



**BIRDWATCH IRELAND CUSKINNY MARSH
NATURE RESERVE: BOTANICAL SURVEY,
JUNE 2018**

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1. INTRODUCTION

I was commissioned by BirdWatch Ireland Cuskinny Marsh Nature Reserve to carry out a botanical survey of the reserve. The brief for the survey was to carry out a one day walkover survey of the vascular plant flora as a repeat of the survey carried out by Tony O'Mahony in 1993 (O'Mahony, 1993). This report presents the results of the survey, assesses changes in the vegetation communities between 1993 and 2018, and includes some outline management recommendations.

The botanical nomenclature in this report follows the National Botanic Gardens usage (www.botanicgardens.ie/herb/census/lists.htm; accessed July 2015) and the species lists from O'Mahony (1993) have been updated to correspond to this taxonomy.

The report makes frequent reference to the 1993 botanical survey report (O'Mahony, 1993), which is referred to hereafter as the 1993 survey, and the habitat map from the management plan (RPS Consultants, 2000), which is referred to hereafter as the 2000 habitat map.

Scientific names of plant species mentioned in the text are listed in Appendix 1.

2. METHODOLOGY

2.1. FIELD SURVEY

I carried out the survey on 14th and 18th June 2018. The reserve was subdivided using the zones defined for the 1993 survey (Figure 1). Each zone (A-F) of the reserve was surveyed separately, and within each zone, separate species lists were taken for the major habitats within the section, with the habitats defined using the Heritage Council classification scheme (Fossitt, 2007). The cover-abundance of each species was qualitatively recorded using the DAFOR scale, using the definitions provided by Smith et al. (2011; Table 1). Following the protocol of the 1993 survey, the following species groups were recorded as aggregates: Blackberry (*Rubus fruticosus* agg.), Dandelion (*Taraxacum* agg.), Elms (*Ulmus* sp.), Poplar (*Populus* sp.), Spear-leaved/Babington's Orache (*Atriplex prostrata/obliquifolia*), Water-cress (*Nasturtium officinale* agg.) and Water-starworts (*Callitriche* sp.). The following additional groups were also recorded as aggregates: Glassworts (*Salicornia* sp.), Sessile/Pedunculate Oak (*Quercus petraea/robur*) and Polypody (*Polypody* sp.); note that both Sessile and Pedunculate Oak were recorded in the 1993 survey, while the only polypody recorded was Intermediate Polypody. Due to the wet and treacherous ground conditions only limited parts of the reedbed habitat in zones D and E, and of the southern section of wet woodland habitat in zone F, could be accessed.

Table 1. DAFOR scale definitions from Smith et al. (2011).

Category	Definition
Dominant (D)	A Dominant species generally covers more than two-thirds of the habitat. Most habitats do not have a dominant species, but exceptions can include dense bracken (HD1) stands or oak-birch-holly woodland (WN1) with a pure canopy of sessile oak (<i>Quercus petraea</i>).
Abundant (A)	Abundant species typically cover between one-third and two-thirds of the habitat. Usually only a few species in a habitat can be considered Abundant.
Frequent (F)	Commonly encountered species seen when walking through a habitat are Frequent. A rule of thumb for evaluating Frequent species is 'everywhere you look, you see some' whereas Abundant species are those where 'everywhere you look, you see lots'.
Occasional (O)	Occasional species generally have relatively low frequency and low cover. However, they do not have to be searched for to be found.
Rare (R)	Rare species are those that are only found once or a very few times during the survey, depending on the size of the habitat. Species cover is also low where Rare species are found.

2.2. PRESENTATION OF SURVEY RESULTS

The presentation of the survey results in this report includes an overview of the whole reserve, separate descriptions of the flora of each of Zones A-F, and an assessment of the vegetation communities present in the reserve and their conservation value.

The zone descriptions include a full list of the species recorded (provided in Appendix 2), discussion of the occurrence of any rare/scarce, or invasive, species, brief descriptions of the vegetation of the main habitats within the zone, and a comparison with the 1993 survey results, with reference to the 2000 habitat map where relevant. Note that, given that neither survey was a comprehensive survey, a lot of the apparent species turnover between the two surveys will be the result of random sampling error (i.e., failure to record occasional/rare species as they were not encountered during the survey). Therefore, it is the broad patterns in changes between the two surveys (e.g., gains/losses of groups of ecologically similar species) that are of interest, rather than gains/losses of individual species (apart from when the latter are particularly prominent, such as woodland canopy species).

The assessment of the vegetation communities is based on the Irish Vegetation Classification (IVC; www.biodiversityireland.ie/ivc, accessed 25th June 2018). The assessment also considers affinities with habitat types listed on Annex I of the Habitats Directive (92/43/EEC). Note that the IVC does not yet include wetland and ruderal communities, so the wetland and roadside/track edge vegetation types within the reserve are not assessed in detail.

3. SURVEY RESULTS

3.1. OVERALL SPECIES LIST

A total of 177 taxa were recorded during the survey (Appendix 2).

Four rare/scarce species were recorded: Black Currant, Black Mustard, Brown Sedge and Wild Onion. The locations where these species were recorded are shown in Figure 2. Black Currant is an introduced species that is naturalised in wet woodlands and is described as “rather rare” in Ireland (Parnell and Curtis, 2012). It is widespread, but localised in Co. Cork. It was recorded in wet woodland habitat in the middle of Zone F. Black Mustard is a species of disturbed ground that is described as “rare” in Ireland (Parnell and Curtis, 2012). It is scarce in Co. Cork but is quite frequent around Cork Harbour. It was recorded in roadside habitats in Zones B and F. Brown Sedge is a wetland species that is particularly associated with areas with fluctuating water tables on base-rich substrates. It is common and widespread throughout most of Ireland but is “rare in the south-west” (Parnell and Curtis, 2012) and is very scarce in Co. Cork. It was recorded in an open area of swamp habitat in the middle of Zone F. Wild Onion is a dry meadow species. It is quite widespread, but “rather rare and local” (Parnell and Curtis, 2012), in southern and eastern Ireland. It is rather scarce in Co. Cork although there is a cluster of records around the Cork Harbour area. It was recorded in dry meadow habitat in Zone C.

Six invasive species were recorded: Sycamore, Three-cornered Garlic, Traveller’s-joy, Montbretia, Winter Heliotrope and Cherry Laurel. Winter Heliotrope is generally widespread and common along the roadsides and track edges around most of the reserve with Montbretia occurring in scattered patches in these areas. Three-cornered Garlic, Traveller’s-joy and Cherry Laurel occur along the track in the middle of the reserve (Figure 2). Mature Sycamore trees are scattered around the reserve while regenerating Sycamore occur infrequently in the main woodland areas.

Compared with the 1993 survey, there were 40 new taxa recorded that were not recorded in 1993, while 16 taxa recorded in 1993 were not recorded in 2018. The most common habitat association of the new species recorded in 2018 was with disturbed roadside habitats (Table 2). Many of these species were only recorded in one or two locations suggesting that most of these additions probably reflect more systematic searching of the roadside habitats in the 2018 survey. There were also a high number of additions associated with freshwater wetland habitats. These included prominent and obvious species such as Branched Bur-reed, Greater Reedmace and Waterplantain, indicating that at least some of these are genuine new additions to the reserve flora since

1993. The composition of the brackish/saltmarsh flora also appears to have changed since 1993 with two species lost and seven species gained. Given the small extent of these habitats on site and their accessibility, it is likely that most, or all of these, represent genuine changes in the reserve flora. The changes in the grassland and woodland flora probably largely represent random sampling error.

Table 2. Habitat associations of new species recorded in 2018, and of species recorded in 1993 but not recorded in 2019

Habitat associations	New species in 2018	Species not recorded in 2018
Brackish/saltmarsh	7	2
Freshwater wetland	11	0
Grasslands	3	5
Woodland	7	6
Disturbed roadsides	19	4
Other	0	1

Habitat associations for the new species in 2018 are based on the habitats in which they were mainly recorded during the survey. Habitat associations for the species not recorded in 2018 are based on the general habitat associations of the species and the information on their distribution within the reserve included in O'Mahony (1993). Note that some species are counted under more than one habitat category.

3.2. ZONE DESCRIPTIONS

3.2.1. Zone A

Zone A comprises the beach and roadway to the east of the outlet from the lake. A total of 34 taxa were recorded in this section (Appendix 2). No rare or scarce species, and no invasive species, were recorded.

The vascular plant flora is confined to a narrow strandline zone at the top of the beach and to the stone wall along the edge of the road (Plate 1). Spear-leaved/Babington's Orache is the main component of the strandline flora, with scattered plants on the shingle ridge and more or less continuous cover along the base of the wall. Other strandline species that occur here include Rock Samphire, Sea Beet, Curled Dock and Sea Mayweed. Most of the strandline species are also present on the stone wall, along with various grassland and wasteland species.

Compared to the 1993 survey, there were 23 new species recorded in this zone, while two species recorded in 1993 were not recorded in 2018. Most of the additional species are likely to reflect more intensive recording effort in this section. One of the species losses was Garden Apple.

3.2.2. Zone B

Zone B comprises a segment enclosed by the outlet drain from the lake, the roadways and a silted up drain. A total of 89 taxa were recorded in this section (Appendix 2). One rare/scarce species, Black Mustard, was recorded in disturbed ground near the junction between the Tay Road and the Coast Road. Three invasive species were recorded: Sycamore, Montbretia and Winter Heliotrope. Winter Heliotrope was abundant, with scattered patches of Montbretia along the Tay Road, with both species being occasional along the Coast Road. Mature Sycamore trees occur along the woodland edge next to the Tay Road, with a few regenerating saplings within the woodland.

There are four distinct habitat sections in this zone. The southern section is occupied by Elm dominated woodland with a rather disturbed ground flora (Plate 2). The gives way to a narrow section of dry meadow habitat, which has similar vegetation to that in the more extensive area of this habitat in Zone C (see below). The northern section is mainly occupied by reedswamp, with pockets of saltmarsh. The reedswamp is dominated by Common Reed with most of the additional species occurring along the outer (away from the lake) edges of the habitat. The saltmarsh mainly comprises upper saltmarsh habitat dominated by Creeping Bent. However, a small pocket of lower saltmarsh habitat with Glasswort and Annual Sea-blite on bare mud occurs close to the road (Plate 3).

In 1993, this zone was described as “a large damp brackish meadow, but with some rubble deposition at the western roadside which provides a contrasting, warm, porous habitat with its own distinctive flora”. There is no reference to woodland, scrub or reedbed habitat occurring in this zone, and neither Elm nor Common Reed are included in the species list for this section. The 2000 habitat map shows three habitats in this zone: scrub, tall herb/ruderal and swamp. Therefore, it appears that the Elm woodland and reedbed habitats in this section are of recent origin, developing since 1993.

Compared to the 1993 survey, there were 64 new species recorded in this zone, while 19 species recorded in 1993 were not recorded in 2018. The species turnover reflects the changes from predominantly open dry grassland habitat to woodland, saltmarsh and swamp habitat.

3.2.3. Zone C

Zone C comprises an open meadow to the east of the outlet drain from the lake. A total of 90 taxa were recorded in this section (Appendix 2). One scarce species was recorded in this section: Wild Onion. This species occurred in a raised area of dry grassland adjacent to the entrance from the road. The only invasive species recorded was Sycamore, a single tree of which is present in the scrub in the centre of this zone.

There are four distinct habitat sections in this zone. Dry meadow habitat occupies most of the southern and western section of the zone. This is mainly species-poor grassland dominated by tall swards of Common Couch, with Red Fescue, Yorkshire-fog and Rough Meadow-grass, and very low diversity of forbs. Localised patches of higher diversity occur with species such as Common Bird's-foot-trefoil, Ribwort Plantain, Meadow Buttercup, Common Sorrel, Perennial Sow-thistle and Bush Vetch. A large patch of Blackthorn dominated scrub occurs in the middle of this zone. Pockets of upper saltmarsh habitat occur in low-lying areas within the grassland and along the lakeshore. These areas are mainly dominated by Saltmarsh Rush with swards of Red Fescue, and with a good diversity of other halophytes such as Sea Aster, Spear-leaved/Babington's Orache, Sea-milkwort, Sea Plantain and Sea Arrowgrass. The area of this habitat adjacent to the lake appears to be heavily trampled in places resulting in the occurrence of Greater Plantain, which is an atypical feature for saltmarsh habitat (Plate 4). The saltmarsh by the lakeshore gives way to the east to an area of swamp dominated by Sea Club-rush (Plate 5). This swamp has a good diversity of other species including saltmarsh elements, while some freshwater species, such as Water-plantain and Hemlock Water-dropwort come in at the eastern edge of the zone.

