INVERTEBRATE SURVEY OF LAND AT COLNEY HEATH LANE, ST ALBANS

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1 Summary

- The three days of survey produced a diversity of 410 species identified, a very good diversity for just three visits.
- Of these 42 (10.2%) are considered here as Species of conservation concern, nine of them of RDB quality or equivalent.
- This is an excellent quality, well within that of most nature-reserves.
- A few species with conservation status are now known to be commoner than formerly, the proportion found here being very typical of such surveys.
- The scarce and rare species include many not previously recorded in Hertfordshire and even one species as yet undescribed and only known from one other UK specimen and two specimens from Finland.
- The four compartments/habitats varied in diversity from 82 to 163 species, with the grassland and ponds compartments proving equally diverse, the scrub/hedgerows a little less so and the woodland with lowest diversity.
- The ponds exhibited the best quality with a very good 9.8% scarce/RDB species.
- The grassland was very similar at 9.2%, and the scrub/hedgerows a little poorer at 8.8%.
- The poorest compartment was the woodland with 6.1%, but this is still rather good.
- Pantheon analysis was based on 328 species, the remainder not yet being coded in the Pantheon program.
- Seven specific assemblage types (SATs) are brought out by Pantheon, with two assemblages graded as “favourable” rich flower resource and scrub-edge, all the remainder graded as unfavourable.
- The results of this survey confirm that the land at Colney Heath Lane is an important site for invertebrate conservation in a local and regional context.
- Loss of this land is very likely to lead to local and regional biodiversity loss
- Significant mitigation will be required to prevent this and fulfil the requirements of biodiversity net-gain.

2 Introduction

The area of land north of Colney Heath Lane is largely open tall-herb/coarse grassland and developing scrub. At the western end is a complex of ponds and wet depressions that are mostly just winter-wet, but a few hold permanent water and have a fringe of emergent vegetation. A block of woodland which contains some mature oaks on the south side of the survey area was also sampled. A previous one-day survey in August 2023 (Denton 2023) found a very good diversity but rather a poor proportion of scarce species (4.4%). Despite this the results were sufficient to indicate a full EIA was required.

3 Survey Methodology

3.1 Sampling Techniques

Surveying involved searching flowers for larger species, notably hoverflies, bees and wasps, examining plants for signs of larvae, especially in the more open areas and in woodland areas sampling rot holes and bark from dying or fallen trees. Most specimens were taken by sweeping with a 14-inch diameter white-bag net through the grass, herbage, under storey vegetation, over piles of dead wood and from overhanging branches. Butterflies, some hoverflies and other conspicuous species were identified in the field but specimens were always taken if there was any possibility of an incorrect identification. Specimens were extracted from the net with a pooter or, in the case of larger specimens, individually potted in 30ml soda glass tubes. When sampling of a particular compartment was completed or the pooter became too full, the contents were killed with ethyl acetate then transferred to 30ml soda glass tubes together with a data label. These samples were then kept in a freezer until it

was possible to identify them.

The survey area was divided into four sampling area by habitat type as marked on the map (Fig 1).

Figure 1 Map showing sample compartments.

3.2 Sample Timing

The site was visited on three occasions from spring through the summer, the first on 8/9 May was early enough to record the majority of spring and early summer species. The second visit on the 23 June covers the high summer period when grassland diversity is at its peak. The final visit on the 17 July should cover the peak diversity in the woodland and wetland areas.

This spread of sample dates is as good as possible for just three visits, only very early spring species and the Autumn flush of woodland species is likely to have been missed.

3.3 Constraints

Every attempt was made to visit in sunny, dry conditions, and by and large this was achieved on the three visits. On the 8/9 May although the vegetation was still wet in the morning during the walkover, by the time sampling started it was warm and sunny with little wind. On the 23 June it was warm and sunny, dry, about 20°C, very little wind as such close to ideal sampling conditions. The final visit on the 17 July was warm, becoming hot later, remaining dry but with about 40% cloud cover.

3.4 Identification

Where practical, invertebrates were identified in the field but wherever the slightest doubt existed, one or more specimens were collected for more detailed scrutiny. To achieve rigorously accurate identifications, specimens were identified using the author's own library and entomological collection. Where these proved insufficient, specimens were submitted to relevant experts. Selected specimens have been retained in the author's personal collection as vouchers.

3.5TAXONOMIC COVERAGE

It is desirable that as wide a taxonomic range as possible is identified, in order to sample numerous ecological types, i.e. invertebrates with widely differing natural histories. As there was only a limited amount of time available for identification, it was important to name the more readily identified groups which do not require very time-consuming techniques or are out with the experience of the worker.

The following orders and families of invertebrates were named to species.

Araneae – Spiders

Odonata - Dragonflies and Damselflies

Orthoptera – Grasshoppers and crickets

Dermaptera – earwigs

Hemiptera, **Heteroptera - True Bugs** (excluding smaller Miridae)

Hemiptera, Auchenorrhyncha - Froghoppers and Leafhoppers (excluding females of difficult genera)

Lepidoptera – Butterflies and Moths

Trichoptera – Caddisflies

Coleoptera – **Beetles** (all except small Aleocharine rove beetles and other very small obscure families)

Diptera - True Flies (except, Cecidomyiidae, Chironomidae, Ceratopogonidae, Simulidae, Phoridae, Sphaeroceridae, and females of some groups which are not identifiable).

Hymenoptera – Sawflies, wasps and bees.

3.6ANALYSIS-GENERAL

The quality of the site for invertebrates has been assessed with reference to the species found which are considered to be nationally scarce or rare by the various Natural England Commissioned Reports published by JNCC (e.g. Falk 1991a; Falk 1991b; Hyman, 1992) and subsequently Natural England. These reviews place all nationally scarce species into categories according to their degree of rarity and their vulnerability to extinction and are accepted as the “official” JNCC/NE designations (see Appendix 1). The more recent ones also assess taxa with reference to IUCN threat categories.

Since the first reviews were published in the 1990’s selected families have been updated and this process is ongoing. But this still leaves many groups (e.g. Tipulidae and Sciomyzidae) where statuses have remained unchanged for more than 30 years while other families (e.g. Larger Brachycera Drake 2017) have been updated very recently. For this reason, in order to facilitate the greatest consistency with earlier surveys, species that were included in earlier reviews, but have lost their status recently, are included in the analysis. These species, no longer considered of conservation concern, are indicated as such in the species accounts. In addition, a number of species that still have official national status but are clearly much more frequent than formerly, and will probably have their status removed when their family is updated, are indicated as such.

Additionally an attempt has been made to gauge the value of the site within a local and regional context. Many of the Nationally Scarce species are also very uncommon in a local or regional context. Also many species which do not merit inclusion in "The reviews of scarce insects" are none-the-less scarce within the region. Biodiversity Action Plan and Amber List species are important here, although the Section 41 (formerly BAP) species are heavily skewed towards the Lepidoptera.

As a simple and readily comparable indication of quality, the proportion of Nationally Scarce and RDB species of the total diversity is calculated. The same is done just for the rarest taxa with RDB status. Depending on the habitat type, a proportion of scarce/RDB between 3-5% needs to be exceeded before it can be safely concluded that the site has some conservation significance. Very high-quality sites of national importance will have a proportion close to or exceeding 10% Nationally Scarce/RDB species.

3.7 PANTHEON ANALYSIS

Pantheon is the successor program to ISIS for analysis of species lists to identify invertebrate assemblages and gauge the favourability of associated habitats. It groups species into assemblages according to their habitat requirements and then using a score of the rarity of the species, it generates a Species Quality Index (SQI) to gauge the favourability or otherwise of the habitat. The program is still under development, with numerous errors and omissions, and covers only a proportion of the British fauna, but is nonetheless an improvement on ISIS and provides some information and perspective not otherwise easily available. The disadvantage of Pantheon is that outputs are not directly comparable with those from ISIS so making backwards comparison impractical.

4 Results

4.1 OVERALL RESULTS

The survey identified 410 species of invertebrate (Appendix 2), a very good diversity for just three visits and reflects the range of different habitats present. The primary survey technique, Sweep-netting, was most productive at recording flying invertebrates, Diptera being the most abundant sampled (227 species, 55%), a typical result from this type of survey covering different habitats. The second largest group found was Hymenoptera (59 species 14%) a rather lower diversity and proportion than usually found on such surveys. Third most diverse was the Coleoptera (55 species, 13%) a very good result given the sampling techniques used, significantly better than usually found. Then comes Hemiptera (29 species 7%), also a good diversity for this order and reflective of the good plant diversity. Lepidoptera is next (21 species 5%) which is rather poor, butterflies and day-flying moths relatively lacking and . given the absence of any light trapping nocturnal moths only recorded in small numbers, mostly as larvae.

Of the 410 species identified by this survey, 42 (10.2%) are considered here as Species of conservation concern (defined in section 3.6). 10.2% is a very really excellent proportion of scarce and rare species and compares very well to most nature reserves, and approaches some of the better sites surveyed over the last 20 years. Compared with other surveys using the same techniques it falls just outside the best 20% as judged by the proportion of conservation significant species. Most sites that score higher are high quality woodlands, fens, coastal marshes and heathlands. Very few open, mosaic habitats have proved to be such high quality, and those that have are mostly coastal grasslands with mixed wetland and bare substrate.

An analysis of the important species found reveals that several are not any longer of great conservation concern. In Table 1 below eleven species have been highlighted in grey as no longer of national conservation concern despite still having this status officially in many cases. These are species that have significantly increased in range and abundance in recent years, possibly due to more favourable climatic conditions, or were much overlooked in the past and have subsequently been shown to be commoner than formally thought. The proportion of scarce species that are getting commoner is about 26%, very close to typical for this type of survey, which is usually about 30%. Another eleven species highlighted in yellow in the species column really do merit attention as they are judged still to be of national conservation significance not obviously increasing in abundance or range or even with evidence of a decline, or both so rare and little known that precaution is advisable. The species left unhighlighted are neither obviously moving out of conservation concern, nor is

there evidence of any decline. These species are either stable nationally or locally or there is insufficient evidence to make a decision. Some species in this category are being increasingly recorded, but have specialist requirements so are likely to be vulnerable.

Table 1 Summary of scarce species.

