Cooper's Hill Pond 1: PSYM Survey Report

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Photo: Cooper's Hill Pond 1 (Josh Hellon)

Contents

1 Summary

PSYM (the Predictive SYstem for Multimetrics) was used to assess the condition of a pond at Cooper's Hill. The methodology was found to be a suitable way to rapidly assess the quality of ponds on our reserves.

2 Introduction

Figure 1 Map of Cooper's Hill Pond 1 (©Google 2016)

The following description of the pond area is taken from the management plan:

The underlying geology is part of the Greensand Ridge, which is named after the Lower Greensand rock, which forms a narrow ridge across Bedfordshire. Where the Ampthill Clay reaches the surface on the edge of the site, springs occur and form wet flushes supporting rich marsh plant communities. A small acidic mire has developed, supporting uncommon plant species and representing a type of habitat very rare in Bedfordshire.

The pond & mire area had become in the most part, covered with or shaded by trees. The ground flora is unusual and the invertebrate communities may be valuable. In the past, introductions have been made to the pond of non-native species by persons unknown. Species introduced include fish and water lily. The ponds have also been regularly dredged. Nettles are becoming dominant in areas through enrichment.

To improve the area, a gradual process of coppicing and tree clearance has been started. A reduction of the tree canopy would allow more light to reach the ground and also reduce the loss of water through transpiration from the trees. Trees can seriously deplete ground water in mire areas. The area surround the mash violet colony is cut at the end of summer to keep the area open. This area has been increased in 2011 and will require careful monitoring and management to ensure it remains open.

The area was enriched by nutrients following an incident at a nearby septic tank between 2000-2005.

3 Methodology

On the 14th June 2016, a surveyor attended the site (Josh Hellon – Monitoring & Research Manager).

The PSYM methodology was used to survey the freshwater macroinvertebrates and macrophytes at the site (Pond Conservation 2002). This method involves a standard sweep net survey of aquatic invertebrates, identified to family-level. Aquatic plants are surveyed from the edge of the pond and identified to species-level. Scores for each taxon recorded are used to calculate indexes for the pond.

4 Results

Site description

Figure 2 Ampthill Pond 1

The NGR for the site was TL02633794 (Altitude: 100m). Turbidity at the pond was low to moderate, with ochre colouration. 5% of the pond surface was overhung by trees. Emergent vegetation covered 30% of the pond surface, dominated by yellow flag iris *Iris pseudacorus.* The area of the pond was approximately 190m2. An inflow was present at one end of the pond. The pond margin was not grazed. The substrate was dominated by clay/earth.

Invertebrate & plant survey

Table 1 PSYM results for Cooper's Hill Pond 1

Plant metrics	
No. of submerged + marginal plant species (not including floating leaved)	11
Number of uncommon plant species	1
Trophic Ranking Score (TRS)	9.6
Invertebrates metrics	
ASPT	4.6
Odonata + Megaloptera (OM) families	2
Coleoptera families	3

11 aquatic plant species were recorded. The only plant species considered uncommon was rigid hornwort *Ceratophyllum demersum.*

13 invertebrate taxa were found. The presence of hawker dragonfly larvae (Aeshnidae) and caddis larvae (Limnephilidae) indicate good biological water quality. Three beetle families were recorded and two dragonfly/damselfly families.

PSYM analysis is not currently available to calculate predicted scores. This will be possible in 2016/2017 through the Freshwater Habitat Trust's Pondnet scheme.

5 Conclusions

PSYM provides a rapid way to assess the ponds on Wildlife Trust reserves. The indices will enable a comparison between ponds, and over time at a single site.

The Pondnet scheme will enable results to be uploaded rapidly to the national monitoring scheme and will automatically calculate indices for the site. The Waternet portal is expected to be available for this purpose by the end of 2016.

6 References

Pond Conservation, 2002. A guide to monitoring the ecological quality of ponds and canals using PSYM.