Compared to the 1993 survey, there were 51 new species recorded in this zone, while 16 species recorded in 1993 were not recorded in 2018. The species turnover appears to indicate a reduction in the diversity of the dry grassland habitat and greater development of the saltmarsh habitat. Notably, the description of this zone in the report of the 1993 survey does not make any reference to the presence of distinct saltmarsh zone, while the 2000 habitat map does not map any saltmarsh habitat in this zone.

3.2.4. Zone D

Zone D comprises the narrow western segment of the reserve between the lake and the road, south of the track. A total of 83 taxa were recorded in this section (Appendix 2). No rare or scarce species were recorded. Four invasive species were recorded: Sycamore, Traveller's-joy, Montbretia and Winter Heliotrope. Winter Heliotrope occurs along the road edge and on the bank inside the stone wall, throughout most of this section, with scattered patches of Montbretia, and a few Sycamore trees. Traveller's-joy occurs along the track edge at the northern end of this section.

Two distinct habitat zones were defined for this zone. Reedswamp occurs along the lake shore at the northern and southern ends of the zone. This habitat is mainly a monoculture of Common Reed with very limited diversity of other species. The narrow linear zone between the road and the lake/reedswamp is occupied by a heterogeneous mix of habitats, including a stone wall along the road, a drainage ditch, and a bank with tall herb vegetation and scrub between the ditch and the lake/reedswamp. The flora includes a corresponding diverse mixture of species.

Compared to the 1993 survey, there were 31 new species recorded in this zone, while 22 species recorded in 1993 were not recorded in 2018. The species losses include Sea Club-rush, Saltmarsh Rush and Grey Club-rush, suggesting that there may have been expansion of the reedbed habitat at the expense of more open brackish marsh habitat.

3.2.5. Zone E

Zone E comprises the section of the reserve around the northern and eastern shoreline of the lake. A total of 86 taxa were recorded in this section (Appendix 2). No rare or scarce species were recorded. Four invasive species were recorded: Sycamore, Montbretia, Winter Heliotrope and Cherry Laurel. Montbretia and Winter Heliotrope occur along the edge of the track at the northern end of this zone, while a couple of bushes of Cherry Laurel occur in the woodland adjoining the track. Regenerating Sycamore occurs sparsely in the woodland with both seedlings and young saplings present.

There are two distinct habitat sections in this zone, with reedswamp around the lake edge, backed by wet woodland. The reedswamp habitat is mainly a monoculture of Common Reed with very limited diversity of other species (Plate 6). The wet woodland is dominated by tall Alder at its northern end, becoming lower and more shrubby with more prominent Grey Willow along the eastern side of the lake, where mature Horse chestnut occur along the field boundary. The ground flora is dominated by Hemlock Water-dropwort and is generally less diverse than in the wet woodland habitat in Zone F.

Compared to the 1993 survey, there were 39 new species recorded in this zone, while 24 species recorded in 1993 were not recorded in 2018. Some of the apparent losses are dry woodland species and may be due to the 1993 survey extending further south into the drier woodland habitat at the southern end of the lake.

3.2.6. Zone F

Zone F comprises the northern section of the reserve upstream of the track. A total of 113 taxa were recorded in this section (Appendix 2). This included three scarce species: Black Currant, Black Mustard and Brown Sedge, Black Currant was found in wet woodland habitat close to the stream in the middle of the zone. Black Mustard occurs in disturbed roadside habitat near the northern end of the zone. Brown Sedge was recorded from an open area of swamp habitat in the middle of the zone. Four invasive species were recorded: Sycamore, Three-cornered Garlic, Montbretia and Winter Heliotrope. Montbretia and Winter Heliotrope occur along the road edge in the southern half of the zone and also along the edge of the track, where the Three-cornered Garlic also occurs. Sycamore is occasional in the woodland canopy with regenerating saplings occurring sparsely in the northern section of the zone.

There are four distinct habitat sections in this zone. A small area of mature conifer plantation occurs at the southern end of this zone. However, most of the southern part of the zone is occupied by very swampy wet woodland dominated by large, sprawling Grey Willow. This woodland is very wet with numerous wet hollows and open swampy areas dominated by Hemlock Water-dropwort (Plate 7). The pond that was excavated in the 1990s is located in this section but was inaccessible even after the very dry weather that had preceded my survey. In the middle of the zone, the woodland becomes more open with Alder and Crack-willow becoming dominant in the canopy and with open areas of Common Reed and Common Nettle, with some of these areas having a good diversity of tall herb swamp species (Plate 8). The ground is still soft, with a wetland flora, but with fewer really wet areas. In the northern section of the zone, the woodland becomes drier. The canopy is still dominated by Alder but several planted Poplar trees are present, while the ground flora is dominated by species such as Creeping Bent, Common Couch, Blackberry and Common Nettle, with patches of Common Reed.

Compared to the 1993 survey, there were 60 new species recorded in this zone, while 19 species recorded in 1993 were not recorded in 2018. The species turnover appears to indicate a change from drier woodland and grassland habitat in 1993 to wetter woodland and swamp habitat in 2018.

This ties in with the 2000 habitat map, which mapped areas now occupied by wet woodland and swamp as being occupied by tall herb/ruderal vegetation.

3.3. VEGETATION COMMUNITIES

3.3.1. Wetland

The main wetland habitat in the reserve is the marginal reedbed around the lake, which is largely a monoculture of Common Reed. This corresponds to the reed and tall sedge swamp (FS1) habitat of Fossitt (2007). There has been no formal assessment of reedbed vegetation communities in Ireland. However, reedbed vegetation generally does not correspond to any Annex I habitat type.

Small areas of open vegetation with Common Reed occur in Zone F. These tend to be more species rich than the reedbed around the lake with a high component of broad-leaved herbs. These areas probably correspond to the tall herb swamp (FS1) habitat of Fossitt (2007). It is possible that some of these areas may correspond to the Annex I habitat *hydrophilous tall herb fringe communities of plains and of the montane to alpine levels* (6430). However, this Annex I habitat is poorly defined in an Irish context.

3.3.2. Saltmarsh

Small pockets of upper saltmarsh (CM2) habitat occur in Zones B and C. The upper saltmarsh habitat in Zone B is dominated by Creeping Bent and probably corresponds to the IVC *Creeping Bent – Sea Arrowgrass saltmarsh* (SM6B) vegetation type. The upper saltmarsh habitat in Zone C is dominated by Saltmarsh Rush with a high abundance of Red Fescue and probably corresponds to the IVC *Red Fescue – Saltmarsh Rush saltmarsh* (SM4B) vegetation type. An unusual feature is the occurrence of Greater Plantain in the area of this saltmarsh that occurs adjacent to the lake, which indicates impacts to the vegetation from trampling/disturbance. All the upper saltmarsh habitat in Zones B and C correspond to the Annex I habitat *Atlantic salt meadows* (1330).

A small area of lower saltmarsh (CM1) habitat dominated by Glasswort occurs in Zone B. This corresponds to the IVC *Glasswort saltmarsh* (SM1A) vegetation type and the Annex I habitat *Salicornia and other annuals colonising mud and sand* (1310).

A sizeable area of Sea Club-rush swamp occurs in Zone C. This can be classified as either upper saltmarsh (CM2) or reed and large sedge swamp (FS1) habitat and corresponds to the IVC *Sea Club-rush – Creeping Bent saltmarsh-swamp* (SM6A) vegetation type. This vegetation does not correspond to any Annex I habitat type.

3.3.3. Woodland

The woodland in Zones E and F is all wet woodland, with the canopy dominated by tree species associated with wet ground conditions. Alder and Grey Willow are prominent throughout. However, there are several distinct vegetation types, although the boundaries between these types are not clear cut.

Towards the upper end of Zone F (F3 and F4) the woodland is open with Crack-willow forming a high component of the canopy, and with Osier and White Willow also present. The ground layer has vegetation typical of areas subject to frequent flooding, with a combination of species typical of disturbed ground such as Common Couch and Common Nettle, and wetland species such as Meadowsweet and Yellow Iris. While Crack-willow, Osier and White Willow are non-native species, woodlands dominated by these willows can still be classified as native/semi-natural woodlands. This woodland habitat in Cuskinny corresponds to the riparian woodland (WN5) habitat type of Fossitt (2007) and shows affinities IVC *Salix fragilis – Calystegia sepium subcommunity* (WL3Di) sub-community of the *Grey Willow – Common Nettle woodland* (WL3D) vegetation type. This is an unusual vegetation type that is mainly associated with large rivers in south-east Ireland and is rare in Co. Cork.

Moving downstream, the woodland becomes wetter with a more closed canopy dominated by Grey Willow (F2). This woodland habitat is probably best classified as wet willow-alder-ash woodland (WN6). The vegetation type largely corresponds to the IVC *Crataegus monogyna* – *Dryopteris dilatata* sub-community (WL3Dii) sub-community of the Grey Willow – Common Nettle woodland (WL3D) vegetation type, although it also shows affinities to the Grey Willow – Reed Canary-grass woodland (WL3F) vegetation type.

In Zone E, the woodland canopy is dominated by Alder but, otherwise, the woodland vegetation is broadly similar to that in F2. This woodland habitat is also best classified as wet willow-alder-ash woodland (WN6), while the vegetation type largely corresponds to the IVC Alder – Creeping Buttercup woodland (WL3B) vegetation type. However, the abundance of Hemlock Water-dropwort in the field layer in both F2 and E2 are unusual features for this type of woodland and indicates a continuing strong influence of water movement on the woodland vegetation.

The only other area of woodland in the reserve is the small area of Elm-dominated woodland in Zone B, which appears to be of recent origin. Wych Elm is native to Ireland, while other elm species are regarded as introduced. The Elms in Zone B do not appear to be pure Wych Elms, based on the leaf characters (Coleman, 2002). Woodlands dominated by Elms are rare and are not covered by the published classifications of Irish native woodland types. However, there are a few examples of established Wych Elm dominated woodlands in the Cork Harbour area, so the developing Elm woodland at Cuskinny may be considered to be a recently established semi-natural woodland.

3.3.4. Other habitats

The beach in Zone A contains strandline vegetation. The strandline is truncated by the road, although elements of the strandline vegetation continue on to the stone wall along the road. Strandline vegetation corresponds to the Annex I habitat *annual vegetation of drift lines* (1210). However, the strandline habitat at Cuskinny is poorly developed and does not represent a good example of this vegetation.

Dry meadow (GS2) grassland habitat occurs in Zones B and C. The grassland is dominated by tall, coarse grasses with low diversity of broad-leaved herbs and is typical of the unmanaged grasslands that develop on road verges, etc. It is probably a variant of the IVC Red Fescue – Ribwort Plantain grassland (GL3C) vegetation type and does not correspond to any Annex I habitat types. It has low botanical conservation value although a locally rare species (Wild Onion) occurs in this grassland in Zone C.

Sections of stone wall along the road verges hold rather species-poor stone wall vegetation communities. There has been no formal assessment of stone wall vegetation communities in Ireland. However, stone wall vegetation does not correspond to any Annex I habitat type.

4. CONCLUSIONS

4.1. CONSERVATION EVALUATION

The Cuskinny Nature Reserve contains well-developed wet woodland vegetation which corresponds to the Annex I *residual alluvial forests* (91E0) habitat type. As such, the vegetation community is of high conservation value. The habitat is also of high value for its invertebrate fauna, as was demonstrated by the Malaise trapping survey carried out in 2010 (Gittings, 2013). Other vegetation communities of conservation importance are the saltmarsh habitats, which correspond to two Annex I habitat types. These are small in extent but are quite well-developed with good representation of typical species. The tall herb swamp habitats in Zone F are also of possible conservation importance for their vegetation communities, as possible examples of the *hydrophilous tall herb fringe communities of plains and of the montane to alpine levels* (6430) Annex I habitat type. However, in a broader context, these areas should be considered as part of the wet woodland habitat complex. The reedbed and Sea Club-rush swamp habitats within the reserve are not of recognised conservation importance for their vegetation communities. However, these habitats are of high value for their invertebrate fauna. The Elm woodland habitat in Zone B

is not of high conservation value, but is of scientific interest as an example of an unusual woodland type.

