

Severn Trent Grassland Biodiversity Enhancement

Guidance Note

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WONDERFUL ON TAP



Introduction

This document aims to set out the relevant steps required to raise the biodiversity value of a grassland area through creation, enhancement, restoration, or improvement techniques. Enhancement can be viewed as a subjective term and therefore it is difficult to assign a specific parametric indicator to define or quantify a successful grassland enhancement project.

This is evidenced in Chambers & Samways (1998)¹ study which found that grasshopper species richness and abundance increased in grassland plots mown once per year when compared to plots mown three times per year. Therefore, it could be extrapolated that a reduction in mowing may improve the biodiversity value of the grassland by increasing the invertebrate assemblage. Buckingham, Peach and Fox's (2006)² work aligns with this, as this correlative study aimed to identify factors which have the greatest influence on the usage of grasslands by foraging birds. The results suggested that sward structure had more influence on bird usage than botanical composition. From this study it could be suggested that an increase in difference in grassland sward structure would raise the biodiversity value of the site for local bird species.

These examples highlight that raising the biodiversity value of a grassland can be achieved through several techniques, however the focus of this document, is to provide guidance on management techniques that directly increase botanical diversity (mainly the wildflower component) of a defined area.

Prerequisite requirements and site selection

Not all grasslands are suitable for enhancement, and sward enrichment can be a difficult and lengthy process. It is generally considered the sites with the greatest chance of success contain; Low soil phosphorus, few competitive species in the sward, a limited pernicious weed problem and having livestock available to help with management.

Residual soil fertility is the main obstacle to successful sward enhancement, and therefore is the most important factor to consider. The soil nutrient status of species-rich semi natural grassland is typically low. The most important nutrient which is thought to influence sward diversity is generally considered to be the available phosphorus (P), although other nutrients, especially potassium (K), also have a role. Grassland selected for sward enhancement should usually have a low soil P status (index 0 or 1) Although exceptions include sites which are regularly cut for hay, where a relatively rapid reduction in P is expected, a moderate P status (index 2) may be acceptable. Or sites where the soil or slope imposes high stress on plants by drought (indicated by very shallow soil or extreme stoniness) or water-logging, as some level of botanical diversity may be attained even if the P status is high.

¹ Chambers, B.Q. and Samways, M.J., 1998. Grasshopper response to a 40-year experimental burning and mowing regime, with recommendations for invertebrate conservation management. *Biodiversity & Conservation*, 7(8), pp.985-1012.

² Buckingham, D.L., Peach, W.J. and Fox, D.S., 2006. Effects of agricultural management on the use of lowland grassland by foraging birds. *Agriculture, ecosystems & environment*, 112(1), pp.21-40.

The historical management of a site can give a good indication of the likely soil P status. Sites which are likely to be high in P are those that have a long history of regular fertiliser and manure applications.

Therefore, all applicants are encouraged to carry out soil nutrient testing on areas which they propose to conduct species rich grassland creation to enhancement. The results of the testing should be shared with a Severn Trent advisor.

If soil nutrient testing cannot be conducted, then existing aerial photography/satellite imagery which suggest a grassland was present at one point may also be acceptable. Another approach would be to provide evidence of a successful grassland restoration or enhancement of locally adjacent areas which are similar in appearance and historical use as the fields which are being applied for funding.

If soil nutrient testing is not undertaken and submitted, then sign off via the other methods mentioned above will need to be agreed in writing by the Severn Trent ecology team to state that they have reviewed the available evidence and can confirm that grassland enhancement or creation is possible.

General grassland sward enhancement guidance

Swards can be enhanced, and the work can be funded using Severn Trent's Boost4Biodiversity scheme. There are several techniques which can be used to achieve this outcome from spreading species rich green hay, over sowing, slot seeding and planting pot-grown transplants and plug-plants.

The aim of this guidance is to allow those who are wishing to apply for funding an understanding of the requirements involved so that they can successfully achieve the outcomes desired of an improved grassland which is considered biodiverse.

Guidance from a Severn Trent agricultural advisor or ecologist is always encouraged. It is important that the right level of management in relation to grazing and cutting is achievable and sustainable from the start of the project and into the future. The level of management required can be onerous without machinery or sufficient labour and thus should be considered prior to applying for funding. Furthermore, there can be cost implications to maintaining this management which should be delivered by the applicant beyond when the grant period finishes (2025 and beyond).

The first question an applicant should consider is, it always necessary to introduce wildflowers? If a site has potential for enhancement, then the introduction of wildflowers may not always be suitable and an initial site assessment by a Severn Trent Advisor can quickly establish this answer. On many sites wildflowers may already be present at low numbers in the sward and a small change of management can allow them to flourish. The reasoning behind this is often because they have not been allowed to flower they may occur only as vegetative rosettes which are easy to overlook.

The botanical diversity of such grasslands may be enhanced by simply amending management practices, for example changing the timing and intensity of grazing. This can also be coupled with timing and process of cutting and then removing the grass sward in the form of hay or haylage. However, on sites where the potential for natural regeneration and re-colonisation of desirable plant species is judged to be low, then pro-active restoration will be required. This will involve the

introduction of a seeds source and the creation of gaps in the sward to allow those seeds to establish.

Techniques which can be used for enhancement

Seeding

Seeds can be introduced by over sowing, slot seeding, plug planting or the spreading of green hay. One key species that can aid the development of a biodiverse sward is yellow rattle (*Rhinanthus minor*) as this is often a component of seed mixtures and of green hay. Yellow rattle is an annual wildflower that obtains some nourishment by parasitizing its host (called hemiparasitic). This has the impact of it reducing the vigour and biomass of its wide range of hosts but primarily ryegrasses (*Lolium sp*) and clovers (*Trifolium sp.*) which can crowd out a sward.

