Resource Pack

Grassland Habitat

environmental partnership in action

The Greensand Trust

Greensand Country Landscape Partnership

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HERITAGE FUND

Welcome

This is one of a series of Habitat Resource Packs produced by the Greensand Trust on behalf of the Greensand Country Landscape Partnership. Each pack focuses on different habitat types, and provides information on the importance of these habitats, the species associated with them, where they can be found in Greensand Country, their management, survey and monitoring.

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Contents

Importance of Grasslands

The UK's remaining species-rich grasslands now cover a minute fraction of the area they once covered, even relatively recently in the early 20th Century. There were once natural wildflower meadows in every parish – today only 2% of the meadows that existed in the 1930's remain. Nearly 7.5 million acres of wildflower meadow have been lost so far and they are still being destroyed. Of those that do survive, around 75% occur in small fragments and remain vulnerable to destruction.

Harebells

Meadows and species-rich grasslands can support a huge range of wildlife including wildflowers, fungi, bees, flies, beetles, spiders, moths, butterflies, reptiles, amphibians, small mammals, bats and birds. In the UK, more priority species (for conservation attention) are associated with grasslands than with any other habitat type. Only 1% of the UK's land area now supports species-rich grassland and only 2% of the UK's grasslands are species-rich. Species-rich grasslands also provide other environmental benefits including carbon storage, water retention to prevent flooding and habitat for crop pollinators, they are also archaeologically important.

Culturally speaking grasslands have a long history of inspiring artists and writers such as Constable and Shakespeare, they are the landscape setting for many of our most important historical battles, village greens have long been the hub of rural community life, and many a common day phrase take their origin from grasslands..."off to pastures new" and "chalk and cheese".

The decline and loss of meadows and species-rich grasslands is without parallel in the history of nature conservation in the UK. What had been a widespread and ubiquitous part of agriculture and people's daily lives, disappeared altogether in the space of a single generation. Six million acres of grassland was ploughed to grow cereals during the Second World War and this started a process which would see the area of lowland meadows decline by 97% in the following 40 years. Other species-rich grasslands met a similar, albeit marginally less catastrophic, fate.

Types of Grassland

Grasslands can be classified as species-rich or species-poor, improved, semi-improved and unimproved, and whether they are calcareous, neutral, marshy or acid grassland. The different types of grassland can be distinguished by looking for certain indicator species which vary depending on the type of grassland. The keys at the end of the pack help identify the different types of grassland. Generally improved grasslands contain a high proportion of perennial rye grass and few herbs apart from common species such as white clover, while semi-improved and unimproved grasslands support a wider range of grasses and herbs.

Yellow Rattle

Today, the word 'meadow' is often used to describe both hay meadows and other flower-rich grasslands like chalk grassland. On dry soils, including chalk downland pastures these grasslands can be exceptionally rich in flowers – they're some our most species-rich habitats of all – while damp rush pastures are home to their own special flowers. By grazing periodically with smaller numbers of animals and moving them around throughout the year, these flower-rich pastures can support abundant flowers without a hay cut.

The descriptions below can help identify the different types of grasslands.

For more detailed guidance the 'Save Our Marvellous Meadows' website contains a host of useful information, including downloadable pdfs with easy to use keys (see Further Information section at the end of this document".

Semi-improved grassland

If the grassland is semi-improved it might be possible to rehabilitate the grassland using management, such as grazing livestock or reinstating a hay making and aftermath grazing regime. This is particularly the case where there has been, for example, a lack of recent management and many of the characteristic species are still present but at lower frequencies. There may also be opportunities to restore semiimproved grassland, using more interventionist methods such as seed or green hay introduction, to species-rich grassland.

- Semi-improved grassland occurs on a wide range of soils and may be derived from grassland priority habitats following agricultural improvement. It is not considered a priority habitat, but may still contain some wildlife value. Generally, these grasslands are poor in wildflowers as they are unable to compete with the grasses and flower, or the historical management has cut the sward prior to flowering and seed set, and the wildflowers have declined over time. Sometimes, the grassland may have some wildflowers such as common vetch, bush vetch and red clover, but it may still lack the diversity of indicator species present in a priority habitat grassland, such as a lowland meadow.
- Occasionally, re-seeded grasslands that have been sown with a diverse grass mix (sometimes up to 12-15 species) may resemble semiimproved grassland.

- Typical grasses include: cock's-foot, common bent, creeping bent, crested dog's-tail, false oat-grass, meadow fescue, meadow foxtail, red fescue, sweet vernal grass, timothy, tufted hair-grass and Yorkshire-fog.

Lowland meadows

The classic wildflower hay meadow on neutral soils are typified by swathes of buttercups (Ranunculus sp.), clovers (Trifolium sp.), oxeye daisies (Leucanthemum vulgare), common knapweed (Centaurea nigra), yellow rattle (Rhinanthus minor) and orchids, and can have up to 35 species of plant per metre square.