Four rare/scarce species were recorded: Black Currant, Black Mustard, Brown Sedge and Wild Onion. Of these, Brown Sedge and Wild Onion are of most significance as they are scarce species associated with undisturbed semi-natural habitats (wet meadow/fen and dry grassland, respectively), Black Currant is an introduced species, while Black Mustard is a species of disturbed habitats that is locally common in the Cork Harbour area.

Six invasive species were recorded: Sycamore, Three-cornered Garlic, Traveller's-joy, Montbretia, Winter Heliotrope and Cherry Laurel. Of these, only Three-cornered Garlic is a scheduled invasive species¹. Apart from Sycamore, the invasive species are all restricted to edge habitats and do not pose a threat to the semi-natural vegetation communities within the reserve. There is some Sycamore regeneration within the woodland habitats but, at present, it is not at a level that is likely to significantly affect the quality of the woodland habitat. The very wet conditions within most of the woodland habitat is likely to be limiting the spread of Sycamore.

4.2. MANAGEMENT RECOMMENDATIONS

Most of the important vegetation communities within the reserve have developed without management intervention and are maintained by the hydrological conditions within the reserve. Therefore, specific management interventions are not generally required. However, the Sycamore regeneration should be monitored and it would be prudent to remove the Cherry Laurel to prevent any spread into the woodland habitat.

The major opportunity for management intervention is the grassland habitat in Zone C. This is rather species-poor and of low current conservation value for its vegetation community. Introduction of an appropriate grazing or mowing regime would be likely to significantly increase the conservation value of this habitat. There are pockets of higher diversity within the existing grassland, so there are species present to spread into other areas if the habitat conditions are right. However, an area of tall grass should be maintained around the Wild Onion population as this species requires hay meadow type management.

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¹ Scheduled invasive species listed in the third schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011). It is an offence to cause the spread of plant species listed in this schedule.

Appendix 1 Scientific Names of Plants and Animals Mentioned in the Text

Botanical nomenclature follows the National Botanic Gardens usage (www.botanicgardens.ie/herb/census/lists.htm; accessed July 2015).

English name	Scientific name
Alder	<i>Alnus glutinosa</i>
Annual Sea-blite	<i>Suaeda maritima</i>
Black Currant	<i>Ribes nigrum</i>
Black Mustard	<i>Brassica nigra</i>
Blackberry	<i>Rubus fruticosus</i> agg.
Blackthorn	<i>Prunus spinosa</i>
Branched Bur-reed	<i>Sparganium erectum</i>
Brown Sedge	<i>Carex disticha</i>
Bush Vetch	<i>Vicia sepium</i>
Cherry Laurel	<i>Prunus laurocerasus</i>
Common Bird's-foot-trefoil	<i>Lotus corniculatus</i>
Common Couch	<i>Elytrigia repens</i>
Common Nettle	<i>Urtica dioica</i>
Common Reed	<i>Phragmites australis</i>
Common Sorrel	<i>Rumex acetosa</i>
Crack-willow	<i>Salix fragilis</i>
Creeping Bent	<i>Agrostis stolonifera</i>
Curled Dock	<i>Rumex crispus</i>
Elm	<i>Ulmus</i> sp.
Garden Apple	<i>Malus domestica</i>
Glasswort	<i>Salicornia</i> sp.
Greater Plantain	<i>Plantago major</i>
Greater Reedmace	<i>Typha latifolia</i>
Grey Club-rush	<i>Schoenoplectus tabernaemontani</i>
Grey Willow	<i>Salix cinerea</i>
Hemlock Water-dropwort	<i>Oenanthe crocata</i>
Horse chestnut	<i>Aesculus hippocastanum</i>
Intermediate Polypody	<i>Polypodium interjectum</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Montbretia	<i>Crocsmia pottsii</i> × <i>aurea</i> = <i>C. × crocosmiiflora</i>
Osier	<i>Salix viminalis</i>
Perennial Sow-thistle	<i>Sonchus arvensis</i>
Poplar	<i>Poplar</i> sp.

English name	Scientific name
Ribwort Plantain	<i>Plantago lanceolata</i>
Rock Samphire	<i>Crithmum maritimum</i>
Red Fescue	<i>Festuca rubra</i>
Rough Meadow-grass	<i>Poa trivialis</i>
Saltmarsh Rush	<i>Juncus gerardii</i>
Sea Arrowgrass	<i>Triglochin maritima</i>
Sea Aster	<i>Aster tripolium</i>
Sea Beet	<i>Beta vulgaris</i> subsp. <i>maritima</i>
Sea Club-rush	<i>Bolboschoenus maritimus</i>
Sea Mayweed	<i>Tripleurospermum maritimum</i>
Sea Plantain	<i>Plantago maritima</i>
Sea-milkwort	<i>Glaux maritima</i>
Spear-leaved Orache	<i>Atriplex prostrata</i>
Sycamore	<i>Acer pseudoplatanus</i>
Three-cornered Garlic	<i>Allium triquetrum</i>
Traveller's-joy	<i>Clematis vitalba</i>
Water-plantain	<i>Alisma plantago-aquatica</i>
White Willow	<i>Salix alba</i>
Wild Onion	<i>Allium vineale</i>
Winter Heliotrope	<i>Petasites fragrans</i>
Wych Elm	<i>Ulmus glabra</i>
Yellow Iris	<i>Iris pseudacorus</i>
Yorkshire-fog	<i>Holcus lanatus</i>
Rough Meadow-grass	<i>Poa trivialis</i>
Saltmarsh Rush	<i>Juncus gerardii</i>
Sea Arrowgrass	<i>Triglochin maritima</i>
Sea Aster	<i>Aster tripolium</i>
Sea Beet	<i>Beta vulgaris</i> subsp. <i>maritima</i>
Sea Club-rush	<i>Bolboschoenus maritimus</i>
Sea Mayweed	<i>Tripleurospermum maritimum</i>
Sea Plantain	<i>Plantago maritima</i>
Sea-milkwort	<i>Glaux maritima</i>
Spear-leaved/Babington's Orache	<i>Atriplex prostrata</i> / <i>glabriuscula</i>
Sycamore	<i>Acer pseudoplatanus</i>

Appendix 2 Plant species lists

OVERALL SPECIES LIST

Group	Family	Scientific name	English name	A	B	C	D	E	F
Trees, shrubs and woody climbers	Pinaceae	<i>Picea</i> sp.	Spruce	0	0	0	0	0	1
	Ulmaceae	<i>Ulmus</i> sp.	Elm	0	1	0	0	0	1
	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	0	1	1	1	1	1
	Betulaceae	<i>Alnus glutinosa</i>	Alder	0	0	0	1	1	1
	Salicaceae	<i>Populus</i> sp.	Poplar	0	0	0	1	1	1
		<i>Salix alba</i>	White Willow	0	0	0	0	0	1
		<i>Salix cinerea</i>	Grey Willow	0	1	0	1	1	1
		<i>Salix fragilis</i>	Crack-willow	0	0	0	1	1	1
		<i>Salix viminalis</i>	Osier	0	0	0	0	0	1
	Grossulariaceae	<i>Ribes nigrum</i>	Black Currant	0	0	0	0	0	1
	Rosaceae	<i>Crataegus monogyna</i>	Hawthorn	0	1	0	1	1	1
		<i>Prunus laurocerasus</i>	Cherry Laurel	0	0	0	0	1	0
		<i>Prunus spinosa</i>	Blackthorn	0	1	1	0	0	1
		<i>Rosa canina</i> agg.	Dog-rose	0	0	0	1	1	1
		<i>Rosa</i> sp.	Rose	0	0	0	0	0	1
		<i>Rubus fruticosus</i> agg.	Blackberry	1	1	1	1	1	1
	Fabaceae	<i>Ulex europaeus</i>	Gorse	0	0	1	1	1	0
	Aquifoliaceae	<i>Ilex aquifolium</i>	Holly	0	0	0	0	0	1
	Buxaceae	<i>Buxus</i> sp.	Box	0	0	0	0	0	1
	Hippocastanaceae	<i>Aesculus hippocastanum</i>	Horse chestnut	0	0	0	0	1	0
	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	0	1	1	1	1	1
	Araliaceae	<i>Hedera helix</i>	Ivy	0	1	1	1	1	1
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	0	1	1	1	1	1
	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	0	1	1	1	1	1
	Oleaceae	<i>Fraxinus excelsior</i>	Ash	0	1	0	1	1	0
		<i>Ligustrum vulgare</i>	Wild Privet	0	1	0	0	0	1
	Caprifoliaceae	<i>Lonicera periclymenum</i>	Honeysuckle	0	0	0	1	1	1
		<i>Sambucus nigra</i>	Elder	0	1	1	0	0	1
Ferns and allies	Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail	0	0	0	0	1	0
		<i>Equisetum palustre</i>	Marsh Horsetail	0	0	0	0	0	1
	Polypodiaceae	<i>Polypody</i> sp.	Polypody	0	1	1	1	1	1
	Hypolepidaceae	<i>Pteridium aquilinum</i>	Bracken	0	0	0	1	1	1
	Aspleniaceae	<i>Asplenium scolopendrium</i>	Hart's-tongue Fern	0	1	0	1	0	1
		<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	0	1	0	1	0	0
	Athuriaceae	<i>Athyrium filix-femina</i>	Lady-fern	0	0	0	0	1	1
		<i>Dryopteris affinis</i>	Scaly Male-fern	0	0	0	0	1	0
	Dryopteridaceae	<i>Dryopteris dilatata</i>	Broad Buckler-fern	0	0	0	1	1	1
		<i>Polystichum setiferum</i>	Soft Shield-fern	0	1	1	1	1	1

Group	Family	Scientific name	English name	A	B	C	D	E	F
Forbs	Ranunculaceae	<i>Clematis vitalba</i>	Traveller's-joy	0	0	0	1	0	0
		<i>Ranunculus acris</i>	Meadow Buttercup	0	1	1	1	1	1
		<i>Ranunculus flammula</i>	Lesser Spearwort	0	0	0	0	1	1
		<i>Ranunculus repens</i>	Creeping Buttercup	1	1	1	1	1	1
		<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	0	1	1	1	1	0
	Fumariaceae	<i>Fumaria muralis</i>	Common Ramping-fumitory	0	0	1	0	1	1
	Urticaceae	<i>Parietaria judaica</i>	Pellitory-of-the-wall	1	1	1	1	0	0
		<i>Urtica dioica</i>	Common Nettle	1	1	1	1	1	1
	Chenopodiaceae	<i>Atriplex prostrata/glabriuscula</i>	Spear-leaved/Babington's Orache	1	1	1	0	0	0
		<i>Beta vulgaris subsp. maritima</i>	Sea Beet	1	1	1	0	0	0
		<i>Salicornia</i> sp.	Glasswort	0	1	0	0	0	0
		<i>Suaeda maritima</i>	Annual Sea-blite	0	1	0	0	0	0
	Caryophyllaceae	<i>Cerastium fontanum</i>	Common Mouse-ear	0	1	0	0	0	0
		<i>Silene flos-cuculi</i>	Ragged-Robin	0	0	0	0	0	1
		<i>Spergularia rupicola</i>	Rock Sea-spurrey	1	0	1	0	0	0
		<i>Stellaria graminea</i>	Lesser Stitchwort	0	0	0	0	0	1
		<i>Stellaria media</i>	Common Chickweed	0	1	0	0	0	0
	Polygonaceae	<i>Rumex acetosa</i>	Common Sorrel	0	0	1	0	1	1
		<i>Rumex crispus</i>	Curled Dock	1	1	1	1	1	1
		<i>Rumex obtusifolius</i>	Broad-leaved Dock	1	0	0	1	1	1
		<i>Rumex sanguineus</i>	Wood Dock	0	1	0	1	1	1
	Plumbaginaceae	<i>Armeria maritima</i>	Thrift	0	0	1	0	0	0
	Brassicaceae	<i>Brassica nigra</i>	Black Mustard	0	1	0	0	0	1
		<i>Brassica rapa</i>	Turnip	1	0	0	0	0	0
		<i>Capsella bursa-pastoris</i>	Shepherd's-purse	1	0	0	0	1	0
		<i>Cardamine flexuosa</i>	Wavy Bitter-cress	0	1	0	0	1	1
		<i>Cardamine pratensis</i>	Cuckooflower	0	0	0	0	0	1
		<i>Nasturtium officinale</i> agg.	Water-cress	0	0	0	1	0	1
		<i>Sinapis arvensis</i>	Charlock	0	0	0	0	1	1
		<i>Sisymbrium officinale</i>	Hedge Mustard	0	1	0	1	0	0
	Primulaceae	<i>Glaux maritima</i>	Sea-milkwort	0	0	1	0	0	0
		<i>Primula vulgaris</i>	Primrose	0	0	0	0	1	1
		<i>Samolus valerandi</i>	Brookweed	0	0	1	0	0	0
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	1	1	1	1	0	1
	Saxifragaceae	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	0	0	0	0	1	1
	Rosaceae	<i>Filipendula ulmaria</i>	Meadowsweet	0	0	0	1	1	1
		<i>Geum urbanum</i>	Wood Avens	0	1	0	1	1	1
		<i>Potentilla anserina</i>	Silverweed	0	0	1	0	0	0
		<i>Potentilla reptans</i>	Creeping Cinquefoil	0	0	1	1	1	1

