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Investigating ditch biodiversity in the Gwent Levels : a survey of vegetation and aquatic macro-invertebrates at 5 sites within the Gwent Levels

Final Report, Jonathan Graham & Martin Hammond (March 2022)

Executive Summary

- Ditches[1] at five sites (Great Newra Farm, Cross Farm site 1, Cross Farm site 2, Fair Orchard Farm and Sluice House Farm) within the Gwent Levels were surveyed for plants and aquatic macro-invertebrates.

- Great Newra Farm and Fair Orchard Farm sites had features of a more traditional Gwent Levels farmscape with mature hedges, semi-improved pasture and a pattern of "herringbone" grip surface drains. The other 3 sites had low hedges, less regularly managed (and reed filled) boundary ditches and have been agriculturally improved with more efficient under-drainage.

- Three sites (Cross Farm site 2, Fair Orchard Farm and Sluice House Farm) had ditches that were drawn down at the time of the 5th August survey with a water level of c10cm or less. This had a direct bearing on the occurrence of submerged aquatic plants that were best represented at Great Newra Farm and Cross Farm site 1 which had ditches with water levels between c30-40cm on the 5th August.

- 3 sites (Great Newra Farm, Cross Farm site 1, Cross Farm site 2) within Nash & Goldcliff SSSI had independently qualifying SSSI plant and invertebrate features (Hairlike Pondweed, Rootless Duckweed, the diving beetle *Hydaticus transversalis,* Great Silver Water Beetle, Ornate Brigadier soldierfly). In addition, the following 3 species qualify as being part of a notified assemblage feature on the SSSIs: Frogbit, Smooth Hornwort, Tubular Water-dropwort and the following 7 species are considered notable: Lesser Pondweed, *Great* Water Dock, , Moss Bladder Snail, the diving beetle *Agabus conspersus*, the diving beetle *Nartus grapii,* the scavenger water beetle *Berosus signaticollis,* Pink Water Speedwell Weevil. It is encouraging that these 3 sites support SSSI qualifying features at a single field level.

- Nine-spined and/or Three-spined Sticklebacks were present in most of the ditches sampled. Single elvers were found in GN-EA27 and CF1-IDB71. Smooth and/or Palmate Newt tadpoles were present in the ditches at Great Newra Farm.

- The vast majority of ditches (all sites) with open water were dominated by duckweed at very high cover (often to 100% surface cover). Such high cover of duckweed is linked to eutrophication (particularly phosphate concentration) and can have a negative indirect impact on SSSI qualifying submerged aquatic plants such as Hairlike Pondweed.

- All 5 survey sites were grazed (mainly by cattle) and the resulting poaching of drain margins, along with routine cleaning out of ditches, is considered very important for both drain plants and invertebrates.

- It is worth noting that the main report for the Underdrainage project (Rigare, 2022) finds that there is very unlikely to be any systematic difference between ditch water depth regime and field drainage type (traditional or underdrained), during either the warmer or colder

[1] The words 'ditch' and 'drain' are used interchangeably throughout.

month periods. Therefore, hydrological supporting conditions or ditch plant communities, as defined through the ditch water depth regime, are very unlikely to be sensitive to field drainage type. The number of sites surveyed here was too small to test this conclusion empirically.

1 Introduction

1.1 The Gwent Levels are an extensive low lying area of alluvial wetland and intertidal mudflats adjoining the north bank of the Severn Estuary, either side of the River Usk estuary near Newport in south-east Wales. The area includes 1,448 kilometres of watercourses known locally as “reens”.

1.2 The Gwent Levels are of both national and international importance for wildlife and include 5,700 hectares notified as 6 Sites of Special Scientific Interest (SSSI).

1.3 The Levels qualify as SSSI on the basis of their rare wetland plants and invertebrates but also have important populations of other creatures such as otters, water voles and breeding waders. Important flowering plants include Brackish Water-crowfoot *Ranunculus baudotii*, Hairlike Pondweed *Potamogeton trichoides*, Blunt-leaved Pondweed *Potamogeton obtusifolius*, Small Pondweed *Potamogeton berchtoldii*, Lesser Pondweed *Potamogeton pusillus*, Narrow-leaved Water-plantain *Alisma lanceolatum*, Whorled Water-milfoil *Myriophyllum verticillatum,* Fine-leaved Water-dropwort *Oenanthe aquatica*, Meadow Thistle *Cirsium dissectum*, Blunt-flowered Rush *Juncus subnodulosus* and Rootless Duckweed *Wolffia arrhiza.* The Gwent Levels is the best place in Wales for wetland insects and other invertebrates notably water beetles, soldierflies, dragonflies and damselflies.

1.4 In general terms, favourable hydrological supporting conditions for the ditch communities of the Gwent Levels are associated with high water level conditions within ditches and by extension within the adjacent fields. Such high water level conditions can affect the viability and productivity of agriculture within the fields, and to mitigate this effect the possibility of installation of underdrainage has been raised. Underdrainage would require the legal consent of Natural Resources Wales (NRW), and to date no permissions have been granted.

1.5 Aquatic invertebrate assemblages are influenced by a range of factors including type of water body (e.g. pond, lake, river or spring), hydroperiod (permanent/semi-permanent/seasonal/temporary), water quality (including dissolved oxygen concentration and nutrient levels) and habitat structure (including vegetation architecture and substrate type). There is considerable inter-relationship between these factors. For example, high nutrient levels favour the dominance of tall swamp plants, floating carpets of duckweeds or planktonic algae depending on the habitat. The simplified vegetation structure which results tends to impoverish the invertebrate assemblage. Such synergies make it difficult to disentangle individual drivers.

1.6 In flowing waters, biological monitoring generally focuses on the presence or absence of invertebrate taxa sensitive to organic pollution. Thus, a high-quality river or stream will be characterised by taxa such as stonefly, mayfly and caddisfly larvae which require permanently well-oxygenated water, though the assemblage will vary according to geography, water chemistry (e.g. base status) and physical habitat. In still waters (including most ditch systems), the classic indicators of high biological water quality are generally sparse or absent and the fauna tends to be dominated by taxa which either obtain atmospheric air at the surface (such as beetles and bugs) or tolerate relatively low levels of dissolved oxygen (e.g. pond snails). Although water quality is still an important factor, especially for gill-breathing taxa such as dragonfly larvae, the conservation quality of still-water invertebrate assemblages usually focuses on metrics such as species quality and species richness.

1.7 The RSPB is concerned that underdrainage would represent a risk to the conservation condition of the ditch communities through its possible direct effect on their hydrological supporting conditions. It is also concerned that underdrainage represents a risk to the wider ecosystem service suite associated with the Gwent Levels, including cultural, biodiversity and archaeological assets and services.

1.8 In order to inform future management of the Gwent Levels, the RSPB has promoted a project "Underdrainage on the Gwent Levels" to provide a qualitative conceptual assessment of the current hydrological regime of the Gwent Levels catchment as a whole and the six Gwent Levels SSSI in particular.

1.9 A team of relevant independent specialists led by Dr Rob Low (Rigare Ltd) were assigned to the project in 2020 which looked at 5 sites (3 east of the River Usk) and 2 sites (west of the River Usk). Jonathan Graham (plants) and Martin Hammond (aquatic macro-invertebrates) were commissioned to undertake ecological assessments of ditches at these 5 sites and this report provides the results of these ecological surveys. This report comprises findings of the ecological assessments of ditches as part of the Underdrainage on the Gwent Levels project.

2 Methodology

2.1 General

2.1.1 Five sites were selected for assessment of ditches: 3 sites (Great Newra Farm, Chapel Road, ST3684; Cross Farm site 1, Chapel Road, ST3683; Cross Farm site 2, Goldcliff Road, ST3483) east of the River Usk and 2 sites (Fair Orchard Farm, Duffryn, ST2983; Sluice House Farm, Wentloog Road, ST2479) west of the River Usk. Great Newra Farm, Cross Farm (sites 1 & 2) are situated within Nash & Goldcliff Special Scientific Interest (SSSI), Fair Orchard Farm in St. Brides SSSI and Sluice House Farm in Rumsey & Peterstone SSSI. Map 1 shows the location of these 5 sites.

2.1.2 Each site generally represented a single agricultural field managed as permanent pasture grazed by cattle and/or sheep. Such fields are bordered by smaller field ditches and sometimes are also bordered by or in close proximity to larger Internal Drainage District (IDD) or “main” reens.

2.13 At each of the five sites a minimum of 3 ditches (either field ditch, IDD or Main reen) were selected for ecological assessment. Where possible, ditches were selected which had a least 10cm of water so that both aquatic invertebrates and plants could be assessed together. However, assessment of aquatic invertebrates was limited to only 2 sample points (Cross Farm site 2 and Fair Orchard Farm) and a single sample point (Sluice House Farm) because ditches were completely drawn down at the time of survey (5th August). A total of 16 ditches were surveyed for plants and 11 ditches surveyed for aquatic invertebrates.

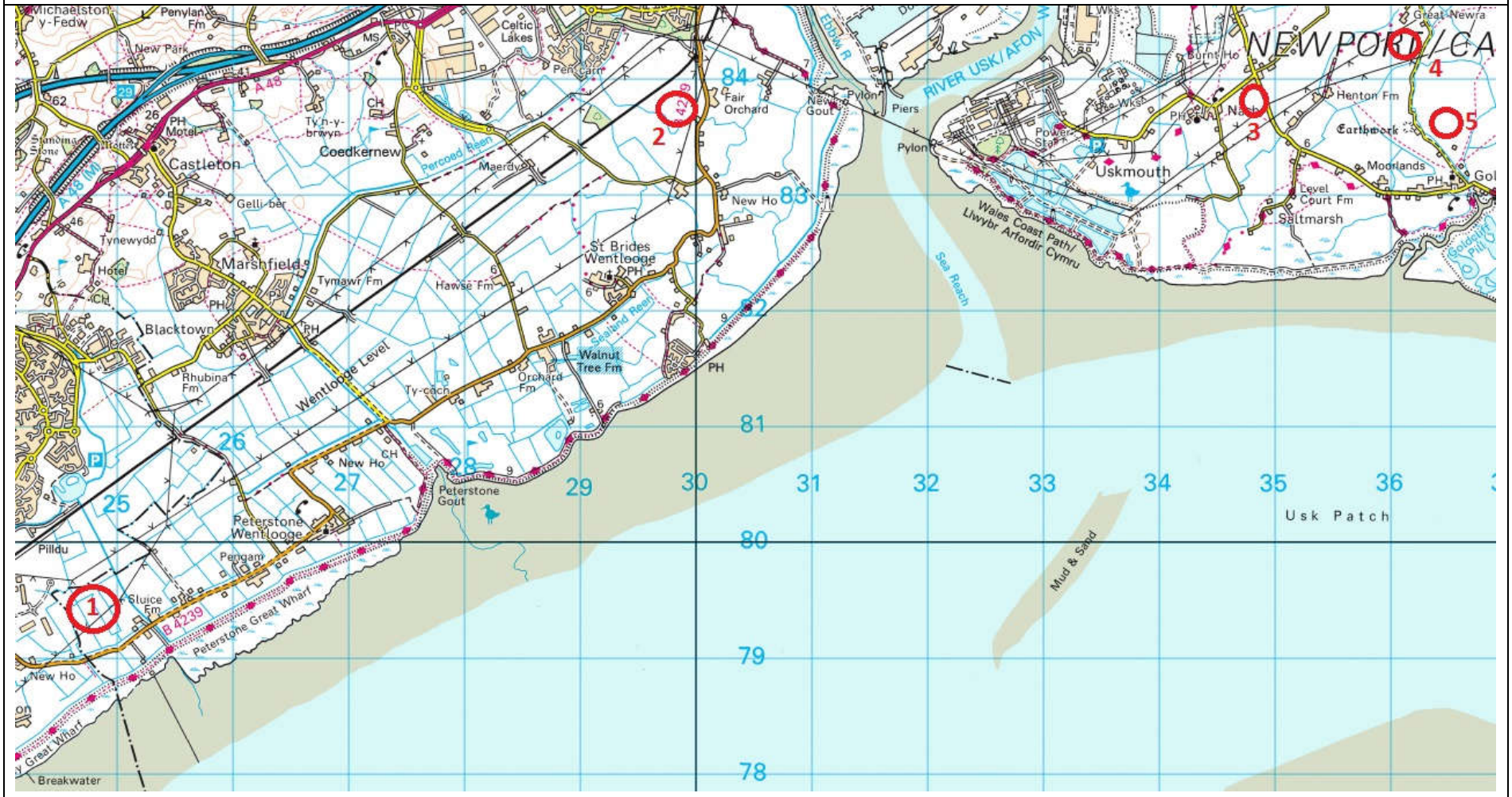
2.1.4 Survey work was undertaken on the 19th March 2020 (plants only at Great Newra and Cross Farm site 1) and on 5th August 2010 (plants and aquatic invertebrates for all 5 sites) during fine weather. All flowering plants, Charophytes, bryoplytes, Chlorophyta (when prominent) and aquatic macro-invertebrates were recorded. Also basic water chemistry: water temperature, pH and conductivity were measured for each sample ditch using a Hanna H1 9811-5 meter.

2.1.5 Nomenclature adopted follows Stace (2019) for flowering plants and Atherton et. al. (2010) for bryophytes.

2.1.6 In addition to plants and aquatic macro-invertebrates, vertebrates (such as fish and amphibians) were noted.

2.1.7 Full field data are provided for plants (Appendix 1) and aquatic macro-invertebrates (Appendix 2).

Map 1 Location of 5 survey sites



1. Sluice House Farm, 2. Fair Orchard Farm, 3. Cross Farm (site 2), 4. Great Newra Farm, 5. Cross Farm (site 1),

2.2 Methodology - plants

2.2.1 All flowering plants and where prominent charophytes and bryophytes were recorded and noted as either bank, emergent or aquatic species.

2.2.2 An estimation of the abundance of aquatic plants (both submerged and floating species) was made using the DAFOR scale. The full length of each ditch was surveyed for plants while a strict 20m sample was surveyed for aquatic invertebrates.

2.2.3 Plants were surveyed by sight and by use of a grapnel. Critical species (such as certain pondweed *Potamogeton* species, Water Starworts *Callitriche* species, bryophytes, charophytes and filamentous green algae (Chlorophyta)) were collected and stored in small plastic bags before being checked later with a microscope.

2.2.4 A number of critical plant taxa have been included in this survey. White-flowered *Nasturtium* (water-cress) species have only been recorded to species level where mature fruit was present (the character of flower size is considered unreliable in separating the two species, *Nasturtium officinale sensu stricto* and *N. microphyllum). Callitriche* (water-starwort) species have been named on the basis of microscopic examination of pollen (Lansdown, 2008) and/or the presence of semi-mature or mature fruits while a small number of infertile plants were recorded as the aggregate *Callitriche* sp.. Records of Lesser Pondweed *Potamogeton pusillus* are based on microscopic examination of stipules following Preston (1995).

2.3 Methodology – macro-invertebrate sampling

2.3.1 Assessment of freshwater macro-invertebrates is often based on a timed hand-netting sample obtained using a standard collection protocol. For example, most assessments of biological water quality for rivers are based on 3 minutes kick-sampling plus 1 minute's sweeping of the river margin. Timed samples subdivided between each meso-habitat also form the basis of invertebrate sampling in PSYM (Predictive System for Multimetrics), the standard methodology for monitoring ecological quality in ponds and small lakes (Environment Agency, 2002). However, experience suggests that timed sampling is inefficient at maximising the range of species detected, partly because obstacles such as algal mats or dense vegetation affect the efficiency of netting. Entomologists concerned with obtaining a more representative sample of the species present in a given habitat have preferred to use exhaustive sampling whereby all meso-habitats (e.g. emergent vegetation, submerged vegetation, open water) are sampled until no further taxa can be recognised in the sorting tray.

2.3.2 Thus the technique we used was to sample a 20 metre section of each ditch exhaustively, with collected material deposited in a sorting tray, until no further taxa were recognised. Where obstacles such as bushes were present, accessible areas equivalent to 20 linear metres were netted. As the ditches were roughly similar in dimensions (apart from GN-EA27), this should have resulted in similar sampling effort per site.

2.3.3 Taxa were identified to species level wherever possible, either in the field or in the laboratory; material which could not be identified in the field was preserved in 80% industrial denatured alcohol. Flatworms were only recorded as a single taxon because these delicate animals need to be identified under the microscope alive.

2.3.4 In addition to hand netting, two 24-hour bottle traps (baited with raw liver) were placed in ditches at each of the 5 survey sites. This sampling technique targets larger diving beetles (especially *Dytiscus spp.*) which can be difficult to pick up during a single search using a hand net.

Martin Hammond sampling at ditch for water beetles at Great Newra Farm beside stilling well (sample ditch GN-Dr3)

2.3.5 Assessment methodology

In analysing the data, particular attention was given to water beetles. In still and slow-moving waters, aquatic Coleoptera are by far the most speciose group of aquatic macro-invertebrates which can be sampled readily using a pond-net (Pond Conservation, 2003). Moreover, the distribution, ecology and conservation status of individual species is well-documented in Britain (e.g. Foster *et al* 2016, 2019, 2020). Assemblages of aquatic Coleoptera are thus particularly useful in constructing species quality metrics (Foster & Eyre, 1992), the most frequently used being the Species Quality Index (SQI). An SQI is calculated by scoring individual species according to their ubiquity or rarity using a geometric scale from 1 to 32 (Table 1) then calculating a mean value.

Table 1 Quality Index (SQI) scoring for water beetles

Score	**Rarity**[2]
1	Ubiquitous
2	Widespread but more local
4	Uncommon & local or regionally scarce
8	Nationally Scarce
16	Near Threatened
32	Nationally Vulnerable or Endangered

The Species Quality Score (SQS, the sum of individual species scores) is also a useful metric but influenced more by recording effort and the fact that some habitats are inherently more species-rich than others.

There are limitations to the use of SQI as a proxy metric for conservation quality as species-poor and very species-rich assemblages tend to produce skewed scores but it has been widely used and we found it useful in evaluating a large dataset for agricultural ditches in the Fenland of eastern England (Graham & Hammond, 2015). SQI scores are probably most useful for highlighting the richest and poorest water bodies within a dataset rather than as absolute values.

[2] Nationally Scarce, Near Threatened, Vulnerable and Endangered are nationally recognised categories used in reviews of conservation status published by the Joint Nature Conservation Committee and country wildlife agencies. Nationally Scarce species are believed to occur in 100 or fewer ten km squares on the OS mapping grid for Great Britain. Near Threatened, Vulnerable and Endangered are based on criteria published by the International Union for the Conservation of Nature: see http://data.jncc.gov.uk/data/478f7160-967b-4366-acdf-8941fd33850b/conservation-designations-uktaxa-spreadsheet-constituent-lists.pdf

The Community Conservation Index (CCI) developed by Chadd & Extence (2004) expands on this approach by providing a metric which combines species quality with taxon richness for a full suite of aquatic macro-invertebrates. In this methodology, each taxon is given a Conservation Score (CS) based on its national (GB) status[3]. The sum of CSs is then divided by the number of taxa to produce a mean score. This is multiplied by a 'Community Score' (CoS) based on the highest individual CS[4] to give the CCI score, so that:

$$CCI = \frac{\Sigma\ CS}{n} \times CoS$$

Based on extensive analysis of national datasets, Chadd & Extence (2004) categorize CCI scores based on Table 2 (below).

Table 2 Community Conservation Index (CCI) scoring following Chadd & Extence (2004)

CCI Score	Evaluation
0 to 5	Sites supporting only common species and/or a community of low taxon richness. Low conservation value.
> 5.0 to 10.0	Sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness. Moderate conservation value.
>10.0 to 15.0	Sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness. Fairly high conservation value.
>15.0 to 20.0	Sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness. High conservation value.
>20.0	Sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness. Very high conservation value (potentially of national significance and may merit statutory protection).

[3] Conservation Scores were revised in 2018 (Richard Chadd, pers comm) and these have been used in this study: see Appendix X.

[4] CoS can also be derived from the BMWP score, a measure of biological water quality, but this is less appropriate for still waters.

