Harper's Island Wetlands

Dry Grassland Zone Botanical Survey Report

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An Chomhairle Oidhreachta
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TABLE OF CONTENTS

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1 INTRODUCTION

This report summarises the results of a botanical survey of the dry grassland zone at Harper's Island Wetlands. The results here provide a baseline to inform conservation grazing management of dry grassland and scrub.

2 METHODS

The survey consisted of:

- A walkover survey to compile species lists of vascular plants and bryophytes
- A relevé survey to sample the main vegetation communities and provide baseline data for subsequent monitoring
- Mapping of the vegetation communities

The walkover survey recorded all vascular plants and bryophytes in the 2.5 ha study area, excluding the recently planted native woodland. Particular attention was paid to any rare or protected species present. The size of the population of *Calamagrostis epigejos* was estimated.

Four 2 m x 2 m relevés were recorded, one in each vegetation community present. Locations of relevés were recorded as a GIS point layer, and they were physically marked with white PVC stakes. In each relevé, the relative abundance of all vascular plant and bryophyte species was recorded using the Domin scale, following the Irish Semi-natural Grassland Survey (ISGS) (O'Neill *et al.*, 2013). Other parameters recorded by the ISGS were also recorded:

- cover of bare soil
- cover of bare rock
- cover of leaf litter
- cover of surface water
- cover of total field layer
- cover of bryophytes and forbs
- forb : graminoid cover ratio
- median graminoid and forb heights

These additional data are frequently used in conservation monitoring and will aid in assessment of the effects of conservation grazing. A digital photo of the relevé was also taken.

Vegetation communities were mapped, following the Heritage Council's *Best Practice Guidance* (Smith *et al.*, 2011). A minimum mappable habitat size of 400 m^2 was used. Vegetation mapping was carried out digitally using QField on a ruggedised tablet and finalised in the office using QGIS 3.16 (QGIS Development Team, 2021).

Vegetation communities were assigned to Irish Vegetation Classification (IVC) types (National Parks and Wildlife Service *et al.*, 2019) with the aid of the ERICA classification tool (Perrin, 2020).

Communities were assigned to Heritage Council habitat types (Fossitt, 2000) and, where appropriate, Habitats Directive Annex I habitat types (European Commission, 2013).

Nomenclature follows Stace (2019) for vascular plants and Blockeel *et al.* (2021) for bryophytes.

3 RESULTS

3.1 Grassland Vegetation Communities

Locations of the four relevés along with environmental and structural data are presented in Table 1, and vegetation data are detailed in Table 2.

Table 1. Relevé grid references (ITM), layer cover data (Domin scale[1]), vegetation heights and forb:graminoid ratios

Relevé	1	2	3	4
X	578434	578545	578538	578498
Y	572604	572639	572665	572635
Soil Cover	0	0	0	0
Bare Rock Cover	0	0	0	0
Litter Cover	3	5	6	6
Open Water Cover	0	0	0	0
Total Field Layer Cover	9	9	10	10
Graminoid Cover	8	7	9	9
Forb Cover	7	8	4	5
Bryophyte Cover	6	6	0	0
Graminoid Height (cm)	21	50	75	45
Forb Height (cm)	20	45	25	25
Forb:Graminoid Ratio	45%	65%	10%	25%

Table 2. Cover/abundance (Domin scale[1]) of plant species in relevés

Relevé	1	2	3	4
Agrostis capillaris	5	.	.	.
Agrostis stolonifera	.	4	4	7
Ajuga reptans	1	.	.	.
Anthoxanthum odoratum	5	.	5	6
Arrhenatherum elatius	.	1	8	.
Brachythecium rutabulum	5	3	.	.
Calliergonella cuspidata	5	6	.	.
Carex divulsa	1	.	.	+
Cerastium fontanum	1	.	1	.
Cornus sanguinea	+	.	.	.
Cynosurus cristatus	3	1	.	.
Equisetum arvense	.	+	.	.
Festuca rubra	5	.	.	.
Holcus lanatus	5	5	3	5
Homalothecium lutescens	+	.	.	.
Jacobaea vulgaris (Senecio jacobaea)	+	.	1	.
Juncus gerardii	.	5	.	.
Lolium perenne	1	.	.	.
Lotus corniculatus	5	7	.	.
Luzula campestris	2	.	.	.
Odontites vernus	+	.	.	.
Plantago lanceolata	2	.	3	1
Poa trivialis	2	2	.	.
Potentilla anserina	3	4	.	.
Quercus sp. (young sapling)	1	.	1	.
Ranunculus acris	.	.	.	3
Ranunculus repens	+	.	.	2
Rhytidiadelphus squarrosus	3	.	.	.
Rumex crispus	.	1	.	+
Stellaria graminea	.	.	4	.
Taraxacum officinale agg.	3	1	+	5
Trifolium dubium	1	.	.	.
Trifolium pratense	4	5	.	.
Veronica filiformis	2	.	.	.
Vicia sativa	.	.	.	1
Vulpia bromoides	2	.	.	.