Group	Family	Scientific name	English name	A	B	C	D	E	F
Forbs	Fabaceae	<i>Lathyrus pratensis</i>	Meadow Vetchling	0	0	1	0	0	1
		<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	0	0	1	0	0	0
		<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil	0	1	0	1	0	1
		<i>Medicago lupulina</i>	Black Medick	0	0	1	0	0	0
		<i>Trifolium dubium</i>	Lesser Trefoil	1	0	0	0	0	0
		<i>Trifolium pratense</i>	Red Clover	0	0	1	0	0	0
		<i>Trifolium repens</i>	White Clover	0	1	1	0	1	0
		<i>Vicia cracca</i>	Tufted Vetch	0	1	1	1	0	0
		<i>Vicia sativa</i>	Common Vetch	0	1	1	0	0	1
		<i>Vicia sepium</i>	Bush Vetch	0	1	1	1	1	1
	Onagraceae	<i>Circaea lutetiana</i>	Enchanter's-nightshade	0	1	0	0	0	1
		<i>Epilobium ciliatum</i>	American Willowherb	0	0	1	0	0	0
		<i>Epilobium hirsutum</i>	Great Willowherb	0	1	1	0	1	1
		<i>Epilobium montanum</i>	Broad-leaved Willowherb	0	0	0	0	0	1
		<i>Epilobium obscurum</i>	Short-fruited Willowherb	1	0	0	1	0	1
		<i>Epilobium parviflorum</i>	Hoary Willowherb	1	1	0	0	0	0
	Geraniaceae	<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	0	1	0	0	0	0
		<i>Geranium robertianum</i>	Herb-Robert	0	1	1	1	1	1
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	0	1	1	1	1	1
		<i>Apium nodiflorum</i>	Fool's-water-cress	0	0	0	0	1	1
		<i>Crithmum maritimum</i>	Rock Samphire	1	0	1	0	0	0
		<i>Heracleum sphondylium</i>	Hogweed	1	1	1	1	1	1
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	0	1	1	1	1	1
		<i>Smyrnium olusatrum</i>	Alexanders	0	1	1	0	0	0
		<i>Torilis japonica</i>	Upright Hedge-parsley	0	1	0	0	0	0
	Boraginaceae	<i>Myosotis arvensis</i>	Field Forget-me-not	1	0	0	0	0	0
		<i>Myosotis scorpioides</i>	Water Forget-me-not	0	0	1	1	1	1
	Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy	0	1	0	1	1	1
		<i>Lycopus europaeus</i>	Gypsywort	0	1	1	1	1	1
		<i>Mentha aquatica</i>	Water Mint	0	0	0	0	1	1
		<i>Stachys palustris</i>	Marsh Woundwort	0	0	0	0	0	1
		<i>Stachys sylvatica</i>	Hedge Woundwort	0	1	0	1	1	1
		<i>Teucrium scorodonia</i>	Wood Sage	0	1	0	1	0	0
	Callitricheaceae	<i>Callitriche</i> sp.	Water-starwort	0	1	0	1	1	1
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	0	1	1	1	1	1
		<i>Plantago major</i>	Greater Plantain	1	0	1	0	1	1
		<i>Plantago maritima</i>	Sea Plantain	0	0	1	0	0	0

Group	Family	Scientific name	English name	A	B	C	D	E	F
Forbs	Scrophulariaceae	<i>Cymbalaria muralis</i>	Ivy-leaved Toadflax	0	0	0	1	0	0
		<i>Digitalis purpurea</i>	Foxglove	0	0	0	0	1	1
		<i>Scrophularia auriculata</i>	Water Figwort	0	1	0	1	0	1
		<i>Scrophularia nodosa</i>	Common Figwort	0	1	0	1	1	0
		<i>Veronica chamaedrys</i>	Germander Speedwell	0	0	0	1	0	1
		<i>Veronica montana</i>	Wood Speedwell	0	1	0	0	0	0
		<i>Veronica persica</i>	Common Field-speedwell	1	0	0	0	0	0
	Rubiaceae	<i>Galium aparine</i>	Cleavers	1	1	1	1	1	1
		<i>Galium palustre</i>	Marsh-Bedstraw	0	1	1	1	1	1
	Valerianaceae	<i>Valeriana officinalis</i>	Common Valerian	0	0	0	1	1	1
	Asteraceae	<i>Achillea millefolium</i>	Yarrow	1	0	1	0	0	0
		<i>Arctium minus</i>	Lesser Burdock	0	0	0	0	1	0
		<i>Aster tripolium</i>	Sea Aster	0	1	1	0	0	0
		<i>Bellis perennis</i>	Daisy	0	1	1	0	1	1
		<i>Centaurea nigra</i>	Common Knapweed	0	0	1	0	0	0
		<i>Cirsium arvense</i>	Creeping Thistle	0	1	1	1	1	1
		<i>Cirsium vulgare</i>	Spear Thistle	1	1	1	1	0	0
		<i>Lapsana communis</i>	Nipplewort	0	1	1	1	0	1
		<i>Leucanthemum vulgare</i>	Oxeye Daisy	0	0	0	1	1	0
		<i>Petasites fragrans</i>	Winter Heliotrope	0	1	0	1	1	1
		<i>Pulicaria dysenterica</i>	Common Fleabane	0	0	1	0	0	0
		<i>Scorzoneroide autumnalis</i>	Autumn Hawkbit	1	0	1	0	0	0
		<i>Senecio aquaticus</i>	Marsh Ragwort	0	0	1	0	1	0
		<i>Senecio jacobaea</i>	Common Ragwort	0	1	1	1	0	1
		<i>Senecio vulgaris</i>	Groundsel	1	0	1	0	0	1
		<i>Sonchus arvensis</i>	Perennial Sow-thistle	0	1	1	0	0	0
		<i>Sonchus asper</i>	Prickly Sow-thistle	1	0	1	1	1	1
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	1	1	1	1	0	1
		<i>Taraxacum</i> agg.	Dandelion	1	0	1	1	1	1
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	1	1	1	1	1	1
	Alismataceae	<i>Alisma plantago-aquatica</i>	Water-plantain	0	0	1	0	0	0
	Juncaginaceae	<i>Triglochin maritima</i>	Sea Arrowgrass	0	0	1	0	0	0
	Sparganiaceae	<i>Sparganium erectum</i>	Branched Bur-reed	0	0	0	0	0	1
	Typhaceae	<i>Typha latifolia</i>	Bulrush	0	0	0	0	0	1
	Liliaceae	<i>Allium triquetrum</i>	Three-cornered Garlic	0	0	0	0	0	1
		<i>Allium vineale</i>	Wild Onion	0	0	1	0	0	0
	Iridaceae	<i>Crocsmia pottsii</i> x <i>aurea</i> = <i>C. x crocosmiiflora</i>	Montbretia	0	1	0	1	1	1
		<i>Iris pseudacorus</i>	Yellow Iris	0	0	1	1	1	1

Group	Family	Scientific name	English name	A	B	C	D	E	F
Grasses, sedges and rushes	Juncaceae	<i>Juncus acutiflorus</i>	Sharp-flowered Rush	0	0	0	0	0	1
		<i>Juncus bufonius</i>	Toad Rush	1	0	0	1	0	1
		<i>Juncus conglomeratus</i>	Compact Rush	0	0	0	0	0	1
		<i>Juncus effusus</i>	Soft-rush	0	1	1	1	0	1
		<i>Juncus gerardii</i>	Saltmarsh Rush	0	1	1	0	0	0
	Cyperaceae	<i>Bolboschoenus maritimus</i>	Sea Club-rush	0	1	1	0	0	0
		<i>Carex disticha</i>	Brown Sedge	0	0	0	0	0	1
		<i>Carex divulsa</i>	Grey Sedge	0	1	1	1	0	1
		<i>Carex otrubae</i>	False Fox-sedge	0	1	1	0	0	0
		<i>Carex remota</i>	Remote Sedge	0	1	0	1	1	1
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	1	1	1	1	1	1
		<i>Anisantha sterilis</i>	Barren Brome	0	1	0	0	0	0
		<i>Arrhenatherum elatius</i>	False Oat-grass	0	1	1	1	1	1
		<i>Brachypodium sylvaticum</i>	False-brome	0	1	0	1	1	1
		<i>Cynosurus cristatus</i>	Crested Dog's-tail	0	0	1	0	0	0
		<i>Dactylis glomerata</i>	Cock's-foot	0	0	1	1	1	1
		<i>Deschampsia cespitosa</i>	Tufted Hair-grass	0	0	0	0	0	1
		<i>Elytrigia repens</i>	Common Couch	1	1	1	1	0	1
		<i>Festuca rubra</i>	Red Fescue	1	1	1	1	1	1
		<i>Glyceria fluitans</i>	Floating Sweet-grass	0	0	0	0	1	1
		<i>Holcus lanatus</i>	Yorkshire-fog	0	1	1	1	1	1
		<i>Lolium perenne</i>	Perennial Rye-grass	0	0	1	0	0	0
		<i>Phragmites australis</i>	Common Reed	0	1	0	1	1	1
		<i>Poa annua</i>	Annual Meadow-grass	1	1	1	1	1	0
		<i>Poa trivialis</i>	Rough Meadow-grass	0	1	1	0	1	1

ZONE A

Group	Family	Scientific name	English name	Section A1
Trees, shrubs and woody climbers	Rosaceae	<i>Rubus fruticosus</i> agg.	Blackberry	R
Forbs	Ranunculaceae	<i>Ranunculus repens</i>	Creeping Buttercup	R
	Urticaceae	<i>Parietaria judaica</i>	Pellitory-of-the-wall	F
		<i>Urtica dioica</i>	Common Nettle	R
	Chenopodiaceae	<i>Atriplex prostrata/glabriuscula</i>	Spear-leaved/Babington's Orache	A
		<i>Beta vulgaris</i> subsp. <i>maritima</i>	Sea Beet	F
	Caryophyllaceae	<i>Spergularia rupicola</i>	Rock Sea-spurrey	O
	Polygonaceae	<i>Rumex crispus</i>	Curled Dock	F
		<i>Rumex obtusifolius</i>	Broad-leaved Dock	R
	Brassicaceae	<i>Brassica rapa</i>	Turnip	R
		<i>Capsella bursa-pastoris</i>	Shepherd's-purse	R
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	F
	Fabaceae	<i>Trifolium dubium</i>	Lesser Trefoil	R

Group	Family	Scientific name	English name	Section A1
Forbs	Onagraceae	<i>Epilobium obscurum</i>	Short-fruited Willowherb	O
		<i>Epilobium parviflorum</i>	Hoary Willowherb	O
	Apiaceae	<i>Crithmum maritimum</i>	Rock Samphire	F
		<i>Heracleum sphondylium</i>	Hogweed	R
	Boraginaceae	<i>Myosotis arvensis</i>	Field Forget-me-not	R
	Plantaginaceae	<i>Plantago major</i>	Greater Plantain	O
	Scrophulariaceae	<i>Veronica persica</i>	Common Field-speedwell	R
	Rubiaceae	<i>Galium aparine</i>	Cleavers	F
		<i>Achillea millefolium</i>	Yarrow	R
	Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	R
		<i>Scorzonoides autumnalis</i>	Autumn Hawkbit	O
		<i>Senecio vulgaris</i>	Groundsel	F
		<i>Sonchus asper</i>	Prickly Sow-thistle	F
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	O
		<i>Taraxacum</i> agg.	Dandelion	O
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	F
Grasses, sedges and rushes	Juncaceae	<i>Juncus bufonius</i>	Toad Rush	R
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	F
		<i>Elytrigia repens</i>	Common Couch	R
		<i>Festuca rubra</i>	Red Fescue	R
		<i>Poa annua</i>	Annual Meadow-grass	F

ZONE B

Sections: B1 = elm woodland; B2 = dry meadow; B3 = saltmarsh; B4 = reedbed; B5 = road edge (only additional species not recorded in the other sections listed for this section).

