

**SURVEY AND ASSESSMENT OF  
TRADITIONALLY MANAGED  
HAYMEADOWS AND  
ASSOCIATED GRASSLANDS  
IN SKYE AND LOCHALSH  
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## 1. SUMMARY

1. A survey of traditional haymeadows and associated grasslands was carried out in the crofting areas of Skye and Lochalsh during August 2003, to obtain information on their ecological status and management for the local Biodiversity Action Plan.
2. The sample stratum was limited as some meadows were already cut at the date of survey, and early flowering species such as orchids may have been under recorded.
3. Current flora was described using community (Dafor) and 2m x 2m quadrat (Domin) estimates, together with data on site conditions.
4. Information on present and past management was obtained from the owner/tenant/manager of each site.
5. National Vegetation Classification (NVC) categories were assigned to each site and an assessment of conservation status given.
6. Of 49 sites recorded, 39 retained a herb-rich haymeadow flora, classed as NVC MG 5 *Cynosurus cristatus* – *Centaurea nigra*; 10 were clothed with a taller vegetation dominated by *Filipendula ulmaria* (M 27 *Filipendula ulmaria* – *Angelica sylvestris*) or *Juncus effusus* (M 23 *Juncus effusus* – *Galium palustre*).
7. Traditional croft management of a cropping – hay rotation has given way on many crofts to permanent grass which is variously cut, grazed or not used. Cutting is now very largely for big bale silage with differences from hay management. Grazing is now often by sheep.
8. Comparison of several sites with earlier surveys shows a clear deterioration in floristic richness and conservation value. This is associated with management trends and ingress of coarser species, particularly *Juncus effusus*.
9. A potential may exist for the maintenance of managements conducive to species richness but this is likely to require distinct incentives which might best be applied through the crofting communities.

## 2. INTRODUCTION

The survey was undertaken as part of the Skye and Lochalsh Local Biodiversity Action Plan against a background of the importance of traditionally managed hay meadows in Skye and Lochalsh as a resource of species diversity. These are increasingly coming under threat due to changes taking place in the countryside scene. Crofting, as a method of land use on the limited areas of enclosed land, has persisted into the 21<sup>st</sup> century in many of the Skye and Lochalsh townships. However, the future viability of traditional management is being severely pressurised by modern sociological and economic trends. Information was therefore needed to gauge what changes were taking place in the vegetation of the haymeadows and whether management options were available to ensure conservation of the flora and habitat.

The Inner Hebridean Island of Skye lies off the north west coast of Scotland between 57°0' and 57°45' North. It is now connected to the mainland by the Skye Bridge at Kyleakin/Kyle of Lochalsh. Lochalsh District is an administrative division of Highland Region on the mainland of Scotland immediately next to Skye.

## **Geology**

The geological bedrock of Skye is very largely of Tertiary Igneous formations in the northern two thirds of the island, bordered by Mesozoic Jurassic sediments to the north east. Harder, Tertiary Igneous rocks occur in the Cuillin and Red hills, giving way to Cambrian limestone, Torridonian sandstone and Lewisian Gneiss in the south east. These latter rocks continue into the mainland at Lochalsh (Richey, 1961). Most crofting areas are however located on soils derived from drift deposits resulting from geological or recent weathering.

Geology, soils and land capability were described by Bibby *et al.* (1962) in the Soils Survey of Scotland. Information on soil groups and characteristics for individual crofts has been obtained from this publication. Similarly general details of climatic conditions are available in Birse and Dry (1970).

The agriculture of both Skye and Lochalsh consists predominantly of extensive sheep grazing with some upland beef enterprises. Arable cultivation is confined to very small areas on the most favoured croft lands. Apart from small local industries, tourism has been developed in recent years to be one of the main sources of income for the area.

## **3. REMIT**

- 3.1 To record the present state of vegetation on traditionally managed haymeadows and other grassland habitats in Skye and Lochalsh.
- 3.2 To identify key sites for this habitat type and record their locations.
- 3.3 To obtain information on the current management of these areas.
- 3.4 To make detailed descriptions of plant cover, noting especially species of high conservation interest and to classify the communities present according to the National Vegetation Classification.
- 3.5 To compare the present species composition of selected areas in Skye with that recorded in 1985 by A. Orange.
- 3.6 To evaluate the current condition and management of the grasslands in relation to maintaining their conservation value.

