GROVE FARM – SUFFOLK WILDLIFE TRUST FARMLAND NATURE RESERVE
A PROGRESS REPORT ON A TWO-YEAR EXPERIMENT IN MONITORING CHANGES IN WILDLIFE USING BLACKBOURNE U3A VOLUNTEERS 2012-2014

Summary

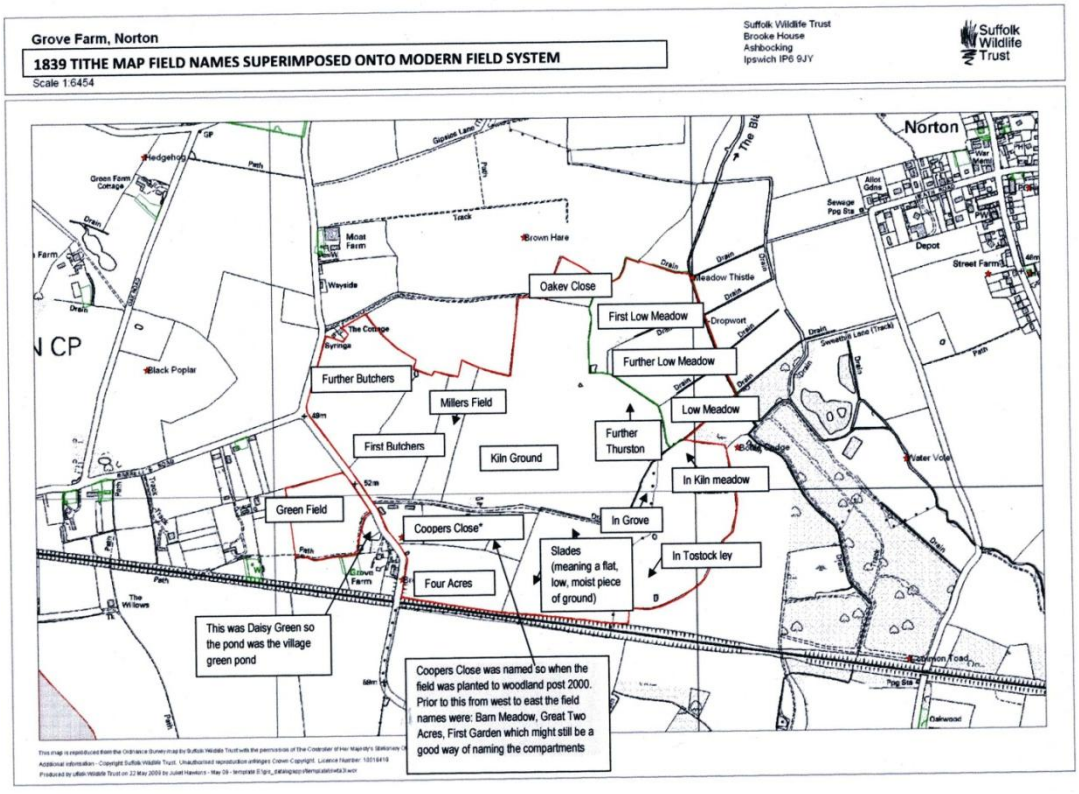
In early 2012 Suffolk Wildlife Trust received a small bursary of £835 to train, equip and organise a monitoring project with the help of 20+ University of Third Age volunteers on their 62ha Grove Farm nature reserve. The project aimed to contribute records of arable flora and colonisation of 20 restored and newly created ponds, especially priority species. Two years on, over 900 plant records have been recorded, including pockets of remnant declining arable flora; and nearly 400 pond records have been collated, including over 17 Nationally Notable Nb and Local aquatic invertebrates; and other groups have been recorded too. U3A volunteers have found the project enjoyable and rewarding opted to continue to monitor the reserve. In June 2014 The Freshwater Habitats Trust selected Grove Farm as a Flagship Pond Site.

Introduction

Grove Farm, situated between Thurston and Norton in central Suffolk, was generously bequeathed to Suffolk Wildlife Trust by Laura Cooper in 1995 and a copse planted in 2001 was named Cooper's Copse in her memory. Whilst small by today's standards, the 62ha farm has an excellent range of habitats – 17ha of County Wildlife Site grazing marsh, 45ha of arable land and small areas of scrub and woodland and 20 ponds.

Environmentally friendly farming opportunities

One of the sad things that happens with government bureaucracy and form-filling in farming is that fields acquire numbers, the numbers effectively become the names and the ancient field names with their various associated meanings are lost. To avoid the same fate happening to this lovely farm, we dug out the 1839 Tithe map which revealed field names including Butchers and Millers which are both evocative of names of previous occupations, Slades (meaning a moist, low, flat piece of land), Green Field (ex-village green), In

