Follow-up Ecological Survey of the Coy Pond Gardens section of the Bourne Stream, Poole, Dorset

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Introduction

A follow-up ecological survey of the Bourne Stream as it runs through Coy Pond Gardens was commissioned in order to assess the state of the stream, two years after major restructuring works were undertaken. The stream was resurveyed using exactly the same protocol, at the same location, at the same time of year and by the same consultant giving a high degree of correspondence between surveys and therefore giving a high degree of confidence in the accuracy of the data comparison.

The work was carried out by Robert Aquilina on 11th August 2005 and the report presented in November 2005.

Methods

Aquatic invertebrates were collected using a standardised, 3 minute timed method, using a hand net from the major habitats in the stream (stands of different wetland plants, distinctive substrates, tree roots etc.). Kick sampling was employed to disturb the stream bed with the dislodged invertebrates being washed downstream into the net. A further 1 minute search of larger objects such as logs and stones was also carried out. The material collected was returned to the laboratory for sorting and identification using a binocular microscope. All major macroinvertebrate groups were recorded to species level, where life-history stage allowed, except for True Flies (Diptera), for which there is little information on species level identification and national distribution. The invertebrate groups recorded were: Bivalvia (bivalves, excluding *Pisidium* sp.), Coleoptera (water beetles), Crustacea (slaters and shrimps), Ephemeroptera (mayflies), Gastropoda (snails), Hemiptera (water bugs), Hirudinea (leeches), Megaloptera (alderflies), Odonata (dragonflies and damselflies), Plecoptera (stoneflies), Trichoptera (caddisflies) and Tricladida (flatworms).

Aquatic macrophytes were recorded from the streambed and bankside below the bankfull height (ie where they would be submerged during times of flood). This was used as a qualitative comparison with data from the previous survey but does not contribute to the quantitative conservation assessment.

Conservation assessment methodology

The evaluation of the conservation value of streams is based on the presence of macroinvertebrates. The level to which identification is made is typically to family level only, although full species lists were produced as part of this assessment in order to ensure that rare species were recognised and inventoried for the site. The BMWP (Biological Monitoring Working party) scores are then used to generate an index for the site. These scores reflect the sensitivity of the families of macroinvertebrates to oxygen depletion and thus to either organic (BOD) or chemical (COD) pollution that reduces the oxygen levels in the environment.

The BMWP score can then be used to assign a quality category to the stream based on the scale below.

BMWP score	Category	Interpretation
0-10	Very poor	Heavily polluted
11-40	Poor	Polluted or impacted
41-70	Moderate	Moderately impacted
71-100	Good	Clean but slightly impacted
>100	Very good	Unpolluted, unimpacted

Scores are not rigidly defined but are open to interpretation depending on the physical and environmental characteristics of the stream. For example, low habitat diversity will generate lower BMWP scores but this does not necessarily indicate pollution, merely that the environment is impacted by lack of mesohabitats.

The results of a previous survey, carried out 26th August 2003, allow an assessment of the changes that have occurred in the intervening two years (see http://www.bournestreampartnership.org.uk/ecological_surveys.htm for the previous survey).

Sample site

The site of the survey was at the uppermost end of Coy Pond gardens at SZ064922 from the point at which the stream exits the culvert to the second footbridge. This was the same location as the previous survey although the stream and banks have been extensively re-contoured to provide a more varied selection of stream habitats and floodplain. The site is pictured on the cover of this report.

Survey results

Species lists for the macroinvertebrates and macrophytes are presented in an Appendix.

The list of macroinvertebrates recorded with 30 species and a BMWP score of 94 indicates a good quality site with clean water and is a clear improvement on the previous survey with 20 species and a BMWP score of 76. Although the latest survey has mostly added species to the list there are a couple of species that have disappeared (caddis flies) which is probably due to the change in the physical structure of the stream. Previously it was highly channelled, with a gravel substrate throughout but it now shows much greater variation with sand and mud banks, pools and vegetated bars. This has resulted in a decline in the riffle nature of the stream at this point which explains the reduction in these particular caddis species which rely on fast-flowing water over gravel. These are both common species and are found elsewhere along the Bourne Stream.

The vegetation surveyed represents a smaller area than that surveyed previously. This is because the groundworks have created a floodplain that naturally separates the stream from the surrounding field. Everything within the floodplain was recorded but the field

vegetation was ignored. This still resulted in an increased species list with 42 species as compared with 16 previously (from equivalent environments). However at least 10 species were introduced with the planting scheme that was carried out with the groundworks improvements. This does not detract from the results as the previous survey noted a number of introduced species anyway, which are still present. The desired result of increasing the number of wetland plant species has been achieved.

Conservation assessment

The restructuring of the stream has been successful in introducing greater diversity of physical habitats which is reflected in the increased diversity of both plants and macroinvertebrates recorded in this survey.

The water quality based on the BMWP score for macroinvertebrates would be considered good. It is not possible to conclude whether this is due to an improvement in water quality or simply an improvement in the habitat diversity. However, based on recent surveys of other sections of the Bourne Stream carried out by this consultant, it is likely that both factors are contributing to the improved score.

A survey carried out in 2001 indicated a stream with poor water quality dominated by pollution tolerant invertebrates. The current situation is of a stream with good water quality and a diverse range of macroinvertebrates and plants.

Survey date	**2001**	**2003**	**2005**
BMWP score	35 (derived)	76	94
Species richness	n/a	20	30

Trends in water quality and conservation value based on macroinvertebrates.

