

Eynsham Abbey Fishponds (Oxon)

Repeat Survey 2014



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Oxford
2014

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1 Introduction

This report presents summary results of a wetland plant and aquatic invertebrate survey undertaken by the Freshwater Habitats Trust at Eynsham Abbey Fishponds (Grid reference SP030 490), in Oxfordshire.

The work was commissioned by Eynsham Parish Council to give information about the ecological value of the site 10 years after a baseline survey was carried out (Pond Conservation, 2004) and subsequent restoration work.

2 Methods

The site is about 25 hectares in surface area, and extends west of Station Road to playing fields in the east (see map in Figure 1). The Chilbrook Stream runs to the south, and a stone wall separates the site from grassland (now gardens) to the north.

Wetland plants and aquatic macroinvertebrates were recorded at the site on 31st July 2014. Sampling was focused on the area of open water, i.e. the restored pond. Other areas surveyed included two ditches: the outflow ditch (Ditch E) and the ditch bordering the site at its eastern boundary (Ditch D). The other ditch areas A/C surveyed in 2004 were dry and were not surveyed in 2014 (see map in Figure 1).

Wetland plants¹ were surveyed by walking and wading each waterbody, noting the species present according to the National Pond Survey standardised method (Pond Action, 1998). For macroinvertebrates, non-standardised field searches were carried out and the specimens collected were identified to species level in the laboratory. As per the 2004 survey, the invertebrate groups recorded were: Amphipoda (shrimps), Bivalvia (bivalves, excluding *Pisidium* sp. which were recorded at genus level), Coleoptera (water beetles), Ephemeroptera (mayflies), Gastropoda (snails), Hemiptera (water bugs), Hirudinea (leeches), Isopoda (slaters), Megaloptera (alderflies), Odonata (dragonflies and damselflies), Plecoptera (stoneflies), Trichoptera (caddisflies) and Tricladida (flatworms).

Rapid water chemistry surveys were also carried out at key locations in and around the sites including the spring-fed well which feeds the pond, the outflow ditch, the stream and the pond itself (see map with results in Figure 3). The aim of the survey was primarily to provide information about potential nutrient pollution. Field kits were used to test for nitrate and phosphate concentrations (Kyoritsu), and a field meter were used for pH and conductivity (Hanna Combo pH/EC meter).

The current ecological value of the pond was assessed using the Priority Pond criteria (Table 1). Note that the PSYM score was based on the plant data only as the invertebrate sampling method was non-standardised. Expert knowledge and a comparison with the results of the 2004 baseline survey were used to assess changes in ecological value of the site as a whole. Management recommendations have been provided based on the results of the analysis and field observations.

¹The term 'wetland plant species' refers to species defined as wetland plants on the National Pond Survey field recording sheet list. Terrestrial plant species are not recorded.