Group	Family	Scientific name	English name	Layer	Sections				
					B1	B2	B3	B4	B5
Trees, shrubs and woody climbers	Ulmaceae	<i>Ulmus</i> sp.	Elm	canopy		D			
		<i>Ulmus</i> sp.	Elm	shrub		F			
		<i>Ulmus</i> sp.	Elm	ground		O			
	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/ Pedunculate Oak	ground		R			
	Salicaceae	<i>Salix cinerea</i>	Grey Willow	shrub		O			
		<i>Salix cinerea</i>	Grey Willow	ground				R	
	Rosaceae	<i>Crataegus monogyna</i>	Hawthorn	shrub		O			
		<i>Prunus spinosa</i>	Blackthorn	shrub		R			
		<i>Rubus fruticosus</i> agg.	Blackberry	ground		F			
	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	canopy		O			
		<i>Acer pseudoplatanus</i>	Sycamore	shrub		R			
	Araliaceae	<i>Hedera helix</i>	Ivy	climber		F			
		<i>Hedera helix</i>	Ivy	ground		A			
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	ground				R	

Group	Family	Scientific name	English name	Layer	Sections				
					B1	B2	B3	B4	B5
Trees, shrubs and woody climbers	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	ground	O	O			
	Oleaceae	<i>Fraxinus excelsior</i>	Ash	canopy		R			
		<i>Fraxinus excelsior</i>	Ash	shrub		R			
		<i>Ligustrum vulgare</i>	Wild Privet	ground					R
	Caprifoliaceae	<i>Sambucus nigra</i>	Elder	shrub		R			
Ferns and allies	Polypodiaceae	<i>Polypody</i> sp.	Polypody	wall					O
	Aspleniaceae	<i>Asplenium scolopendrium</i>	Hart's-tongue Fern	ground		F			
		<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	wall					O
	Dryopteridaceae	<i>Polystichum setiferum</i>	Soft Shield-fern	ground		F			
Forbs	Ranunculaceae	<i>Ranunculus acris</i>	Meadow Buttercup	ground					R
		<i>Ranunculus repens</i>	Creeping Buttercup	ground	O	R	R	O	
		<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	ground					R
	Urticaceae	<i>Parietaria judaica</i>	Pellitory-of-the-wall	ground					O
		<i>Urtica dioica</i>	Common Nettle	ground	O	F			
	Chenopodiaceae	<i>Atriplex prostrata/ glabriuscula</i>	Spear-leaved/ Babington's Orache	ground					O
		<i>Beta vulgaris subsp. maritima</i>	Sea Beet	ground	R				R
		<i>Salicornia</i> sp.	Glasswort	ground					O
		<i>Suaeda maritima</i>	Annual Sea-blite	ground					R
	Caryophyllaceae	<i>Cerastium fontanum</i>	Common Mouse-ear	ground					R
		<i>Stellaria media</i>	Common Chickweed	ground					R
	Polygonaceae	<i>Rumex crispus</i>	Curled Dock	ground	R		R	F	
		<i>Rumex sanguineus</i>	Wood Dock	ground		F			
	Brassicaceae	<i>Brassica nigra</i>	Black Mustard	ground					R
		<i>Cardamine flexuosa</i>	Wavy Bitter-cress	ground		O			
		<i>Sisymbrium officinale</i>	Hedge Mustard	ground					R
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	ground					O
	Rosaceae	<i>Geum urbanum</i>	Wood Avens	ground		F			
	Fabaceae	<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil	ground				O	O
		<i>Trifolium repens</i>	White Clover	ground					R
<i>Vicia cracca</i>		Tufted Vetch	ground					R	
<i>Vicia sativa</i>		Common Vetch	ground	R		R			
<i>Vicia sepium</i>		Bush Vetch	ground	R					

Group	Family	Scientific name	English name	Layer	Sections				
					B1	B2	B3	B4	B5
Forbs	Onagraceae	<i>Circaea lutetiana</i>	Enchanter's-nightshade	ground		R			
		<i>Epilobium hirsutum</i>	Great Willowherb	ground	R		O		
		<i>Epilobium parviflorum</i>	Hoary Willowherb	ground	R				
	Geraniaceae	<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	ground					R
		<i>Geranium robertianum</i>	Herb-Robert	ground		F			
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	ground	R		O		
		<i>Heracleum sphondylium</i>	Hogweed	ground	O	F			
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	ground	R		O		
		<i>Smyrnium olusatrum</i>	Alexanders	ground					R
		<i>Torilis japonica</i>	Upright Hedge-parsley	ground					R
	Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy	ground		O			
		<i>Lycopus europaeus</i>			R		R		
		<i>Stachys sylvatica</i>	Hedge Woundwort	ground		O			
		<i>Teucrium scorodonia</i>	Wood Sage	ground					O
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	ground					O
	Scrophulariaceae	<i>Scrophularia auriculata</i>	Water Figwort	ground	R	O			
		<i>Scrophularia nodosa</i>	Common Figwort	ground				O	
		<i>Veronica montana</i>	Wood Speedwell	ground		R			
	Rubiaceae	<i>Galium aparine</i>	Cleavers	ground	O	F		O	
		<i>Galium palustre</i>	Marsh-Bedstraw	ground	O		O	F	
	Asteraceae	<i>Aster tripolium</i>	Sea Aster	ground			O	F	
		<i>Bellis perennis</i>	Daisy	ground					R
		<i>Cirsium arvense</i>	Creeping Thistle	ground	O				O
		<i>Cirsium vulgare</i>	Spear Thistle	ground	R		R		
		<i>Lapsana communis</i>	Nipplewort	ground					O
		<i>Petasites fragrans</i>	Winter Heliotrope	ground		R			
		<i>Senecio jacobaea</i>	Common Ragwort	ground	R				R
		<i>Sonchus arvensis</i>	Perennial Sow-thistle	ground	F		R	F	
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	ground	R				
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	ground	R		O	O	
	Iridaceae	<i>Crocasmia pottsii</i> x <i>aurea</i> = <i>C. x crocosmiiflora</i>	Montbretia	ground					O

Group	Family	Scientific name	English name	Layer	Sections				
					B1	B2	B3	B4	B5
Grasses sedges and rushes	Juncaceae	<i>Juncus effusus</i>	Soft-rush	ground				R	
		<i>Juncus gerardii</i>	Saltmarsh Rush	ground			R	O	
	Cyperaceae	<i>Bolboschoenus maritimus</i>	Sea Club-rush	ground				R	
		<i>Carex divulsa</i>	Grey Sedge	ground	R				
		<i>Carex otrubae</i>	False Fox-sedge	ground	R				
		<i>Carex remota</i>	Remote Sedge	ground		O			
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	ground	O		O	A	
		<i>Anisantha sterilis</i>	Barren Brome	ground					R
		<i>Arrhenatherum elatius</i>	False Oat-grass	ground	F	O			
		<i>Brachypodium sylvaticum</i>	False-brome	ground		O			
		<i>Elytrigia repens</i>	Common Couch	ground	F		R	F	
		<i>Festuca rubra</i>	Red Fescue	ground	F		R		
		<i>Holcus lanatus</i>	Yorkshire-fog	ground	F				
		<i>Phragmites australis</i>	Common Reed	ground			D	O	
		<i>Poa annua</i>	Annual Meadow-grass	ground					O
		<i>Poa trivialis</i>	Rough Meadow-grass	ground	O	O			

ZONE C

Sections: C1 = dry meadow; C2 = saltmarsh; C3 = Sea Club-rush swamp; C4 = scrub; C5 = roadside bank and wall.

Group	Family	Scientific name	English name	Layer	Sections				
					C1	C2	C3	C4	C5
Trees, shrubs and woody climbers	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	canopy				R	
	Rosaceae	<i>Prunus spinosa</i>	Blackthorn	shrub	R			D	
		<i>Rubus fruticosus</i> agg.	Blackberry	shrub				F	
		<i>Rubus fruticosus</i> agg.	Blackberry	ground	O				
	Fabaceae	<i>Ulex europaeus</i>	Gorse	shrub	R			F	
	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	canopy				R	
	Araliaceae	<i>Hedera helix</i>	Ivy	climber				F	
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	ground				O	
	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	ground	O		O	O	
	Caprifoliaceae	<i>Sambucus nigra</i>	Elder	shrub				O	
Ferns and allies	Polypodiaceae	<i>Polypody</i> sp.	Polypody	ground					R
	Dryopteridaceae	<i>Polystichum setiferum</i>	Soft Shield-fern	ground					R
Forbs	Ranunculaceae	<i>Ranunculus acris</i>	Meadow Buttercup	ground					R
		<i>Ranunculus repens</i>	Creeping Buttercup	ground	O				
		<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	ground			O		

Group	Family	Scientific name	English name	Layer	Sections				
					C1	C2	C3	C4	C5
Forbs	Fumariaceae	<i>Fumaria muralis</i>	Common Ramping-fumitory	ground					R
	Urticaceae	<i>Parietaria judaica</i>	Pellitory-of-the-wall	wall					R
		<i>Urtica dioica</i>	Common Nettle	ground	O			O	O
	Chenopodiaceae	<i>Atriplex prostrata/glabriuscula</i>	Spear-leaved/Babington's Orache	ground		F			R
		<i>Beta vulgaris subsp. maritima</i>	Sea Beet	ground		F			F
	Caryophyllaceae	<i>Spergularia rupicola</i>	Rock Sea-spurrey	ground					R
	Polygonaceae	<i>Rumex acetosa</i>	Common Sorrel	ground	O				
		<i>Rumex crispus</i>	Curled Dock	ground	F	F			F
	Plumbaginaceae	<i>Armeria maritima</i>	Thrift	ground					R
	Primulaceae	<i>Glaux maritima</i>	Sea-milkwort	ground		F			
		<i>Samolus valerandi</i>	Brookweed	ground		O	O		
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	wall					R
	Rosaceae	<i>Potentilla anserina</i>	Silverweed	ground	R				
		<i>Potentilla reptans</i>	Creeping Cinquefoil	ground					R
	Fabaceae	<i>Lathyrus pratensis</i>	Meadow Vetchling	ground	O				
		<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	ground					F
		<i>Medicago lupulina</i>	Black Medick	ground					R
		<i>Trifolium pratense</i>	Red Clover	ground	R				
		<i>Trifolium repens</i>	White Clover	ground					R
		<i>Vicia cracca</i>	Tufted Vetch	ground	R				
		<i>Vicia sativa</i>	Common Vetch	ground	R				
		<i>Vicia sepium</i>	Bush Vetch	ground	O				
	Onagraceae	<i>Epilobium ciliatum</i>	American Willowherb	ground					R
		<i>Epilobium hirsutum</i>	Great Willowherb	ground	R		R		
	Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert	ground					R
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	ground			R		
		<i>Crithmum maritimum</i>	Rock Samphire	ground					O
		<i>Heracleum sphondylium</i>	Hogweed	ground	R				O
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	ground	R		R		
		<i>Smyrnium olusatrum</i>	Alexanders	ground					O
	Boraginaceae	<i>Myosotis scorpioides</i>	Water Forget-me-not	ground			R		
	Lamiaceae	<i>Lycopus europaeus</i>	Gypsywort	ground	R				
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	ground	O				O
		<i>Plantago major</i>	Greater Plantain	ground		O			
		<i>Plantago maritima</i>	Sea Plantain	ground		O			
	Rubiaceae	<i>Galium aparine</i>	Cleavers	ground	R				
		<i>Galium palustre</i>	Marsh-Bedstraw	ground			O		

