Meadows and more: a botanical journal of five days on the Uists, Benbecula and Eriskay

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Meadows and more: a botanical journal of five days on the Uists, Benbecula and Eriskay

Owen Mountford (lead author)
Stewart Clarke, David Gowing, Emma Rothero & Hilary Wallace

Preamble
In the first week of July 2018, the Floodplain Meadows Partnership (FMP) held its annual steering group meeting with field excursions on the Outer Hebrides. The aim of the field part of our meeting was to familiarise ourselves with wet meadows (including those on machair) of the Uists and Benbecula, and compare their composition and ecology with related habitats further south in the UK. However, a chance for us to explore the other habitats of these islands was too good an opportunity to miss. Hence five of us arrived on the islands a few days before the main group and roamed more extensively, looking at a wide range of habitats in addition to meadows. The lead author’s role in this botanical journal was to note incidental observations made in addition to the formal study of the meadows. Hilary Wallace directed the quadrat recording in wet meadows, and the overall programme of work was coordinated by David Gowing and Emma Rothero of the Open University. Even during the FMP field excursions, we could not ignore other habitats entirely and Stewart Clarke (National Trust Freshwaters and Estuaries Specialist) paid special attention to the aquatic flora.

The Floodplain Meadows Partnership
The Floodplain Meadows Partnership was formed in 2006 by a core of organisations interested in the conservation ecology of this rare and threatened habitat. Its work over the past 12 years has been primarily funded by environmental charities, such as the Esmée Fairbairn Foundation. Other organisations have joined over time and the partnership now boasts ten members, who pool their data, knowledge and information with respect to wet meadows. The membership comprises The Open University, Natural England, Natural Resources Wales, Environment Agency, National Trust, Wildlife Trusts, Centre for Ecology and Hydrology, Field Studies Council, People Need Nature and the Royal Society for the Protection of Birds.

Since its inception, the partnership has only had limited interaction with Scottish groups, in the belief that classic floodplain meadows did not occur in Scotland. However, discussions with Jane Mackintosh and, more recently, Helen Doherty from Scottish Natural Heritage (SNH), have opened our eyes to the diversity of wet grassland that does occur in Scotland and the close parallels that exist between systems such as the wet machair and ground-water-fed meadows in the rest of the UK.

The developing appreciation of the machair ecosystem prompted us to visit the Hebrides at the invitation of SNH, with whom we hope to work closely in future to characterise the diverse grasslands and support their conservation on the basis of their rich heritage, both natural and social.
The Journal
The main body of this article comprises a day by day account of our travels and the plants we observed. Within each day, the records are arranged in the order that the observations were made. These records do not represent comprehensive surveys of the places we explored, but instead are notes on species that were deemed notable in some respect – especially to botanists and ecologists visiting largely from the south of England. Most records are localised by grid reference with some notes on the location and the habitats that were present. Taxonomy follows the 3rd edition of Stace (2010), whilst names (and numbers) of vegetation types are derived from the National Vegetation Classification (Rodwell 1992, 2000). Place names follow the spelling used by the Ordnance Survey.

Some species of note were frequently observed (on all 5 days) whilst travelling around the islands.

- *Comarum palustre* – colouring areas of mire by roads and in adjacent mires
- *Crocosmia x crocosmiiflora* – patches on banks by roads, mainly next to habitation
- *Glebionis segetum* – frequent in field corners, almost always where occasionally tilled
- *Lysimachia punctata* – an introduced species, in extensive patches on banks by roads, mainly (but not exclusively) next to habitation
- *Nymphaea alba subsp. occidentalis* – covering the surface of lochans and sheltered bays of larger lochs
- *Rosa rugosa* – apparently used in hedging by habitation but spreading from such sites along roadsides
- *Salix viminalis* – presumably planted for shelter by habitation but locally spreading

1st July 2018 (Benbecula and South Uist)
Arriving in the afternoon at the airport to a piper’s welcome, we travelled along the west coast of Benbecula stopping at a lochan before crossing to South Uist in search of one of the most unusual of Hebridean plants – the American Pondweed (*Potamogeton epiphyrus*). We returned to our base at the south end of Benbecula via meadows on the west coast of South Uist.

NF7855 near Benbecula Airport (Balivanich).
Prominent species of shorter roadside turf within the village and also locally southward toward Nuntun.

