High Weald AONB Unit Commissioned Report

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A review of current grassland monitoring & evaluation approaches with recommendations for a High Weald NRA

Informing a High Weald Nature Recovery Area proposal



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The High Weald: an outstanding medieval landscape

Our research and advice programme

Futhering understanding of one of England's finest landscapes

The High Weald Area of Outstanding Natural Beauty is one of the best surviving medieval landscapes in northern Europe. The components of the High Weald's natural beauty that make it recognisably distinct are:

- **Geology, landform, water systems and climate:** deeply incised, ridged and faulted landform of clays and sandstone from which spring numerous gill streams.
- **Settlement:** dispersed historic settlements of farmsteads and hamlets and late medieval villages.
- **Routeways:** ancient routeways often narrow, deeply sunken, and edged with trees, hedges, wildflower-rich verges and boundary banks.
- **Woodland:** a great extent of ancient woods, gills, and shaws in small holdings
- **Field and heath:** small, irregularly shaped and productive fields often bounded by – and forming a mosaic with – hedgerows and small woodlands.

The High Weald AONB Joint Advisory Committee (JAC) is a partnership established in 1991 of 15 local authorities, Defra, Natural England and organisations representing farming, woodland, access and community interests. The JAC is responsible for publishing and monitoring the statutory **AONB Management Plan**.

The JAC is supported by a small, dedicated staff team, the **High Weald Unit,** which develops understanding of the High Weald's key components - their history, development, distribution, special qualities, management, deterioration, damage and loss - to provide an evidence base for the AONB Management Plan and related policy, guidance and action.

This report has been produced to further that understanding and aims to help everybody conserve and enhance **one of England's finest landscapes.**

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Content

1. Summary

- There are several different methods that can be used to survey and monitor lowland grassland habitats, each with its advantages and disadvantages. Different levels of expertise are needed to carry out the surveys and to interpret the results.
- It is possible to set out very simplistic guidelines to help non-specialists estimate the wildlife value of grassland habitats but after this preliminary screening stage there will inevitably be a need for more experienced input to assess grassland habitat more fully.
- Grassland of high nature conservation value is usually described using a narrow range of NVC communities (in the High Weald most often MG5) or the BAP Priority habitat (Lowland Meadow) criteria.
- Grasslands that are of high biodiversity value in the High Weald AONB often fail to qualify as priority habitats under these criteria and hence may be excluded from the most suitable Countryside Stewardship options or are at risk of being lost to development.
- Adopting a definition of valuable grassland habitat that is too rigid and discounting sites that don't qualify may exclude areas of tussocky grassland, wet grassland, scrub and grassland mosaic that are essential to the extensive, landscape-scale habitat mosaic that will form a Nature Recovery Area for all grassland biota in the High Weald.
- A wider definition of high value grassland is needed for the High Weald AONB to ensure that areas of existing interest are conserved, that deteriorating sites are enhanced and that connectivity of grassland habitats is maximised at a landscape scale.
- Setting strict outcome targets for grassland management and creation sites with monitoring focused only on features associated with those targets carries a risk of under-valuing or entirely missing species or features of high wildlife value that are already present or which may develop (unexpectedly) over time.
- A high degree of flexibility in site selection, assessment and evaluation of outcomes is key to creating and supporting a real and functioning Nature Recovery Area on the ground in the High Weald AONB.

2. Survey, Assessment & Monitoring Techniques

There are different grassland survey techniques that are appropriate for different purposes, some of the most commonly used methodologies are summarised below. In terms of pinpointing where grassland habitats occur, the location of species-rich or high nature conservation value grassland may be revealed during broad, landscape-scale habitat assessments. These can be followed up with site specific botanical surveys of vegetation composition that allow an assessment of the plant communities present. Once a baseline survey has been completed then ongoing, monitoring surveys provide data about how the habitat is changing over time.

The above-ground features that characterise grassland habitats and which need to be assessed in order to evaluate their quality or guide future management include; botanical composition, ratio of herbs to grasses, presence and abundance of positive and negative indicator species (including scrub), type and quality of boundary features, the impact and appropriateness of management, potential to support invertebrates, fungi and other fauna.

In recent years there has been much work put into developing assessment methodologies that clarify the condition of high nature value grassland and also to pin down the qualifying features for BAP priority grassland habitats.

The time, money and expertise available for biological survey and monitoring work are constant constraints. As a result there has been an increased focus on using rapid survey methodologies. Most rapid assessment methods are based on recording the presence and cover of selected plant species as positive and negative indicators as a proxy for species-richness and grassland condition.

Collecting information about past and current management is particularly important when assessing the conservation value and potential of grassland habitats. Some management variables can be modified to improve site condition, for example removing cut material, reducing the extent of undesirable species at an early stage of infestation, timing of mowing, stocking levels and duration/timing of grazing. Other results of management or neglect may have more intractable or irreversible impacts such as elevated soil nutrient levels, loss of non-competitive species from the sward and seed bank or very long established woody plants.

Ideally baseline surveys of grassland should be repeatable if ongoing monitoring of the habitat is required i.e. the survey results should be of a type and in a format to allow measurement of change over time. Monitoring (measuring change) should also extend beyond simple component species records and encompass other habitat condition indicators such as presence/proportion of scrub, grazing pressure, sward structure and extent of bare ground.

Data capture and information management techniques should be decided at an early stage as they are very important to ensure that the maximum value is obtained from whatever survey and monitoring methodologies are used.

Phase 1 Survey

Phase 1 habitat survey is a long-established, standardised system used to classify and map wildlife habitats and semi-natural vegetation. It is based on a hierarchical habitat classification system that can be carried out relatively rapidly in the field and has been widely used in surveys at a range of geographic scales.

Phase 1 survey is based on vegetation assessment to define broad habitat types with some reference to topography and substrates but only a limited number of species records tend to be collected when using this methodology. It has been used to gather habitat data by the Statutory Nature Conservation Agencies, NGOs and ecological consultants for a wide range of purposes. It is a relatively blunt tool but can be cost effective over large areas of land.

In recent years there has been a move towards using "Extended Phase 1" methodologies, particularly in ecological assessments carried out by professional ecologists in connection with development sites (CIEEM 2017). This type of survey would aim to collect more species data from each habitat that has been identified and include observations of fauna. However, is still a preliminary, broad assessment that relies on surveyor experience to correctly classify the habitats observed.

PHASE 1 SURVEY	
Strengths & Opportunities	**Weaknesses**
• A rapid survey method especially useful over large areas • Can identify areas of species-rich and semi-improved grassland habitat within the landscape • Can highlight areas in need of more detailed survey and assessment • Uses habitat indicator species	• Relies on ability to recognise indicator species • Needs expertise in habitat recognition • Not useful as a monitoring tool • Limited botanical data collected

The UK Habitat Classification (UKHab)

This is a hierarchical habitat classification system with different levels of habitat definition and progressively fine scale detail used alongside non-hierarchical codes that can be added to capture data on habitat mosaics, management and the origin of mapped features.

It is intended to allow rapid identification and mapping of UK habitats in the field in a consistent way. Designed to be highly compatible with GIS there is an emphasis on promoting better data sharing and integration between different bodies. It is essentially a more refined version of Phase 1 habitat survey with better facility for digital mapping.

There is considerable flexibility in the Primary Habitat codes available to use, for example g3a covers Lowland meadows (within the BAP priority habitat definition) whilst g3c is other neutral grassland (not BAP priority i.e. semi-improved). Lowland grassland is a very wide category that can be used with secondary code qualifiers such as management, sward features, wet or dry. There is a useful Primary Habitat key that refers to NVC vegetation types.

This system is still at an early stage of development and is principally intended for use by ecological professionals and depends on good botanical skills to reach a meaningful level of detail in the classification but at its most basic it can be used by less experienced surveyors to describe vegetation and habitats.

THE UK HABITAT CLASSIFICATION (UKHab)	
Strengths & Opportunities	**Weaknesses**
• A descriptive hierarchical system that allows different levels of habitat assessment • Allows comparison with Phase 1 and NVC survey results • Useful across large areas/at landscape scale • Flexible in level of detail to record, from broad habitat type down to use of indicator species for grassland communities • Can incorporate management characteristics and other features	• Yet to be widely adopted • Not useful as a monitoring tool • Limited botanical data collected

NVC Survey (Phase 2 Survey)

The National Vegetation Classification system classifies and describes British plant communities and currently forms the basis of most “Phase 2” surveys. This level of survey defines more precisely the vegetation of habitats that have been identified and mapped in a Phase 1 survey. There is not a direct correspondence between habitats defined in a Phase 1 survey and the NVC plant communities

The NVC system describes constant species and characteristic rarities for each vegetation community and sub-community. Volume 3 of British Plant Communities (Rodwell 1992) describes grassland and montane vegetation communities in detail, however when using the NVC to classify grassland (or any other habitat) it is important to remember that it is intended as a convenient classification not as an exact blueprint of grassland sward composition.