Results

3.1 Overview: Plants

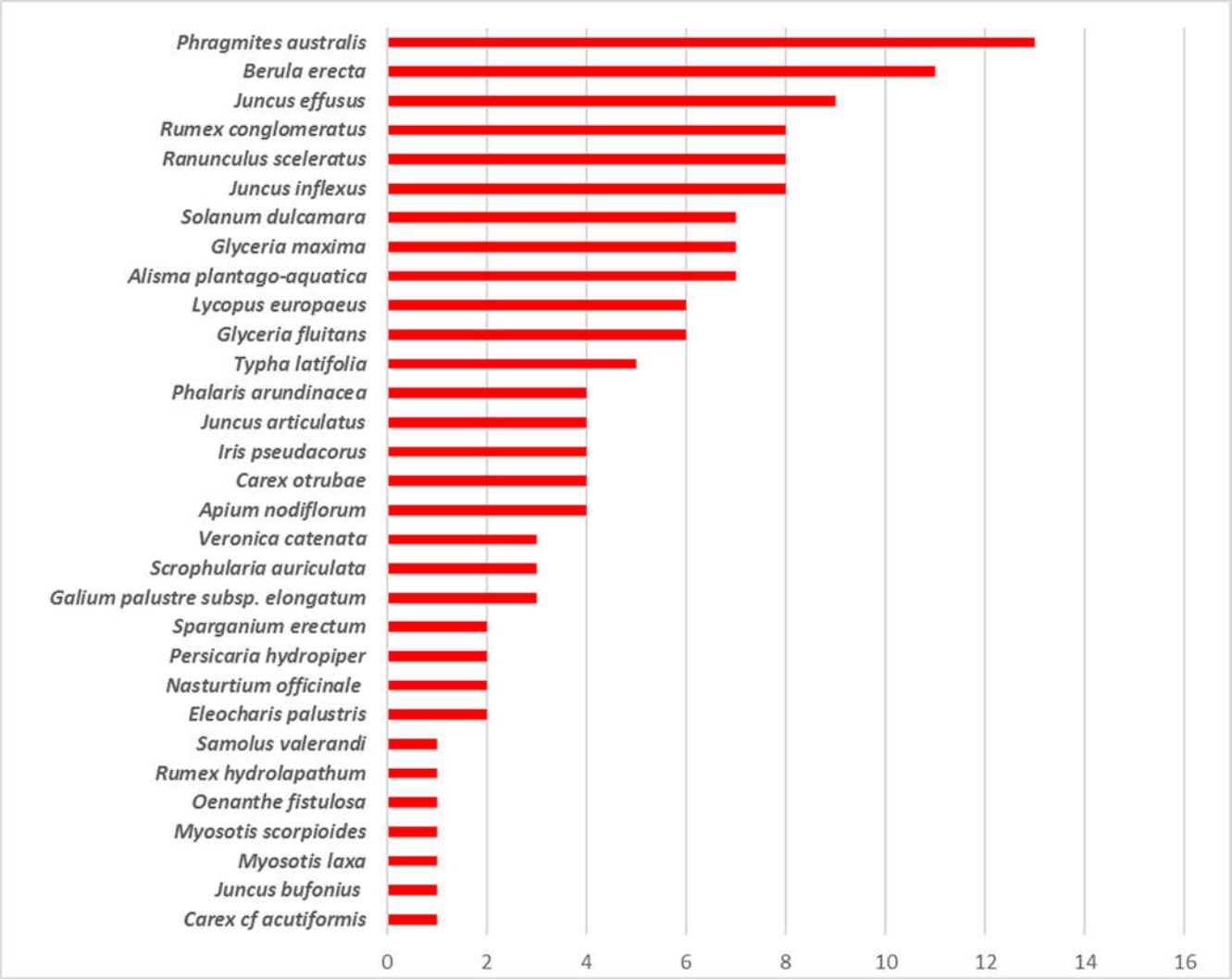
3.1.1 One hundred and twelve plants have been recorded comprising 60 bank species (including hedge species and epiphytic bryophytes), 33 emergent species of the water's edge, 7 floating aquatic species (including the alga *Ulva*) and 12 submerged aquatic species. All these species are listed in Appendix 3.

3.1.2 Figures 1 and 2 show occurrence of emergent and aquatic (floating and submerged) species within the 16 ditch sample points.

3.1.3 The emergent flora of the water's edge is dominated by Common Reed *Phragmites australis* and Lesser Water-parsnip *Berula erecta* (>10 out of 16 ditch sample points) with frequent Floating Sweet-grass *Glyceria fluitans*, Gypsywort *Lycopus europaeus*, Common Water-plantain *Alisma plantago-aquatica*, Reed Sweet-grass *Glyceria maxima*, Woody Nightshade *Solanum dulcamara*, Hard Rush *Juncus inflexus*, Soft Rush *Juncus effusus*, Celery-leaved Buttercup *Ranunculus sceleratus* and Clustered Dock *Rumex conglomeratus* (between 6 and 10 out of 16 ditch sample points). Twenty other emergent species occurred in <5 out of 16 ditch sample points including species of conservation note such as Tufted Forget-me-not *Myosotis laxa subsp. caespitosa*, Tubular Water-dropwort *Oenanthe fistulosa*, Water Dock *Rumex hydrolapathum* and Brookweed *Samolus valerandi*.

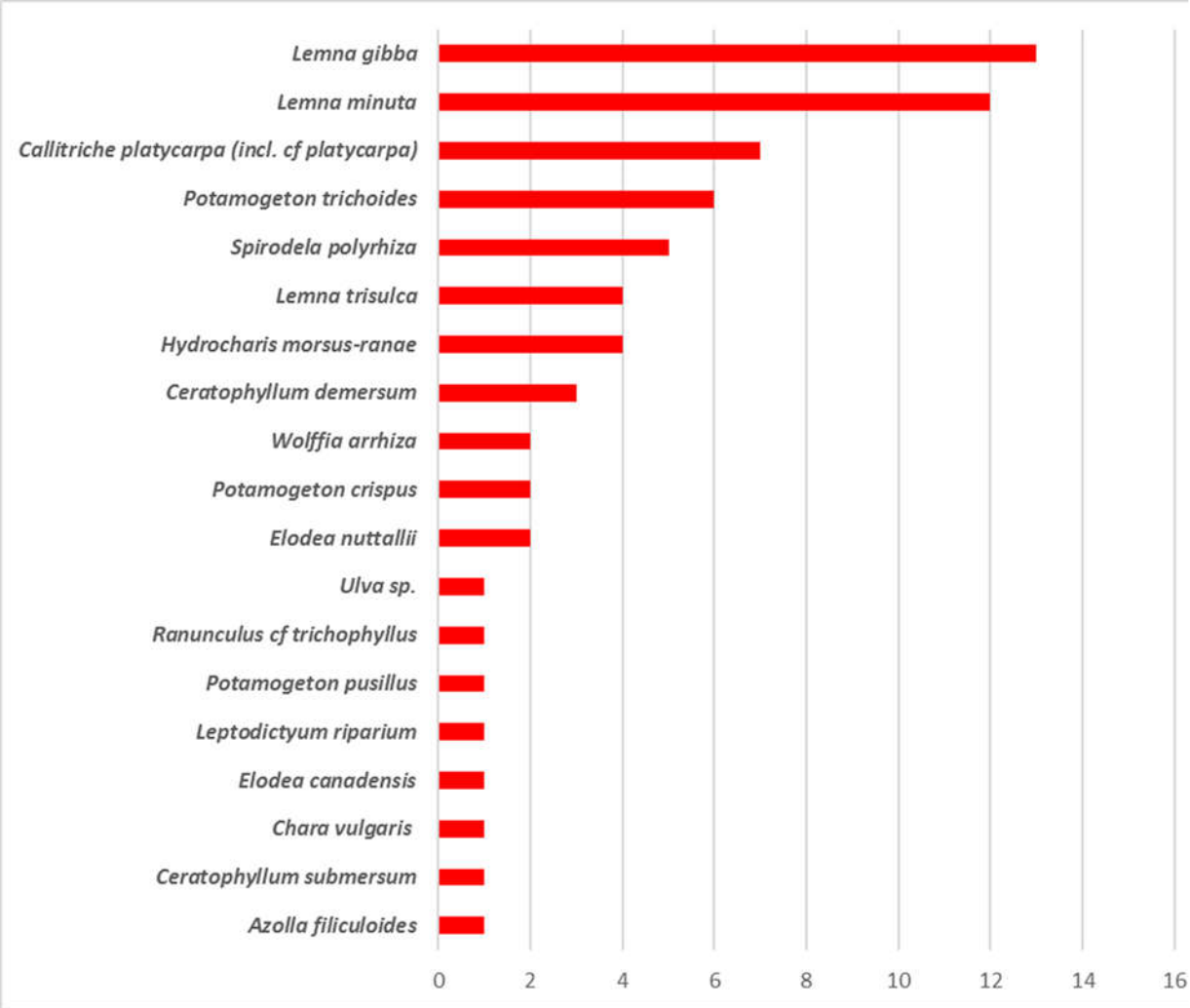
3.1.4 The aquatic flora is dominated by a floating duckweed layer with Fat Duckweed *Lemna gibba* and alien Least Duckweed *Lemna minuta* (>10 out of 16 ditch sample points) with occasional Greater Duckweed *Spirodela polyrhiza* and Frogbit *Hydrocharis morsus-ranae* occurring in between 4 and 5 out of 16 ditch sample points. The submerged aquatic flora is dominated by Hairlike Pondweed *Potamogeton trichoides* (frequently beneath the duckweed carpet) and Various-leaved Water-crowfoot *Callitriche platycarpa* in between 6 and 7 sample points. Eight other submerged aquatic species occurred in <4 out of 16 ditch sample points and include species of conservation note such as Soft Hornwort *Ceratophyllum submersum* and Lesser Pondweed *Potamogeton pusillus*. The alien Water Fern *Azolla filiculoides* occurred in one ditch the minute Rootless Duckweed *Wolffia arrhiza* was recorded from two ditch sample points.

Figure 1 Occurrence of emergent plant species within 16 ditch sample points



3.1.4 The vegetation of the more species-rich ditches surveyed, those with a cover of duckweed and at least 2-3 submerged aquatic plants belong to the National Vegetation Classification (NVC) type A3 *Spirodela polyrhiza - Hydrocharis morsus-ranae* community following Rodwell (1995).

Figure 2 Occurrence of aquatic plant species within 16 ditch sample points



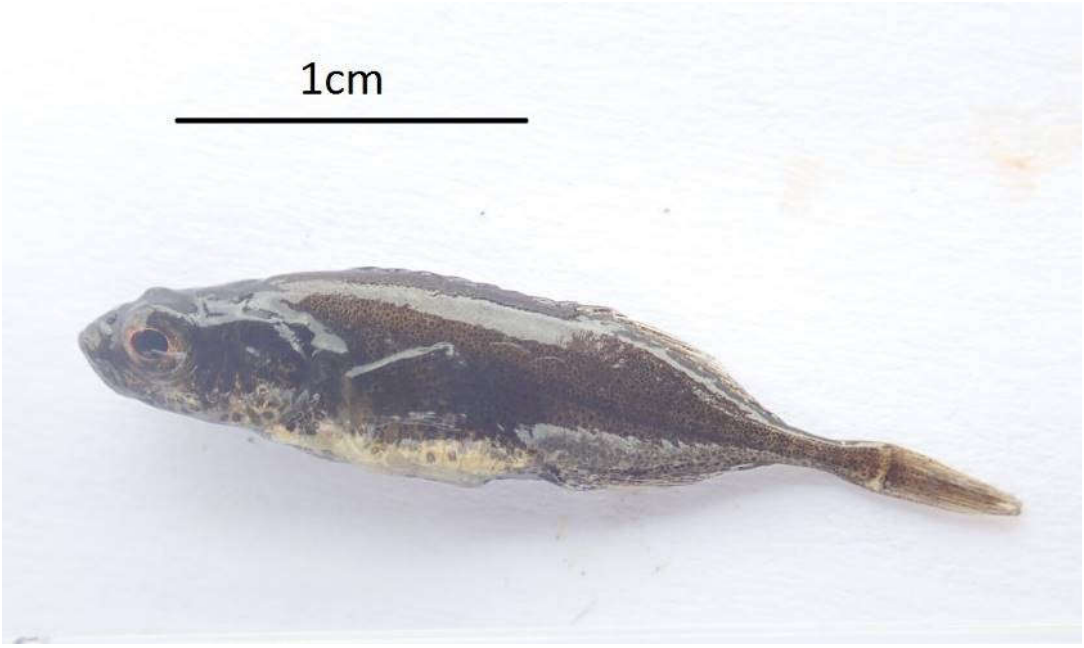
3.2 Overview: Aquatic macro-invertebrates and vertebrates

3.2.1 Aquatic macro-invertebrates

82 taxa of aquatic macro-invertebrates were recorded (Appendix 3), including one which is categorised as Near Threatened in Great Britain (the Great Silver Water Beetle, *Hydrophilus piceus*) and four which are listed as Nationally Scarce (the diving beetles *Agabus conspersus* and *Hydaticus transversalis*, the Pink Water Speedwell Weevil *Gymnetron villosulum* and the Ornate Brigadier soldierfly *Odontomyia ornata*). With the exception of the ubiquitous amphipod *Crangonyx pseudogracilis*, which is of North American origin, there was no evidence of non-native species. Invertebrates usually associated with brackish water included the amphipod *Gammarus duebeni* at one site, the diving beetle *Agabus conspersus* at one site and the Caspian Whirligig *Gyrinus caspius* at two.

3.2.2 Vertebrates

Nine-spined and/or Three-spined Sticklebacks were present in most of the ditches sampled. Single elvers were found in GN-EA27 and CF1-IDB71. Smooth and/or Palmate Newt tadpoles were present in the ditches at Great Newra Farm.



Ten-spined Stickleback net caught from sample point GN-Dr3

3.3 Measuring ecological quality (macro aquatic-invertebrates)

3.3.1 Water beetles

Foster & Eyre (1992) considered sites with a total SQS of >100 to represent "top sites" for aquatic Coleoptera. None of the sites sampled in this survey met this threshold, the highest being GN-Dr3 with 62. However, Foster & Eyre's dataset included many large, well-studied sites. As a rule of thumb, the same authors considered sites with an SQI of 2.0 or more to be "good" sites based on their water beetle assemblage; on this basis, CF1-Dr1, GN-Dr3 and GN-Dr4 represent good sites for water beetles. In the case of CF1-Dr1, only five species were recorded so the presence of one uncommon species clearly skews the score.

3.3.2 Community Conservation Index

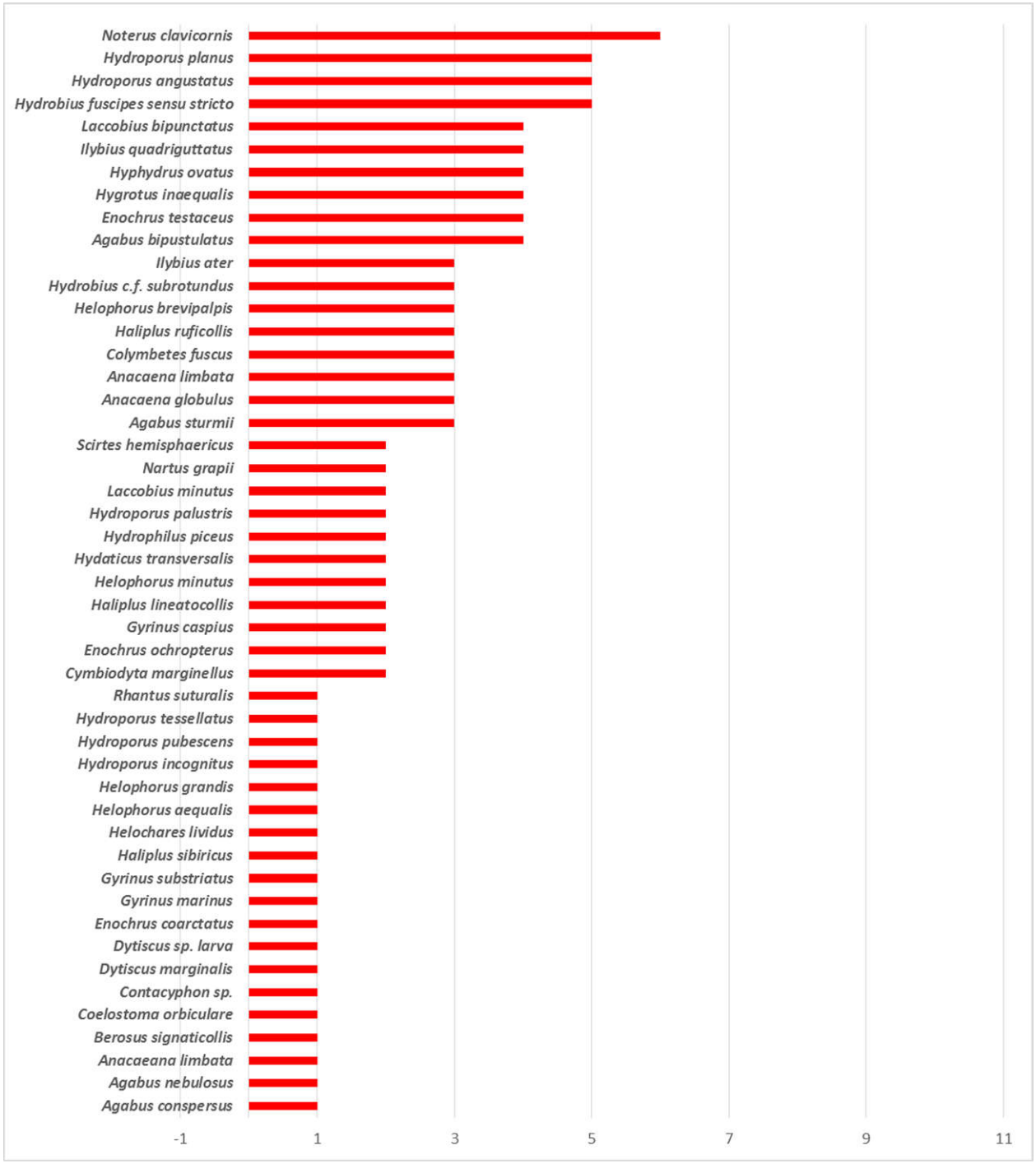
Table 3 summarises the CCI (for all aquatic macro-invertebrates) and water beetle SQI scores for the ditches sampled. Ditches Dr3 and Dr4 at Great Newra Farm have Very High CCI scores; Chadd & Extence (2004) consider ditches with CCI scores in this range to be potentially of national (GB-wide) significance. CF1-Dr1 at Cross Farm 1 and FO-Dr1 at Fair Orchard Farm are in the High category; as with the water beetle SQI, the score for the first-named ditch could be considered inflated due to the presence of Pink Water Speedwell Weevil amongst a short list of species.

Table 3 Community Conservation Index for water beetle Species Quality Index and Species Quality Score for the 12 ditches sampled

Ditch	CCI score	CCI category	SQI	SQS
CF1-Dr1	16.45	High	3.4	17
CF1-Dr3	3.75	Low	1.0	2
CF1-IDB71	4.89	Low	1.25	10
CF2-Dr1	10.0	Moderate	1.5	15
CF2-Dr2	14.0	Fairly High	1.89	17
FO-Dr1	17.36	High	1.89	34
FO-Dr2	8.55	Moderate	1.75	7
GN-Dr2	14.91	Fairly High	1.73	26
GN-Dr3	33.12	Very High	2.58	62
GN-Dr4	20.5	Very High	2.92	35
GN-EA27	4.62	Low	1.0	4
SH-Dr1	1.0	Low	1.0	0

3.3.2 The excellent scores for Dr3 and Dr4 at Great Newra Farm might be influenced by water quality and the suite of species is generally associated with permanent or at least semi-permanent still water. However, both ditches are also characterised by diverse habitat structure including floating and submerged vegetation, pockets of open water, trailing grass mats, stands of low and tall emergents and rush tussocks. This heterogeneity and structural complexity contrasts with several other ditches where dense, structurally simple mats of duckweeds carpeted the water surface. Figure 3 shows the occurrence of water beetles within the 11 sample points.

Figure 3 Occurrence of water beetle species within 11 ditch sample points



4 Noteworthy Species

4.1 Plants

The following plants are considered noteworthy following Stroh (2014) from which GB status is also provided where applicable.