- *Anacamptis pyramidalis*
- *Dactylorhiza fuchsii subsp. hebridensis*
- *Galium verum*
- *Geranium pratense*
- *Leontodon saxatilis*

NF773250 small lochan near Loch Mor, Griminis (Benbecula).
These species occurred in shorter vegetation of the mire between lochan and minor road.
Anagallis tenella  Eriophorum angustifolium
Baldellia ranunculoides  Juncus bulbosus
Blysmus rufus  Oenanthe lachenalii
Caltha palustris  Pedicularis palustris
Carex echinata  Samolus valerandi
Carex panicea  Senecio aquaticus
Comarum palustre  Silene flos-cuculi
Dactylorhiza fuchsii  Triglochin maritima

NF7529 following a track to Loch a’ Chlachain east from A865.

a) NF752294 Edges of pools near main road.
   Carex arenaria  Equisetum fluviatile
   Carex disticha  Juncus balticus

b) NF754292 to NF757291 undulating moor with some boggy depressions.
   Botrychium lunaria  Pedicularis sylvatica subsp. sylvatica
   Dactylorhiza fuchsii  Platanthera bifolia
   Dactylorhiza maculata subsp. ericetorum  Potamogeton polygonifolius
   Euphrasia scottica  Schoenus nigricans
   Hypericum pulchrum  Triglochin palustris
   Narthecium ossifragum  Veronica anagallis-aquatica

c) NF757291 sheltered bay of Loch a’ Chlachain.
   A very few fragments of Potamogeton epihydrus were found floating at the shore
   but we could not confirm that there were rooted plants among the other pondweed.
   Eleocharis palustris  Menyanthes trifoliata
   Littorella uniflora  Nymphaea alba subsp. occidentalis
   Lobelia dortmanna  Potamogeton natans

d) NF757291 shores and banks of inlet of Loch a’ Chlachain.
   Anthoxanthum odoratum  Ophioglossum vulgatum
   Drosera rotundifolia  Pinguicula vulgaris
   Dryopteris aemula  Platanthera bifolia
   Festuca vivipara  Selaginella selaginoides
   Molinia caerulea

NF736345 - the meadows between Loch Altabrug and Loch a Mhoil, overwhelmingly
   forb-dominated.
   Angelica sylvestris  Potentilla anserina
   Dactylorhiza fuchsii  Ranunculus acris²
   Dactylorhiza incarnata subsp. coccinea  Rumex acetosa
   Dactylorhiza incarnata subsp. incarnata  Vicia cracca
   Dactylorhiza x kernerorum

74
2nd July 2018 (North Uist and Benbecula)

**NF797485** within the grounds of Isle of Benbecula House Hotel, including gravel and waste ground.

- *Anthyllis vulneraria subsp. vulneraria*
- *Crepis capillaris*
- *Epilobium montanum*
- *Epilobium parviflorum*
- *Euphorbia peplus*
- *Hypochaeris radicata*
- *Juncus bufonius sens. strict.*

Our journey took us onto North Uist, focusing mainly on machair on the north coast of that island but returning to look at a rich wet meadow site near Nunton on Benbecula. *Schoenoplectus lacustris* formed big beds in Loch Aonghais (NF8573).

Exploring the machair and associated habitat northeast and southwest of Hornais, Clachan Sands – the former near Corran Ghoulabaidh (tetrad NF87T and 87Y), the latter part of Machair Robach (tetrad NF87T and a small part of 87S).

- a) More widely distributed species in these tetrads in suitable habitats (machair dune grassland and slacks).
  - *Ammophila arenaria*
  - *Anacamptis pyramidalis*
  - *Anagallis tenella*
  - *Anchusa arvensis*
  - *Anthyllis vulneraria subsp. vulneraria*
  - *Avenula pubescens*
  - *Campanula rotundifolia*
  - *Cardamine pratensis*
  - *Carex arenaria*
  - *Carex demissa*
  - *Centaurium erythraea*
  - *Cerastium diffusum*
  - *Comarum palustre*
  - *Dactylorhiza fuchsii*
  - *Eleocharis uniglumis*
  - *Euphrasia arctica subsp. borealis*
  - *Hydrocotyle vulgaris*
  - *Koeleria macrantha*
  - *Lathyrus pratensis*
  - *Linum catharticum*
  - *Mentha aquatica*
  - *Myosotis laxa*
  - *Polygala vulgaris*
  - *Potentilla anserina*
  - *Primula vulgaris*
  - *Ranunculus flammula*
  - *Sedum acre*
  - *Succisa pratensis*
  - *Thalictrum minus*
  - *Thymus polytrichus*
  - *Trisetum flavescens*
  - *Vicia cracca*

- b) **NF874767** sandy short grassland bank between car park and shore.
  - *Coeloglossum viride*
  - *Dactylorhiza purpurella*

- c) **NF878772** by stream outfall of Allt Gulabaidh, mainly on upper strandline.
  - *Atriplex glabraiusscula*
  - *Cakile maritima*
  - *Honckenya peploides*
  - *Tripleurospermum maritimum*
d) NF878773 etc. on moist machair. A plant that appeared to be a hybrid between *Dactylorhiza ebudensis* and *D. fuchsii* occurred as well as:

| Coeloglossum viride | Pinguicula vulgaris |
| Ophioglossum vulgatum | Selaginella selaginoides |

e) NF880774 etc normally wet depressions (the habitat was markedly parched during our visit).