Conducting an NVC survey is time-consuming and requires good botanical id skills. It is most often used by professional ecologists and academics. Plants are recorded within a series of representative quadrats in each stand of homogeneous vegetation and their abundance estimated on the Domin scale. In grassland the standard quadrat size can be either 1m x 1m or 2m x 2m. Data on vegetation height, sward structure and environmental details are also recorded.

The analysis of NVC survey quadrat data is often done using computer programmes (such as MATCH or TABLEFIT) which sort the samples and provide a “best fit” to the floristic tables that define NVC vegetation types. The floristic tables for each vegetation community show the set of constant species that help to define each community.

With experience it is possible to identify NVC communities without recording multiple quadrats but there can be considerable variation between the conclusions reached by individual surveyors in some habitats.

The NVC survey guidelines (Rodwell 2006) make it clear that there is considerable flexibility in the application of the NVC survey methodology and that “the floristic tables in *British Plant Communities* provide broad generalisations from a national data set…” and “...much interesting local diversity can be obscured by simply quoting an “answer” derived from a key”.

The implications of this caveat are crucial when using NVC vegetation types as shorthand for grassland of high conservation value in the High Weald. MG5 *Cynosurus cristatus – Centaurea nigra* grassland is not the only type of grassland in the High Weald AONB that should be considered as high priority.

Other vegetation communities of interest frequently occur in Wealden grasslands, for example on sites where traditional management has declined or where springs emerge at the junction of clay and sandstone soils. Such grassland swards may be is classified within MG1 *Arrhenatherum elatius* and MG6 *Lolium perenne – Cynosurus cristatus* or MG9 *Holcus lanatus – Deschampsia cespitosa* grassland, MG 10 *Holcus lanatus – Juncus effusus,* M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, or even fragments of wetter swards such as M27 *Filipendula ulmaria – Angelica sylvestris* or M28 *Iris pseudacorus – Filipendula ulmaria* mires. All these vegetation communities that may occur within Wealden grasslands should receive further attention and not be dismissed out of hand.

NVC (PHASE 2) SURVEY	
Strengths & Opportunities	**Weaknesses**
• A descriptive system that identifies different types of grassland community • Priority NVC grassland communities of high value have been defined within CS and BAP/ S41 of the NERC Act • Will identify the plant communities that are currently considered priority grassland habitat with a high degree of certainty • Provides full botanical data from survey plots	• Good botanical skills needed • Time consuming if a full botanical survey with multiple quadrats is carried out • Experience needed to analyse the survey data and identify the vegetation community/sub-community present • Not widely employed for monitoring but NVC community descriptions can be used to compare examples of a vegetation community against average data from the initial NVC survey (see case studies) • Some NVC grassland communities that are of high value that occur in the AONB are not routinely identified as being priority grassland

Common Standards Monitoring (CSM)

CSM is the system used for monitoring SSSI qualifying features and is focused on the condition and extent of plant communities. It is designed to be used by Natural England staff to monitor whether the objectives set out within a site management plan for that feature have been met. The main intention of CSM is to gather data to inform site management.

To carry out CSM surveyors must be able to recognise NVC units in the field and prepare a baseline map of vegetation communities against which to measure change. Moderately good field id skills are necessary.

The survey is based on a structured walk during which regular stops are made and vegetation attributes recorded within 1m x 1m quadrats.

A CSM survey records primary attributes such as grass to herb ratio, positive and negative indicators, indicators of local distinctiveness (eg rare/scarce species, transitions zones etc) as the main determinant of condition and has target values for these attributes. Sward structure features such as vegetation height, litter, bare ground are considered secondary attributes. The method does not include guidance for assessing sward structure that is likely to be beneficial for invertebrates.

The condition assessments derived from CSM surveys fall into the categories of favourable, unfavourable or destroyed, further subdivided depending on whether the feature was considered to be maintained or recovered (favourable condition), recovering, declining no change (unfavourable condition).

In the first six years of CSM only 57% of the total number of features in the UK designated for their nature conservation value were reported on. After the first 6-year cycle (1999-2005) 1.2% of the lowland neutral grassland SSSI sites assessed had been lost, 30.6% were in unfavourable condition, 25.8% were in recovering condition and 42.4% were in favourable condition.

Limited resources have meant that many designated sites are not being monitored every 6 years as intended. This illustrates the difference between setting up a robust monitoring scheme and being able to implement it.

The CSM methodology of recording indicator species and sward attributes at regular stops along a route has been used as the basis for most other versions of Rapid Assessment methods for lowland grassland, including BEHTA for Countryside Stewardship applications (see below).

COMMON STANDARDS MONITORING (CSM)SURVEY TYPE	
Strengths & Opportunities	**Weaknesses**
• A structured survey that can be repeated • Consistent methodology between sites • Good for ongoing monitoring of condition • Uses indicator species rather than full botanical survey	• Good botanical skills needed • Time consuming • Quite complicated methodology • Specific method developed for monitoring SSSIs • Measurement of condition of SSSI qualifying features may not reflect overall condition of SSSI grassland for biodiversity

Rapid Assessment (RA) via Save Our Magnificent Meadows

The Save Our Magnificent Meadows (SOMM) website www.magnificentmeadows.org.uk is an invaluable resource for all aspects of grassland survey, monitoring and management. It includes details of a Rapid Assessment methodology, principally for created or restored swards that is derived from CSM and based on a structured walk with sampling at intervals.

There is a useful step by step guide to setting up a RA survey with a suggested list of indicator species for BAP meadow types but it specifies that a small set of indicator species should be set for each site. 19 species are suggested for lowland meadows. Positive indicators should either already be present in the sward or be in the seed mixture added.

The method involves a structured walk with between 10 and 20 stops where vegetation and ecological variable recording takes place in 1m x 1m quadrats. Ecological variables include sward height of >10cm in June/July, single species >70%, herbs >40% and scrub <5% or scrub height >10cm (figures are examples and should be set at appropriate site specific levels).

The presence/absence of indicators is recorded at each sampling point and the number of presence records is converted to a DAFORN score for the whole site. Thresholds are set for the best case scenario for indicator species abundance and progress towards thresholds are measured through repeat surveys every 3 years (or annually in newly seeded swards).

The analysis of results section in the main guidance is also very helpful. Using a spreadsheet with 1 for present and 0 for absent allows totalling of positive and negative indicators per quadrat and across the site. This provides a measure of how many quadrats have enough positive indicators present to pass the threshold that has been set. In their example 70% of quadrats should have 10 or more indicators.

The key aspect of this monitoring protocol is to establish a baseline of data about the vegetation of an individual site and then set a bespoke threshold rather than expecting all fields to meet a universal threshold condition regardless of starting point.

This methodology would be especially useful to measure change in a recipient site relative to the donor site species composition in grassland enhancement through re-seeding if applied to both sites at the project's start. It is intended for use by anyone who is involved with grassland creation, restoration or management work but requires expertise to set initial parameters and some basic training or botanical id skills to carry out the monitoring.

RAPID ASSESSMENT (RA) SURVEY	
Strengths & Opportunities	**Weaknesses**
• Similar to CSM methodology with sampling points along a structured walk • Uses indicator species along with other variables to assess grassland condition • Useful to measure broad change in condition across a site • Useful to measure development of created swards • Indicator species can be tailored to individual sites • Suitable for less skilled surveyors with appropriate training	• Does not provide full botanical data for a site • Good botanical/ecological skills needed to set indicator species and interpret results • Recording points are not fixed between surveys

Baseline Evaluation of Higher Tier Agreements (BEHTA)

BEHTA is a very specific assessment methodology that has been designed for a particular purpose but has elements in common with CSM and RA. It is part of the required process through which landowners can apply for Higher Tier (HT) Countryside Stewardship agreements. The first step an applicant takes is to create a preliminary Farm Environment Record (FER) which identifies all the habitats and features on a landholding. Next a BEHTA assessment is carried out to confirm the presence of defined priority habitats and features that will be covered by an HT agreement and to map their extent. BEHTA also pinpoints whether features are suitable for restoration or re-creation work.

It is predominantly Natural England advisors who undertake BEHTA assessments having received training in its application. Advisors first carry out desktop scoping for notable or important species records prior to field visits. Data for the desktop phase is derived solely from internal NE sources (Webmap2 or HAT) rather than also consulting Local Biological Record Centres. This is certainly a flaw in the system since important biological records for potential HT sites could be omitted from the BEHTA.

BEHTA is intended to establish baseline information about the HT features before a CS agreement begins so that progress towards the agreed management outcomes is measurable. Each agreement contains tailored management prescriptions and sets out Indicators of Success (IoS).