Species	National status	Current status	Local status
Cercidia prominens	Nationally Scarce	Widespread and apparently declining	No records on NBN in Herts, presumably scarce in county
Roeseliana roeselii	(Nationally Scarce b) None	Much increased, no longer of conservation concern.	Well established and frequent in Herts
Conocephalus fuscus	(Nationally Scarce a) None	Much increased, no longer of conservation concern.	Well established and frequent in Herts
Balcanocerus larvatus	None (Nationally Scarce b)	A recent colonist, status unknown, will probably become commoner.	New for Herts, but likely to be under recorded as yet.
Asiraca clavicornis	Nationally Scarce b	Fairly frequent around London, possibly increasing	Recent records in Herts suggest it is becoming re-established.
Nemophora cupriacella	Nationally Scarce b	Very local and infrequent.	seems to be rare or unrecorded in Herts.
Rugilus similis	Nationally Scarce	Widespread but very local and rarely recorded.	No Herts records on NBN
Agrilus viridis	Nationally Scarce a	Very local and little recorded	There are a couple of records in Herts.
Pyrochroa coccinea	Nationally Scarce b	A widespread woodland indicator species but local in good woodlands with ample dead wood resources.	Unrecorded or rare in Herts
Donacia impressa	(Nationally Scarce a) Nationally Scarce	Widespread but local wetland species.	Possibly rare in Herts as no records on NBN
Aulacobaris lepidii	Nationally Scarce a	Widespread but very local, less frequent than formally.	Apparently rare in Herts, no records on NBN
Hypera melancholica	Nationally Scarce b	A scarce grassland weevil, Widespread but very local.	Known from Herts, but very scarce.
Sylvicola fuscatus	RDBK	A recent colonist, status unknown, will probably become commoner.	First records for Hertfordshire.
Dolichopus virgultorum	Nationally Scarce	Widespread in southern half of England but very scarce	Possibly rare in Herts as no records on NBN
Volucella inanis	Nationally Scarce	A conspicuous species now more widespread and frequent than formerly.	Known in Herts, but less frequent than expected.
Volucella zonaria	Nationally Scarce	Our largest hoverfly so very well recorded. Has significantly expanded its range in recent decades.	As with last species known in Herts, but not as many records as expected given its proximity to London.
Lonchaea palposa	Nationally Scarce	Scattered records across S England but elusive and little recorded.	Appears to be the first record for Hertfordshire.
Lonchaea subneatosa	None (RDBK)	Recently recognised in the UK, still very few records.	New for Herts.
Tephritis divisa	None (RDBK)	A recent colonist, now very widespread and frequent, no longer meriting its conservation status.	No Herts records on NBN but this will be due to under-recording of this recently arrived fly.
Aulogastromyia anisodactyla	Nationally Scarce	Widespread and scattered, infrequently encountered.	No Herts records on NBN but probably under-recorded.
Sapromyza quadricincta	Nationally Scarce	Widespread, possibly becoming more frequent.	Just a single Herts record on NBN.
Pherbellia dorsata	Nationally Scarce	Well distributed but local, usually from good wetland sites.	No Herts records on NBN so clearly rare locally.
Pherbellia nana	Nationally Scarce	Widespread but very local in good fens and other wetlands.	No Herts records on NBN so likely to be rare locally.
Agromyza albipennis	None (Nationally Scarce b)	Probably commoner than status suggests as little studied and difficult to identify.	Known from Herts so probably frequent.

Melanagromyza aeneoventris	None (Nationally Scarce b)	Probably commoner than status suggests as little studied and difficult to identify.	Unknown from Herts but this is down to under-recording.
Ophiomyia alliariae	None (pRDB 1)	Very few UK records suggest that this really is a rare species despite under-recording.	New for Herts.
Phytobia cf betulivora	New for Science	An undescribed species known from one other UK specimen and 2 from Finland.	New for Herts.
Cerodontha lateralis	None (Nationally Scarce b)	Probably commoner than status suggests as little studied and difficult to identify.	Unknown from Herts but this is down to under-recording.
Liriomyza soror	None (pRDB 1)	Rather few UK records, almost all eastern, suggests this really is a scarce species despite under-recording.	New for Herts.
Pseudopachychaeta approximatonervis	Nationally Scarce	Widespread but very local and likely to be overlooked due to its small size.	No Herts records on NBN.
Oscinimorpha sordidissima	Nationally Scarce	Widespread but local and likely to be under-recorded.	No Herts records on NBN.
Trachysiphonella scutellata	(Nationally Scarce) None	Widespread and local, but easily overlooked, status recently removed.	No Herts records on NBN due to under-recording rather than rarity
Fannia pauli	Nationally Scarce	Widespread but scattered and local, likely to be under-recorded.	No records on NBN in Herts, probably over-looked
Hydrotaea parva	Nationally Scarce	Widespread in England but very local and scarce.	No records on NBN in Herts, probably over-looked
Blaesoxipha plumicornis	(Nationally Scarce) RDB3	A scarce and possibly declining species of southern England.	No records on NBN in Herts, probably over-looked
Sarcophaga bulgarica	None (RDBK)	A recent colonist, status unknown, will probably become commoner, currently scattered across SE England.	Likely to be new for Herts.
Actia lamia	None (Nationally Scarce)	Widespread and probably becoming more frequent.	No Herts records on NBN but likely to be under-recorded.
Dolerus anticus	(RDB2)	Apparently a very scarce and local species but probably over-looked as sawflies are little studied.	This is probably the first record for Herts.
Hylaeus cornutus	Nationally Scarce a	Widespread but local in England, but apparently increasing in frequency.	Recorded in Herts, but only a single record on NBN
Lasioglossum pauxillum	Nationally Scarce a	Formerly rare, recently spreading across S England and more frequent, but this may not be sustained.	Recorded in Herts, but only a single record on NBN
Heriades truncorum	RDBK	Scarce and local in SE England but clearly increasing in range and frequency.	There are several records from Herts.
Osmia bicolor	Nationally Scarce b	A scarce species of grassland and downland in S England, possibly becoming more frequent.	Recorded in Herts, but only a few records of this conspicuous species on NBN

4.2 PANTHEON RESULTS

The checklist of all 410 species was entered into the online Pantheon website. Of these 408 taxa were recognised by the program (the other two are undescribed species so not on the database) and 328 were used in the analysis, a proportion of 80% of the described species found, leaving 80 not analysed. These 80 taxa are from groups that have yet to be scored so Pantheon cannot at the moment assign them to assemblages or habitats, nor do they have a rarity score. This is largely because they are from obscure groups where information to permit scoring is limited including Agromyzidae, Anthomyiidae, Ichneumonidae and Tenthredinidae. Despite the Pantheon output being based on 80% of the results, this is still quite a large proportion and in line with the sample sizes that would come from common

standards monitoring. The main output from Pantheon tabulates the assemblages present (Table 2).

Table 2 ISIS Specific assemblage types - Pantheon output.

Broad biotope	Habitat	Code	SAT	No. of species	% representation	SQI	Conservation status	Species with conservation status	Reported condition
open habitats		F002	rich flower resource	19	8	116	1 [RDB K]; 2 [Na]; 1 [Nb]	4	Favourable (19 species, 15 required)
open habitats		F001	scrub edge	17	7	135	1 [Na]; 1 pNS	2	Favourable (17 species, 11 required)
tree-associated	decaying wood	A212	bark & sapwood decay	15	3	160	1 NS; 1 [RDB K]; 1 [Na]	3	Unfavourable (15 species, 19 required)
open habitats	short sward & bare ground	F112	open short sward	5	3	160	1 Section 41 Priority Species; 1 VU; 1 Nb	2	Unfavourable (5 species, 13 required)
wetland	acid & sedge peats	W314	reed-fen & pools	2	2	250	1 Notable	1	Unfavourable (2 species, 11 required)
open habitats	short sward & bare ground	F111	bare sand & chalk	2	<1	250			Unfavourable (2 species, 19 required)
open habitats		F003	scrub-heath & moorland	1	<1	100			Unfavourable (1 species, 9 required)

Seven specific assemblage types (SATs) are brought out by Pantheon, associated with both open habitats as well as with woodland and wetland. Unfortunately, in most cases the number of associated species for each SAT is small, so the usefulness of this table is uncertain in these cases. However, in two cases, flower-rich resource and scrub edge, Pantheon reports "favourable" condition, which is an excellent result from such a single-year survey. More usually on such surveys no assemblages are reported to be in favourable condition. The SAT "bark & sapwood decay" is close to being favourable having 15 of the required 19 associated species and a good rarity score. The wetland SAT "reed-fen & pools" is rated as unfavourable, rather surprisingly with only 2 out of 11 required associated species. However it has a very good rarity score so this does add to the other results.

Much more Pantheon analysis can be seen here.

Results overview: List 9251 [Colney Heath Lane, St Albans, Hertfordshire] (brc.ac.uk)

4.3 RESULTS BY COMPARTMENT

The sampling compartments on this survey are habitat rather than geographically based. Only the woodland compartment is mutually exclusive from the other sampling areas. The scrub/hedgerows borders much of the grassland and is scattered across it while the ponds are dotted across the western half of the site.

4.3.1 Grassland

This habitat covers much of the area other than the woodland compartment, the densely scrubbed over areas and the ponds, often surrounding or forming a complex mosaic with them. The western part of the site was more uniformly dominated by tall herbs and coarse grassland and provided the greater part of the sample, with smaller areas continuing right to

the southeastern corner of the site. A total of 163 species were recorded, a very good diversity for a single habitat. Of these a very impressive 15 (9.2%) are of conservation importance, a relatively high proportion rarely found in such surveys of this type of grassland. Most of the key species are known to be associated with grassland, a habitat that also comes out very well in the Pantheon analysis being deemed to be in "Favourable" condition.

4.3.2 Ponds

This sampling area consists of numerous ponds and wetlands, some of them permanent water-bodies with marginal emergent vegetation, others just winter-wet but with some wetland plants, especially *Eleocharis*. About 17 ponds and wetlands from permanent ponds over 30m long to small almost dry depressions just 2-3m in diameter. This habitat produced 163 species, exactly the same as the grassland despite it covering a much more limited area. This excellent diversity is not surprising for such habitat, wetlands are very speciose, especially for Diptera which are favoured by the sweep-netting technique used. Of these 16 species have some conservation status, more than any other compartment a proportion of 9.8%, also the best result on this survey although not significantly better than the grassland. This is highly indicative of a habitat of significant conservation value, despite the Pantheon results which were surprisingly poor. This discrepancy is presumably due to many of the scarce species found in this sample not yet scored in the Pantheon program.

4.3.3 Scrub and Hedgerows

This complex compartment consists of tall, unmanaged hedgerows and tree-lines along the south and western parts of the site and large areas of developing scrub in the eastern part of the survey area. Floral diversity is probably very similar to the grassland, but sampling this complex habitat with many woody and thorny plants was much more difficult that the other three areas, and this probably accounts for the lower diversity found. A total of 113 species was identified from this compartment, a good diversity for this type of habitat. Of these a respectable ten are species of conservation importance, a proportion of 8.8%, lower than the grassland or ponds but still indicative of habitat important for invertebrate conservation. This conclusion is supported by the Pantheon results which gives this habitat "favourable" status.

4.3.4 Woodland

A relatively small compartment of largely closed-canopy woodland, mainly of recent origin but with a few very large trees, including some mature oaks. The understorey was very sparse in places, and rather dense and uniform in others. Relatively little dead wood on the woodland floor except in association with the older oaks. For a woodland this compartment did not prove very diverse with only 82 species recorded. Of these, five species (6.1%) have conservation status, the lowest result on this survey, but still quite good and indicative of some conservation value in this small patch of woodland. The Pantheon results for deadwood resource was graded as unfavourable and yet there was quite a good rarity score. This apparently contradictory result is down to an insufficient sample size, or rather insufficient species that have been scored by Pantheon, falling short of the number needed by just two.

