Institute of Freshwater Ecology

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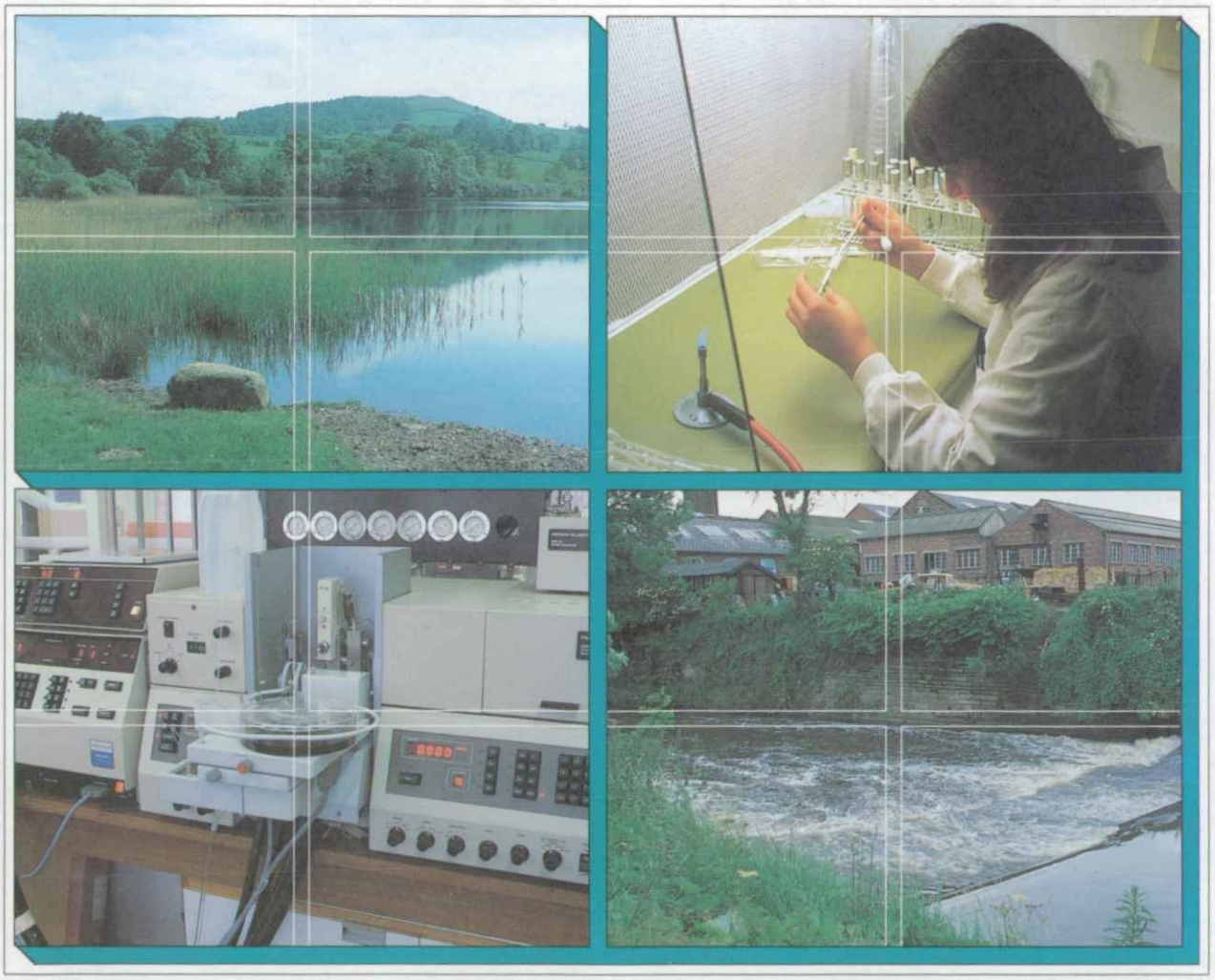
by P.D. Armitage, J.H.Blackburn and K.L. Symes

A report to The Royal Society for the Protection of Birds - Arne Nature Reserve



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Freshwater biological monitoring of the Furzebrook Stream (South Dorset) using macroinvertebrates.

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SUMMARY

The macroinvertebrate fauna of a small water course, the Furzebrook Stream, in South Dorset was examined over 3 seasons at 6 sites, including a small tributary. The faunal communities were not characterised by the presence of many rare species but the trichopteran *Hydropsyche saxonica* (a Red Data Book species) was found at two sites. The top site supported the richest fauna with crustaceans and worms dominating numerically. Application of RIVPACS to assess biological quality indicated the lowest grade (B) at the 2 downstream sites.This is probably attributable to the relatively unstable bottom on the artificially cut channel which lacks sinuosity and hence habitat diversity.