The BEHTA protocol is to walk a W-shaped route with 10 (or more) stops at each of which a 1m x 1m sample of vegetation is assessed. The presence of pre-determined indicator species is recorded at each stop and their frequency across all stops is used to determine the grassland type (semi-improved or species-rich). Estimates of other attributes of the grassland, such as the species-richness of the sward, percentage cover of herbs and the amount of bare ground or scrub are used to navigate through a series of keys.

BEHTA makes extensive use of its keys to help identify types of priority and non-priority habitats along with their restoration and re-creation potential. The suite of species present at the start of an HT agreement is used to set the Indicators of Success for that site.

The guidance includes the caveat that assessors should “recognise the limitations of the BEHTA in relation to collecting species information. There will be very limited scope for gathering species information when you are in the field.” Despite this BEHTA places considerable reliance on using indicator species to distinguish between different types of lowland grassland. If species data is incomplete it could lead to advisors having difficulty in correctly distinguishing between priority and non-priority swards.

BEHTA in its full form is not designed for use by non-specialists nor for those without moderately good botanical id skills. The habitat condition assessment protocol in particular could be misleading if not correctly followed and the two condition categories (A or B) determine the management option that will be applied. The observed frequency of positive indicator species is crucial to the agreed IoS for each grassland site so it is vital that these are correctly identified at the time when targets are set.

The relevant BEHTA keys are Key 2a, which helps to identify broad grassland types, Key 2b, which helps to separate priority species-rich grassland from semi-improved grassland, Key 2c, the botanical restoration potential key and Key 3 that helps to identify grassland with invertebrate interest.

The threshold frequency of positive and negative indicator species found during the field survey is of paramount importance for the way that a grassland site progresses through the BEHTA process. It defines the difference between semi-improved (GO2) with only moderate restoration potential and species-rich semi-improved (GO2*) with high restoration potential. The latter has priority (GO6) grassland indicator species at a low frequency. There is a fine line between the grassland categories and correct identification of positive indicator species and the ability to recognise different species in vegetative form is essential for an accurate assessment of sward type. For example, in poor weather or outside optimum seasonal timing it can be difficult to determine whether there are 15 different species of non-flowering “wildflowers” in a 1m plot if this includes grasses, rushes and sedges.

Species-rich grassland in the High Weald can often have characteristics of several different priority grassland types within close proximity. In such cases a BEHTA assessor might need to use indicator species from the neutral, acid and wet grassland keys. The importance of the fields to invertebrates as well as the contribution made by any hedgerows, scrub and old routeways would need to be assessed as separate features in this methodology. The BEHTA guidance allows for flexibility between priority habitat types and indicator species but it relies on the field skills of the assessor to make a good job of this.

The BEHTA indicator species lists for semi-improved and species-rich lowland neutral grassland have been developed as national standards, though the guidance allows for regional and local variations to be incorporated.

BEHTA	
Strengths & Opportunities	**Weaknesses**
• A repeatable survey that uses indicator species and other attributes to assess grassland condition at 1m x 1m sampling points along a structured walk • Establishes a baseline against which progress towards defined outcomes is measured • Useful to set targets and measure development of restored or created swards • Elements of BEHTA could be adopted for use by non-specialists • Key 2c for botanical enhancement of species-poor grassland is clear and useful • Key 3 to identify habitat for invertebrates is clear and useful • Soil sampling is included within the assessment process for restoration/re-creation decisions • A system designed for standardised data extraction and reporting across a national system	• A specific methodology developed to assess extent and condition of target features for CS Higher Tier applications • Relies heavily on frequency of indicator species at sample points meeting thresholds for important decisions about grassland types, setting IoS and measuring progress towards targets • Keys 2a and 2b that distinguish between priority neutral grassland types and restoration potential need good botanical skills to make the best of BEHTA • Quite complicated methodology not suitable (or approved by NE) for use by non-specialists • Uses NE datasets not available to others for desktop study but does not specify use of LRC data reports • Not tailored to local conditions • Non-grassland supporting features (hedges, routeways, scrub etc.) are subject to separate, non-integrated, BEHTA assessments • BEHTA of Weald grassland is complex when characteristics of neutral, acid and wet grassland types occur

Floodplain Meadows Partnership (FMP) Monitoring Protocol

The FMP protocol is intended for larger sites and aims to standardise monitoring of existing and restored wet grassland sites across the country. It allows comparison between sites and for data to be incorporated into their "Meadows" database.

A key feature is the use of relocatable sample points. This is recommended because wet grassland is often patchy so random quadrats generate "noise" in the data. Fixed transects and quadrat locations are marked during the survey with canes. These are re-located on subsequent surveys using GPS and fixed marker posts or buried metal markers with metal detectors. Maps and photos of the locations are also used to help re-find sampling points.

The survey method uses a line of sampling stations following a transect along a major gradient of variation. All vascular species and principle mosses are recorded in 1m x 1m quadrats at minimum of 10m spacing with estimated % cover values for each species.

This is a labour intensive way of monitoring but yields scientifically valid results that can provide robust data on grassland change. It is most appropriate for use by academics, professional ecologists or others with high level botanical id skills.

FLOODPLAIN MEADOWS PROJECT MONITORING PROTOCOL	
Strengths & Opportunities	**Weaknesses**
• Repeatable structured survey method designed to allow accurate condition monitoring at a fine scale • Uses quadrats along transects to record full botanical data at each sampling point • Sampling points are fixed and repeated at each survey	• Good botanical skills needed • Very time consuming • Needs two people

National Plant Monitoring Scheme (NPMS)

The NPMS is a monitoring scheme run by a partnership of BSBI, CEH, JNCC and Plantlife within which volunteers record plants selected parts of an allocated 1km square twice per year.

The scheme monitors the abundance of sets of plant species in fixed plots in specific habitats. Up to 30 positive and negative habitat indicator species are used per habitat and the number recorded depends on the expertise of each surveyor.

Some of the positive indicator species used in the NPMS for pasture and meadow habitats do not correspond well with those in other methodologies that attempt to identify species-rich grassland indicators. For example in the NPMS positive indicators include crosswort, common mouse-ear, Yorkshire fog, hedge bedstraw and creeping buttercup whilst rushes are negative indicators.

NPMS requires a significant time commitment from participants and has a quite complicated methodology that uses different sized square (5m x 5m) or linear (1 x 25m) plots, each located in a single habitat type.

Volunteers are provided with species list, species guide and monitoring forms. A map of their 1km square has pre-selected plots. They can record at 3 levels of detail (wildflower, indicator and inventory level) depending on their botanical id skills.

Vegetation in the plots is classified on two habitat scales (broad and fine) with volunteers deciding which type of habitat they are in using the associated species lists. Under this protocol for any valuable grasslands of the High Weald AONB the broad habitat type is “Lowland Grassland” and the fine habitat type would be “Neutral damp grassland (floodplain or fen)” or “Neutral pastures and meadows”.

The plots are relocated as exactly as possible on each monitoring visit. Species present and their percentage cover on Domin scale are recorded along with other features such as bare ground, litter, rock, lichen etc and vegetation height and “woodedness”. Aspect, slope, management and grazing are optional to record.

National Plant Monitoring Scheme	
Strengths & Opportunities	**Weaknesses**
• Designed to allow good comparison of data over time • An effective tool for monitoring habitat change in the wider countryside • Designed for different levels of ability in surveyors • Uses habitat indicator species appropriate to surveyor ability but has the option of full species inventory for experienced surveyors • Has very good species id guides and extensive support resources for participants	• Very time consuming • Quite complicated methodology • Randomly selected sites not targeted to valuable grassland (but elements of the survey methodology could be adopted if appropriate)

3. Defining Lowland Neutral Grassland Value and Condition

Lowland semi-natural and species-rich neutral grassland of high biodiversity value can be a more difficult habitat to identify and define clearly in the real world than some other types of vegetation, such as ancient woodland or heathland. Lowland grassland vegetation exists on a continuum of sward composition and condition that is influenced by multiple factors. Each site represents a unique node at a different place on that continuum.

Discussion usually centres around Lowland Meadow BAP priority habitat grassland (aka Lowland Meadow Habitat of Principle Importance under Section 41 of the NERC Act 2006). This habitat category encompasses many of the grassland types of high biodiversity value that occur in the High Weald AONB. However the line between grassland that falls into that "high value" category and "second tier" sites that may not meet the botanical criteria is blurred. The second tier sites may not meet botanical thresholds but may nevertheless be of high nature value for other taxa or as the connective tissue between the most important species-rich grassland sites. Attempting to make comparisons between the wildlife value of different grassland sites is complex and ultimately probably less useful than assessing each site on its own merits.

This assertion is supported by a JNCC report (Rodwell et al. 2007) that examines the character of UK Lowland Meadow BAP priority habitat in a European context. BAP Lowland Meadows are described as "more variable than defined by NVC" and the authors identify wetter plant communities within lowland meadow vegetation as a gap in the NVC/survey coverage of the habitat type. Wet flushes, springs and damp meadows with rushy areas are not uncommon as part of the grassland mosaic across the High Weald.

