habitat for breeding waders (curlew, snipe and redshank)

Defining good habitat

The objective relates to creating, maintaining or restoring components of an unimproved/semi improved wet grassland habitat, in order to ensure that the wader species needs are met from when they return to the uplands, to when they depart with a brood of fledged young.

In order to define the indicators, there needs to be an assumption made about what constitutes good breeding wader habitat. Various research sources were trawled to pick out these key features. The identification of the ideal habitat is difficult if viewed on a field by field basis as wader habitat requirements differ between wader species (lapwing, curlew, snipe and redshank) with lapwing having very different needs. Waders tend to move their young between habitats across a relatively wide area, so features are needed at different

scales. Because of this, it was felt that there could be two approaches to assessing the habitat:

- At a field scale where management indicators would be followed according to grouping of species - lapwing and curlew/snipe/redshank
- At a landscape scale where indicators for all 4 main wader species were included, with a 'group' of fields being assessed as one habitat area.

Either is possible, but in order to trial a more simple approach that the farmers could identify with, it was felt that it should be set at a 'landscape' scale. This was supported by the farmers.

Therefore a more generic set of attributes for good breeding wader habitat have been defined as follows:

- Openness and aspect - open site within a mosaic of grassland and moorland habitats - as opposed to feeling enclosed or having woodland at a boundary.
- Slope- the potential for nesting birds is greatly increased by flatness of ground. Shallow sloping and terraced fields hold high numbers of breeding waders. The following measure is a guide:
    - more than 50% of the field is flat (0-8) = good potential,
    - 26-49% of the field is flat = medium potential;
    - 0-25%= poor potential. NB depends on size of field, so for example, 25% of a 20ha field = 5ha of flat ground.
- Damp grassland containing wet features like flushes, open drains and scrapes, over at least 10% of the field area.
- Rush cover (particularly soft rush) up to a maximum cover of 30% of the field – scattered
- Varied sward height and changes to vegetation structure and tussock density where there are significant areas of relatively short grassland (<5cm).
- Site is grazed by cattle and sheep (lightly during April – June)
- Permanent grassland containing a range of plants and invertebrates and features such as mole hills, hoof prints, farm yard manure
- The habitat may or may not be used by breeding waders, but it is within 5km of known wader sites

Initial site selection criteria

Sites that are eligible for entry into this scheme would need to meet the following requirements:

- Openness
- At least medium potential for slope – with adviser discretion if there are significant flat areas within steeper sites
- Damp grassland containing wet features – damp meaning you can easily push a 6 inch nail into the soil.
- Semi – improved / unimproved permanent grassland
- Habitat used by waders or within 5km of known sites

Indicators

Using the key suite of attributes above, indicators can be developed where farmers have total control over their management and therefore control over the 'score' they can achieve with managing the overall habitat. For this example, 5 main indicators have been developed:

1. Presence and diversity of birds:
A simple species count has been included as it helps with project monitoring and also improves the land managers' observational skills and understanding of which species are using his fields. The observations do not count towards a result indicator as the presence or absence of waders is subject to outside influences beyond the land managers control, for example adverse weather conditions or effects of poor habitat management outside of the uplands. A site visit in May will determine which species were present.

Bird species	Present Y/N	Estimate of number using site
lapwing		
Curlew		
Redshank		
Snipe		

This element of basic monitoring is recommended to be backed up by an adviser led monitoring program of bird numbers and activities using the standard 3 visit methodology for breeding wader surveys.

2. Vegetation height and tussock coverage

Waders require variety in the sward structure. Taller areas provide cover for concealing nests and chicks while shorter areas are favoured for feeding. In addition, a lack of structural diversity can result in little invertebrate diversity (Ausden et al 2001). It also encourages predation from mammals and corvids.

Different species select fields with different sward heights. Lapwings select fields with a short sward and scattered tussocks that will conceal their nests and chicks, but while leaving their all-round view uninhibited. At the other extreme, the snipe prefers a higher level of concealment in taller vegetation. Redshank accept a broad range of tussock frequencies and swards with well-developed. most species preferred swards with tussocks to those that lacked them, the maintenance of grazing regimes which promote the development of swards rich in tussocks is clearly beneficial.

Farmers have complete control over this indicator which can be delivered using a mixed stocking regime (ideally). There is no stocking rate requirement as part of this indicator, instead a simple range of sward heights and cover are shown which should be assessed by the farmer during the breeding season. Example stocking regimes should be given within the guidelines together with explanations for why this is important e.g.. high risk of nest trampling; 20–33% of nest failures were attributed to trampling by livestock. (Grant et al 2001).