Appendices

Appendix 1 species lists and index calculation

PLANT LIST

R = Rarity Score, T = Trophic Ranking Score (TRS)

Enter 1 if species present

	R	T	Emergent Plants
	1		Achillea ptarmica
	1		Acorus calamus
	1		Agrostis canina
	1		Agrostis stolonifera
	#		Alisma gramineum
	2		Alisma lanceolatum
	1	9	Alisma plantago-aquatica
	2		Alopecurus aequalis
	4		Alopecurus borealis
	1		Alopecurus geniculatus
	2		Anagallis tenella
	2		Andromeda polifolia
	1		Angelica archangelica
	1		Angelica sylvestris
	2		Apium graveolens
	1	10	Apium nodiflorum
	#		Apium repens
	2		Baldellia ranunculoides
	2	10	Berula erecta
	2		Bidens cernua
	1		Bidens connata
	1		Bidens frondosa
	2		Bidens tripartita
	2		Blysmus compressus
	2		Bolboschoenus maritimus
	2		Butomus umbellatus
	2		Calamagrostis canescens
	2		Calamagrostis epigejos
	8		Calamagrostis purpurea
	8		Calamagrostis stricta
	#		Calamogrostis scotica
	1		Calla palustris
	1	7	Caltha palustris
	1		Cardamine amara
	1		Cardamine pratensis
	2		Carex acuta
	1	10	Carex acutiformis
	4		Carex appropinquata
	2		Carex aquatilis
	2		Carex curta
	2		Carex diandra
	1		Carex disticha
	1		Carex echinata
	2	10	Carex elata
	4		Carex elongata
	1		Carex flacca
	1		Carex hostiana
	2		Carex laevigata
	2	4	Carex lasiocarpa
	2	4	Carex limosa
	1	5	Carex nigra
	1		Carex oedocarpa
	1		Carex otrubae
	1		Carex panicea
	2	10	Carex paniculata
	1		Carex pendula
	2	10	Carex pseudocyperus
	1		Carex pulicaris
	1	10	Carex riparia
	1	5.3	Carex rostrata
	2		Carex spicata
	2		Carex vesicaria
	1		Carex viridula
	#		Carex vulpina
	1		Carex sp.
	2		Catabrosa aquatica
	4		Cicuta virosa
	2		Cirsium dissectum
1	1		Cirsium palustre
	2		Cladium mariscus
	1		Conium maculatum
	1		Crassula helmsii
	1		Crepis paludosa
	#		Cyperus fuscus
	4		Cyperus longus
	2		Dactylorhiza sp (undet.)
	#		Damasonium alisma
	1		Deschampsia cespitosa
	2		Drosera anglica
	1		Drosera binata
	1		Drosera capensis
	2		Drosera intermedia
	1		Drosera rotundifolia
	#		Dryopteris cristata
	2		Eleocharis acicularis
	8		Eleocharis austriaca
	2		Eleocharis multicaulis
	1		Eleocharis palustris
	2		Eleocharis quinqueflora
	2		Eleocharis uniglumis
	2		Epilobium alsinifolium
	2		Epilobium anagallidifolium
	1		Epilobium brunnescens
	1		Epilobium ciliatum