On some sites, there are good reasons for specifically establishing yellow rattle before sowing of other wildflower species as it can help improve the chances of the other species eventually establishing. Yellow rattle is found a wide range of soil types but is normally absent from sites which are called acid (pH less than 5.0).

Hay Spreading

The term hay spreading means the use of green hay which refers to herbage cut at, or just before the seed within the desired plant has naturally shed/ The hay is collected from a donor site without prior wilting or turning and spread immediately on the receptor site. If collected from species-rich grassland and used correctly on the right sites it can be a very effective method of sward enhancement.

The main advantages of using green hay are that it is usually cheaper than purchasing commercial seed and it is a good means of ensuring that fresh seed from a local source is used. In addition, a wider range of species may be contained in green hay than is available as seed.

To be successful, the technique of spreading green hay requires careful organisation. The receptor site must be ready to receive the hay when the donor site is cut. Green hay cannot be stored because if left in a heap it heats up. Any heating will threaten the viability of the seeds. Once collected the green hay must be immediately transported to and spread on the receptor site and this should occur within a maximum 7 hours from cutting to spreading.

Therefore if green hay is the chosen enhancement approach, Severn Trent ecologist or agricultural advisors must be made aware of the donor site and the proposed cutting & spreading date & schedule.

For further details see Natural England Technical Information Note TIN063 "Sward enhancement: diversifying grassland by spreading species-rich green hay"

Over sowing

The success of over sowing depends on the presence of gaps in the sward which are large and persistent enough for seeds to germinate and establish free from excessive competition for resources such as nutrients or light. After sowing it is important that seeds are then rolled into the bare soil in the gaps to generate good seed to earth contact with sufficient moisture to germinate and sustain them.

Therefore, for this technique to be successful some ground preparation will be required prior to over sowing. Sowing onto a closed sward is extremely unlikely to be successful. Seed may fail to come into contact with the soil and die, and any seedlings which germinate may be out-competed by the existing sward.

To be effective, a short sward is required (less than 5cm) and this can be created by cutting (with cuttings removed) or grazing. The aim is then to create 50% bare ground, using both livestock (the 'hoof and tooth' method, -cattle preferred over sheep- or machinery. To create bare ground mechanically this can be created using a power harrow or set of discs. The sward will recover, and very little bare ground will remain. Often a period of hard grazing to achieve the right sward height then mechanical creation of bare ground in combination is the most effective ground preparation.

It is important to note that if known archaeological sites are in the area then you should consult your Severn Trent advisor to ensure important or protected archaeological features are not damaged. It is the applicant's responsibility to undertake such checks.

Slot seeding

Slot seeding was originally developed as a technique for increasing the productivity of grassland by introducing species such as white clover (*Trifolium repens*) and ryegrass (*Lolium perenne*). The method has been used with some success to introduce wildflowers too. Slot seeding requires specialist machinery which drills seed into shallow slots, up to 15 mm deep, cut into the turf.

For successful use of this technique some ground preparation is required by creating a short sward by either cutting (with the cuttings removed) or hard grazing as described above. However, if this technique is being used then allow the sward to green up slightly to provide a target for the herbicide. This is essential to control competition from the existing sward in order for seedlings to establish and survive. The best means of doing this is by fitting the slot seeder with a band sprayer which applies a narrow strip of contact herbicide to the sward at the same time as the seed is sown

For further advice see Natural England Technical Information Note TIN064 Sward enhancement: diversifying grassland by over sowing and slot seeding

Pot grown wildflowers or seedling plugs

Pot-grown wildflowers and plugs are expensive and are labour intensive in comparison to seed. They are poor value for money when used as the main method of sward enhancement and are best considered as a complimentary method in the following situations. To introduce additional species which are difficult to germinate from seed, and/or mainly vegetative reproduction, that scarce or

have expensive seed, where species can be specifically selected for key areas which require a particular niche, specific food plants, e.g. for a particular species of butterfly, key species as identified in bold in guidance document produced by Severn Trent “Grass Seed Mixes for STEPS to achieve a biodiversity gain by creating appropriate grasslands that are Biodiverse Habitats (BAP)”.

Planting in the autumn is recommended as it allows time for the roots to establish over winter, giving the plants a greater chance of competing with the existing sward in spring. Spring planting is possible but there is higher risk of failure due to drought.

Browsing pressure of local wildlife should also be considered, particularly areas with known Deer, Rabbit or Badger populations and in some circumstances it may be necessary to provide guards until plants become fully established.

Natural England Technical Information Note TIN065 Sward enhancement: diversifying grassland using pot grown wildflowers or seedling plugs

Source of the seeds to be used

What seed is used in the enhancement or re-creation of grassland should be of British native origin. This means that it has originated from native plants growing in natural or semi-natural habitats in the wild in Britain. Seed of British native origin will offer a better representation the genetic diversity and adaptive capacity of wild plants compared with imported stock or with commercially bred agricultural and amenity varieties.

If applicants are buying seed from a commercial seed merchant or supplier of wild flower seed, they should specify not only the species required but also the origin, e.g. 'Yarrow *Achillea millefolium*, British native origin', adding specific details for local origin seed. There are suppliers of British native origin seed, and applicants should keep a copy of any documentation provided by the supplier who is providing the seed, and this should be shared with a Severn Trent advisor.

Collecting seed from the wild is also an acceptable method. This means that the seed is collected from a donor site (with necessary permissions from the land owner). The main methods for direct seed harvesting are either by brush harvester, vacuum collector, or combine. Most directly harvested seed is collected for specific contracts and is usually cleaned and dried before sowing. However, some companies do sell bagged seed mixes. The main advantage of directly harvested seed is that it allows seed to be selected from a local site that closely matches the soil, climate and habitat type on the receptor site; the seed will also have a higher likelihood of being a representation of the local typical plant communities.

Selecting the right source of seed

Selection of the most appropriate seed will depend on the site objectives, soil conditions, and proximity to other sites. In relation to both enhancing and creating rich semi-natural grassland the origin of the seed should ideally come from within the same Natural Character Area (NCA) as the receptor site.

