

THE NATURETALE RESTORATION FOUNDATION

INTRODUCTION



At first glance the two areas of grass in the photos above do not look that different – they are both green, and about the same length. However to an ecologist – or to a butterfly – they are very different indeed. And it is this difference that the Naturetale Restoration Foundation aims to help improve our ability to achieve.

The grass on the left is a ryegrass sward, sown to produce grazing for cattle and sheep. And very good for them it is too, producing large quantities of nutrient rich forage. For anything else, however, it is not so good. In pastures of this type there are typically just one species of grass and little or no flowers. Flowers compete with the grass, so farmers tend to spray special herbicides to kill them. So there is no pollen or nectar for insects to eat, and no seeds for birds. There are no hiding places to allow small mammals to survive, and the millions of micro-organisms that make up the soil fauna will struggle too. Perhaps 90% of the lowland grassland in the UK is now of this type.

In contrast the grass on the right is an ancient meadow. It is not as productive as a ryegrass sward, which is why more than 97% of them have disappeared since the 1930's— converted into the grass on the left. In fact now only 2-3% of lowland grassland is species rich. But on the other hand meadows such as the one pictured can contain up to forty species of grasses and flowers. We associate these with beautiful displays of wild flowers such as orchids, buttercups, cowslips and forget-me-nots. But they are much more important for wildlife than this alone. Their plants provide food for bumblebees, butterflies and many other types of insects. Their seeds provide food for birds – and so do the insects. Small mammals can live in the undisturbed base of the meadow, and the soil below will support a rich fauna.

Because so many of our ancient meadows have been lost, many organisations such as the Wildlife Trusts, The National Trust, the RSPB, Plantlife, The Woodland Trust and others are now actively engaged in creating new meadows and improving those that exist. And they are making good progress.

But there is a problem: research has identified the broad methods to use to create a new meadow from scratch, or to improve a poor one. We know how to achieve a meadow that has perhaps between fifteen and twenty or so species in it. That's a lot better than one – but a long way short of forty. What this research revealed is that certain classic meadow flowers don't seem to respond to the techniques that are currently available. They simply fail to establish, and with this comes the risk that meadow creation and improvement gets 'stuck' part way and does not reflect the full spectrum of floral diversity. As a result the full range of benefits that species rich meadows should provide fail to materialise.

It is known that this problem is related to 'competition' from other meadow plants. But no one has yet identified the precise ways that this competition can be overcome, and these species allowed to prosper. For reasons explained below, it is unlikely that the organisations

that are involved with managing and improving meadows will have the focus, time and resources to look at these particular plants in the foreseeable future. We believe that the resources required to run appropriate trials are quite modest, and that a small, focused organisation can make a practical contribution to our ability to establish a wider range of plants in wildlife meadows. In turn this will enhance the value of these meadows to a wide variety of animals.

MISSION

To improve the ability of conservation organisations in the UK to re-establish and improve species-rich lowland wild flower meadows.

ACTIVITIES (OBJECTS)

Undertake long term field trials to identify the best ways to establish specific species that have been found to be difficult to establish, and thus which often fail to become part of new meadows.

To explore how technology such as mobile phone apps could help with the process of improving and managing wild flower meadows, through benefits such as improved worker efficiency and more reliable survey recording.

To identify any potential to improve the processes that are used to re-establish meadows, such as by finding ways to make these more efficient, less labour intensive, more productive, requiring lower skill levels, or reducing the risk of mistakes or failures.

Knowledge transfer – to ensure that the findings from the trials, both successes and failures, are made available to relevant conservation organisations so that they can incorporate these into their work.

PROJECT OUTPUTS

There will potentially be a variety of outputs, relating to the different aspects of this project. They will include:

- Botanical surveys, and statistical analysis based reports of the project's results and conclusions.
- Reports will be distributed to organisations involved in the management and creation of grassland habitats. Papers on the trial and its conclusions may also be given at appropriate ecological Conferences.
- The existence of one or more tested apps, ready for use by grassland conservationists, ecologists and / or botanists.