Enter 1 if species present

	R	T	Emergent Plants (con
	1		Epilobium hirsutum
	1		Epilobium obscurum
	1		Epilobium palustre
	1		Epilobium parviflorum
	1		Epilobium tetragonum
	2		Epipactis palustris
	1		Equisetum fluviatile
	1		Equisetum palustre
	1		Erica tetralix
	1	2.5	Eriophorum angustifolium
	#		Eriophorum gracile
	2		Eriophorum latifolium
	1		Eriophorum vaginatum
	1		Eupatorium cannabinum
	1		Filipendula ulmaria
	2		Galium boreale
	8		Galium constrictum
	1		Galium palustre
	2		Galium uliginosum
	1		Geum rivale
	2		Glyceria declinata
1	1		Glyceria fluitans
	1	10	Glyceria maxima
	2		Glyceria notata
	1		Gnaphalium uliginosum
	1		Hydrocotyle vulgaris
	2		Hypericum elodes
	1		Hypericum tetrapterum
	4		Hypericum undulatum
	2		Impatiens capensis
	1		Impatiens glandulifera
	4		Impatiens noli-tangere
1	1		Iris pseudacorus
	1		Isolepis setacea
	1		Juncus acutiflorus
	1		Juncus articulatus
	1		Juncus bufonius agg.
	1	5.3	Juncus bulbosus
	2		Juncus compressus
	1		Juncus conglomeratus
1	1		Juncus effusus
	2		Juncus foliosus
	1		Juncus inflexus
	#		Juncus pygmaeus
	2		Juncus subnodulosus
	4		Lathyrus palustris
	#		Leersia oryzoides
	#		Liparis loeselii
	1		Lotus pedunculatus
	1		Luzula luzuloides
	2		Luzula sylvatica
	1		Lychnis flos-cuculi
1	1		Lycopus europaeus
	1		Lysimachia nummularia
	1		Lysimachia terrestris
	4		Lysimachia thyrsiflora
	2		Lysimachia vulgaris
	#		Lythrum hyssopifolium
	2		Lythrum portula
	1		Lythrum salicaria
	1	7.3	Mentha aquatica
	#		Mentha pulegium
	1	5.3	Menyanthes trifoliata
	1		Mimulus guttatus
	1		Mimulus luteus
	#		Minuartia stricta
	1		Molinia caerulea
	1		Montia fontana
	1	7.7	Myosotis laxa
1	1	9	Myosotis scorpioides
	1		Myosotis secunda
	4		Myosotis stolonifera
	1		Myosotis sp (undet.).
	2		Myosoton aquaticum
	1		Myrica gale
	1		Narthecium ossifragum
	2		Oenanthe aquatica
	1		Oenanthe crocata
	2		Oenanthe fistulosa
	2		Oenanthe lachenalii
	2		Oenanthe pimpinelloides
	4		Oenanthe silaifolia
	2		Osmunda regalis
	2		Parnassia palustris
	1		Pedicularis palustris
1	1	10	Persicaria hydropiper
	1		Persicaria maculosa
	2		Persicaria minor
	4		Persicaria mitis
	1		Petasites hybridus
	1		Petasites japonicus
	4		Peucedanum palustre
	1	8.5	Phalaris arundinacea
	1	7.3	Phragmites australis

Enter 1 if species present

	R	T	Emergent Plants (cont'd
	4	6	Pilularia globulifera
	2		Pinguicula lusitanica
	1		Pinguicula vulgaris
	1		Potentilla erecta
	1	5	Potentilla palustris
	1		Pulicaria dysenterica
	#		Pulicaria vulgaris
	1		Ranunculus ficaria
	1		Ranunculus flammula
	2	10	Ranunculus hederaceus
	2		Ranunculus lingua
	2		Ranunculus omiophyllus
	#		Ranunculus ophioglossifolius
	#		Ranunculus reptans
	1	10	Ranunculus sceleratus
	2		Rhynchospora alba
	4		Rhynchospora fusca
	2		Rorippa amphibia
	8		Rorripa islandica
	2	10	Rorippa microphylla
1	1	10	Rorippa nasturtium-aquaticum
	1	10	Rorippa (undet.).
	1		Rorippa palustris
	2	10	Rumex hydrolapathum
	2		Rumex maritimus
	2		Rumex palustris
	1		Sagina procumbens
	1		Sagittaria latifolia
	2		Samolus valerandi
	2	8	Schoenoplectus lacustris
	#		Schoenoplectus pungens
	2		Schoenoplectus tabernaemont
	#		Schoenoplectus triqueter
	#		Schoenus ferrugineus
	2		Schoenus nigricans
	#		Scorzonera humilis
	1		Scrophularia auriculata
1	1		Scutellaria galericulata
	1		Senecio aquaticus
	1		Senecio fluviatilis
	#		Senecio paludosus
	4		Sium latifolium
	1	10	Solanum dulcamara
	4		Sonchus palustris
	1	9	Sparganium erectum
	1		Stachys palustris
	2		Stellaria palustris
	1		Stellaria uliginosa
	1		Symphytum officinale
	#		Teucrium scordium
	2		Thalictrum flavum
	4		Thelypteris palustris
	2		Tofieldia pusilla
	1		Trichophorum cespitosum
	1		Triglochin palustre
	2	10	Typha angustifolia
	1	9	Typha latifolia
	2		Valeriana dioica
	1		Vallisneria spiralis
	1		Veronica anagallis-aquatica
	1	10	Veronica beccabunga
	2		Veronica catenata
	1	6	Veronica scutellata
	1		Veronica sp. (undet.)
	1		Viola palustris
	#		Viola persicifolia
	1		Unknown exotic