To aid this Severn Trent can provide additional detailed guidance on grassland mixes most appropriate for the geology, soil types, landscape and management proposed. The aim of this guidance is to create or enhance the right grassland types which should -in the long term- acquire a level of species richness, measured by the number of different plant species present. The community types identified are important nature conservation grasslands which have a high “conservation value” and are known to form a plant community type in the locations identified, lowlands/ uplands/ flood plains and on the major soil groups identified.

To select your commercial seed supplier, or to identify your donor site for green hay, then you must use the guidance document produced by Severn Trent “Grass Seed Mixes for STEPS to achieve a biodiversity gain by creating appropriate grasslands that are Biodiverse Habitats (BAP)”. This guidance is based upon the National Vegetation Classification (NVC) framework which describes the plants which are normally found living together and form these distinct communities. The species lists for each community highlights a range of plants found in each of communities described. The lists are then in two sections, grasses and herbs. The herbs section also cover the clovers in any mix. Within each category they have been split again between, “should have”, and “can have”. The “should have” species are ones which any donor site should offer as seed and the ones in bold are considered iconic species for that community type

See the guidance, Grass Seed Mixes for STEPS to achieve a biodiversity gain by creating appropriate grasslands that are Biodiverse Habitats (BAP), Severn Trent

Protocol to identify a donor site.

Finding the right donor site can be a problem if you are not using a commercial supplier. However, the local Wildlife Trust, National Trust, RSPB, Floodplain Meadows Project may have sites which they are already using as donor sites and they may be happy to help in aiding the applicants enhancement project.

If on the other hand the applicant or local neighbour have a field on their land suitable then the following are the steps to be taken to use this as a seed source. This can especially apply to the use of green hay as a technique for enhancement and if this is the chosen method then consulting with a Severn Trent Advisor is essential.

The steps need to establish if a field can be a donor site

1. It is essential to gather enough reference information about the site from a botanical survey to determine whether a field is suitable to be a ‘donor’ site (have seed harvested from it). However, there is a minimum level of detail that should be obtained using appropriate survey methodology (e.g. UK Habitat classification). The survey season during which botanical surveys of grassland and meadows can be effectively carried out is very short, usually from end of April to the middle of July. The best method is for a survey which provides detail that is required to be able to make a judgement against the National Vegetation Classification (NVC) framework and this should be used when describing the vegetation where possible.
2. For donor grasslands/meadows, it is good practise to monitor them to ensure that they are not damaged by having green hay harvested from them. It is generally accepted that

3 years of harvesting has limited impact on the vegetation which includes the entire sward has been harvested from a distinct block of a field. If harvesting were to have any impact on the vegetation, it would be the annual species that would be most affected as these need to grow from seed every year. Therefore, the approach that Severn Trent recommends is monitoring the donor with a yearly follow-up visit after harvesting, paying particular attention to the abundance of annual species. If there are any worrying signs, the field should be revisited and assessed again to understand if it can continue to act as a donor site. To be sure, fields should be monitored after 1 year and again after 3 years.

3. The guidance document produced by Severn Trent “Grass Seed Mixes for STEPS to achieve a biodiversity gain by creating appropriate grasslands that are Biodiverse Habitats (BAP)” to judge the suitability of the donor site.

Essential management of the site to enhance the grassland and thereafter

Generic advice for grassland creation and enhancement

Year 1

- Remove any areas of soil compaction prior to establishment. Do not subsoil areas on sites of archaeological interest.
- Apply any necessary ground preparation need by the technique chosen to enhance the sward.
- In year 1, enhance sward by any of the above methods mentioned in this document, the agreed technique should be agreed with your Severn Trent Advisor. The sowing should have ideally occurred by 1st October, autumnal sowing is preferred over spring sowing.

Year 2 onwards

- After initial works in year 1 and onwards, manage the sward by grazing and/or cutting to achieve a sward height of between 5cm and 15cm during April and May (unless the land has been shut for hay) and between 2.5cm and 5cm in November.
- If the field is used for grazing only in that year then stocking density of 0.75 LU/ha between 1 April and 31 May, with cattle only is allowed, otherwise the field should remain ungrazed for that period to allow flowering.
Or
- If the field is being cut to make hay, in that year the field should be free from any grazing animals for at least 10 weeks prior the field being cut. The ideal is to make field-dried hay. If you make haylage then you must turn the swath and wilt for at least 48 hours. Do not cut before 1 July, and you must graze the aftermath each autumn to achieve sward heights required in November.

To measure the effectiveness of the enhancement

- By year 2 (The year after initial seeding/intervention), at least 3 moderate value indicator species, **from the Severn Trent agreed mix agreed or a bespoke list** if using a donor site or locally harvested seed, should be recorded as ‘occasional’ in the sward when using the

DAFOR Scale of abundance (more details here
(<http://www.botanicalkeys.co.uk/northumbria/dafor.asp>) .

- The cover of wildflowers in the sward (excluding undesirable species but including rushes and sedges), should be between 20% and 90%. At least 40% of flowers should be flowering during May-June.
- By year 5, at least 2 moderate value indicator species from the Severn Trent mix agreed (or agreed bespoke mix) should be frequent and 2 high value indicator species occasional.
- By year 10, at least 1 high value indicator species from the Severn Trent mix agreed should be frequent and 1 occasional, with in addition at least 2 moderate value indicator species should be frequent and 3 should be occasional in the sward.

(Note that high value indicator species are listed in the Severn Trent mixes and identified in the lists as bold)

Grass Seed Mixes for B4B22 to achieve a biodiversity gain by creating appropriate grasslands that are Biodiverse Habitats (BAP)

The following grassland mixes have been identified as the most appropriate for the geology, soil types, landscape and management proposed. The aim is to create grassland types which should in the long term acquire a level of species richness, measured by the number of different plant species present, which would normally be found as a community at the location employed. The groupings listed below reflect important nature conservation grasslands which have a high “conservation value” and are known to form a plant community type in the locations identified, lowlands/ uplands/ flood plains and on the major soil groups identified.

