

**G.7            Aquatic Invertebrate**



## Damhead Creek - Aquatic Invertebrate Survey

### Sampling Methodology

The drainage ditches were sampled using the Environment Agency's own standard method (Environment Agency, 1999). This comprises a combined four-minute sample, including the following:

- three-minute sweep. Care is taken to ensure that all habitats and microhabitats are (proportionally) represented in the sample;
- One-minute active search divided between hand-netting for surface dwelling species (done prior to the three-minute sweep), such as pondskaters (Gerridae) and water crickets (Veliidae) and hand searching for invertebrates adhering to submerged logs, stones or other debris, such as leeches (Hirudinea) and caddisfly larvae (Trichoptera).

Care was taken to ensure that all habitats and micro-habitats, both typical and atypical, were proportionally represented in the sample, and that surface-active insects and species adhered to submerged logs and stones were included.

The ponds were sampled in accordance with the PSYM methodology, devised by Pond Conservation. The methodology is closely aligned to the methods developed by the Environment Agency for flowing waters. PYM employs a three-minute netting with a one-minute active search.

Typically, the Environment Agency identify macro-invertebrate samples to family level, this is satisfactory for use in their predictive model, RIVPACS. PSYM analysis also requires family level data. However for the purpose of this study the samples of invertebrates were identified to species level, where possible. The only exceptions were the larvae of true flies (Diptera); water beetles (Coleoptera) and water bugs (Hemiptera), which were identified mostly to family only. Individuals of each identified taxon (i.e. species, family or order as appropriate) were then counted.

### Sampling

Three ponds and two ditches were sampled. The sampling was undertaken after a prolonged dry spell and water levels in Pond 1 were noticeably low. This linear pond had effectively been divided in two as a shallow section in the middle had dried out. Consequently two samples were taken from this pond. Two samples were also taken from both ditches to ensure that the data generated is representative of the waterbodies on site. In total eight samples were taken, sorted and identified to species where possible.

### Site descriptions

Pond 1 had fairly steep earth banks and was dominated by Bulrush (*Typha latifolia*). The substrate was fine silt on clay and there was filamentous algae on the bed. The open water was between 30cm and 60cm deep. This pond was approximately 10m by 10m.

Pond 2A and Pond 2B were both set in open grassland with gently sloping banks that were in part covered by large pebbles and small cobbles. The bed was very fine silt and there was some filamentous algae present. Emergent vegetation was dominated a sedge (*Carex* sp.) with some Reed Sweet Grass (*Glyceria maxima*). There were large areas of open water and the depth varied between 40cm and 120cm. Pond 2A was approximately 7m wide and 30m long; Pond 2B was of similar dimensions.

Pond 3 was in a small steep-sided depression. It was choked with low-lying soft grasses and there was little open water. The water was about 20cm deep at the time of sampling and this pond may dry out in long dry summers. The pond was approximately 5m by 5m.

Ditch 1 was very narrow, about 1.5m wide and 30cm deep, there was no perceptible flow. The marginal vegetation, predominantly sedges, rushes (*Juncus* sp.) and bulrush had encroached and were shading out the small areas of open water.

Ditch 2 was 5m wide and 50cm deep with a deep silty, muddy bed. The marginal vegetation included sedges and rushes, in places bulrush had encroached and filled the channel. There was no perceptible flow and few macrophytes, occasional soft hornwort (*Ceratophyllum submersum*), there was also filamentous algae and the green alga, *Enteromorpha* sp., more commonly associated with saltwater.

### **Brief Interpretation of Data**

- Ponds 1 and 2 and particularly 2A supported reasonably diverse fauna. Pond 2 was particularly good for dragonflies and damselflies.
- Pond 3 was species-poor, it is likely that this pond dries out; several of the beetle species are closely associated with marshy, muddy habitats. The importance of temporary ponds is often overlooked and they can often support key species.
- There was evidence of brackish influence at several sites with various brackish water-tolerant species including; *Gammarus duebeni* (freshwater shrimp); *Asellus meridianus* (water slater), *Ishura elegans* (blue-tailed damselfly) and *Potamopyrgus jenkinsi* (Jenkins spire shell)
- Ditch 2 appeared to receive the greatest brackish influence, it was closer to the estuary and included the ditch shrimp (*Palaemonetes varians*), this species will only survive for short periods of time in freshwater. This ditch also supported good populations of the introduced shrimp *Gammarus tigrinus*, normally only found in estuaries.
- The saline influence may explain the poor species-richness in Ditch 2.
- *Lestes sponsa* (emerald damselfly) was found at two sites. The vulnerable species *Lestes dryas* (scarce emerald damselfly) is known to exist in the area; it will tolerate brackish water but larvae were not found in this survey.

### **Summary**

Overall an interesting site improved by the diversity of habitats; permanent ponds, a temporary pond, ditches with differing physical characteristics and different levels of encroachment by emergent macrophytes ensure a good diversity of macro-invertebrates across the site as a whole. Another key factor is the varying degree of brackish influence clearly evident from the species present.

## **References**

Environment Agency (1999). Procedures for collecting and analysing macro-invertebrate samples. The Environment Agency.

