

SOUTHERN SCIENCE



**River Deben Alleviation
of Low Flows Scheme: An
Environmental Appraisal**

**Additional Background
Information**

May, 1994

Report No 94/3/821

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REPORT OF A FISHERIES SURVEY OF THE
RIVER DEBEN
MAY/JUNE 1991

REPORT NUMBER: EA/FRS/28/91

REPORT OF A FISHERIES SURVEY OF THE RIVER DEBEN
MAY/JUNE 1991

1.0 Introduction

This report presents the results of the third routine fisheries survey to be carried out on the River Deben. The first was undertaken in 1984 and the second in 1987.

2.0 Biological and Chemical Quality

There appears to be no reason why on the basis of biological and chemical data, the fish community should be limited.

3.0 Methods and Sampling Sites

The method of sampling was one of successive removal following electrofishing. Eleven sites were sampled, nine sites being replicates of those sampled during the two previous surveys plus two sites only sampled before during the first (1984) survey. See Figure 1.

4.0 Results

4.1 Community Structure

Details of the number of fish caught and estimated to be present at each site are given in Table 1.

Twelve species of fish were caught during this survey. The frequency of occurrence of each species at the eleven sites was as follows :-

Roach	9	Pike	11
Eel	11	Stoneloach	5
Tench	4	Perch	9
Common Bream	3	Dace	6
Roach/Rudd Hybrid	1	Gudgeon	1
Roach/Bream Hybrid	1	Rudd	1

Dominant species include : Eel, Roach, and Dace.

4.2 Growth rates and Year-Class Strengths

The length frequency distribution of each year class of roach and dace are shown in Figure 2. and 3. Mean length at age data are shown in Figure 4.

Roach

The population of roach comprised eleven year classes. Evidence of strong recruitment can be seen during the 1989 and 1990 year class a trend observed in other rivers in this area. This factor should provide good numbers of older fish in future years. The previous 1987 survey indicated a strong 1983 year class and our current 1991 survey also identifies this with good numbers of fish from that cohort being present. These fish are now over eight years old.

Dace

The population of dace comprised eight year classes. As with the roach population evidence of strong recruitment during recent years is present. Currently the dace population can be considered very healthy with little change evident when compared with previous results.

Both the roach and dace population illustrated typical growth rate patterns.

4.3

Density and Biomass

The density and biomass of each species caught are given in tables 2 and 3. The mean total fish density was 0.13 Nos/m² and the mean total fish biomass was 17.3 g/m²

Eel contribute 47% to the overall biomass, roach (24%), pike (18%), dace (7%), and perch (4%).

Eel contribute 40% to the overall density, roach (30%), dace (17%), and perch (7%).

In comparison with previous years both the mean total fish density and biomass have increased slightly.

Roach

The mean fish biomass for roach was 4.0 g/m² with a particularly high individual site biomass of 20.9 g/m² being recorded at site (157) D/S Glevering House. When compared to previous survey results there has been little change although a slight increase in mean fish biomass for roach can be observed between the years.

Dace

The mean fish biomass for dace was 1.14 g/m². Dace were only caught at six of the eleven sites indicating the contribution made to the overall mean from these sites. Site(161) Naunton Hall Farm had a high individual species biomass of 5.9 g/m² this reflected the excellent habitat features that were present at this site and their importance to species such as Dace.

Eel

The mean fish biomass for eel as a species was 8.1g/m². The contribution from each of the sites to this mean was uniform. The mean biomass for eel has not changed significantly between the years studied.

5.0

Discussion

At present the river supports a good population of roach and dace with the expected numbers of predator and minor species.

5.1

The River Deben is currently classified as a CLASS B river based on a total mean fish biomass of 17.3g/m².

5.2

In comparison to previous years the river currently has the highest mean fish biomass. A steady improvement has been recorded 12.6g/m² in 1984 and 15.37g/m² in 1987.

5.3

Recruitment of both Roach and Dace is good with strong year classes evident from 1989 and 1990 for both these species. This augurs well for the future as these fish lend strength of numbers to older year classes.

5.4

At present the population of roach contains a strong contribution from the 1983 year class, this year class was also highlighted during the 1989 survey.

5.5

The dace population was limited to certain sites particularly those with characteristic stream type habitat features such as good riffle/pool sequences. One notable site was Naunton Hall Farm where excellent numbers of dace were caught on typical river habitat.

5.6

Site (159) D/S Whickham Market By-pass once again had the highest number of roach caught during the survey. This site was highlighted during the 1989 survey as being of importance to fish as a winter aggregation site. It also appears that this site remains attractive to fish during the summer months. The site is situated just downstream of Whickham Market S.T.W. which suggests that no acute effects on the fish population are apparent.

5.7

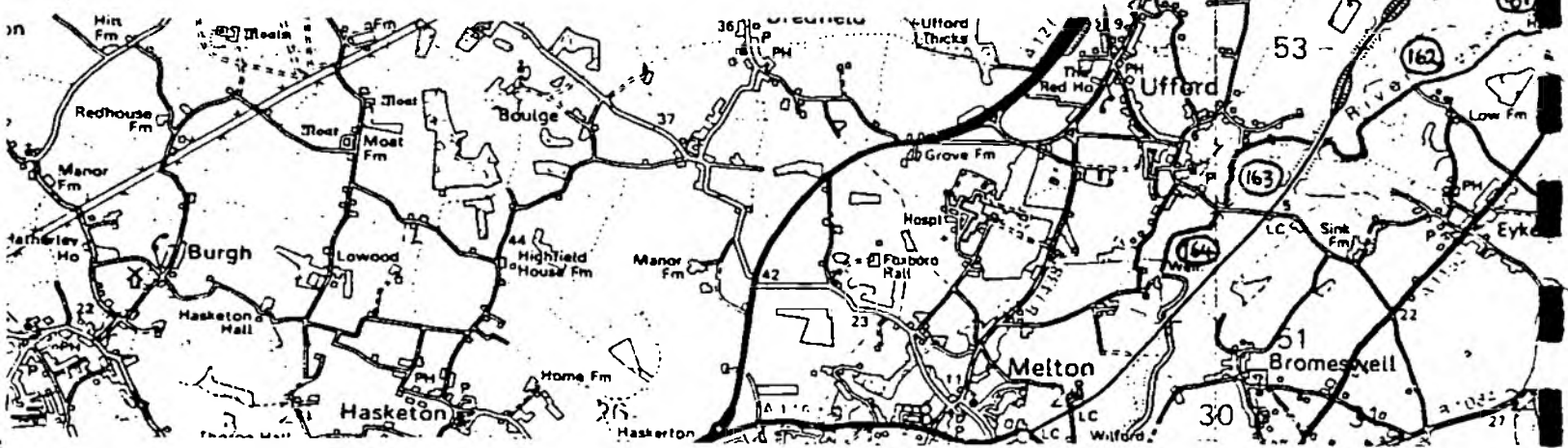
At present the River Deben supports a good cyprinid fish population with the dominant species including roach and dace. A steady increase in mean fish biomass has been recorded over the last three surveys. It is hoped this will continue and CLASS A status reached in future years.

FIGURE 1



SAMPLING SITES

SITE	SITENAME	DATE SAMPLED	GRID REF.	AREA(50 #)	METHOD
152	U/S CRETINGHAM BRIDGE	14/05/91	TM226606	1330	ELECTR
155	U/S KETTLEBURGH BRIDGE	16/05/91	TM263593	1260	ELECTR
156	EASTON FARM PARK	20/05/91	TM276579	2340	ELECTR
157	D/S GLEVERING HOUSE	06/06/91	TM295375	1800	ELECTR
158	U/S WHICKHAM MARKET MILL	10/06/91	TM306568	2800	ELECTR
159	D/S WHICKHAM MARKET BY-PASS	21/05/91	TM311557	1900	ELECTR
160	U/S LODDHAM DECAY	11/05/91	TM315550	600	ELECTR
161	MAUNTON HALL FARM	05/06/91	TM322533	1600	ELECTR
162	LOW FARM	05/06/91	TM315527	1600	ELECTR
163	UFFORD	04/06/91	TM301522	1200	ELECTR
164	MELTON SLUICE	03/06/91	TM299517	1600	ELECTR



**Length frequency distribution and yearclass structure of
Roach from the River Deben, May-June 1991.**

FIGURE 2

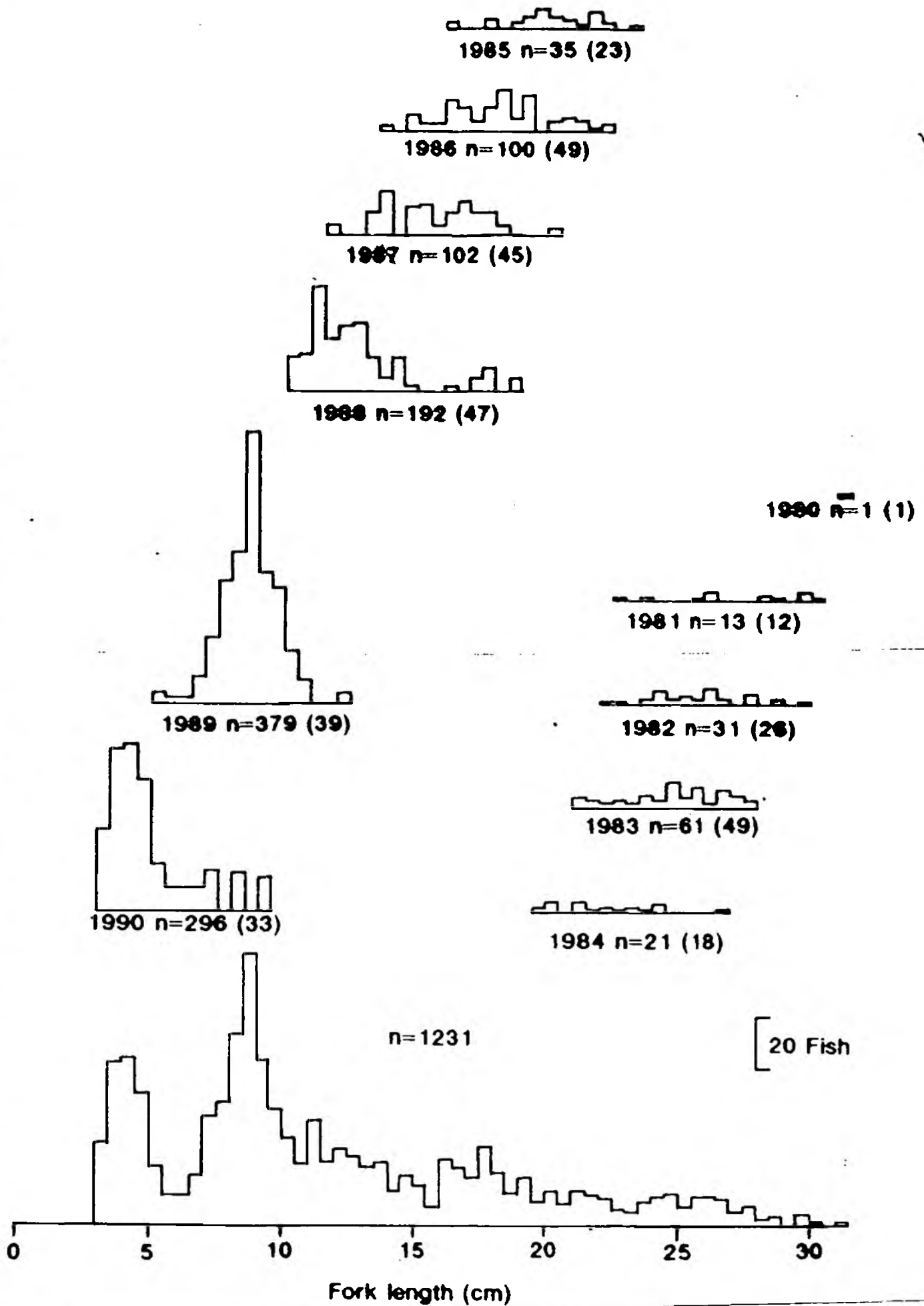


FIGURE 3

Length frequency distribution and yearclass structure of
Dace from the River Deben, May-June 1991.

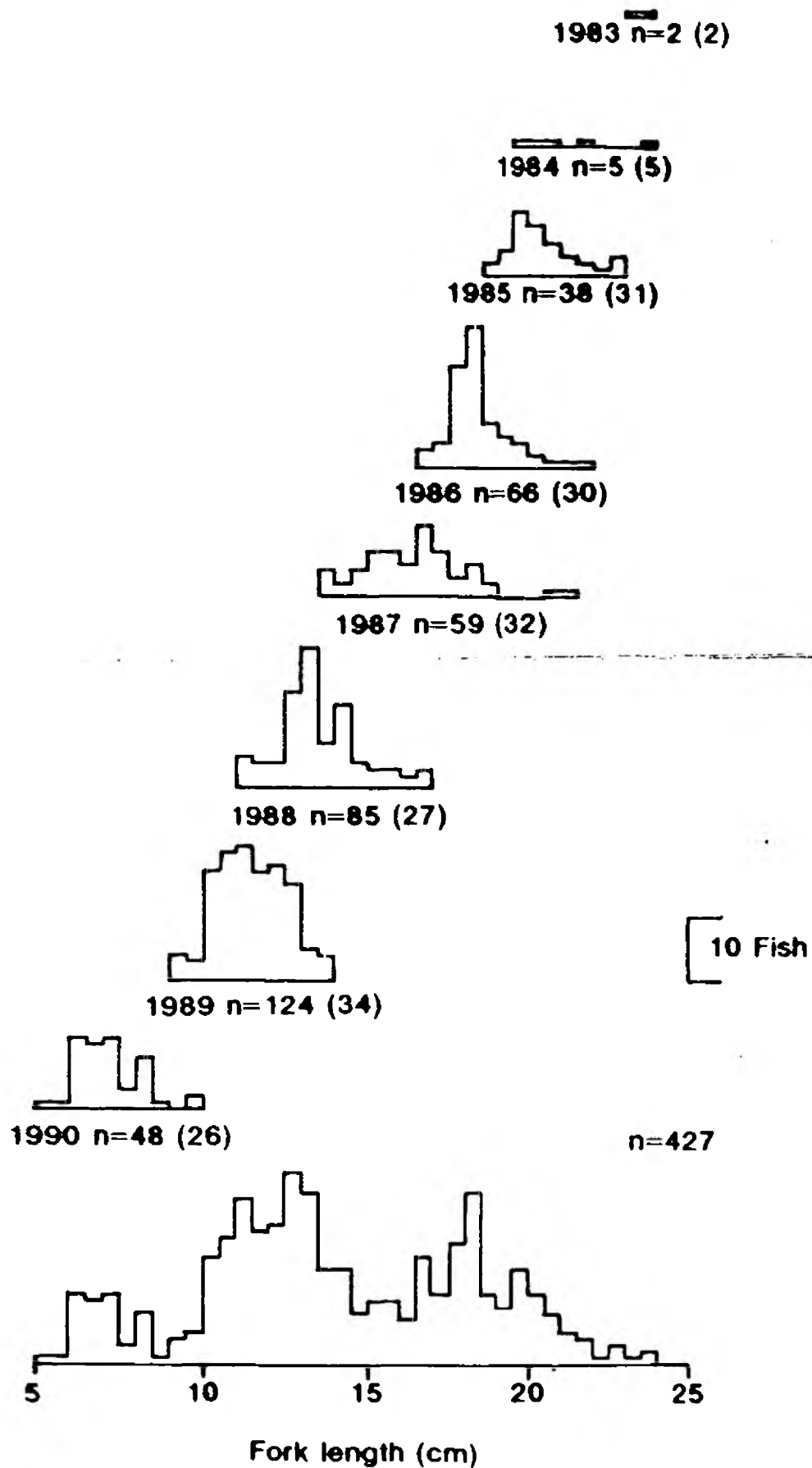


FIGURE 4

MEAN LENGTH AT AGE

FISHERY : RIVER DEBEN
DATE : MAY-JUNE 1991

SPECIES : ROACH
Number of fish aged : 342

AGE	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+	12+
MEAN LENGTH (cm)	5.00	8.73	12.73	15.55	18.02	20.09	22.16	24.88	25.85	27.42	31.30	-
s.d.	1.60	1.06	2.08	1.76	1.97	1.64	1.86	1.87	1.80	2.41	-	-
Number	296	379	192	102	100	35	21	61	31	13	1	-
YEAR CLASS	90	89	88	87	86	85	84	83	82	81	80	79

SPECIES : DACE
Number of fish aged : 187

AGE	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+	12+
MEAN LENGTH (cm)	7.23	11.54	13.59	16.49	18.47	20.46	21.30	23.55	-	-	-	-
s.d.	0.96	1.06	1.28	1.57	0.99	1.06	1.58	-	-	-	-	-
Number	48	124	85	59	66	38	5	2	-	-	-	-
YEAR CLASS	90	89	88	87	86	85	84	83	82	81	80	79

SPECIES: COMMON BREAM

1 AGED AT 1+ YEARS, LENGTH 5.8cm
5 AGED AT 2+ YEARS, MEAN LENGTH 11.2cm
2 AGED AT 4+ YEARS, MEAN LENGTH 19.3cm
3 AGED AT 5+ YEARS, MEAN LENGTH 22.0cm
1 AGED AT 6+ YEARS, LENGTH 22.3cm

SPECIES: TENCH

1 AGED AT 7+ YEARS, LENGTH 28.8cm

SPECIES: RUDD

3 AGED AT 2+ YEARS, MEAN LENGTH 9.3cm

SPECIES: ROACH+BREAM HYBRIDS

2 AGED AT 2+ YEARS, MEAN LENGTH 9.05cm

SPECIES: ROACH+RUDD HYBRID

1 AGED AT 6+ YEARS, LENGTH 15.3cm

TABLE 1

NUMBERS ESTIMATED > 10 cm

SPECIES	SITES											TOTAL
	152	155	156	157	158	159	160	161	162	163	164	
ROACH	7	32	0	146	99	244	120	2	4	0	0	654
PIKE	9	5	7	5	8	13	24	4	4	10	12	101
EELS	63	155	6	21	8	30	34	78	181	160	44	780
STONELOACH	0	1	0	0	0	0	0	0	0	0	0	1
TENCH	0	1	0	0	0	0	1	0	0	1	1	4
PERCH	0	33	10	0	0	3	2	2	15	55	12	132
COMMONBREAM	0	0	0	0	1	5	0	2	0	0	0	8
ROA/RUDHYBD	0	0	0	0	1	0	0	0	0	0	0	1
DACE	0	0	0	0	0	4	11	241	49	37	34	376
GUDGEON	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	79	227	23	172	117	299	192	330	253	263	193	2058

NUMBERS CAPTURED < 10 cm

SPECIES	SITES											TOTAL
	152	155	156	157	158	159	160	161	162	163	164	
ROACH	16	4	30	105	169	221	43	54	0	0	0	642
PIKE	0	0	0	0	3	0	0	0	0	0	0	3
STONELOACH	2	33	0	0	0	2	2	31	0	0	0	70
TENCH	0	0	0	0	0	0	0	0	0	1	0	1
PERCH	0	0	1	0	13	0	12	1	0	3	4	34
COMMONBREAM	0	0	0	0	3	0	0	0	0	0	0	3
RUDO	0	0	0	0	3	0	0	0	0	0	0	3
DACE	0	0	0	0	0	0	0	54	0	0	1	55
ROA/BRMHYBD	0	0	0	0	0	2	0	0	0	0	0	2
GUDGEON	0	0	0	0	0	0	0	7	0	0	0	7
TOTAL	18	37	31	105	191	225	57	147	0	4	5	820

NUMBERS CAPTURED > 10 cm

SPECIES	SITES											TOTAL
	152	155	156	157	158	159	160	161	162	163	164	
ROACH	7	31	0	143	99	186	116	2	3	0	0	589
PIKE	9	5	7	5	8	13	19	4	3	10	9	99
EELS	63	128	6	20	7	27	32	78	181	160	44	746
STONELOACH	0	1	0	0	0	0	0	0	0	0	0	1
TENCH	0	1	0	0	0	0	1	0	0	1	1	4
PERCH	0	33	10	0	0	3	2	2	15	51	12	129
COMMONBREAM	0	0	0	0	1	5	0	2	0	0	0	8
ROA/RUDHYBD	0	0	0	0	1	0	0	0	0	0	0	1
DACE	0	0	0	0	0	4	11	241	48	36	32	372
GUDGEON	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL	79	199	23	168	117	240	181	330	250	253	99	1979

TABLE 2

DENSITY (nos./m²) OF FISH > 10 cm

SPECIES/SITES	152	155	156	157	158	159	160	161	162	163	164	MEAN
ROACH	.0052	.0253	0	.0811	.0353	.1355	.15	.0012	.0025	0	0	.0386
PIKE	.0067	.0039	.0029	.0027	.0028	.0072	.03	.0025	.0025	.0083	.0075	.0070
EELS	.0473	.1230	.0025	.0116	.0028	.0166	.0425	.0487	.1131	.1333	.0275	.0517
STONELOACH	0	<.001	0	0	0	0	0	0	0	0	0	<.001
TENCH	0	<.001	0	0	0	0	.0012	0	0	<.001	<.001	<.001
PERCH	0	.0281	.0042	0	0	.0016	.0025	.0012	.0093	.0456	.0075	.0080
COMMONCREAM	0	0	0	0	<.001	.0027	0	.0012	0	0	0	<.001
ROA/RUDHYD	0	0	0	0	<.001	0	0	0	0	0	0	<.001
DACE	0	0	0	0	0	.0022	.0137	.1506	.0306	.0308	.0212	.0226
SUDGEON	0	0	0	0	0	0	0	<.001	0	0	0	<.001
TOTAL	.0593	.1801	.0096	.0955	.0417	.1661	.24	.2062	.1581	.2191	.0643	.1309

DENSITY (nos./m²) OF FISH - ALL LENGTHS

SPECIES/SITES	152	155	156	157	158	159	160	161	162	163	164	MEAN
ROACH	.0172	.0285	.0128	.1394	.0957	.28	.2125	.035	.0025	0	0	.0748
PIKE	.0067	.0039	.0029	.0027	.0039	.0072	.03	.0025	.0025	.0083	.0075	.0071
EELS	.0473	.1230	.0025	.0116	.0028	.0166	.0425	.0487	.1131	.1333	.0275	.0517
STONELOACH	.0013	.0287	0	0	0	.0011	.0025	.02	0	0	0	.0047
TENCH	0	<.001	0	0	0	0	.0012	0	0	.0016	<.001	<.001
PERCH	0	.0281	.0047	0	.0046	.0016	.0175	.0013	.0093	.0453	.01	.0112
COMMONCREAM	0	0	0	0	.0014	.0027	0	.0012	0	0	0	<.001
RUDE	0	0	0	0	.0010	0	0	0	0	0	0	<.001
ROA/RUDHYD	0	0	0	0	<.001	0	0	0	0	0	0	<.001
DACE	0	0	0	0	0	.0022	.0137	.1862	.0306	.0308	.0212	.0250
ROA/BRNHYD	0	0	0	0	0	.0011	0	0	0	0	0	<.001
SUDGEON	0	0	0	0	0	0	0	.0056	0	0	0	<.001
TOTAL	.0729	.2095	.0230	.1538	.11	.3127	.32	.3012	.1581	.2225	.0675	.1774

TABLE 3

BIOMASS(g/m²) OF FISH > 10 cm

SPECIES\SITES	152	155	156	157	158	159	160	161	162	163	164	MEAN
ROACH	.1912	5.008	0	20.94	4.035	5.727	5.557	.0206	.2131	0	0	4.0955
PIKE	1.293	2.090	1.879	2.476	1.184	4.98	6.181	3.6	1.659	5.977	2.944	3.1151
EELS	9.624	21.71	.7692	2.508	.3264	3.209	6.772	6	17.31	18	3.75	9.1811
STONELOACH	0	0.06	0	0	0	0	0	0	0	0	0	0.005
TENCH	0	.3388	0	0	0	0	.0875	0	0	0.02	.0156	0.04
PERCH	0	1.323	.1623	0	0	.055	.06	.02	.9756	3.426	1.041	.64231
COMMONBREAM	0	0	0	0	0.005	.4411	0	.0431	0	0	0	0.04
RDA/RUDHYED	0	0	0	0	0.02	0	0	0	0	0	0	0.002
DACE	0	0	0	0	0	0.09	.45	5.896	3.24	1.816	1.076	1.1425
GUDGEON	0	0	0	0	0	0	0	.0097	0	0	0	<0.001
TOTAL	11.09	30.53	2.817	25.92	5.578	17.50	19.50	15.58	23.40	29.23	8.828	17.275

BIOMASS(g/m²) OF FISH - ALL LENGTHS

SPECIES\SITES	152	155	156	157	158	159	160	161	162	163	164	MEAN
ROACH	.2639	5.027	0.02	21.46	4.232	9.843	6.561	.1462	.2131	0	0	4.3247
PIKE	1.293	2.090	1.879	2.476	1.185	4.98	6.181	3.6	1.659	5.977	2.944	3.1152
EELS	9.624	21.71	.7692	2.508	.3264	3.209	6.772	6	17.31	18	3.75	9.1811
STONELOACH	0.003	.1452	0	0	0	0.002	.0025	.0643	0	0	0	0.02
TENCH	0	.3388	0	0	0	0	.0875	0	0	0.02	.0156	0.04
PERCH	0	1.323	.1696	0	.02	.055	.2162	.0262	.9756	3.435	1.066	.66296
COMMONBREAM	0	0	0	0	0.02	.4411	0	.0431	0	0	0	0.05
RUD	0	0	0	0	0.01	0	0	0	0	0	0	0.001
RDA/RUDHYED	0	0	0	0	0.02	0	0	0	0	0	0	0.002
DACE	0	0	0	0	0	0.09	.45	6.096	3.24	1.816	1.084	1.1617
RDA/BRMHYED	0	0	0	0	0	0.01	0	0	0	0	0	<0.001
GUDGEON	0	0	0	0	0	0	0	.0393	0	0	0	0.004
TOTAL	11.18	30.64	2.828	26.44	5.814	18.43	20.27	16.01	23.40	29.26	8.851	17.561

FISHERY: RIVER YEBEN DISTRICT: NORWICH AUTHOR: N. BROMIDGE

TITLE AND DATE OF SURVEY: FISHERIES SURVEY OF THE RIVER YEBEN

MAY/JUNE 1991 YEAR OF PREVIOUS SURVEY 1987

REASON(S) FOR SURVEY: ROUTINE SURVEY

BIOLOGICAL AND CHEMICAL QUALITY: NWC CLASS 1B-2

SAMPLING METHOD(S) PULSED D.C. ELECTRO FISHING

FISH BIOMASS MEAN 17.27 g m⁻² FISH DENSITY MEAN 0.13 g m⁻²

MAX 30.53 g m⁻² MAX 0.219 g m⁻²

MIN 2.817 g m⁻² MIN 0.009 g m⁻²

TOTAL NO. OF SAMPLING SITES 11 COMMENTS ON ESTIMATES ESTIMATES

ARE FOR FISH 7 FORKLENGTH 10 cm FISH HEALTH SAMPLE REF NO:

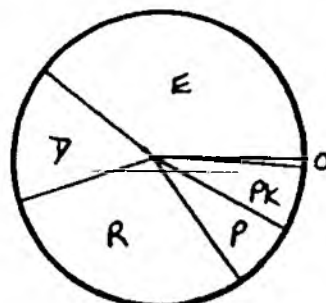
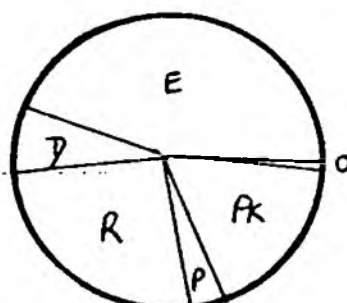
LENGTHS OF RIVER (km) IN EACH BIOMASS CLASS			
A	B	C	D
	20		

SPECIES COMPOSITION

KEY	SPECIES	PERCENTAGE		NO. OF SITES
		BIOMASS	DENSITY	
E	EEL	47	40	11
D	DACE	7	17	6
R	ROACH	24	30	9
P	PERCH	4	7	9
PK	PIKE	18	5	11
T	TENCH			4
B	BREAM			3
SL	STONELOACH			5
G	GUDGEON			1
RT	RUTTY			1

BIOMASS PIECHART

DENSITY PIECHART



YEAR CLASS STRUCTURE AND GROWTH RATES OF IMPORTANT SPECIES

SPECIES \ YEAR CLASS	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+	GROWTH RATE
	90	89	88	87	86	85	84	83	82	81	80	
ROACH	296	379	192	102	100	35	21	61	31	13	1	M
DACE	48	124	85	59	66	38	5	2				M
C. BREAM	1	5		2	3	1						M
TENCH							1					M
RUTTY		3										M
R/B HYB		2										M
R/RT HYB						1						M

* DOMINANT YEAR CLASS, s = MEAN ANNUAL SURVIVAL RATE (%)

GROWTH KEY: VF = VERY FAST; F = FAST; M = MODERATE; S = SLOW; VS = VERY SLOW

PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS GOOD CYPRINID FISH POPULATION WITH A CONTINUED INCREASE IN MEAN FISH BIOMASS

PROMINENT YEAR CLASSES OF ROACH AND BREAM FROM 1989 + 1990 SHOULD RESULT IN FUTURE POPULATIONS BEING STRONG

Report of a Fisheries Survey
of the River Deben

November/December 1987

Report No. ND/FSR/8/88

1. INTRODUCTION

This survey was carried out as part of the routine fisheries survey programme of the Norwich Division. The report presents the results of the second major fisheries survey to be carried out by Anglian Water on the River Deben. The first was undertaken in January/March 1988 and the results were presented in report no. ND/FSR/6/84.

2. SAMPLING SITES

Nine sites covering a total length of 1717 metres were sampled. Details of each site are given in Table 1, the location in Figure 1. Eight of the sites sampled were replicates of those carried out in 1984. Four of the sites sampled in 1984 were not re-surveyed, due to access difficulties, one new site was included in the present survey.

The depth at different sites was varied from 0.1 to 2.5 metres, the river was generally narrow and slow flowing. The substratum varied from general to soft mud and accumulated silt.

As with many of the rivers in the Norwich Division, the river has been artificially impounded at various mills (Ufford, Wickham Market, Easton, Kettleburgh). Thus habitat features varied throughout the length of the river.

3. ANGLING INTERESTS

Woodbridge Angling Club control the fishing below the Wickham Market road bridge to the A12 road bridge and downstream from Glevening bridge to Wickham Market bridge (left bank). Access to the river is otherwise in the hands of riparian owners.

4. METHODS

All sites were sampled using pulsed d.c. electro-fishing gear operated from a punt, used in conjunction with stop-nets. Samples were obtained using catch depletion methods and the data obtained was subjected to Seber and Le Cren (2 catches) or Zippin (2 or more catches) in order to give quantitative estimates.

5. RESULTS

5.1 Community Structure

A total of 2017 fish representing nine species were caught from the nine sites sampled. The frequency of occurrence of each species at these nine sites was as follows:-

Roach	9	Stoneback	6
Pike	9	Tench	3
Eel	9	Gudgeon	2
Perch	6	Bream	1
Dace	6		

The total number of each species caught at each site is shown in Table 2. Estimates of numbers (fish $\geq$ 10cm) are given in Table 3. Pie charts showing relative abundance of each species, by density and biomass are shown in Figures 2 and 3.

5.2 Year-Class Structure and Growth

5.2.1 Roach

Length frequency distributions for each year-class of roach are shown in Figure 4. Fish aged between 0+ and 11+ (1987-1976) year-classes) occurred in the population. The population was very well balanced with good survival between year-classes. The 1983 year-class was particularly strong. The lower numbers of 0+ and 1+ fish were a consequence of the reduced sampling efficiency (by electrofishing gear) of fish <10cm in length.

Mean length at age for roach are given in Table 4. Growth rate is shown in Figure 5. Growth rate was slower than average.

Hickley and Dexter Index = 91 norm = 100

Dexter norm = 100

5.2.2 Dace

Length frequency distributions for each year-class of dace are shown in Figure 6. Fish aged between 0+ and 7+ (1987-1980 year-classes) were caught. Although several year-classes of dace exist the actual number in any particular year-class was relatively low. This was a reflection of the habitat suitability in the river to this particular species. Mean length at age for dace are given in Table 4. Growth rate is shown in Figure 7. Growth rate was faster than average; Hickley and Dexter Index = 106, norm 100.

5.2.3 Pike

Length frequency distributions for each year-class of pike are shown in Figure 8. Fish were aged between 0+ and 8+ (1987-1979 year-classes). The population of pike was typical of this species with large number of small 0+ and 1+ fish and low numbers of larger fish.

Mean length at age for pike are given in Table 4. Growth rate (Figure 9) was slower than average; Hickley and Dexter = 94.87, norm = 100.

5.2.4 Perch

Length frequency distribution for each year class of perch are shown in Figure 10. The majority of the fish were aged 0+ to 2+ (1987-1985 year-classes) two fish were also aged 5+ (1982). Mean length at age for perch are shown in Table 4, growth rate in Figure 11.

5.2.5 Common Bream

Mean length at age for the four bream aged can be seen in Table 4. One fish was aged at 3+ (1984) and two at 4+ (1983).

5.2.6 Tench

Mean lengths at age for the seven trench caught can be seen in Table 4. Three fish were aged at 7+ (1980) and four were aged at 11+ (1976).

5.3 Fish Density

The estimated density (number of fish $\gg$ 10cm/m²) of each species at each site is shown in Table 5. Highest total density was recorded at site 159 (0.374 fish/m²), lowest at site 158 (0.006 fish/m²). The mean total fish density for all sites was moderate (0.10 fish/m²).

5.4 Fish Biomass

The estimated biomass (g/m² fish 10cm) caught at each site is shown in Table 5. Highest biomass was recorded at site 161 (48.1 g/m²), lowest at site 158 (0.88 g/m²). Mean total fish biomass for all sites was 15.37 g/m² (Class B).

6. DISCUSSION

6.1 Community Structure

Each contribute 42% to the biomass, pike (31%), roach (23%), roach (23%), tench (31%) and dace (1%).

Roach contribute 44% to the overall density, eels (42%), pike (10%) and dace (3%). Although the relative biomass was below average, when compared to other non-tidal rivers in the Norwich Division.

Roach and pike were caught at all the sites in the survey, however, the majority of the roach were caught at site 159, in a winter aggregation. Similarly the majority of pike, especially the larger fish, were caught at site 161.

6.2 Year-Class Structure and Growth

The population of roach in the fishery was well balanced with good numbers of fish in each year-class and regular and successful recruitment.

Dace recruitment also appeared regular and successful, however, the number of fish in any one year-class was relatively low.

Pike show regular recruitment to the fishery.

The growth of roach and pike was slower than average, the growth of dace was faster than average.

6.3 Changes in the Fishery Since the Last Survey

6.3.1 Community Structure

The relative biomass of the fish observed in the 1984 survey compared to the biomass observed in the present survey can be seen in Figure 12. There has been very little change in the relative biomass. Roach has decreased slightly from 25% to 23%, eels have decreased from 49% to 42% and pike has increased from 20% to 31% in 1987.

6.3.2 Age Structure and Growth

The roach population has remained very comparable between 1984 and 1987 with a well balanced age structure and good recruitment to the fishery. Similarly the age structure of dace has remained much the same to that observed in 1984.

Other species caught also show similarities in their age structures, in the two surveys carried out.

The growth rates observed in the 1987 survey were the same as those observed in the 1984 survey with roach and pike growth rates below average and dace rates faster than average.

6.3.3 Density and Biomass

There has been an increase in the mean total fish biomass from 12.6 g/m² in 1984 to 15.4 g/m² in 1987. The fishery has therefore retained a Class B status.

The mean total fish density in 1984 was 0.11 fish/m² this has remained much the same (0.10 fish/m²) in 1987.

In the 1984 survey the majority of the roach were aggregated at two sites ie Cretingham bridge and D/S of Wickham Market bypass. This was also the case in the present survey.

7. SUMMARY AND CONCLUSIONS

Nine sites were sampled on the River Deben.

A total of 2017 fish were caught, representing nine species.

Eels contribute 42% to the overall biomass, pike (31%, roach (23%), tench (3%) and dace (1%).

Roach contribute 44% to the overall density, eels (42%), pike (10%) and dace (3%).

Total fish density was high at site 159 (0.374 fish/m²). In general the density at each site was moderate. Mean total fish density was 0.1 fish/m².

Total fish biomass was very high at two sites, site 159 (30.34 g/m²) and site 161 (48.1 g/m²). Mean total fish biomass was moderate (15.37 g/m²) (Class B).

The roach population contained fish aged 0+ to 11+ (1987-1976) and appeared well balanced with good survival between year-classes.

Dace were present in the river, but are only few in number. The general habitat of the river was less suited to this particular species.

Pike occurred at all sites, a partially high density and biomass of pike was recorded at site 161. The overall density of pike in the river was below the average, when compared to other Norwich Division rivers.

The growth rates of roach and pike were below average, the growth rate of dace was faster than average.

A large aggregation of roach was caught at site 159.

The total mean biomass, total mean density and community structure of the fishery has changed very little since the previous survey carried out in 1984, the fishery retains a Class B status.

Table 1
SAMPLING SITES

SITE	SITENAME	DATE SAMPLED
152	U/S CRETINGHAM BRIDGE	25/11/87
155	U/S KETTLEBURGH BRIDGE	15/12/87
156	EASTON PARK FARM	02/12/87
157	D/S GLEVERING HOUSE	07/12/87
158	U/S WICKHAM MARKET MILL	08/12/87
159	D/S WICKHAM MARKET BY-PAS	09/12/87
161	NAUNTON HALL FARM	14/12/87
162	LOW FARM	10/12/87
164	U/S MELTON SLUICE	11/12/87

GRID REF.	AREA[sq m]	METHOD
TM226606	1368	ELECTR
TM263598	2340	ELECTR
TM276579	1520	ELECTR
TM295575	1640	ELECTR
TM306568	2730	ELECTR
TM311557	2730	ELECTR
TM322533	1300	ELECTR
TM315527	1400	ELECTR
TM299517	800	ELECTR

Table 2
NUMBERS CAPTURED > 10cm

SPECIES	SITES									TOTAL
	152	155	156	157	158	159	161	162	164	
ROACH	48	44	4	65	6	817	0	3	0	987
PIKE	8	28	11	4	4	25	46	10	5	141
TENCH	1	0	0	0	0	2	4	0	0	7
EELS	38	177	3	40	6	111	66	87	56	584
STONELOACH	1	0	0	0	0	0	0	0	1	2
PERCH	0	11	2	1	0	2	3	2	0	21
DACE	0	7	0	14	0	15	0	5	3	44
COMMONBREAM	0	0	0	0	0	9	0	0	0	9
GUDGEON	0	0	0	0	0	0	0	1	0	1
TOTAL	96	267	20	124	16	981	119	108	65	1796

NUMBERS CAPTURED < 10cm

SPECIES	SITES									TOTAL
	152	155	156	157	158	159	161	162	164	
ROACH	0	47	10	26	17	20	2	2	3	127
PIKE	0	0	0	0	0	0	0	0	1	1
STONELOACH	3	3	0	2	0	4	1	11	4	28
PERCH	0	13	0	2	0	1	2	0	0	18
DACE	0	2	0	5	2	9	0	10	18	46
GUDGEON	0	0	0	0	0	1	0	0	0	1
TOTAL	3	65	10	35	19	35	5	23	26	221

Table 3
NUMBERS ESTIMATED > 10cm

SPECIES	SITES									TOTAL
	152	155	156	157	158	159	161	162	164	
ROACH	51	44	4	65	8	817	0	3	0	992
PIKE	9	28	11	4	4	29	48	10	5	148
TENCH	1	0	0	0	0	2	4	0	0	7
EELS	42	195	3	40	6	148	66	87	56	643
STONELOACH	1	0	0	0	0	0	0	0	1	2
PERCH	0	11	2	1	0	2	4	2	0	22
DACE	0	7	0	14	0	15	0	5	3	44
COMMONBREAM	0	0	0	0	0	9	0	0	0	9
GUDGEON	0	0	0	0	0	0	0	1	0	1
TOTAL	104	285	20	124	18	1022	122	108	65	1868

Table 4

MEAN LENGTH AT AGE

FISHERY: River Deban Nov/Dec 1987

ROACH

AGE	0 ⁺	1 ⁺	2 ⁺	3 ⁺	4 ⁺	5 ⁺	6 ⁺	7 ⁺	8 ⁺	9 ⁺	10 ⁺	11 ⁺			
MEAN LENGTH (cm)	3.81	7.61	11.30	14.17	15.98	18.11	21.34	25.44	—	23.63	—	25.80			
S.D.	0.38	0.96	1.23	1.19	2.15	2.58	1.59	1.84	—	0.58	—	—			
n	44	66	120	247	520	77	28	7	0	3	0	1			
YEARCLASS	1987	'86	'85	'84	'83	'82	'81	'80	'79	'78	'77	'76			

DACE

AGE	0 ⁺	1 ⁺	2 ⁺	3 ⁺	4 ⁺	5 ⁺	6 ⁺	7 ⁺							
MEAN LENGTH (cm)	5.21	9.74	15.30	17.67	19.40	21.80	28.30	22.80							
S.D.	0.36	1.16	0.71	1.39	1.78	—	—	—							
n	29	25	5	23	5	1	1	1							
YEARCLASS	1987	'86	'85	'84	'83	'82	'81	'80							

PIKE

AGE	0 ⁺	1 ⁺	2 ⁺	3 ⁺	4 ⁺	5 ⁺	6 ⁺	7 ⁺	8 ⁺						
MEAN LENGTH (cm)	17.31	28.65	40.86	63.30	64.66	—	72.80	—	96.30						
S.D.	2.72	3.89	3.01	14.11	1.20	—	12.02	—	—						
n	83	37	8	3	7	0	2	0	1						
YEARCLASS	1987	'86	'85	'84	'83	'82	'81	'80	'79						

PERCH

TENCH

AGE	0 ⁺	1 ⁺	2 ⁺	3 ⁺	4 ⁺	5 ⁺				7 ⁺	→	11 ⁺			
MEAN LENGTH (cm)	6.24	11.74	17.30	—	—	23.30				29.47		40.05			
S.D.	1.11	1.33	—	—	—	0.71				2.93		1.85			
n	18	18	1	0	0	2				3		4			
YEARCLASS	1987	'86	'85	'84	'83	'82				1980		'76			

COMMON BREAM

AGE		3 ⁺	4 ⁺												
MEAN LENGTH (cm)		16.80	23.80												
S.D.		—	3.28												
n		1	3												
YEARCLASS		'1984	'83												

Table 5
DENSITY[no/m²] OF FISH > 10 cm

SPECIES\SITES	152	155	156	157	158	159	161	162	164	MEAN
ROACH	.0372	.0188	.0026	.0396	.0029	.2992	0	.0021	0	.0447
PIKE	.0065	.0119	.0072	.0024	.0014	.0106	.0369	.0071	.0062	.0100
TENCH	<.001	0	0	0	0	<.001	.0030	0	0	<.001
EELS	.0307	.0833	.0019	.0243	.0021	.0542	.0507	.0621	.07	.0421
STONELOACH	<.001	0	0	0	0	0	0	0	.0012	<.001
PERCH	0	.0047	.0013	<.001	0	<.001	.0030	.0014	0	.0013
DACE	0	.0029	0	.0085	0	.0054	0	.0035	.0037	.0027
COMMONBREAM	0	0	0	0	0	.0032	0	0	0	<.001
GUDGEON	0	0	0	0	0	0	0	<.001	0	<.001
TOTAL	.0760	.1217	.0131	.0756	.0065	.3743	.0938	.0771	.0812	.1021

BIOMASS[g/m²] OF FISH > 10 cm

SPECIES\SITES	152	155	156	157	158	159	161	162	164	MEAN
ROACH	5.593	1.985	.2302	5.159	0.09	18.91	0	.1064	0	3.5644
PIKE	1.312	2.416	1.254	.2548	.5076	1.984	33.59	.4214	.3412	4.6762
TENCH	.2595	0	0	0	0	.3802	3.621	0	0	.47347
EELS	6.786	15.72	.5263	2.804	.2857	8.253	10.53	7.071	5.125	6.3463
STONELOACH	0.001	0	0	0	0	0	0	0	.0112	0.002
PERCH	0	.1931	.025	0.02	0	0.02	.3461	.1142	0	.07920
DACE	0	.2542	0	.6323	0	.2765	0	.3214	.0712	.17286
COMMONBREAM	0	0	0	0	0	.5260	0	0	0	0.06
GUDGEON	0	0	0	0	0	0	0	0.01	0	0.001
TOTAL	13.96	20.57	2.036	8.870	.8853	30.34	48.1	8.047	5.548	15.374

Sampling Sites

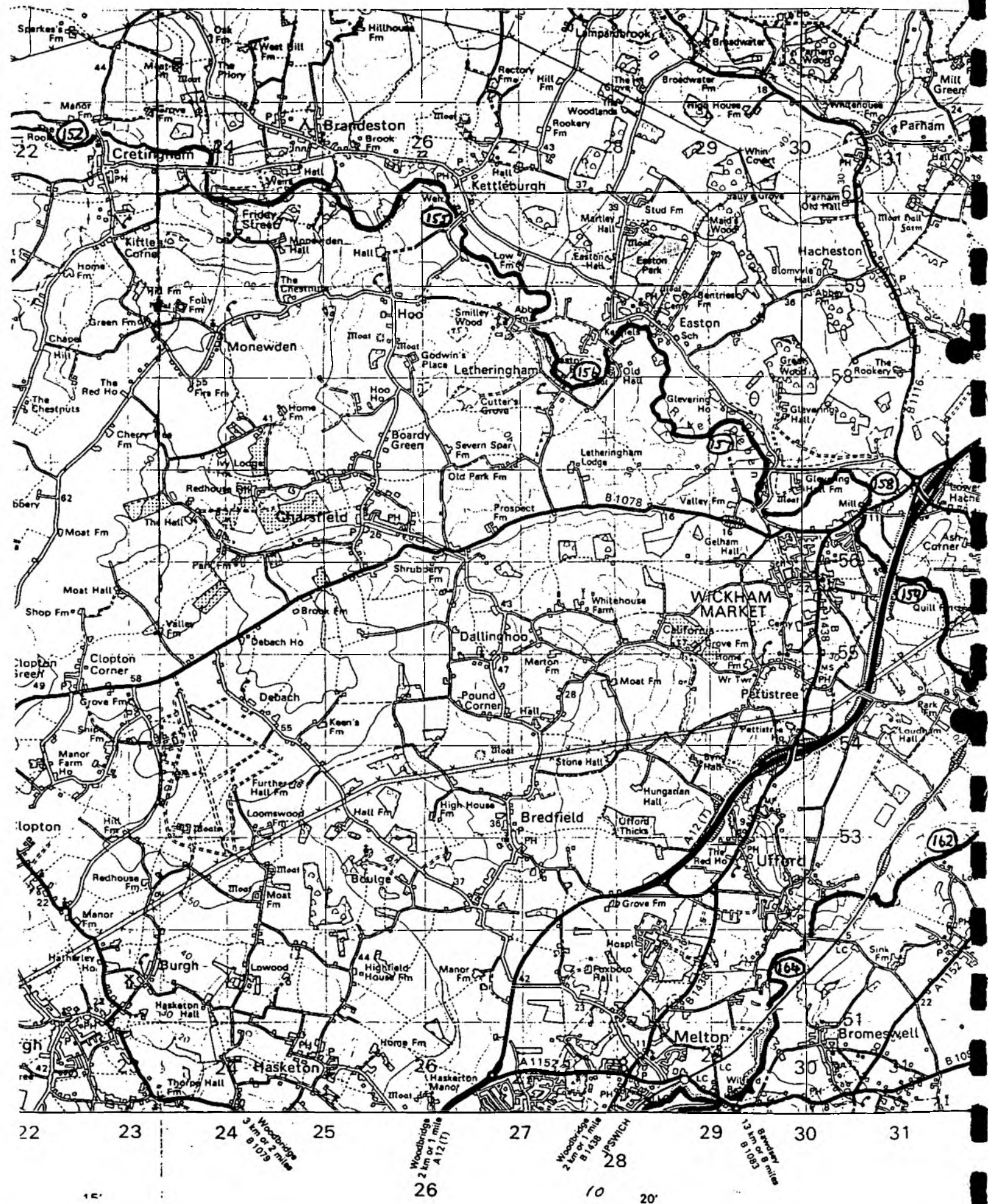
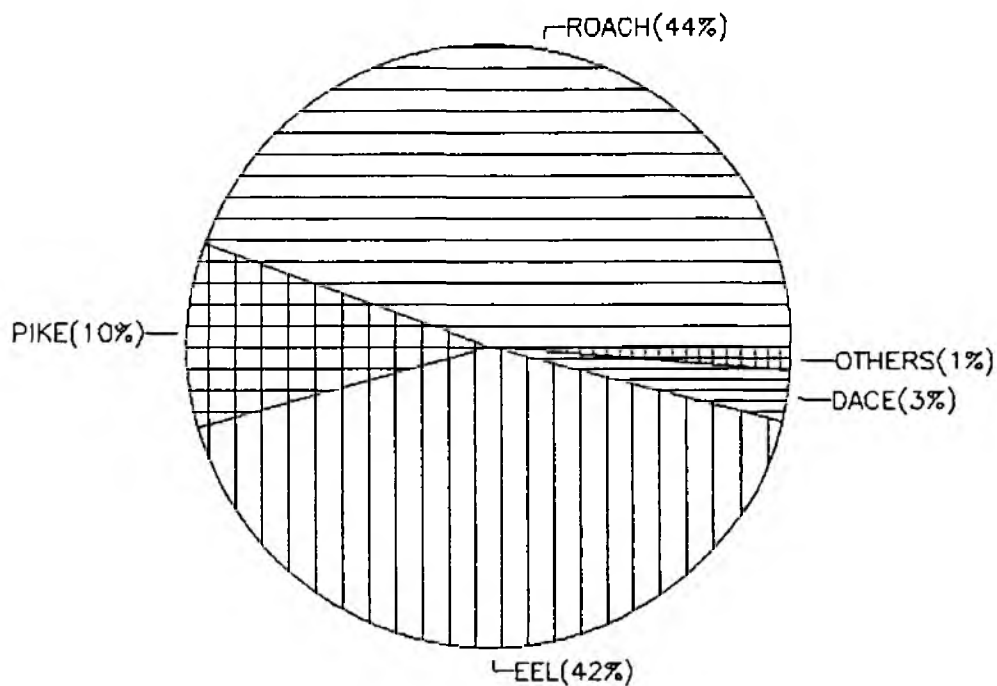


Figure 2

RIVER DEBEN DENSITY PIE CHART 1987

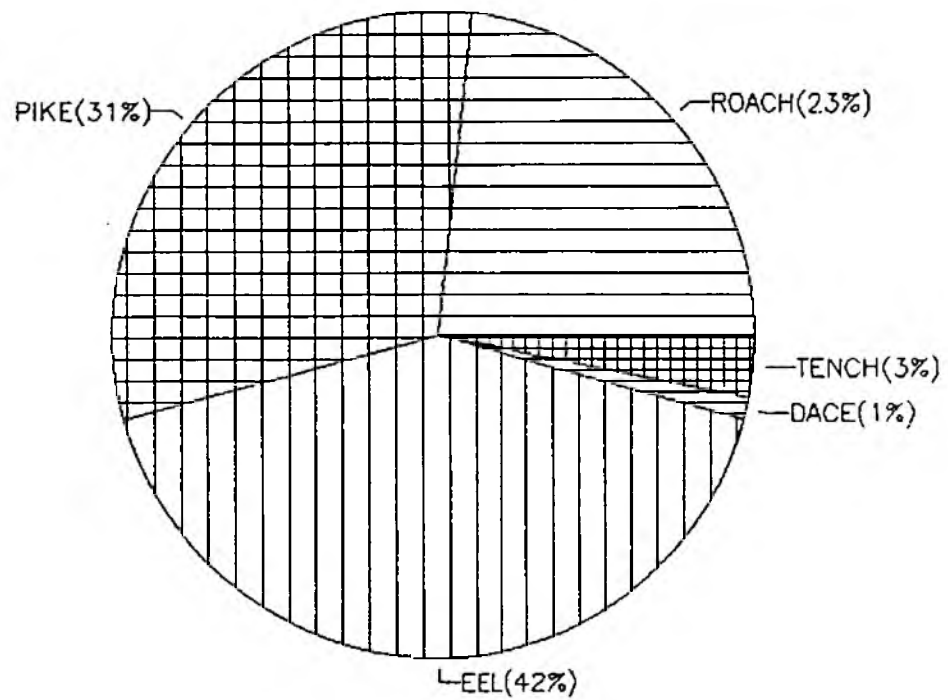
OTHERS = TENCH,S/LOACH,PERCH,BREAM,GUDGEON



MEAN DENSITY = 0.10 Nos/m²

Figure 3

RIVER DEBEN BIOMASS PIE CHART 1987



MEAN BIOMASS = 15.4 g/m²

Figure 4

LENGTH FREQUENCY DISTRIBUTION AND YEARCLASS STRUCTURE OF ROACH
FROM THE RIVER DEBEN.
NOVEMBER/DECEMBER 1987.

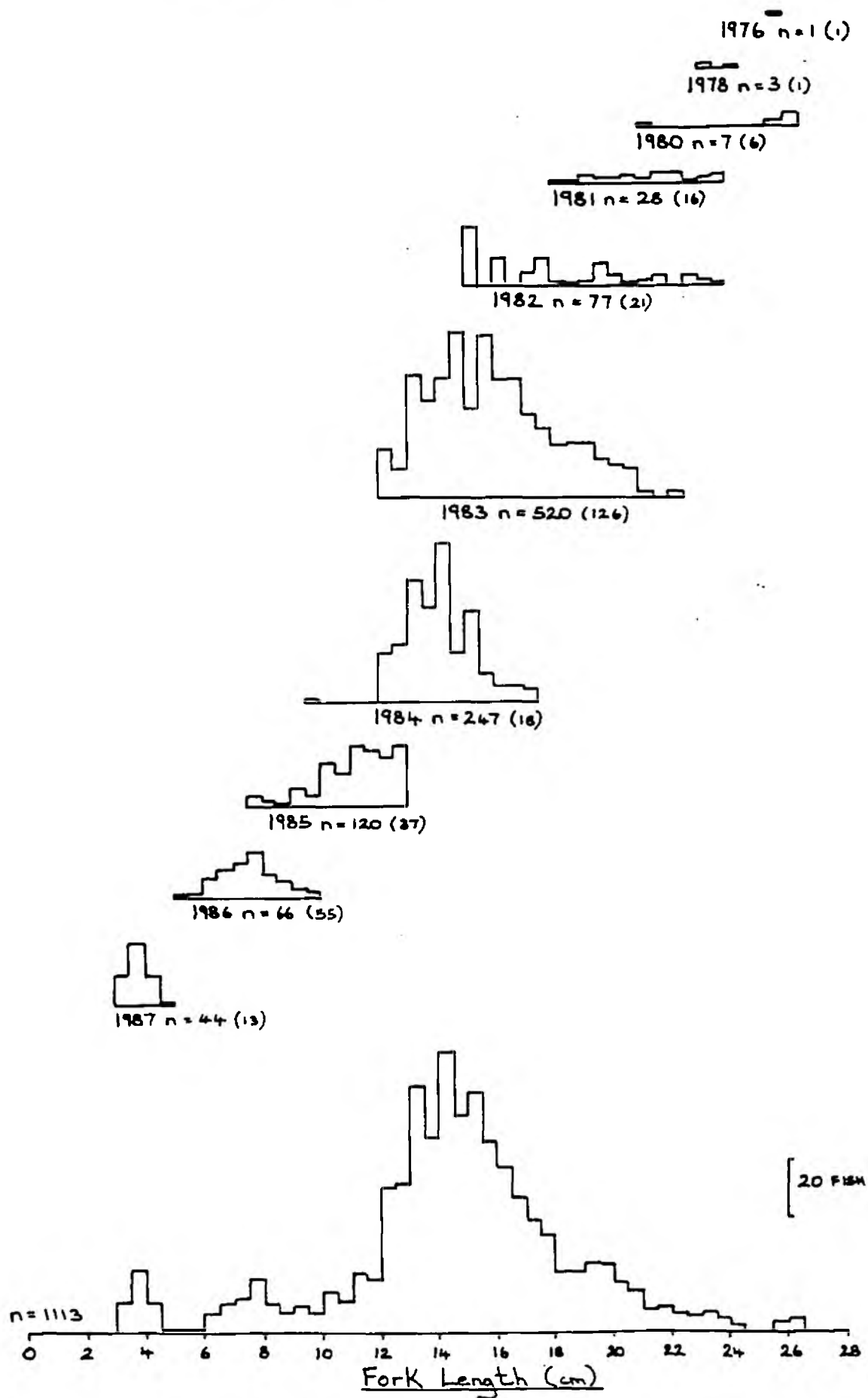


Figure 5

THE GROWTH OF ROACH FROM THE RIVER DEBEN
NOVEMBER/DECEMBER 1987.