4.1.1 Rootless Duckweed *Wolffia arrhiza*

GB status: Vulnerable

Wolffia arrhiza is a very localized plant with a national (GB) strong hold in the ditches of the Gwent Levels. It was recorded from two sampled drains from 2 different sites (GN-EA27 & CF1-Dr1) where it was often locally abundant mixed with other duckweed species (*Lemna gibba, Spirodela polyrhiza, Lemna minuta*) and occasionally Frogbit *Hydrocharis morsus-ranae.*

Wolffia mixed with *Lemna gibba, Lemna minuta* and filamentous green algae as part of the floating aquatic mat on the surface of ditch GN-EA27

4.1.2 Frogbit *Hydrocharis morsus-ranae*

GB status: Vulnerable

Hydrocharis morsus-ranae was once a common plant in England associated with ponds and ditches within grazing marshes but has declined greatly with the loss of these habitats, principally as a result of conversion to arable and drainage schemes. It was recorded from four sampled ditches from 4 different sites (GN-EA27, CF1-Dr1, and CF2-Dr1 & FO-Dr1). *Hydrocharis morsus-ranae* was seen in greatest abundance in ditch GN-EA27 (as flowering plants) but occurred in the other ditches as scattered small non flowering populations. At all sites it was associated with various duckweed species (*Lemna gibba, Spirodela polyrhiza, Lemna minuta*). These ditches (with surface domination of duckweed species) are relatively eutrophic and have hydrological connectivity with the nutrient-rich water of the main reens.

4.1.3 Tubular Water-dropwort *Oenanthe fistulosa*

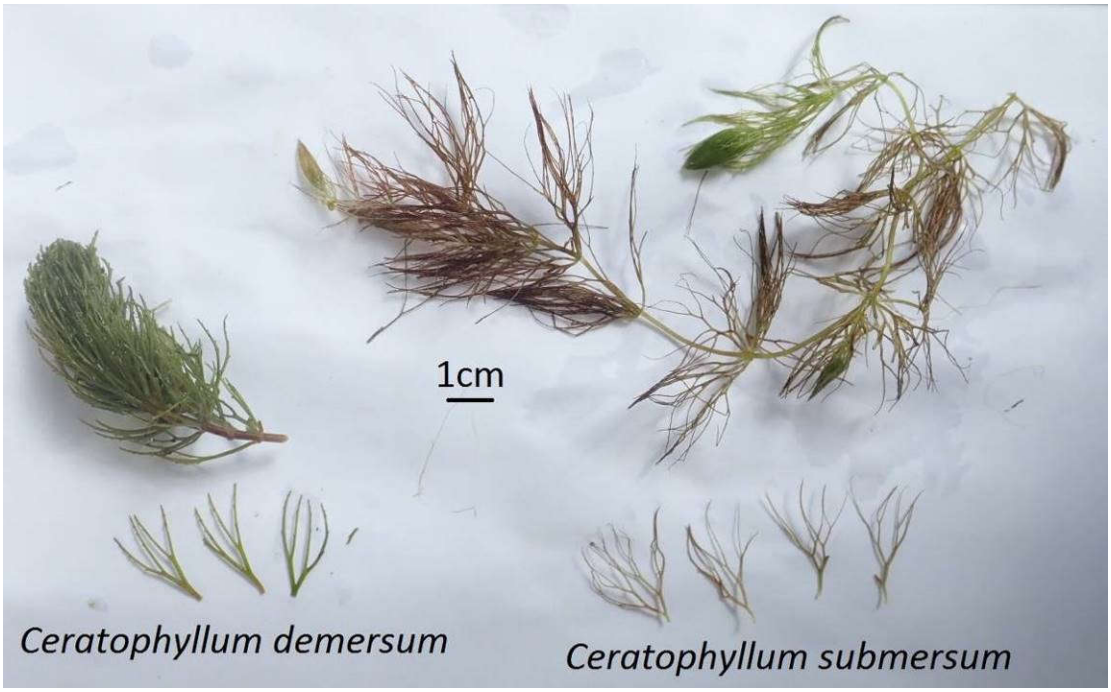
Oenanthe fistulosa is a local and declining species with a centre of distribution in south-east England where it occurs at the wet margins of ponds, ditches and canals. It has declined nationally due to agricultural improvement and land drainage (Preston *et al.*, 2002). A small population of this plant was recorded from a single ditch (FO-Dr1, Fair Orchard Farm) which was drawn down (at the time of survey, 5th August) and had a cattle-poached margin. This species favours shallow ditches within grazed floodplain grazing marshes and washlands.

Oenanthe fistulosa at the cattle-grazed margin of ditch FO-Dr1.

4.1.4 Other plant species considered important in a local context for the Gwent Levels

A number of other plant species recorded during the survey are considered notable in a local context for the Gwent Levels. These are either uncommon species in the context of the Gwent Levels or thought to be declining nationally. These include Hair-like Pondweed *Potamogeton trichoides* recorded from 6 sample points (GN-Dr2, GN-Dr4, GN-EA27, CF1-Dr1, CF1-IDB71 7 CF2-Dr1) and is an independently qualifying species for all 6 Gwent levels SSSIs; Lesser Pondweed *Potamogeton pusillus* recorded from a single sample point (CF1-IDB71); Great Water Dock *Rumex hydrolapathum* recorded from a single sample point (FO-Dr1); Smooth Hornwort *Ceratophyllum submersum* recorded from a single sample point (CF2-Dr1); and Brookweed *Samolus valerandi* recorded from a single sample point (GN-Dr4)

Material of Potamogeton trichoides (forming turions) collected from sample point CF2-Dr1.



Material of Ceratophyllum submersum (right) collected from sample point CF2-Dr1 in comparison with *Ceratophyllum demersum* collected from sample point GN-EA27.

4.2 Aquatic macro-invertebrates

4.2.1 *Aplexa hypnorum*, Moss Bladder Snail

This elongate snail is associated with shallow, grassy pools often in habitats which dry out in summer. Although still widespread in lowland Britain it has declined due to land drainage and is now uncommon in many districts; in Wales, records are centred around the south coast and Anglesey. This species was abundant in ditch FO-Dr1.

Aplexa hypnorum from ditch FO-Dr1.

4.2.3 *Agabus conspersus*, a diving beetle (Nationally Scarce)

A mid-sized diving beetle of mildly brackish water with individuals occasionally encountered inland of coasts and estuaries. A single specimen was collected from CF2-Dr2, presumably a wanderer from estuarine grazing marsh in the vicinity. Modern Welsh records come exclusively from the Gwent Levels (map in Foster *et al*, 2016).

4.2.4 *Nartus grapii*, a diving beetle

Formerly known as *Rhantus grapii*, this all-black, mid-sized diving beetle has a restricted British distribution centred on historic lowland fenland areas. In Wales it is known mainly from the Gwent Levels and Anglesey with a handful of records further west along the south coast. Recorded from FO-Dr1 and GN-Dr3, *N. grapii* is a characteristic insect of high quality grazing marsh ditches.

4.2.5 *Hydaticus transversalis*, a diving beetle **(**Nationally Scarce)

This fairly large diving beetle is a handsome and distinctive species found in richly-vegetated ditches and ponds in old fenland and grazing marsh habitats. Like other diving beetles it is predatory on small invertebrates such as aquatic fly larvae, worms and crustacea. We found three adults in two ditches at Great Newra Farm (GN-Dr3 and GN-Dr4).

Hydaticus transversalis is a rare species in Britain, confined to the Gwent and Somerset Levels, the Fens and Broadland. Even in these areas it is scarce, for example we found it in only 4 out of 175 ditches in the Cambridgeshire Fens. It was formerly known from scattered sites in the Midlands, North Lincolnshire and Yorkshire but has died out in these areas, presumably due to land drainage and habitat loss.

Hydaticus transversalis hand netted in ditch GN-Dr3

Hydaticus transversalis is mentioned in the SSSI citations for all six component SSSIs of the Gwent Levels and is an independently qualifying feature for 5 out of the 6 Gwent levels SSSIs (including Nash & Golcliffe SSSI).

4.2.6 *Berosus signaticollis*, a scavenger water beetle

Although apparently increasing and expanding northwards in England, there are very few records of this beetle for Wales: Kenfig Pool in Glamorganshire is mentioned by Foster *et al* (2018) but there are mapped records for only two or three 10 km squares and this may be a new species for the Gwent Levels. Two individuals were netted from GN-Dr2. *Berosus signaticollis* prefers ponds and ditches with an exposed mineral substrate.

4.2.7 *Hydrophilus piceus*, Great Silver Water Beetle **(**Near Threatened)

One of Britain's largest beetles, 40 mm long, and readily recognisable both as an adult and as a larva. We found larvae in two ditches at Great Newra Farm (GN-Dr3 and GN-Dr4). The Great Silver Water Beetle has a very restricted British distribution, being confined to the Gwent and Somerset Levels, the coastal levels of south-east England, the Suffolk coast and the Norfolk Broadland; it has recently colonised the West Norfolk Breckland but has disappeared from the Fens (Foster *et al*, 2019). Apart from a 19th century record from Crymlyn Bog in Glamorgan, it is unknown in Wales outside the Gwent Levels, where modern records come from three 10 km squares.

Two larvae of *Hydrophilus piceus* hand netted from ditch GN-Dr4

The characteristic habitat of the Great Silver Water Beetle is ditches in low-lying fens and grazing marshes. Although it is a hydrophilid ('scavenger water beetle') rather than a dytiscid (predatory diving beetle), the larva feeds on water snails, breaking into the shell to digest the mollusc via its formidable, sickle-like mouthparts.

Great Silver Water Beetle is mentioned in the SSSI citations for four component SSSIs of the Gwent Levels and is an independently qualifying feature for 5 out of the 6 Gwent Levels SSSIs (including Nash & Golcliffe SSSI).

4.2.8 Gymnetron villosulum, Pink Water Speedwell Weevil Nationally Scarce

This weevil develops as a larva and pupates in the seed pods of Pink Water Speedwell *Veronica catenata*, forming a distinctive gall like a miniature green tomato. Galls were found on the host plant in ditch CF1-Dr1. This species is still categorised as Nationally Scarce but a status review for wetland weevils is long overdue. In our experience the galls can often be found where the food plant is common and *G. villosulum* is unlikely to warrant a GB conservation status. The adult weevil probably has a limited activity period outside the gall which may account for its apparent rarity.

Distinctive galls of *Gymnetron villosulum* on Pink Water Speedwell in ditch CF1-Dr1.

4.2.9 *Odontomyia ornata*, Ornate Brigadier soldierfly Nationally Scarce

This soldierfly has its national strongholds on the Gwent and Somerset Levels, occurring more sparsely in the coastal grazing levels of Sussex, Kent, Suffolk and Norfolk. "As *ornata* is almost confined to grazing marshes, it is a good flagship species for this habitat" (Stubbs & Drake, 2001). Its aquatic larvae float amongst aquatic vegetation in ditches; the adults feed at umbels.

A larva was collected from ditch GN-Dr3 at Great Newra Farm along with several larvae of the more widespread but nonetheless uncommon *O. tigrina*.

Odontomyia ornata is mentioned in the SSSI citations for all six component SSSIs of the Gwent Levels and is an independently qualifying feature for all of these SSSIs.

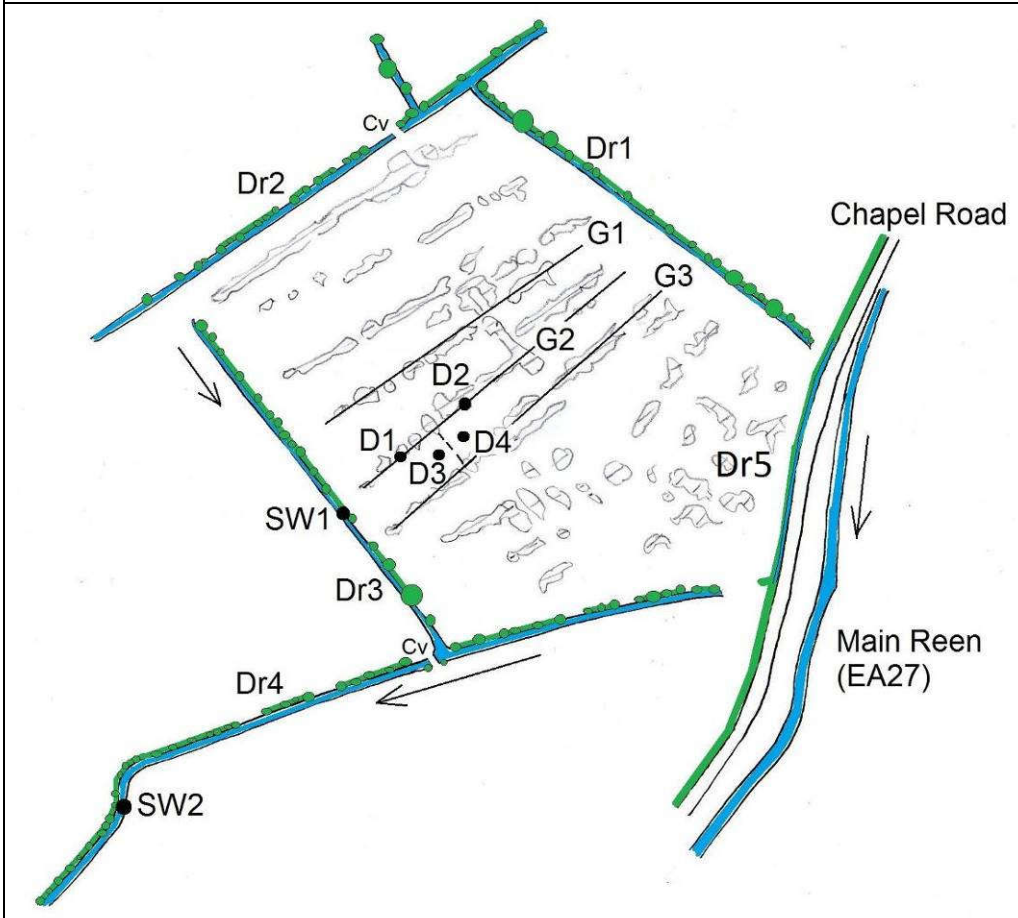
5 Individual site descriptions

5.1 Great Newra Farm

5.1.1 Site features

Map 2 shows the features of the Great Newra Farm site which comprises a single roughly rectangular shaped field with ditches along all its 5 boundaries.

Map 2 Great Newra Farm site (OS Grid reference at field centre: ST3613884229)



Dr = drain G = field grip D = Dipwell SW = Stilling Well Cv = Culvert - - - = "herringbone" grip → = indicative direction of water flow at time of survey (19th March 2020) = Hard Rush (*Juncus inflexus*) marking out old grips and herringbone grips	Dr1 (stock fenced inside, hedge on outside) Dr2 (unfenced inside, hedge on outside) Dr3 (unfenced both sides, broken hedge on both sides) Dr4 (unfenced both sides, broken hedge on north side) Dr5 (drain concealed by hedges on both sides) Main Reen (EA27) lies at close proximity to field on the far side of Chapel Road.

5.1.2 Assessment

A brief botanical and hydrological assessment of Great Newra farm was made on 19th March 2020 and complete surveys of plants and water beetles undertaken on 5th August 2020. Winter water levels of ditches were high (c40cm on 19th March) and the "herringbone" grips within the field had shallow surface water (to c5cm). During the late summer visit (5th August) the "herringbone" grips had no surface water and boundary ditches maintained a lower summer water level (c30-40cm).

5.1.3 Basic water chemistry

Table 4 shows basic water chemistry for boundary ditches at Great Newra Farm from field along with an estimate of duckweed cover. All ditches are mildly acidic with low conductivity and winter conditions had water that was slightly more acidic and with slightly higher conductivity.

Table 4 Great Newra Farm – Basic water chemistry and duckweed cover

Code	pH		EC		Temp (oC)		% Duckweed cover (all species)	
	19th March	5th Aug	19th March	5th Aug	19th March	5th Aug	19th March	5th Aug
GN-G1	6.8	No data (dry)	710	No data (dry)	8.9	No data (dry)	0	n/a (dry)
GN-G2	6.6	No data (dry)	660	No data (dry)	9.3	No data (dry)	0	n/a (dry)
GN-G3	6.8	No data (dry)	410	No data (dry)	8.7	No data (dry)	0	n/a (dry)
GN-Dr1	No data	No data	No data	No data	No data	No data	0	100
GN-Dr2	7.0	6.5	430	430	8.5	18.1	0	100
GN-Dr3	6.9	6.4	400	600	8.3	16.1	0	40
GN-Dr4	7.1	6.4	470	480	8.4	17.1	0	90
GN-Dr5	No data	No data	No data	No data	No data	No data	0	30 (shaded)
GN-EA27	No data	6.6	No data	320	No data	20.5	0	100

5.1.4 Grazing

During the 5th August visit, this field was grazed in conjunction with several adjoining fields and was grazed by a mixture of sheep, ponies & donkeys, and cattle.

5.1.5 Vegetation

Mature boundary hedges comprise Field Maple *Acer campestre*, Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Elder *Sambucus nigra* with Dog Rose *Rosa canina agg.*, Bramble *Rubus fruticosus agg*., climbers such as Ivy *Hedera helix* and hedge Bindweed *Calystegia sepium* subsp. *sepium*. Grey Willow *Salix cinerea* subsp. *cinerea* is also present with very occasional Goat Willow *Salix caprea*.

Where lightly shaded by hedges, ditch banks support Nettle *Urtica dioica*, Ground Ivy *Glechoma hederacea*, Rough-leaved Meadow-grass *Poa trivialis*, Upright Hedge-parsley *Torilis japonica*, Cleavers *Galium aparine*, Wavy Bitter-cress *Cardamine flexuosus*, Square-stemmed St John's-wort *Epilobium tetragonum* subsp. *tetragonum*, Stone Parsley *Sison amomum*, the shade tolerant moss *Kindbergia praelonga* and more locally characteristic hedgerow and woodland species such as Lords-and Ladies *Arum maculatum*, Remote Sedge *Carex remota*, Hedge Woundwort *Stachys sylvatica*. Open areas of bank (where poached by cattle) tend to support species found in the open field such as Yorkshire Fog *Holcus lanatus*, Dandelion *Taraxacum sp*., Cuckoo Flower *Cardamine pratensis*, Marsh Thistle *Cirsium palustre*, Meadow Buttercup *Ranunculus acris*, Silverweed *Potentilla anserina* and Creeping Buttercup *Ranunculus repens*.

The water's edge of ditches locally supports tall mixed stands of Common Reed *Phragmites australis*, Reed Canary-grass *Phalaris arundinacea*, Branched Bur-reed *Sparganium erectum*, Bulrush *Typha latifolia* and Reed Sweet-grass *Glyceria maxima*. Flowering stands of Lesser Water-parsnip *Berula erecta* are frequent in open water. Where there is grazing and poaching by cattle, a broad number of lower growing emergents occur including Creeping Bent *Agrostis stolonifera*, Water-plantain *Alisma plantago-aquatica*, Marsh Foxtail *Alopecurus geniculatus*, Fool's Water-cress *Apium nodiflorum*, Marsh Bedstraw *Galium palustre* subsp. *elongatum*, False Fox-sedge *Carex otrubae*, Greater Pond-sedge *Carex riparia*, Common Spike-rush *Eleocharis palustris*, Hairy Willowherb *Epilobium hirsutum,* Hoary Willowherb *Epilobium parviflorum*, Floating sweet-grass *Glyceria fluitans*, Jointed Rush *Juncus articulatus*, Soft Rush *Juncus effusus*, Hard Rush *Juncus inflexus*, Greater Bird's-foot Trefoil *Lotus uliginosus*, Gypsywort *Lycopus europaeus, Water-cress Nasturtium officinale*, Hemlock Water-dropwort *Oenanthe crocata*, Celery-leaved Buttercup *Ranunculus sceleratus*, Clustered Dock *Rumex conglomeratus*, Brookweed *Samolus valerandi* (GN-Dr4) and Water Figwort *Scrophularia auriculata*.

The open water frequently has high cover of duckweeds (*Lemna gibba, Lemna minuta, Spirodela polyrhiza*) with the alga *Ulva* but areas of open water are also present with Various-leaved Water-starwort *Callitriche platycarpa*, Ivy-leaved Duckweed *Lemna trisulca* and the semi-aquatic moss *Leptodictyum riparium*. Hairlike Pondweed *Potamogeton trichoides* was locally frequent under duckweed in ditch GN-Dr2 and Curled Pondweed *Potamogeton crispus* was locally abundant in sections of ditch GN-Dr3 without duckweed cover. A small patch of a non-fertile Water-crowfoot was also found in ditch GN-Dr3 which is likely to be Thread-leaved Water-crowfoot *Ranunculus trichophyllus*.

