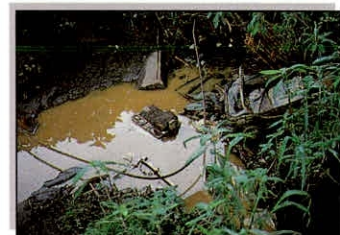
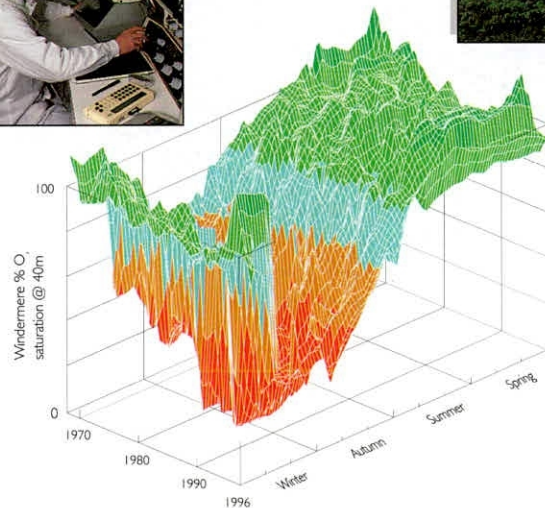


**MACROINVERTEBRATE SAMPLING OF WOODED AND OPEN SECTIONS OF
TRIBUTARIES OF THE R. ITCHEN - MAY 1997**

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Report Date: October 1997
Report to: CEFAS and Environment Agency, Southern Region
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Natural Environment Research Council

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INTRODUCTION

This report on the invertebrates of two tributaries of the River Itchen has been produced as part of a joint CEFAS/Environment Agency study on the production of juvenile salmonids. Two sites, one wooded and one open, from each of two tributaries were chosen for study and the invertebrate fauna were sampled at each site. In 1996, benthic samples taken in May and October showed a significantly greater biomass in the open sections than in the wooded sections.

In an effort to increase the invertebrate production of the wooded sections, the canopy was opened at the wooded sites, Blackbridge A and Fallosen B, in December 1996. The samples analysed in this report were taken by CEFAS staff in May 1997 and represent the first series of samples taken since the canopy was opened.

The timing of the sampling was chosen so that the faunal communities could be compared with those expected by using the RIVPACS database if this proved necessary.

IFE were contracted to receive the preserved samples from the four sites, sort and identify the invertebrates to family level and determine the biomasses present at each site.

METHODS

Two Surber samplers of area 0.05 m^2 were supplied and 30 benthic samples were taken from each site. Subsequently, 120 samples were sorted and invertebrates identified to family level. Each sample was sorted by placing a portion in a tray divided into 16 sections by marks on the base. The number of invertebrates was quickly surveyed and a convenient subsample was decided upon by experience. The same proportion of each sample from a particular site was picked to simplify the statistics. Portions of each subsample were picked until the whole sample had been examined. In addition to picking the determined fraction, the rest of the sample was scanned for invertebrate families not present in that fraction. In this way, a complete family list can be acquired without the need to pick out every individual animal. The invertebrates from each sample were picked into two vials, one for the fraction picked completely (Tube A) and one for the rest of the sample (Tube B). These invertebrates were then identified to family level and the total number of animals of each family was determined by multiplying the number in Tube A by the appropriate factor ($1/\text{fraction}$) and adding the number from Tube B. Although adding the number from Tube B is not strictly correct, the error is small compared to that from the sub-sampling itself and it does have the advantage of ensuring that the most complete family list is compiled for each sample (otherwise those present in small numbers and not appearing in the fraction considered would be missed).

Invertebrate samples were dried in a fan assisted oven at 60°C for 3 hours and weighed to 4 sig figs after cooling in a desiccator.

Although not strictly within the terms of the contract, some simple analysis has been completed, BMWP and ASPT values are given as well as biomass values.