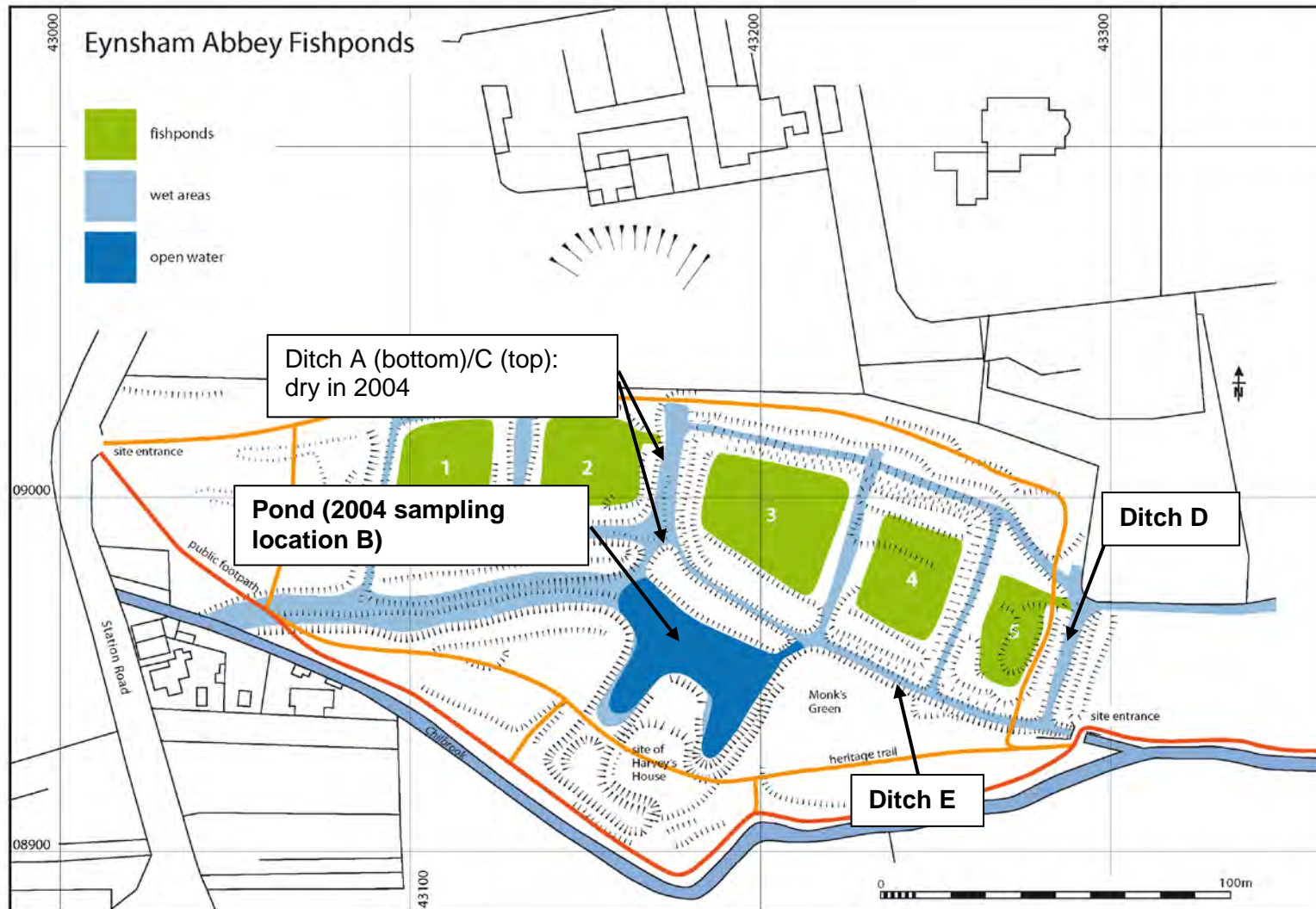


Figure 1. Map showing the location of 2004 and 2014 surveys. Areas sampled in 2014 in bold.

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Table 1. Priority Pond criteria

Criteria	Description
Criterion 1: Habitats of international importance	Ponds that meet criteria under Annex I of the Habitats Directive
Criterion 2: Species of high conservation importance	Ponds supporting Red Data Book species, UK BAP species, species fully protected under the Wildlife and Countryside Act Schedule 5 and 8, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species
Criterion 3: Exceptional assemblages of key biotic groups	Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (i.e. supporting ≥ 30 wetland plant species or ≥ 50 aquatic macroinvertebrate species using the National Pond Survey method)
Criterion 4: Ponds of high ecological quality	Ponds classified in the top PSYM category ('high') for ecological quality (i.e. having a PSYM score $\geq 75\%$). PSYM (the Predictive SYstem for Multimetrics) is a method for assessing the biological quality of still waters in England and Wales (Pond Conservation, 2002)
Criterion 5: Other important ponds	Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context e.g. pingos, duneslack ponds, machair ponds
See http://www.freshwaterhabitats.org.uk/projects/surveys/	

3 Survey Results

The biological diversity of the water environment at the **Abbey Fishponds site** as a whole has considerably increased since the baseline survey in 2004, and the subsequent management work. A total of 34 species of wetland plants and 72 species of macroinvertebrates were recorded in July 2014, an increase of 55% for wetland plants and 170% for macroinvertebrates (see Appendices for species lists).