- Lowland meadows are species-rich, semi-natural grassland on freedraining, neutral soils in the lowlands and upland fringes, including species-rich flood plain grassland.
- They are managed by cutting (generally for hay or haylage in wet years) and/or grazing and may be called a number of different things such as hay meadows, floodplain meadows and grazing pasture.
- Typical grasses include: cock's-foot, common bent, crested dog's-tail, red fescue, meadow fescue, sweet vernal grass, yellow oat-grass and Yorkshire fog.
- Typical wildflowers include: common knapweed, common bird's-foot-trefoil, common meadow-rue, marsh valerian, meadow vetchling, meadowsweet, narrow-leaved water-dropwort and ragged robin.

Lowland dry acid grassland

Dry acid grassland may not have as many flowers as some of the other grasslands, but some are key indicators such as sheep's sorrel (Rumex acetosella) and heath bedstraw (Galium saxatile). They can are often dominated by grasses, including wavy hair-grass (Avenella flexuosa), sheep's fescue (Festuca ovina) and early hair-grass (Aira praecox).

- This refers to semi-natural grassland, generally dominated by fine-leaved grasses on nutrient-poor, free-draining soils in the lowlands and enclosed upland fringe. It sometimes occurs in a mosaic with lowland heath. Mosses and/or lichens are sometimes frequent. Some sites may be naturally species-poor (dominated, for example, by bristle bent or wavy hair-grass). However, lowland acid grassland is a scarce resource and any site is likely to be considered of high value.
- Acid grassland is also widespread in the uplands where it exists largely as extensive species-poor communities on the open fell or in large enclosures above the moorland line. Species-rich upland acid grassland sites are generally dominated by sheep's fescue and common bent, with a high proportion of herbs such as betony, devil's-bit scabious, bitter-vetch, harebell, heath bedstraw, lady's bedstraw and mountain pansy. Other moorland species such as tormentil, heath bedstraw, heather and bilberry show the gradation into upland heath.
- This grassland is managed primarily by grazing.
- Typical grasses include: common bent, early hair-grass, heath grass, sheep's fescue, sweet vernal grass and wavy hair-grass.
- Typical wildflowers include: common centaury, common stork's-bill, heath bedstraw, heath speedwell, mouse-ear hawkweed, rough/ lesser hawkbit, sheep's sorrel, tormentil, violets and wild strawberry.

Purple moor-grass and rush pastures or marshy grassland

On wetter soil where rivers break their banks in winter, floodplain meadows are more fertile and support taller, lusher vegetation. Tall meadow foxtail *(Alopecurus pratensis)*, rushes *(Juncus sp.)* and common reed (Phragmites australis) are enlivened with splashed of colour from ragged-robin *(Silene flos-cuculi)*, kingcups / marsh-marigold *(Caltha palustris)*, meadowsweet *(Filipendula ulmaria)*, marsh orchids *(Dactylorhiza sp)* and great burnet. This is also now a very rare type of meadow, with just 1,500 ha remaining in the UK.

- This refers to species-rich, semi-natural grassland with abundant purple moor-grass and/or jointed rushes (sharp-flowered rush, jointed rush or blunt-flowered rush) on poorly drained neutral and acidic soils of the lowlands and upland fringe. Purple moor-grass and rush pasture is often associated with springs, seepage lines and slopes surrounding waterlogged depressions and hollows.
- Purple moor-grass and rush pasture can occur on the upland fringes and above the moorland line, but can easily be confused with species-poor, rush-dominated flushes and semiimproved pastures (where soft rush is often the most abundant rush).
- Typical grasses include: creeping bent, crested dog's-tail, purple moor-grass, quaking-grass, red fescue, sweet vernal grass, tufted hair-grass, velvet bent and Yorkshire-fog.
- Typical wildflowers include: devil's-bit scabious, marsh thistle, fen/marsh bedstraw, common knapweed, lesser spearwort and meadowsweet.

Lowland calcareous grassland

Calcareous grasslands are some of our most species rich, with a wide range of flowers and grasses. Some of the most recognisable are wild thyme *(Thymus drucei)*, common rock-rose *(Helianthemum nummularium)*, salad burnet *(Poterium sanguisorba ssp. sanguisorba)* and mouse-ear hawkweed *(Pilosella officinarum)*. They are usually managed as pasture and have thin soils.

- This is species-rich, semi-natural grassland on chalk and limestone in the lowlands and upland fringe, generally below 300 m in altitude.
- The pasture is managed primarily by grazing.
- Typical grasses include: blue moorgrass, cock's-foot, common bent, crested hair-grass, downy oat-grass, meadow oat-grass, quaking-grass, sheep's fescue, tor-grass, upright brome and yellow oat-grass.
- Typical wildflowers include: common bird's-foot-trefoil, common rock-rose, cowslip, eyebright, greater knapweed, lady's bedstraw, milkworts, small scabious and wild thyme.