Mixed sward height where between 25 - 75% of the field is short and the rest varied, tussocks frequently seen and well distributed	Good

Over 75% long. Short swards confined to very small parts of fields (e.g. gateways, sup feed sites only) Tussocks indistinguishable from other tall vegetation	Average
Over 75% short with little to no variation in height. Tussocks rare or absent	Average
No difference in height – either all short, or all long with no variation	Poor

Short = below ankle height; Long = over 15cm

3. Cover of rush

Fields prone to rush infestation are often damp, and as such are good potential habitat for breeding waders. In fields with little plant diversity, rushes may be the only taller vegetation present, making them an important feature of the habitat. Rushes can provide tussocks that are useful for cover, but if they create dense cover then the field will lack the shorter areas that are useful for feeding. If rushes take up more than one-third of a fields area then grazing management, which is essential to maintaining the grassland for breeding waders, is made more difficult, the site looses its open aspect and quality of habitat is reduced (RSPB 2008).

The scoring criteria is influenced by the 30% threshold O'Brien(2001) researched, where wader numbers using rough grazing sites declined once rush cover exceeded 30%. Farmers are able to manipulate rush cover through the implementation of a regular mowing regime which could be accompanied by chemical treatment, therefore could progress from a poor habitat category to a good within a relatively short space of time.

10 – 30% cover, well scattered with local areas of dense rush	Good
Sparse rush cover 5 – 10%	Average
>30% rush cover, large areas of dense rush and tall vegetation	Average
>5% rush cover	Poor

4. Wet features

The extent of wet feature is an extremely important factor to the success of attracting adults and subsequently rearing young. These wet features support a wide variety of aquatic, terrestrial and aerial invertebrates, such as beetles, bugs and molluscs. A definition of what constitutes the right area of 'wetness' varies. For Natural England (2005) good wader habitat lies wet across more than 10% of the area. RSPB (Eglington 2007 & 2010) have calculated that chicks need 150m/ha of foot drains to provide enough invertebrate food to successfully fledge. For scrapes a minimum of 60m2 per ha has been suggested. Transferring this level of technical information into scoring criteria whilst retaining a level of simplicity for the end user has been challenging. The use of images as an aid to definition of good and poor habitat will help. Farmers are able to influence the assessment of this indicator by creating more wet areas within the field and therefore improve the habitat within a year.

a) Extent of wet features across field

Field is damp across the majority of the area with a number of wet features scattered across the field	Good
Damp areas are contained to approximately 10% of the field, e.g. springs, remainder of field is dry	Average

Damp areas are rarely seen	Poor

The quality of the wet feature is as important as the scale of them. A combination of areas of open water, waterlogged ground, good areas of exposed mud with a proportion of rush cover provides ideal conditions for a range of waders. The RSPB consider location of wet features have a direct effect on breeding success. Proximity to predator posts, overhead wires, woodland has detrimental effects on chick numbers. This issue would be best provided in guidance material for farmers rather than used as score criteria.

b) Quality of wet features

Wet features contain a mix of shallow pools and wet vegetation, gently sloping edges, 50% of the edge is mud with less than 25% rush or tall vegetation	Good
A number of wet features on the site but not meeting all criteria above	Average
Steep sided, no muddy edge, dense rush cover, inaccessible to birds	Poor

5. Damaging operations

Damaging activities that affect the integrity of the habitat should be represented as a negative 'score' - the degree of which depends on the extent of the damage. Where damage occurs over more than 25% of the field area, this should receive the severest penalty - no payment. Between 10% and 25% a negative score should be issued that ensures the total score is at least one step lower than it would be, had no damage occurred.

Damaging operations include:

a. excessive use and poor management of supplementary feeders causing damage to vegetation and soil
b. use of machinery during the bird nesting season
c. intensification of fertiliser use identified through soil test results and decline in wildflower cover.

Payment for actions

Similar to many RBAP schemes across Europe, the inclusion of a 'capital works' program to encourage restoration of poor habitat and therefore progression up a payment scale, is essential. Actions to correct sub optimal habitat should include the following:

a. Rush management, where rush cover is above 30% - to include a combined treatment of mowing and chemical application
b. Wet feature creation - scrapes, blocking drains, creating foot drains
c. Unblocking drains where land is extremely waterlogged (Prolonged floods can result in a reduction in invertebrate numbers (Ausden et al 2001)
d. Predator control - for consideration at a landscape scale, where a group of farmers legally control corvids and mustelids. A bonus payment could be issued once this has been achieved over a defined area.

Why predator control should be included:

The indicators above support optimum habitat management to enable the objective to be met. To further support the success of this approach, additional non habitat work is required in order to prevent further declines in wader numbers. Predation of eggs and chicks is typically identified as the most frequent source of low productivity (Grant 2001). An experiment on moorland in northern England confirmed that predator control reduced the

abundance of Red Foxes and Carrion Crows, and that this led to a greater than threefold increase in Curlew breeding success, and annual increases in breeding numbers. Where no predator control occurred, only 15% of Curlew pairs produced young. (Fletcher et al. 2010).