(95% confidence limits are shown for samples
of 5 or more fish)

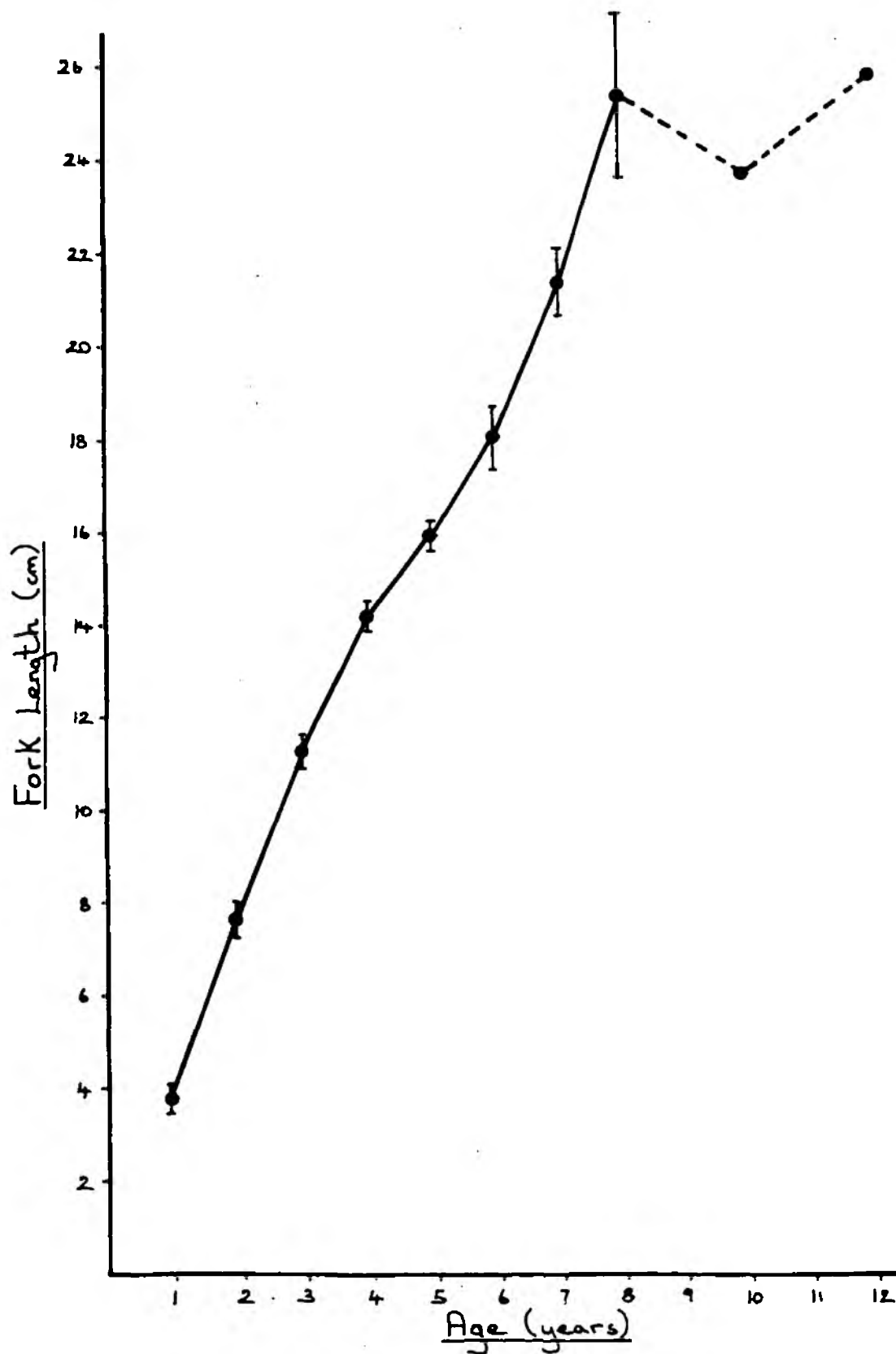


Figure 6

LENGTH FREQUENCY DISTRIBUTION AND YEARCLASS STRUCTURE OF DACE
FROM THE RIVER DEBEN.
NOVEMBER/DECEMBER 1987.

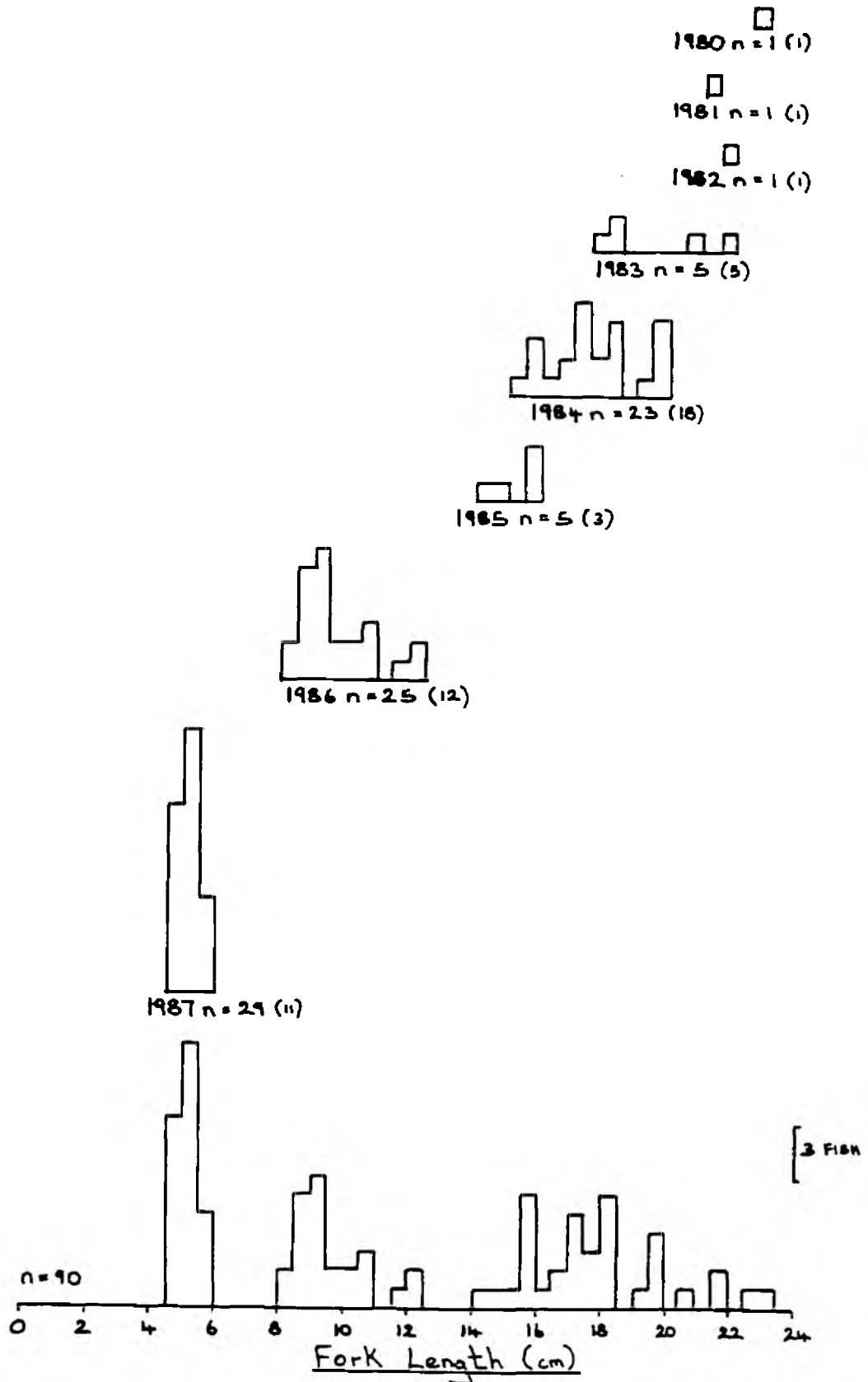


Figure 7

THE GROWTH OF DACE FROM THE RIVER DEBEN
NOVEMBER/DECEMBER 1987.
(95% confidence limits are shown for samples
of 5 or more fish)

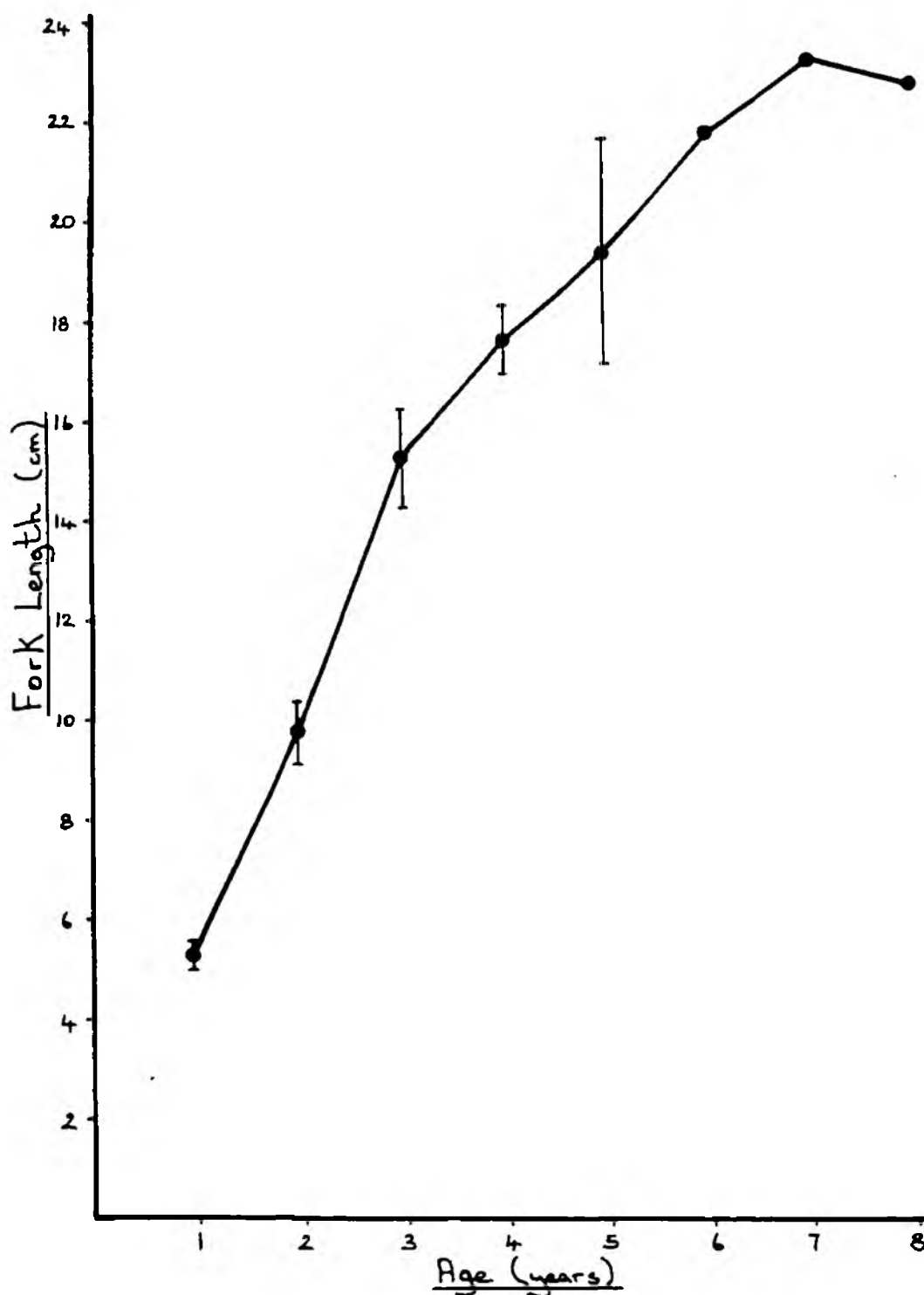


Figure 8

LENGTH FREQUENCY DISTRIBUTION AND YEARCLASS STRUCTURE OF PIKE
FROM THE RIVER DEBEN.
NOVEMBER/DECEMBER 1987.

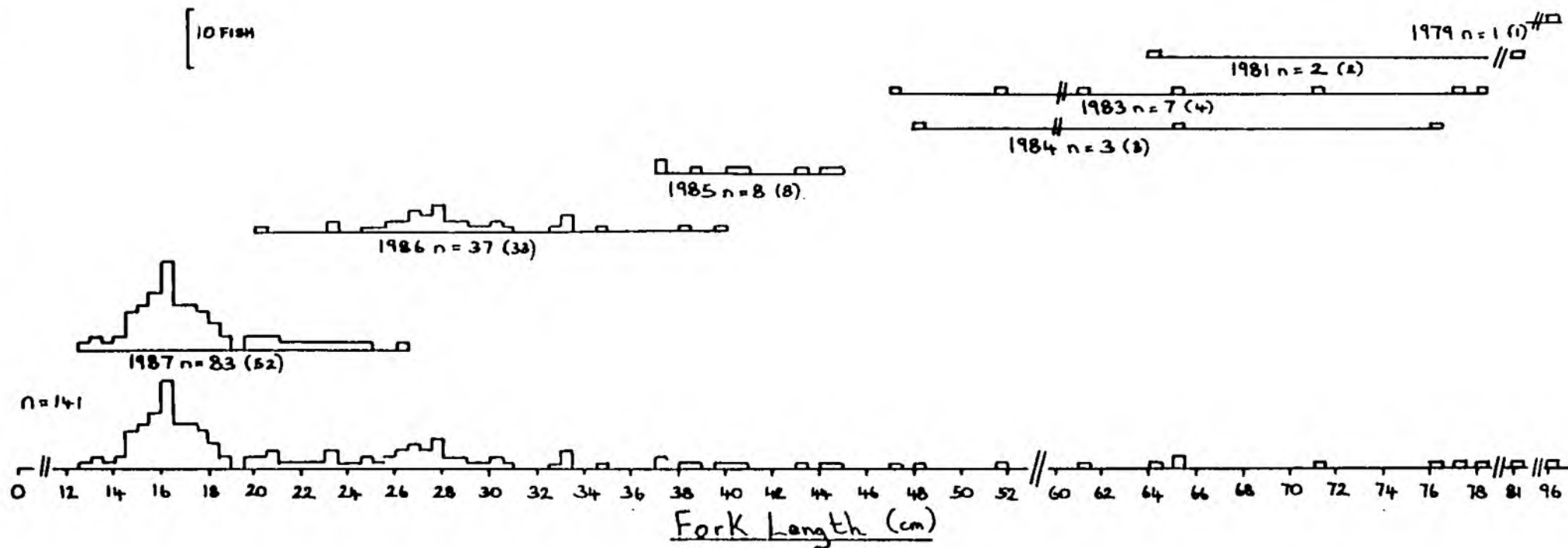


Figure 9

THE GROWTH OF PIKE FROM THE RIVER DEBEN
NOVEMBER/DECEMBER 1987.
(95% confidence limits are shown for samples
of 5 or more fish)

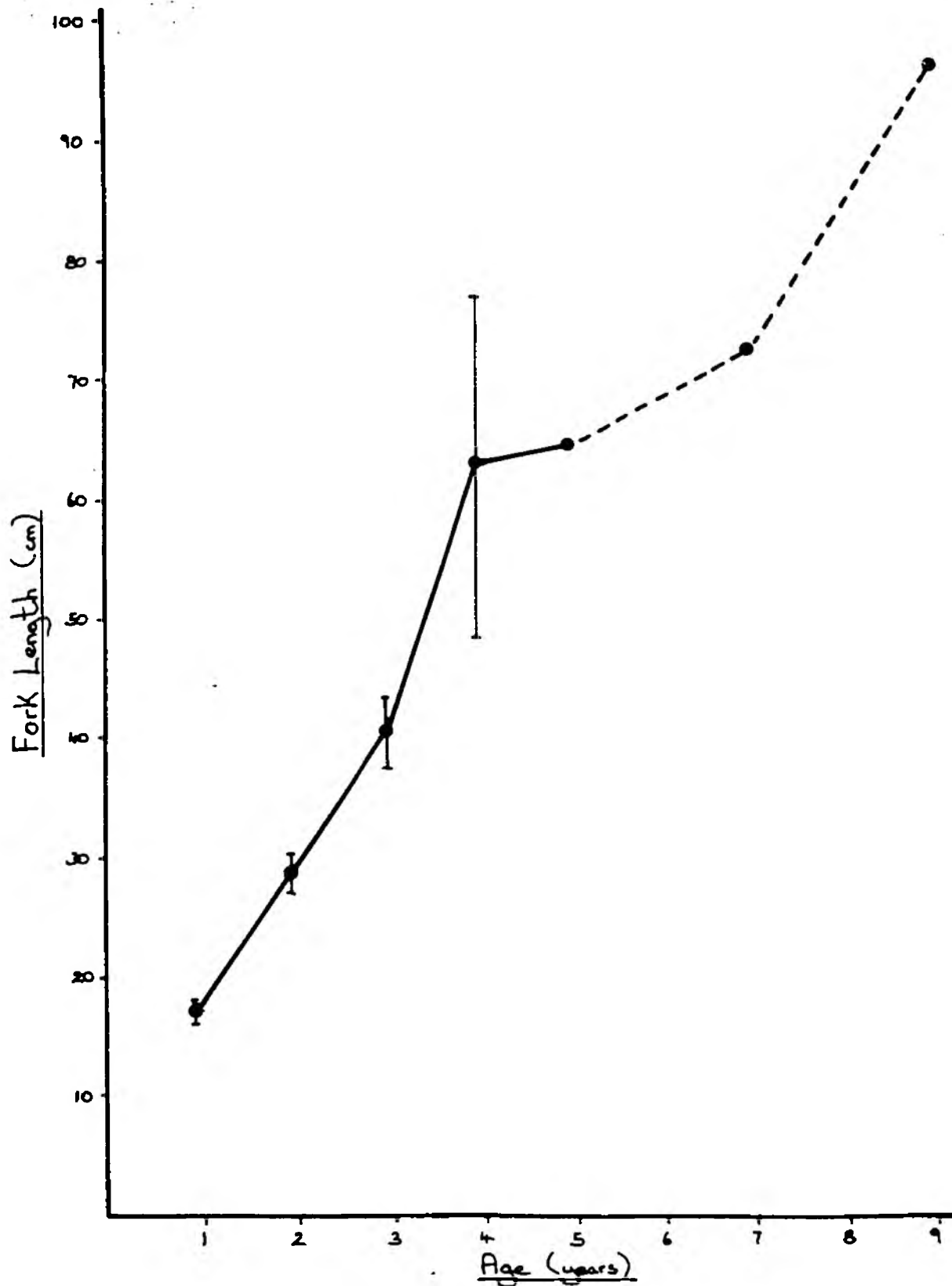


Figure 10

LENGTH FREQUENCY DISTRIBUTION AND YEARCLASS STRUCTURE OF PERCH
FROM THE RIVER DEBEN.
NOVEMBER/DECEMBER 1987.

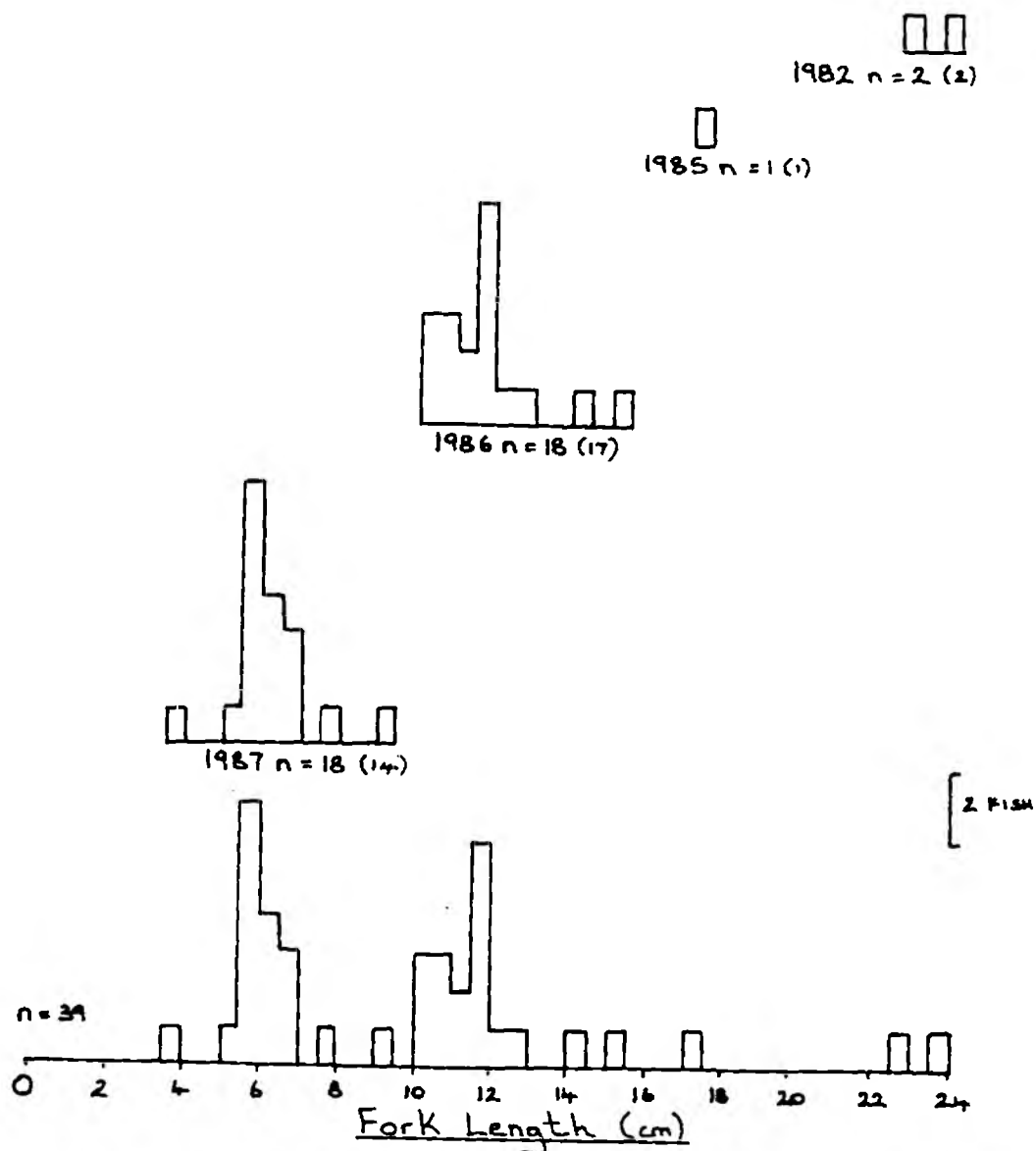


Figure 11

THE GROWTH OF PERCH FROM THE RIVER DEBEN
NOVEMBER/DECEMBER 1987.
(95% confidence limits are shown for samples
of 5 or more fish)

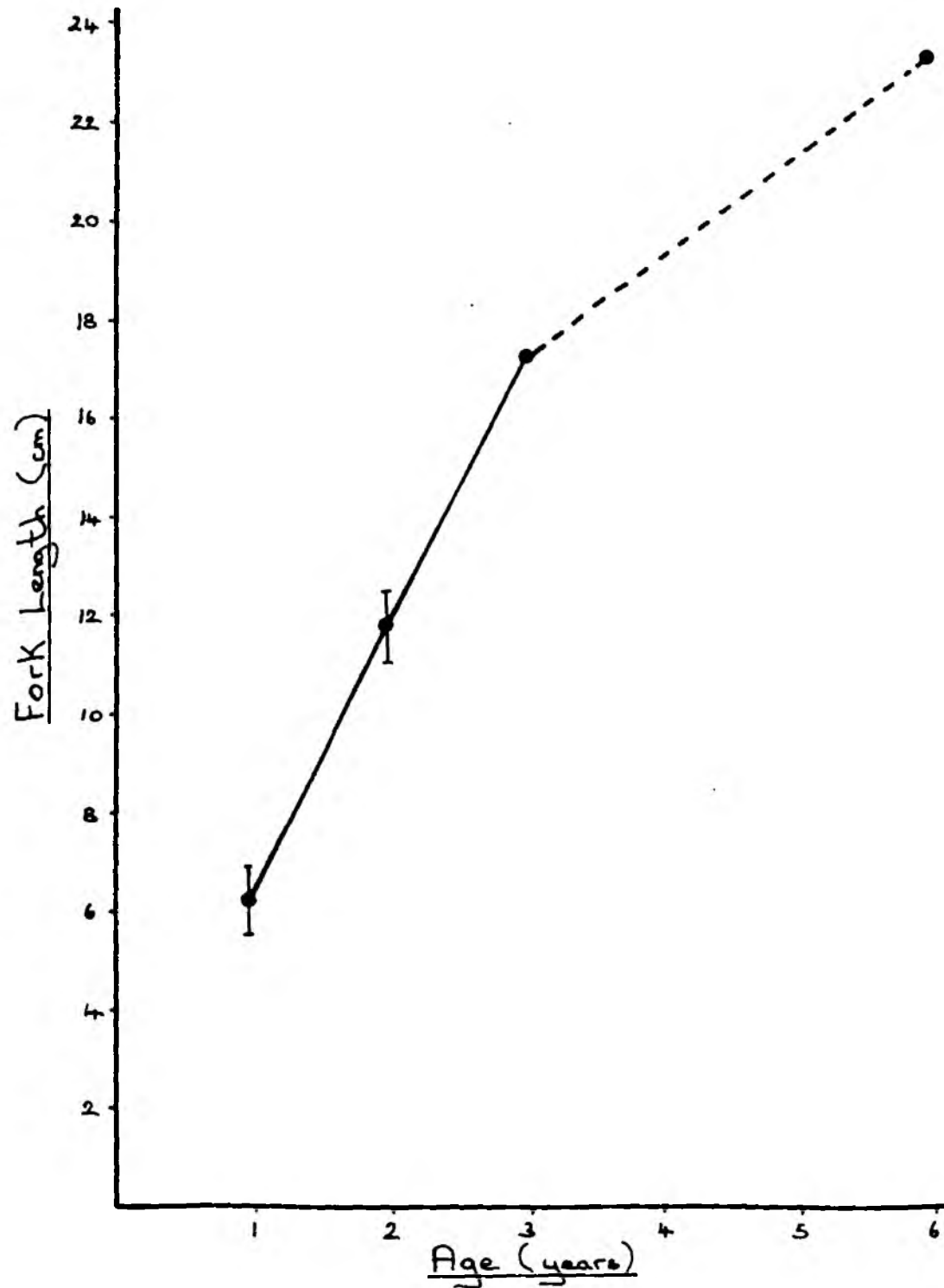
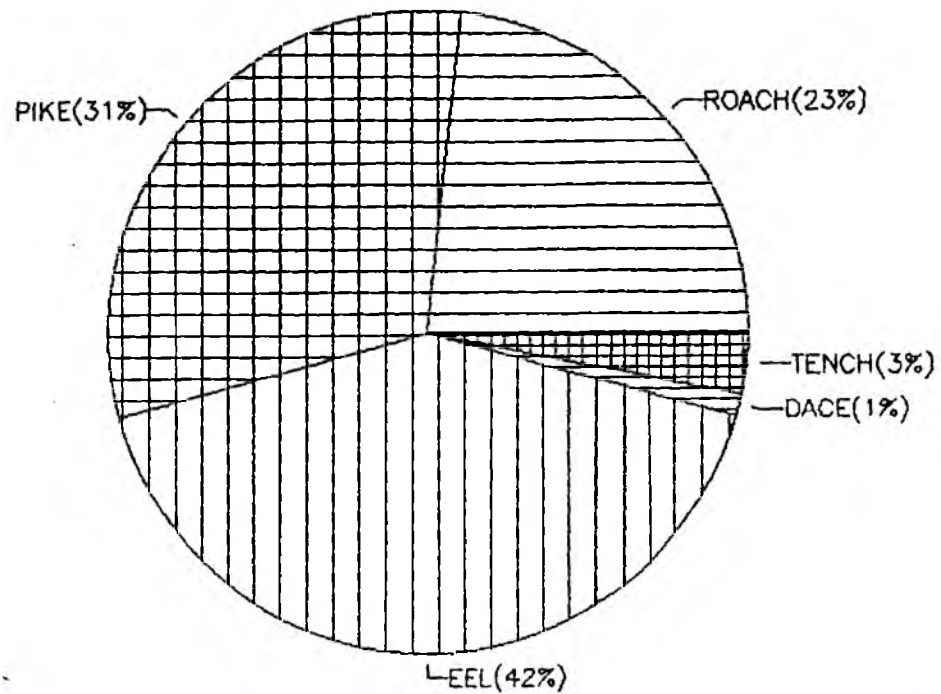


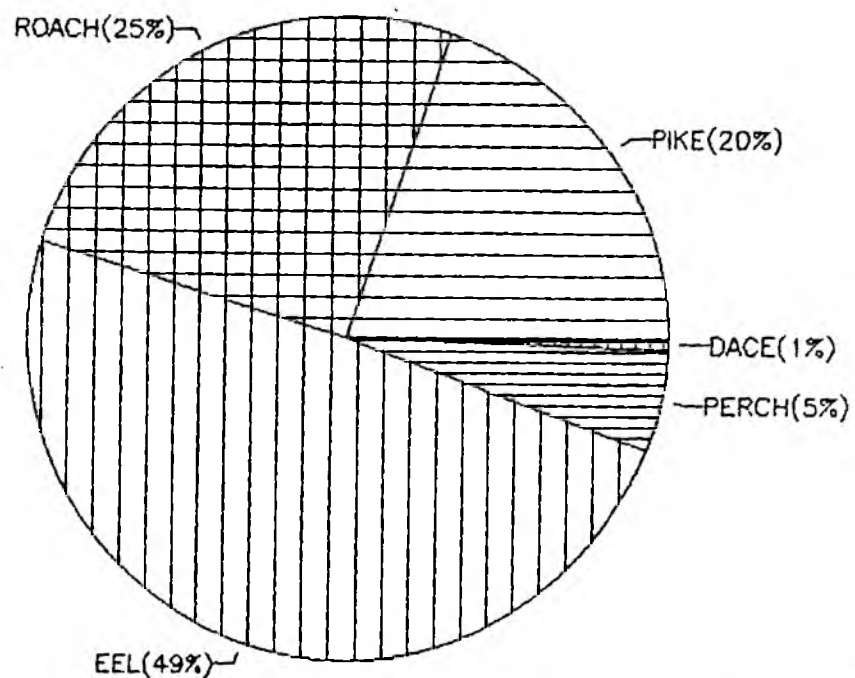
Figure 12

RIVER DEBEN BIOMASS PIE CHART 1987



MEAN BIOMASS = 15.4 g/m²

RIVER DEBEN BIOMASS PIE CHART 1984



MEAN BIOMASS

REGIONAL FISH DISEASES UNIT

HEALTH CHECKS ON COARSE FISH FROM

THE RIVER DEBEN

INTRODUCTION

In conjunction with the survey of fish populations on the River Deben, a sample of coarse fish was submitted to the Regional Fisheries Laboratory for general health checks and assessment of the parasite burden.

METHODS

Fish were brought back to the laboratory alive and examined as soon as possible after arrival. A brief assessment was made of the live condition of the sample, after which, fish were sacrificed and examined post mortem. Gross external and internal examinations were carried out, and a representative selection of tissues taken for standard histological and microbiological investigations; all tissues showing abnormalities or lesions were taken. In addition, parasites were noted and collected/processed for identification.

RESULTS

A total of 15 fish were submitted; species, morphometric and sex ratio data are detailed below.

	<u>Length range (cm)</u>	<u>weight range (g)</u>	<u>sex</u>
Roach (10)	15.9 - 23.1	68.0 - 158.0	7 male, 3 female
Pike (5)	17.5 - 40.5	36.7 - not recorded	1 male, 4 female

The results of parasitological examinations are shown in Table 1 for the parasite species recorded, the respective hosts, and the sites and levels of infection. Parasites are listed according to taxonomic group. With the exception of Sporozoon tincae (presumptive identification) infection in a single roach, the parasite species were typical for the hosts examined, and levels of infection did not present any significant disease aspects. The presence of Sporozoon tincae had elicited obvious pathology in the form of ulcerative, haemorrhagic, boil-like lesions on the snout, fin bases and within the buccal cavity. The haemorrhagic and mucoid transformation had resulted in quite severe lesions, albeit in one isolated fish.

Lesions and histopathological in the sample are listed in Table 2. Apart from the roach lesions due to Sporozoon tincae described above, the general condition of fish in the sample, both externally and internally, was considered to be good, and no other entities of disease significance were noted.

DISCUSSIONS AND SUMMARY

A total of 15 fish were examined from the River Deben. Apart from a single roach infected with Sporozoon tincae, the general condition of fish submitted was considered to be good, and no lesions or parasites of widespread disease significance were apparent.

For Sporozoon tincae this infection should be noted. Although only one roach was affected, the 'bloody-boil' transformation elicited by the parasite is quite striking. The presence of (?) Sporozoon tincae is one of interest since this haplosporidian parasite is relatively unusual in the UK (subject to formal confirmation of identification). This species is a rickettsia-like organism which infects histiocytes (tissue cells). Affected fish show haemorrhagic lumps in the skin and other organs, which swell up and eventually burst, assuming an ulcerative aspect. The infection is unusual and little is known regarding transmission or development, although presumably dissemination occurs when the spores are released from the boils. Isolated infected specimens have been recorded from several sites in the region and we are continuing investigations on all incidences to assess the wider significance, if any, of the infection.

87/140 Norwich

TABLE 1. - HOST AND PARASITE SPECIES FROM

THE RIVER DEBEN

PARASITE	HOST SPECIES (Number infected)	SITE AND LEVEL OF INFESTATION
PROTOZOA		
<u>Trichodina</u> sp	Roach/2	Gill lamellae, light infections
<u>Trichodina</u> sp	Pike/1	Gill lamellae, light infection
<u>T. urinale</u>	Roach/1	Ureters, light infection
? <u>Sporozoon tincae</u>	Roach/1	Skin, snout, buccal cavity and fin bases - localised heavy infections
<u>Eimeria rutili</u>	Roach/1	kidney interstitial areas, few cysts
MYXOZOA		
<u>Henneguya psorospermica</u>	Pike/1	Gill lamellae, heavy infections
<u>Chloromyxum</u> sp	Pike/1	Kidney tubular, few trophs present
<u>Myxidium lieberkuhni</u>	Pike/2	Urinary bladder, trophs and spores noted
<u>Myxidium rhodei</u>	Roach/2	Gall bladder, few spores present
<u>Myxidium</u> sp	Roach/5	Kidney interstitial areas, few cysts noted
<u>Myxobolus</u> sp	Roach/1	Gill lamellae, light infection
PLATYHELMINTHES		
MONOGENEA		
<u>Dactylogyrus</u> sp	Roach/5	Gill filaments 5 - 15 worms per fish noted
<u>Tetraonchus monenteron</u>	Pike/3	Gill filaments, 5 - 15 worms per fish noted
DIGenea		
<u>Posthodiplostomum</u> <u>cuticola</u> (encysted 'blackspot' stage)	Roach/2	Skin surface, 1 - 10 cysts noted per fish
<u>Diplostomum</u> sp (metacercarial larval stages)	Roach/9 Pike/4	Eye lens, 2 - 40 stages per fish Eye lens, 2 - 10 stages per fish
CESTODA		
<u>Triaenophorus nodulosus</u>	Pike/3	Liver, several cysts noted (1 fish) Intestine, 3 - 5 worms per fish noted (2 fish)
<u>Caryophyllaeides fennica</u>	Roach/1	Intestine, 2 worms noted

TABLE 2 - LESIONS AND HISTOPATHOLOGICAL ENTITIES NOTED IN FISH FROM

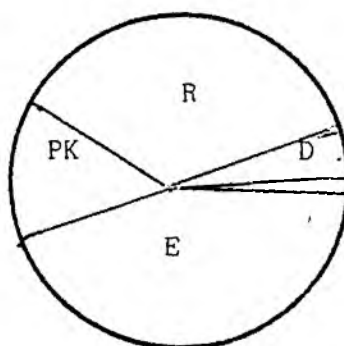
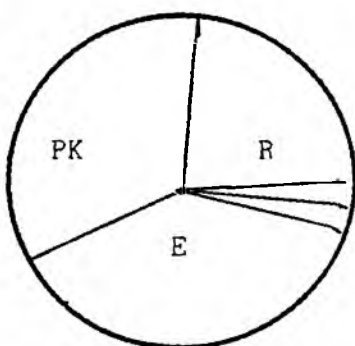
THE RIVER DEBEN

ENTITY/LESION OBSERVED	FISH SPECIES (Number affected)
<u>EXTERNAL</u>	
(N.A.D. - No abnormalities detected)	Roach/8, Pike/4
Opacity of left cornea	Pike/1
Haemorrhagic goil-like lesion on snout, extending into buccal cavity; similar lesions at bases of left pectoral and pelvic fins (due to <u>S. tincae</u>)	Roach/1
<u>GILLS</u>	
Pale necrotic patches on filament (<u>S. tincae</u>)	Roach/1
Secondary fungal infection	Pike/1
Mild hyperplasia of respiratory epithelium	Roach/2
Moderate hyperplasia of respiratory epithelium	Roach/4, Pike/1
Marked hyperplasia of respiratory epithelium	Roach/1, Pike/1
Variable congestion of branchial vessels	Roach/2
Aneurysms (limited) of lamellar capillaries	Roach/2
Inflamed buccal epithelium	Roach/1
<u>INTERNAL</u>	
Liver - pale, no micropath	Roach/1
- granulomata (parasitic origin)	Pike/1
Gall bladder - pale and fibrous	Roach/1
Body musculature - localised mucoid transformation of histiocytes	Roach/1
Spleen - pale, no micropath	Roach/1
Kidney - pale, no micropath	Roach/1
- hypercellular interstitial areas	Roach/1

FISHERY: RIVER DEBEN DIVISION: NORWICH AUTHOR: J.S. WORTLEY
 TITLE AND DATE OF SURVEY FISHERIES SURVEY OF THE RIVER DEBEN - NOV/DEC 1987
 REASON(S) FOR SURVEY ROUTINE SURVEY
 BIOLOGICAL AND CHEMICAL QUALITY NWC CLASS 1B/2 BMWP = 96-53 LINCOLN INDEX = B/C
 SAMPLING METHOD(S) PULSED DC.ELECTRO-FISHING
 FISH BIOMASS { MEAN 15.37 $g\ m^{-2}$
 MAX 48.10 $g\ m^{-2}$
 MIN 0.88 $g\ m^{-2}$ FISH DENSITY { MEAN 0.1021 m^{-2}
 MAX 0.3743 m^{-2}
 MIN 0.0065 m^{-2}
 TOTAL NO. OF SAMPLING SITES 9 COMMENTS ON ESTIMATES DATA REFER TO FISH
 > 10cm FISH HEALTH SAMPLE REF. NO. 87/140

LENGTHS OF RIVER(km) IN EACH BIOMASS CLASS			
A	B	C	D
	20		

SPECIES COMPOSITION
 BIOMASS PIECHART DENSITY PIECHART



KEY	SPECIES	PERCENTAGE		NO. OF SITES
		BIOMASS	DENSITY	
R	ROACH	23	44	9
PK	PIKE	31	10	9
E	EEL	42	42	9
T	TENCH	3		3
D	DACE	1	3	6
SL	ROACH			6
CB	BREAM			1
G	GUDGEON			2
P	PERCH			6

YEAR CLASS STRUCTURE AND GROWTH RATES OF IMPORTANT SPECIES

YEAR CLASS	0+ 87	1+ 86	2+ 85	3+ 84	4+ 83	5+ 82	6+ 81	7+ 80	8+ 79	9+ 78	10+ 77	11+ 76	s	GROWTH RATE
ROACH	44	66	120	247	520	77	28	7	0	3	0	1		M
DACE	29	25	5	23	5	1	1	1						F
PIKE	83	37	8	3	7	0	2	0	1					M
PERCH	18	18	1	0	0	2								M
C.BREAM				1	3									M
TENCH								3				4		M

*DOMINANT YEAR CLASS, s = MEAN ANNUAL SURVIVAL RATE (%)

GROWTH KEY: VF = VERY FAST; F = FAST; M = MODERATE; S = SLOW; VS = VERY SLOW

PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS

Very little change in mean biomass and density and community structure since previous survey. Winter aggregations occur at specific sites. Potential for ORSV development and further recreational fishery development.

REPORT OF A FISHERIES SURVEY
OF THE RIVER DEBEN

January/March 1984

Report No. ND/FSR/6/84

1. INTRODUCTION

1.1 This report summarises the data arising from a quantitative survey of the fish populations in the non-tidal River Deben between Crettingham and Melton. This was the first quantitative assessment of fish stocks in the River Deben to be carried out by Anglian Water.

1.2 The aim of the survey was to obtain reliable baseline data on the components of the fish community including density, biomass, growth rates and year class strengths of the dominant species.

1.3 Sampling sites

1.3.1 Twelve sites having a total length of 2196 metres were sampled from a total river length of approximately 16 km. Details of each sampling site are given in Table 1 and the location of each site is shown in Figure 1. Sites were selected so as to represent as far as possible the different physical characteristics of the river.

1.3.2 The depth at different sites varied between 0.1 metre and 2.5 metres and the river was generally fairly narrow, shallow and slow flowing. The substratum varied from hard gravel at Crettingham to fairly soft mud with beds of accumulated silt at Wickham Market.

1.3.3 The river falls approximately 15 metres between Crettingham and the tidal limit at Melton, i.e. the overall gradient between these points is approximately 93 cm/Km. However, as with many other rivers in the Norwich Division, the river is artificially impounded at various mills (Ufford, Wickham Market, Easton) and this leads to diversity in the river habitat at these points.

1.4 Water Quality

1.4.1 The analytical results of routine water samples taken from the river at Crettingham, Wickham Market and Loudham during 1983/84 are shown in Appendix 1. Water quality is generally high and is not influenced by any effluents which would be detrimental to fish life. However, agricultural effluents do occasionally pollute the river at discreet points and when this occurs the results can be catastrophic for fish life (see Appendix 3).

1.4.2 The biological status of the river is good with a wide diversity and abundance of aquatic invertebrates (Appendix 2). This diversity of invertebrate life reflects both the good water quality and the diverse physical aspects of the habitat.

1.5 Angling Interests

1.5.1 Woodbridge Angling Club control the fishing on the river upstream of Wickham Market. For the rest of the river, the fishing is in the hands of riparian landowners who will usually permit access to the river by anglers.

FIGURE 1

River Deben Survey - January/March 1984

Sampling Sites

Scale 1 :

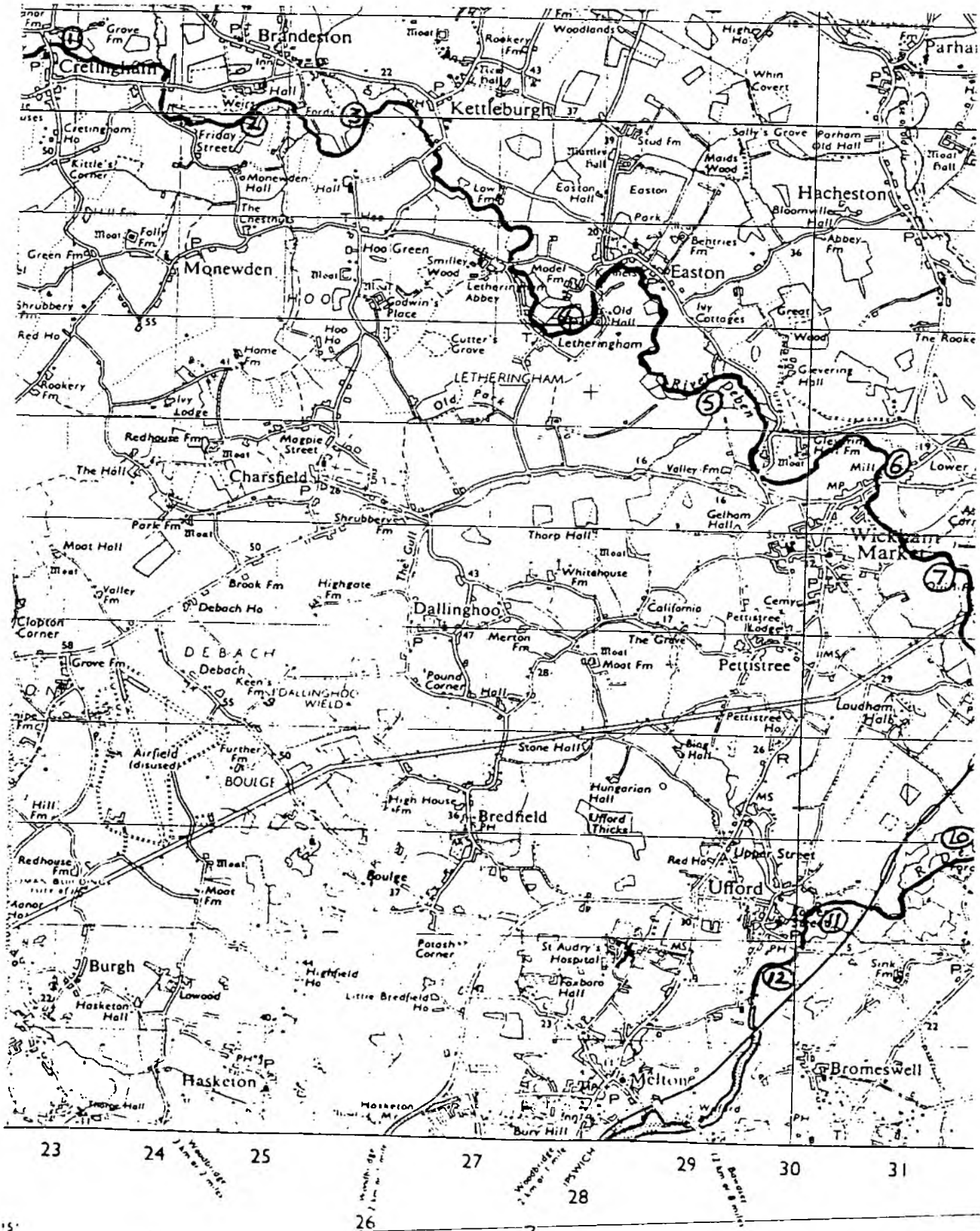


TABLE 1

River Deben Survey - January / March 1984Sampling Sites

Site No.	Location	Date Sampled	Length m	Width m	Area m ²
1.	Cretingham Bridge	6/3/84	157	7.2	1130.4
2.	Brandeston School	5/3/84	167	8.0	1346.0
3.	D/S Brandeston	1/3/84	195	7.0	1365.0
4.	Easton Farm Park	29/2/84	147	10.0	1470.0
5.	D/S Glevering House	28/2/84	190	8.0	1520.0
6.	U/S Wickham Market Mill	27/2/84	210	14.0	2950.0
7.	D/S Wickham Market Bypass	22/2/84	250	8.0	2000.0
8.	U/S Londham Decoy	21/2/84	150	5.0	750.0
9.	Naunton Hall Farm	20/2/84	190	6.2	1178.0
10.	Low Farm	18/1/84	200	7.0	1400.0
11.	Ufford	12/1/84	150	3.5	525.0
12.	U/S Melton Sluice	9/1/84	190	7.2	1368.0

2. METHODS

- 2.1 All sites were sampled using pulsed d.c. electro-fishing and quantitative estimates of the number of fish present were made using successive removal methods. Details of these and other methods used have been given in previous reports of fisheries surveys, e.g. report number ND/FSR/2/83 "Report of a fisheries survey of the upper River Wensum - April/May 1983".

3. COMMUNITY STRUCTURE

- 3.1.1 The total number of each species of fish caught at each site is shown in Table 2. Estimates of the actual numbers of fish ≥ 10 cm present at each site are shown in Table 3.

- 3.1.2 A total of 1927 fish representing ten species were caught. The frequency of occurrence of each species at the twelve sites sampled was as follows:-

Eel	12	Stoneloach	4
Pike	12	Gudgeon	1
Perch	10	Common bream	1
Roach	9	Rudd	1
Dace	5	Bullhead	1

- 3.1.3 The relative abundance of each species derived from the mean biomass of fish ≥ 10 cm occurring at all sites is shown in Figure 2. Mean biomass was 12.587 gm/m^2 of which about half was composed of eels. Roach, pike, perch and dace made up the remaining biomass, although dace contributed only a very minor proportion of this.

3.2 Size Frequency and Age Structure

3.2.1 Roach

Length frequency distributions for each year class of roach are shown in Figure 3. Fish aged between 0+ and 10+ (1983-1973 year classes) occurred in the population. Good year classes of roach occurred in 1978 and 1981 (5+ and 2+ fish). Survival between year classes was generally good. The 1983 year class (0+ fish) did not appear to be particularly strong, but these fish were below the size caught quantitatively by the electrofishing gear and their numbers would therefore have been underestimated. Although the overall year class composition of the roach population was normal, the distribution of fish in the river was not as expected (see Section 4).

3.2.2 Dace

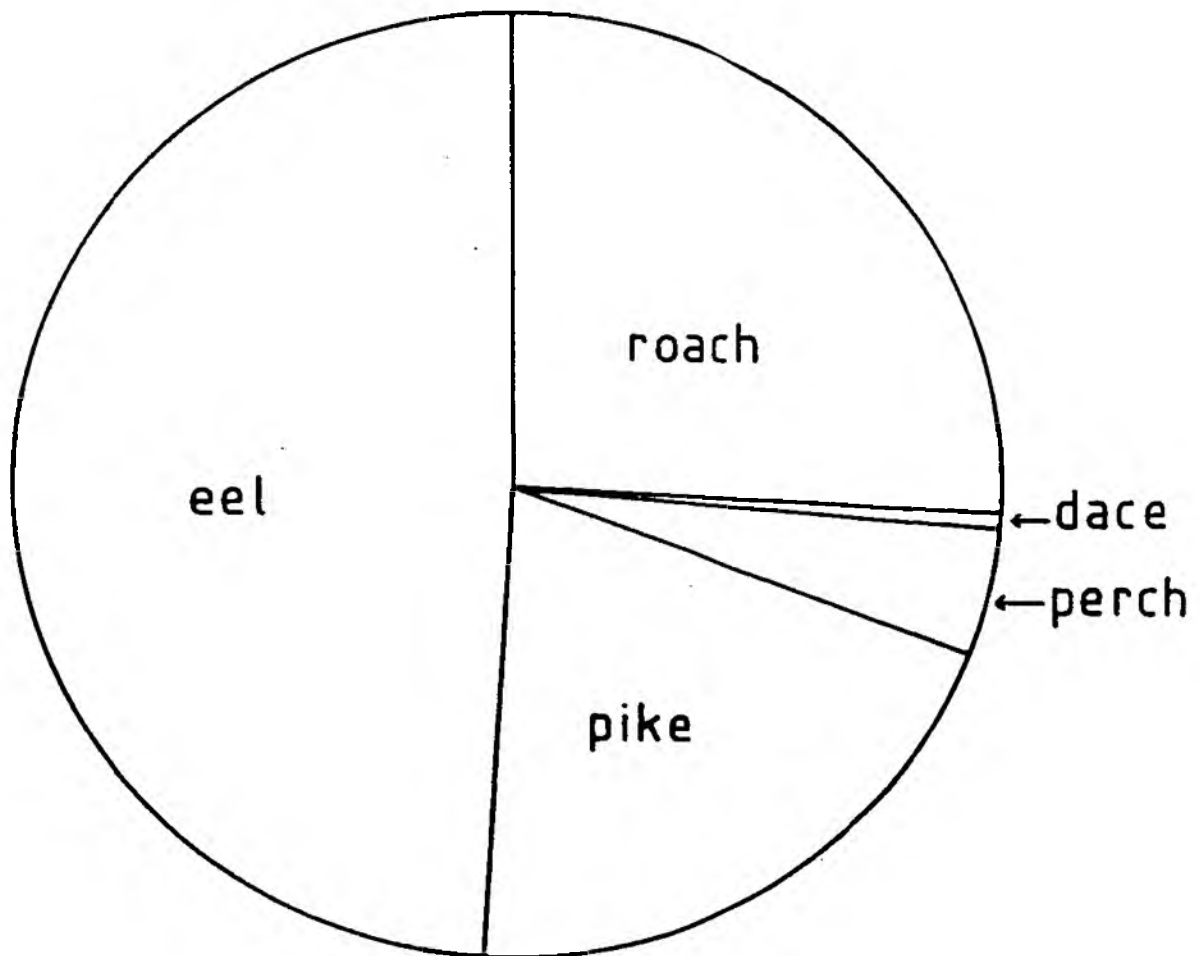
Length frequency distributions for each year class of dace are shown in Figure 4. A total of only twenty five fish were caught and the species is not, therefore well represented in the river.

Figure 2

River Deben Survey - January / March 1984

Community Structure

Fish ≥ 10 cm



mean biomass = $12.587 \text{ g / m}^{-2}$

TABLE 2

River Deben Survey - January / March 1984

Total number of fish caught at each site. Fish < 10 cm

Species	Site												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Roach	16	462	9	3		5	4		15	1	1		516
Dace									2	1		5	8
Perch			5	1	2	1	1	1					11
Gudgeon							1						1
Stoneloach	5	19	2								6		32
C Bream									1				1
Bullhead											3		3
Rudd		1											1
Total	21	482	16	4	2	6	6	1	18	2	10	5	573

Fish ≥ 10 cm

Pike	12	7	5	6	1	3	11	10	9	1	10	1	76
Roach	207	85				9	141		8	2			452
Dace							6		8		1	2	17
Perch		30	13	27	18	13	15		7	5	18	8	154
Eel	12	61	4	12	17	14	137	52	45	9	240	52	655
TOTAL	231	183	22	45	36	39	310	62	77	17	269	63	1354

TABLE 3

River Deben Survey - January/ March 1984

Estimated numbers of each species of fish > 10 cm present at each site with 95% confidence limits

Species	Site												Mean*
	1	2	3	4	5	6	7	8	9	10	11	12	
Pike	12 (12-13)	7 (7-9)	5*	8 (6-18)	1*	4 (3-11)	11*	12 (10-21)	9*	1*	11 (10-12)	1*	6.83
Roach	210 (207-215)	103 (85-125)				9*	141*		8*	2*			39.42
Dace							6*		8 (8-9)		1*	2*	1.42
Perch		30*	13 (13-16)	36 (27-57)	18*	13*	15*		7*	5*	18 (18-19)	8*	13.58
Eel	16 (12-30)	77 (61-100)	4*	12*	17*	14*	158 (127-190)	60 (52-74)	45*	9*	240*	52*	58.67
TOTAL*	238	217	22	56	36	40	331	72	77	17	270	63	119.92

* Minimum estimate based on total catch

However, the ages of those fish caught ranged between 0+ (1983 year class) and 5+ (1978 year class). The 2+ fish (1981 year class) formed the dominant component of the population.

3.2.3 Pike

Length frequency distributions for each year class of pike caught are shown in Figure 5. Fish aged between 0+ and 6+ were caught (1983-1977 year classes). The population was dominated by 0+ fish.

3.2.4 Perch

Length frequency distributions for each year class of perch caught are shown in Figure 6. Fish aged between 0+ and 4+ occurred in the population. The 1981 and 1982 year classes dominated the population (1+ and 2+ fish).

3.3 Growth

3.3.1 Roach

Mean lengths for each year class of roach were derived from scales taken from 848 fish aged between 0+ and 10+. Results are shown in Table 4 and Figure 7. The Hickley and Dexter growth index was calculated to be 98.0 which is below the norm for the British Isles and was the lowest index of growth from roach so far recorded in the Norwich Division. Growth rate of roach is, however, moderate.