Grasslands in Greensand Country

Greensand Country contains examples of all the above grassland types, depending on the underlying geology, with acid grassland on the exposed Lower Greensand soils and neutral and calcareous grassland on the overlying Boulder Clay. Marshy grassland including purple moor grass and rush-pastures is most frequent in the Flit and other river valleys, though smaller areas will also be present in spring-fed wet flushes among other grasslands, such as at the junction of Greensand and Boulder Clay. Semi-improved grassland is the most abundant type of grassland that often has characteristics of the above types.

The following sites are all good examples of where it is possible to see the different grassland habitats in Greensand Country. All of the sites have some level of public access, and further details on this are available via the Greensand Country Interactive Map (www.greensandcountry.com)

Neutral Grassland

Rushmere Country Park
Stanbridge Meadows
Sandhouse Pit Nature Reserve
Old Warden Cutting

Acid Grassland

Rushmere Country Park
Ampthill Park
The Lodge, Sandy

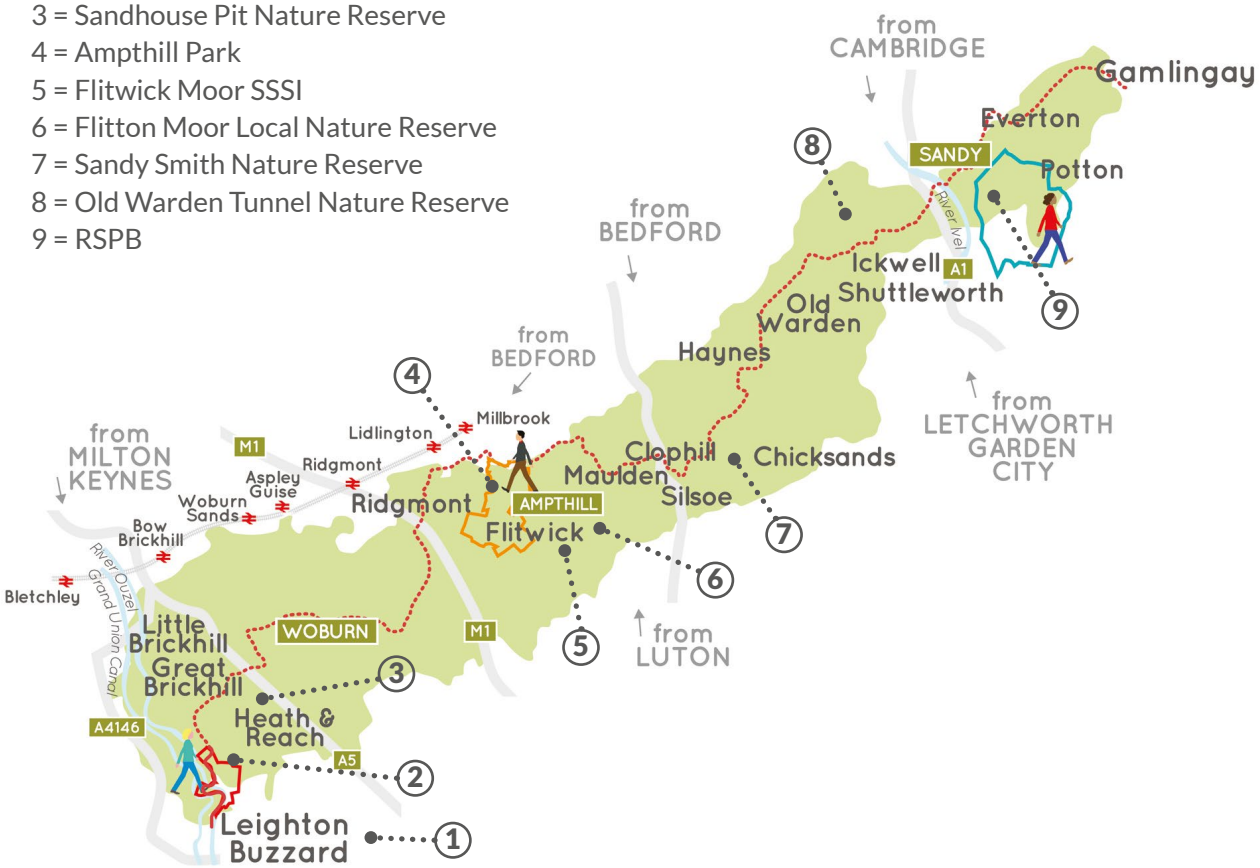
Calcareous Grassland

Old Warden Tunnel Nature Reserve
Sandhouse Pit Nature Reserve

Purple moor grass and rush pastures or marshy grassland

Flitwick Moor SSSI
Flitton Moor Local Nature Reserve
Sandy Smith Nature Reserve
Rushmere Country Park
Ampthill Park