Any technology such as app(s) that are developed as part of this project would be made available to download for free from the relevant app stores. In addition the source code would be made available for free for other conservation charities to incorporate into apps that they are developing.

BENEFITS OF THIS ACTIVITY

The primary benefit of these trials will be to provide meadow restorers and managers with practical guidance on how to establish and maintain the species that are the subject of the trials, along with those that behave in a similar fashion. This information is currently unknown. In turn, this will mean that the biodiversity value of lowland neutral meadows will be increased, compared to what it otherwise would be.

This work will be unique, as is explained in the next section.

Because the Natureale Restoration Foundation is a small charity, with virtually no overhead costs, we can undertake trials of this type cost effectively, see below.

The perceived value of these benefits will be demonstrated by obtaining two or three letters of support of our aims and plans from senior figures from organisations who would use our trial results, such as the Wildlife Trusts, Plantlife, the National Trust, or the RSPB.

The benefit of any apps we are able to develop will be to improve the efficiency, cost effectiveness and ease of management of habitat management and improvement activity. This could potentially apply to a wider range of habitats than just lowland meadows.

The local community will derive benefits and interest from this project through the provision of explanatory boards at the trial site, visits to the trials site from interested local groups, and the provision of talks to interested local groups. While the trials activity itself may be somewhat technical and specialised, the need for, and benefits of, this project can be used to illustrate the broader issues involved in re-creating and improving wildlife habitats. Part of this will be to explain the differences between poor and rich wildlife habitats, as illustrated by the two images above.

WHY THIS ACTIVITY IS NEEDED

Interest and initial research into the establishment of biodiverse grasslands commenced in the 1970s, led by grassland scientists at the former Institute of Terrestrial Ecology (now CEH). However, it was the advent of agri-environment schemes in the late 1980s and then implementation of the UK Biodiversity Action Plan in the late 1990s that resulted in increased efforts to restore grassland of high nature value to part compensate for the large losses of so-called ancient grassland in the countryside that occurred due the decades following WW2.

Thus, over the last 25 years in particular, there has been much effort expended in creating new grasslands of biodiversity value using both seed mixtures of suitable species and hay transfer from existing donor sites. In parallel, there has been a major programme of research into the best methods for creating or restoring biodiverse grasslands over the last two decades. Much of this has been funded by Defra as part of its Environmental Land Management Research and Development programme and contracted out to various Universities and research institutes.

There is now a large body of research that has been translated into practical advice as to how best to create biodiverse grasslands on former arable land or the restoration of botanical diversity to species-poor, agriculturally improved grasslands.

The final project on this general topic in the Defra research programme was completed in 2013 and the current thrust of the programme is now more focused on the role of biodiversity in the provision of Ecosystem Services. This is down to a perception that the key priority research on all aspects of the conservation of grassland biodiversity has been largely fulfilled over the last 20 years.

Appendix 1 outlines the roles of the main organisations that are involved with meadows in the UK, and indicates why none of these are likely to undertake the type of work covered by this trial.

Despite this likely lack of activity in the future, there are several research areas that would repay further research. For example, there has been limited research into how best to establish certain species that are known to be 'poor-performers' in projects to restore high-value grassland. There is a suite of species, many of more local distribution, that i) regularly fail to germinate or establish when sown in seed mixtures or introduced by the spreading of hay taken from existing high value sites or ii) tend to be species that are not often available in seed mixtures or present in hay donor sites.

They are though, important components of the overall richness of plant species that make up England's wildflower-rich neutral grasslands. It is important that restored grasslands projects do not inadvertently 'homogenise' the species composition of grasslands across the UK and are able to reflect variation in species composition and species richness according to factors such as soils, local climate, altitude etc. This is less likely to occur if poor performing species can successfully be established in restored grasslands. Appendix 2 provides a characterisation of plant species of neutral wildflower-rich grasslands according to difficulty of establishment.