5 Key Species

5.1 RED DATA BOOK

5.1.1 *Sylvicola fuscatus* RDBK

This Anisopodid fly with unmarked wings is a recent discovery in Britain, first recorded in 2021 (Thomas 2022). So far it is only known from two specimens found in Buckinghamshire in that year, but likely to be more widespread once its presence in the UK becomes known. This is the first record for Hertfordshire. Given that it is a relatively large and conspicuous fly, it probably hasn't gone undetected so is most likely a recent colonist. Nothing is known of its Biology. Two specimens found in the woodland compartment.

5.1.2 *Lonchaea subneatosa* None (RDBK)

This small, shiny blue-black fly is another relatively recent addition to the UK fauna, being added to the British list in 2006. Thus far it is known from Essex, Hampshire, Oxfordshire and Surrey (MacGowan & Rotheray 2008) and Shropshire (NBN). This is the first record from Hertfordshire. In the UK larvae have been found under the bark of poplar, especially *Populus nigra*, on the continent also reared from *P. tremula*, *Ulmus* and *Tilia*. Adults recorded in May and June. A single female swept in the scrub/hedgerow compartment, which includes *Populus* trees.

5.1.3 *Tephritis divisa* None (RDBK)

This attractive gall fly was recorded new to Britain from Sussex in August 2004, when they were swept off bristly oxtongue on the outskirts of Bognor Regis. Later the same month the fly was found to be present in large numbers at the original site and was also noted at two other Sussex sites in September 2004. Examination of reference collection turned up another specimen from Newhaven, August 2002 showing that the species had been present in Britain for several years. Subsequently the species has been recorded in Essex where it is now well established along the Thames Gateway, with scattered records in North Essex (Hodge, 2005). There is even a recent record from Somerset so it is now well established in Britain and seemingly spreading rapidly in common with several other colonising Tephritids and probably no longer deserves its conservation status. *Tephritis divisa* is a native of southern Europe. The larvae develop in the flower heads of *Helminthotheca* (*Picris*) *echioides* and possibly other related species. Recorded in both scrub/hedgerow and grassland compartments.

5.1.4 *Ophiomyia alliariae* None (pRDB 1)

This small black leaf-miner fly is known from a few records in Britain in the south and east of the country. Its status is unofficial and has been applied by the National Agromyzid recording scheme. This family of flies are studied by few Dipterists, as such they are very under-recorded, the status given follows the strict criteria for applying conservation status, but does not take under-recording of this group into account so is likely to be down-graded as more data becomes available. This is the first record for Hertfordshire. It is a stem miner of various Brassicae including *Alliaria, Berteroa, Brassica, Capsella, Cardamine, Erysimum, Raphanus, Sinapis and Sisymbrium*. Adults recorded from April to July (National Agromyzid recording scheme). One male swept from the ponds compartment.

5.1.5 *Phytobia cf betulivora* New for Science

This relatively large, all black, leaf-mining fly belongs to an as yet undescribed taxon. This family of flies is little studied and this particular genus are usually cambium borers which show no external evidence of their presence so very difficult to find as larvae. Other than this example it is known only from one other British specimen from the east of England and a couple of specimens from Finland (B. Warrington pers. comm.). A single male swept from the ponds compartment.

5.1.6 *Liriomyza soror* None (pRDB 1)

This tiny black and bright yellow leaf mining fly is recorded from a few eastern counties north to Yorkshire and north Wiltshire. As this species makes a visible mine in the leaves of thistles (*Circium* and *Carduus*), the problem of under recording shouldn't be as acute compared to internal stem miners. However there seem to be few records based on mines (none on NARS) so it appears to be over-looked and misidentified so should probably be Nationally Scarce once it becomes better known. This is the first record for Hertfordshire. Adults recorded from May to August. One male swept in the ponds compartment.

5.1.7 *Sarcophaga bulgarica* None (RDBK)

This flesh fly with a red epandrium is another recent discovery in the UK, being added to the British list in 2020 (Whitmore *et al* 2020). Thus far it is known from Bedfordshire, Kent and

East Sussex in SE England (Whitmore et al op cit) with subsequent records from Hampshire, Wiltshire, Surrey, Berkshire, Cambridgeshire and Suffolk (NBN). This is probably the first record for Hertfordshire. It is clear that this species is now well established and probably spreading so is unlikely to retain its current conservation status for long. A single male swept in the scrub/hedgerow compartment.

5.1.8 *Dolerus anticus* (RDB2)

This black and red sawfly is rather local but widespread in eastern and central England, with a single record from Scotland (Musgrove 2023). There are no records in Hertfordshire on NBN. Sawflies are a relatively poorly studied group, and are certainly under-recorded, but this is a fairly large species so its current status is likely to reflect the real situation. This species occurs in wetland areas where the larvae feed on Spike Rush *Eleocharis*. Adults recorded in May and June (British and Irish Sawflies). Two males swept from the ponds area.

5.1.9 *Heriades truncorum* Large-headed Resin Bee RDBK

This small, black solitary bee has always been considered to be scarce, mostly associated with the Surrey commons. Its apparent association with pines in southern England led to the assumption that it was a recent arrival in Britain. However, it is now known that it is not dependant on pine. Formerly restricted to south-east England south of the Thames and east of the Solent, but now known to be more widespread with records in the midlands and north Norfolk (BWARS). There are several records in Hertfordshire including a couple in the city of St Albans (NBN). They build their nests in beetle burrows in dead wood, occasionally holes in brickwork or bramble stems, in sunny positions. Females stock their nests with pollen from yellow daises (Edwards 2007). Swept in the grassland compartment.

5.2 NATIONALLY SCARCE

5.2.1 *Cercidia prominens* Nationally Scarce

This spider is widespread in Britain, most frequent in the south, with few records in the south-west, Wales, north to Yorkshire and in central Scotland. Apparently declining. There are no records in Hertfordshire on NBN. Mainly frequents heathland and calcareous grassland, perhaps preferring habitats with sparse vegetation. They spin orb webs that lack a silken retreat constructed in vegetation near to ground. Males are adult from spring to autumn, females may be present all year (Spider and Harvestman Recording Scheme). One swept from the ponds.

5.2.2 *Roeseliana roeselii* Roesel's Bush Cricket (Nationally Scarce b) None

The Roesel's Bush Cricket was formerly a very local species confined to coastal grassland in Kent and the Thames Estuary. However, for the last 50 years it has been exhibiting a remarkable westward and northward spread into the Home Counties and then along the M4 corridor to Bristol and beyond. It is now too frequent to merit Nb status and this was removed in a recent review. (Sutton, 2015). In Hertfordshire it is now well established and frequent. Usually found in coarse grassland in warm, sunny locations at low levels, Nymphs emerge in late May and June becoming adult in late July surviving into October in favourable years (Haes & Harding 1997). Noted in grassland compartment.

5.2.3 *Conocephalus fusca* Long-winged Conehead (Nationally Scarce a) None

The Long-winged cone-head, once such an uncommon species of the south coast west to the New Forest, has shown a remarkable spread in recent years and it is now a frequent species across much of England and South Wales. In Hertfordshire it is now well established and frequent so it is clear that this species is no longer of conservation concern and this was removed in a recent review (Sutton, 2015). Occurs in coarse, mainly ungrazed vegetation in warm places such as downland, coastal reedbeds, heath, bogs and disturbed areas. Nymphs

emerge in May maturing in August sometimes surviving until November (Haes & Harding 1997). Swept from the ponds area.

5.2.4 *Balcanocerus larvatus* None (Nationally Scarce b)

This small and attractively marked leaf-hopper is another recent arrival in the UK being discovered in 2017 in Buckinghamshire and Middlesex (Bantock 2018). Subsequently it has been recorded in Berkshire and Surrey (NBN). This leaf-hopper feeds on blackthorn *Prunus spinosa* growing in warm situations. Adults are recorded in July and August. Several swept from scrub/hedgerows compartment.

5.2.5 *Asiraca clavicornis* Nationally Scarce b

A very distinctive plant-hopper with long conspicuous antennae, formerly widely distributed in southern England but recent records are mostly from the vicinity of the Thames estuary, especially the London area. Possibly becoming reestablished in its former range as there are recent records in Hertfordshire (NBN). Occurs in open sunny conditions in grassy areas sometimes with sparse scrub. Many recent records are from ruderal areas showing its capacity to colonise new habitat. Adults overwinter so are found in spring and late summer (Kirby 1992). Swept in grassland compartment.

5.2.6 *Nemophora cupriacella* Nationally Scarce b

This attractive, metallic green and purplish long-horn moth is a local species, widespread but mainly found in the south of England, becoming scarcer in the north and in Wales. There are no Hertfordshire records on NBN. Usually occurs in dry grassy areas and downland, and flying in the daytime. The larvae feed on various species of scabious (*Knautia*, *Succisa* or *Scabiosa*), initially on the seeds, later building a case and feeding on fallen and lower leaves. Adults are on the wing in July. A single individual found in the grassland compartment.

5.2.7 *Rugilus similis* Nationally Scarce

This diminutive, brown rove beetle was formerly quite widespread in England north to Worcestershire but is very local with recent records from just four vice counties (Hyman & Parsons 1994). There are no records of this beetle in Hertfordshire on NBN. Usually found on dry or chalky grassland, and also once from a reedbed. Adults are recorded in January, February and from July to October and again in December so present as an adult year-round. Swept in the grassland compartment.

5.2.8 *Agrilus viridis* Nationally Scarce a

This small green jewel beetle is an exceedingly scarce and elusive species currently known from relatively few locations in southern England with a few outliers in the Welsh Marches. Perhaps becoming more frequent, or at least more often correctly identified, with at least a couple of records in Hertfordshire. Known from broad-leaved woodland and willow beds. Thought to be associated with Goat Willow *Salix caprea*, and perhaps oak, on the continent association with other trees is reported. Adults recorded from June to August (Hyman & Parsons 1992). One male swept from the ponds area.

5.2.9 *Pyrochroa coccinea* Black-headed Cardinal Beetle Nationally Scarce b

The Black-headed cardinal beetle is an attractive and easily recognised species which is widespread but local in England and Wales. It is a Grade 1 (Garland 1983) or Grade 3 (Harding & Rose 1986) woodland indicator species. Seems to be unrecorded in Hertfordshire, although recorded from adjacent counties (NBN). Frequents ancient broad-leaved woodland and pasture woodland where the larvae develop under the bark of dead wood including oak, beech and elm. The adults can be found from April to June and are often to be seen on flowers (Hyman & Parsons 1992). A larvae found under bark of very large fallen oak branch in the woodland compartment.

5.2.10 *Donacia impressa* (Nationally Scarce a) Nationally Scarce

This attractive metallic reed-beetle is widespread in Britain north to Inverness but very local and scattered. No Hertfordshire records on NBN. Found in aquatic and semi-aquatic habitats, including freshwater lakes, ponds, meres, and ditches. Associated with bulrush, *Scirpus lacustris*, *Glyceria*, *Schoenoplectus* and *Carex*, with larvae feeding on the roots. Adults recorded from April to September and November (Hyman & Parsons 1992). Adults swept in ponds area.