3.3.2 Dace

Mean lengths for each year class of dace were calculated from scales taken from 26 fish aged between 0+ and 5+. Results are shown in Table 4 and Figure 8. The Hickley and Dexter growth index was 105.6, indicating that the growth rate of dace in the River Deben is above the norm for the British Isles.

3.3.3 Pike

Mean lengths for each year class of pike were derived from scales taken from 72 fish aged between 0+ and 6+. Results are shown in Table 5 and Figure 9. The Hickley and Dexter growth index was calculated to be 76.0 indicating that the growth rate of pike in the River Deben is well below the norm for British Waters. This, however, is probably related to the small overall size of the river.

3.3.4 Perch

Mean lengths for each year class of perch were derived from scales taken from 148 fish aged between 0+ and 4+. Results are shown in Table 5 and Figure 10. The growth rate of perch in the Deben is moderate.

Fig 3

LENGTH FREQUENCY DISTRIBUTION AND
YEAR CLASS STRUCTURE OF ROACH FROM
THE RIVER DEBEN. DEC 1983 - MAR 1984.

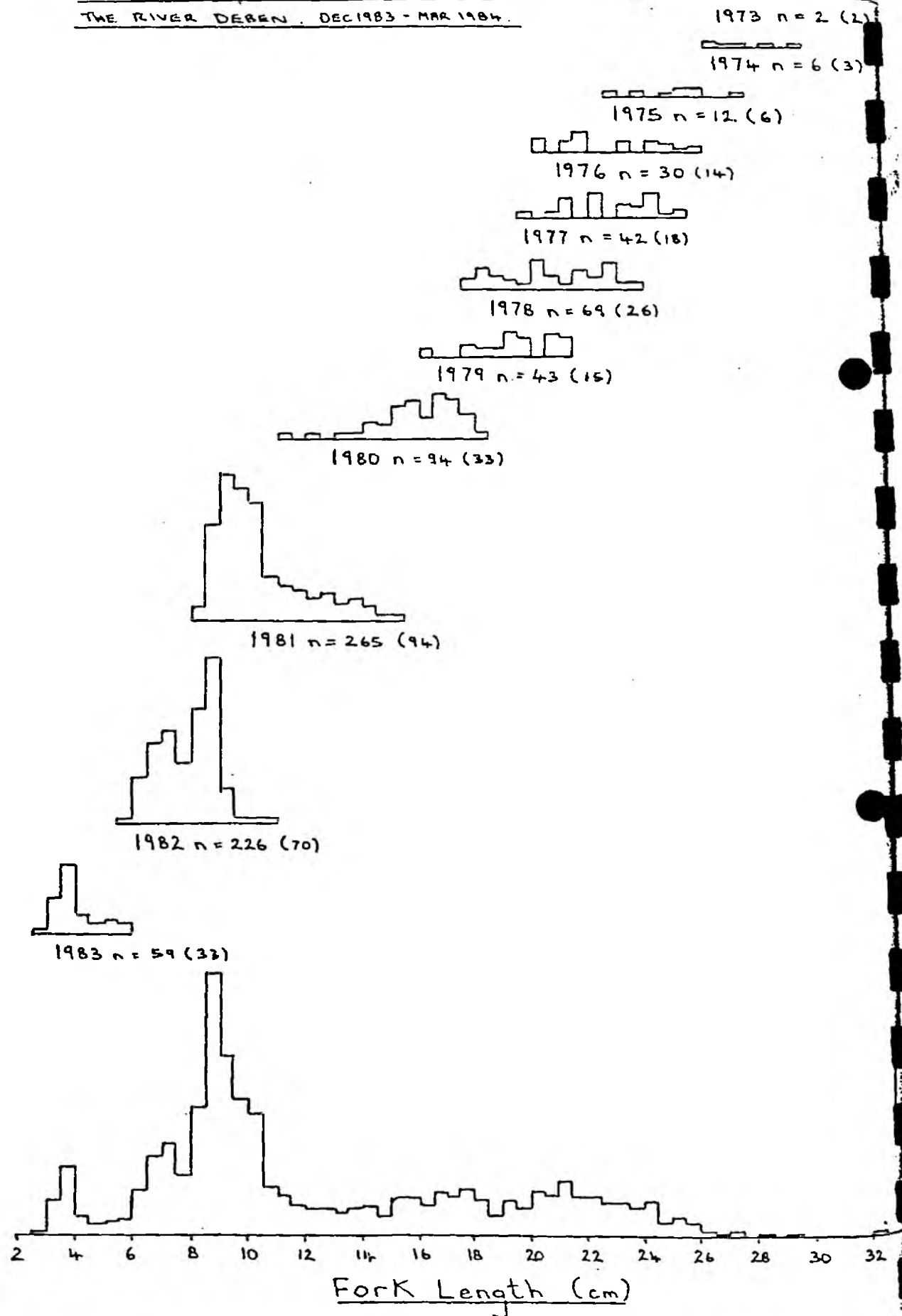
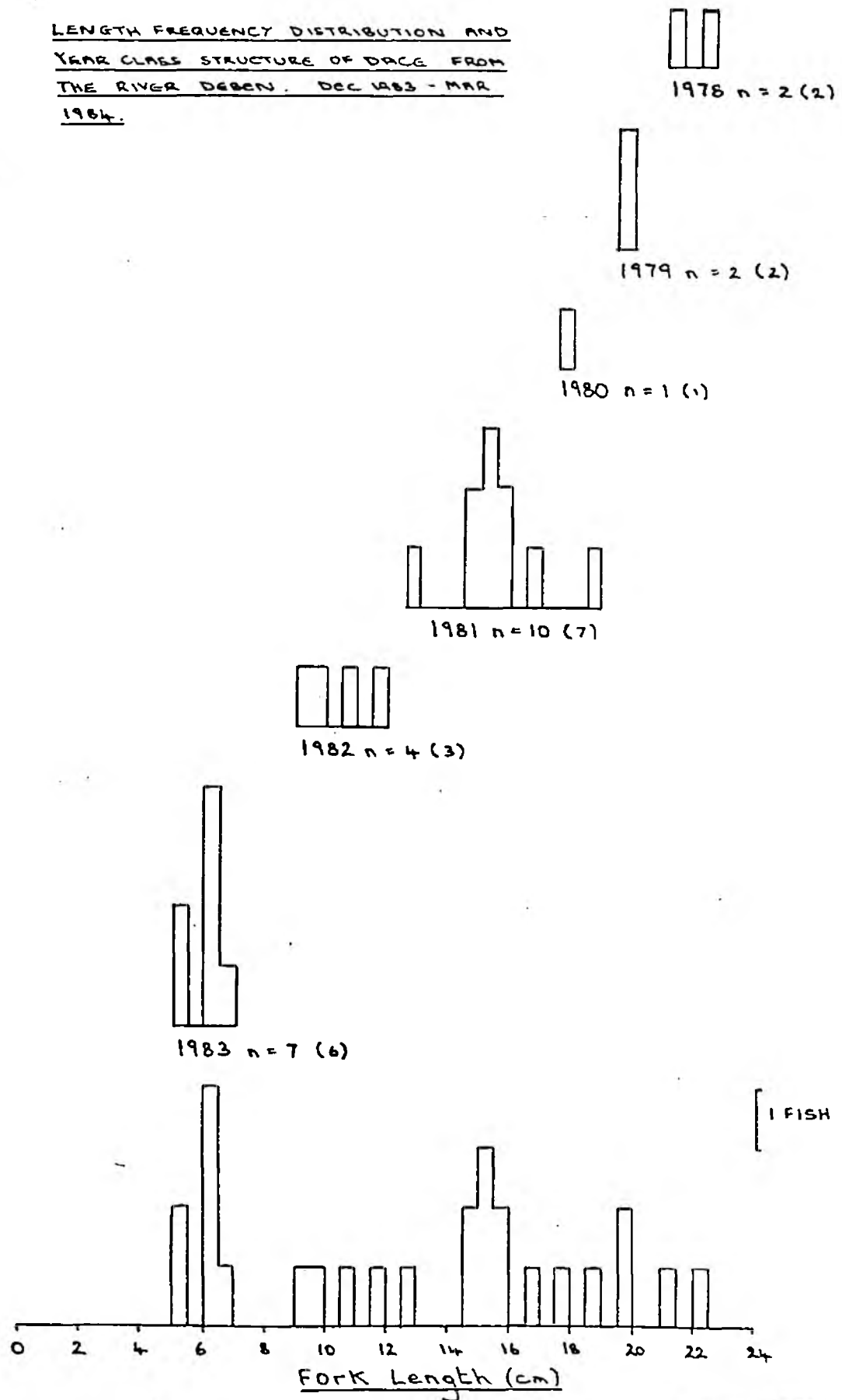


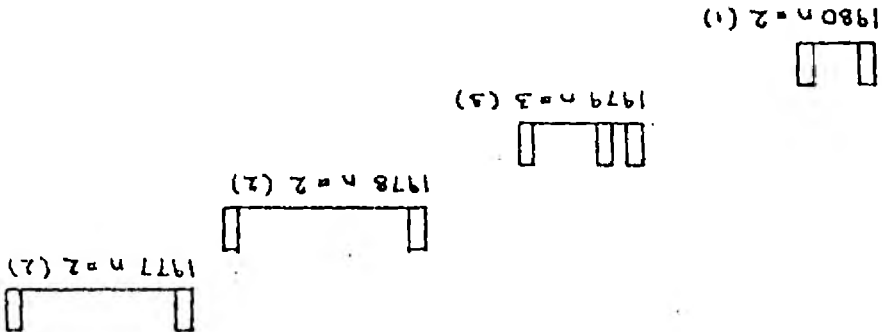
Fig 4

LENGTH FREQUENCY DISTRIBUTION AND
YEAR CLASS STRUCTURE OF DACE FROM
THE RIVER DEBEN. DEC 1983 - MAR
1984.



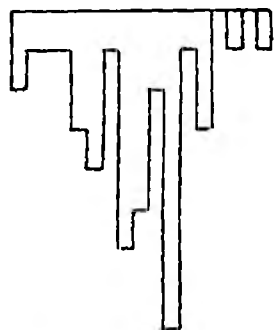
2 fish

1983 - MAR 1984
STRUCTURE OF PINE FROM THE RIVER BASIN, DEC
LENGTH FREQUENCY DISTRIBUTION AND YEAR CLASS





1983 n = 40 (33)



1982 n = 13 (12)



1981 n = 10 (10)

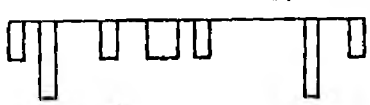


Fig 6

LENGTH FREQUENCY DISTRIBUTION AND YEAR CLASS
STRUCTURE OF PERCH FROM THE RIVER DEBEN
DEC 1983 - MAR 1984.

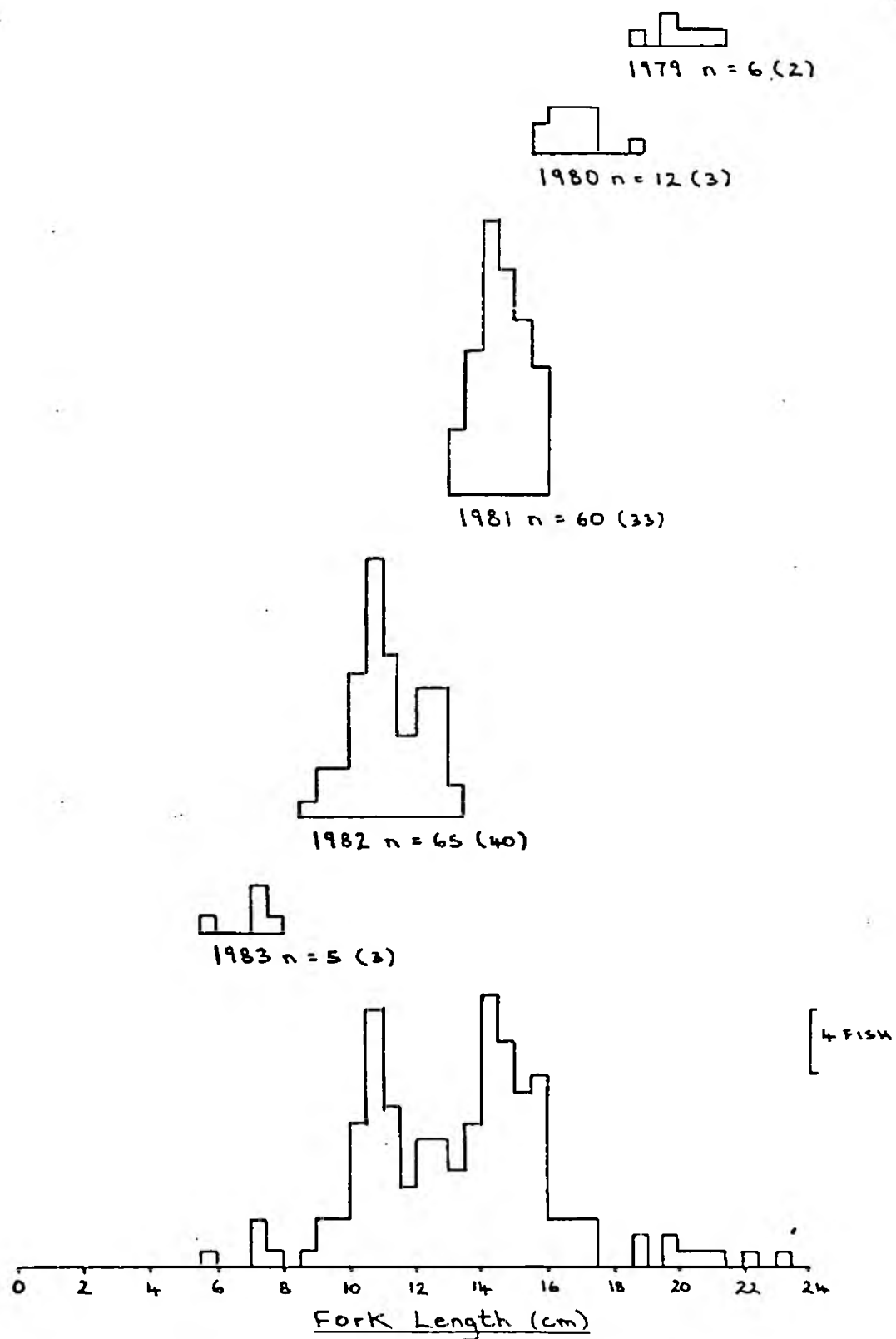


TABLE 4

River Deben Survey - January / March 1984

Growth in length of roach and dace

Roach

Age Years	Mean Fork Length cm	Standard Deviation cm	Sample Size
0+	4.06	0.75	59
1+	7.98	0.97	226
2+	10.39	1.53	265
3+	16.0	1.47	94
4+	19.52	1.42	43
5+	20.74	1.81	69
6+	22.90	1.49	42
7+	22.70	1.79	30
8+	24.88	1.34	12
9+	27.38	1.20	6
10+	28.05	6.01	2

Dace

0+	6.08	0.56	7
1+	10.42	1.10	4
2+	15.55	1.53	10
3+	17.80	0	1
4+	19.80	0	2
5+	21.80	0.71	2

Fig 7

Growth of roach from the River Deben. Dec 1983 - Mar 19

(95% confidence limits are shown for samples of 6 or more fish)

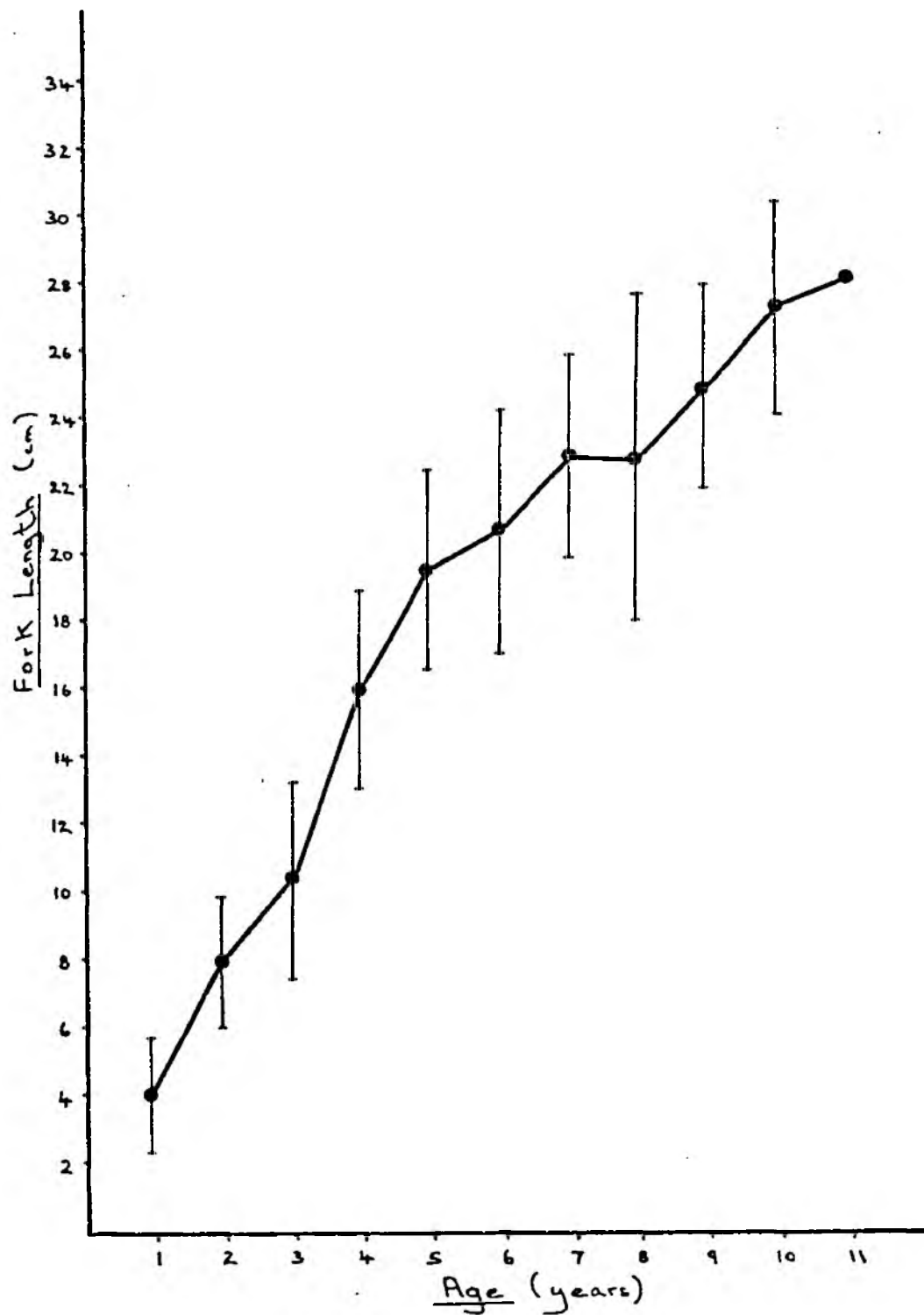


Fig 8

Growth of dace from the River Daben. Dec 1983 - Mar 1984
(95% confidence limits are shown for samples of 4 or more fish).

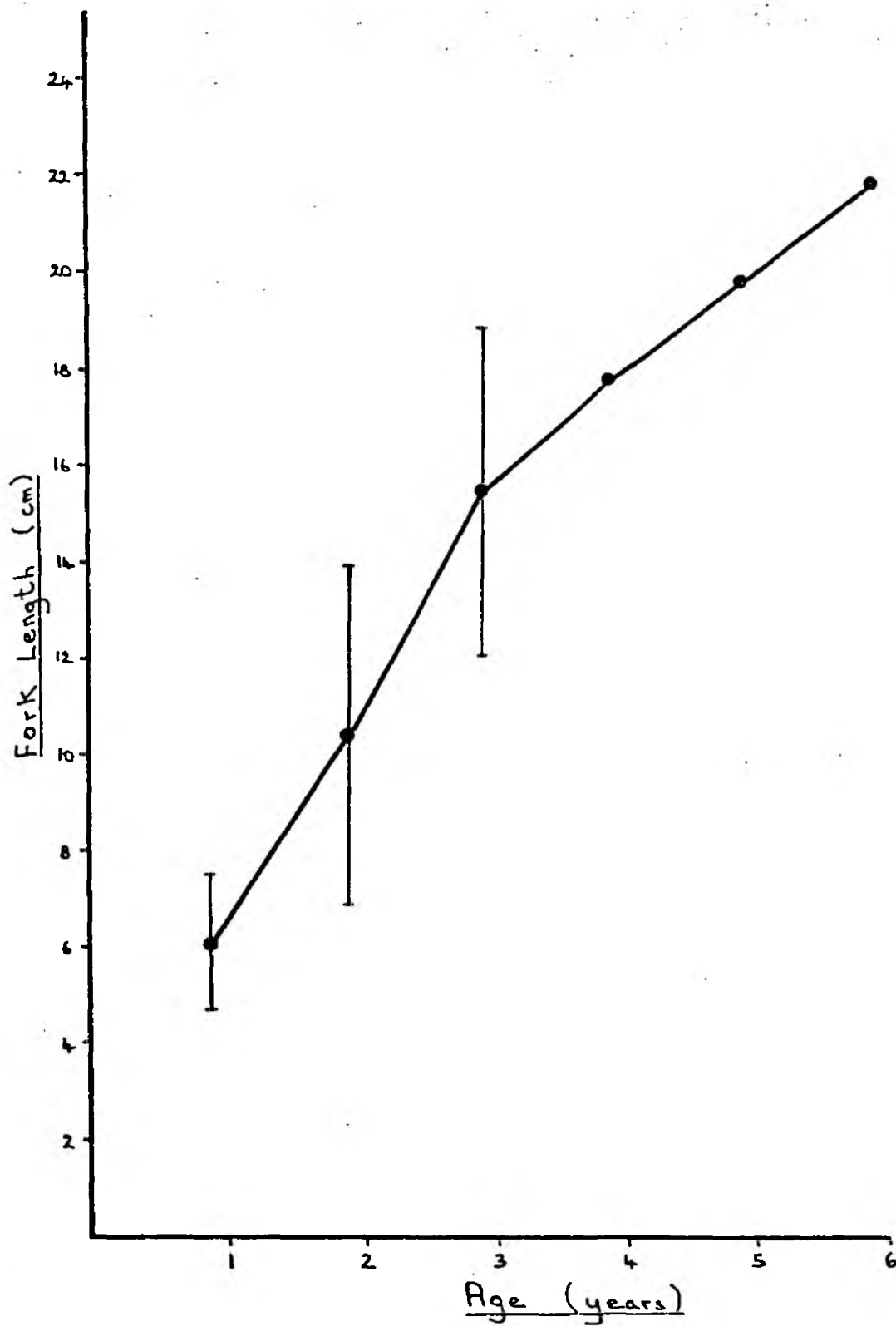


TABLE 5

River Deben Survey - January / March 1984Growth in length of pike and perchPike

Age Years	Mean Fork Length cm	Standard Deviation cm	Sample Size
0+	20.04	1.81	40
1+	28.84	2.54	13
2+	39.75	3.93	10
3+	48.30	1.41	2
4+	56.30	1.80	3
5+	64.80	4.24	2
6+	72.05	3.88	2

Perch

0+	7.10	0.76	5
1+	11.25	1.07	65
2+	14.71	0.66	60
3+	16.80	0.83	12
4+	20.13	0.88	6

Common Bream

1 fish aged 1+ 9.7 cm

Fig 9

Growth of pike from the River Deben. Dec 1983-Mar 1
(95% confidence limits are shown for samples of 3 or more)

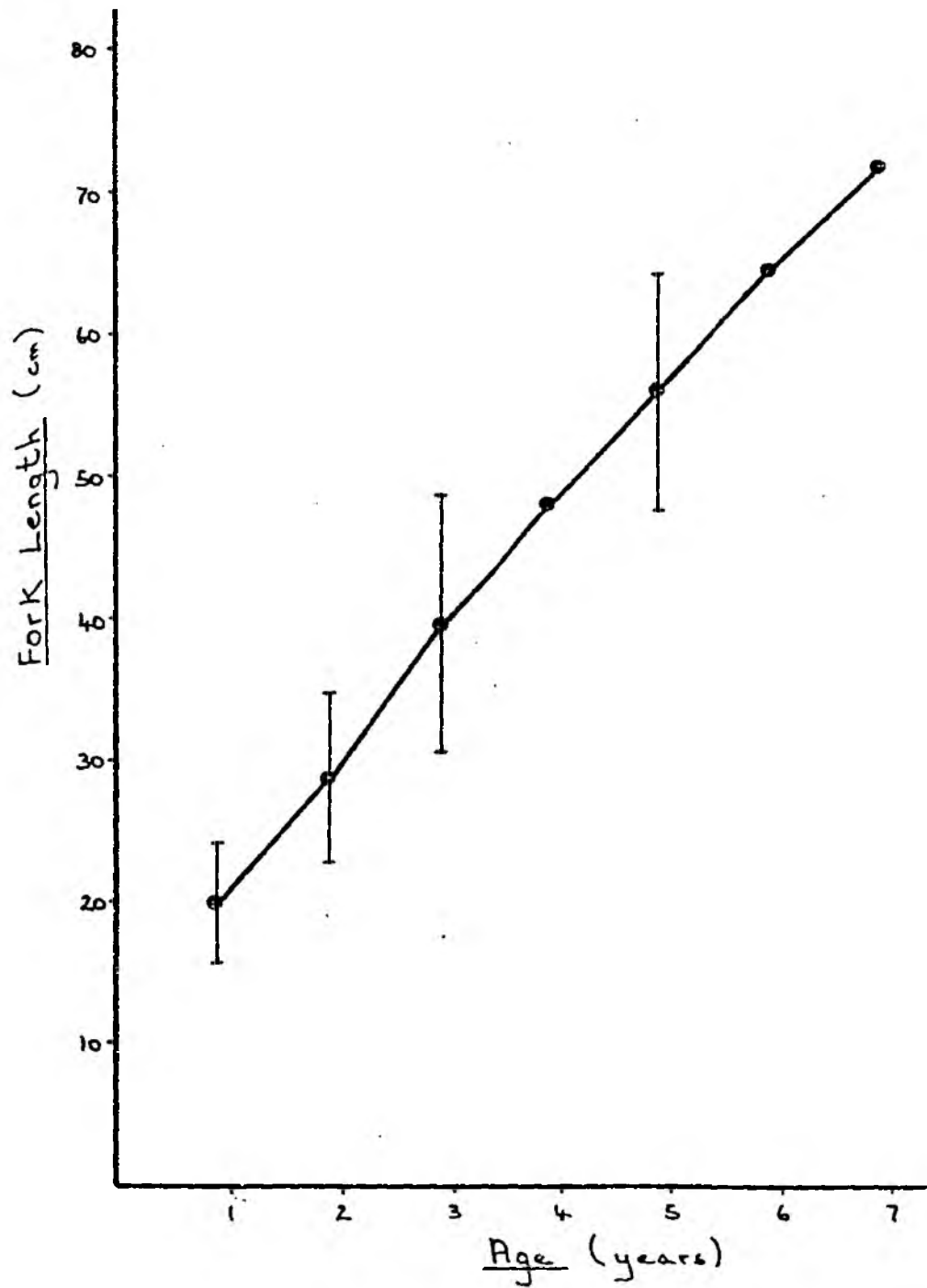
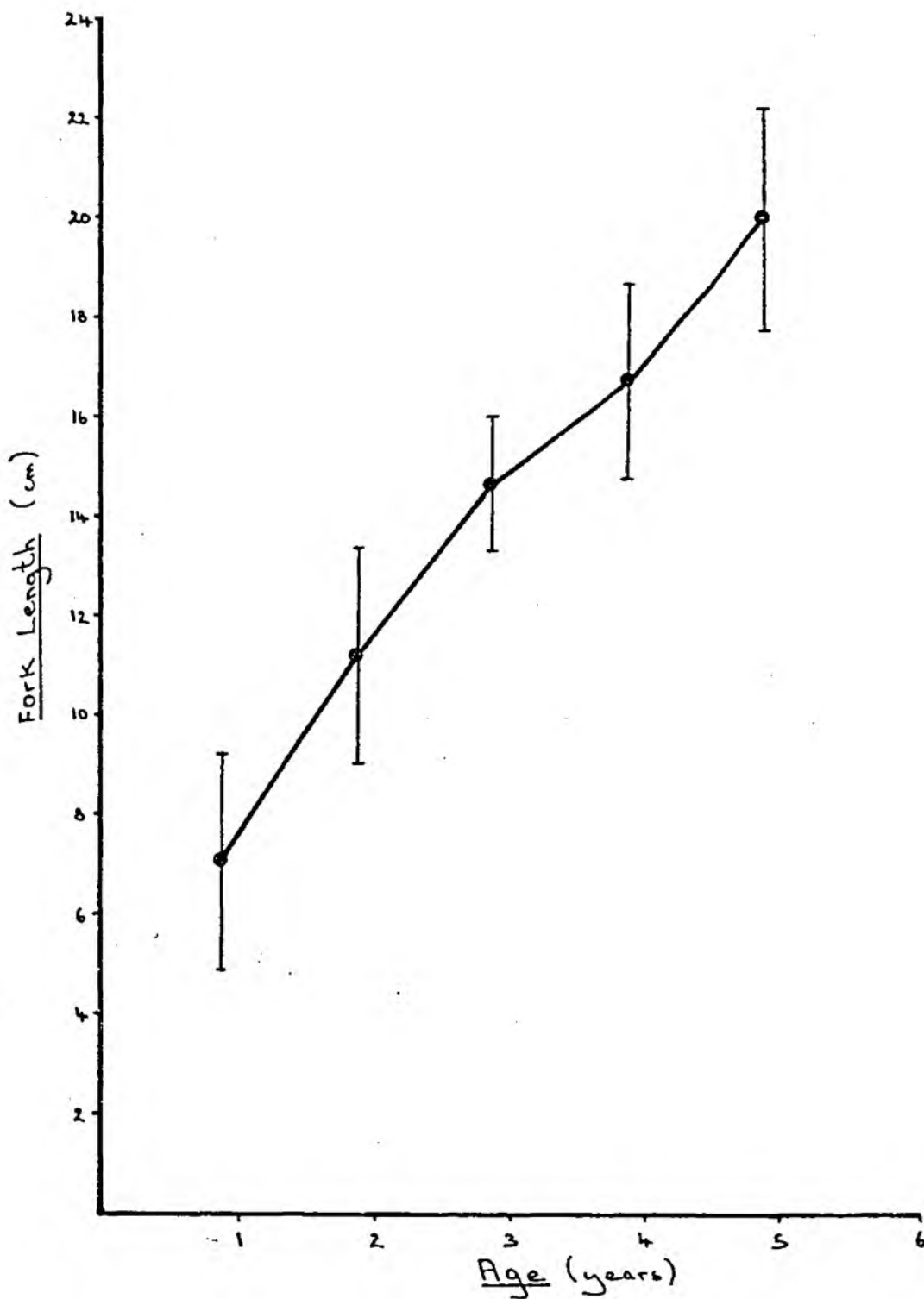


Fig 10

Growth of perch from the River Deben. Dec 1983 - Mar 1984
(95% confidence limits are shown)



3.3.5 Common bream

One fish only was caught aged 1+ (Table 5).

3.4 Fish Density

- 3.4.1 The density of each species of fish (no/m^2 of fish ≥ 10 cm) at each site is shown in Table 6. Where the number of fish caught was too small to permit an accurate estimate of density to be made, this value has been derived from the total catch and hence represents a minimum value.
- 3.4.2 Total fish density was low at 8 sites, moderate at 3 sites and high at one site (Site 11). The highest total density ($0.186/\text{m}^2$) occurred at site 11 and was composed almost entirely of small eels. Mean total fish density was $0.114/\text{m}^2$.
- 3.4.3 The density of roach was highest for roach at site 11 (Crettingham). The density of roach at this site ($0.186/\text{m}^2$) was moderate to high and was significantly higher than at any other site. The density of dace, perch and pike was low at all sites and the density of eels was low or moderate at all sites except site 11 where it was very high.

3.5 Fish Biomass

- 3.5.1 The biomass of each species of fish (gm/m^2 of fish ≥ 10 cm) caught at each site is shown in Table 7. Total fish biomass was low or very low at five sites (3, 4, 5, 6, 10 and 12); moderate at three sites (2, 8 and 9) and high or very high at three sites (1, 7 and 11). The mean total biomass was moderate ($12.587 \text{ gm}/\text{m}^2$).
- 3.5.2 The biomass of roach was very high at site 1, moderate at site 11 and low or very low at all other sites. Pike and eels contributed significantly to the overall biomass at all sites and apart from roach at sites 1 and 7 formed the major part of the fish biomass in the river (see Figure 2).

4. DISCUSSION

- 4.1 This survey has shown that over most of the length of the non-tidal River Deben, the fish population is dominated by eels and pike. Other species which are of more interest to anglers, i.e. roach, dace and perch are present throughout the river but - except at one or two specific sites - are only present in low numbers.
- 4.2 By far the greatest density and biomass of roach occurred at the upstream limit of the survey at Crettingham. These fish clearly spawned successfully in the river and large numbers of 1+ and 2+ fish occurred in the samples taken at Brandeston (Site 2). Why the numbers of roach were not greater at most of the other sites sampled, was not clear. Despite the presence of eels and pike at all sites sampled it was not thought likely that the roach population was subject to over predation by these species. At Site 7 a large shoal of roach had formed under the A12 road bridge.

TABLE 6

River Deben Survey - January / March 1984

Density (no/m²) of fish $\geq$ 10 cm present at each site

Species	Site												
	1	2	3	4	5	6	7	8	9	10	11	12	Mean*
Pike	0.010	0.005	0.004*	0.005	0.001*	0.001	0.006*	0.016	0.008*	0.001*	0.020	0.001*	0.007
Roach	0.186	0.076				0.003*	0.071*		0.007*	0.001*			0.029
Dace							0.003*		0.007		0.002*	0.001*	0.001
Perch		0.022*	0.010	0.024	0.012*	0.004*	0.008*		0.006*	0.004*	0.034	0.006*	0.011
Eel	0.014	0.057	0.003*	0.008*	0.011*	0.005*	0.079	0.080	0.038*	0.006*	0.457*	0.038*	0.066
TOTAL. *	0.210	0.160	0.017	0.037	0.024	0.013	0.167	0.096	0.066	0.012	0.513	0.046	0.114

* Minimum estimate based on total catch

TABLE 7

River Deben Survey - January / March 1984

Biomass (gm/m²) of fish $\geq$ 10 cm present at each site

Species	Site												
	1	2	3	4	5	6	7	8	9	10	11	12	Mean*
Pike	3.885	2.158	0.623*	1.349	0.055*	0.065	1.010*	4.158	9.284*	0.032*	7.319	0.061*	2.500
Roach	23.179	3.335				0.174*	11.579*		0.145*	0.046*			3.205
Dace							0.167*		0.460*		0.030*	0.177*	0.070
Perch		0.707*	0.325	1.095	0.690*	0.190*	0.466*		0.311*	0.066*	3.202	0.499*	0.629
Eel	2.552	8.907	0.366*	1.361*	1.118*	0.542*	8.445	7.384	3.526*	0.523	37.211	2.266	6.181
TOTAL *	29.616	15.107	1.314	3.805	1.863	0.971	21.667	11.542	13.726	0.667	47.762	3.003	12.587

* Minimum estimate based on total catch

- 4.3 The roach which are present in the river showed a normal year class structure with good survival up to 10+. The 1981 year class particularly strong and should serve to maintain the numbers of lar fish in the river as the year class grows on. The growth rate of ro was somewhat slower than that recorded from other waters within Norwich Division but was nevertheless quite adequate and there was evidence of the presence of stunted fish.
- 4.4 Dace have a very limited distribution in the river brought about principally by the lack of flow over most of the river's length. It is only in the faster water downstream of mills that this species exists in any numbers. Perch, on the other hand, occurred at 10 of the 12 sites sampled. None of the fish caught were particularly big, but the population contained fish aged up to 4+ and the 1+ and 2+ year classes were well represented. There was, however, some evidence of "perch disease" in the fish caught and it is likely that this was reason for the limited number of larger perch in the river.
- 4.5 Pike (20%) and eels (49%) together formed about 69% of the biomass of fish over 10cm length. However, despite this apparent dominance the actual numbers of pike and eels present were not excessive and the dominance in Tables 6 and 7 reflects the low numbers of other species present rather than excessive numbers of pike and eels. It is recommended that one or more off river supplementation units (ORSU's) be developed on the upper and middle reaches of this river as soon as practicable.

5. SUMMARY AND CONCLUSIONS

- 5.1 Twelve sites were sampled between Crettingham and Melton.
- 5.2 A total of 1927 fish representing ten species were caught. Eels formed the dominant component of the overall biomass of fish $\geq 10\text{cm}$ (49%) and pike represented 20% of the biomass. Roach was the dominant cyprinid (26% of the biomass).
- 5.3 Total fish density was low at 8 sites, moderate at 2, 3 sites and high at one site. Mean total fish density was low ($0.114/\text{m}^2$).
- 5.4 Total fish biomass was low or very low at 5 sites, moderate at 3 sites and high or very high at 3 sites. Mean total biomass was moderate ($12.587\text{gm}/\text{m}^2$). (Class B)
- 5.5 Roach was the dominant cyprinid in the river and the population contained fish aged between 0+ and 10+. Good year classes occurred in 1978 and 1981 and survival between year classes was good. The roach population was however limited in its distribution, with most fish occurring in the Crettingham to Brandeston stretch and over a fairly short length downstream of Wickham Market. The growth rate of roach was moderate.
- 5.6 The dace population was very limited, only 25 fish aged between 0+ and 5+ were caught.
- 5.7 Pike occurred at all sites with fish aged between 0+ and 6+ being caught. The growth rate of pike was rather slow, probably reflecting the small size of the river as a whole.

- 5.8 Perch occurred at 10 sites and were aged between 0+ and 4+. The distribution and success of this species in the river is probably influenced by the occurrence of "perch disease".
- 5.9 The most significant feature of the survey was the limited distribution of cyprinids especially roach in a river which appeared to be ideally suited to this species.
- 5.10 It is recommended that one or more ORSU's are established adjacent to the upper and middles reaches of the river as soon as possible.

Appendix 1

REPORT COVERS PERIOD(S) FROM 01/04/83 TO 31/03/84

NO. OF SAMPLES - 12

SAMPLE POINT - R04BFDEB070
SAMPLE TYPE - BFR.DEBEN, WHITE BRIDGE, LOUDHAM
RIVER/STREAM WATER

GRID REF - TM 31500 55300

DETERMINAND	UNITS	NO. OF VALUES	MEAN VALUE (OR RANGE)	STD. DEV.	95%ILE (OR RANGE)	MINIMUM	MAXIMUM	MEDIAN
PH	0061 PH UNITS	12 0	8.0083	0.188	8.3788- 7.6377	7.8	8.4	7.95
COND 20 C	0062 USIE/CM	12 0	929.5833	81.894	1070.0948 (LOG NORMAL)	795.0	1040.0	915.0
SS 105 C	0135 MG/L	12 0	10.4166	13.787	32.8591 (LOG NORMAL)	2.0	51.0	4.5
TEMP C	0076 CEL	12 0	11.25	6.1809	22.9497 (LOG NORMAL)	3.0	20.0	12.0
BOD+ATU T	0085 MG/L O	12 0	2.1083	0.5299	3.0722 (LOG NORMAL)	1.4	3.1	2.1
AMMONIA N	0111 MG/L N	12 2<	0.2033-	>0.176	0.5312 (LOG NORMAL)	<0.05	0.65	0.195
NITRITE N	0118 MG/L N	11 0	0.1272	0.0684	0.2567 (LOG NORMAL)	0.05	0.25	0.1
NITRATE N	0117 MG/L N	10 0	8.2	6.9729	21.0191 (LOG NORMAL)	2.0	23.0	5.0
T.O.N AS N	0116 MG/L N	1 0	14.0	0.0	14.0 (ONLY VALUE)	14.0	14.0	14.0
ALK CAC03	0162 MG/L CAC03	2 0	300.0	18.3847	313.0 (MAX VALUE)	287.0	313.0	300.0
HARD TOTAL	0158 MG/L CAC03	1 0	408.0	0.0	408.0 (ONLY VALUE)	408.0	408.0	408.0
CALCIUM	0241 MG/L CA	1 0	155.0	0.0	155.0 (ONLY VALUE)	155.0	155.0	155.0
MAGNESIUM	0237 MG/L MG	2 0	5.5	0.7071	6.0 (MAX VALUE)	5.0	6.0	5.5
P ORTH DIS	0191 MG/L P	10 0	0.335	0.2333	0.7735 (LOG NORMAL)	0.05	0.8	0.275
CHLORIDE	0172 MG/L CL	12 0	58.25	8.7086	73.5712 (LOG NORMAL)	44.0	72.0	61.0
DO FIELD %	9219 % SATN	12 0	93.75	16.8205	68.8546 (5%ILE)	68.0	132.0	90.0

*** STATISTICS FOR ANOTHER SAMPLE POINT ON NEXT PAGE ***

Appendix 1

REPORT TYPE 712 - PART 3 - STATISTICAL SUMMARY REPORT

REPORT COVERS PERIOD(S) FROM 01/04/83 TO 31/03/84

NO. OF SAMPLES - 1

SAMPLE POINT - R04BFDEBQ23
SAMPLE TYPE - BF

RIVER DEBEN CRETINGHAM BRIDGE
RIVER/STREAM WATER

GRID REF - TM 22700 60600

DETERMINAND	UNITS	NO. OF VALUES	MEAN VALUE(OR RANGE)	STD.DEV.	95%ILE(OR RANGE)	MINIMUM	MAXIMUM	MEDIAN
PH	0061 PH UNITS	1 0	8.0	0.0	8.0 (ONLY VALUE)	8.0	8.0	8.0
COND 20 C	0062 USIE/CM	1 0	940.0	0.0	940.0 (ONLY VALUE)	940.0	940.0	940.0
SS 105 C	0135 MG/L	1 0	7.0	0.0	7.0 (ONLY VALUE)	7.0	7.0	7.0
TEMP C	0076 CEL	1 0	18.0	0.0	18.0 (ONLY VALUE)	18.0	18.0	18.0
BOD+ATU T	0085 MG/L O	1 0	2.8	0.0	2.8 (ONLY VALUE)	2.8	2.8	2.8
AMMONIA N	0111 MG/L N	1 0	0.35	0.0	0.35 (ONLY VALUE)	0.35	0.35	0.35
NITRITE N	0118 MG/L N	1 0	0.2	0.0	0.2 (ONLY VALUE)	0.2	0.2	0.2
NITRATE N	0117 MG/L N	1 0	4.0	0.0	4.0 (ONLY VALUE)	4.0	4.0	4.0
P ORTH DIS	0191 MG/L P	1 0	0.6	0.0	0.6 (ONLY VALUE)	0.6	0.6	0.6
CHLORIDE	0172 MG/L CL	1 0	62.0	0.0	62.0 (ONLY VALUE)	62.0	62.0	62.0
DO FIELD X	9219 % SATN	1 0	108.0	0.0	108.0 (ONLY VALUE)	108.0	108.0	108.0

*** STATISTICS FOR ANOTHER SAMPLE POINT ON NEXT PAGE ***

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Appendix 1

REPORT TYPE 712 - PART 3 - STATISTICAL SUMMARY REPORT

REPORT COVERS PERIOD(S) FROM 01/04/83 TO 31/03/84

NO. OF SAMPLES - 13

SAMPLE POINT - R04BFDEB030
SAMPLE TYPE - BF

R. DEBEN, BRANDESTON BRIDGE, CRETINGHAM
RIVER/STREAM WATER

GRID REF - TM 23800 60300

DETERMINAND	UNITS	NO. OF VALUES	MEAN VALUE (OR RANGE)	STD. DEV.	95%ILE (OR RANGE)	MINIMUM	MAXIMUM	MEDIAN
PH	0061 PH UNITS	13 0	7.923	0.1012	8.1225- 7.7236	7.7	8.1	7.9
COND 20 C	0062 USIE/CM	13 0	978.0769	60.2956	1080.3054 (LOG NORMAL)	895.0	1080.0	970.0
SS 105 C	0135 MG/L	13 0	12.0769	12.0862	33.6013 (LOG NORMAL)	5.0	41.0	7.0
TEMP C	0076 CEL	13 0	10.4615	4.9094	19.7279 (LOG NORMAL)	4.0	19.0	11.0
BOD+ATU T	0085 MG/L O	13 0	2.0846	0.7278	3.4381 (LOG NORMAL)	0.7	3.9	2.0
AMMONIA N	0111 MG/L N	13 2<	0.5776- 0.5853	>0.6235	1.6724 (LOG NORMAL)	<0.05	2.0	0.31
NITRITE N	0118 MG/L N	12 1<	0.1708- 0.175	>0.1685	0.4749 (LOG NORMAL)	<0.05	0.6	0.1
NITRATE N	0117 MG/L N	11 0	8.909	6.4723	21.0313 (LOG NORMAL)	2.0	20.0	8.0
T.O.N AS N	0116 MG/L N	1 0	18.0	0.0	18.0 (ONLY VALUE)	18.0	18.0	18.0
ALK CAC03	0162 MG/L CAC03	2 0	304.0	15.5563	315.0 (MAX VALUE)	293.0	315.0	304.0
HARD TOTAL	0158 MG/L CAC03	1 0	420.0	0.0	420.0 (ONLY VALUE)	420.0	420.0	420.0
CALCIUM	0241 MG/L CA	1 0	160.0	0.0	160.0 (ONLY VALUE)	160.0	160.0	160.0
MAGNESIUM	0237 MG/L MG	2 0	5.5	0.7071	6.0 (MAX VALUE)	5.0	6.0	5.5
P ORTH DIS	0191 MG/L P	11 1<	0.3863- 0.3909	>0.3064	0.9578 (LOG NORMAL)	<0.05	1.0	0.3
CHLORIDE	0172 MG/L CL	13 0	59.8461	9.2542	76.1586 (LOG NORMAL)	45.0	75.0	60.0
DO FIELD X	9219 % SATN	13 0	90.1538	16.4967	65.7944 (5%ILE)	72.0	130.0	88.0

*** STATISTICS FOR ANOTHER SAMPLE POINT ON NEXT PAGE ***

Appendix 1

DATE PRODUCED 22/05/84 ANGLIAN WATER AUTHORITY - CHEMICAL DATA PROCESSING SYSTEM

PAGE NO.

OUTPUT FROM GENERAL DATA ABSTRACTION FACILITY

REPORT TYPE 712 - PART 3 - STATISTICAL SUMMARY REPORT

REPORT COVERS PERIOD(S) FROM 01/04/83 TO 31/03/84

NO. OF SAMPLES - 1

SAMPLE POINT - R04BFDEB060
SAMPLE TYPE - BF

R. DEBEN, WICKEN MARKET BRIDGE
RIVER/STREAM WATER

GRID REF - TM 30600 56500

DETERMINAND	UNITS	NO. OF VALUES	MEAN VALUE(OR RANGE)	STD.DEV.	95%ILE(OR RANGE)	MINIMUM	MAXIMUM	MEDIAN
PH	0061 PH UNITS	1 0	8.0	0.0	8.0 (ONLY VALUE)	8.0	8.0	8.0
COND 20 C	0062 USIE/CM	1 0	1020.0	0.0	1020.0 (ONLY VALUE)	1020.0	1020.0	1020.0
SS 105 C	0135 MG/L	1 0	5.0	0.0	5.0 (ONLY VALUE)	5.0	5.0	5.0
TEMP C	0076 CEL	1 0	8.0	0.0	8.0 (ONLY VALUE)	8.0	8.0	8.0
BOD+ATU T	0085 MG/L O	1 0	2.8	0.0	2.8 (ONLY VALUE)	2.8	2.8	2.8
AMMONIA N	0111 MG/L N	1 0	0.3	0.0	0.3 (ONLY VALUE)	0.3	0.3	0.3
NITRITE N	0118 MG/L N	1 0	0.05	0.0	0.05 (ONLY VALUE)	0.05	0.05	0.05
NITRATE N	0117 MG/L N	1 0	9.0	0.0	9.0 (ONLY VALUE)	9.0	9.0	9.0
P ORTH DIS	0191 MG/L P	1 0	0.3	0.0	0.3 (ONLY VALUE)	0.3	0.3	0.3
CHLORIDE	0172 MG/L CL	1 0	66.0	0.0	66.0 (ONLY VALUE)	66.0	66.0	66.0
DO FIELD %	9219 % SATN	1 0	116.0	0.0	116.0 (ONLY VALUE)	116.0	116.0	116.0

*** STATISTICS FOR ANOTHER SAMPLE POINT ON NEXT PAGE ***

REGIONAL FISH DISEASES UNIT
HEALTH CHECKS ON COARSE FISH FROM
THE RIVER DEBEN, SUFFOLK

Introduction

In conjunction with the survey of fish populations on the River Deben, samples of coarse fish from selected sites were brought to the Fish Diseases Unit for general health examinations and assessment of the parasite burden.

Summary

A total of 30 fish comprising 3 species were examined; samples were submitted from two sites - Brandeston (Perch, pike, roach), and Crettisham (roach only). Upon inspection, most fish submitted appeared to be in good condition and no evidence of any major infectious disease problem was indicated.

Parasite species recovered were consistent with those normally associated with the hosts examined; no unusual species were recorded and generally the levels of infestation did not present a disease aspect. Dactylogyrus infections of the gills on roach from Crettisham were heavy and this may have resulted in a limited gill pathology (increased mucus, hyperplasia, congestion), although a similar irritant effect can be caused by poor water quality. Characteristic Ligula pathology was evident in a single infected roach from Brandeston.

Methods

Fish were brought back to the laboratory alive, and examined as soon as possible after arrival. A brief assessment was made of the live condition of the sample, after which fish were sacrificed and examined post-mortem. Gross external and internal examinations were made and a representative selection of tissues taken for standard histological and microbiological investigations; all tissues showing abnormalities or lesions were taken. In addition, parasites were noted and collected/processed for identification.

Results

Fish were submitted from two sites - these, and the species examined, with morphometric and sex ratio data are shown in Table 1.

The results of parasitological investigations are shown in Table 2, for the parasite species recovered, with the respective host species, sites and levels of infestation. Parasites are listed according to taxonomic group.

Histopathological entities, macro - and microscopic, are presented in Table 3.

In general, no significant parasites or histopathological entities were found in the fish examined, the exceptions being as follows:-

Ligula intestinalis - The presence of a single larval plerocercoid in the body cavity of the single roach from Brandeston resulted in a marked compression of the visceral organs, slight proliferation of fibrous connective tissue, and traumatic damage to visceral organs, in particular the liver.

Gill Monogenea - Roach from Crettisham harboured Dactylogyrus similis (87% infection) and Diplozoon paradoxum (13% infection) on the gills. In the

case of the former species, the worm burden was high - 10 fish each harbouring over 100 parasites.

Gill lesions - Increased mucus production over the gill filaments was evident in 7 of 15 roach from Crettisham; gill aneurysms and slight hyperplasia of the respiratory epithelium was noted in 7, and 5 fish respectively from the same site. These lesions may reflect the high worm burden noted above but may also be indicative of a response to irritation arising from poor water quality.



Dr. C.N. TOMLINSON
25/4/84
H407/4

Table 1

Sampling sites, fish species examined, with morphometric and sex data

Site	Fish Species (Number examined)	Length Range (cm)	Weight Range (g)	Sex of fish		
				male	female	undetermined
Brandeston	Perch (12)	8.9 - 13.8	9.7 - 43.8	5	5	2
	Pike (2)	15.2 - 21.0	26.4 - 67.7	1	1	-
	Roach (1)	5.0	3.7	-	-	1
Crettisham	Roach (15)	11.5 - 18.3	35.6 - 110.7	8	7	-

Table 2

List of Parasite and Host Species, with sites and levels of infestation

PARASITE	HOST SPECIES (Number infected)	SITE AND LEVEL OF INFESTATION
PROTOZOA		
<u>Trichodina</u> sp (Ciliata)	Roach (3)	Gill lamellae - light infection
Unidentified Flagellate (?) <u>Cryptobia</u>	Pike (1)	Gill lamellae - light infection
MYXOZOA		
<u>Myxobolus</u> sp	Roach (1)*	Gill filaments - spores with
<u>Henneguya psorospermica</u>	Pike (1)	Gill filaments - spores with
<u>Chloromyxum</u> sp	Pike (1)	Cysts in renal interstitial several cysts seen in section
<u>Henneguya</u> sp	Perch (5)	Cysts on body surface, up to fish
<u>Myxidium rhodei</u>	Roach (2)	Cysts in renal interstitial several cysts seen in section
PLATYHELMINTHES		
Monogenea		
<u>Dactylogyrus similis</u>	Roach (13)	Gill filaments - 22 to 178 worms
<u>Tetraonchus monenteron</u>	Pike (2)	Gill filaments - 2 and 15 worms
<u>Diplozoon paradoxum</u>	Roach (2)	Gill filaments - one worm per
Digenea		
<u>Allocreadium isoparum</u>	Roach (1)	Intestine - 5 worms present
<u>Bunodera luciopercae</u>	Perch (11)	Intestine - 10 to over 200 worms
<u>Diplostomum spathaceum</u>	Roach (14)	Eye lens - 3 to 62 stages per
(metacercarial larval stages)	Pike (1)	" " - 2 stages present
	Perch (1)	" " - 1 stage present
Cestoda		
<u>Ligula intestinalis</u> (plerocercoid larva)	Roach (1)*	Body cavity - 1 plerocercoid
<u>Caryophyllaeides fennica</u>	Roach (2)	Intestine - 2 and 4 worms present
Nematoda		
<u>Camallanus lacustris</u>	Perch (7)	Intestine 1 to 5 worms per
Encysted nematodes	Pike (1)	Several encysted forms in section gut wall
Acanthacephala		
<u>Acanthacephalus lucii</u>	Perch (4)	Intestine - 1 to 7 worms per
Fungi		
(?) <u>Saprolegnia</u> sp	Roach (2)	Gill filaments - light hyphal

*Single roach from Brandeston site

Table 3

Histopathological entities (macro and microscopic) from River Deben fish

Observation	Fish species and number affected
Gills - palor (macro)	Perch (1), Roach (3)
- aneurysms	Roach (7), Pike (1)
- slight hyperplasia	Roach (5), Pike (1)
- increased mucus production	Roach (7)
Haemorrhagic skin lesions	
- on head	Pike (1), Roach (1)
- on body lateral surfaces	Roach (2), Perch (3)
Tail erosion	Roach (1), Perch (2)
Descaling	Perch (4)
Increased mucus production	Perch (4)
Liver - palor (macro)	Roach (1), Perch (1)
- moderate hepatocytic vacuolation	Roach (1), Perch (1)
Pancreas - granuloma (?) parasitic	Roach (1)
Spleen - congestion	Roach (1)
- prominent lymphoid centres	Roach (1)
Heart - congestion	Roach (1)
- oedema	Perch (1), Roach (1)
- leucocytic infiltration	Perch (1)
Kidney - palor (macro)	Roach (1)
- tubular degeneration	Roach (1)
Intestine - congested wall	Perch (1)
Generalised traumatic damage to visceral organs and gonads.	Roach (1)*

* Single roach specimen from Brandeston site

RIVER DEBEN (CRETINGHAM -> Melton): Biological Quality.

Details of Biological Survey.

A total of five sites on the River Deben were investigated during the summer of 1984. Invertebrate and macrophyte samples were taken at all sites to provide information on the quality of the river with regard to fishery potential. At two of the sites, it was possible to take quantitative 'surber' samples. These samples were processed and invertebrate biomass calculated.

Time was insufficient to visit all the ten fishery survey sites but the five sites chosen covered representative stretches of the river.

Results.

1) Brandeston Ford (TM 251601) to Wickham Mill (TM 306 566).

The River Deben from Brandeston Ford to Wickham Mill appears to be of good biological quality. It is very clear that this stretch of river has not been affected by the pollution incident of May 1984, which killed fish in the Upper Deben.

