

**A Management Tool for Monitoring the Botanical Condition of  
Essex Wildlife Trust Grassland Nature Reserves**

**by**

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**Abstract**

There is an urgent need to monitor the wildlife value of grasslands and effectiveness of management. Grasslands are a priority habitat due to their fragility within succession. If they are not managed properly they will change their characteristics and floristic diversity very quickly. It has been recognised that certain species indicate floristic diversity whilst others indicate either a positive or negative effect of management and these species could be used to monitor sites.

**Introduction**

The vegetation of Britain has undergone major changes as a consequence of modern land use and certain plant species have declined within the last 50 years. Essex Wildlife Trust protects over 7,000 acres of land through the management of 89 nature reserves. Many of these reserves contain grassland habitats. To effectively manage all of these sites requires vast resources, both human and financial, and it is therefore important to focus the Trust resources on sites that require urgent action. As conservation resources are limited the method for monitoring Essex Wildlife Trust reserves is very similar to English Nature's *rapid assessment method* (Robertson & Jefferson, 2000).

A problem with management is getting the balance right. From an ecological viewpoint, grassland management should maximise the opportunities for plants to flower, set seed, and for as wide range of invertebrates as possible to establish viable populations on the site. At the same time it should prevent the grassland from changing into scrub or woodland. However, small amounts of scrub can be of interest depending on the conservation objectives for the site. On most grasslands, cutting once a year in autumn would match most requirements, but this could be less frequent on sub-soils where growth is slow and sparse. Such late cutting has the added advantage of giving the least time for re-growth over winter, and thus starting with an open sward in the spring in which the annuals can establish. Cutting earlier, as when a hay crop is taken in July will reduce the potential for invertebrates and small mammals, and give a longer period of re-growth during the growing season. In such situations, further cuts with the material removed or grazing will be needed. There will be a loss of botanical species if hay cutting in July is not followed by grazing or cutting.

If stock is unavailable, another alternative is to take an early cut with the material removed. However, this may need to precede the breeding season if birds of conservation importance may be benefiting from the grassland. This early cut can reduce grass vigour for up to 2 months, and two early cuts in April – if ground nesting birds are not an issue - may reduce sward height and vigour significantly. The main function of removing cut material is to avoid the development of a thick thatch that effectively smothers weaker,

smaller plants and to create colonising gaps. On the other hand, leaving some grassland uncut, perhaps around the edge of the site would benefit invertebrates, such as meadow brown butterflies and small mammals.

Botanical richness and diversity will differ for sites and therefore the data collected should enable analysis to reflect the current status of the grassland and allow comparisons from year to year. In addition, the data recorded must be of a consistently high quality. Recording various attributes of grasslands will allow a better overall assessment of the current status and future trends. These are: a) extent of interesting types of grassland; b) sward composition, c) sward structure. Sward composition can be divided into positive and negative 'indicator' species and grass/herb ratio. However, the 'indicators' must: a) be easy to identify; b) reflect positive and negative management rather than other factors, such as weather or life strategies; c) be easy to record in a repeatable way; d) be standardised to ensure continuity between years and samplers. The presence of particular species forms a critical part of the assessment and visits have to be made when these species are easily identifiable. Sward structure can be broken down into sward height, cover of litter and extent of bare ground.

Essex Wildlife Trust volunteers trialled the grassland monitoring system over the summer and their comments have been incorporated in this document.

### **Method**

Ideally grasslands should be visited annually. However the frequency has to be considered within the framework of available staff and volunteer resources. At best an annual visit although a minimum of one visit in a 3-year period may be more realistic. The priority is to ensure grasslands are managed and maintained to a predetermined condition. Management is vital to the conservation of grasslands and the speed at which grasslands can change is such that where possible more frequent visits should be made.

Grasslands should be assigned various targets bearing in mind their conservational objective. The various attributes with suggested targets include:

- 1) **Extent** - the extent of the wildlife interest feature being assessed  
**TARGET: NO LOSS OF AREA**
  
- 2) **Sward composition: grass/herb ratio** - this attribute refers to the proportion expressed as a percentage cover of non-Graminae (grasses) in the sward. This includes most species although a recent report suggests that competitive herbs were sometimes recorded in high proportions (Robertson *et al*, 2002). Visually estimate the proportion (%) of herb cover in the grassland. Herbs include all vascular plants except grasses, i.e. rushes and sedges are 'honorary' herbs. Estimate by looking down on the sward at stops rather than looking across the top of it. Patchiness should be averaged out.  
**TARGET: 40-90% HERBS**
  
- 3) **Sward composition: frequency of positive indicator species/taxa** - this attribute is of key importance in assessing condition as it reflects the ecological condition



and survival of particular assemblages of grassland species. The selection of species was based on a) species largely confined to unimproved grassland and not normally found in improved or semi-improved grasslands, b) species characteristic of and reasonably frequent in the grassland type, c) species relatively easy to identify and are present and obvious in the sward for a reasonable length of time. The following species were selected as positive indicator species of sward composition: Agrimony (*Agrimonia eupatoria*), adders tongue-fern (*Ophioglossum vulgatum*), common knapweed (*Centaurea nigra*), betony (*Stachys officinalis*), burnet-saxifrage (*Pimpinella saxifraga*), bird's-foot trefoil (*Lotus corniculatus*), cuckoo-flower (*Cardamine pratensis*), cowslip (*Primula veris*), devil's-bit scabious (*Succisa pratensis*), dyers greenweed (*Genista tinctoria*), grass vetchling (*Lathyrus nissolia*), green winged orchid (*Orchis morio*), rough hawkbit (*Leontodon hispidus/L. saxatilis*), harebell (*Campanula rotundifolia*), lady's bedstraw (*Galium verum*), salad burnet (*Sanguisorba minor*), meadowsweet (*Filipendula ulmaria*), meadow vetchling (*Lathyrus pratensis*), milkworts (*Polygala* spp.), oxeye daisy (*Leucanthemum vulgare*), pepper-saxifrage (*Silaum silaus*), Pignut (*Conopodium majus*), ragged-robin (*Lychnis flos-cuculi*), selfheal (*Prunella vulgaris*), small blue-green sedges (*Carex* spp.) sneezewort (*Achillea ptarmica*), tormentil (*Potentilla erecta*), yellow rattle (*Rhinanthus minor*).

