



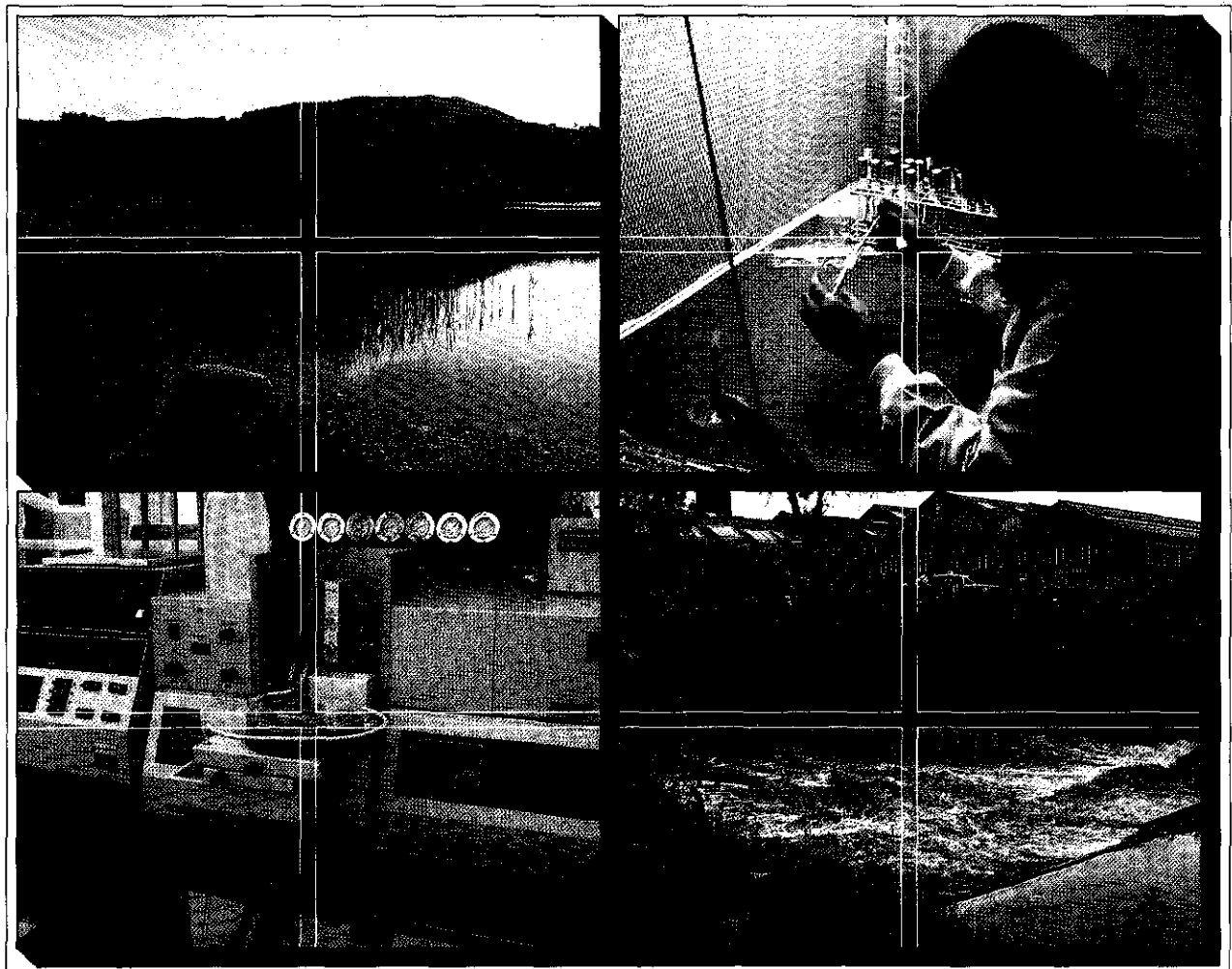
**Institute of
Freshwater
Ecology**

MID-KENT STREAM SURVEY

**Report to:
Environmental Assessment Services Limited**

(May 1995)
Compiled by J.A.B.Bass

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Report date: May 1995
Report to: Environmental Assessment Services Limited
(Annette Mills)

IFE Report No: ER/T11064J7/51

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CONTENTS

This report includes data from site visits in January and April 1995, together with their interpretation.

	Page Numbers
General Overview	1
Site Descriptions	2-5
Aquatic Plants	6-7
Freshwater Invertebrates	8-16
Acknowledgements	17
References	17
Appendix I - Tables 1-8: Site records of freshwater invertebrates	
Appendix II - NRA water quality data	
Appendix III - Field Data Sheets	

Kent Streams

Site Locations

January 95

April 95

Stream 1

Upstream site

NGR TQ904510

NRG TQ905508

Downstream site

NGR TQ902502

NGR TQ902502

Stream 2

Upstream site

NGR TQ926504

NGR TQ926504

Downstream site

NGR TQ926492

NGR TQ926492

Stream 3

Upstream site

NGR TQ943488

NGR TQ943488

Downstream site

NGR TQ937477

NGR TQ937477

Stream 4

Upstream site

NGR TQ952476

NGR TQ952476

Downstream site

NGR TQ949467

NGR TQ949467

Kent Streams

General Overview

Streams 1-4 receive water from chalk springs at their sources. Streams 1 and 4 have inputs from sewage treatment works.

Stream 3 receives intermittent pumped water from a sand quarry, which can include sand and silt after heavy rain. The close proximity of the deep quarry to stream 3, which is said to flow throughout the year (Mid-Kent Water, monitoring staff), indicates minimal infiltration from the stream, but the possible installation of an impervious membrane when the stream was realigned should be checked.

All streams are influenced by overland runoff from agricultural land. At its source, stream 2 may also receive runoff from a major road (A20).

The extremes of discharge appear to differ between the streams, with trapped debris at greater heights alongside streams 2 and 4. Discharge monitoring and general observations by Mid-Kent Water staff, confirm that stream 2 is particularly variable and short lengths have become dry during the period mid-1993 to 1995.

When stream discharges are low the sewage treatment works effluent received by streams 1 and 4 will tend to maintain flows but at such times reduced dilution may adversely affect water quality. This is of particular concern given the decline in water quality downstream from the confluence of stream 4 with the Great Stour (indicated by NRA chemical monitoring data, see Appendix II).

Whilst perennial discharge regimes are maintained it is considered the invertebrate communities will not exhibit serious degradation over the short lengths of streams 1-4. However, should future changes to groundwater abstraction reduce the dilution of STW effluents, particularly under low river discharge conditions, it is considered that the freshwater invertebrate community in the Great Stour may be impacted.

The most vulnerable freshwater invertebrate groups present in streams 1-4 require high water quality and are characteristic of well oxygenated flowing water, they are generally within Families with high BMWP scores. In spring 1995 several Families were recorded from upstream but not downstream sites on individual streams, this will be associated with water temperature preferences, as well as changes in water chemistry. Greater contrasts between upstream and downstream sites are considered likely to develop in mid- to late summer, as the natural seasonal discharges decline. Changes observed at sampling sites between January and April 1995 are noted below.

Site Descriptions

(Summarised from field data sheets, Appendix III)

Stream 1

1 - Upstream site

January 1995

The stream passes between hawthorn scrub on the NE boundary of the STW compound. The sample site was about 40m upstream from the treatment works outlet, stream banks were poached by grazing animals. Substrates included large flints, cobbles and pebbles, with fine sediments within stands of Apium nodiflorum and Mimulus (naturalised garden escape). Stream width about 1.5m, water depth 5-15cm, water velocity 0.25-0.5m sec⁻¹, the water was clear and uncoloured. Some large stones had a thin algal film present.

April 1995

The sample site was changed to just downstream from the STW outfall, to match the aquifer location. The channel had been dredged in January, consequently no in-stream vegetation was present restricting the habitats available to invertebrates. The close proximity of the STW outfall will impact the fauna, but continuous passive colonisation by downstream drift permits the transient occurrence of some species.

1 - Downstream site

January 1995

Following recent dredging, this stream was not sampled in January 1995.

April 1995

Previously unstable stream banks had become revegetated and access to the stream was possible. The stream bed remained atypical with a few pebbles overlying liquid mud over much of the stream and little habitat diversity was evident.

Stream 2

2 - Upstream Site

January 1995

The sampling location was about 200m upstream from the railway line. The stream forms a field boundary between an arable and a grazed field (NE). The sample point was adjacent to a footpath crossing the stream. A low hedge was present on the NE bank, whilst a winter cereal crop had been sown close to the open SW bank. Low herbs and grasses were present on the steep SW bank. Substrates were dominated by sandy silts trapped between dense stands of Apium nodiflorum (about 85% cover) and some Glyceria fluitans (?). A few pebbles were present near the footbridge, where water flow was greatest. This section of stream was heavily vegetated, possibly because of a

shallow gradient at this point, resulting in lower water velocity than observed at other sites on streams 1 - 4. Average water velocity was about 0.25m sec^{-1} , water depth 10-25cm, stream width about 1.2m. The water was clear with no colour. Coarse organic detritus was present within the silty substrate.

April 1995

Little change was evident since the site visit in January. The vegetation in the stream had become more dense causing the water to back-up.

2 - Downstream Site

January 1995

The sample site was about 40m downstream from the road bridge. The stream runs alongside a recreation field with a high garden hedge to the east. The west bank had low vegetation on a steep bank. Dead stems of tall herbs were present and within the channel Apium nodiflorum, Veronica beccabunga, Glyceria fluitans occurred with Juncus sp. at the margins. The stream bed had a broad range of substrates and varied velocity patterns between submerged plant stands and sediment banks.

Mean velocity was estimated to be $0.25\text{-}0.50\text{m sec}^{-1}$ and depth 15-25cm.

April 1995

An extremely luxuriant growth of filamentous algae was present on all submerged surfaces, reducing the microhabitat variability for invertebrates normally evident in a range of plants and other substrata.

Stream 3

3 - Upstream Site

January 1995

The surveyed area was situated about 150m upstream of the road bridge, above and below a pumped discharge from a sand quarry. Owing to possible impacts from the intermittent quarry discharge, an extra freshwater invertebrate sample was obtained 10m upstream, just to check for additional taxa. The main sample site was on a sinuous channel through grazed meadows with alder trees on the east bank, with 45° banks of rough grass. Water width was 0.8m, average depth 10cm and water velocity $0.5\text{-}1.0\text{m sec}^{-1}$. Stream substrates included some large flints, pebbles and gravel, with sand and silt occupying about one third of the stream bed, there was no organic detritus present. Isolated stands of Apium nodiflorum and Myosotis scorpioides (?) provided about 10% cover within the channel. Water colour was yellow/sandy and highly turbid. Upstream from the quarry discharge (supplying about one quarter of the stream flow) the water was clear and uncoloured, flowing within a straightened channel beside the quarry. The stream bed was hard clay or tuffa, with a few flints. A footpath ran adjacent to the stream course.

April 1995

There had been an increase in filamentous algae on the stream bed since January, in

other respects the site was unchanged. There was no indication of recent pumped discharges from the sand quarry.

3 - Downstream Site

January 1995

An area 10m upstream from the road access point was selected for sampling. The stream had a straight channel with steep banks lined by alder, ash and oak to the west and woodland herbs and a hedge to the east. Stream width was about 1.4m, water depth 10-15cm, flow velocity 0.5-1.0m sec⁻¹. The substrates were dominated by flint cobbles, with pebbles, gravel and some silty sand. The water was slightly coloured but the stream bed was clearly visible. Lime encrusted the stones and woody debris, little detritus was present and rapid flow combined with tree shading restricted water plants to small patches of Apium nodiflorum.

April 1995

The stream was unchanged in appearance since the visit in January. Heavy shading may restrict algal growth, in contrast to other stream sites.

Stream 4

4 - Upstream Site

January 1995

The site was about 200m upstream of the road bridge access, just downstream from a collapsed farm bridge. The stream flows through a straightened channel with 45° groomed banks, winter wheat crops are present to within 1.5m of the stream, with a hedge and isolated ash trees on one bank. Water width was about 1.2m, depth 5-15cm, velocity 0.5-1.0m sec⁻¹. The bank had a steep gradient and some bank erosion was apparent downstream.

Stream substrates were dominated by large flints with some smaller gravel, diatoms were present on the largest stable flints, also lime deposits. Aquatic plants provided about 5% cover (Apium nodiflorum), detritus was absent, bankside plants included Oenanthe sp (dropwort), figwort and dock. Water clarity was good with no colour.

April 1995

Little change was evident within the stream channel, with the exception of more algae being present on the stones. Marginal plants were not encroaching into the stream, in April.

4 - Downstream Site

January 1995

Sampling took place 10m upstream from the road access, by a woodyard. The channel skirting a private garden lawn to the NE, with shading from a 3m conifer hedge on the SW bank. The NE bank had been recently inundated during flooding. Mean water width was 1.8m (1.5-2.0m), depth 10-15cm and velocity 0.5-1.0m sec⁻¹. Substrates consisted of cobbles and pebbles with some sand, detritus was absent. About 20% cover

was provided by Apium nodiflorum. Water clarity was clear and bright.

April 1995

This site receives moderate shading and plants within the channel appeared to have put on little growth since January, however some bankside maintenance was evident and it is possible aquatic plants have been trimmed. Algal coatings and well-developed filamentous growths were present on some stones.