At Brandeston Ford, where both slow and fast flowing areas were sampled, a diverse fauna was dominated by Baetid mayflies and blackfly larvae (simuliidae). Minute cased caddis larvae of the family Hydroptilidae were also common. Macrophytes were well represented with Sparganium emersum dominant in the slower flowing area upstream of the ford.

Further downstream at Letheringham Bridge, a biotic score of 74 was calculated, indicating a slightly inferior diversity of invertebrates. This was perhaps accentuated by the relative uniformity of the habitat. This consisted of slow flowing water supporting very dense growths of the water lily, Nuphar lutea. Nevertheless, the crustaceans, Crangonyx pseudogracilis and Gammarus pulex, and the mayfly Baetis sp were present in good numbers. Typical slow water species were also present, including Notonecta glauca, Hydrometra sp and Corixidae.

Upstream of Wickham Mill, flow was again extremely slow and supported rich stands of the macrophytes, Nuphar lutea, Ceratophyllum demersum, and Callitriche sp. Emergent vegetation was also very abundant and these combined to support a very rich invertebrate fauna. Representatives of five families of molluscs were recorded, whilst the still water mayfly, Cloeon dipterum was abundant. The dragonflies, Aeshna grandis, Sympe trum sp, Ischnura elegans and coenagrion sp were also present.

2) Eyke Ford to Ufford Bridge.

These two sites differed from the previous two sites in that flow was fairly brisk over a shallow gravel substrate. As a result mayflies and caddis flies again became important, although molluscs were calculated to form the highest percentage of biomass at both sites. The total biomass values of 6.2 g/m² for Eyke Ford and 10.3 g/m² for Ufford Bridge compare well with results calculated for the R. Wensum and R. Yare, suggesting a similar invertebrate standing crop.

Macrophyte growth at these two sites, however, was very poor and at Eyke Ford only a few clumps of Potamogeton pectinatus were present. At Ufford Bridge, macrophytes were again scarce although mats of filamentous algae were quite common.

Contd./.....

Contd/.....2.....

Summary.

The River Deben from Cretingham to Melton appears to be in generally good biological condition. In its slower flowing areas macrophyte growth is healthy and supports a diverse fauna, whilst in faster flowing areas the fauna is still rich despite poor growth of macrophytes.

Estimates of invertebrate standing crop for the two shallow water sites are comparable to those previously calculated for the River Wensum and River Yare.

TABLE (1).

RIVER DEBEN.

SITE	GRID REFERENCE	NO OF FAMILIES.	BMWP SCORE.
BRANDESTON FORD	TM 252 601	23	101
LEATHERINGHAM BRIDGE	TM 279 584	17	74
U/S WICKHAM MILL	TM 306 566	28	113
LOW FARM FORD	TM 313 527	24	118
UFFORD BRIDGE	TM 301 519	22	102

1. The scoring system. B.M.W.P.

Score	Water Quality in terms of Organic Pollution
25	Poor
26 - 50	Moderate
51 - 100	Good
101 - 150	Very good
150	Exceptional

This score was developed by the Biological Methodology Working Party. Essentially it assigns a score of 1 - 10 to each taxonomic family depending on its tolerance to organic pollution. The score is then summed for each taxonomic group for each site.

Clearly, the physical nature and size of river will modify the expected score. However, in general terms the above values serve as useful guidelines.

RIVER DEBEN SPECIES LIST (SUMMER 1984)

1. Invertebrates.

Oligochaete Worms.

Tubificidae

Lumbricidae

Naididae

Flatworms

Dugesia sp

Polycelis sp

Leeches

Erpobdella octoculata

Helobdella stagnalis

Hemiclepsia marginata

Glossiphonia complanata

Piscicola geometra

Theromyzon tessulatum

Molluscs.

Valvata piscinalis

Bithynia tentaculata

Physa fontinalis

Lymnaea peregra

Planorbis albus

Planorbis carinatus

Planorbis vortex

Sphaerium corneum

Pisidium sp

Ancylus fluviatilis

Crustaceans.

Gammarus pulex

Asellus aquaticus

Asellus meridanus

Crangonyx pseudogracilis

Mayflies

Baetis scambus

Baetis vernus

Baetis sp

Caenis moesta gp

Cloeon dipterum

Habrophlebia fusca

Contd/.

Caddis flies

Hydropsyche angustipennis
Polycentropus flavomaculatus
Sericostoma personatum
Athripsodes cinereus
Tinodes waeneri
Ceraclea senilis
Hydroptilidae
Goera pilosa
Rhyacophila sp
Limnephilidae

Dragonflies

Aeshna grandis
Sympetrum sp
Coenagrion sp
Ischnura elegans

Other flies.

Chironimidae
Simulidae
Sialis lutaria

Beetles & Bugs

Dytiscidae (Hydroparous sp
Deronectes sp
Graptodytes sp)

Corixidae
Elmis aenea
Limnius volkmari
Oulimnius tuberculatus
Gyrinidae
Haliphus sp
Notonecta sp
Gerris sp
Hydrometra sp

2

Macrophytes

Callitriche sp
Ceratophyllum sp
Nuphar lutea
Sparganium sp
Oenanthe sp
Potamogeton pectinatus
Filamentous algae
Sagittaria sp

Report on the fish mortality in the River Deben at Crettingham - 3rd May 19841. Introduction

1.1 On 3rd May 1984 the River Deben at Crettingham was polluted with pesticide (thought to be DDT) washed from a spray tank and which entered the river via the Framsdon watercourse upstream of Crettingham Bridge. Observations carried out at the time indicated that some 200 fish (mostly roach and pike) had been killed between Crettingham and Brandeston.

1.2 In an attempt to quantify the extent of the fish loss a further electro-fishing survey was carried out at site 1 on the 15th May 1984. By utilising the same site on the river and the same methods which were used when site 1 was first surveyed on 6th March 1984 it was considered that reliable quantitative data on the effects of the pollution could be obtained.

2. Methods

2.1 Site 1 was enclosed with stop nets in the same manner as had been done during the first survey and the site was fished through twice using pulsed d.c. electro-fishing. All fish caught on each fishing were removed and held separately in aerated bins on the river bank. The numbers and lengths of all roach caught was recorded and the total number and weight of eels caught was also recorded.

3. Results

3.1 The following fish were caught :-

Fish < 10 cm fork length

Species	6th March 1984	15th May 1984
Roach	16	9
Stoneloach	5	5
TOTAL	21	14

Fish ≥ 10 cm fork length

Roach	207	36
Pike	12	0
Eel	12	9
TOTAL	231	45

- 3.2 The actual numbers of fish present at the site calculated from the 2 catch successive removal method of Seber and Le Cren was as follows.

Numbers of fish ≥ 10 cm fork length present at site

(Figures in Brackets are 95% confidence limits)

Species	6th March 1984	15th May 1984
Roach	210 (207 - 215)	48 (36 - 72)
Pike	12 (12 - 13)	0
Eel	16 (12 - 30)	9
TOTAL	238	57

- 3.3 The density of each species of fish present at site 1 expressed as numbers per square metre of river was as follows.

Density of fish ≥ 10 cm fork length occurring at site 1

No. m⁻²

Species	6th March 1984	15th May 1984
Roach	0.186	0.042
Pike	0.010	0
Eel	0.014	0.008
TOTAL	0.210	0.050

4. Discussion

- 4.1 The survey carried out on the 15th May 1984 following the pollution incident showed that for fish ≥ 10 cm fork length the number of roach at site 1 had been reduced by almost 23% ; pike had been eliminated and the number of eels had been reduced by 44%.
- 4.2 The pollution had an effect on fish life from a point upstream of site 1 where the Framsdon watercourse enters the Deben to a point estimated to be near Brandeston School. The total river length involved was therefore approximately 2 km. Taking the mean river width as 7 metres, the total river area involved was about 14,000 m².

- 4.3 The density of roach ≥ 10 cm at site 1 on the 6th March 1984 estimated to be 0.186 fish m^{-2} and at site 2 (Brandeston) to be 0.07 fish m^{-2} , ie. the mean density between sites 1 and 2 was 0.131 fish m^{-2} .
- 4.4 The number of roach present in the 2 km stretch between Crettingham and Brandeston can therefore be calculated as :
- $2,000 \times 7 \times 0.131 = 1,834$ roach.
- 4.5 The survey carried out on 15th May 1984 indicated that some 23% of these roach had been killed by the pollution ie. some 421 fish. Observations carried out at the time of the pollution indicated that the total number of fish killed (roach and pike) was 200. It is possible that 200 is an underestimate of the number of fish killed and it is also possible that some roach were displaced downstream and survived.
- 4.6 Pike seemed to have been reduced in numbers to a greater extent than roach and the survey of 15th May indicated that these fish had been eliminated at site 1. How far this effect carried on downstream is difficult to say but it is not thought to have been beyond Brandeston.
- 4.7 The population of roach in the River Deben is not high, and the river depends heavily on fish in the upper reaches between Crettingham and Brandeston as a source of young fish which move downstream and colonise the middle and lower reaches. Although the roach population in this upper stretch has not been eliminated, it is strongly recommended that the river between Crettingham and Brandeston is restocked with about 400 roach. It is not thought necessary to restock with pike as the current reduction in the number of this predator will actually enable a more rapid recovery of the roach population.

5. Conclusions

- 5.1 Pollution of the River Deven by pesticide washings on the 3rd May 1984 was estimated to have killed 400 - 500 roach of 10 cm or larger between Crettingham and Brandeston.
- 5.2 The pollution killed all pike between Crettingham and Brandeston.
- 5.3 It is recommended that this stretch of the river is restocked with 400 roach and that the pike population is left to recover naturally.

BIOLOGICAL

LIVER 1/EBEN

SURVEY

RESULTS - COPIES OF ORIGINALS

SITES:

ALL20 BR. (ASHFIELD)

BRANDESTON BR

CASTINGHAM BR

DEBENHAM STW

EYKE FORD

CLEVERING BR

KETTLEBURGH

LETHEBINGHAM BR

UFFORD BR

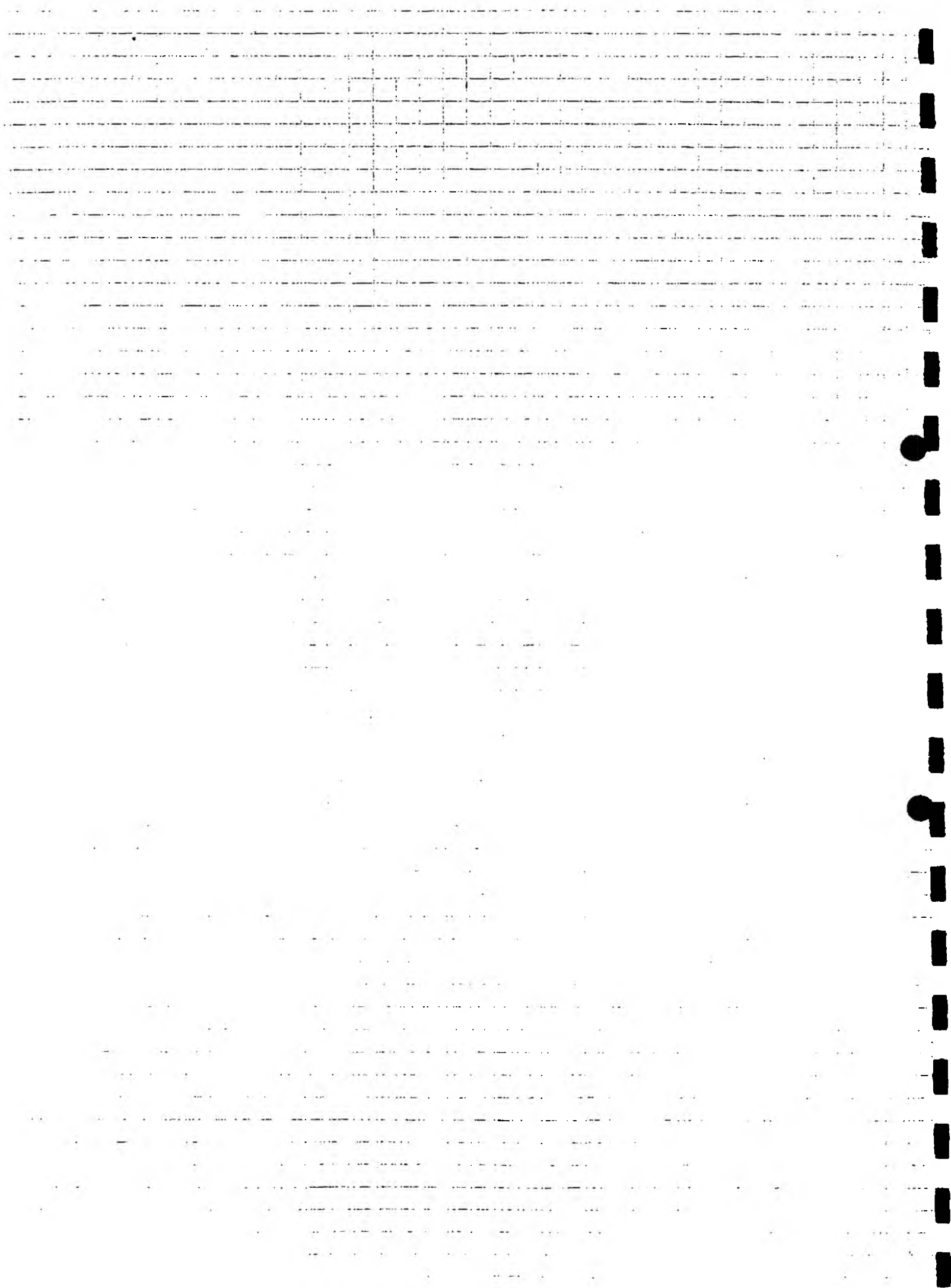
V/S WICKHAM MILL

DEBEN + DEBEN TRIBS

[Faint, illegible text covering the majority of the page, possibly bleed-through from the reverse side.]



SITE: A1120 BRIDGE



INVERTEBRATE SURVEY

6026020.

River/Broad/Lake DEBEN Sampling Point FRANSDEN ROAD BRIDGE (A112)
 Collected by J.S.W. Sorted By H.G.
 Date 2/1/76 Sample No
 Details of sampling site (veg, substratum, flow) below Road Bridge stones/silt
No veg. Many leaves

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	<u>2</u>	Lymnaea peregra	.....
Polycelis nigra	<u>2</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>2</u>
Nematoda	.....	Planorbis albus	.....
	.....	Planorbis laevis	.....
Naididae	.....	Segmentina complanata	.....
Tubificidae	<u>2</u>	Segmentina nitida	.....
Lumbriculidae	.....		
Lumbricidae	.....	Anodonta cygnea	.....
Enchytraeidae	.....	Anodonta anatina	.....
	.....	Dreissena polymorpha	.....
Piscicola geometra	<u>6</u>	Sphaerium corneum	<u>3</u>
Eupobdella octoculata	<u>2</u>	Pisidium	.....
Helobdella stagnalis	<u>4</u>		
Glossiphonia complanata	.....	Cladocera	.....
Eopobdella testacea	.....	Ostracoda (CYPRIA SP.)	<u>>10</u>
Theromyzon tessulatum	.....	Copepoda	.....
	.....	Argulus foliaceus	.....
Theodoxus fluviatilis	.....	Asellus aquaticus	<u>>10</u>
Viviparus fasciatus	.....	Asellus meridicanus	.....
Viviparus viviparus	.....	Gammarus pulex	<u>>10</u>
Valvata cristata	.....	Gammarus zaddachi	.....
Valvata piscinalis	.....	Corophium lacustrae	.....
Bithynia tentaculata	.....	Palaemonetes varians	.....
Bithynia leachi	.....	Sphaeroma rugicauda	.....
Assimineae grayana	.....	Astacus pallipes	.....
Hydrobia ulvae	.....		
Potamopyrgus jenkinsi	.....	Nemoura cinerea	.....
Acroloxus lacustris	.....		
Ancylus fluviatilis	.....	Baetis rhodani	.....
Zonitoides nitidus	.....	Baetis fuscatus	.....
Physa fontinalis	.....	Baetis muticus	.....
Lymnaea stagnalis	.....	Baetis veruus	.....
Lymnaea palustris	.....		

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	>10	Nepa	.....
Caenis rivulorum	.6..	Hydrometridae	.....
Caenis moesta	.7.0	Corixidae (CORIXA SP.)	.1..
Cloeon dipterum	.....	Dytiscidae (DERONECTES SP.)	>10
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae (ELMIS SP. - ADULT)	2
Proclotron pseudorufulum	.....	(ELMIS AENEAE - NYMPH)	1
Siphonurus linneanus	.....	Haliplidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
Rhyacophila	.....	Hydrophilidae	.....
Hydropsychidae	.2	Anisoptera	.....
Philopotamidae	.....	Zygoptera	.....
Polycentropidae	.....	Limncharidae	>10
Psychomyidae	.....	Hygrobatidae	>10
Trinodes	.....	Noemacheilus	.....
Mystacides	.....	Cottus	.....
Phryganeidae	.....	Gasterosteus	.....
Agapetus	.....	Pungitius	.....
Silo	.2	Phoxinus	.....
Molannidae	.....	Total Groups	26
Leptoceridae	.2	Trent Index	9
Hydroptilidae	.....	D & F Class	A
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	.....		
Chironomidae	>10		
Chironomus thummi	.....		
Simuliidae (SIMULIUM SP. LARVAE)	.6..		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.2		
Tabanidae	.....		
Syrphidae	.....		

River/Lake... Dalpen Sampling Point Ashfield Bridge BD 60
 Collected by H.G. Sorted By H.G. SSW
 Date 1.7.76 Sample No
 Details of sampling site (veg, substratum, flow) Nuphar, covered in algae
Mud, Smell Much silt 1094/72
V. sluggish

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	<u>C</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>R</u>
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	<u>R</u>
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
	.....	Anodonta anatina	.....
Fiscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	<u>C</u>	Sphaerium corneum	<u>O</u>
Helobdella stagnalis	<u>AB</u>	Pisidium	<u>W</u>
Glossiphonia complanata	<u>O</u>		
Erpobdella testacea	.....	Cladocera	<u>V. AB</u>
Theromyzon tessulatum	.....	Ostracoda	<u>V. AB</u>
Theodoxus fluviatilis	.....	Copepoda	<u>C</u>
Viviparus fasciatus	.....	Argulus foliaceus	.....
Viviparus viviparus	.....	Asellus aquaticus	<u>C</u>
Valvata cristata	.....	Asellus meridicanus	.....
Valvata piscinalis	.....	Gammarus pulex	.....
Bithynia tentaculata	.....	Gammarus zaddachi	.....
Bithynia leachi	.....	Corophium lacustrae	.....
Assiminea grayana	.....	Paleamonetes varians	.....
Hydrobia ulvae	.....	Sphaeroma rugicauda	.....
Potamopyrgus jenkinsi	.....	Astacus pallipes	.....
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis veruus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphebachirus	.....
Caenis hewesii ROBUSTA	 C	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae - NYMPHS & ADULTS - AB	.....
Cloeon dipterum	 O	Dytiscidae	.....
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae	.....
Procladius pseudorufus	.....	Halipidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	DYTISCINAE - HYDROPHUS SP. - O	.....
Hydropsychidae	.....	Anisoptera	.....
Phlebotomidae	.....	Zygoptera	.....
Polycentropidae	.....	Limnocoaridae	.....
Psychomyidae	.....	Hygrobatidae	 O
Triandrus	.....	Noemacheilus	.....
Mystacidae	.....	Cottus	.....
Phryganeidae	.....	Gasterosteus	.....
Agapetus	.....	Pungitius	.....
Silo	 O	Phoxinus	.....
Molannidae	.....	Total Groups	 19
Leptoceridae	.....	Trent Index	 9
Hydroptilidae	.....		
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	 O		
Chironomidae	 AB		
Chironomus thummi PLUMOSUS	 C		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

DOE class A

INVERTEBRATE SURVEY

River/~~Stream/Lake~~..... Dekker Sampling Point A 1120 640E8010
 Collected by AS Sorted By
 Date 8/2/77 Sample No 19
 Details of sampling site (veg, substratum, flow) D - 10 cm F - 0.5 ms⁻¹
Subs Stones, Gravel, Sand
Veg X

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	<u>0</u>
Polycelis nigra	<u>C</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	<u>C</u>
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
emertini	.....	Planorbis vortex	<u>0</u>
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	<u>C</u>	Sphaerium corneum	<u>C</u>
Helobdella stagnalis	<u>0</u>	Pisidium	<u>C</u>
Glossiphonia complanata	.....		
Erpobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	<u>C</u>
Theodoxus fluviutlis	.....	Copepoda	.....
Viviparus fasciatus	.....	Argulus foliaceus	.....
Viviparus viviparus	.....	Asellus aquaticus	<u>C</u>
Valvata cristata	.....	Asellus meridicanus	<u>C</u>
Valvata piscinalis	.....	Gammarus pulex	<u>C</u>
Bithynia tentaculata	.....	Gammarus zaddachi	.....
Bithynia leachi	.....	Corophium lacustrae	.....
Assimineae grayana	.....	Palaemonetes varians	.....
Hydrobia ulvae	.....	Sphaeroma rugicauda	.....
Potamopyrgus jenkinsi	.....	Astacus pallipes	.....
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	<u>0</u>
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis verus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	 ⁰	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	 ^F	Corixidae	.....
Cloeon dipterum	.....		
Ephemera danica	.....	Dytiscidae	.....
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procloeon pseudorufulum	.....	Elmuthidae	 ^C
Siphonurus linneanus	.....	Halipidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
		Hydrophilidae	.....
Rhyacophila	.....		
Hydropsychidae	 ⁰	Anisoptera	.....
Ptilocotidae	.....	Zygoptera	.....
Polycentropidae	.....		
Psychomyidae	 ⁰	Limnocythidae	.....
Tricentropidae	.....	Hygrobatidae	 ^C
Mystacidae	.....		
Phryganeidae	.....	Noemacheilus	.....
Agapetus	.....	Cottus	.....
Silo	 ⁰	Gasterosteus	.....
Molanidae	.....	Pungitius	.....
Leptoceridae	 ⁰	Phoxinus	.....
Hydroptilidae	.....		
Limnephilidae	 ⁰	Total Groups	 ²⁷
		Trent Index	 ⁹
Lepidoptera	.....		
Sialis lutaria	 ⁰	D.O.E	A
Chironomidae	 ^C		
Chironomus thummi	.....		
Simuliidae	 ^C		
Dixidae	.....		
Culicidae	 ^C		
Chaoborus	.....		
Tipulidae	 ⁰	89	
Tabanidae	 ⁰		
Syrphidae	.....		

INVERTEBRATE SURVEY

River/Broad/Lake Deben Sampling Point A1120 BDEBORO
 Collected by GAWH Sample Number 8
 Sorted by GAWH Date 28.7.77
 Depth 0.1-0.4 Flow 0.1m/s Substratum gravel, silt, mud
 Vegetation V. small strands Callitriche. Entomomorpha. Spirogyra
 Comments _____

P = Present, <10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, >10

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	<u>P</u>	Lymnaea palustris	_____
Polycelis nigra	_____	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	_____
Polycelis tenuis	<u>C</u>	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	<u>P</u>
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	_____
Nematoda	_____	Planorbis leucostoma	_____
Naididae	<u>C</u>	Planorbis vortex	<u>C</u>
Tubificidae	_____	Planorbis vortex	<u>P</u>
Lumbriculidae	_____	Planorbis albus	_____
Lumbricidae	_____	Planorbis laevis	_____
Enchytraeidae	_____	Segmentina complanata	_____
	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	<u>C</u>	Anodonta anatina	_____
Helobdella stagnalis	<u>C</u>	Dreissenia polymorpha	_____
Glossiphonia complanata	<u>P</u>	Sphaerium corneum	_____
Erpobdella testacea	_____	Fisidium	_____
Theromyzon tessulatum	_____		_____
Theodoxus fluviatilis	_____	Cladocera	_____
Viviparus fasciatus	_____	Ostracoda	_____
Viviparus viviparus	_____	Copepoda	<u>A</u>
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	_____	Asellus aquaticus	_____
Bithynia tentaculata	_____	Asellus meridianus	_____
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	<u>A</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____

<i>Sphaeroma hookeri</i>	_____	Chaoboridae	_____
<i>Paleamonetes varians</i>	_____	Simuliidae	_____
<i>Astacus pallipes</i>	_____	Dixidae	_____
		Culicidae	_____
<i>Nemoura cinerea</i>	_____	Chaoborus	_____
		Tipulidae	_____
<i>Baetis rhodani</i>	_____	Tabanidae	_____
<i>Baetis fuscatus</i>	_____	Syrphidae	_____
<i>Baetis muticus</i>	_____	Psychodidae	_____
<i>Baetis vernus</i>	_____	Ceratopogonidae	_____
<i>Baetis buceratus</i>	_____		
<i>Baetis niger</i>	_____	Notonecta	<u>P</u>
<i>Centroptilum luteolum</i>	<u>C</u>	Plea	_____
<i>Centroptilum pennulatum</i>	_____	Aphelocheirus	_____
<i>Caenis horaria</i>	_____	Nepa	_____
<i>Caenis rivulorum</i>	_____	Hydrometridae	_____
<i>Caenis moesta</i>	_____	Corixidae	<u>A</u>
<i>Cloeon dipterum</i>	_____		
<i>Ephemera danica</i>	_____	Dytiscidae	<u>C</u>
<i>Ephemerella ignita</i>	_____	Hygrobiidae	_____
<i>Ecdyonurus insignis</i>	_____	Elminthidae	_____
<i>Habrophlebia fusca</i>	_____	Haliplidae	<u>P</u>
<i>Paraleptophlebia submarginata</i>	_____	Cyrinidae	_____
<i>Procloeon pseudorufulum</i>	_____	Hydrophilidae	_____
<i>Siphonurus linneanus</i>	_____		
<i>Heptagenia sulphurea</i>	_____	Anisoptera	_____
		Zygoptera	_____
<i>Rhyacophila</i>	_____		
<i>Hydropsychidae</i>	_____	Limnocytharidae	<u>C</u>
<i>Philopotamidae</i>	_____	Hygrobatidae	<u>A</u>
<i>Polycentropidae</i>	_____		
<i>Psychomyidae</i>	_____	Neomacheilus	_____
<i>Tranodes</i>	_____	Cottus	_____
<i>Mystacides</i>	_____	Gasterosteus	_____
<i>Phryganeidae</i>	_____	Pungitius	_____
<i>Agapetus</i>	_____	Phoxinus	_____
<i>Silo</i>	_____		
<i>Molannidae</i>	_____	Sewage Fungus	_____
<i>Leptoceridae</i>	_____		
<i>Hydroptilidae</i>	_____	Total Groups	<u>19</u>
<i>Limnephilidae</i>	_____	Trent Index	<u>8</u>
		D.O.E. Class	<u>A (B?)</u>
<i>Lepidoptera</i>	_____		
<i>Sialis lutaria</i>	<u>P</u>		

River/Broad/Lake DEZEN Sampling Point A1120 BR BFOEBORO
 Collected by _____ Sample Number (1)
 Sorted by _____ Date 7.4.78
 Depth 0.2 Flow 0.2 Substratum gravel, silt
 Vegetation - Cladophora
 Comments Densifying

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 100

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____
Polycelis nigra	<u>P</u>	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	_____
Polycelis tenuis	_____	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	_____
Nematoda	_____	Planorbis leucostoma	_____
Naididae	<u>C</u>	Planorbis vortex	_____
Tubificidae	_____	Planorbis albus	_____
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	<u>C</u>	Anodonta anatina	_____
Helobdella stagnalis	_____	Dreissenia polymorpha	_____
Glossiphonia complanata	<u>C</u>	Sphaerium corneum	_____
Erpobdella testacea	_____	Pisidium	<u>C</u> 30
Theromyzon tessulatum	_____		
Theodoxus fluviatilis	_____	Cladocera	_____
Viviparus fasciatus	_____	Ostracoda	_____
Viviparus viviparus	_____	Copepoda	_____
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	_____	Asellus aquaticus	_____
Bithynia tentaculata	_____	Asellus meridianus	_____
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	<u>A</u> 60
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____
Ancylus fluviatilis	_____	Corophium multisetosum	_____

Sphaeroma hookeri

Palaemonetes varians

Astacus pallipes

Nemoura cinerea

60
100 Baetis rhodani

Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centroptilum luteolum

Centroptilum pennulatum

Caenis horaria

Caenis rivulorum

100 Caenis ~~coesta~~ robusta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

Polycentropidae

Psychomyidae

Tranodes

Mytacididae

Phryganeidae

Agapetus

Silo

Molannidae

Leptoceridae

Hydroptilidae

Limnephilidae

Lepidoptera

Sialis lutaria

Chironomus tentans

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae

Hygrobiidae

Elmthidae

Halplidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocyrtidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

BMWP SH

13 (14)

7

B (A)

535

495

DENDROCOELIDAE	30/30/
Dendrocoelum lacteum	
LAMARIIIDAE	30/30/
Polycelis felina	
Polycelis nigra	
Polycelis tenuis	
Dugesia lugubris	
Dugesia polychroa	
Dugesia tigrina	
LIGOCHAETA	1/1/
Lumbricidae	
Lumbriculidae	
Naididae	
RUBRICOLAE	/c
ISCICOLIDAE	20/20/
Isocoma geometra	
ISODONTIIDAE	10/10/
Isodonta octoculata	/c
GLOSSIPHONIIDAE	10/10/
Glossiphonia complanata	/p
Glossiphonia heteroclita	
Melobdella stagnalis	
Theromyzon tessellatum	
VIBRATIDAE	40/40/
Theodoxus fluviatilis	
VIVIPARIIDAE	40/40/
Viviparus fasciatus	
Viviparus piscinalis	
VALVATIDAE	10/10/
Valvata cristata	
Valvata macrostoma	
Valvata piscinalis	
HYDROBIIDAE	10/10/
Hydra grayana	
Bithynia leachi	
Bithynia tentaculata	
Hydrobia ulvae	
Lotamopyrgus jenkinsi	
CYCLIDAE	40/40/
Acroloxus lacustris	
Cycylus fluviatilis	
PHRYGANEIDAE	10/10/
Phrysa acuta	
Phrysa fontinalis	
Phrysa heterostrophus	
LYMNAEIDAE	10/10/
Lymnaea auricularia	
Lymnaea palustris	
Lymnaea peregrina	
Lymnaea stagnalis	
Lymnaea stultissima	
PLANORBIDAE	10/10/
Planorbis albus	
Planorbis carinatus	
Planorbis contortus	
Planorbis cristatus	
Planorbis laevis	
Planorbis leucostoma	
Planorbis planorbis	
Planorbis vortex	/p
Segmentina complanata	
Segmentina vitidiae	
UNIONIDAE	40/40/
Anodonta anatina	
Anodonta cygnea	
Unio pictorum	
Sphaeriidae	10/10/
Pisidium sp.	
Sphaerium corneum	
DREISSENIDAE	
Dreissena polymorpha	
ASCELLIDAE	10/10/
Asellus aquaticus	
Asellus meridianus	
GAMMARIDAE	40/40/
Crangonyx pseudogracilis	
Gammarus duebeni	
Gammarus pulex	/p
Gammarus zaddachi	
COROPHIIDAE	40/40/
Corophium lacustre	
Corophium multisetosum	
ASTACIDAE	60/80/
Astacus pallipes	
HEMIGURIDAE	50/70/
CAPNIIDAE	80/100/
CHLOROPELIDAE	80/100/
LEUCTRIDAE	80/100/
PERLIDAE	80/100/
PERLODIDAE	80/100/
TALNIOPTERYGIDAE	80/100/

TIME	20/20/
netis rhodani	a
netis	Venus
entrostilum luteolum	
entrostilum pennulatum	
loeca dipterum	
rocloson pseudorufulum	
UIDAE	50/70/
acnis moesta	
acnis	
EMERIDAE	80/100/
phemera danica	
phemera vulgata	
EMERELLIDAE	80/100/
phemerella ignita	
TAGENIDAE	80/100/
cdyonurus	
epiagenia	
TOPHLEBIDAE	80/100/
abrophlebia fusca	
traleptophlebia submarginata	
ELONURIDAE	80/100/
ACOPHILIDAE	50/70/
capetus	
nyacophila	
ROPSYCHIDAE	30/30/
YCENTROPIDAE	50/70/
CHOMYDAE	60/80/
EGANEIDAE	80/100/
ICOSTOMATIDAE	80/100/
RIDAE	80/100/
UNIDAE	80/100/
CCERIDAE	80/100/
ROPTILIDAE	40/40/
SEPHILIDAE	50/70/
LIDAE	20/20/
lalis	p
MONOMIDAE	5/5/
ILIDAE	30/30/
ILIDAE	30/30/

VIOUS NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.V.P.

NOTONECTIDAE	P	30/30/
PLEIDAE		30/30/
APHELOCHEIRIDAE		80/100/
NEPIDAE		30/30/
HYDROMETRIDAE		30/30/
CORIXIDAE	P	30/30/
DYTISCIDAE		30/30/
HYGROBIIDAE		30/30/
ELMINTHIDAE		30/30/
HALIPLIDAE		30/30/
HYDROPHILIDAE		30/30/
GYRINIDAE		30/30/
AGRIIDAE		60/80/
AESCHIDAE		60/80/
LESTIDAE		60/80/
GOMPHIDAE		60/80/
CORDULEGASTERIDAE		60/80/
CORULIIDAE		60/80/
LISELLIDAE		60/80/
HYDRACHEILIDAE		

PRESENT NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.V.P.

Site : BRANDSTON BR



RIVER

Deben

SITE

Brandebon
Kettleborough
Ford

DATE

4/8/84

CODE

NCR

TM 251 601

FlowShadeSubstrate

Pebbles D

Very fast

None

Boulders

Riffle

Low

Pebbles

Fast run

Med

Gravel

Slow run

Great

Sand

Pool

Silt

Slack

Detritus

Marginal plants

Submerged plants

SUBMERGED PLANTS% Cover = 30%

Aplon nodiflorum

Berula erecta

Callitriche sp

Chara sp

Elodea canadensis

Filamentous algae

Fontinalis sp

Myriophyllum sp

Nuphar lutea

Nymphaea alba

Oenanthe fluviatilis

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp

Common

Present

Trace

D = dominant

C = common

P = present

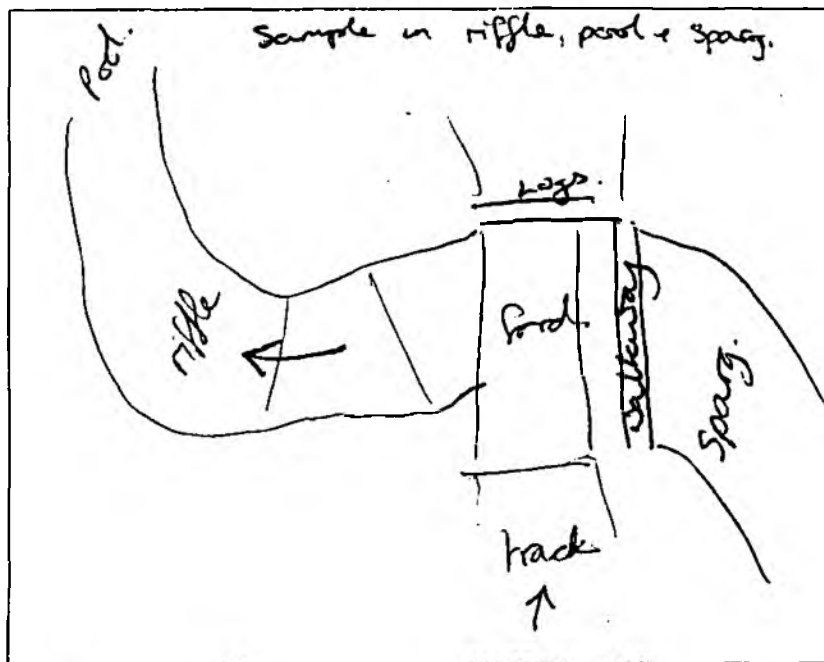
T = trace

Sparganium sp
Sagittaria
Sagittaria

Land Use

Wasteland	Width <u>2-4m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.3-0.4m</u>	.....
Pastoral <u>✓</u>	Temp .....	.....
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of twitches - 101

DENDROCOELIDAE 5
Dendrocoelum lacteum
Bdellocephala

PLANARIIDAE 5/P
Polycelis sp
Planaria torva
Dugesia lugubris
Dugesia polychroa
Dugesia tigrina

OLIGOCHAETA 1
Lumbricidae
Lumbriculidae
Naididae
Tubificidae

PISCICOLIDAE
Piscicola geometra

ERPOBDELLIDAE Eod. P
Glossiphoniidae comp 2
Glossiphonia
Helobdella stagnalis
Theromyzon tessellatum

NERITIDAE 6
Theodoxus fluviatilis

VIVIPARIDAE 6
Viviparus fasciatus
Viviparus viviparus

VALVATIDAE 3
Valvata cristata
Valvata macrostoma
Valvata piscinalis

HYDROBIIDAE 3
Assininea grayana
Bithynia leachi
Bithynia tentaculata
Hydrobia ulvae
Potamopyrgus jenkinsi

ANCYLIDAE 6
Acrolonx lacustris
Anclylus fluviatilis

PHYSIDAE 2
Physa fontinalis

LYMAEIDAE 3
Lymnaea auricularia
Lymnaea palustris
Lymnaea peregra
Lymnaea stagnalis

PLANORBIDAE ✓
Planorbis albus
Planorbis carinatus
Planorbis contortus
Planorbis cristata
Planorbis laevis
Planorbis leucostoma
Planorbis planorbis
Planorbis vortex
Segnetina complanata
Segmentina vitidae

UNIONIDAE 6
Anodonta anatina
Anodonta cygnea
Unio pictorum

SPHAERIIDAE 3
Pisidium sp
Sphaerium corneum

ASELLIDAE 3
Asellus aquaticus
Asellus meridianus

GAMMARIDAE 6
Crangonyx pseudogracilis
Gammarus duebeni
Gammarus pulex
Gammarus zaddachi

COROPHIDAE 6

ASTACIDAE 8

NEHOEURIDAE 7

CAPNIIDAE 10

CHLOROPERLIDAE 10

LEUCTRIDAE 10

BAETIDAE 4 a
Baetis sp
Centroptilum luteolum
Centroptilum pennulatum
Cloeon dipterum
Proclon pseudorufulum

CAENIDAE 7
Caenis sp

EPHEMERIDAE 10
Ephemera danica
Ephemera vulgata

EPHEMERELLIDAE 10
Ephemerella ignita

HEPTAGENIIDAE 10
Ecdyonurus sp
Heptagenia sp

LEPTOPHLEBIIDAE 10
Habrophlebia fusca
Paraleptophlebia submarginata

SIPHONURIDAE 10

RHYACOPHILIDAE 7
Agapetus fuscipes
Rhyacophila sp

HYDROPSYCHIDAE 5

POLYCENTROPIDAE 7

PSYCHOMYIIDAE 8

PHRYGANEIDAE 10

SERICOSTOMATIDAE 10

GOERIDAE 10

MOIANNIDAE 10

LEPTOCERIDAE 10

HYDROPTILIDAE 6

LIMNephilidae 7

SIALIDAE 4

CHIRONOMIDAE 2

SIMULIDAE 3

TIPULIDAE 3

NOTONECTIDAE 3

PLEIDAE 3

APHELOCHEIRIDAE 10

NEPIDAE 5

HYDROMETRIDAE 3

CORIXIDAE 3

DYTISCIDAE 3

HYDROBIIDAE 5

ELMINTHIDAE 5

HALIPLIDAE 5

HELODIDAE 5

GYRINIDAE 8

AESHNIDAE 8

LESTIDAE 8

COMPHIDAE 8

CORDULEGASTERIDAE 8

CORDULIIDAE 8

LIBELLULIDAE 8

COENAGRIDAE 8

HYDRACINELLIDAE 8

CERATOPOGONIDAE 8

CLADOCERA 8

OSTRACODA 8

COPEPODA 8

RIVER

Deben

SITE

Brandesheim
Bridge

DATE

16/5/84

COVE

NCK

FlowShadeSubstrate

Very fast	None	Boulders
Riffle ✓	Low ✓	Pebbles ✓
Fast run ✓	Med	Gravel
Slow run	Great	Sand
Pool		Silt ✓
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

Apium nodiflorum
Berula erecta
Callitriche sp
Chara sp
Elodea canadensis
 Filamentous algae
Pontinella sp
Myriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp

.....

.....

.....

.....

D = dominant

C = common

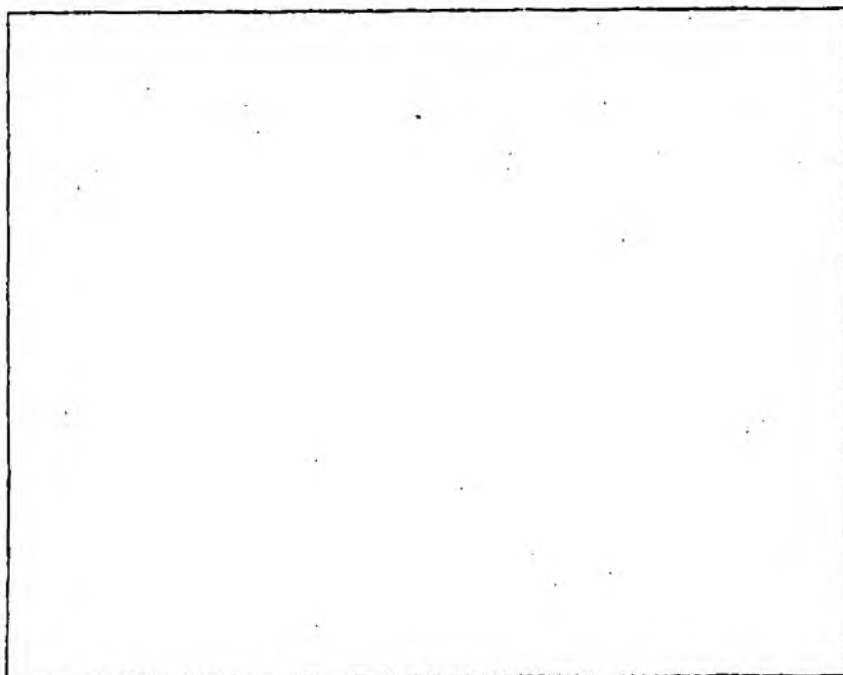
P = present

T = trace

Land Use

Wasteland	Width ^{8m}	Visible signs of effluent's impact on river
Urban	Depth .... / .... / ....	.....
Pastoral ☒	Temp °C	.....
Arable ☒	Oxygen ..... %	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of tiles = 7 B.M.W.P. score = 26

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis crista	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segnetina complanata	
Lumbricidae		Segnetina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae	✓ a.	Anodonta anatina	
Tubificidae		Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorus	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	P ✓ 3	Pisidium sp	
GLOSSIPHONIIDAE	✓ r	Sphaerium corneum	
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Asellus aquaticus	
Theromyzon tessellatum		Asellus meridicanus	
HERITIDAE	6	GAMMARIDAE	6 * No
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Gammarus duebeni	
Viviparus fasciatus		Gammarus pulex	
Viviparus viviparus		Gammarus taddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		HEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPHERIDAE	10
Asellinea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centropbium luteolum	
Potamopyrgus jenkinsi		Centropptilum pennulatum	
ANCYLIDAE	6	Cloosia dipterum	
Acroloxus lacustris		Procloosia pseudorufulum	
Ancylus fluviatilis		CAENIDAE	✓ c.
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYMNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregra			
Lymnaea stagnalis			

EPHEMERELLIDAE	10
<i>Ephemerella ignita</i>	
HEPTAGENIIDAE	10
<i>Ecdyonurus</i> sp	
<i>Heptagenia</i> sp	
LEPTOPHLEBIIDAE	10
<i>Habrophlebia fusca</i>	
<i>Paraleptophlebia submarginata</i>	
SIPHONURIDAE	10
RHYACOPHILIDAE	7
<i>Agapetus fuscipes</i>	
<i>Rhyacophila</i> sp	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHOMYIIDAE	8
PHRYGANEIDAE	10
SERICOSTOMATIDAE	10
GOERIDAE	10
MOLANNIDAE	10
LEPTOCERIDAE	10
HYDROPTILIDAE	6
LIMNephilidae	7
SLALIDAE	4
CHIRONOMIDAE	2
SEMULIDAE	5
TIPULDAE	5
NOTONECTIDAE	5
PLEIDAE	5
APHELOCHEIRIDAE	10
NEPIDAE	5
HYDROMETRIDAE	5
CORIXIDAE	5
DYTISCIDAE	5

HYGROBIIDAE	5
ELMINTHIDAE	5
HALIPLIDAE	5
HELODIDAE	5
CYRINIDAE	8
AESHNIDAE	8
LESTIDAE	8
GOMPHIDAE	8
CORDULECASTERIDAE	8
CORDULIIDAE	8
LIBELLULIDAE	8
COENAGRIIDAE	6
HYDRACINELLIDAE	
CERATOPOGONIDAE	
CLADOCERA	
OSTRACODA	
COPEPODA	

gannarus
still

RIVER

Deben

SITE

Brandsbury
Ford

DATE

16/5/64

CODE

NCR

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTSZ Cover =

One bank

Apium nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

D = dominant

C = common

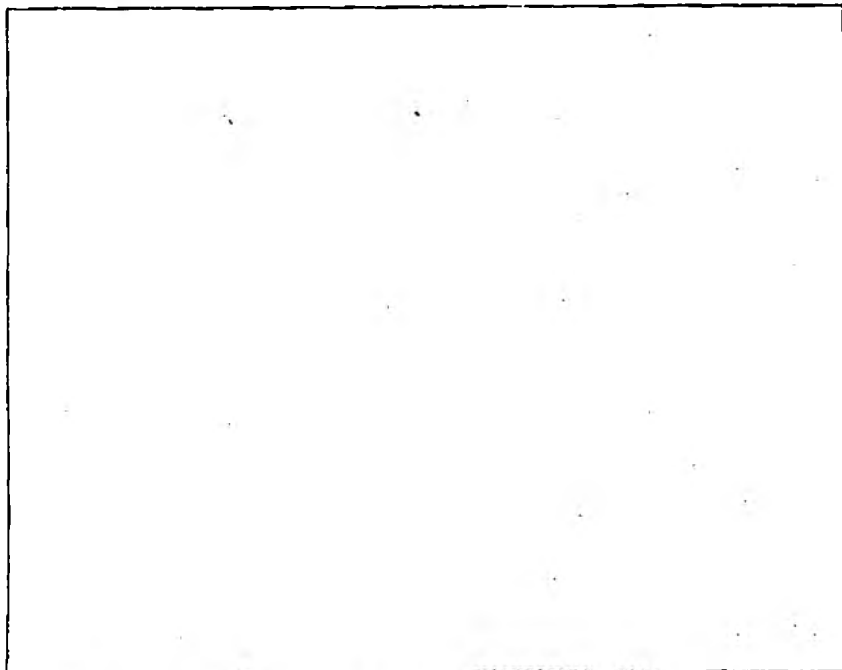
P = present

T = trace

Land Use

Wasteland	Width <u>8-7m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.5</u> .....	.....
Pastoral	Temp .....°C	.....
Arable	Haycut .....	.....
Health	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of Allen

13

B.N.W.P. score

58

DENDROCOELIDAE 5
Dendrocoelum lacteum
Bdellocephala

PLANARIIDAE 5
Polycelis sp
Planaria torva
Dugesia lugubris
Dugesia polychroa
Dugesia tigrina

OLIGOCHAETA 1
Lumbricidae
Lumbriculidae
Naididae
Tubificidae

PISCICOLIDAE 4
Piscicola geometra

ERPODELLIDAE 3
Eodonta

GLOSSIPHONIIDAE 3
Glossiphonia sp
Helobdella stagnalis
Theromyzon tessellatum

NERITIDAE 6
Theodoxus fluviatilis

VIVIPARIDAE 6
Viviparus fasciatus
Viviparus viviparus

VALVATIDAE 3
Valvata cristata
Valvata macrostoma
Valvata piscinalis

HYDROBIIDAE 3
Asselina grayana
Bithynia leschi
Bithynia tentaculata
Hydrobia ulvae
Potamopyrgus jenkinsi

ANCYLIDAE 6
Acroloxus lacustris
Anchylus fluviatilis

PHYSIDAE
Physa fontinalis

LYMAEIDAE 3
Lymnaea auricularia
Lymnaea palustris
Lymnaea peregra
Lymnaea stagnalis

PLANORBIIDAE
Planorbis albus
Planorbis carinatus
Planorbis contortus
Planorbis crista
Planorbis laevis
Planorbis leucostoma
Planorbis planorbis
Planorbis vortex
Segmentina complanata
Segmentina vitidis

UNIONIDAE 6
Anodonta anatina
Anodonta cygnea
Unio pictorum

SPHAERIIDAE 3
Pisidium sp
Sphaerium corneum

ASELLIDAE 3
Asellus aquaticus
Asellus meridionalis

GAMMARIDAE 6
Crangonyx pseudogracilis
Gammarus duebeni
Gammarus pulex
Gammarus zaddachi

COROPHIIDAE 6

ASTACIDAE 8

NEMOURIDAE 7

CAPNIIDAE 10

CHLOROPERLIDAE 10

LEUCTRIDAE 10

BAETIDAE 4
Baetis sp
Centroptilum luteolum
Centroptilum pannulatum
Cloeon dipterum
Procladius pseudorufus

CAENIDAE
Caenis sp

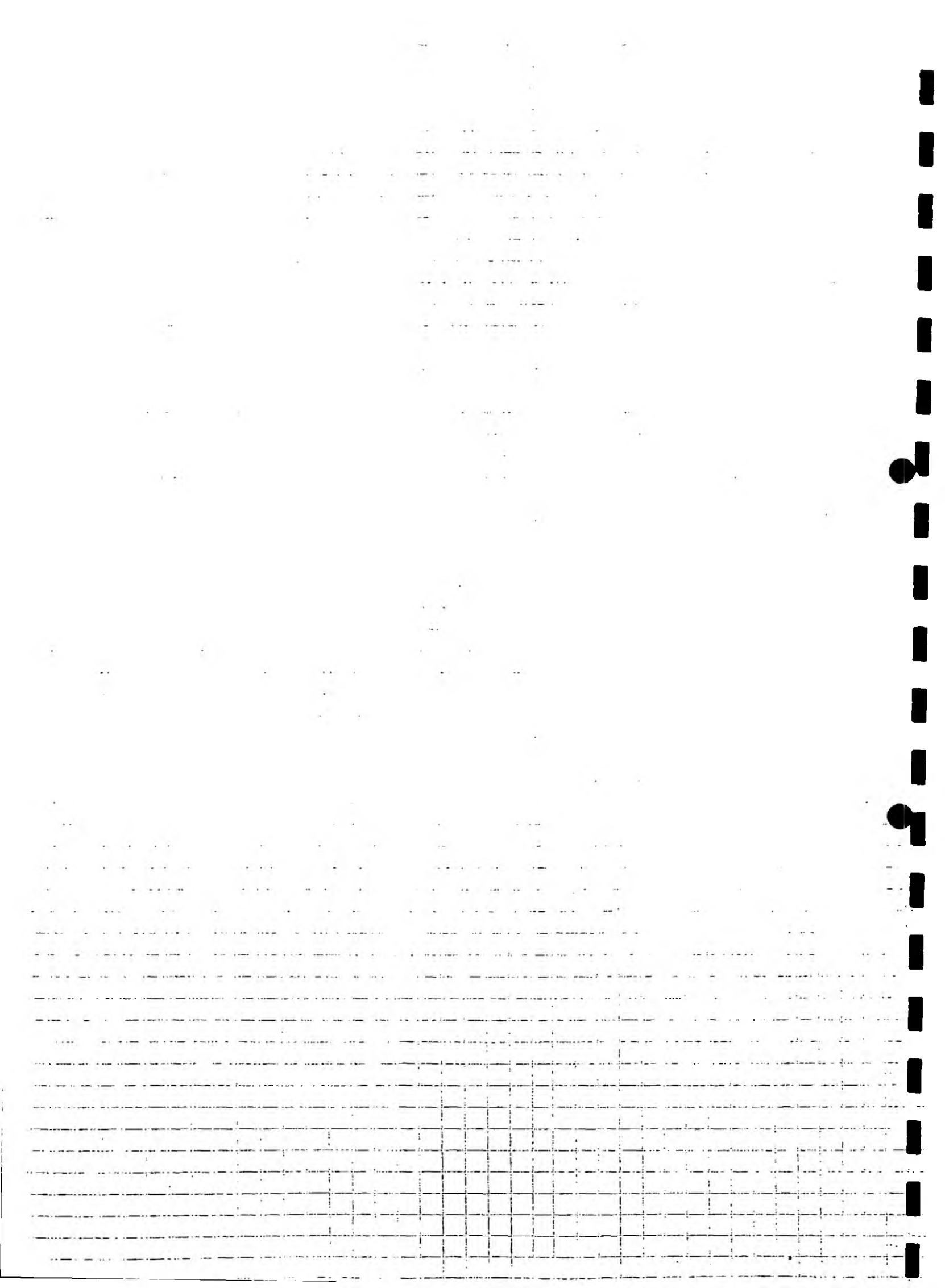
EPHEMERIDAE 10
Ephemera danica
Ephemera vulgata

EPHEMERELLIDAE	10	HYCROBIIDAE	5
<i>Ephemerella ignita</i>			
HEPTAGENIIDAE	10	ELMINTHIDAE	5
<i>Ecdyonurus</i> sp			
<i>Heptagenia</i> sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
<i>Habrophlebia fusca</i>		GYRINIDAE	8
<i>Paraleptophlebia submarginata</i>		AESHNIDAE	8
SIPHONURIDAE	10	LESTIDAE	8
RHYACOPHILIDAE	7	COMPHIDAE	8
<i>Agapetus fuscipes</i>		CORDULEGASTERIDAE	8
<i>Rhyacophila</i> sp		CORDULIIDAE	8
HYDROPSYCHIDAE	5	LIBELLULIDAE	8
POLYCENTROPIDAE	7	GOENAGRIIDAE	6
PSYCHOMYIIDAE	8	HYDRACHNELLIDAE	
PHRYCANEIDAE	10	CERATOPOGONIDAE	
SERICOSTOMATIDAE	10	CLADOCERA	
GOERIDAE	10	OSTRACODA	
MOLANNIDAE	10	COPEPODA	
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNephilidae	7		
SLALIDAE	6		
CHIRONOMIDAE	2		
SEMULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

SITE

CZETINCHAM

BRIDE



RIVER

Deben

SITE

Oettingham

DATE

16/5/84

CODE

NCR

Bridge

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

Aplon nodiflorus
Berula erecta
Callitriche sp
Chara sp
Elodea canadensis
 Filamentous algae
Fontinalis sp
Myriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank
 Both banks
 Sparse
 Patchy
 Abundant
 Few species
 Many species
 Dominant spp

D = dominant

C = common

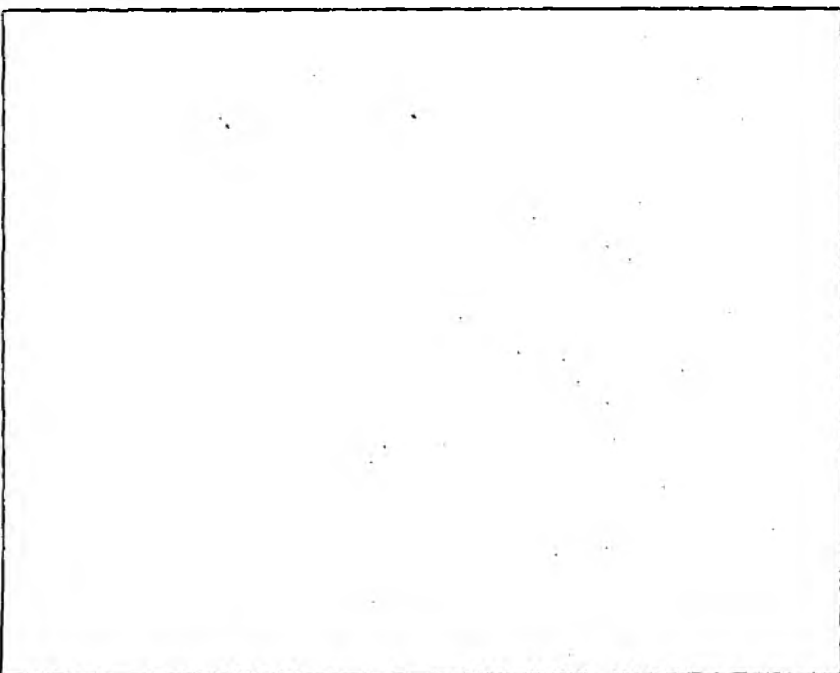
P = present

T = trace

Land Use

Wasteland	Width 6-7m	Visible signs of effluent's impact on river
Urban	Depth 0.5	
Pasturel	Temp	Brown dead
Arable	IMYGN	algae
Health	Representative of cunch?	
Bog/marsh	Yes/No	
Decid. wood		
Conif. wood		