The lists have been split into two sections grasses and herbs. The herbs section also cover the clovers in any mix. Within each category they have been split again between, “should have”, and “can have”. This second split is to allow for seed merchant variability and also seed availability. It is envisaged that the “should have” part of the mix ought to contain at least 90% of the species listed. For the species listed as “can have” this is to allow for individual additions by agreement holders and advisors partly to make up for any, “should have” which are missing from the “should have” list and to allow for some variation as would normally occur in these types of vegetation community naturally. In addition to aid guidance on any mix the key species in the mix are in bold and they are the ones which are the key ones for that community type.

Generic mixes

Natural grasslands (mesotrophic)

This will be anywhere in the lowlands which does not have chalk/limestone soils (calcareous) or sandstone (acid soils) and will be associated with mostly drift geology – clay lands. This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred. This mix will work for both hay cutting regimes as well as grazed only lowland grasslands.



Credit: © Natural England/Dave Rothero

Hay meadows MG5 Black Knapweed Crested Dogtail Lowland Hay Meadow
(*Centaureo-Cynosuretum cristati* grassland) a major BAP habitat type

Grasses should have

<i>Festuca rubra</i>	red fescue
<i>Cynosurus cristatus</i>	crested dogtail
<i>Agrostis capillaris</i> common Bent	
<i>Anthoxanthum odoratum</i> sweet vernal grass	
<i>Dactylis glomerata</i>	cocksfoot
<i>Festuca pratensis</i> meadow fescue	
<i>Phleum pratense</i> timothy	
<i>Poa trivialis</i>	rough stalked meadow grass

Grasses could have

<i>Trisetum flavescens</i>	yellow oat grass
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Briza media	quaking grass
Poa pratensis	smooth stalked meadow grass
Alopecurus pratensis	meadow foxtail

Herbs should have

Lotus corniculatus	birds foot trefoil
Plantago lanceolata	ribwort plantain
Trifolium pratense	red clover

Centaurea nigra black knapweed

Leucanthemum vulgare	oxeye daisy
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Rhinanthus minor	hay rattle
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Lathyrus pratensis	meadow vetchling
Knautia arvensis	field scabious
Ranunculus acris	meadow buttercup
Hypochoeris radicata	cats ear

Herbs could have

Prunella vulgaris	self heal
Leontodon autumnalis	autumn hawkbit
Succisa pratensis	devils-bit scabious
Pimpinella saxifraga	burnet-saxifrage
Stachys betonica	betony

Conopodium majus	pignut
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Rumex acetosa	common sorrel
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Achillea millefolium	yarrow
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Leontodon hispidus	rough hawkbit
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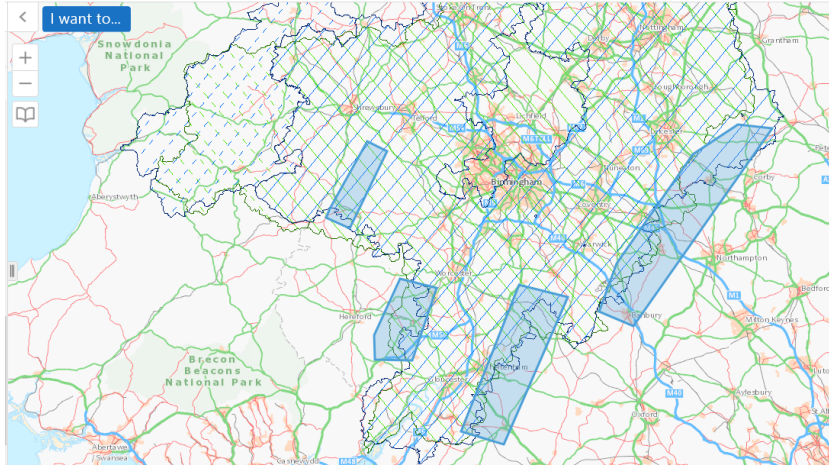
Sanguisorba minor	great burnet
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Ranunculus bulbosus	bulbous buttercup
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Primula veris	cowslip
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Calcareous grasslands (Calcicoles)

These grasslands are associated with the escarpment limestone/chalk uplands and are generally associated with key sheep grazing areas. They historically were part of the sheep/corn system of farming which formed the backbone of the midlands. This grassland type is usually grazed.