Group	Family	Scientific name	English name	Layer	Sections				
					C1	C2	C3	C4	C5
Forbs	Asteraceae	<i>Achillea millefolium</i>	Yarrow	ground					R
		<i>Aster tripolium</i>	Sea Aster	ground			R		
		<i>Bellis perennis</i>	Daisy	ground					R
		<i>Centaurea nigra</i>	Common Knapweed	ground	R				
		<i>Cirsium arvense</i>	Creeping Thistle	ground	O				
		<i>Cirsium vulgare</i>	Spear Thistle	ground	R				R
		<i>Lapsana communis</i>	Nipplewort	ground					R
		<i>Pulicaria dysenterica</i>	Common Fleabane	ground			R		
		<i>Scorzoneroidea autumnalis</i>	Autumn Hawkbit	ground			R		
		<i>Senecio aquaticus</i>	Marsh Ragwort	ground	R				
		<i>Senecio jacobaea</i>	Common Ragwort	ground	R				R
		<i>Senecio vulgaris</i>	Groundsel	ground					O
		<i>Sonchus arvensis</i>	Perennial Sow-thistle	ground	O		O		O
		<i>Sonchus asper</i>	Prickly Sow-thistle	ground					R
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	ground	R				R
		<i>Taraxacum</i> agg.	Dandelion	ground	R				
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	ground			O		O
Grasses, sedges and rushes	Alismataceae	<i>Alisma plantago-aquatica</i>	Water-plantain	ground			R		
	Juncaginaceae	<i>Triglochin maritima</i>	Sea Arrowgrass	ground		O			
	Liliaceae	<i>Allium vineale</i>	Wild Onion	ground	R				
	Iridaceae	<i>Iris pseudacorus</i>	Yellow Iris	ground	R				
	Juncaceae	<i>Juncus effusus</i>	Soft-rush	ground	R				
		<i>Juncus gerardii</i>	Saltmarsh Rush	ground		A			
	Cyperaceae	<i>Bolboschoenus maritimus</i>	Sea Club-rush	ground		F	A		
		<i>Carex divulsa</i>	Grey Sedge	ground			R		
		<i>Carex otrubae</i>	False Fox-sedge	ground	R				
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	ground		F			
		<i>Arrhenatherum elatius</i>	False Oat-grass	ground	A				F
		<i>Cynosurus cristatus</i>	Crested Dog's-tail	ground	O				
		<i>Dactylis glomerata</i>	Cock's-foot	ground	O				O
		<i>Elytrigia repens</i>	Common Couch	ground	A	F			A
		<i>Festuca rubra</i>	Red Fescue	ground	F	F			A
		<i>Holcus lanatus</i>	Yorkshire-fog	ground	F				
		<i>Lolium perenne</i>	Perennial Rye-grass	ground	O				O
		<i>Poa annua</i>	Annual Meadow-grass	ground					R
		<i>Poa trivialis</i>	Rough Meadow-grass	ground	F				

ZONE D

Sections: D1 = sea-wall; D2 = reedbed; D3 = roadside strip, including drain and bank along lake edge.

Group	Family	Scientific name	English name	Layer	Sections		
					D1	D2	D3
Trees, shrubs and woody climbers	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	canopy			R
		<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	shrub			R
		<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	ground			R
	Betulaceae	<i>Alnus glutinosa</i>	Alder	ground			R
	Salicaceae	<i>Populus</i> sp.	Poplar	canopy			R
		<i>Salix cinerea</i>	Grey Willow	shrub			O
		<i>Salix fragilis</i>	Crack-willow	shrub			O
		<i>Salix fragilis</i>	Crack-willow	ground			O
	Rosaceae	<i>Crataegus monogyna</i>	Hawthorn	shrub			O
		<i>Rosa canina</i> agg.	Dog-rose	shrub			R
		<i>Rosa canina</i> agg.	Dog-rose	ground			R
		<i>Rubus fruticosus</i> agg.	Blackberry	shrub			F
		<i>Rubus fruticosus</i> agg.	Blackberry	ground		F	
	Fabaceae	<i>Ulex europaeus</i>	Gorse	shrub		R	
	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	canopy			R
		<i>Acer pseudoplatanus</i>	Sycamore	ground			R
	Araliaceae	<i>Hedera helix</i>	Ivy	climber		O	O
		<i>Hedera helix</i>	Ivy	ground			O
		<i>Hedera helix</i>	Ivy	wall			F
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	ground			R
	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	ground	O	F	F
	Oleaceae	<i>Fraxinus excelsior</i>	Ash	ground			R
	Caprifoliaceae	<i>Lonicera periclymenum</i>	Honeysuckle	climber			O
		<i>Lonicera periclymenum</i>	Honeysuckle	ground			O
Ferns and allies	Polypodiaceae	<i>Polypody</i> sp.	Polypody	epiphyte		R	
		<i>Polypody</i> sp.	Polypody	wall			O
	Hypolepidaceae	<i>Pteridium aquilinum</i>	Bracken	ground		R	
	Aspleniaceae	<i>Asplenium scolopendrium</i>	Hart's-tongue Fern	wall			F
		<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	wall			F
	Dryopteridaceae	<i>Dryopteris dilatata</i>	Broad Buckler-fern	ground			R
		<i>Polystichum setiferum</i>	Soft Shield-fern	ground		O	O
	Forbs	Ranunculaceae	<i>Clematis vitalba</i>	Traveller's-joy	ground		
<i>Ranunculus acris</i>			Meadow Buttercup	ground			R
<i>Ranunculus repens</i>			Creeping Buttercup	ground		O	F
<i>Ranunculus sceleratus</i>			Celery-leaved Buttercup	ground	R		R
Urticaceae		<i>Parietaria judaica</i>	Pellitory-of-the-wall	wall			O
		<i>Urtica dioica</i>	Common Nettle	ground	O	O	F

Group	Family	Scientific name	English name	Layer	Sections		
					D1	D2	D3
Forbs	Polygonaceae	<i>Rumex crispus</i>	Curled Dock	ground	R		O
		<i>Rumex obtusifolius</i>	Broad-leaved Dock	ground			F
		<i>Rumex sanguineus</i>	Wood Dock	ground		O	
	Brassicaceae	<i>Nasturtium officinale</i> agg.	Water-cress	ground			R
		<i>Sisymbrium officinale</i>	Hedge Mustard	ground			O
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	wall			F
	Rosaceae	<i>Filipendula ulmaria</i>	Meadowsweet	ground		R	O
		<i>Geum urbanum</i>	Wood Avens	ground			O
		<i>Potentilla reptans</i>	Creeping Cinquefoil	ground			O
	Fabaceae	<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil	ground			O
		<i>Vicia cracca</i>	Tufted Vetch	ground			R
		<i>Vicia sepium</i>	Bush Vetch	ground			O
	Onagraceae	<i>Epilobium obscurum</i>	Short-fruited Willowherb	ground			R
	Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert	ground			F
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	ground		O	O
		<i>Heracleum sphondylium</i>	Hogweed	ground			F
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	ground	R	O	F
	Boraginaceae	<i>Myosotis scorpioides</i>	Water Forget-me-not	ground			R
	Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy	ground			O
		<i>Lycopus europaeus</i>	Gypsywort	ground	R		
		<i>Stachys sylvatica</i>	Hedge Woundwort	ground			O
		<i>Teucrium scorodonia</i>	Wood Sage	wall			R
	Callitricheaceae	<i>Callitriche</i> sp.	Water-starwort	ground			F
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	ground			O
	Scrophulariaceae	<i>Cymbalaria muralis</i>	Ivy-leaved Toadflax	wall			F
		<i>Scrophularia auriculata</i>	Water Figwort	ground			R
		<i>Scrophularia nodosa</i>	Common Figwort	ground			O
		<i>Veronica chamaedrys</i>	Germander Speedwell	ground			R
	Rubiaceae	<i>Galium aparine</i>	Cleavers	ground		O	F
		<i>Galium palustre</i>	Marsh-Bedstraw	ground		O	O
	Valerianaceae	<i>Valeriana officinalis</i>	Common Valerian	ground		O	
	Asteraceae	<i>Cirsium arvense</i>	Creeping Thistle	ground			O
		<i>Cirsium vulgare</i>	Spear Thistle	ground			O
		<i>Lapsana communis</i>	Nipplewort	ground			F
		<i>Leucanthemum vulgare</i>	Oxeye Daisy	ground			R
		<i>Petasites fragrans</i>	Winter Heliotrope	ground			F
		<i>Senecio jacobaea</i>	Common Ragwort	ground			R
		<i>Sonchus asper</i>	Prickly Sow-thistle	ground			R
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	ground			O
		<i>Taraxacum</i> agg.	Dandelion	ground			F
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	ground			R

Group	Family	Scientific name	English name	Layer	Sections		
					D1	D2	D3
Forbs	Iridaceae	<i>Crocasmia pottsii</i> x <i>aurea</i> = <i>C. x crocosmiiflora</i>	Montbretia	ground			O
		<i>Iris pseudacorus</i>	Yellow Iris	ground		R	O
Grasses, sedges and rushes	Juncaceae	<i>Juncus bufonius</i>	Toad Rush	ground			R
		<i>Juncus effusus</i>	Soft-rush	ground		O	
	Cyperaceae	<i>Carex divulsa</i>	Grey Sedge	ground			F
		<i>Carex remota</i>	Remote Sedge	ground		O	O
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	ground	O		F
		<i>Arrhenatherum elatius</i>	False Oat-grass	ground		F	F
		<i>Brachypodium sylvaticum</i>	False-brome	ground			O
		<i>Dactylis glomerata</i>	Cock's-foot	ground			O
		<i>Elytrigia repens</i>	Common Couch	ground			F
		<i>Festuca rubra</i>	Red Fescue	ground			O
		<i>Holcus lanatus</i>	Yorkshire-fog	ground		O	O
		<i>Phragmites australis</i>	Common Reed	ground	D	F	F
		<i>Poa annua</i>	Annual Meadow-grass	ground			O

ZONE E

Sections: E1 = wet woodland (northern section); E2 = wet woodland (southern section); E3 = reedbed; E4 = track edge (only additional species not recorded in the other sections listed for this section).