Spate/Recent Spate/Low Flow



1 2 3 4 5

Number of 7

B.M.W.P. score =

23

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis crista	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae	✓ C	Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	✓ P	Platidium sp	
GLOSSIPHONIIDAE	✓ P	Sphaerium corneum	✓ P
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Aesellus aquaticus	
Theromyzon tessellatus		Aesellus meridicanus	
NERITIDAE	6	GAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Gammarus duebeni	✓ C
Viviparus fasciatus		Gammarus pulex	
Viviparus viviparus		Gammarus zaddachi	≡
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEHOEURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Aeslinines grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulva		Centropbilum luteolum	
Potamopyrgus jenkinsi		Centrophtlum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Proclouson pseudorufulum	
Ancylus fluviatilis		PHYSIDAE	3
PHYSIDAE	3	Physa fontinalis	
LYMAEIDAE	3	LYMAEIDAE	3
Lymnaea auricularia		Lymnaea auricularia	
Lymnaea palustris		Lymnaea palustris	
Lymnaea peregra		Lymnaea peregra	
Lymnaea stagnalis		Lymnaea stagnalis	

EPHEMERELLIDAE	10	HYGROBIIDAE	5
<i>Ephemerella ignita</i>			
HEPTAGENIIDAE	10	ELMINTHIDAE	5
<i>Ecdyonurus</i> sp			
<i>Heptagenia</i> sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
<i>Habrophlebia fusca</i>		GYRINIDAE	8
<i>Paraleptophlebia submarginata</i>		AESHNIDAE	8
SIPHONURIDAE	10	LESTIDAE	8
RHYACOPHILIDAE	7	COMPHIDAE	8
<i>Agapetus fuscipes</i>		CORDULEGASTERIDAE	8
<i>Rhyacophila</i> sp		CORDULIIDAE	8
HYDROPSYCHIDAE	5	LIBELLULIDAE	8
POLYCENTROPIDAE	7	COENACRIIDAE	6
PSYCHOMYIIDAE	8	HYDRACHNELLIDAE	
PHRYGANEIDAE	10	CERATOPOGONIDAE	
SERICOSTOMATIDAE	10	CLADOCERA	
GOERIDAE	10	OSTRACODA	
MOLANNIDAE	10	COPEPODA	
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNephilidae	7		
SIALIDAE			
CHIRONOMIDAE	5		
SIMULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

River Dulles Site Croftingham Br Number Date 11/8/81
 Collected by PS 5/11 Substratum some - stones, mud Depth up to 0.5m Flow slow
 Vegetation Recently cut-back - but some marginal V.acca & Mys Width 8m
 Comments
 Land Use

DENDROCOELIDAE 5 Dendrocoelum lacteum	Planorbis cristatus Planorbis laevis Planorbis leucostoma Planorbis planorbis P Planorbis vortex P Segmentina complanata Segmentina vitidae
PLANARIIDAE 5 Polycelis felina Polycelis nigra P Polycelis tenuis r Dugesia lugubris Dugesia polychroa Dugesia tigrina	UNIONIDAE 6 Anodonta anatina Anodonta cygnea Unio pictorum
OLIGOCHAETA 1 Lumbricidae P Lumbriculidae Naididae P Tubificidae P	SPHAERIIDAE 3 Pisidium sp. r Sphaerium corneum
PISCICOLIDAE 4 Piscicola geometra	DREISSENIDAE Dreissena polymorpha
ERPOBDELLIDAE 3 Erpobdella octoculata P	ASELLIDAE 3 Asellus aquaticus Asellus meridianus
GLOSSIPHONIIDAE 3 Glossiphonia complanata P Glossiphonia heteroclita Y Helobdella stagnalis P Theromyzon tessulatus P	GAMMARIDAE 6 Y Crangonyx pseudogracilis P Gammarus duebeni P Gammarus pulex P Gammarus zaddachi
MERITIDAE 6 Theodoxus fluviatilis	COROPHIDAE 6 Corophium lacustrae Corophium multisetosum
VIVIPARIDAE 6 Viviparus fasciatus Viviparus viviparus	ASTACIDAE 8 Astacus pallipes
VALVATIDAE 3 Valvata cristata Valvata macrostoma Valvata piscinalis	NEMOURIDAE 7
HYDROBIIDAE 3 Assininea grayana Bithynia leachi Bithynia tentaculata Hydrobia ulvae Potamopyrgus jenkinsi	CAPNIIDAE 10
ANCYLIDAE 6 Ancylus fluviatilis Ancylus fluviatilis	CHLOROPERLIDAE 10
PHYSIDAE 3 Physa acuta Physa fontinalis Physa heterontropa	LEUCTRIDAE 10
LYMAEIDAE 3 Lymnaea auricularia Lymnaea palustris P Lymnaea peregra r Lymnaea stagnalis Lymnaea glutinosa	PERLIDAE 10
PLANORBIDAE 3 A Planorbis albus P Planorbis carolinianus Planorbis contortus	PERLODIDAE 10
	TAENIOPTERYGIDAE 10
	CLADOCERA E. lamellatus P
	OSTRACODA
	COPEPODA P

BAETIIDAE 4 P Baetis rhodani Baetis Centroptilum luteolum Centroptilum pennulatum C Clocon dipterum Proclocon pseudorufulum	NOTONECTIDAE 5 r
CAENIDAE 7 Caenis moesta Caenis	PLEIDAE 5
EPHEMERIDAE 10 Ephemera danica Ephemera vulgata	AMELOCHEIRIDAE 10
EPHEMERELLIDAE 10 Ephemerella ignita	NEPIDAE 5
HEPTAGENIIDAE 10 Ecdyonurus Heptagenia	HYDROMATRIDAE 5
LEPTOPHLEBIIDAE 10 Habrophlebia fusca Paraleptophlebia submarginata	Q CORIXIDAE 5 c
SIPHONURIDAE 10	DTISCIDAE 5 p
RHYACOPHILIDAE 7 Agapetus Rhyacophila	HYGROBIIDAE 5
HYDROPSYCHIDAE 5	ELMINTHIDAE 5
POLYCENTROPIDAE 7 r	HALIPLIDAE 5 P
PSYCHOMYIIDAE 2 all like r	HELOIDAE 5
IMRYGANEIDAE 10	GYRINIDAE 5
SERICOSTOMATIDAE 10	AGRIIDAE 8
GOERIDAE 10	AESCHIDAE 8
MOLANNIDAE 10	LESTIDAE 8
LEPTOCERIDAE 10	COMMIIDAE 8
HYDROPTILIDAE 6	CORDULEGASTERIDAE 2
LIMNETHIDAE 7	CORDULIDAE 3
SIALIDAE 4 Sialis	LIBELLULIDAE 8
D. CHIRONOMIDAE 2 c	COENAGRIIDAE 6
SIMULIDAE 5	C HYDRACHNEIDAE 1 p
TIPULIDAE 5	
SEMATOPHOMIDAE 5 P	
PREVIOUS NUMBER OF SPECIES 18 T.B.I. D.O.E. H.M.W.P. 47 Date 5/5/80	PARENT NUMBER OF SPECIES 24 T.B.I. D.O.E. H.M.W.P. 63 Date

River Duron Site Edtingham Bc Date 5/8/80
 Collected by RB Substratum mud, sand, leaves Depth 0.7m Flow S
 Vegetation Myosotis palustris Width 5m
 Comments _____

Land Use _____

DENDROCOELIDAE 5 Dendrocoelum lacteum	Planorbis cristatus Planorbis laevis Planorbis leucostoma Planorbis planorbis P Planorbis vortex ✓ P Segmentina complanata Segmentina vitinae
PLANARIIDAE 5 Polycelis felina Polycelis nigra P Polycelis tenuis P Dugesia lugubris Dugesia polychroa Dugesia tigrina	UNIONIDAE 6 Anodonta anatina Anodonta cygnea Unio pictorum
OLIGOCHAETA 1 Lumbricidae Lumbriculidae Naididae P Tubificidae	SPHAERIIDAE 3 Pisidium sp. V Sphaerium corneum
PISCICOLIDAE 4 Piscicola geometra	DREISSENIDAE Dreissena polymorpha
ERPOBIDAE 3 P Erpobdella octoculata	ASELIDAE 3 Asellus aquaticus P Asellus meridianus
GLOSSIPHONIIDAE 3 Glossiphonia complanata Glossiphonia heteroclita P Helobdella stagnalis r Theromyzon tessellatum	GAMMARIDAE 6 Crangonyx pseudogracilis r Gammarus duebeni Gammarus pulex P Gammarus taddaei
NERITIDAE 6 Theodoxus fluviatilis	COROPHIDAE 6 Corophium lacustrae Corophium multisetosum
VIVIPARIDAE 6 Viviparus fasciatus Viviparus viviparus	ASTACIDAE 8 Astacus pallipes
VALVATIDAE 3 Valvata cristata Valvata macrostoma Valvata piscinalis	HEMORIDAE 7 CAPNIDAE 10 CHLOROFERIDAE 10
HYDROBIIDAE 3 Assiminea grayana Bithynia leschi r Bithynia tentaculata Hydrobia ulvae Potamopyrgus jenkinsi	LEUCTRIDAE 10 PERLIDAE 10 PERLODIDAE 10
ANCYLIDAE 6 Acroloxus lacustris Ancylus fluviatilis	TAENIOPIERYGIDAE 10 CLATYGENA
PHYSIDAE 3 Physa acuta Physa fontinalis Physa heterostrophus	UTRACOLA COPEPODA r
LYNCEIDAE 3 Lyncea auricularia Lyncea palustris Lyncea peregrina P Lyncea stagnalis Lyncea glutinosa	
PLANORBIDAE 3 Planorbis olivaceus Planorbis marginatus Planorbis lacteum	

BAETIIDAE	4	NOTONECTIDAE	5
<i>Haetia rhodani</i>			
<i>Haetia</i>		PLEIDAE	5
<i>Centroptilum luteolum</i>		APHRODINETRIDAE	10
<i>Centroptilum pennulatum</i>			
<i>Cloeon dipterum</i>	✓C	NEPIDAE	5
<i>Procloeon pseudorufulum</i>			
CAENIDAE	7	HYDROMETRIDAE	5
<i>Caenis moesta</i>			
<i>Caenis</i>		CORIXIDAE	5
EMHEMERIDAE	10	DYTISCIDAE	5
<i>Ephemera danica</i>			
<i>Ephemera vulgata</i>		HYGROBIIDAE	5
EPHEMERELLIDAE	10		
<i>Ephemerella ignita</i>		ELMINTHIDAE	5
HEPTAGENIIDAE	10		
<i>Ecdyonurus</i>		QUALIFIDAE	5
<i>Heptagenia</i>			
LEPTOPHLEBIIDAE	10	HELODIDAE	5
<i>Hebrophebia fusca</i>			
<i>Paraleptophlebia submarginata</i>		GTRINIDAE	5
SIPHONURIDAE	10	AGRIIDAE	8
RHYACOPHILIDAE	7	AESCHNIDAE	8
<i>Azapetus</i>			
<i>Rhyacophila</i>		LESTIDAE	8
HYDROPSYCHIDAE	5	COENPHIDAE	8
POLYCENTROPIDAE	7	CORDULEGASTERIDAE	8
PSYCHOMYIIDAE	8	CORDULIIDAE	8
PHRIGANEIDAE	10	LIBELLULIDAE	8
SERICOSTOMATIDAE	10	COENAGRIIDAE	6
GOERIDAE	10	HYDRACHNELLIDAE	
MOLANIIDAE	10		
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNAPHILIDAE	7		
SIALIDAE	4		
<i>Sialis</i>			
CHIRONOMIDAE	2		
SIMULIDAE	5		
TIPULIDAE	5		
CERATOPOGONIDAE			
PREVIOUS NUMBER OF GROUPS	18	PRESSENT NUMBER OF GROUPS	18
T.B.I.		T.B.I.	
D.O.E.		D.O.E.	
B.M.V.P.		B.M.V.P.	47
Date	17/7/75	Date	

River Dulles Site Potomac Date 17/7/79

Collected by PR E/D 0 Substratum rock Depth 1 Flow 1

Vegetation Phragmites at edge of Eutrophication

Comments

DENDROCOELIDAE	30/30/	
Dendrocoelum lacteum		
PLANARIIDAE	30/30/	
Polycelis felina		
Polycelis nigra		
Polycelis tenuis		✓
Dugesia lugubris		
Dugesia polychroa		
Dugesia tigrina		
OLIGOCHAETA	1/1/	
Lumbricidae		
Lumbriculidae		
Naididae		
ASCICOLIDAE	20/20/	
Ascicola geometra		
ERPOBDELIDAE	10/10/	
Erpobdella octoculata		✓
GLOSSIPHONIIDAE	10/10/	
Glossiphonia complanata		
Glossiphonia heteroclita		
Helobdella stagnalis		✓
Theromyzon tessellatum		
THEODOXIDAE	40/40/	
Theodoxus fluviatilis		
VIVIPARIIDAE	40/40/	
Viviparus fasciatus		
Viviparus piscinalis		
VALVATIDAE	10/10/	
Valvata cristata		
Valvata macrostoma		
Valvata piscinalis		
HYDROBIIDAE	10/10/	
Hydrobia ulvae		
Potamopyrgus jenkinsi		
ANCYLIDAE	40/40/	
Acroloxus lacustris		
Ancylus fluviatilis		
PHYSIIDAE	10/10/	
Physa acuta		
Physa fontinalis		
Physa heterostrophia		
LYMNAEIDAE	10/10/	
Lymnaea auricularia		
Lymnaea palustris		
Lymnaea peregra		
Lymnaea stagnalis		
Lymnaea stagnalis		
PLANORBIDAE	10/10/	
Planorbis albus		
Planorbis carinatus		
Planorbis contortus		
Planorbis cristatus		
Planorbis laevis		
Planorbis leucostoma		
Planorbis planorbis		
Planorbis vortex		✓
Segmentina complanata		
Segmentina vitidae		
UNIONIDAE	40/40/	
Anodonta anatina		
Anodonta cygnea		
Unio pictorum		
SPHAERIIDAE	10/10/	
Pisidium sp.		
Sphaerium corneum		✓
DREISSENIDAE		
Dreissena polymorpha		
ASCELLIDAE	10/10/	
Asellus aquaticus		✓
Asellus meridianus		✓
GAMMARIDAE	40/40/	
Gratunyx pseudograssilis		
Gammarus duebeni		
Gammarus pulex		
Gammarus zaddachi		
COROPHIIDAE	40/40/	
Corophium lacustris		
Corophium multisetosum		
ASTACIDAE	50/80/	
Astacus pallipes		
NEOOURIDAE	50/70/	
CAPNIIDAE	80/100/	
CHLOROPERLIDAE	80/100/	
LEUCTRIDAE	80/100/	
PERLIDAE	80/100/	
PERLODIDAE	80/100/	
TAENIOPTERYGIDAE	80/100/	

Cladocera ✓

NOTIDAE	20/20/	NOTONECTIDAE	30/30/
Notis rhodani			
Notis <i>12mm</i>		PLEIDAE	30/30/
entropitulum luteolum		APHELOCEHELIDAE	80/100/
entropitulum pennulatum			
loeon dipterum		NEPIDAE	30/30/
roclaeon pseudorufulum			
VIDAE	50/70/	HYDROMETRIDAE	30/30/
venis moesta			
venis		CORIXIDAE	30/30/
EMERIDAE	80/100/		
phemera danica		DYTISCIDAE	30/30/
phemera fulgata			
EMERELLIDAE	80/100/	HYGROBIIDAE	30/30/
phemercella ignita			
EUGENIIDAE	80/100/	ELMINTHIDAE	30/30/
edyonurus			
eptagena		HALIPLIDAE	30/30/
POPHLEIIDAE	80/100/		
abrophlebia fusca		HYDROPHILIDAE	30/30/
areolophtetia submarginata			
ELCNURIDAE	80/100/	GYRINIDAE	30/30/
ACOPHILIDAE	50/70/	AGRIIDAE	60/80/
gapetus			
hyacophila		AESINIDAE	60/80/
ROPSYCHIDAE	30/30/		
		LESTIDAE	60/80/
VENTROPIDAE	50/70/		
		GOMPHIDAE	60/80/
CHOMYDAE	60/80/		
		CORIDULEGASTERIDAE	60/80/
YGANEIDAE	80/100/		
		CORDULIIDAE	60/80/
POCOSTOMATIDAE	80/100/		
		LIBELLULIDAE	60/80/
PRIDAE	80/100/		
		HYDRACHNELLIDAE	
AMNIDAE	80/100/		
COCCERIDAE	80/100/		
ROPTILIDAE	40/40/		
NEPHILIDAE	50/70/		
LIDAE	20/20/		
halis			
TRICHOIDAE	5/5/		
ULIDAE	30/30/		
ULIDAE	30/30/		

WIDIOUS NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.W.P.

PRESENT NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.W.P.

NORFOLK AND SUFFOLK RIVER DIVISION

INVERTEBRATE SURVEY

River/Broad/Lake	<u>Deben</u>	Sampling Point	<u>Chetingham Br.</u>
Collected by	<u>GAWH</u>	Sample Number	<u>10</u>
Sorted by	<u>GAWH</u>	Date	<u>28.7.77</u>
Depth	<u>0.05</u>	Substratum	<u>mud, silt</u>
Vegetation	<u>70% Enteromorpha + Callitriche + Epilobium hirsutum.</u>		
Comments	_____		

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 100

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____
Polycelis nigra	_____	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	_____
Polycelis tenuis	<u>C</u>	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	_____
Nematoda	_____	Planorbis leucostoma	_____
Naididae	_____	Planorbis vortex	<u>P</u>
Tubificidae	<u>C</u>	Planorbis albus	_____
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	_____	Anodonta anatina	_____
Helobdella stagnalis	<u>C</u>	Dreissenia polymorpha	_____
Glossiphonia complanata	_____	Sphaerium corneum	<u>P</u>
Erpobdella testacea	_____	Pisidium	<u>P</u>
Theromyzon tessulatum	_____		
Theodoxus fluviatilis	_____	Cladocera	<u>C</u>
Viviparus fasciatus	_____	Ostracoda	<u>C</u>
Viviparus viviparus	_____	Copepoda	<u>A</u>
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	<u>C</u>	Asellus aquaticus	_____
Bithynia tentaculata	<u>C</u>	Asellus meridianus	<u>A</u>
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	<u>C</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____

Sphaeroma rugicauda	_____	Chironomidae	<u>A</u>
Sphaeroma hookeri	_____	Chironomus thummi	_____
Paleamonetes varians	_____	Simuliidae	_____
Astacus pallipes	_____	Dixidae	_____
		Culicidae	_____
Nemoura cinerea	_____	Chaoborus	_____
		Tipulidae	_____
Baetis rhodani	_____	Tabanidae	_____
Baetis fuscatus	_____	Syrphidae	_____
Baetis muticus	_____	Psychodidae	_____
Baetis vernus	_____	Ceratopogonidae	<u>P</u>
Baetis buceratus	_____		
Baetis niger	_____	Notonecta	<u>P</u>
Centroptilum luteolum	<u>A</u>	Plea	_____
Centroptilum pennulatum	_____	Aphelocheirus	_____
Caenis horaria	_____	Nepa	_____
Caenis rivulorum	_____	Hydrometridae	_____
Caenis moesta	_____	Corixidae	<u>VA</u>
Cloeon dipterum	<u>P</u>		
Ephemera danica	_____	Dytiscidae	<u>C</u>
Ephemerella ignita	_____	Hygrobiidae	_____
Ecdyonurus insignis	_____	Elminthidae	_____
Habrophlebia fusca	_____	Haliplidae	_____
Paraleptophlebia submarginata	_____	Cyrinidae	_____
Procloeon pseudorufulum	_____	Hydrophilidae	_____
Siphonurus linneanus	_____		
Heptagenia sulphurea	_____	Anisoptera	_____
		Zygoptera	_____
Rhyacophila	_____		
Hydropsychidae	_____	Limnocyrtidae	<u>A</u>
Philopotamidae	_____	Hygrobatidae	<u>C</u>
Polycentropidae	_____		
Psychomyidae	_____	Neomacheilus	<u>P</u>
Tranodes	_____	Cottus	_____
Mystacides	_____	Gasterosteus	_____
Phryganeidae	_____	Pungitius	_____
Agapetus	_____	Phoxinus	_____
Silo	_____		
Molannidae	_____	Sewage Fungus	_____
Leptoceridae	_____		
Hydroptilidae	_____	Total Groups	<u>24</u>
Limnephilidae	_____	Trent Index	<u>9</u>
		D.O.E. Class	<u>A. (B)?</u>
Lepidoptera	_____		

INVERNESS RIVER SURVEY

River/Broad/Lake	<u>DEBEN</u>	Sampling Point	<u>Creetingham En.</u>
Collected by		Sample Number	<u>(2)</u>
Sorted by		Date	<u>7/6</u>
Depth		Substratum	<u>5th gravel sill</u>
Vegetation	<u>Callitriche 51 + algae</u>		
Comments	<u>Deposit</u>		

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 10

Forifera		Physa fontinalis	
Hydroids		Lymnaea stagnalis	
Dendrocoelum lacteum		Lymnaea palustris	
Polycelis nigra		Lymnaea truncatula	
Polycelis felina		Myxas glutinosa	
Polycelis tenuis		Lymnaea auricularia	
Dugesia tigrina		Lymnaea peregra	
Dugesia lugubris		Planorbarius corneus	
Dugesia polychroa		Planorbis crista	
Planaria torva		Planorbis contortus	
Rhabdocoelidae		Planorbis planorbis	
Nemertini		Planorbis carinatus	
Nematoda		Planorbis leucostoma	
Naididae		Planorbis vortex	
Tubificidae		Planorbis albus	
Lumbriculidae		Planorbis laevis	P 15
Lumbricidae		Segmentina complanata	
Enchytraeidae		Segmentina nitida	
Piscicola geometra		Anodonta cygnea	
Erpobdella octoculata	C	Anodonta anatina	
Helobdella stagnalis		Dreissenia polymorpha	
Glossiphonia complanata		Sphaerium corneum	
Erpobdella testacea		Pisidium	
Theromyzon tessulatum	P		
Theodoxus fluviatilis		Cladocera	
Viviparus fasciatus		Ostracoda	
Viviparus viviparus		Copepoda	
Valvata cristata		Argulus foliaceus	
Valvata piscinalis	P	Asellus aquaticus	
Bithynia tentaculata		Asellus meridianus	
Bithynia leachi		Crangonyx pseudogracilis	
Assimineae grayana		Gammarus pulex	C 60
Hydrobia ulvae		Gammarus duebeni	
Potamopyrgus jenkinsi		Gammarus zaddachi	
Acroloxus lacustris		Corophium lacustrae	
Ancylus fluviatilis		Corophium multisetosum	

Sphaeroma rugicauda

Sphaeroma hookeri

Paleamonetes varians

Astacus pallipes

Nemoura cinerea

600 Baetis rhodani

60 Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centroptilum luteolum

100 Centroptilum pennulatum

Caenis horaria

Caenis rivulorum

Caenis moesta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

100 Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

70 Polycentropidae

Psychomyidae

Trianodes

Mystacides

Phryganeidae

Agapetus

Silo

Molannidae

Leptoceridae

Hydroptilidae

Limnephilidae

Lepidoptera

Chironomidae

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

2 sp. Dytiscidae

Hygrobiidae

Elminthidae

Haliplidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocytharidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

B.M.W.P. 5th

650

River/Stream/Lake
 Collected by AE Sorted By Cretingham Rd. Bridge
 Date 8/2/78 Sample No 0
 Details of sampling site (veg, substratum, flow) D - 0.2 - 1.0 m F - 0.25 ms⁻¹
Subs. - Stones, Gravel, Sand, Mud
Veg. - 2% Potamogeton + Callitriche

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	<u>C</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>C</u>
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	<u>C</u>	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	<u>C</u>	Sphaerium corneum	.....
Helobdella stagnalis	<u>O</u>	Pisidium	<u>C</u>
Glossiphonia complanata	.....		
Erpobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	<u>C</u>
		Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	<u>C</u>
Viviparus viviparus	.....	Asellus meridicanus	<u>C</u>
Valvata cristata	.....	Gammarus pulex	<u>C</u>
Valvata piscinalis	<u>C</u>	Gammarus zaddachi	.....
Eithynia tentaculata	.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	<u>O</u>
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis verus	.....
Lymnaea truncatula	.....	Baetis buceratus	.....

(cont.)

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	O.....	Plea	.....
Centroptilum pennulatum	.....	Aphaeochirus	.....
Caenis horaria	F.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	F.....	Corixidae	C.....
Cloeon dipterum	O.....	Dytiscidae	Dytiscidae.....C.....
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae	.....
Procladius pseudocrafulum	.....	Halipidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	.....	Zygoptera	.....
Philopotamidae	.....	Limncharidae	.....
Polycentropidae	O.....	Hygrobatidae	C.....
Psychomyidae	.....	Noemacheilus	.....
Tranodes	.....	Cottus	.....
Mystacidae	.....	Gasterosteus	.....
Phryganeidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	.....	Total Groups	28.....
Molannidae	C.....	Trent Index	9.....
Leptoceridae	C.....	D.O.E.	A.
Hydroptilidae	.....		
Limnephilidae	C.....		
Lepidoptera	.....		
Sialis lutaria	C.....		
Chironomidae	C.....		
Chironomus thummi	.....		
Simuliidae	C.....		
Dixidae	.....		
Culicidae	C.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		
Ceratopogonidae	C.....		

River/Broad/Lake DEBEN Sampling Point GRETINGHAM ROAD BRIDGE
 Collected by J. S. W. Sorted By H. G.
 Date 21/1/76 Sample No
 Details of sampling site (veg, substratum, flow) Below road bridge
slow - small riffs : Much silt - 1m? like below riffs

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	.....	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	.....
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....	Anodonta cygnea	.....
Enchytraeidae	.....	Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Eopobdella octoculata	.....	Sphaerium corneum	.....
Helobdella stagnalis	.....	Pisidium	.....
Glossiphonia complanata	.....	Cladocera	.....
Eopobdella testacea	.....	Ostracoda (CYPRIA SP.)	V. ABUNDANT
Theromyzon tessulatum	.....	Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	V. ABUNDANT
Viviparus viviparus	.....	Asellus meridicanus	.....
Valvata cristata	.....	Gammarus pulex	ABUNDANT
Valvata piscinalis	.....	Gammarus zaddachi	.....
Bithynia tentaculata	.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....	Nemoura cinerea	.....
Acroloxus lacustris	.....	Baetis rhodani	.....
Ancylus fluviatilis	.....	Baetis fuscatus	.....
Zonitoides nitidus	.....	Baetis muticus	.....
Physa fontinalis	.....	Baetis veruus	.....
Lymnaea stagnalis	.....	Baetis buceratus	.....
Lymnaea palustris	.....		
Lymnaea truncatula	.....		

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	ABUNDANT	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	ABUNDANT	Corixidae (CORIXA SP.)	1
Cloeon dipterum	.....		
Ephemera danica	.....	Dytiscidae	.....
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procloeon pseudocrufulum	.....	Elminthidae	.....
Siphonurus linneanus	.....	Haliplidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
		Hydrophilidae	.....
Ryacophila	.....		
Hydropsychidae	.....	Anisoptera	.....
Philopotamidae	.....	Zygoptera	.....
Polycentropidae	.....		
Psychomyidae	.....	Limnocharidae	.....
Trianodes	.....	Hygrobatidae	.....
Mystacides	.....		
Phryganeidae	.....	Noemacheilus	1
Agapetus	.....	Cottas	.....
Silo	.....	Gasterosteus	.....
Molannidae	.....	Pungitius	.....
Leptoceridae	.....	Phoxinus	.....
Hydroptilidae	.....		
Limnephilidae	.....	Total Groups	14
		Trent Index	8
Lepidoptera	.....		
Sialis lutaria	2		
		Dof Class A	
Chironomidae	2		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

SITE:

DEBENTHAM

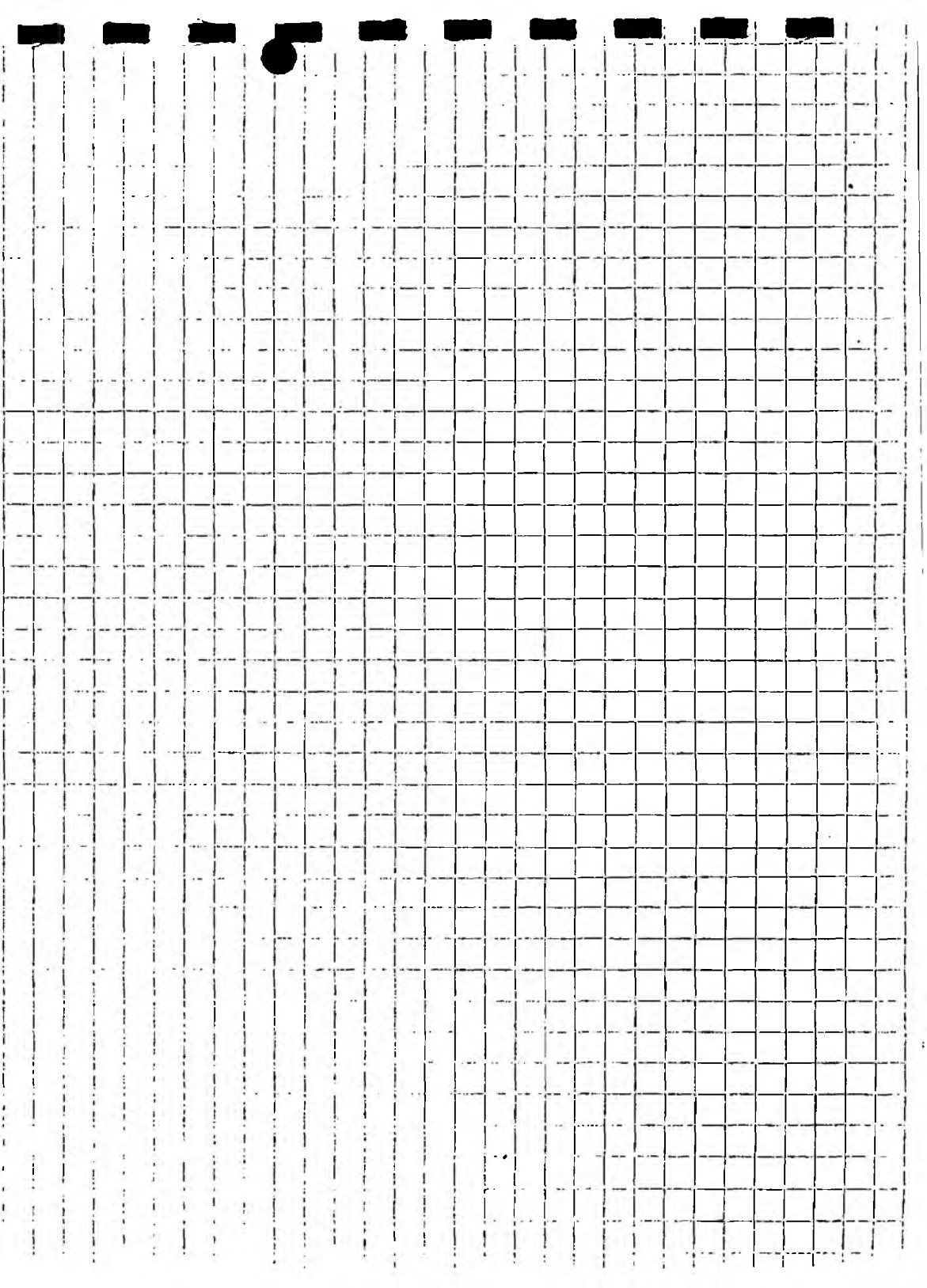
TW

D/S

V/S

BR. 500 m d/s

BR. 1 km d/s



River/Stream/Lake..... Sampling Point..... STW
 Collected by ..H. G..... Sorted By ..H. G. HS Debenham STW
 Date1/7/76..... Sample No
 Details of sampling site (veg, substratum, flow) ..FLOW V. SLUGGISH.....
SUBSTRATUM STONES + GRAVEL COVERED BY CHIRONOMID TUBES.....
LITTLE ~~WATER~~ VEG. - CALLITRICHE + GREEN ALGA.....

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	 O
Polycelis nigra	.....	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	 O	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	 R
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	 R
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....	Anodonta cygnea	.....
Enchytraeidae	.....	Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	 C	Sphaerium corneum	 C
Helobdella stagnalis	 AB	Pisidium	.....
Glossiphonia complanata	 C	Cladocera	.....
Erpobdella testacea	.....	Ostracoda	 V. AB
Theromyzon tessulatum	.....	Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	 O
Viviparus viviparus	.....	Asellus meridicanus	 C
Valvata cristata	.....	Gammarus pulex	.....
Valvata piscinalis	.....	Gammarus zaddachi	.....
Bithynia tentaculata	.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assimineae grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....	Nemoura cinerea	.....
Acroloxus lacustris	.....	Baetis rhodani	.....
Ancylus fluviatilis	.....	Baetis fuscatus	.....
Zonitoides nitidus	.....	Baetis muticus	.....
Physa fontinalis	.....	Baetis veruus	.....
Lymnaea stagnalis	.....	Baetis buceratus	.....
Lymnaea palustris	.....		
Lymnaea truncatula	.....		

(cont.)

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis maesta	.....	Corixidae	 <u>AB</u>
Cloeon dipterum	.....		
Ephemera danica	.....	Dytiscidae	.....
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procladius pseudorufus	.....	Elmidae	.....
Siphonurus linneanus	.....	Halipidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
		Hydrophilidae	.....
Rhyacophila	.....	DYTISCINAE - HYDROPHILUS SP. - <u>AC</u>	.....
Hydroptilidae	.....	Anisoptera	.....
Phlebotomidae	.....	Zygoptera	.....
Polycentropidae	.....		
Psychomyidae	.....	Limnocythidae	 <u>C</u>
Triclistus	.....	Hygrobatidae	 <u>C</u>
Hemiteles	.....		
Phryganeidae	.....	Noemacheilus	.....
Agabus	.....	Cicadas	.....
Silo	.....	Gasterosteus	.....
Molannidae	.....	Pungitius	.....
Leptoceridae	.....	Phoxinus	.....
Hydroptilidae	.....		
Limnephilidae	.....	Total Groups	 <u>18</u>
		Trent Index	 <u>6</u>

Lepidoptera AC

Sialis lutaria AC

Chironomidae V. AB

Chironomus ~~torosus~~ PLUMOSUS AC

Simuliidae AC

Dixidae AC

Culicidae AC

Chaoborus AC

Tipulidae AC

Tabanidae AC

Syrphidae AC

DOE class B

River/Stream DEPEN Sampling Point 4/7 VEOPVH4/7 SLW 4
 Collected by AG Sorted By AG + JSW + RWS
 Date 1/7/76 Sample No
 Details of sampling site (veg, substratum, flow) FLOW V. SLOW
SUBSTRATUM MUD. SMALL AMOUNTS OF CALLITRICH.
NO FLOW IMMEDIATELY ABOVE OUTFALL

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	 ✓
Polycelis nigra	.....	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	.....
Ctenophora	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	.....	Sphaerium corneum	.....
Helobdella stagnalis	.....	Pisidium	.....
Glossiphonia complanata	.....		
Erpobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	.....
		Copepoda	.....
Heodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	.....
Viviparus viviparus	.....	Asellus meridicanus	.....
Valvata cristata	.....	Gammarus pulex	.....
Valvata piscinalis	.....	Gammarus zaddachi	.....
Bithynia tentaculata	.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis veruus	.....
Lymnaea truncatula	.....	Baetis buceratus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae	V.V.AB
Cloeon dipterum	.....		
Ephemera danica	.....	Dytiscidae	.....
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procladius pseudorufus	.....	Elmidae	.....
Siphonurus lineatus	.....	Halipidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
		Hydrophilidae	.....
Rhyacophila	.....		
Hydropsychidae	.....	Anisoptera	.....
Phlebotomidae	.....	Zygoptera	.....
Polycentropidae	.....		
Psychomyidae	.....	Limnephilidae	.....
Trichoptera	.....	Hygrobatidae	.....
Mesochorus	.....		
Phryganeidae	.....	Noemacheilus	.....
Agabus	.....	Catantopidae	.....
Silphidae	.....	Gasterosteus	.....
Molannidae	.....	Pungitius	.....
Leptoceridae	.....	Phoxinus	.....
Hydroptilidae	.....	Total Groups	6
Limnephilidae	.....	Trent Index	4

Lepidoptera
Sialis lutaria

Chironomidae
Chironomus thummi
Simuliidae
Dixidae
Culicidae
Chaoborus
Tipulidae
Tabanidae
Syrphidae

AB

DOE class B / C

DE SI

186623

16/1/83

Deben

SITE

D/S Debenham STW

REF

DATE

TIME

SHADE

LN

EM

SUBSTRATE

LAND USE

None

Boulders

Wasteland

Width 3m

Low

Pebbles

Urban

Depth 2.5/

Med

Gravel

Pastural

Temp °C

Great

Sand

Arable

Oxygen %

Silt

Heath

Representative of re

Detritus

Bog/Marsh

Yes/No

Marginal Plants

Decid. Wood

Submerged Plants

Conif. Wood

Marginal/Emergent

Bankside

Submerged

One side only/Both sides

% Cover = None

not much

Agrostis stolonifera

Brambles

Filipendula ulmaria

Hesp. Agrimony

Low Bushes

Pond Bay Willow Herb

Solanum dulcamara

Apium nodiflorum

Berula erecta

Callitriche sp.

Chara sp.

Elodea canadensis

Filamentous algae

Fontinalis sp.

Myriophyllum sp.

Nuphar lutea

Oenanthe fluviatilis

Potamogeton crispus

Potamogeton pectinatus

Potamogeton perfoliatus

Ranunculus sp.

Zannichellia palustris

Alisma plantago-aquatica

Apium nodiflorum

Berula erecta

Carex sp.

Epilobium sp.

Glyceria maxima

Iris pseudacorus

Juncus sp.

Lythrum salicaria

Najas aquatica

Najas scorpioides

Ranunculus officinale

Ranunculus fluviatilis

Phalaris arundinacea

Phragmites australis

Rorippa amphibia

Sagittaria sagittifolia

Scheuchzeria palustris

Sparganium sp.

Typha latifolia

Veronica anagallis-aquatica

Veronica beccabunga

Grass

Comments:-

Site seems devoid of animals. Perhaps caused by flooding, but in comparison with the one sampled today it is very sparse.

Previous B.M.W.P. score =

Present B.M.W.P. score =

Androcossus lacteus	
ARIIDAE	5
Alycia fallax	
Alycia nigra	
Alycia tenuis	
Aegula lugubris	
Aegula polychroma	
Aegula tigrina	
COCHLEATA	1
Umbricidae	
Umbriculidae	
Alidae	
Ubificidae	✓ OE C
CICOLINAE	4
Tacicola geometra	
OBIELLIDAE	3
Erpobdella octoculata	
ESSIMONIIDAE	3
Glossiphonia complanata	✓ ✓
Glossiphonia heteroclita	
Ellobdella stagnalis	
Theromyzon tessellatum	
ITIDAE	6
Heodorux fluviatilis	
IPARIDAE	6
Viviparus fasciatus	
Viviparus viviparus	
ATIDAE	3
Alvata cristata	
Alvata macrostoma	
Alvata piacinalis	
POBYIIDAE	3
Caeminea grayana	
Hithynia leachi	
Hithynia tentaculata	
Hydrobia ulvae	
Notanoplytus jenkinsi	
YLIDAE	6
Ceroloxus lacustris	
Encylus fluviatilis	
SIDAE	3
Syna acuta	
Syna fontinalis	
Syna heterostrophia	
YNAEIDAE	3
Yanaca auricularia	
Yanaca palustris	
Yanaca peregrina	
Yanaca stagnalis	
Yanaca glutinosa	
PLANORBIDAE	3
Planorbis albus	
Planorbis carinatus	
Planorbis confertus	
Planorbis cristata	
Planorbis laevis	
Planorbis leucostoma	
Planorbis planorbis	
Planorbis vortex	
Segmentina complanata	
Segmentina villosa	
IONIDAE	6
Odonta anatina	
Odonta cygnea	
Odonta pictorata	

SIMAEIIDAE	3
Pisidium sp.	
Sphaerium corneum	
DUEISSENIDAE	
Dreissena polymorpha	
ASELLIDAE	3
Acellus aquaticus	
Acellus meridionalis	✓ P
GAMMARIDAE	6
Crangonyx pseudogracilis	
Gammarus duebeni	
Gammarus pulex	
Gammarus zaddachi	
COHOPHIIDAE	6
Corophium lacustrae	
Corophium multiaulosus	
ASTACIDAE	8
Astacus pallipes	
NEHOUKIDAE	7
CAPNIIDAE	10
CHLOROPERLIDAE	10
LEUCTRIDAE	10
BARTIIDAE	4
Baetis rhodani	
Baetis	
Centroptilum luteolum	
Centroptilum pennulatum	✓ P
Cloeon dipterum	
Proclouon pseudorufulum	
CAENIDAE	7
Caenis moesta	
Caenis	
EMIDERIDAE	10
Ephemera danica	
Ephemera vulgata	
EPHEMERELLIDAE	10
Ephemerella ignita	
HEPTAGENIIDAE	10
Ecdyonurus	
Heptagenia	
LEPTOPHLEBIIDAE	10
Habrophlebia fusca	
Paraleptophlebia submarginata	
SIPHONUNIDAE	10
RHYACOPHYLLIDAE	7
Agapetus	
Rhyacophila	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHONYIIDAE	8
PHRYGANEIDAE	10
SERICOSTOMATIDAE	10
COERIDAE	10

MOLANIIDAE	10
LEPTOCERIDAE	10
HYDROPTILIDAE	6
LYNCEPHIIDAE	7
SIALIDAE	4
Siella	✓ r
CHIRONOMIDAE	2
CEPHALIDAE	5
TYPHIDAE	5
NOTONECTIDAE	5
PLEIDAE	5
AMELOCHNEURIDAE	10
NEPIDAE	5
HYDROUTRIDAE	5
CORIXIDAE	5
DYTISCIDAE	5
HYGROBIIDAE	5
ELMIMIIDAE	5
HALIPLIDAE	5
HELODIDAE	5
CYRINIDAE	5
AGRIIDAE	8
AESHNIDAE	8
LESTIDAE	8
COMPHIDAE	8
CORDULEGASTERIDAE	8
CORDULIIDAE	8
LIBELLULIDAE	8
COENAGRIIDAE	6
HYDRACHNELLIDAE	
CLATONCHONIDAE	
CLADOCERA	
COTRACODA	
COTRACODA	

DE. 50

16/1/83

DEBEN	STCS	U/S	Debenham STW	TOP	CODE	DATE
FLOW	SHADE	LN	PH	SUBSTRATE	LAND USE	
Fast	None.....	.....	.....	Boulders.....	Wasteland.....	Width.....
.....	Low.....	.....	.....	Pebbles.....	Urban.....	Depth...../...../.....
Run.....	Med.....	.....	.....	Gravel.....	Pastural.....	Temp °C.....
Slow Run.....	Great.....	.....	.....	Sand.....	Arable.....	Oxygen %.....
.....				Silt.....	Heath.....	Representative of re:
Rock.....				Detritus.....	Bog/Marsh.....	Yes/No.....
				Marginal Plants	Decid. Wood.....	
				Submerged Plants.....	Conif. Wood.....	

Marginal/Emergent	Bankside	Submerged
One side only/Both sides		% Cover=
Agrostis stolonifera	Brambles	
Alisma plantago-aquatica	Filipendula ulmaria	Apium nodiflorum
Apium nodiflorum	Hemp Agrimony	Barula erecta
Barula erecta	Low Bushes	Callitriche sp.
Carex sp.	Poss Bay Willow Herb	Chara sp.
Epilobium sp.	Solanum dulcamara	Elodea canadensis
Glyceria maxima		Filamentous algae
Iris pseudacorus		Fontinalis sp.
Juncus sp.		Myriophyllum sp.
Lythrum salicaria		Nuphar lutea
Najas aquatica		Oenanthe fluviatilis
Agrostis scorpioides		Potamogeton crispus
Nasturtium officinale		Potamogeton pectinatus
Oenanthe fluviatilis		Potamogeton perfoliatus
Phalaris arundinacea		Ranunculus sp.
Phragmites australis		Zannichellia palustris
Rorippa amphibia		Grass
Sagittaria sagittifolia		
Schoenoplectus lacustris		
Sparganium sp.		
Typha latifolia		
Veronica anagallis-aquatica		
Veronica beccabunga		
	Comments:-	
	Flooded (dry bed with leaved grass)	

Previous B.N.W.P. score =

Present B.N.W.P. score =

<i>Dendrocoelus larteyi</i>	
LAHARIIDAE	5
<i>Polycella felina</i>	
<i>Polycella nigra</i>	
<i>Polycella tenuis</i>	
<i>Dugesia luxurians</i>	
<i>Dugesia polychroa</i>	
<i>Dugesia tigrina</i>	
LIGOCOAETA	7
Lumbricidae	
Lumbriculidae	
Naididae	
Tubificidae	✓P
ISCICOLIDAE	4
<i>Minicola geometrica</i>	
NOBUELLIDAE	3
<i>Eropodella octoculata</i>	
GLOSSIPHONIIDAE	3
<i>Glossiphonia complanata</i>	
<i>Glossiphonia heteroclita</i>	
<i>Helobdella stagnalis</i>	
<i>Theromyzon tessellatum</i>	
ERITIDAE	6
<i>Theodoxus fluviatilis</i>	
VIVIPARIDAE	6
<i>Viviparus fasciatus</i>	
<i>Viviparus viviparus</i>	
ALVATIDAE	3
<i>Valvata cristata</i>	
<i>Valvata macrostoma</i>	
<i>Valvata piscinalis</i>	
HYDROBIIDAE	3
<i>Assiminea grayana</i>	
<i>Bithynia leachi</i>	
<i>Bithynia tentaculata</i>	
<i>Hydrobia ulvae</i>	
<i>Potamopyrgus jenkinsi</i>	
ACYLIDAE	6
<i>Acroloxus lacustris</i>	
<i>Ancylus fluviatilis</i>	
HYSIDAE	3
<i>Physa acuta</i>	
<i>Physa fontinalis</i>	
<i>Physa heterostrophia</i>	
LYMAEIDAE	3
<i>Lymnaea auricularia</i>	
<i>Lymnaea palustris</i>	
<i>Lymnaea peregra</i>	
<i>Lymnaea stagnalis</i>	
<i>Hyas glutinosa</i>	
PLANORBIDAE	3
<i>Planorbis albus</i>	
<i>Planorbis carinatus</i>	
<i>Planorbis confertus</i>	
<i>Planorbis cristatus</i>	
<i>Planorbis laevis</i>	
<i>Planorbis leucostoma</i>	
<i>Planorbis planorbis</i>	
<i>Planorbis vortex</i>	
<i>Segmentina complanata</i>	
<i>Segmentina vitidis</i>	
YTONIDAE	6
<i>Modiola anatina</i>	
<i>Modiola cygnea</i>	
<i>Modiola pictorina</i>	

SIMAEIIDAE	3
<i>Pisidium</i> sp.	
<i>Sphaerium corneum</i>	
DREISSENIDAE	
<i>Dreissena polymorpha</i>	
ASELLIDAE	3
<i>Asellus aquaticus</i>	
<i>Asellus meridionalis</i>	
GAMMARIDAE	6
<i>Crangonyx pseudogracilis</i>	
<i>Gammarus duebeni</i>	
<i>Gammarus pulex</i>	
<i>Gammarus zaddachi</i>	
COROPHIIDAE	6
<i>Corophium lacustrae</i>	
<i>Corophium multisetosum</i>	
ASTACIDAE	8
<i>Astacus pallipes</i>	
MEMBRIDAE	7
CAPNIIDAE	10
CHLOROPERLIDAE	10
LEUCTRIDAE	10
BAETIDAE	4
<i>Baetis rhodani</i>	
<i>Baetis</i>	
<i>Centroptilum luteolum</i>	
<i>Centroptilum pennulatum</i>	
<i>Cloeon dipterum</i>	
<i>Procladius pseudorufus</i>	
CARNIDAE	7
<i>Caenis moesta</i>	
<i>Caenis</i>	
EMERIDAE	10
<i>Ephemera danica</i>	
<i>Ephemera vulgata</i>	
EPHEMERELLIDAE	10
<i>Ephemerella ignita</i>	
NEPTAGENIIDAE	10
<i>Ecdyonurus</i>	
<i>Neptenia</i>	
LEPTOPHEBIIDAE	10
<i>Habrophlebia fusca</i>	
<i>Paraleptophlebia submarginata</i>	
SIPHONURIDAE	10
PHYCOPHYLLIDAE	7
<i>Agabus</i>	
<i>Rhyacophila</i>	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHONYIIDAE	8
PHRYGANEIDAE	10
SERICOSTOMATIDAE	10
GOERIDAE	10

MOLANIIDAE	10
LEUCOCERIDAE	
HYDROTILIDAE	6
LYNCEIDAE	
SIALIDAE	4
<i>Sialis</i>	
CHIRONOMIDAE	✓P
DIPTERIDAE	✓P
TIPIIDAE	
NOTONECTIDAE	5
PLEIDAE	5
AMPHIRODIDAE	10
NEPIDAE	5
HYDROMETRIDAE	
CORIXIDAE	5
DYTISCIDAE	5
HYGROBIIDAE	5
ELMIDAE	5
HALIPLIDAE	5
HELODIDAE	5
GYRINIDAE	5
AGRIIDAE	8
ALBIDAE	8
LESTIDAE	8
COMPHIDAE	8
CORDULEGASTERIDAE	8
CORDULIDAE	8
LIBELLULIDAE	8
COENAGRIDAE	6
HYDRACHNIDAE	
CLADOCERA	
OCTACODA	
COLEPTRA	

River/Stream/Lake DEBEN Sampling Point BRIDGE APPROX. 500 M. D/S
 Collected by A.G. Sorted By J.H. G. + J.S.W. + R.W.E. DEBENHAM
 Date 1/7/76 Sample No
 Details of sampling site (veg, substratum, flow) FLOW V. SLUGGISH
SUBSTRATUM MUD + LARGE AMOUNTS GREEN ALGAE. NO MACROPHYTES.