[1] Domin cover/abundance scale: 10=91-100%, 9=76-90%, 8=51-75%, 7=34-50%, 6=26-66%, 5=11-25%, 4=5-10%, 3=1-4%, 2=<1% and several individuals, 1=<1% and few individuals, += present.

The IVC did not characterise well the grassland vegetation at Harper's Island, as all affinities of relevés with IVC communities were below 50% (Table 3).

Table 3. Affinities of relevés to IVC communities

Relevé 1		Relevé 2		Relevé 3		Relevé 4	
Community	Affinity (%)	Community	Affinity (%)	Community	Affinity (%)	Community	Affinity (%)
GL3D	34.6	DU3B	46.6	GL3C	18.4	GL2C	40.9
GL3E	34.6	SM6C	11.5	GL2C	13.2	GL2B	38.3
GL4A	23.3	FE3D	7.1	GL1A	10.2	GL2A	7.9
GL3C	4.9	GL1B	5.4	GL2B	9.0	GL1A	6.9

Relevé 1 – Species-rich dry grassland

Relevé 1 – Species-rich dry grassland

Relevé 1 was recorded in a relatively low, open sward that supported a diversity of different grass and forb species, with no one species dominating. It was by far the most species-rich of the four relevés with a total of 27 plant species present. For the purposes of this report, the community was named the "Species-rich dry grassland community".

This community shared equal affinities with the IVC grassland communities *Cynosurus cristatus – Trifolium pratense* grassland (GL3D) and *Festuca rubra – Rhinanthus minor* grassland (GL3E) (Table 3). These are dry, calcareous to neutral semi-natural grassland communities. There are also affinities with the semi-improved, mildly acidic *Agrostis capillaris – Trifolium repens* grassland (GL4A). The first two communities have some affinities with the Annex I habitat 'semi-natural dry grasslands & scrub facies on calcareous substrates (6210).' The "Species-rich dry grassland community" at Harper's Island, however, would not correspond to Annex I calcareous grasslands, as only two positive indicator species for the habitat (Martin *et al.*, 2018) are present (*Homalothecium lutecens* and *Lotus corniculatus*). Under the Heritage Council classification scheme (Fossitt, 2000), this community can be classified as *dry neutral and calcareous grasslands* (GS1).

Relevé 2 – Wet *Juncus gerardii* grassland

Relevé 2 – Wet *Juncus gerardii* grassland

Relevé 2 sampled a small area of wet grassland with a high cover of *Lotus corniculatus*. *Juncus gerardii*, a coastal species characteristic of but not restricted to salt marshes, was a notable feature of the vegetation. It was the second most species rich relevé with a total of 14 plant species recorded. This community was labelled "Wet *Juncus gerardii* grassland".

This community has the greatest affinity with *Agrostis stolonifera-Calliergonella cuspidata-Carex arenaria* grassland (DU3B) (Table 3). This is a seasonally flooded coastal community characteristic of dune slacks that may also occur inland where there is similar seasonal flooding. There are also affinities with *Agrostis stolonifera-Potentilla anserina* grassland (SM6C), a community typically found in upper salt marshes where there is occasional inundation by brackish or salt water. *Juncus gerardii, Agrostis stolonifera, Potentilla anserina* and *Lotus corniculatus* are frequently found in this community and were present in Relevé 2. *Agrostis stolonifera-Potentilla anserina* grassland (SM6C) can also be found in inland sites periodically flooded by freshwater. "Wet *Juncus gerardii* grassland" at Harper's Island is probably best classified as *wet grassland* (GS4) rather than *upper salt marsh* (CM2), as it is not in direct contact with the sea or a lagoon.