1 = Stanbridge Meadows
2 = Rushmere Country Park
3 = Sandhouse Pit Nature Reserve
4 = Ampthill Park
5 = Flitwick Moor SSSI
6 = Flitton Moor Local Nature Reserve
7 = Sandy Smith Nature Reserve
8 = Old Warden Tunnel Nature Reserve
9 = RSPB



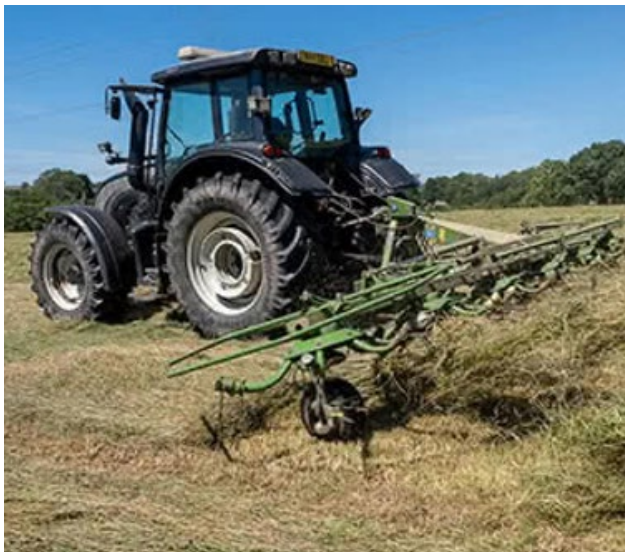
Management of Grasslands

With all natural and semi-natural grasslands, appropriate conservation management is required in order to maintain and enhance their interest, with the removal of nutrients being important. Such management for grasslands is by hay-cutting or grazing, often in combination with each other

Hay-cutting

A traditional meadow is a field or grassy area allowed to grow unhindered until its cut for hay in late summer. After the hay has been cut and collected in late July or August, the meadow is grazed for a few months during autumn and winter, usually by cattle or sheep. As midwinter approaches and the grass stops growing, the animals are fed the hay from the meadow while food is short. In early spring as the meadow wakes up, the animals are removed from the field (the meadow is 'shut up') and the grasses and flowers allowed to grow unhindered until the hay is ready to cut again.

Hay is cut from mid-July to September depending on weather and the wild flowers present. Alternating between earlier cuts (usually after mid-July) to later cuts (late August or early September) is beneficial. Leaving unmown strips along the edges of fields provides a food resource for insects, especially butterflies and bumblebees. These margins and plots could be swapped around each year so that they do not become swamped with more competitive grasses.



The hay is cut, usually with a tractor mounted drum or disc mower, and spread out to dry. It is 'tedded', meaning turned, at least once a day to dry the crop. This also has the advantage of loosening any seed that still remains in the flower heads, particularly yellow rattle, so that it falls out onto the ground. When the hay is dry, which is usually after 3-5 days, and once any dew has dried in the sun, it is baled and taken away for storage and use over the winter. There are several types of bales: round, large rectangular and small rectangular. Unlike straw, hay is not wrapped but if the weather is damp during the cut or when it is drying, haylage may be made instead of hay, and this is usually wrapped in plastic so that the grass can ferment slightly.

A few weeks after the hay is cut and baled, the new grass growth can be grazed. There are three benefits of aftermath grazing: livestock break up any matted vegetation and mosses, push seeds onto the soil helping germination, and eat down the grass growth before the wetter autumn and winter weather, allowing light to get to the ground and aiding wild flower germination.

The types of animals and levels of grazing vary for each type of grassland and is estimated at 1-2.25 LU/Ha. Grazing may be extensive with around 1-1.5 LU/Ha (a low number of livestock may be allowed to graze for a longer period of time) or pulse or mob grazing may be used with 1.5-2.25 LU/Ha (a short intensive burst of grazing before removing the livestock).

The aim is to reduce the height of the vegetation to 2-10 cm before the end of the winter but without causing poaching (where cattle, ponies or sheep leave pock-marks with their hooves in grassland, particularly after wet weather). A little poaching can be helpful as it creates bare ground, but large areas denude vegetation and can cause damage, particularly compaction, which can increase the spread of problem plants, such as docks *(Rumex sp.)*. Livestock should be removed from the field if there is very wet weather or if poaching in gateways or along fence lines starts to become apparent.