Group	Family	Scientific name	English name	Layer	Sections			
					E1	E2	E3	E4
Trees, shrubs and woody climbers	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	canopy	O			
	Betulaceae	<i>Alnus glutinosa</i>	Alder	canopy	A	A		
	Salicaceae	<i>Populus</i> sp.	Poplar	canopy	O			
		<i>Salix cinerea</i>	Grey Willow	canopy	O			
		<i>Salix cinerea</i>	Grey Willow	shrub	A	F		
		<i>Salix fragilis</i>	Crack-willow	ground	R			
	Rosaceae	<i>Crataegus monogyna</i>	Hawthorn	shrub	O			
		<i>Prunus laurocerasus</i>	Cherry Laurel	shrub	R			
		<i>Rosa canina</i> agg.	Dog-rose	shrub	R			
		<i>Rosa canina</i> agg.	Dog-rose	ground	R			
		<i>Rubus fruticosus</i> agg.	Blackberry	shrub		F		
		<i>Rubus fruticosus</i> agg.	Blackberry	ground	F			
	Fabaceae	<i>Ulex europaeus</i>	Gorse	ground	R			
	Hippocastanaceae	<i>Aesculus hippocastanum</i>	Horse chestnut	canopy	R	F		
		<i>Aesculus hippocastanum</i>	Horse chestnut	ground	R			

Group	Family	Scientific name	English name	Layer	Sections			
					E1	E2	E3	E4
Trees, shrubs and woody climbers	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	shrub	R			
		<i>Acer pseudoplatanus</i>	Sycamore	ground	R			
	Araliaceae	<i>Hedera helix</i>	Ivy	climber	O			
		<i>Hedera helix</i>	Ivy	ground	F			
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	ground	O	R		
	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	ground	O		R	
	Oleaceae	<i>Fraxinus excelsior</i>	Ash	canopy		R		
		<i>Fraxinus excelsior</i>	Ash	ground	R			
	Caprifoliaceae	<i>Lonicera periclymenum</i>	Honeysuckle	climber	R	F		
		<i>Lonicera periclymenum</i>	Honeysuckle	ground	O			
Ferns and allies	Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail	ground	R			
	Polypodiaceae	<i>Polypody</i> sp.	Polypody	epiphyte	R			
	Hypolepidaceae	<i>Pteridium aquilinum</i>	Bracken	ground	R			
	Athyriaceae	<i>Athyrium filix-femina</i>	Lady-fern	ground	F			
	Dryopteridaceae	<i>Dryopteris affinis</i>	Scaly Male-fern	ground	R	F		
		<i>Dryopteris dilatata</i>	Broad Buckler-fern	ground	F			
		<i>Polystichum setiferum</i>	Soft Shield-fern	ground	O	F		
Forbs	Ranunculaceae	<i>Ranunculus acris</i>	Meadow Buttercup	ground		R		
		<i>Ranunculus flammula</i>	Lesser Spearwort	ground	O	R		
		<i>Ranunculus repens</i>	Creeping Buttercup	ground	F	F		
		<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	ground		R		
	Fumariaceae	<i>Fumaria muralis</i>	Common Ramping-fumitory	ground		O		
	Urticaceae	<i>Urtica dioica</i>	Common Nettle	ground	F	F		
	Polygonaceae	<i>Rumex acetosa</i>	Common Sorrel	ground	R			
		<i>Rumex crispus</i>	Curled Dock	ground		O		
		<i>Rumex obtusifolius</i>	Broad-leaved Dock	ground	O			
		<i>Rumex sanguineus</i>	Wood Dock	ground	F	F		
	Brassicaceae	<i>Capsella bursa-pastoris</i>	Shepherd's-purse	ground		R		
		<i>Cardamine flexuosa</i>	Wavy Bitter-cress	ground		O	O	
		<i>Sinapis arvensis</i>	Charlock	ground		O		
	Primulaceae	<i>Primula vulgaris</i>	Primrose	ground		O		
	Saxifragaceae	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	ground	F			
	Rosaceae	<i>Filipendula ulmaria</i>	Meadowsweet	ground	O			
		<i>Geum urbanum</i>	Wood Avens	ground	F			
		<i>Potentilla reptans</i>	Creeping Cinquefoil	ground		O		
	Fabaceae	<i>Trifolium repens</i>	White Clover	ground		O		
<i>Vicia sepium</i>		Bush Vetch	ground		R			

Group	Family	Scientific name	English name	Layer	Sections			
					E1	E2	E3	E4
Forbs	Onagraceae	<i>Epilobium hirsutum</i>	Great Willowherb	ground	O			
	Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert	ground	O	F		
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	ground	F		R	
		<i>Apium nodiflorum</i>	Fool's-water-cress	ground	F	F	R	
		<i>Heracleum sphondylium</i>	Hogweed	ground		O		
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	ground	A	F	R	
	Boraginaceae	<i>Myosotis scorpioides</i>	Water Forget-me-not	ground	O	O	R	
	Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy	ground	O			
		<i>Lycopus europaeus</i>	Gypsywort	ground	O	O	O	
		<i>Mentha aquatica</i>	Water Mint	ground	O	F		
		<i>Stachys sylvatica</i>	Hedge Woundwort	ground	R			
	Callitrichaceae	<i>Callitriche</i> sp.	Water-starwort	ground		O		
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	ground		O		
		<i>Plantago major</i>	Greater Plantain	ground		R		
	Scrophulariaceae	<i>Digitalis purpurea</i>	Foxglove	ground	R			
		<i>Scrophularia nodosa</i>	Common Figwort	ground		R		
	Rubiaceae	<i>Galium aparine</i>	Cleavers	ground	F	F		
		<i>Galium palustre</i>	Marsh-Bedstraw	ground	F		R	
	Valerianaceae	<i>Valeriana officinalis</i>	Common Valerian	ground	R			
	Asteraceae	<i>Arctium minus</i>	Lesser Burdock	ground		R		
		<i>Bellis perennis</i>	Daisy	ground		O		
		<i>Cirsium arvense</i>	Creeping Thistle	ground		O		
		<i>Leucanthemum vulgare</i>	Oxeye Daisy	ground		R		
		<i>Petasites fragrans</i>	Winter Heliotrope	ground	R			
		<i>Senecio aquaticus</i>	Marsh Ragwort	ground	R			
		<i>Sonchus asper</i>	Prickly Sow-thistle	ground		R		
		<i>Taraxacum</i> agg.	Dandelion	ground		O		
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	ground		R		
	Iridaceae	<i>Crocasmia pottsii</i> x <i>aurea</i> = <i>C. x crocosmiiflora</i>	Montbretia	ground	R			
		<i>Iris pseudacorus</i>	Yellow Iris	ground	O			
Grasses, sedges and rushes	Cyperaceae	<i>Carex remota</i>	Remote Sedge	ground	F	F		
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	ground	F			
		<i>Arrhenatherum elatius</i>	False Oat-grass	ground	R			
		<i>Brachypodium sylvaticum</i>	False-brome	ground	O			
		<i>Dactylis glomerata</i>	Cock's-foot	ground		O		
		<i>Festuca rubra</i>	Red Fescue	ground		O		
		<i>Glyceria fluitans</i>	Floating Sweet-grass	ground	O			
		<i>Holcus lanatus</i>	Yorkshire-fog	ground	F			

Group	Family	Scientific name	English name	Layer	Sections			
					E1	E2	E3	E4
Grasses, sedges and rushes	Poaceae	<i>Phragmites australis</i>	Common Reed	ground			D	
	Poaceae	<i>Poa annua</i>	Annual Meadow-grass	ground				O
	Poaceae	<i>Poa trivialis</i>	Rough Meadow-grass	ground	F	F		

ZONE F

Sections: F1 = conifer plantation; F2 = wet woodland (southern section); F3 = wet woodland (middle section); F4 = wet woodland (upper section); F5 = road/track edge (only additional species not recorded in the other sections listed for this section).

Group	Family	Scientific name	English name	Layer	Sections				
					F1	F2	F3	F4	F5
Trees, shrubs and woody climbers	Pinaceae	<i>Picea</i> sp.	Spruce	canopy	D				
	Ulmaceae	<i>Ulmus</i> sp.	Elm	ground				R	
		<i>Ulmus</i> sp.	Elm	shrub				O	
	Fagaceae	<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	canopy		O	O		
		<i>Quercus petraea/robur</i>	Sessile/Pedunculate Oak	ground		R			
	Betulaceae	<i>Alnus glutinosa</i>	Alder	canopy		F	F	F	
		<i>Alnus glutinosa</i>	Alder	shrub		R	R		
	Salicaceae	<i>Populus</i> sp.	Poplar	canopy			O	O	
		<i>Salix alba</i>	White Willow	canopy			O	O	
		<i>Salix cinerea</i>	Grey Willow	canopy		A	A	A	
		<i>Salix cinerea</i>	Grey Willow	shrub		F	F	F	
		<i>Salix fragilis</i>	Crack-willow	canopy			F	F	
		<i>Salix fragilis</i>	Crack-willow	ground			O	O	
		<i>Salix fragilis</i>	Crack-willow	shrub			F	F	
		<i>Salix viminalis</i>	Osier	shrub				R	
	Grossulariaceae	<i>Ribes nigrum</i>	Black Currant	shrub			R		
	Rosaceae	<i>Crataegus monogyna</i>	Hawthorn	ground	R				
		<i>Crataegus monogyna</i>	Hawthorn	shrub		F	F		
		<i>Prunus spinosa</i>	Blackthorn	shrub					O
		<i>Rosa canina</i> agg.	Dog-rose	ground		R			
		<i>Rosa</i> sp.	Rose	shrub					R
		<i>Rubus fruticosus</i> agg.	Blackberry	ground	F	F	F	F	
	Aquifoliaceae	<i>Ilex aquifolium</i>	Holly	ground	R				
		<i>Ilex aquifolium</i>	Holly	shrub		R			
	Buxaceae	<i>Buxus</i> sp.	Box	shrub					R
	Aceraceae	<i>Acer pseudoplatanus</i>	Sycamore	canopy		O	O	O	
		<i>Acer pseudoplatanus</i>	Sycamore	shrub			R		

Group	Family	Scientific name	English name	Layer	Sections				
					F1	F2	F3	F4	F5
Trees, shrubs and woody climbers	Araliaceae	<i>Hedera helix</i>	Ivy	climber		O	O		
		<i>Hedera helix</i>	Ivy	ground	F	F	F	F	
	Solanaceae	<i>Solanum dulcamara</i>	Bittersweet	ground		F	F		
	Convolvulaceae	<i>Calystegia sepium</i>	Hedge Bindweed	ground		F	F	F	
	Oleaceae	<i>Ligustrum vulgare</i>	Wild Privet	shrub					R
	Caprifoliaceae	<i>Lonicera periclymenum</i>	Honeysuckle	ground		F			
<i>Sambucus nigra</i>		Elder	shrub					F	
Ferns and allies	Equisetaceae	<i>Equisetum palustre</i>	Marsh Horsetail	ground		O			
	Polypodiaceae	<i>Polypody</i> sp.	Polypody	epiphyte	O	O	O	O	
	Hypolepidaceae	<i>Pteridium aquilinum</i>	Bracken	ground	O	O	O	O	
	Aspleniaceae	<i>Asplenium scolopendrium</i>	Hart's-tongue Fern	ground				R	R
		<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	ground					O
	Athyriaceae	<i>Athyrium filix-femina</i>	Lady-fern	ground	F	F	F	F	
	Dryopteridaceae	<i>Dryopteris dilatata</i>	Broad Buckler-fern	ground	O	O	O	O	
<i>Polystichum setiferum</i>		Soft Shield-fern	ground	O	O	O	O		
Forbs	Ranunculaceae	<i>Ranunculus acris</i>	Meadow Buttercup	ground					R
		<i>Ranunculus flammula</i>	Lesser Spearwort	ground		O			
		<i>Ranunculus repens</i>	Creeping Buttercup	ground	F	F	F	F	
	Fumariaceae	<i>Fumaria muralis</i>	Common Ramping-fumitory	ground					O
	Urticaceae	<i>Urtica dioica</i>	Common Nettle	ground	F	F	F	F	
	Caryophyllaceae	<i>Silene flos-cuculi</i>	Ragged-Robin	ground		O			
		<i>Stellaria graminea</i>	Lesser Stitchwort	ground					R
	Polygonaceae	<i>Rumex acetosa</i>	Common Sorrel	ground	O	O	O	O	
		<i>Rumex crispus</i>	Curled Dock	ground		O	O	O	
		<i>Rumex obtusifolius</i>	Broad-leaved Dock	ground					R
		<i>Rumex sanguineus</i>	Wood Dock	ground		O	O	O	
	Brassicaceae	<i>Brassica nigra</i>	Black Mustard	ground					R
		<i>Cardamine flexuosa</i>	Wavy Bitter-cress	ground		O			
		<i>Cardamine pratensis</i>	Cuckooflower	ground				O	
		<i>Nasturtium officinale</i> agg.	Water-cress	ground				R	
		<i>Sinapis arvensis</i>	Charlock	ground					R
	Primulaceae	<i>Primula vulgaris</i>	Primrose	ground		O			
	Crassulaceae	<i>Umbilicus rupestris</i>	Navelwort	ground					O
	Saxifragaceae	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage	ground		F	F		