## **4. METHODS**

### **4.1 Selection of Sites**

Selection of survey sites was based on:

- a) A sub sample of the sites previously recorded by A. Orange (in Skye) and K Hutcheon (in Lochalsh), visiting those considered still to have potential conservation value.
- b) Additional sites suggested by local SAC staff in Portree
- c) Sites accepted in Skye for the Skye Grasslands for Corncrakes scheme

### **4.2 Site Survey**

After initial contact with local crofters and/or owner, each site was visually inspected as to suitability for this survey.

- 4.2.2 Field records were then taken, including those of aspect, slope, soil, landscape context, surrounding vegetation, appearance, sward height and structure, together with community and quadrat species lists and estimates of species abundance (Dafor and Domin values).
- 4.2.3 Samples of surface soil were taken on selected sites and photographs of the sward where possible.
- 4.2.4 Management information was obtained by discussion with the owner or local representatives and through telephone contact.
- 4.2.5 Site records, species lists and NVC Classification are incorporated into the appendix and tables of this report. Site and quadrat records were also transcribed on to SNH Community and Quadrat Grassland cards.
- 4.2.6 Dates of survey. The survey was carried out between 30 July and 28 August 2003, recording only sites which remained uncut at the date of visit.
- 4.2.7 Time spent on site. The average time spent on each site was 1-1.5 hours, plus an additional 0.5-1 hour if the crofter or neighbours were present.

## **5. SITES SURVEYED AND VISITED**

- 5.1 Tables 1 and 2 list the grassland sites surveyed in Skye and Lochalsh respectively, including site code number, map grid reference, survey date and croft owner. Figure 1 gives indicative positions on the maps of Skye and Lochalsh.
- 5.2 Table 3 lists additional sites visited but not recorded in detail.

## 6. SITE DESCRIPTIONS

Descriptions (aspect, slope, landscape context, geology, soil, archaeology) of each site are detailed in Appendix Tables LA1 - 18, SK1 - 31 together with vegetation content, sward appearance and structure, species lists, DAFOR values, quadrat information, NVC category, site assessment, plan diagram and photographs. Areas given for sites or grassland are estimates only. Similarly, locations and areas on the maps are indicative only. Table 10 gives approximate areas of the main physiognomic communities on each site.

## 7. NVC CATEGORISATION

Plant communities on each site were assigned to NVC categories by comparing plant community lists with accompanying descriptions in British Plant Communities (Rodwell, 1991,1992,1995).

The herb rich communities fell under NVC category MG 5 *Cynosurus cristatus*, *Centaurea nigra* and sub communities: *Lathyrus pratensis*, including *Juncus* sp. variant and *Danthonia decumbens*, a calcifuge variant. Some MG 5 sites contained a higher content of grasses. *Filipendula ulmaria* communities were M 27 *Filipendula ulmaria* – *Angelica sylvestris*. *Juncus* sites were MG 10 *Holcus lanatus* – *Juncus effusus* or M 23 *Juncus effusus* – *Galium palustre* rush pastures.

## 8. MANAGEMENT DETAILS

- 8.1 Management treatment of the site on the date of visit was recorded with observations relating to current management, i.e. presence of stock, condition of fencing, appearance of the sward, signs of poaching or other management activity, in addition to elements of the flora such as presence of arable weeds.
- 8.2 Details were sought from the croft owner/manager on management in the immediate recent past and also on the previous historical past as far as was known. Important data were dates since last cultivation, cutting and grazing management and dates whether grazed by cattle or sheep, intensity of stocking and information on manurial or fertiliser applications.
- 8.3 Indications of intended future management were obtained and also if the site had been accepted in any environmental scheme, such as Countryside Premium, Rural Stewardship or Skye Grasslands for Corncrakes scheme.

## 9. CONSERVATION VALUE

A High, Medium or Low Conservation Value was subjectively assigned to each grassland site. This was based on the floristic composition, uniformity, stability and area extent of the constituent communities, as well as current management.

Species diversity and presence of non-gramineous species characteristic of old grassland were taken as indications of Medium – High values. The occurrence of infrequently seen species such as orchids, globeflower would result in a High conservation value rating.