The 2007 report also notes the lack of recognition given to some MG1 swards that are diverse and of conservation interest, especially the MG1e *Centaurea nigra* sub-community. MG6 vegetation is considered to be consistently under-appreciated, for example the MG6b *Anthoxanthum* sub-community that can be very rich floristically and derived from high quality MG5 grassland.

Threats to these valuable grassland communities include unimaginative management, a lack of landscape scale management and under-valuing some sward types as well as failing to take into account context and surrounding features. The authors advise against "uncritical acceptance of existing definitions of what is included in each (BAP priority Habitat type)". Specific mention is made of MG1 grassland that is "potentially much more interesting than so far thought, and quite readily manageable, and which could be a worthy part of the Lowland Meadow BAP habitat."

These results are recognised in the 2014 revised grassland SSSI criteria (Jefferson et. al 2014) which, in brief, acknowledges the value of grassland for ecological coherence and functionality. The value of some MG1 and MG6 communities, along with the importance of mosaics of NVC communities within grassland is recognised. The value of scrub in some contexts of semi-natural grassland, especially the grassland/scrub interface is also noted. Importantly more emphasis is placed in the revised SSSI selection criteria on the value of semi-natural grassland habitats for other species groups such as fungi (Bosanquet et.al 2018), bryophytes, lichens, birds and invertebrates.

Despite published evidence and guidance from at least as early as 2007, it seems very likely that there is a suite of grassland sites in the HWAONB that are currently falling below the commonly accepted threshold to qualify as species-rich or BAP priority habitat but which are in fact of potentially high importance to a Nature Recovery Area.

The main reason these sites are currently falling through the net is due to an overly narrow interpretation of the NVC vegetation communities that should be considered as high wildlife value meadows. It may also be because the botanically based assessment thresholds are set too high and take no account of the faunal interest or context of the sites.

4. Bespoke High Weald Grassland Assessments

There is an urgent need to gather data about valuable but vanishing grassland habitats but the time and money for such work is always in short supply. Inevitably this creates a desire to develop tailored, rapid survey protocols for different regions/areas which hold significant amounts of important grassland, such as the High Weald AONB.

Producing such tailored assessment protocols can be done by taking elements of existing methodologies and adapting the standard lists of positive and negative indicator species. This should make use of local expert knowledge along with published guidance on the choice of indicator species to use in different types of semi-natural neutral grassland. Other site characteristics such as soils, hydrology and boundary features are also likely be important and specific to different areas so must be included in a bespoke methodology.

Vegetation composition is clearly the most basic feature of any grassland habitat and needs to be surveyed and assessed at some stage in order to evaluate its value and condition. There is no way to avoid the fact that this needs surveyors with at least moderately good botanical id skills.

Assessing the importance of grassland sites for waxcap and other fungi can require even more skill and patience due to the erratic, unpredictable appearance of CHEGD fruiting bodies and the need for microscopic examination to confirm the identification of some species.

Attempting to enable non-specialist High Weald grassland landowners or other stakeholders to collect substantial amounts of botanical data is unlikely to be a successful approach. Instead there should be a focus on using structural and contextual features of the grassland as a proxy for condition with a very limited selection of indicator species that can be identified with confidence after minimal training or using a simple photo id guide. However, each site is different and sooner or later some expertise/skill will be needed.

In recent years there have been different grassland assessment and monitoring methodologies developed by organisations and individual ecologists in the High Weald. A few of these are summarised here as case studies to illustrate the different levels of data on Wealden grassland sites that has been gathered. The data from all these case studies has been shared with the SxBRC. There are many others working across the High Weald AONB whose work should be included in a future Nature Recovery Area.

Case Study 1. The High Weald Rapid Assessment Pilot Survey 2015/16

This pilot project attempted to develop a rapid and inexpensive method to capture data about the extent of important grassland habitats at a landscape scale. It made use of elements of existing methodologies and tailored them to the High Weald.

The focus of the first phase of the methodology was to identify any undesignated and unrecorded valuable grassland sites of all types in the wider countryside based on aerial imagery, existing data

and field survey using only public rights of way.

The rapid assessment protocol combined desk study and field survey in an approach similar to that used in the Weald Ancient Woodland Survey of 2006. The field assessment methodology had elements of other survey and monitoring techniques but attempted to reduce the complexity of recording and did not include a structured walk with sampling points.

Grassland indicator species were included as part of the field survey with selected grasses used in addition to a range of herbs to help capture "second tier" sites of potential interest. Positive and negative indicator species were set out on the simple 2 side of A4 survey form with space for other records of notable fauna and flora (see appendix).

The features that were recorded on the survey form were intended to capture wildlife-rich grassland, historic boundaries and habitats of value to pollinators. Information on management was also recorded where possible.

Stage 1 of the pilot survey in 2015 trialled the rapid assessment pilot within one tetrad in the High Weald AONB where there were no records of valuable grassland habitat on the NE grassland inventory or in the Sussex Biodiversity Record Centre database.

All parts of the tetrad were covered as thoroughly as possible using roads and public rights of way. A separate survey sheet was completed for each area of grassland that appeared to be of potential interest.

Stage 1 of the pilot survey identified c50ha of possibly valuable grassland within the selected tetrad.

Stage 2 of the pilot survey in 2016 followed up on some sites identified in 2015 as being of potential interest. The landowner was contacted and walkover field surveys were conducted to compile vascular plant species lists and assess the NVC plant communities present.

On one site a University of Brighton MSc student carried out a simultaneous research project into the use of remote sensing to detect unimproved grassland. In this area a series of 1m x 1m vegetation quadrats was recorded to contribute to sward assessment data for the student project.

The second phase of the pilot survey confirmed that the rapid assessment had correctly identified areas of previously unrecorded valuable grassland habitat. It also highlighted some aspects of biological data sharing and knowledge of grassland sites in the High Weald that could be improved.

In retrospect the list of positive indicator species used in this pilot survey could be further refined, though space was allowed on the form to record other notable species.

Case Study 2. Natural England Field Unit Wealden Meadows Surveys 2017/18

Led by Janet Whitman of the NE Field Unit, these surveys aimed to identify wildlife-rich grasslands, semi-improved grassland and potential grassland creation/restoration fields and habitats of value to pollinators. The surveys focused on a project area where Buglife B-Lines, grassland Local Wildlife Sites, known HWAONB meadows and NE agri-environment grassland options overlapped with landowners in agri-environment schemes due to expire in 2017 and the Facilitation Fund area.

This project used a methodology that combined Countryside Stewardship BEHTA assessment with the High Weald rapid assessment method and also included elements of the Natural England rapid proxy invertebrate habitat assessment.

Pairs of surveyors, walked a W or Z route through each grassland field and recorded the presence of indicator species at 10 regular stops in 1m x 1m quadrats. Incidental records of interesting or rare species were photographed, GPS located or noted. Data was collected on a spreadsheet on computer tablets in the field along with paper maps for annotation with target notes of condition, management, grazing etc.

Field quality was assessed using the BEHTA criteria for semi-improved grassland (G02) or lowland neutral grassland (G06). Surveyors judgement was then used to judge current condition into 5 categories:

- species-rich (G06)
- species-rich – failing condition
- semi-improved – good for restoration to species-rich grassland
- semi-improved (G02)
- semi-improved – failing condition
- Not applicable (fields failed to meet BEHTA threshold or hay cut had taken place)

In 2017 the survey covered 86ha of grassland in 8 days across 15 landholdings. Average field size 1.88ha (range 0.5ha to 5ha).

The survey found that not all good indicator species of Wealden grassland are currently used in the BEHTA assessment, for example adder's-tongue *Ophioglossum vulgatum* is not included at present. It also found that seasonal bias and poor weather had an impact on the results. This method (along with most other grassland survey techniques) fails to pick up important CHEGD fungi grasslands.

The Field Unit survey field recording form has been updated for the 2019 field survey season with some indicator species changed in the light of results from the 2017/18 surveys (see appendix). However, the survey form now has more than 120 plant taxa listed, which makes completing the species record at each 1m x 1m quadrat closer to carrying out a full botanical inventory than undertaking a rapid assessment.

This case study provides a good example of the difficulty inherent in attempting to narrow down the diverse nature of high quality Wealden grassland to a small set of indicator species.

Case Study 3. Sussex Wildlife Trust High Weald Grassland Reserves

The Sussex Wildlife Trust (SWT) manages two nature reserves in the High Weald AONB that contain valuable grassland habitats. The Brickfield Meadow in Fairwarp near Ashdown Forest is a small, species-rich Wealden meadow and the Marline Valley reserve near Hastings has extensive areas of unimproved meadows.

There is no rigid protocol for monitoring the grassland condition on the reserves, instead a bespoke method is developed for each site. Most of the survey and monitoring work at Brickfield is carried out by Graeme Lyons, SWT's ecologist, whilst an experienced volunteer undertakes vegetation monitoring at the Marline Valley meadows.