Key areas; Cotswolds, Malvern Hills, Northamptonshire Wolds; Wenlock Edge



Credit: © Natural England/Des Sussex

CG2 Festuca ovina-Avenula pratensis grassland- a major BAP habitat type

Grasses should have

Festuca ovina

sheeps fescue

Helictotrichon (Avenula) pratensis meadow oat grass

Dactylis glomerata cocksfoot

Helictotrichon (Avenula) pubescens downy oat grass

Grasses could have

Briza media quaking oat grass

Koeleria macrantha crested hair grass

Trisetum flavescens yellow oatgrass

Phleum pratense pratensetimothy

Herbs should have

Sanguisorba minor salad burnet

Plantago lanceolata ribwort plantain

Lotus corniculatus **bird'sfoot trefoil**

Leontodon hispidus rough hawkbit

Hieracium pilosella mouse-ear hawkweed

Scabiosa columbaria **small scabious**

Trifolium pratense red clover

Succisa pratensis **devil's-bit scabious**

Centaurea nigra agg. black knapweed

Medicago lupulina black medick

Hippocrepis comosa **horseshoe vetch***

Helianthemum nummularium **common rock-rose***

**key food plants for butterfly species*

Herbs could have

Thymus praecox wild thyme

Prunella vulgaris common self-heal

Plantago media greater plantain

Euphrasia officinalis agg. eyebright

Ranunculus bulbosus **bulbus buttercup**

Pimpinella saxifraga burnet-saxifrage

Galium verum lady's bedstraw

Linum catharticum fairy flax,

Gentianella amarella autumn gentian

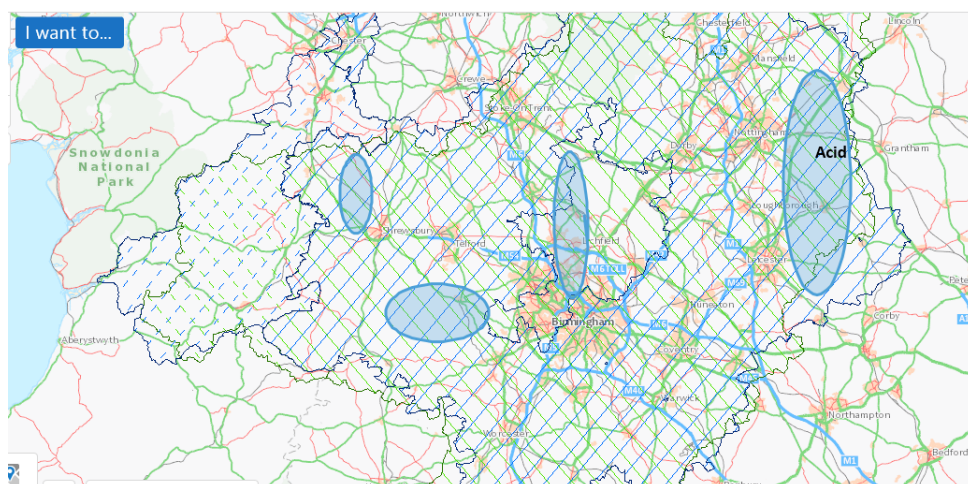
Filipendula vulgaris dropwort

Primula veris common cowslip

Acid grasslands (calcifuges)

U1 *Festuca ovina*-*Agrostis capillaris*-*Rumex acetosella* grassland- a major BAP habitat type

This grassland type is highly variable and needs to be tailored to the acid substrate therefore further ecological input is required for this option from ecologymatters@severntrent.co.uk. This grassland type is usually grazed.



Key areas are: Sherwood Forest, Cannock Chase, Wyre Forest, Shropshire Sandstone Hills



Credit: © Natural England/Steve Pullan

Grasses should have

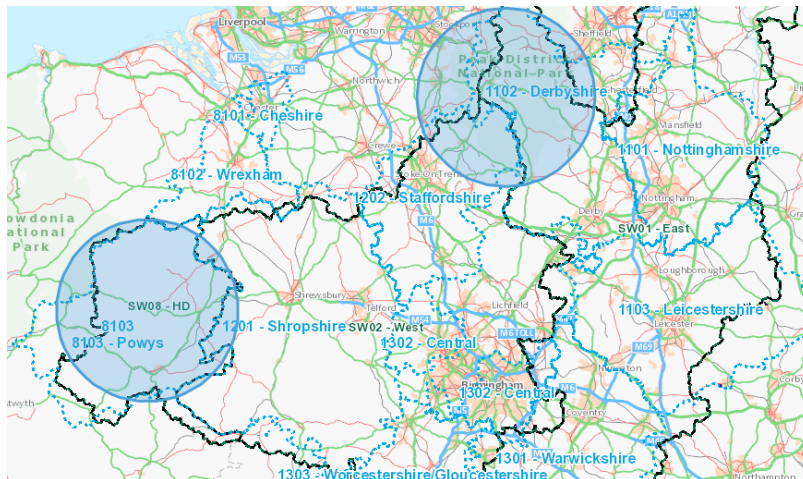
Festuca ovina	sheep fescue
Agrostis capillaris	common bent
Aira praecox	early hair grass
Anthoxanthum odoratum	sweet vernal grass
Koeleria macrantha	crested hair-grass

Herbs should have

Rumex acetosella	sheep sorrel
Cerastium fontanum	mouse eared chickweed
Lotus corniculatus	birds foot trefoil
Plantago lanceolata	ribwort plantain
Galium saxatile	heath bedstraw
Hieracium pilosella	mouse eared hawkweed
Thymus praecox	wild thyme
Galium verum	lady's bedstraw

Upland areas-

Upland areas should be considered to be land above 200m above sea level and where climate influences the number of rain days per year (from around 180/day/yr⁻¹ plus). The growth of any grassland is not likely to start until April and to be short and will cease with the first frosts in late October. This can be summed up as cold, windy, cloudy and wet. These are the main areas where these upland mixes should be used. If the land is dominated by heather *erica sp.* or upland heath then these mixes are not appropriate, further advice should be sort from ecologymatter@severntrent.co.uk for an appropriate mix.



Key Areas; Welsh uplands with the Shropshire border uplands, Derbyshire Peaks and Staffordshire moorlands.

Upland Hay meadows

MG3 Sweet Vernal Grass- Woody Cranesbill Upland Hay Meadow
(*Anthoxanthum odoratum*-*Geranium sylvaticum* grassland) a major
BAP habitat type

This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred.