| Caltha palustris | Galium palustre |
| Dactylorhiza incarnata subsp. coccinea | Juncus balticus |
| Dactylorhiza incarnata subsp. incarnata | Molinia caerulea |
| Dactylorhiza purpurella | Pedicularis palustris |
| Filipendula ulmaria | Salix repens |

f) NF88327752 in slightly hummocky slack.

| Calliergonella cuspidata | Eriophorum angustifolium |
| Caltha palustris | Holcus lanatus |
| Carex dioica | Juncus articulatus |
| Carex nigra | Pedicularis palustris |
| Carex panicea | Pinguicula vulgaris |
| Cynosurus cristatus | Plantago maritima |
| Dactylorhiza ebudensis | Prunella vulgaris |
| Dactylorhiza incarnata subsp. coccinea | Rhytidiadelphus squarrosus |
| Dactylorhiza incarnata subsp. incarnata | Schoenus nigricans |
| Dactylorhiza x latirella @ NF88357751 | Trifolium pratense |
| Danthonia decumbens | Triglochin maritima |
| Eleocharis palustris | Triglochin palustris |

g) NF884776 as latter but with short sedges commoner.

| Carex dioica |
| Carex pulicaris |
| *Dactylorhiza x venusta* |

Figure 1: *Dactylorhiza x venusta* (*D. fuchsii x D. purpurella*) in machair near Clachan Sands

© Graham Goodfellow
h) NF882778 primary dune crest and adjacent shore. The eel-grass was abundant stranded along whole length of beach here.

   Elytrigia juncea
   Zostera marina

i) NF871765 in upper part of fallow field.

   Erodium cicutarium
   Viola tricolor subsp. curtisii

j) NF869760 depressions in sheep-grazed machair.

   Dactylorhiza ebudensis
   Dactylorhiza purpurella
   Neottia ovata

k) NF868759 area of quite closely grazed machair where tufts of Schoenus are frequent in a depression at corner of field near fences. Known as a site for Dactylorhiza “lapponica” though this orchid was not seen on this occasion.

   Anagallis tenella
   Koeleria macrantha
   Ophioglossum vulgatum
   Pinguicula vulgaris
   Thymus polytrichus white

NF798752 in shorter swards of machair near Malacleit, by track.

   Cerastium diffusum
   Coeloglossum viride
   Honckenya peploides
   Lotus corniculatus
   Poa humilis
   Ranunculus acris
   Rhinanthus minor
   Thalictrum minus

NF765534 to NF765531 and NF766533 Nunton (Benbecula)
Especially toward shore of Loch na Liana Moire. We focussed on the wet meadow between track and loch.

a) Wet meadow with shallow (presently dry) ditches.

   Berula erecta
   Carex diandra
   Hippuris vulgaris
   Lythrum portula
   Oenanthe lachenalii
   Sagina nodosa
   Samolus valerandi
   Schedonorus arundinaceus
   Senecio aquaticus
   Triglochin maritima
   Triglochin palustris
   Veronica scutellata

b) Shore and shallows of loch.

   Alopecurus geniculatus
   Eleocharis palustris
   Eleogiton fluitans
   Equisetum fluviatile
   Littorella uniflora
   Menyanthes trifoliata

c) Environs of ruined wall by farmstead at Nunton.

   Aegopodium podagraria
   Odontites vernus
3rd July 2018 (Benbecula, South Uist and Eriskay)
This day’s exploration began with two short forays in southern Benbecula.

NF811484 shores of Loch na Creige Glaise etc near Hacklet.
This is a known as a site for *Spiranthes romanzoffiana* but we failed to find it. Just to north of this lochan is an inlet of the sea, called Ob Saile.

a) Freshwater lochan and shore.

- *Carex pulicaris*
- *Dryopteris aemula*
- *Eleogiton fluitans*
- *Festuca vivipara*
- *Littorella uniflora*
- *Salix aurita*
- *Sparganium angustifolium*

b) Shore of sea inlet.

- *Armeria maritima*
- *Juncus gerardii*

NF8650 looking at coastal moorland by Caolas Orasaigh, Uisegeabhagh at the end of the minor road from Hacklet.

- *Anagallis tenella*
- *Calluna vulgaris*
- *Carex binervis*
- *Carex pilulifera*
- *Carex pulicaris*
- *Empetrum nigrum*

Crossing onto South Uist, we made a series of stops on the west side of the island, spending most time near Dalabrog, again looking for the American Pondweed (*Potamogeton epihydrus*).

NF775396 in and by portion of Loch Druidibeag cut off by causeway of B890.

a) In the loch itself.