Aquatic plants

Within-stream and emergent vegetation was surveyed at each stream site. In January many plant species have died back and their presence can pass undetected or identification of over-wintering growth forms are uncertain. Consequently, the list of species at each site will be incomplete. A second assessment of the streams in mid-April, provided confirmation of species present where spring growth had commenced, but the list is likely to be incomplete with some plants occurring at other times of year.

Stream 1 - Upstream Site

Apium nodiflorum occurred at the stream margins, where shading from scrub was absent. A stand of Mimulus guttatus (a common garden escape) was also present. The change in sample location in April gave rise to no further species being recorded, but those present were restricted to the stream margins.

Stream 1 -Downstream Site

All vegetation had been removed from the stream within the preceding week by an excavator. Stream sediment covered bankside plants. In April some sparse growth of Sparganium erectum was evident within the channel and marginal plants were also becoming established.

Stream 2 - Upstream Site

This was the most heavily vegetated of the sites surveyed on streams 1-4, with 90% cover provided by Apium nodiflorum. Isolated plants of Glyceria fluitans and Nasturtium officinale (water cress) were present. The presence of Mentha aquatica was noted in April and other species had emerged above the water surface, causing some restriction to stream flow.

Stream 2 - Downstream Site

Plants within the stream were Apium nodiflorum, Veronica beccabunga and Glyceria fluitans, whilst semi-aquatic bankside vegetation included Juncus sp. and Sparganium sp. There were indications that extensive aquatic plant stands occur at this site during the growing season. In April Mentha aquatica was widespread, other submerged species had not greatly increased in biomass, possibly because of the heavy shade provided by algae.

Site 3 - Upstream Site

There were few aquatic plants at this site, accessibility to grazing stock and partial shade may restrict plants in such a shallow stream. Apium nodiflorum and Myosotis sp were present as isolated plants, the banks had predominately coarse grasses. No changes to

the plants were noted in April.

Site 3 - Downstream Site

Heavy bankside shade, a straight channel with fast-flowing water and an absence of fine sediment deposits restricted the establishment of aquatic plants. Apium nodiflorum was present and dormant rhizomes of a Sparganium (?) sp. occurred near the road bridge. The stream appeared similar in April, the presence of Sparganium erectum was confirmed.

Site 4 - Upstream Site

The rapid current at this sample site restricted aquatic plants to the marginal zone, where Apium nodiflorum and Oenanthe sp., (water dropwort) were present. In April no further plant species had appeared.

Site 4 - Downstream Site

A greater variety of substrates and flow conditions had permitted the establishment of Apium nodiflorum within 20% of the channel. At the margins a few Oenanthe sp. (water dropwort) plants were present. As at the upstream site, no new plant species were evident in April.

Freshwater Invertebrates

Records of all invertebrates recovered from sites on streams 1-4 in January 1995 are presented in Tables 1-8 (Appendix I). A summarising table (Table 9) permits comparison between all sites and with NRA data for Stream 4 (full data in Appendix II).

General comments on freshwater invertebrates recorded

From an examination of site data it was found that five taxa occurred in all January samples (Oligochaeta, Glossiphoniidae, Hydracarina, Gammaridae and Chironomidae), with the exception of Glossiphoniidae, these Families were also present at all sites in April. Fauna confined to "upstream" sites included seven frequently associated with stream sources, headwaters and springs, (Polycelis felina, Niphargus sp, Nemoura 2spp, Simulium 3spp). Some are restricted to the close proximity of stream sources by water temperature, precise habitat requirements or egg-laying site selection. These species do not migrate downstream in response to irregular stream drying events.

It is noteworthy that no species recorded in January 1995 were indicative of winterbournes (chalkstream headwaters which flow in late winter and dry up each year in late spring). Identification was confined to Family level for the April samples.

The presence of nine taxa at downstream sites and their absence from upstream sites is less easily explained. Generally a downstream increase in variety of habitat and food resources provides more niches leading to a more varied fauna, however within the streams under consideration there was little visual indication of increased habitat variety at downstream sites. It is stressed that species recorded as single specimens may result from chance captures.

When considered at Family level the range of BMWP scoring taxa increased downstream on streams 2, 3 and 4 in January and on streams 2 and 4 in April. The downstream reduction in taxa observed in stream 1 (April) may be associated with the major dredging activity in January and the impact of STW effluent which contributes a large proportion of the stream discharge. The downstream reduction in taxa on stream 3 is not easily explained, being possibly a combination of loss of headwater "specialist" species coupled with the presence of very similar within-stream habitats at the upstream and downstream sites.

The BMWP total scores showed overall declines in April, this was unexpected. The taxa contributing to these losses include Glossiphoniidae (previously ubiquitous but at low abundance), also Simuliidae and Tipulidae which may have pupated and emerged as adults. Other Families apparently absent in April had all been at low abundance levels in January and failure to record some of them may be attributed to chance, however the appearance of new taxa (by chance) did not counterbalance this. There are no visual indications of water quality decline (aside from those associated with changing the Stream 1 upstream sample location).

Some freshwater invertebrates are restricted to the close proximity of stream sources by water temperature, precise habitat or egg-laying site requirements (eg, certain Planariidae, stoneflies and Simuliidae). These species do not migrate downstream in response to irregular stream drying events. The restricted fauna present in stream 2 in 1995 is considered to be atypical of a permanently flowing chalkstream, therefore greater faunal diversity should develop whilst this stream continues to flow. Streams 1,3 and 4 would develop similar invertebrate faunal communities to stream 2 if their discharge was greatly reduced for short periods (Bickerton et al, 1993). The presence of STW discharges near the source of stream 1 and in stream 4 will buffer any reduction in baseline stream flows but stream 3 is believed to have no major inputs downstream from its spring sources.

Table 9. Freshwater invertebrate "Families" recorded on Kent stream sites in January and April 1995 (present study) and from NRA monitoring data (Appendix II). * - site 1 upstream relocated in April.

	Stream 1		Stream 2		Stream 3		Stream 4	
	Upstr*	D/st	Upstr	D/st	Upstr	D/st	Upst	D/str
<u>January 1995</u>								
BMWP scoring taxa	14	-	8	12	15	16	15	20
Total Score	61	-	26	45	71	78	71	94
ASPT	4.36	-	3.25	3.75	4.73	4.87	4.73	4.70
<u>April 1995</u>								
BMWP scoring taxa	8	6	7	8	13	11	13	19
Total Score	29	19	23	31	63	51	55	94
ASPT	3.62	3.17	3.29	3.87	4.85	4.64	4.23	4.95

NRA data for Stream 4.

(between the present studies Upstream and Downstream sites)

Autumn/Spring (equivalent data)

BMWP Scoring taxa	Mar90	Oct90	Mar91	Mar92	Apr93	Oct93	Mar94	Nov94
BMWP Scoring taxa	19	20	18	14	17	18	19	17
Total Score	85	100	91	69	90	84	92	80
ASPT	4.47	5.00	5.06	4.93	5.29	4.67	4.84	4.71

[BMWP - Biological Monitoring Working Party - a scoring system based on perceived susceptibility/resistance to pollution. ASPT - Average Score Per Taxon, derived from the sum of the BMWP taxa scores divided by the number of scoring taxa].

Invertebrate community structure

The general approach to investigate freshwater invertebrate richness and community structure at a particular site is to survey during three seasonal periods "spring" (Feb-May), "summer"(Jun-Aug) and "autumn"(Sept-Nov). In this way a composite picture of invertebrates at a site through the year is established. The Institute of Freshwater Ecology have developed techniques for predicting the faunal composition of streams and rivers, in the absence of pollution (RIVPACS - River InVertebrate Prediction and Classification System). The NRA have adopted this approach in comparing predictions with the fauna actually present, leading on to monitoring biological water quality and the setting of specific water quality objectives. These predictions can also be used to detect unusually rich or impoverished sites (based on a range of physical and chemical descriptive variables). This can be done on seasonal or annual data.

In the present study, January samples from the Kent streams were taken between the "autumn" and "spring" periods, followed by further sampling during the spring period (April). Generation of more robust RIVPACS predictions in streams of such small size is currently under development by IFE. For the present, the RIVPACS I package provided very similar predictions of BMWP score, number of scoring taxa and ASPT for all 8 sites (Table 10).

Table 10. Kent Streams, RIVPACS (I) a) predictions of BMWP scores, number of taxa and ASPT in spring.(see text for abbreviations); b) Taxa with the highest probability of occurrence.

a)	BMWP Score	Number of Taxa	ASPT
Stream 1(Upstream)	114	21	5.5
Stream 1(D/stream)	106	20	5.2
Stream 2(Upstream)	109	20	5.5
Stream 2(D/stream)	112	20	5.5
Stream 3(Upstream)	111	20	5.7
Stream 3(D/stream)	112	20	5.5
Stream 4(Upstream)	111	20	5.6
Stream 4(D/stream)	113	21	5.5

b) Predicted probability (%) of occurrence (excludes taxa below 50% probability at most sites). Families showing wide deviation from predictions underlined.

	-----Predictions-----								Mean % occurrence
	Stream 1		Stream 2		Stream 3		Stream 4		
	Up/st	D/st	Up/st	D/st	Up/st	D/st	Up/st	D/st	
Oligochaeta	100	100	100	100	100	100	100	100	100
Chironomidae	100	100	100	100	100	100	100	100	100
Sphaeriidae	98	99	100	99	100	98	100	98	75
Limnephilidae	98	98	100	99	100	98	100	98	75
Gammaridae	99	97	100	99	100	97	100	98	100
Simuliidae	96	93	98	97	100	98	100	96	60
Tipulidae	93	87	98	94	100	87	99	90	75
<u>Nemouridae</u>	83	72	92	86	99	86	97	82	<u>25</u>
Baetidae	80	79	74	78	75	82	75	81	88
Hydrobiidae	75	74	76	75	75	71	75	74	47
Elmidae	72	77	67	70	63	69	64	72	60
<u>Perlodidae</u>	67	<50	77	69	86	62	84	62	<u>0</u>
Glossi- phoniidae	64	74	56	62	51	66	52	67	88
Planariidae	67	68	78	68	75	58	75	62	60
<u>Dytiscidae</u>	55	<50	57	57	62	57	61	55	<u>12</u>
Scirtidae	<50	<50	57	<50	62	<50	60	<50	25
Sericostomatidae	53	55	52	62	<50	60	<50	<50	40
Hydropsychidae	<50	50	<50	<50	<50	<50	<50	<50	47
Asellidae	<50	55	<50	<50	<50	<50	<50	<50	25
<u>Erpobdellidae</u>	<50	<50	<50	<50	<50	<50	<50	<50	<u>100</u>

Certain invertebrate groups have not been identified to species (Oligochaeta, Chironomidae, some caddis, eg Limnephilidae), as this is too time-consuming within the present study. Other families have been taken to species (for January samples), except when juvenile forms are not covered in identification keys. For the purposes of water quality assessment the normal procedure adopted is to identify to the Family level. A diverse range of beetles are normally found close to stream sources (generally as adults during winter), but with the exception of Elmidae (Streams 3 & 4 , Upstream and Downstream), Scirtidae (Stream 3 Upstream and Downstream) and Dytiscidae (Stream 2 Downstream) no beetles were present. NRA monitoring data indicates Haliplidae were recorded in previous years (Stream 4, Appendix II).

The present survey is regarded as an incomplete audit of freshwater invertebrates utilising the sites on streams 1-4. Should a more detailed investigation be required the preserved invertebrate material will be retained and available for further study.

The fauna of headwater streams (first and second order) has been the focus of recent IFE studies, such headwaters were identified as "important sources of species diversity in need of protection from further environmental degradation". Unpolluted chalkstream headwaters would be expected to yield between 15 and 25 BMWP scoring taxa, whilst exceptionally rich streams have up to 30 scoring taxa (Furse, pers com). The "value" of the Kent streams within the present survey has not been clearly established by the visits in January and April 1995. An assessment of the invertebrate communities present follows and should be considered within the above constraints.

When considered in terms of invertebrate diversity and the types of taxa represented, streams 1,3 and 4 have communities closely similar to other chalkstream headwaters with perennial flow (Wright & Berrie 1987). The total number of BMWP scoring taxa, the Total Score and the Average Score Per Taxon for these sites in the January samples (Table 9) were at the lower end of the broad range indicative of high water quality. The less rich fauna in stream 2 may result from the lag in recovery following periods when the stream became dry in some reaches (Mid-Kent Water monitoring data), rather than poor water quality. The reduction in scoring taxa at most sites in April was unexpected and may result from loss of habitat diversity associated with algal overgrowths and the seasonal emergence of some insect species.

It should be noted that such high gradient streams with unpolluted sources provide important dilution for effluent discharges downstream. Similarly, the headwater invertebrate community is constantly "seeding" downstream sites with fauna capable of rapidly replacing components lost during periods of reduced water quality or quantity (note exceptions provided by taxa restricted to stream sources). Other natural recolonisation routes are available but tend to operate more slowly, in these cases complete faunal recovery following a stress event can take several months (Wood & Petts, 1994) or in excess of one year (Ladle & Bass, 1981).

Predictions versus Occurrences (Table 10)

As the BMWP scores for streams 1-4 are generally lower than predictions, it is to be expected that many individual Families will also have occurred at lower occurrence rates than those predicted by RIVPACS (Table 10). It should be noted that most Families have occurrence rates only slightly less than predicted, but the overall depression of rates has driven down the observed BMWP scores.

These results may be attributed to the possible impacts of STW effluent streams 1 and 4, dredging activities on stream 1, the intermittent flow regime on stream 2 and lack of habitat diversity on stream 3. Further interpretation is confined to those Families with very much lower or higher occurrence rates than predicted rates.