The larger reen GN-EA27 (adjoining Chapel Road) had populations of the two local species Frogbit *Hydrocharis morsus-ranae* and the minute Rootless Duckweed *Wolffia arrhiza* as well as Hairlike Pondweed *Potamogeton trichoides* and both Canadian Waterweed *Elodea canadensis* and Nuttall's Waterweed *Elodea nuttallii.*

The open field (cattle-grazed pasture) is semi-improved and dominated by Perennial Rye-grass *Lolium perenne*, Crested Dog's-tail *Cynosurus cristatus*, Creeping Buttercup *Ranunculus repens*, White Clover *Trifolium repens* with very occasional Meadow Buttercup *Ranunculus acris* and Sorrel *Rumex acetosa*. The historic "herringbone" grips (G1-3) held a shallow water level (c10cm) during the winter months and support a depauperate relict wet grassland flora with Hard Rush *Juncus inflexus*, Floating Sweet-grass *Glyceria fluitans*, Clustered Dock *Rumex conglomeratus*, Marsh Thistle *Cirsium palustre* and Cuckoo Flower *Cardamine pratensis*.

5.1.6 Aquatic macro invertebrates

Great Newra Farm was the most species-rich site by a considerable margin with 59 taxa in total. These included Great Silver Water Beetle, the diving beetle *Hydaticus transversalis* and the Ornate Brigadier soldierfly. There were also several uncommon invertebrates characteristic of high quality fenland ditch systems such as the Caspian Whirligig, the diving beetle *Nartus grapii*, the scavenger water beetles *Berosus signaticollis* and *Enochrus ochropterus* and the soldierfly *Odontomyia tigrina*.

GNDr3 was the most species-rich individual ditch sampled during the survey, with 45 taxa. Invertebrates of conservation concern included Great Silver Water Beetle, *Hydaticus transversalis* and Ornate Brigadier as well as several localised species. This was the most highly scoring ditch in terms of CCI score and would be categorised as being of Very High conservation quality. It was also a "good" site for water beetles in terms of its SQI.

GNDr2 yielded 24 aquatic macro-invertebrate taxa; none of these have a GB conservation status but the uncommon scavenger water beetles *Berosus signaticollis* and *Enochrus ochropterus* were recorded. This ditch produced a "Fairly High" CCI score though the water beetle SQI was unexceptional.

GNDr4 produced 21 aquatic macro-invertebrate taxa including Great Silver Water Beetle and *Hydaticus transversalis*. This was the second highest scoring ditch in terms of CCI score, placing it in the Very High category for conservation quality. It also produced the second highest SQI for water beetles.

GN-EA27 was the large roadside reen, outside the Great Newra Farm pastures. It produced only 12 widespread aquatic invertebrate taxa, with low CCI and SQI scores. However, this deep, steep-sided ditch was difficult to access so the invertebrate sample is likely to be unrepresentative.

Great Newra Farm – Monitoring photos

GN-G1 looking SW towards Dr3 (19th March)

GN-G2 looking SW towards Dr3 (19th March)

GN-G3 looking SW towards Dr3 (19th March)

GN-Dr2 looking SW (19th March)

GN-Dr2 looking NE (5th August)

GN-Dr3 looking NW (19th March)

GN-Dr3 looking SE (5th August)

GN-Dr4 looking SW (19th March)

GN-Dr4 looking SW (5th August)

GN-Dr1 looking SE (5th August)

GN-Dr5 looking SE (5th August)

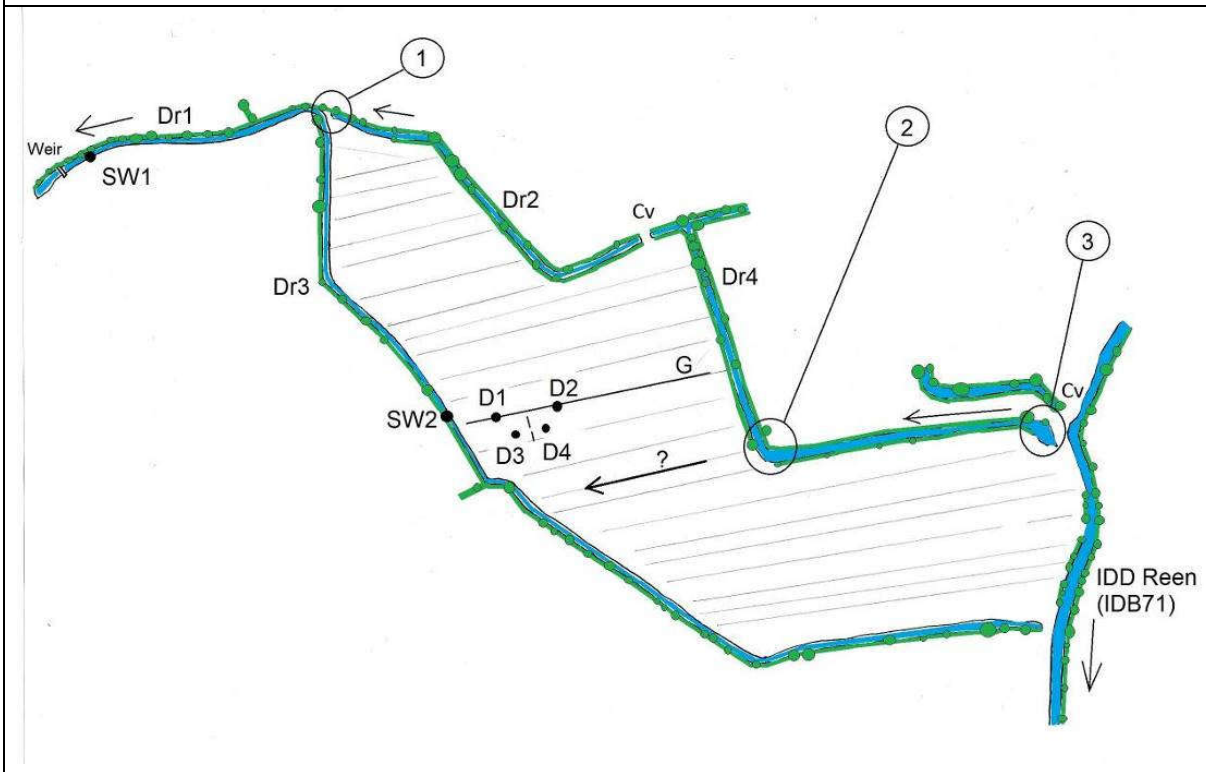
GN-EA27 looking NE (5th August)

5.2 Cross Farm (site 1)

5.2.1 Site features

Map 2 shows the features of Cross Farm (site 1) which comprises a complex shaped single field with ditches along all its boundaries.

Map 3 Cross Farm (site 1) - OS Grid reference at field centre: ST3650283618



Dr = drain G = field grip D = Dipwell SW = Stilling Well Cv = Culvert ----- = "herringbone" grip → = indicative direction of water flow at time of survey (19th March 2020)	Dr1 (no fences, hedge on N side) Dr2 (no fences, hedges on both sides) Dr3 (no fences, hedge on outside) Dr4 (no fences, hedge on outside & almost continuous hedge on inside) IDD Main Reen (IDB71) - hedge on outside & gappy hedge on inside) 1 = Dr2 overflowing to DR1 (no culvert?) 2 = section of Dr4 with open pool (gap in hedge on SW bank) 3 = Open seepage (overflow from upturned pipe) with *Glyceria maxima, Alisma Plantago-aquatica, Mentha aquatica*, flowing NW to Dr4

5.2.2 Assessment

A brief botanical and hydrological assessment of Cross farm (site 2) was made on 19th March 2020 and complete surveys of plants and water beetles undertaken on 5th August 2020. Winter water levels of ditches were high (c40cm on 19th March) and the "herringbone" grips within the field had shallow surface water (to c5cm). During the late summer visit (5th August) the "herringbone" grips had no surface water and boundary ditches maintained a lower summer water level (c30-40cm).

5.2.3 Basic water chemistry

Table 5 shows basic water chemistry for boundary ditches at Cross Farm (site 1) along with an estimate of duckweed cover. All measured ditches are mildly acidic to neutral with low conductivity.

Table 5 Cross Farm (site 1) – Basic water chemistry and duckweed cover

Code	pH		EC		Temp (oC)		% Duckweed cover (all species)	
	19th March	5th Aug	19th March	5th Aug	19th March	5th Aug	19th March	5th Aug
CF1--G							0	n/a (dry)
CF1-Dr1	No data	7.0	No data	400	No data	20.7	0	85
CF1-Dr2	No data	No data	No data	No data	No data	No data	n/a (heavily shaded by hedges)	n/a (heavily shaded by hedges)
CF1-Dr3	6.8	6.7	310	280	8.6	18.9	0	95
CF1-Dr4	No data	No data	No data	No data	No data	No data	n/a (heavily shaded by hedges)	n/a (heavily shaded by hedges)
CF1-IDB71	7.2	6.6	440	430	8.6	18.8	0	60

5.1.4 Grazing

During the 5th August visit, this field was grazed in conjunction with several adjoining fields and was grazed by cattle.

5.1.5 Vegetation

Mature boundary hedges are frequent at this site and CF1-Dr2 and CF1-Dr2 have mature hedges on both banks effectively shading the water's surface of the ditches. These hedges comprise Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Elder *Sambucus nigra,* suckers of English Elm *Ulmus procera* with Dog Rose *Rosa canina agg.*, Bramble *Rubus fruticosus agg*. and climbers such as Ivy *Hedera helix* and hedge Bindweed *Calystegia sepium subsp. sepium*.

Where lightly shaded by hedges, ditch banks support Nettle *Urtica dioica*, Ground Ivy *Glechoma hederacea*, Upright Hedge-parsley *Torilis japonica*, Cleavers *Galium aparine*, Stone Parsley *Sison amomum* and more locally characteristic hedgerow and woodland species such as Lords-and Ladies *Arum maculatum*, Remote Sedge *Carex remota*, Hedge Woundwort *Stachys sylvatica*, Male Fern *Dryopteris filix-mass*, Hart's-tongue Fern *Asplenium scolopendrium*, Lady Fern *Athyrium filix-femina* and the pleurocarpous moss *Oxyrrhynchium hians.* More open areas of bank tend to support species such as Field Horsetail *Equisetum arvense* as well as species found in the open field such as Yorkshire Fog *Holcus lanatus* and Marsh Thistle *Cirsium palustre.*

The ditches at this site (particularly CF1-Dr1 and CF1-Dr3) are quite steep sided and not easily accessed and poached by cattle, and this reduces the variety of water-edge habitat niches available for emergent plant species. Consequently, the emergent flora of these ditches is not as rich as seen along the poached margins of the shallower ditches at Great Newra Farm. However, a broad number of species were recorded including Water-plantain *Alisma plantago-aquatica*, Fool's Water-cress *Apium nodiflorum*, Lesser Water-parsnip *Berula erecta*, Marsh Bedstraw *Galium palustre* subsp. *elongatum*, Wavy Bittercress *Cardamine flexuosa*, False Fox-sedge *Carex otrubae*, Hairy Willowherb *Epilobium hirsutum,* Hoary Willowherb *Epilobium parviflorum*, Floating sweet-grass *Glyceria fluitans*, Soft Rush *Juncus effusus*, Hard Rush *Juncus inflexus*, Hemlock Water-dropwort *Oenanthe crocata*, Celery-leaved Buttercup *Ranunculus sceleratus*, Clustered Dock *Rumex conglomeratus*, Water Figwort *Scrophularia auriculata,* Meadowsweet *Filipendula ulmaria*, Reed Sweet-grass *Glyceria maxima*, Yellow Iris *Iris pseudacorus*, Reed canary-grass *Phalaris arundinacea*, Water-mint *Mentha aquatica*, Pink-flowered Water-speedwell *Veronica catenata* and Woody Nightshade *Solanum dulcamara*.

The open water of all ditches (with the exception of CF1-IDB71) had a very high cover of duckweeds (*Lemna gibba, Lemna minuta, Spirodela polyrhiza*). Hairlike Pondweed *Potamogeton trichoides* was locally frequent under duckweed in ditch CF1-Dr1 along with Rigid Hornwort *Ceratophyllum demersum*, Nuttall's Waterweed *Elodea nuttallii* and Ivy-leaved Duckweed *Lemna trisulca.* A small stand of Various-leaved Water-starwort *Callitriche platycarpa* was recorded only from CF1-Dr1. Ditch CF1-Dr1 was

also notable for having populations of the two local species, Frogbit *Hydrocharis morsus-ranae* and the minute Rootless Duckweed *Wolffia arrhiza.*

The larger reen CF1-IDB71 differed from the other ditches in having occasional tall marginal stands of Reed *Phragmites australis*, less surface cover of duckweed and the additional marginal species Water Forget-me-not *Myosotis scorpioides*, Gypsywort *Lycopus europaeus* and Marsh Woundwort *Stachys palustris*. The small acrocarpous moss *Physcomitrium pyriforme* was also of interest along its poached margins during the winter visit (19th March). CF1-IDB71 was the richest sample point in the survey for true pondweeds (*Potamogeton* species) having Hairlike Pondweed *Potamogeton trichoides,* Curled Pondweed *Potamogeton crispus* and Lesser Pondweed *Potamogeton pusillus.*

The open field (cattle-grazed pasture) is improved and dominated by Perennial Rye-grass *Lolium perenne*, Creeping Buttercup *Ranunculus repens* and White Clover *Trifolium repens* with very occasional Meadow Buttercup *Ranunculus acris* and Sorrel *Rumex acetosa*.

5.1.6 Aquatic macro invertebrates

The three ditches at Cross Farm 1 produced 32 aquatic macro-invertebrate taxa including the Nationally Scarce Pink Water Speedwell weevil. Caspian Whirligig beetle and the amphipod shrimp *Gammarus duebeni* represent a small brackish-water element, probably reflecting the proximity of this site to the estuarine grazing marshes at Goldcliff rather than any unusual water chemistry,

CF1-IDB71 yielded 16 widespread aquatic macro-invertebrate taxa. It produced low CCI and SQI scores.

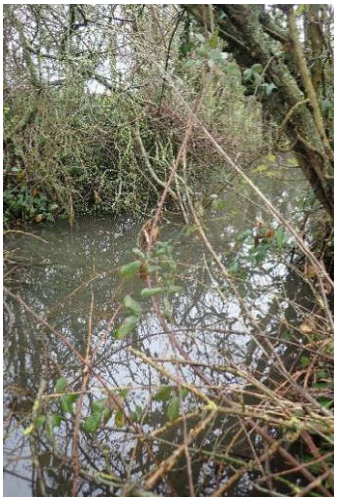
CF1-Dr1 produced 17 taxa including Pink Water Speedwell Weevil. Notably there were also three species of whirligig beetle in mixed congregations on open water adjoining a small weir, a contrast to most other ditches where floating vegetation smothers the surface and excludes surface-dwelling insects dependent on more open conditions. Two generally coastal/estuarine species were present: Caspian Whirligig and *Gammarus duebeni*. This ditch produced a High CCI score and also the highest SQI score for water beetles in the survey. However, these results should be interpreted with caution: both scores are inflated by one high scoring species among a relatively short list and that species (Pink Water Speedwell Weevil) is probably under-recorded nationally.

CF1-Dr3 was covered by a dense duckweed mat with poor structural diversity. Only 8 widespread aquatic macro-invertebrate taxa could be found here. It produced a Low CCI score and a water beetle SQI of 1.0 (only ubiquitous species recorded).

Cross Farm (site 1) – Monitoring photos

CF1-G looking W towards Dr3 (19th March)

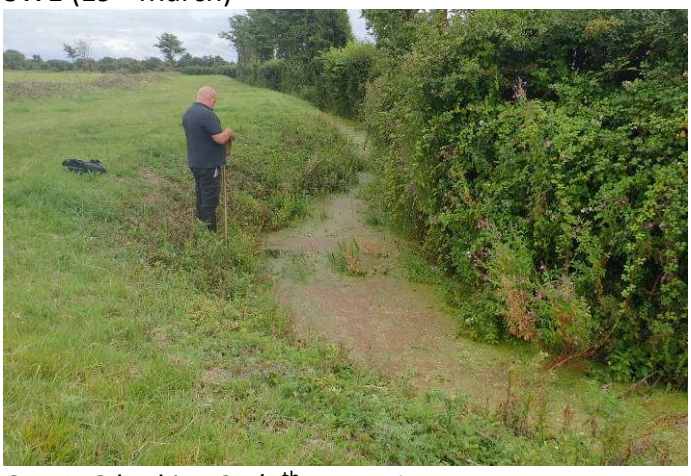
CF1-Dr 2 looking SE (outer hedge), 19th March



CF1-Dr2 looking SE (ditch), 19th March

CF1-Dr1 looking E from just below weir and showing SW1 (19th March)

CF1-Dr1 looking W (5th August)



CF1-Dr3 looking SE (5th August)

CF1-DR4 looking N showing open pool (2) at corner (19th March)

CF1-IDB71 looking SW (19th March)

CF1-IDB71 looking SW (5th August)

5.3 Cross Farm (site 2)

5.3.1 Site features

Map 4 shows the features of Cross Farm (site 2) which comprises a linear single field with ditches along 3 of its boundaries.

Map 4 Cross Farm (site 2) - OS Grid reference at field centre: ST3485883797

H = hedge (without drain)
Dr = drain
Cv = Culvert

= rough grass road verge

= dense reed fringe beside drain

H1 (hedge without drain)
Dr1 (no fences, hedge on outside)
Dr2 (no fences, hedge on outside)
Dr3 (no fences, dense reed fringe on both sides of drain with occasional short sections of gappy hedge)

5.3.2 Assessment

A single visit was made to Cross farm (site 2) on 5th August 2020 when complete surveys of plants and water beetles were undertaken. At the time of survey CF2-DR1 and CF2-DR2 had a summer water level c30-40cm. CF2-DR3 had dense reed fringe on either side with, scattered hawthorn, elder forming gappy hedge in places and so could not be adequately accessed for survey.

5.3.3 Basic water chemistry

Table 6 shows basic water chemistry for boundary ditches at Cross Farm (site 2) along with an estimate of duckweed cover. All measured ditches are mildly acidic to neutral with low conductivity.

Table 6 Cross Farm (site 2) – Basic water chemistry and duckweed cover (on 5th August)

Code	pH	EC	Temp (oC)	% Duckweed cover (all species)
CF2-Dr1	7.1	500	20.3	95
CF2-Dr2	6.3	510	19	40
CF2-Dr3	No data	No data	No data	n/a (heavily shaded by reed fringe)

5.3.4 Grazing

During the 5th August visit, this field was grazed in conjunction with several adjoining fields and was grazed by dairy cattle.

5.3.5 Vegetation

Mature boundary hedges comprise Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Grey Willow *Salix cinerea* subsp. *cinerea*, suckers of English Elm *Ulmus procera* with Bramble *Rubus fruticosus agg*. and climbers such as Ivy *Hedera helix* and Hedge Bindweed *Calystegia sepium subsp. sepium*.

Where lightly shaded by hedges, ditch banks support Nettle *Urtica dioica*, Ground Ivy *Glechoma hederacea*, Upright Hedge-parsley *Torilis japonica*, Stone Parsley *Sison amomum.* More open areas of bank tend to support species such as Hogweed *Heracleum sphondylium*, Rough-leaved Meadow-grass *Poa trivialis* and Yorkshire Fog *Holcus lanatus*.

The ditches at this site are relatively steep-sided and not easily accessed and poached by cattle, and this reduces the variety of water-edge habitat niches available for emergent plant species. Ditch CF2-Dr3 is filled with mature stands of Reed Phragmites australis and locally there are other stands of tall emergent vegetation (Reed Canary-grass *Phalaris arundinacea*, CF2-Dr1 and CF2-Dr2) and Reedmace *Typha latifolia* along sections of CF2-Dr2. Lower growing emergent vegetation is poorly developed and comprises only a moderate number of species including Water-plantain *Alisma plantago-aquatica*, Lesser Water-parsnip *Berula erecta*, Common Spike-rush *Eleocharis palustris*, False Fox-sedge *Carex otrubae*,

Greater Willowherb *Epilobium hirsutum,* Hoary Willowherb *Epilobium parviflorum*, Soft Rush *Juncus effusus*, Hard Rush *Juncus inflexus*, Hemlock Water-dropwort *Oenanthe crocata*, Clustered Dock *Rumex conglomeratus*, Yellow Iris Iris pseudacorus, Woody Nightshade *Solanum dulcamara* and, locally, Fleabane *Pulicaria dysenterica* and Gypsywort *Lycopus europaeus.*

Ditches CF2-Dr2 and CF2-Dr3 were partially drawn down at the time of the 5th August survey. Where open water was present, cover of duckweed (*Lemna gibba, Lemna minuta*) was close to 100%. CF2-Dr1 retained a good water level (c40cm) and had locally frequent Hairlike Pondweed *Potamogeton trichoides* below the duckweed mat as well as small amounts of Smooth Hornwort *Ceratophyllum submersum,* Ivy-leaved Duckweed *Lemna trisulca* and the local species Frogbit *Hydrocharis morsus-ranae*. Drawn-down sections of ditches CF2-Dr2 and CF2-Dr3 had occasional patches of Various-leaved Water-starwort *Callitriche platycarpa*, often growing terrestrially on exposed mud.