Appendix 2 shows an example score card for the indicators.

Species rich grassland - hay meadows

Defining the objective
To maintain or enhance the nature conservation interest of hay meadows by undertaking sustainable agricultural management in order to produce herb rich forage.

It is important to include both biodiversity and agricultural outcomes within this objective as these are shared by the farmer and the advising authority. It acknowledges the agricultural importance of making good quality hay for winter fodder. The link with soils further underlines the connection and supports the production of nutrient and mineral rich forage.

Defining good habitat from a nature conservation and agricultural perspective

Using Natural England data (2013), Rodwell plant community descriptions (1992), a definition of the attributes an optimally managed habitat can be produced. Excellent examples of typical MG3 upland hay meadows contain:

- High diversity and quantity of flowering plants and grasses
- Ratio of flowering plants to grasses in excess of 50:50
- Plants are able to flower and set seed annually
- Sward structure is varied
- Site is grazed by sheep and cattle
- Grass crop is removed each year via mowing (for hay meadows)
- Weeds and dominant grasses absent or very low cover
- Occurrence of bare soil is minimal
- Soils containing low levels of nutrients and in particular extractable P and K

Defining a good hay crop:
The objective in making hay is to reduce the moisture content from fresh grass at 80 per cent to about 20- 25 per cent. In this condition, fungal and bacterial growth is prevented and the product can be stored and used as a winter feed.

Haymaking needs dry conditions with low humidity. A period of at least three days is normally required to reduce the moisture content from the cut herbage. This is achieved through regular turning of the hay to expose the cut leaves to sun and wind in order to speed up the drying process. This operation also allows ripe seed to be shed into the soil, to germinate for the following season.

The timing of the cut is dependant on this three day window, which can be problematic in the North and West of the country. Little is known about the seasonal changes in digestibility of the “grass” crop taken from semi-natural grassland swards, although the limited data available suggests a decline in digestibility as the season progresses (Tallowin 1997). However, hay from herb-rich meadows may contain a greater variety of essential minerals for animal production than hay from improved or semi-improved swards. It is still not really known if some herb species in grassland do have a positively beneficial effect on livestock.

Entry criteria
The minimum set of criteria needed for entry to the scheme includes the following:

1. The grassland should contain more than 12 different species of flowering plants, including at least 4 high value plant species.
2. The cover of wildflowers and sedges should be more than 10%
3. Undesirable species cover should be less than 20%
4. Soil analysis results show low nutrient status, where P has a maximum index of 2, but preferably 1.

The criteria are set in order to prevent grasslands that have been too intensively managed from being included. Grassland restoration is a long term process which only works under certain circumstances, with the soil chemistry being the key attribute to be met.

Indicators
This assessment is designed to identify the baseline condition of the hay meadow and determine how (if need be) to improve the management of the grassland in order for it to reach its full potential. The assessment includes detailed species identification as well as broad field level observations to provide an overall 'score' of the quality of the hay meadow on a scale of 1 (poor) to 10 (excellent).

It uses elements of a number of well researched indices to help define the most important indicators to measure. In particular the Ellenberg Indices for wildflower cover and the Shannon diversity index for assessing good botanical composition.

1. Percentage ground cover of wildflowers
This is a typical measurement used in botanical surveys and common standards monitoring to determine diversity of sward. The inclusion of it within the suite of indicators is in order to determine level of past improvement (if any) and monitor change towards a more species rich sward, and to ensure deterioration is avoided. It is contentious in the fact that identifying cover is a very subjective exercise. Having a broad range in scales will reduce subjectivity to a certain degree.

The farmer will undertake a visual assessment of the wildflower cover within the 1m² at each stop along the transect line. The cover excludes creeping buttercup and white clover as these are negative indicator species and relate to nutrient enrichment. This is written as a percentage on the form under the corresponding stop number.

Percentage cover of wildflowers	<10%	10 - 25%	25 - 50%	50 - 75%	>75%
Score	0	5	10	15	20

2. Species diversity

The range of positive plant indicator species within the sward is closely related to different methods of agricultural management. Some key indicator plant species are very sensitive to high nutrient inputs – for example Globeflower, ox eye daisy and species of orchid, and can be used as a barometer of health for the meadow.