Nemouridae, as with most Families of stonefly, are associated with high water quality, rapid velocities and low water temperatures. In S.E. England this largely restricts their occurrence to the winter-spring period and (comparatively few) headwater localities. Such local regional anomalies can explain depressed occurrence rates.

Two leech Families (Glossiphoniidae & Erpobdellidae) showed elevated occurrence rates (over predicted), both feed on a range of prey types, but it is not clear why they should be favoured by conditions in streams 1-4.

In the Simuliidae the impact of STW effluent (stream 1), lack of suitable flow in the preceding autumn for oviposition (stream 2, upper), lack of suitable substrate (extensive algae in April) contribute to low occurrence.

Such influences may also impact other Families, but the precise conditions preferred and, more importantly, what the aquatic fauna is subjected to in the period prior to and between sample collections will always be difficult to establish.

Invertebrate community structure - site specific anomalies.

Stream 1 - Upstream site

No molluscs were found at this site in January, apart from one species of bivalve. Other expected groups were generally represented. The reduced number of Families recorded in April (at the revised site location) depressed the BMWP score and may be attributed to the dredging noted in January, the STW effluent, or both.

Stream 1 -Downstream site

Data were available for April, when the stream showed physical signs of recovery from the dredging undertaken in January. The faunal diversity was particularly low (Table 2) and further recovery over the coming weeks can be anticipated.

Stream 2 - Upstream site

The absence of Baetidae (Mayflies), Simuliidae (Blackflies) and Tipulidae (Craneflies), when they were found at each of the other upstream sites in January, was surprising. This, combined with the abundance of Lymnaea palustris (the Marsh Snail), may indicate the stream was dry at this point in the previous autumn.

Stream 2 - Downstream site

Despite the presence of a broader range of habitat types at this site, the invertebrate fauna was relatively poor (12 BMWP scoring taxa), when compared with streams 3 and 4 (16 and 20, respectively). No taxa recorded at this site were particularly noteworthy. The Simulium aureum species group have a widespread occurrence in lowland England and are associated with aquatic plants, which were relatively plentiful at this site.

Stream 3 - Upstream site

The blackfly Simulium costatum, found only at this site, is confined to permanent spring sources. Stoneflies (Nemoura spp.) are also of restricted occurrence and are intollerant of organic pollution.

Stream 3 - Downstream site

The absence of simuliid (blackfly) larvae, despite suitable flow conditions was surprising. This site yielded no Asellus or small bivalves (Sphaeriidae), in contrast to the downstream sites on other streams, but the habitats available were considered unsuitable for these groups.

Stream 4 - Upstream site

Acknowledgements

NRA (Southern) staff kindly supplied biological and chemical monitoring data, at very short notice. IFE staff generated RIVPACS predictions, retrieved archived data on adjacent streams and provided helpful comments on data interpretation. Annette Mills (EASL) focused the study and provided the project management.

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Appendix I

Tables

Table 1

Kent Streams - Stream 1 (Upstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr

Note: site change, April samples taken below STW discharge point.

5	Planariidae (flatworms)	2	-
3	Lymnaeidae (snails)	-	1
3	Sphaeriidae (pea mussels)	2	1
1	Oligochaeta (worms)	1	3
3	Glossiphoniidae (leech)	1	1
3	Erpobdellidae (leech)	1	-
-	Hydracarina (mites)	1	1
3	Asellidae (slaters)	1	-
6	Gammaridae (shrimps)	3	3
4	Baetidae (mayflies)	3	1
7	Nemouridae (stoneflies)	1	-
8	Psychomyiidae (caddis)	1	-
7	Limnephilidae (caddis)	1	1
5	Tipulidae (cranefly)	1	-
2	Chironomidae (non-biting midge)	1	3
-	Muscidae (fly)	1	-
5	Simuliidae (blackfly)	2	-

Table 2

Kent Streams - Stream 1 (Downstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score Invertebrate Family scale of abundance

Note: site was not sampled in January, as extensive dredging had just been completed.

		Apr
3	Sphaeriidae (pea mussels)	1
1	Oligochaeta (worms)	3
3	Erpobdellidae (leech)	2
6	Gammaridae (shrimps)	3
4	Baetidae (mayflies)	3
2	Chironomidae (non-biting midge)	2

Table 3

Kent Streams - Stream 2 (Upstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
5	Planariidae (flatworms)	2	2
3	Hydrobiidae (snails)	1	-
3	Lymnaeidae (snails)	2	2
3	Sphaeriidae (pea mussels)	-	2
1	Oligochaeta (worms)	2	3
3	Glossiphoniidae (leech)	1	-
3	Erpobdellidae (leech)	2	2
-	Hydracarina (mites)	1	1
6	Gammaridae (shrimps)	2	1
-	Ostracoda (ostracods)	2	-
-	Ceratopogonidae (midge)	2	2
2	Chironomidae (non-biting midge)	2	2

Table 4

Kent Streams - Stream 2 (Downstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
5	Planariidae (Flatworms)	-	1
3	Lymnaeidae (snails)	3	2
-	Succinidae (snail)	1	-
3	Sphaeriidae (pea mussels)	1	-
1	Oligochaeta (worms)	2	3
3	Glossiphoniidae (leech)	1	-
3	Erpobdellidae (leech)	1	-
-	Hydracarina (mites)	1	1
3	Asellidae (slaters)	1	-
6	Gammaridae (shrimps)	2	2
4	Baetidae (mayflies)	2	1
5	Elmidae (Beetles)	1	-
5	Dytiscidae (Beetles)	-	1
7	Limnephilidae (caddis)	1	-
5	Tipulidae (cranefly)	1	-
-	Ceratopogonidae (midge)	1	1
2	Chironomidae (non-biting midge)	3	3
5	Simuliidae (blackfly)	1	-

Table 5

Kent Streams - Stream 3 (Upstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
5	Planariidae (flatworms)	2	2
3	Lymnaeidae (snails)	1	2
1	Oligochaeta (worms)	2	2
3	Glossiphoniidae (leech)	1	-
3	Erpobdellidae (leech)	1	-
-	Hydracarina (mites)	1	2
6	Gammaridae (shrimps)	2	3
4	Baetidae (mayflies)	2	3
7	Nemouridae (stoneflies)	2	2
5	Scirtidae (beetles)	1	2
5	Elmidae (beetles)	1	2
5	Hydropsychidae (caddis)	-	1
7	Limnephilidae (caddis)	1	2
8	Psychomyiidae (caddis)	-	1
10	Sericostomatidae (caddis)	1	1
5	Tipulidae (cranefly)	1	-
-	Ceratopogonidae (midge)	1	2
2	Chironomidae (non-biting midge)	3	2
-	Stratiomyidae (midge)	1	2
5	Simuliidae (blackfly)	2	-

Table 6

Kent Streams - Stream 3 (Downstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
3	Hydrobiidae (snails)	2	1
3	Lymnaeidae (snails)	-	1
1	Oligochaeta (worms)	2	3
4	Piscicolidae (leech)	1	-
3	Glossiphoniidae (leech)	2	2
3	Erpobdellidae (leech)	1	-
-	Hydracarina (mites)	2	2
6	Gammaridae (shrimps)	3	3
-	Ostracoda (ostracods)	1	-
4	Baetidae (mayflies)	3	3
5	Scirtidae (beetles)	1	-
5	Elmidae (beetles)	2	3
7	Rhyacophilidae (caddis)	1	1
8	Psychomyiidae (caddis)	2	2
5	Hydropsychidae (caddis)	2	2
7	Limnephilidae (caddis)	2	2
10	Sericostomatidae (caddis)	1	-
5	Tipulidae (cranefly)	2	-
2	Chironomidae (non-biting midge)	2	2
-	Ceratopogonidae (midges)	-	1

Table 7

Kent Streams - Stream 4 (Upstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
5	Planariidae (flatworms)	1	-
3	Hydrobiidae (snails)	1	1
6	Ancylidae (limpets)	-	1
3	Sphaeriidae (pea mussels)	1	1
1	Oligochaeta (worms)	1	2
3	Glossiphoniidae (leech)	1	-
3	Erpobdellidae (leech)	-	1
-	Hydracarina (mites)	2	2
6	Gammaridae (shrimps)	3	3
-	Niphargidae (shrimps)	1	-
4	Baetidae (mayflies)	1	3
5	Elmidae (beetles)	3	2
7	Rhyacophilidae (caddis)	2	-
5	Hydropsychidae (caddis)	3	3
7	Limnephilidae (caddis)	1	1
10	Sericostomatidae (caddis)	1	-
5	Tipulidae (cranefly)	1	1
2	Chironomidae (non-biting midge)	1	3
-	Psychodidae (midge)	1	-
5	Simuliidae (blackfly)	2	1

Table 8

Kent Streams - Stream 4 (Downstream)

Freshwater invertebrate fauna : 1995

Abundance scale: 1=1-9, 2=10-99, 3=100-999, 4=>1000

BMWP Score	Invertebrate Family	scale of abundance	
		Jan	Apr
3	Hydrobiidae (snails)	2	1
3	Lymnaeidae (snails)	2	1
3	Planorbidae (snails)	1	1
6	Ancylidae (limpets)	1	2
3	Sphaeriidae (pea mussels)	2	3
1	Oligochaeta (worms)	2	3
3	Glossiphoniidae (leech)	1	1
3	Erpobdellidae (leech)	2	1
-	Hydracarina (mites)	1	2
3	Asellidae (slaters)	1	1
6	Gammaridae (shrimps)	3	3
-	Ostracoda (ostracods)	1	-
4	Baetidae (mayflies)	2	3
10	Leptophlebiidae (mayflies)	-	1
10	Ephemeridae (mayflies)	1	-
5	Elmidae (beetles)	3	2
7	Rhyacophilidae (caddis)	2	3
5	Hydropsychidae (caddis)	3	3
7	Limnephilidae (caddis)	2	2
10	Leptoceridae (caddis)	-	1
10	Sericostomatidae (caddis)	2	1
5	Tipulidae (cranefly)	1	-
2	Chironomidae (non-biting midge)	2	2
-	Psychodidae (midge)	1	-
-	Muscidae (fly)	1	-
5	Simuliidae (blackfly)	2	-

Appendix II

NRA data, Freshwater invertebrates and water chemistry

CHERING STREAM
 LEACON FARM
 TO 6515 4732

LIST OF INVERTEBRATE TAXA

SITE CODE	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098	1E0098
DATE	220390	260790	101090	210391	180691	050991	110392	180892	200493	271093	091194
TAXA											
Leptophlebiidae*			1								
Ephemeroellidae*		2			1						
Leptoceridae*	1		3	3					1		
Sericostomatidae*			2	3			2	1	3	3	2
Psychomyiidae†				1		1		3	1		
Rhyacophiliidae*			1	3		1	2		3	3	3
Limnephilidae*	2			4	2		3		3		2
Ancyliidae*	3	2	2	3	3	3	1	1	3	3	2
Hydroptilidae*	1	2	2					2		2	
Gammaridae*	4	4	3	4	5	5	6	3	4	3	4
Epididae*								1			
Corixidae*		2	2			1		2			
Salpidae*	1					2					
Dytiscidae*	2	1	2								
Scirtidae*										2	
Elmidae*	3	3	2	3	3	3	2	3	3	3	3
Hydroptychidae*	3	3	3	5	4	2	2	3	3	3	3
Tipulidae*	2				1		2	1	2	2	2
Simuliidae*				1	2		3	2		2	
Planariidae*					1				3	2	2
Dendrocoelidae*											1
Beetidae*	3		2	4	3	3	3	2	3	2	1
Sialidae*		1									
Valvatidae*										3	
Hydrobiidae*	5	5	3	5	5	5	2	3	4	5	4
Lymnaeidae*	1			3	4						
Planorbidae*	2	2	2			2					2
Sphaeriidae*	3	5	3	5	5	5	3	3	3	3	3
Glossiphoniidae*	2	2	2	2	2	2		2	2		2
Hirudidae*										2	
Erpobdellidae*		2	2			2		1			
Asellidae*	1	1	1	2	3						
Chironomidae*	4	4	3	3	4	3	3	3	3	2	2
Oligochaeta*	5	3	3	3	3	3	3	3	3	3	3
Hydracarina	2	1	1	2	1	2	2		2		1
Veliidae								2			
Ostracoda	1		1			1					
Psychodidae	2	2		2	1					1	
Ceratopogonidae	2			3	3				2	2	
Stratiomyidae						2					1
Epididae				2						1	
Tabanidae					1						
Muscidae				1							
No of SCORING TAXA	19	17	20	18	17	16	14	18	17	18	17
BIMF SCORE	85	73	100	91	76	69	69	85	90	84	80
ASPT SCORE	4.47	4.29	5.00	5.06	4.47	4.33	4.93	4.72	5.29	4.67	4.71