5.2.11 *Aulacobaris lepidii* Nationally Scarce a

This shiny black weevil is widely distributed north to Yorkshire, although recently not north of Leicestershire. No records on NBN for Hertfordshire. Found in wetland habitats such as river banks and ditches. Associated with various species of Brassicae that occur in this habitat. Adults are recorded from January and May to September (Hyman & Parsons 1992). One swept from grassland compartment.

5.2.12 *Hypera melancholica* Nationally Scarce b

This relatively large greyish weevil is known from England and southern Scotland. In Hertfordshire there is at least one record, from Hemel Hempstead (NBN). Favours open situations, grassland, field margins and occasionally wetlands. A phytophagous species associated with *Medicago*, and on the continent *Vicia*, the larvae feeding externally on the foliage. Adults recorded from April to July (Hyman & Parsons 1992). One swept in the grassland compartment.

5.2.13 *Dolichopus virgultorum* Nationally Scarce

This shiny, metallic green dolichopodid fly is widespread in southern England and Wales north to Herefordshire; about 15 post 1960 sites. This would appear to be the first record for Hertfordshire (NBN). Known to occur on coastal levels as well as in woodland. Biology unknown, larvae are possibly semi-aquatic predators. Adults recorded from June to September (Falk & Crossley 2005). Found from the ponds, scrub/hedgerows and woodland compartments.

5.2.14 *Volucella inanis* Nationally Scarce

This large and striking hoverfly, patterned in black and yellow to mimic the hornet, is very much a south eastern species, especially the home counties (Ball et. al. 2011). There is evidence that it is spreading as recently more records have come from outside this core area. Records from Hertfordshire are surprisingly few on NBN. Usually found in open woodland, rides, clearings, parks and gardens. The larvae develop as commensals in the nests of social wasps including *Vespula germanica* and *Vespa crabro*. Adults can be found from April to September with a peak in August (Ball & Morris op.cit.). Noted in scrub/hedgerows compartment.

5.2.15 *Volucella zonaria* Nationally Scarce

This striking black and yellow fly is the largest and most conspicuous of all the British hoverflies; it is predominantly a species of south east England, especially around London. Records from Hertfordshire are surprisingly few on NBN. Occurs in scrub, heath, woodland and ruderal sites well into towns and cities, seems to prefer urban areas. The larvae develop as commensals in nests of wasps including *Vespula germanica* and *V. vulgaris*. Thought to feed on organic debris in the bottom of the nest; adults are on the wing June to October and can frequently be seen feeding at flowers. In some years resident populations are supplemented by migrants from the continent, especially the females (Falk 1991b). Noted in scrub/hedgerows compartment.

5.2.16 *Lonchaea palposa* Nationally Scarce

This shiny black lance-fly with conspicuously dilated palps is a very rarely encountered species. Records are scattered across southern England north to Cambridgeshire. Likely to be more widespread, but too scarce to be detected by the present levels of recording. This appears to be the first record for Hertfordshire (NBN). Found in Broadleaved woodland with a requirement for either old or diseased trees or dead wood. Larvae develop beneath the bark of various broadleaved trees, including poplar and hawthorn, though whether the trees were dead is unspecified, also reared from an elm log. Adults recorded from June to August (Falk et al 2016). Swept from scrub/hedgerows.

5.2.17 *Aulogastromyia anisodactyla* Nationally Scarce

This yellow lauxaniid fly has records scattered over Britain with nearly thirty known post-1960 sites, some six sites on the Coal Measures of Rotherham alone so it might prove to be more widespread when a greater interest is taken in this family. No Hertfordshire records on NBN. Usually in woodland edge habitat, rides and clearings, also open structured scrub. Biology unknown; larvae of this family are generally believed to develop in decaying vegetable matter including fallen leaves and have been taken on *Boletus edulis* at Windsor Forest, Berkshire, though it is unclear if this has biological significance. Adults recorded from May to October (Falk et al 2016). Swept in woodland compartment.

5.2.18 *Sapromyza quadricincta* Nationally Scarce

This yellow Lauxaniid fly has a scattered distribution in southern England north to Warwickshire and one locality in Wales. There is a single record from Hertfordshire on NBN. Frequents woodland, woodland edge, scrub and occasionally gardens, one record from saltmarsh. Its biology is unknown but the larvae of this family are generally believed to develop in decaying vegetable matter including fallen leaves. Adults are recorded from June to October (Falk et al 2016). Swept from the ponds and scrub/hedgerows.

5.2.19 *Pherbellia dorsata* Nationally Scarce

A small snail-killing fly well distributed in England north to the north Pennines and in south Wales with a concentration around the fens. There are no Hertfordshire records on NBN. Occurs in a variety of wetlands, both coastal and inland, shaded and unshaded but some standing water is likely to be a requirement. Larvae are parasitoides of aquatic snails, *Planorbis planorbis* being a known host. Adults recorded from April to October in several generations (Falk 1991b). Many specimens swept from the ponds.

5.2.20 *Pherbellia nana* Nationally Scarce

As its name suggests this is one of the smallest members of the genus with a highly localised distribution north to Yorkshire. Most records are concentrated in the Fens, the north Midlands and New Forest with odd outliers in Wales, London and north Yorkshire. No Hertfordshire records on NBN. Frequents a wide variety of wetland habitats, both open and shady, lake margins and dune slacks, both permanent and temporary in nature. Probably prefers sparsely vegetated pools which dry out in summer. The larvae develop as parasitoides in aquatic snails including *Aplexa*, *Lymnaea*, *Physa* and *Planorbis* and the terrestrial species *Helicella*, *Hygromia* and *Succinea*. Adults are recorded from mid-May to mid-September in several generations. Swept from the ponds.

5.2.21 *Agromyza albipennis* None (Nationally Scarce b)

This small, black leaf-mining fly is widely distributed in the UK north to Moray in Scotland. The status applied does not take under-recording of this little-studied group into account. Given that it mines grasses, and as such is very difficult to identify from the mine alone, it will certainly prove to be more frequent and not merit this status when more data becomes available. Already known from Hertfordshire. Frequents grasslands where it mines the leaves

of a wide variety of grasses including some of our commonest species. Adults recorded from May to September (NARS). A couple of adult males swept from the ponds compartment.

5.2.22 *Melanagromyza aeneoventris* None (Nationally Scarce b)

A small, shiny black leaf-mining fly, as with the last species widespread in Britain and no doubt much under-recorded. It will probably lose this status from NARS once more data accumulates. No records from Hertfordshire. It is an internal stem-borer, making it difficult to record as a larvae, feeding low down in the stem of various Asteraceae. Usual host plants are *Carduus*, *Cirsium*, *Crepis*, *Inula* and *Senecio*. Adults recorded from April to July (NARS). One male swept in the grassland compartment.

5.2.23 *Cerodontha lateralis* None (Nationally Scarce b)

A well-marked grey and yellow species, relatively easily identified and widespread in England, but only from one VC in Wales and unrecorded in Scotland. It is already known from Hertfordshire. This is another grass-miner, on several common genera, the mine hardly distinguishable from other grass-miners so certainly much under-recorded. Unlikely to retain its status once full data become available. Adults recorded from March to September (NARS). An adult male swept in the grassland.

5.2.24 *Pseudopachychaeta approximatonervis* Nationally Scarce

This tiny black and yellow chloropid fly is widely distributed in Britain north to East Ross but localised with eight known post-1960 sites. There are no Hertfordshire records of this fly on NBN but this tiny species is likely to be over-looked. Habitat preferences unclear, possibly marshy areas and damp woodland where the host plant grows. The larvae of this genus appear to be associated with seed heads of spike rushes. Adults recorded throughout the year, including most winter months (Falk et al 2016). One swept from the ponds where its foodplant is abundant.

5.2.25 *Oscinimorpha sordidissima* Nationally Scarce

This very small, black chloropid fly is known from scattered localities in England north to Norfolk and with isolated records in Wales and Scotland but localised and possibly under-recorded to some extent with eight known post-1960 sites. No Hertfordshire records on NBN. Frequents dry grassland in a range of situations, including on heathland and chalk downs, cliffs and fixed dunes. Biology unknown but the larvae are probably phytophagous and some related species use labiates. Adults are recorded from May to September (Falk et al 2016). Swept from the grassland compartment.

5.2.26 *Trachysiphonella scutellata* (Nationally Scarce) None

This tiny black and yellow frit fly is known to be widespread in southern England. Now considered to be too frequent to merit nationally scarce status so was deleted from the list in a review published in 2016. No Hertfordshire records on NBN but must be very under-recorded. Frequents short dry grassland, both calcareous and acid. Biology unknown. Adults recorded from June to August (Falk & Ismay in prep.). Swept from the ponds.

5.2.27 *Fannia pauli* Nationally Scarce

This small dark fly is sparsely distributed in England north to Yorkshire and Cumbria and three sites scattered across Wales. No status was applied by Falk (1991b) but it was included in the recently published review (Falk & Pont 2017). No records on NBN for Hertfordshire. Found in broadleaved woodland, even in small coastal copses. Its biology is unknown but *Fannia* larvae develop in a wide range of decaying organic matter. Adults are recorded from June to September (Falk & Pont 2017). One swept in the woodland compartment.

5.2.28 *Hydrotaea parva* Nationally Scarce

This small, black housefly is widespread in England as far north as Yorkshire and also in Wales (Glamorgan), very local but with a fair number of post-1960 localities, no doubt overlooked. No records in Hertfordshire on NBN. Found in pastures in a range of situations including coastal marshes, around fens and *Phragmites* beds, and within or close to ancient broadleaved woodland. The larvae have been reared from horse and cow dung where they are predaceous on other insect larvae. Adults recorded from May to September (Falk & Pont 2017). Swept in the grassland compartment.

5.2.29 *Blaesoxipha plumicornis* (Nationally Scarce) RDB3

This flesh fly is a very scarce species mainly recorded from Dorset, Hampshire and Surrey, but also known from Cornwall, Devon, Sussex, Middlesex and Berkshire. Only three post 1960 records so it's national status was increased in the latest review covering this group, perhaps this species is recovering from a period of great scarcity. There are no records of this species for Hertfordshire on NBN. Usually found in heathland and grassland, the larvae developing as parasitoids of Grasshoppers including *Pseudochorthippus parallelus*, *C. brunneus* and *Omocestus viridulus* (Orthoptera, Acrididae). Adults from June to September (Falk & Pont 2017). A couple of males swept in the grassland compartment.

5.2.30 *Actia lamia* (Nationally Scarce)

This small parasitoid fly is widespread in Southern England, Wales and with one locality in Scotland. There are about 5 post-1960 localities but appears to be getting more frequent. Not in Falk (1991b) so status unofficial but is proposed to be added when the review is next updated. In Hertfordshire there are no records on NBN. Frequents marshes, wet grasslands and woodlands, and dry scrubby grassland. The larvae are parasitoids of *Epiblema caterpillars* (Lepidoptera, Tortricidae), stem- and root-borers and concealed feeders on shrubs and herbs, and have been reared in Britain from species on Marsh Thistle (*Cirsium palustre*). Adults from May to July (Falk & Pont in prep.). Swept from the ponds area.