RESULTS

Samples were taken between 15 and 21 May 19967 inclusive.

All benthic samples were sub-sampled and one eighth of each sample was picked for biomass estimates.

The families found at each site are shown in Tables 1-4 respectively for the sites as listed above. In addition, the numbers of animals of each family in each sample are given.

BMWP values for each sample at each site are given in Table 5 and results for ASPT values in Table 6.

Biomass estimates are given in Table 7 and means and 95% CLs are also given. The confidence limits of the means in both streams overlap between the wooded and open sites. A t test was therefore performed on the biomass data from both streams. The analysis was performed twice, assuming first equal and secondly unequal variances. In both statistics, the results were identical. In the Blackbridge stream, there was a significant difference between the biomasses of the previously wooded and open sites with a greater biomass of invertebrates in the open site ($t = 2.25$, $p = 0.014$). In the Falloden stream there was no significant difference between the previously wooded and open sites ($t = 1.06$, $p = 0.15$).

Table 1 List of invertebrate families and numbers found from samples at Site A (wooded) on the Blackbridge stream on 21 May 1997

	Site number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Heptageniidae	2	2	1	8	1	11	16	69	1		2	97	18	1	10
Leptophlebiidae															
Ephemereilidae	27	39	64	20	109	172	67		43	132	67		127	83	105
Ephemeridae															
Leuctridae	1	1	8				16		8	9	17		8		24
Odontoceridae	1	8	1		9	9	16	19	8	2	10	9	2		8
Leptoceridae						8									
Goeridae		1	8							1					8
Lepidostomatidae														1	
Sericostomatidae					1					9		17			
Calopterygidae															
Psychomyiidae															
Caenidae	1		11	8	16	10	16	8	16	64	41		26	2	9
Rhyacophilidae			1	9	24	25		18	3	3	2		17	18	34
Polycentropodidae															
Limnephilidae					8	9		9	1	9	1	2		10	
Ancylidae															
Hydroptilidae				8		8				1					
Gammaridae	21	42	55	9	131	51	84	52	58	79	82	93	56	34	175
Haliplidae															
Dytiscidae					1			8							
Gyrinidae															
Elmidae	57	81	128	146	127	17	52	135	263	117	135	30	121	2	219
Chrysomelidae															
Hydropsychidae	1		2		16		1	8	1	1		1		1	1
Tipulidae	27	13	29	10	27		29	30	16	32	67	12	42		65
Simuliidae	1					13									29
Planariidae							1		8						
Dendrocoelidae								9			8			1	
Baetidae	10	27	72	24	212	233	25	104	84	217	163	11	174	42	132
Piscicolidae							8								
Valvatidae											8				
Hydrobiidae			1							10					
Sphaeriidae					1										
Glossiphoniidae		9				9	1					9			
Erpobdellidae	1		1		8		1	10		10	9			1	
Asellidae															1
Chironomidae	1	41	11		41	14	34	2	48	50	24	22	20	56	35
Oligochaeta	20	35	44	25	78	11	61	6	61	63	60	23	17	8	36
Hydracarina			9						16		9			1	
Empidae															
Ceratopogonidae							8				1				
Curculionidae															
Nematoda	8				8							1			

Table 5 BMWP values for each sample at each site

SAMPLE	Falloden A BMWP	Falloden B BMWP	Blackbridge A BMWP	Blackbridge B BMWP
1	125	95	79	65
2	122	83	76	68
3	119	66	92	87
4	104	43	61	96
5	82	100	80	88
6	73	75	99	96
7	100	80	85	95
8	101	59	82	94
9	75	73	89	85
10	84	77	111	80
11	105	77	95	87
12	99	109	68	87
13	102	117	77	82
14	105	84	77	92
15	91	66	95	110
16	108	83	70	85
17	124	73	67	78
18	120	68	70	95
19	132	68	63	95
20	109	96	66	96
21	129	104	103	95
22	93	96	97	97
23	130	59	88	121
24	119	106	89	63
25	97	87	86	55
26	115	71	43	52
27	115	91	65	73
28	86		82	65
29	127	101	71	85
30	102	103	92	69
MEAN	106.43	83.10	80.60	84.53

