

# How to Enhance a Grassland Using Green Hay



Species-rich wildflower meadows buzz with life during the summer months and can be inspirational places to spend time and appreciate the wildlife around you. Wildflower meadows are an important ancient habitat within the mosaic of the British countryside. Not only is this special habitat a fundamental part of British folklore, culture and farming, but meadows and species-rich grasslands also support a wide variety of organisms, including a huge range of plants, invertebrates, birds, bats, and many more.

However, wildflower meadows are now scarce, having declined by 97% since World War II due to factors including conversion to arable crop production, development, or neglect – reverting the once diverse meadow back to scrub or woodland. As tractors have replaced horses for farming, the need for an annual supply of hay has dramatically reduced, and with it the economic value of hay meadows.

If we are to recover nature at a landscape scale we need to protect existing species-rich meadows, and enhance other areas of grassland so they too can become high-value species-rich sites. One way of enhancing existing grasslands is through the use of locally sourced green hay.

Using green hay captures local wildflower seed and therefore local gene types. This helps retain strong

genetic diversity and may help with resilience to disease and climate change. Green hay can be used alongside commercial seed mixes and, as well as bringing greater genetic diversity, can add in some wildflower species often not available commercially.

## What is green hay?

Usually taken from a species-rich grassland, green hay is wildflowers and grasses that have been harvested just as they are shedding seed. Unlike a conventional hay crop, which is cut and allowed to dry in situ, green hay is used immediately after cutting, quickly transferred and spread over a pre-prepared recipient site and left until the hay has dried and the seeds have dropped.

## Choosing the receptor site to enhance

Before diving into enhancing a meadow, it is important to choose your site carefully. It is recommended that a baseline botanical survey of the site is undertaken – this is best done in June, before cutting the grassland, when plants will be at their most visible. Get in touch with Norfolk Wildlife Trust or your local flora group if you need assistance, or if you are a keen botanist then have a go yourself.



Saving **Norfolk's Wildlife** for the Future

There are various types of wildflower-rich grasslands, their character and species composition largely based on the underlying soil type and conditions. Meadows can range from calcareous (chalky), through neutral, to acidic, and specific plants can be strongly associated with different soil types. Landowners may well be familiar with the type of soil under their areas of grassland. It is also possible to complete a pH test to determine the alkalinity or acidity of the soil. These pH tests can be bought from most garden centres, and tests should be done by taking multiple samples from across the site.

If your site has a limited range of wildflower species, using green hay can be a great way of increasing diversity. Careful choice of donor site is crucial, to ensure the green hay being added contains desirable and appropriate species, or those currently missing from your grassland.

It is important to choose the right size area for you to enhance – don't bite off more than you can chew. The manageable size will depend on the amount of green hay you are able to source and whether you have the right machinery, or sufficient volunteers available, to prepare and manage the site.

Consider carefully where green hay could be obtained. You will need a species-rich local source. If you have an existing meadow with some species-rich areas, you could harvest green hay from these and spread it on less diverse areas. In other cases you will need to find an external source of green hay. This could be from a local species-rich meadow, or a Roadside Nature Reserve. In all cases you will need the consent of the landowner before beginning – you can consult Norfolk Wildlife Trust for advice.



*Green hay being spread at a receptor site*

## When to spread green hay

You should cut and spread green hay when target wildflower species have had the chance to grow and set seed, but before all that seed has been dropped. The exact timing will depend on weather conditions, the range of species present in your donor grassland, and on any restrictions to the permitted timing of the green hay cut (for example some stewardship schemes restrict when cutting can take place). As a guide, the cut is likely to take place between mid-July and mid-August – seek advice if in doubt.

## Preparation of the receptor site

- **Nutrient levels:** low nutrient levels are needed to allow a range of native wildflower species to flourish. High nutrient levels tend to favor weed species and coarse grasses. The best way to lower nutrient levels is to stop the addition of fertilisers and ensure that vegetation growth is removed regularly. This is normally done by regular cutting and removal of the grass at least once every year, or possibly more regularly if your goal is specifically to reduce nutrient levels.
- **Weed control:** if your site is dominated by rank weed growth, such as thistles, nettles and docks, as is often the case where the soil has high nutrient levels, this may need to be tackled specifically. In some cases it may be necessary to use an appropriate herbicide to reduce the dominance of rank weed species – this should be done on as small a scale as possible and using the most species-specific herbicide available, to limit the effect on non-target species. Always leave appropriate buffers to hedges, watercourses and other high-value features such as woodland. If in doubt seek specialist advice.