5.2.31 *Hylaeus cornutus* Spined Hylaeus Nationally Scarce a

This distinctive small black bee is largely confined to southern counties of England with a very definite eastern bias extending north to Lincolnshire. The most westerly record is an old one from east Devon (Falk 1991a). Even in the south east it is generally rare but there has been a noticeable increase in records in recent years. In Hertfordshire there is at least one record on the outskirts of St Albans (NBN). Frequents various open habitats especially calcareous grassland where they probably collect pollen from a variety of flowers. The nesting requirements are poorly known but probably needs sunny situations where they utilise hollow dead stems of herbaceous plants (Edwards & Telfer 2001). One male swept in the grassland compartment.

5.2.32 *Lasioglossum pauxillum* Lobe-spurred Furrow Bee Nationally Scarce a

A small shiny black mining bee very hard to distinguish from numerous commoner species. It has a very scattered distribution in southern England north to Herefordshire and is local with about 20 post 1970 sites (Falk 1991a) but has become much more frequent in recent years so may no longer merit its national status (M. Edwards pers. comm.). In Hertfordshire there is at least one record in the east of the county (NBN) and is probably frequent. Inhabits a wide variety of situations including calcareous grassland, probably needs bare or sparsely vegetated soil in warm, sunny situations for nesting. Overseas it has been shown to be eusocial with several females using one nest; females fly from April to September with males coming out later in July to October. Pollen requirements in Britain are unknown (Falk op.cit.). One swept in the grassland compartment.

5.2.33 *Osmia bicolor* Red-tailed Mason Bee Nationally Scarce b

An attractive black and red mason bee; widely distributed in calcareous areas in southern England north to Norfolk but much declined (Falk 1991a). A few records on NBN from Hertfordshire. It may well be that this species is becoming commoner and may soon no longer merit the status applied by Falk (op.cit.). *O. bicolor* constructs its nests in the old shells of terrestrial snails like *Helix*, *Cepaea* and *Monacha*, stocking the cells within with pollen from *Viola*, *Lotus*, *Hippocrepis* and other plants. After plugging the nest the bee spends considerable time collecting dead grass stems, transporting them to the nest and building up a pile over the shell to camouflage it. It is a spring species on the wing from early April to early July. Noted in the scrub/hedgerows zone.

5.3 SECTION 41 AND LOCALLY SIGNIFICANT SPECIES

5.3.1 *Coenonympha pamphilus* Small Heath Section 41

This is a widespread butterfly and can be found over most of the British Isles with the exception of the Shetlands and Orkneys and mountainous regions (NBN). It lives in discrete colonies and adults rarely venture far from the colony. Not confined to heathland and can be found in a wide variety of habitats. Populations found in the north have one generation each year, while populations in the south have two generations each year and possibly three in exceptional years. Both population and range declining, hence its addition to the Priority List of UK Biodiversity Action Plan Species. Adults can be found continuously from late May until mid-September as a result (UK Butterflies). Noted in grassland compartment.

5.3.2 *Tyria jacobaeae* Cinnabar Section 41

This very attractive and well-known day-flying moth that has recently been added to the Priority List of UK Biodiversity Action Plan Species. In Hertfordshire it is still quite common and well recorded (NBN). Its addition is due to concern that the species is suffering a significant decline and probably that its food plant is in jeopardy due to new legislation. The larvae feed on Ragwort, a plant much persecuted by many landowners. Ragwort supports many insect species other than Cinnabar so this moth acts as a flagship for the whole Ragwort dependant fauna. Both adults and larvae noted in the grassland and scrub/hedgerow compartments.

5.3.3 *Allophyes oxyacanthae* Green-brindled Crescent Section 41

The Green-brindled Crescent is a subtly attractive moth that was historically almost ubiquitous across the UK where its food plants occur. Still relatively frequent but much declined, although its late flying season and concentration on recording adults rather than larvae is likely to have led to under-recording. Well distributed in Hertfordshire, including recent records in St Albans. The caterpillars hatch in spring and feed on a variety of trees and bushes, including hawthorn (*Crataegus*) and blackthorn (*Prunus spinosa*). Adults emerge in the autumn, flying from September to November. A single caterpillar swept from the scrub/hedgerow habitat.

6 Site Evaluation

Overall the results of this survey show that the land at Colney Heath Lane, St Albans is a valuable site for invertebrate conservation at both a local and regional level, with even some species of national importance given current knowledge. The proportion of scarce species found is certainly of Nature Reserve quality and indeed all compartments achieved this threshold (i.e. above 5% scarce and RDB species) individually. The Pantheon analysis very clearly identifies grassland, especially flower-rich resource, as having the most important invertebrate assemblage present, and deems it to be in favourable condition. Scrub edge habitat also came out as “favourable” which is an excellent result as this assemblage very rarely achieves this with so brief a single-season survey. The woodland compartment is the

least interesting compartment, but with more survey it is possible that a good saproxylic assemblage would be found here.

7 Comparison with 2024 survey

A direct comparison with the 2024 survey is not really valid because that was a single day survey intended to assess the requirement for a full survey. It conforms to this survey in that a very good diversity was recorded, 251 species being excellent for a single visit. However, the quality found was significantly less than discovered on this survey. With just 11 key species identified this is a proportion of 4.4%, which is less than half that was found in the full survey and below the usual criteria for a site of conservation value (5%)(NB the criteria used for species of conservation concern is not identical between these two reports, but on balance it is equivalent). This is likely a good example of why a one-day survey can never be used to assess a site, particularly one late in the season past the peak diversity of many invertebrate species.

8 Mitigation

Given the high quality of the invertebrate assemblages at this site, rather better than many nature reserves, the loss of this area would be regrettable and certainly require significant mitigation. In the absence of full knowledge of the footprint of any future development, it is not possible to know whether any on-site mitigation is possible. For example the woodland patch could be retained as could most of the ponds area. These would both need a fully funded management plan and could not count towards mitigation or biodiversity net-gain without this.

Even with only a limited loss of habitat at this site, mitigation to fulfil the requirements of biodiversity net gain will almost certainly require substantial off-site compensatory land. There is a large area of similar habitat to the east and south east of the survey site that offers the potential for such mitigation and biodiversity net gain. Unfortunately this area was not included in the survey so it cannot be ascertained whether this area is of similar quality to the survey area. From arial photos it would appear to be substantially equivalent, although there appear to be fewer of the small ponds that are such an important feature of the western end of the survey site. If an area of land similar in size and adjacent to the survey area can be secured, and funding provided to manage the habitat such that it can support the same invertebrate assemblages that will be lost on the development site, then this should ensure that there is no local or regional loss of biodiversity.

Management should include the creation of more ponds of varying depths to include some that hold water year-round and others that dry out in summer. A protocol for grassland management will be needed to ensure scrub encroachment does not proceed too far, and yet the important scrub-grassland transition zone is maintained.

A full management plan for any mitigation land will require more survey, or at least a one-day walk-over assessment.

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10 Appendix 1: British conservation status categories – definitions.

The following definitions are those used by the JNCC review of the status's of scarce invertebrates of Great Britain.

Red Data Book Category 1. **RDB1-ENDANGERED**

- Taxa in danger of extinction if causal factors continue unabated. Includes species occurring as a single colony or only in habitats which are much reduced and highly threatened or which have shown a rapid and continuous decline.

Red Data Book Category 2. **RDB2-VULNERABLE**

- Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating. Includes species of which most or all populations are decreasing and those which are confined to vulnerable habitats.

Red Data Book Category 3. **RDB3-RARE**

- Taxa with small populations that are not at present endangered or vulnerable, but are at risk; usually localised within restricted geographical areas or habitats or are thinly scattered over a wider range. Includes species estimated to exist in only fifteen or fewer post 1970 10km squares or, if more, then in vulnerable habitat.

Red Data Book Category 4. **RDBK – Data deficient**

- Taxa that are suspected, but not definitely known, to belong to any of the above categories, because of lack of information. Includes taxa recently discovered or recognised in Great Britain which may prove to be more widespread in the future; taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult groups; species known from very few localities but which occur in inaccessible habitats or habitats which are seldom sampled; species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Nationally Scarce Category a. **Na**

- Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in 30 or fewer 10km squares or, in less well recorded groups, within seven or fewer vice-counties.

Nationally Scarce Category b. **Nb**

- Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in between 31 and 100 10km squares or, in less well recorded groups, between eight and twenty vice-counties.