- *Littorella uniflora*
- *Lobelia dortmanna*
- *Sparganium angustifolium*

b) On the stony shore of loch.

- *Drosera anglica*
- *Eleocharis uniglumis*
- *Myrica gale*
- *Pinguicula vulgaris*
- *Ranunculus flammula*
- *Ulex europaeus on slopes*

c) NR774396 looking mainly at shrubbery and road verge by Hopewell Cottage but also a runnel/ditch (*) entering loch.

- *Aegopodium podagraria*
- *Lysimachia punctata*
- *Mentha x villosa*
- *Mimulus x robertsii*
- *Rosa rugosa*

Taking the access track from the A865 to the phone mast on Aisgerbheinn and parking near NF754230, we walked east to Lochs Fada and Crocabhat, exploring the shores.
a) Moist margins of track at NF754230.

*Alchemilla mollis*

*Senecio x ostenfeldii*

b) Moorland slopes between Lochs Fada and Crocabhat at NF759227, including boggy flats, flushes and below rocks.

*Dryopteris aemula*  
*Dactylorhiza fuchsii*  
*Rhynchospora alba*  
*Schoenus nigricans*

c) NF760223 Southwest shore of Loch Fada, in shallows or on stony shore. There was no sign of *Potamogeton epihydrus* though the BSBI DDb gives the precise location as NF76062249 – on the NE shore – and thus our search may have been wrongly targeted.

*Drosera anglica*  
*Littorella uniflora*  
*Lobelia dortmanna*  
*Menyanthes trifoliata*

...  
*Nymphaea alba subsp. occidentalis*  
*Phragmites australis*  
*Potamogeton natans*

d) NF758226 etc Far eastern end of Loch Crocabhat in shallows, stony shore and on rock crevices just above shore.

*Drosera anglica*  
*Drosera intermedia*  
*Lobelia dortmanna*  
*Nymphaea alba occidentalis*  
*Osmunda regalis (2 tiny plants)*  
*Sorbus aucuparia*

e) NF75882269 inlet at far north-eastern corner of Loch Crocabhat near stream outfall – shallow still water with much cast up material.

*Eleogiton fluitans*  
*Juncus bulbosus (aquatic form)*  
*Potamogeton epihydrus (submerged leaves/stem)*  
*Potamogeton natans*

**NF757172** lines of peat blocks by B888 near Buaile Dubh. Adjacent moist grassland and roadside ditch.

*Dactylorhiza fuchsii hebridensis*  
*Eleogiton fluitans*  
*Epilobium palustre*  
*Platanthera bifolia*

We made a very brief visit to Eriskay, stopping at NF787107 to look at roadside rocks and turf on the highest point of the minor road to the Barra ferry at Coilleag:

*Anthyllis vulneraria subsp. vulneraria*  
*Asplenium adiantum-nigrum*  
*Danthonia decumbens*  
*Koeleria macrantha*  
*Leontodon hispidus*  
*Leontodon saxatilis*  
*Poa humilis*  
*Salix repens*  
*Sedum anglicum*  
*Oenanthe fistulosa* was notably frequent in and by roadside ditches near Cille Pheadair at NF740197.
NF734201 near Aisled House, Cille Pheadair (Kilpheder).

a) Sandy grassland at end of lane, with moister depressions.

- *Anacamptis pyramidalis*
- *Avenula pubescens*
- *Dactylorhiza fuchsii* (large pale)
- *Gnaphalium uliginosum*
- *Thalictrum minus*
- *Viola tricolor subsp. curtisii*

b) Fallow strip:

- *Anchusa arvensis*
- *Avena strigosa*
- *Chenopodium album*[^1]
- *Fallopia convolvulus*
- *Secale cereale*
- *Sinapis arvensis*

At this point, the “forward party” (Ann Skinner, Graham Goodfellow, Hilary Wallace, Ciara Sugrue and Owen Mountford) was joined at the Isle of Benbecula House Hotel by the rest of the FMP group and other participants guided by Patrick Hughes (SNH).

A brief evening outing took us to NF7849 south of Lionacleit, where we looked at areas of fallow and cultivated machair, finding the following in Secale strips:

- *Anchusa arvensis*
- *Erodium cicutarium*
- *Euphorbia helioscopia*
- *Glebionis segetum*
- *Lamium amplexicaule*
- *Lamium hybridum*
- *Papaver dubium sens. strict.*
- *Polygonum aviculare sens. strict.*
- *Polygonum boreale*
- *Sinapis arvensis*
- *Urtica urens*

4th July 2018 (South Uist)

**NF7317 and 7318**

The group examined an area of hay-meadows and associated habitats north of the burial ground adjacent to North and South Boisdale toward Kilpheder.

a) NF736173 more disturbed ground in and around cemetery.