INTRODUCTION

The macroinvertebrate fauna of the Furzebrook Stream has been examined previously in connection with consented discharges from the BP Furzebrook Rail Terminal (Girton 1986, Armitage et al. 1993). These studies were concentrated at the upper end of the stream near the terminal and there has been no survey along its entire length. In 1994 the Institute of Freshwater Ecology was commissioned by RSPB to supplement previous surveys and extend the area covered. The objective was to provide a list of taxa based on three seasons samples along the length of the stream.

Such streams are frequently neglected in national surveys but may support rare and

endangered species as well providing examples of unusual habitat with distinct communities of invertebrates. Such streams are particularly vulnerable to changes arising from land management and physical and chemical disturbance and it is important to catalogue their characteristics to provide data for comparisons in the future.

STUDY AREA AND METHODS

The Furzebrook Stream arises at Creech Heath on Tertiary deposits of gravel and sand, and flows through the English China Clay works and the BP railway terminal before draining northwards through heathland and moorland for about 4km where it joins the River Frome near Ridge. The stream flows through a woodland strip for 850m below the BP terminal and trees (willows/birches) border the two other sites downstream. North of the Ridge - Arne road the stream receives water from land drainage ditches.

Six sites were sampled in the survey, including a small tributary which joins the main stream about 750m from its source. The location of the sites is shown in Figure 1 and the physical and chemical characteristics are presented in Table 1. Chemical data are presented for 4 sites two of which were also examined in September 1993. The values are compared in the table and do not show any major differences between the two years. 'Spring' and 'summer' samples were taken on April 7 1995 and June 12 1994 respectively and all 'autumn' samples with the exception of 1 and 4 (surveyed on September 17 1993) were sampled on November 1 1994. Samples were collected using a standard 3 minute kick/sweep technique (Wright et al. 1993) with a pond net of 900 μm mesh. Samples were fixed in 5% formaldehyde solution and sorted into 70% alcohol. Identifications were made to species level wherever keys and life-history stage allowed.

Site 1, just downstream of the BP terminal, is a small shaded stream with a sandy gravel bottom. The banks are vertical and slightly undercut and are bordered with willows. Some traces of oil were apparent when the substrate was disturbed.

has a predominantly sandy bottom and flows through birch woodland at the sample site. Debris dams and falls over tree roots are a feature of the site.

Site 3, a small tributary of the main stream draining an area of bog and flowing through willow/birch woodland at the sample site. The substratum ranges from tree roots through peaty silt to silty clay with some woody debris. A small patch of *Callitriche* sp. occurred at the site in the June sample. The flow pattern through the system consisted of falls over tree roots above and below a peaty pool.

Site 4, about 6m upstream of a concrete culvert which carries the stream under the Wareham - Corfe Road. The site is shaded by birch, alder and willow and the stream flows between tree roots and tussocks to form a series of deep pools (0.9m) and falls. Substratum ranges from woody debris, to tree roots and at the end of the sampled reach some larger stones associated with the building of the culvert. The stream margins support a diverse collection of bryophytes including dense growths of thallose and leafy liverworts.

Site 5, is situated on the Stoborough Heath National Nature Reserve. The site is tree-lined (willow and birch) and shaded, with deeply undercut banks. The channel appears to have been artificially straightened and has a gravel bottomed substratum with exposed tree roots. Pebbles and gravel form an armoured layer over soft sandy deposits.

Site 6, is located about 10m upstream of a culvert which takes the stream under the Arne Road. The site is partially shaded with willow scrub and has high banks and as at site 5 the channel appears to have been artificially straightened. Instream macrophytes (*Sparganium erectum*, *Gyceria* sp. and *Callitriche* sp.) covered up to about 30 % of the sample area in the summer. The substratum is predominantly sand which in the November samples covered an anaerobic layer of buried vegetation.

RESULTS AND DISCUSSION

The fauna

A total of 138 taxa were recorded from the six sites in the three seasons (Table 2). The group with the most taxa was the Chironomidae (25), with Oligochaeta, Coleoptera and Trichoptera also contributing a high proportion of species (16,16, and 18 respectively). The distribution of taxa among major groups is shown in Table 3. The fauna generally was typical of lowland headwater streams and although many species were found none of these was particularly rare.

The composition in terms of major faunal groups is shown in Figure 2 together with the total abundance of benthic macroinvertebrates based on the sum of the three seasons samples. There were no consistent trends in faunal composition and abundance was remarkably constant from top to bottom of the system with greatest densities recorded at site 1 The highest numbers of taxa were also noted at Site 1 (78) which is dominated numerically by Oligochaeta (mainly Tubificidae) with Crustacea (*Gammarus pulex*) and Mollusca (*Potamopyrgus jenkinsi*) subdominant. Diptera (mainly Chironomidae) were also well represented. Site 2 is similar in faunal composition but the proportion of Oligochaeta is drastically reduced. Planariidae were most abundant at this site and Trichoptera although not abundant were represented by 9 species. The small tributary, site 3, is characterised by low numbers of molluscs and high proportions of Crustacea (*Asellus* spp and *Gammarus pulex*) and Diptera (mainly Chironomidae - Tanypodinae). Trichoptera were diverse at this site (9 species) but not abundant. In contrast Ephemeroptera and in particular Plecoptera were both abundant and diverse. Site 4 just upstream of the Corfe Road has a very similar composition to that of site 3 with Ephemeroptera and Plecoptera well represented by 8 species. Site 5 is totally dominated by the mollusc *P. jenkinsi* with *Gammarus pulex* sub-dominant. Other groups particularly Coleoptera (mainly Elmidae) and Diptera occurred at moderate densities. Only 42 taxa were recorded at this site At site 6, molluscs which were a major component of most other sites were found at very low densities (combined total of 16 specimens) and the fauna was dominated by *Gammarus pulex* and Diptera (mainly Simuliidae).