## 10. DISCUSSION

This survey describes the botanical composition of a sample of haymeadows and associated croft grasslands in Skye and Lochalsh, together with current management practices. The sites surveyed can be grouped into: (1) Herb-rich swards with relatively short (20-35 cm) herbage heights; mainly NVC and MG 5 communities; and (2) Tall herb sites with lower grass and herb contents and much taller (60-150 cm) vegetation; comprising M 27 and *Juncus* communities. Intermediate sites of mixed composition are grouped according to the predominant community.

### Phytosociology

The herb-rich communities were classed by Birks (1973) as the Braun-Blanquet and Tüxen *Centaureo - Cynosuretum* Association and the tall herb communities as *Juncus acutiflorus – Filipendula ulmaria*. In the National Vegetation Classification (Rodwell, 1991; 1992) the communities, respectively, are classified as MG 5 *Cynosurus cristatus – Centaurea nigra* and M 27 *Filipendula ulmaria – Angelica sylvestris*.

Table 4 summarises the NVC categories assigned to the survey sites.

### Distribution

The present survey confirms that the traditional hay meadows with a visually attractive appearance in the flowering stage, are of very limited occurrence and of highly scattered distribution. There is a range of diversity of species present which varies greatly with site (see Species Lists in Appendix) and associated management.

The tall herb communities are of much wider distribution in wet situations. These were not surveyed except on a limited number of crofts in the Skye Grasslands for Corncrakes Scheme.

### Comparison with Previous Surveys

A detailed NVC survey of Drumbuie – Duirinish in Lochalsh was conducted by Hutcheon (1997). Orange (1987) surveyed grassland sites of conservation value more extensively on Skye. Both surveys indicated a widespread occurrence of species with high conservation value, viz globeflower and orchids. In the present survey globeflower was seen in small quantities on three sites in Skye and one in Lochalsh. Orchids (fruiting) were recorded on three sites in Skye and four in Lochalsh. It should be emphasised that the Orange and Hutcheon surveys were conducted at earlier dates in the season when the globeflower and orchids were flowering and thus more conspicuous. To obtain more precise records of these early flowering species a mid-summer (June-July) reassessment would be desirable. However, in the present survey, orchid fruiting stems were not often seen though several crofters said orchids were present. Similarly, the tall large leaves of globeflower are relatively conspicuous but were rarely seen. Thus, in spite of possible under-recording, it is

difficult to avoid the impression that there has been a decline in numbers of these species. In some crofts the more regular and heavier grazing by sheep rather than less intensive use by cattle could be a major cause for this decline.

## **Management**

A very noticeable feature was the wide range of management regimes at present applied across the croft land surveyed, in many cases being specific to individuals.

### **Traditional Management**

Traditional management of the croft involved a rotation of 2-4 years cropping (potatoes, turnips, oats, oats-undersown) with 7 or more years of grass. The grass was cut annually in late summer to make hay for winter feeding of cattle and horses. The aftermath was grazed in autumn by cattle coming off the hill, then rested in winter before shutting up for the summer hay crop. FYM from winter housing would be returned to the land mainly for the crop phases of the rotation. Late summer cutting of the grass ensured flowering and seeding, and thus maintenance, of the sward components.

This management was the primary factor which resulted in the development of the hay meadow community, which is a unique and now scarce habitat in the British Isles. Similar meadows in the Yorkshire Dales (Smith, 1985) occur on more basic soils.

### **Present Management**

Very few crops are now cut for hay in the strictly traditional manner. Some are cut for hay which is collected as big bales, rather than the traditional temporary stocking before removal to the steading. However, the majority of meadows are now cut and baled moist for big bale silage. This is quicker, less weather-dependent, less labour intensive and can be done by a contractor. Other crofts are no longer cut, being either grazed year round, grazed autumn uncut for summer, irregularly cut in autumn, or neither cut or grazed. Only a minority of crofts still practise cropping in an arable/grass rotation. Clearly these deviations from traditional management can be expected to influence the meadow flora, e.g. Sites SK 1,2.