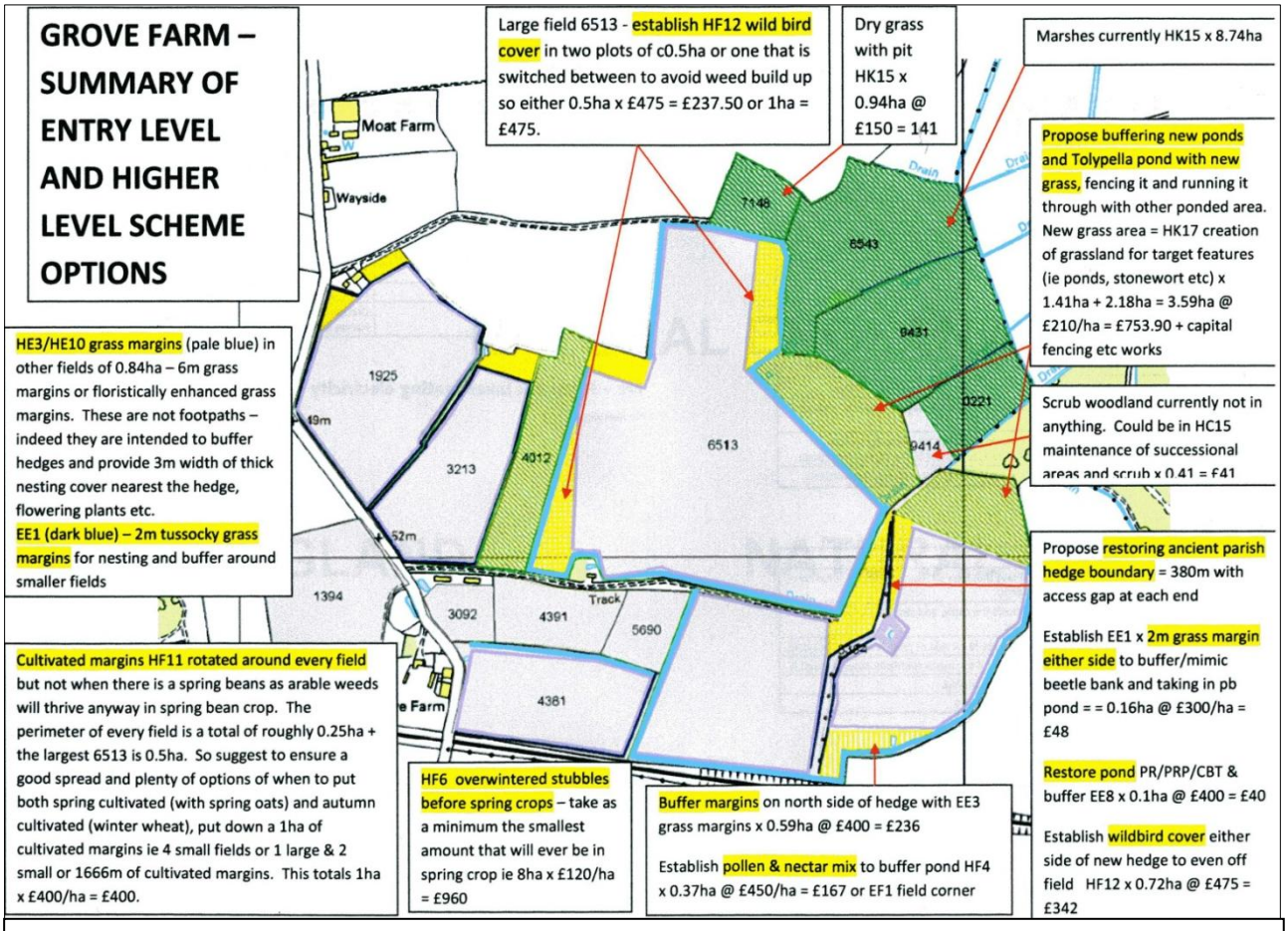


Grove (wood), Tostock Ley and Low meadow (indicating grassland). These have provided much more attractive points of reference for farming and wildlife recording than field numbers.

Whilst a few arable fields have been amalgamated since 1839, most have remained the same with the average arable field size still only 9ha - presenting some logistical issues for large modern machinery. And with new moves afoot to make mixed cropping obligatory on every farm, no matter what size the fields, any contractor working here needs to carefully consider how to minimise tractor journeys and expense to deal with relatively small areas of different crops that have different requirements throughout the year. Fortunately, we have been lucky in finding the Barker brothers, Brian and Patrick, to do this contracting work. As well-respected arable farmers, with a passion for wildlife, they understand the agronomic requirements of commercial crops and have experience of environmentally-friendly farming.

SWT staff Dorothy Casey (left) and Will Cranstoun (right) with Brian, Patrick and David Barker, farming tenants at Grove Farm

In 2012 the Trust agreed exciting new changes with Natural England to its ten-year Higher Level Scheme (HLS) agreement. This HLS scheme will help SWT's enthuiastic new farming tenants, by providing management payments for new, more challenging options that aim to help reverse the decline in key farmland birds and rare arable flora. We hope that we can use the farm as a demonstration site for various environmentally-friendly farming options and techniques such as cultivated margins (that mimic fallow land) and wild bird cover (that provides a giant bird table of small seed) that benefit wildlife such as declining arable flora and birds of arable farmland.



Summary of revised Entry and Higher Level Scheme options from 2012

Millennium Pond Project

An early pond survey of the 11 existing ponds in 2007 indicated that smooth newt was present and that great crested newt were hanging on in the two more open ponds but that most of the existing ponds were of relatively low wildlife value, being shaded, full of organic matter and devoid of vegetation. Under Natural England's Higher Level Scheme, SWT restored several of the farm's ancient ponds to benefit great crested newt and other pond life. Within a year of opening up these ponds, smooth newts had colonised them and with a good network of connecting rough grass margins it was hoped the great crested newt would soon colonise.

In 2010 SWT successfully applied for a Million Pond Project (MPP) grant to create nine new ponds and to restore a few more of the ancient ponds. Miles Waterscapes from nearby Great Ashfield dug the new ponds in September 2010, all designed by SWT with slightly different shapes and underwater profile to create different microhabitats for a range amphibians, aquatic invertebrates and plants.

Monitoring opportunities

With a new contractor and new agri-environment techniques being adopted, the Trust felt this was a perfect opportunity to monitor and record the changes in wildlife that occur over the years. With this in mind, it was a stroke of luck when the local wildlife group from the Thurston-based Blackbourne U3A (University of the Third Age) contacted us to ask whether they could be of any assistance at Grove Farm. The Third Age is, theoretically, the age of retirement (or semi-retirement) but the U3A believes that by keeping minds and bodies alert, we can enrich our lives and slow the ageing process and so provides day-time opportunities for education and recreation for mature people no longer in full time employment – and in doing so they get together in groups to learn, to follow their hobbies and interests for general companionship. U3A Blackbourne wildlife group leader Rob Parker has been the Suffolk's county butterfly recorder for 11 years, co-ordinating recording effort and events, so he was no stranger to rallying the troops for a specific project – and so the group teamed up with SWT to monitor wildlife habitat at Grove Farm in the first collaborative venture of its kind in Suffolk.

Extract from Millennium Pond Project's Year 4 report

SNS bursary for monitoring

In February 2010, SWT was awarded a Suffolk Naturalists' Society bursary of £835 over two years to help study the various changes in wildlife that occur at Grove Farm from the baseline year of 2012. However, this monitoring project was also seen as an experiment in harnessing the enthusiasm of U3A volunteers with the following specific aims:

1. **To** study how quickly **rare arable flora** returns to arable fields following a change in management of arable field margins and introduction of winter stubbles. The chalky boulder clay in Suffolk is known to be important for rare arable flora. With a change from conventionally farmed land to the introduction of overwintered stubbles and spring and autumn cultivated margins specifically aimed at benefiting rare arable flora, there was an opportunity to monitor the changes from a baseline year.

2. A study of how quickly **Biodiversity Action Plan species (great crested newt, toad, grass snake, tassel stonewort) and aquatic invertebrates** colonise nine new (and several restored) ponds from existing ponds. Within this were the following objectives:

    a. **To increase local/interested amateur naturalists' understanding of pond ecology, amphibian, plants and aquatic invertebrates** through two training workshops; collection of data and ongoing feedback/dialogue regarding recorded finds.

    b. **To contribute records that help the understanding of colonisation of newly created ponds**.

    c. **To establish whether it is possible to use non-specialist volunteers to help flag up sites of high conservation value which can then be studied further by specialists.**

The project involves working with Suffolk Wildlife Trust pond adviser Juliet Hawkins, Suffolk's county botanist and author of *A Flora of Suffolk* Martin Sanford and county freshwater invertebrate recorder Adrian Chalkley. U3A volunteers (c20) attended a training workshop in May 2012 in Norton village hall, followed by a wet visit to Grove Farm. Volunteers were issued with £475 worth of pond nets and sampling equipment and guidance as to how to use them and how to record baseline arable flora and pond data and how to collect specimens for identification. Volunteers were split into specialist teams which systematically monitor arable flora, amphibians and aquatic invertebrates and sub-groups cover specific ponds and field

U3A volunteer training day in May 2012 – discussing ponds with Adrian Chalkley and Juliet Hawkins, and identifying arable plants with Martin Sanford. A second training day was held in May 2013.

margins – with all of them keeping their eyes and ears open on every visit for incidental records of birds, butterflies, mammals and reptiles. New volunteers with additional skills such as photography have joined the monitoring team; there are frequently additional observations of orchids, birds and butterflies on the Grove Farm e-grapevine; and aquatic specimens to identify roll in each year.