A: Number of positive indicator species

Using the key indicators of the MG3 / MG8 habitat, survey work undertaken by the Hay Time Project (YDRT 2011) the Hay Meadows Project (Peak District NPA 1998) and research undertaken in Upper Teesdale (Kiddle & Christie 2014) a definitive list can be developed that

relates to upland hay meadows within a broad geographical area (from Forest of Bowland to the North Pennines). This list includes rarities as well as the most common plants found within this habitat and includes plants that favour acid, calcareous or damp grasslands . The list is circa 50 species long (see Appendix 3) and contains mainly flowering broad leaved plants. The list will need to be reduced to include the most typical and the highest value species in order to make it a useable tool for farmers to use. Kiddle and Christie (2014) produced 2 lists; one that included the most common species found in the majority of upland hay meadows and one that included species only found in the best examples of MG3 grasland. PDNPA (1998) produced 6 lists defined by location or plant type – acid, calcareous, damp grassland, woodland and orchid and grassland ferns.

The development of one list with high value species marked, may simplify the process as defined through the Shannon Diversity index. The assessment for this indicator would be based on the number of species seen, where each species would be worth a score. The difference between scores would depend on whether the species is typical of a hay meadow or of high value (those seen more commonly in the best examples of MG3).

At the initial assessment stage, the adviser and farmer walk the transect and identify all plants listed on the positive indicator survey sheet. This sets the baseline. It is expected that there will be no drop in species numbers during the lifetime of the agreement (subject to force majeure/extenuating circumstances). The absence of species provides a starting point for management considerations regarding native seed addition.

	No.	Score
Typical meadow species – score 1 points per species		
High value species – score 2 points per species		
Total score		

B: Abundance of high value species

Abundance of plant species provides an indication as to how special a particular grassland is. You can have a meadow that includes over 30 flowering species, but if the majority of them are rare, the condition of the grassland habitat might well be poorer than first thought. So a measure of abundance is important to help define the grasslands health.

Originally described to asses terrestrial vegetation coverage the DAFOR scale is a useful tool to visually assess the abundance of any species on a semi-quantitative or as in this case qualitative level.
D=dominant
A=abundant
F=frequent
O=occasional
R=rare

The DAFOR classes have no strict definition so personal interpretation is required when applying this scale. (Sutherland, W.J. 1996). The interpretation for the habitat survey is as follows:

Rarely seen - found at 1 - 2 stops
Occasional – found at 3 - 4 stops
Frequent/abundant – found at 5 - 10 stops

Using abundance as an indicator will provide recognition to the meadows that are extremely species rich. However, care is needed to prevent unfair discrimination between the best meadows and the rest. This approach will need to be tested in order to make sure this does not happen, or does not adversely skew the final score.

Frequency	No of high value plant species	Value per species	Score
Frequent/abundant		3	
Occasional		2	
Rare		1	
Total score			

4. Undesirable species

The Hay Time Project (2011) and the study undertaken by Kiddle and Christie (2014) used negative scores for undesirable or negative indicator species in order to assess changes to the condition and richness of the hay meadows. This could be easily implemented within the species list but may not capture the true scale of the problem if the indicator is confined to just presence or absence of the negative plant species. The use of an estimate of cover from looking at the whole field (rather than just along the transect), is again subjective but will capture the full extent of the issue. Negative indicators include cow parsley, soft brome, soft rush, creeping buttercup, bracken and the main weed species – creeping thistle, nettle, dock, spear thistle and ragwort (Kiddle and Christie, 2014).

Percentage cover of undesirable species	>20%	10 - 20%	5- 10%	<5%
Score	-20	-10	5	10

5. Damaging activities

Damaging activities that affect the integrity of the habitat should be represented as a negative 'score' - the degree of which depends on the extent of the damage. Where damage occurs over more than 25% of the field area, this should receive the severest penalty - no payment. Between 10% and 25% a negative score should be issued that ensures the total score is at least one step lower than it would be, had no damage occurred.

Damaging operations include:

a. excessive use and poor management of supplementary feeders causing damage to vegetation and soil
b. use of machinery during the bird nesting season
c. intensification of fertiliser use...

Appendix 3 provides an example of the score card, survey form and ID booklet which would be used by the farmer and adviser.

Payments for action

To encourage restoration of poor habitat and therefore progression up a payment scale, the inclusion of payments for capital works is an essential incentive. Actions to correct sub optimal habitat should include the following:

1. Soil test payment – once every three years to determine nutrient management and ensure pH is moving in the right direction
2. Contribution to liming costs – to reverse the acidity in soils and therefore reduce species loss, help with rush management and improve soil condition
3. Field drainage maintenance – on sites that are suffering from severe waterlogging and rush encroachment, where species loss is evident as a result of waterlogging
4. Field boundary maintenance – to help with stock management
5. Native seed addition – to help with plant species recovery across the field

Scheme Implementation for hay meadows

During the first meeting between adviser and farmer, past management practices that have helped create the grassland should be documented as a precursor for the site survey and decision making on the future management practices.

An initial survey is carried out by the adviser and farmer, setting the transect line and the required number of stops and jointly agreeing the indicators, the species cover and undesirable species cover.

This should be undertaken in June – July when the meadow is as close to full flower as possible, but this will depend on the season.