The six species which will be used in this trial all fall into Group 3 in Appendix 2, the so-called poor performers which are generally poor competitors.

HOW THE ACTIVITIES WILL BE IMPLEMENTED

The trial will involve four species out of Pignut, Saw-wort, Dropwort, Meadow saxifrage, Burnet saxifrage and Bitter vetch. These plants are typical species of lowland neutral meadows and pastures, which previous work has shown to be difficult to establish. The primary reason for this is that they are relatively weak competitors and thus are 'out-competed' by more vigorous species. At the same time they were sufficiently ubiquitous that many organisations that are involved in restoring and improving neutral lowland meadows will be interested in including them in their work.

Not only are these species valuable components of species rich meadows, the same techniques that will improve the ability to establish these species are also likely to be helpful in relation to the establishment of other 'difficult' meadow species. Thus the benefits of this trial will be more broadly applicable than to just the species that are used in it.

Our trials will test alternative sward management approaches to curbing this competition. The main competitive factors that will be tested are:

1. Germination – by using seeds. (It is possible that we could look at using plug plants in the future).
2. Resistance to initial establishment, by using both bare soil and a 'loosened or disturbed' sward.
3. The use of different mowing regimes to control competitive plants with differing intensity.

Details of the trial treatments are shown in Appendix 3.

It is important to make clear that the aim of this trial is to provide meadow managers with relevant, practical and credible guidance – we are not doing 'science' for its own sake. Therefore the design and analysis of the trial is intended to address factors that occur, and can be controlled, in practice. The analysis of the results will focus on identifying whether or not genuine differences between the treatments have been found.

The trials will be carried out on land at The Woodland Trust's reserve on the Fordham Hall Estate, near Colchester, Essex. The trial site is shown in Appendix 4. This land has been made available rent free, and an access agreement will be provided covering the first five years of the trial.

Information about the trials and their outcomes will be made available to relevant audiences through a combination of articles in popular and semi-scientific magazines, talks and papers at relevant conferences, site visits, a website, blog and other social media.

THE ORGANISATION

The foundation will be run by a board comprised of:

- Steve Hallam – Managing Director of Naturetale Limited, Partner of Hallam Marketing, Secretary of International Fertiliser Society.
- Dr. Richard G. Jefferson CEng, CEnv, FCIEEM - Senior Specialist, Grasslands, Natural England.
- Mr. Andrew Savage, who is a trustee of five other charities and has knowledge of charity financing and law.

The nature of the foundation's aims and activities means that it will not be a member organisation.

There are different options for the type of organisation we could use:

- If its annual turnover is less than £5,000 p.a. it could be set up as a small charity. This is simple and, as it would not have to be registered with the Charities Commission, quicker.
- If the anticipated turnover is higher than £5,000 it would need to be set up as either a trust or a foundation community incorporated organisation (cio), and then registered with the Charities Commission. The main difference is that a cio is incorporated, so the trustees are not personally liable for the affairs of the organisation. Also, being incorporated, a cio can enter into commercial contracts in its own name (a trust cannot), see below for the role of contracts.
- However, even if turnover is expected to be less than £5,000, it can be constituted as a foundation community incorporated organisation (cio), and then registered with the Charities Commission. This is the option that we have decided to take.

LOCAL COMMUNITY INVOLVEMENT

The foundation will be happy to host visits by local groups who are interested in its activities. Once the plots are established there could be scope for local residents to take part in activities such as recording butterfly or bumblebee visits to the flowers of the species in the meadow.

In addition, depending on our ability to develop apps to 'de-skill' botanical surveying and recording, there could be scope to engage local residents in testing these.

There will also be scope to engage with the local community by using the trials to demonstrate broader points about what constitutes high value wildlife habitats and what is involved in creating them, as explained in the Outputs section.