The faunal communities were not characterised by the presence of many rare species but the trichopteran *Hydropsyche saxonica* (a Red Data Book species, Shirt 1987) was found at two

sites (2 and 4). This species has until recently not been recorded in the British Isles (Blackburn & Forest 1995) since its apparent extinction from its only known locality in 1955. It seems likely that it has been overlooked since its first reported occurrence near Oxford. The species is now known from about 34 sites, occurring in small gravel-bottomed headwater streams with marginal silt deposits. The current information suggests that the species occurs widely but at low densities. In the Furzebrook Stream *H. saxonica* was found with *Diplectrona felix* which has been reported to replace the former species upstream (Blackburn & Forrest 1995). The two species probably inhabiting different mesohabitats.

A relatively rich collection of Nemouridae (stoneflies) was found in the wooded reach between sites 1 and 4. The greatest number of coleopteran species (12), more than twice that at other sites, were recorded at site 6 which was relatively open with a moderate cover of macrophytes. Two species, found only at this site, *Haliplus fulvus* and *Helochares punctatus* are both associated with peat bogs which are common features of the surrounding land. *Crangonyx pseudogracilis*, a crustacean accidentally introduced from America in the first half of this century and now fairly widespread throughout Great Britain might have been expected at the lower sites on the Furzebrook Stream but did not appear in our collections.

Environmental quality

RIVPACS II (River Invertebrate Prediction And Classification System) a software program developed by the Institute of Freshwater Ecology at their Dorset River Laboratory for the classification and prediction of macroinvertebrate communities in running water (Wright et al. 1993) was used to assess the environmental quality of the sites. Over the past 15 years about 600 species of macroinvertebrate have been identified from more than 400 substantially unpolluted sites throughout Great Britain. The species lists have been used to construct a national classification of running-water sites and to develop a technique for predicting the probabilities of occurrence of individual taxa at sites of known environmental characteristics.

This large data base provides a method of setting a standard against which to assess the fauna of new sites and also places the site in a national context. The technique has been adopted by the National Rivers Authority in their surveys of river quality. The output from the program includes predictions of numbers of taxa, BMWP biotic score and Average Score Per

Taxon (Armitage et al. 1983). Predicted target values for BMWP score, number of scoring taxa and ASPT were obtained for each site based on data from the three seasons. These results are compared with observed values based on combined seasons data to give an observed /expected index (Table 4). Also shown are the results from a new version of RIVPACS (Cox et al. 1995). RIVPACS III is based on an enlarged reference data-set (614 sites) which includes more headwaters. A warning message is shown on screen and printout if, on the basis of the physical and chemical data, the site has a probability of less than 5% of belonging to any of the classification groups. In the Furzebrook Stream three sites, 1, 3, and 4, possessed characteristics which did not match those of the classification groups, nevertheless there are sufficient similarities for a prediction to be made.

The banding system developed by Wright et al. (1993) in conjunction with biologists in the water industry was applied to the results. Four biological classes A,B,C,D are recognized where A is indicative of a high quality site. The overall classification is derived as the median of the three individual classes for each faunal parameter except where the individual class for ASPT is lower. In this case the final classification conforms to the band given by ASPT. The results in Table 4 show that sites 1 and 4 are classed as A by both RIVPACS versions, sites 5 and 6 are classed as B and sites 2 and 3 are classed as A by RIVPACS II and as B by RIVPACS III.

DISCUSSION AND CONCLUSIONS

The stream flows through the English China Clay works and has in the past contained high levels of suspended solids from this operation (Girton 1986). During this present survey there were no obvious stresses on the system from either ECC works or drainage from the BP terminal. The only sites which are below top quality are those at the bottom of the system. The stream as it flows through the Stoborough National Nature Reserve appears to be channelised and the channel is actively adjusting to this adjustment of its course. Symptoms are undercut banks and a very unstable substratum which presents a hostile environment for many benthic invertebrates. This may contribute to the reduced quality. Although the catchment area is relatively small and the slope not extreme, run-off is rapid and easily mobilises the sandy stream substrate. Several families were predicted to occur with a high

proabability but were not recorded. The mayflies Heptageneidae, Ephemeridae and Ephemerellidae had a >70% probability of occurrence but due to flow and substrate conditions none of these families were found at site 5. Similarly at site 6 all three families were absent but probability of occurrence was >50%. There is insufficient information on the requirements of individual species to explain their distribution but it is clear that in the absence of obvious indicators of reduced water quality, through enrichment by agricultural nutrients or application of pesticides, the faunal communities are controlled by the availability of suitable habitat. Superficially, substrate-type may appear suitable but in fact is unstable and offers few niches to benthic invertebrates.