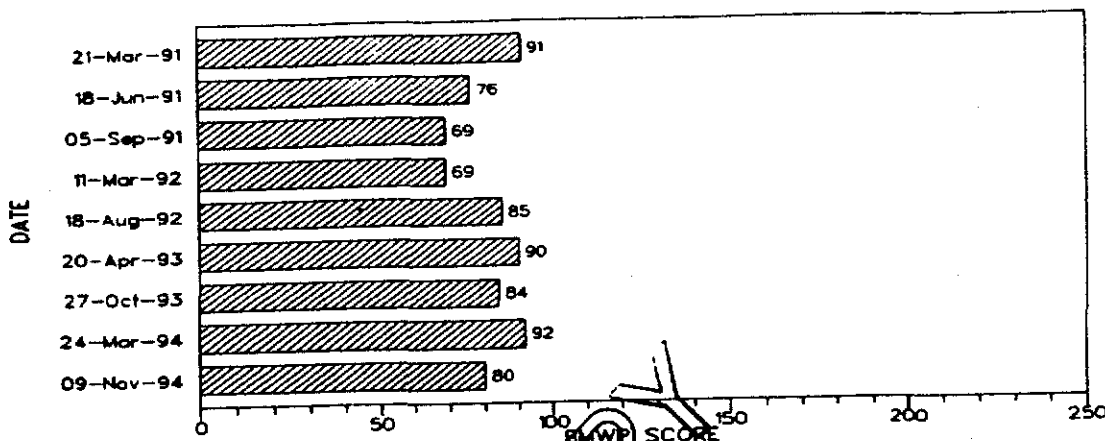
(* BIMF Scoring Taxa)

BIOLOGICAL SAMPLE REPORT

Watercourse : CHARING STREAM
 Location : LEACON FARM
 NGR : TQ 9515 4732
 Date : 09/11/1994
 BMWP Score : 80

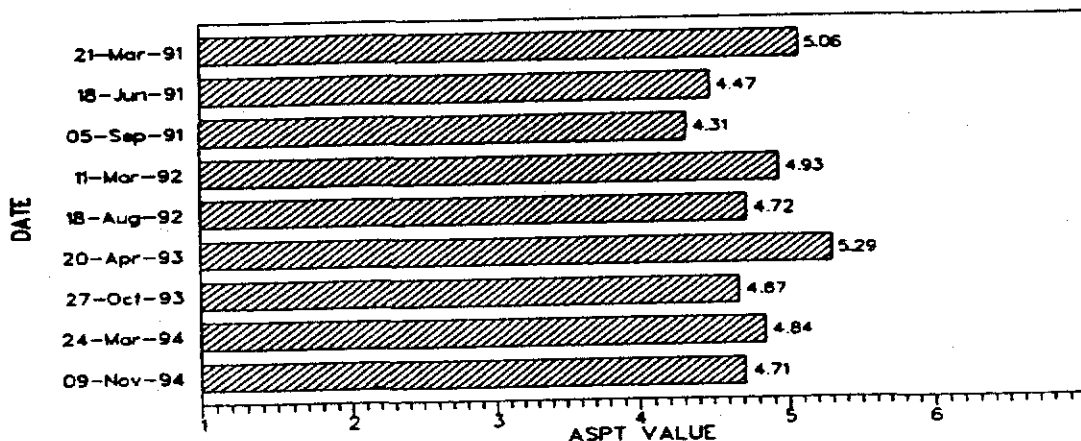
Site Code : 1E0098
 Sample Code : 941E0363
 ASPT Score : 4.71

Graph of the most recent BMWP Scores.



COPY

Graph of the most recent ASPT values.



COMMENTS:

ACTION:

Signed:

Measurements for Specified Determinands WA1304
Sampling Point 00001311 CHARLING STM CONF GT NGR: TQ9490046300 between 03-FEB-83 & 03-FEB-95

NRA Southern Region
Water Archive System

When Sampled Date	Time	Pu M e c	M a t	0061 PH UNITS	0172 CHLORIDE MG/L CL	0076 TEMPERATURE CEL	0081 OXYGEN % SATN	0117 NITRATE MG/L N	0111 AMMONIA - N MG/L N	0085 BOD 5 ATU MG/L O	0119 AMMONIA UNI MG/L N	0180 O-PHOSPHA MG/L P
06-DEC-94	1023	NW	04	20	415.00	5.00	101.00	15.00	<	3.10	.00	4.50
07-JAN-95	0840	NW	04	20	230.00	4.00	102.00	12.40	<	2.60	.00	1.80
07-FEB-95	0840	NW	04	20	240.00	4.00	126.00	10.50	<	1.60	.00	1.30
07-MAR-95	0845	NW	04	20	240.00	6.00	101.00	8.90	<	1.00	.00	1.10
07-APR-95	0846	NW	04	20	305.00	4.00	101.00	9.00	<	1.80	.00	1.30
07-MAY-95	0852	NW	04	20	345.00	4.00	104.00	15.40	<	1.50	.00	1.30
07-JUN-95	0840	NW	04	20	380.00	4.00	109.00	13.30	<	1.20	.00	1.30
07-JUL-95	0840	NW	04	20	380.00	4.00	101.00	11.00	<	1.50	.00	1.10
07-AUG-95	0840	NW	04	20	230.00	4.00	101.00	10.00	<	1.60	.00	1.10
07-SEP-95	0840	NW	04	20	230.00	4.00	101.00	10.00	<	1.40	.00	1.10
07-OCT-95	0840	NW	04	20	230.00	4.00	101.00	10.00	<	1.40	.00	1.10
07-NOV-95	0840	NW	04	20	230.00	4.00	101.00	10.00	<	1.40	.00	1.10
07-DEC-95	0840	NW	04	20	230.00	4.00	101.00	10.00	<	1.40	.00	1.10
08-JAN-96	0840	NW	04	20	175.00	4.00	106.00	10.00	<	1.40	.00	1.10
08-FEB-96	0840	NW	04	20	148.00	4.00	109.00	10.00	<	1.40	.00	1.10
08-MAR-96	0840	NW	04	20	153.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-APR-96	0840	NW	04	20	208.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-MAY-96	0840	NW	04	20	247.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-JUN-96	0840	NW	04	20	286.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-JUL-96	0840	NW	04	20	261.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-AUG-96	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-SEP-96	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-OCT-96	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-NOV-96	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
08-DEC-96	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-JAN-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-FEB-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-MAR-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-APR-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-MAY-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-JUN-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-JUL-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-AUG-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-SEP-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-OCT-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-NOV-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
09-DEC-97	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10
10-JAN-98	0840	NW	04	20	143.00	4.00	103.00	10.00	<	1.40	.00	1.10

Measurements for Specified Determinands WA1304
Sampling Point 00001313 GI STOUR LITTLE CHAR NGR: TQ9440045900 between 03-FEB-83 & 03-FEB-95

NRA Southern Region
Water Archive System

When Sampled Date	Time	Pu M e c	M a t	0061 PH UNITS	0172 CHLORIDE MG/L CL	0076 TEMPERATURE CEL	0081 OXYGEN % SATN	0085 DISS NITRATE MG/L N	0117 AMMONIA - N MG/L N	0085 BOD 5 ATU MG/L O	0119 AMMONIA UNI MG/L N	0180 O-PHOSP MG/L P
16-MAR-83	1200	XR	2F	8.30	39.00	8.00	124.00	10.20	<	2.20		1.20
16-MAY-83	1205	XR	2F	7.50	36.00	14.00	98.00	8.30		1.30		1.20
19-JUL-83	0900	XR	2F	6.90	37.00	15.00	95.00	8.30		2.00		1.20
17-OCT-83	1025	XR	2F	7.30	31.00	12.00	76.00	9.20		1.20		1.20
17-NOV-83	0950	XR	2F	7.90	27.00	6.00	60.00	11.00		3.30		1.20
05-JAN-84	1145	XR	2F	7.90	41.00	11.00	90.00	10.50	<	1.50		1.20
23-JAN-84	1250	XR	2F	8.00	27.00	9.50	99.00	10.50		3.20		1.20
13-MAR-84	1540	XR	2F	7.80	33.00	7.00	100.00	10.50		3.30		1.20
13-MAY-84	1240	XR	2F	7.00	32.00	15.00	96.00	10.50		1.90		1.20
13-JUN-84	1430	XR	2F	7.00	32.00	15.00	118.00	10.50		2.20		1.20
13-JUL-84	1430	XR	2F	7.00	32.00	15.00	93.00	10.50		2.40		1.20
13-SEP-84	1430	XR	2F	7.80	32.00	15.00	82.00	10.50		2.40		1.20
13-OCT-84	1430	XR	2F	7.80	32.00	15.00	126.00	10.50		2.40		1.20
13-NOV-84	1430	XR	2F	7.80	32.00	15.00	80.00	10.50		2.40		1.20
13-DEC-84	1430	XR	2F	7.80	32.00	15.00	132.00	10.50		2.40		1.20
13-JAN-85	1430	XR	2F	7.80	32.00	15.00	108.00	10.50		2.40		1.20
13-FEB-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-85	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-86	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-87	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-88	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-89	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-90	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUN-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JUL-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-AUG-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-SEP-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-OCT-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-NOV-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-DEC-91	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-JAN-92	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-FEB-92	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAR-92	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-APR-92	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20
13-MAY-92	1430	XR	2F	7.80	32.00	15.00	107.00	10.50		2.40		1.20

Measurements for Specified Determinands WA1304
Sampling Point 00001313 GT STOUR LITTLE CHAR NGR: TQ9440045900 between 03-FEB-83 & 03-FEB-95

NRA Southern Region
Water Archive System

When Sampled Date	Time	Pu M e C	M a t	0061 PH UNITS	0172 CHLORIDE MG/L CL	0076 TEMPERATURE CEL	0081 OXYGEN % SATN	0117 NITRATE - N MG/L N	0111 AMMONIA - N MG/L N	0085 BOD 5 ATU MG/L O	0119 AMMONIA UNI MG/L N	0180 O-PHOSPHA MG/L P
95-SEP-01	1200	NW	04	8.8	82	18	95	7.2	<	1.0	0.0	94
95-NOV-01	1220	NW	04	8.8	83	18	100	10.2	<	1.60	0.0	1.10
95-DEC-01	1145	NW	04	8.8	49	14	91	7.3	<	3.10	0.0	.85
96-JAN-02	1035	NW	04	8.8	62	7	93	9.0	<	1.80	0.0	.77
96-FEB-02	0825	NW	04	8.8	44	7	124	8.6	1.2	1.30	0.0	.80
96-MAR-02	0853	NW	04	8.8	49	7	94	9.1	1.0	9.30	0.0	.45
96-APR-02	0853	NW	04	8.8	46	7	105	7.0	0.5	1.50	0.0	.75
96-MAY-02	0848	NW	04	8.8	47	7	106	7.1	0.5	1.50	0.0	.90
96-JUN-02	0820	NW	04	8.8	52	7	106	7.5	0.8	1.60	0.0	.65
96-JUL-02	0820	NW	04	8.8	52	7	106	7.5	0.8	1.60	0.0	.65
96-AUG-02	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
96-SEP-02	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
96-OCT-02	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
96-NOV-02	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
96-DEC-02	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-JAN-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-FEB-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-MAR-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-APR-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-MAY-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-JUN-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-JUL-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-AUG-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-SEP-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-OCT-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-NOV-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
97-DEC-03	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-JAN-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-FEB-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-MAR-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-APR-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-MAY-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-JUN-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-JUL-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-AUG-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-SEP-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-OCT-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-NOV-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
98-DEC-04	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-JAN-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-FEB-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-MAR-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-APR-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-MAY-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-JUN-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-JUL-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-AUG-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-SEP-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-OCT-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-NOV-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65
99-DEC-05	0820	NW	04	8.8	48	7	106	7.5	0.8	1.60	0.0	.65

Appendix III
Field data sheets

SAMPLE AREA PLAN

WA/RPB:-
 RIVER:- **STREAM 1**
 SITE:- **UPSTREAM SITE**
 MGR:- **TQ 904 510**
 RECORDER(S):- **J BASS IFE**
 DATE:- **25.1.95**
 SAMPLE TIME (MINS):- **3**
 SAMPLING METHOD:- **STANDARD POND NET (KICK-SAMPLING)**
 DIMENSIONS OF SAMPLING DEVICE:-
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	1.5
MEAN DEPTH	10
VELOCITY CATEGORY	3

WATER WIDTH IN SAMPLE AREA **1.5** m
 DEPTH IN SAMPLE AREA (cm) AT **5** | **15** | **10** WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL: cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50 <input checked="" type="checkbox"/>	>50-100	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

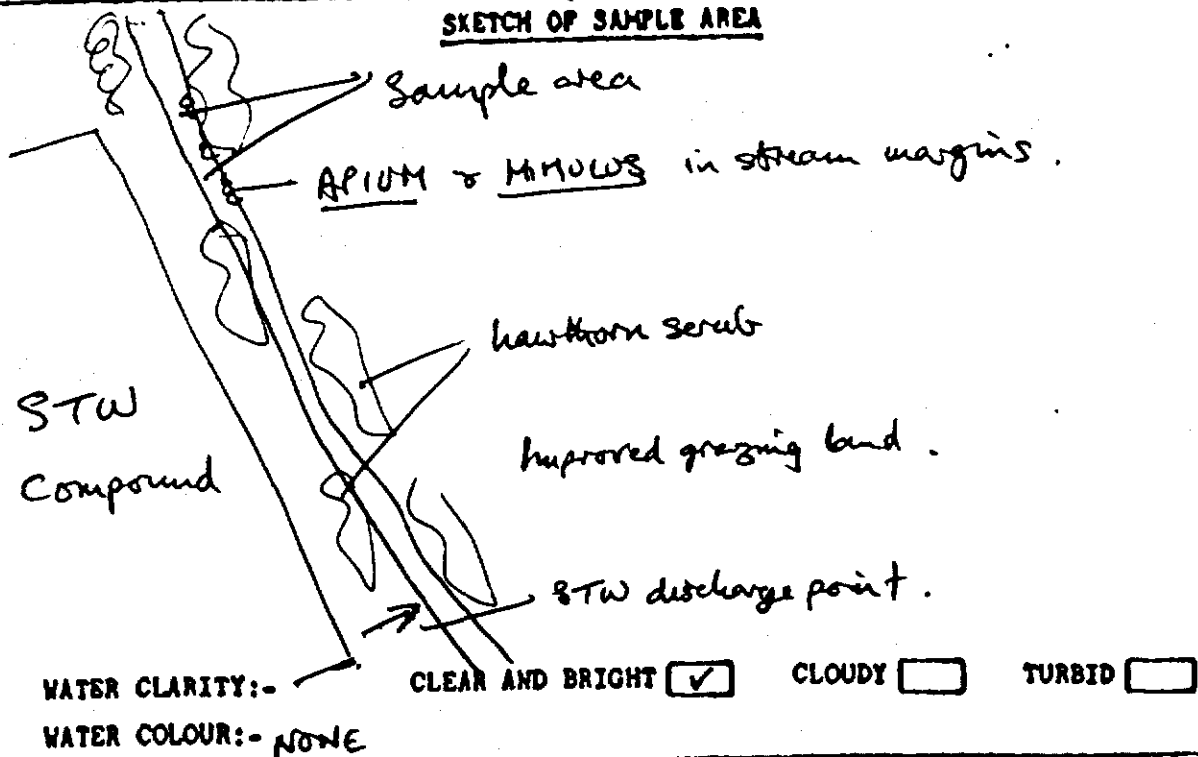
- ROCK PAVEMENT**
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - ≤0.004 mm CLAY

A	B
✓	30
✓	40
+	20
+	5
+	5
TOTAL	100%

BOULDERS	
+ COBBLES	30
PEBBLES	
+ GRAVEL	60
SAND	5
SILT	
+ CLAY	5
TOTAL	100

STREAM 1 (UPSTREAM)

SKETCH OF SAMPLE AREA



MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APICUM NODIFLORUM
MIMULUS GUTATA(?)