On both sites periodic monitoring is carried out by recording vegetation in random quadrats which are sited in approximately the same part of each field on every occasion. The percentage cover of all

species is recorded along with the presence of unwanted species within 1m of the quadrat.

In addition to the periodic botanical monitoring the Trust ecologist has devised a standardised rapid grazing assessment protocol that is used in each compartment on all SWT grassland reserves. This is a simple 5 point grassland condition scale comprises: Ideal condition, slightly over-grazed, over-grazed, slightly under-grazed, under-grazed.

There is also a 3 point (traffic light) scale for the amount of scrub present in the grassland sward in each compartment.

Each reserve also has a traffic light system for condition which is used to alert reserve managers when overall condition is moving from green (ideal) through amber (sub-optimal) to red (unfavourable).

Case Study 4. University of Sussex Grassland Surveys & Monitoring Led by Dr Margaret Pilkington

Margaret Pilkington's team of well-trained and experienced volunteers have carried out numerous grassland surveys and monitoring projects in Sussex over a number of years, many of them as part of the River Ouse Project.

The River Ouse Project had a focus on streamside grassland in the Upper Ouse catchment and had the two-fold objective of characterising species-rich grassland using the NVC and identifying species-poor grassland sites that are suitable for restoration or enhancement.

Restoration trials and ongoing monitoring have been carried out by recording vegetation in 2m x 2m quadrats using two different techniques; either percentage cover (or Domin values) in standard 2m x 2m quadrats or presence/absence of species in sub-divided quadrats where the 2m x 2m sample plot is divided into 25 small squares.

The team have a long-term meadow monitoring site at Hanging Meadow in the Loder Valley. Monitored on-going management there started in 2009 but records which can be compared go back to 2014. These use a sub-divided 2m by 2m quadrat placed in 3 'permanently' marked positions. It was found that some difficult-to-identify species had to be lumped together to get consistent results, for example small plants of bird's-foot-trefoil *Lotus spp.* are difficult to separate early in the season, so are better kept together. Similarly sharp-flowered rush *Juncus acutiflorus* and jointed rush *Juncus articulatus* were lumped together.

The full details of these projects can be found at www.sussex.ac.uk/riverouse but some key observations on grassland survey and monitoring techniques that have been highlighted by Margaret for this report are:

- Meaningful assessment of grassland swards needs time
- Wealden Meadows (as opposed to chalk grassland) require 2m x 2m samples because of the 'coarseness' of the vegetation
- There are a few key indicator plants which it is important to be able to identify because of what they tell you. These include bird's-foot-trefoil (common or greater can be lumped together), sweet vernal grass *Anthoxanthum odoratum* (which would be a problem for non-specialists especially if it wasn't in flower), and red clover *Trifolium pratense*

- Estimating percentage cover tends to vary a lot between different observers (even experienced ones). Using Domin categories is more consistent but seasonal and between year variations have a big effect on values
- Recording species presence in the small squares in a sub-divided quadrat is much more consistent than estimating percentage cover but this method takes a *lot* more time. It also puts more emphasis on less common species compared with dominant grasses

The difficulties and pitfalls of making accurate assessments of Wealden grassland habitat is illustrated by this example from a 2018 survey carried out by Margaret's team.

> *A series of meadows was surveyed using the NVC method but in order to help the landowner with her mid tier application the CS BEHTA assessment method was also used. For one of the meadows this gave a very misleading result. It was MG5a grassland, but came out as semi-improved grassland under the CS assessment. This was the same result as another of the meadows which was MG6a.*

As Margaret points out, there can be a huge difference between MG6a and MG5a vegetation communities. The outcome of CS assessments are very important for land management advisors who recommend the best type of grassland management or enhancement measures for landowners to carry out under agri-environment schemes. For example, sward enhancement with wildflower seed or green hay might be an appropriate action to recommend for a site with MG6a vegetation. Sward enhancement would probably not be advisable for a meadow of existing high botanical value, classified as MG5a, instead the correct timing of hay cut and details of the grazing regime would be much more important recommendations.

In a separate project the team has monitored vegetation plots in the Coronation Meadow at Wakehurst Place that was enhanced using seed from a donor site. The results have been analysed using NVC community data tables to measure change as the plant communities respond to management. They have shown a progression from the MG6b *Lolium perenne – Cynosurus cristatus; Anthoxantum odoratum* sub-community to MG5a *Cynosurus cristatus – Centaurea nigra; Lathyrus pratensis* sub-community though this is described as "species-poor" MG5a with an average of only 16 species per 2m x 2m quadrat whilst the NVC initial survey average for MG5a is 22 species and the donor site had an average of 33 species per quadrat.

5. Overall Recommendations

Recommendation 1

Prioritise baseline habitat survey & a grassland inventory

The primary recommendation remains the need for a robust baseline of information in the form of an inventory of grassland in the HWAONB. Kent has a county-wide phase 1 habitat dataset but Sussex does not. Further collation of existing data from a range of sources (not just HLS/CS) is still needed. Gaps can then be filled and a systematic assessment of the grassland resource made.

Progress to prioritised site level survey, assessment and monitoring would most logically follow on from the data held in the grassland inventory.

Targeted management, enhancement and engagement action for "second tier" grassland resources around the nodes of highest quality grassland sites should form the basis of the NRA.

Recommendation 2

Acknowledge the complexity of High Weald grasslands

Grassland in the High Weald AONB is different from many other lowland areas due to factors such as its complex geology, geomorphology, historical land-use and micro-climate.

Focusing the NRA exclusively on MG5 grassland communities/BAP Priority Lowland Meadow habitats is too restrictive.

Grassland sites that are important for CHEGD fungi are under-recorded and should receive higher priority in the NRA.

There should be an overt acknowledgement that the NRA will aim to document, map, assess, manage, restore and value other related grassland types that contribute to the overall, connected, biodiversity-rich grassland resource.

Recommendation 3

Use existing bespoke rapid assessment & monitoring templates in the High Weald

Wider countryside assessment for grassland with actual or potential value for inclusion in the NRA should use the draft High Weald rapid assessment template. This does not include sampling stops or quadrat recording but highlights where there is a need for further, more detailed survey. It is especially useful when landowners are not known or where full access to land is not available. It can help to fill gaps in the known grassland network.

The NE Field Unit's template and method with structured walk and stops should be used where sites have open access or the landowner is known or for entry into CS.

Monitoring grassland condition could be based on a repeat of the Field Unit method at regular (3) year intervals but with more frequent condition assessments similar to the SWT protocol using a traffic light alert system of major sward features e.g. scrub height and cover, tussocky grasses cover, depth of thatch etc.

Recommendation 4

Carry out invertebrate assessments

The rapid assessment survey templates developed for use in the High Weald AONB from 2015 to 2018 allow surveyors to record features in and around grassland that are of value to invertebrates both for feeding and as nesting or over-wintering habitat. Examples include tussocky sward structure, adjoining woody habitats, how “flowery” the sward is and whether there are areas of bare ground or sunny banks.

Direct observations of insects such as bees and butterflies can also be recorded during the vegetation surveys.

Structured survey methods for the distribution and abundance of bees and butterflies in grassland have been developed. Bumblebee Conservation Trust has designed the standardised Bee Walk 1-2km transect survey. Butterfly Conservation supports butterfly monitoring via a standardised transects methodology. Both these techniques require a level of expertise in species recognition.

Recommendation 5

Set bespoke targets

Targets must be set at a site level rather than relying on generic prescribed outcomes across all sites. The features of importance that have been identified for each individual grassland should be taken into account. For example, if important populations of invertebrates or invertebrate assemblages have been identified on a site then targets might include sward structure, condition of boundary features or management timing rather than be focused on botanical composition of the sward.

In grasslands rich in waxcap/CHEGD fungi the most important management objective is to have a low sward by fruiting time (late summer/autumn) and going into winter. Grazing of such swards should be regular but does not need to maintain a short sward during the rest of the year.

The key to a monitoring programme for High Weald AONB grasslands is to adopt a broad process then tailor the details to each site rather than try to shoehorn them into a generic system.

Tailoring a method to the High Weald must take into account the potential for meadows to vary from neutral grassland into more acidic, wet and sometimes even locally calcareous swards. The complex geology of the High Weald means that positive indicator species in particular need to be chosen with care to ensure the most special sites are captured during rapid assessments.

Setting milestones i.e. stages in restoration when certain positive indicators might appear is a possibility, with weighting given to different indicators. This too should be tailored to each site depending on factors such as starting point, component species, seeded/added species and local context.

Recommendation 6

Set realistic expectations of outcomes

A high degree of realism is essential when setting targets for grassland restoration or creation outcomes. It is better to build on the existing strengths and features of a site than set unrealistic expectations which will only lead to failure. For example, some MG1 swards with tall tussocky grasses that derive from long periods of under-management can be very species rich (NE2007) and have high biodiversity value for plants and animals without being a typical MG5 meadow.