The open field (grazed by dairy cattle) is improved and dominated by Perennial Rye-grass *Lolium perenne*, Creeping Buttercup *Ranunculus repens* and White Clover *Trifolium repens*.

5.3.6 Aquatic macro invertebrates

The two ditches at Cross Farm 2 yielded 24 aquatic macro-invertebrate taxa. A single specimen of the brackish-water diving beetle *Agabus conspersus* (possibly a wanderer here) was the only species of conservation concern. CF2-Dr1 produced 14 widespread taxa. CF2-Dr2 also produced 14, including *A. conspersus*. These ditches were categorised as being of Moderate and Fairly High conservation quality respectively based on their CCI scores.

Cross Farm (site 2) – Monitoring photos

Looking N from CF2-Dr1 (across site) to houses at far N boundary of site (5th August)

CF2-Dr1 looking NE (5th August)

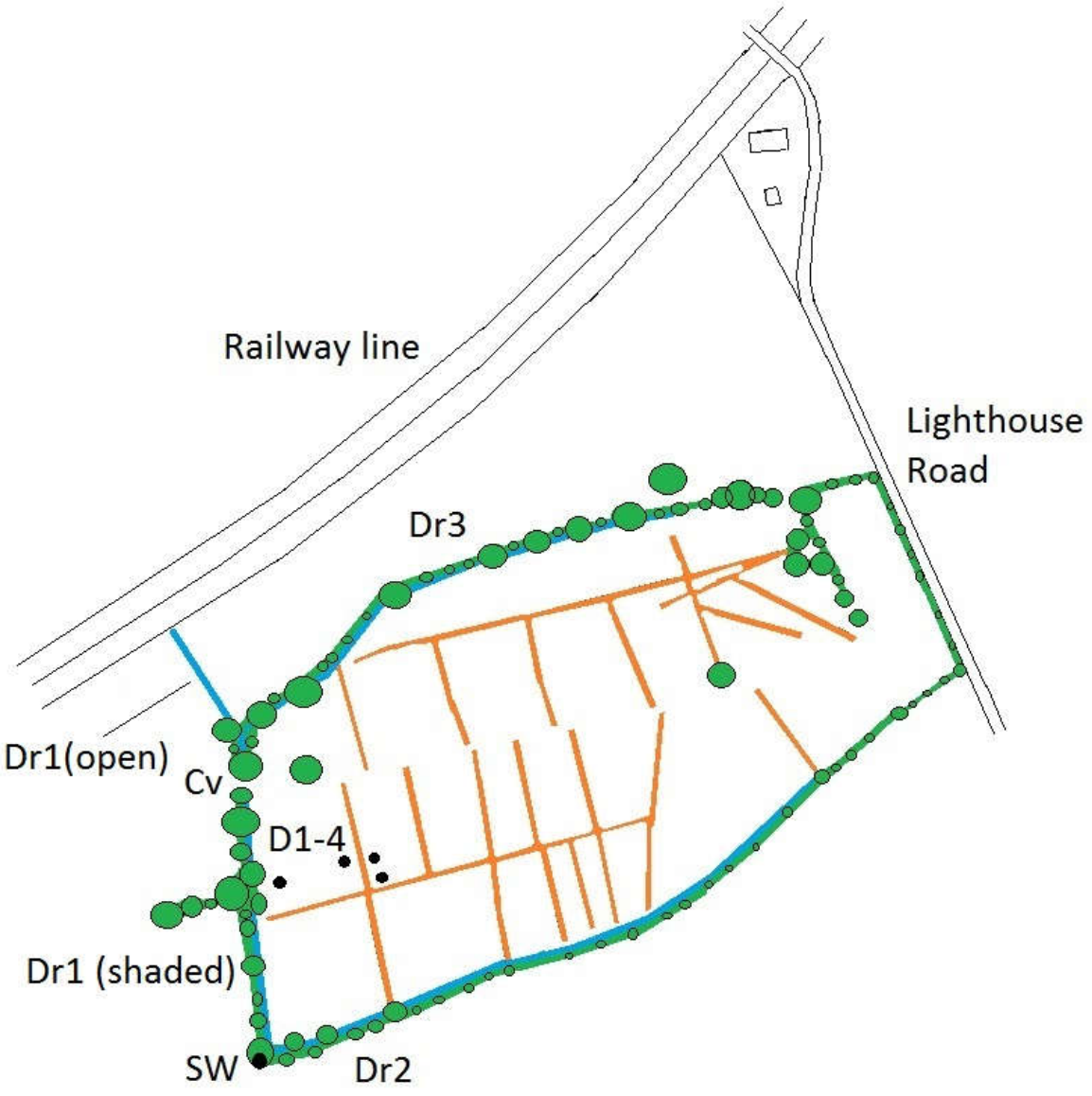
CF2-Dr2 looking N (5th August)

5.4 Fair Orchard farm site

5.4.1 Site features

Map 5 shows the features of Fair Orchard Farm site which comprises a roughly rectangular single field with ditches along three of its boundaries. The site also has a series of historic "herringbone" grips that were dry at the time of the 5th Aug survey.

Map 5 Fair Orchard Farm site (OS Grid reference at field centre: ST2993383946)



Dr = drain D = Dipwell SW = Stilling Well Cv = Culvert ---- = "herringbone" grip	Dr1 (open section to N fenced on NE side, no hedges; S section with old fences and mature hedges on both sides) Dr2 (fenced on inside in places, hedge on outside) Dr3 (no fences, hedge on outside, drain dry at time of 5th Aug survey)

5.4.2 Assessment

A single visit was made to Fair Orchard Farm on 5th August 2020 when complete surveys of plants and water beetles were undertaken. At the time of survey FO-DR1 was drawn down (water level c10cm), FO-Dr2 had drawn down and "ponded" at the SW corner of the site (water level to c30cm) and FO-DR3 was completely dry.

5.4.3 Basic water chemistry

Table 7 shows basic water chemistry for boundary ditches at Fair Orchard Farm along with an estimate of duckweed cover. All measured ditches are mildly acidic with low conductivity.

Table 7 Fair Orchard Farm – Basic water chemistry and duckweed cover (on 5th August)

Code	pH	EC	Temp (oC)	% Duckweed cover (all species)
FO-Dr1	6.5	540	18	2
FO-Dr2	6.4	610	17.1	85
FO-Dr3	n/a dry	n/a dry	n/a dry	n/a dry

5.4.4 Grazing

During the 5th August visit, this field was grazed in conjunction with several adjoining fields and was grazed by cattle.

5.4.5 Vegetation

The boundary hedges of this site comprise Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Grey Willow *Salix cinerea* subsp. *cinerea* with Bramble *Rubus fruticosus agg*. and Ivy *Hedera helix.* The hedge adjoining FO-Dr3 (towards the western boundary of the site) is very mature with oak trees *Quercus robur* and the ditch banks in the south-west corner of the site (FO-Dr1 and FO-Dr2) have mature Grey Willows *Salix cinerea* subsp. *cinerea* which have created shaded humid conditions for a number of common epiphytic bryophytes including *Hypnum cupressiforme, Orthotrichum affine, Frullania dilatata* and *Ulota bruchii.* Due to the shading only Nettle *Urtica dioica* and Yorkshire Fog *Holcus lanatus* were present as bank species along with a small number of emergents such as Greater Pond-sedge *Carex riparia*, Reed Sweet-grass *Glyceria maxima*, Yellow Iris *Iris pseudacorus*, Amphibious Bistort *Persicaria amphibia*, Woody Nightshade Solanum dulcamara and

Celery-leaved Buttercup *Ranunculus sceleratus*. Open sections of ditch FO-Dr3 were cattle poached with lots of emergent plant growth and included the additional species Floating Sweet-grass *Glyceria fluitans*, Soft Rush *Juncus effusus*, Hard Rush *Juncus inflexus* and Water-pepper *Persicaria hydropiper*. A single open section of FO-Dr2 (close to the south-west corner) had Jointed Rush *Juncus articulatus* and a small population of Tufted Forget-me-not *Myosotis laxa* subsp. *caespitosa.*

The open northern section of FO-Dr1 (adjoining the railway line) was by far the most interesting ditch for plants at this site. This shallow ditch is cattle poached on its western side and is full of emergent vegetation with Lesser Water-parsnip *Berula erecta,* Creeping Bent *Agrostis stolonifera*, Water-plantain *Alisma plantago-aquatica*, Fool's Water-cress *Apium nodiflorum*, Greater Pond-sedge *Carex riparia*, Floating Sweet-grass *Glyceria fluitans*, Reed Sweet-grass Glyceria maxima, Jointed Rush *Juncus articulatus*, Yellow Iris Iris pseudacorus, Soft Rush *Juncus effusus*, Greater Bird's-foot Trefoil *Lotus uliginosus*, Water-mint Mentha aquatica, *Water-cress Nasturtium officinale*, Amphibious Bistort *Persicaria amphibia*, Woody Nightshade *Solanum dulcamara* and Celery-leaved Buttercup *Ranunculus sceleratus*. The two uncommon plants Water Dock *Rumex hydrolapathum* and Tubular Water-dropwort *Oenanthe fistulosa* were also present of note.

All ditches were strongly drawn down at the time of the 5th August survey with a good water level (c40cm) present only in FO-Dr1 between the South-west corner (ponded section close to Stilling Well) and the culvert to the north. Where open water was present, cover of duckweeds (*Lemna gibba, Lemna minuta*) was close to 100%. Various-leaved Water-starwort *Callitriche platycarpa* was locally abundant in the open sections of all ditches often growing terrestrially on exposed mud. The only other aquatic present was a single plant of Frogbit *Hydrocharis morsus-ranae* present in a drawn-down pool within FO-Dr1 (close to the culvert).

The open field (cattle-grazed pasture) is semi-improved and dominated by Perennial Rye-grass *Lolium perenne* with Creeping Bent *Agrostis stolonifera*, Creeping Buttercup *Ranunculus repens*, White Clover *Trifolium repens* with very occasional Meadow Buttercup *Ranunculus acris,* Red Clover *Trifolium pratense* and Sorrel *Rumex acetosa*. The historic "herringbone" grips support a depauperate relict wet grassland flora with Hard Rush *Juncus inflexus*, Floating Sweet-grass *Glyceria fluitans*, Marsh Fox-tail *Alopecurus geniculatus*, Marsh Thistle *Cirsium palustre* and Cuckoo Flower *Cardamine pratensis*. Very locally, the grazed tops of the boundary ditches have species characteristic of less improved grassland such as Meadow Vetchling *Lathyrus pratensis* and Tufted Vetch *Vicia cracca*.

5.4.6 Aquatic macro-invertebrates

The two ditches at Fair Orchard Farm produced 31 aquatic macro-invertebrate taxa. All of these were recorded from FO-Dr1, which was open and structurally complex. No species of GB conservation concern were collected but several localised invertebrates were recorded. Invertebrates typical of shallow, impermanent water were better represented than in the other ditches surveyed, including a large population of the uncommon and declining Moss Bladder Snail and several small diving beetles of the genus *Hydroporus*. More seasonal water bodies like this tend to be most productive of invertebrates in spring so it's likely that further species would be recorded earlier in the year. This ditch was categorised as being of High conservation quality based on its CCI score.

FO-Dr2 is heavily shaded along most of its length with minimal vegetation structure. Only 7 widespread aquatic invertebrate taxa could be found. It was of Moderate quality based on its CCI score.

Fair Orchard site – Monitoring photos

FO-Dr1 (N open section) looking N to railway line (5th August)

FO-Dr1 (S section with mature hedges) looking N to railway line (5th August)

FO-Dr2 looking SW (5th August)

FO-Dr2 ponded area in SW corner of site close to where Stilling Well is situated (5th August)

FO-Dr3 (inside) looking NE (5th August)

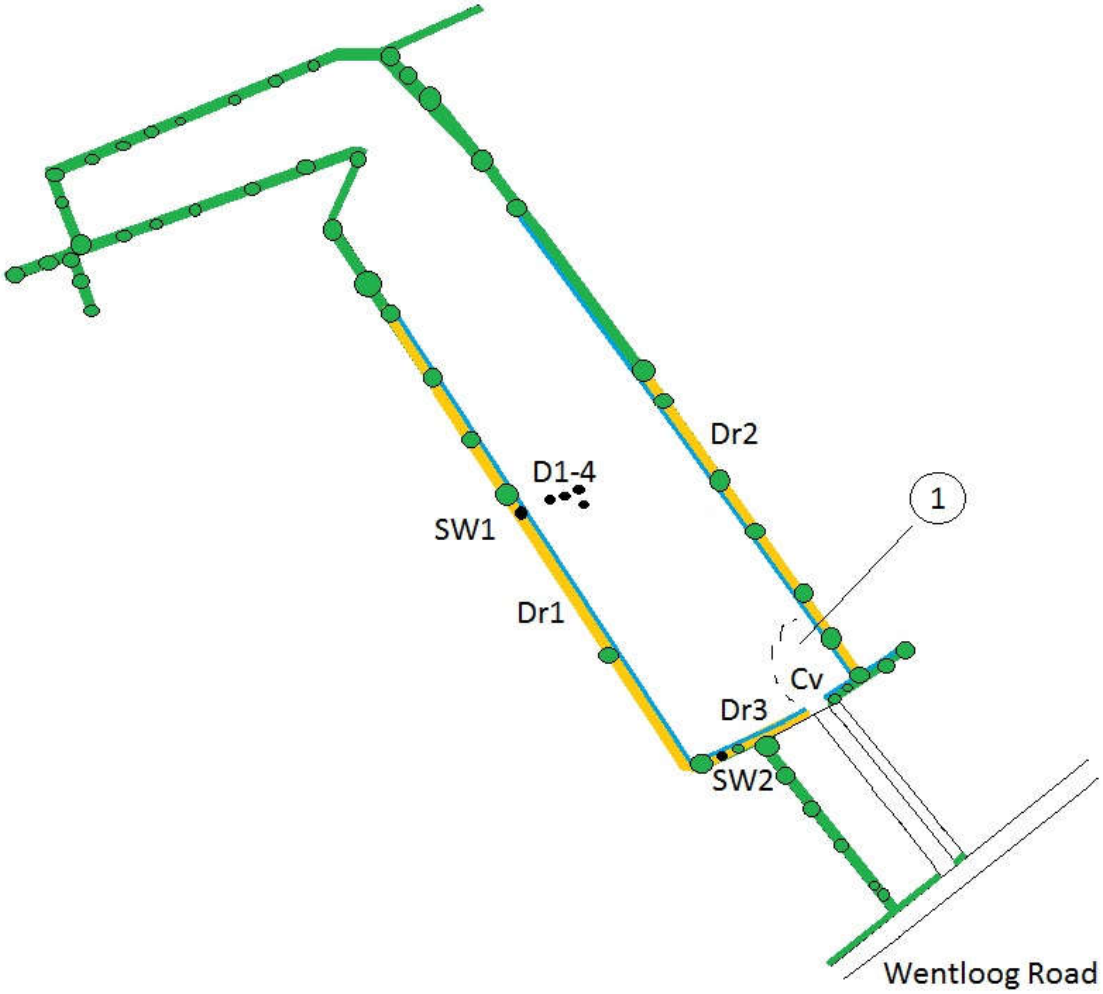
FO-Dr3 (outside) looking NE (5th August)

5.5 Sluice House Farm site

5.5.1 Site features

Map 6 shows the features of Sluice House Farm site which comprises a long linear single field with reed-filled ditches along three of its boundaries.

Map 6 Sluice House Farm site (OS Grid reference at field centre: ST2487979426)



Dr = drain D = Dipwell SW = Stilling Well Cv = Culvert = dense reed fringe beside drain	Dr1 (fenced on outside, ditch with dominant reed fringe to SE and scattered scrubby hedge) Dr2 (fenced on outside, ditch with dominant reed fringe to SE and scattered scrubby hedge) Dr3 (fenced on outside, ditch with dominant reed fringe to SE and scattered scrubby hedge)

5.5.2 Assessment

A single visit was made to Sluice House Farm on 5th August 2020 when complete surveys of plants and water beetles were undertaken. At the time of survey all ditches were drawn down and only SH-DR1 held water (water level c20cm).

5.5.3 Basic water chemistry

Table 8 shows basic water chemistry for boundary ditches at Fair Orchard Farm along with an estimate of duckweed cover. The single ditch with water was circumneutral with moderate conductivity.

Table 8 Sluice House Farm – Basic water chemistry and duckweed cover (on 5th August)

Code	pH	EC	Temp (oC)	% Duckweed cover (all species)
SH-Dr1	6.6	550	18.8	100
SH-Dr2	n/a dry	n/a dry	n/a dry	n/a dry
SH-Dr3	n/a dry	n/a dry	n/a dry	n/a dry

5.5.4 Grazing

During the 5th August visit, this field appeared to have been recently been grazed by sheep.

5.5.5 Vegetation

All boundary ditches at this site were choked with Common Reed *Phragmites australis.* Low Hawthorn *Crataegus monogyna* hedges were present in the northern-western section of the site and scattered along the south-eastern boundaries. The only other species present are Bramble *Rubus fruticosus agg.,* Hedge Bindweed *Calystegia sepium subsp. sepium* and Nettle *Urtica dioica.*

All ditches were strongly drawn down at the time of the 5th August survey with a good water level (c30cm) present only in SH-Dr1 (in the section between Stilling Wells) and this ditch was the only ditch on site to have a central channel with open water. SH-Dr1 had a 100% cover of duckweed (*Lemna gibba, Lemna minuta*) with very occasional plants of the alien Water-fern *Azolla filiculoides*. The only submerged aquatic was Ivy-leaved Duckweed *Lemna trisulca*.

A very small number of emergent species were present including Creeping Bent *Agrostis stolonifera*, Celery-leaved Buttercup *Ranunculus sceleratus*, Clustered Dock *Rumex conglomeratus* and locally Reedmace *Typha latifolia*.

The open field (apparently grazed by sheep) is improved and dominated by Perennial Rye-grass *Lolium perenne*, Creeping Buttercup *Ranunculus repens* with White Clover *Trifolium repens*.

5.5.6 Aquatic macro-invertebrates

The single ditch at Sluice House Farm was densely choked by Common Reed and yielded only 5 common aquatic invertebrate taxa. It produced low CCI and SQI scores.

Sluice House Farm site – Monitoring photos

Whole site looking NW from SE boundary (5th August)

SH-Dr1 looking NW (5th August)

SH-Dr2 looking NW (5th August)

Centre of SH-Dr2 looking NW (5th August)

Centre of SH-Dr3 looking NE (5th August)

6 Conclusions

6.1 The 5 sites surveyed (Great Newra Farm, Cross Farm site 1, Cross Farm site 2, Fair Orchard Farm and Sluice House Farm) are similar in that they comprise a single field within one of three Sites of Special Scientific Interest (SSSI) within the Gwent Levels but are quite variable in their ecological value. Great Newra Farm and Fair Orchard Farm sites had features of a more traditional Gwent Levels farmscape with mature hedges, semi-improved pasture and a relict pattern of "herringbone" grip surface ditches. The other 3 sites had less mature hedges, less regularly managed (and reed filled) boundary ditches and are more agriculturally improved as a result of more efficient under-drainage.

6.1.2 Three sites (Cross Farm site 2, Fair Orchard Farm and Sluice House Farm) had ditches that were drawn down at the time of the 5th August survey with a water level of c10cm or less. This had a direct bearing on the occurrence of submerged aquatic plants that were best represented at Great Newra Farm and Cross Farm site 1 which had ditches with water levels between c30-40cm.

6.1.3 Table 9 summarises the occurrence of independent plant and invertebrate SSSI qualifying species features for the Gwent Levels occurring at the 5 survey sites. Great Newra Farm has by far the most qualifying features.