In general terms the Furzebrook Stream is of predominantly high environmental quality and supports a varied and distinct community of benthic macroinvertebrates. The main threats to the system are situated at source where potential problems are siltation from ECC workings and the accidental spillage of oil or run-off of oily water from the terminal site. To date these possible stresses have not caused any major damage to the system. However the small size of the stream and low discharge makes the site particularly vulnerable to even small impacts. The section below the terminal is an excellent example of the small incised streams draining heathland in wooded areas and although rare species were not a feature the overall community is distinctive. Three of these sites possessed combinations of environmental features not represented in the RIVPACS III data base and the RIVPACS site-group with which the Furzebrook Stream has the greatest similarity is represented by only 10 sites mainly in the New Forest area.

The biological quality of the lower 2 sites could be improved by encouraging sinuosity in the stream channel. This would help stabilize some areas of channel bed and encourage the develoment of faunal communities. This would be further enhanced by partially reducing shading along the stream to encourage the growth of instream macrophytes. Water plants and woody debris often provide the only large substrate units in such streams and accumulations of these materials frequently provide a refuge for the benthos on otherwise unstable substrates and support a relatively rich faunal community. A survey of 3 sites on the lower Corfe River (Armitage et al. 1987) recorded maximum faunal richness in weed beds and amongst debris dams.

FUTURE WORK

The area downstream of the Arne road was omitted from the present survey but if the opportunity arises this area should be surveyed. There is a high probability that these lower reaches will have a rich coleopteran fauna and the reduced slope may encourage the growth of instream vegetation which was notably lacking from the existing survey sites. Furthermore there are likely to be some tidal influences as the stream approaches the Frome.

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Table 1. Physical and chemical characteristics of the six sites on the Furzebrook Stream. [Physical data are the means of three seasons, chemical data are based on water samples taken on October 16 1995.Chemical data from September 1993 are given in parentheses for sites 2 and 4].

Site	1	2	3	4	5	6
Grid Reference	SY 935842	SY936843	SY937843	SY937844	SY938854	SY942863
Altitude (m O.D.)	30	25	25	21	10	2
Distance from source (km)	0.5	0.75	0.2	9	1.6	2.7
Slope (m/km)	25	25	25	6.7	8.33	3
Water Width (m)	0.6	0.97	0.97	0.57	0.98	1.3
Mean Depth (cm)	22.6	15.6	47.6	73.9	20.9	15.2
Surface velocity (cm/s)	10-25	25-50	10-25	10-25	10-25	25-50
Substratum Cover %						
Boulders & Cobbles	2	2	0	3	3	0
Pebbles &Gravel	48	17	0	7	59	18
Sand	28	51	1	20	24	68
Silt & Clay	22	30	99	70	14	14
pH	-	(7.19) 6.94	6.39	(6.75) 6.91	-	6.9
calcium (mg/l Ca)	-	(30) 31.8	21.4	-24	-	21.8
Alkalinity (mg/l CaCO3)	-	(75) 42	21	(33) 30.5	-	21
chloride (mg/l Cl)	-	(37) 37.2	35.8	(42) 38.3	-	37.6
nitrate (mg/l N)	-	(0.3) 0.52	0.17	(0.41) 0.61	-	0.53
phosphate (ug /l P)	-	(26) 14	14.8	(11) 10.5	-	12.1

Table 2. The occurrence of macroinvertebrates at 6 sites on the Furzebrook Stream based on 3 minute kick'sweep samples taken in spring summer and autumn.