EXTRA SPECIES IN SURVEY AREA

COVER %:- ALGAE MOSS HIGHER PLANTS 20 TOTAL 20

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)
POACHED STREAM MARGINS, GRAZED VEGETATION, SHADING RESTRICTIVE AQUATIC PLANT GROWTH.

SAMPLE AREA FORM

WA/RPB:-

RIVER:- STREAM 1

SITE:- DOWNSTREAM SITE

MGR:- TO 902502

RECORDER(S):- J. BASS (IFE)

DATE:- 24.1.95

SAMPLE TIME (MINS):-

SAMPLING METHOD:-

DIMENSIONS OF SAMPLING DEVICE:-

MESH SIZE OF NET:-

WA/RPB SAMPLE NUMBER (IF ANY):-

IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO

IF NO GIVE DETAILS:-

SUMMARY

WIDTH	2.2
MEAN DEPTH	2.3
VELOCITY CATEGORY	

WATER WIDTH IN SAMPLE AREA 7.2 m

DEPTH IN SAMPLE AREA (cm) AT 20 | 30 | 20 WIDTH

ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL: cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
<10	>10-25	>25-50 ✓	>50-100	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

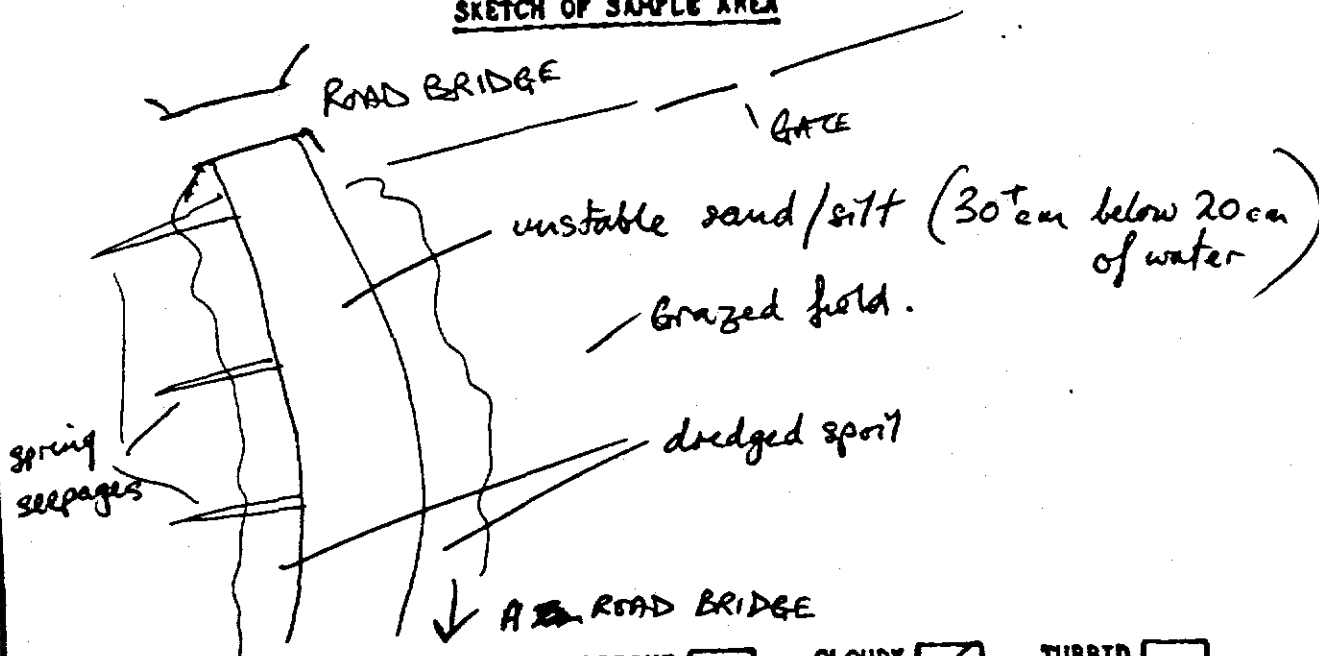
- ROCK PAVEMENT
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
✓	90
+	5
+	5
TOTAL	100%

BOULDERS + COBBLES	
PEBBLES + GRAVEL	
SAND	90
SILT + CLAY	10
TOTAL	100

STREAM 1 (DOWNSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:- BROWN

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

NONE

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

THIS SITE HAD BEEN DREDGE SINCE A VISIT 7 DAYS PREVIOUSLY, IT WAS NOT CONSIDERED USEFUL TO ASSESS INVERTEBRATES USING THE SITE

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- **STREAM 2**
 SITE:- **UPSTREAM SITE**
 NCR:- **TQ 926 504**
 RECORDER(S):- **T BASS (IFE)**
 DATE:- **25.1.95**
 SAMPLE TIME (MINS):- **3**
 SAMPLING METHOD:- **KICK SAMPLING**
 DIMENSIONS OF SAMPLING DEVICE:- **STANDARD POND NET**
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	1.2
MEAN DEPTH	18
VELOCITY CATEGORY	3

WATER WIDTH IN SAMPLE AREA **1.2**
 DEPTH IN SAMPLE AREA (cm) AT **20** | **25** | **10** WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50 ✓	>50-100	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE
 OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE
 FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL
 PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES
 IN ESTIMATES OF % COVER)

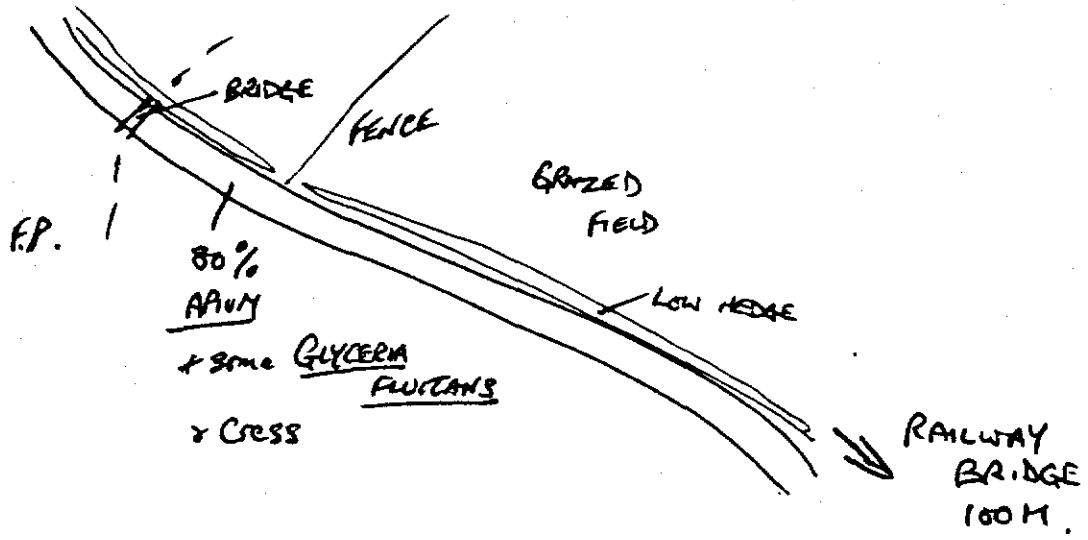
- ROCK PAVEMENT
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
+	5
+	5
✓	80
+	5
TOTAL	100%

BOULDERS	
COBBLES	
PEBBLES	
GRAVEL	5
SAND	5
SILT	85
CLAY	
TOTAL	100

STREAM 2 (UPSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:- NONE

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APUM NODIFLORUM

NASTURTIUM (Water Cress)

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

90

TOTAL

90

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

EXTENSIVE SILT DEPOSITS UNDER APUM, WITH ISOLATED GRAVEL PATCHES. SEEMS TO HAVE A LESS SHEEP GRADIENT THAN OTHER LOCAL STREAM SITES VISITED.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- *STREAM 2*
 SITE:- *DOWNSTREAM SITE*
 TQ 926492
 NGR:-
 RECORDER(S):- *J. BASS IFE*
 DATE:- *25.1.95*
 SAMPLE TIME (MINS):- *3*
 SAMPLING METHOD:- *STANDARD PONDNET (KICK-SWEEP)*
 DIMENSIONS OF SAMPLING DEVICE:-
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA *1.8* m
 DEPTH IN SAMPLE AREA (cm) AT *20* *25* *15* WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL: cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
<10	>10-25	>25-50 <input checked="" type="checkbox"/>	>50-100	>100

WIDTH	<i>1.8</i>
MEAN DEPTH	<i>20</i>
VELOCITY CATEGORY	<i>3</i>

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

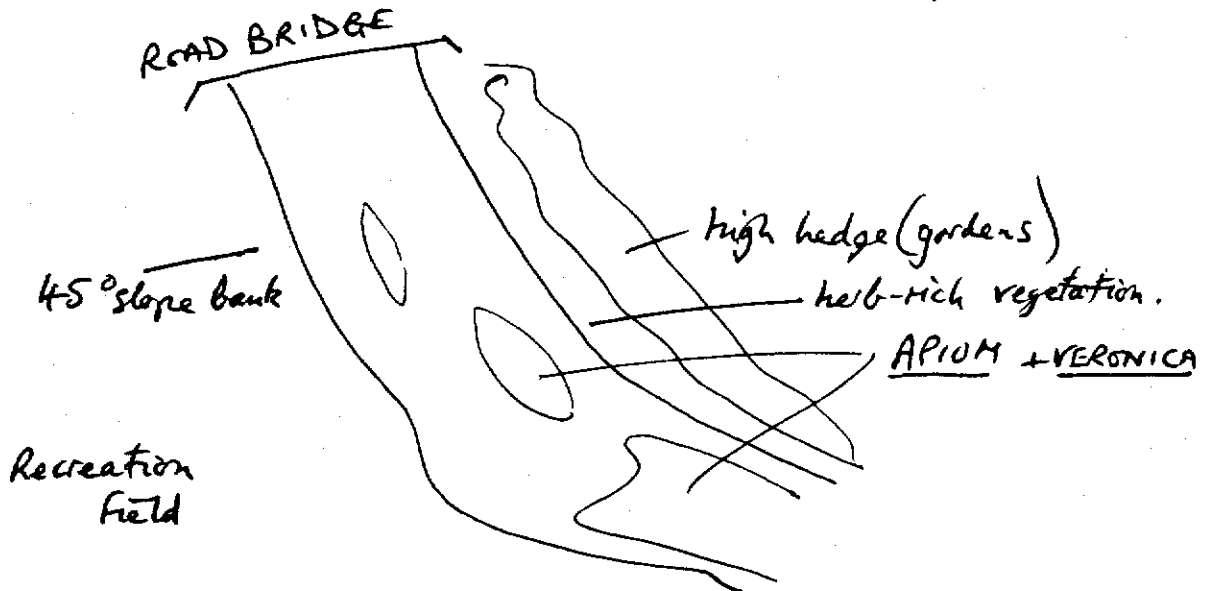
- ROCK PAVEMENT
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - ≤0.004 mm CLAY

A	B
+	10
✓	40
✓	20
+	10
+	10
+	10
+	10
TOTAL	100%

BOULDERS	
+ COBBLES	<i>50</i>
PEBBLES	
+ GRAVEL	<i>20</i>
SAND	<i>10</i>
SILT	
+ CLAY	<i>10</i>
TOTAL	<i>100</i>

STREAM 2 (DOWNSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID
 WATER COLOUR:- NONE

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA.
 IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE, TICK SPECIES
 SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APIUM NODIFLORUM
VERONICA BECABONGA
SPARGANIUM? sp
JUNCUS sp
GYNERIA FLUITANS

EXTRA SPECIES IN SURVEY AREA

COVER %:- ALGAE MOSS HIGHER PLANTS 40 TOTAL 40
 DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)
 MORE VARIED HABITAT STRUCTURE THAN SEEN ON OTHER D/SIDE SITES
 ON ADJACENT STREAMS.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- **VIOLET WOOD STREAM (STREAM 3)**
 SITE:- **UPSTREAM SITE**
 NCR:- **TQ 943485**
 RECORDER(S):- **J. BASS (IFE)**
 DATE:- **25.1.95**
 SAMPLE TIME (MINS):- **3**
 SAMPLING METHOD:- **KICK SAMPLING**
 DIMENSIONS OF SAMPLING DEVICE:- **STANDARD POND NET**
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA **0.8**
 DEPTH IN SAMPLE AREA (cm) AT WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 ✓	>100

WIDTH	0.8
MEAN DEPTH	10
VELOCITY CATEGORY	4

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

- ROCK PAVEMENT**
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - ≤0.004 mm CLAY

A	B
/	40
+	10
+	20
+	} 30
+	
TOTAL	100%

BOULDERS + COBBLES	
PEBBLES + GRAVEL	50
SAND	20
SILT + CLAY	30
TOTAL	100

STREAM 3 - UPSTREAM

SKETCH OF SAMPLE AREA

WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID

WATER COLOUR:- SANDY/YELLOW

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE, TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APIUM
MYOSOTIS sp.