Recommendation 7

Set realistic expectations of stakeholder input & the need for ongoing support

The techniques used to survey and monitor sites for the NRA will have to be a balance between the information needed to make sensible decisions and the skills available.

Encouraging landowners, volunteers and others to undertake surveys and monitoring is good for engagement but any limitations to the data collected or skill of participants must be made explicit, ideally without discouraging people from taking part.

Promoting engagement must go hand in hand with simple but robust guidance and training to make sure the evidence gathered is value and useful. The National Plant Monitoring Scheme has produced excellent species ID guide and cribs. Producing these types of resources specific to High Weald grasslands would help many landowners to gain the skills needed for basic levels of survey and monitoring.

A two tier system of assessment will always be needed such that grassland can be provisionally identified as being of potential value by a non-specialist but should then be verified by a more experienced assessor.

Devising a bespoke monitoring scheme for each site needs a degree of expertise but a part of its design should take account of the skills of the landowner/volunteers available and highlight the site's key features. Tailored training on how to recognise and assess the features would be needed but a simple traffic light system for each feature could be used. Illustrated examples of features in a monitoring guide would be very valuable.

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Appendix 1

Recording sheets for High Weald Rapid Assessment Pilot Survey 2015/16

Survey Area:					**Site Ref (central point or each end of linear site):**				
Recorder:			**Follow up needed?** Yes / No		**Date:**				
Site description (circle)	Enclosed field	Unenclosed area	Road verge	Boundary bank	Other (specify)				
Comments									
Trees and/or shrubs present in sward? (circle)	Yes	No	**Approximate cover of woody species**	0-10%	11-25%	26-50%	51-75%	75%+	
Comments (age, species, source of woody species etc.)									
Sward characteristics (% of area)	Short <15cm	Tall >15cm	Tussocky	Herb-rich areas	Bare ground	Litter layer	Grass dominated	Fine grasses	Other
Comments (depth of litter, amount of bare ground, other features of interest etc.)									
Physical features (circle)	Anthills	Ridges	Wet flush	Pond	Stream	Steep slope	Dips or hollows	Other e.g rock outcrops	
Comments (aspect of slope, extent/size of wet features, presence of deadwood etc.)									
NVC grassland community types present (circle)	MG (neutral grassland)	M (marshy grassland)	U (acid grassland)	CG (chalk grassland)					
Comments (details of NVC communities, proportion of different types etc.)									
Adjoining habitats and features (circle)	Woodland / Scrub	Hedge	River/ stream	Open water	Wetland	Grassland	Arable	Unsurfaced track	Urban	Road
Comments (impact of adjoining features, good quality arable margins, presence of footpaths etc)										
Management (circle)	Grazed	Mown	Unmanaged	Other (specify)						
Comments (type of livestock, hay crop taken, silage cut etc.)										
Condition (circle)	Favourable	Unfavourable	Neglected	Other						
Comments (details)										
Historic boundary features (circle)	Bank	Ditch	Track	Pollards, stubs, large coppice stools	Shaw	Notable hedgerow	Notable Trees	Other		
Comments (species, size, proximity to other features)										

Positive Indicator Species		DAFOR
Achillea ptarmica	Sneezewort	
Agrimonia eupatoria	Agrimony	
Ajuga reptans	Bugle	
Anacamptis morio	Green-winged orchid	
Anenome nemorosa	Wood anemone	
Betonica officinalis	Betony	
Briza media	Quaking grass	
Calluna vulgaris	Ling	
Campanula rotundifolia	Harebell	
Carex flacca	Glaucous sedge	
Carex leporina	Oval sedge	
Carex nigra	Common sedge	
Carex panicea	Carnation sedge	
Centaurea nigra	Common knapweed	
Cirsium dissectum	Meadow thistle	
Conopodium majus	Pignut	
Dactylorhiza spp.	Spotted/marsh orchid spp.	
Danthonia decumbens	Heath grass	
Erica spp.	Heather spp.	
Euphrasia spp.	Eyebright spp.	
Festuca rubra	Red fescue	
Filipendula ulmaria	Meadowsweet	
Filipendula vulgaris	Dropwort	
Galium saxatile	Heath bedstraw	
Galium verum	Lady's bedstraw	
Genista tinctoria	Dyer's greenweed	
Glechoma hederacea	Ground-ivy	
Hyacinthoides non-scripta	Bluebell	
Lathyrus linifolius	Bitter-vetch	
Lathyrus pratensis	Meadow vetchling	
Leontodon spp.	Hawkbit spp.	
Leucanthemum vulgare	Ox-eye daisy	
Linum catharticum	Fairy flax	
Lotus spp.	Birds-foot-trefoil spp.	
Luzula spp.	Wood-rush spp.	
Melampyrum pratense	Common cow-wheat	
Oenanthe pimpinelloides	Corky-fruited waterdropwort	
Oenanthe silaifolia	Narrow-lvd waterdropwort	
Ophioglossum vulgatum	Adders-tongue	
Pedicularis sylvatica	Common lousewort	
Pilosella officinarum	Mouse-ear hawkweed	
Pimpinella saxifraga	Burnet-saxifrage	
Polygala spp.	Milkwort spp.	
Potentilla erecta	Tormentil	
Poterium sanguisorba	Salad burnet	
Primula veris	Cowslip	

Positive Indicator Species		DAFOR
Pulicaria dysenterica	Fleabane	
Rhinanthus minor	Yellow rattle	
Rumex acetosella	Sheep's sorrel	
Serratula tinctoria	Saw-wort	
Silaum silaus	Pepper-saxifrage	
Silene flos-cuculi	Ragged robin	
Succisa pratensis	Devils-bit scabious	
Tragopogon pratensis	Goats-beard	
Trifolium pratense	Red clover	
Vaccinium myrtillus	Bilberry	
Veronica officinalis	Heath speedwell	
Viola spp.	Violet spp.	
Negative Indicator Species		
Anthriscus sylvestris	Cow parsley	
Arrhenatherum elatius	False oat-grass	
Cirsium arvense	Creeping thistle	
Cirsium vulgare	Spear thistle	
Galium aparine	Common cleavers	
Heracleum sphondylium	Hogweed	
Helminthotheca echioides	Bristly ox-tongue	
Plantago major	Greater plantain	
Rumex crispus	Curled dock	
Rumex obtusifolius	Broad-leaved dock	
Pteridium aquilinum	Bracken	
Senecio jacobaea	Common ragwort	
Urtica dioica	Nettle	
Other Notable Flora or Fauna		
Sketch of Site		

Appendix 2 - Recording Sheet for NE Field Unit Wealden Meadow Surveys 2016/19

Rapid Site Assessment – Wealden Grassland Form

Invertebrate sections in this colour

Date:	01/04/18	**Assessed by: (Surveyors Names)**	Janet and Matt
Field RLR parcel number OR 8-figure Grid Ref if not on RLR (IMPT a form must be completed for each individual field)	TQ12345678	**Site/Farm Name:**	Old MacDonalds Farm
Field Description and Sketch Map:	**Comments**		
Annotate these on the map and where relevant do a target note (topography, aspect, boundaries, variations in vegetation types, wetness)	See map for details. There are species rich thick and bushy hedgerows on 3 sides and a woodland shaw on the last. There is a small pond in the Northern corner, with surrounding wetter plants and rushes. The sloping ground facing south is rich in wildflowers and the rabbit warren and associated scrapes are good for insects.		
Weather conditions: (temperature, cloud cover %, wind speed, sunny, wet etc from an invertebrate perspective)	**Comments**		
	Gentle breeze, barely moving leaves, clear sky and sunshine - lots of butterflies on the wing		

Adjoining habitats and features (Y to mark up) where relevant.	**Woods**	**Hedge**	**Scrub**	**River/ Stream**	**Open Water**	**Wetland**	**Grassland**	**Arable**
	Y	Y	N	N	Y - pond	e rushes ne	Y	N

Sunken routeway/unsurfaced track	**Farm Buildings**	**Town/ Village**	**Tarmac Road**	**Industrial**
Y	Y	N	N	N

Comments (impact of adjoining features good or bad, e.g., good arable margins, presence of footpaths, conifer plantation etc)

Good example of AONB landscape componets and good connectivity for wildlife

Field sward type (tick)	**<3cm sward**	**5-15cm sward**	**>15cm sward**	**Fine Grasses, e.g. red fescue**	**Grass Tussocks, e.g. cocks foot, purple moor grass, tufted hair grass**	**Rush spps**	**Dense litter**	**Bare Ground**