	1	2	3	4	5	6
Polycelis nigra group	0	0	0	1	1	0
Polycelis felina (Dalyell)	1	1	1	1	1	0
Crenobia alpina (Dana)	1	0	0	0	0	0
Potamopyrgus jenkinsi (Smith)	1	1	0	1	1	1
Lymnaea peregra (Müller)	0	0	0	1	0	0
Anisus leucostoma (Millet)	0	0	0	0	0	1
Ancylus fluviatilis Müller	0	0	0	1	1	0
Succineidae	0	1	0	0	0	0
Zonitidae	1	0	0	1	0	0
Pisidium casertanum (Poli)	0	1	0	0	0	0
Pisidium personatum Malm	1	0	1	0	0	0
Pisidium hibernicum Westerlund	1	0	0	0	0	0
Pisidium nitidum Jenyns	0	0	1	0	0	0
Pisidium sp.	1	1	1	0	0	1
Nais communis group	1	0	0	1	0	0
Nais elinguis (Müller)	0	1	0	0	0	0
Slavina appendiculata (d'Udekem)	1	0	0	0	0	0
Pristina idrensis Sperber	0	0	0	1	0	0
Tubifex tubifex (Müller)	1	0	0	0	0	1
Tubifex ignotus (Stolc)	0	0	0	0	0	1
Limnodrilus claparedeianus Ratzel	0	0	0	0	0	1
Limnodrilus hoffmeisteri Claparede	1	0	1	0	0	1
Spirosperma ferox (Eisen)	1	0	0	1	1	1
Rhyacodrilus coccineus (Vejdovsky)	0	1	1	0	1	0
Aulodrilus pluriseta (Piguet)	1	1	1	1	1	1
Tubifex/Potamothrix	0	0	1	0	1	0
Enchytraeidae	1	1	1	1	1	1
Lumbriculus variegatus (Müller)	1	1	1	1	1	1
Stylodrilus heringianus Claparede	1	1	1	1	1	0
Lumbricidae	0	1	0	1	1	1
Piscicola geometra (L.)	1	0	0	1	1	1
Glossiphonia complanata (L.)	1	0	0	1	0	1
Helobdella stagnalis (L.)	1	0	0	0	0	0
Hydracarina	1	1	1	0	0	0
Asellus aquaticus (L.)	0	0	1	1	0	0
Asellus meridianus Racovitza	1	1	1	1	0	1
Gammarus pulex (L.)	1	1	1	1	1	1
Baetis rhodani (Pictet)	1	1	1	1	1	1
Leptophlebia marginata (L.)	1	0	1	1	1	1
Habrophlebia fusca (Curtis)	0	0	1	0	0	0
Amphinemura standfussi Ris	0	1	1	1	0	1
Nemurella picteti Klapalek	0	0	1	1	0	0
Nemoura cinerea (Retzius)	1	1	0	1	0	1
Nemoura erratica Classen	0	1	1	1	0	0
Nemoura avicularis Morton	0	1	1	1	1	1
Leuctra hippopus (Kempny)	0	0	1	0	1	1
Leuctra fusca (L.)	1	1	1	1	1	1
Pyrrhosoma nymphula (Sulzer)	1	0	1	0	0	1

Cordulegaster boltonii (Donovan)	1	1	1	1	1	1
Hydrometra stagnorum (L.)	0	0	1	0	0	1
Velia caprai Tamanini	1	1	1	0	1	1
Haliplus fulvus (Fabricius)	0	0	0	0	0	1
Haliplus sp.	1	0	0	0	0	0
Hydroporus tessellatus Drapiez	1	0	0	0	0	0
Ilybius fuliginosus (Fabricius)	0	0	0	0	0	1
Gyrinus substriatus Stephens	1	0	0	0	0	0
Helochares punctatus Sharp	0	0	0	0	0	1
Helophorus brevipalpis Bedel	0	0	0	1	1	1
Helophorus flavipes (Fabricius)	0	0	0	0	0	1
Anacaena globulus (Paykull)	0	1	0	0	1	1
Anacaena lutescens (Stephens)	0	0	0	0	0	1
Laccobius minutus (L.)	1	0	0	0	0	0
Elodes sp.	0	0	1	0	0	1
Dryops sp.	0	1	0	0	0	1
Elmis aenea (Müller)	1	1	0	1	1	1
Limnius volckmari (Panzer)	1	1	0	0	1	1
Oulimnius tuberculatus (Müller)	0	0	0	0	0	1
Sialis lutaria (L.)	0	0	0	0	0	1
Pyralidae (non-gilled)	0	0	0	0	1	0
Rhyacophila dorsalis (Curtis)	0	1	0	1	1	0
Agapetus sp.	1	0	0	0	0	0
Plectrocnemia conspersa (Curtis)	1	1	1	1	1	0
Lype sp.	1	1	1	1	0	1
Hydropsyche siltalai Dohler	0	0	0	0	1	1
Hydropsyche saxonica McLachlan	0	1	0	1	0	0
Diplectrona felix McLachlan	0	1	0	1	1	0
Limnephilus lunatus group	1	1	1	1	0	1
Glyphotaelius pellucidus (Retzius)	1	0	0	0	0	0
Halesus radiatus (Curtis)	1	1	1	1	0	1
Halesus digitatus (Schrank)	0	0	0	0	0	1
Halesus sp.	0	0	0	0	1	0
Micropterna sequax McLachlan	1	1	1	1	1	1
Chaetopteryx villosa (Fabricius)	1	0	0	1	1	1
Beraea pullata (Curtis)	0	0	1	0	0	0
Beraea maurus (Curtis)	0	0	1	1	0	0
Adicella reducta (McLachlan)	1	1	1	1	0	0
Crunoecia irrorata (Curtis)	0	0	1	1	0	0
Sericostoma personatum (Spence)	1	0	0	0	0	0
Tipula rufina Meigen	0	0	0	0	1	0
Tipula montium group	1	0	0	0	0	0
Tipula maxima Poda	0	0	1	0	0	1
Tipula vittata Meigen	0	0	0	0	0	1
Dicranota sp.	1	1	1	1	1	1
Limnophila (Eloeophila) sp.	1	1	1	1	1	1
Pilaria (Neolimnomyia) sp.	0	1	0	0	0	0
Pilaria (Pilaria) sp.	0	0	0	0	0	1
Pericoma pulchra Eaton	0	0	1	0	0	0
Pericoma trivialis group	1	0	1	0	1	1
Dixa dilatata Strobl	0	0	0	1	0	0
Dixa maculata complex	1	0	0	0	0	0
Culiseta (Culiseta) sp.	0	0	1	0	0	0