At each stop the farmer will need to identify the following:
a. the range of positive plant species as noted on the accompanying plant ID card; using the survey sheet, tick each positive plant species you see under the corresponding stop number.
b. assess the cover of flowering plants within the 1m square and write this on the survey sheet,

At the start or end of the transect, look across the whole field and assess the total cover of undesirable species.

In order to ensure government inspection and verification requirements are met, the farmer should maintain a simple diary of management to include at least the following:

1. Grazing regime: including livestock type, numbers, timing of grazing, use of supplementary feeding
2. Mowing practice: methods used, approx. range of cutting dates, spring and aftermath grazing
3. Use of surface applications: lime, compound fertiliser, farm yard manure. Include timings of applications and rates
4. Other management practices – chain harrowing, rolling, weed control measures
5. Other wildlife that use the fields – e.g. breeding waders
6. Historic features present – note condition with adviser and

The nutrient regime of any given meadow should be informed by its soil nutrient status, grass utilisation, past fertility management and conservation objectives.

Once every three years, a soil nutrient test on each field should be undertaken to support decision making on application of nutrients.

The ideal soil nutrient status[1] of upland hay meadows should reflect the following:

[1] Critchley et al. (2002) state that compared to other mesotrophic grasslands in England, the MG3 community tends to occur on soils with low levels of extractable P and K with typical soil nutrient values for MG3 meadows.

Olsen's extractable P 7.7 mg kg-1, Total N 0.9 %, K is 96mg kg-1 and pH is 6.4.
Soil test results will provide recommendations for nutrient input according to whether the soil is above or below the ideal status. In addition, manure nutrient testing is recommended. This is supporting information for the farmer to make an informed decision on creating the right soil conditions for the hay meadows.

Training for farmers
A training program for participating farmers, akin to that in the Burren, will support the development of the RBAP scheme and encourage success in achieving greater results. It can also benefit the wider farm business and as in the Burren, help improve natural resource management – for example, reduction in pollution for agricultural sources. For this example, participating farmers should attend peer to peer learning sessions at farms where the habitat quality is excellent, in order to learn from others. Species identification training in addition to the initial adviser led survey, should be undertaken at least once within the agreement term.

4.0 Payment calculations for both grassland habitats

The calculation of the payment rates have been undertaken by rural surveyors Windle Beech Winthrop using the protocol laid out in Annex 28 (6) of Regulation EU (No. 13/05/2013) (see supplementary report by Akrigg J 2015), relating to income foregone, additional costs incurred for carrying out specific management and a further allowance for additional transaction costs.
The payment summary can be found in Appendix 4. The total payment calculation for managing the habitats is:

Habitat for breeding waders - £343/ha
Upland hay meadows - £554/ha

Using a score scale of 1- 10 for both habitats, where 1 is poor habitat and 10 is excellent, the maximum calculated payment rate would be applied to the highest score, with payments for lower scores, worked out at a percentage basis. Further analysis and peer review will be needed with regards to the distribution of differing payment rates across the scale to ensure that the payments reflect the cost of the management.

5.0 Next Steps

The development of a suite of indicators for two grassland habitats using research, local expert knowledge from farmers and advisers has produced a tailored scheme for the NUC. The proposals will require peer review, further consultation with farmer groups and a final refinement prior to field testing. Field testing should be undertaken across a range of grassland quality types to ensure the score scale is set accurately, reflects the cost of managing the habitat and therefore fits with the payment scales.

Field testing or piloting, via means of agreements with participating farmers will need to be for a period of several years in order to monitor habitat change. During this period, a detailed monitoring program should be instigated observing management change coupled with habitat improvement. Farmer input to the continued assessment of the scheme will form an important element of its development – this could be in the form of a farmer stakeholder group and through opinion surveys.

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Appendix 1 Farmer Meeting feedback and presentation

Habitat for breeding waders:
There was agreement on what constituted good quality breeding wader habitat with discussion centred on management practices and capital works to achieve the results. Current problems farmers are facing at the moment with this habitat include excessive rush growth, fields lying wet for too long a period, soils becoming even more acidic and under grazing where stocking rates have been set too low.

Farmers are uncomfortable with including an indicator that related to the presence of bird species, though all agreed it would be helpful to keep an annual record to support a basic level of monitoring. Farmers considered the structure of the habitat to be the priority. There was agreement on providing a mosaic of vegetation heights and tussocks. This was important both agriculturally and for the biodiversity, though there was some discussion over whether this can be achieved if only using sheep. Management of wet features was more contentious as there is a worry that the land could become too wet and therefore be detrimental to soil fauna and livestock. The ability to allow water to drain away as well as be held should be considered. The inclusion of capital payments for blocking drains, clearing drains, putting in sluices and creating scrapes was favoured.