RESOURCES THAT WILL BE REQUIRED

We do not envisage that the foundation will own any assets. The land needed for the trial work will be provided for free by The Woodland Trust, underpinned by an access agreement.

Trial fieldwork will be carried out by horticultural contractors who have relevant experience and expertise. We have obtained quotes from the contractor that the Woodland Trust uses on its sites in the locality. The contractors will provide all the equipment they need.

A trained botanist / ecologist will be required to carry out an initial botanical evaluation of the site, plus species counts in all trial plots once every year.

Office and administrative services will be provided for free by Naturetale Limited. All the equipment and resources required have already been obtained.

Resources required for app development:
Contract programming

USAGE OF CONTRACTS

The foundation will not undertake any contract work for other organisations and will have no revenue stream. However it will require the services of third party suppliers to provide the following:

- Land work – mowing, planting, fencing etc.
- Ecological / botanical surveys
- Soil test analyses
- App programming and project management work.

These will be subject to standard commercial contracts.

STATEMENTS OF MERIT

As required by the Charities Commission, statements of opinion regarding the merit of the objects of the NRF have been obtained from relevant independent experts. These are shown in Appendix 5.

APPENDIX 1

ORGANISATIONS INVOLVED WITH MEADOWS

Defra / Natural England (NE)	Historically have been the primary commissioning body of research into meadow establishment and management. A change in research focus, combined with continuing budgetary constraints, means that further research into aspects of meadow establishment is unlikely to be commissioned.
Environment Agency (EA)	The EA does have a biodiversity remit, but it utilises techniques that have been developed by other agencies, rather than doing / commissioning any research of its own.
Centre for Ecology and Hydrology (CEH)	The leading scientific research organisation operating in this field – very high powered and employs leading academics. It undertook much of the research that was commissioned by Defra. Whilst, CEH is able to tender for commissions from third parties, its own research priorities tend to be less focused on practical grassland restoration.
Universities	In the past ecology departments at some universities have carried out research that has been commissioned by Defra or NE. It is unlikely that priority would be given to research aimed at informing practical meadow restoration.
The Wildlife Trusts (TWT)	Their role is to manage existing sites and, where appropriate, create or restore new meadows. However TWT tend to use techniques that have been developed by third parties, or adapt techniques by practical trial rather than undertaking specific scientific research.
Plantlife	The leading NGO focused entirely on plants and, to a lesser extent, habitat conservation. They generally do not get involved in practical conservation, although they do manage one or two reserves, and are jointly leading the Coronation Meadows project. This is using established techniques such as green hay and brush harvesting.
Botanical Society of the British Isles (BSBI)	Their focus is to advance the study and enjoyment of wild plants and support their conservation in Britain and Ireland. This largely involves co-ordinating national and local surveys of plant distribution. It does not involve commissioning research into habitat restoration techniques such as for meadows.
Royal Society for the Protection of Birds (RSPB)	They do manage grassland and meadows on many of their reserves, but will use existing techniques. With their focus on birds they would expect others to initiate development or research work relating to meadows.
National Trust (NT)	They are extensive land managers, which will include meadow management. However, as with TWT and RSPB they will use existing techniques and unlikely to commission specific research or undertake scientific trials
Flood Plain Meadows Project (FPMP)	This project provides advice on the creation of new meadows. However they would base this on existing techniques that have been developed by others.
The Woodland Trust	As per the RSPB and NT.
The Forestry Commission	As per the RSPB and NT.

Note: this list is not exhaustive, but does cover the main organisations that operate in this area.

APPENDIX 2

A CATEGORISATION OF LOWLAND NEUTRAL MEADOW SPECIES

The species listed below are divided into three broad categories relating to their ability to colonise new sites or establish in grassland restoration or creation sites. These should be used only as a general guide.

Group 1

Good competitors, tolerant of a wide range of conditions and may be present on more fertile grassland. Some species are capable of vegetative spread.