Four months after the volunteers' induction, they had made a first visit to each of the target ponds and field margins. Smooth newts had been found in almost all of the ponds and, by August 2012, common frogs and toads were turning up in the grass margins, sometimes well away from the ponds. Butterflies, dragonflies, birds and a few mammals were noted as incidental sightings. Getting to grips with the aquatic invertebrates was new for most and beyond their expertise, so samples were sent to Adrian Chalkley for expert identification. A second training day in May 2013 updated U3A's skills and by the end of 2013 many more records and observations had been collected.

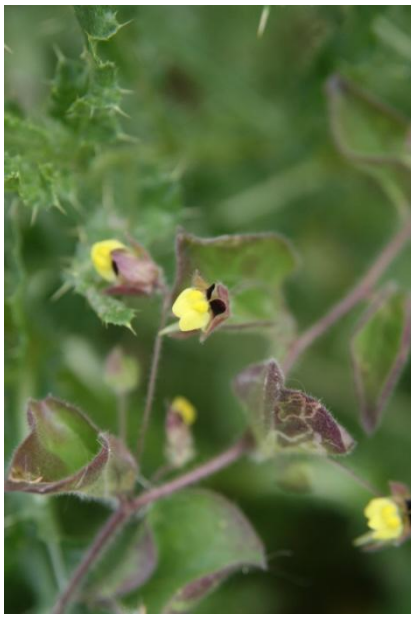
A total of 21 butterfly species have been recorded as incidental sightings by U3A volunteers including the brimstone pictured above. Photo: Trevor Goodfellow

Monitoring project achievements 2012-2014

Baseline arable plant information

Whilst early to get anything other than baseline information for arable flora (over 900 plant records) associated with fairly intensive farming before more environmentally friendly changes in farming really kick in such as uncultivated margins and winter stubbles, some early records of declining arable flora show that some species are hanging on. One arable field in particular, Kiln Ground, has yielded some interesting records: Round-leaved fluellen (*Kickxia spuria*) and sharp leaved fluellen (*Kickxia elatine*) were found once in 2012 in stubble, but in 2013 was recorded in several occasions along with dwarf spurge (*Euphorbia exigua*); bee orchid (*Ophrys apifera*), and both fairy flax (*Linum catharticum*) and hoary plantain (*Plantago media*) were recorded on the field edges, indicators of species-rich sites on clay – and possibly likely to expand in the future with more generous grassy field margins. Common spotted (*Dactylorhiza fuchsia*) and pyramidal orchids (*Anacamptis pyramidalis*) have both been recorded along with a long list of other wild flowers have been recorded in naturally regenerating scrub and grass fields and field corners. [See Appendix 3 for full list.]

One hectare of 1666m of 6m wide 'cultivated margins' are now established annually, rotating around different fields – they are cultivated but not sown with a crop so the aim is to simply grow annual arable flora, known as weeds to most farmers! In addition 8ha of cereal stubbles will be allowed to stay uncultivated for the winter until 15th February each year, providing stubbles for seed-eating birds and allowing late flowering arable flora to set seed in the autumn. It is hoped that long-dormant seeds will germinate and, in the absence of herbicides to control them, will thrive. Regular monitoring will show which plants re-emerge from these seedbanks.



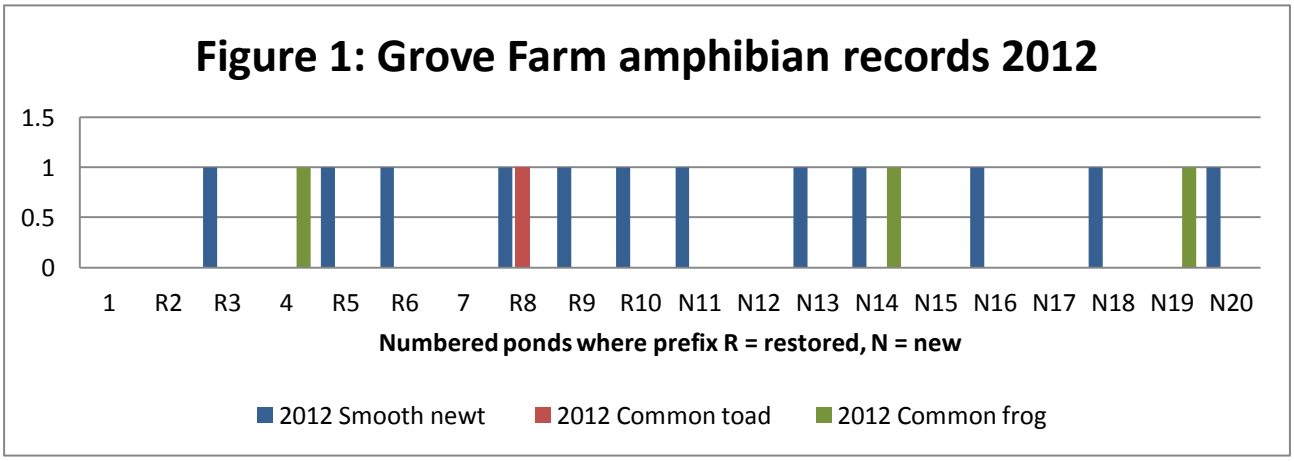
Round-leaved fluellen, dwarf spurge and fairy flax were all found around the field margins of Kiln Ground field. Photos: Juliet Hawkins

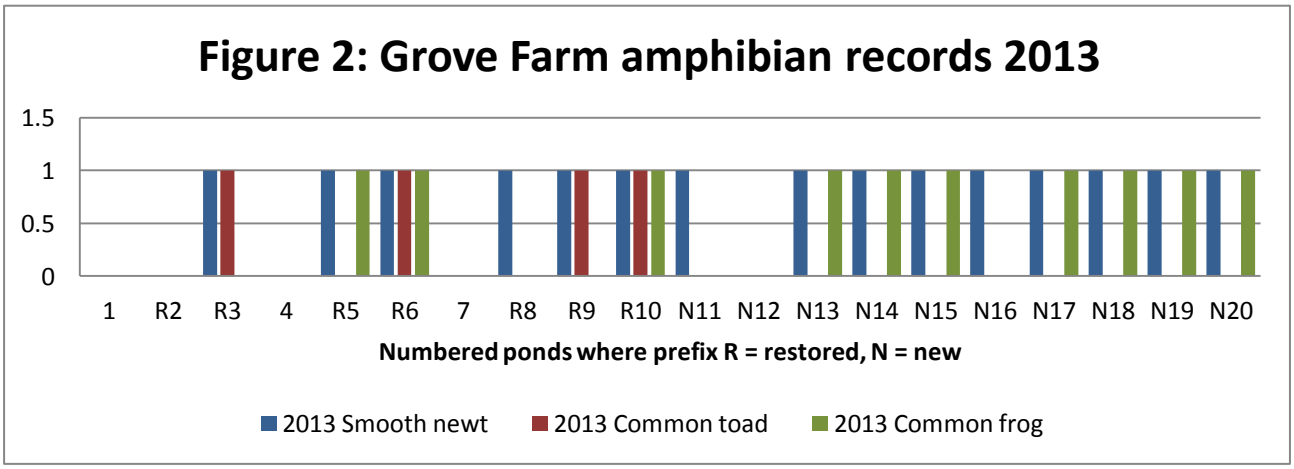
Monitoring of pond BAP species and aquatic invertebrates

There are now 20 new and old ponds at Grove Farm - such a large cluster of ponds in a small area presents an amazing opportunity to learn some conservation lessons and use them as a demonstration site for others embarking on pond conservation work. How fast does wildlife come in naturally? What size and what shape works well for which species? Regular U3A volunteer monitoring of the new ponds developing and the established old ponds following restoration is providing really valuable data.