Relevé 3 – *Arrhenatherum elatius* grassland

Relevé 3 – *Arrhenatherum elatius* grassland

Relevé 3 was dominated by tall *Arrhenatherum elatius*, with *Stellaria graminea* as the most abundant forb. It was the most species-poor (9 species) of the four relevés. Rank cover of tall graminoids over a dense litter layer has resulted in an absence of bryophytes and a much-reduced cover of forbs. This community is called the "*Arrhenatherum elatius* grassland" community in this report.

IVC affinities were especially poor for this community, perhaps due to the low

number of species and the dominance of *Arrhenatherum elatius*. The strongest relationship was with *Festuca rubra – Plantago lanceolata* grassland (GL3C), a species-rich, lowland meadow community. There were also affinities with *Holcus lanatus – Lolium perenne* grassland (GL2C), a species-poor, semi-improved community of damp meadows; *Juncus acutiflorus – Holcus lanatus* grassland, a species-poor, mildly acidic wet grassland community (GL1A); and the usually rank wet pasture community, *Juncus effusus – Holcus lanatus* grassland (GL2B).

Given the sward dominated by coarse grasses and tall forbs, the "*Arrhenatherum elatius* grassland" is best classified as an example of *dry meadows and grassy verges* (GS2) Heritage Council habitat type (Fossitt, 2000).

Relevé 4 – *Agrostis stolonifera – Anthoxanthum odoratum* grassland

Relevé 4 was characterised by a mixture of *Agrostis stolonifera, Anthoxanthum odoratum* and *Holcus lanatus*, with *Taraxacum officinale* agg. as the most abundant forb. As with the "*Arrhenatherum elatius* grassland" community, it was species-poor (10 species), dominated by grasses with a dense litter layer and an absence of bryophytes. The species composition of this community, identified as "*Agrostis stolonifera – Anthoxanthum odoratum* grassland", suggests that the soils where it occurs are more poorly drained than in the "*Arrhenatherum elatius* grasslands".

Relevé 4 – *Agrostis stolonifera – Anthoxanthum odoratum* grassland

This community is transitional between the IVC mesotrophic grassland communities *Holcus lanatus – Lolium perenne* grassland (GL2C) and *Juncus effusus – Holcus lanatus* grassland (GL2B), which are both typically rank and species-poor. Given the unmanaged nature of the grassland and the low cover and number of truly wet grassland species, the community is best considered an example of *dry meadows and grassy verges* (GS2) habitat.

3.2 Vegetation Community Map

The four grassland vegetation communities are mapped in Figure 1. The *Agrostis stolonifera – Anthoxanthum odoratum* grassland community was the dominant community. The Species-rich dry grassland community occurs on shallow soils in the south-west of the site, and the coarse *Arrhenatherum elatius* grassland community occupies the north-east end of the site. The *Juncus gerardii* wet grassland community occupies a damp hollow near the centre of the site.