Black medick (N)
Bulbous buttercup (N a good competitor once established, but can be difficult to establish from sown seed)
Common bird's-foot trefoil (N, C, A)
Common cats-ear (N)
Common knapweed (N, C)
Common sorrel (N)
Cuckoo flower (N)
Lesser yellow trefoil (N)
Meadow buttercup (N)
Meadow vetchling (N)
Oxeye daisy (N, C)
Ragged-robin (N, needs wet conditions and can tolerate more acidic soils)
Red clover (N)
Ribwort plantain (N)
Rough hawkbit (N, C, A)
Self-heal (N)
Wild carrot (N, C)
Yarrow (N, C)

Group 2

Species likely to do reasonably well being moderately good competitors, but tolerating a more limited range of conditions and characteristic of more species-rich, less fertile conditions.

Agrimony (N,C)
Cowslip (N, C)
Lady's bedstraw (N, C, A)
Meadowsweet (N, and characteristic of damper conditions)
Salad burnet (N, C)
Tufted vetch (N)
Yellow-rattle (N, C)

Group 3

Species unlikely to do well. Stress-tolerant species that are poor competitors, with specific requirements and characteristic of nutrient-poor grassland.

Betony (N, C, A)
Bitter vetch (N)
Burnet-saxifrage (N, C)
Devil's-bit scabious (N, C, A)
Dropwort (N, C)

Dyer's greenweed (N, C)
Fairy flax (N, C)
Field scabious (N)
Great burnet (N)
Hairy violet (C)
Hoary plantain (N, C)
Meadow saxifrage (N)
Pepper-saxifrage (N, C)
Pignut (N)
Sawwort (N, C, A)
Spring sedge, Glaucous sedge (N, C)
Tormentil (N, C, A)

This categorisation is modified from Natural England Technical Information Note TIN050, *Selecting indicators of success for grassland enhancement*.

Species in bold are to be included in these trials.

APPENDIX 3

DETAILS OF TRIAL TREATMENTS

FIRST YEAR WORK PLAN

Pre treatment

Take soil samples of experimental area using standard protocols and analyse for pH, total nitrogen, loss on ignition, plant available phosphorus and potassium.

Carry out a base line survey of the site and assign DAFOR values, plus conduct five representative quadrats across the site.

Mow existing grassland area subject to the experiment (see below) to a height of 5cm

Establish 2 pre-treatments 1) do nothing (control) 2) harrow / rotovate to create 75% bare ground with a coarse tilth (sieve profile to be specified?) replicated twice.

To each of these four plots hand sow seeds of the four selected species at 100 seed m⁻² in autumn. Roll plots with small ring-roller one day after sowing.

Control plot 1: cut twice, in late June and early September.

Control plot 2: cut three times – late May, late July, and mid September.

Harrowed Plot 1: cut twice, in late June and early September.

Harrowed plot 2: cut three times – late May, late July, and mid September.

Replicate 3 times giving a total of 12 plots

SECOND YEAR WORK PLAN

Establish 12 further plots, replicating those set up in Year 1

Continue with mowing regimes as for Year 1

THIRD YEAR WORK PLAN

Establish 12 further plots, replicating those set up in Years 1 and 2, taking the total to 36

Continue with mowing regimes as for previous years

FOURTH AND FIFTH YEAR WORK PLANS

Continue with mowing regimes as for previous years

Suggested Plot sizes

Each plot will be 5 x 5 metres = 25m²: so the total area sown in each year will = 300 m², and the total trial area will be 900 m². The plots will be separated by 10 metres, which will enable GPS technology to distinguish between adjacent plots.

Monitoring

Within each of the 36 plots, randomly locate 0.5m x 0.5m quadrats and count all individual plants of the 4 species. This will probably be done annually, at a suitable time of year depending on which species are selected. Also recorded will be sward height and % bare ground. This will be repeated in every year that the trial is running.

