

Restoring diverse grassland: what can be achieved, where, and what will it do for us?

Workshop 2: Grassland restoration techniques

Question 1: What constraints (abiotic, biotic and socio-economic) need to be overcome to achieve the restoration of grassland biodiversity? Question 2: How do we overcome these constraints?

Constraints (Q1)	Solutions (Q2)
Resources and expertise –costs/funding advisor/project officer time,	In the absence of increased resources for the statutory agencies and A-E schemes, develop further local grassland projects (for example Hay Day, Hay Time are good exemplars) (preferably long-term) seeking funds from HLF, Charitable Trusts, Private Sector (?) Some provision made for these projects by NE through HLS/PAH payments.
Abiotic - available land, suitable soil (ideally low nutrient status, suitable pH for target community) topography and hydrology	Careful targeting of restoration to suitable sites using soil and other analyses, knowledge of location of existing semi-natural sites. Use of amelioration techniques e.g. soil stripping (only suitable in limited circumstances), deep ploughing. Seed bed or sward preparation, aftercare management of restored swards to reduce competition including appropriate weed control
Availability of livestock (including FYM where appropriate for meadows) and hay making equipment/labour, brush harvesting equipment and other equipment necessary for green hay transfer	Development of niche markets for livestock products (meat, milk, cheese etc). Maintenance/further development of grazing animal type projects, flying flocks, machinery rings Seek to influence national/EU livestock policy (policy advocacy)
Perception of poor quality herbage /hay yield from restored grasslands; also timing of cut can be constraint i.e weather; compared to silage or even haylage.	Increase awareness in farming community of other benefits of having semi-natural grasslands and the potential for development of niche markets. Showing farmers data on nutrient values of herb rich hay versus Lolium leys etc. HLS can provide longer term incentives for hay cutting.
Knowledge of the location of and availability of suitable donor sites for green hay or brush harvesting	Accessibility to and further improvement of inventories of priority grasslands (NE etc) Local Wildlife sites, Local record Centres
Knowledge of approved seed suppliers. Availability of suitable local provenance (and viable) seed from commercial seed houses	Flora Locale website. Local farmers/landowners on board as commercial enterprise selling species rich seed etc.
Keen, enthusiastic and knowledgeable farmers/landowners with resources to manage sites	Raise awareness, initiate training – face to face discussions (role of advisors, project officers), demonstration events etc

Lack of monitoring of restored grasslands	Seek to monitor (detailed quadrat sampling) grassland restoration projects where resources can be obtained. Closer links with universities and research bodies.
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- As a general comment the indications suggest that grassland creation is easier and possibly more successful than restoration certainly in the shorter-term.

Question 3 What further research and monitoring is required to underpin the restoration of grassland biodiversity?

- Meta-analysis of the large body of R & D and monitoring data on grassland restoration (high priority). Repeat soil testing some years post restoration to supplement botanical survey results.
- Grassland ecosystem services – following on from the publication of the UK National Ecosystem Assessment - further R & D on the range and detail of ecosystem services provided by semi-natural and restored grassland
- Grassland invertebrates – e.g. colonisation timescales of restored grasslands by selected guilds of invertebrates
- Further research into quality/taste/health benefits of livestock products (especially meat) derived from species-rich grasslands
- Long-term monitoring of grassland restoration sites, at least 10 years. Thorough IOS monitoring of HLS targeted restoration sites by NE advisers or contractors, universities etc.
- More research into the abiotic conditions (soils, hydrology, topography etc) of existing semi-natural wet grasslands, especially purple moor-grass and rush pastures, fen meadows, to inform the restoration of such communities
- Is deep ploughing an effective method to reduce fertility? Pywell suggested not. Has proved more suitable for woodland projects.
- Further research into the facilitator species debate – do they facilitate establishment of bigger stress tolerant herbs or do they inhibit establish of same? ASAP – practitioners need an answer on this one as we are using Smith's guidance which is – 'use facilitator species'!
- More recognition of BAP quality grasslands by NE advisors and more passing on information to : County record centres; for inclusion in the Grassland Inventory; for bodies who designate County Wildlife Sites; Wildlife Trusts etc. (So we have a better inventory of good sites).

General requirement for **technology transfer** to make applied research available to advisors, practitioners etc.

Another general comment and a Q raised throughout conference was; What is best restoration technique? There are several valuable Technical Information Notes on Natural England website. Wonder whether a short summary of key techniques would be useful i.e soil stripping, harrowing, ploughing, post management treatments and what would be best to maximise biodiversity. The latter was well illustrated (Pywell, Wagner) where ridge and furrow had been adopted providing more niche diversity.

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