Amphibians

As well as daytime amphibian searches, licensed newt volunteers went out for night torching sessions in spring. A few eggs of great crested newt (BAP species) were recorded in two of the oldest ponds in 2007 where the low numbers suggested they were a small population hanging on. N one have been found by volunteers or SWT staff since ponds have been restored but it is hoped that as habitat links are gradually improved between the new ponds, they will find their way to new and restored ponds. Figures 1 and 2 show how the common toad (BAP species) appears to be associated with the restored ancient ponds and after three years has only colonised one new pond suggesting it prefers the well vegetated ponds where its warty skin is good protection against well established predatory species – and that it is possibly slow to move along habitat corridors. One diseased toad was found at P8 in 2012 (but none there again in 2013) but by 2013, toads were recorded in 4/7 (57%) restored ponds but still none in any new ponds.





Note 1: New pond N12 – Millers Dry Pond – is only seasonally damp and dries out annually.

Figures 1 and 2 illustrate how quickly smooth newt (*pictured right*) have colonised new or recently restored ponds – by 2012 they were recorded in 6/10 (60%) of new ponds and a total of 12/17 (70%) restored/new ponds, and by 2013 they were recorded in 9/10 (90%) of new ponds (only the seasonally wet P12 did not have them) and 15/17 (88%) of restored/new ponds. This suggests that the habitat connectivity for easy movement – grass, scrub, hedges – between all the ponds is good.

Figures 1 and 2 also demonstrate the speed with which common frogs colonise – and seem to prefer - new ponds. By spring 2012 they had colonised 2/10 (20%) of new ponds created in autumn 2010, but by 2013 they had spread to 7/10 (70%) of new ponds, but were still only present in 3/7 (43%) of restored ponds. This suggests a possible preference for new ponds (possibly fewer predators but good protection from early pioneering stoneworts) and that the habitat connectivity between all the ponds allows for good movement between them. This is further supported by the fact that the only three new ponds the frogs were not found in were P11 which was created before the others (but extended in 2010) so may have had time for more predators to colonise and is furthest away from existing ponds; P12 (Millers Dry pond) which is only seasonally wet, and P16 (Thurston middle pond) which is furthest from a hedge and a ditch of all new ponds.

Aquatic invertebrates

Finding, catching and identifying aquatic insects in ponds on slippery clay is a challenge for anyone and volunteers need to work in pairs to haul each other out if they fall in! With SNS bursary-funded nets and specimen tubes, U3A volunteers collect and preserve carefully numbered specimens from their allocated ponds. These tubes are then sent to Adrian Chalkley who verifies the collections and collates the records of these - and as the county's freshwater invertebrate recorder, he is in a good position to put the importance of the finds in context.

So far 91 species of aquatic invertebrates have been recorded including six microscopic species of water flea; 24 species of water beetle from the tiny 2.5mm *Haliplus* species to larger 15-17mm long diving beetle *Colymbetes fuscus,* and three beetles which are Nationally Notable (Nb) Red Data Book species; three species of elegant pond skaters; leeches and many more. We have recorded every species of backswimmer in Suffolk on Grove Farm, not a common occurrence at one site, and the reserve has 12 species of lesser water boatman, one fifth of the British list. So, many of the records represent one or two of only a handful of county records for what may be very under-recorded species. Table 1 summarises the noteworthy species collected/recorded by the project. Appendix 1 and 2 provides full species lists.

Above left*: Notodromas monacha* - an Ostracod and a specialist swimming upside down along the bottom of the surface film, eating whatever is trapped there. It is the only record from Suffolk but our Ostracod records are almost non-existent and there is no national recording scheme. Above right: *Colymbetes fuscus* the largest water beetle (15-17mm long) of 24 species recorded at Grove Farm. Photos: Adrian Chalkley, Daisy Hawkins

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Table 1: Noteworthy aquatic invertebrates collected by volunteers in Grove Farm ponds (A Chalkley)

Species	Common name	Status	Suffolk context
Hesperocorixa moesta	A lesser water boatman	**Notable Nb**	7 other records since 1953, only one other from a farm pond
Berosus affinis	A water scavenger beetle	**Notable Nb**	5 archive records from 1899 but only 3 other farm pond or ditch records. Seems to be very widespread and uncommon in the county.
Hydroglyphus geminus	A lesser diving beetle	**Notable Nb**	Only 6 other records, the first in 1889, again widespread across the county
Ilybius chalconatus	A diving beetle	**Notable Nb**	Only 2 other records since 2000, 4 earlier, the first in 1955
Ferrissia clessiniana	Wautier's Limpet (introduced)	**Local**	Species introduced accidentally from North America now spreading across Britain. Suffolk - not often found, 10 records from Elveden Center Parcs since 2007, Bixley Decoy in 2010 and Brights Farm in 2011
Laccophilus minutus	A lesser diving beetle	**Local**	Local nationally but common in Suffolk
Notonecta maculata	A water boatman	**Local**	Local nationally but reasonably common/occasional in Suffolk 30 records
Notonecta viridis	A water boatman	**Local**	Local nationally but reasonably common/occasional in Suffolk 25 records
Plea minutissima	A lesser waterboatman	**Local**	Local nationally but reasonably common/occasional in Suffolk 22 records
Sigara limitata	A lesser water boatman	**Local**	Local nationally but reasonably common/occasional in Suffolk 25 records
Haliplus obliquus	A crawling water beetle	**Local**	Local nationally but Notable in Suffolk. 3 x 19th century records from 1893, 6 records 1900 to 1970, 3 more records in the next 30 years and 7 records since 2000. Said to be dependent on stoneworts
Haliplus sibericus	A crawling water beetle	**Local**	Local nationally but considered Notable in Suffolk 19 records, earliest in 1931, and only 5 since 2000
Hygrobia hermanni	The screech beetle	**Local**	Local nationally but common in Suffolk
Hygrotus confluens	A lesser diving beetle	**Local**	Local nationally rare in Suffolk. Only 9 records - 1898, 1948, 1955, 1976, 1979, 1985, 1986, 200 & 2003 So no more than 2 records each decade.
Hygrotus impressopunctatus	A lesser diving beetle	**Local**	Local nationally but reasonably common / occasional in Suffolk 29 records, 15 since 2000 - becoming more common
Noterus clavicornis	A lesser diving beetle	**Local**	Local nationally but common in Suffolk 99 records, expect its status to be downgraded in the next review
Notodromas monacha	An ostracod	**Local**	Only Suffolk record and there is no national recording scheme.