Group	Family	Scientific name	English name	Layer	Sections				
					F1	F2	F3	F4	F5
Forbs	Rosaceae	<i>Filipendula ulmaria</i>	Meadowsweet	ground		F	F	F	
		<i>Geum urbanum</i>	Wood Avens	ground		O	O	O	
		<i>Potentilla reptans</i>	Creeping Cinquefoil	ground				R	
	Fabaceae	<i>Lathyrus pratensis</i>	Meadow Vetchling	ground				R	
		<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil	ground		F	F	F	
		<i>Vicia sativa</i>	Common Vetch	ground					R
		<i>Vicia sepium</i>	Bush Vetch	ground					O
	Onagraceae	<i>Circaea lutetiana</i>	Enchanter's-nightshade	ground		O			
		<i>Epilobium hirsutum</i>	Great Willowherb	ground		F	F	F	
		<i>Epilobium montanum</i>	Broad-leaved Willowherb	ground					R
		<i>Epilobium obscurum</i>	Short-fruited Willowherb	ground		O			
	Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert	ground		O			
	Apiaceae	<i>Angelica sylvestris</i>	Wild Angelica	ground		F	F		
		<i>Apium nodiflorum</i>	Fool's-water-cress	ground		O	O		
		<i>Heracleum sphondylium</i>	Hogweed	ground		F	F	F	
		<i>Oenanthe crocata</i>	Hemlock Water-dropwort	ground		A			
	Boraginaceae	<i>Myosotis scorpioides</i>	Water Forget-me-not	ground		F	F		
	Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy	ground					O
		<i>Lycopus europaeus</i>	Gypsywort	ground		F	F		
		<i>Mentha aquatica</i>	Water Mint	ground		F	F	F	
		<i>Stachys palustris</i>	Marsh Woundwort	ground		O	O	O	
		<i>Stachys sylvatica</i>	Hedge Woundwort	ground			O	O	
	Callitricheaceae	<i>Callitriche</i> sp.	Water-starwort	ground		O			
	Plantaginaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	ground					O
		<i>Plantago major</i>	Greater Plantain	ground					R
	Scrophulariaceae	<i>Digitalis purpurea</i>	Foxglove	ground		R			
		<i>Scrophularia auriculata</i>	Water Figwort	ground		F	F	F	
		<i>Veronica chamaedrys</i>	Germander Speedwell	ground					O
	Rubiaceae	<i>Galium aparine</i>	Cleavers	ground	F	F	F	F	
		<i>Galium palustre</i>	Marsh-Bedstraw	ground		F	F		
	Valerianaceae	<i>Valeriana officinalis</i>	Common Valerian	ground		F	F		
	Asteraceae	<i>Bellis perennis</i>	Daisy	ground					O
		<i>Cirsium arvense</i>	Creeping Thistle	ground				R	
		<i>Lapsana communis</i>	Nipplewort	ground					O
		<i>Petasites fragrans</i>	Winter Heliotrope	ground				R	
		<i>Senecio jacobaea</i>	Common Ragwort	ground		R			

Group	Family	Scientific name	English name	Layer	Sections				
					F1	F2	F3	F4	F5
Forbs	Asteraceae	<i>Senecio vulgaris</i>	Groundsel	ground					O
		<i>Sonchus asper</i>	Prickly Sow-thistle	ground					R
		<i>Sonchus oleraceus</i>	Smooth Sow-thistle	ground		R			
		<i>Taraxacum</i> agg.	Dandelion	ground					R
		<i>Tripleurospermum maritimum</i>	Sea Mayweed	ground					O
	Sparganiaceae	<i>Sparganium erectum</i>	Branched Bur-reed	ground		O	O		
	Typhaceae	<i>Typha latifolia</i>	Bulrush	ground		O	O	O	
	Liliaceae	<i>Allium triquetrum</i>	Three-cornered Garlic	ground					R
	Iridaceae	<i>Crocsmia pottsii</i> x <i>aurea</i> = <i>C. x crocosmiiflora</i>	Montbretia	ground					O
		<i>Iris pseudacorus</i>	Yellow Iris	ground		F	F	F	
Grasses, sedges and rushes	Juncaceae	<i>Juncus acutiflorus</i>	Sharp-flowered Rush	ground			O		
		<i>Juncus bufonius</i>	Toad Rush	ground					O
		<i>Juncus conglomeratus</i>	Compact Rush	ground			O		
		<i>Juncus effusus</i>	Soft-rush	ground		F	F	F	
	Cyperaceae	<i>Carex disticha</i>	Brown Sedge	ground				R	
		<i>Carex divulsa</i>	Grey Sedge	ground	F				
		<i>Carex remota</i>	Remote Sedge	ground		F	F		
	Poaceae	<i>Agrostis stolonifera</i>	Creeping Bent	ground		F	F	F	
		<i>Arrhenatherum elatius</i>	False Oat-grass	ground		F	F	F	
		<i>Brachypodium sylvaticum</i>	False-brome	ground					O
		<i>Dactylis glomerata</i>	Cock's-foot	ground					R
		<i>Deschampsia cespitosa</i>	Tufted Hair-grass	ground		R			
		<i>Elytrigia repens</i>	Common Couch	ground				A	
		<i>Festuca rubra</i>	Red Fescue	ground			F	F	
		<i>Glyceria fluitans</i>	Floating Sweet-grass	ground		O	O	O	
		<i>Holcus lanatus</i>	Yorkshire-fog	ground		F	F	F	
		<i>Phragmites australis</i>	Common Reed	ground		F	F	F	
		<i>Poa trivialis</i>	Rough Meadow-grass	ground		F	F	F	

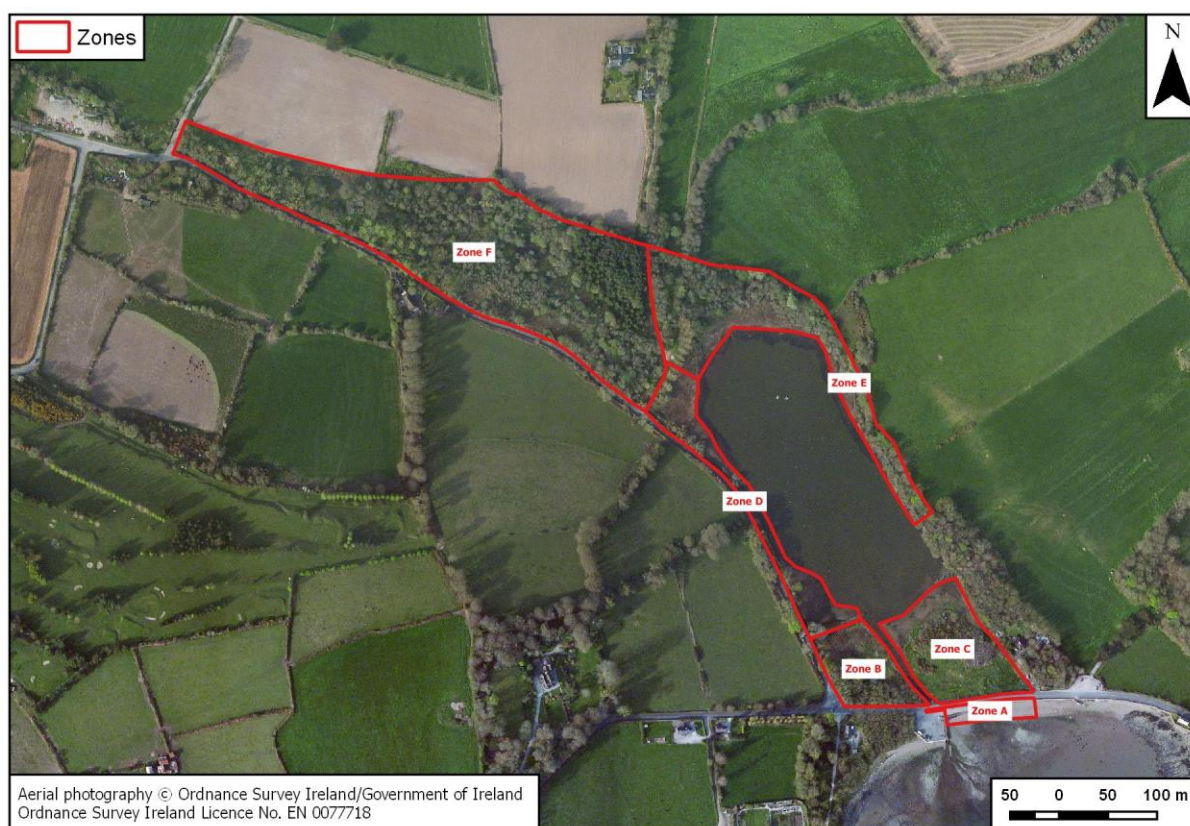


Figure 1. Zones used for the botanical survey.

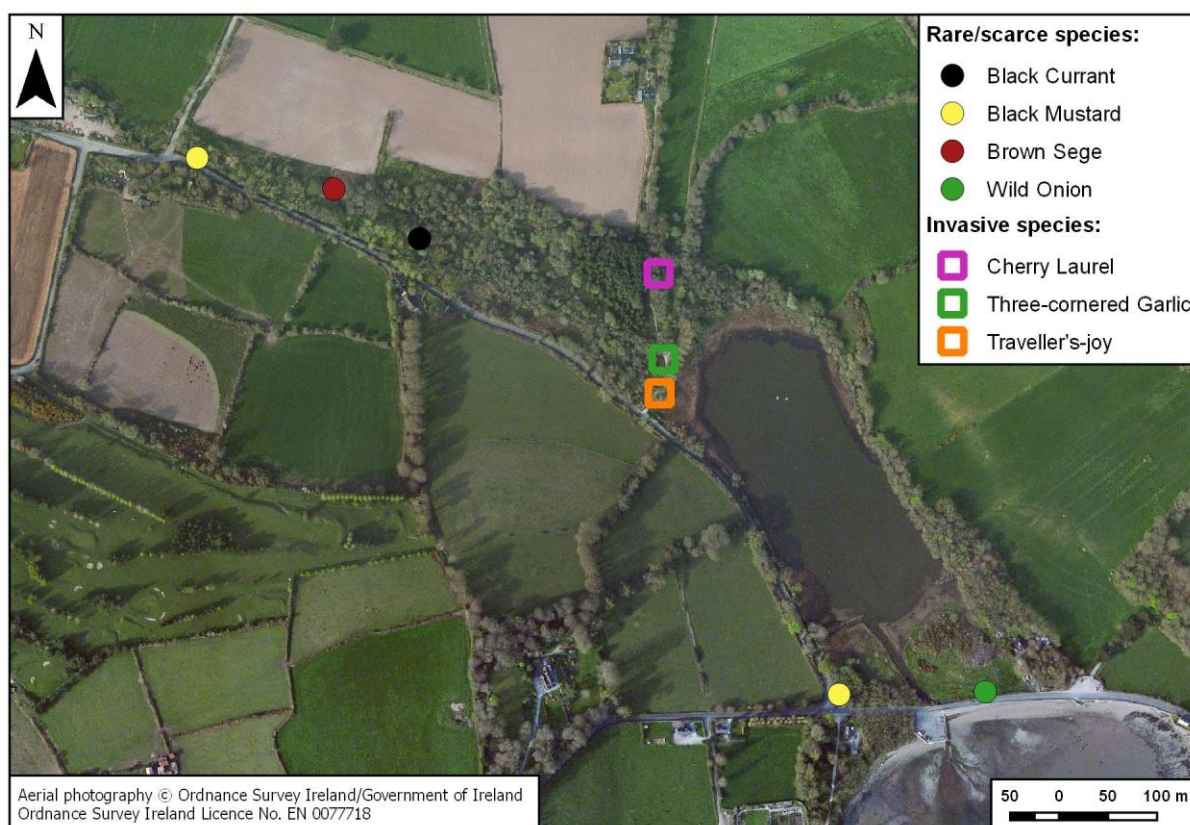


Figure 2. Locations of rare/scarse species and invasive species (excluding Montbretia, Syacamore and Winter Heliotrope)..



Plate 1. Strandline vegetation at the base of the stone wall in Zone A.



Plate 2. Elm woodland in Zone B.



Plate 3. Glasswort dominated lower saltmarsh habitat in Zone B.



Plate 4. Upper saltmarsh habitat with trampled areas in Zone C.



Plate 5. Sea Club-rush swamp in Zone C.



Plate 6. Reedswamp habitat in Zone E, with a disturbed area with Winter Heliotrope in the foreground.



Plate 7. Wet woodland habitat with abundant Hemlock Water-dropwort in Zone F.



Plate 8. Tall herb swamp habitat in Zone F.