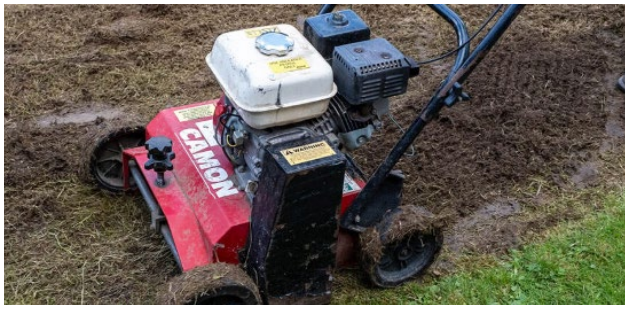
If grazing is not possible, a mat of vegetation can build up (thatch) and mechanical removal using chain and tine harrows will be necessary. The thatch should be removed so that it does not decompose adding nutrients back into the soil and affecting the growth of wild flowers and grasses. Harrowing can either be undertaken in the autumn in damper fields, or in late winter or early spring in drier fields.

Today, an increasing number of green spaces and garden lawns are managed as meadows on a smaller scale and without livestock. Mowing and then removing the clippings mimics the hay cutting and grazing cycles. As with any meadow, the vegetation should be left to grow and bloom over spring and summer and once the plants have set seed the site should be cut and the clippings removed. You may also wish to leave a strip or area uncut for sheltering invertebrates. Most of the grass should be kept at ankle-height over winter.

Garden lawns, road verges, school grounds, patches of amenity grassland, areas of graveyards and cemeteries, and fields under a hectare in size can all be managed as meadows in this way. On small areas cutting with a mower set at its highest setting, or with a strimmer or brush cutter are all good options. Raking off and removing the clippings afterwards is very important so the clippings don't rot down and enrich the soil – wild flowers thrive in poor soils. On larger areas, an Allen scythe or a mechanical flail collector mounted on a tractor works well.

Small machinery suitable for garden and smaller meadows

Lawn mowers can work well for managing meadows in small spaces such as gardens. A lawn mower can be used to cut and remove the grass from a meadow at the end of the summer. Its best to start cutting with the blades set as high as possible and cut the meadow several times lowering the cutting height each time. This method normally works best if the grass box is not used, which means raking off the cuttings by hand after each cut.



Garden scarifiers can be used for to create bare ground before sowing wildflower seed or spreading green hay. They are well suited to smaller sites such as gardens, verges and green spaces and are readily available through most plant and machinery hire shops. Don't forget to rake off all the dead grass and thatch after scarifying, before sowing seed or spreading green hay.

Strimmer/brushcutters are great for the annual cut of small meadows in gardens or green spaces. If a cord attachment is used they can be effective at creating bare ground before sowing seed in smaller spaces.

Hand tools can be used for creating bare ground and managing small meadows.

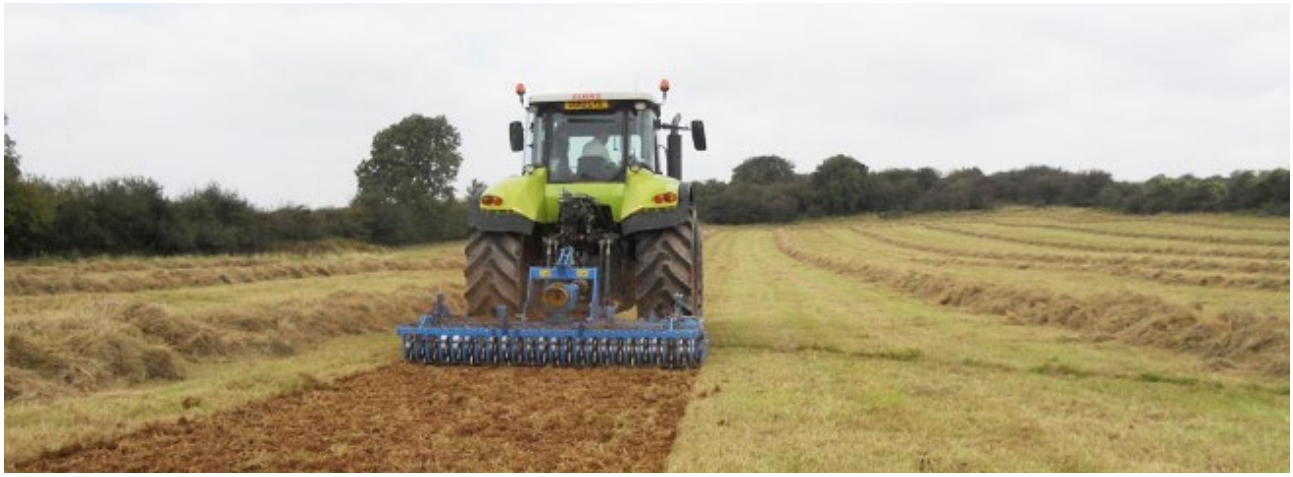
Allen scythes are great for cutting larger meadows that are too small for farm machinery and where access is limited. They are readily available through most plant and machinery hire shops.

Bigger machinery for field-scale meadow creation and management

The machinery listed below is designed to fit on the back of a tractor. It is best suited to field-scale meadow creation and management of over one hectare. Most of the machinery listed below is commonly used by farmers and is widely available. It may be possible to contract a local farmer to help with preparing the ground, sowing wildflower seed, and annual meadow management.