- *Artemisia vulgaris*
- *Bromus hordeaceus sens. strict.*
- *Galium aparine*
- *Plantago coronopus*

b) NF736175 fallow and cereal crop near cemetery.

- *Anagallis arvensis*
- *Anchusa arvensis*
- *Avena strigosa*
- *Glebionis segetum*
- *Odontites vernus*
- *Papaver dubium sens. strict.*
- *Spergula arvensis*

[c] NF736175 Rougher grassland by track to meadows and trampled parts of track itself.

- *Agrostis stolonifera*
- *Crepis capillaris*
- *Galium verum*
- *Juncus bufonius sens. strict.*
- *Matricaria discoidea*
- *Potentilla anserina*
- *Scorzoneraoides autumnalis*
- *Thalictrum minus*
d) Hay meadows, to east of track, focusing especially on those at NF736181 and NF736185.

<table>
<thead>
<tr>
<th>Species</th>
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<tr>
<td><em>Bellis perennis</em></td>
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<td><em>Carex nigra</em></td>
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<td><em>Centaurea nigra</em></td>
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<td><em>Cerastium fontanum subsp. vulgare</em></td>
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<td><em>Cynosurus cristatus</em></td>
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<td><em>Dactylis glomerata</em></td>
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<td><em>Dactylorhiza fuchsii</em></td>
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<td><em>Dactylorhiza incarnata</em></td>
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<td><em>Equisetum fluviatile</em></td>
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<td><em>Epilobium palustre</em></td>
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<td><em>Epilobium parviflorum</em></td>
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<td><em>Euphrasia arctica subsp. borealis</em></td>
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<td><em>Festuca rubra</em></td>
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<td><em>Heracleum sphondylium</em></td>
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<td><em>Holcus lanatus</em></td>
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<td><em>Hypochaeris radicata</em></td>
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<td><em>Iris pseudacorus</em></td>
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<td><em>Juncus articulatus</em></td>
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<td><em>Juncus bufonius sens. strict.</em></td>
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<td><em>Lolium perenne</em></td>
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<td><em>Myosotis laxa subsp. cespitosa</em></td>
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<td><em>Neottia ovata @ NF73571848</em></td>
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<td><em>Persicaria amphibia</em></td>
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<td><em>Trifolium pratense</em></td>
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<td><em>Trifolium repens</em></td>
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<td><em>Vicia cracca</em></td>
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**NF731229-735223**

Helen Doherty and Patrick Hughes led us to Loch Hallan, where we examined the transition between the loch, reed-swamp, wet grassland and machair. Our route took us north from the cemetery and Cladh Hallan (where *Thalictrum minus* frequent). Loch Hallan is designated as an example of a hard water Chara-dominated lake in the South Uist machair Special Area of Conservation; this is a rare lake type in the UK.

a) Generally distributed species.

<table>
<thead>
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<tr>
<td><em>Angelica sylvestris</em></td>
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<td><em>Avenula pubescens</em></td>
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<td><em>Cardamine pratensis</em></td>
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<td><em>Carex disticha</em></td>
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<td><em>Dactylorhiza fuchsi</em></td>
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<td><em>Dactylorhiza incarnata subsp. coccinea</em></td>
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<td><em>Hydrocotyle vulgaris</em></td>
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<td><em>Menyanthes trifoliata</em></td>
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<td><em>Molinia caerulea</em></td>
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<td><em>Neottia ovata</em></td>
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<td><em>Phragmites australis</em></td>
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<td><em>Pinguicula vulgaris</em></td>
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<td><em>Ranunculus acris</em></td>
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<td><em>Schoenoplectus tabernaemontani</em></td>
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<td><em>Silene flos-cuculi</em></td>
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<td><em>Triglochin maritima</em></td>
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<td><em>Vicia cracca</em></td>
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b) NF7313922959 Undisturbed transition to reedbed.

- Angelica sylvestris
- Centaurea nigra
- Dactylorhiza fuchsii
- Dactylorhiza maculata subsp. ericetorum
- Hierochloe odorata
- Lathyrus pratensis
- Molinia caerulea
- Neottia ovata
- Phragmites australis
- Poa humilis
- Ranunculus acris
- Silene flos-cuculi
- Triglochin maritima
- Vicia cracca

(Hierochloe also at NF7309923037).

c) NF7348722339 Rutted and disturbed transition from reedbed to wet grassland.

- Centaurea nigra
- Hierochloe odorata
- Holcus lanatus
- Phragmites australis
- Ranunculus acris
- Ranunculus flammula
- Silene flos-cuculi


d) NF73522236 Reedier area toward lake.

- Caltha palustris
- Cicuta virosa
- Hydrocotyle vulgaris
- Phragmites australis
- Schoenoplectus lacustris
- Schoenoplectus tabernaemontani


e) NF735223 shallow water of Loch Hallan; much of the loch is very shallow (<20 cm depth) and hence it was possible to explore large areas by wading.