EXTRA SPECIES IN SURVEY AREA

COVER %:- ALGAE MOSS HIGHER PLANTS TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

INTERMITTENT DISCHARGE OF SEDIMENT FROM THE QUARRY (WAS TAKING PLACE AS THE SITE WAS SAMPLED). GRAZED FIELDS. SILT & SAND OVERLYING GRAVEL. SUBSIDIARY SAMPLE TAKEN UPSTREAM FROM QUARRY DISCHARGE TO CHECK FOR ADDITIONAL FAUNA.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- VIOLET WOOD STREAM (STREAM 3)
 SITE:- DOWNSTREAM SITE
 MGR:- TQ 937477
 RECORDER(S):- JBASS (IFE)
 DATE:- 24.1.95
 SAMPLE TIME (MINS):- 3
 SAMPLING METHOD:- KICK-SAMPLING
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA 1.4 m
 DEPTH IN SAMPLE AREA (cm) AT 10 | 15 | 10 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 <input checked="" type="checkbox"/>	>100

WIDTH	1.4
MEAN DEPTH	12
VELOCITY CATEGORY	4

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

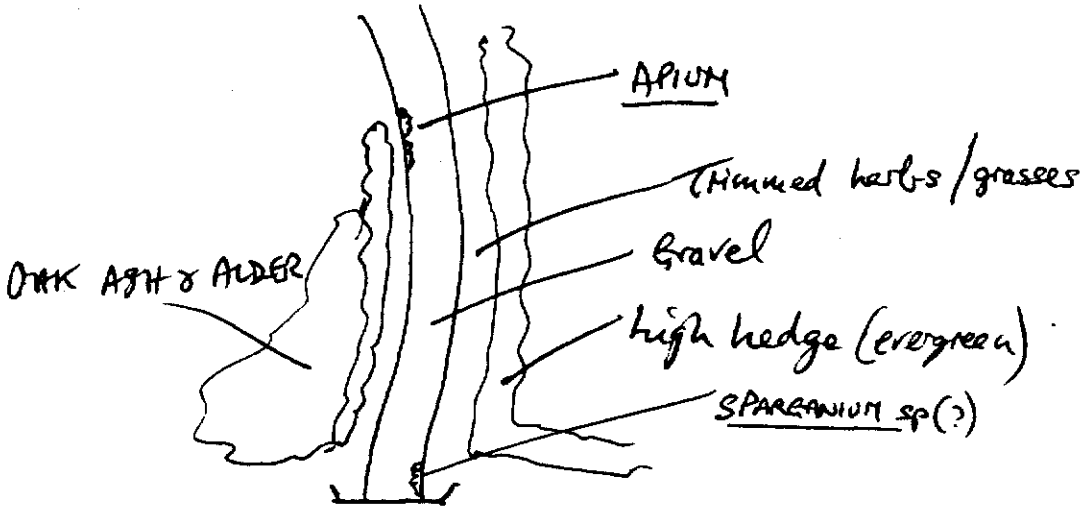
ROCK PAVEMENT
 >256 mm BOULDERS
 >64-256 mm COBBLES
 >16-64 mm PEBBLES
 >2-16 mm GRAVEL
 >0.0625-2 mm SAND
 >0.004-0.0625 mm SILT
 ≤0.004 mm CLAY

A	B
✓	60
✓	20
+	10
+	5
+	5
TOTAL	100%

BOULDERS	
+ COBBLES	60
PEBBLES	
+ GRAVEL	30
SAND	5
SILT	
+ CLAY	5
TOTAL	100

STREAM 3 - DOWNSTREAM

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:-

NONE

SLIGHTLY

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE, TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APIUM NODIFLORUM

SPARGANIUM sp?

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

2

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

SOME WOODY DEBRIS WITH LIME/TOPHA DEPOSITS, ALSO ON STONES
RAPID FLOW AND LITTLE SCOPE FOR PLANTS TO BECOME ESTABLISHED.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- CHARING STREAM (STREAM 4)
 SITE:- HEACON FARM (UPSTREAM)
 MGR:- TQ 952476
 RECORDER(S):- JBASS (IFE)
 DATE:- 25.1.95
 SAMPLE TIME (MINS):- 3
 SAMPLING METHOD:- KICK SAMPLING
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA 1.2 m
 DEPTH IN SAMPLE AREA (cm) AT 20 25 10 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1		CATEGORY 2		CATEGORY 3		CATEGORY 4		CATEGORY 5	
<10		>10-25		>25-50		>50-100	<input checked="" type="checkbox"/>	>100	

WIDTH	1.2
MEAN DEPTH	18
VELOCITY CATEGORY	4

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

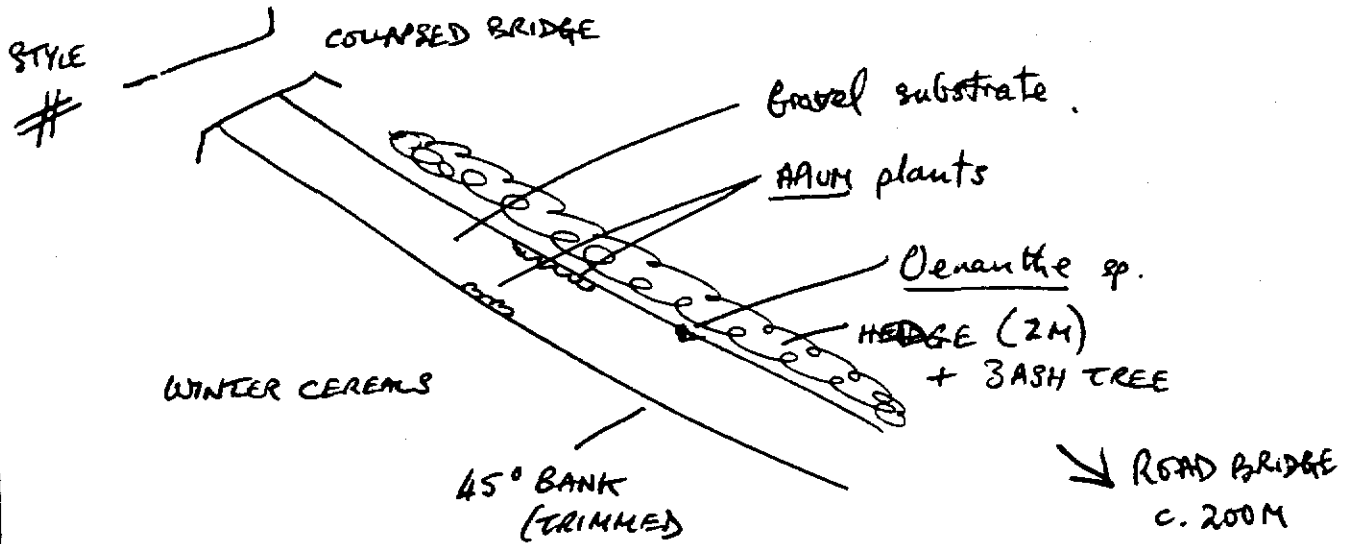
- ROCK PAVEMENT
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - 0.004 mm CLAY

A	B
20	+
70	✓
5	+
5	+
TOTAL	100%

BOULDERS	
+ COBBLES	20
PEBBLES	
+ GRAVEL	75
SAND	5
SILT	
+ CLAY	
TOTAL	100

STREAM 4 - UPSTREAM

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:-

NONE

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE, TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

APIUM NODIFLORUM

OENANTHE SP

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

THIS SITE IS UPSTREAM FROM THE ROAD BRIDGE, WHICH IS A REGULAR NRA MONITORING SITE. THE CHARACTERISTICS AND FAUNA ARE LIKELY TO BE SIMILAR.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- CHIRING STREAM (STREAM 4)
 SITE:- DOWNSCREEN SIZE
 MGR:- TO 949 467
 RECORDER(S):- J BASS (IFE)
 DATE:- 24.1.95
 SAMPLE TIME (MINS):- 3 MINS
 SAMPLING METHOD:- KICK SAMPLING
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	1.8
MEAN DEPTH	12
VELOCITY CATEGORY	4

WATER WIDTH IN SAMPLE AREA 1.8 m
 DEPTH IN SAMPLE AREA (cm) AT 10 15 15 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL: cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 <input checked="" type="checkbox"/>	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

ROCK PAVEMENT

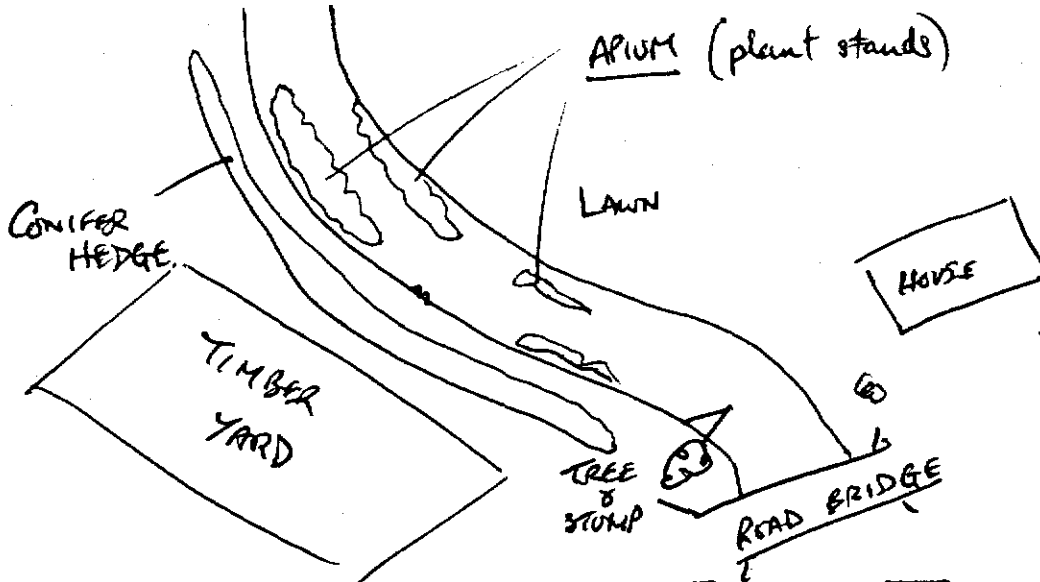
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
✓	40
✓	40
+	10
+	10
TOTAL	100%

BOULDERS	
+ COBBLES	40
PEBBLES	
+ GRAVEL	50
SAND	10
SILT	
+ CLAY	
TOTAL	100

CHARING STREAM (DOWNSTREAM - 4)

SKETCH OF SAMPLE AREA



WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID
 WATER COLOUR:- NONE

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

EXTRA SPECIES IN SURVEY AREA

APICUM

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

20

TOTAL

20

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

SAID TO BE A STW INPUT UPSTREAM. NO INDICATIONS OF POLLUTION, EXCEPT FROM A DRAIN BESIDE THE ROAD WHICH WAS DISCHARGING SOME OIL AFTER HEAVY RAIN.