There was general support for carrying out the assessment at a larger scale than individual fields, this provided greater flexibility of management and an ability to meet the indicator target for vegetation height, rush cover and provision of wet features. There was some support for a bonus score or payment for those who run organic farms as this ensured there was a healthy invertebrate and worm population in the soil thus providing abundant adult and chick food. The positive use of spreading muck in early spring was key to having a high number of lapwings on many farms and it was thought that one of the indicators should relate to positive field operations.

The following costs should be considered as part of the income foregone and incentive payment:
Rush management – for maintenance of low levels of rush cover
Mixed stocking
Monitoring
Attendance at training events

It was considered essential to offer additional capital works to provide incentive to produce the results required for better habitat:
Rush management – for intensive mowing and herbicide treatment of infested rush pastures and allotments
Costs of creating wet features like scrapes
Blocking drains / clearing drains
Predator control
Creation of bare ground (for lapwings)
Lime applications to improve soil pH for soil invertebrates
Field boundary management and scrub control.

Hay meadows
There was broad support for what constitutes good quality, species rich meadows; however it was felt that there needed to be a balanced approach to setting the objective for hay meadows as they are equally important for agriculture and for biodiversity. Other factors to consider could include creating a diverse robust habitat network, improving soil biodiversity and maintaining soil minerals.

Key management problems facing hay meadows include acidification of the soil leading to leaching, increase in rushes, reduction in species diversity and locking up of soil nutrients. Old field drains have collapsed under the weight of heavier farm machinery, leading to waterlogging and compaction, rush encroachment and a deterioration in species diversity. Following set cutting dates has forced farmers to make haylage rather than hay due to missing out on good hay time weather.

In terms of key indicators to score against, farmers on the whole, were apprehensive of being able to identify flowering plants but understood the rational behind it. Plant identification cards would help and additional training from advisers and knowledgeable farmers would be needed. There was wide support for allowing farmers to manage the meadows as they saw fit – particularly in terms of key dates when meadows are shut up, grass is mown and timing of other field operations. It was felt that if the indicators included stocking rates, sward height and mowing dates, this would be no different to the current schemes. Many were supportive of including a score to recognise the effort of maintaining stock proof boundaries and field barns. This may be difficult to include in a biodiversity focused scheme, but should be recognised as good management within the guidelines. Use of fertiliser and muck was seen as a positive management tool, though the risk of over delivery of nutrients was possible if a suite of guidelines was not available. The use of soil tests to calculate soil pH was well supported particularly if this led to grant funding for liming.

In addition to the income foregone calculations, additional costs for monitoring, attending training events, soil testing, liming and controlling weeds should be included. As with the breeding waders, capital works were seen as essential to further restoration efforts and subsequent payments for meadows. These should include:
Costs of adding seed – extra management requirements and payment for donor farmer
Field drain maintenance
Late hay cut incentive payment

Appendix 2 Habitat for breeding waders scoring sheet 2016

Objective: To provide suitable feeding, nesting and chick rearing habitat for breeding waders (curlew, snipe and redshank)

Survey time: May to early June, preferably an early morning visit in order to capture the range of breeding waders using the sites.

1. **Presence and diversity of birds**: a site visit in May could determine which species were present. A rudimentary count could be undertaken, but no need for a formal bird survey. *A good quality habitat should provide suitable breeding conditions for 2 or more species of breeding wader.*

Bird species	Present Y/N	Estimate of number using site
lapwing		
Curlew		
Redshank		
Snipe		

Walk a diagonal line through the field observing the amount of rush cover, tussocks and sward height. At the end of the walk, answer the following questions.

2. **Vegetation height and tussock coverage-**
   Short = below ankle height
   Long = between ankle and knee height

Mixed sward height where between 25 - 75% of the field is short and the rest varied, tussocks frequently seen and well distributed	10
Over 75% long. Short swards confined to very small parts of fields (e.g. gateways, sup feed sites only) Tussocks indistinguishable from other tall vegetation	5
Over 75% short with little variation in height. Tussocks rare or absent	5
No difference in height – either all short, or all long with no variation	1

Images to input here as examples

3. **Cover of rush**

10 – 30% cover, well scattered with local areas of dense rush	10
>30% rush cover, large areas of dense rush and tall vegetation	5
Absent or sparse <5%	1

RSPB recommends 30% is the defining cover between well managed habitat and poor.

Images to input here as examples

4. Wet features

4a – Extent of wet features across field

Field is damp across the majority of the area with a number of wet areas scattered across the field	10
Damp areas are contained to approximately 10% of the field, e.g. springs, remainder of field is dry	5
Damp areas are rarely seen	1

4b – Quality of wet features

Wet features contain a mix of shallow pools and wet vegetation, gently sloping edges, 50% of the edge is mud with less than 25%[2] rush or tall vegetation	10
A number of wet features on the site but not meeting all criteria above	5
Steep sided, no muddy edge, dense rush cover, inaccessible to birds	1

5. Damaging operations

Damaging activities that affect the integrity of the habitat relates to poor management which should be avoided. Severe damage where over 25% of the habitat is damaged will result in an overall score of 0 and no payment will be made that year. See general guidance for further information.