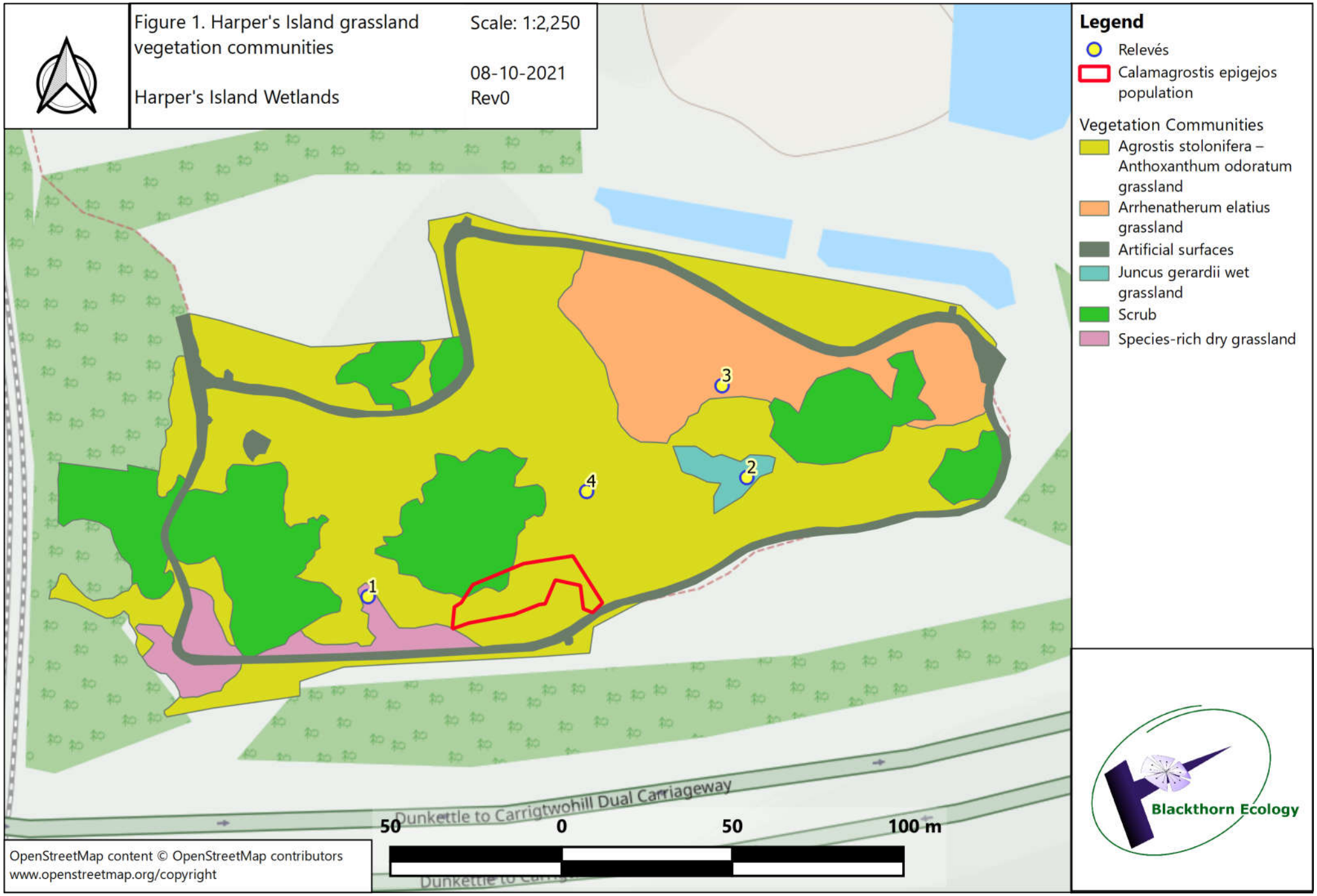
Figure 1. Harper's Island grassland vegetation communities
Scale: 1:2,250
08-10-2021
Harper's Island Wetlands
Rev0
Legend
Relevés
Calamagrostis epigejos population
Vegetation Communities
Agrostis stolonifera – Anthoxanthum odoratum grassland
Arrhenatherum elatius grassland
Artificial surfaces
Juncus gerardii wet grassland
Scrub
Species-rich dry grassland
1
2
3
4
Dunkettle to Carrigtwohill Dual Carriageway
50
0
50
100 m
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Also shown in Figure 1 are the positions of the four relevés and the location of the *Calamagrostis epigejos* population.

In 2009, a population of the legally protected *Calamagrostis epigejos*, which is listed as Vulnerable to extinction (Wyse Jackson *et al.*, 2016), was discovered in the Harper's Island grasslands. It was surveyed in 2012 as part of NPWS rare plant survey work. At the time, the population was estimated as occupying an area of approximately 360 m^2. At the time, the site was grazed by horses, whereas it is currently ungrazed. The population was mapped in 2021 as occupying approximately 434 m^2. Therefore, it appears to be spreading at Harper's Island, at least in the absence of grazing.

3.3 Species List

A total of 85 vascular plant species and 13 bryophytes (all mosses) were recorded in the dry grassland zone of Harper's Island (Table 4). Time on site permitted a reasonably thorough search, but this list cannot be considered comprehensive. Some species are likely to have been overlooked, particularly early-flowering species and small bryophytes.