*Preparing the receptor site ground for green hay*

- **Sward preparation:** as part of the preparation of your site, the sward needs to be cut in summer, just prior to it receiving the green hay. Depending on the size of the site, and the kit you have available, this could be done as a commercial hay cut, with a tractor-mounted cut and collect flail mower or a ride-on lawn mower. Or you could do it by strimming, scything or using a regular garden lawn mower. It is especially important to remove the resultant cuttings, to give a clear surface for the green hay.
- **Bare ground creation:** creating bare ground is essential to give the seeds from the green hay the best chance to make contact with the soil and successfully germinate. This process is called scarifying. After the summer cut you will need to disturb the ground to create areas of bare soil. Again, depending on the size of the site, and the equipment you have available, this could be done using machinery such as a power harrow or a set of discs, or for small sites using a fork or rake to scarify the ground. You need to apply as much pressure as required to ensure areas of bare ground are created. Ensure this is completed shortly before the green hay is strewn, aiming to create around 30-50% bare ground.
- **Moving the hay:** the green hay must be cut, moved and spread within 24 hours, and must not be allowed to over-heat before spreading, as this can impair resultant seed germination. The logistics of transporting the green hay must be carefully planned. It is vital that the donor site and the receptor site are in close proximity to one another. Once cut, the green hay can be transported as conventional bales, or be collected into and transported in tonne bags, in a trailer, or any method which is logistically easy and efficient and doesn't result in large amounts of seed being lost.
- **Spreading the green hay:** once delivered to the receptor site, the green hay must be spread quickly. It should be spread evenly and thinly to ensure sufficient coverage, noting that it takes a surprisingly small amount of green hay to adequately cover the receptor site. The green hay spreading can be done using a muck spreader, spreading with pitchforks, or even forking it out of a trailer. Using volunteers for this is a great idea if you can. Once spread, the green hay must be left in-situ for 2 to 3 weeks, and within that time should be turned over at least once to ensure all viable seeds drop out. After this period of time, the hay can be gathered and taken off the receptor site, to ensure the soil is not enriched with nutrients from decomposition of the dried hay. Alternatively, the site can then be grazed – the livestock will help by treading in seed and eating any remaining hay.

## Strewing the green hay

- **The donor site:** must be cut while the wildflowers and grasses are still green, i.e. before the seeds have dropped, hence the name green hay. The timing of this varies but it is typically done from mid-July to mid-August.



*Strewing green hay*

- **How much green hay do I need?** A rough rule of thumb is that the area you cut for green hay will cover five times that area when spread thinly at the recipient site. E.g. if you have a recipient site of 500 sq. metres then you will need to cut 100 sq. metres of donor site to produce sufficient green hay. This estimate depends on the quality of the donor site because the higher the species diversity and abundance at the donor site the more viable seed will be present in a given volume of green hay.
- **Yellow rattle:** a semi-parasitic plant which feeds off the nutrients in the roots of nearby grasses, restricting the grass's growth. As a result, it is often added to wildflower meadows in an effort to combat high grass densities and allow more delicate species to establish within the sward. Therefore it can be beneficial to specifically add yellow rattle seed to your meadow in late summer/early autumn, if there are not large amounts of yellow rattle already present in the green hay. Your local Wildlife Trust will be able to advise on sourcing yellow rattle seed.
- **Hand collected seed:** using green hay captures a variety of wildflower seed – but can miss early flowering species which may have dropped their seed before the green hay is harvested. It is a good idea to supplement green hay with some hand collected seed of a number of target species – this can capture earlier flowering species like meadow saxifrage which will be a valuable addition to enhanced meadows.

## Long term management

After enhancement, the site will need a regular management regime in order to allow the range of species introduced to develop. This will involve cutting and possibly grazing. Green hay may need to be used over several years, in conjunction with site management, in order to achieve the best possible results.

- **Primary annual cut:** it is crucial that the meadow vegetation is short (5-10cm) at the start of the growing season i.e. the start of March. The meadow should then be left to grow until, at least, the end of June.

Each year, ensure the meadow is cut between late June and early September, and cut material is left in-situ until fully dry and the seeds have dropped before being removed. Traditional hay cutting usually took place in June, before the cereal harvest, which would harvest grasses when they were richest in protein. For pure conservation-focussed cuts, later mowing might be better to allow seeds to drop. Mowing the site in stages over a couple of months can be a good idea, and can make the site more manageable.

Once dry, the hay must then be removed to avoid soil nutrient-enrichment. Avoid cutting when the ground is damp as this compacts the soil and can make future management more difficult. It is also advised to cut from one side of the meadow to the other, or the centre outwards to allow ground nesting birds and other vulnerable species the chance to escape.



© Helen Baczkowska

- **Autumn management:** if the grass re-grows strongly in the autumn then it is a good idea to cut the area again, and remove the cut material, to ensure a short sward at the start of the next growing season. Alternatively, if the area is fenced, and livestock is available, the meadow can be 'aftermath' grazed to keep the sward short. Generally aftermath grazing takes place from September to November, this varying depending on the timing of the hay cut and the autumn weather conditions. The livestock should be removed in good time to ensure the soil isn't poached. Sheep are generally the preferred livestock used as they minimize ground compaction due to their light weight, and leave the sward short and evenly grazed.
- **Leaving some areas uncut:** optionally, you may decide to leave a 2 to 4 meter margin uncut on each side, on rotation each year. This can be a good option to allow food for insects to still be readily available.



© Ben Newton

## Green Recovery Challenge Fund



Saving **Norfolk's Wildlife** for the Future