Status: Notable Nb: between 30 – 100 10km squares of the UK

Status: Local: Infrequently encountered and confined to a habitat type or a geographic area

Ponds in early stages of succession

Figures 3-6 illustrate the number of aquatic invertebrate species and plant species at each pond. The oldest seven ponds that have been restored, together with new pond 11 (the oldest of the new ponds), support the most invertebrate species, with the best six ponds supporting 25-36 invertebrate species per pond (Figure 3). This corresponds strongly, but not exclusively, with the ponds with the most plant species too (Figure 6) – the plants providing good shelter, breeding sites and food for a range of invertebrates.

The youngest ponds, created in September 2009, support a lower average of 12 aquatic invertebrate species per pond and this is unsurprising when one sees that the average number of plants per pond is 2-3 species with correspondingly provide fewer places to hide and breed. However, the importance of having some ponds in these early stages of succession (which mimics historic rotational pond management) must be emphasised as many species prefer these very bare-seeming ponds – and even those that dry up completely. For example, the charismatic dragonflies love bare mud: southern hawkers often lay their eggs in the damp exposed mud of the littoral/drawdown zone; black-tailed skimmers rest in the sun on bare clay banks; and common darter and broad-bodied chaser larvae like bare sandy and clayey sediments and are often the first to colonise new ponds. The bare ponds also attract early colonisation especially by backswimmers and pond skater and the bare mud is attractive to beetles for pupation and because some pioneer species like empty ponds - even puddles which dry up.

The bare ponds quickly become green with algae, the spores of which can blow in or be brought in by birds, which is followed by 'blanket' algae. The first insects to arrive will have already laid eggs by now and amongst the algae will be larvae of several types of fly which will occur in large numbers until predators arrive to consume them. The larger flying insects, notably bugs, damsel and dragon flies along with some pioneer beetle species will fly in from other ponds or nearby rivers as part of their natural dispersal and find a plentiful food supply amongst the larvae hidden in the strands of algae. Thus within a short time of digging a mini ecosystem builds up and the most noticeable members are the Pondskaters, Backswimmers, Corrixid bugs, small beetles and Odonata nymphs. Water fleas will appear, either from resting eggs called Ephippia blown or carried in or that lie buried from previous times within the soil (Ephippia can spring back to life after hundreds of years of dormancy). The water fleas multiply rapidly by parthenogenesis and eat the water clear again, leaving themselves at the mercy of small insect larvae that have by now appeared. And so the ecosystem continues its cycle.

Plants start to appear from the seed bank revealed by digging the pond and often some of the first to appear are the stoneworts. Some of those pioneer beetle species are attracted by this new food supply and two of the tiny crawling water beetles recorded at Grove Farm, *Haliplus confinis* and *Haliplus obliquus* are good examples of this; both of them infrequently recorded because they rely on their preference for eating Stoneworts. As larger plants establish and the stoneworts become shaded out and reduced in number specialist *Haliplus* will probably move on or become prey for more aggressive predators which move in on the now widening invertebrate community. Eventually our pond may become weed choked, silted up and overshaded and in need of clearing to let the cycle begin again, or indeed a new pond may be dug afresh. This natural cycle is best left to complete by itself rather than being short circuited by introducing plant or animal species, after all those specialised species mentioned above are in constant need of just the right stage in pond succession to move on to.

Figure 3: Total aquatic invertebrate species recorded at each Grove Farm pond by 2010-2013

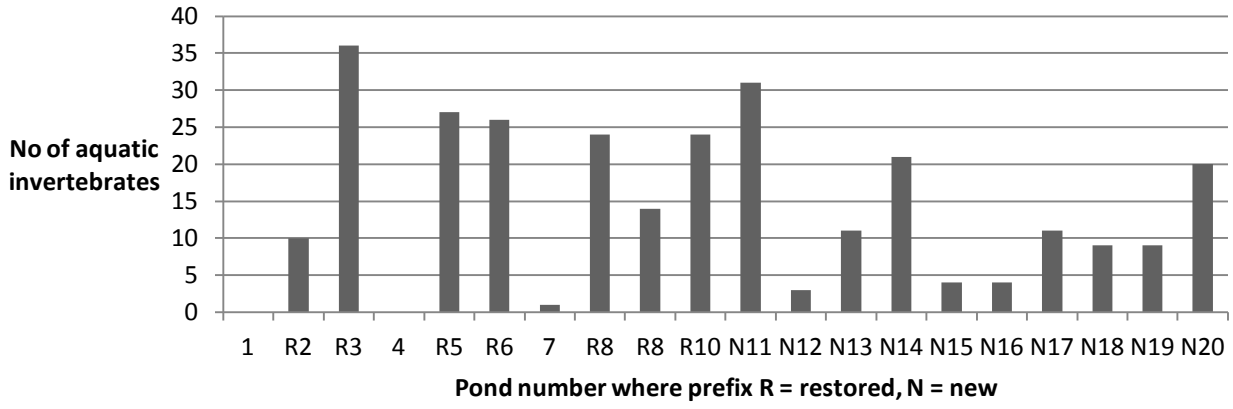


Figure 4: Addition of new aquatic invertebrate records at each Grove Farm pond each year 2010-2013