WA/RPB:-
 RIVER:- (STREAM FROM LENHAM)
 SITE:- UPSTREAM (1)
 MGR:- TQ 904508
 RECORDER(S):- J. BASS
 DATE:- 18.4.95
 SAMPLE TIME (MINS):- 3 MINS
 SAMPLING METHOD:- KICK SAMPLING - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	2.0
MEAN DEPTH	12
VELOCITY CATEGORY	4

WATER WIDTH IN SAMPLE AREA 2.0 m
 DEPTH IN SAMPLE AREA (cm) AT { 10 | 10 | 15 } WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 <input checked="" type="checkbox"/>	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE
 OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE
 FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL
 PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES
 IN ESTIMATES OF % COVER)

ROCK PAVEMENT

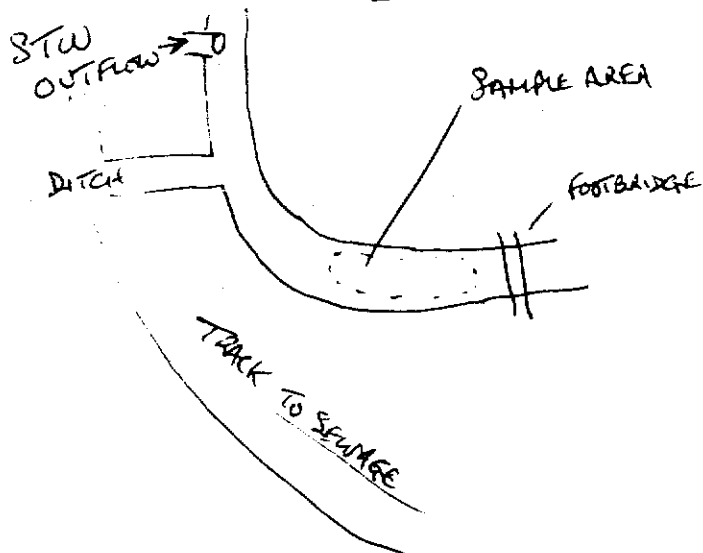
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
-	10
✓	
+	80
+	5
+	5
TOTAL	100%

BOULDERS	
+ COBBLES	10
PEBBLES	
+ GRAVEL	80
SAND	5
SILT	
+ CLAY	5
TOTAL	100

STREAM ① - UPSTREAM (18.4.95)

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:-

LIGHT BROWN

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

EXTRA SPECIES IN SURVEY AREA

NO IN-STREAM PLANTS

MARGINALS IN/ON/DISE

Catalpa

Mimulus

Apium

Mentha

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

THIS SITE IS \approx 200m d/s OF THE SITE VISITED IN JANUARY - THERE IS CONSIDERABLE MORE DISCHARGE HERE, AS IT INCLUDES THE STW OUTPUT (ESTIMATED AS \approx 80' AT THE TIME OF SAMPLING). THE TREATED SEWAGE MAY HAVE MORE IMPACT D/S, AWAY FROM THE INFLUENCE OF DRIFTING COLONISERS (FROM UPSTREAM).

THIS SITE WAS DREDGED IN JANUARY 1995

WA/RPB:-
 RIVER:- (STREAM FROM LEHMAN)
 SITE:- DOWNSTREAM (1)
 MGR:- TQ. 902502
 RECORDER(S):- J. BASS
 DATE:- 10.4.95
 SAMPLE TIME (MINS):- 3 MINS
 SAMPLING METHOD:- KICK SAMPLING - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

WATER WIDTH IN SAMPLE AREA 2.1 m
 DEPTH IN SAMPLE AREA (cm) AT { 10 } { 15 } { 10 } WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
<10	>10-25	>25-50 ✓	>50-100	>100

SUMMARY

WIDTH	2.1
MEAN DEPTH	12
VELOCITY CATEGORY	3

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

ROCK PAVEMENT

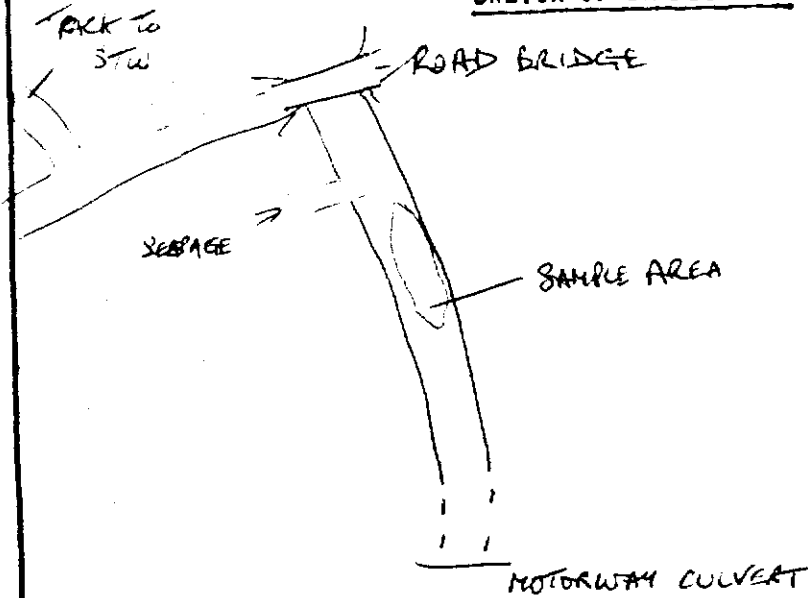
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
✓	50
+	30
+	20
TOTAL	100%

BOULDERS	
+ COBBLES	
PEBBLES	
+ GRAVEL	50
SAND	30
SILT	20
+ CLAY	
TOTAL	100

STREAM 1 (DOWNSTREAM) 18.4 9.5

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:-

SLIGHT COLOUR

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

A FEW STEMS OF SPARGANUM SP PRESENT IN THE STREAM.

MARGINALS INCL.
Catabrosa
Vernicia beccabunga

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE 30

MOSS -

HIGHER PLANTS 5

TOTAL 35

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

THIS LOCATION WAS DREDGED IN MID-JANUARY, IN APRIL THE STREAM BANK WAS RE-VEGETATED. THE CHANNEL RETAINS 10-20cm OF FINE SEDIMENT OVER THE WHOLE BED SOME ~~SMALL~~ GRAVEL HAS SETTLED ON THE CONSOLIDATED SEDIMENT BUT THERE REMAINS LITTLE COVER FOR INVERTEBRATES. THE SITE WAS NOT SAMPLED IN JANUARY - HAVING BEEN DREDGED JUST PRIOR TO THE VISIT.

WA/RPB:-
 RIVER:-
 SITE:- STREAM 2 UPSTREAM
 MGR:- TQ 926504
 RECORDER(S):- J. BASS
 DATE:- 18.4.95
 SAMPLE TIME (MINS):- 3 MINS
 SAMPLING METHOD:- KICK SAMPLING / SWEEPS - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA 1.3 m
 DEPTH IN SAMPLE AREA (cm) AT 15 | 20 | 15 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	
>10	

CATEGORY 2	
>10-25	<input checked="" type="checkbox"/>

CATEGORY 3	
>25-50	

CATEGORY 4	
>50-100	

CATEGORY 5	
>100	

WIDTH	1.3
MEAN DEPTH	17
VELOCITY CATEGORY	2

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE
 OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE
 FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL
 PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES
 IN ESTIMATES OF % COVER)

ROCK PAVEMENT

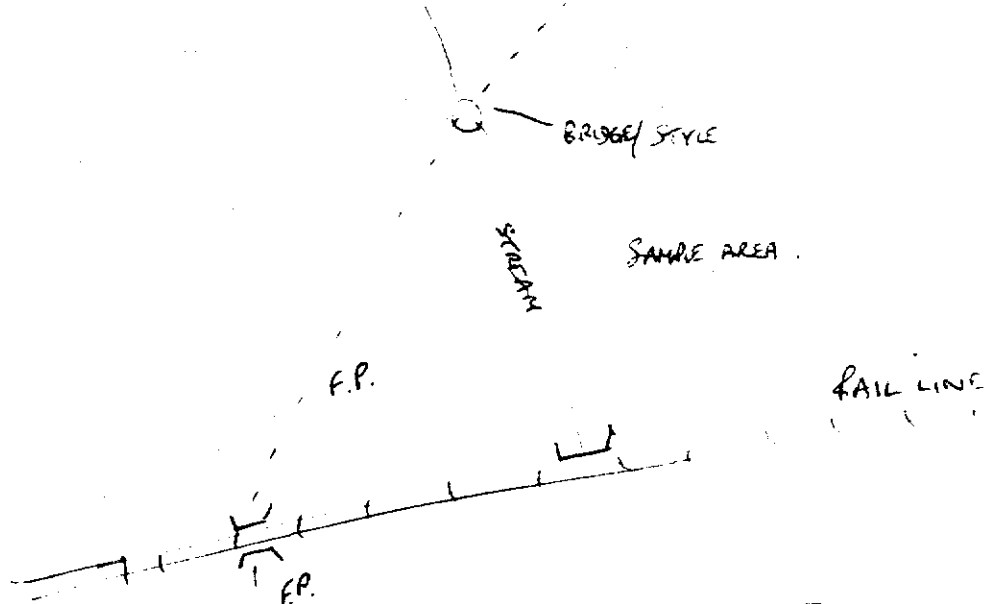
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤0.004 mm CLAY

A	B
+	5
+	15
	0
✓	80
+	
TOTAL	100%

BOULDERS	
+ COBBLES	5
PEBBLES	
+ GRAVEL	15
SAND	0
SILT	80
+ CLAY	
TOTAL	100

STREAM 2 (UPSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID
 WATER COLOUR:- No colour

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

...
 DENSE EMERGENT STANDS OF:-
Apium
Nasturtium
Mentha
 Some marginal growth of Catabrosa
 spreading into the channel

EXTRA SPECIES IN SURVEY AREA

Willow herb & figwort present

COVER %:- ALGAE 5 MOSS - HIGHER PLANTS 90 TOTAL 95
 DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

LITTLE CHANGE SINCE THE PREVIOUS VISIT IN JAN 95. PLANTS MORE DEVELOPED

WA/RPB:-
 RIVER:-
 SITE:- STREAM 2 (DOWNSTREAM)
 NCR:- TQ 926492
 RECORDER(S):- J. BASS
 DATE:- 18.4.95
 SAMPLE TIME (MINS):- 3 MIN
 SAMPLING METHOD:- KICK SAMPLING - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD FRA. POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	1.8
MEAN DEPTH	15
VELOCITY CATEGORY	3

WATER WIDTH IN SAMPLE AREA 1.8 m

DEPTH IN SAMPLE AREA (cm) AT 15 | 20 | 10 WIDTH

ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
<10	>10-25	>25-50 <input checked="" type="checkbox"/>	>50-100	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE
 OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE
 FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL
 PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES
 IN ESTIMATES OF % COVER)

ROCK PAVEMENT

- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- ≤ 0.004 mm CLAY

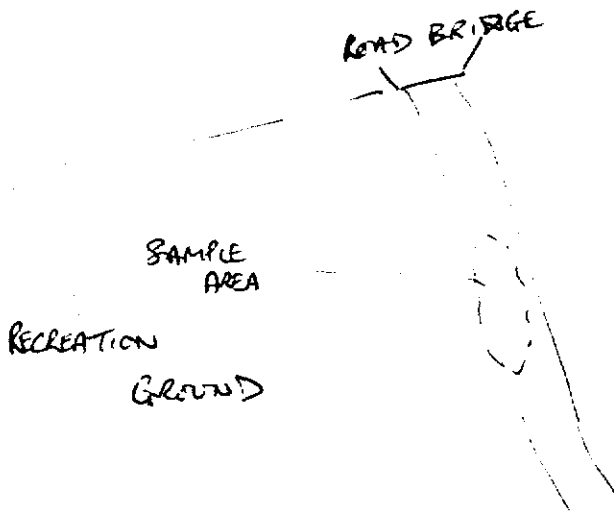
A	B
+	30
✓	60
+	5
+	5
TOTAL	100%

effectively swamped by filamentous algae.

BOULDERS	
+ COBBLES	30
PEBBLES	
+ GRAVEL	60
SAND	5
SILT	5
+ CLAY	
TOTAL	100

STREAM 2 (DOWNSREAM) 18 4 95

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:- NO COLOUR

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

IN DESCENDING ORDER OF FREQUENCY:-

Apium nodiflorum

Mentha aquatica

Catabrosa

Sparganium

Iris

Caltha

Veronica

EXTRA SPECIES IN SURVEY AREA

Some bankside Juncus sp.

COVER %:-

ALGAE

50

MOSS

HIGHER PLANTS

50

TOTAL

100

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

LUXURIENT FILAMENTOUS ALGAE COVERED ALL SURFACES OBSCURING THE SHAPES & SIZES OF STREAM SUBSTRATES.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- VIOLET WOOD STREAM
 SITE:- STREAM 3 (UPSTREAM)
 MGR:- TQ 943488
 RECORDER(S):- FBASS
 DATE:- 18.4.95
 SAMPLE TIME (MINS):- 3 MIN
 SAMPLING METHOD:- KICK SAMPLING - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WIDTH	0.6
MEAN DEPTH	13
VELOCITY CATEGORY	4

WATER WIDTH IN SAMPLE AREA 0.6 m
 DEPTH IN SAMPLE AREA (cm) AT 10 15 15 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 <input checked="" type="checkbox"/>	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA
 IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

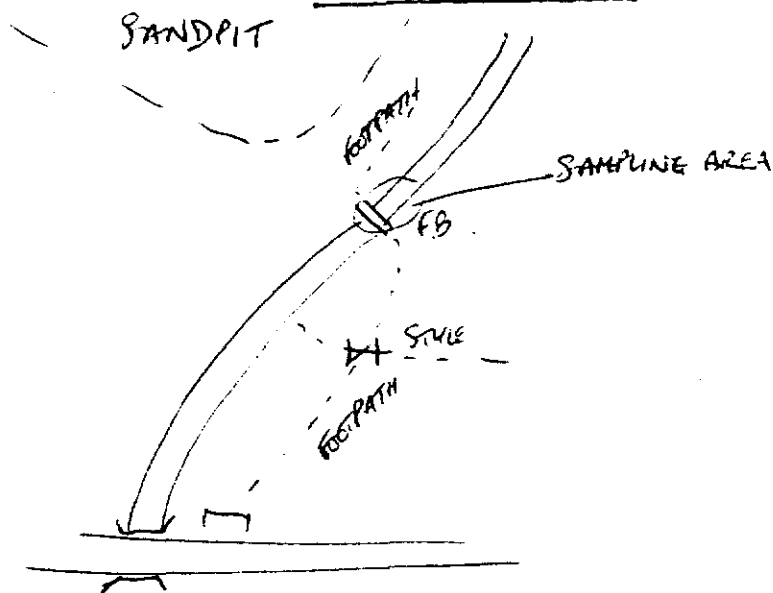
- ROCK PAVEMENT
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - ≤0.004 mm CLAY

A	B
+	40
✓	50
+	10
TOTAL	100%

BOULDERS + COBBLES	
PEBBLES + GRAVEL	40
SAND	50
SILT + CLAY	10
TOTAL	100

STREAM 3 (UPSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:- *slightly coloured*

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

Trailing grasses & willow herb.
Some *Juncus*.
Myosotis sp.