Tine harrows are ideal for creating bare ground before sowing wild flowers in a field with existing grass. They are good for pulling out the thatch of dead grass and moss that can build up in meadows to expose bare ground. They also work well in sites where problem plants have been present in the past, as they only scratch the soil surface and are less likely to 'awaken' problem plant seeds from the existing seed bank.

Power harrows will create a lot of bare ground quickly. Care must be taken to avoid harrowing too deep. Harrow harrows should only be used in meadows with very short grass and when you can be sure there have been few problem plants in the past.



Chain harrows can be used to create bare ground before sowing wild flowers. They work best if the ground is slightly soft and the grass is very short. They are less effective than tine or power harrows so it may be necessary to harrow the meadow several times.

Disc or drum mowers are used for cutting meadows as part of the haymaking process.

Hay turners (Hay bob) are used for spreading the grass around the meadow to aid in drying during haymaking. They can also be used for spreading green hay out if this is used as a source of seed for a meadow creation.

Balers (round/square) are used to bale hay the dried grass in traditional hay meadow management. Large round balers are now more common than small square balers. Round balers require the bales to be moved out of the meadow using a tractor and front loader, as they are too heavy to move by hand. Small square bales can easily be loaded and moved by hand. Road balers are also effective for baling green hay for use in a meadow restoration.

Flail collectors are great for cutting and removing the annual grass growth in a meadow where it's not possible to make hay. Flail collectors cut and collect at the same time. They are a more specialist piece of equipment but are being increasingly used to manage roadside verges and smaller meadows where it's not practical to make hay or graze livestock.

Straw choppers can be used to spread green hay bales out as part of a meadow creation/restoration.

Grazing

Species-rich grasslands need to be managed appropriately to ensure their survival. Grazing forms a key part of this, either as spring and aftermath grazing on meadows managed for hay or extensive or pulse/ mob grazing on pasture. An efficient grazing regime is based on a complex combination of four factors:

- timing – time of year and frequency of grazing
- intensity – stocking rates
- targeting – which areas to graze
- stock - type of animal to be used.

There are three main types of livestock used to graze grasslands - cattle, horses and sheep. Goats may sometimes be used, depending on the situation. Livestock do two things in grassland; they eat and remove the vegetation which allows the less competitive plants, such as many wildflowers, to grow alongside the more competitive plants. Many grasses are good competitors and without grazing they often become tufted and can grow tall, shading wildflowers and preventing them from being able to harness the sun for photosynthesis. This effectively starves the plant and they are unable to survive. The second thing that livestock do is remove the thatch (dead grass and leaves) that gets trapped between the grasses and flowers covering the soil. Some thatch may be eaten by livestock when they munch through living vegetation, but they also help by trampling the ground and creating patches of bare soil between the grass tufts moving the thatch aside. All wildflower and grass seeds need to be in contact with bare ground to germinate and establish a root system. Thatch prevents this from occurring but livestock encourage germination by removing this build-up of dead material. Livestock eat in different manners, which can have different effects on wildflowers and grasses. Some of these may be positive and help to maintain the species-richness of the grassland, whilst others may be negative. Occasionally, it may be recommended to graze a grassland harder to reduce scrub encroachment, create small areas of bare ground to help seeds germinate and take the grassland back to an earlier stage of ecological succession1 In an ideal world, a combination of mixed stocking will produce the best management outcome.

All grazing animals need:

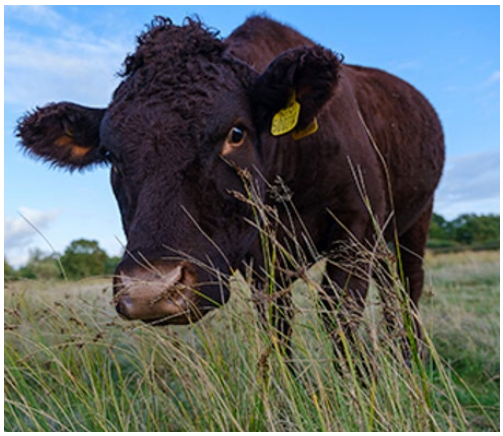
- water – via a trough, man-made channel or naturally occurring.
- shelter – against the worst weather or shade in summer. Even if there are not housing facilities on each site, there should be trees, bushes or rock outcrops that livestock can retreat too in severe conditions.
- fencing – appropriate fencing that is well maintained.
- attention – the livestock should be checked at suitable intervals, which may be daily.
- care – on site and off site visits by a vet may be required.

It can be difficult to move livestock between farm holdings, particularly in areas with high TB. Movement licenses are required for some types of stock and standstill periods may apply. This can cause difficulties if there are 'flying' herds of animals used to graze species-rich grasslands. All grasslands are a managed environment and if grazing cannot be undertaken, some other form of management may need to be done to replicate grazing, such as mowing and harrowing.