Table 9 Independent plant and invertebrate SSSI qualifying features for the Gwent Levels occurring at the 5 survey sites

Feature		Nash & Goldcliff SSSI			St. Brides SSSI	Rumsey & Peterstone SSSI
English Name	Latin name	Great Newra Farm	Cross Farm (site 1)	Cross Farm (site 2)	Fair Orchard Farm	Sluice House Farm
Hairlike Pondweed	*Potamogeton trichoides*					
Rootless Duckweed	*Wolffia arrhiza*					
A diving beetle	*Hydaticus transversalis*					
Great Silver Water Beetle	*Hydrophilus piceus*					
Ornate Brigadier soldierfly	*Odontomyia ornata*					

In addition, the following 3 species qualify as being part of a notified assemblage feature on the SSSIs:: Frogbit *Hydrocharis morsus-ranae* (Great Newra Farm, Cross Farm site 1, Cross Farm site 2, Fair Orchard Farm), Smooth Hornwort *Ceratophyllum submersum* (Cross Farm site 2), Tubular Water-dropwort *Oenanthe fistulosa* (Fair Orchard Farm and the following 7 species are considered notable: Lesser Pondweed *Potamogeton pusillus* (Cross Farm site 1), Great Water Dock *Rumex hydrolapathum* and Moss Bladder Snail *Aplexa hypnorum* (Fair Orchard Farm), the diving beetle *Agabus conspersus* (Cross Farm site 2), the diving beetle *Nartus grapii* (Great Newra Farm and Fair Orchard Farm), the scavenger water beetle *Berosus signaticollis* (Great Newra Farm), Pink Water Speedwell Weevil *Gymnetron villosulum* (Cross Farm site 1).

6.1.4 The vast majority of ditches (all sites) with open water were dominated by a very high cover of duckweed (*Lemna gibba, Lemna minuta, Spirodela polyrhiza*) often to 100% surface cover. Such high cover of duckweed is linked to eutrophication (particularly concentration of phosphate). A recent briefing note by NRW (2016)[5] states that there are "widespread chronic failures" in relation to the Ortho-phosphate target for the Gwent Levels.

High cover of duckweed inhibits growth of submerged aquatics by shading and can, in some cases, negatively impact on fauna by causing sudden low oxygen levels in late summer. Although the SSSI qualifying submerged aquatic plant Hairlike Pondweed *Potamogeton trichoides* was locally frequent under duckweed mats at 3 of the survey sites, plants were already breaking up and forming over wintering turions by 5th August in response to the high duckweed cover. In ditches with a low nutrient status and no or very low duckweed cover, this species has been observed to continue growing into September (Mountford & Graham, *A Fenland Flora* - in preparation). In this way, eutrophication has an indirect negative impact on the growing season of such submerged aquatics.

6.1.5 All 5 survey sites were grazed (mainly by cattle) and the resulting poaching of ditch margins, along with routine cleaning out of ditches, is considered to be very important for both ditch plants and invertebrates. The restriction of hedges to one side only of ditches is also important in allowing light penetration of the water column and recent positive conservation work to address this was evident at Cross Farm (site 1).

[5] Natural Rerources Wales (NRW), 2016**.** Advice on Water Quality Standards to be used for Impact Assessment of the M4 Relief Road on the Gwent Levels Ditch System (Technical Appendix 2). Http://bailey.persona-pi.com/Public-Inquiries/M4-Newport.

6.1.6 Nine-spined and/or Three-spined Sticklebacks were present in most of the ditches sampled. Single elvers were found in GN-EA27 and CF1-IDB71. Smooth and/or Palmate Newt tadpoles were present in the ditches at Great Newra Farm.

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Appendix 1 Plant data

Gwent Levels Project: plant data							
Site Name	**SSSI**	**Ditch code**	**Species**	**Frequency**	**Grid reference**	**Date**	**Notes**
Great Newra Farm	Nash & Goldcliff	GN-G1	*Juncus inflexus*	D	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Glyceria fluitans*	F	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Rumex conglomeratus*	O	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Ranunculus repens*	O	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Brachythecium rutabulum*	O	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Kindbergia praelonga*	O	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G1	*Urtica dioica*	O	ST3611484193	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G2	*Juncus inflexus*	D	ST3612984182	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G2	*Rumex conglomeratus*	O	ST3612984182	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G3	*Juncus inflexus*	D	ST3614184168	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G3	*Rumex conglomeratus*	O	ST3614184168	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G3	*Epilobium sp.*	O	ST3614184168	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-G3	*Cardamine pratensis*	R	ST3614184168	19/03/2020	drain not surveyed in detail (difficult access due to fence and hedge)
Great Newra Farm	Nash & Goldcliff	GN-Dr1	*Epilobium hirsutum*	O	ST3617484293	05/08/2020	drain not surveyed in detail (difficult access due to fence and hedge)
Great Newra Farm	Nash & Goldcliff	GN-Dr1	*Juncus inflexus*	F	ST3617484293	05/08/2020	drain not surveyed in detail (difficult access due to fence and hedge)
Great Newra Farm	Nash & Goldcliff	GN-Dr1	*Lemna gibba*	D	ST3617484293	05/08/2020	drain not surveyed in detail (difficult

							access due to fence and hedge)
Great Newra Farm	Nash & Goldcliff	GN-Dr1	*Salix cinerea subsp. cinerea*	bank	ST3617484293	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Alisma plantago-aquatica*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Alisma plantago-aquatica*	R	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Agrostis stolonifera*	R	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Cardamine flexuosus*	O	ST3606584289	19/03/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Cardamine pratensis*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Berula erecta*	O	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Berula erecta*	O	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Cirsium palustre*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Crataegus monogyna*	bank	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Crataegus monogyna*	bank	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Carex otrubae*	R	ST3606584289	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Epilobium hirsutum*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Epilobium hirsutum*	R	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Epilobium parviflorum*	R	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Galium palustre subsp. elongatum*	R	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Glyceria fluitans*	O	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Glyceria fluitans*	O	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Holcus lanatus*	bank	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Juncus inflexus*	O	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Juncus effusus*	F	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Juncus effusus*	F	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Juncus articulatus*	R	ST3606584289	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Lycopus europaeus*	R	ST3606584289	05/08/2020	flowering

Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Lemna minuta*	O	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Lemna minuta*	O	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Lemna gibba*	D	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Salix cinerea subsp. cinerea*	bank	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Sparganium erectum*	R	ST3606584289	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Potentilla anserina*	R	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Potamogeton trichoides*	F	ST3606584289	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Ranunculus sceleratus*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Ranunculus sceleratus*	R	ST3606584289	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Ranunculus acris*	bank	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Torilis japonica*	bank	ST3606584289	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Urtica dioica*	bank	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Rubus fruticosus agg.*	bank	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Rubus fruticosus agg.*	bank	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Rosa canina agg.*	bank	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Rumex conglomeratus*	O	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Rumex conglomeratus*	O	ST3606584289	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Spirodela polyrhiza*	F	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Scrophularia auriculata*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Typha latifolia*	R	ST3606584289	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr2	*Typha latifolia*	R	ST3606584289	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Acer campestre*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Agrostis stolonifera*	O	ST3606684200	05/08/2020	flowering (mostly at open N end of drain)
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Alisma plantago-aquatica*	O	ST3606684200	19/03/2020	

Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Alisma plantago-aquatica*	O	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Alopecurus geniculatus*	R	ST3606684200	05/08/2020	flowering (mostly at open N end of drain)
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Apium nodiflorum*	O	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Apium nodiflorum*	O	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Arum maculatum*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Berula erecta*	LA	ST3606684200	19/03/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Berula erecta*	LA	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Galium palustre subsp. elongatum*	O	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Callitriche platycarpa*	LA	ST3606684200	05/08/2020	with maturing (slightly winged) fruits
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Callitriche sp.*	R	ST3606684200	19/03/2020	non-fertile plants with floating leaves
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Cardamine flexuosus*	O	ST3606684200	19/03/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Cardamine pratensis*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Carex remota*	R	ST3606684200	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Chara vulgaris*	R	ST3606684200	05/08/2020	checked microscopically
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Cirsium arvense*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Cirsium palustre*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Cirsium vulgare*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Crataegus monogyna*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Crataegus monogyna*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Eleocharis palustris*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ulva*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Epilobium hirsutum*	O	ST3606684200	19/03/2020	

Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Epilobium hirsutum*	O	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Epilobium parviflorum*	O	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Epilobium sp.*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Epilobium tetragonum subsp. tetragonum*	R	ST3606684200	05/08/2020	single flowering plant
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Galium aparine*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Glechoma hederacea*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Glechoma hederacea*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Glyceria fluitans*	F	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Glyceria fluitans*	F	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Hedera helix*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Hedera helix*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Holcus lanatus*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Juncus effusus*	F	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Juncus effusus*	F	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Juncus inflexus*	O	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Juncus inflexus*	O	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lemna gibba*	O	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lemna minuta*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lemna minuta*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lemna trisulca*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Leptodictyum riparium*	LA	ST3606684200	19/03/2020	bank at water's edge
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Leptodictyum riparium*	LA	ST3606684200	19/03/2020	bank, at water's edge and occasionally on open water
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lotus uliginosus*	R	ST3606684200	05/08/2020	mostly at open N end of drain

Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Lycopus europaeus*	R	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Nasturtium officinale sensu lato*	O	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Nasturtium officinale sensu stricto*	O	ST3606684200	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Oenanthe crocata*	R	ST3606684200	19/03/2020	seedling
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Phalaris arundinacea*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Phragmites australis*	O	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Phragmites australis*	O	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Poa trivialis*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Potamogeton crispus*	LA	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Potentilla anserina*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Prunus spinosa*	bank	ST3606684200	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ranunculus acris*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ranunculus cf aquatilis*	R	ST3606684200	05/08/2020	single plant (without laminar leaves or flowers)
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ranunculus repens*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ranunculus sceleratus*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Ranunculus sceleratus*	R	ST3606684200	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Rosa canina agg.*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Rubus fruticosus agg.*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Rubus fruticosus agg.*	bank	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Rumex conglomeratus*	O	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Rumex conglomeratus*	O	ST3606684200	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Salix caprea*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Salix cinerea subsp. cinerea*	O	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Sambucus nigra*	O	ST3606684200	05/08/2020	

Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Sison amomum*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Spirodela polyrhiza*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Stachys sylvatica*	bank	ST3606684200	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Taraxacum sp.*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Typha latifolia*	R	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Typha latifolia*	R	ST3606684200	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr3	*Urtica dioica*	bank	ST3606684200	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Arum maculatum*	bank	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Berula erecta*	O	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Calystegia sepium subsp. sepium*	bank	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Carex otrubae*	R	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Carex remota*	bank	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Carex remota*	bank	ST3603984086	19/03/2020	at water's edge
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Carex riparia*	R	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Carex riparia*	R	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Crataegus monogyna*	bank	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Crataegus monogyna*	bank	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Epilobium hirsutum*	O	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Epilobium hirsutum*	O	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Epilobium parviflorum*	O	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Glyceria fluitans*	O	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Glyceria maxima*	R	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Holcus lanatus*	bank	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Juncus articulatus*	R	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Juncus effusus*	O	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Juncus effusus*	O	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Juncus inflexus*	R	ST3603984086	05/08/2020	

Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Lemna gibba*	A	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Lemna minuta*	R	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Lemna minuta*	O	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Lycopus europaeus*	R	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Potamogeton trichoides*	F	ST3603984086	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Rosa canina agg.*	bank	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Rubus fruticosus agg.*	bank	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Rumex conglomeratus*	O	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Rumex conglomeratus*	O	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Salix cinerea subsp. cinerea*	bank	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Samolus valerandi*	R	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Sparganium erectum*	R	ST3603984086	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Spirodela polyrhiza*	F	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Torilis japonica*	bank	ST3603984086	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Typha latifolia*	R	ST3603984086	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-Dr4	*Typha latifolia*	R	ST3603984086	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Berula erecta*	R	ST3623384103	05/08/2020	flowering (mostly in open water)
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Calystegia sepium subsp. sepium*	bank	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Ceratophyllum demersum*	LA	ST3623384103	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Elodea canadensis*	R	ST3623384103	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Elodea nuttallii*	O	ST3623384103	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Filipendula ulmaria*	bank	ST3623384103	05/08/2020	flowering

Great Newra Farm	Nash & Goldcliff	GN-EA27	*Glyceria maxima*	O	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Hydrocharis morsus-ranae*	O	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Juncus inflexus*	R	ST3623384103	05/08/2020	fruiting
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Lathyrus pratensis*	bank	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Lemna gibba*	D	ST3623384103	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Lemna minuta*	O	ST3623384103	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Oenanthe crocata*	O	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Phalaris arundinacea*	O	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Phragmites australis*	F	ST3623384103	05/08/2020	flowering
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Potamogeton trichoides*	F	ST3623384103	05/08/2020	below duckweed matt
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Spirodela polyrhiza*	A	ST3623384103	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-EA27	*Wolffia arrhiza*	R	ST3623384103	05/08/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Cirsium palustre*	R	ST3613984231	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Cynosurus cristatus*	F	ST3613984231	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Ranunculus acris*	O	ST3613984231	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Ranunculus repens*	F	ST3613984231	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Rumex acetosa*	O	ST3613984231	19/03/2020	
Great Newra Farm	Nash & Goldcliff	GN-open field	*Trifolium repens*	F	ST3613984231	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-G	*Ranunculus acris*	O	ST3647183625	19/03/2020	dry semi-improved grassland grip
Cross Farm 1	Nash & Goldcliff	CF1-G	*Trifolium repens*	F	ST3647183625	19/03/2020	dry semi-improved grassland grip
Cross Farm 1	Nash & Goldcliff	CF1-G	*Ranunculus repens*	F	ST3647183625	19/03/2020	dry semi-improved

							grassland grip
Cross Farm 1	Nash & Goldcliff	CF1-G	*Rumex acetosa*	R	ST3647183625	19/03/2020	dry semi-improved grassland grip
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Alisma plantago-aquatica*	O	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Asplenium scolopendrium*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Berula erecta*	LF	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Calystegia sepium subsp. sepium*	bank	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Carex cf acutiformis*	R	ST3627983748	05/08/2020	non flowering stand
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Carex remota*	bank	ST3627983748	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Ceratophyllum demersum*	O	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Conyza cf canadensis*	bank	ST3627983748	05/08/2020	(disturbed bank where hedge has been removed, plants just coming into flower)
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Crataegus monogyna*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Dryopteris felix-mass*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Elodea nuttallii*	D	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Epilobium hirsutum*	O	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Epilobium parviflorum*	R	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Filipendula ulmaria*	R	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Glyceria maxima*	O	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Hydrocharis morsus-ranae*	R	ST3627983748	05/08/2020	single non-flowering plant
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Iris pseudacorus*	R	ST3627983748	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Juncus effusus*	O	ST3627983748	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Juncus inflexus*	R	ST3627983748	05/08/2020	fruiting

Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Lemna gibba*	F	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Lemna minuta*	O	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Lemna trisulca*	O	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Lycopus europaeus*	O	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Oenanthe crocata*	O	ST3627983748	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Potamogeton trichoides*	F	ST3627983748	05/08/2020	below duckweed matt
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Prunus spinosa*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Ranunculus acris*	bank	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Rosa canina agg.*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Rubus fruticosus agg.*	bank	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Rumex conglomeratus*	O	ST3627983748	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Solanum dulcamara*	O	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Sonchus asper*	bank	ST3627983748	05/08/2020	(disturbed bank where hedge has been removed, flowering)
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Torilis japonica*	bank	ST3627983748	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Veronica catenata*	R	ST3627983748	05/08/2020	in open water (fruiting)
Cross Farm 1	Nash & Goldcliff	CF1-Dr1	*Wolffia arrhiza*	R	ST3627983748	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr2	*Crataegus monogyna*	bank	ST3646483705	05/08/2020	drain not surveyed in detail (difficult access due to hedges on both sides)
Cross Farm 1	Nash & Goldcliff	CF1-Dr2	*Rubus fruticosus agg.*	bank	ST3646483705	05/08/2020	drain not surveyed in detail (difficult access due to hedges on both

							sides)
Cross Farm 1	Nash & Goldcliff	CF1-Dr2	*Lemna gibba*	O	ST3646483705	05/08/2020	drain not surveyed in detail (difficult access due to hedges on both sides)
Cross Farm 1	Nash & Goldcliff	CF1-Dr2	*Juncus inflexus*	R	ST3646483705	05/08/2020	drain not surveyed in detail (difficult access due to hedges on both sides)
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Agrostis stolonifera*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Alisma plantago-aquatica*	R	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Apium nodiflorum*	R	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Arum maculatum*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Asplenium scolopendrium*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Athyrium felix-femina*	bank	ST3646283565	19/03/2020	single plant (far bank)
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Berula erecta*	LA	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Berula erecta*	LA	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Callitriche platycarpa*	R	ST3646283565	05/08/2020	with maturing (slightly winged) fruits
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Callitriche sp.*	R	ST3646283565	19/03/2020	non-fertile plants with floating leaves
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Calystegia sepium subsp. sepium*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Cardamine flexuosus*	O	ST3646283565	19/03/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Cirsium palustre*	R	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Crataegus monogyna*	bank	ST3646283565	19/03/2020	

Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Epilobium hirsutum*	O	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Epilobium hirsutum*	O	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Epilobium tetragonum subsp. tetragonum*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Equisetum arvense*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Galium aparine*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Galium aparine*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Glechoma hederacea*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Glyceria fluitans*	O	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Hedera helix*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Hedera helix*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Holcus lanatus*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Lemna gibba*	D	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Lemna minuta*	R	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Lemna minuta*	O	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Oenanthe crocata*	O	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Oenanthe crocata*	O	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Prunus spinosa*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Ranunculus acris*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Ranunculus acris*	R	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Ranunculus repens*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Ranunculus sceleratus*	R	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Rosa canina agg.*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Rubus fruticosus agg.*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Rubus fruticosus agg.*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Rumex conglomeratus*	O	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Rumex conglomeratus*	O	ST3646283565	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Scrophularia auriculata*	R	ST3646283565	05/08/2020	flowering

Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Scrophularia auriculata*	O	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Sison amomum*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Solanum dulcamara*	O	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Stachys sylvatica*	bank	ST3646283565	19/03/2020	rare
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Torilis japonica*	bank	ST3646283565	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Ulmus cf procera*	bank	ST3646283565	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Urtica dioica*	bank	ST3646283565	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-Dr3	*Veronica catenata*	R	ST3646283565	05/08/2020	single fruiting plant in open water
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Glyceria maxima*	F	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Glyceria maxima*	F	ST3671883590	05/08/2020	open seepage from upturned pipe (E end of drain), flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Phalaris arundinacea*	O	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Berula erecta*	A	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Berula erecta*	A	ST3671883590	05/08/2020	open seepage from upturned pipe (E end of drain), flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Mentha aquatica*	O	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Alisma plantago-aquatica*	R	ST3671883590	19/03/2020	open seepage from upturned pipe (E

							end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Alisma plantago-aquatica*	R	ST3671883590	05/08/2020	open seepage from upturned pipe (E end of drain), flowering
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Juncus inflexus*	R	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-Dr4	*Juncus effusus*	R	ST3671883590	19/03/2020	open seepage from upturned pipe (E end of drain)
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Apium nodiflorum*	O	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Arum maculatum*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Asplenium scolopendrium*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Berula erecta*	O	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Berula erecta*	O	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Cardamine flexuosus*	O	ST3672983540	19/03/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Carex otrubae*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Carex otrubae*	R	ST3672983540	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Ceratophyllum demersum*	O	ST3672983540	05/08/2020	often below duckweed matt
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Crataegus monogyna*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Crataegus monogyna*	bank	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Galium palustre subsp. elongatum*	R	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Glyceria maxima*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Glyceria maxima*	R	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Holcus lanatus*	bank	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Juncus effusus*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Juncus inflexus*	O	ST3672983540	19/03/2020	

Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Juncus inflexus*	O	ST3672983540	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Lemna gibba*	D	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Lemna minuta*	R	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Lycopus europaeus*	R	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Myosotis scorpioides*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Myosotis scorpioides*	R	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Oenanthe crocata*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Oxyrrhynchium hians*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Phalaris arundinacea*	O	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Phragmites australis*	LD	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Phragmites australis*	LD	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Physcomitrium pyriforme*	O	ST3672983540	19/03/2020	at water's edge (fruiting)
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Potamogeton crispus*	O	ST3672983540	05/08/2020	below duckweed matt
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Potamogeton pusillus*	O	ST3672983540	05/08/2020	single plant (below duckweed matt)
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Potamogeton trichoides*	LA	ST3672983540	05/08/2020	often below duckweed matt
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Ranunculus acris*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Ranunculus acris*	R	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Ranunculus sceleratus*	R	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Rubus fruticosus agg.*	bank	ST3672983540	05/08/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Rumex conglomeratus*	O	ST3672983540	05/08/2020	fruiting
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Sambucus nigra*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Scrophularia auriculata*	O	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Scrophularia auriculata*	O	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Sison amomum*	R	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Spirodela polyrhiza*	A	ST3672983540	05/08/2020	

Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Stachys palustris*	bank	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Torilis japonica*	bank	ST3672983540	05/08/2020	flowering
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Urtica dioica*	bank	ST3672983540	19/03/2020	
Cross Farm 1	Nash & Goldcliff	CF1-IDB71	*Veronica catenata*	O	ST3672983540	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Alisma plantago-aquatica*	O	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Berula erecta*	O	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Callitriche cf platycarpa*	R	ST3491583660	05/08/2020	non fertile plants
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Calystegia sepium subsp. sepium*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Carex otrubae*	R	ST3491583660	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Ceratophyllum submersum*	R	ST3491583660	05/08/2020	single plant (below duckweed matt)
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Cirsium arvense*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Cirsium vulgare*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Eleocharis palustris*	R	ST3491583660	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Epilobium hirsutum*	O	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Epilobium parviflorum*	R	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Glechoma hederacea*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Holcus lanatus*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Hydrocharis morsus-ranae*	R	ST3491583660	05/08/2020	single non-flowering plant
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Juncus effusus*	O	ST3491583660	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Juncus inflexus*	R	ST3491583660	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Lemna gibba*	D	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Lemna minuta*	F	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Lemna trisulca*	O	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Lycopus europaeus*	R	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Oenanthe crocata*	R	ST3491583660	05/08/2020	flowering

Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Phragmites australis*	O	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Poa trivialis*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Potamogeton trichoides*	F	ST3491583660	05/08/2020	below duckweed matt
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Prunus spinosa*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Pulicaria dysenterica*	bank	ST3491583660	05/08/2020	single flowering plant
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Ranunculus repens*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Rubus fruticosus agg.*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Salix cinerea subsp. cinerea*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Sison amomum*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Solanum dulcamara*	O	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Torilis japonica*	bank	ST3491583660	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Ulmus cf procera*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr1	*Urtica dioica*	bank	ST3491583660	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Alisma plantago-aquatica*	O	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Berula erecta*	LF	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Callitriche cf platycarpa*	R	ST3480383802	05/08/2020	non fertile plants on drawn-down mud
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Calystegia sepium subsp. sepium*	R	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Cirsium arvense*	bank	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Crataegus monogyna*	bank	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Epilobium hirsutum*	O	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Epilobium parviflorum*	R	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Hedera helix*	bank	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Iris pseudacorus*	R	ST3480383802	05/08/2020	fruiting

Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Juncus effusus*	O	ST3480383802	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Lemna gibba*	D	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Oenanthe crocata*	R	ST3480383802	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Phalaris arundinacea*	O	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Phragmites australis*	R	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Prunus spinosa*	bank	ST3480383802	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Rumex conglomeratus*	O	ST3480383802	05/08/2020	fruiting
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Sison amomum*	bank	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Solanum dulcamara*	R	ST3480383802	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr2	*Typha latifolia*	R	ST3480383802	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Arrhenatherum elatius*	O	ST3492083754	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Calystegia sepium subsp. sepium*	O	ST3492083754	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Epilobium hirsutum*	R	ST3492083754	05/08/2020	flowering
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Heracleum sphondylium*	O	ST3492083754	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Phragmites australis*	D	ST3492083754	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Rubus fruticosus agg.*	O	ST3492083754	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Salix cinerea subsp. cinerea*	R	ST3492083754	05/08/2020	
Cross Farm 2	Nash & Goldcliff	CF2-Dr3	*Urtica dioica*	R	ST3492083754	05/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Agrostis stolonifera*	bank	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Alisma plantago-aquatica*	O	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Apium nodiflorum*	O	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Berula erecta*	LF	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Callitriche cf platycarpa*	LA	ST2979183963	06/08/2020	small non fertile plants (growing terrestrially on drawn-down mud)
Fair Orchard Farm	St. Brides	FO-Dr1	*Carex riparia*	R	ST2979183963	06/08/2020	fruiting

Fair Orchard Farm	St. Brides	FO-Dr1	*Crataegus monogyna*	bank	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Glyceria fluitans*	LF	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Glyceria maxima*	R	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Hedera helix*	bank	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Holcus lanatus*	bank	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Hydrocharis morsus-ranae*	R	ST2979183963	06/08/2020	single non-flowering plant in pooled section of drawn-down drain
Fair Orchard Farm	St. Brides	FO-Dr1	*Iris pseudacorus*	R	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Juncus articulatus*	O	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Juncus bufonius sensu stricto*	R	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Juncus effusus*	O	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Lathyrus pratensis*	bank	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Lemna gibba*	O	ST2979183963	06/08/2020	plants on drawn-down mud
Fair Orchard Farm	St. Brides	FO-Dr1	*Lemna minuta*	R	ST2979183963	06/08/2020	plants on drawn-down mud
Fair Orchard Farm	St. Brides	FO-Dr1	*Lotus uliginosus*	R	ST2979183963	06/08/2020	single patch in open grazed edge
Fair Orchard Farm	St. Brides	FO-Dr1	*Mentha aquatica*	R	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Nasturtium officinale sensu lato*	O	ST2979183963	06/08/2020	non flowering plants
Fair Orchard Farm	St. Brides	FO-Dr1	*Oenanthe fistulosa*	R	ST2979183963	06/08/2020	c6 non flowering plants (in one place)
Fair Orchard Farm	St. Brides	FO-Dr1	*Persicaria amphibia*	O	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Persicaria hydropiper*	R	ST2979183963	06/08/2020	single non flowering plant

Fair Orchard Farm	St. Brides	FO-Dr1	*Phragmites australis*	R	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Prunus spinosa*	bank	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Ranunculus acris*	bank	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr1	*Ranunculus sceleratus*	R	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Rumex acetosa*	bank	ST2979183963	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr1	*Rumex hydrolapathum*	R	ST2979183963	06/08/2020	single non flowering plant
Fair Orchard Farm	St. Brides	FO-Dr1	*Salix cinerea subsp. cinerea*	bank	ST2979183963	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr1	*Solanum dulcamara*	R	ST2979183963	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Berula erecta*	LF	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Callitriche cf platycarpa*	O	ST2983583833	06/08/2020	small non fertile plants (growing terrestrially on drawn-down mud)
Fair Orchard Farm	St. Brides	FO-Dr2	*Carex riparia*	R	ST2983583833	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr2	*Frullania dilatata*	epiphyte	ST2983583833	06/08/2020	epiphyte on mature *Salix cinerea*
Fair Orchard Farm	St. Brides	FO-Dr2	*Glyceria maxima*	R	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Hedera helix*	bank	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Holcus lanatus*	bank	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Hypnum cupressiforme*	epiphyte	ST2983583833	06/08/2020	epiphyte on mature *Salix cinerea*
Fair Orchard Farm	St. Brides	FO-Dr2	*Iris pseudacorus*	O	ST2983583833	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr2	*Juncus articulatus*	R	ST2983583833	06/08/2020	small stand of fruiting plants in open area
Fair Orchard Farm	St. Brides	FO-Dr2	*Lathyrus pratensis*	bank	ST2983583833	06/08/2020	flowering

Fair Orchard Farm	St. Brides	FO-Dr2	*Lemna gibba*	LA	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Lemna minuta*	R	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Myosotis laxa*	R	ST2983583833	06/08/2020	several flowering plants in open area
Fair Orchard Farm	St. Brides	FO-Dr2	*Orthotrichum affine*	epiphyte	ST2983583833	06/08/2020	epiphyte on mature *Salix cinerea*
Fair Orchard Farm	St. Brides	FO-Dr2	*Persicaria amphibia*	bank	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Phragmites australis*	A	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Ranunculus acris*	bank	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Ranunculus repens*	bank	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Ranunculus sceleratus*	R	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Rubus fruticosus agg.*	bank	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Salix cinerea subsp. cinerea*	bank	ST2983583833	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr2	*Solanum dulcamara*	O	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr2	*Ulota cf bruchii*	epiphyte	ST2983583833	06/08/2020	epiphyte on mature *Salix cinerea*
Fair Orchard Farm	St. Brides	FO-Dr2	*Vicia cracca*	bank	ST2983583833	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr3	*Callitriche cf platycarpa*	LA	ST2985183981	06/08/2020	small non fertile plants (growing terrestrially on drawn-down mud)
Fair Orchard Farm	St. Brides	FO-Dr3	*Carex riparia*	R	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Crataegus monogyna*	bank	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Glyceria fluitans*	LA	ST2985183981	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr3	*Glyceria maxima*	R	ST2985183981	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr3	*Holcus lanatus*	bank	ST2985183981	06/08/2020	flowering
Fair Orchard Farm	St. Brides	FO-Dr3	*Juncus effusus*	O	ST2985183981	06/08/2020	fruiting

Fair Orchard Farm	St. Brides	FO-Dr3	*Juncus inflexus*	R	ST2985183981	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr3	*Lemna gibba*	LA	ST2985183981	06/08/2020	on drawn-down mud
Fair Orchard Farm	St. Brides	FO-Dr3	*Lemna minuta*	R	ST2985183981	06/08/2020	on drawn-down mud
Fair Orchard Farm	St. Brides	FO-Dr3	*Persicaria amphibia*	bank	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Persicaria hydropiper*	O	ST2985183981	06/08/2020	non flowering plants on drawn-down mud
Fair Orchard Farm	St. Brides	FO-Dr3	*Phragmites australis*	LF	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Quercus robur*	bank	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Ranunculus sceleratus*	O	ST2985183981	06/08/2020	fruiting
Fair Orchard Farm	St. Brides	FO-Dr3	*Rubus fruticosus agg.*	bank	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Salix cinerea subsp. cinerea*	bank	ST2985183981	06/08/2020	
Fair Orchard Farm	St. Brides	FO-Dr3	*Solanum dulcamara*	R	ST2985183981	06/08/2020	seedling
Fair Orchard Farm	St. Brides	FO-Dr3	*Urtica dioica*	bank	ST2985183981	06/08/2020	
Sluice House Farm	St. Brides	SH-Dr1	*Agrostis stolonifera*	bank	ST2485879372	06/08/2020	flowering
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Azolla filiculoides*	R	ST2485879372	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Crataegus monogyna*	bank	ST2485879372	06/08/2020	forming dense reed fringe
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Holcus lanatus*	bank	ST2485879372	06/08/2020	flowering
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Lemna gibba*	D	ST2485879372	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Lemna minuta*	R	ST2485879372	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Lemna trisulca*	O	ST2485879372	06/08/2020	
Sluice House Farm	Rumney &	SH-Dr1	*Phragmites australis*	A	ST2485879372	06/08/2020	forming dense reed

	Peterstone						fringe
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Ranunculus repens*	bank	ST2485879372	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Ranunculus sceleratus*	O	ST2485879372	06/08/2020	fruiting
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Rumex conglomeratus*	O	ST2485879372	06/08/2020	fruiting
Sluice House Farm	Rumney & Peterstone	SH-Dr1	*Typha latifolia*	R	ST2485879372	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr2	*Crataegus monogyna*	bank	ST2493379423	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr2	*Phragmites australis*	D	ST2493379423	06/08/2020	drain dry and dominated by reed
Sluice House Farm	Rumney & Peterstone	SH-Dr2	*Cirsium arvense*	bank	ST2493379423	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr2	*Rubus fruticosus agg.*	bank	ST2493379423	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr2	*Urtica dioica*	bank	ST2493379423	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr3	*Calystegia sepium subsp. sepium*	bank	ST2498379211	06/08/2020	flowering
Sluice House Farm	Rumney & Peterstone	SH-Dr3	*Phragmites australis*	D	ST2498379211	06/08/2020	drain dry and dominated by reed
Sluice House Farm	Rumney & Peterstone	SH-Dr3	*Rubus fruticosus agg.*	bank	ST2498379211	06/08/2020	
Sluice House Farm	Rumney & Peterstone	SH-Dr3	*Urtica dioica*	bank	ST2498379211	06/08/2020	

Appendix 2 Aquatic macro-invertebrate data

Gwent Levels Project: Aquatic macro invertebrate data											
Ditch code	**Site**	**Date**	**Grid ref**	**Species**	**English name**	**Family**	**Order**	**Status**	**SQS (COL)**	**CS (CCI)**	**Notes**
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gammarus duebeni*	an amphipod shrimp	Gammaridae	Amphipoda			4	1 specimen collected
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gymnetron villosulum*	Pink Water Speedwell Weevil	Curculionidae	Coleoptera	NS	8	7	galls on Veronica catenata
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gyrinus caspius*	Caspian Whirligig	Gyrinidae	Coleoptera		4	3	numerous
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gyrinus marinus*	a whirligig beetle	Gyrinidae	Coleoptera		2	2	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gyrinus substriatus*	Common Whirligig	Gyrinidae	Coleoptera		1	1	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Haliplus sibiricus*	an algivorous water beetle	Haliplidae	Coleoptera		2	3	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Bithynia tentaculata*	Common Bithynia	Bithyniidae	Gastropoda			1	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Corixa punctata*	a lesser water-boatman	Corixidae	Hemiptera			1	
CF1-Dr1	Cross Farm	05/08/2020	ST3627983748	*Hesperocorixa*	a lesser water-	Corixidae	Hemiptera			4	

	(site 1)			*linnaei*	boatman						
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Sigara dorsalis*	a lesser water-boatman	Corixidae	Hemiptera			1	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Gerris* sp.	a pond-skater	Gerridae	Hemiptera			1	immature
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
CF1-Dr1	Cross Farm (site 1)	05/08/2020	ST3627983748	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Crangonyx pseudogracilis*	an amphipod shrimp	Crangonyctidae	Amphipoda			1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Agabus sturmii*	a diving beetle	Dytiscidae	Coleoptera		1	1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Hydroporus planus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
CF1-Dr3	Cross Farm (site 1)	05/08/2020	ST3646283565	*Sympetrum striolatum*	Common Darter larva	Libellulidae	Odonata			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Crangonyx pseudogracilis*	an amphipod shrimp	Crangonyctidae	Amphipoda			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Hygrotus inaequalis*	a diving beetle	Dytiscidae	Coleoptera		1	2	
CF1-	Cross Farm	05/08/2020	ST3672983540	*Hyphydrus ovatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	

IDB71	(site 1)										
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Haliplus ruficollis*	an algivorous water beetle	Haliplidae	Coleoptera		1	1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Anacaena globulus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Enochrus testaceus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	3	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Hydrobius* c.f. *subrotundus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Laccobius bipunctatus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	2	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Planorbis planorbis*	Margined Ramshorn Snail	Planorbidae	Gastropoda			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Sialis lutaria*	alderfly larvae	Sialidae	Megaloptera			1	
CF1-IDB71	Cross Farm (site 1)	05/08/2020	ST3672983540	*Oligochaeta* sp.	an oligochaete worm	Oligochaeta	Oligochaeta			1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Dytiscus* sp. larva	a great diving beetle larva	Dytiscidae	Coleoptera		2	1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Hygrotus inaequalis*	a diving beetle	Dytiscidae	Coleoptera		1	2	
CF2-Dr1	Cross Farm	05/08/2020	ST3491583660	*Haliplus*	an algivorous	Haliplidae	Coleoptera		1	1	

	(site 2)			*lineatocollis*	water beetle						
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Haliplus ruficollis*	an algivorous water beetle	Haliplidae	Coleoptera		1	1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Helophorus brevipalpis*	a scavenger water beetle	Helophoridae	Coleoptera		1	1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Anacaeana limbata*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Enochrus testaceus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	3	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Helochares lividus*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	5	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Hydrobius fuscipes* sensu stricto	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Anisus leucostoma*	White-lipped Ramshorn Snail	Planorbidae	Gastropoda			4	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
CF2-Dr1	Cross Farm (site 2)	05/08/2020	ST3491583660	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Crangonyx pseudogracilis*	an amphipod shrimp	Crangonyctidae	Amphipoda			1	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Agabus bipustulatus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Agabus conspersus*	a diving beetle	Dytiscidae	Coleoptera	NS	8	7	1 adult
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Agabus sturmii*	a diving beetle	Dytiscidae	Coleoptera		1	1	

CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Hydroporus angustatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Hydroporus planus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Ilybius ater*	a diving beetle	Dytiscidae	Coleoptera		2	3	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Helophorus brevipalpis*	a scavenger water beetle	Helophoridae	Coleoptera		1	1	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Anacaena limbata*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Anisus leucostoma*	White-lipped Ramshorn Snail	Planorbidae	Gastropoda			4	
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Gerris* sp.	a pond-skater	Gerridae	Hemiptera			1	immature
CF2-Dr2	Cross Farm (site 2)	05/08/2020	ST3480383802	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Sphaerium corneum*	Horny Orb-mussel	Sphaeriidae	Bivalvia			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Agabus bipustulatus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Colymbetes fuscus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydroporus angustatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	

FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydroporus incognitus*	a diving beetle	Dytiscidae	Coleoptera		1	3	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydroporus palustris*	a diving beetle	Dytiscidae	Coleoptera		1	1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydroporus planus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydroporus pubescens*	a diving beetle	Dytiscidae	Coleoptera		1	2	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Ilybius ater*	a diving beetle	Dytiscidae	Coleoptera		2	3	1 ex bottle trap
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Ilybius quadriguttatus*	a diving beetle	Dytiscidae	Coleoptera		4	5	1 male
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Ilybius quadriguttatus*	a diving beetle	Dytiscidae	Coleoptera		4	5	2 ex bottle trap
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Nartus grapii*	a diving beetle	Dytiscidae	Coleoptera		4	7	1 adult
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Rhantus suturalis*	a diving beetle	Dytiscidae	Coleoptera		4	5	3 adults
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Helophorus aequalis*	a scavenger water beetle	Helophoridae	Coleoptera		1	1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Helophorus minutus*	a scavenger water beetle	Helophoridae	Coleoptera		1	2	

FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Coelostoma orbiculare*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	5	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Cymbiodyta marginellus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	5	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Helochares lividus*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	5	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydrobius c.f. subrotundus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hydrobius fuscipes* sensu stricto	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	Limoniidae sp.	a cranefly larva	Limoniidae	Diptera			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Stagnicola palustris* agg.	Marsh Pond Snail	Lymnaeidae	Gastropoda			2	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Aplexa hypnorum*	Moss Bladder Snail	Physidae	Gastropoda			5	abundant
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	

FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Gerris* sp.	a pond-skater	Gerridae	Hemiptera			1	immature
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Nepa cinerea*	Water Scorpion	Nepidae	Hemiptera			3	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Sympetrum striolatum*	Common Darter larva	Libellulidae	Odonata			1	
FO-Dr1	Fair Orchard Farm	05/08/2020	ST2979183963	*Limnephilus* sp.	a caddis fly	Limnephilidae	Trichoptera			1	empty pupal case
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Agabus sturmii*	a diving beetle	Dytiscidae	Coleoptera		1	1	
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Hydroporus angustatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Ilybius quadriguttatus*	a diving beetle	Dytiscidae	Coleoptera		4	5	1 ex bottle trap
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Ilybius quadriguttatus*	a diving beetle	Dytiscidae	Coleoptera		4	5	2
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Contacyphon* sp.	a marsh beetle larva	Scirtidae	Coleoptera		1	1	

FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
FO-Dr2	Fair Orchard Farm	06/08/2020	ST2983583833	*Limnephilus* sp.	a caddis fly	Limnephilidae	Trichoptera			1	empty pupal case
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Gammarus pulex*	Freshwater Shrimp	Gammaridae	Amphipoda			1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Sphaerium corneum*	Horny Orb-mussel	Sphaeriidae	Bivalvia			1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Agabus bipustulatus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Agabus nebulosus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Dytiscus marginalis*	Great Diving Beetle	Dytiscidae	Coleoptera		2	1	1 ad male
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hydroporus angustatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hydroporus palustris*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hydroporus planus*	a diving beetle	Dytiscidae	Coleoptera		1	2	

GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hyphydrus ovatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Berosus signaticollis*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Enochrus ochropterus*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Enochrus testaceus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	3	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hydrobius c.f. subrotundus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hydrobius fuscipes* sensu stricto	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Laccobius minutus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Scirtes hemisphaericus*	a marsh beetle	Scirtidae	Coleoptera		2	2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	

GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Notonecta glauca*	Common Backswimmer	Notonectidae	Hemiptera			1	
GN-Dr2	Great Newra Farm	05/08/2020	ST3606584289	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Crangonyx pseudogracilis*	an amphipod shrimp	Crangonyctidae	Amphipoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Agabus bipustulatus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Colymbetes fuscus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydaticus transversalis*	a diving beetle	Dytiscidae	Coleoptera	NS	8	7	1 adult
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydroporus angustatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydroporus planus*	a diving beetle	Dytiscidae	Coleoptera		1	2	

GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydroporus tessellatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hygrotus inaequalis*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Nartus grapii*	a diving beetle	Dytiscidae	Coleoptera		4	7	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Gyrinus caspius*	Caspian Whirligig	Gyrinidae	Coleoptera		4	3	1 male
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Haliplus ruficollis*	an algivorous water beetle	Haliplidae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Helophorus grandis*	a scavenger water beetle	Helophoridae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Helophorus minutus*	a scavenger water beetle	Helophoridae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydrobius fuscipes* sensu stricto	a scavenger water beetle	Helophoridae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Anacaena globulus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Anacaena limbata*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Cymbiodyta marginellus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	5	

GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Enochrus coarctatus*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Enochrus ochropterus*	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Enochrus testaceus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	3	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hydrophilus piceus*	Great Silver Water Beetle	Hydrophilidae	Coleoptera	NT	16	8	1 larva
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Laccobius bipunctatus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Laccobius minutus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Scirtes hemisphaericus*	a marsh beetle	Scirtidae	Coleoptera		2	2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	Dixidae	meniscus midge larvae	Dixidae	Diptera			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Odontomyia ornata*	Ornate Brigadier soldierfly	Stratiomyidae	Diptera	NS		9	1 larva
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Odontomyia tigrina*	Black Colonel soldierfly	Stratiomyidae	Diptera			7	3 larvae

GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Bithynia tentaculata*	Common Bithynia	Bithyniidae	Gastropoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Lymnaea stagnalis*	Greater Pond Snail	Lymnaeidae	Gastropoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Radix balthica*	Wandering Snail	Lymnaeidae	Gastropoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Anisus leucostoma*	White-lipped Ramshorn Snail	Planorbidae	Gastropoda			4	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Nepa cinerea*	Water Scorpion	Nepidae	Hemiptera			3	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Notonecta glauca*	Common Backswimmer	Notonectidae	Hemiptera			1	

GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Microvelia reticulata*	a pygmy water-cricket	Veliidae	Hemiptera			4	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Aeshna mixta*	Migrant Hawker dragonfly	Aeshnidae	Odonata			3	2 larvae
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Ischnura elegans*	Blue-tailed Damselfly larva	Coenagrionidae	Odonata			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	*Sympetrum striolatum*	Common Darter larva	Libellulidae	Odonata			1	
GN-Dr3	Great Newra Farm	05/08/2020	ST3606684200	Tubellaria sp.	flatworms	Turbellaria	Turbellaria			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Gammarus pulex*	Freshwater Shrimp	Gammaridae	Amphipoda			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Agabus bipustulatus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Colymbetes fuscus*	a diving beetle	Dytiscidae	Coleoptera		1	1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hydaticus transversalis*	a diving beetle	Dytiscidae	Coleoptera	NS	8	7	1 adult
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hygrotus inaequalis*	a diving beetle	Dytiscidae	Coleoptera		1	2	

GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hyphydrus ovatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Ilybius ater*	a diving beetle	Dytiscidae	Coleoptera		2	3	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Helophorus brevipalpis*	a scavenger water beetle	Helophoridae	Coleoptera		1	1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Anacaena limbata*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hydrobius fuscipes* sensu stricto	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Laccobius bipunctatus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	2	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hydrophilus piceus*	Great Silver Water Beetle	Hydrophilidae	Coleoptera	NT	16	8	2 larvae
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Noterus clavicornis*	a burrowing water beetle	Noteridae	Coleoptera		1	2	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Radix balthica*	Wandering Snail	Lymnaeidae	Gastropoda			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	

GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Hesperocorixa sahlbergi*	a lesser water-boatman	Corixidae	Hemiptera			2	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	Oligochaeta sp.	an oligochaete worm	Oligochaeta	Oligochaeta			1	
GN-Dr4	Great Newra Farm	05/08/2020	ST3603984086	Tubellaria sp.	flatworms	Turbellaria	Turbellaria			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Sphaerium corneum*	Horny Orb-mussel	Sphaeriidae	Bivalvia			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Hyphydrus ovatus*	a diving beetle	Dytiscidae	Coleoptera		1	2	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Haliplus lineatocollis*	an algivorous water beetle	Haliplidae	Coleoptera		1	1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Anacaena globulus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Laccobius bipunctatus*	a scavenger water beetle	Hydrophilidae	Coleoptera		1	2	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Bithynia tentaculata*	Common Bithynia	Bithyniidae	Gastropoda			1	

GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Planorbarius corneus*	Greater Ramshorn Snail	Planorbidae	Gastropoda			4	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Planorbis planorbis*	Margined Ramshorn Snail	Planorbidae	Gastropoda			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Ilyocoris cimicoides*	Saucer Bug	Naucoridae	Hemiptera			3	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Oligochaeta* sp.	an oligochaete worm	Oligochaeta	Oligochaeta			1	
GN-EA27	Great Newra Farm	05/08/2020	ST3623384103	*Glossiphonia complanata*	a leech	Glossiphoniidae	Rhynchobdellida			1	
SH-Dr1	Sluice House Farm	05/08/2020	ST2485879372	*Crangonyx pseudogracilis*	an amphipod shrimp	Crangonyctidae	Amphipoda			1	
SH-Dr1	Sluice House Farm	05/08/2020	ST2485879372	*Physa fontinalis*	Common Bladder Snail	Physidae	Gastropoda			1	
SH-Dr1	Sluice House Farm	05/08/2020	ST2485879372	*Anisus vortex*	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1	
SH-Dr1	Sluice House Farm	05/08/2020	ST2485879372	*Notonecta glauca*	Common Backswimmer	Notonectidae	Hemiptera			1	

SH-Dr1	Sluice House Farm	05/08/2020	ST2485879372	*Asellus aquaticus*	Water Hoglouse	Asellidae	Isopoda			1	

Appendix 3

Taxonomic list of plant species recorded during this survey

Taxanomic list of plant species		
SPECIES	**English name**	**Type**
Chlorophyta	Green algae	
Chara vulgaris	Common Stonewort	Submerged aquatic
Ulva sp.	A macro green alga	Floating aquatic
Bryophyta	Mosses, liverworts & hornworts	
Brachythecium rutabulum	Rough-stalked Feather-moss	Bank
Frullania dilatata	Dilated Scalewort	Bank
Hypnum cupressifolme	Cypress-leaved Plait-moss	Bank
Kindbergia praelonga	Common Feather-moss	Bank
Leptodictyum riparium	Kneiff's Feather-moss	Submerged aquatic
Oxyrrhynchium hians	Swartz's Feather-moss	Bank
Orthotrichum affine	Wood Bristle-moss	Bank
Physcomitrium pyriforme	Common Bladder-moss	Bank
Ulota cf bruchii	Bruch's Pincushion	Bank
Calamophytes	Horsetails	
Equisetum arvense	Field Horestail	Bank
Leptosporangiate ferns	True Ferns	
Asplenium scolopendrium	Hart's-tongue Fern	Bank
Azolla filiculoides	Water Fern	Bank
Athyrium felix-femina	Lady Fern	Bank
Dryopteris felix-mass	Male Fern	Bank
Angiosperms	Flowering plants	
Acer campestre	Field Maple	Bank
Agrostis capillaris	Brown Bent	Field
Agrostis stolonifera	Creeoing Bent	Bank
Alisma plantago-aquatica	Water-plantain	Emergent
Alopecurus geniculatus	Marsh Foxtail	Bank
Anthoxanthum odoratum	Sweet Vernal-grass	Field
Apium nodiflorum	Fool's Watercress	Emergent
Arrhenatherum elatius	False-oat	Bank
Arum maculatum	Lords-and-ladies	Bank
Berula erecta	Lesser Water-parsnip	Emergent
Callitriche platycarpa	Various-leaved Water-starwort	Submerged aquatic
Calystegia sepium subsp. sepium	Hedge Bindweed	Bank
Cardamine flexuosus	Wavy Bittercress	Bank
Cardamine pratensis	Cuckoo Flower	Bank
Carex cf acutiformis	Lesser Pond-sedge	Emergent
Carex otrubae	False Fox-sedge	Emergent
Carex remota	Remote Sedge	Bank
Carex riparia	Greater Pond-sedge	Emergent
Ceratophyllum demersum	Ridged Hornwort	Submerged aquatic
Ceratophyllum submersum	Smooth Hornwort	Submerged aquatic
Cirsium arvense	Creeping Thistle	Bank
Cirsium palustre	Marsh Thistle	Bank
Cirsium vulgare	Spear Thistle	Bank
Conyza cf canadensis	Canadian Fleabane	Bank
Crataegus monogyna	Hawthorn	Bank
Cynosurus cristatus	Crested Dog's-tail	Bank

Eleocharis palustris	Common Spike-rush	Emergent
Elodea canadensis	Canadian Waterweed	Submerged aquatic
Elodea nuttallii	Nuttall's Waterweed	Submerged aquatic
Epilobium hirsutum	Great Willowherb	Bank
Epilobium parviflorum	Hoary Willowherb	Bank
Epilobium tetragonum subsp.	Square-stalked Willowherb	Bank
Filipendula ulmaria	Meadow-sweet	Bank
Galium aparine	Cleavers	Bank
Galium palustre subsp. elongatum	Marsh Bedstraw	Emergent
Glechoma hederacea	Ground Ivy	Bank
Glyceria fluitans	Floating Sweet-grass	Emergent
Glyceria maxima	Reed Sweet-grass	Emergent
Hedera helix	Ivy	Bank
Heraclium sphondylium	Hogweed	Bank
Holcus lanatus	Yorkshire Fog	Bank
Hordeum secalinum	Meadow Barley	Field
Hydrocharis morsus-ranae	Frogbit	Fl. aquatic
Iris pseudacorus	Yellow Iris	Emergent
Juncus articulatus	Jointed Rush	Emergent
Juncus bufonius sesu stricto	Toad Rush	Emergent
Juncus effusus	Soft Rush	Emergent
Juncus inflexus	Hard Rush	Emergent
Lathyrus pratensis	Meadow Vetchling	Bank
Lemna gibba	Fat Duckweed	Floating aquatic
Lemna minuta	Least Duckweed	Floating aquatic
Lemna trisulca	Ivy-leaved Duckweed	Submerged aquatic
Lolium perenne	Perennial Rye-grass	Field
Lotus uliginosus	Greater Bird's-foot Trefoil	Bank
Lycopus europaeus	Gypsywort	Emergent
Mentha aquatica	Water Mint	Emergent
Myosotis laxa	Tufted Forget-me-not	Emergent
Myosotis scorpioides	Water Forget-me-not	Emergent
Nasturtium officinale sensu stricto	Water-cress	Emergent
Oenanthe crocata	Hemlock Water-dropwort	Bank
Oenanthe fistulosa	Tubular Water-dropwort	Emergent
Persicaria amphibia	Amphibious Bistort	Bank
Persicaria hydropiper	Water Pepper	Emergent
Phalaris arundinacea	Reed Canary-grass	Emergent
Phragmites australis	Common Reed	Emergent
Poa trivialis	Rough-leaved Meadow-grass	Bank
Potamogeton crispus	Curled Pondweed	Submerged aquatic
Potamogeton pusillus	Lesser Pondweed	Submerged aquatic
Potamogeton trichoides	Hair-like Pondweed	Submerged aquatic
Potentilla anserina	Silver-weed	Bank
Prunus spinosa	Blackthorn	Bank
Pulicaria dysenterica	Fleabane	Bank
Quercus robur	Pedunculate Oak	Bank
Ranunculus acris	Meadow Buttercup	Bank
Ranunculus cf trichophyllus	Thread-leaved Water-crowfoot	Submerged aquatic
Ranunculus repens	Creeping Buttercup	Bank
Ranunculus sceleratus	Celery-leaved Buttercup	Emergent

Rosa canina agg.	Dog Rose	Bank
Rubus fruticosus agg.	Bramble	Bank
Rumex acetosa	Sorrel	Field
Rumex conglomeratus	Clustered Dock	Emergent
Rumex hydrolapathum	Water Dock	Emergent
Rumex obtusifolius	Broad-leaved Dock	Bank
Salix caprea	Goat Willow	Bank
Salix cinerea subsp. cinerea	Gret Willow	Bank
Sambucus nigra	Elder	Bank
Samolus valerandii	Brookweed	Emergent
Scrophularia auriculata	Water Figwort	Emergent
Sison amomum	Stone Parsley	Bank
Solanum dolcamara	Woody Nightshade	Emergent
Sonchus asper	Prickly Sowthistle	Bank
Sparganium erectum	Branched Bur-reed	Emergent
Spirodella polyrhiza	Greater Duckweed	Floating aquatic
Stachys palustris	Marsh Woundwort	Bank
Stachys sylvatica	Hedge Woundwort	Bank
Taraxacum sp.	Dandelion	Bank
Torilis japonica	Upright Hedge-parsley	Bank
Trifolium pratense	Red Clover	Field
Trifolium repens	White Clover	Field
Typha latifolia	Greater Reedmace	Emergent
Ulmus cf procera	English Elm	Bank
Urtica dioica	Nettle	Bank
Veronica catenata	Pink Water-speedwell	Emergent
Vicia cracca	Tufted Vetch	Bank
Wolffia arrhiza	Watermeal	Floating aquatic

Appendix 4

Taxonomic list of aquatic macro-invertebrate taxa recorded during this survey

Species	English name	Family	Order	Status	SQS (COL)	CS (CCI)
Tubellaria sp.	flatworms		Turbellaria			1
Oligochaeta sp.	an oligochaete worm	Oligochaeta	Oligochaeta			1
Glossiphonia complanata	a leech	Glossiphoniidae	Rhynchobdellida			1
Bithynia tentaculata	Common Bithynia	Bithyniidae	Gastropoda			1
Aplexa hypnorum	Moss Bladder Snail	Physidae	Gastropoda			5
Physa fontinalis	Common Bladder Snail	Physidae	Gastropoda			1
Lymnaea stagnalis	Greater Pond Snail	Lymnaeidae	Gastropoda			1
Radix balthica	Wandering Snail	Lymnaeidae	Gastropoda			1
Stagnicola palustris agg.	Marsh Pond Snail	Lymnaeidae	Gastropoda			2
Anisus leucostoma	White-lipped Ramshorn Snail	Planorbidae	Gastropoda			4
Anisus vortex	Whirlpool Ramshorn Snail	Planorbidae	Gastropoda			1
Planorbarius corneus	Greater Ramshorn Snail	Planorbidae	Gastropoda			4
Planorbis planorbis	Margined Ramshorn Snail	Planorbidae	Gastropoda			1
Sphaerium corneum	Horny Orb-mussel	Sphaeriidae	Bivalvia			1
Crangonyx pseudogracilis	an amphipod shrimp	Crangonyctidae	Amphipoda			1
Gammarus duebeni	an amphipod shrimp	Gammaridae	Amphipoda			4
Gammarus pulex	Freshwater Shrimp	Gammaridae	Amphipoda			1
Asellus aquaticus	Water Hoglouse	Asellidae	Isopoda			1

Ischnura elegans	Blue-tailed Damselfly larva	Coenagrionidae	Odonata			1
Sympetrum striolatum	Common Darter larva	Libellulidae	Odonata			1
Aeshna mixta	Migrant Hawker dragonfly	Aeshnidae	Odonata			3
Sialis lutaria	alderfly larvae	Sialidae	Megaloptera			1
Nepa cinerea	Water Scorpion	Nepidae	Hemiptera			3
Corixa punctata	a lesser water-boatman	Corixidae	Hemiptera			1
Hesperocorixa linnaei	a lesser water-boatman	Corixidae	Hemiptera			4
Hesperocorixa sahlbergi	a lesser water-boatman	Corixidae	Hemiptera			2
Sigara dorsalis	a lesser water-boatman	Corixidae	Hemiptera			1
Notonecta glauca	Common Backswimmer	Notonectidae	Hemiptera			1
Ilyocoris cimicoides	Saucer Bug	Naucoridae	Hemiptera			3
Gerris sp.	a pond-skater	Gerridae	Hemiptera			1
Microvelia reticulata	a pygmy water-cricket	Veliidae	Hemiptera			4
Gyrinus caspius	Caspian Whirligig	Gyrinidae	Coleoptera		4	3
Gyrinus marinus	a whirligig beetle	Gyrinidae	Coleoptera		2	2
Gyrinus substriatus	Common Whirligig	Gyrinidae	Coleoptera		1	1
Haliplus lineatocollis	an algivorous water beetle	Haliplidae	Coleoptera		1	1
Haliplus ruficollis	an algivorous water beetle	Haliplidae	Coleoptera		1	1
Haliplus sibiricus	an algivorous water beetle	Haliplidae	Coleoptera		2	3
Noterus clavicornis	a burrowing water beetle	Noteridae	Coleoptera		1	2

Agabus bipustulatus	a diving beetle	Dytiscidae	Coleoptera		1	1
Agabus conspersus	a diving beetle	Dytiscidae	Coleoptera	NS	8	7
Agabus nebulosus	a diving beetle	Dytiscidae	Coleoptera		1	1
Agabus sturmii	a diving beetle	Dytiscidae	Coleoptera		1	1
Ilybius ater	a diving beetle	Dytiscidae	Coleoptera		2	3
Ilybius quadriguttatus	a diving beetle	Dytiscidae	Coleoptera		4	5
Nartus grapii	a diving beetle	Dytiscidae	Coleoptera		4	7
Rhantus suturalis	a diving beetle	Dytiscidae	Coleoptera		4	5
Colymbetes fuscus	a diving beetle	Dytiscidae	Coleoptera		1	1
Hydaticus transversalis	a diving beetle	Dytiscidae	Coleoptera	NS	8	7
Dytiscus marginalis	Great Diving Beetle	Dytiscidae	Coleoptera		2	1
Hydroporus angustatus	a diving beetle	Dytiscidae	Coleoptera		1	2
Hydroporus incognitus	a diving beetle	Dytiscidae	Coleoptera		1	3
Hydroporus palustris	a diving beetle	Dytiscidae	Coleoptera		1	1
Hydroporus planus	a diving beetle	Dytiscidae	Coleoptera		1	1
Hydroporus pubescens	a diving beetle	Dytiscidae	Coleoptera		1	2
Hydroporus tessellatus	a diving beetle	Dytiscidae	Coleoptera		1	2
Hygrotus inaequalis	a diving beetle	Dytiscidae	Coleoptera		1	2
Hyphydrus ovatus	a diving beetle	Dytiscidae	Coleoptera		1	2
Helophorus aequalis	a scavenger water beetle	Helophoridae	Coleoptera		1	1
Helophorus brevipalpis	a scavenger water beetle	Helophoridae	Coleoptera		1	1
Helophorus grandis	a scavenger water beetle	Helophoridae	Coleoptera		1	2
Helophorus minutus	a scavenger water beetle	Helophoridae	Coleoptera		1	2
Berosus signaticollis	a scavenger water	Hydrophilid	Coleoptera		4	7

	beetle	ae				
Laccobius bipunctatus	a scavenger water beetle	Hydrophilidae	Coleoptera		1	2
Laccobius minutus	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2
Hydrobius c.f. *subrotundus*	a scavenger water beetle	Hydrophilidae	Coleoptera		2	2
Hydrobius fuscipes sensu stricto	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1
Hydrophilus piceus	Great Silver Water Beetle	Hydrophilidae	Coleoptera	NT	16	8
Anacaena globulus	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1
Anacaena limbata	a scavenger water beetle	Hydrophilidae	Coleoptera		1	1
Cymbiodyta marginellus	a scavenger water beetle	Hydrophilidae	Coleoptera		2	5
Enochrus coarctatus	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7
Enochrus ochropterus	a scavenger water beetle	Hydrophilidae	Coleoptera		4	7
Enochrus testaceus	a scavenger water beetle	Hydrophilidae	Coleoptera		2	3
Helochares lividus	a scavenger water beetle	Hydrophilidae	Coleoptera		4	5
Coelostoma orbiculare	a scavenger water beetle	Hydrophilidae	Coleoptera		2	5
Contacyphon sp.	a marsh beetle larva	Scirtidae	Coleoptera		1	1
Scirtes hemisphaericus	a marsh beetle	Scirtidae	Coleoptera		2	2
Gymnetron villosulum	Pink Water Speedwell Weevil	Curculionidae	Coleoptera	NS	8	7
Dixidae	meniscus midge larvae	Dixidae	Diptera			1

Limoniidae sp.	a cranefly larva	Limoniidae	Diptera			1
Odontomyia ornata	Ornate Brigadier soldierfly	Stratiomyidae	Diptera	NS		9
Odontomyia tigrina	Black Colonel soldierfly	Stratiomyidae	Diptera			7
Limnephilus sp.	a caddis fly	Limnephilidae	Trichoptera			1