Table 4. Vascular plant and bryophyte species recorded at Harper's Island grasslands

Scientific Name	Common Name
Vascular Plants	
Achillea millefolium	Yarrow
Achillea ptarmica	Sneezewort
Agrostis capillaris	Common Bent
Agrostis stolonifera	Creeping Bent
Aira caryophyllea	Silver Hair-grass
Ajuga reptans	Bugle
Anthoxanthum odoratum	Sweet Vernal-grass
Arrhenatherum elatius	False Oat-grass
Bellis perennis	Daisy
Blackstonia perfoliata	Yellow-wort
Calamagrostis epigejos	Wood Small-reed
Calystegia sepium	Hedge Bindweed
Carex disticha	Brown Sedge
Carex divulsa subsp. divulsa	Grey Sedge
Carex flacca	Glaucous Sedge
Carex otrubae	False Fox-sedge
Carex remota	Remote Sedge
Centaurium erythraea	Common Centaury
Cerastium fontanum	Common Mouse-ear
Cirsium arvense	Creeping Thistle
Cirsium palustre	Marsh Thistle

Scientific Name	Common Name
Cirsium vulgare	Spear Thistle
Cornus sanguinea	Dogwood
Crepis capillaris	Smooth Hawk's-beard
Cynosurus cristatus	Crested Dog's-tail
Dactylis glomerata	Cock's-foot
Dipsacus fullonum	Wild Teasel
Eleocharis palustris	Common Spike-rush
Epilobium hirsutum	Great Willowherb
Epilobium montanum	Broad-leaved Willowherb
Epilobium parviflorum	Hoary Willowherb
Equisetum arvense	Field Horsetail
Festuca rubra	Red Fescue
Fragaria vesca	Wild Strawberry
Galium aparine	Cleavers
Hieracium sect. Cerinthoidea	Hawkweed
Holcus lanatus	Yorkshire-fog
Hypericum perforatum	Perforate St John's-wort
Hypochaeris radicata	Cat's-ear
Jacobaea vulgaris	Common Ragwort
Juncus articulatus	Jointed Rush
Juncus bufonius	Toad Rush
Juncus conglomeratus	Compact Rush
Juncus effusus	Soft-rush
Juncus gerardii	Saltmarsh Rush
Juncus inflexus	Hard Rush
Juncus tenuis	Slender Rush
Lathyrus pratensis	Meadow Vetchling
Leontodon saxatilis	Lesser Hawkbit
Linum catharticum	Fairy Flax
Lolium perenne	Perennial Rye-grass
Lotus corniculatus	Common Bird's-foot-trefoil
Luzula campestris	Field Wood-rush
Medicago lupulina	Black Medick
Odontites vernus	Red Bartsia
Plantago lanceolata	Ribwort Plantain
Plantago major	Greater Plantain
Poa trivialis	Rough Meadow-grass
Potentilla anserina	Silverweed
Potentilla reptans	Creeping Cinquefoil
Quercus robur	Pedunculate Oak
Ranunculus acris	Meadow Buttercup
Ranunculus repens	Creeping Buttercup
Rosa canina	Dog-rose

Scientific Name	Common Name
Rubus fruticosus agg.	Blackberry
Rumex acetosa	Common Sorrel
Rumex crispus	Curled dock
Rumex obtusifolius	Broad-leaved Dock
Sagina procumbens	Procumbent Pearlwort
Salix cinerea subsp. oleifolia	Rusty Willow
Salix x multinervis	a hybrid willow
Stellaria graminea	Lesser Stitchwort
Taraxacum agg.	Dandelion
Trifolium dubium	Lesser Trefoil
Trifolium pratense	Red Clover
Trifolium repens	White Clover
Ulex europaeus	Gorse
Urtica dioica	Common Nettle
Verbascum thapsus	Great Mullein
Veronica chamaedrys	Germander Speedwell
Veronica filiformis	Slender Speedwell
Vicia sativa subsp. nigra	Narrow-leaved Vetch
Vicia sativa subsp. sativa	Common Vetch
Vicia sepium	Bush Vetch
Vulpia bromoides	Squirreltail Fescue
Bryophytes	
Atrichum undulatum	a moss
Brachythecium rutabulum	a moss
Bryum dichotomum	a moss
Calliergonella cuspidata	a moss
Ceratodon purpureus	a moss
Cratoneuron filicinum	a moss
Didymodon fallax	a moss
Drepanocladus cf. aduncus	a moss
Funaria hygrometrica	a moss
Homalothecium lutescens	a moss
Rhytidiadelphus squarrosus	a moss
Schistidium crassipilum	a moss
Streblotrichum convolutum var. convolutum	a moss

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