11 Appendix 2: Species list.

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Araneae: Araneidae	*Cercidia prominens*		**Nationally Scarce**		**X**		
Araneae: Araneidae	*Mangora acalypha*			**X**	**X**		
Araneae: Dictynidae	*Dictyna arundinacea*				**X**		
Araneae: Pisauridae	*Pisaura mirabilis*			**X**		**X**	
Odonata: Coenagriidae	*Pyrrhosoma nymphula*	Large Red Damselfly			**X**	**X**	
Odonata: Coenagriidae	*Ischnura elegans*	Blue-tailed Damselfly			**X**		
Odonata: Coenagriidae	*Coenagrion puella*	Azure Damselfly		**X**	**X**	**X**	
Odonata: Aeshnidae	*Aeshna grandis*	Brown Hawker			**X**		
Odonata: Aeshnidae	*Anax imperator*	Emperor Dragonfly			**X**		
Odonata: Libellulidae	*Libellula depressa*	Broad-bodied Chaser			**X**		
Odonata: Libellulidae	*Libellula quadrimaculata*	Four-spotted Chaser		**X**	**X**		
Odonata: Libellulidae	*Sympetrum striolatum*	Common Darter			**X**		
Odonata: Libellulidae	*Sympetrum sanguineum*	Ruddy Darter			**X**		
Orthoptera: Tettigoniidae	*Roeseliana roeselii*	Roesel's Bush Cricket	**(Nationally Scarce b) None**	**X**			
Orthoptera: Conocephalidae	*Conocephalus fuscus*	Long-winged Conehead	**(Nationally Scarce a) None**		**X**		
Orthoptera: Phaneropteridae	*Leptophyes punctatissima*	Speckled Bush Cricket				**X**	
Orthoptera: Acrididae	*Chorthippus parallelus*	Meadow Grasshopper		**X**	**X**		
Dermaptera: Forficulidae	*Forficula auricularia*	Common Earwig		**X**			
Heteroptera: Scutelleridae	*Eurygaster testudinaria*	Tortoise Shieldbug			**X**		
Heteroptera: Pentatomidae	*Aelia acuminata*	Bishop's Mitre Shieldbug		**X**			
Heteroptera: Pentatomidae	*Dolycoris baccarum*	Hairy Shieldbug		**X**		**X**	
Heteroptera: Pentatomidae	*Eurydema oleracea*	Crucifer Shieldbug			**X**		
Heteroptera: Pentatomidae	*Palomena prasina*	Common Green Shieldbug				**X**	
Heteroptera: Pentatomidae	*Pentatoma rufipes*	Red-legged Shieldbug				**X**	**X**
Heteroptera: Pentatomidae	*Podops inunctus*	Turtle Shieldbug		**X**			
Heteroptera: Coreidae	*Coreus marginatus*	Dock Bug			**X**	**X**	
Heteroptera: Rhopalidae	*Rhopalus subrufus*			**X**			
Heteroptera: Rhopalidae	*Stictopleurus abutilon*			**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Heteroptera: Lygaeidae	*Ischnodemus sabuleti*				X		
Heteroptera: Lygaeidae	*Peritrechus geniculatus*			X			
Heteroptera: Nabidae	*Himacerus major*			X			
Heteroptera: Miridae	*Capsus ater*			X	X		
Heteroptera: Miridae	*Closterotomus norwegicus*				X		
Heteroptera: Miridae	*Closterotomus trivialis*				X	X	X
Heteroptera: Miridae	*Grypocoris stysi*						X
Heteroptera: Miridae	*Heterotoma planicornis*					X	
Heteroptera: Miridae	*Stenodema laevigata*			X	X		
Heteroptera: Miridae	*Stenotus binotatus*			X			
Auchenorrhyncha: Aphrophoridae	*Aphrophora alni*				X	X	
Auchenorrhyncha: Aphrophoridae	*Philaenus spumarius*			X			
Auchenorrhyncha: Cicadellidae	*Aphrodes bicinctus*			X			
Auchenorrhyncha: Cicadellidae	*Balcanocerus larvatus*		**None (Nationally Scarce b)**			X	
Auchenorrhyncha: Cicadellidae	*Typhlocyba quercus*					X	
Auchenorrhyncha: Delphacidae	*Asiraca clavicornis*		**Nationally Scarce b**	X			
Auchenorrhyncha: Delphacidae	*Conomelus anceps*				X		
Auchenorrhyncha: Delphacidae	*Javesella dubia*				X	X	
Auchenorrhyncha: Delphacidae	*Javesella pellucida*				X		
Lepidoptera: Adelidae	*Nemophora degeerella*	a moth				X	
Lepidoptera: Adelidae	*Nemophora cupriacella*	a moth	**Nationally Scarce b**	X			
Lepidoptera: Zygaenidae	*Zygaena filipendulae*	Six-spot Burnet		X			
Lepidoptera: Hesperiidae	*Thymelicus lineola*	Essex Skipper		X			
Lepidoptera: Hesperiidae	*Thymelicus sylvestris*	Small Skipper		X			
Lepidoptera: Hesperiidae	*Ochlodes sylvanus*	Large Skipper		X			
Lepidoptera: Pieridae	*Anthocharis cardamines*	Orange-tip		X		X	
Lepidoptera: Pieridae	*Pieris napi*	Green-veined White		X		X	
Lepidoptera: Pieridae	*Gonepteryx rhamni*	Brimstone		X			
Lepidoptera: Nymphalidae	*Coenonympha pamphilus*	Small Heath	**NBN**	X			
Lepidoptera: Nymphalidae	*Maniola jurtina*	Meadow Brown		X		X	
Lepidoptera: Nymphalidae	*Pyronia tithonus*	Gatekeeper		X		X	
Lepidoptera: Nymphalidae	*Melanargia galathea*	Marbled White		X			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Lepidoptera: Nymphalidae	*Vanessa atalanta*	Red Admiral				**X**	
Lepidoptera: Nymphalidae	*Aglais io*	Peacock		**X**			
Lepidoptera: Nymphalidae	*Aglais urticae*	Small Tortoiseshell		**X**			
Lepidoptera: Geometridae	*Erannis defoliaria*	Mottled Umber				**X**	
Lepidoptera: Erebidae	*Tyria jacobaeae*	Cinnabar	**NBN**	**X**		**X**	
Lepidoptera: Erebidae	*Lithosia quadra*	Four-spotted Footman			**X**		
Lepidoptera: Noctuidae	*Panemeria tenebrata*	Small Yellow Underwing				**X**	
Lepidoptera: Noctuidae	*Allophyes oxyacanthae*	Green-brindled Crescent	**NBN**			**X**	
Trichoptera: Limnephilidae	*Limnephilus auricula*	a caddisfly			**X**		
Coleoptera: Dytiscidae	*Hydroporus planus*				**X**		
Coleoptera: Carabidae	*Bembidion lunulatum*				**X**		
Coleoptera: Carabidae	*Amara aenea*				**X**		
Coleoptera: Carabidae	*Amara familiaris*			**X**			
Coleoptera: Carabidae	*Amara ovata*			**X**			**X**
Coleoptera: Carabidae	*Badister bullatus sens. lat.*			**X**	**X**		
Coleoptera: Carabidae	*Acupalpus dubius*				**X**		
Coleoptera: Carabidae	*Stenolophus mixtus*				**X**		
Coleoptera: Hydrophilidae	*Hydrobius fuscipes*				**X**		
Coleoptera: Staphylinidae	*Drusilla canaliculata*				**X**		
Coleoptera: Staphylinidae	*Stenus aceris*						**X**
Coleoptera: Staphylinidae	*Stenus cicindeloides*				**X**		
Coleoptera: Staphylinidae	*Stenus picipes*				**X**		
Coleoptera: Staphylinidae	*Stenus solutus*				**X**		
Coleoptera: Staphylinidae	*Rugilus similis*		**Nationally Scarce**	**X**			
Coleoptera: Staphylinidae	*Xantholinus elegans*			**X**			
Coleoptera: Staphylinidae	*Philonthus carbonarius*				**X**		
Coleoptera: Scirtidae	*Scirtes hemisphaericus*				**X**		
Coleoptera: Buprestidae	*Agrilus viridis*	a jewel beetle	**Nationally Scarce a**		**X**		
Coleoptera: Elateridae	*Agriotes lineatus*			**X**	**X**		
Coleoptera: Elateridae	*Limonius poneli*			**X**		**X**	

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Coleoptera: Cantharidae	*Cantharis flavilabris*			**X**			
Coleoptera: Cantharidae	*Cantharis lateralis*			**X**	**X**		
Coleoptera: Cantharidae	*Rhagonycha fulva*			**X**	**X**		
Coleoptera: Cantharidae	*Malthodes marginatus*						**X**
Coleoptera: Melyridae	*Cordylepherus viridis*			**X**			
Coleoptera: Melyridae	*Malachius bipustulatus*	Malachite Beetle		**X**			
Coleoptera: Byturidae	*Byturus ochraceus*						**X**
Coleoptera: Coccinellidae	*Rhyzobius chrysomeloides*			**X**			
Coleoptera: Coccinellidae	*Coccinella septempunctata*	7-spot Ladybird		**X**		**X**	
Coleoptera: Coccinellidae	*Harmonia axyridis*	Harlequin Ladybird		**X**	**X**		
Coleoptera: Coccinellidae	*Propylea quattuordecimpunctata*	14-spot Ladybird		**X**			**X**
Coleoptera: Coccinellidae	*Tytthaspis sedecimpunctata*	16-spot Ladybird		**X**	**X**		
Coleoptera: Coccinellidae	*Subcoccinella vigintiquattuorpunctata*	24-spot Ladybird		**X**			
Coleoptera: Tenebrionidae	*Lagria hirta*						**X**
Coleoptera: Oedemeridae	*Oedemera lurida*			**X**	**X**		
Coleoptera: Oedemeridae	*Oedemera nobilis*	Swollen-thighed Beetle		**X**	**X**	**X**	
Coleoptera: Pyrochroidae	*Pyrochroa coccinea*	Black-headed Cardinal Beetle	**Nationally Scarce b**				**X**
Coleoptera: Cerambycidae	*Grammoptera ruficornis*					**X**	
Coleoptera: Cerambycidae	*Pseudovadonia livida*			**X**			
Coleoptera: Cerambycidae	*Rutpela maculata*					**X**	
Coleoptera: Chrysomelidae	*Donacia impressa*		**(Nationally Scarce a) Nationally Scarce**		**X**		
Coleoptera: Chrysomelidae	*Donacia simplex*				**X**		
Coleoptera: Chrysomelidae	*Cassida rubiginosa*	Thistle Tortoise Beetle		**X**			
Coleoptera: Chrysomelidae	*Lochmaea crataegi*	Hawthorn Leaf Beetle				**X**	
Coleoptera: Rhynchitidae	*Tatianaerhynchites aequatus*	Apple Fruit Rhynchites				**X**	
Coleoptera: Apionidae	*Ceratapion onopordi*			**X**			
Coleoptera: Apionidae	*Protapion fulvipes*	White Clover Seed Weevil		**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Coleoptera: Curculionidae	*Aulacobaris lepidii*		**Nationally Scarce a**	**X**			
Coleoptera: Curculionidae	*Anthonomus rubi*	Strawberry Blossom Weevil		**X**			
Coleoptera: Curculionidae	*Curculio venosus*					**X**	
Coleoptera: Curculionidae	*Rhinoncus pericarpius*				**X**		
Coleoptera: Curculionidae	*Phyllobius roboretanus*	Small Green Nettle Weevil			**X**		
Coleoptera: Curculionidae	*Strophosoma melanogrammum*	Nut Leaf Weevil					**X**
Coleoptera: Curculionidae	*Hypera melancholica*		**Nationally Scarce b**	**X**			
Diptera: Tipulidae	*Nephrotoma appendiculata*						**X**
Diptera: Tipulidae	*Nephrotoma flavescens*			**X**			
Diptera: Tipulidae	*Tipula vernalis*			**X**	**X**		**X**
Diptera: Tipulidae	*Tipula lateralis*				**X**		
Diptera: Limoniidae	*Erioconopa trivialis*				**X**		
Diptera: Limoniidae	*Molophilus griseus*				**X**		
Diptera: Limoniidae	*Symplecta stictica*						**X**
Diptera: Limoniidae	*Austrolimnophila ochracea*						**X**
Diptera: Limoniidae	*Epiphragma ocellare*						**X**
Diptera: Limoniidae	*Phylidorea ferruginea*				**X**		
Diptera: Limoniidae	*Limonia nubeculosa*						**X**
Diptera: Bolitophilidae	*Bolitophila saundersii*						**X**
Diptera: Keroplatidae	*Macrocera vittata*						**X**
Diptera: Mycetophilidae	*Leia fascipennis*						**X**
Diptera: Mycetophilidae	*Leia subfasciata*						**X**
Diptera: Anisopodidae	*Sylvicola cinctus*						**X**
Diptera: Anisopodidae	*Sylvicola fuscatus*		**RDBK**				**X**
Diptera: Ptychopteridae	*Ptychoptera contaminata*					**X**	
Diptera: Stratiomyidae	*Chorisops tibialis*			**X**		**X**	
Diptera: Stratiomyidae	*Pachygaster atra*			**X**		**X**	
Diptera: Stratiomyidae	*Pachygaster leachii*					**X**	
Diptera: Stratiomyidae	*Chloromyia formosa*			**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Asilidae	*Leptogaster cylindrica*			X	X	X	
Diptera: Asilidae	*Dioctria atricapilla*			X			
Diptera: Asilidae	*Dioctria baumhaueri*					X	
Diptera: Asilidae	*Dioctria linearis*						X
Diptera: Hybotidae	*Hybos culiciformis*					X	
Diptera: Hybotidae	*Oedalea stigmatella*						X
Diptera: Hybotidae	*Drapetis exilis*					X	
Diptera: Hybotidae	*Elaphropeza ephippiata*					X	X
Diptera: Hybotidae	*Platypalpus agilis*			X			X
Diptera: Hybotidae	*Platypalpus annulipes*					X	
Diptera: Hybotidae	*Platypalpus calceatus*				X	X	X
Diptera: Hybotidae	*Platypalpus longiseta*					X	
Diptera: Hybotidae	*Platypalpus optivus*					X	X
Diptera: Hybotidae	*Platypalpus pallidiventris*					X	
Diptera: Empididae	*Clinocera stagnalis*				X		
Diptera: Empididae	*Empis albinervis*				X		
Diptera: Empididae	*Empis caudatula*			X	X	X	
Diptera: Empididae	*Empis praevia*				X		
Diptera: Empididae	*Empis tessellata*			X			
Diptera: Empididae	*Empis livida*			X	X	X	X
Diptera: Empididae	*Empis scutellata*					X	X
Diptera: Empididae	*Hilara cornicula*				X		
Diptera: Empididae	*Rhamphomyia crassirostris*						X
Diptera: Empididae	*Rhamphomyia atra*					X	X
Diptera: Empididae	*Rhamphomyia tarsata*						X
Diptera: Dolichopodidae	*Argyra leucocephala*				X		
Diptera: Dolichopodidae	*Chrysotus blepharosceles*			X	X	X	
Diptera: Dolichopodidae	*Chrysotus gramineus*			X	X	X	
Diptera: Dolichopodidae	*Dolichopus festivus*			X	X	X	
Diptera: Dolichopodidae	*Dolichopus griseipennis*			X	X	X	X
Diptera: Dolichopodidae	*Dolichopus latilimbatus*				X		
Diptera: Dolichopodidae	*Dolichopus ungulatus*			X	X		

