Environmental Stewardship 2012 Review of options

Option (s) reviewed:

HK6 Maintenance of Species Rich Grassland £200/ha

Option use data

Uptake in December 2012: 2702 agreements covering 29,109.76 ha
Agreement Cost: £51,907,341.49

Option covers management of:

12,709.13 ha of BAP habitat (G04 –6107.2ha, G05 – 1622.36 ha, G06 – 3798.77 ha, G07 – 913.71 ha and G08 – 267.09 ha)

6 HER entries 1 Scheduled monument
1416 Agreements covering SSSI, 10 Agreements covering SPA +SAC, 223 Agreements covering SSSI + SAC, 18 Agreements covering SSSI + SPA, 84 Agreements covering SSSI + SAC + SPA
553 Agreements with Option in NPs covering 6561.71 ha
762 Agreements with Option in AONBs covering 13,435.08 ha

Delivery of environmental outcomes

Note that the terminology used in HLS differs from that used in the Biodiversity Action Plan (BAP) and Biodiversity 2020. These differences make reporting outcomes difficult.

Flora

HK6 is aimed at BAP Priority Habitat, and it should already be in good condition. There are six types of this (features G04-09) and one or more of them are in all HLS Target Areas and all theme statements. Botanical assessments carried out in the HLS monitoring project (Mountford & Cooke, eds, 2012) classified 69% of the HK6 area as BAP PH and they suggested that the option was well targeted since in most of the 31% of remaining cases habitat quality was good, despite falling below the threshold for Priority Habitat.

For most of the six feature types only about 20% was in condition A. Typically about 40% was in condition C – the reason often being insufficient frequency of positive indicator species.

Mountford & Cooke (eds, 2012) also made expert panel judgements of the likelihood of the desired outcomes of the option being achieved. A matter for considerable concern is that in c.5% of cases achievement was judged unlikely for most or all outcomes, and in a further 25% it was judged unlikely for some. These judgements stemmed in part from the high proportion of low-scoring assessments of the comprehensiveness and appropriateness of prescriptions and Indicators of Success.

Plantlife observational data (2012) identified a suite of dry grassland plants that benefit from HK6 maintenance of spp rich semi-natural grassland. These include four S41 species among other scarce plants.

Fauna

There is strong evidence in the literature of the benefits of spp-rich grassland for invertebrates, eg

- A review of grassland management practices in the UK (Wakeham-Dawson & Smith 2000) found one study that reported that densities of invertebrates such as species of mites and ticks (Acari), springtails (Collembola), flies (Diptera), beetles (Coleoptera) and millipedes and centipedes (Myriapoda) were higher in unfertilized permanent pasture than pasture receiving over 140 kg nitrogen/ha/year (Curry 1994).
- Agri-environmentally managed species-rich grasslands resulted in higher moth abundance and species richness than their conventional counterparts (Effectivness of agri-environment schemes for the conservation of farmland moths: assessing the importance of a landscape-scale management approach Elisa Fuentes-Montemayor*, Dave Goulson and Kirsty J. Park 2010)
- The abundance of invertebrate detritivores was highest in the species-rich grassland compared with all others, providing evidence of the ability of this habitat to breakdown and cycle nutrients (Tallowin et al 2005).

HK6 is a key delivery tool for habitat specialist grassland butterflies including S41 species. HK6/HK7 is the most widely used option in managing for each of the eight SI01 butterfly species strongly associated with grassland habitats. (NE unpublished data on Options used to manage for SI01 butterfly features)

Use of HK6 and cattle grazing supplements to successfully restore and improve connectivity of Marsh Fritillary populations on Dartmoor (Placket, J., Bourn N & Bulman C. 2012. In: Restoring Marsh Fritillary metapopulations on Dartmoor. In: Landscape-scale conservation for butterflies and moths: lessons from the UK. [ed. S. Ellis. N.A.D. Bourn C.R. Bulman,. & M.S. Warren], pp. 12-15. Butterfly Conservation, Wareham, Dorset).

Use of HK6 and cattle grazing supplement to restore individual populations and increase regional abundance of the Marsh Fritillary in the Wessex Downs. (Bulman C. Bourn N, belding R, Middlebrook I, Brook S, Shreeves B & Warren M 2012. In: Restoring Marsh Fritillary metapopulations on Dartmoor. In: Landscape-scale conservation for butterflies and moths: lessons from the UK. (ed. S. Ellis. N.A.D. Bourn C.R. Bulman,. & M.S. Warren), pp. 24-29. Butterfly Conservation, Wareham, Dorset).