Grasses should have

<i>Agrostis capillaris</i>	common bent
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Festuca rubra</i>	red fescue
<i>Cynosurus cristatus</i>	crested dogstail
<i>Poa trivialis</i>	rough stalked meadow grass

Grasses can have

<i>Dactylis glomerata</i>	cocksfoot
<i>Trisetum flavescens</i>	yellow oat grass
<i>Helictotrichon (Avenula) pubescens</i>	downy oat grass
<i>Briza media</i>	quaking grass
<i>Phleum pratense pratense</i>	timothy

Herbs should have

<i>Plantago lanceolata</i>	ribwort plantain
<i>Rumex acetosa</i>	common sorrel

Ranunculus acris
Rhinanthus minor
Centaurea nigra
Trifolium pratense
Lotus corniculatus

Herbs could have

Conopodium majus
Sanguisorba officinalis
Vicia sativa
Ranunculus bulbosus
Leontodon hispidus
Hypochoeris radicata
Geranium sylvaticum
Thymus praecox
Anemone nemorosa
Achillea millefolium
Potentilla erecta
Trollius europaeus
Leontodon autumnalis
Prunella vulgaris
Ajuga reptans
Trifolium medium

meadow buttercup
hay rattle
black knapweed
red clover
birds foot trefoil

pignut
great burnet
common vetch
bulbous buttercup
lesser hawkbit
common cats ear
woody cranesbill
wild thyme
wood anemone
yarrow
tormentil
globe flower
autumn hawkbit
selfheal
bugle
zig zag clover

Upland Calcareous Grasslands CG10 Festuca ovina-Agrostis capillaris-Thymus praecox grassland a major BAP habitat type

This grassland type is usually grazed.



Credit:© Natural England/Jenny Wheeldon

Grasses should have

Festuca ovina	sheep fescue
Agrostis capillaris	common Bent
Anthoxanthum odoratum	sweet Vernal Grass

Grasses can have

Festuca rubra agg.	Red fescue
Agrostis canina sens.lat.	Velvet bent
Danthonia decumbens	heath grass

Herbs should have

Thymus praecox -	wild thyme
Potentilla erecta	tormentil
Plantago lanceolata	ribwort plantain
Prunella vulgaris	common self-heal
Achillea millefolium	yarrow
Ranunculus acris	meadow buttercup
Lotus corniculatus	birds-foot trefoil
Viola riviniana	common dog-violet,*

Hippocrepis comosa

horseshoe vetch*

**key food plants for butterfly species*

Herbs could have

Campanula rotundifolia	hairbell
Galium saxatile	heath bedstraw
Veronica officinalis	heath speedwell
Cerastium fontanum	mouse-ear chickweed,
Linum catharticum	fairy flax
Succisa pratensis	devil's-bit scabious
Alchemilla glabra	lady's mantle
Geum rivale	water avens,
Saxifraga aizoides	yellow saxifrage
Euphrasia officinalis agg.	Eyebright

Upland acrid grassland U2 Deschampsia flexuosa grassland

This grassland type is usually grazed.



Grasses should have

Avenella (Deschampsia) flexuosa wavy hair grass

Festuca ovina	sheep fescue
Agrostis capillaris	common bent
Festuca rubra agg.	red fescue

Grasses can have

Agrostis vinealis	brown bent
Anthoxanthum odoratum	sweet vernal grass

Herbs should have

Galium saxatile heath bedstraw

Potentilla erecta tormentil

Rumex acetosella	common sorrel
Rumex acetosa	sheep sorrel
White Clover	Trifolium repens

Herbs could have

These species can be added if a transition to heathland is required but the area can only be grazed. Further advice from ecologymatters@severntrent.co.uk should be sort if these species are to be used,

Erica species

Calluna vulgaris	ling heather
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Erica cinerea	crossed leaved heather
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Vaccinium myrtillus	bilberry
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Empetrum nigrum subsp.nigrum	crowberry
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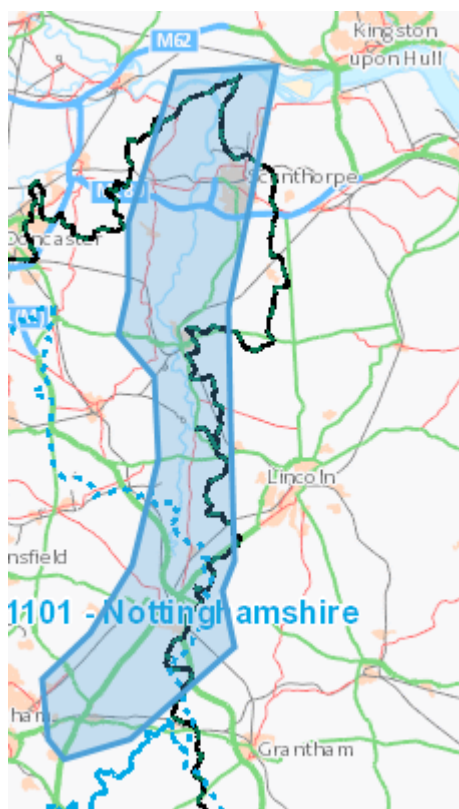
Flood plain grasslands

These grasslands are influenced by the level of flooding and the length of time that the land is underwater. Therefore, choosing the right mix may require further ecology input. The general sequence of plant community is from drier MG4 →MG15 to wetter due to long term inundation →MG8→MG13. In some circumstances due to prolonged inundation then the community type can morph into a fen community S28 *Phalaris arundinacea* tall-herb fen, or an upper salt marsh community SM28 *Elymus repens* salt-marsh community. These latter two communities will develop overtime in areas of prolong inundation and it's not proposed that these should be restored. Further advice from ecologymatters@severntrent.co.uk should be sort before these options are used.

However, if the grassland is primarily being created for breeding birds this can be achieved using either, MG8 or MG13. Grasslands for breeding birds are a combination of wet features such as, scrapes, rhymes and swales and a mosaic sward structure which has a combination of sward heights and tussocks. To be successful for bird breeding then the grassland must have both the physical features and the sward structure. Normally some of the tussocks would be made up of *Juncus* species but these will ingress via natural process so it's not proposed that these species are sown.