Field swards (% cover) = 100%	12%	68%	20%	15%	8%	10%	6%	3%
Sward composition	**White clover & rye grass**	**Wild flowers (don't add the white clover back in)**	**Coarse grasses (Yorkshire fog, Cock's**	**Injurious weeds (ragwort, docks, thistles)**	**Bracken**	**Bramble**	**Tree/Scrub seedlings & saplings in sward**	
Sward composition (% cover)	25%	60%	15%	2%	0%	1%	1%	
Trees & Scrub type Add comment saying which non-native species seen	**In Field Tree spps (% cover)**	**In Field Shrub spps (% cover)**	**Veteran Trees (No of trees)**	**Deadwood fallen >20cm diameter (Nos seen)**		**Deadwood standing (Nos of trees)**	**Non-native trees and scrubs (% cover and provide a comment on what species)**	
Trees & Scrub % cover or No seen	0.00%	0.00%	1.00	0.00		0.00	0.00%	
In Field Features	**Anthills**	**Wet flush, Spring/ Seepage**	**Pond, River or Stream**	**Rock Outcrops**	**Sheltered slopes (give aspect, e.g. SE facing)**		**Dips and hollows (natural or historic) state type in comments**	
NB importance of nesting areas on south, south/east facing banks rather than north / west facing ones.	y	n	y	n	y		n	

Boundaries (annotate map)	**Hedgerow type: Species rich; Gappy; sheep grazed; overgrown; 'T' shaped; Hedgerow Trees (handout hedgelink guide)**	**Ditch (wet or dry)**	**Line of Trees**	**Fenced (permanent post and wire, electric)**
Please annotate the paper OS map with what the hedges, ditches and boundaries are like and jot down the hedgerow species velow as a target note	species rich	n	n	yes permanent stock proof
Boundaries comments: Please record hedgerow shrubs, structure, ground flora, esp. Apiaceae/ Umbelliferae	**Comments** (record hedgerow shrubs, structure, ground flora, esp. Apiaceae/ Umbelliferae)			
	blackthorn, hawthorn, elder, holly, hazel hedgerow with in hedge oak and ash trees. Nice ground flora under hedges of wood anemone, bluebell, red campion, bugle, greater stitchwort and nettle patches. The woodland is mainly oak and hornbeam. As it is a grazed field there isn't much cow parsley or tall herbaceous plants, like on road verges for bumblebees to nest in.			

Management (drop down pick list)	**Grazing - select from drop down (cattle, sheep, horses, rabbits)**	**Mown - silage, hay, topped**	**Unmanaged**	**Other - please specify**
				some rabbits grazing

	Grazed					some rabbits grazing and deer seen
Micro-habitats for invertebrates (mark up)	**Dead last winter seed-heads present**	**Fibrous dung (horses, cattle)**	**vertical exposed soil (river banks, quarry faces)**	**damp bare mud (pond edges, wet areas**	**Bare friable sandy soils (rabbit**	**0.5-2m wide taller ruderal vegetation margins or areas near hedge/ditch bank boundaries. Note Umbellifers**
	Y - near hedgerows and pond	N	N	Y	Y	N

Invertebrate comments Please think about feeding, nesting and sheltering	**Comments** (record feeding, nesting, sheltering opportunities)
	woods and hedges giving shelter and wildflowers giving feeding opportunities. Some nesting opportunities by rabbit warrens for mining bees in bare ground.
Record the variety and abundance of any invertebrates seen, even if it is at a family level.	**Please give an idea of the variety and abundance of insects, esp. pollinators seen as you walk the field**, e.g. 7 Meadow Browns, 2 different Bees, 1 hoverfly, 3 different beetles, a dragonfly and a hornet.
	3 orage tips, a stripy bumblebee and a red tailed one. A grasshopper and a spider. A horse fly and 4 hoverfly seen.
Other species seen, e.g. reptiles, birds or mammals Please ensure any S41 species you can identify are listed here	Song thrush on woodland edge and buzzard overhead.

Field Summary (condition & management)
landowner managing land sympathetically. With grazing it would be hard to increase tall herbage without temporary electric fencing

Landowner Discussions (if you meet with the landowner)
Landower was not present

Each Field Stop recording form

Please record information from a number of stops during the structured walk, giving a Y=Yes or N=No to indicate if a species was seen in that stop. Species have been colour-coded according to the BEHTA manual for improved, semi-improved, species-rich grasslands and injurious

Species Common names	Species Latin names	1	2	3	4	5	6	7	8	9	10	Summary	Frequency	Classification
Adder's-tongue fern	*Ophioglossum vulgatum*											**0**	**#N/A**	**Rare**
Agrimony	*Agrimonia eupatoria*	**Y**				**y**						**2**	**Rare**	**Neutral**
Autumn Hawkbit	*Leontodon autumnalis*											**0**	**#N/A**	**Wet**
Bell heather	*Erica cinerea*											**0**	**#N/A**	**Acid**
Betony	*Stachys officinalis*											**0**	**#N/A**	**Neutral**
Bitter vetch	*Lathyrus linifolius (=L. montanus)*											**0**	**#N/A**	**Neutral**
Black Medick	*Medicago lupulina*											**0**	**#N/A**	**Semi**
Bluebell	*Hyacinthoides non-scripta*			**y**								**1**	**Rare**	**pollinator**
Bracken	*Pteridium aquilinium*											**0**	**#N/A**	**Weed**
Bramble	*Rubus fruticosus*						**y**					**1**	**Rare**	**Weed**
Broad leaved dock	*Rumex obtusifolius*	y						**y**				**2**	**Rare**	**Weed**
Buck's-horn plantain	*Plantago coronopus*											**0**	**#N/A**	**Acid**
Bugle	*Ajuga reptans*	**y**		**y**								**2**	**Rare**	**Neutral**
Bulbous Buttercup	*Ranunculus bulbosus*				**y**	**y**						**2**	**Rare**	**Semi**
Burnet-saxifrage	*Pimpinella saxifraga*											**0**	**#N/A**	**Semi**
Carex spp. small blue-green leaves less than 5mm wide. Glaucous sedge, Common sedge and Carnation sedge	***Carex spp. small blue-green leaves less than 5mm wide*** *(=C. flacca, C. nigra, C. panicea)*						**y**		**y**			**2**	**Rare**	**Neutral**
Chaffweed	*Anagallis minima*											**0**	**#N/A**	**Rare**
Common Bird's-foot-trefoil	*Lotus corniculatus*			**y**			**y**		**y**			**3**	**Occassional**	**Neutral**
Common bistort	*Bistorta officinalis*											**0**	**#N/A**	**Wet**
Common cat's-ear	*Hypocharis radicata*		**y**	**y**	**y**	**y**			**y**			**5**	**Frequent**	**Semi**
Common centaury	*Centaurium erythraea*											**0**	**#N/A**	**Acid**
Common fleabane	*Pulicaria dysenterica*									**y**		**1**	**Rare**	**Semi**
Common Knapweed	*Centaurea nigra*		**y**				**y**		**y**			**3**	**Occassional**	**Neutral**
Common mouse-ear	*Cerastium fontanum*	**y**	**y**	y	**y**	y	**y**	y				**7**	**Frequent**	**pollinator**
Common nettle	*Urtica dioca*				**y**						**y**	**2**	**Rare**	**weed**
Common ragwort	*Jacobaea vulgaris*	y										**1**	**Rare**	**weed**
Common sorrel	*Rumex acetosa*	y		**y**	**y**			**y**	**y**			**5**	**Frequent**	**Semi**

Neils wizardry table		
#N/A	**1**	**Rare**
	2	**Rare**
	3	**Occassional**
	4	**Occasional**
	5	**Frequent**
	6	**Frequent**
	7	**Frequent**
	8	**Frequent**
	9	**Frequent**
	10	**Frequent**