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	 ✓ Oc
Polycelis nigra	.....	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	.....
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Fiscicola geometra	.....	Dreissena polymorpha	.....
Erpobdella octoculata	.....	Sphaerium corneum	.....
Helobdella stagnalis	.....	Pisidium	.....
Glossiphonia complanata	.....		
Erpobdella testacea	.....	Cladocera	 AB
Theromyzon tessulatum	.....	Ostracoda	 AB
Theodoxus fluviatilis	.....	Copepoda	.....
Viviparus fasciatus	.....	Argulus foliaceus	.....
Viviparus viviparus	.....	Asellus aquaticus	 E. AB C
Valvata cristata	.....	Asellus meridicanus	 AB
Valvata piscinalis	.....	Gammarus pulex	.....
Bithynia tentaculata	.....	Gammarus zaddachi	.....
Bithynia leachi	.....	Corophium lacustrae	.....
Assiminea grayana	.....	Palaemonetes varians	.....
Hydrobia ulvae	.....	Sphaeroma rugicauda	.....
Potamopyrgus jenkinsi	.....	Astacus pallipes	.....
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis veruus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Apheboellirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae	AB.
Cloeon dipterum	.....		
Ephemerella danica	.....	Dytiscidae	.....
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procladius pseudocrufulum	.....	Elminthidae	.....
Siphonurus linneanus	.....	unidentified Coleopteran adult	o✓
Heptagenia sulphurea	.....	Halipidae	.....
	.....	Gyrinidae	.....
Rhyacophila	.....	Hydrophilidae	.....
Hydropsychidae	.....	DYTISCINAE - HYDROPHORUS SP.	.....
Ptilocentropidae	.....	Anisoptera	.....
Polycentropidae	.....	Zygoptera	.....
Psychomyidae	.....	Limnocoaridae	.....
Triacodes	.....	Hygrobatidae	.....
Hydroptilidae	.....		
Phryganidae	.....	Noemacheilus	.....
Agapetus	.....	Cottus	.....
Silo	.....	Gasterosteus	.....
Molannidae	.....	Pungitius	.....
Leptoceridae	.....	Phoxinus	.....
Hydroptilidae	.....		
Limnephilidae	.....	Total Groups	9
		Trent Index	6
Lepidoptera	.....		
Sialis lutaria	.....	DOE Class B/C	
Chironomidae	AB		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

SITE: EYKE FORD

INVERTEBRATE SURVEY

BFD-8037

River/Broad/Lake <u>Deben</u>	Sampling Point <u>Eyke Ford</u>
Collected by <u>94WH</u>	Sample Number <u>25</u>
Sorted by <u>9mutt</u>	Date <u>28.7.77</u>
Depth <u>0.1-0.4</u> Flow <u>0.4</u>	Substratum <u>gravel</u>
Vegetation <u>Najas lutea, C. platycarpa? v. small amount, L. minor, Cladophora</u>	
Comments <u>Entomomorpha, Elodea</u>	

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 10

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	<u>C</u>	Lymnaea palustris	_____
Polycelis nigra	<u>C</u>	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	<u>C</u>
Polycelis tenuis	<u>C</u>	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	<u>C</u>	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	<u>P</u>
Nematoda	_____	Planorbis leucostoma	_____
Naididae	_____	Planorbis vortex	<u>C</u>
Tubificidae	_____	Planorbis albus	_____
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	_____	Anodonta anatina	_____
Helobdella stagnalis	_____	Dreissenia polymorpha	_____
Glossiphonia complanata	<u>P</u>	Sphaerium corneum	<u>C</u>
Erpobdella testacea	_____	Pisidium	_____
Theromyzon tessulatum	_____		
Theodoxus fluviatilis	_____	Cladocera	<u>C</u>
Viviparus fasciatus	_____	Ostracoda	<u>C</u>
Viviparus viviparus	_____	Copepoda	<u>A</u>
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	_____	Asellus aquaticus	_____
Bithynia tentaculata	<u>C</u>	Asellus meridianus	_____
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	<u>C</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____
Ancylus fluviatilis	_____	Corochium multisetosum	_____

Sphaeroma hookeri	_____	Chironomus thummi	_____
Palaemonetes varians	_____	Simuliidae	_____
Astacus pallipes	_____	Dixidae	_____
		Culicidae	_____
Nemoura cinerea	_____	Chaoborus	_____
		Tipulidae	_____
Baetis rhodani	_____	Tabanidae	_____
Baetis fuscatus	_____	Syrphidae	_____
Baetis muticus	_____	Psychodidae	_____
Baetis vernus	_____	Ceratopogonidae	<u>P</u>
Baetis buceratus	_____		
Baetis niger	_____	Notonecta	_____
Centroptilum luteolum	_____	Plea	_____
Centroptilum pennulatum	_____	Aphelocheirus	_____
Caenis horaria	_____	Nepa	_____
Caenis rivulorum	_____	Hydrometridae	_____
Caenis moesta	<u>P</u>	Corixidae	_____
Cloeon dipterum	<u>P</u>		
Ephemera danica	_____	Dytiscidae	<u>C</u>
Ephemerella ignita	_____	Hygrobiidae	_____
Ecdyonurus insignis	_____	Elminthidae	_____
Habrophlebia fusca	_____	Haliplidae	_____
Paraleptophlebia submarginata	_____	Cyrinidae	_____
Procloeon pseudorufulum	_____	Hydrophilidae	_____
Siphonurus linneanus	_____		
Heptagenia sulphurea	_____	Anisoptera	_____
		Zygoptera	_____
Rhyacophila	_____		
Hydropsychidae	_____	Limnocyphidae	<u>C</u>
Philopotamidae	_____	Hygrobatidae	<u>C</u>
Polycentropidae	_____		
Psychomyidae	_____	Neomacheilus	_____
Tranodes	_____	Cottus	_____
Nystacides	_____	Gasterosteus	_____
Phryganeidae	_____	Pungitius	_____
Agapetus	_____	Phoxinus	_____
Silo	_____		
Molannidae	_____	Sewage Fungus	_____
Leptoceridae	_____		
Hydroptilidae	_____	Total Groups	<u>21</u>
Limnephilidae	_____	Trent Index	<u>9</u>
		D.C.E. Class	<u>A</u>
Lepidoptera	_____		
Sialis lutaria	_____		

River/Broad/Lake Deben Sampling Point Eyke Ford
 Collected by _____ Sample Number 5
 Sorted by _____ Date 7/6/78
 Depth 0.1 Flow 0.2 Substratum shingle gravel
 Vegetation None
 Comments Deben

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 100

Porifera	_____	Physa fontinalis	<u>P</u>	<u>15</u>
Hydroids	_____	Lymnaea stagnalis	_____	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____	_____
Polycelis nigra	<u>C</u>	Lymnaea truncatula	_____	_____
Polycelis felina	_____	Myxas glutinosa	_____	_____
Polycelis tenuis	_____	Lymnaea auricularia	_____	_____
Dugesia tigrina	_____	Lymnaea peregra	<u>P</u>	<u>15</u>
Dugesia lugubris	_____	Planorbarius corneus	_____	_____
Dugesia polychroa	_____	Planorbis crista	_____	_____
Planaria torva	_____	Planorbis contortus	_____	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____	_____
Nemertini	_____	Planorbis carinatus	_____	_____
Nematoda	_____	Planorbis leucostoma	_____	_____
Naididae	_____	Planorbis vortex	_____	<u>1</u>
Tubificidae	<u>C</u>	Planorbis albus	_____	_____
Lumbriculidae	_____	Planorbis laevis	_____	_____
Lumbricidae	_____	Segmentina complanata	_____	_____
Enchytraeidae	_____	Segmentina nitida	_____	_____
Piscicola geometra	_____	Anodonta cygnea	_____	_____
Erpobdella octoculata	<u>P</u>	Anodonta anatina	_____	_____
Helobdella stagnalis	_____	Dreissenia polymorpha	_____	_____
Glossiphonia complanata	<u>P</u>	Sphaerium corneum	<u>C</u>	<u>30</u>
Erpobdella testacea	_____	Pisidium	_____	_____
Theromyzon tessulatum	_____	_____	_____	_____
Theodoxus fluviatilis	<u>P</u>	Cladocera	_____	_____
Viviparus fasciatus	_____	Ostracoda	_____	_____
Viviparus viviparus	_____	Copepoda	_____	_____
Valvata cristata	_____	Argulus foliaceus	_____	<u>15</u>
Valvata piscinalis	_____	Asellus aquaticus	<u>C</u>	_____
Bithynia tentaculata	<u>P</u>	Asellus meridianus	<u>C</u>	_____
Bithynia leachi	_____	Crangonyx pseudogracilis	_____	_____
Assiminea grayana	_____	Gammarus pulex	<u>C</u>	<u>6</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____	_____
Ancylus fluviatilis	<u>P</u>	Corophium multisetosum	_____	_____

Synaeroma hookeri
Paleamonetes varians
Astacus pallipes

Nemoura cinerea

100 Baetis rhodani

Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centropilum luteolum

Centropilum pennulatum

100 Caenis horaria

Caenis rivulorum

Caenis moesta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

Habrophlebia fusca

Paraleptophlebia submarginata

Proclaeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

Polycentropidae

Psychomyidae

Tranodes

Mystacides

Phryganeidae

Agapetus

Silo

Molannidae

Leptoceridae

Hydroptilidae

Limnephilidae

Lepidoptera

Sialis lutaria

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae

Hygrobiidae

Elminthidae

Halipidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocyphidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

25

9

A

670

670

River/Broad/Lake..... DEBEN Sampling Point Eyke Ford 67058037
 Collected by FF Sorted By FF
 Date 8/2/74 Sample No 21
 Details of sampling site (veg, substratum, flow) ... D. - 0.5 m ... F. - 0.5 ms⁻¹ ...
 Subs. - Stones + Gravel
 veg. - 1% Cladophora

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	 <u>C</u>
Polycelis nigra	 <u>F</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	 <u>C</u>	Planorbis contortus	 <u>C</u>
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	 <u>C</u>
Nematoda	.....	Planorbis albus	 <u>C</u>
		Planorbis laevis	.....
Naididae	.....	Segmentina complanata	 <u>O</u>
Tubificidae	 <u>C</u>	Segmentina nitida	.....
Lumbriculidae	.....		
Lumbricidae	.....	Anodonta cygnea	.....
Enchytraeidae	.....	Anodonta anatina	.....
		Dreissena polymorpha	.....
Fiscicola geometra	.....	Sphaerium corneum	 <u>C</u>
Erpobdella octoculata	 <u>C</u>	Pisidium	 <u>C</u>
Helobdella stagnalis	.....		
Glossiphonia complanata	.....	Cladocera	.....
Erpobdella testacea	.....	Ostracoda	 <u>C</u>
Theromyzon tessulatum	.....	Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	 <u>C</u>
Viviparus viviparus	.....	Asellus meridicanus	 <u>C</u>
Valvata cristata	 <u>C</u>	Gammarus pulex	 <u>C</u>
Valvata piscinalis	 <u>A</u>	Gammarus zaddachi	.....
Bithynia tentaculata	 <u>C</u>	Corophium lacustrae	.....
Bithynia leachi	 <u>A</u>	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zenitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	 <u>C</u>	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis veruus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	 ^c	Napa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae	.....
Cloeon dipterum	 ^o	Dytiscidae	 ^o
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elmuthidae	 ^c
Procloeon pseudocrufulum	.....	Halipidae	 ^c
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	 ^o	Zygoptera	.....
Phlebotomidae	.....	Limnocythidae	 ^c
Polycentropidae	.....	Hygrobatidae	 ^c
Psychomyidae	 ^o	Noemacheilus	.....
Triantodes	.....	Cottus	.....
Mystacides	.....	Gasterosteus	.....
Phryganeidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	 ^c	Total Groups	 ³³
Molannidae	.....	Trent Index	 ⁹
Leptoceridae	 ^c	D.O.E.	A.
Hydroptilidae	.....		
Limnephilidae	 ^c		
Lepidoptera	.....		
Sialis lutaria	.....		
Chironomidae	 ^c		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

Ver Deben Site EYKE FORD BROOK Date 17/7/79

ected by PE ED Substratum stones Depth 1m Flow 2m/s

Station mass small amounts of Rana & Muscic at a's margin

ments

ANDROCOELIDAE 30/30/

Androcoelum lacteum

ARIIDAE 30/30/

Polycelis felina

Polycelis nigra

Polycelis tenuis

Dugesia lugubris

Dugesia polychroa

Dugesia tigrina

IGOCOAETA 1/1/

umbricidae

umbriculidae

Naididae

ICOLIDAE

icola geometra

POBDELLIDAE 10/10/

Probdella octoculata

LOSSIPHONIIDAE 10/10/

Glossiphonia complanata

Glossiphonia heteroclita

lebdella stagnalis

Theromyzon tessulatum

ITIDAE 40/40/

heodoxus fluviatilis

IVIPARIDAE 40/40/

viviparus fasciatus

viviparus piscinalis

ALVATIDAE 10/10/

Valvata cristata

Valvata macrostoma

Valvata piscinalis

ITHYIIDAE 10/10/

ithymina grayana

Bithynia leachi

Bithynia tentaculata

Hydrobia ulvae

Potamopyrgus jenkinsi

ACYLIDAE 40/40/

Acroloxus lacustris

Acroloxus fluviatilis

HYSIDAE 10/10/

Physa acuta

Physa fontinalis

Physa heterostrophia

LYMAEIDAE 10/10/

Lymnaea auricularia

Lymnaea palustris

Lymnaea peregra

Lymnaea stagnalis

Lymnaea stagnalis

PLANORBIIDAE 10/10/

Planorbis albus

Planorbis carinatus

Planorbis contortus

Planorbis cristatus

Planorbis laevis

Planorbis leucostoma

Planorbis planorbis

Planorbis vortex

Segmentina complanata

Segmentina vitidae

UNIONIDAE 40/40/

Anodonta anatina

Anodonta cygnea

Unio pictorum

SPHAERIIDAE 10/10/

Pisidium sp.

Sphaerium corneum

DREISSENIDAE

Dreissena polymorpha

ASELLIDAE 10/10/

Asellus aquaticus

Asellus meridianus

GAMMARIDAE 40/40/

Crangonyx pseudogracilis

Gammarus duebeni

Gammarus pulex

Gammarus zaddachi

COROPHIDAE 40/40/

Corophium lacustris

Corophium multisetosum

ASTACIDAE 60/60/

Astacus pallipes

NEPOURIDAE 50/70/

CAPHIIDAE 60/100/

CHLOROPERLIDAE 60/100/

LEUCTRIDAE 80/100/

PERLIDAE 80/100/

PERLODIDAE 80/100/

TAENIOPTERYGIDAE 80/100/

Penia c

[illegible]

River/Broad/Lake DEBEN Sampling Point EYKE FORD 6FDC6057
 Collected by J.S.W. Sorted By H.G.
 Date 21/1/76 Sample No
 Details of sampling site (veg, substratum, flow) VEG - CALLITRICHAE
clean gravel + silt with deeper mud

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	<u>F. ABUNDANT</u>	Lymnaea peregra	.....
Polycelis nigra	<u>V. ABUNDANT</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	<u>ABUNDANT</u>	Planorbis contortus	.....
Dugesia polychroa <u>LUCUBRIS</u>	<u>ABUNDANT</u>	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>1</u>
Nematoda	.....	Planorbis albus	.....
<u>DELOCEPHALA PUNCTATA</u>	<u>1</u>	Planorbis laevis	.....
Naididae	.....	Segmentina complanata	.....
Tubificidae	<u>FLABUNDANT</u>	Segmentina nitida	.....
Lumbriculidae	<u>210</u>	Anodonta cygnea	.....
Lumbricidae	.....	Anodonta anatina	.....
Enchytraeidae	.....	Dreissena polymorpha	.....
Piscicola geometra	.....	Sphaerium corneum	<u>1</u>
Eopobdella octoculata	<u>3</u>	Pisidium	.....
Helobdella stagnalis	.....	Cladocera	.....
Glossiphonia complanata	.....	Ostracoda (<u>CYPRIDIA SP.</u>)	<u>2</u>
Eopobdella testacea	.....	Copepoda	.....
Theromyzon tessulatum	.....	Argulus foliaceus	.....
Theodoxus fluviatilis	.....	Asellus aquaticus	<u>V. ABUNDANT</u>
Viviparus fasciatus	.....	Asellus meridicanus	.....
Viviparus viviparus	.....	Gammarus pulex	<u>ABUNDANT</u>
Valvata cristata	.....	Gammarus zaddachi	.....
Valvata piscinalis	<u>F. ABUNDANT</u>	Corophium lacustrae	.....
Bithynia tentaculata	<u>1</u>	Paleamonetes varians	.....
Bithynia leachi	.....	Sphaeroma rugicauda	.....
Assiminea grayana	.....	Astacus pallipes	.....
Hydrobia ulvae	.....	Nemoura cinerea	.....
Potamopyrgus jenkinsi	.....	Baetis rhodani	.....
Acroloxus lacustris	.....	Baetis fuscatus	.....
Ancylus fluviatilis	.....	Baetis muticus	.....
Zonitoides nitidus	.....	Baetis veruus	.....
Physa fontinalis	.....		
Lymnaea stagnalis	.....		
Lymnaea palustris	.....		

Caetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	ABUNDANT	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae (CORIXA SP.)	.....
Cloeon dipterum	.....	Dytiscidae	.....
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae (ELMIS AENEAE - NYMPH)	1
Procloeon pseudorufulum	.....	(ELMIS - ADULT)	1
Siphonurus linneanus	.....	Haliplidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
Ryacophila	.....	Hydrophilidae	.....
Hydropsychidae	.....	Anisoptera	.....
Philopotamidae	.....	Zygoptera	.....
Polycentropidae	.....	Limnocharidae	.....
Psychomyidae	.....	Hygrobatidae	F. ABUNDANT
Trianodes	.....	Noemacheilus	1
Mystacides	.....	Cottus	.....
Phryganeidae	.....	Gasterosteus	.....
Agapetus	.....	Pungitius	.....
Silo	.....	Phoxinus	.....
Molannidae	.....	Total Groups	21
Leptoceridae	.....	Trent Index	8
Hydroptilidae	.....		
Limnephilidae	1		
Lepidoptera	.....		
Sialis lutaria	.....	DOE Class A	
Chironomidae	>10		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

SITE: CLEVERING BRIDGE

[Faint, mostly illegible text covering the majority of the page, possibly representing a document or a list of items.]



River/Broad/Lake Deben Sampling Point Glover's Dy
 Collected by _____ Sample Number 4
 Sorted by _____ Date 7/6/
 Depth _____ Flow _____ Substratum gravel sand
 Vegetation Najas 707. Oenanthia
 Comments drift

P = Present, <10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, >10

Porifera		Physa fontinalis	P	15
Hydroids		Lymnaea stagnalis		
Dendrocoelum lacteum		Lymnaea palustris		
Polycelis nigra	P	Lymnaea truncatula		
Polycelis felina		Myxas glutinosa		
Polycelis tenuis		Lymnaea auricularia		
Dugesia tigrina		Lymnaea peregra		
Dugesia lugubris		Planorbis cornutus		
Dugesia polychroa		Planorbis crista		
Planaria torva		Planorbis contortus	P	15
Rhabdocoelidae		Planorbis planorbis	P	
Nemertini		Planorbis carinatus		
Nematoda		Planorbis leucostoma		
Naididae		Planorbis vortex		
Tubificidae	C	Planorbis albus		
Lumbriculidae		Planorbis laevis		
Lumbricidae		Segmentina complanata		
Enchytraeidae		Segmentina nitida		
70 Piscicola geometra	P	Anodonta cygnea		
Erpobdella octoculata		Anodonta anatina		
Helobdella stagnalis		Dreissena polymorpha		
15 Glossiphonia complanata	C	Sphaerium corneum	P	30
Erpobdella testacea		Pisidium		
Theromyzon tessulatum				
Theodoxus fluviatilis		Cladocera		
Viviparus fasciatus		Ostracoda		
Viviparus viviparus		Copepoda		
Valvata cristata		Argulus foliaceus		
12 Valvata piscinalis	A	Asellus aquaticus	P	15
15 Bithynia tentaculata	A	Asellus meridianus	C	15
Bithynia leachi		Crangonyx pseudogracilis		
Assiminea grayana		Gammarus pulex	C	60
Hydrobia ulvae		Gammarus duebeni		
Potamopyrgus jenkinsi		Gammarus zaddachi		
Acroloxus lacustris		Corophium lacustrae		
Ancylus fluviatilis		Corophium multisetosum		

Sphaeroma hookeri
Paleamonetes varians
Astacus pallipes

Nemoura cinerea

Baetis rhodani

Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

60 Baetis niger

100 Centropilum luteolum

Centropilum pennulatum

100 Caenis horaria

Caenis rivulorum

Caenis coesta maculata

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

100 Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

Polycentropidae

Psychomyidae

Tranodes

Nystacides

Phryganeidae

Agapetus

Silo

Molannidae

Leptoceridae

Hydroptilidae

100 Limnephilidae

Lepidoptera

Sialis lutaria

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae

Hygrobiidae

Elmthidae

Halplidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnolidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.C.E. Class

3 MWP. 5th

24

9

A

990
950

50

50

50

60

INVERTEBRATE SURVEY

River/~~Brook~~ DEBEN Sampling Point GLEVERING HALL FM. BRIDGE
 Collected by J.S.W. Sorted By H.G. 6426050
 Date 21/1/76 Sample No
 Details of sampling site (veg, substratum, flow) ... Deep. Much banks
 old pilings

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	<u>3</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	<u>1</u>	Planorbis contortus	.....
Dugesia polycarpa <u>lucorum</u>	<u>1</u>	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>1</u>
Nematoda	.....	Planorbis albus	.....
		Planorbis laevis	.....
Naididae	.....	Segmentina complanata	.....
Tubificidae	<u>F. ABUNDANT</u>	Segmentina nitida	.....
Lumbriculidae	.....	Anodonta cygnea	.....
Lumbricidae	.....	Anodonta anatina	.....
Enchytraeidae	.....	Dreissena polymorpha	.....
		Sphaerium corneum	.....
		Pisidium	.....
Piscicola geometra	.....	Cladocera	.....
Eopobdella octoculata	<u>3</u>	Ostracoda	.....
Helobdella stagnalis	.....	Copepoda	.....
Glossiphonia complanata	.....	Argulus foliaceus	.....
Eopobdella testacea	.....	Asellus aquaticus	<u>V. ABUNDANT</u>
Theromyzon tessulatum	.....	Asellus meridianus	.....
Theodoxus fluviatilis	.....	Gammarus pulex	<u>F. ABUNDANT</u>
Viviparus fasciatus	.....	Gammarus zaddachi	.....
Viviparus viviparus	.....	Corophium lacustrae	.....
Valvata cristata	.....	Palaemonetes varians	.....
Valvata piscinalis	<u>ABUNDANT</u>	Sphaeroma rugicauda	.....
Bithynia tentaculata	<u>3</u>	Astacus pallipes	.....
Bithynia leachi	.....	Nemoura cinerea	.....
Assimineae grayana	.....	Baetis rhodani	.....
Hydrobia ulvae	.....	Baetis fuscatus	.....
Potamopyrgus jenkinsi	.....	Baetis muticus	.....
Acroloxus lacustris	.....	Baetis verus	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....		
Physa fontinalis	<u>1</u>		
Lymnaea stagnalis	.....		
Lymnaea palustris	.....		

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	2	Corixidae (CORIXA SP.)	4
Cloeon dipterum	3		
Ephemera danica	.....	Dytiscidae	1
Paraleptophlebia submarginata	.....	Hygrobiidae	.....
Procloeon pseudocrufulum	.....	Elminthidae	.....
Siphonurus linneanus	.....	Haliplidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
		Hydrophilidae	.....
Ryacophila	.....		
Hydropsychidae	.....	Anisoptera	.....
Philopotamidae	.....	Zygoptera	.....
Polycentropidae	.....		
Psychomyidae	.....	Limnocharidae	1
Tranodes	.....	Hygrobatidae	ABUNDANT
Mystacides	.....		
Phryganeidae	.....	Noemacheilus	.....
Agapetus	.....	Cottus	.....
Silo	.....	Gasterosteus	.....
Molannidae	.....	Pungitius	.....
Leptoceridae	.....	Phoxinus	.....
Hydroptilidae	.....		
Limnephilidae	.....	Total Groups	19
		Trent Index	9
Lepidoptera	.....		
Sialis lutaria	1		
		DOE Class A	
Chironomidae	6		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

INVERTEBRATE SURVEY

River/Broad/Lake..... Deben Sampling Point Glaveing Br.
 Collected by AB Sorted By
 Date 8/21/77 Sample No 2
 Details of sampling site (veg, substratum, flow) .. D. = 0.5 m F. = 0.5 m s⁻¹
 .. Subs. = Stones + Gravel + Mud
 .. Veg. = 2% Oenanthe fluviatilis + Elodea

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	<u>0</u>	Lymnaea peregra	.....
Polycelis nigra	<u>C</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	<u>C</u>	Planorbis contortus	<u>a</u>
Dugesia polychroa	<u>C</u>	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Emertini	.....	Planorbis vortex	<u>C</u>
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	<u>C</u>	Segmentina complanata	<u>0</u>
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
	<u>C</u>	Anodonta anatina	.....
Piscicola geometra	<u>C</u>	Dreissena polymorpha	.....
Erpobdella octoculata	<u>C</u>	Sphaerium corneum	<u>0</u>
Helobdella stagnalis	<u>0</u>	Pisidium	<u>C</u>
Glossiphonia complanata	<u>C</u>		
Erpobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	<u>C</u>
		Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	<u>C</u>
Viviparus viviparus	.....	Asellus meridicanus	<u>C</u>
Valvata cristata	.....	Gammarus pulex	<u>C</u>
Valvata piscinalis	<u>C</u>	Gammarus zaddachi	.....
Bithynia tentaculata	<u>C</u>	Corophium lacustrae	.....
Bithynia leachi	<u>C</u>	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	<u>C</u>	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	<u>C</u>	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis verus	.....

Leptophlebia vespertina 0

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelocleirus	.....
Caenis horaria	C	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	C	Corixidae	C
Gloeon dipterum	C	Dytiscidae	2 spp. ....0
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elmiphidae	C
Procladius pseudorufus	.....	Halipidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	.....	Zygoptera	C
Phlebotomidae	.....	Limnocoaridae	C
Polycentropidae	.....	Hygrobatidae	C
Psychomyidae	.....	Noemacheilus	.....
Tricentropidae	.....	Cottus	.....
Mystacidae	.....	Gasterosteus	.....
Phryganeidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	.....	Total Groups	35
Molannidae	.....	Trent Index	9
Leptoceridae	.....	D.O.E.	A
Hydroptilidae	.....		
Limnephilidae	C		
Lepidoptera	.....		
Sialis lutaria	0		
Chironomidae	C		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

INVERTEBRATE SURVEY

River/Broad/Lake	<u>Toben</u>	Sampling Point	<u>Glewing Br</u> <u>Kettleburgh Br</u>
Collected by	<u>GAW</u>	Sample Number	<u>19</u>
Sorted by	<u>GAW</u>	Date	<u>28.7.77</u>
Depth	<u>0.1 - 0.5</u>	Flow	<u>0.2 m/s</u>
Substratum	<u>Gravel</u>		
Vegetation	<u>Nuphar lutea, Elodea canadensis, Oenanthe laticarpa sp. l. minor.</u>		
Comments			

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 100

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____
Polycelis nigra	C	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	C
Polycelis tenuis	C	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	_____
Rhabdoccelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	_____
Nematoda	_____	Planorbis leucostoma	_____
Naididae	_____	Planorbis vortex	C
Tubificidae	_____	Planorbis albus	_____
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	_____	Anodonta anatina	_____
Helobdella stagnalis	_____	Dreissenia polymorpha	_____
Glossiphonia complanata	C	Sphaerium corneum	P
Erpobdella testacea	_____	Pisidium	_____
Theromyzon tessulatum	_____		_____
Theodoxus fluviatilis	_____	Cladocera	_____
Viviparus fasciatus	_____	Ostracoda	_____
Viviparus viviparus	_____	Copepoda	4
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	P	Asellus aquaticus	_____
Bithynia tentaculata	C	Asellus meridianus	C
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	C
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____
Ancylus fluviatilis	_____	Corophium multisetosum	_____

Sphaeroma hookeri	_____	Chironomus thummi	_____
Palaemonetes varians	_____	Simuliidae	_____
Astacus pallipes	_____	Dixidae	_____
		Culicidae	_____
Nemoura cinerea	_____	Chaoborus	_____
		Tipulidae	_____
Baetis rhodani	_____	Tabanidae	_____
Baetis fuscatus	_____	Syrphidae	_____
Baetis ruticus	_____	Psychodidae	_____
Baetis vernus	_____	Ceratopogonidae	P
Baetis buceratus	_____		
Baetis niger	_____	Notonecta	P
Centroptilum luteolum	C	Plea	_____
Centroptilum pennulatum	_____	Aphelocheirus	_____
Caenis horaria	_____	Nepa	_____
Caenis rivulorum	_____	Hydrometridae	_____
Caenis roesta	_____	Corixidae	A
Cloeon dipterum	_____		
Ephemerella danica	_____	Dytiscidae <i>leptocoma</i>	C
Ephemerella ignita	_____	Hygrobiidae	_____
Ecdyonurus insignis	_____	Elminthidae	P
Habrophlebia fusca	_____	Halplidae	_____
Paraleptophlebia submarginata	_____	Cyrinidae	_____
Proclonon pseudorufulum	_____	Hydrophilidae	_____
Siphonurus linneanus	_____		
Heptagenia sulphurea	_____	Anisoptera	_____
		Zygoptera	_____
Rhyacophila	_____		
Hydropsychidae	_____	Limnocyrtidae	A
Philopotamidae	_____	Hygrobatidae	C
Polycentropidae	_____		
Psychomyidae	_____	Neomacheilus	_____
Tranodes	_____	Cottus	_____
Nystacides	_____	Gasterosteus	_____
Phryganeidae	_____	Pungitius	_____
Agapetus	_____	Phoxinus	_____
Silo	_____		
Molannidae	_____	Sewage Fungus	_____
Leptoceridae	_____		
Hydroptilidae	_____	Total Groups	20
Limnephilidae	_____	Trent Index	8
		D.O.E. Class	A (B?)
Lepidoptera	_____		
Sialis lutaria	_____		

River Glenside Bridge Date 17/7/79

Collected by PE E/D Substratum mid. river Depth up to 1' Flow class

Vegetation Alnus, Populus, Myrica, Salix, Phragmites - Myrica at margins

Comments _____

DENDROCOELIDAE	30/30/	Planorbis cristata	
Dendrocoelum lacteum		Planorbis laevis	
PLANARIIDAE	30/30/	Planorbis leucostoma	
Polycelis felina		Planorbis planorbis	
Polycelis nigra		Planorbis vortex	/P
Polycelis tenuis	/P	Segmentina complanata	
Dugesia lugubris		Segmentina vitidae	
Dugesia polychroa		UNIONIDAE	40/40/
Dugesia tigrina		Anodonta anatina	
IGOCHAETA	1/1/	Anodonta cygnea	
Lumbricidae		Unio pictorum	
Lumbriculidae		SPHAERIIDAE	10/10/
Naididae	<u>Stylinae</u> <u>aculeata</u> /P	Pisidium sp.	
<u>Planorbidae</u> /P	<u>P. brandiana</u> /P	Sphaerium corneum	/P
SCICOLIDAE	20/20/	DREISSENIDAE	
Scicola geometra		Dreissena polymorpha	
TRICOLIDAE	10/10/	ASELLIDAE	10/10/
Tricoidella octoculata	/P	Asellus aquaticus	/P
CSSIPHONIIDAE	10/10/	Asellus meridianus	
Glossiphonia complanata		GAMMARIDAE	40/40/
Glossiphonia heteroclita		Crangonyx pseudogracilis	
Halobdella stagnalis	/P	Gammarus duebeni	/P
Theromyzon tessulatum		Gammarus pulex	/P
THEODOXIDAE	40/40/	Gammarus zaddachi	
Theodoxus fluviatilis		COROPHIDAE	40/40/
VIPARIDAE	40/40/	Corophium lacustrum	
Viviparus fasciatus		Corophium multisetosum	
Viviparus piscinalis		ASTACIDAE	60/60/
VALVATIDAE	10/10/	Astacus pallens	
Valvata cristata		NEPGURIDAE	50/70/
Valvata macrostoma	/P	CAPNIIDAE	80/100/
Valvata piscinalis	/P	CHLOROPERLIDAE	80/100/
HYDROBIIDAE	10/10/	LEUCITRIDAE	80/100/
Hydrobia ulvae		PERLIDAE	80/100/
Potamopyrgus jenkinsi		PERLODIDAE	80/100/
ANCYLIDAE	40/40/	TAENIOPTERYGIDAE	80/100/
Ancylus lacustris			
Ancylus fluviatilis			
PHYSAIDAE	10/10/		
Physa acuta			
Physa fontinalis			
Physa heterostrophia			
LYMNAEIDAE	10/10/		
Lymnaea auricularia			
Lymnaea stagnalis	/P		
Lymnaea peregra	/P		
Lymnaea stagnalis			
Lymnaea glutinosa			
PLANORBIIDAE	10/10/		
Planorbis albus	/P		
Planorbis carinatus			
Planorbis contortus			

STIDAE	20/20/
Euctis radansi	
Enetia	
Centrostilum luteolum	/a
Centrostilum tenuistum	
Cloeon dioteron	
Procloeon pseudorufulum	
ENIDAE	50/70/
Caenis moesta	
Caenis	in bottle p
HEMERIDAE	80/100/
Ephemera danica	
Ephemera vulgata	
HEMERELLIDAE	80/100/
Ephemerella ignita	
HEMERELLIDAE	80/100/
Ephemerella	
Heptagenia	
PROPHLEBIIDAE	80/100/
Heptagenia fusca	p
Paraleptophlebia submarginata	
PHLOMURIDAE	80/100/
JACOPHELIDAE	50/70/
Jacopus	
Rhyacophila	
DROPSYCHIDAE	30/30/
LYCENTROPIDAE	50/70/
OROMYIDAE	60/80/
YGANEIDAE	80/100/
ICOSTOMATIDAE	80/100/
RICIDAE	80/100/
RICIDAE	80/100/
RICIDAE	80/100/
RICIDAE	40/40/
RICIDAE	50/70/
RICIDAE	20/20/
RICIDAE	5/5/
RICIDAE	30/30/
RICIDAE	30/30/

NOTOHECTIDAE	30/30/
PLEIDAE	30/30/
APHELOMETRIDAE	80/100/
NETIDAE	30/30/
HYDROMETRIDAE	30/30/
CORIXIDAE	30/30/
DYTISCIDAE	30/30/
HYGROBIIDAE	30/30/
ELMINTHIDAE	30/30/
HALIPLIDAE	30/30/
HYGROPHILIDAE	30/30/
GYRINIDAE	30/30/
AGRIIDAE	60/80/
AESCHIDAE	60/80/
LECTIDAE	60/80/
GOMPHIDAE	60/80/
CORDULEGASTERIDAE	60/80/
CORDULIIDAE	60/80/
LIBELLULIDAE	60/80/
HYDRACHNIDAE	
Peraipagionid - p.	

IOUS MEMBER OF GROUPS
 T.B.I.
 D.O.E.
 B.M.N.P.

PRESENT NUMBER OF GROUPS
 T.B.I.
 D.O.E.
 B.M.N.P.

River Delaware Site Glenning Bridge Number BFOA0070 Date 5/8/80
 Collected by PS E/D Substratum mud and stones Depth upto 1m Flow slow
 Vegetation Najas cells Width 10m
 Comments _____
 Land Use _____

DENDROCOELIDAE 5 Dendrocoelum lacteum	Planorbis cristatus Planorbis lacustris Planorbis leucostoma Planorbis planorbis Planorbis vortex Segmentina complanata Segmentina vitidae
PLANARIIDAE 5 Polycelis felina Polycelis nigra Polycelis tenuis Dugesia lugubris Dugesia polychroa Dugesia tigrina	UNIONIDAE 6 Anodonta anatina Anodonta cygnea Unio pictorus
OLIGOCHAETA 1 Lumbricidae Lumbriculidae Naididae Tubificidae	SPHAERIIDAE 3 Pisidium sp. Sphaerium corneum
PISCICOLIDAE 4 Piscicola geometra	DREISSENIDAE Dreissena polymorpha
ERPOBDELLIDAE 3 Erpobdella octoculata	ASELLIDAE 3 Asellus aquaticus Asellus meridicanus
GLOSSIPHONIIDAE 3 Glossiphonia complanata Glossiphonia heteroclita Helobdella stagnalis Theromyzon tessellatum	GAMMARIDAE 6 Crangonyx pseudogracilis Gammarus duebeni Gammarus pulex Gammarus zaddachi
MERITIDAE 6 Ineocoxus fluviatilis	COROPHIDAE 6 Corophium lacustrum Corophium multisetosum
VIVIPARIIDAE 6 Viviparus fuscatus Viviparus viviparus	ASTACIDAE 8 Astacus pallipes
VALVATIDAE 3 Valvata cristata Valvata macrostoma Valvata piccinella	NEMOURIDAE 7 CAPNIDAE 10 CHLOROPHILIDAE 10 LEUCTRIDAE 10 PERLIDAE 10 PERLODIDAE 10 TAENIOPTERYGIDAE 10
HYDROBIIDAE 3 Assiminea grayana Bithynia leschi Bithynia tentaculata Hydrobia ulvae Potamopyrgus jenkinsi	CLADOCERA COXACULA COPEPODA
ANCYLIDAE 6 Acroloxus leucostriatus Anchylus fluviatilis	
PHYSIDAE 3 Physa acuta Physa fontinalis Physa heterostropha	
LYNAEIDAE 3 Lymnaea auricularia Lymnaea palustris Lymnaea perelae Lymnaea stagnalis Neritina glutinosa	
PLANORBIDAE 3 Planorbis albus Planorbis carinatus Planorbis confusus	

BARTIDAE 4	PROTONECTIDAE 5
Baetis rhodani	
Baetis	
Centropetium luteolum	
Centropetium pennulatum	
Cloeon dipterum	
Proclonus pseudorufulum	
CAENIDAE 7	
Caenis moesta	
Caenis	
EPHEMERIDAE 10	
Ephemera danica	
Ephemera vulgata	
EPHEMERELLIDAE 10	
Ephemerella ignita	
HEPTAGENIIDAE 10	
Ecdyonurus	
Heptagenia	
LEPTOPHLEBIIDAE 10	
Leptophlebia fusca	
Paraleptophlebia submarginata	
SIMULONURIDAE 10	
RHYACOPHILIDAE 7	
Acadeta	
Rhyacophila	
HYDROPSYCHIDAE 5	
POLYCENTROPIDAE 7	
PSYCHOMYIIDAE 8	
PHRYGANEIDAE 10	
SEMICOSTOMATIDAE 10	
GOERIDAE 10	
MOLANIIDAE 10	
LEPTOCERIDAE 10	
HYDROPTILIDAE 6	
LIMNEMYLIDAE 7	
SIALIDAE 4	
Sialis	
CHIRONOMIDAE 2	
SIMULIDAE 5	
TIPULIDAE 5	
CERATOPOGONIDAE	
PREVIOUS NUMBER OF GROUPS 28	PRESENT NUMBER OF GROUPS 26
T.B.I.	T.B.I.
D.O.E.	D.O.E.
B.M.V.P.	B.M.V.P.
Date 01/1/75	Date 68

River Chasing Ridge Date 11/8/81
 Collected by DB Substratum slate mud Depth up to 1.0m Flow slow
 Vegetation very little - recently banks cleared etc. some Nymphs 10-
 Comments _____
 Land Use _____

DENDROCOELIDAE Dendrocoelum lacteum	5	Planorbis cristatus	
PLANARIIDAE	5	Planorbis laevis	
Polycelis felina		Planorbis leucostoma	
Polycelis nigra		Planorbis planorbis	
Polycelis tenuis	P	Planorbis vortex	P
Dugesia lugubris		Segmentina complanata	
Dugesia polychroa		Segmentina vitidae	
Dugesia tigrina		UNIONIDAE	6
OLIGOCHAETA	1	Anodonta anatina	
Lumbricidae		Anodonta cygnea	
Lumbriculidae		Unio pictorum	
Naididae	P	SPHAERIIDAE	3
Tubificidae		Fisidium sp.	
PISCICOLIDAE	4	Sphaerium cornutum	P
Piscicola geometra	P	DREISSENIDAE	
ERPOBDELLIDAE	3	Dreissena polymorpha	
Erpobdella octoculata	P	ASELLIDAE	3
GLOSSIPHONIIDAE	3	Asellus aquaticus	P
Glossiphonia complanata		Asellus meridianus	
Glossiphonia heteroclita		GAMMARIDAE	6
Helobdella stagnalis	P	Crangonyx pseudogracilis	
Theromyzon tessellatum		Gammarus duebeni	
NERITIDAE	6	Gammarus pulex	
Theodoxus fluviatilis		Gammarus zaddachi	
VIVIPARIDAE	6	COROPHIDAE	6
Viviparus fasciatus		Corophium lacustrae	
Viviparus viviparus		Corophium multisetosum	
VALVATIDAE	3	ASTACIDAE	8
Valvata cristata		Astacus pallipes	
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis	P	CAMBIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Acoiminea grayana		LEUCTRIDAE	10
Bithynia leachi		PERLIDAE	10
Bithynia tentaculata	P	PERLODIDAE	10
Hydrobia ulvae		TAENIOPTERYGIDAE	10
Potamopyrgus jenkinsi		CLADOCERA	
ANCYLIDAE	6	OCTACODA	
Acroloxus lacustris		COPEPODA	
Ancylus fluviatilis			
MYSIDAE	3		
Myra acute			
Myra fontinalis	P		
Myra heterotropha			
LYMNAEIDAE	3		
Lymnaea auricularia			
Lymnaea palustris			
Lymnaea peruviana	P		
Lymnaea stagnalis			
Hydra glutinosa			
PLANORBIDAE	3		
Planorbis alban	P		
Planorbis carolinensis			
Planorbis confusus			

PARTIIDAE 4	PROCTOTRUPIDAE 5
<i>Acetia rhodani</i>	
<i>Acetia</i>	PLEIDAE 5
<i>Centropitulum luteolum</i> C	AMELOCHNEIIDAE 10
<i>Centropitulum pennulatum</i>	
<i>Clocon dipterum</i> P	NEPIDAE 5
<i>Proclocon pseudorufulum</i>	HYGROBATRIDAE 5
CAENIDAE 7	CORIXIDAE 5
<i>Caenis moesta</i>	
<i>Caenis</i> P	DYTISCIDAE 5
EFHEMERIDAE 10	HYGROBIIDAE 5
<i>Ephemera danica</i>	
<i>Ephemera vulgata</i>	ELMINTHIDAE 5
EFHEMERELLIDAE 10	HALIPLIDAE 5
<i>Ephemerella ignita</i>	HELODIDAE 5
HEPTAGENIIDAE 10	GYRINIDAE 5
<i>Ecdyonurus</i>	AGRIIDAE 8
<i>Heptagenia</i>	AESHNIDAE 6
LEPTOPHLEBIIDAE 10	LESTIDAE 8
<i>Hebrophebia fusca</i>	COENIDAE 8
<i>Paraleptophlebia submarginata</i>	CORULEGASTERIDAE 8
SIMULONIDAE 10	CORBULIIDAE 8
RHYACOPHILIDAE 7	LIBELLULIDAE 8
<i>Agapetus</i>	COENAGRIIDAE 6
<i>Rhyacophila</i>	HYDRACHNEIIDAE 4
HYLOPSYCHIDAE 5	
POLYCENTROPIDAE C 7	
PSYCHONYIIDAE 8	
PHRYGANEIDAE 10	
SERICOSTOMATIDAE 10	
GOERIDAE 10	
MOLANIIDAE 10	
LEPTOCERIDAE 10	
HYDROPTILIDAE 6	
LIMNEMIDAE 7	
PSIALIDAE r 4	
<i>Stelia</i>	
PHIRONOMIDAE c 2	
SIMULIDAE 5	
TIPULIDAE 5	
CERATOPOGONIDAE	
PREVIOUS NUMBER OF GROUPS 26	PRESENT NUMBER OF GROUPS 24
T.B.I.	T.B.I.
D.O.E.	D.O.E.
B.H.V.P.	B.H.V.P.
Date 6/10/50	Date 7/0

SITE: KETTLEBURGH

RIVER

Deben

SITE

Kettleburgh
Bridge.

DATE

16/5/84

COUE

NCR

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTS% Cover =

One bank

Apium nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

✓ unaffected

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

Potamogeton crispus

D = dominant

Potamogeton pectinatus

C = common

Ranunculus sp

P = present

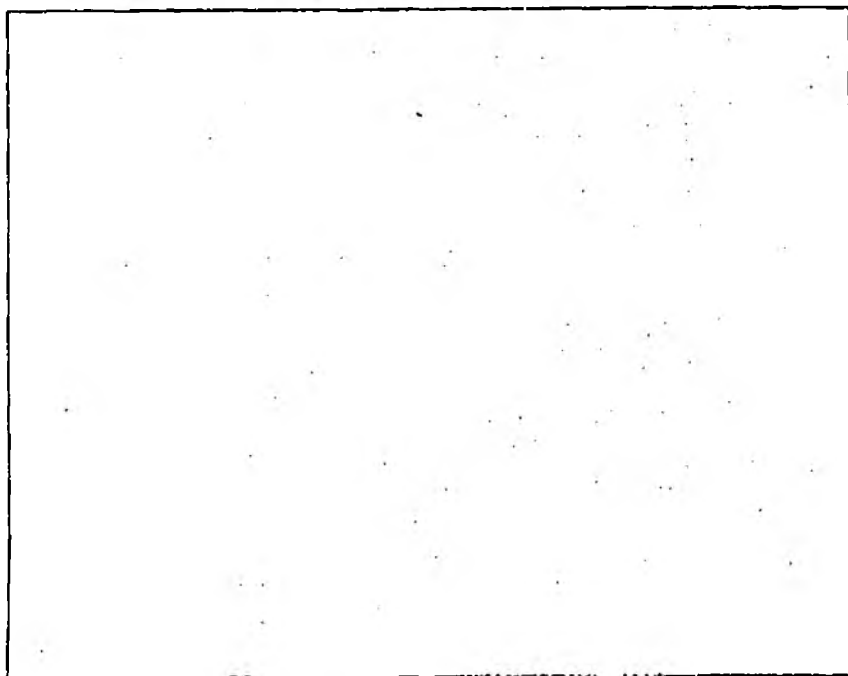
Zannichellia palustris

T = trace

Land Use

Wasteland	Width <u>8m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.5</u> .....	.....
Pastoral	Temp .....°C	.....
Arable	Oxygen .....	.....
Health	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of families * 13. B.S.Q.P. score * 61

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelus lacteus		Planorbis albus	
Sellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristatus	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	✓
Dugesia tigrina		Planorbis vortex	✓
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae	✓a	Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra	✓	SPHAERIIDAE	3
ERPODELLIDAE	3	Pisidium sp	✓
GLOSSIPHONIIDAE	3	Sphaerium corneum	✓
Glossiphonia sp	✓	ASELLIDAE	3
Helobdella stagnalis	✓	Asellus aquaticus	✓
Theromyzon tessellatum	✓	Asellus meridicanus	✓
NERITIDAE	6	CAMPARIIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	✓
VIVIPARIDAE	6	Gammarus duebeni	✓
Viviparus fasciatus		Gammarus pulex	✓
Viviparus viviparus		Gammarus zaddachi	✓
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEHOEURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Asselinea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	✓
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centroptilum luteolum	
Potamopyrgus jenkinsi		Centroptilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Proclloeon pseudorufulum	
Ancylus fluviatilis		CAENIDAE	7
PHYSIDAE	3	Caenis sp	✓
Physa fontinalis		EPHEMERIDAE	10
LYNNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregra			
Lymnaea stagnalis			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
<i>Ephemera ignita</i>			
HEPTAGENIIDAE	10	ELMINTHIDAE	5 ✓p
<i>Ecdyonurus</i> sp			
<i>Heptagenia</i> sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10 ✓p	HELODIDAE	5
<i>Habrophlebia fusca</i>		CYRINIDAE	8
<i>Paraleptophlebia submarginata</i>			
SIPHONURIDAE	10	AESHNIDAE	8
RIHYACOPHILIDAE	7 ✓p	LESTIDAE	8
<i>Agasictus fuscipes</i>		COMPHIDAE	8
<i>Rhyacophila</i> sp			
HYDROPSYCHIDAE	5 ✓p	CORDULEGASTERIDAE	8
POLYCENTROPIDAE	7	CORDULIIDAE	8
PSYCHOMYIIDAE	8	LIBELLULIDAE	8
PHRYGANEIDAE	10	COENACRIIDAE	6
SERICOSTOMATIDAE	10	HYDRACHNELLIDAE	
COERIDAE	10	CERATOPOGONIDAE	
MOLANNIDAE	10	CLADOCERA	
LEPTOCERIDAE	10	OSTRACODA	
HYDROPTILIDAE	6	COPEPODA	
LIMNAPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	2 ✓p		
SEMULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

EO/130

ETIDAE	20/20/	NOTONECTIDAE	30/30/
Baetis rhodani	all sizes 12mm	PLEIDAE	30/30/
Baetis	monous	APHELOCESTRIDAE	80/100/
Centroptilum luteolum	" " a	NEPIDAE	30/30/
Centroptilum pennulatum		HYDROMETRIDAE	30/30/
Cloeon dipterum		CORIXIDAE	30/30/
Procladius pseudorufus		DTISCIDAE	30/30/
ENIDAE	50/70/	HYGROBIIDAE	30/30/
Caenis moesta		ELMINTHIDAE	30/30/
Caenis		HALIPLIDAE	30/30/
HEMERIDAE	80/100/	HYDROPHILIDAE	30/30/
Ephemerella danica		GYRINIDAE	30/30/
Ephemerella vulgata		AGRIIDAE	60/20/
HEMERELLIDAE	80/100/	AESCHIDAE	60/80/
Ephemerella ignita		LESTIDAE	60/80/
TAGENIIDAE	80/100/	GOMPHIDAE	60/80/
Isonychia		CORULEGASTERIDAE	60/80/
Leptagenia		CORULIIDAE	60/80/
TOPHLEBIIDAE	80/100/	LISELLULIDAE	60/80/
Trophlebia fusca	10mm	HYDRACHNELLIDAE	
Trophlebia submarginata			
ELONERIDAE	80/100/		
ACOTYLIDAE	50/70/		
Agabus			
Hydrophilus			
ROPSYCHIDAE	30/30/		
YCENTROPIDAE	50/70/		
P. 4. 12mm	all sizes p		
CHONYIDAE	60/80/		
YGANEIDAE	80/100/		
ICOSTOMATIDAE	80/100/		
IDAE	80/100/		
INIDAE	80/100/		
OCERIDAE	80/100/		
OPTILIDAE	40/40/		
EPHILIDAE	50/70/		
IDAE	20/20/		
elis			
ONOMIDAE	5/5/		
LIDAE	30/30/		
LIDAE	30/30/		

JOUS NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.W.P.

PRESENT NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.W.P.

River Delton Site Kettleburgh Number Date 5/8/80
 Collected by AB ED Substratum stones mud Depth up to 1m Flow 5 cm
 Vegetation Phalaris, Typha, Nuphar Width
 Comments
 Lond Use

DENDROCOELIDAE Dendrocoelum lacteum	5	Planorbis cristatus	
PLANARIIDAE	5	Planorbis laevis	
Polycelis felina		Planorbis leucostoma	
Polycelis nigra		Planorbis planorbis	/
Polycelis tenuis	/ p	Planorbis vortex	/ c
Dugesia lugubris		Segmentina complanata	
Dugesia polychroa		Segmentina vitidae	
Dugesia tigrina			
OLIGOCHAETA	1	UNIONIDAE	6
Lumbricidae	/ / v	Anodonta anatina	
Lumbriculidae	/ / v	Anodonta cygnea	
Naididae	/ p	Unio pictorum	
Tubificidae	/ p	SIMULIIDAE	3
PISICOLIDAE	4	Pisidium sp.	
Pisicola geometra	/ v	Simulium corneum	/
ERPOBDELLIDAE	3	DREISSENIDAE	
Erpobdella octoculata	/ r	Dreissena polymorpha	
GLOSSIPHONIIDAE	3	ASELLIDAE	3
Glossiphonia complanata	/ p	Asellus aquaticus	/ v
Glossiphonia heteroclita		Asellus meridianus	/
Hebiobella stagnalis	/ p	GAMMARIDAE	6
Theromyzon tessellatum	/	Crangonyx pseudogracilis	
NERITIDAE	6	Gammarus duebeni	/
Neorthis fluviatilis		Gammarus pulex	/ p
VIVIPARIDAE	6	Gammarus zaddachi	
Viviparus fuscatus		COPEPODIDAE	6
Viviparus viviparus		Corophium lacustrae	
VALVATIDAE	3	Corophium multisetosum	
Valvata cristata	/	ASTACIDAE	8
Valvata macrostoma	/ p	Astacus pallipes	
Valvata piscinalis	/ p	NEPHROIDAE	7
HYDROBIIDAE	3	CAENIDAE	10
Assiminea grayana		Chloroperlidae	10
Bithynia leachi		LEUCOTRIDAE	10
Bithynia tentaculata	/ p	PERLIDAE	10
Hydrobia ulvae		PERLODIDAE	10
Potamopyrgus jenkinsi		TAFETOTERYGIIDAE	10
ANCYLIDAE	6	CLADOCERA	/ a
Acroloxus lacustris		GASTROPODA	/
Ancylus fluviatilis		COPEPODA	/ p
PHYSIIDAE	3		
Physa acuta			
Physa fontinalis	/		
Physa heterostrophus	/		
LYMNAEIDAE	3		
Lymnaea stagnalis			
Lymnaea palustris			
Lymnaea peregra	/		
Lymnaea stagnalis			
Hyas glutinosus			
PLANORBIDAE	3		
Planorbis albus	/ p		
Planorbis carinatus	/		
Planorbis confusus	/		

002 BARTICAE 1⁴ C Baetis rhodani Baetis a Centroptilum luteolum Centroptilum punctulatum Cloos dieterum Procloos pseudorufulum	NOTORECTIDAE 1^r 5 PLEIDAE 5 AMELOCHNEURIDAE 10 NEPIDAE 5 HYDROMETRIDAE 5 CORIXIDAE 1^a 5 PTISCIDAE 1^c 5 HYGROBIIDAE 5 ELMINERIDAE 1^r 5 HALIPLIDAE 1^c 5 HELODIDAE 5 STIRINIDAE 5 AGRIIDAE 8 AESHNIDAE 8 LECTIDAE 8 GOMPHIDAE 8 CORDULEGASTERIDAE 8 CORDULIIDAE 8 LIBELLULIDAE 8 COENACIIDAE 6 HYDRACHNELLIDAE 1^c
CAENIDAE 7 Caenis moesta Caenis	
EPHEMERIDAE 10 Ephemera danica Ephemera vulgata	
EPHEMERELLIDAE 10 Ephemerella ignita	
HEPTAGENIIDAE 10 Ecdyonurus Heptagenia	
LEPTOPHLEBIIDAE 10 Leptophlebia fusca Paraleptophlebia submarginata	
SIPHONURIDAE 10	
RYTHACOPHILIDAE 7 Rhyacotus Rhyacophila	
HYDROPSYCHIDAE 1^p 5	
POLYCENTROPIDAE 1^p 7	
PSYCHOMYIIDAE 8	
PERYGONEIDAE 10	
SERICOCTENATIDAE 10	
GOERIDAE 10	
MOLANIIDAE 10	
LEPTOCERIDAE 10	
HYDROPTILIDAE 6	
LIMNETHILIDAE 1^r 7	
SIALIDAE 4 Sialis	
CHIRONOMIDAE 1^c 2	
SIMULIDAE 1^p 5	
TIPULIDAE 5	
CERATOPOGONIDAE 1^p	
PREVIOUS NUMBER OF GROUPS 27 T.B.I. D.S.E. R.M.W.P. Date 12/1/79	PRESENT NUMBER OF GROUPS 32 T.B.I. D.S.E. R.M.W.P. Date 8/9

River Delam Site Kettleburgh Number _____ Date 11/8/81
 Collected by PB SD Substratum stones, mud, chalk Depth up to 0.5m Flow 8 cm
 Vegetation marginal grass, Typha, Myo, some Nuphar in river Width 5-6m
 Comments _____
 Land Use _____

DENDROCOELIDAE Dendrocoelum lacteum	5	Planorbis cristatus	
PIANARIIDAE	5	Planorbis laevis	
Polycelis felina		Planorbis leucostoma	
Polycelis nigra		Planorbis planorbis	
P Polycelis tenuis	<u>1c</u>	C Planorbis vortex	<u>2</u> <u>P</u>
Dugesia lugubris		Segmentina complanata	
Dugesia polychroa		Segmentina vitidae	
Dugesia tigrina		UNIONIDAE	6
OLIGOCHAETA	1	Anodonta anatina	
Lumbricidae		Anodonta cygnea	
V Lumbriculidae	<u>1</u>	Unio pictorum	
P Naididae	<u>1</u>	SPHAERIIDAE	3
P Tubificidae	<u>1</u>	Pisidium sp.	
PISCICOLIDAE	4	Sphaerium corneum	<u>1</u>
V Piscicola geometra		DREISSENIDAE	
ERPOBDELLIDAE	3	Dreissena polymorpha	
V Erpobdella octoculata	<u>1</u>	ASELLIDAE	3
GLOSSIPHONIIDAE	3	Acellus aquaticus	<u>1</u>
Glossiphonia complanata	<u>1</u>	Acellus meridianus	
Glossiphonia heteroclita		GAMMARIDAE	6
Helobdella stagnalis		Crangonyx pseudogracilis	
Theromyzon tessellatum		Gammarus duobeni	
MERITIDAE	6	P Gammarus pulex	<u>1</u>
Theodoxus fluviatilis		Gammarus zaddachi	
VIVIPARIDAE	6	COROPHIIDAE	6
Viviparus fuscatus		Corophium lacustrae	
Viviparus viviparus		Corophium multisetosum	
VALVATIDAE	3	ASTACIDAE	8
Valvata cristata		Astacus pallipes	
P Valvata macrostoma		MEMBRIDAE	7
P Valvata piscinalis	<u>1</u>	CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPHERIIDAE	10
Acsiminea grayana		LEUCTRIDAE	10
Bithynia leachi		PERLIDAE	10
P Bithynia tentaculata	<u>1</u>	PERLODIDAE	10
Hydrobia ulvae		TAENIOPTERYGIDAE	10
Potamopyrgus jenkinsi		ACIADOCERA	<u>1</u>
ANCYLIDAE	6	OCTRACODA	
Acroloxus lacustris		COPEPODA	
Ancylus fluviatilis			
PHYGIDAE	3		
Phyca acuta			
Phyca fontinalis			
Phyca heterontropa			
LYMNAEIDAE	3		
Lymnaea auricularia			
Lymnaea patuntrin			
Lymnaea peregrina			
Lymnaea stagnalis			
Myxas glutinosa			
PLANORBIDAE	3		
P Planorbis albus			
Planorbis carinatus			
Planorbis costatus	<u>1</u>		

MAETIDAE 4 <i>Maetia rhodani</i> /c <i>Maetia</i> /c <i>Centropitilum luteolum</i> /c <i>Centropitilum pennulatum</i> /c <i>Clocon dipterum</i> /p <i>Proclocon pseudorufulum</i>	PROTORGETIDAE 5
CAENIDAE 7 <i>Caenis moesta</i> /r <i>Caenis</i> /r	PLEIDAE 5
EPHEMERIDAE 10 <i>Ephemera danica</i> <i>Ephemera vulgata</i>	AMELOHEMERIDAE 10
EPHEMERELLIDAE 10 <i>Ephemerella ignita</i>	NEPIDAE 5
HEPTAGENIIDAE 10 <i>Ecdyonurus</i> <i>Heptagenia</i>	HYDROMETRIDAE 5
LEPTOPHLEBIIDAE 10 <i>Habrophlebia fusca</i> <i>Paraleptophlebia submarginata</i>	CORIXIDAE /c 5
SIPHONURIDAE 10	CDYTISCIDAE /c 5
RHYACOPHILIDAE 7 <i>Agapetus</i> <i>Rhyacophila</i>	HYGROBIIDAE 5
<i>PHYDROPSYCHIDAE</i> /p 5	HELMINTHIDAE /c 5
<i>POLYCENTROPIDAE</i> /c 7	CHALIPLIDAE /c 5
PSYCHONYIIDAE 8	MELOBIIDAE 5
PHRYGANEIDAE 10	GYRINIDAE /r 5
SERICOSTOMATIDAE 10	AGRIIDAE 8
GOERIDAE 10	AESHNIDAE 8
MOLANNIDAE 10	LESTIDAE 8
LEPTOCERIDAE 10	COMPHIDAE 8
HYDROPTILIDAE /p 6	CORNULEGASTERIDAE 8
VLINZEHILIDAE 7	CORDULIDAE 8
STALIDAE 4 <i>Stalia</i>	LIBELLULIDAE 8
<i>CHIRONOMIDAE</i> /c 2	COENAGRIIDAE 6
<i>PSIMULIDAE</i> /p 5	HYDRACHNELLIDAE /c
TIPULIDAE 5	
<i>CHATOOGONIDAE</i> /c	
PREVIOUS NUMBER OF GROUPS 32 T.B.I. D.O.E. B.N.W.P. 87 Date 5/12/80	PRESENT NUMBER OF GROUPS 29 T.B.I. D.O.E. B.N.W.P. 94 Date

INVERTEBRATE SURVEY

River/Broad/Lake DEBEN Sampling Point KETTLEBURGH ROAD BRIDGE
 Collected by J.S.W. Sorted By H.G.
 Date 21/1/76 Sample No
 Details of sampling site (veg, substratum, flow) Behind Road Bridge
Riffle - stones - silt - shallow. much algae on stones

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	.....	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	.....
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	✓.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Eopobdella octoculata	2.....	Sphaerium corneum	1.....
Helobdella stagnalis	.....	Pisidium	.....
Glossiphonia complanata	2.....		
Eopobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	.....
		Copepoda	.....
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	ABUNDANT
Viviparus viviparus	.....	Asellus meridianus	.....
Valvata cristata	.....	Gammarus pulex	ABUNDANT
Valvata piscinalis	.....	Gammarus zaddachi	.....
Bithynia tentaculata	1.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assiminea grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis veruus	.....