Ceratopogonidae	1	0	1	1	0	1
Apsectrotanypus trifascipennis (Zetterstedt)	1	0	0	1	0	0
Macropelopia sp.	1	1	1	1	1	0
Procladius sp.	1	0	1	1	0	1
Conchapelopia sp.	1	0	0	0	0	0
Natarsia sp.	0	1	0	0	0	0
Thienemannimyia group	1	1	1	1	0	1
Trissopelopia longimana (Staeger)	1	0	1	1	0	1
Zavrelimyia sp.	1	0	1	0	0	0
Brillia modesta (Meigen)	1	1	1	1	1	1
Cricotopus (Isocladius) sp.	1	0	0	0	0	0
Cricotopus group	1	0	0	0	0	0
Eukiefferiella brevicalcar (Kieffer)	0	1	1	1	0	1
Heterotanytarsus apicalis (Kieffer)	1	0	0	0	0	0
Heterotrissocladius sp.	1	1	1	1	0	0
Rheocricotopus sp.	1	1	0	1	0	0
Limnophyes sp.	1	0	0	0	0	0
Parametriocnemus stylatus (Kieffer)	1	0	0	1	0	0
Thienemanniella sp.	1	0	0	0	0	0
Prodiamesa olivacea (Meigen)	1	1	1	0	0	0
Polypedilum sp.	1	0	1	0	0	0
Stictochironomus sp.	0	0	0	0	0	1
Micropsectra sp.	1	1	1	1	1	1
Tanytarsus brundini Lindeberg	1	0	0	0	0	0
Rheotanytarsus sp.	1	1	0	1	0	0
Stempellinella sp.	0	0	1	0	0	0
Simulium (Nevermannia) vernum group	0	0	1	0	0	0
Simulium (Nevermannia) cryophilum group	0	0	1	1	0	1
Simulium (Nevermannia) angustitarse group	0	0	1	1	0	0
Simulium (Eusimulium) aureum group	0	0	1	1	0	0
Simulium (Simulium) ornatum group	1	1	1	1	1	1
Chelifera group	0	0	1	1	0	0
Hemerodromia group	1	0	0	1	0	1
Chrysops sp.	1	0	0	1	0	1
Tabanus group	0	1	0	0	0	0
Sciomyzidae	1	0	0	0	0	0
Muscidae	1	1	0	0	0	0
Microturbellaria	0	1	1	1	0	1
Nematoda	0	0	0	1	0	0
	77	53	64	67	41	66

Table 3. The distribution of species/taxa per major groups and total number of taxa per group at the six sites on the Furzebrook Stream.

GROUP\SITE	1	2	3	4	5	6	TOTAL
TRICLADIDA	2	1	1	2	2	0	3
GASTROPODA	2	2	0	4	2	2	6
BIVALVIA	3	2	3	0	0	1	4
OLIGOCHAETA	9	8	7	9	9	9	16
HIRUDINEA	3	0	0	2	1	2	3
HYDRACARINA	1	1	1	0	0	0	1
CRUSTACEA	2	2	3	3	1	2	3
EPHEMEROPTERA	2	1	3	2	2	2	3
PLECOPTERA	2	5	6	6	3	5	7
ODONATA	2	1	2	1	1	2	2
HEMIPTERA	1	1	2	0	1	2	2
COLEOPTERA	6	4	1	2	4	12	16
MEGALOPTERA	0	0	0	0	0	1	1
LEPIDOPTERA	0	0	0	0	1	0	1
TRICHOPTERA	10	9	9	12	7	7	18
TIPULIDAE	3	3	3	2	3	5	8
CHIRONOMIDAE	22	10	12	12	3	7	25
SIMULIIDAE	1	1	5	4	1	2	5
OTHER DIPTERA	7	2	5	5	1	4	12
MICROTURBELLARIA	0	1	1	1	0	1	1
NEMATODA	0	0	0	1	0	0	1
	78	54	64	68	42	66	138

Table 4. Results of RIVPACS predictions based on versions II and III for sites on the Furzebrook Stream