	R	T	Floating-leaved Plants
	1		Azolla filiculoides
	2		Hydrocharis morsus-ranae
	1		Hydrocotyle ranunculoides
	2		Lemna gibba
1	1	9	Lemna minor
	1		Lemna minuta
	1	10	Lemna trisulca
	4		Luronium natans
	1		Nuphar advena
	2	9	Nuphar lutea
	4	7	Nuphar pumila
	2	7	Nymphaea alba
	1		Nymphaea sp. (exotic)
	4		Nymphoides peltata
	1	9	Persicaria amphibia
	1		Potamogeton natans
	1	4	Potamogeton polygonifolius
	2		Riccia fluitans
	2		Ricciocarpus natans
	2		Spirodela polyrhiza
	4		Wolffia arrhiza

Enter 1 if species present

	R	T	Submerged Plants
	2	6	Apium inundatum
	1		Aponogeton distachyos
	1		Cabomba caroliniana
	2		Callitriche brutia
	1	6	Callitriche hamulata
	2	9	Callitriche hermaphroditica
	2		Callitriche obtusangula
	2		Callitriche platycarpa
	1	7	Callitriche stagnalis
	4		Callitriche truncata
1	1		C. stagnalis/platycarpa agg.
	1		C. hamulata/brutia agg.
	1		Callitriche sp. (undet.)
1	2	10	Ceratophyllum demersum
	2		Ceratophyllum submersum
	2	7	Chara sp.
	1		Egeria densa
	4	7	Elatine hexandra
	4		Elatine hydropiper
	2		Eleogiton fluitans
	1		Elodea callitrichoides
	1	7	Elodea canadensis
	1	10	Elodea nuttallii
	8		Eriocaulon aquaticum
	1	6	Fontinalis antipyretica
	2		Groenlandia densa
	2	8	Hippuris vulgaris
	2		Hottonia palustris
	4		Isoetes echinospora
	2	5	Isoetes lacustris
	1		Lagarosiphon major
	2	7	Littorella uniflora
	2	5	Lobelia dortmanna
	8		Ludwigia palustris
	1	7	Myriophyllum alterniflorum
	1		Myriophyllum aquaticum
	2	9	Myriophyllum spicatum
	4		Myriophyllum verticillatum
	4		Najas flexilis
	2	7	Nitella sp.
	2		Oenanthe fluviatilis
	#		Potamogeton acutifolius
	2	6	Potamogeton alpinus
	2	7	Potamogeton berchtoldii
	4		Potamogeton coloratus
	4		Potamogeton compressus
	1	10	Potamogeton crispus
	#		Potamogeton epihydrus
	4	10	Potamogeton filiformis
	2	10	Potamogeton friesii
	2	7	Potamogeton gramineus
	2	10	Potamogeton lucens
	8		Potamogeton nodosus
	2	8	Potamogeton obtusifolius
	1	10	Potamogeton pectinatus
	2	7	Potamogeton perfoliatus
	2	9	Potamogeton praelongus
	2	9	Potamogeton pusillus
	8		Potamogeton rutilus
	4	10	Potamogeton trichoides
	2	10	Ranunculus aquatilis
	2	10	Ranunculus baudotii
	2	10	Ranunculus circinatus
	2		Ranunculus fluitans
	2	7	Ranunculus peltatus
	2	9	Ranunculus penicillatus
	2	9	Ranunculus trichophyllus
	#		Ranunculus tripartitus
	1		Ranunculus sp. (undet.)
	1		Sagittaria rigida
	1		Sagittaria sagittifolia
	2		Sagittaria subulata
	2	4	Sparganium angustifolium
	1	10	Sparganium emersum
	2		Sparganium natans
	1	3	Sphagnum sp.
	4		Stratiotes aloides
	2	4	Subularia aquatica
	4		Tolypella sp.
	2		Utricularia australis
	2	4	Utricularia intermedia
	2	4	Utricularia minor
	2	5	Utricularia vulgaris
	1		Vallisneria spiralis
	2	10	Zannichellia palustris