EXTRA SPECIES IN SURVEY AREA

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

COMPACTED HARD SAND (ANALOGOUS TO 'GRAVEL') WITH ALGAL MATS AND MOBILE SAND IN ARTIFICIALLY NARROW CHANNEL.

SAMPLE AREA FORM

WA/RPB:-

RIVER:- VIOLET WOOD STREAM

SITE:- STREAM 3 (DOWNSTREAM)

NGR:- T.O. 937477

RECORDER(S):- J. BASS

DATE:- 18.4.95

SAMPLE TIME (MINS):- 3 MINS

SAMPLING METHOD:- KICK SAMPLING - POND NET

DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET

MESH SIZE OF NET:-

WA/RPB SAMPLE NUMBER (IF ANY):-

IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO

IF NO GIVE DETAILS:-

SUMMARY

WIDTH	0.8
MEAN DEPTH	10
VELOCITY CATEGORY	4

WATER WIDTH IN SAMPLE AREA 0.8 m

DEPTH IN SAMPLE AREA (cm) AT WIDTH

ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 ✓	>100

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

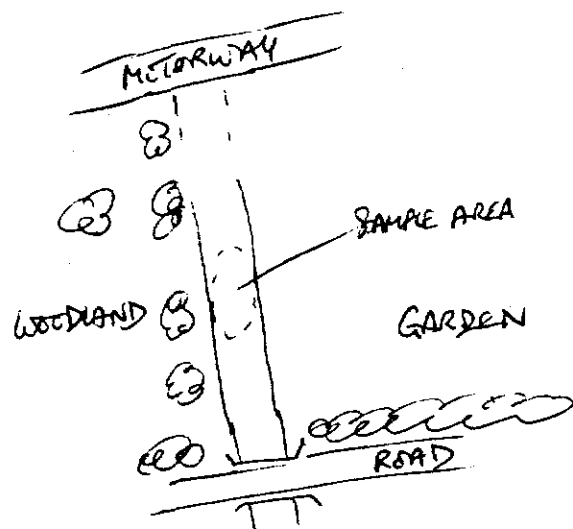
- ROCK PAVEMENT
- >256 mm BOULDERS
 - >64-256 mm COBBLES
 - >16-64 mm PEBBLES
 - >2-16 mm GRAVEL
 - >0.0625-2 mm SAND
 - >0.004-0.0625 mm SILT
 - ≤0.004 mm CLAY

A	B
✓	40
+	30
+	20
+	5
+	5
TOTAL	100%

BOULDERS + COBBLES	40
PEBBLES + GRAVEL	50
SAND	5
SILT + CLAY	5
TOTAL	100

STREAM 3 (DOWNSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID
 WATER COLOUR:- SLIGHTLY COLOURED

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

Trailing isolated plants of
Apium and Sparganium

EXTRA SPECIES IN SURVEY AREA

COVER %:- ALGAE MOSS HIGHER PLANTS 5 TOTAL 5
 DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)
 THIS SITE WAS DOWNSTREAM (c. 200M) FROM THE REFERRED CATION, WHERE ACCESS TO THE STREAM WAS ON PRIVATE LAND.
 IT WAS THE SAME LOCATION AS SAMPLED IN JAN 95

SAMPLE AREA FORM

WA/RPB:-

RIVER:- CHARING STREAM

SITE:- STREAM (4) UPSTREAM

NCR:- TA 952476

RECORDER(S):- J. BASS

DATE:- 18.4.95

SAMPLE TIME (MINS):- 3 MINS

SAMPLING METHOD:- KICK SAMPLING - POND NET

DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET

MESH SIZE OF NET:-

WA/RPB SAMPLE NUMBER (IF ANY):-

IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO

IF NO GIVE DETAILS:-

SUMMARY

WIDTH	1.2
MEAN DEPTH	13
VELOCITY CATEGORY	4

WATER WIDTH IN SAMPLE AREA 1.2 m

DEPTH IN SAMPLE AREA (cm) AT 10 20 10 WIDTH

ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
≤10	>10-25	>25-50	>50-100 <input checked="" type="checkbox"/>	>100

SUBSTRATUM IN SAMPLE AREA

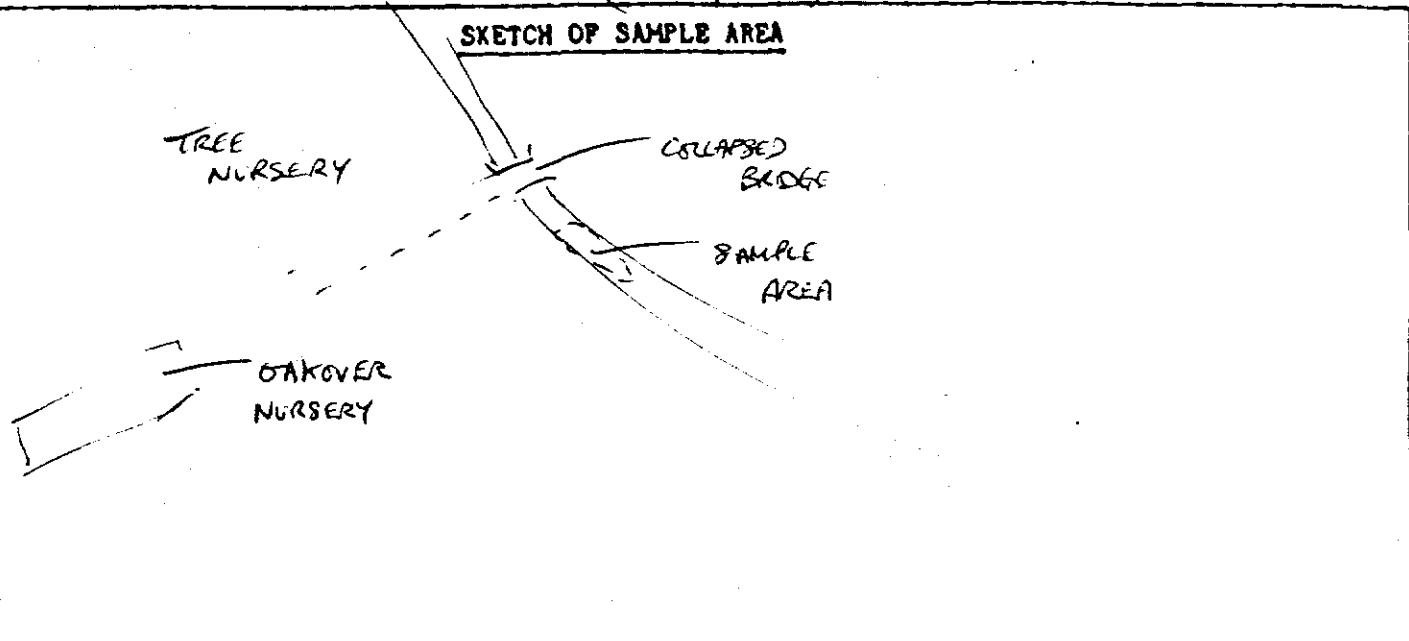
GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

	A	B
ROCK PAVEMENT		
>256 mm BOULDERS		
>64-256 mm COBBLES	+	30
>16-64 mm PEBBLES	+	60
>2-16 mm GRAVEL	-	5
>0.0625-2 mm SAND	+	5
>0.004-0.0625 mm SILT		
≤0.004 mm CLAY		
TOTAL		100%

BOULDERS + COBBLES	30
PEBBLES + GRAVEL	65
SAND	5
SILT + CLAY	
TOTAL	100

STREAM 4 (UPSTREAM)

SKETCH OF SAMPLE AREA



WATER CLARITY:-

CLEAR AND BRIGHT

CLOUDY

TURBID

WATER COLOUR:- NO COLOUR

MACROPHYTES (INCLUDING MOSSES AND LARGE ALOAE) IN SAMPLE/SURVEY AREA. IDENTIFY TO SPECIES IF POSSIBLE, LIST IN ORDER OF ABUNDANCE. TICK SPECIES SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

trailing Oenanthe and Apium nodiflorum

EXTRA SPECIES IN SURVEY AREA

Some bankside dock (Rumex)

COVER %:-

ALGAE

MOSS

HIGHER PLANTS

TOTAL

DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):-

PRESENT

ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

LITTLE CHANGE SINCE PREVIOUS VISIT IN JAN 95 — SOME ADDITIONAL ALGAE ON STONES.

SAMPLE AREA FORM

WA/RPB:-
 RIVER:- CHARING STREAM
 SITE:- STREAM 4 (DOWNSTREAM)
 NCR:- TA 949467
 RECORDER(S):- J. BASS
 DATE:- 18.4.95
 SAMPLE TIME (MINS):- 3 MINS
 SAMPLING METHOD:- KICK SAMPLING - POND NET
 DIMENSIONS OF SAMPLING DEVICE:- STANDARD FBA POND NET
 MESH SIZE OF NET:-
 WA/RPB SAMPLE NUMBER (IF ANY):-
 IS SAMPLING IN PROPORTION TO OCCURRENCE OF HABITATS:- YES NO
 IF NO GIVE DETAILS:-

SUMMARY

WATER WIDTH IN SAMPLE AREA 1.6 m
 DEPTH IN SAMPLE AREA (cm) AT 10 | 15 | 10 WIDTH
 ESTIMATED SURFACE VELOCITY IN MAIN FLOW CHANNEL cm sec⁻¹

CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
<10	>10-25	>25-50 ✓	>50-100	>100

WIDTH	1.6
MEAN DEPTH	12
VELOCITY CATEGORY	3

SUBSTRATUM IN SAMPLE AREA

GIVE DETAILS FOR THE FULL WIDTH OF RIVER AT THE SAMPLING AREA IN COLUMN A INDICATE THE DOMINANT PARTICLE SIZE BY / AND THE PRESENCE OF OTHERS BY +. IN COLUMN B ATTEMPT ROUGH ESTIMATES OF % COVER FOR THE FOUR CATEGORIES LISTED. IF WENTWORTH ANALYSIS IS UNDERTAKEN ACTUAL PROPORTIONS MAY BE SUBSTITUTED. (INCLUDE SUBSTRATA UNDER MACROPHYTES IN ESTIMATES OF % COVER)

ROCK PAVEMENT

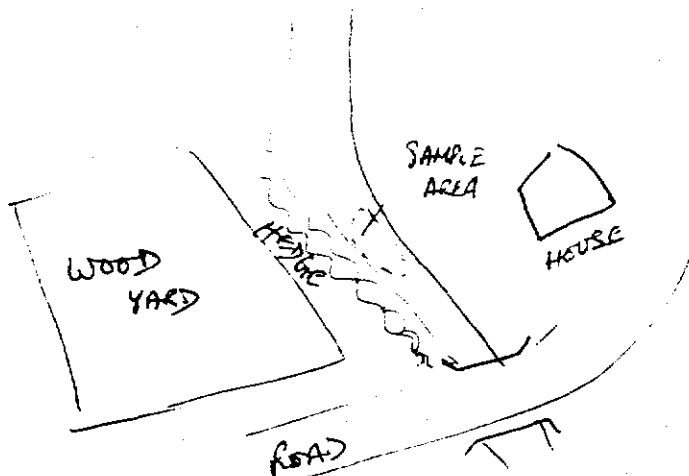
- >256 mm BOULDERS
- >64-256 mm COBBLES
- >16-64 mm PEBBLES
- >2-16 mm GRAVEL
- >0.0625-2 mm SAND
- >0.004-0.0625 mm SILT
- 50.004 mm CLAY

A	B
+	30
✓	40
+	20
+	5
+	5
TOTAL	100%

BOULDERS	
+ COBBLES	30
PEBBLES	
+ GRAVEL	50
SAND	5
SILT	5
+ CLAY	
TOTAL	100

STREAM (in DEWATER) 18.4.95

SKETCH OF SAMPLE AREA



WATER CLARITY:- CLEAR AND BRIGHT CLOUDY TURBID
 WATER COLOUR:- NO COLOUR

MACROPHYTES (INCLUDING MOSSES AND LARGE ALGAE) IN SAMPLE/SURVEY AREA.
 IDENTIFY TO SPECIES IF POSSIBLE. LIST IN ORDER OF ABUNDANCE. TICK SPECIES
 SAMPLED FOR INVERTEBRATES.

MACROPHYTES IN SAMPLE AREA

EXTRA SPECIES IN SURVEY AREA

...
Spium nodiflorum
 and some Oenanthe in the
 margins.
 Filamentous algae conspicuous.

COVER %:- ALGAE 70 MOSS HIGHER PLANTS 20 TOTAL 90
 DETRITUS (ROTTING VEGETABLE MATTER, LEAVES):- PRESENT ABSENT

ADDITIONAL INFORMATION (INCLUDING CHANGES IN SAMPLE AREA SINCE LAST VISIT)

Additional algal growth evident, in other respects similar to Jan 95

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