Also there are important differences between cutting for hay and for big bale silage (Table 5) which are bound to affect plant behaviour, bearing in mind that plant persistence depends on, (1) continuous seed supply; and (2) rapid competitive recovery after cutting.

### **Conservation Value**

Estimates of current and potential conservation value of sites surveyed are given in Table 8, there being approximately one third of the total in each of the High, Medium and Low categories. Table 9 gives a comparison of conservation value of sites previously surveyed by Orange, 1985, with estimates of current ranking.

Hutcheon (1997) gives a detailed evaluation of the National and local conservation importance of meadow sites in Drumbuie-Duirinish, Lochalsh. These considerations are broadly applicable to the High and Medium value sites on Skye.

From the sample of sites surveyed, a wide variety in habitat condition has been observed, which can be related to crofter differences in approach to and execution of sward management. Soils sampled in 10 sites showed moderate-high organic matters, similar acid pH (4.5-5.2) and low P. There were greater ranges in K, Mg and Ca contents (Table 6). Table 7 indicates the variety of cutting and grazing treatments given.

It is a widely acknowledged fact that neutral and herb-rich grasslands both in UK and Europe (e.g. the Swiss, Austrian and Italian wildflower meadows) are maintained by the primary management factor of late, infrequent cutting. Limited manuring using organic manures to prevent dominance of grasses and extensive light grazing in autumn/winter preferably by cattle are also important. As indicated above, the management being given to the croft meadows in Syke and Lochalsh not only includes a form of hay/late cutting but also subsequent relatively heavy grazing by cattle or more severe grazing by sheep. Supervision of grazing is kept to a minimum due to labour costs and sound fencing allows the possibility of more intensive grazing. Signs of late season poaching/pugging were seen in some of the swards. Grazing by sheep at high or uncontrolled stock densities appeared to be most damaging to floral diversity.

On many areas there has been an extensive invasion by soft rush, *Juncus effusus*, leading to crowding out of many of the smaller herbs. Similarly, *Filipendula ulmaria* is spreading on some sites, though this might be an advantage in providing early cover in the corncrake crofts.

### **Future Conservation Prospects**

The widespread traditional croft management which led to the development of hay meadows has but a tenuous presence on few and scattered crofts. Hay is still made usually by the older crofters, but big bale silage is now the norm. While removal of the mature herbage is beneficial to the meadow, consideration could be given to raising the cutting level which is often at the soil surface. Herbage yields would be lower (Reid, 1982) but fodder quality and the vigour of the sward would improve.

Some of the best sites visited were uncut (SK 22) or cut late in the season (LA 12). Such a lenient or lack of management could amount to neglect in the long term, with a risk of invasion of coarser species. A periodic cutting or grazing treatment would be beneficial. Initial floristic composition would also be critical.

It is debatable whether an 'ideal' prescription could be engineered to approximate to the former traditional haymeadow management, in order to conserve the habitat on selected sites (Smith, 1974). There is a bias against making hay rather than silage due to weather and convenience factors. The new generation of crofters may need considerable incentives to carry out the required management. Clearly some of current managements are unsustainable. In some townships only one crofter had machinery available or owns livestock to carry out the necessary management of all the crofts.

Absentee owners/tenants, decrofting of the croft homestead and development of the croft for building plot, contractor working, migration and dilution of the formerly tight-knit township community have led to a disruption of the sympathetic land management of crofting areas, characteristic of former times. This can only multiply the diversity of management likely in the future.

Many of the crofters contacted have a strong sympathy with wildlife conservation and place a high value on a diverse and attractive meadow flora. However, the modern crofters generally work, and may live elsewhere, and usually lack the resources for land management.

There could be merit in considering the development of cooperative management (through township communities) across several crofts to conserve habitat in favoured areas, e.g. Duirinish, Roag, Uig corkcrake area. Conservation features maintained could be given a high tourist profile highlighting international significance to promote increased income. Wildlife benefits may accrue from a joint management approach over wider area embracing several crofts, rather than piecemeal on individual crofts.

Possible sites that could be considered for future conservation initiatives include Loch Chaluum Chille and surrounding area, Drumbuie, Duirinish, Roag, Tarskavaig. Some roadside verges could also be considered as reservoirs of flower-rich diversity (Way, 1977). Uncut headland strips on the airstrip at Plockton would be another potential reservoir.