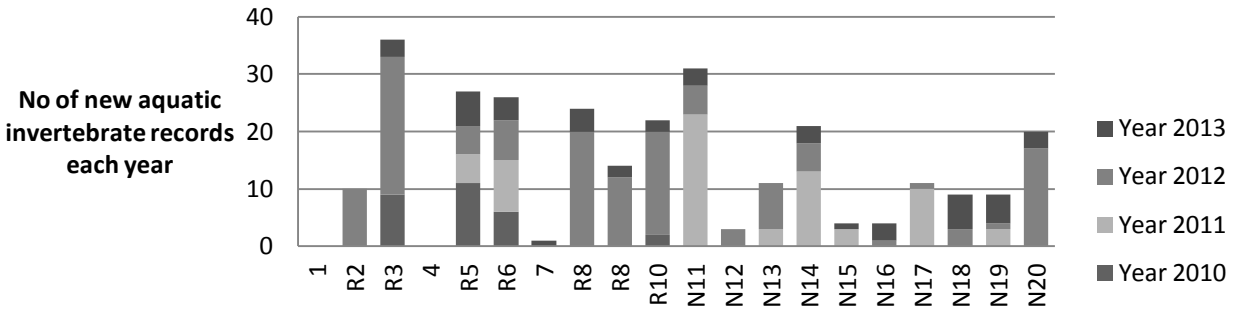


Figure 5: Total (minimum) number of aquatic plants* at each Grove Farm pond 2013

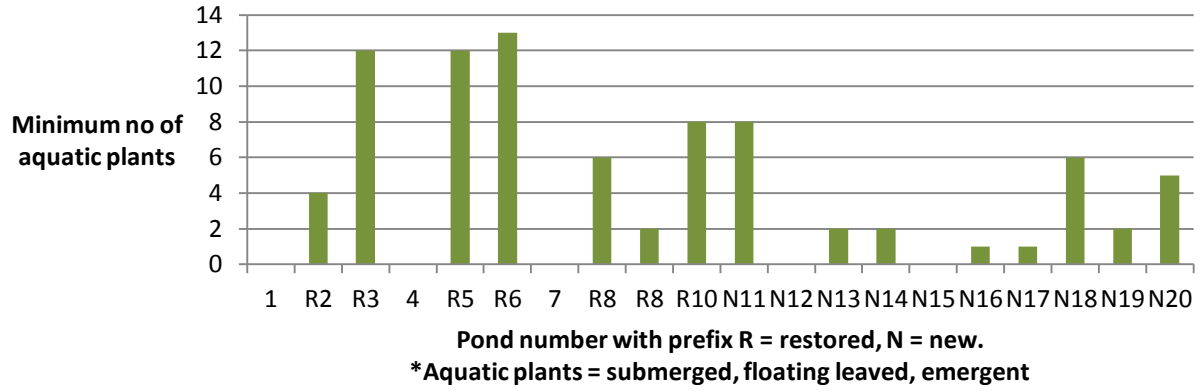
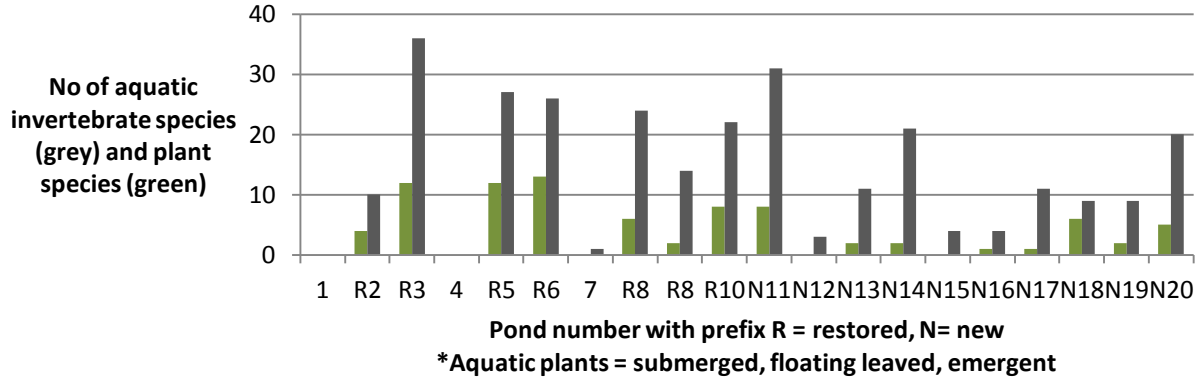
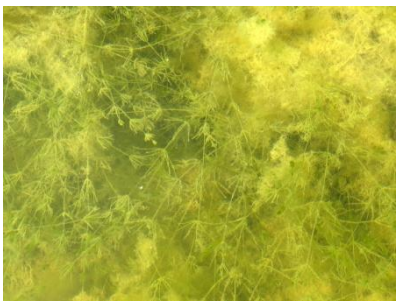


Figure 6: Total aquatic invertebrate species and plant species* recorded at each Grove Farm pond by 2013



Whilst a few ancient ponds were completely devoid of aquatic vegetation prior to restoration, several had a few species. Since restoration, partial or otherwise, the ancient ponds three ponds (R3 Tostock Ley Pond, R5 Tolypella Pond and R6 Grazing Marsh Pond) have 12 or more aquatic plant species (submerged, floating leaved and emergent) which have naturally regenerated from dormant seeds following light being let into them and, where appropriate, accumulated organic matter removed. The Countryside Survey (2007) figures suggest that 8.2 plant species is a typical average for a countryside pond, which means that a minimum of three restored ponds – and possibly more (R10 Barn Meadow Pond, N11 Kiln Ground Top Pond) – are considered of higher quality, based on plant species number, than the national average.



Excluding N12 Millers Dry Pond, the other nine new ponds have an average of 3.0 aquatic plant species – these mainly being delicate stonewort (*Chara virgata, pictured right*), creeping bent (*Agrostis stonolifera*) and blanketweed algae. Creeping bent is a valuable grass that grows at the pond edges and provides valuable cover for invertebrates and, for smooth newts, a substrate for egg laying. Great crested newt eggs are larger than smooth newts and, whilst they will occasionally lay eggs on large leaves of creeping bent, they tend to opt for broader grass leaves (such as Glyceria sp) and other plants such as watermint.

Ponds in early stages of succession with water that is free of a lot of competitive vegetation are incredibly important for some early pioneering plant species such as the rare stoneworts. Delicate stonewort was abundant in several new ponds where it forms valuable charophyte 'beds' with a high biomass which can accumulate large concentrations of nutrients which they retain for long periods due to their slow rate of decomposition. Their large surface area is colonised by micro-organisms which can support a large invertebrate population (when other aquatic plants have not yet colonised) and especially throughout winter (when other aquatic plants have died back).

At Grove Farm, the vulnerable/endangered early-spring flowering tassel stonewort, *Tolypella intricata (pictured right)*, was found in an established pond that had been restored in 2008, effectively creating bare, open water. This British Red Data Book and BAP species has only been found at seven sites in the UK (22 waterbodies) since 1970. By creating nine new ponds, all well linked by hedgerows, grass margins and cattle-grazed grassland, it is hoped that this rare stonewort's oospores will be moved to new ponds on the feet of cattle, birds and mammals – and continued recording effort will help us understand the ecology of this and other species. At Grove Farm it is very important to be vigilant in monitoring the stoneworts due to the presence of this rare species but so far, monitoring has not revealed tassel stonewort since its first and only tantalising appearance in P5 Tolypella pond.

Filamentous algae (multi-cellular 'blanket weed') tend to dominate in the first few years after pond creation or restoration (*pictured right in NP11 Kiln Ground Top Pond*). The clear, mineral-enriched waters with few plants and good light penetration to the depths allows algae to germinate in February and as the algae matures it floats to the surface forming unpleasant smelling algal mats of decaying algae. However unattractive it is, algae are very important members of a healthy, well-balanced pond ecosystem, providing food for species at the lower end of the food-chain. Gradually, as other macrophyte plant species colonise the pond, the dominance of stonewort and algae is likely to decline.

These restored and new ponds have 'lived through' some very different weather since 2009 resulting in widely fluctuating water levels. In July 2011 several ponds dried up completely; spring 2013 was very cold, followed by another very hot summer and now an exceedingly wet winter which has re-filled the ponds. We don't know how this might affect colonisation rates – some insects can't fly far and some bugs only fly in good conditions when food is plentiful and weather is favourable. In poor years a number of aquatic bugs re-absorb their wing muscles to be able to survive and overwinter which limits dispersal between ponds.

New pond 11, Millers Dry Pond, has caused consternation amongst some in that it is dry for most of the year so is effectively not a 'pond' and perhaps we should stop calling it one. However, the need of many invertebrates for warm and sunny conditions may be supplied by these sheltered south-facing slopes and banks with sparse vegetation and bare ground where the sun can penetrate to ground level for much of the day. Bare ground is used for basking, for hunting, for burrowing and nesting. Thus Millers Dry Area creates a valuable patch of dry ground in the scrub, grass, pond mosaic of Millers Field and should be valued for this. Monitoring of solitary bees, robber flies and other species would be a useful addition – and justification – for this site to demonstrate the site's value left as it is – and perhaps occasionally disturbed in the future to maintain open ground.