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Dolichopodidae	*Dolichopus virgultorum*		**Nationally Scarce**		**X**	**X**	**X**
Diptera: Dolichopodidae	*Poecilobothrus nobilitatus*				**X**		
Diptera: Dolichopodidae	*Medetera jacula*						**X**
Diptera: Dolichopodidae	*Neurigona quadrifasciata*						**X**
Diptera: Dolichopodidae	*Rhaphium caliginosum*				**X**		
Diptera: Dolichopodidae	*Sciapus platypterus*						**X**
Diptera: Dolichopodidae	*Campsicnemus curvipes*				**X**		
Diptera: Dolichopodidae	*Campsicnemus scambus*				**X**		
Diptera: Dolichopodidae	*Xanthochlorus galbanus*						**X**
Diptera: Phoridae	*Phora atra*					**X**	
Diptera: Lonchopteridae	*Lonchoptera bifurcata*				**X**		
Diptera: Lonchopteridae	*Lonchoptera lutea*				**X**		**X**
Diptera: Syrphidae	*Melanostoma mellinum*	a hoverfly		**X**	**X**	**X**	
Diptera: Syrphidae	*Platycheirus albimanus*	a hoverfly		**X**		**X**	
Diptera: Syrphidae	*Chrysotoxum bicinctum*	a hoverfly				**X**	
Diptera: Syrphidae	*Epistrophe eligans*	a hoverfly		**X**		**X**	
Diptera: Syrphidae	*Epistrophe nitidicollis*	a hoverfly			**X**		
Diptera: Syrphidae	*Episyrphus balteatus*	a hoverfly				**X**	
Diptera: Syrphidae	*Sphaerophoria scripta*	a hoverfly		**X**	**X**		
Diptera: Syrphidae	*Syrphus ribesii*	a hoverfly		**X**			
Diptera: Syrphidae	*Xanthogramma citrofasciatum*	a hoverfly		**X**			
Diptera: Syrphidae	*Cheilosia proxima*	a hoverfly		**X**			
Diptera: Syrphidae	*Cheilosia scutellata*	a hoverfly			**X**		
Diptera: Syrphidae	*Cheilosia vernalis*	a hoverfly			**X**		
Diptera: Syrphidae	*Neoascia tenur*	a hoverfly			**X**		
Diptera: Syrphidae	*Helophilus pendulus*	a hoverfly			**X**		
Diptera: Syrphidae	*Parhelophilus versicolor*	a hoverfly			**X**		
Diptera: Syrphidae	*Merodon equestris*	a hoverfly				**X**	
Diptera: Syrphidae	*Pipizella viduata*	a hoverfly		**X**			
Diptera: Syrphidae	*Volucella bombylans*	a hoverfly		**X**	**X**		
Diptera: Syrphidae	*Volucella inanis*	a hoverfly	**Nationally Scarce**			**X**	
Diptera: Syrphidae	*Volucella pellucens*	a hoverfly				**X**	

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Syrphidae	*Volucella zonaria*	a hoverfly	**Nationally Scarce**			**X**	
Diptera: Syrphidae	*Xylota segnis*	a hoverfly				**X**	
Diptera: Syrphidae	*Xylota sylvarum*	a hoverfly				**X**	
Diptera: Pipunculidae	*Eudorylas obliquus*			**X**			
Diptera: Conopidae	*Sicus ferrugineus*			**X**			
Diptera: Lonchaeidae	*Priscoearomyia nigra*						**X**
Diptera: Lonchaeidae	*Lonchaea contigua*						**X**
Diptera: Lonchaeidae	*Lonchaea palposa*		**Nationally Scarce**			**X**	
Diptera: Lonchaeidae	*Lonchaea scutellaris*						**X**
Diptera: Lonchaeidae	*Lonchaea subneatosa*		**None (RDBK)**			**X**	
Diptera: Lonchaeidae	*Lonchaea tarsata*					**X**	
Diptera: Pallopteridae	*Palloptera scutellata*	a picture-winged fly			**X**		
Diptera: Tephritidae	*Urophora cardui*			**X**	**X**		
Diptera: Tephritidae	*Urophora jaceana*			**X**			
Diptera: Tephritidae	*Urophora quadrifasciata*			**X**			
Diptera: Tephritidae	*Urophora stylata*			**X**			
Diptera: Tephritidae	*Tephritis divisa*		**None (RDBK)**	**X**		**X**	
Diptera: Tephritidae	*Tephritis neesii*			**X**	**X**		
Diptera: Tephritidae	*Chaetorellia jaceae*			**X**			
Diptera: Tephritidae	*Terellia serratulae*			**X**			
Diptera: Lauxaniidae	*Homoneura notata*					**X**	
Diptera: Lauxaniidae	*Aulogastromyia anisodactyla*		**Nationally Scarce**				**X**
Diptera: Lauxaniidae	*Calliopum simillimum*					**X**	**X**
Diptera: Lauxaniidae	*Meiosimyza decempunctata*						**X**
Diptera: Lauxaniidae	*Meiosimyza rorida*						**X**
Diptera: Lauxaniidae	*Meiosimyza subfasciata*					**X**	
Diptera: Lauxaniidae	*Minettia fasciata*			**X**	**X**	**X**	
Diptera: Lauxaniidae	*Peplomyza litura*						**X**
Diptera: Lauxaniidae	*Sapromyza quadricincta*		**Nationally Scarce**		**X**	**X**	
Diptera: Lauxaniidae	*Sapromyza quadripunctata*			**X**	**X**	**X**	
Diptera: Lauxaniidae	*Tricholauxania praeusta*						**X**
Diptera: Chamaemyiidae	*Chamaemyia polystigma*			**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Sciomyzidae	*Pherbellia cinerella*			**X**			
Diptera: Sciomyzidae	*Pherbellia dorsata*		**Nationally Scarce**		**X**		
Diptera: Sciomyzidae	*Pherbellia nana*		**Nationally Scarce**		**X**		
Diptera: Sciomyzidae	*Pherbellia ventralis*				**X**		
Diptera: Sciomyzidae	*Dichetophora obliterata*					**X**	
Diptera: Sciomyzidae	*Elgiva cucularia*				**X**		
Diptera: Sciomyzidae	*Hydromya dorsalis*				**X**		
Diptera: Sciomyzidae	*Ilione albiseta*				**X**		
Diptera: Sciomyzidae	*Limnia unguicornis*			**X**	**X**		
Diptera: Clusiidae	*Clusiodes albimanus*						**X**
Diptera: Agromyzidae	*Agromyza albipennis*	a leaf-miner fly	**None (Nationally Scarce b)**		**X**		
Diptera: Agromyzidae	*Melanagromyza aeneoventris*	a leaf-miner fly	**None (Nationally Scarce b)**	**X**			
Diptera: Agromyzidae	*Ophiomyia alliariae*	a leaf-miner fly	**None (pRDB 1)**		**X**		
Diptera: Agromyzidae	*Phytobia cf betulivora*		**New for Science**		**X**		
Diptera: Agromyzidae	*Cerodontha lateralis*	a leaf-miner fly	**None (Nationally Scarce b)**	**X**			
Diptera: Agromyzidae	*Liriomyza soror*	a leaf-miner fly	**None (pRDB 1)**		**X**		
Diptera: Agromyzidae	*Phytomyza lappae*	a leaf-miner fly					**X**
Diptera: Agromyzidae	*Chromatomyia milii*	a leaf-miner fly		**X**	**X**	**X**	**X**
Diptera: Agromyzidae	*Chromatomyia nigra*	a leaf-miner fly			**X**		
Diptera: Agromyzidae	*Chromatomyia ramosa*	a leaf-miner fly			**X**		
Diptera: Agromyzidae	*Phytomyza ranunculi*	a leaf-miner fly			**X**		
Diptera: Opomyzidae	*Opomyza germinationis*				**X**		**X**
Diptera: Opomyzidae	*Opomyza petrei*				**X**		
Diptera: Anthomyzidae	*Anthomyza gracilis*			**X**	**X**		
Diptera: Chloropidae	*Cetema neglectum*				**X**		
Diptera: Chloropidae	*Chlorops hypostigma*				**X**		
Diptera: Chloropidae	*Chlorops pumilionis*				**X**		
Diptera: Chloropidae	*Chlorops scalaris*					**X**	
Diptera: Chloropidae	*Diplotoxa messoria*				**X**		
Diptera: Chloropidae	*Pseudopachychaeta approximatonervis*		**Nationally Scarce**		**X**		
Diptera: Chloropidae	*Thaumatomyia notata*			**X**	**X**	**X**	