The pond, which was excavated in what was a homogenous Reed Sweet-grass stand in 2004, now supports diverse communities of both wetland plants and macroinvertebrates. Overall, 27 species of wetland plants and 57 species of macroinvertebrates were recorded in the pond in 2014. The pond is a Priority Pond based on its macroinvertebrate community (Criteria 3), and narrowly misses the 30 species threshold for wetland plants (Criterion 3). The PSYM assessment returned a score of 73%, again narrowly missing the threshold of 75% to qualify as a Priority Pond (Criterion 4). The PSYM score was lowered by the lack of uncommon wetland plants recorded in the pond, and because the composition of the plant community suggested that the pond may be enriched by nutrients.

Plants which have benefitted from the more open conditions created by the pond restoration include truly aquatic species like water-crowfoot and Ivy-leaved Duckweed, and smaller emergent species which grow on exposed muddy margins like Pink Water-speedwell, Brooklime and Common Spike-rush. For macroinvertebrates, the most diverse habitat in the pond was the well vegetated, shallow margin (i.e. less than 10 cm in depth), and future management work should ensure that this type of habitat is maintained or enhanced. Deeper water supported only a few patches of aquatic plants and abundant sticklebacks, and so lower invertebrate species diversity and abundance. The new pond has provided a breeding

habitat for four species of dragonflies and damselflies, when none were recorded at the site in 2004. Clearly the management work has also greatly increased the number of water beetle, water snail and water bug species at the site (Figure 2 and Appendix 2). One nationally notable species was recorded at the site in 2014, *Microvelia pygmaea*, a usually wingless water cricket which benefits from good plant cover.

