Restoration of species-rich grassland in agri-environment schemes, 1987-2016.

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The birth of agri-environment

Effigies of the conservationists burned by Somerset farmers in 1983. Photo: Roger Hutchins

- Farmers responding to designation of West Sedgemoor SSSI, 1983

Environmentally Sensitive Areas (ESA) Scheme, 1987

South Downs ESA

- Tier 1: Permanent grassland on the chalk (£40/ha, £60 from 1997?).
- Aim: To maintain and, where there has been intensification or abandonment, *enhance* the nature conservation interest of calcareous grassland.

- Tier 3: arable reversion to permanent grassland

- Prescriptions: NO fertiliser, lime, herbicide, cutting before specified date.

Agri-environment monitoring programme

- Mandatory to monitor schemes
- Budget c. £1m/yr

- **Results for ESAs and CSS:**
- Existing grassland generally maintained but little evidence of enhancement.
- Arable reversion successful for landscape, archaeology, maintaining/re-instating livestock enterprises, possibly extending/ linking sites. Not very successful at creating wildlife habitats.

Monitoring project 2004: Evaluation of Arable Reversion Agreements in CSS and ESAs. (Kirkham, Davis et al, ADAS, 2006)

ESA 66 sites, CSS 45 sites

Agri-environment R&D programme

- Established c.1992.
- Ring-fenced budget (c. £2m/yr) until c.2012.
- Funded by MAFF/ Defra but managed by ADAS/FRCA/RDS/Natural England
- Grassland the largest component

Some key R&D projects

BD1404 Multi-site experiments on restoration of herb-rich grassland - arable reversion

BD1433 A review of the ecological characteristics of wildflower species in relation to the success of restoration

BD1459 Techniques to enhance the establishment and persistence of poor-performing species in grassland restoration (Microsites)   *£822k* 2007–12.

BD5101 Improving effectiveness of grassland restoration and creation options: development of a methodology for setting indicators of success and assessing progress ("Milestones of progress") *£240k*   2010-12

BD1451 Diversification of grassland through the manipulation of plant-soil interactions and the identification of indicators of restorability (DIGFOR). *£668k* 2004-09

CTE0822: Characterisation of soil structural degradation under grassland and development of measures to ameliorate its impact on biodiversity and other soil functions. *c.£750k* 2008-13

BD1466 Widescale enhancement of biodiversity: effects on other resources (WEB) *£476k*   2008-11

Monitoring and research findings

Soil suitability: *Nearly all species-rich grassland is found on soil which has a low soil phosphorus content (extractable P index 0 or 1)*

Relationship between soil extractable P and species richness
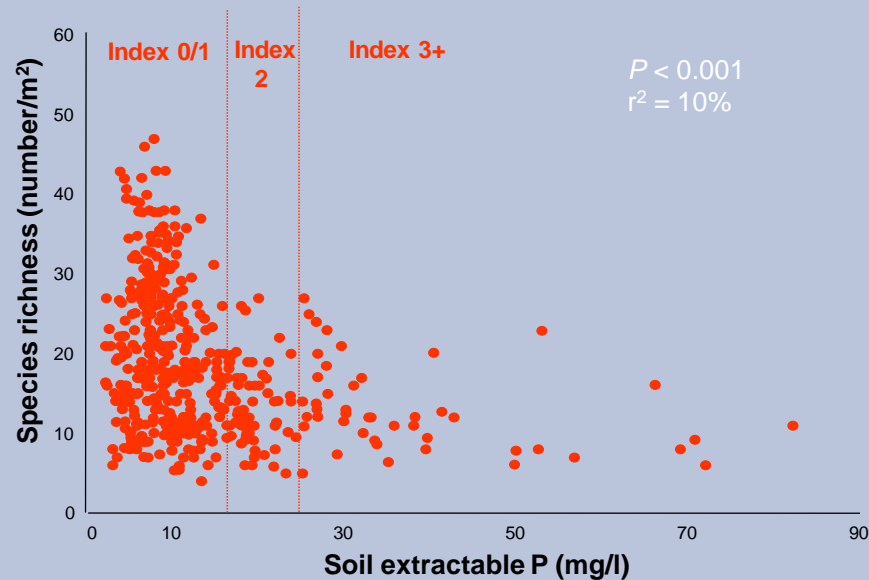
Diversification of existing grassland