Record data on suitable hand held device in a format that can be downloaded for subsequent statistical analysis. The latter is likely to involve repeated measures ANOVA (GenStat package)

APPENDIX 4

THE PRIMARY TRIAL SITE



Width: 40 metres x Length: 250m

If each plot is 5 x 5 metres, and we have 10 metre between each plot, we could fit 3 rows each of 13 plots within this area: 39 plots in total.

APPENDIX 5

INDEPENDENT EXPERT STATEMENTS REGARDING THE MERIT OF THE OBJECTS OF THE NATURETALE RESTORATION FOUNDATION

TO WHOM IT MAY CONCERN

I have been asked to provide a letter of merit for the aims of the Naturetale Restoration Foundation (NRF), as required by the Charity Commission.

I am employed by Cumbria Wildlife Trust and have been involved in practical works restoring upland hay meadows in the county since 2008; mentoring volunteer surveyors and the provision of meadow advice and guidance for Natural England advisors. For the last year I have been working on the Coronation Meadows project, mostly in the assessment of sites for the project, the provision of restoration advice for project officers throughout England and Wales, and in-field training. I am a member of the Steering Group, Communications Group and Technical Group for the Coronation Meadows project.

Reflecting on my own experience and on the difficulties in introducing key species to meadows, I believe that the trial that the NRF is intending to run will generate new and useful knowledge about how best to establish specific meadow species. The species chosen, many of which are key ecological indicators for meadows, are ones that are hard to introduce and establish. Focussing on these, through seedbed preparation and mowing regimes in a systematic way should generate new information and improve the chances of successful restorations. There is already much information and experience on how to introduce generalist species to meadows, and hemi-parasitic annuals, but some species have been proving far more challenging to introduce and maintain.

Sharing the information learnt through their website will increase the knowledge shared throughout the conservation community, and will become part of the useful dialogue between the many organisations working to improve diversity in our grasslands.

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TO WHOM IT MAY CONCERN

I have been asked to provide my view of the merit of the objects of the Natureale Restoration Foundation (NRF), as required by the Charity Commission.

I became aware of the aims of the NRF during the summer of 2015, when I was approached by them to become a trustee. I was interested in doing so, but had to decline due to the commitment I had recently taken on with another charitable initiative, People Need Nature.

Previously I have been a trustee of The Grasslands Trust currently a Trustee of the High Weald Landscape Trust and People Need Nature Trust. I serve on the Coronation Meadows project Steering and Technical Advisory Committees. I managed the Beech Estate at Battle for 46 years, which contains the largest surviving tract of ancient species rich meadows in the South East. Here I developed the "Whole Crop Method" of re-creating species rich grassland now adopted by Natural England and used extensively across Britain. This contributed to my becoming the first ever National Winner of Natural England's Future of Farming Award, and subsequently receiving an OBE for Services to Conservation and to Environmental Land Management.

Based on the experience that I have accumulated I believe that the trial that the NRF is intending to run will generate new and useful knowledge about how best to establish specific meadow species that are known to be difficult. The species that will be included in NRF's trial are ones that pose a challenge when establishing a new species rich meadow, so having additional specific guidance on how to fine tune seedbed preparation and mowing regimes will expand the current knowledge base and improve restoration/creation outcomes. The alternative approaches to these that the trials will test are practical, relevant and realistic. The results will improve the ability of anyone who wishes to establish, or improve, a species rich meadow to increase the biodiversity of that meadow.

I know that the NRF has the technical ability to achieve their aims, and make their results relevant, because of the relevant knowledge and expertise held within their trustees. Based on the plans shown to me, they also have the organisational capability to deliver the outcomes they have set themselves.

I am particularly interested in their idea to use their trial work as a platform for the development of a mobile technology app to help manage conservation field work in general. It appeared to me that such technology would be of potential benefit to any organisation that has to manage staff, contractors or volunteers in the field, often a stumbling block for many restorations.

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