Common spotted orchid	*Dactylorhiza fuchsii*									y		1	Rare	Neutral
Common stork's-bill	*Erodium cicutarium*											0	#N/A	Acid
Common Vetch	*Vicia sativa*		y			y		y		y		4	Occasional	pollinator
Coralroot	*Cardamine bulbifera*											0	#N/A	Rare
Corky-fruited Water-dropwort	*Oenanthe pimpinelloides*											0	#N/A	Wet
Cow Parsley	*Anthriscus sylvestris*		y									1	Rare	Weed
Cowslip	*Primula veris*											0	#N/A	Neutral
Creeping buttercup	*Ranunculus repens*		y	y	y			y				4	Occasional	Weed
Creeping Cinquefoil	*Potentilla reptans*					y			y			2	Rare	Semi
Creeping thistle	*Cirsium arvense*			y			y					2	Rare	Weed
Crosswort	*Cruciata laevipes*											0	#N/A	Semi
Cuckooflower	*Cardamine pratensis*								y	y		2	Rare	Semi
Curled dock	*Rumex crispus*											0	#N/A	Weed
Dandelion	*Taraxacum agg.*	y						y		y		3	Occassional	pollinator
Devil's-bit Scabious	*Succisa pratensis*											0	#N/A	Neutral
Dyer's Greenweed	*Genista tinctoria*											0	#N/A	Neutral
Eyebrights	*Euphrasia spp*											0	#N/A	Neutral
Field wood-rush	*Luzula campestris*			y			y			y		3	Occassional	Semi
Germander speedwell	*Veronica chamaedrys*			y		y						2	Rare	Semi
Goat's-Beard	*Tragopogon pratensis*										y	1	Rare	Neutral
Grass Common bent	Grass *Agrostis capillaris*							y				1	Rare	Semi
Grass Meadow Fescue	Grass *Schedonorus pratensis*				y			y				2	Rare	Semi
Grass Cock's-foot	Grass *Dactylis glomerata*		y		y							2	Rare	Semi
Grass Creeping bent	Grass *Agrostis stolonifera*			y		y		y	y			4	Occasional	Semi
Grass crested dog's-tail	Grass *Cynosurus cristatus*			y				**y - probably under-recorded as early in year**				1	Rare	Semi
Grass False oat grass	Grass *Arrhenatherum elatius*		y									1	Rare	Semi
Grass Meadow Foxtail	Grass *Alopecurus pratensis*											0	#N/A	Semi
Grass Perennial rye grass	Grass *Lolium perenne*		y		y		y					3	Occassional	Weed
Grass Red fescue	Grass *Festuca rubra*				y	y		y			y	4	Occasional	Semi
Grass Sweet Vernal Grass	Grass *Anthoxanthum odoratum*		y	y		y	y		y		y	6	Frequent	Semi
Grass Timothy	Grass *Phleum pratense*								y			1	Rare	Semi
Grass Tufted Hair-grass	Grass *Deschampsia cespitosa*									y		1	Rare	Semi

Grass Vetchling	*Lathyrus nissolia*											0	#N/A	pollinator
Grass Yorkshire-fog	Grass *Holcus lanatus*				y	y	y	y		y		5	Frequent	Semi
Great Burnet	*Sanguisorba officinalis*											0	#N/A	Wet
Greater Bird's-foot-trefoil	*Lotus pedunculatus*									y		1	Rare	Neutral
Green-winged Orchid	*Orchis morio*											0	#N/A	Rare
Gypsywort	*Lycopus europaeus*									y		1	Rare	Wet
Hard rush	*Juncus inflexus*											0	#N/A	
heath bedstraw	*Galium saxatile*											0	#N/A	Acid
heath speedwell	*Veronica officinalis*											0	#N/A	Acid
Heather	*Calluna vulgaris*											0	#N/A	Acid
Hedge bedstraw	*Galium mollugo*											0	#N/A	Semi
Hemp agrimony	*Eupatorium cannabinum*											0	#N/A	Wet
Hogweed	*Heracieum sphondylium*											0	#N/A	weed
Jointed Rushes	**Jointed Rushes**											0	#N/A	Wet
Lady's Bedstraw	*Galium verum*											0	#N/A	Neutral
Lesser hawkbit	*Leontodon saxatilis*											0	#N/A	Neutral
Lesser stitchwort	*Stellaria graminea*	y	y	y	y	y	y					6	Frequent	pollinator
Lesser Trefoil	*Trifolium dubium*											0	#N/A	Semi
Lousewort	*Pedicularis sylvatica*											0	#N/A	Acid
Marsh thistle	*Cirsium palustre*									y		1	Rare	pollinator
Marsh Valerian	*Valeriana dioica*											0	#N/A	Wet
Marsh/Fen bedstraws	*Galium palustre/G. uliginosum*											0	#N/A	Wet
Marsh-marigold	*Caltha palustris*											0	#N/A	Wet
Meadow Buttercup	*Ranunculus acris*				y	y	y		y	y		5	Frequent	Semi
Meadow Vetchling	*Lathyrus pratensis*	y	y	y					y			4	Occasional	Neutral
Meadowsweet	*Filipendula ulmaria*									y		1	Rare	wet
Milkworts	*Polygala spp*											0	#N/A	Neutral
Mouse-ear hawkweed	*Hieracium pilosella*					y					y	2	Rare	Acid
Narrow-leaved Water-dropwort	*Oenanthe silaifolia*											0	#N/A	Wet
Orchids	*Dactylorhiza spps*											0	#N/A	Neutral
Oxeye Daisy	*Leucanthemum vulgare*			y	y							2	Rare	Neutral
Pepper-saxifrage	*Silaum silaus*											0	#N/A	wet
Pignut	*Conopodium majus*											0	#N/A	Neutral
Primrose	*Primula vulgaris*	y										1	Rare	pollinator
Purple Loosetrife	*Lythrum salicaria*											0	#N/A	wet

Ragged-robin	*Lychnis flos-cuculi*											**0**	**#N/A**	**wet**
Red Clover	*Trifolium pratense*	**y**			**y**			**y**				**3**	**Occassional**	**Semi**
Ribwort Plantain	*Plantago lanceolata*					**y**	**y**	**y**	**y**			**4**	**Occasional**	**Semi**
Rough hawkbit	*Leontodon hispidus*											**0**	**#N/A**	**Neutral**
Rough meadow grass	*Poa trivialis*		**y**	**y**	**y**	**y**						**4**	**Occasional**	
Salad Burnet	*Sanguisorba minor*											**0**	**#N/A**	**Neutral**
Selfheal	*Prunella vulgaris*		**y**	**y**	**y**		**y**		**y**			**5**	**Frequent**	**Semi**
Sheep's sorrel	*Rumex acetosella*										**y**	**1**	**Rare**	**Acid**
Skullcap	*Scutellaria galericulata*											**0**	**#N/A**	**wet**
Smooth Hawk's beard	*Crepis capilaris*											**0**	**#N/A**	**Semi**
Sneezewort	*Achillea ptarmica*											**0**	**#N/A**	**wet**
Soft rush	*Juncus effusus*									**y**		**1**	**Rare**	
Spear thistle	*Cirsium vulgare*											**0**	**#N/A**	**weed**
Spiked Rampion	*Phyteuma spicatum*											**0**	**#N/A**	**Rare**
Spring sedge	*Carex caryophllea*											**0**	**#N/A**	**Rare**
Thyme leaved speedwell	*Veronica serpyllifolia*			**y**				**y**				**2**	**Rare**	**pollinator**
Thymes	*Thymus spps*											**0**	**#N/A**	**Acid**
Tormentil	*Potentilla erecta*										**y**	**1**	**Rare**	**Neutral**
Tufted Vetch	*Vicia cracca*											**0**	**#N/A**	**Semi**
Violet spps	*Viola spps*										**y**	**1**	**Rare**	**Acid**
Water forget-me-not	*Myosotis scorpioides*											**0**	**#N/A**	**Wet**
Water horsetail	*Equisetum fluviatile*											**0**	**#N/A**	**Wet**
Water Mint	*Mentha aquatica*								**y**	**y**		**2**	**Rare**	**Wet**
White Clover	*Trifolium repens*			**y**	**y**	**y**	**y**	**y**				**5**	**Frequent**	**weed**
Wild Carrot	*Daucus carota*											**0**	**#N/A**	**Semi**
Wild/Barren Strawberry spps	*Fragaria vesca and/or Potentilla sterilis*										**y**	**1**	**Rare**	**Acid**
Wood Anemone	*Anenome nemorosa*										**y**	**1**	**Rare**	**Neutral**
Wood Sage	*Teucrium scorodonia*											**0**	**#N/A**	**Acid**
Yarrow	*Achillea millefolium*	**y**		**y**	**y**			**y**			**y**	**5**	**Frequent**	**Semi**
Yellow-rattle	*Rhinanthus minor*											**0**	**#N/A**	**Neutral**
												0	**#N/A**	
												0	**#N/A**	
												0	**#N/A**	
Spps Sum on Stops		**12**	**14**	**21**	**19**	**17**	**15**	**16**	**15**	**15**	**11**		**AVERAGE**	**15.5**

Improved Grassland Cover of rye-grasses and white clover is more than 30%, with a species-poor sward (up to 8 species/m^2, including grasses). Total cover of wildflowers and sedges < 10%, excluding white clover, creeping buttercup and injurious weeds. Typical grass species are cock's-foot, Italian rye-grass, perennial rye-grass, rough-stalked meadow-grass, Timothy

Semi-improved Grassland Moderately species-rich, with typically 8–15 species/ m^2. Total cover of wildflowers and sedges usually less than 30%, excluding white clover, creeping buttercup and injurious weeds. Rye-grass cover generally less than 25%.

Species-rich Grassland Cover of rye-grasses and white clover is less than 10%. The sward is species-rich (>15 vascular plant species/m^2, including grasses). There is high cover of wildflowers and sedges (more than 30%), excluding white clover, creeping buttercup and injurious weeds. A wide range of grass species may be present, including blue moor-grass, crested hair-grass, heath-grass, meadow oat-grass, sheep's fescue, tor-grass, upright brome, quaking grass and yellow oat-grass.