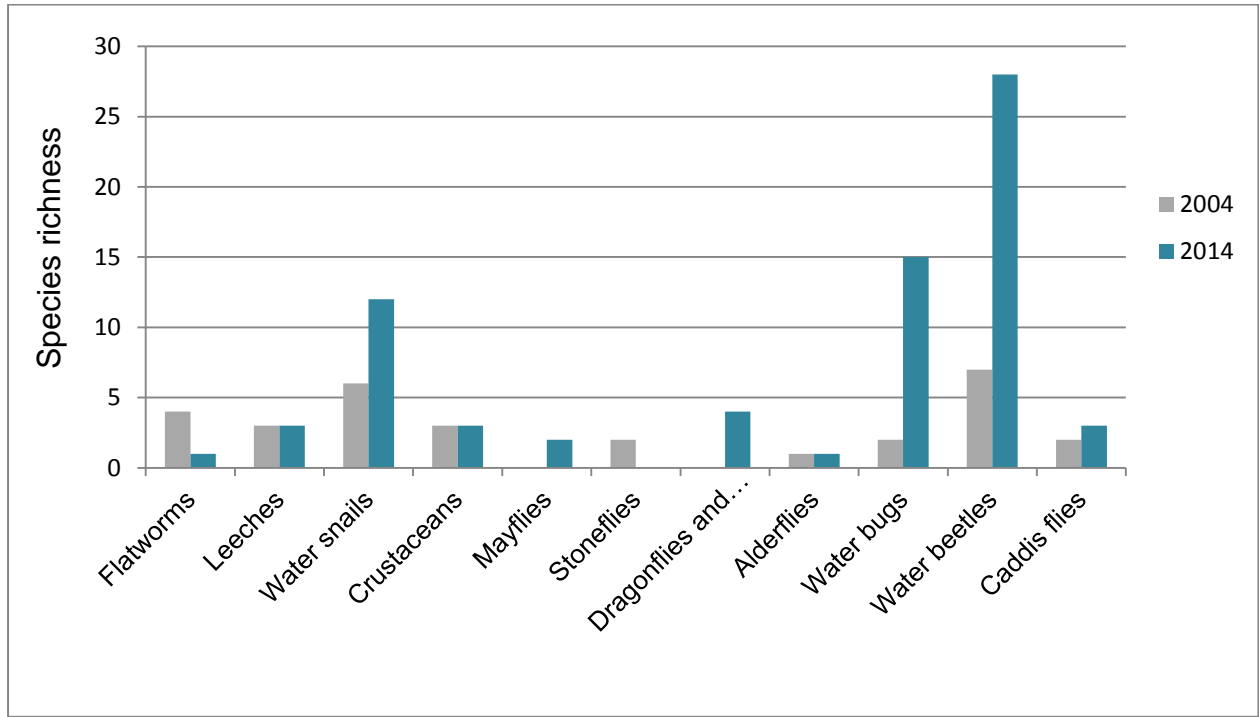


Figure 2. Number of macroinvertebrate species recorded at the Abbey Fish Pond site in 2004 and 2014 in each of the biological groups recorded.