Damage more severe covering up to 25% of field area	-10
Limited areas confined to gateways – less than 1% of field area	0
No damage	10

Total score to be divided by 5.

1	2	3	4	5	6	7	8	9	10

[2] RSPB 2003 Advice Note Creating wader scrapes and flashes on farmland

Appendix 3 Species rich hay meadows

A. score sheet 2016

Hay meadow assessment instructions

Timing of survey – Before the hay is cut and once the majority of plant species are in flower – usually in late June, early July.

Method - walk a diagonal route through the field (refer to map) stopping 10 times and look at the sward within a 1m square in front of you.

Completing the survey form - At each stop consider questions A and B and complete the relevant boxes on the survey form. Once all stops have been made, complete question C and E

Completing the scoring process: using the results on the survey form, work out the average for questions A and B and assign score using the scoring profile below. Complete question D and assign score

a) ***Percentage ground cover of wildflowers***– undertakes a visual assessment of the wildflower cover within the 1m² in front of you. (exclude creeping buttercup and white clover). Write this as a percentage on the form under the corresponding stop number

Percentage cover of wildflowers	<10%	10 - 25%	25 - 50%	50 - 75%	>75%
Score	0	5	10	15	20

b) ***Species diversity*** – using the ID card tick all the positive plant species seen at each stop on your diagonal walk.

	No.	Score
Typical meadow species – score 1 points per species		
High value species – score 2 points per species		
Total score		

c) ***Undesirable species*** -from a spot where you can see the whole field, make an assessment of the cover of the following undesirable species: creeping thistle, nettle, dock, spear thistle, ragwort, cow parsley, bracken, soft rush.

Percentage cover of undesirable species	>20%	10 - 20%	5- 10%	<5%
Score	-10	-5	0	5

d) Abundance of meadow species – number and frequency of high value species indicates the richness of the meadow. For each species marked with an asterix on the survey form, count how many stops they were seen at. At the end of each asterixed line write down the frequency. Frequency is determined as follows:

Rare - found at 1 - 2 stops - mark with an R
Occasional – found at 3 - 4 stops – mark with an O
Frequent/common – found at 5 - 10 stops – mark with a F

Score 3 points per frequent / common species seen
Score 2 points per occasional species
Score 1 point per rare species

Frequency	No of high value plant species	Value per species	Score
Frequent/common		3	
Occasional		2	
Rare		1	
Total score			

e) Damaging activities

Damaging activities that affect the integrity of the habitat relates to poor management which should be avoided. Severe damage where over 25% of the habitat is damaged will result in an overall score of 0 and no payment will be made that year.

Damage more severe covering up to 25% of field area	-10
Limited areas confined to gateways – less than 1% of field area	0
No damage	10

Total score matrix
Divide total score by x (and round to nearest score) to give you a final score and payment

	1	2	3	4	5	6	7	8	9	10
£/ha	100	150	200	250	300	350	400	450	500	550
Difference between scores		50	50	50	50	50	50	50	50	50

B. Hay meadow survey form

Meadow survey sheet

STOPS	1	2	3	4	5	6	7	8	9	10	Frequency / Average
A. % cover of positive plant species											
B. Positive plant species (√)											
Betony *											
Birds foot trefoil*											
Bugle *											
Bulbous buttercup											
Burnet saxifrage *											
Cats ear											
Common bistort *											
Common black knapweed *											
Common dog violet											
Common mouse ear											
Common sorrel											
Common vetch											
common yarrow											
Cowslip *											
cuckoo flower											
Devils bit scabious/field scabious *											
Eyebrights*											
Fairy flax *											
feather moss											
Field wood rush											
Globe flower *											
Greater burnet *											
Harebell *											
Hawkbits *											
Ladies mantle sp *											
Marsh hawksbeard *											
Marsh marigold											
Meadow buttercup											
Meadow cranesbill *											
Meadow vetchling											
Meadowsweet *											
Melancholy thistle*											
Mountain pansy											
Orchids *											
Ox eye daisy *											
Pignut											
Ragged robin *											
Red clover											
Ribwort plantain											
Salad burnet											
Salad burnet *											
Sedges - short *											
Sedges – tall *											
Self heal											

Sneezewort *											
Vetches											
Water mint *											
White clover											
Wild thyme *											
Wood cranesbill *											
Yellow rattle *											
Quaking grass *											
Sweet vernal grass *											
Meadow oat grass *											
No. of species per stop											
C. % Cover of undesirable species: rush, creeping thistle, nettle, dock, spear thistle, ragwort, cow parsley, bracken											
D. Total number of frequent high value species *											
Total number of occasional high value species*											
Total number of rare high value species											