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

**Aquatic macro invertebrate data: Damhead Creek Power Station**

SPECIES	Description	Ecological Information	BMWP Score	Site Reference								
				Pond 1	Pond 2A	Pond 2B	Pond 3	Ditch 1A	Ditch 1B	Ditch 2A	Ditch 2B	
<b>INSECTA</b>												
<b>TRICHOPTERA</b>	Caddisflies											
<b>Leptoceridae</b>			<b>10</b>									
<i>Oecetis furva</i>	A caddisfly	Usually found in large ponds in marginal vegetation. Widespread and locally common.			2	1					1	
<i>1st instar (indet.)</i>				1								
<b>EPHEMEROPTERA</b>	Mayflies											
<b>Baetidae</b>			<b>4</b>	2	19	2						
<i>Cloeon dipterum</i>	A mayfly	Found in small productive ponds. Common and locally abundant.			2	2						
<b>Caenidae</b>			<b>7</b>									
<i>Caenis sp.</i>				3								
<i>Caenis robusta</i>	A mayfly	Found in ponds, rivers and canals especially in mud rich in organic matter.		19	7							
<b>ODONATA</b>	Dragonflies and Damselflies											
<b>Libellulidae</b>			<b>8</b>									
<i>Orthetrum cancellatum</i>	Black-tailed Skimmer	Breeds in ponds and lakes, often clay and gravel pits. Found in south-east England and increasing it's range.		2							1	
<i>Sympetrum striolatum</i>	Common Darter	Breeds in ponds, rivers and canals. Common and often abundant.			5							
<i>Sympetrum sanguinaum</i>	Ruddy Darter	Breeds in marshes, dykes, ponds and lakes, particularly associated with stands of Bulrush. Less common than previously in south-east due to habitat loss.					2					
<i>Sympetrum sp.</i>											3	
<b>Aeshnidae</b>			<b>8</b>									
<i>Aeshna sp.</i>					19	4	1				2	
<i>Aeshna mixta</i>	Migrant Hawker	Once considered a migrant now regularly breeding in south and east.			3							
<b>Lestidae</b>			<b>8</b>									
<i>Lestes sponsa</i>	Emerald Damselfly	Breeds in ponds, marshes, canals and weedy ditches. Locally common.			1			1				
<b>Coenagriidae</b>			<b>6</b>		50	7		16			12	
<i>Ishura sp.</i>					31							
<i>Ishnura elegans</i>	Blue tailed damselfly	Found in weedy ponds, lakes and brackish waters. Very common.			70	15		7			11	
<i>Enallagma cyathigerum</i>	Common Blue Damselfly	Breeds in ponds, lakes, canals, slowmoving streams and in brackish water. Abundant throughout Britain.				6						
<b>COLEOPTERA</b>												
<b>Dytiscidae</b>	Diving beetles		<b>5</b>									
<i>Hygrotus inaequalis</i>	A diving beetle	Ponds, bays in lakes and slow water. Fairly common across Britain.		1	2							
<i>Lacophilus minutus</i>	A diving beetle	Common in lowland ponds and ditches.			4							



SPECIES	Description	Ecological Information	BMWP Score	Site Reference								
				Pond 1	Pond 2A	Pond 2B	Pond 3	Ditch 1A	Ditch 1B	Ditch 2A	Ditch 2B	
<b>INSECTA</b>												
<i>Asellus meridianus</i>	Common hog-louse	Common and often found in brackish water.		1			4		3			
<b>Gammaridae</b>	Water shrimp		6									
<i>Gammarus duebeni</i>	A water shrimp	Common and often found in brackish water.						30	54			4
<i>Gammarus tigrinus</i>	A water shrimp	Introduced from North America, often found in estuaries, also present in freshwater.									54	80
<b>Palaemonidae</b>	Common prawn		N/S									
<i>Palaemonetes varians</i>	Ditch shrimp	Found in brackish water ponds, ditches and lagoons.									3	1
<b>Ostracoda</b>	Ostracods		N/S		40	110						
<b>MOLLUSCA</b>												
<b>GASTROPODA</b>												
<b>Hydrobiidae</b>	Mud snails		3									
<i>Potamopyrgus jenkinsi</i>	Jenkins' spire snail	Common in moving waters, rare in closed ponds. Often found in brackish water.		26	206			1450	52	532		58
<b>Lymnaeidae</b>	Pond snails		3									
<i>Lymnaea peregra</i>	Wandering pond snail			18	366	374		53	90	22		
<b>Planorbidae</b>	Ramshorn snails	Very common across the British Isles. Found in a wide variety of habitats.	3									
<i>Planorbis cristata</i>	Nautilus ramshorn	Common and often found in small ponds.		1								
<b>DIPTERA</b>												
<b>Chironomidae</b>	Non-biting midges		2									
Unidentified larvae				12	190	266	6	16			114	20
<b>Tipulidae</b>	Cranefly larvae		5		12	2	7			2		
<b>Other Diptera</b>												
Culicidae	Mosquito larvae		N/S				4					
Stratiomyidae			N/S		1							1
Ephydriidae			N/S								1	
Unidentified dipterum larvae			N/S					4	2			
<b>OTHER TAXA</b>												
<i>Collembola</i>	Spring-tails		N/S				2					
<i>Hydracarina</i>	Water mites		N/S		3							
			<b>Total BMWP Score</b>	<b>58</b>	<b>94</b>	<b>68</b>	<b>36</b>	<b>58</b>	<b>30</b>	<b>61</b>	<b>16</b>	
			<b>No. of Scoring Families</b>	<b>12</b>	<b>17</b>	<b>13</b>	<b>7</b>	<b>12</b>	<b>7</b>	<b>12</b>	<b>4</b>	
			<b>ASPT Score</b>	<b>4.83</b>	<b>5.53</b>	<b>5.23</b>	<b>5.14</b>	<b>4.83</b>	<b>4.29</b>	<b>5.08</b>	<b>4.00</b>	