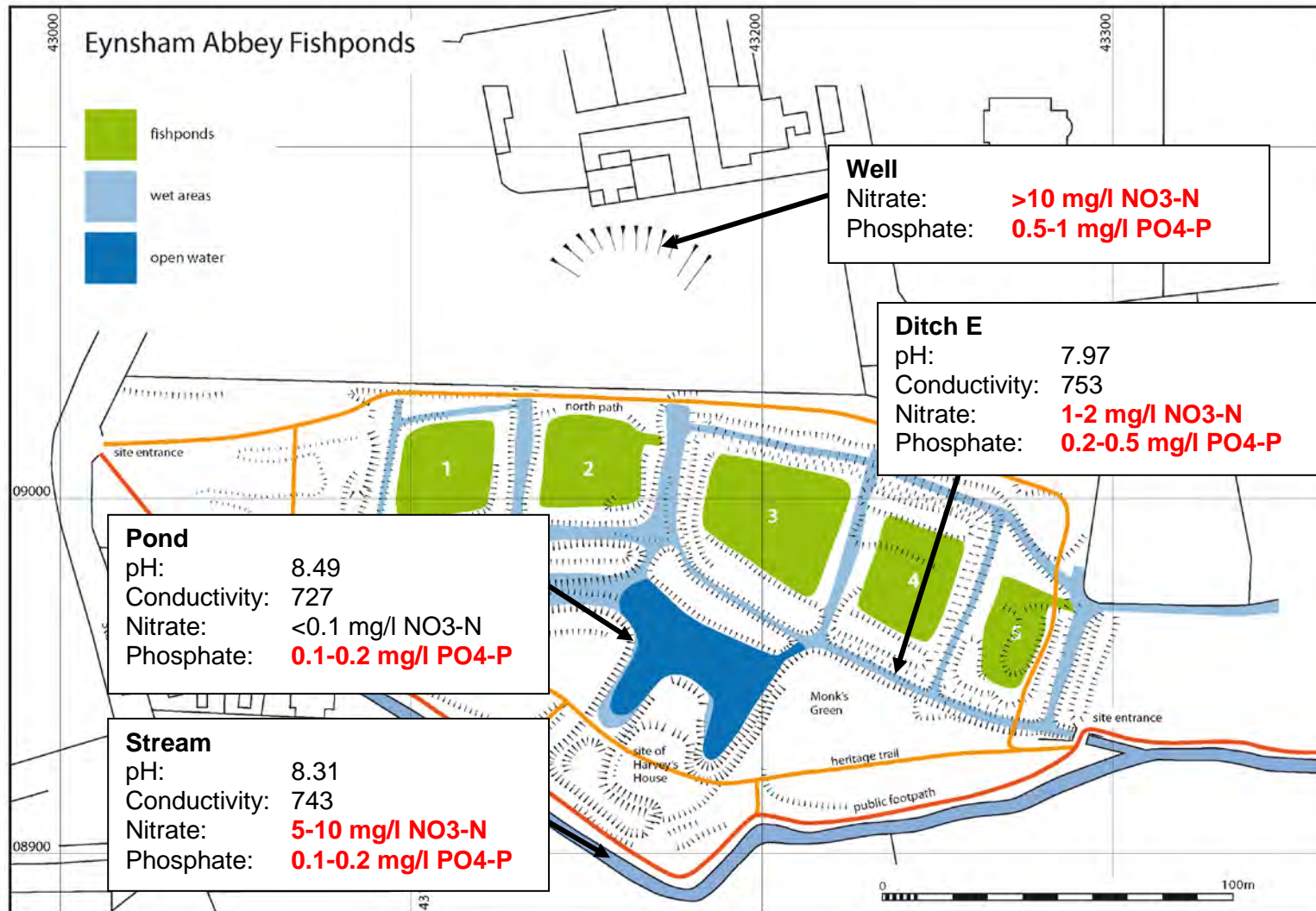


Figure 3. Map showing rapid water chemistry survey results (concentrations above thresholds of biological degradation are shown in bold/red).

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The ditches have also increased in diversity overall (see Appendix 2). Stoneflies were not recorded in 2014, and this is because the spring-fed ditch where they had been recorded in 2004 was dry and so could not be sampled in 2014. It is unclear why no stoneflies were recorded in Ditch E – the other area where these species were recorded in 2004. Ditch D – at the eastern boundary of the site - has considerably changed since the last survey. Indeed it has become silted up and overgrown, resembling a late succession pond rather than a flowing ditch, seemingly without detrimental effect on species diversity.

The **water chemistry** rapid survey showed that the water from the spring-fed neighbouring well, which normally feeds into the pond, has very high concentrations of nitrate and phosphate. Similarly both the stream and Ditch E - the only ditch that could be sampled in 2014 - were nutrient enriched. The pond itself had low nitrate concentration, and similar phosphate concentration to that of the stream. This, together with the gravelly substrate and the presence of the mayfly Angler's curse, suggests that there is groundwater inflow into the pond.

4 Recommendations

Based on the present evaluation, the work carried out of the past 10 years by Eynsham Parish Council has clearly improved the aquatic biodiversity of the Abbey Fishponds. Overall, the aim of management at the site should be to maintain habitat diversity and investigate potentially issues with water quality:

- **Water quality:** Further information on water quality should be gathered on a monthly or quarterly basis to increase the understanding of potential sources of nutrient pollution in the pond, particularly from the inflow from the spring-fed well. Monitoring could easily be done by volunteers at minimum cost and with minimum training if using similar rapid methods as those used in this survey. If the well is indeed shown to significantly contribute to nutrient enrichment in the pond, the creation of small wetland features in series should be considered to hold back nutrients and sediments before they reach the pond, or the water from the well should be diverted into the outflow ditch before it reaches the pond.
- **Habitat creation:** The biological diversity of the site may be further increased by creating other patches of open water in relatively homogenous tall emergent stands, but away from paths to prevent or at least minimise disturbance by dogs. These could be smaller and shallower than the current pond (e.g. 25 m², maximum depth 0.5 m), and could be created on a long-term rotation to maintain a range of successional stages. This is of course subject to the archaeological interest of the site.
- **Ditch management:** Management should take place to maintain a range of successional stages in the ditches, again on a long-term rotation (5-10 years). For example silt, overhanging trees and vegetation could be removed from about a quarter of Ditch D, i.e. the ditch bordering the eastern boundary of the site, to maintain some areas of open water and enhance plant diversity.
- **Pond management:** A light touch should be taken with managing the pond so that both marginal vegetation in the shallow water areas and submerged plant communities in deeper water are allowed to develop. The margins should also be managed to prevent

tall emergent plant, like sedges and Reed Sweet-grass, and trees like willows taking over.

Ideally further professional advice should be sought before management is carried out, and to provide on-site support for the contractor. Management work should be recorded (at least before/after photographs and dates) to inform future management and monitoring programmes.

5 References

Pond Conservation (2005) *Ecological Survey of Eynsham Abbey Fish Ponds*. The Freshwater Habitats Trust, Oxford.