**TARGET: AT LEAST TWO SPECIES ARE FREQUENT AND TWO OCCASIONAL, i.e. out of 20 stops species recorded between 5 and 8 times are occasional and those recorded 9 or over are frequent throughout the walk.**

- 4) **Sward composition: frequency of negative indicator species/taxa** - these are listed as injurious weeds under the Weeds Act 1959, creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), broad-leaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*) and ragwort species (*Senecio* spp.). Others also include cow parsley (*Anthriscus sylvestris*) and common nettle (*Urtica dioica*). Some negative indicators have been rejected because of difficulties of identification.

**TARGET: NO SPECIES MORE THAN OCCASIONAL THROUGHOUT THE SWARD OR SINGLY OR TOGETHER MORE THAN 5% COVER.**

- 4) **Sward composition: indicators of waterlogging** - Certain species are indicative of water-logging resulting in poor survival of grassland interest. Cover % of rushes (*Juncus* spp.), tufted hair-grass (*Deschampsia cespitosa*), large sedge (*Carex* spp.) (leaves more than 5mm wide), e.g. *Carex acutiformis*, large grasses (leaves more than 10mm wide, stout stems), i.e. *Glyceria maxima*, *Phalaris arundinacea*, *Phragmites australis*.

**TARGET: NO SPECIES TOGETHER OR SINGLY COVERING MORE THAN 10% OF THE SWARD.**

- 6) **Sward composition: frequency and % cover of all scrub and tree species** - scrub and tree species are clearly problematic for grasslands if they become

abundant because they shade out grassland plants. However small amounts of scrub can be of interest depending on the conservation objectives for the site. Any size of woody species, such as bramble, hawthorn and blackthorn seedlings, would be described as scrub in the targets rather than frequency. If scrub/tree species in pastures are more than occasional throughout the sward and less than 5% cover, they are soon likely to become a problem if grazing levels are not sufficient or if scrub control is not being carried out.

**TARGET: NO MORE THAN OCCASIONAL THROUGHOUT THE SWARD, i.e. out of 20 stops no species recorded more than 8 times throughout the walk.**

- 7) **Sward structure: average height** - this attribute is an early warning signal of the condition that will be deleterious to plant assemblages of particular grassland types. Visually assess the average height of the sward at intervals during the walk, i.e. the height of the main mass of herbage.

**TARGET: AVERAGE HEIGHT BETWEEN 5 – 15 CM.**

- 8) **Sward structure: litter** - the build up of dead plant material can signal problems due to insufficient removal of biomass by grazing or cutting. Vascular plants are usually very sparse and even limited appearance of dead material in a layer is likely to be noticeable and signal a problem. Visually assess the cover of any litter layer at intervals during the walk. Litter is dead plant material and is of concern where it forms a more or less continuous layer made up of fallen stems and leaves.

**TARGET: NO MORE THAN 25% OF THE SWARD.**

- 9) **Sward structure: bare ground** - An important ecological role of small patches of bare ground distributed through the sward is the provision of regeneration sites for seedlings. This can be achieved through the treading of livestock. Mowing alone in the absence of grazing can lead to a reduction of species richness. However excessive trampling (poaching) and over-grazing can increase bare ground to damaging levels. Bare ground must be visible from above without disturbing the vegetation.

**TARGET: NO MORE THAN 5%.**

Assessment involves a simple structured walk, stopping at predetermined points and recording various attributes. Sketch a route to follow on a map to cover the whole area. A W-shape walk is recommended. The paces do not need to be even as the aim is merely to be more objective about where to stop. Follow the route and at every stopping point search the area and record the various attributes (Appendix 1). The size of the search area should be a full circle of approximately one metre radius.

At the end of the walk the frequencies of each attribute are analysed to assign the grassland to various categories. Only one category can be assigned to the grassland. The categories are as follows:

- 1) *Botanically maintained*: All desirable attributes are within targets.



- 2) *Botanically declining*: One or more desirable attributes are outside targets compared to the previous visit.
- 3) *Botanically recovered*: All desirable attributes are now within targets but the feature was declining on the previous visit.
- 4) *Botanically recovering*: One or more desirable attributes are outside targets but there is evidence of recovery, i.e. one or more attributes are now within targets compared to being outside the targets on the previous visit.
- 5) *Botanically no change*: The same desirable attributes are outside targets and there is no change in the estimates for these attributes and the same discretionary attributes are outside the targets.
- 6) *Partially destroyed / Destroyed*: If it has been removed or irretrievably altered.

### **Conclusion**

Management of grasslands is critical to their conservation and it is vital that if features are unfavourable or appear to be declining in condition then remedial action is necessary. In order to utilise Trust resources appropriately, priorities need to be assigned to different categories. Support from the Trust should focus on these priorities for the following year. This grassland monitoring system has been developed to take in to account the needs of grasslands on Trust reserves and the resources available to give a cost effective management tool.

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### **References**

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