	Expected		Observed	Observed/Expected			
	RIVPACS II	RIVPACS III		RIVPACS II	Band	RIVPACS III	Band
Score							
1(BP)	**151.10** *	**203.9** *	**159**	**1.05**	A	**0.78**	A
2(RIGHT)	**150.40** #	**203.4** #	**121**	**0.80**	A	**0.59**	B
3(LEFT)	**147.30** !	**206.1** !	**137**	**0.93**	A	**0.66**	B
4(CORFE)	**155.80** *	**207.2** !	**159**	**1.02**	A	**0.77**	A
5(NNR)	**207.80** #	**206.8** #	**112**	**0.54**	B	**0.54**	B
6(ARNE)	**186.80** #	**207.1** #	**142**	**0.76**	A	**0.69**	B
Taxa							
1(BP)	**25.90** *	**32.4** *	**28**	**1.08**	A	**0.86**	A
2(RIGHT)	**25.80** #	**32.4** #	**22**	**0.85**	A	**0.68**	B
3(LEFT)	**25.50** !	**32.9** !	**22**	**0.86**	A	**0.67**	B
4(CORFE)	**26.60** *	**33.0** !	**27**	**1.02**	A	**0.82**	A
5(NNR)	**33.50** #	**32.9** #	**20**	**0.60**	B	**0.61**	B
6(ARNE)	**30.80** #	**33.0** #	**28**	**0.91**	A	**0.85**	A
ASPT							
1(BP)	**5.80** *	**6.28** *	**5.68**	**0.98**	A	**0.90**	A
2(RIGHT)	**5.80** #	**6.27** #	**5.51**	**0.95**	A	**0.88**	B
3(LEFT)	**5.80** !	**6.26** !	**6.227**	**1.07**	A	**0.99**	A
4(CORFE)	**5.80** *	**6.27** !	**5.89**	**1.02**	A	**0.94**	A
5(NNR)	**6.20** #	**6.28** #	**5.6**	**0.90**	A	**0.89**	A
6(ARNE)	**6.10** #	**6.27** #	**5.07**	**0.83**	B	**0.81**	B

[Probability that site belongs to any group in the classification: # >5%,* <5%, * <1%, ! <0.1%]