11	Number of emergent & submerged species
1	Number of uncommon species (with a rarity score
9.60	Trophic Ranking Score (TRS)

NOTES: Species whose Rarity Score is in an unshaded box are uncommon species often introduced to sites (see Preston *et al* 2002). If the species is likely have been introduced, do not include it in the "Number of uncommon species" total score. You can change it by removing the rarity score for the specific species (i.e. 2, 4, 8, 16 or 32) and replacing it with 1.

>>>

MACROINVERTEBRATE LIST: Enter 1 if group is present; remember to fill in ASPT, OM and Cole boxes

Group 1 taxa (BMWP:	ASPT	OM	Cole.
Siphlonuridae			
Heptageniidae			
Leptophlebiidae			
Ephemerellidae			
Potamanthidae			
Ephemeridae			
Taeniopterygidae			
Leuctridae			
Capniidae			
Perlodidae			
Perlidae			
Chloroperlidae			
Aphelocheiridae			
Phryganeidae			
Molannidae			
Beraeidae			
Odontoceridae			
Leptoceridae			
Goeridae			
Lepidostomatidae			
Brachycentridae			
Sericostomatidae			
No. of taxa	0		
Group 2 taxa (BMWP: 8)			
Astacidae			
Lestidae			
Calopterygidae (Agriidae)			
Gomphidae			
Cordulegasteridae			
Aeshnidae	1	1	
Corduliidae			
Libellulidae			
Philopotamidae			
Psychomyiidae			
No. of taxa	1	1	

Group 3 taxa (BMWP: 7)	ASPT	OM	Cole.
Caenidae			
Nemouridae			
acophilidae (Glossomatidae)			
Polycentropodidae			
Limnephilidae	1		
No. of taxa	1		
Group 4 taxa (BMWP: 6)			
Neritidae			
Viviparidae			
Ancylidae (Acroloxidae)			
Hydroptilidae			
Unionidae			
Corophiidae			
ammaridae (Crangonyctidae)			
Platycnemididae			
Coenagriidae	1	1	
No. of taxa	1	1	
Group 5 taxa (BMWP: 5)			
Planariidae (Dugesiidae)			
Dendrocoelidae			
Mesovelidae			
Hydrometridae			
Gerridae	1		
Nepidae			
Naucoridae			
Notonectidae	1		
Pleidae			
Corixidae	1		
Haliplidae	1		1
Hygrobiidae			
Dytiscidae (Noteridae)	1		1
Gyrinidae			
Hydrophilidae (Hydraenidae)	1		1
Dryopidae			
Elmidae			
Hydropsychidae			
Tipulidae			
Simuliidae			
No. of taxa	6		3

Group 6 taxa (BMW	ASPT	OM	Cole.
Baetidae			
Sialidae			
Piscicolidae			
No. of taxa	0	0	
Group 7 taxa (BMWP: 3)			
Valvatidae			
ydrobiidae (Bithyniidae)			
Lymnaeidae	1		
Physidae			
Planorbidae			
Sphaeriidae			
Glossiphoniidae			
Hirudinidae			
Erpobdellidae			
Asellidae	1		
No. of taxa	2		
Group 8 taxa (BMWP: 2)			
Chironomidae	1		
No. of taxa	1		
Group 9 taxa (BMWP: 1)			
Oligochaeta	1		
No. of taxa	1		
TOTAL NO. OF TA	13		
TOTAL BMWP SC	60		
ASPT	4.6		
NO. OF OM TAXA		2	
NO. COLEOPT. TAXA			3