Landscape

Unimproved hay meadows and pastures are (vitally) important to the character pf locally disticntive pastoral and mixed farming landscapes and will be identified as key landscape characteristics across England wherever they appear. They are a lasting reminder of traditional farming practices. They support distinctive mixes of grasses and wildflowers that are characteristic of calcarerous, neutral or acid soil conditions, often containing uncommon species such as orchids. Their conservation, restoration and creation will bring very significant landscape benefits. (Landscape effects of

Environmental Stewardship options for grassland 2012).

Resource protection and climate

Both soil organic matter and carbon were highest in the species-rich grasslands maintained under HLS, confirming the importance of these habitats as a carbon sink in the regulation of greenhouse gases (Hui, 2011; Watson et al., 2011).

Species-rich grassland had a lower bulk density and higher sand content compared to the intensively managed and ex-arable grassland which indicates a higher soil pore space and greater water infiltration capacity. This suggests that in flood plains the maintenance and restoration of extensive areas of species-rich grassland may provide more effective flood prevention and water storage than intensively managed grasslands (Tallowin et al 2005).

Long-term diversity restoration practices can yield significant benefits for soil C storage when they are combined with increased abundance of a single, sub-ordinate legume species. Moreover, we show that these management practices deliver additional ecosystem benefits such as N storage in soil and improved soil structure. (Additional carbon sequestration benefits of grassland diversity restoration De Deyn, B Gerlinde, Robert S Shiel, Nick, Journal of Applied Ecology (2011) Volume: 48, Issue: 3, Publisher: Wiley-Blackwell, Pages: 600-608)

Recent research, presented at the 3rd European Conference of Conservation Biology in Glasgow, demonstrates species-rich meadows are much more efficient for storing carbon dioxide than the "improved" (i.e. fertilized), but species-poor grasslands that predominate in modern agriculture" PRESS RELEASE - 31.08.2012, ECCB2012, Glasgow.

Because they support more species and a greater abundance of animals than Improved Grassland or Arable and Horticultural land (Cole *et al.* 2002), and are often positioned within farmed areas, Semi-natural Grasslands have the potential to provide services for farming, in particular,pollination and pest control (Cole, L.J., McCracken, D.I., Dennis, P., Downie, I.S., Griffin, A.L., Foster, G.N., Murphy, K.J. & Waterhouse, T. (2002) Relationships between agricultural management and ecological groups of ground beetles (Coleoptera : Carabidae) on Scottish farmland. *Agriculture Ecosystems & Environment,* **93**, 323–336)

Influencing delivery of environmental outcomes

Identify positive and negative factors impacting on delivery
e.g- increased cohesion of management between land owners and tenants

Outcomes depend upon setting appropriate sward heights and heterogeneity. Sward height compliance can be difficult on small upland sites especially where only part field is species rich. The decline in abundance of cattle and ponies in the uplands has affected the ability to deliver this outcome on some habitats and option payments don't cover costs of sourcing livestock or infrastructure set up (Jane Mills, Peter Gaskell, Countryside and Community Research Unit, University of Gloucestershire. Mervyn Lewis, Martin Riley, Rural Business Research Unit, Askham Bryan College. Louise Williams, Limestone Country Project. Yorkshire Dales Limestone Country, Project – Economic Research Final Report, May 2007).

Ongoing capital support for scrub/bracken control is often required on leniently grazed pastures.

(Mountford and Cooke, (Eds 2012) commented that the observed frequency of mismatches between features and options was important in that it could result in poor delivery of environmental outcomes. They also found the 'habitat quality inflation' observed in the FEPs led to some features being placed in maintenance options when restoration or creation would have been more appropriate. This was particularly an issue for the use of **HK6** and **HK7**, where **HK6** was used on semi-improved swards, instead of **HK7** or indeed where the latter was used on such swards with no clarity over how restoration would be brought about.

Adviser comment (2012): Option does not cover/reflect landscape objective sufficiently. Co-location of options can be important. Eg management of spp rich hay meadow can be very important in landscape terms but hedges/ponds need to be integral to this.