Table 6 ASPT values for each sample at each site May 1997

SAMPLE	Falloden A ASPT	Falloden B ASPT	Blackbridge A ASPT	Blackbridge B ASPT
1	5.21	6.79	5.64	5.91
2	5.3	6.38	6.33	5.67
3	5.41	6.6	5.75	6.21
4	5.47	4.3	6.1	5.65
5	5.86	6.25	5	5.87
6	5.62	6.25	6.19	6
7	5.26	6.67	5.67	5.59
8	5.61	4.92	5.47	5.88
9	5.77	6.64	6.36	5.67
10	5.6	5.92	6.17	5.71
11	5.83	6.42	5.94	5.8
12	5.82	6.81	5.67	5.8
13	6	6.16	6.42	5.86
14	5.53	6	5.5	7.08
15	5.35	5.5	6.33	6.47
16	5.4	6.92	5.83	5.67
17	5.39	6.08	5.58	5.2
18	5.45	5.67	6.36	5.59
19	6	5.67	5.53	5.9
20	5.45	6	5.08	6
21	5.86	6.12	6.06	5.94
22	5.47	6.4	6.06	6.06
23	5.91	5.36	5.87	6.37
24	5.95	5.89	6.36	6.38
25	5.39	6.21	6.14	5
26	6.05	6.45	4.78	4.82
27	5.48	6.07	5.42	5.62
28	5.73		6.31	5.91
29	5.52	6.06	6.45	6.07
30	5.37	5.53	5.75	4.6
MEAN	5.61384615	6.09153846	5.853461538	5.85

Table 7 Biomass estimates (individual, means and 95% CLs) at each site with mean biomasses expressed as g per metre squared

SAMPLE	Falloden A weight (g)	Falloden B weight (g)	Blackbridge A weight (g)	Blackbridge B weight (g)
1	0.1007	0.0840	0.0151	0.0313
2	0.1065	0.0628	0.0982	0.0151
3	0.1906	0.0300	0.0438	0.0897
4	0.1562	0.0672	0.0514	0.1910
5	0.0302	0.1001	0.1426	0.1054
6	0.0506	0.0525	0.0842	0.1283
7	0.0472	0.0982	0.0592	0.1347
8	0.0466	0.0367	0.106	0.3904
9	0.0486	0.0505	0.1151	0.3159
10	0.0284	0.0505	0.1578	0.0616
11	0.0936	0.0458	0.1288	0.1042
12	0.0164	0.0543	0.0725	0.0560
13	0.0480	0.1400	0.07	0.2016
14	0.0741	0.0772	0.0449	0.2062
15	0.0649	0.0489	0.1087	0.2142
16	0.0291	0.0346	0.0906	0.2291
17	0.1866	0.0776	0.0371	0.1500
18	0.1041	0.0712	0.0638	0.0988
19	0.0930	0.0757	0.271	0.0975
20	0.0389	0.0890	0.037	0.0557
21	0.0609	0.1650	0.0752	0.0973
22	0.0171	0.0657	0.0687	0.1518
23	0.1939	0.0754	0.0375	0.1684
24	0.1078	0.0725	0.042	0.2414
25	0.1271	0.1042	0.114	0.0377
26	0.0669	0.0620	0.0885	0.0622
27	0.0962	0.0554	0.172	0.0577
28	0.0490		0.073	0.0650
29	0.1353	0.0884	0.079	0.1658
30	0.1204	0.0746	0.205	0.0945
TOTAL	2.53	2.11	2.75	4.02
MEAN	0.08	0.07	0.09	0.13
95%CL	0.02	0.01	0.02	0.03
BIOMASS	1.69	1.46	1.84	2.68

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