Northern- The Trent Valley flood plain

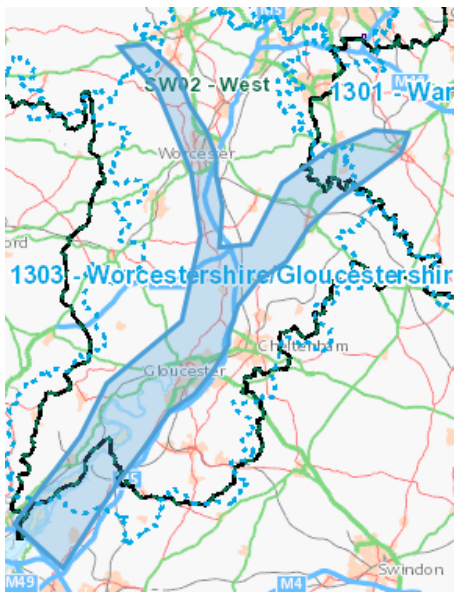
In this area the main grasslands should be either MG15, MG8 or MG13



Key areas: Trent flood plain

Southern- The Severn Valley flood plains and its tributaries

In this area the main grasslands should be MG4, MG15 or MG13



Key areas: Severn vale and Avon flood plains

**MG4 Meadow Foxtail- Greater Burnet river meadow *Alopecurus pratensis*-
Sanguisorba officinalis grassland. A major BAP habitat type**

This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred until flooding occurs.



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Grasses should have

Alopecurus pratensis	meadow foxtail
Festuca rubra	red fescue
Cynosurus cristatus	crested dogtail
Anthoxanthum odoratum	sweet vernal grass
Trisetum flavescens	yellow oat grass
Festuca pratensis	meadow fescue
Agrostis capillaris	common bent
Festuca arundinacea	tall fescue

Grasses can have

Phleum pratense pratense	timothy
Briza media	quaking grass
Poa trivialis	rough stalked meadow grass
Poa pratensis	smooth stalked meadow grass

Herbs should have

Sanguisorba officinalis	greater burnet
Plantago lanceolata	ribwort plantain

Ranunculus acris
Rumex acetosa
Trifolium pratense
Lathyrus pratensis
Rhinanthus minor
Leucanthemum vulgare
Ranunculus bulbosus

Herbs could have

Filipendula ulmaria
Silaum silaus
Veronica serpyllifolia
Centaurea nigra
Lotus corniculatus
Vicia cracca
Succisa pratensis
Leontodon autumnalis
Cardamine pratensis
Leontodon hispidus
Primula veris
Prunella vulgaris
Trifolium dubium
Achillea millefolium
Thalictrum flavum
Serratula tinctoria
Stachys betonica
Potentilla anglica
Hypochoeris radicata
Galium verum
Caltha palustris
Vicia sepium

meadow buttercup
common sorrel
red clover
meadow vetch
hay rattle
ox-eye daisy
bulbous buttercup

meadowsweet
pepper-saxifrage
thyme-leaved speedwell
black knapweed
birds-foot trefoil
tufted vetch
devils-bit scabious
autumn hawkbit
cuckoo-flower
rough stalked hawkbit
cowslip
selfheal
lesser trefoil
yarrow
common meadow-rue
saw-wort
betony
trailing tormentil
cats-ear
lady's bedstraw
kingcup
bush vetch

MG15 Alopecurus pratensis-Poa trivialis-Cardamine pratensis grassland River flood plain grassland a major BAP habitat type

This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred until flooding occurs as the grazing animal.



Grasses should have

Poa trivialis	rough stalked meadow grass
Cynosurus cristatus	crested dogstail
Alopecurus pratensis	meadow foxtail
Festuca rubra	red fescue
Anthoxanthum odoratum	sweet vernal grass
Festuca pratensis	meadow fescue
Agrostis capillaris	common bent
Festuca arundinacea	tall fescue

Grasses can have

Bromus commutatus	meadow brome
Phalaris arundinacea	reed canary grass
Agrostis canina	velvet bent
Alopecurus geniculatus	marsh foxtail
Hordeum secalinum	meadow barley
Agrostis stolonifera	creeping bent
Glyceria fluitans	floating sweet-grass

Herbs should have

Cardamine pratensis	cuckoo flower
Ranunculus acris	meadow buttercup
Rumex acetosa	common sorrel
Filipendula ulmaria	meadowsweet
Plantago lanceolata	ribwort plantain
Trifolium pratense	red clover
Leontodon autumnalis	autumn hawkbit

Lathyrus pratensis	meadow vetchling
Rhinanthus minor	hay rattle
Achillea ptarmica	sneezewort
Vicia cracca	tufted vetch
Sanguisorba officinalis	great burnet
<i>Herbs could have</i>	
Senecio aquaticus	marsh ragwort
Silaum silaus	pepper-saxifrage
Centaurea nigra	black knapweed
Oenanthe silaifolia	water dropworts
Caltha palustris	kingcup
Polygonum amphibium	water knotweed
Galium palustre	marsh-bedstraw
Myosotis laxa caespitosa	tufted forget-me-not,
Trifolium dubium	lesser trefoil

MG13 *Agrostis stolonifera*-*Alopecurus geniculatus* inundation grassland (Foxtail splash) a major BAP habitat type

This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred as the main grazing animal until flooding occurs. This mix can be used to create grassland for breeding waders too, but the grassland will be managed by grazing only and overtime *Juncus* species will become present. The land should be managed as a grassland with splash pools present during the key months of May to June.