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Chloropidae	*Conioscinella mimula*			X		X	
Diptera: Chloropidae	*Dicraeus ingratus*			X			
Diptera: Chloropidae	*Dicraeus vagans*			X		X	
Diptera: Chloropidae	*Elachiptera sp. nr cornuta ss Ismay*				X		
Diptera: Chloropidae	*Oscinella frit*			X			
Diptera: Chloropidae	*Oscinella nigerrima*			X			
Diptera: Chloropidae	*Oscinella nitidissima*				X		
Diptera: Chloropidae	*Oscinimorpha minutissima*			X			
Diptera: Chloropidae	*Oscinimorpha sordidissima*		**Nationally Scarce**	X			
Diptera: Chloropidae	*Trachysiphonella scutellata*		**(Nationally Scarce) None**		X		
Diptera: Chloropidae	*Tricimba lineella*					X	
Diptera: Heleomyzidae	*Suillia affinis*						X
Diptera: Heleomyzidae	*Suillia bicolor*						X
Diptera: Heleomyzidae	*Suillia notata*						X
Diptera: Heleomyzidae	*Suillia variegata*						X
Diptera: Sphaeroceridae	*Crumomyia fimetaria*						X
Diptera: Sphaeroceridae	*Lotophila atra*			X			
Diptera: Drosophilidae	*Lordiphosa andalusiaca*						X
Diptera: Drosophilidae	*Scaptomyza pallida*				X		X
Diptera: Drosophilidae	*Scaptomyza flava*					X	
Diptera: Drosophilidae	*Scaptomyza graminum*						X
Diptera: Diastatidae	*Diastata adusta*				X		
Diptera: Camillidae	*Camilla flavicauda*						X
Diptera: Ephydridae	*Diasemocera glabricula*				X		
Diptera: Ephydridae	*Coenia palustris*				X		
Diptera: Ephydridae	*Parydra fossarum*				X		
Diptera: Ephydridae	*Parydra coarctata*				X		
Diptera: Ephydridae	*Scatella paludum*				X		
Diptera: Ephydridae	*Scatella stagnalis*				X		
Diptera: Ephydridae	*Scatella lacustris*				X		
Diptera: Ephydridae	*Discocerina obscurella*				X		
Diptera: Ephydridae	*Gymnoclasiopa plumosa*						X

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Ephydridae	*Hydrellia griseola*				X	X	
Diptera: Ephydridae	*Hydrellia albiceps*				X		X
Diptera: Ephydridae	*Notiphila graecula*				X		
Diptera: Ephydridae	*Hyadina guttata*			X	X		
Diptera: Ephydridae	*Pelina similis*				X		
Diptera: Scathophagidae	*Scathophaga stercoraria*			X	X	X	X
Diptera: Anthomyiidae	*Botanophila discreta*				X		
Diptera: Anthomyiidae	*Hylemya partita*					X	
Diptera: Anthomyiidae	*Lasiomma seminitidum*				X	X	
Diptera: Anthomyiidae	*Delia platura*			X			
Diptera: Anthomyiidae	*Pegoplata annulata*						X
Diptera: Fanniidae	*Fannia armata*					X	
Diptera: Fanniidae	*Fannia fuscula*			X		X	
Diptera: Fanniidae	*Fannia pauli*		**Nationally Scarce**				X
Diptera: Fanniidae	*Fannia polychaeta*					X	
Diptera: Fanniidae	*Fannia postica*			X			
Diptera: Fanniidae	*Fannia serena*						X
Diptera: Fanniidae	*Fannia sociella*						X
Diptera: Muscidae	*Coenosia infantula*			X			
Diptera: Muscidae	*Coenosia mollicula*						X
Diptera: Muscidae	*Lispocephala erythrocera*				X		
Diptera: Muscidae	*Schoenomyza litorella*				X		
Diptera: Muscidae	*Lispe tentaculata*				X		
Diptera: Muscidae	*Hydrotaea parva*		**Nationally Scarce**	X			
Diptera: Muscidae	*Hebecnema nigra*				X		
Diptera: Muscidae	*Helina reversio*			X			
Diptera: Muscidae	*Phaonia rufiventris*						X
Diptera: Muscidae	*Phaonia tuguriorum*			X			
Diptera: Calliphoridae	*Lucilia ampullacea*					X	
Diptera: Calliphoridae	*Melanomya nana*				X		
Diptera: Rhinophoridae	*Rhinophora lepida*			X	X		X

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Diptera: Sarcophagidae	*Nyctia halterata*			**X**			
Diptera: Sarcophagidae	*Blaesoxipha plumicornis*		**Nationally Scarce**	**X**			
Diptera: Sarcophagidae	*Sarcophaga bulgarica*		**None (RDBK)**			**X**	
Diptera: Sarcophagidae	*Sarcophaga dissimilis*					**X**	
Diptera: Sarcophagidae	*Sarcophaga anaces*					**X**	
Diptera: Sarcophagidae	*Sarcophaga incisilobata*				**X**		
Diptera: Tachinidae	*Dinera carinifrons*			**X**			
Diptera: Tachinidae	*Eriothrix rufomaculata*			**X**	**X**		
Diptera: Tachinidae	*Exorista rustica*			**X**			
Diptera: Tachinidae	*Phasia pusilla*			**X**			
Diptera: Tachinidae	*Gymnocheta viridis*					**X**	
Diptera: Tachinidae	*Solieria pacifica*			**X**			
Diptera: Tachinidae	*Macquartia tenebricosa*			**X**			
Diptera: Tachinidae	*Actia lamia*		**None (Nationally Scarce)**		**X**		
Diptera: Tachinidae	*Siphona geniculata*			**X**	**X**		
Hymenoptera: Cephidae	*Calameuta pallipes*	a sawfly			**X**		
Hymenoptera: Cephidae	*Cephus spinipes*	a sawfly		**X**	**X**		
Hymenoptera: Cephidae	*Phylloecus linearis*	a sawfly		**X**			
Hymenoptera: Argidae	*Arge cyanocrocea*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Allantus cinctus*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Allantus togatus*	a sawfly			**X**		
Hymenoptera: Tenthredinidae	*Ametastegia glabrata*	a sawfly			**X**		
Hymenoptera: Tenthredinidae	*Athalia bicolor*	a sawfly		**X**			
Hymenoptera: Tenthredinidae	*Athalia liberta*	a sawfly					**X**
Hymenoptera: Tenthredinidae	*Cladius pectinicornis*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Cladius pilicornis*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Hoplocampa crataegi*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Euura myosotidis*	a sawfly			**X**		
Hymenoptera: Tenthredinidae	*Pristiphora armata*	a sawfly				**X**	
Hymenoptera: Tenthredinidae	*Pristiphora punctifrons*	a sawfly		**X**			
Hymenoptera: Tenthredinidae	*Dolerus anticus*	a sawfly	**(RDB2)**		**X**		
Hymenoptera: Tenthredinidae	*Dolerus nigratus*	a sawfly		**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Hymenoptera: Tenthredinidae	*Nesoselandria morio*	a sawfly			**X**		
Hymenoptera: Tenthredinidae	*Selandria serva*	a sawfly			**X**		
Hymenoptera: Tenthredinidae	*Macrophya alboannulata*	a sawfly		**X**			**X**
Hymenoptera: Ichneumonidae	*Glypta elongata*	an ichneumon			**X**		
Hymenoptera: Ichneumonidae	*Collyria trichophthalma*	an ichneumon		**X**			
Hymenoptera: Ichneumonidae	*Idiolispa analis*	an ichneumon		**X**			
Hymenoptera: Ichneumonidae	*Trychosis legator*	an ichneumon		**X**			
Hymenoptera: Ichneumonidae	*Hadrodactylus flavofacialis*	an ichneumon		**X**	**X**		
Hymenoptera: Ichneumonidae	*Enizemum ornatum*	an ichneumon					**X**
Hymenoptera: Ichneumonidae	*Syrphoctonus tarsatorius*	an ichneumon					**X**
Hymenoptera: Ichneumonidae	*Syrphophilus bizonarius*	an ichneumon		**X**			
Hymenoptera: Ichneumonidae	*Syspasis scutellator*	an ichneumon		**X**	**X**		
Hymenoptera: Ichneumonidae	*Cratichneumon culex*	an ichneumon					**X**
Hymenoptera: Ichneumonidae	*Astiphromma splenium*	an ichneumon					**X**
Hymenoptera: Ichneumonidae	*Ophion mocsaryi*	an ichneumon				**X**	
Hymenoptera: Ichneumonidae	*Perithous scurra*	an ichneumon					**X**
Hymenoptera: Ichneumonidae	*Barycnemis harpura*	an ichneumon				**X**	
Hymenoptera: Ichneumonidae	*Acrotomus lucidulus*	an ichneumon				**X**	
Hymenoptera: Figitidae	*Callaspidia defonscolombei*	a parasitic wasp		**X**			
Hymenoptera: Crabronidae	*Crossocerus podagricus*	a digger wasp					**X**
Hymenoptera: Crabronidae	*Spilomena troglodytes*	a digger wasp					**X**
Hymenoptera: Crabronidae	*Stigmus solskyi*	a digger wasp				**X**	
Hymenoptera: Andrenidae	*Andrena scotica*	Chocolate Mining Bee		**X**			
Hymenoptera: Andrenidae	*Andrena cineraria*	Ashy Mining Bee				**X**	
Hymenoptera: Andrenidae	*Andrena chrysosceles*	Hawthorn Mining Bee				**X**	
Hymenoptera: Andrenidae	*Andrena haemorrhoa*	Orange-tailed Mining Bee		**X**			
Hymenoptera: Apidae	*Apis mellifera*	Western Honey Bee		**X**		**X**	
Hymenoptera: Apidae	*Bombus hortorum*	Small Garden Bumblebee		**X**			
Hymenoptera: Apidae	*Bombus lapidarius*	Red-tailed Bumblebee		**X**			
Hymenoptera: Apidae	*Bombus pratorum*	Early Bumblebee		**X**		**X**	
Hymenoptera: Apidae	*Bombus pascuorum*	Common Carder Bee		**X**		**X**	
Hymenoptera: Apidae	*Nomada goodeniana*	Gooden's Nomad Bee		**X**			

Order: Family	Taxon	Vernacular	National Status	Grassland	Ponds	Scrub	Wood
Hymenoptera: Colletidae	*Hylaeus cornutus*	Spined Hylaeus	**Nationally Scarce a**	**X**			
Hymenoptera: Colletidae	*Hylaeus confusus*	White-jawed Yellow-face Bee		**X**			
Hymenoptera: Halictidae	*Lasioglossum lativentre*	Furry-claspered Furrow Bee		**X**			
Hymenoptera: Halictidae	*Lasioglossum albipes*	Bloomed Furrow Bee		**X**			
Hymenoptera: Halictidae	*Lasioglossum calceatum*	Common Furrow Bee		**X**	**X**		
Hymenoptera: Halictidae	*Lasioglossum pauxillum*	Lobe-spurred Furrow Bee	**Nationally Scarce a**	**X**			
Hymenoptera: Megachilidae	*Megachile versicolor*	Brown-footed Leafcutter Bee			**X**		
Hymenoptera: Megachilidae	*Megachile willughbiella*	Willughby's Leafcutter Bee		**X**			
Hymenoptera: Megachilidae	*Heriades truncorum*	Large-headed Resin Bee	**RDBK**	**X**			
Hymenoptera: Megachilidae	*Osmia bicolor*	Red-tailed Mason Bee	**Nationally Scarce b**			**X**	
		total diversity	410	163	163	113	82
		all scarce/RDB	42	15	16	10	5
		% scarce/RDB	10.2	9.2	9.8	8.8	6.1
		no RDB	9	2	4	3	1
		% RDB	2.2	1.2	2.5	2.7	1.2