Specific threats to the maintenance of diversity are: decline of traditional management, intensive sheep grazing, invasion of rushes and other coarse species, decrofting of part of the croft, sometimes for building, and local development plans. In some areas it has been observed that restricted summer grazing, required by the Countryside Premium Scheme, has resulted in the accumulation of tall, thick herbage and consequent sharp decline in wildflowers and orchids.

From anecdotal reports and past management records of the survey sites and other references (Smith and Jones, 1991; Smith and Rushton, 1994; Crofts and Jefferson, 1994), there are strong indications that light-moderate grazing by **cattle**, even during the summer, has been an important factor in the development of the meadow flora. There could be scope for limited trial treatments to obtain evidence for future conservation prescriptions.

Isolated corncrake meadows appear to be vulnerable when surrounded by other land uses. Larger, blocked areas may well prove to be better targets for grant support. The possibilities of encouraging taller species, e.g. *Phragmites australis*, should be explored on these sites.

The Loch Chaluum Chille Valley area, once termed 'the Granary of Skye', is now an impenetrable jungle of giant *Juncus effusus*. The area appears to be agriculturally useless and of nil-low value for nature conservation. The possibility of developing the Loch's vegetation to a more open herbage, e.g. *Phragmites* or willow scrub is suggested.

In conclusion, the scarcity and international significance of the Skye and Lochalsh haymeadows requires continued attention from conservation bodies, with incentives and encouragement to the croft owners and managers. These would be best applied through the local croft communities with sensitive consideration of traditional crofter values.

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It should be noted that specific information which is personal to the crofter or croft management was freely given. It should therefore be held in confidence and not publicly used without reference to the crofter concerned.

## **REFERENCES**

Birks, H.J.B. (1973). Past and present vegetation of the Isle of Skye. Cambridge.

Birse E.L. and Dry, F.T. (1970). Assessment of Climatic Conditions in Scotland 1–3. Macaulay Institute for Soil research.

Bibby, J.S., Hudson, G. and Henderson, D.J. (1982). Soil and Land Capability for Agriculture. Western Scotland. Macaulay Institute for Soil Research.

Crofts, A. and Jefferson, R.G. (eds). (1994). The Lowland Grassland management handbook. English Nature/The Wildlife Trusts.

Hutcheon, K. (1997). Vegetation survey of Drumbuie, Kyle of Lochalsh. National Trust for Scotland.

Orange, A. (1987). A survey of haymeadows and associated grasslands in Skye, Ardnamurchan, Sunart and Lochaber. Nature Conservancy Council, Edinburgh.

Reid, D. (1982). The sward: its composition and management, in Rook, J.A.F. and Thomas, P.C. (eds.). Silage for milk production. Hannah Research Institute, Ayr.

Richey, J.E. (1961). British Regional Geology. Scotland: The Tertiary Volcanic Districts. HMSO.

Rodwell, J.S. (1991 – 1995). British Plant Communities. Vol 2 (1991) Mires and Heaths. Vol 3 (1992) Grassland and Montane Communities. Vol 4 (1995) Aquatic Communities, Swamps and Tall-herb Fens.

Smith, R.S. (1985). Conservation of Northern Upland Meadows. Yorkshire Dales National Park Authority. Bainbridge.

\_\_\_\_\_ (1988). Farming and the Conservation of Traditional meadowland in the Pennine Dales Environmentally Sensitive Area. In Usher, M.B. and Thompson, D.B.A. Ecological Change in the uplands. Special publication No 7 of the British Ecological Society. Blackwell.

Smith, R.S. and Jones, L. (1991). The phenology of mesotrophic grassland in the Pennine Dales, Northern England: Historic hay cutting dates, vegetation variation and plant species phenologies. *J. Appl. Ecology*, 28,42-59

Smith R.S. and Rushton, S.P. (1994) The effects of grazing management on the vegetation of mesotrophic (Meadow) grassland in Northern England. *J.Appl. Ecology*, 31, 13-24.

Stace, C. (1997). *New Flora of the British Isles*. Cambridge.

Way, J.M. (1977). Roadside verges and conservation in Britain: a review. *Biol. Conserv.*12,65-74.