- Chara aspera
- Myriophyllum spicatum
- Potamogeton gramineus
- Potamogeton hybrid

NF7536 by the chapel near Tobha Mor, looking at non-meadow habitats.

The FMP group recorded meadow quadrats to the north.

a) In disturbed sandy grassland.
- Arctium minus sens. strict.
- Polygonum boreale
- Thalictrum minus

b) Shallow water of Loch an Eilean, which is noted in the Special Area of Conservation designation as another example of a hard water loch with Chara spp. but this loch has a species composition more characteristics of a rarer lake type i.e. oligotrophic waters of sandy plains.

- Apium inundatum
- Baldellia ranunculoides
- Carex rostrata
- Littorella uniflora
- Myriophyllum spicatum
- Potamogeton gramineus

5th July 2018 (North Uist and Benbecula)

The full group explored broadly the same regions as the smaller party had on 2nd July but, apart from Nunton, visiting different sites.

NF887727 We broke the journey at the Fairy Knoll picnic area and especially the brackish lagoon
which has been formed where A865 causeway cuts it off from the sea near Aileodair. *Dryopteris aemula* grows on moorland banks by the lagoon, and the following were observed in shallow stony brackish water by picnic area:

- Lamprothamnium papulosum
- Ruppia cirrhosa
- Zostera marina (cast up)

**NF811751** etc machair meadows at Sollas on east side of track from main road. Mosaic of plant communities including some MG8 (Rodwell 1992), as well as dry grassland, mire and swamp, as well as seasonally flooded depressions (e.g. at NF811753 where *Catabrosa* frequent). Some areas exceptionally rich with at least 43 species per square metre.

\[
\begin{align*}
&\text{Alopecurus geniculatus} & \text{Equisetum fluviatile} \\
&\text{Apium nodiflorum} & \text{Equisetum palustre} \\
&\text{Callitriche cf platycarpa} & \text{Euphrasia arctica subsp. borealis} \\
&\text{Carex demissa} & \text{Glyceria fluitans} \\
&\text{Carex disticha} & \text{Hippuris vulgaris} \\
&\text{Carex dioica} & \text{Menyanthes trifoliata} \\
&\text{Carex lepidocarpa} & \text{Nasturtium officinale sens. strict.} \\
&\text{Carex panicea} & \text{Pedicularis palustris} \\
&\text{Catabrosa aquatica} & \text{Pinguiulca vulgaris} \\
&\text{Comarum palustre} & \text{Sagina nodosa} \\
&\text{Coeloglossum viride} & \text{Selaginella selaginoides} \\
&\text{Dactylorhiza incarnata subsp. coccinea} & \text{Triglochin maritima} \\
&\text{Dactylorhiza purpurella} & \text{Triglochin palustris}
\end{align*}
\]

a) In ditches by access track

- *Nasturtium x sterile*
- *Veronica anagallis-aquatica*

**NF7070** At Balranald nature reserve (RSPB), although we did look at the grassy dunes (finding *Coeloglossum viride* on the banks of a grassy dune hollow at NF701702), we spent most of our time in areas of ploughed machair left fallow for one year and two years. As well as relic Secale and *Avena strigosa*, these strips contained:

\[
\begin{align*}
&\text{Anchusa arvensis} & \text{Honckenya peploides} \\
&\text{Anthyllis vulneraria subsp. vulneraria} & \text{Papaver dubium sens. strict.} \\
&\text{Arearia serpyllifolia sens. lat.} & \text{Scorzoneroides autumnalis var. simplex} \\
&\text{Daucus carota} & \text{Thalictrum minus} \\
&\text{Erodium cicutarium} & \text{Trupleurospermum maritimum} \\
&\text{Glebionis segetum} & \text{Viola tricolor subsp. curtisii}
\end{align*}
\]
NF733686 Loch Sanndaraigh near Paible.

a) Wet/moist grassland and transition to dry acid grassland around loch.

- Carex disticha
- Comarum palustre
- Dactylorhiza purpurella
- Hydrocotyle vulgaris
- Juncus acutiflorus
- Linum catharticum
- Oenanthe lachenalii
- Molinia caerulea
- Salix repens
- Triglochin maritima

b)Species on the loch shore mainly north of the causeway, or in the loch waters (both shallows with a sandy bottom and deeper water). Much of the loch bottom was covered in a charophyte lawn whose composition was not worked out. In the shallows there were collections of spherical dark green gelatinous objects; these were thought to be colonies of *Nostoc pruniforme* but, without a microscope, we were not able to confirm this identification.