Pond Action (1998) *The National Pond Survey (NPS) methods*. The Freshwater Habitats Trust, Oxford.

Appendix 1 Wetland plant species list

Survey Year			2004	2014			
Common name	Latin name	Conservation status	total for site	ditches	pond	total for site	new species recorded in 2014
Submerged species							
Water starwort species	<i>Callitriche</i> spp.	n/a			1	1	New
Water crowfoot species	<i>Ranunculus</i> spp.	n/a			1	1	New
Floating-leaved species							
Common Duckweed	<i>Lemna minor</i>	Common	1	1	1	1	
Ivy-leaved Duckweed	<i>Lemna trisulca</i>	Common			1	1	New
A water lily species	<i>Nymphaeaceae</i> spp. (exotic)	n/a			1	1	New
Amphibious bistort	<i>Persicaria amphibia</i>	Common	1	1	1	1	
Emergent species							
Creeping Bent	<i>Agrostis stolonifera</i>	Common	1		1	1	
Wild Angelica	<i>Angelica sylvestris</i>	Common	1	1	1	1	
Fool's Watercress	<i>Apium nodiflorum</i>	Common	1	1	1	1	
Marsh Marigold	<i>Caltha palustris</i>	Common	1			1	
Water Parsnip	<i>Berula erecta</i>	Common			1	1	New
Lesser Pond Sedge	<i>Carex acutiformis</i>	Common	1		1	1	
False Fox Sedge	<i>Carex otrubae</i>	Common			1	1	New
Great Pond Sedge	<i>Carex riparia</i>	Common	1		1	1	
Common Spike-rush	<i>Eleocharis palustris</i>	Common			1	1	New

Survey Year			2004	2014			
Common name	Latin name	Conservation status	total for site	ditches	pond	total for site	new species recorded in 2014
Great Willowherb	<i>Epilobium hirsutum</i>	Common	1	1	1	1	
Marsh Willowherb	<i>Epilobium palustre</i>	Common			1	1	New
Meadowsweet	<i>Filipendula ulmaria</i>	Common	1		1	1	
Reed Canary-grass	<i>Glyceria maxima</i>	Common	1	1	1	1	
Hard rush	<i>Juncus inflexus</i>	Common			1	1	New
Soft Rush	<i>Juncus effusus</i>	Common	1			1	
Gipsywort	<i>Lycopus europaeus</i>	Common	1	1	1	1	
Water Mint	<i>Mentha aquatica</i>	Common	1		1	1	
Water Forget-me-not	<i>Myosotis scorpioides</i>	Common	1	1		1	
Water Chickweed	<i>Myosoton aquaticum</i>	Common	1	1		1	
Reed Sweet-grass	<i>Phalaris arundinacea</i>	Common	1	1	1	1	
Celery-leaved Buttercup	<i>Ranunculus sceleratus</i>	Common			1	1	New
Watercress	<i>Rorripa nasturtium-aquaticum</i> (s.s.)	Common			1	1	New
Bittersweet	<i>Solanum dulcamara</i>	Common	1	1		1	
Marsh Woundwort	<i>Stachys palustris</i>	Common	1		1	1	
Common Comfrey	<i>Symphytum officinale</i>	Common	1			1	
Bulrush	<i>Typha latifolia</i>	Common	1		1	1	
Brooklime	<i>Veronica beccabunga</i>	Common	1	1		1	
Pink Water-speedwell	<i>Veronica catenata</i>	Common			1	1	New
Total species richness			22	12	27	34	12