References

Aquilina (2003) Baseline ecological survey of Coy Pond Gardens.
At: http://www.bournestreampartnership.org.uk/ecological_surveys.htm

Appendix

Macroinvertebrate species recorded at Coy Pond Gardens

Species	Common name	Family	BMWP score
Lymnaea peregra	Wandering snail	Lymnaeidae	3
Potamopyrgus antipodarum	Jenkins spire shell	Hydrobiidae	3
Physa sp.	None (snail)	Physidae	3
Planorbis carinatus	Keeld ramshorn	Planorbidae	3
Ancylus fluviatilis	River limpet	Ancylidae	6
Pisidium sp.	Pea mussel	Sphaeridae	3
Muscalarium lacustre	Orb mussel	Sphaeridae	
Polycelis nigra	None (flatworm)	Planariidae	5
Polycelis tenuis	None (flatworm)	Planariidae	
Dugesia tigrina	None (flatworm)	Planariidae	
Erpobdella testacea	None (leech)	Erpobdellidae	3
Theromyzon tessalatum	None (leech)	Glossiphoniidae	3
Helobdella stagnalis	None (leech)	Glossiphoniidae	
Lumbriculus variegatus	None (worm)	Oligochaeta	1
Eiseniella tetraeda	None (worm)	Oligochaeta	
Asellus aquaticus	Water hog-louse	Asellidae	3
Crangonyx pseudogracilis	Freshwater shrimp	Gammaridae	6
Baetis rhodani	Mayfly (large dark olive)	Baetidae	4
Cordulegaster boltonii	Golden-ringed Dragonfly	Cordulegasteridae	8
Aeshna sp.	A Hawker dragonfly	Aeshnidae	8
Gerris gibbifer	Pond skater	Gerridae	5
Velia sp.(nymph)	Water cricket	Veliidae	0
Notonecta sp.(nymph)	Water boatman	Notonectidae	5
Haliplus lineatocollis	Crawling water beetle	Haliplidae	5
Gyrinus substriatus	Whirligig beetle	Gyrinidae	5
Culex sp.	Mosquito	Culicidae	0
Chironomid sp.	Non-biting midge	Chironomidae	2
Tipula sp.	Crane fly	Tipulidae	5
Simulium sp.	Black fly	Simuliidae	5
Stratiomyid sp.	Fly	Stratiomyidae	0
Totals	**30 species**		**94**

Macrophytes recorded at Coy Pond Gardens

Common name	Species	Location
Ferns		
Male fern	*Dryopteris filix-mas*	Bank
Hartstongue	*Phyllitis (Asplenium) scolopendrium*	Bank
Sedges and Rushes		
Pendulous sedge	*Carex pendula*	Bank
Soft rush	*Juncus effusus*	Bank
Galingale (introduced)	*Cyperus eragrostis*	Bank
Floating Clubrush	*Eleogiton (Scirpus) fluitans*	Stream
Grasses		
Floating sweet-grass	*Glyceria fluitans*	Stream bed
Creeping Bent	*Agrostis stolonifera*	Stream bed
Flowering plants		
Water Plantain	*Alisma plantago-aquatica*	Stream
Rigid hornwort	*Ceratophyllum demersum*	Stream
Curled Pondweed	*Potamogeton crispus*	Stream
Cattail (bulrush) (introduced)	*Typha latifolia*	Bank
Redshank	*Polygonum persicaria*	Bank
Purple loosestrife	*Lythrum salicaria*	Bank
Great willowherb	*Epilobium hirsutum*	Bank
Marsh willowherb	*Epilobium palustre*	Bank
Evening primrose (introduced)	*Oenothera biennis agg.*	Bank
Mint (introduced ?)	*Mentha sp*	Bank
Common fleabane	*Pulicaria dysenterica*	Bank
Michaelmas daisy (introduced)	*Aster novi-belgii*	Bank
Goldenrod (introduced)	*Solidago canadensis*	Bank
Meadow Buttercup	*Ranunculus acris*	Bank
Dandelion	*Taraxacum* sect *vulgaria*	Bank
Purple toadflax (introduced ?)	*Linaria purpurea*	Bank
Common Nettle	*Urtica dioica*	Bank
Ribwort Plantain	*Plantago lanceolata*	Bank
Greater Plantain	*Plantago major*	Bank
Marsh woundwort	*Stachys palustris*	Bank
Brooklime	*Veronica beccabunga*	Stream
Water forgetmenot	*Myosotis scorpiodes*	Bank
Tutsan (introduced)	*Hypericum androsaemum*	Bank
Lilac (introduced)	*Syringa vulgaris*	Bank
Lesser water-parsnip	*Berula erecta*	Bank
Wild carrot	*Daucus carota*	Bank
Stone parsley	*Sison amomum*	Stream
Fennel	*Foeniculum vulgare*	Bank
Hemlock Water Dropwort	*Oenanthe crocata*	Stream
Butterbur (introduced)	*Petasites hybridus*	Bank
Meadowsweet	*Filipendula ulmaria*	Bank
Iris (introduced)	*Iris sp*	Bank
Hedge bindweed	*Calystegia sepium*	Bank
Ragwort	*Senecio jacobaea*	Bank
Submerged plant species	**3**	
Floating-leaved plant species	**0**	
Emergent plant species	**6**	
Total plant species	**42**	