- Apium inundatum
- Baldellia ranunculoides
- Callitriche hermaphroditica
- Carex rostrata
- Chara virgata
- Eleocharis palustris
- Elodea nuttallii
- Equisetum fluviatile
- Fontinalis antipyretica
- Littorella uniflora
- Menyanthes trifoliata
- Myriophyllum alterniflorum
- Persicaria amphibia
- Potamogeton cf berchtoldii
- Potamogeton gramineus
- Potamogeton natans
- Potamogeton x nitens
- Potamogeton perfoliatus

NF766532

We returned to the wet meadow by Loch na Liana Moire near Nunton (see 2nd July 2018). Although quadrats were recorded in the meadow, an additional focus this time was the loch shore.

a) Dry rocky bluff on east side of northern inlet of loch.

- Aira praecox
- Antennaria dioica
- Danthonia decumbens
- Salix repens

b) NF7661353246 shallow peaty water on wet side of northern inlet.

- Apium nodiflorum
- Myriophyllum alterniflorum
- Myriophyllum spicatum
- Potamogeton coloratus
- Potamogeton gramineus
- Potamogeton natans

Among the beds of *P. coloratus* were some plants that appeared to be *Potamogeton x billupsii*, known from this lake since 1935 but with most localised records slightly further south (NF765528, NF764531, NF765530, NF765531). However, the material recovered was rather tattered and thus a definitive identification was not possible.

The following morning, the lead author flew back to Glasgow. The rest of the group followed in the afternoon, having recorded more quadrats in wet grassland near Loch
Hebridean Meadows in a UK context
The objective of the site visits by FMP was to assess the range and extent of wet meadows and pastures on the blacklands, behind the machair, in the context of the revised classification of the Calthion group of communities (Wallace and Prosser 2017). This classification updates that originally published in the NVC (Rodwell 1992, 2000). Increasing our understanding of the link between dune slack and damp meadow grassland was also a topic of interest.

Seven sites were visited (Table 1 and Map 1), many of which were exceptionally species rich, with up to 43 species in a 1 m² quadrat. A total of 111 species were recorded in the sample of 23 quadrats; the most frequent species being nine graminoids (Agrostis stolonifera, Anthoxanthum odoratum, Cynosurus cristatus, Festuca rubra, Holcus lanatus, Poa trivialis, Carex nigra and Juncus articulatus), six forbs (Bellis perennis, Caltha palustris, Cerastium fontanum, Ranunculus acris, Silene flos-cuculi and Trifolium repens) and a moss (Calliergonella cuspidata). So far, only some of the data have been input, thus the allocation of NVC units is provisional and likely to become clearer when the full range of samples has been analysed.

The sites that were managed for hay, Sollas and Kilpheder, appeared to support vegetation that was close to the newly described Caltha palustris-Bellis perennis
subcommunity of *Cynosurus cristatus-Carex panicea-Caltha palustris* grassland (MG8d), a unit that is concentrated in the north of England (Wallace and Prosser 2017).

Many of the grazed sites, which tended to have damper soils, still appeared intermediate in their floristic composition between the *Potentilla anserina-Carex nigra* dune slack community (SD17) and MG8c, the *Carex nigra-Ranunculus flammula* subcommunity of *Cynosurus cristatus-Carex panicea-Caltha palustris* grassland. The exception was Loch Bi where much of the vegetation was clearly closer to the MG8c subcommunity, grading to SD17 in places.

This close association between MG8 and SD17 has been noted by Rodwell (2000) and also by earlier users of the NVC in Somerset and it seems that analysis of an expanded data-set (including existing data from the sand dune survey and additional data from the meadows and pastures) is needed to unravel the botanical and hydrological distinctions between the two.

Table 1: Hebridean grassland sites assessed by the Floodplain Meadows Partnership with their management, number of quadrats recorded and NVC types to which the grassland has been allocated

<table>
<thead>
<tr>
<th>Site name</th>
<th>Grid Reference (centred on)</th>
<th>Management</th>
<th>Quadrats sampled</th>
<th>NVC units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Best fit</td>
</tr>
<tr>
<td>Sollas</td>
<td>NF811754</td>
<td>Hay meadows</td>
<td>19</td>
<td>MG8d</td>
</tr>
<tr>
<td>Loch Sanndaragh/ Paibeil</td>
<td>NF730680</td>
<td>Meadow</td>
<td>10</td>
<td>MG8c</td>
</tr>
<tr>
<td></td>
<td>NF733685</td>
<td>Lake margin</td>
<td>3</td>
<td>M25</td>
</tr>
<tr>
<td>Nunton – by Loch na Liana Moire</td>
<td>NF764533</td>
<td>Pasture</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Loch Bi</td>
<td>NF764425-764433</td>
<td>Pasture</td>
<td>9</td>
<td>MG8d</td>
</tr>
<tr>
<td>Howmore/ Tobha Mor</td>
<td>NF757368</td>
<td>Hay</td>
<td>11</td>
<td>SD17c</td>
</tr>
<tr>
<td>Loch Hallan</td>
<td>NF734223</td>
<td>Cultivated machair</td>
<td>2</td>
<td>MG8b</td>
</tr>
<tr>
<td>Kilpheder</td>
<td>NF736189</td>
<td>Hay</td>
<td>12</td>
<td>MG8d</td>
</tr>
</tbody>
</table>