Deliverability of option for NE

In survey of NCAs in 2011 here was little evidence of trends in species richness when comparing paired maintenance and restoration options, although **HK6** was somewhat richer than **HK7**. However, comparison of the results with the equivalent information for the baseline survey showed that the quadrats in agreements that had been under HLS options for at least two years were almost consistently more species-rich (Mountford and Cooke Eds, 2012)

Advisers commented on " the inadequacy of capital payments for scrub clearance on species rich grassland (cf. heaths and wetlands where we can fund up to 100%)".

Quality of FEP data can be variable and is very dependent on: botanical knowledge of FEP Agent, surveys being carried out at the correct time of year, FEP Agent being suitably independent of applicant, FEP Agent spending adequate time assessing quality of grassland (this element of Fepping can be time consuming and therefore expensive), often do not give an estimate of extent of BAP habitat with a parcel, Poor data can make selection of sites and setting of IOS very difficult (Adviser comments 2012).

The overall proportion of options where more than one IoS was failed or judged likely to fail was 18%, with particularly high rates of failure in some grassland options :**HK6,** HK7 and HK16 (Mountford and Cooke, Eds 2012).

Whilst over half the land under **HK6** for maintenance of species-rich semi-natural grassland was mapped using codes corresponding to BAP quality grassland types, which would be appropriate, a significant proportion was mapped as semi-improved, improved or other habitats.

Advisers mostly consider that the payment is sufficient incentive (for meadows, normally when haymaking supplement is used).

Guidance on eradication of invasive species was typically poor with ambiguous wording that might not provide clarity to the agreement holder (Mountford and Cooke, Eds 2012)

Deliverability of option for customers

Customers broadly understand the benefits and can deliver the option to the required standard, but don't always find the option easy to implement (Natural England Adviser Survey results - internal.) Some are reluctant to commit to future hay making due to increased summer rain, lack of cattle & FYM availability in the SDA and possible lower yields. Allowance for earlier shut up and cutting may require earlier lambing and tupping and influence rough grazing and moorland management on many SDA farms.

Agreements can be wordy and difficult to understand and some farmers would appreciate a better understanding of why the suggested management is specified.

Issues of providing adequate lay back land to support grazing management of priority grasslands. Particularly where priority grassland sites are more fragmented and require supporting land to ensure these sites are managed effectively. (Anecdotal: Pastures New liaison and advice from 2008-12)

Verifiable prescriptions

Shutting up dates, sward heights, hay cutting dates are verifiable but require timely visits and monitoring. FYM inputs are more difficult to verify and can be misunderstood by farmers with applications rates often exceeding the recommended levels and farmers rarely know how much FYM they apply[12] and improved recording and soil tests may help to provide information on nutrients.

Key Lessons

- **For the first time in agri-environment schemes this is an option for which eligibility is restricted to BAP PH. This focuses the minds of applicants and advisers and makes the desired outcomes much clearer.**
- **The option broadly protects the existing BAP grassland resource and there are good examples of its use benefitting uncommon bird and invertebrate species. Inability to meet indicators is largely down to: its inappropriate use on semi-improved grassland; inappropriate shut up and cutting dates and/or FYM inputs on upland hay meadows; or lack of cattle/pony grazing on some pastures.**
- **FEP surveyors were often over-optimistic in assessing the botanical quality of grassland. The fact that two-thirds in HK6 was judged as BAP PH is creditable but there is room for improvement in targeting.**
- **There is also room for improvement in setting appropriate prescriptions and particularly IoS. A fundamental criticism levelled by the panel (Mountford and Cooke, Eds 2012) concerned the measurability of some Indicators of Success For example, reference to 'maintaining' species**

populations would require accurate baseline information and regular, accurate monitoring that could be beyond the scope of the agreement.

- **Pywell *et al.,* (2010) commented: "Future management prescriptions must reflect the need to restrict summer grazing of flower-rich grassland if support to the pollination service is to be maximised".**
- **Species rich grassland is regarded as being relatively resilient to climate change, however increased flexibility in management may be required eg cutting dates, stocking density to respond to the likely increased variance seasonal weather patterns and extreme events eg flooding, drought. Change hydrological regmines may lead to changes in community composition in lowland meadows that will need to be built into IoS.**

Mountford J O and Cooke A I (Eds 2012). Monitoring the Outcomes of Higher Level Stewardship: Results of a 3-year Agreement Monitoring Programme.