Appendix 2 Macroinvertebrate species list

Survey Year	Common name	Latin name	National status	2004					2014					
				Site A	Site B	Site C	Ditch D	Ditch E	Total for site	Pond	Ditch D	Ditch E	Total for site	New species in 2014
	Flatworms													
	A flatworm	<i>Dendrocoelum lacteum</i>	Common		1					1				
	A flatworm	<i>Dugesia polychroa</i>	Common		1					1				
	A flatworm	<i>Polycelis felina</i>	Common				1			1				
	A flatworm	<i>Polycelis tenuis</i>	Common	1	1	1	1	1				1	1	
	Leeches													
	A leech	<i>Erpobdella octoculata</i>	Common	1	1	1	1	1		1		1	1	
	A leech	<i>Glossiphonia complanata</i>	Common		1	1		1		1		1	1	
	Duck leech	<i>Theromyzon tessulatum</i>	Common							1			1	new
	A leech	<i>Helobdella stagnalis</i>	Common		1					1				
	Water snails													
	Flat valve snail	<i>Valvata cristata</i>	Common				1			1		1	1	
	Marsh pond snail	<i>Lymnaea fusca (=palustris)</i>	Common		1		1	1			1		1	
	Great pond snail	<i>Lymnaea stagnalis</i>	Common							1	1		1	new
	Ear snail	<i>Radix (=Lymnaea) auricularia</i>	Common							1			1	new
	Wandering snail	<i>Radix (=Lymnaea) balthica</i>	Common		1	1				1			1	
	Button ramshorn	<i>Anisus leucostoma</i>	Common	1	1				1					
	Whirlpool ramshorn	<i>Anisus vortex</i>	Common	1						1	1	1	1	
	Twisted ramshorn	<i>Bathyomphalus contortus</i>	Common	1	1	1	1			1	1	1	1	
	Nautilus ramshorn	<i>Gyraulus crista</i>	Common									1	1	new
	Smooth ramshorn	<i>Gyraulus laevis</i>	Common							1			1	new
	Great ramshorn	<i>Planorbarius corneus</i>	Common							1	1		1	new
	Lake limpet	<i>Acroloxus lacustris</i>	Common									1	1	new
	A pea mussel	<i>Pisidium spp.</i>	Common							1		1	1	new
	Crustaceans													
	Water hoglouse	<i>Asellus aquaticus</i>	Common	1	1	1	1	1		1	1	1	1	
	Freshwater shrimp	<i>Crangonyx pseudogracilis</i>	Common		1					1	1	1	1	

Survey Year			2004						2014				
Common name	Latin name	National status	Site A	Site B	Site C	Ditch D	Ditch E	Total for site	Pond	Ditch D	Ditch E	Total for site	New species in 2014
Freshwater shrimp	<i>Gammarus pulex</i>	Common	1		1	1	1	1	1	1		1	
Mayflies													
Angler's curse	<i>Caenis horaria</i>	Common							1			1	new
Pond olive	<i>Cloeon dipterum</i>	Common							1	1		1	new
Stoneflies													
A stonefly	<i>Nemoura cinerea</i>	Common	1		1		1	1					
A stonefly	<i>Nemurella picteti</i>	Common	1		1		1	1					
Dragonflies/Damsel.													
Azure/Variable damselfly	<i>Coenagrion puella/pulchellum</i>	Common							1			1	new
Emperor dragonfly	<i>Anax imperator</i>	Common							1			1	new
A hawkler dragonfly	<i>Aeshna sp.</i>	n/a							1			1	new
Common darter	<i>Sympetrum striolatum</i>	Common							1	1		1	new
Alderfly													
An alderfly	<i>Sialis lutaria</i>	Common				1		1			1	1	
Water bugs													
Water scorpion	<i>Nepa cinerea</i>	Common							1			1	new
Water stick insect	<i>Ranatra linearis</i>	Common							1			1	new
Saucer bug	<i>Ilyocoris cimicoides</i>	Common							1			1	new
A greater water boatman	<i>Notonecta glauca</i>	Common							1	1		1	new
A lesser water boatman	<i>Corixa panzeri</i>	Common							1			1	new
A lesser water boatman	<i>Hesperocorixa castanea</i>	Common							1			1	new
A lesser water boatman	<i>Hesperocorixa sahlbergi</i>	Common								1		1	new
A lesser water boatman	<i>Sigara dorsalis</i>	Common							1	1		1	new
A lesser water boatman	<i>Sigara falleni</i>	Common							1			1	new