Baetis niger	.....	Notonecta	.....
Centroptilum Tuteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	V.A.BUNDANT	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	(new)
Caenis moesta	ABUNDANT	Corixidae	.....
Cloeon dipterum	.....	Dytiscidae	(DERONECTES)
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae	.....
Proclotron pseudorufulum	.....	Haliplidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	.....	Zygoptera	.....
Philopotamidae	.....	Limnococharidae	.....
Polycentropidae	.....	Hygrobatidae	.....
Psychomyidae	.....	Noemacheilus	.....
Tranodes	.....	Cottus	.....
Mystacides	.....	Gasterosteus	.....
Phryganeidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	.....	Total Groups	\$12
Molannidae	.....	Trent Index	8
Leptoceridae	.....	DOF Class	A
Hydroptilidae	.....		
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	.....		
Chironomidae	✓.....		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Syrphidae	.....		

River/Broad/Lake..... Deber Sampling Point Kettleburgh Br.
 Collected by ES Sorted By
 Date 8.12.77 Sample No 20
 Details of sampling site (veg, substratum, flow) D. = 0.5m. F. = 0.25m.s⁻¹
Subs. = Stones + Silt
Veg. = 1% Cladophora + Callitriche

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	<u>.....</u>	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	.....	Planorbis contortus	.....
Dugesia polychroa	<u>.....</u>	Planorbis planorbis	.....
Planaria torva	.....	Planorbis carinatus	<u>.....</u>
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	<u>.....</u>
Nematoda	.....	Planorbis albus	<u>.....</u>
		Planorbis laevis	.....
Naididae	.....	Segmentina complanata	<u>.....</u>
Tubificidae	.....	Segmentina nitida	.....
Lumbriculidae	.....		
Lumbricidae	.....	Anodonta cygnea	.....
Enchytraeidae	.....	Anodonta anatina	.....
		Dreissena polymorpha	.....
Piscicola geometra	.....	Sphaerium corneum	<u>.....</u>
Erpobdella octoculata	<u>.....</u>	Pisidium	.....
Helobdella stagnalis	<u>.....</u>		
Glossiphonia complanata	<u>.....</u>	Cladocera	.....
Erpobdella testacea	.....	Ostracoda	.....
Theromyzon tessulatum	.....	Copepoda	.....
		Argulus foliaceus	.....
Heodoxus fluviutilis	.....	Asellus aquaticus	<u>.....</u>
Viviparus fasciatus	.....	Asellus meridicanus	<u>.....</u>
Viviparus viviparus	.....	Gammarus pulex	<u>.....</u>
Valvata cristata	.....	Gammarus zaddachi	.....
Valvata piscinalis	<u>.....</u>	Corophium lacustrae	.....
Bithynia tentaculata	<u>.....</u>	Palaemonetes varians	.....
Bithynia leachi	<u>.....</u>	Sphaeroma rugicauda	.....
Assimineae grayana	.....	Astacus pallipes	.....
Hydrobia ulvae	.....		
Potamopyrgus jenkinsi	.....	Nemoura cinerea	.....
Acroloxus lacustris	.....		
Ancylus fluviatilis	.....	Baetis rhodani	.....
Zonitoides nitidus	.....	Baetis fuscatus	.....
Physa fontinalis	<u>.....</u>	Baetis muticus	.....
Lymnaea stagnalis	.....	Baetis veruus	.....
Lymnaea palustris	.....	Baetis buceratus	.....
Lymnaea truncatula	.....		

WATER IN THE ENVIRONMENT

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Corixidae	.....
Cloeon dipterum	.....	Dytiscidae	.....
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae	.....
Procladius pseudorufus	.....	Halipidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	.....	Zygoptera	.....
Phlebotomidae	.....	Limncharidae	.....
Polycentropidae	.....	Hygrobatidae	.....
Psychomyidae	.....	Noemacheilus	.....
Triantodes	.....	Cottus	.....
Mystacidae	.....	Gasterosteus	.....
Phryganidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	.....	Total Groups	29
Molannidae	.....	Trent Index	9
Leptoceridae	.....		
Hydroptilidae	.....		
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	.....		
Chironomidae	.....		
Chironomus thummi	.....		
Simuliidae	.....		
Dixidae	.....		
Culicidae	.....		
Chaoborus	.....		
Tipulidae	.....		
Tabanidae	.....		
Empididae	.....		

D.O.E. A

INVERTEBRATE SURVEY

River/Broad/Lake <u>TUD</u>	Sampling Point <u>Killbuck Br.</u>
Collected by <u>G. A. W. H.</u>	Sample Number <u>14</u>
Sorted by <u>G. A. W. H.</u>	Date <u>28.7.77</u>
Depth <u>0.3-0.5</u> Flow <u>0.2</u>	Substratum _____
Vegetation <u>Nuphar lutea Sparganium emersum? Callitriche stagnalis L. minor</u>	
Comments <u>Entomomorpha Potamogeton natans * - dominant.</u>	

P = Present, <10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, >100

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____
Polycelis nigra	<u>C</u>	Lymnaea truncatula	_____
Polycelis felina	_____	Myxas glutinosa	<u>C</u>
Polycelis tenuis	<u>C</u>	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	_____
Planaria torva	_____	Planorbis contortus	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	<u>P</u>
Nematoda	_____	Planorbis leucostoma	_____
Naididae	<u>C</u>	Planorbis vortex	<u>P</u>
Tubificidae	_____	Planorbis albus	<u>C</u>
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	<u>C</u>	Anodonta anatina	_____
Helobdella stagnalis	_____	Dreissenia polymorpha	_____
Glossiphonia complanata	<u>C</u>	Sphaerium corneum	_____
Erpobdella testacea	_____	Pisidium	_____
Theromyzon tessellatum	_____		
Theodoxus fluviatilis	_____	Cladocera	<u>C</u>
Viviparus fasciatus	_____	Ostracoda	_____
Viviparus viviparus	_____	Copepoda	<u>A</u>
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	_____	Asellus aquaticus	_____
Bithynia tentaculata	<u>P</u>	Asellus meridianus	<u>A</u>
Bithynia leachi	_____	Crangonyx pseudogracilis	_____
Assimineae grayana	_____	Gammarus pulex	<u>C</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____

Sphaeroma rugicauda
Sphaeroma hookeri
Paleamonetes varians
Astacus pallipes

Nemoura cinerea

Baetis rhodani

Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centroptilum luteolum

Centroptilum pennulatum

Caenis horaria

Caenis rivulorum

Caenis moesta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

Polycentropidae ^{Polycentropus flavo-nuculatus}

Psychomyidae

Tranodes

Nystacides

Phryganeidae

Agapetus

Silo

Molannidae

Leptoceridae

Hydroptilidae

Limnephilidae

Lepidoptera

Sialis lutaria

Chironomidae

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae (larvae)

Hygrobiidae

Elmthidae (larvae)

Haliplidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocyrtidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

23

8

A

INVERTEBRATE SURVEY

River/Broad/Lake	_____	Sampling Point	<u>Kettleburgh Br</u>
Collected by	_____	Sample Number	<u>3</u>
Sorted by	_____	Date	<u>7/6/78</u>
Depth <u>0.3</u>	Flow <u>0.3</u>	Substratum	<u>silt gravel</u>
Vegetation	<u>Callitriche Potamogeton crispus</u>		
Comments	<u>eroder/dispersing</u>		

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 10

Porifera	_____	Physa fontinalis	_____
Hydroids	_____	Lymnaea stagnalis	_____
Dendrocoelum lacteum	_____	Lymnaea palustris	_____
Polycelis nigra	_____	Lymnaea truncatula	_____
Polycelis felina	<u>P</u>	Myxas glutinosa	_____
Polycelis tenuis	_____	Lymnaea auricularia	_____
Dugesia tigrina	_____	Lymnaea peregra	_____
Dugesia lugubris	_____	Planorbarius corneus	_____
Dugesia polychroa	_____	Planorbis crista	<u>P sp? P</u>
Planaria torva	_____	Planorbis contortus	_____
Rhabdocoelidae	_____	Planorbis planorbis	_____
Nemertini	_____	Planorbis carinatus	_____
Nematoda	_____	Planorbis leucostoma	_____
Naididae	_____	Planorbis vortex	_____
Tubificidae	_____	Planorbis albus	_____
Lumbriculidae	_____	Planorbis laevis	_____
Lumbricidae	_____	Segmentina complanata	_____
Enchytraeidae	_____	Segmentina nitida	_____
Piscicola geometra	_____	Anodonta cygnea	_____
Erpobdella octoculata	<u>C</u>	Anodonta anatina	_____
Helobdella stagnalis	<u>P</u>	Dreissenia polymorpha	_____
Glossiphonia complanata	<u>P</u>	Sphaerium corneum	<u>C</u>
Erpobdella testacea	_____	Pisidium	<u>C</u>
Theromyzon tessulatum	_____		
Theodoxus fluviatilis	_____	Cladocera	_____
Viviparus fasciatus	_____	Ostracoda	_____
Viviparus viviparus	_____	Copepoda	_____
Valvata cristata	_____	Argulus foliaceus	_____
Valvata piscinalis	<u>C</u>	Asellus aquaticus	<u>C</u>
Bithynia tentaculata	<u>P</u>	Asellus meridianus	_____
Bithynia leachi	<u>P</u>	Crangonyx pseudogracilis	_____
Assiminea grayana	_____	Gammarus pulex	<u>C</u>
Hydrobia ulvae	_____	Gammarus duebeni	_____
Potamopyrgus jenkinsi	_____	Gammarus zaddachi	_____
Acroloxus lacustris	_____	Corophium lacustrae	_____
Ancylus fluviatilis	_____	Corophium multisetosum	_____

15

30

15

60

Sphaeroma rugicauda

Sphaeroma hookeri

Palaemonetes varians

Astacus pallipes

Nemoura cinerea

100 Baetis rhodani

Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centroptilum luteolum

Centroptilum pennulatum

Caenis horaria

Caenis rivulorum

100 Caenis moesta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

100 Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

70 Polycentropidae

Psychomyidae

Tranodes

Mystacides

Phryganeidae

Agapetus

Silo

Molannidae

100 Leptoceridae

Hydroptilidae

Limnephilidae

Lepidoptera

Sialis lutaria

Chironomidae

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae

Hygrobiidae

Elmthidae

Halplidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocyrtidae

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

B.M.P. Sh

20(21)

9

A

260
720

SITE: LETHERINGHAM BRIDGE

RIVER

Deben

SITE

Letheringham

Bridges

DATE

14/8/84

CODE

NGR T.M. 279 584

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

70%

Apium nodiflorum
Verula erecta
Callitriche sp / P
Chara sp
Elodea canadensis
 Filamentous algae / C
Ponticalia sp
Myriophyllum sp / D
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp. *Myosotis*

.....

.....

.....

.....

D = dominant

C = common

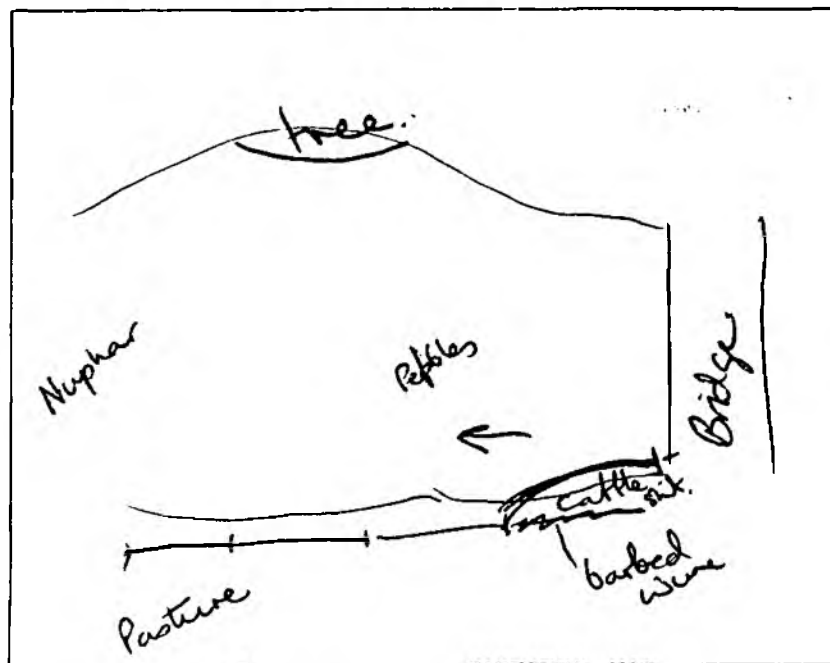
P = present

T = trace

Land Use

Wasteland	Width <u>4m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.30-0.5m</u> .....	.....
Pastoral ☒	Temp .....°C	.....
Arable	Oxygen .....%	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of families =

H.S.W.P. score =

74

DENDROCOELIDAE 3
Dendrocoelum lacteum
Bdellocephala

PLANARIIDAE P⁵
Polycelis sp
Planaria torva
Dugesia lugubris
Dugesia polychroa
Dugesia tigrina

OLIGOCHAETA 1
Lumbricidae
Lumbriculidae
Naididae
Tubificidae

PISCICOLIDAE 4
Piscicola geometra

ERPOBDELLIDAE 3

GLOSSIPHONIIDAE 3
Glossiphonia sp
Helobdella stagnalis
Theromyzon tessulatum

NERITIDAE 6
Theodoxus fluviatilis

VIVIPARIDAE 6
Viviparus fasciatus
Viviparus viviparus

VALVATIDAE 3
Valvata cristata
Valvata macrostoma
Valvata piscinalis

HYDROBILIDAE 3
Assininae grayana
Bithynia leachi
Bithynia tentaculata
Hydrobia ulvae
Potamopyrgus jenkinsi

ANCYLIDAE 6
Acroloxus lacustris
Anchylus fluviatilis

PHYSIDAE 3
Physa fontinalis

LYMNAEIDAE 3
Lymnaea auricularia
Lymnaea palustris
Lymnaea peregra
Lymnaea stagnalis

PLANORBIDAE P
Planorbis albus
Planorbis carinatus
Planorbis contortus
Planorbis cristata
Planorbis laevis
Planorbis leucostoma
Planorbis planorbis
Planorbis vortex
Segnetina complanata
Segmentina vitidae

UNIONIDAE 6
Anodonta anatina
Anodonta cygnea
Unio pictorum

SPHAERIIDAE 3
Pisidium sp
Sphaerium corneum

APELLIDAE 3
Asellus aquaticus
Asellus meridianus

GAMMARIDAE 6
Crangonyx pseudogracilis
Gammarus duebeni
Gammarus pulex
Gammarus zaddachi

COROPHIDAE 6

ASTACIDAE 8

NEMOURIDAE 7

CAPNIIDAE 10

CHLOROPERLIDAE 10

LEUCTRIDAE 10

BAETIDAE 4
Baetis sp rhod/janus
Centroptilum luteolum
Centroptilum pennulatum
Cloeon dipterum
Proclon pseudorufulum

CAENIDAE 2
Caenis sp

EPHEMERIDAE 10
Ephemera danica
Ephemera vulgata

EPHEMERELLIDAE 10
Ephemerella ignita

HEPTAGENIIDAE 10
Ecdyonurus sp
Heptagenia sp

LEPTOPHLEBIIDAE 10
Habrophlebia fusca
Paraleptophlebia submarginata

SIPHONURIDAE 10

RHYACOPHILIDAE 7
Agapetus fuscipes
Rhyacophila sp

HYDROPSYCHIDAE 3
Hydropsyche

POLYCENTROPIDAE 1
Polycentropus

PSYCHOMYIIDAE 1
Pseudomaculatus

PIRYCANEIDAE 10

SERICOSTOMATIDAE 10

GOERIDAE 10

MOLANNIDAE 10

LEPTOCERIDAE 10

HYDROPTILIDAE 6

LYNNEPHILIDAE 7

SIALIDAE 4

CHIRONOMIDAE 2

SMULIDAE 3

TIPULDAE 3

NOTONECTIDAE 3

PLEIDAE 3

APHELOCHEIRIDAE 10

NEPIDAE 3

HYDROMETRIDAE 3
Hydrometra

CORIXIDAE 3

DYTISCIDAE 1
Hydromantes

HYGROBIIDAE 5

ELMINTHIDAE 5

HALIPLIDAE 5
Halipus

HELODIDAE 5

GYRINIDAE 8

AESHNIDAE 8

LESTIDAE 8

COMPHIDAE 8

CORDULEGASTERIDAE 8

CORDULIIDAE 8

LIBELLULIDAE 8

COENAGRIDAE 6
Telegerus

HYDRACINELLIDAE

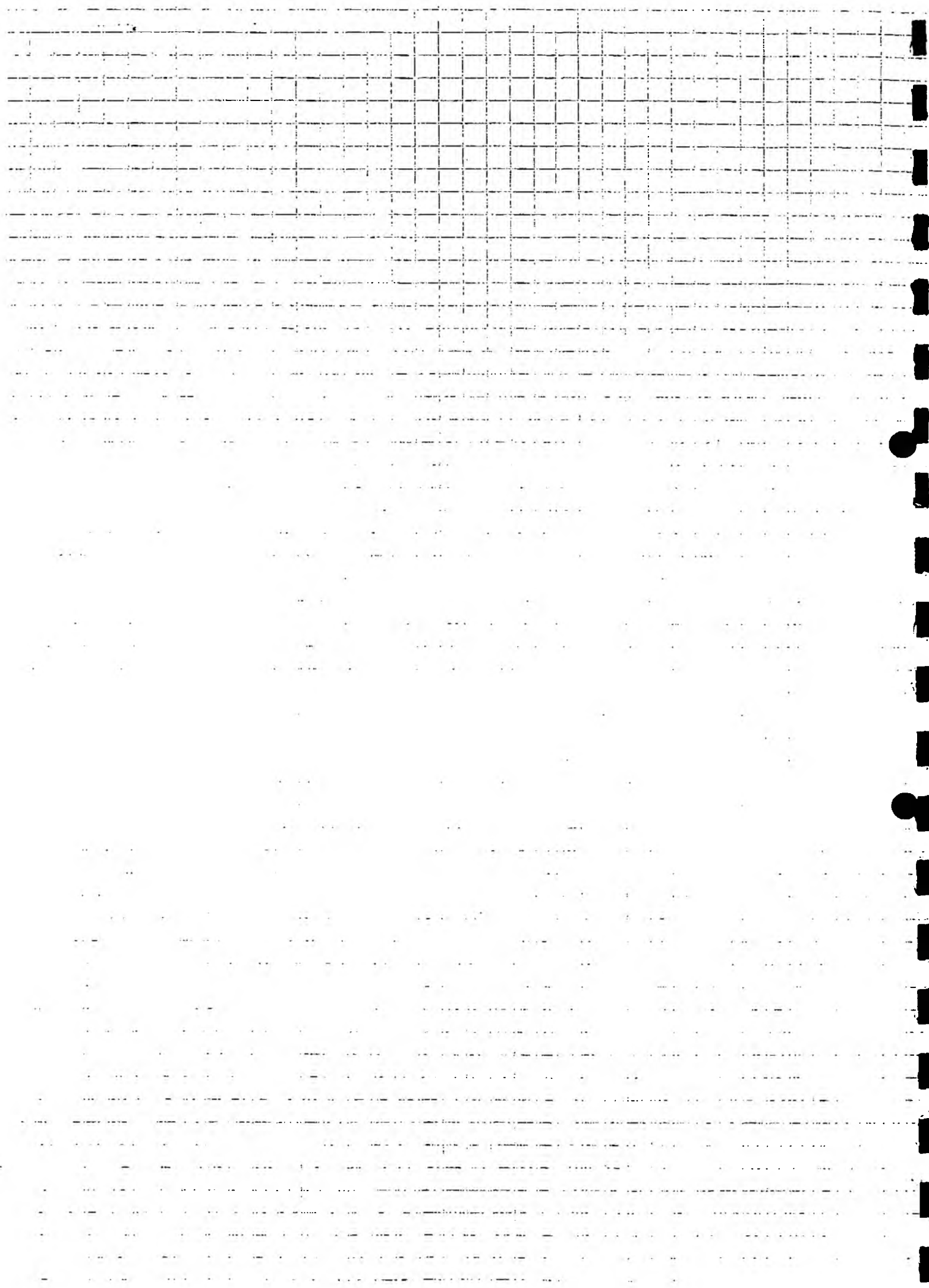
CERATOPOGONIDAE

CLADOCERA

OSTRACODA

COPEPODA

SITE: OFFORD BRIDGE



INVERTEBRATE SURVEY

River/Broad/Lake _____	Sampling Point <u>Ufford Br</u>
Collected by _____	Sample Number <u>6</u>
Sorted by _____	Date <u>7/6/78</u>
Depth _____ Flow _____	Substratum <u>gravel stones</u>
Vegetation <u>Najas, Oenanthus</u>	<u>Apium</u>
Comments <u>Depositing</u>	

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 10

Porifera		Phrysa fontinalis	C	15
Hydroids		Lymnaea stagnalis		
Dendrocoelum lacteum		Lymnaea palustris		
Polycelis nigra	C	Lymnaea truncatula		
Polycelis felina		Myxas glutinosa		
Polycelis tenuis		Lymnaea auricularia		
Dugesia tigrina		Lymnaea peregra		
Dugesia lugubris		Planorbis corneus		
Dugesia polychroa		Planorbis crista		
Planaria torva		Planorbis contortus		
Rhabdocoelidae		Planorbis planorbis		
Nemertini		Planorbis carinatus		
Nematoda		Planorbis leucostoma		
Naididae		Planorbis vortex		
Tubificidae		Planorbis albus		
Lumbriculidae		Planorbis laevis		
Lumbricidae		Segmentina complanata		
Enchytraeidae		Segmentina nitida		
Piscicola geometra	P	Anodonta cygnea		
Erpobdella octoculata	P	Anodonta anatina		
Helobdella stagnalis		Dreissenia polymorpha		
Glossiphonia complanata	C	Sphaerium corneum	C	30
Erpobdella testacea		Pisidium	C	
Theromyzon tessulatum	P			
G. heterochyta	P	Cladocera		
Theodoxus fluviatilis		Ostracoda		
Viviparus fasciatus		Copepoda		
Viviparus viviparus		Argulus foliaceus		
Valvata cristata		Asellus aquaticus	C	15
Valvata piscinalis	C	Asellus meridianus	C	
Bithynia tentaculata	C	Crangonyx pseudogracilis		
Bithynia leachi	C	Gammarus pulex	C	60
Assimineae grayana		Gammarus duebeni		
Hydrobia ulvae		Gammarus zaddachi		
Potamopyrgus jenkinsi		Corophium lacustrae		
Acroloxus lacustris		Corophium multisetosum		
Ancylus fluviatilis	C			

Sphaeroma rugicauda
Sphaeroma hookeri
Paleamonetes varians
Astacus pallipes

Nemoura cinerea

100 Baetis rhodani

60 Baetis fuscatus

Baetis muticus

Baetis vernus

Baetis buceratus

Baetis niger

Centroptilum luteolum

Centroptilum pennulatum

Caenis horaria

Caenis rivulorum

100 Caenis moesta

Cloeon dipterum

Ephemera danica

Ephemerella ignita

Ecdyonurus insignis

Habrophlebia fusca

Paraleptophlebia submarginata

Procloeon pseudorufulum

Siphonurus linneanus

Heptagenia sulphurea

Rhyacophila

Hydropsychidae

Philopotamidae

Polycentropidae

Psychomyidae

Tranodes

Nystacides

Phryganeidae

Agapetus

Silo

Nolannidae

Leptoceridae

Hydroptilidae

100 Limnephilidae

Lepidoptera

Sialis lutaria

Chironomidae

Chironomus thummi

Simuliidae

Dixidae

Culicidae

Chaoborus

Tipulidae

Tabanidae

Syrphidae

Psychodidae

Ceratopogonidae

Notonecta

Plea

Aphelocheirus

Nepa

Hydrometridae

Corixidae

Dytiscidae

Hygrobiidae

Elminthidae

Halipilidae

Cyrinidae

Hydrophilidae

Anisoptera

Zygoptera

Limnocyphidae R

Hygrobatidae

Neomacheilus

Cottus

Gasterosteus

Pungitius

Phoxinus

Sewage Fungus

Total Groups

Trent Index

D.O.E. Class

BMWP. 5th

10

50

50

50

50

100

26

8

A

880

INVERTEBRATE SURVEY

River/Broad/Lake	<u>Deben</u>	Sampling Point	<u>Ufford Bridge</u>
Collected by	<u>SAWH</u>	Sample Number	<u>2</u>
Sorted by	<u>SAWH</u>	Date	<u>28-7-77</u>
Depth <u>0.5</u>	Flow <u>0.4</u>	Substratum	<u>gravel</u>
Vegetation	<u>Najas, Callitriche platycarpa?, L. minor, Elodea, Oenanthe, aquatic-</u>		
Comments	<u>Betula exulta Cladophora * = dominant.</u>		

P = Present, < 10; C = Common, 10-50; A = Abundant, 50-100; VA = Very Abundant, > 100

Porifera		Physa fontinalis	
Hydroids		Lymnaea stagnalis	
Dendrocoelum lacteum		Lymnaea palustris	
Polycelis nigra	C	Lymnaea truncatula	
Polycelis felina		Myxas glutinosa	C
Polycelis tenuis	C	Lymnaea auricularia	
Dugesia tigrina		Lymnaea peregra	P
Dugesia lugubris		Planorbis corneus	
Dugesia polychroa		Planorbis crista	
Planaria torva		Planorbis contortus	
Rhabdocoelidae		Planorbis planorbis	
Nemertini		Planorbis carinatus	
Nematoda		Planorbis leucostoma	
Naididae	C	Planorbis vortex	
Tubificidae		Planorbis albus	
Lumbriculidae		Planorbis laevis	
Lumbricidae		Segmentina complanata	
Enchytraeidae		Segmentina nitida	
Piscicola geometra		Anodonta cygnea	
Erpobdella octoculata	C	Anodonta anatina	
Helobdella stagnalis	C	Dreissena polymorpha	
Glossiphonia complanata		Sphaerium corneum	C
Erpobdella testacea		Pisidium	
Theromyzon tessulatum			
Theodoxus fluviatilis		Cladocera	
Viviparus fasciatus		Ostracoda	
Viviparus viviparus		Copepoda	
Valvata cristata		Argulus foliaceus	
Valvata piscinalis		Asellus aquaticus	
Bithynia tentaculata	C	Asellus meridianus	C
Bithynia leachi		Crangonyx pseudogracilis	
Assiminea grayana		Gammarus pulex	P
Hydrobia ulvae		Gammarus duebeni	
Potamopyrgus jenkinsi		Gammarus zaddachi	
Acroloxus lacustris		Corophium lacustrae	

Sphaeroma rugicauda	_____	Chironomidae	_____
Sphaeroma hookeri	_____	Chironomus thummi	_____
Palaemonetes varians	_____	Simuliidae	_____
Astacus pallipes	_____	Dixidae	_____
		Culicidae	_____
Nemoura cinerea	_____	Chaoborus	_____
		Tipulidae	_____
Baetis rhodani	_____	Tabanidae	_____
Baetis fuscatus	_____	Syrphidae	_____
Baetis muticus	_____	Psychodidae	_____
Baetis vernus	_____	Ceratopogonidae	P
Baetis buceratus	_____		
Baetis niger	_____	Notonecta	_____
Centroptilum luteolum	_____	Plea	_____
Centroptilum pennulatum	_____	Aphelocheirus	_____
Caenis horaria	_____	Nepa	_____
Caenis rivulorum	_____	Hydrometridae	_____
Caenis moesta	C	Corixidae	_____
Cloeon dipterum	_____		
Ephemera danica	_____	Dytiscidae	C
Ephemerella ignita	_____	Hygrobiidae	_____
Ecdyonurus insignis	_____	Elminthidae	P.
Habrophlebia fusca	_____	Haliplidae	_____
Paraleptophlebia submarginata	_____	Cyprinidae	_____
Procloeon pseudorufulum	_____	Hydrophilidae	P
Siphonurus linneanus	_____		
Heptagenia sulphurea	_____	Anisoptera	_____
		Zygoptera	_____
Rhyacophila	_____		
Hydropsychidae	_____	Limnocyrtidae	A
Philopotamidae	_____	Hygrobatidae	A
Polycentropidae	_____		
Psychomyidae	Tinodes waeneri P.	Neomacheilus	P.
Tranodes	_____	Cottus	_____
Nystacides	_____	Gasterosteus	_____
Phryganeidae	P.	Pungitius	_____
Agapetus	_____	Phoxinus	_____
Silo	_____		
Molannidae	_____	Sewage Fungus	_____
Leptoceridae	_____		
Hydroptilidae	_____	Total Groups	22
Limnephilidae	_____	Trent Index	8
		D.O.E. Class	A
Lepidoptera	_____		
Sialis lutaria	_____		

Collected by	Sorted By
Date 8/2/77	Sample No 18
Details of sampling site (veg, substratum, flow) ... 0 ... 0.2 ... 1.0 m ... F < 0.5 ms ⁻¹	
Subs. Stones, Gravel, Mud	
Veg. 5% Cladophora 1% Callitriche Iris beds	
Porifera	Myxas glutinosa
Hydroids	Lymnaea auricularia
Dendrocoelum lacteum	Lymnaea peregra C
Polycelis nigra	Planorbarius corneus
Polycelis felina	Planorbis crista
Polycelis tenuis C	Planorbis contortus O
Dugesia polychroa O	Planorbis planorbis
Planaria torva	Planorbis carinatus
Rhabdocoelidae	Planorbis leucostoma
Nemertini	Planorbis vortex C
Nematoda	Planorbis albus O
Nauididae	Planorbis laevis
Tubificidae C	Segmentina complanata
Lumbriculidae	Segmentina nitida
Lumbricidae	Anodonta cygnea O
Enchytraeidae	Anodonta anatina
Piscicola geometra	Dreissena polymorpha
Erpobdella octoculata C	Sphaerium corneum C
Helobdella stagnalis	Pisidium C
Glossiphonia complanata C	Cladocera
Erpobdella testacea	Ostracoda C
Theromyzon tessulatum	Copepoda C
Theodoxus fluviatilis	Argulus foliaceus
Viviparus fasciatus	Asellus aquaticus C
Viviparus viviparus	Asellus meridicanus C
Valvata cristata C	Gammarus pulex C
Valvata piscinalis A	Gammarus zaddachi
Bithynia tentaculata C	Corophium lacustrae
Bithynia leachi F	Palaemonetes varians
Assiminea grayana	Sphaeroma rugicauda
Hydrobia ulvae	Astacus pallipes
Potamopyrgus jenkinsi	Nemoura cinerea
Acroloxus lacustris C	Baetis rhodani
Ancylus fluviatilis	Baetis fuscatus
Zonitoides nitidus	Baetis muticus
Physa fontinalis A	Baetis veruus
Lymnaea stagnalis	Baetis buceratus
Lymnaea palustris	
Lymnaea truncatula	

(cont.)

Baetis niger	.....	Notonecta	.....
Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphaeochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis modesta	.....	Corixidae	.....
Cloeon dipterum	.....	Dytiscidae	.....
Ephemerella danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae	.....
Procloeon pseudorufulum	.....	Halipilidae	.....
Siphonurus linneanus	.....	Gyrinidae	.....
Heptagenia sulphurea	.....	Hydrophilidae	.....
Rhyacophila	.....	Anisoptera	.....
Hydropsychidae	.....	Zygoptera	.....
Philopotamidae	.....	Limncharidae	.....
Polychaetropidae	.....	Hygrobatidae	.....
Psychomyidae	.....	Noemacheilus	.....
Triacodes	.....	Cottus	.....
Hysteroidea	.....	Gasterosteus	.....
Phryganeidae	.....	Pungitius	.....
Agapetus	.....	Phoxinus	.....
Silo	.....	Total Groups	33
Molannidae	.....	Trent Index	9
Leptoceridae	.....		
Hydroptilidae	.....		
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	.....		

Chironomidae
 Chironomus thummi
 Simuliidae
 Dixidae
 Culicidae
 Chaoborus
 Tipulidae
 Tabanidae
 Syrphidae

D.O.E. A.

River/Stream..... Sampling Point.....
 Collected by J.S.W...... Sorted By H.G. Ifford bridge
 Date 21/1/76..... Sample No.....
 Details of sampling site (veg, substratum, flow) shallow / slow current
with algae slit

Porifera	.....	Myxas glutinosa	.....
Hydroids	.....	Lymnaea auricularia	.....
Dendrocoelum lacteum	.....	Lymnaea peregra	.....
Polycelis nigra	ABUNDANT	Planorbarius corneus	.....
Polycelis felina	.....	Planorbis crista	.....
Polycelis tenuis	ABUNDANT	Planorbis contortus	.....
Dugesia polychroa	.....	Planorbis planorbis	.....
Planaria torva	1	Planorbis carinatus	.....
Rhabdocoelidae	.....	Planorbis leucostoma	.....
Nemertini	.....	Planorbis vortex	1
Nematoda	.....	Planorbis albus	.....
Naididae	.....	Planorbis laevis	.....
Tubificidae	.....	Segmentina complanata	.....
Lumbriculidae	.....	Segmentina nitida	.....
Lumbricidae	.....		
Enchytraeidae	.....	Anodonta cygnea	.....
		Anodonta anatina	.....
Piscicola geometra	.....	Dreissena polymorpha	.....
Eopobdella octoculata	4	Sphaerium corneum	.....
Helobdella stagnalis	.....	Pisidium	.....
Glossiphonia complanata	1		
Eopobdella testacea	.....	Cladocera	.....
Theromyzon tessulatum	.....	Ostracoda	.....
		Copepoda (CYCLOPS SP.)	F. ABUNDANT
Theodoxus fluviatilis	.....	Argulus foliaceus	.....
Viviparus fasciatus	.....	Asellus aquaticus	V. ABUNDANT
Viviparus viviparus	.....	Asellus meridianus	.....
Valvata cristata	.....	Gammarus pulex	F. ABUNDANT
Valvata piscinalis	F. ABUNDANT	Gammarus zaddachi	.....
Bithynia tentaculata	.....	Corophium lacustrae	.....
Bithynia leachi	.....	Palaemonetes varians	.....
Assimineae grayana	.....	Sphaeroma rugicauda	.....
Hydrobia ulvae	.....	Astacus pallipes	.....
Potamopyrgus jenkinsi	.....		
Acroloxus lacustris	.....	Nemoura cinerea	.....
Ancylus fluviatilis	.....		
Zonitoides nitidus	.....	Baetis rhodani	.....
Physa fontinalis	.....	Baetis fuscatus	.....
Lymnaea stagnalis	.....	Baetis muticus	.....
Lymnaea palustris	.....	Baetis verus	.....
Lymnaea truncatula	.....	Baetis buceratus	.....

Centroptilum luteolum	.....	Plea	.....
Centroptilum pennulatum	.....	Aphelochirus	.....
Caenis horaria	.....	Nepa	.....
Caenis rivulorum	.....	Hydrometridae	.....
Caenis moesta	.....	Gorixidae	.....
Cloeon dipterum	.....	Dytiscidae	.....
Ephemera danica	.....	Hygrobiidae	.....
Paraleptophlebia submarginata	.....	Elminthidae (ELMIS AENEAE-NYMPH)	.....
Procloeon pseudorufulum	.....	(ELMIS - ADULT)	.....
Siphonurus linneanus	.....	Halipilidae	.....
Heptagenia sulphurea	.....	Gyrinidae	.....
Ryacophila	.....	Hydrophilidae	.....
Hydropsychidae	.....	Anisoptera	.....
Philopotamidae	.....	Zygoptera	.....
Polycentropidae	.....	Limnocharidae	F. ABUNDANT
Psychomyidae	.....	Hygrobatidae	ABUNDANT
Trianodes	.....	Noemacheilus	.....
Mystacides	.....	Cottus	.....
Phryganeidae	.....	Gasterosteus	.....
Agapetus	.....	Pungitius	.....
Silo	.....	Phoxinus	.....
Molannidae	.....	Total Groups	 19
Leptoceridae	.....	Trent Index	 8
Hydroptilidae	.....	DOF Class	A
Limnephilidae	.....		
Lepidoptera	.....		
Sialis lutaria	.....		

Chironomidae
 Chironomus thummi
 Simuliidae
 Dixidae
 Culicidae
 Chaoborus
 Tipulidae
 Tabanidae
 Syrphidae

F. ABUNDANT

River Dakota Date Upford Bridge Number _____ Date 11/8/81
 Collected by PS CO Substratum stones, mud Depth av. 0.5m Flow S - M
 Vegetation Nuphar in riv Width up to 10m
 Comments _____
 Land Use _____

DETROICOELESIDAE 5 Dendrocoelum lacteum	Planorbis crista Planorbis laevis Planorbis leucostoma Planorbis planorbis C Planorbis vortex P Segmentina complanata P Segmentina vitidae
PLANARIIDAE 5 Polycelis felina Polycelis nigra P Polycelis tenuis P Dugesia lugubris Dugesia polychroa Dugesia tigrina	UNIONIDAE 6 Anodonta anatina Anodonta cygnea Unio pictorum
OLIGOCHAETA 1 Lumbricidae Lumbriculidae P Naididae P Tubificidae P	SPHAERIIDAE 3 Pisidium sp. C Sphaerium corneum P
PISCICOLIDAE 4 P Piscicola geometra P	DREISSENIDAE Dreissena polymorpha
ERPOBDELLIDAE 3 C Erpobdella octoculata P	ASELLIDAE 3 P Asellus aquaticus C Asellus meridianus
P GLOSSIPHONIIDAE 3 Glossiphonia complanata Glossiphonia heteroclita Helobdella stagnalis Theromyzon tessellatum P	GAMMARIDAE 6 Crangonyx pseudogracilis Gammarus duebeni C Gammarus pulex P Gammarus zaddachi
NERITIDAE 6 Theodoxus fluviatilis	COROPHIDAE 6 Corophium lacustrae Corophium multisetosum
VIVIPARIDAE 6 Viviparus fuscatus Viviparus viviparus	ASTACIDAE 8 Astacus pallipes
VALVATIDAE 3 Valvata cristata Valvata macrostoma C Valvata piscinalis P	NEMOURIDAE 7
HYDROBIIDAE 3 Assiminea grayana P Bithynia leachi P Bithynia tentaculata P Hydrobia ulvae Potamopyrgus jenkinsi	CAPNIIDAE 10
ANCYLIDAE 6 Acroloxus lacustris Ancylus fluviatilis	CHLOROPHERIDAE 10
PHYSIDAE 3 Physa acuta P Physa fontinalis P Physa heterostropha	LEUCTRIDAE 10
LYMNAEIDAE 3 Lymnaea auricularia Lymnaea palustris Lymnaea peregra P Lymnaea stagnalis Mysas glutinosa	PERLIDAE 10
PLANORBIDAE 3 Planorbis albus Planorbis carinatus P Planorbis contortus	PERLODIDAE 10
	TAENIOPTERYGIDAE 10
	CLADOCERA
	OSTRACODA
	COPEPODA
	Panfa

HAETIDAE C Haetia rhodani Haetia P Centropilum luteolum Centropilum pennulatum P Cloron dipterum Procloeon pseudorufulum	5	NOTONECTIDAE	5
CAENIDAE Caenia moesta Caenia	7	PLEIDAE	5
EPHEMERIDAE Ephemera danica Ephemera vulgata	10	AMELOHEMIDAE	10
EPHEMERELLIDAE Ephemerella ignita	10	NEPIDAE	5
HEPTAGENIIDAE Ecdyonurus Heptagenia	10	HYDROMETRIDAE	5
LEPTOPHLEBIIDAE Habrophlebia fusca Para-leptophlebia submarginata	10	P CORIXIDAE C	5
SIPHONURIDAE	10	C DYTISCIDAE P	5
RHYACOPHYLLIDAE Agapetus Rhyacophila	7	HYGROBIIDAE	5
P HYDROPSYCHIDAE	5	ELMINTHIDAE P	5
P POLYCENTROPIDAE P	7	PHALIPIDAE P	5
PSYCHOMYIIDAE	8	HELODIDAE	5
PHYGANEIDAE	10	GYRINIDAE	5
SERICOSTOMATIDAE	10	AGRIIDAE	8
GOERIDAE	10	AEGINIDAE	8
MOLANNIDAE	10	LESTIDAE	8
LEPTOCERIDAE P	10	COMPTIDAE	8
HYDROPTILIDAE	6	CORULEGASTERIDAE	8
CLIMACULIDAE	7	CORULIIDAE	8
PSIALIDAE Stelia	4	LIBELLULIDAE	8
CCHIRONOMIDAE C	2	COENAGRIIDAE r	6
SIMULIDAE P	5	C HYDRACHNELLIDAE C	
PTIPULIDAE	5		
PERATOPOGONIDAE P			
PREVIOUS NUMBER OF GROUPS T.B.I. D.O.E. B.N.V.P. Date	53 109 5/12/81	PRESENT NUMBER OF GROUPS T.B.I. D.O.E. B.N.V.P. Date	24 2897

River Dulan Site Ufford Bridge Number _____ Date 5/8/50
 Collected by PO Substratum stagnant mud Depth upto 1m Flow 3-4 m
 Vegetation _____ Width 10m
 Comments _____
 Land Use _____

DENDROCOELIDAE 5 Dendrocoelum lacteum	Planorbis cristatus Planorbis laevis Planorbis leucostoma Planorbis planorbis Planorbis vortex <u>✓</u> Segmentina complanata <u>✓</u> Segmentina vitidae
PLANARIIDAE 5 Polycelis felina Polycelis nigra Polycelis tenuis <u>P</u> Dugesia lugubris Dugesia polychroa Dugesia tigrina	UNIONIDAE 6 Anodonta anatina Anodonta cygnea Unio pictorum
OLIGOCHAETA 1 Lumbricidae Lumbriculidae Naididae <u>✓</u> Tubificidae <u>✓</u>	SIMULIIDAE 3 Simulium sp. <u>✓</u> Sphaerium corneum <u>✓</u>
PISCICOLIDAE 4 Piscicola geometra	DREISSENIDAE Dreissena polymorpha
ERPOBDELLIDAE 3 Erpobdella octoculata <u>✓</u>	ASELLIDAE 3 Asellus aquaticus <u>✓</u> Asellus meridianus <u>✓</u>
GLOSSIPHONIIDAE 3 Glossiphonia complanata <u>✓</u> Glossiphonia heteroclita Helobdella stagnalis Theromyzon tessellatum	GAMMARIDAE 6 Crangonyx pseudogracilis Gammarus duebeni Gammarus pulex <u>✓</u> Gammarus zaddachi
MERITIDAE 6 Meristonyx fluviatilis	COROPHIDAE 6 Corophium lacustrae Corophium multisetosum
VIVIPARIDAE 6 Viviparus fuscatus Viviparus viviparus	ASTACIDAE 8 Astacus pallipes
VALVATIDAE 3 Valvata cristata Valvata macrostoma Valvata piscinalis <u>✓</u>	NEMOURIDAE 7 CAPNIIDAE 10
HYDROBIIDAE 3 Assiminea grayana Bithynia leachi <u>✓</u> Bithynia tentaculata <u>✓</u> Hydrobia ulvae Potamopyrgus jenkinsi	CHLOROPERLIDAE 10 LEUCTRIDAE 10 PERLIDAE 10 PERIODIDAE 10
ANCYLIDAE 6 Acroloxus lacustris Ancylus fluviatilis	TAENIOPTERYGIDAE 10 CLADOCERA OSTRACODA COPEPODA
PHYSIDAE 3 Physa acuta Physa fontinalis <u>✓</u> Physa heterostropha	<u>Amphipoda</u> <u>✓</u>
LYNNAEIDAE 3 Lymnaea auricularia Lymnaea palustris Lymnaea peregra Lymnaea stagnalis Mysas glutinosa	<u>Al</u>
PLANORBIDAE 3 Planorbis albus Planorbis carinatus <u>✓</u> Planorbis contortus <u>✓</u>	

30 BARTIDAE /c Baetis rhodani Baetis C Centropetrum luteolum /p Centropetrum pennulatum Cloeon dipterum /p C Proclonus pseudorufulus	NOTONECTIDAE /p 5 PLEIDAE 5 AMHELOCHETIDAE 10 NEPIDAE 5 HYDROMETRIDAE 5 CORIXIDAE /c 5 PTISCIDAE /c 5 HYGROBIIDAE 5 ELMINTHIDAE /p 5 PLIPLIDAE /p 5 HELODIDAE 5 GYRINIDAE 5 AGRIIDAE 8 AEGHINIDAE 8 LESTIDAE 8 CGMHIDAE 8 CORDULEGASTERIDAE 8 CORDULIIDAE 8 LIBELLULIDAE 8 COENACRIDAE 6 HYDRACHNELLIDAE /c
CAENIDAE 7 Caenis moesta Caenis	
EPHEMERIDAE 10 Ephemera danica Ephemera vulgata	
EPHEMERELLIDAE 10 Ephemerella ignita	
HEPTAGENIIDAE 10 Ecdyonurus Heptagenia	
LEPTOPHEBIIDAE 10 Habrophlebia fusca Paraleptophlebia submarginata	
SIPHONURIDAE 10	
RHYACOPHILIDAE 7 Agapetus Rhyacophila	
HYEROPSYCHIDAE /p 5	
POLYCENTROPIDAE /p 7	
PSYCHOMYIIDAE 8	
PHRYGANEIDAE 10	
SERICOSTOMATIDAE 10	
GOERIDAE 10	
MOLANIDAE 10	
LEPTOCERIDAE /r 10	
HYDROPTILIDAE 6	
PLIMNPHILIDAE /r 7	
PSIALIDAE /p 4 Sialis	
PHIRONOMIDAE /c 2	
SIMULIDAE 5	
TIPULIDAE /p 5	
CERATOPOGONIDAE /p	
PREVIOUS NUMBER OF GROUPS 35 T.B.I. 9 D.O.E. B.M.W.P. Date 17/7/79.	PRESENT NUMBER OF GROUPS 33 T.B.I. D.O.E. B.M.W.P. 109. Date

River 1/2/3m

Site Offord Bridge

Date 25/7/79

Collected by PR

E/D

Substratum stones silt

Depth 22'

Flow slow

Vegetation abundant submerged Sparganium & Najas in water - Mysis, Ponds Phalaris

Comments on banks

DENDROCOELIDAE

30/30/

Dendrocoelum lacteum

PLANARIIDAE

30/30/

Polycelis felina

Polycelis nigra

Polycelis tenuis

Dugesia lugubris

Dugesia polychroa

Dugesia tigrina

LIGOCHAETA

1/1/

Lumbricidae

Lumbriculidae

Naididae

ISCICLIDAE

20/20/

Isocloa geometra

Glossiphoniidae

10/10/

Glossiphonia octoculata

Glossiphoniidae

10/10/

Glossiphonia complanata

Glossiphonia heteroclita

Helobdella stagnalis

Theromyzon tessellatum

VIVIPARIDAE

40/40/

Theodoxus fluviatilis

VIVIPARIDAE

40/40/

Viviparus fasciatus

Viviparus piscinalis

VALVATIDAE

10/10/

Valvata cristata

Valvata macrostoma

Valvata piscinalis

HYDROBIIDAE

10/10/

Hydrobia grayana

Hydrobia leachi

Hydrobia tentaculata

Hydrobia ulvae

Potamopyrgus jenkinsi

ACROLOXIDAE

40/40/

Acroloxus lacustris

Acroloxus fluviatilis

PHYSAIDAE

10/10/

Physa acuta

Physa fontinalis

Physa heterostrophia

LYMNAEIDAE

10/10/

Lymnaea auricularia

Lymnaea palustris

Lymnaea peregra

Lymnaea stagnalis

Lymnaea stagnalis

PLANORBIDAE

10/10/

Planorbis albus

Planorbis carinatus

Planorbis contortus

Planorbis cristatus

Planorbis laevis

Planorbis leucostoma

Planorbis planorbis

Planorbis vortex

Segmentina complanata

Segmentina viticula

UNIONIDAE

40/40/

Anodonta anatina

Anodonta cygnea

Unio pictorum

SPHAERIIDAE

10/10/

Fisidium sp.

Sphaerium corneum

DREISSENIDAE

Dreissena polymorpha

ASCELLIDAE

10/10/

Asellus aquaticus

Asellus meridianus

GAMMARIDAE

40/40/

Gammarus pseudograssili

Gammarus duebeni

Gammarus pulex

Gammarus zaddachi

CEROPHIIDAE

40/40/

Cerophium lacustre

Cerophium multisetosum

ASTACIDAE

60/80/

Astacus pallipes

NEPHROIDAE

50/70/

CAPNIIDAE

80/100/

CHLOROPERLIDAE

80/100/

LEUCTRIDAE

80/100/

PERLIDAE

80/100/

PERLODIDAE

80/100/

TRENIOPTERYGIDAE

80/100/

Pond

TRIDAE	20/20/
Metis rhodani	
Scetis	
Centroptilum luteolum	10 mm C
Centroptilum pennulatum	
Cloeon dipterum	
Procloeon pseudorufulum	11 mm C
ENIDAE	50/70/
Caenis moesta	✓ P
Caenis hvaria	P
HEMERICIDAE	80/100/
Ephemera danica	
Ephemera vulgata	
HEMERELLIDAE	80/100/
Ephemerella ignita	
PTAGENIIDAE	80/100/
Ecdyonurus	
Heptagenia	
PTOPHLEBIIDAE	80/100/
Habrophlebia fusca	
Paroleptophlebia submarginata	
PHLONURIDAE	80/100/
MACOPHILIDAE	50/70/
Agapetus	
Rhyacophila	
DROPSYCHIDAE	30/30/
LYCENTROPIDAE	50/70/
	✓ P P. flavomaculatus
PSYCHOMYIDAE	60/80/
RYGANEIDAE	80/100/
RICOSTOMATIDAE	80/100/
TRIDAE	80/100/
	S. to cross
LANNIDAE	80/100/
POCERIDAE	80/100/
DROPTILIDAE	40/40/
NEPHILIDAE	50/70/
	✓ 12 mm P
ALIDAE	20/20/
Sialis	✓ P
IRONOMIDAE	5/5/
	✓ P
ULIDAE	30/30/
PULIDAE	30/30/

PREVIOUS NUMBER OF GROUPS

T.B.I.
D.O.E.
B.M.W.P.

NOTONECTIDAE	30/30/
PLEIDAE	30/30/
APHELOCHEIRIDAE	80/100/
NEPIDAE	30/30/
HYDROMETRIDAE	30/30/
CORIXIDAE	30/30/
DYTISCIDAE	30/30/
	adult P
HYGROBIIDAE	30/30/
ELMINTHIDAE	30/30/
	adult P
HALIPLIDAE	30/30/
	adult P
HYDROPHILIDAE	30/30/
GYRINIDAE	30/30/
AGRIIDAE	60/80/
AESHNIDAE	60/80/
LESTIDAE	60/80/
GOMPHIDAE	60/80/
CORDULEGASTERIDAE	60/80/
CORDULIIDAE	60/80/
LIBELLULIDAE	60/80/
HYDRACHNELLIDAE	
	✓ C
	Bull head
	Ceratopogonid - P

PRESENT NUMBER OF GROUPS

35
T.B.I. 9
D.O.E. A
B.M.W.P. 556

SITE: U7S WICKHAM HILL

RIVER DebenSITE U/S Wickham MillDATE 14/8/84

CODE

NCK TM 306 566.

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

Apium nodiflorum

Nerula erecta

Callitriche sp

Ceratophyllum

Chara sp

Elodea canadensis

Filamentous algae

Fontinalis sp

Myriophyllum sp

Nuphar lutea

Nymphaea alba

Oenanthe fluviatilis

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp. GlyceriaMyosotisMenthaRorippa

D = dominant

C = common

P = present

T = trace

garg
emertsum

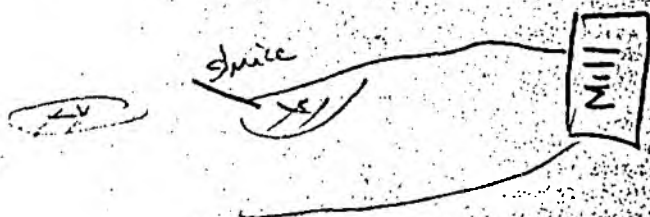
Land Use

Wasteland Width 10m
 Urban / Depth 7.1.0m
 Pastoral / Temp °C
 Arable Oxygen %
 Heath Representative of
 Bog/marsh ranch?
 Decid. wood Yes/No
 Conif. wood

Visible signs of effluent's
 impact on river

Spate/Recent Spate/Low Flow

Sample in m/phyllo e emergent
 vegetation



Large shoals of
 fish visible

Number of families =

H.M.V.P. score = 113

DENDROCOELIDAE

Dendrocoelum lacteum
Bdellocephala

PLANARIIDAE

Polycelis sp
Planaria torva
Dugesia lugubris
Dugesia polychroa
Dugesia tigrina

OLIGOCHAETA

Lumbricidae
Lumbriculidae
Naididae
Tubificidae

PISCICOLIDAE

Piscicola geometra

ERPODELLIDAE

GLOSSIPHONIIDAE

Glossiphonia sp
Helobdella stagnalis
Theromyzon tessellatum

NERITIDAE

Theodoxus fluviatilis

VIVIPARIDAE

Viviparus fasciatus
Viviparus viviparus

VALVATIDAE

Valvata cristata
Valvata macrostoma
Valvata piscinalis

HYDROBIIDAE

Assiminea grayana
Sithynia leachi
Sithynia tentaculata
Hydrobia ulvae
Potamopyrgus jenkinsi

ANCYLIDAE

Aceroloxus lacustris
Anchylus fluviatilis

PHYSIDAE

Physa fontinalis

LYNAEIDAE

Lymnaea auricularia
Lymnaea palustris
Lymnaea peregra
Lymnaea stagnalis

PLANORBIIDAE

Planorbis albus
Planorbis carinatus
Planorbis contortus
Planorbis cristata
Planorbis laevis
Planorbis leucostoma
Planorbis planorbis
Planorbis vortex
Segmentina complanata
Segmentina vitidis

UNIONIDAE

Anodonta anatina
Anodonta cygnea
Unio pictorus

SPHAERIIDAE

Placidium sp
Sphaerium corneum

ASELLIDAE

Aesellus aquaticus
Aesellus veridicus

CAMMARIDAE

Crangonyx pseudogracilis
Cammarus duebeni
Cammarus pulex
Cammarus zaddachi

COROPHIIDAE

ASTACIDAE

NEHOIRIDAE

CAPNIIDAE

CHLOROPERLIDAE

LEUCTRIDAE

BAETIDAE

Baetis sp
Centroptilum luteolum
Centroptilum pennulatum
Clooson dipterum
Proclooson pseudorufulum

CAENIDAE

Caenis sp

EPHEMERIDAE

Ephemera danica
Ephemera vulgata

EPHEMERELLIDAE 10
Ephemerella ignita

HEPTAGENIIDAE 10
Ecdyonurus sp
Heptagenia sp

LEPTOPHLEBIIDAE 10
Hebrophebia fusca
Paraleptophlebia submarginata

SIPHONURIDAE 10

RHYACOPHILIDAE 7
Agapetus fuscipes
Rhyacophila sp

HYDROPSYCHIDAE 5

POLYCENTROPIDAE 7

PSYCHOMYIIDAE 8

PHRYCANIIDAE 10

SERICOSTOMATIDAE 10

COERIDAE 10

MOLANNIDAE 10

LEPTOCERIDAE 10

HYDROPTILIDAE 6

LIMNephilidae 7

SLALIDAE 6

CHIRONOMIDAE 2

SIMULIDAE 5

TIPULIDAE 5

NOTONECTIDAE 5

PLEIDAE 5

APHELOCHEIRIDAE 10

NEPIDAE 5

HYDROMETRIDAE 5

CORIXIDAE 5

DYTISCIDAE 5

Hydroporus

Deronectes

HYGROBIIDAE 5

ELMINTHIDAE 5

HALIPLIDAE 5

HELODIDAE 5

CYRINIDAE 5

AESHNIDAE 5

LESTIDAE 5

COMPHIDAE 8

CORDULEGASTERIDAE 8

CORDULIIDAE 8

LIBELLULIDAE 8

COENAGRIDAE 8

HYDRACKNELLIDAE 8

CERATOPOGONIDAE 8

CLADOCERA 10

OSTRACODA 10

COPEPODA 10

SITES:

DEBEN

+

DEBEN TRIB.