Appendix 4 – Payment rate calculations – taken from RBAP report by John Akrigg, Windle Beech Winthrop, December 2015

OPTION: Management of Grassland for Wading Birds

Changes to Management Practices

Reduced stocking density
Reduced fertilizer input
Spot treatment of weeds
Application of farmyard manure
Additional time to monitor and score
Additional time to manage stocking levels
Management of rushes

Economic Implications

Loss of spring and winter grazing
Reduction in grazing value
Increased liver fluke
Increased labour input
Capital cost of machinery/contract charges

Income Forgone

1	**Enterprise Gross margin (baseline) 1.30LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£210.00	-£60.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£262.50	-£70.00
			£472.50	£342.50
1	**Enterprise Gross margin (RBAPS) 0.60LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£105.00	-£30.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£112.50	-£30.00
			£217.50	£157.50
	Income forgone		*£185.00*	

Additional Costs

2	**Management activity**	Baseline £/ha	RBAPS £/ha	Difference £/ha
2.1	Weed control	£12.00	£32.00	£20.00
2.2	Rush control	£0.00	£30.00	£30.00
2.3	Ditch management	£0.00	£10.00	£10.00
2.4	Fertilizer cost	£40.00	£0.00	-£40.00
2.5	Additional livestock husbandry	£0.00	£25.00	£25.00
2.6	Extended spring housing of suckler cows	£0.00	£18.00	£18.00

2.7	Additional shepherding time to achieve optimum grazing	£0.00	£25.00	£25.00
2.8	Time spent monitoring and scoring habitat	£0.00	£20.00	£20.00
				£108.00
	Addition costs		*£108.00*	

Additionality/Transaction Costs

3	**Incentive Payment**		£/ha	
3.1	Training days		£20.00	
3.2	Management of historic features		£30.00	
	Incentive payment		*£50.00*	

Option Payment ***£343.00***

Capital Works/Additional Actions Supplement

4	**Additional Activity**	£/ha	£/m	
4.1	Creation of scrapes		£10.00	(m2)
4.2	Dry stone walling		£35.00	
4.3	Riparian fencing		£7.50	
4.3	Hedgerow planting		£25.00	
4.4	Management of drains			75% cost
4.5	Control of bracken or dense rush	£120.00		
4.6	Site specific works			75% cost

OPTION: Management of Hay Meadows and Species-rich Grassland

Changes to Management Practices

Reduced stocking density
Reduced fertilizer input
Re introduction of traditional haymaking
Spot treatment of weeds
Application of farmyard manure
Additional time to monitor and score
Additional time to manage stocking levels

Economic Implications

Reduced crop yield
Reduction in feed grazing/feed value
Increased labour input
Capital cost of machinery/contract charges

Income Forgone

1	**Enterprise Gross margin (baseline) 1.4LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£227.50	-£65.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£281.25	-£75.00
			£508.75	£368.75
1	**Enterprise Gross margin (RBAPS) 0.85LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£140.00	-£40.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£168.75	-£45.00
			£308.75	£223.75
	Income forgone		*£145.00*	

Additional Costs

2	**Management activity**	Baseline £/ha	RBAPS £/ha	Difference £/ha
2.1	Weed control	£17.70	£44.00	£26.30
2.2	Purchased concentrate (to compensate for reduced ME content)	£0.00	£35.00	£35.00
2.3	Purchased forage (to compensate for reduced forage yield)	£0.00	£150.00	£150.00
2.4	Fertilizer cost	£140.00	£0.00	-£140.00
2.5	Haymaking Costs (exclusively contract)	£0.00	£458.00	£458.00
2.6	Silage making costs (exclusively contract)	£245.00	£0.00	-£245.00
2.7	Additional shepherding time to achieve optimum grazing	£0.00	£25.00	£25.00

2.8	Time spent monitoring and scoring habitat	£0.00	£20.00	£20.00
				£329.30
	Addition costs		*£329.30*	

Additionality/Transaction Costs

3	**Incentive Payment**		£/ha	
3.1	Training days and soil testing		£30.00	
3.2	Management of walls and barns as historic features		£50.00	
	Incentive payment		*£80.00*	

Option Payment ***£554.30***

E & O E

Capital Works/Additional Actions Supplement

4	**Additional Activity**	£/ha	£/m	
4.1	Introduction of native seed	£200.00		
4.2	Dry stone walling		£35.00	
4.3	Riparian fencing		£7.50	
4.4	Hedgerow planting		£25.00	
4.5	Field drainage			75% cost
4.6	Control of rushes	£120.00		
4.7	Site specific works including liming			75% cost