Survey Year	Common name	Latin name	National status	2004					2014					
				Site A	Site B	Site C	Ditch D	Ditch E	Total for site	Pond	Ditch D	Ditch E	Total for site	New species in 2014
	A lesser water boatman	<i>Sigara lateralis</i>	Common							1			1	new
	Water singer	<i>Micronecta scholtzi</i>	Common							1			1	new
	Least water boatman	<i>Plea minutissima</i>	Common							1			1	new
	A pond skater	<i>Gerris lacustris</i>	Common					1	1	1	1		1	
	A water cricket	<i>Microvelia pygmaea</i>	Notable b							1			1	new
	A water cricket	<i>Velia caprai</i>	Common	1		1	1			1	1		1	
	Water beetles													
	A whirligig beetle	<i>Gyrinus substriatus</i>	Common							1	1		1	new
	A crawling water beetle	<i>Halplus ruficollis</i>	Common							1			1	new
	A diving beetle	<i>Noterus clavicornis</i>	Common							1			1	new
	A diving beetle	<i>Acilius sulcatus</i>	Common							1			1	new
	A diving beetle	<i>Agabus sturmii</i>	Common								1	1	1	new
	A diving beetle	<i>Colymbetes fuscus</i>	Common		1					1			1	
	Great diving beetle	<i>Dytiscus marginalis</i>	Common							1			1	new
	A diving beetle	<i>Hydroglyphus geminus</i>	Common							1			1	new
	A diving beetle	<i>Hydroporus angustatus</i>	Common		1					1			1	
	A diving beetle	<i>Hydroporus palustris</i>	Common							1	1		1	new
	A diving beetle	<i>Hydroporus planus</i>	Common							1	1		1	new
	A diving beetle	<i>Hygrotus confluens</i>	Common							1			1	new
	A diving beetle	<i>Hygrotus impressopunctatus</i>	Common							1			1	new
	A diving beetle	<i>Hygrotus inaequalis</i>	Common							1	1		1	new
	A diving beetle	<i>Hyphydrus ovatus</i>	Common							1			1	new
	A diving beetle	<i>Ilybius fuliginosus</i>	Common								1		1	new
	A diving beetle	<i>Laccophilus minutus</i>	Common							1			1	new
	A diving beetle	<i>Platambus maculatus</i>	Common									1	1	new
	A scavenger beetle	<i>Anacaena globulus</i>	Common		1							1	1	
	A scavenger beetle	<i>Anacaena limbata</i>	Common		1	1		1	1	1	1	1	1	

Survey Year			2004						2014				
Common name	Latin name	National status	Site A	Site B	Site C	Ditch D	Ditch E	Total for site	Pond	Ditch D	Ditch E	Total for site	New species in 2014
A scavenger beetle	<i>Berosus affinis</i>	Common							1	1		1	new
A scavenger beetle	<i>Helochaeres lividus</i>	Common							1			1	new
A scavenger beetle	<i>Helophorus grandis</i>	Common		1				1					
A scavenger beetle	<i>Helophorus aequalis</i>	Common								1		1	new
A scavenger beetle	<i>Helophorus brevipalpis</i>	Common							1			1	new
A scavenger beetle	<i>Helophorus minutus</i>	Common							1	1		1	new
A scavenger beetle	<i>Helophorus obscurus</i>	Common		1	1		1	1	1			1	
A scavenger beetle	<i>Hydrobius fuscipes</i>	Common							1	1	1	1	new
A scavenger beetle	<i>Ochthebius minimus</i>	Common								1		1	new
A scavenger beetle	<i>Cercyon convexiusculus</i>	Common		1				1					
Caddis flies													
A cased caddis	<i>Glyptotaelius pellucidus</i>	Common							1			1	new
A innamon sedge	<i>Limnephilus lunatus</i>	Common		1	1	1	1	1			1	1	
A cased caddis	<i>Mystacides longicornis</i>	Common							1			1	new
	<i>Plectrocnemia conspersa</i>	Common	1		1			1					
	Total species		11	20	14	11	13	30	57	27	18	72	52