Have we achieved the aims of the SNS bursary?

Objective 1: To study how quickly rare arable flora returns to arable fields following a change in management of arable field margins and introduction of winter stubbles .

U3A volunteers have contributed valuable baseline records for arable flora prior to environmentally friendly changes in farming techniques and as the project evolves any corresponding changes can continue to be recorded.

Objective 2. A study of how quickly Biodiversity Action Plan species (great crested newt, toad, grass snake, tassel stonewort) and aquatic invertebrates colonise nine new (and several restored) ponds from existing ponds. Within this were the following objectives:

a. **To increase local/interested amateur naturalists' understanding of pond ecology, amphibian, plants and aquatic invertebrates** through two training workshops; collection of data and ongoing feedback/dialogue regarding recorded finds.

b. **To contribute records that help the understanding of colonisation of newly created ponds**.

c. **To establish whether it is possible to use non-specialist volunteers to help flag up sites of high conservation value which can then be studied further by specialists.**

U3A volunteers have received two training days in 2012 and in 2013 and support from SWT staff and county recorders Martin Sanford and Adrian Chalkley. They have recorded physical and biological changes in ponds following creation and restoration, including the colonisation of BAP species of ponds. They have regularly collected specimens which have been accurately identified by the county freshwater invertebrate recorder and Table 1 demonstrates the valuable list of pond species that have been recorded. Several volunteers took photographs, provided commentaries and summary reports of, for example, a newt surveying evening or thoughts on pond colonisation. And in turn, SWT, has provided feedback and, this report is hoped to summarise progress to date. Thus the use of non-specialist volunteers has flagged up ponds with 17 Nationally Notable Nb and Local species which can be studied further and certainly guide SWT management of these and other similar sites.

Research suggests that any on any one pond visit, a professional surveyor is only likely to find around 54% of the total species within the pond. The combined efforts of the U3A volunteers are undoubtedly catching a lot of species but it is too early to make great assertions on the rates of invertebrate colonisation of new ponds and we must be very careful about any conclusions we make. What we can say is that with the very great help of enthusiastic and dedicated Blackbourne U3A volunteers, we have some excellent baseline wildlife records with which to compare changes in the future. This snapshot of pond life will help naturalists and conservationists to assess the effects of changes in farm and pond management and possibly much longer term changes such as climate.

Importantly for both SWT and the U3A, feedback from U3A volunteers was that the progressive assembling of an inventory of the 'natural treasures' of Grove Farm had been "*absorbing, educational and good fun too*". The Wildlife Watching Group of the Blackbourne U3A fast became SWT's local ears and eyes and, in turn, the project so far has proved enormously rewarding for those involved.

Observations and photographs submitted to the group email indicate how wide ranging the U3A's records are – birds, bugs, beetles, dragonflies, deer and others. In 2014, the group turned their attention to some reptile monitoring and eight corrugated iron sheets were laid in the southern part of the farm for casual monitoring by anyone who happens to be close to the sheets and a systematic check of all 8. And so begins a new dimension to monitoring.

The project has had numerous mentions in the Millennium Pond Project's published report, SWT's own magazine including snippets in 2012 and a long article in spring 2014, three articles in SNS's White Admiral in autumn 2012 and spring 2013. Hopefully this ongoing and evolving collaborative venture will inspire others and provide a blueprint for similar monitoring schemes elsewhere in the county where both wildlife and people of the Third Age benefit. And right up to date ... in June 2014 the Freshwater Habitat Trust informed SWT that they had selected Grove Farm as one of their national Flagship Pond Sites in the UK and hope to bid successfully for Lottery Funds for further work.

U3A volunteers did not have the expertise to identify most aquatic invertebrates to species level but they collected specimens, took photos of some, and sent them to Adrian Chalkley for identification.

APPENDIX 1: Summary of the number of aquatic invertebrate records from each pond (A Chalkley)

Pond Name & number	Daisy Field 1	Red House 2	Tostock Ley 3	Parish boundary 4	Toly-pella 5	1st Low Meadow 6	Kiln Ground 7	Butchers West 8	Four Acres 9	Barn Meadow 10
No. Records	0	17	52	0	39	34	2	50	24	53
No. Species	0	12	39	0	31	26	2	30	16	33
Records from these years		2012 2013	2012 2013		2010 2011 2012 2013	2010 2011 2012 2013	2012 2013	2012 2013	2012 2013	2010 2012 2013

Pond Name & number	Kiln Ground Top 11	Millers Dry 12	Millers Middle 13	Millers Far 14	Further Thurston Near 15	Further Thurston Middle 16	Further Thurston Far 17	Kiln Meadow Long 18	Kiln Meadow Corner 19	Butchers East 20
No. Records	70	3	16	31	6	5	13	12	15	44
No. Species	35	3	12	21	6	5	12	11	12	27
Records from these years	2011 2012 2013	2012	2011 2012 2013	2011 2012 2013	2011 2013	2012 2013	2011 2012 2013	2012 2013	2011 2012 2013	2012 2013

APPENDIX 2: Complete Species List for Grove Farm Ponds; Invertebrates and Amphibians (A Chalkley)

COMPLETE SPECIES LIST, GROVE FARM PONDS 2010 - 2013:
100 SPECIES (the status of 16 are LOCAL & 5 are NOTABLE B)

	ORDER	SPECIES		Status
1	Amphibia	Bufo bufo	Common Toad	Common
2	Amphibia	Lissotriton vulgaris	Smooth Newt	Common
3	Amphibia	Rana temporaria	Common Frog	Common
4	Amphipoda	Crangonyx pseudogracilis	A Freshwater Shrimp	Locally common
5	Amphipoda	Gammarus pulex	A Freshwater Shrimp	Very Common
6	Cladocera	Ceriodaphnia reticulata	A Water Flea	Occasional
7	Cladocera	Chydorus sphaericus	A Water Flea	Common
8	Cladocera	Daphnia obtusa	A Water Flea	Common
9	Cladocera	Daphnia pulex	A Water Flea	Common
10	Cladocera	Simocephalus exspinosus	A Water Flea	Local
11	Cladocera	Simocephalus vetulus	A Water Flea	Common
12	Coleoptera	Acilius sulcatus	A Diving Beetle	Common
13	Coleoptera	Agabus bipustulatus	A Diving Beetle	Very common
14	Coleoptera	Agabus nebulosus	A Diving Beetle	Very common
15	Coleoptera	Agabus sp.	A Diving Beetle larva	
16	Coleoptera	Anacaena limbata	A Water Scavenger Beetle	Very common
17	Coleoptera	Berosus affinis	A Water Scavenger beetle	Notable B
18	Coleoptera	Colymbetes fuscus	A Diving Beetle	Very common
19	Coleoptera	Enochrus coarctatus	A Water Scavenger Beetle	Local
20	Coleoptera	Gyrinus substriatus	The Common Whirligig	Very common
21	Coleoptera	Haliplus confinis	A crawling water beetle	Common
22	Coleoptera	Haliplus lineatocollis	A crawling water beetle	Very common
23	Coleoptera	Haliplus obliquus	A crawling water beetle	Local
24	Coleoptera	Haliplus ruficollis	A crawling water beetle	Very common
25	Coleoptera	Haliplus sibericus	A crawling water beetle	Local
26	Coleoptera	Haliplus sp.	A crawling water beetle larva	
27	Coleoptera	Hydrobius fuscipes	A Water Scavenger Beetle	Very common
28	Coleoptera	Hydroglyphus geminus	A Lesser Diving Beetle	Notable B
29	Coleoptera	Hydroporus palustris	A Lesser Diving Beetle	Very common
30	Coleoptera	Hydroporus planus	A Lesser Diving Beetle	Common
31	Coleoptera	Hygrobia hermanni	The Screech Beetle	Local
32	Coleoptera	Hygrotus confluens	A Lesser Diving Beetle	Local
33	Coleoptera	Hygrotus impressopunctatus	A Lesser Diving Beetle	Local
34	Coleoptera	Hygrotus inaequalis	A Lesser Diving Beetle	Common
35	Coleoptera	Hyphydrus ovatus	A Lesser Diving Beetle	Common
36	Coleoptera	Ilybius chalconatus	A Diving Beetle	Notable B