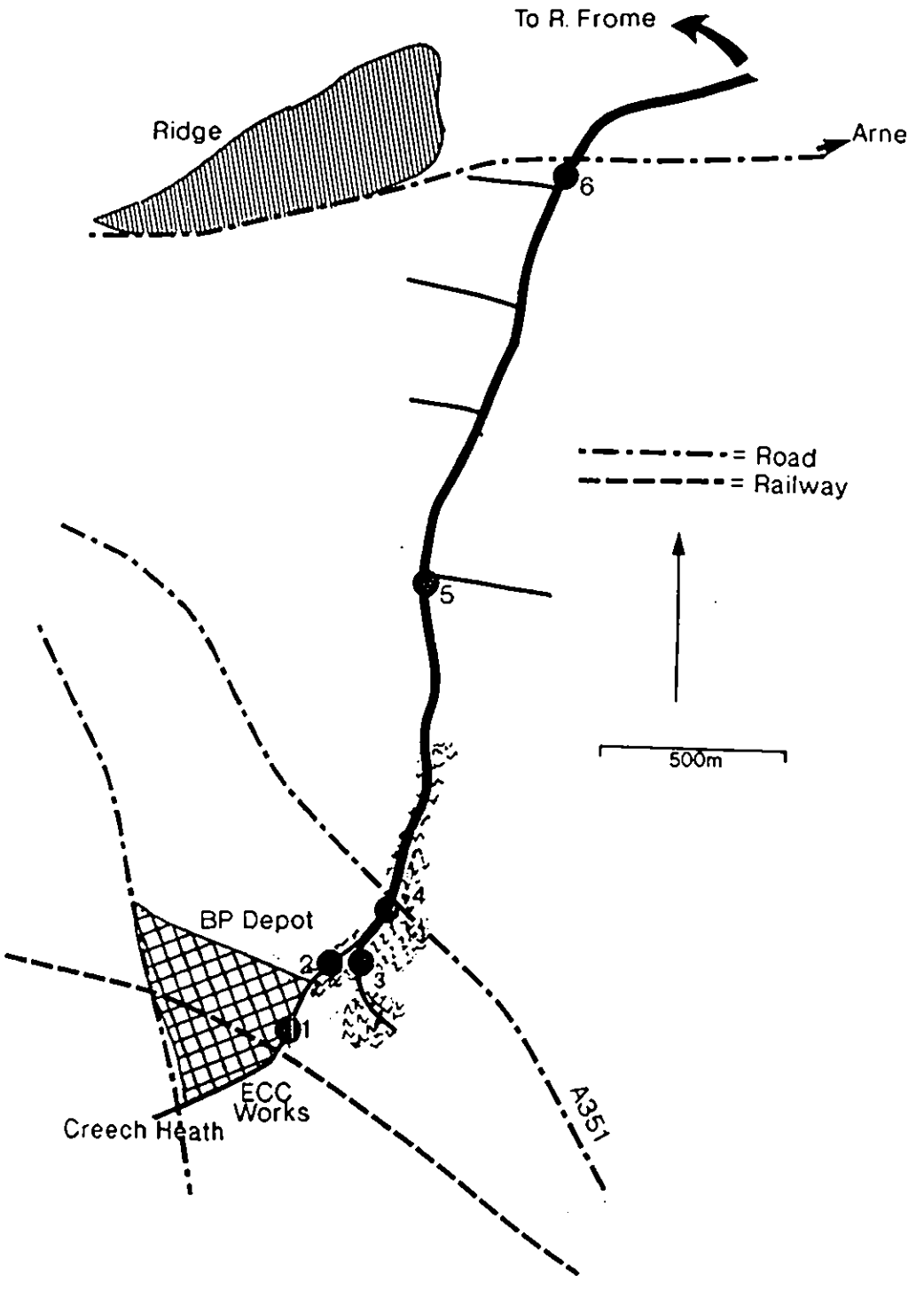

Figure 1 Sketch map of the Furzebrook Stream showing the position of the 6 sites and location of the BP depot, the ECC works and the village of Ridge. The shaded area downstream of the BP Depot represents woodland.

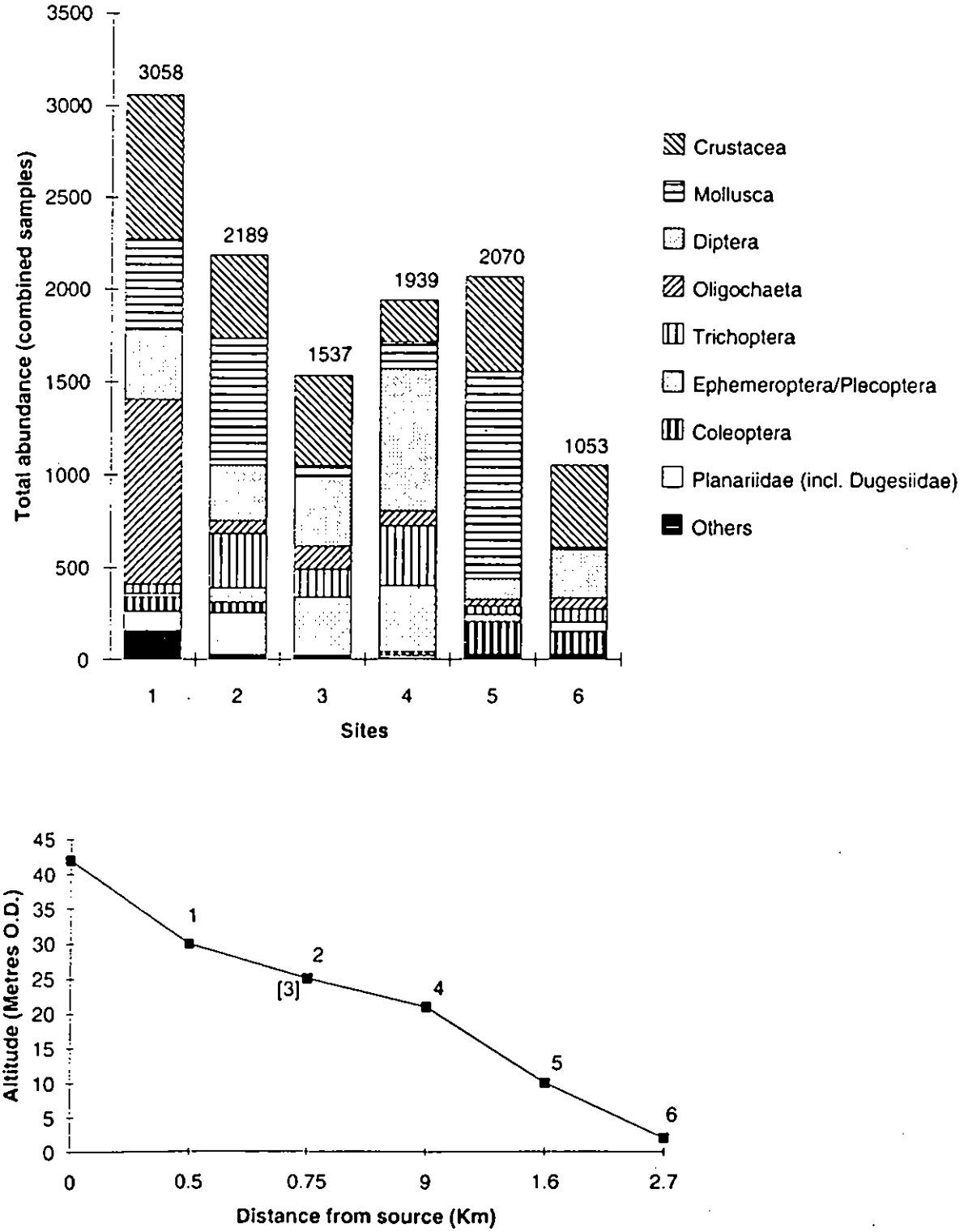

Figure 2 Faunal composition (relative numbers in major groups) at the 6 sites along the length of the Furzebrook Stream , based on data collected in spring, summer and autumn. Also shown is a profile of the stream.

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