Cattle

Cattle prefer to eat longer grasses and use their tongue to pull and tear the vegetation; grazing to a minimum height of 5-6 cm. They are generally better than sheep at creating and maintaining structurally diverse grassland:

- their large size and heavy weight breaks up the ground;
- they avoid grazing around dung pats which creates patches of longer vegetation important for insect communities. These in turn are eaten by birds and bats;
- cattle are particularly good at knocking down and creating gaps in tall, coarse vegetation such as bracken and scrub.



Different cattle breeds have differing effects on rough grassland. Traditional breeds are more adapt at eating rough grassland, putting on weight and maintaining condition for production, compared with commercial breeds. Cattle need more water than sheep, and access to troughs is required at all times. The location of water troughs and mineral licks can be used to influence where cattle graze. Poaching or pock marks (the excessive trampling of grassland by cattle when wet) adversely affects pasture and meadows and can lead to a hard impenetrable surface when dry, where plants are unable to germinate. It is a particular problem that can occur around water troughs and feeders and when cattle are over wintered outside.

Cattle are particularly good at reducing some problem grassland plant species. For example, tor-grass occurs on calcareous grassland and is not particularly palatable for livestock. However, it is most palatable earlier in the year when the shoots appear and cattle can be used to spring-graze pastures where it occurs. Spring-grazing can also be used to reduce other grasses like tufted hair-grass and purple moor-grass.

Horses and ponies

Horses and ponies have forward facing teeth and can graze extremely close to the ground – as close as rabbits. The benefits of grazing with horses and ponies are:

- they preferentially select sweet grasses, but will also eat a variety of sedges and rushes particularly later in the summer;
- they tend not to select flowers, as sheep do, and avoid buttercup, common knapweed and ragwort;
- they regularly graze tufted grasses, including tor-grass;
- these 'fussy' diets are ideal for maintaining the mosaic habitat needed by many insects.

As with other livestock, there are behavioural and grazing differences between horse breeds. Native breeds such as Exmoor, Dartmoor and New Forest ponies are regarded as more suitable for rough grasslands and are hardy, being able to cope in adverse weather as they are often reared outside without ever being brought into a stable. In the autumn, some breeds such as New Forest ponies, will graze large quantities of bracken once the toxicity has reduced, making them ideal for restoration grazing.

Problems can arise in specific locations as horses may create latrine areas, which lead to a tightly grazed vegetation and can cause localised high nutrient levels and encourage the spread of thistles, nettles and docks. Regular collection of dung will alleviate this problem and usually the more species-rich areas of a site are not used as a latrine as they are become preferred grazing locations.

Sheep

Sheep have thin, mobile lips and move slowly over the sward nibbling the grass. They eat selectively when circumstances allow, biting off single leaves or shoots down to a height of 3 cm. It is notable that sheep only develop a full set of adult teeth after 3-4 years and then steadily lose them as they age, therefore young and old sheep may not graze as effectively as middle-aged sheep. As well as grasses and herbs, sheep will also selectively eat some low scrub, especially the hardy breeds such as Soay and Hebridean.

The benefits of grazing with sheep are:

- they are light and more agile than cattle and are more suited to steeply sloping land;

- although on heavy, wet soils sheep can cause trampling and poaching they do not have such an impact as heavier grazers;
- their dung is deposited randomly and they will graze next to it, therefore grazing swards to a uniformly low height.

Sheep are less susceptible to the toxins in ragwort and so can be used to spring graze it in its rosette stage to prevent flowering and setting seed. However, they are not immune to its toxins so require plenty of other vegetation to eat along with it. Extensive bramble can cause difficulties for sheep as their fleece may get caught. As sheep are prone to foot rot they are not best suited to predominantly wet sites. They also require more secure fencing than cattle.

Goats

Feral goats may be managed as a livestock herd. They are browsers, consuming woody vegetation 50-75% of their feeding time where this is available, and do best on land that has scrub and tufted grasses making them particularly suited to restoration grazing. Usually they graze grasses down to a height of around 6 cm and can target grass seed heads eating them before starting to eat the leaves. Like sheep, they do not develop their full set of teeth until they are five years old and can lose teeth in older age, meaning that middleaged goats are most effective.

The benefits of grazing with goats are:

- they have a small muzzle and a flexible upper lip allowing them to be highly selective about what they eat. Goats prefer to eat the newer growth and leaves of scrub, bramble and tufted grasses rather than finer grasses;
- they are less prone to foot rot than sheep making them suitable for wetter sites but they do need some dry sheltered ground within their home range;
- they are agile and can tackle steep hills and rock edges, particularly suited to cliff edges that other livestock would have trouble accessing.