37	Coleoptera	Laccophilinae sp.	A Lesser Diving Beetle larva	
38	Coleoptera	Laccophilus minutus	A Lesser Diving Beetle	Local
39	Coleoptera	Noterus clavicornis	The larger species of Noterus	Local
40	Coleoptera	Suphrodytes dorsalis	A Diving Beetle	Local
41	Collembola	Isotomurus palustris	A Springtail	Common
42	Collembola	Podura aquatica	A Springtail	Common
43	Collembola	Sminthurides aquaticus	A Springtail	Common
44	Copepoda	Copepoda sp.	A Cyclops	
45	Copepoda	Cyclopoida sp.	A Cyclops	
46	Diptera	Chaoborus sp.	A Phantom Midge Larva	
47	Diptera	Chironimidae sp.	A Midge Larva	
48	Diptera	Culex sp.	A Mosquito Larva	
49	Diptera	Oxycera sp.	A Fly Larva	
50	Ephemeroptera	Cloeon dipterum	The Pond Olive Mayfly	Very Common
51	Gastropoda	Anisus leucostoma	Button Ramshorn	Occasional
52	Gastropoda	Anisus vortex	Whirlpool Ramshorn	Very common
53	Gastropoda	Ferrissia clessiniana	Wautier's Limpet (introduced)	Local
54	Gastropoda	Lymnaea stagnalis	Great Pond Snail	Very common
55	Gastropoda	Radix balthica	Wandering Snail	Very common
56	Hemiptera	Corixa punctata	A Lesser Water Boatman	Very common
57	Hemiptera	Dipsocoromorpha sp.	A True Bug larva	
58	Hemiptera	Gerris gibbifer	A Pond Skater	Occasional
59	Hemiptera	Gerris lacustris	The Common Pond Skater	Very common
60	Hemiptera	Gerris thoracicus	A Pond Skater	Occasional
61	Hemiptera	Hesperocorixa linnaei	A Lesser Water Boatman	Occasional
62	Hemiptera	Hesperocorixa moesta	A Lesser Water Boatman	Notable B
63	Hemiptera	Hesperocorixa sahlbergi	A Lesser Water Boatman	Common
64	Hemiptera	Hydrometra stagnorum	The Water Measurer	Very common
65	Hemiptera	Nepa cinerea	Water Scorpion	Frequent
66	Hemiptera	Notonecta glauca	Common Water Boatman	Very common
67	Hemiptera	Notonecta maculata	A Water Boatman	Local
68	Hemiptera	Notonecta viridis	A Water Boatman	Local
69	Hemiptera	Plea minutissima	A Waterboatman	Local
70	Hemiptera	Sigara distincta	A Lesser Water Boatman	Occasional
71	Hemiptera	Sigara dorsalis	A Lesser Water Boatman	Very common
72	Hemiptera	Sigara lateralis	A Lesser Water Boatman	Common
73	Hemiptera	Sigara limitata	A Lesser Water Boatman	Local
74	Hemiptera	Sigara nigrolineata	A Lesser Water Boatman	Common
75	Heteroptera	Hesperocorixa linnaei	A Lesser Water Boatman	Occasional
76	Heteroptera	Hesperocorixa moesta	A Lesser Water Boatman	Notable B
77	Heteroptera	Sigara distincta	A Lesser Water Boatman	Occasional
78	Heteroptera	Sigara limitata	A Lesser Water Boatman	Local

79	Heteroptera	Sigara nigrolineata	A Lesser Water Boatman	Common
80	Hirudinea	Helobdella stagnalis	A Leech of aquatic invertebrates	Very common
81	Hirudinea	Theromyzon tessulatum	The Duck Leech	Common
82	Hydracarina	Water Mites sp.		
83	Isopoda	Asellus aquaticus	A Water Slater or Hog Louse	Common
84	Megaloptera	Sialis lutaria	The Common Alder fly	Common
85	Mollusca	Anisus vortex	Whirlpool Ramshorn	Very common
86	Mollusca	Radix balthica	Wandering Snail	Very common
87	Odonata	Aeshna cyanea	The Southern Hawker	Very Common
88	Odonata	Aeshna mixta	The Migrant Hawker	Common
89	Odonata	Anax imperator	The Emperor Dragonfly	Occasional
90	Odonata	Coenagrion puella	The Azure Damselfly	Common
91	Odonata	Ischnura elegans	The Blue-tailed Damselfly	Very common
92	Odonata	Libellula depressa	The Broad-bodied Chaser	Common
93	Odonata	Orthetrum cancellatum	The Black-tailed Skimmer	Common
94	Odonata	Pyrrhosoma nymphula	The Large Red Damselfly	Frequent
95	Odonata	Sympetrum sanguineum	The Ruddy Darter	Frequent
96	Odonata	Sympetrum striolatum	The Common Darter	Very common
97	Ostracoda	Notodromas monacha	An Surface Dwelling Ostracod	Unknown
98	Ostracoda	Ostracod sp.	An Ostracod	
99	Trichoptera	Limnephilus flavicornis	A cased caddis	Common
100	Tricladida	Polycelis nigra / tenuis	A Flatworm	Common

Appendix 3: Dragonflies recorded casually

1.	Odonata	Aeshna cyanea	The Southern Hawker
2.	Odonata	Aeshna mixta	The Migrant Hawker
3.	Odonata	Anax imperator	The Emperor Dragonfly
4.	Odonata	Coenagrion puella	The Azure Damselfly
5.	Odonata	Ischnura elegans	The Blue-tailed Damselfly
6.	Odonata	Libellula depressa	The Broad-bodied Chaser
7.	Odonata	Orthetrum cancellatum	The Black-tailed Skimmer
8.	Odonata	Pyrrhosoma nymphula	The Large Red Damselfly
9.	Odonata	Sympetrum sanguineum	The Ruddy Darter
10.	Odonata	Sympetrum striolatum	The Common Darter
11.	Odonata	Calopteryx splendens	Banded demoiselle
12.	Odonata	Aeshna grandis	Brown hawker
13.	Odonata	Libellula quadrimaculata	Four-spotted chaser
14.	Odonata	Enallagma cyathigerum	Common blue damselfly