- *Soils under improved or even semi-improved grassland contain very little viable seed of species characteristic of spp-rich grassland.*
- *Dispersal from adjacent habitat can be very slow.*

Diversification of existing grassland

- **Botanical diversification depends on seed introduction, and the presence of patches of bare ground.**

Diversification of existing grassland

- *Diversification may be very slow for a number of years, then a step change occurs.*
- *Introduction of hay-cutting management on a grazed pasture may stimulate such a step-change.*

Grassland creation (arable reversion)

- *Arable soils contain almost no viable seed of species characteristic of spp-rich grassland.*
- *Dispersal by wind of many species is only effective over very short distances (a few metres).*
- *Sowing species-rich seed mixtures can be very successful.*

Technical Information Notes

TIN 061 to 065 Sward enhancement

TIN 066 to 068 Arable reversion

TIN 036 Soil interpretation

TIN 038 Seed sources

TIN 050 Selecting IoS

TIN 060 Yellow rattle

http://webarchive.nationalarchives.gov.uk/20140523111208/
http://publications.naturalengland.org.uk/category/9001#
content

How could we do better? Design of Environmental Stewardship (Higher Level) 2005

- Flexible prescriptions
- Indicators of Success

Restoration
- Separate from maintenance
- Identify site potential and prioritise
- Require seed introduction in most cases

Creation (arable reversion)
- Do less of it.
- Better targeting: site potential, context.
- Better evaluation of need for seed.

- Put more science into Stewardship.

Defining species-rich grassland and potential for restoration

Decision keys to identify:

- Key 2a –semi-improved and species-rich grasslands
- Key 2b – BAP features (Priority Habitats).

- Key 2c – botanical enhancement potential of species-poor grassland. See also TIN061.

- Key 1 – potential of arable land for reversion to species-rich grassland. See also TIN066.

Options for species-rich grassland

- **HK6 Maintenance of species-rich semi-natural grassland** defined by Keys 2a and 2b, in good condition.

- **HK7 Restoration of species-rich semi-natural grassland** have *high or medium potential* (Key 2c).

- **HK8 Creation of species-rich, semi-natural grassland** on former arable, ley grassland or set-aside.   Must have *high or medium potential* (Key 1).

Uptake of HLS – species-rich grassland options (2005-2015)

Option	£/ha	Uptake		Lifetime cost (10 yrs) £M
		Agree-ments	ha	
HK6 Maintenance	200	3356	34474	57
HK7 Restoration	200	5413	67820	113
HK8 Creation	280	561	4791	11
GS Seed mix, capital item		(732)		(2.6)

How successful has agri-environment been?

- Advisers nominated successful sites in 2010-11.
- Most were creation rather than restoration.
- Of 73 sites, 62 met or exceeded threshold (Keys 2a and 2b) for BAP Priority Habitat
- Typically took 8-15 years

Natural England Commissioned Report 0107.

How successful has option HK8 been for creation of spp-rich grassland?

- Random sample of 36 agreements set up in 2006, resurveyed in 2011

- 12 (33%) met threshold for spp-rich grassland,

- of which 6 (17%) were in condition A.

- A further 11 (30%) met threshold for semi-improved.

M&E project LM0409

How successful has option HK7 been for restoration of spp-rich grassland?

- Random sample of 76 agreements set up in 2006, surveyed in 2007.
- 9% were spp-rich, mostly in condition B or C.
- 72% were semi-improved.
- Only 36% of agreements specified seed introduction.
- Resurveyed 2014 – about to be published.

MA01035 baseline report on HK6 and HK7

Recommended reading

Restoring diverse grassland: what can be achieved where, and what will it do for us? *Aspects of Applied Biology 115.* (2012).

See Association of Applied Biologists website.

Conclusions

- Grassland restoration and creation - the most demanding agri-environment options
- We have the techniques – can identify sites with potential, can create and restore.
- Takes timeliness and attention to detail.
- Restoration can be more difficult than creation – usually need seed introduction and a lot of bare ground.
- Land managers need strong support at outset, and ongoing.