**Summary**

The primary objective of our visit was to investigate grasslands whose floristic composition appeared closely related to some types of lowland wet grassland elsewhere in the UK. Our observations confirmed this close relationship, and showed that these meadows and pastures form an extremely valuable botanical resource, not only at a Hebridean but at a national scale. Unfortunately, these grasslands fall largely outside
the current conservation designations for the dunes and associated machair areas on the Hebrides. Their effective conservation may require a revision of the designations and management plans.

However, our attention was by no means restricted to these wet grasslands. To botanists from the south of England, the special joy of a visit to the Outer Hebrides is the apparent integrity and diversity of so much of the vegetation, with (semi-) natural habitats covering the landscape. Many of these habitats and vegetation types contain species that have decidedly declined in lowland England, often to the point of extinction, but on the Outer Hebrides are frequent, even locally abundant. The variety of loch types in such a small area is remarkable with transitions of fresh-brackish-saline and acidic to calcareous occurring within very short distances. Furthermore, unlike many waterbodies further south, most of those we visited appear to have been spared the ravages of nutrient enrichment from artificial fertilisers, intensive livestock of human development. In addition, some plant genera are especially diverse here e.g. marsh-orchids (*Dactylorhiza*), pondweeds (*Potamogeton*) and eyebrights (*Euphrasia*). Their location on the Atlantic fringe of Europe is reflected in the presence of some species whose centre of distribution is in North America e.g. Irish Lady’s-tresses (*Spiranthes romanzoffiana*) and American Pondweed (*Potamogeton epihydrus*).

Two of our group (JOM and SJC) were naturalised Fenmen, and were thus particularly interested to visit Loch na Liana Moire at Nunton. The hybrid between Fen Pondweed and Various-leaved Pondweed (*Potamogeton x billupsii*) has only ever been known at two locations, here on Benbecula and at Benwick in Cambridgeshire just 10-15 km from where both Stewart and Owen grew up. Sadly, this distinctive pondweed died out in Fenland over a century ago.

Comparing our records with those published in Preston et al. (2002) or on the BSBI database suggests that botanists visiting from elsewhere may make their biggest contribution by looking at roadsides or around buildings, where garden escapes and other species not native to these islands are more likely to occur. Visitors will understandably tend to focus on the riches of the native flora, but they should not neglect the apparently familiar, which they are tempted to dismiss as ubiquitous. For example, our observation of Petty Spurge (*Euphorbia peplus*) on Benbecula may, surprisingly, be amongst the most important records made during the visit!

We hope that this account of our travels is stimulating not only to other visiting botanists but also encourages local naturalists to share their observations of the remarkable riches of these islands.

**Acknowledgements**

Apart from the authors of this article, other members of the Floodplain Meadows Partnership were present and participated in the field excursions, including the recording of meadow quadrats: Sue Townsend, Richard Jefferson, Dominic Coath, Matt Johnson, Mike Dodd, Irina Tatarenko, Clare Lawson and Ann Skinner. Our visit was much aided both by Scottish Natural Heritage staff with detailed knowledge of the
islands (Helen Doherty, Debbie Spray and Patrick Hughes) and by scientists who had conducted or planned research on these Outer Hebridean grasslands (Robin Pakeman of the James Hutton Institute and Ciara Sugrue). Special mention should be made of Graham Goodfellow who accompanied the whole of the trip, contributing detailed knowledge (and photographs) of the remarkable variation in Dactylorhiza taxa present on these islands. Finally, we are grateful to Paul Smith (Botanical Society of Britain and Ireland recorder for vice-county 110) who commented on a preliminary report of our visit to these islands.

References

Notes on variation and identification in some species
(recorded generally on the islands unless a location is specified).

1. The pyramidal orchids near the airport were notably dark-coloured.
2. Many plants of Ranunculus acris were notably large-flowered
3. Plants of Crepis capillaris were hairier than is typical elsewhere in the UK
4. The yellow rattle at this location seemed intermediate between subsp. monticola and subsp. stenophyllus.
5. Chenopodium album is seemingly always a coarse toothed form
6. The watercress was identified as this hybrid at the time, and there are also records by Richard Pankhurst from 2006. However Paul Smith (BSBI recorder for the Outer Hebrides) has not seen the taxon in the vice-county.
7. This identification is probable only, as we were unable to distinguish the material from P. pusillus in the field.
8. At this location, the form of Ranunculus baudotii without laminar leaves

Hebridean Naturalist (2018) 18, 72-88