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Grasses should have

<i>Poa trivialis</i>	rough stalked meadow grass
<i>Cynosurus cristatus</i>	crested dogstail
<i>Alopecurus pratensis</i>	meadow foxtail
<i>Festuca rubra</i>	red fescue
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Festuca pratensis</i>	meadow fescue
<i>Agrostis capillaris</i>	common bent
<i>Festuca arundinacea</i>	tall fescue
<i>Alopecurus geniculatus</i>	marsh foxtail

Grasses could have

<i>Bromus commutatus</i>	meadow brome
<i>Phalaris arundinacea</i>	reed canary grass
<i>Agrostis stolonifera</i>	creeping bent
<i>Glyceria fluitans</i>	floating sweet-grass

Herbs should have

<i>Cardamine pratensis</i>	cuckoo flower
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Potentilla anserina silverweed

Galium palustre marsh-bedstraw,

Ranunculus flammula lesser spearwort,

Caltha palustris kingcup

Ranunculus acris meadow buttercup

Trifolium pratense red clover

Herbs could have

Leontodon autumnalis autumn hawkbit

Oenanthe fistulosa water dropworts

Myosotis laxa caespitosa tufted forget-me-not,

Rumex acetosa common sorrel

Polygonum amphibium water knotweed

Senecio aquaticus marsh ragwort

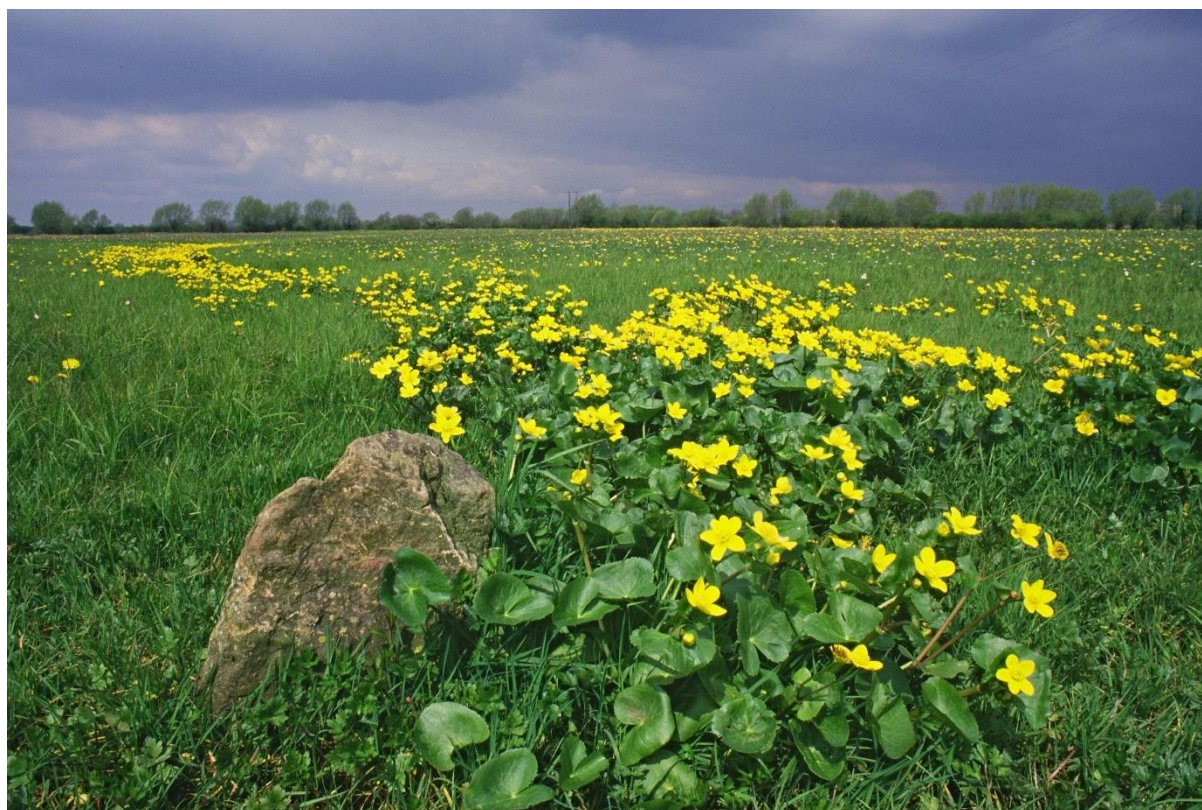
Lychnis flos-cuculi ragged-robin

Lotus uliginosus greater bird's-foot-trefoil

MG8 *Cynosurus cristatus*-*Caltha palustris* grassland-BAP habitat

This grassland type is usually managed as a hay meadow, cut in summer and aftermath grazed in the autumn, with cattle preferred until flooding occurs. This mix can be used to create grassland for breeding waders too, but the grassland will be managed by grazing only and overtime *Juncus* species will become present. The land should be managed as a grassland with splash pools present during the key months of May to June

This community is also found in the uplands in meadows in areas where water comes to the surface and forms a flush. Therefore, this option can be used also in upland areas to create a mosaic grassland type if flushes are a feature of the landscape.



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Grasses should have

<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Festuca rubra</i>	red fescue
<i>Cynosurus cristatus</i>	crested dogstail
<i>Phleum pratense</i>	timothy
<i>Agrostis canina</i>	velvet bent
<i>Bromus racemosus</i>	hairy brome

Grasses can have

<i>Agrostis stolonifera</i>	creeping bent
<i>Briza media</i>	quaking grass
<i>Festuca pratensis</i>	tall fescue
<i>Agrostis capillaris</i>	common bent
<i>Dactylis glomerata</i>	cocksfoot

Herbs should have

Ranunculus acris	meadow buttercup
Filipendula ulmaria	meadowsweet
Plantago lanceolata	ribwort plantain
Sanguisorba officinalis	great burnet,
Succisa pratensis	devil's-bit scabious
Prunella vulgaris	common self-heal,
Vicia cracca	tufted vetch
Trifolium dubium	lesser hop trefoil,

Herbs could have

Lotus corniculatus	bird's-foot trefoil
Lychnis flos-cuculi	ragged-robin
Lotus uliginosus	greater bird's-foot-trefoil
Ranunculus flammula	lesser spearwort
Galium palustre	heath bedstraw
Leontodon hispidus	rough hawkbit
Rumex acetosa	common sorrel
Rhinanthus minor	hay rattle
Caltha palustris	kingcup
Cardamine pratensis	cuckoo flower
Leontodon autumnalis	autumn hawkbit
Lathyrus pratensis	common vetch
Mentha aquatica	water mint