Goats will bark strip taking in order of preference, holly, ash, rowan and willow, oak, hazel, alder and birch in upland situations. In lowland situations they tend to eat elder first, followed by ash, blackthorn, sycamore and rose. They generally do not eat field maple or hawthorn. Bark-stripping takes place during mid-late winter when there are few leaves and the preceding year's growth has been consumed. They may also browse heather to a greater extent than sheep. They have also been used to reduce rush on wet grassland, with restoration achieved after 3-4 years by spring mob grazing with goats at a stocking density of more than 10 animals per hectare. Goats can be difficult to manage, and are often considered to be escape artists breaking out of enclosures. However, they can be very effective and different breeds can be used to address separate situations and issues.

Livestock may remain on pasture for much of the year depending on the site, conditions and the stock but the following advice will help to do this for the benefit of wild flowers and their associated wildlife:

- Livestock may be removed from the pasture for the early months of the year, if the ground gets very wet, to avoid poaching damaging the grassland. Light grazing can then start in March.
- Grazing may either continue at this low level throughout the spring and early summer, or livestock should be removed to allow the flowers to bloom. On sites with sensitive or delicate species that take

time to establish, such as orchids, it is better to remove livestock in late spring and throughout the flowering period.

- In the late summer, grazing may increase in order to remove the vegetation and create a varied sward height recommended 0.4-1 LU/Ha is recommended but each type of grassland is different – coarser pasture will benefit from more intensive grazing and different levels of grazing will likely be required each year depending on the weather.
- Extensive and/or mob grazing can be undertaken, especially if the grassland is broken into different fields or includes different types of grassland. This can be very beneficial for plants and wildlife as it creates structural diversity among and within fields that suits a wide range of species.

Survey and Monitoring of Grasslands

There are many methods of surveying grassland depending on what you wish to survey and monitor. The list below contains only a few different methods for surveying grassland. Some are more general helping to identify different types of grassland or map grassland habitats for example, whilst others are specific to a certain type of grassland.

National Vegetation Classification (NVC)

National Vegetation Classification (NVC) is a descriptive system of categorising habitats in Britain. The original surveys were commissioned in 1975, and the resulting botanical data was analysed and separated into different vegetation communities. The resulting NVC categories are used to identify priority habitats, for example lowland meadow is identified as MG4, MG5 and MG8 and upland hay meadow MG3 and MG8.

NVC is a great tool for being able to identify types of grassland which can then be related to whether the grassland is considered to be a priority and is species-rich. A full botanical survey of five 2 x 2 m quadrats is required and experience of analysing the data to identify the closest NVC community description.

Identifying the NVC community can help to target management that could diversify the grassland either maintaining the species richness, or increasing the number of species present. However, because the rate of change on a grassland is usually quite slow NVC is not a good monitoring or surveillance tool for feedback into management. It also requires very good botanical identification skills and experience of being able to analyse species composition data to find the nearest vegetation community description.

Phase 1 habitat classification

Phase 1 habitat classification is a landscape surveillance method, identifying types of semi-natural habitat on a broad scale. It is designed to cover large areas of the countryside relatively quickly and provide some basic information about the type of habitat present and possible importance for nature conservation.

It is a useful method for mapping habitats across large areas at a coarse scale, and is also used as a baseline for preparing Environmental Impact Assessments. Phase 1 Habitat Survey relies on being able to identify some indicator species to provide a broad assessment of the habitat, particularly grasslands. However, it does not require a full species list like more intensive survey techniques.

Phase 1 Habitat Survey is suitable for use when surveying large areas of habitat, and grasslands can be separated into their different types, or can be lumped together under improved or semi-improved grassland. The method does not enable detailed botanical information to be collected, and as a consequence, can limit priority habitat identification and cannot be used to monitor changes in species composition.

Common standards monitoring

Common standards monitoring is a specific monitoring method for Sites of Special Scientific Interest. It uses indicators of success to determine whether the habitat and species for which the site is designated for are in favourable, unfavourable improving, unfavourable – maintaining or unfavourable declining condition.

Fixed point photography

Fixed point photography can be a useful way of monitoring the effect of management and how grassland habitats change over time. For example, taking photos over several seasons and years can show changes in the cover of scrub and bracken.

Further Information

Illustrated guide to managing neutral pasture for wildlife (TIN088) - Neutral grassland grazed by livestock can be a valuable habitat for many small birds, mammals, insects and other invertebrates. The key to providing opportunities for these species is to get the sward structure right at key times of the year. This guide illustrates what the sward should look like in the spring; in the early summer and in autumn.

www.magnificentmeadows.org.uk

https://meadows.plantlife.org.uk/

http://publications.naturalengland.org.uk/publication/32007

www.greensandcountry.com for interactive map

www.greensandtrust.org

www.wildlifebcn.org

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www.magnificentmeadows.org.uk

https://meadows.plantlife.org.uk

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www.greensandcountry.com/discover/resources