U/S FARM DITCH
LITTLE VALLEY FARM
D/S FARM DITCH
U/S CONFL.
D/S CONFL.
CROFTINGHAM FORD

sites: - All 20 Road Bridge = 1 (1981 survey), = A (1980 survey)
 Crettingham Bridge = 2 " = B
 Kettleburgh Bridge = 3 " = C
 Gloening Bridge = 4 " = D
 Eyke Ford = 5 " = E
 Ufford Bridge = 6 " = F

Letter or number
indicates presence or
absence of species

DENDROCOELIDAE 5 <i>Dendrocoelum lacteum</i>	<i>Planorbis cristatus</i> <i>Planorbis laevis</i> <i>Planorbis leucostoma</i> <i>Planorbis planorbis</i> <i>Planorbis vortex</i> 23456 BCDEF <i>Segmentina complanata</i> <i>Segmentina vitidus</i>
PLANORBIDAE 5 <i>Polycelis felina</i> <i>Polycelis nigra</i> <i>Polycelis tenuis</i> 23456 BCDEF <i>Dugesia lugubris</i> 5 E <i>Dugesia polychra</i> <i>Dugesia tigrina</i>	UNIONIDAE 6 <i>Anodonta anatina</i> <i>Anodonta cygnea</i> <i>Unio pictorum</i>
OLIGOCHAETA 1 <i>Lumbricidae</i> <i>Lumbricidae L. variegatus</i> C <i>Enididae</i> 1234 AB CF <i>Tubificidae</i> 12356 CEF	SPHARIIDAE 3 <i>Hydris sp.</i> 12 <i>Sphaerium corneum</i> 3456 ADEF
PISCICOLIDAE 4 <i>Piscicola geometra</i> 46 CF	DREISSENIDAE <i>Dreissena polymorpha</i>
ERPODIELLIDAE 3 <i>Erpoddella octoculata</i> 12356 A CDEF	ASELLIDAE <i>Asellus aquaticus</i> 356 ACDEF <i>Asellus acridianus</i> 5 ADE
GLASSIPHORIIDAE 3 <i>Glossiphonia complanata</i> 123 CEF <i>Glossiphonia heteroclita</i> <i>Helobdella stagnalis</i> 24 ABCD <i>Theromyzon tessellatum</i> 46 E	CAMBARIDAE 6 <i>Cambarus pseudogracilis</i> 2 B <i>Cambarus duebeni</i> <i>Cambarus pulex</i> 12356 BCDEF <i>Cambarus zaddachi</i>
NERITIDAE 6 <i>Theodoxus fluviatilis</i>	COROPHIDAE 6 <i>Corophium lacustrum</i> <i>Corophium multisetosum</i>
VIVIPARIDAE 6 <i>Viviparus fasciatus</i> <i>Viviparus viviparus</i>	ASTACIDAE 8 <i>Astacus pallipes</i>
VALVATIDAE 3 <i>Valvata cristata</i> <i>Valvata macrostoma</i> <i>Valvata piscinalis</i> 3456 CD CDEF	HEMORHIDAE 7
HYDROBIIDAE 3 <i>Aceminia grayana</i> <i>Bithynia leachi</i> 5 F <i>Bithynia tentaculata</i> 3456 CDF <i>Hydrobia ulvae</i> <i>Potamopyrgus jenkinsi</i>	CAPRIIDAE 10
ANCYLIDAE 6 <i>Ancylus lacustris</i> <i>Ancylus fluviatilis</i>	CHIRONOMIDAE 10
HYGIDAE 3 <i>Hyas acuta</i> <i>Hyas fontinalis</i> 56 DF <i>Hyas heterotrophus</i>	LEUCOTRIDAE 10
LYNAEIDAE 3 <i>Lymnaea auricularia</i> <i>Lymnaea palustris</i> <i>Lymnaea peregra</i> 2456 BD <i>Lymnaea stagnalis</i> <i>Hyas glutinosa</i>	PERIIDAE 10
PLANORBIDAE 3 <i>Planorbis albus</i> 24 BC <i>Planorbis carinatus</i> D	PHILODIDAE 10
	TACHYDONTIDAE 10
	CLADOCERA 123 CDE
	OSTRACODA
	COLEPODA 1245 BCD
	PORIFERA F

PARTIANS			
<i>Beetia rhodani</i>	3 5 6	ABCE F	
<i>Beetia</i>			
<i>Centropilus luteolus</i>	2 3 4 5	CDEF	
<i>Centropilus punctatus</i>			
<i>Cloaca diptera</i>	1 2 3 4 6	BCDEF	
<i>Proclonus paradorufulus</i>			
CAENIDAE			7
<i>Caenis montana</i>			
<i>Caenis herania</i>	3 4 5	E	
EPHEMERIDAE			10
<i>Ephemerella denticata</i>			
<i>Ephemerella vulgata</i>			
EPHEMERELLIDAE			10
<i>Ephemerella ignita</i>			
HEPTAGENIIDAE			10
<i>Ecdyonurus</i>			
<i>Heptagenia</i>			
LEPTOMERIIDAE			10
<i>Hydrophlebia fusca</i>			
<i>Paraleptophlebia subarginata</i>			
SIMULONIDAE			10
PHYAGOMELIDAE			7
<i>Agapetus</i>			
<i>Rhyacophila</i>			
HYDROPSYCHIDAE			3
<i>Hydropsyche pellucidula</i>	3 5	CEF	
POLYCENTROPIDAE			7
<i>Polycentropus flavimaculatus</i>	2 3 4 5 6	CEF	
PSYCHOTIIDAE			2
PHRYGANIIDAE			10
SEMIOSTOMATIDAE			10
CORRIDAE			5
MOLANIIDAE			10
LEPTOCERIDAE			6
HYDROPTILIDAE			3
LIBELLULIDAE			A C E F
STALIDAE			4
<i>Stelia lutea</i>		A D F	
CHIRONOMIDAE			1 2 3 4 5 6
SIMULIIDAE			3 6
TIBULIDAE			5 C E
CERATOPOGONIDAE			2 3 5
TENTATIVE ORDER OF GROUPS			
T.O.I.			
P.O.I.			

NOTONECTIDAE			12	BCDEF
MEGALOPTERIDAE			5	
AMPHIRODONTIDAE			10	
NEPTIDAE			5	
HYDROMETRIDAE			5	
COLEPTERIDAE			1 2 3 4 5 6	ABCDEF
DIPYSCIDAE			1 2 3 4 5 6	ABCDEF
HYGROPHIDAE			5	
ELIMIDAE			1 3 5 6	CF
<i>Elmis aenea</i>				
HALIPIDAE			1 3 4 5 6	BCDEF
<i>Brychius elevatus</i>				
HELODIDAE			5	
CYRINIDAE			3	
<i>Cyanus sp.</i>				
AGRIDAE			8	
ATRIDAE			4	
LESTIDAE			8	
COMPTIDAE			8	
COMBLECASTIDAE			8	
COMULIDAE			8	
LIBELLULIDAE			8	
COENAGRIDAE			6	
HYDRACHNEIDAE			1 2 3 4 5 6	ABCDEF
The typed number is the score attributed to the family by the B.M.W.P. pollution index. The total number obtained by adding all the individual scores for each family at one sampling gives a pollution rating. The score is open-ended, but scores above 80-90 are considered good.				
TENTATIVE ORDER OF GROUPS				
T.O.I.				
P.O.I.				

1980 survey - 23/1/80
1981 survey - 11/5/80
Letter or number
indicates presence or
absence of species

PORIFERA

HEPTAGENIDAE		
Hectia rhodani	3 5 6	ABCE F
Hectia		
Centropilum luteolum	2 3 4 5	CDEF
Centropilum punctatum		
Cleocia dipicrus	1 2 3 4 6	BCDEF
Triclocia pseudorufulum		
CATRINAE		?
Coccia rosata		
Coccia herania	3 4 5	E
EPHEMERIDAE		10
Ephemeria canica		
Ephemeria vulgata		
EPHEMERELLIDAE		10
Ephemerella ignita		
HEPTAGENIDAE		10
Hedyonurus		
Heptagenia		
LEPTODRUSIDAE		10
Leptodrus fuscus		
Paraleptodrus submarginatus		
SIPHONURIDAE		10
HYACINTHIDAE		7
Agapetus		
Rhyacophila		
HYDROPSYCHIDAE		
Hydropsyche pellucidula	3 5	CEF
POLYCENTROPIDAE	2 3 4 5 6	?
Polycentropus flavimaculatus		CEF
PSYCHRYIIDAE	2	8
PHRYGANEIDAE		10
SERICOSTOMATIDAE		10
GOERIDAE	5	10
MOLANIDAE		10
LEPTOCERIDAE	6	10 F
HYDROPTILIDAE	3	6
LIBELLULIDAE		A C E F
SIALIINAE		
Sialis lutaria	4	A D F
CHIRONOMIDAE	1 2 3 4 5 6	ABCEDEF
SIMULIIDAE	3 6	CE
TIPULIDAE		F
CRATOPROCTIDAE	2 3 5	ABCE F

POGONATIDAE	12	BCDEF
PLECIDAE		5
AMPHIOPTERIDAE		10
HEPTIDAE		5
HYDROPTERIDAE		5
CORIXIDAE	1 2 3 4 5 6	ABCEDEF
DYTISCIDAE	1 2 3 4 5 6	ABCEDEF
HYGROPHIDAE	5	5
ELMIDAE		5
Elmis aenea	1 3 5 6	CF
HALIPIDAE		
Baychius elevatus	1 3 4 5 6	BCDEF
HELOIDAE		5
GYRINIDAE		5
Cyranus sp.	3	
AGRIDAE		8
AFRIDAE	4	8
LESTIDAE		8
COMPTIDAE		8
COMOLEGASTRIDAE		8
COMULIDAE		8
LIBELLULIDAE		8
COENAGRITIDAE	6	6
HYDROPHILLIDAE	1 2 3 4 5 6	ABCEDEF

The typed number is the score attributed to the family by the B.M.W. pollution index. The total number obtained by adding all the individual scores for each family at one sampling gives a pollution rating. The score is open-ended, but scores above 80-90 are considered good.

PREVIOUS NUMBER OF COPIES

T.O.I.

P.O.I.

PREVIOUS NUMBER OF COPIES

T.O.I.

P.O.I.

RIVER Deben trib.SITE 50m U/S V. Farm Ditch

DATE

16/5/84

CODE

NR

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTS% Cover =

Aplun nodiflorum
Berula erecta
Callitriche sp
Chara sp
Elodea canadensis
 Filamentous algae
Fontinalis sp
Hyriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

One bank
 Both banks
 Sparse
 Patchy
 Abundant
 Few species
 Many species
 Dominant spp

D = dominant

C = common

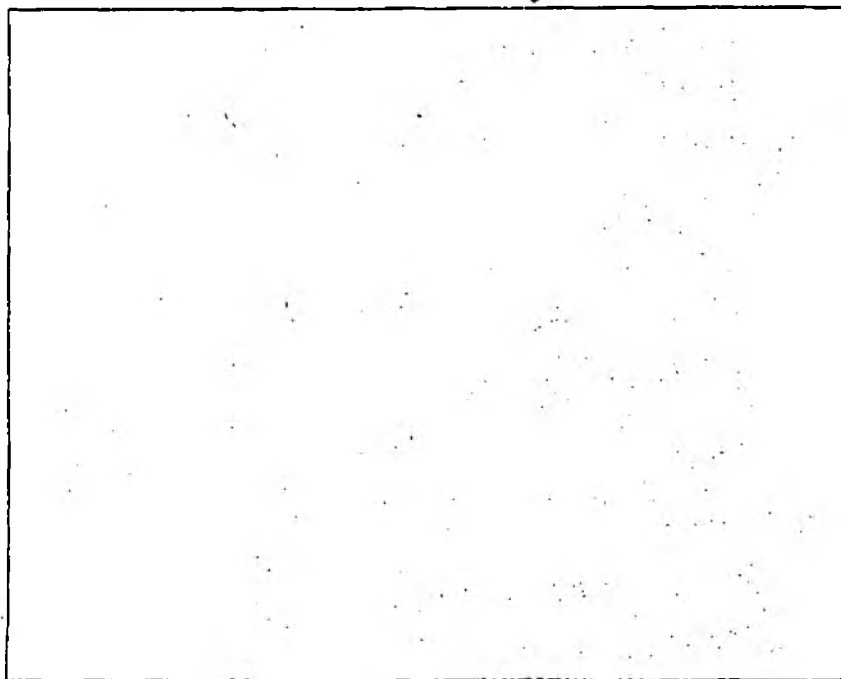
P = present

T = trace

Land Use

Wasteland	Width <u>3m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.3m</u> .....	.....
Pastoral	Temp .....	.....
Arable <u>✓</u>	Oxygen .....	.....
Health	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow ✓



Number of Ineffluents =

10

B.M.W.P. score =

39.

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristata	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segnetina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae	10	Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra		SPHAERIIDAE	3
ERPODELLIDAE	3 ✓ P	Pisidium sp	✓ P
GLOSSIPHONIIDAE	3 ✓	Sphaerium corneum	✓ P
Glossiphonia sp		ASELLIDAE	3 ✓ P
Melobdella stagnalis		Asellus aquaticus	
Theromyzon tessulatum		Asellus meridicanus	
NERITIDAE	6	GAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	✓ } c
VIVIPARIDAE	6	Gammarus duebeni	
Viviparus fasciatus		Gammarus pulex	
Viviparus viviparus		Gammarus zaddachi	
VALVATIDAE	3	COROPHYIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Assiminea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centropilum luteolum	
Potamopyrgus jenkinsi		Centropilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Ancylus leucostriatus		Proclon pseudorufulum	
ANCYLUS FLUVIATILIS		CAENIDAE	7 ✓ P
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYNNAEIDAE	3	Ephemera danica	
Lynnaea auricularia		Ephemera vulgata	
Lynnaea palustris			
Lynnaea peregrina			
Lynnaea stagnalis			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
Ephemerella ignita			
HEPTAGENIIDAE	10	ELMINTHIDAE	5 ✓
Ecdyonurus sp			
Heptagenia sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
Habrophlebia fusca		CYRINIDAE	8
Paraleptophlebia submarginata		AESHNIDAE	8
SIPHONURIDAE	10	LESTIDAE	8
RHYACOPHILIDAE	7	COMPHIDAE	8
Agapetus fuscipes		CORDULEGASTERIDAE	8
Rhyacophila sp		CORDULIIDAE	8
HYDROPSYCHIDAE	5	LIBELLULIDAE	8
POLYCENTROPIDAE	7	COENAGRIIDAE	6
PSYCHOMYIIDAE	8	HYDRACHNELLIDAE	
PHRYGANEIDAE	10	CERATOPOGONIDAE	
SERICOSTOMATIDAE	10	CLADOCERA	
GOERIDAE	10	OSTRACODA	
MOLANNIDAE	10	COPEPODA	
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LYMNEPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	✓ c	+ stone loach.	
STMULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		
Hydroporus	✓ p.f.		

RIVER Deben hrib SITE U/S Farm Ditch DATE 21/8/84

CODE NCR T11 196 609

<u>Flow</u>	<u>Shade</u>	<u>Substrate</u>
Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run /	Med /	Gravel /
Slow run /	Great /	Sand /
Pool		Silt /
Slack		Detritus
		Marginal plants <u>1</u> /
		Submerged plants

SUBMERGED PLANTS

% Cover =

Aplon nodiflorus 100P
Berula erecta 1
Callitriche sp 1
Chara sp
Elodea canadensis
Filamentous algae
Fontinalis sp
Myriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank
 Both banks
 Sparse
 Patchy
 Abundant
 Few species
 Many species
 Dominant spp

D = dominant
C = common
P = present
T = trace

Land Use

Wasteland	Width ^{3m}	Visible signs of effluent's impact on river
Urban	Depth ^{0.19m} .....	.....
Pastoral	Temp .....°C	.....
Arable ☒	Oxygen .....%	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow ☒

1. low flow
Flows at gauge 'on surface'.

Number of families

13.

H.S.W.P. score =

46.

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristata	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
		Segnetina cooplanata	
		Segmentina vitidae	
OLIGOCHAETA	1	UNIONIDAE	6
Lumbricidae		Anodonta anatina	
Lumbriculidae		Anodonta cygnea	
Naididae	/	Unio pictorum	
Tubificidae	/ C		
PISCICOLIDAE	4	SPHAERIIDAE	3
Piscicola geometra	/	Pisidium sp	/ P
ERPOBDELLIDAE	3	Sphaerium corneum	/ P
GLOSSIPHONIIDAE	3	ASELLIDAE	3 P
Glossiphonia sp	/	Asellus aquaticus	/ P
Helobdella stagnalis	/ P	Asellus meridicanus	
Theromyzon tessulatum			
NERITIDAE	6	GAMMARIDAE	6
Theodoxus fluviatilis		Grangonyx pseudograssilis	/
		Gammarus duebeni	/ C
		Gammarus pulex	
		Gammarus zaddachi	
VIVIPARIDAE	6	COROPHIIDAE	6
Viviparus fasciatus			
Viviparus viviparus		ASTACIDAE	8
VALVATIDAE	3	NEHOEURIDAE	7
Valvata cristata		CAPNIIDAE	10
Valvata macrostoma		CHLOROPERLIDAE	10
Valvata piscinalis		LEUCTRIDAE	10
HYDROBIIDAE	3	BAETIDAE	
Aesininea grayana		Baetis sp	/
Bithynia leachi		Centropilum luteolum	/ P
Bithynia tentaculata		Centropilum pennulatum	/ P
Hydrobia ulvae		Gloeon dipterum	
Potamopyrgus jenkinsi		Procladius pseudorufus	
ANCYLIDAE	6	CAENIDAE	7
Acroloxus lacustris		Caenis sp	
Ancylus fluviatilis			
PHYSIDAE	3	EPHEMERIDAE	10
Physa fontinalis	/	Ephemera danica	
	/	Ephemera vulgata	
LYNNAEIDAE	3		
Lymnaea auricularia	/		
Lymnaea palustris	/		
Lymnaea peregina	/		
Lymnaea stagnalis	/		

EPHEMERELLIDAE	10	HYGROBIIDAE	5
Ephemereila ignita			
HEPTAGENIIDAE	10	ELMINTHIDAE	5
Ecdyonurus sp			
Heptagenia sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
Habrophlebia fusca		CYRINIDAE	8
Paraleptophlebia submarginata			
SIPHONURIDAE	10	AESHNIDAE	8
RHYACOPHILIDAE	7	LESTIDAE	8
Agapetus fuscipes			
Rhyacophila sp		COMPHIDAE	8
HYDROPSYCHIDAE	5	CORDULEGASTERIDAE	8
POLYCENTROPIDAE	7	CORDULIIDAE	8
PSYCHOMYIIDAE	8	LIBELLULIDAE	8
PHRYGANEIDAE	10	COENAGRIIDAE	6
SERICOSTOMATIDAE	10	HYDRACHNELLIDAE	
GOERIDAE	10	CERATOPOGONIDAE	
MOLANNIDAE	10	CLADOCERA	
LEPTOCERIDAE	10	OSTRACODA	
HYDROPTILIDAE	6	COPEPODA	
LIMNephilidae	7		
SIALIDAE	4		
CHIRONOMIDAE	2		
SIMULIDAE	5		
TIPULDAE	5		
Dicranota			
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROCHETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		
Hydroporus			
+ 1 sp			

RIVER

Deben trib

SITE

Little Valley Farm

DATE

16/5/84

CODE

NCR

FlowShadeSubstrate

Very fast	None	Boulders
Riffle } ✓	Low } ✓	Pebbles } ✓
Fast run } ✓	Med } ✓	Gravel } ✓
Slow run	Great	Sand
Pool		Silt } ✓
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTS% Cover =

One bank

Aplis nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

D = dominant

C = common

P = present

T = trace

Land Use

Wasteland	Width	Visible signs of effluent's impact on river
Urban	Depth / / ...	... <i>brown, dead</i> ...
Pastoral	Temp °C	... <i>algae</i> ...
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood ☒ .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low ☒ Flow



Number of families •

3

B.M.W.P. score •

9

DENDROCOELIDAE	5	PLANORBIIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis crista	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidis	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae		Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	3	Pisidium sp	
Glossiphoniidae	3	Sphaerium corneum	
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Asellus aquaticus	
Theromyzon tessellatum		Asellus meridicanus	
NERITIDAE	6	CAMPARIIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Gammarus duebeni	
Viviparus fasciatus		Gammarus pulex	
Viviparus viviparus		Gammarus zaddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Assininea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centroptilum luteolum	
Potamopyrgus jenkinsi		Centroptilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Procloeon pseudorufulum	
Ancylus fluviatilis		CAENIDAE	7
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYNNAEIDAE	3	Ephemera danica	
Lynnaea auricularia		Ephemera vulgata	
Lynnaea palustris			
Lynnaea peregra			
Lynnaea stagnalis			

EPHEMERELLIDAE	10
<i>Ephemerella ignita</i>	
HEPTAGENIIDAE	10
<i>Ecdyonurus</i> sp	
<i>Heptagenia</i> sp	
LEPTOPHLEBIIDAE	10
<i>Habrophlebia fusca</i>	
<i>Paraleptophlebia submarginata</i>	
SIPHONURIDAE	10
RHYACOPHILIDAE	7
<i>Agapetus fuscipes</i>	
<i>Rhyacophila</i> sp	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHOMYIIDAE	8
PHRYGANEIDAE	10
SERICOSTOMATIDAE	10
GOERIDAE	10
MOLANNIDAE	10
LEPTOCERIDAE	10
HYDROPTILIDAE	6
LEMNEPHILIDAE	7
SIALIDAE	4
CHIRONOMIDAE	2
SEMULIDAE	5
TIPULDAE	5
NOTONECTIDAE	5
PLEIDAE	5
APHELOCHEIRIDAE	10
NEPIDAE	5
HYDROMETRIDAE	5
CORIXIDAE	5
DYTISCIDAE	5

HYGROBIIDAE	5
ELMINTHIDAE	✓ 5
HALIPLIDAE	5
HELODIDAE	5
CYRINIDAE	8
AESHNIDAE	8
LESTIDAE	8
COMPHIDAE	8
CORDULEGASTERIDAE	8
CORDULIIDAE	8
LIBELLULIDAE	8
COENAGRIDAE	6
HYDRACHNELLIDAE	
CERATOPOGONIDAE	
CLADOCERA	
OSTRACODA	
COPEPODA	

RIVER Deben brook SITE Little Valley DATE 2/18/66

CODE

NCR

Form
TM 203611

<u>Flow</u>	<u>Shade</u>	<u>Substrate</u>
Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS

% Cover =

Apium nodiflorum
Berula erecta
Callitriche sp. T
Chara sp.
Elodea canadensis
Filamentous algae C
Fontinalis sp.
Hydrophyllum sp.
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp.
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp. Mentha
Veronica

.....

.....

.....

D = dominant

C = common

P = present

T = trace

Land Use

Wasteland	Width <u>3m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.5m</u>	
Pastoral	Temp .....°C	.....
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood ☒ .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow

Number of families = 13

B.S.V.P. score =

49.

DENDROCOELIDAE	
Dendrocoelum lacteum	✓ p
Bdellocephala	
PLANARIIDAE	5
Polycelis sp	
Planaria torva	
Dugesia lugubris	
Dugesia polychroa	
Dugesia tigrina	
OLIGOCHAETA	1
Lumbricidae	
Lumbriculidae	
Naididae	✓
Tubificidae	
PISICOLIDAE	4
Pisicola geometra	✓
ERPOBDELLIDAE	3
GLOSSIPHONIIDAE	3
Glossiphonia sp	
Helobdella stagnalis	
Theromyzon tessulatum	
NERITIDAE	6
Theodoxus fluviatilis	
VIVIPARIDAE	6
Viviparus fasciatus	
Viviparus viviparus	
VALVATIDAE	3
Valvata cristata	
Valvata macrostoma	
Valvata placinalis	
HYDROBIIDAE	3
Asellinea grayana	
Bithynia leachi	
Bithynia tentaculata	
Hydrobia ulvae	
Potamopyrgus jenkinsi	
ANCYLIDAE	6
Acroloxus lacustris	
Ancylus fluviatilis	
PHYSIDAE	3
Physa fontinalis	
LYNNAEIDAE	3
Lymnaea auricularia	
Lymnaea palustris	
Lymnaea peregra	✓ p
Lymnaea stagnalis	

PLANORBIIDAE	3
Planorbis albus	
Planorbis carinatus	
Planorbis contortus	
Planorbis cristatus	
Planorbis laevis	
Planorbis leucostoma	
Planorbis planorbis	
Planorbis vortex	
Segmentina complanata	
Segmentina vitidis	
UNIONIDAE	6
Anodonta anatina	
Anodonta cygnea	
Unio pictorus	
SPHAERIIDAE	3
Pisidium sp	
Sphaerium corneum	✓
ASELLIDAE	2
Asellus aquaticus	✓
Asellus meridianus	
GAMMARIDAE	6
Crangonyx pseudogracilis	
Gammarus duebeni	✓ p
Gammarus pulex	
Gammarus zaddachi	
COROPHIIDAE	6
ASTACIDAE	8
NEMOURIDAE	7
CAPNIIDAE	10
CHLOROPERLIDAE	10
LEUCTRIDAE	10
BAETIDAE	1
Baetis sp	✓ C
Centroptilum luteolum	
Centroptilum pennulatum	
Cloeon dipterum	✓ p
Procloeon pseudorufulum	
CAENIDAE	7
Caenis sp	
EPHEMERIDAE	10
Ephemera danica	
Ephemera vulgata	

EPHEMERELLIDAE	10
<i>Ephemerella ignita</i>	
HEPTAGENIIDAE	10
<i>Ecdyonurus</i> sp	
<i>Heptagenia</i> sp	
LEPTOPHLEBIIDAE	10
<i>Habrophlebia fusca</i>	
<i>Paraleptophlebia submarginata</i>	
SIPHONURIDAE	10
RHYACOPHILIDAE	7
<i>Agapetus fuscipes</i>	
<i>Rhyacophila</i> sp	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHOMYIIDAE	8
PHRYGANEIDAE	10
SERICOSTOMATIDAE	10
GOERIDAE	10
MOLANNIDAE	10
LEPTOCERIDAE	10
HYDROPTILIDAE	6
LIMNephilidae	7
SIALIDAE	4
<i>Sialis</i>	
CHIRONOMIDAE	2
Red.	
SEDULIDAE	5
TIPULDAE	5
NOTONECTIDAE	5
PLEIDAE	5
APHELOCHEIRIDAE	10
NEPIDAE	5
HYDROMETRIDAE	5
CORIXIDAE	5
DYTISCIDAE	5

HYGROBIIDAE	5
ELMINTHIDAE	5
HALIPLIDAE	5
HELODIDAE	5
CYRINIDAE	8
AESHNIDAE	8
LESTIDAE	8
COMPHIDAE	8
CORDULEGASTERIDAE	8
CORDULIIDAE	8
LIBELLULIDAE	8
COENAGRITIDAE	6
HYDRACHNELLIDAE	
CERATOPOGONIDAE	
CLADOCERA	c/a
OSTRACODA	
COPEPODA	

stone leech

RIVER Deben tribSITE 10-100m DlsDATE ¹⁶ 8-5-84

CODE

NCR

of V.F. Ditch

<u>Flow</u>	<u>Shade</u>	<u>Substrate</u>
Very fast	None	Boulders
Riffle	Low	Pebbles ✓
Fast run ✓	Med ✓	Gravel
Slow run ✓	Great ✓	Sand
Pool		Silt ✓
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSZ Cover =

Aplis nodiflorus
Berula erecta
Callitriche sp
Chara sp
Elodea canadensis
 Filamentous algae
Fontinalis sp
Myriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank
 Both banks
 Sparse
 Patchy
 Abundant
 Few species
 Many species
 Dominant spp

D = dominant

C = common

P = present

T = trace

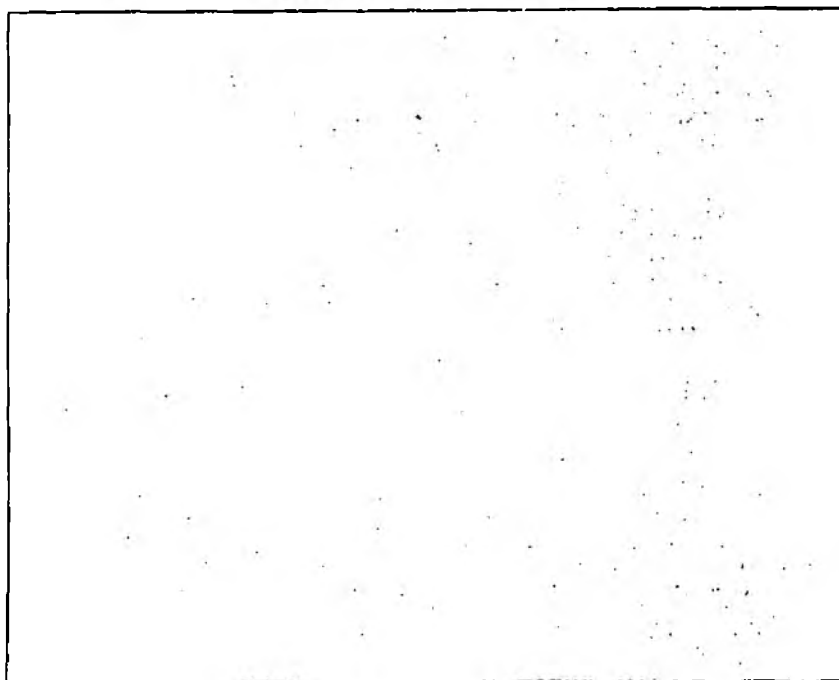
Land Use

Wasteland Width 3m
 Urban Depth 0.5m
 Pastoral / Temp °C
 Arable Oxygen %
 Heath Representative of
 Bog/marsh reach?
 Decid. wood Yes/No
 Conif. wood

Visible signs of effluent's
 impact on river

Brown - dead
filamentous algae.

Spate/Recent Spate/Low Flow



Number of families =

B.M.W.P. score =

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristatus	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidis	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae		Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	3	Psidium sp	
GLOSSIPHONIIDAE	3	Sphaerium corneum	
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Asellus aquaticus	
Theromyzon tessulatus		Asellus meridicanus	
MERITIDAE	6	GAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Gammarus duebeni	
Viviparus fasciatus		Gammarus pulex	
Viviparus viviparus		Gammarus zaddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Assininea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centropilum luteolum	
Potamopyrgus jenkinsi		Centropilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Proclloeon pseudorufulum	
Ancylus fluviatilis		CAENIDAE	7
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYNNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregre			
Lymnaea stagnalis			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
<i>Ephemerella ignita</i>		ELMINTHIDAE	5
HEPTAGENIIDAE	10	KALIPLIDAE	5
<i>Ecdyonurus</i> sp		HELODIDAE	5
<i>Heptagenia</i> sp		GYRINIDAE	8
LEPTOPHLEBIIDAE	10	AESHNIDAE	8
<i>Habrophlebia fusca</i>		LESTIDAE	8
<i>Paraleptophlebia submarginata</i>		COMPHIDAE	8
SIPHONURIDAE	10	CORDULECASTERIDAE	8
RHYACOPHILIDAE	7	CORDULIIDAE	8
<i>Agapetus fuscipes</i>		LIBELLULIDAE	8
<i>Rhyacophila</i> sp		COENACRIDAE	6
HYDROPSYCHIDAE	5	HYDRACHNELLIDAE	
POLYCENTROPIDAE	7	CERATOPOGONIDAE	
PSYCHOMYIIDAE	8	CLADOCERA	
PHRYCANEIDAE	10	OSTRACODA	
SERICOSTOMATIDAE	10	COPEPODA	
GOERIDAE	10		
MOLANNIDAE	10		
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LYMNEPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	2		
SDULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

RIVER

Deben trib

SITE

1a
25 - 50m D/S

DATE

Ditel
21/8/89

CODE

NCR

TM 1737 609

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run]	Med	Gravel
Slow run ✓	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

~ 0

Aplis nodiflorum

Berula erecta

Callitriche sp ✓ T

Chara sp

Elodea canadensis

Filamentous algae

Fontinalis sp ✓ T

Myriophyllum sp

Nuphar lutea

Nymphaea alba

Oenanthe fluviatilis

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp. Hypsoptic

D = dominant

C = common

P = present

T = trace

Land Use

Wetland	Width ^{2m}	Visible signs of effluent's impact on river
Urban	Depth 0.30m	
Pastoral ☒	Temp °C	.....
Arable	Oxygen ..... %	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow

stone/coral p.

Number of benthos =

11

B.S.W.P. score =

41

DENDROCOELIDAE			
Dendrocoelum lacteum	✓	C	
Bdellocephala			
PLANARIIDAE	5		
Polycelis sp			
Planaria torva			
Dugesia lugubris			
Dugesia polychroa			
Dugesia tigrina			
OLIGOCHAETA	1		
Lumbricidae			
Lumbriculidae			
Naididae			
Tubificidae	✓	C	
PISCIOLIDAE	4		
Pisicicola geometra			
ERPODELLIDAE		3	P
Eod			
GLOSSIPHONIIDAE		2	P
Glossiphonia sp	✓		
Helobdella stagnalis	✓	P	
Theromyzon tessulatum			
NERITIDAE	6		
Theodoxus fluviatilis			
VIVIPARIDAE	6		
Viviparus fasciatus			
Viviparus viviparus			
VALVATIDAE	3		
Valvata cristata			
Valvata macrostoma			
Valvata piscinalis			
HYDROBIIDAE	3		
Assininea grayana			
Bithynia leachi			
Bithynia tentaculata			
Hydrobia ulvae			
Potamopyrgus jenkinsi			
ANCYLIDAE	6		
Acroloxus lacustris			
Ancylus fluviatilis			
PHYSIDAE	3		
Physa fontinalis			
LYMAEIDAE	3		
Lymnaea auricularia			
Lymnaea palustris	✓	P	
Lymnaea peregra			
Lymnaea stagnalis			
PLANORBIIDAE	3		
Planorbis albus			
Planorbis carinatus			
Planorbis contortus			
Planorbis cristata			
Planorbis laevis			
Planorbis leucostoma			
Planorbis planorbis			
Planorbis vortex			
Segmentina complanata			
Segmentina vitidae			
UNIONIDAE	6		
Anodonta anatina			
Anodonta cygnea			
Unio pictorum			
SPHAERIIDAE	3		
Pisidium sp			
Sphaerium corneum	✓	P	
ASELLIDAE	3		
Asellus aquaticus			
Asellus meridianus			
GAMMARIDAE	6		
Cragonyx pseudogracilis			
Gammarus duebeni	✓	P	
Gammarus pulex			
Gammarus saddachi			
COROPHIIDAE	6		
ASTACIDAE	8		
NEMOURIDAE	7		
CAPNIIDAE	10		
CHLOROPERLIDAE	10		
LEUCTRIDAE	10		
BAETIDAE	4		
Baetis sp			
Centroptilum luteolum			
Centroptilum pennulatum			
Cloeon dipterum			
Proclloeon pseudorufulum			
CAENIDAE	7		
Caenis sp			
EPHEMERIDAE	10		
Ephemera danica			
Ephemera vulgata			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
Ephemerella ignita			
HEPTAGENIIDAE	10	ELMINTHIDAE	5
Ecdyonurus sp			
Heptagenia sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
Habrophlebia fusca		CYRINIDAE	8
Paraleptophlebia submarginata		AESHNIDAE	8
SIPHONURIDAE	10	LESTIDAE	8
RHYACOPHILIDAE	7	GOMPHIDAE	8
Agapetus fuscipes		CORDULEGASTERIDAE	8
Rhyacophila sp		CORDULIIDAE	8
HYDROPSYCHIDAE	5	LIBELLULIDAE	8
POLYCENTROPIDAE	7	COENACRIDAE	6
PSYCHOMYIIDAE	8	HYDRACHNELLIDAE	
PHRYGANEIDAE	10	CERATOPOGONIDAE	
SERICOSTOMATIDAE	10	CLADOCERA	
GOERIDAE	10	OSTRACODA	
MOLANNIDAE	10	COPEPODA	
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNAPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	2		
Red chironomus			
SMULIDAE	5		
TIPULIDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APNELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROCHETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		
Colymbetes			

RIVER Deben 30m U/S confluence
 SITE with polluted tide DATE 16/5/84

CODE

NGN

<u>Flow</u>	<u>Shade</u>	<u>Substrate</u>
Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run ✓	Med	Gravel ✓
Slow run	Great	Sand ✓
Pool		Silt
Slack		Detritus
		Marginal plants ✓
		Submerged plants

SUBMERGED PLANTS

% Cover =

Aplus nodiflorum
Verula erecta
Callitriche sp
Chara sp
Elodea canadensis
 Filamentous algae
Fontinalis sp
Myriophyllum sp
Nuphar lutea
Nymphaea alba
Oenanthe fluviatilis
Potamogeton crispus
Potamogeton pectinatus
Ranunculus sp
Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp

.....

.....

.....

.....

D = dominant

C = common

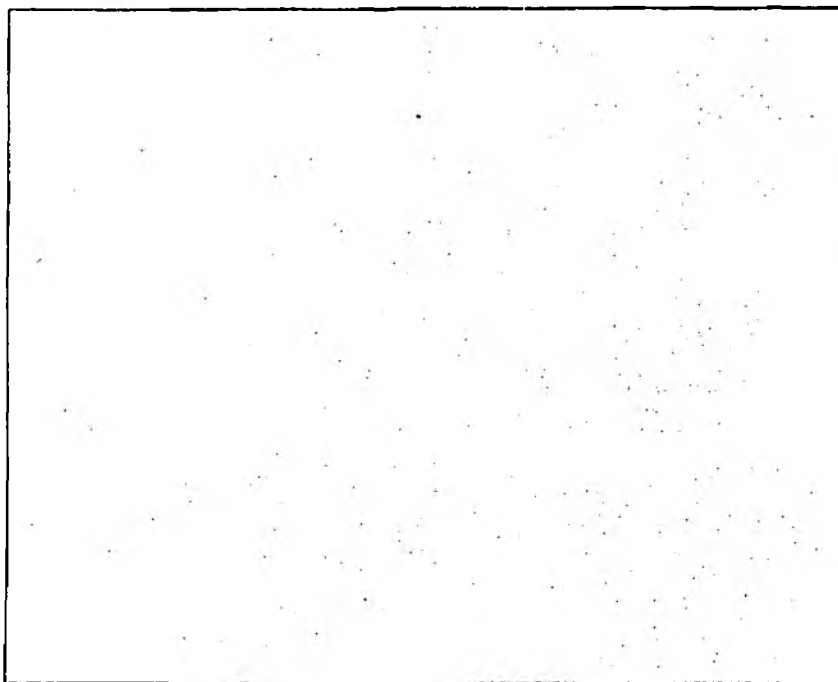
P = present

T = trace

Land Use

Wasteland	Width	2.5-4m	Visible signs of affluent's impact on river
Urban	Depth	0.5m/...	
Pastoral	Temp	°C	.....
Arable	Oxygen	.....%	.....
Heath	Representative of reach?		.....
Bog/marsh	Yes/No		.....
Decid. wood .....			.....
Conif. wood .....			.....

Spate/Recent Spate/Low Flow



Number of families = 14 B.M.V.P. score = 64

DENDROCOELIDAE	5	PLANORBIIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdeliocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristatus	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae	✓a	Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorum	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	6 Oct ✓	Piridium sp	
GLOSSIPHONIIDAE	✓✓	Sphaerium corneum	
Glossiphonia sp		ASELLIDAE	✓P
Helobdella stagnalis		Asellus aquaticus	
Theromyzon tessellatum		Asellus meridionalis	
NERITIDAE	6	CAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Gammarus duebeni	
Viviparus fasciatus		Gammarus pulex	✓C
Viviparus viviparus		Gammarus zaddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Assinina grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	✓
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centroptilum luteolum	
Potamopyrgus jenkinsi		Centroptilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Proclloeon pseudorufulum	
Ancylus fluviatilis		CAENIDAE	✓
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYMNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregra			
Lymnaea stagnalis			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
Ephemerella ignita			
HEPTAGENIIDAE	10	ELMINTHIDAE	5 ✓ p
Ecdyonurus sp		Limnephilidae	
Heptagenia sp		KALIPIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
Habrophlebia fusca		GYRINIDAE	8
Paraleptophlebia submarginata ✓		AESHNIDAE	8
SIPHONURIDAE	10	LESTIDAE	8
RHYACOPHILIDAE	7	GOMPHIDAE	8
Agapetus fuscipes		CORDULEGASTERIDAE	8
Rhyacophila sp		CORDULIIDAE	8
HYDROPSYCHIDAE	5 ✓ r	LIBELLULIDAE	8
POLYCENTROPIDAE	7	COENAGRIIDAE	6
PSYCHOMYIIDAE	8	HYDRACHNELLIDAE ✓	
PHRYCANEIDAE	10	CERATOPOGONIDAE	
SERICOSTOMATIDAE	10	CLADOCERA	
GOERIDAE	10	OSTRACODA	
MOLANNIDAE	10	COPEPODA	
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNEPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	2 ✓ c		
SEMULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5 ✓		
CORIXIDAE	5 ✓		
DYTISCIDAE	5 ✓		
Hydropsorus sp			

MAIN RIVER DobenSITE U/S ConbDATE 7/18/64

CODE

NCR

711 202 611FlowShadeSubstrate

Very fast	None	Boulders
Riffle <u>/</u>	Low <u>/</u>	Pebbles <u>/</u>
Fast run <u>/</u>	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants <u>/</u>
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTSI Cover =

One bank

Aplus nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

*Potamogeton crispus**Potamogeton pectinatus**Ranunculus* sp*Zannichellia palustris*

D = dominant

C = common

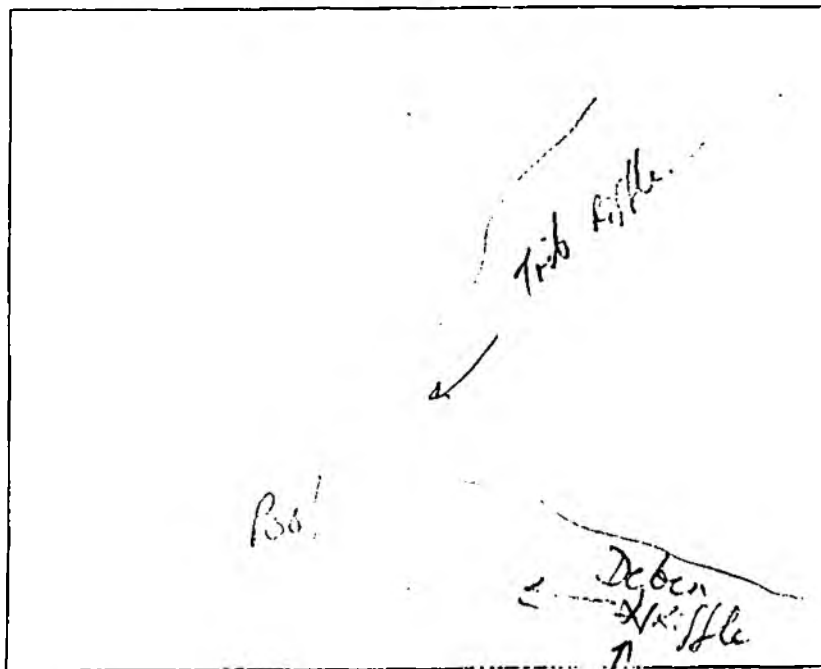
P = present

T = trace

Land Use

Wasteland	Width <u>2m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.1-0.5m</u>	
Pastoral <u>/</u>	Temp .....	.....
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spatw/Recent Spatw/Low Flow



Number of families =

15

H.M.W.P. score =

~~61~~ 65

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristata	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae		Anodonta anatina	
Tubificidae		Anodonta cygnea	
PISCICOLIDAE	4	Unio pictorus	
Piscicola geometra		SPHAERIIDAE	3
ERPOBDELLIDAE	3	Pisidium sp	
GLOSSIPHONIIDAE	5	Sphaerium cornu	
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Asellus aquaticus	
Theromyzon tessellatum		Asellus meridianus	
NERITIDAE	6	CAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Cammarus duebeni	
Viviparus fasciatus		Cammarus pulex	
Viviparus viviparus		Cammarus zaddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Asellinea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centropilum luteolum	
Potamopyrgus jenkinsi		Centropilum pennulatum	
ANCYLIDAE	6	Gloson dipterum	
Acrolorus lacustris		Procladius pseudorufus	
Anchylus fluviatilis		CAENIDAE	7
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYMNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregrina			
Lymnaea stagnalis			

EPIHEMERELLIDAE	10	HYGROBIIDAE	5
Ephemerella ignita			
HEPTAGENIIDAE	10	ELMINTHIDAE	5
Ecdyonurus sp			
Heptagenia sp		HALIPLIDAE	5
LEPTOPHLEBIIDAE	10	HELODIDAE	5
Habrophlebia fusca			
Paraleptophlebia submarginata		GYRINIDAE	8
SIPHONURIDAE	10	AESHNIDAE	8
RHYACOPHILIDAE	7	LESTIDAE	8
Agapetus fuscipes			
Rhyacophila sp		GOMPHIDAE	8
HYDROPSYCHIDAE	5	CORDULEGASTERIDAE	8
POLYCENTROPIDAE	7	CORDULIIDAE	8
PSYCHOMYIIDAE	8	LIBELLULIDAE	8
PHRYGANEIDAE	10	COENAGRITIDAE	6
		HYDRACHNEULLIDAE	6
SERICOSTOMATIDAE	10		
		CERATOPOGONIDAE	
GOERIDAE	10		
		CLADOCERA	
MOLANNIDAE	10		
		OSTRACODA	
LEPTOCERIDAE	10		
		COPEPODA	
HYDROPTILIDAE	6		
LIMNEPHILIDAE	7		
SLALIDAE	4		
CHIRONOMIDAE	2		
STHULIDAE	3		
TIPULDAE	3		
NOTONECTIDAE	3		
PLEIDAE	3		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROHETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

(Iyocanus unicoloris)

Neira cinerea

RIVER DebenSITE 10m D/S confluence DATE
with trib.

CODE

NCR

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run ✓	Med	Gravel ✓
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTS% Cover =

One bank

Aplis nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

D = dominant

C = common

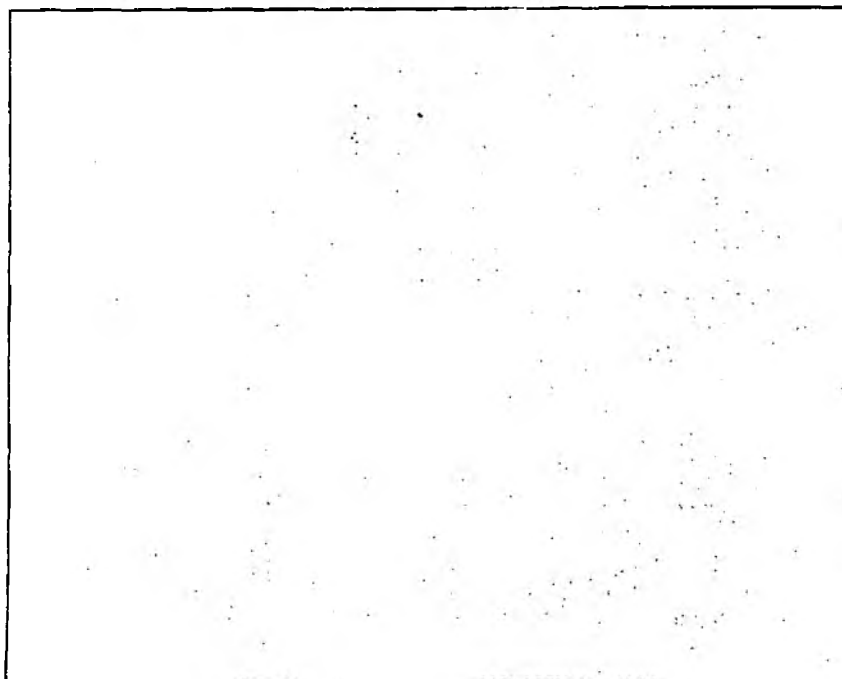
P = present

T = trace

Land Use

Wasteland	Width	Visible signs of effluent's impact on river
Urban	Depth / / ...	<i>Brown dead</i>
Pastoral	Temp °C	<i>alga</i>
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of families •

4

B.M.V.P. score =

10

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	5	Planorbis contortus	
Polycelis sp		Planorbis cristata	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
		Segmentina complanata	
		Segmentina vitidae	
OLIGOCHAETA	1	UNIONIDAE	6
Lumbricidae		Anodonta anatina	
Lumbriculidae		Anodonta cygnea	
Naididae		Unio pictorum	
Tubificidae	✓c		
PISCICOLIDAE	4	SPHAERIIDAE	3
Piscicola geometra		Pisidium sp	
ERPOBDELLIDAE	✓p	Sphaerium corneum	
GLOSSIPHONIIDAE	3	ASELLIDAE	3
Glossiphonia sp		Asellus aquaticus	
Helobdella stagnalis		Asellus meridianus	
Theromyzon tessellatum		CAMMARIDAE	6
NERITIDAE	6	Crangonyx pseudogracilis	
Theodoxus fluviatilis		Cammarus duebeni	
		Cammarus pulex	
VIVIPARIDAE	6	Cammarus zaddachi	
Viviparus fasciatus		COROPHIIDAE	6
Viviparus viviparus		ASTACIDAE	8
VALVATIDAE	3	NEMOURIDAE	7
Valvata cristata		CAPNIIDAE	10
Valvata macrostoma		CHLOROPERLIDAE	10
Valvata piscinalis		LEUCTRIDAE	10
HYDROBIIDAE	3	BAETIDAE	4
Asselinea grayana		Baetis sp	
Bithynia leachi		Centrophilum luteolum	✓✓
Bithynia tentaculata		Centrophilum pannulatum	
Hydrobia ulvae		Gloeon dipterum	
Potamopyrgus jenkinet		Procloeon pseudorufulum	
ANCYLIDAE	6	CAENIDAE	7
Acroloxus lacustris		Caenis sp	
Ancylus fluviatilis		EPHEMERIDAE	10
PHYSIDAE	3	Ephemera danica	
Physa fontinalis		Ephemera vulgata	
LYMNAEIDAE	3		
Lymnaea auricularia			
Lymnaea palustris			
Lymnaea peregrina			
Lymnaea stagnalis			

EPHEMERELLIDAE	10
<i>Ephemera ignita</i>	
HEPTAGENIIDAE	10
<i>Ecdyonurus</i> sp	
<i>Heptagenia</i> sp	
LEPTOPHLEBIIDAE	10
<i>Hebephlebia fusca</i>	
<i>Paraleptophlebia submarginata</i>	
SIPHONURIDAE	10
RHYACOPHILIDAE	7
<i>Agapetus fuscipes</i>	
<i>Rhyacophila</i> sp	
HYDROPSYCHIDAE	5
POLYCENTROPIDAE	7
PSYCHOMYIIDAE	8
PHRYCANIIDAE	10
SERICOSTOMATIDAE	10
GOERIDAE	10
MOLANNIDAE	10
LEPTOCERIDAE	10
HYDROPTILIDAE	6
LIMNephilidae	7
SLALIDAE	4
CHIRONOMIDAE	✓ _p 2
SIMULIDAE	5
TIPULIDAE	5
NOTONECTIDAE	5
PLEIDAE	5
APHELOCHEIRIDAE	10
NEPTIDAE	5
HYDROMETRIDAE	5
CORIXIDAE	5
DYTISCIDAE	5

HYGROBIIDAE	5
ELMINTHIDAE	5
HALIPLIDAE	5
HELODIDAE	5
CYRINIDAE	8
AESHNIDAE	8
LESTIDAE	8
COMPHIDAE	8
CORDULEGASTERIDAE	8
CORDULIIDAE	8
LIBELLULIDAE	8
COENACRIDAE	6
HYDRACHNELLIDAE	
CERATOPOGONIDAE	
CLADOCERA	
OSTRACODA	
COPEPODA	

RIVER

Debar

SITE

D/S congl

DATE

21/8/89

CODE

NR

7112 108 6

Flow

Shade

Substrate

Very fast

None

Boulders

Riffle

Low

Pebbles

Fast run

Med

Gravel

Slow run

Great

Sand

Pool

Silt

Slack

Detritus

Marginal plants

Submerged plants

SUBMERGED PLANTS

MARGINAL/EMERGENT PLANTS

% Cover =

One bank

Apium nodiflorum

Both banks

Berula erecta

Sparse

Callitriche sp

Patchy

Chara sp

Abundant

Elodea canadensis

Few species

Filamentous algae

Many species

Fontinalis sp

Dominant spp

Myriophyllum sp

.....

Nuphar lutea

.....

Nymphaea alba

.....

Oenanthe fluviatilis

.....

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

D = dominant

C = common

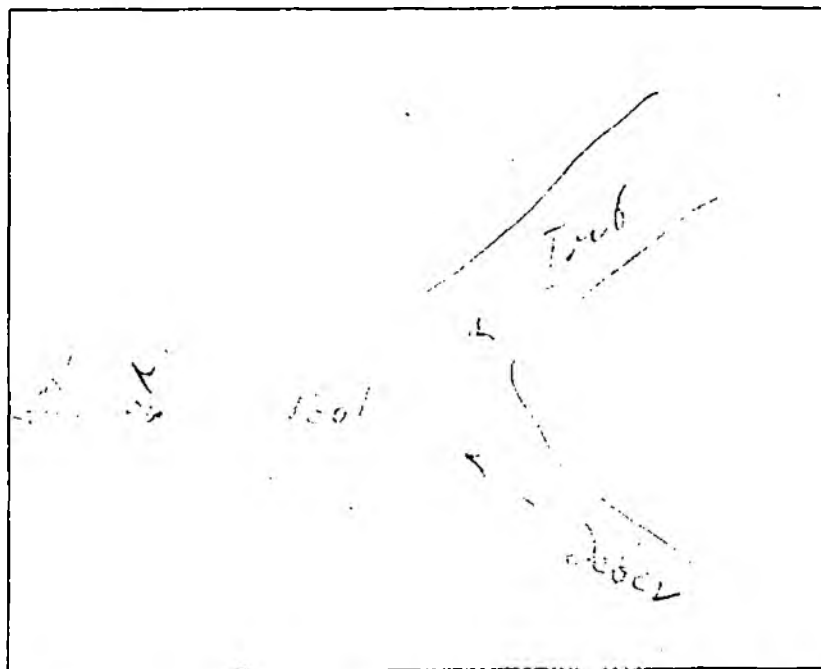
P = present

T = trace

Land Use

Wasteland	Width ^{2m}	Visible signs of effluent's impact on river
Urban	Depth ^{0.10m} .....	.....
Pastoral ☒	Temp .....°C	.....
Arable	Oxygen .....%	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Space/Recent Space/Low Flow



Number of bottles =

17

B.S.Q.P. score =

69

DENDROCOELIDAE 5
Dendrocoelum lacteum
Dellocephala

PLANARIIDAE 5
Polycelis sp
Planaria torva
Dugesia lugubris
Dugesia polychroa
Dugesia cigrina

OLIGOCHAETA 1
Lumbricidae
Lumbriculidae
Naididae
Tubificidae

PISCICOLIDAE 4
Piscicola geometra

ERPOBDELLIDAE 3

GLOSSIPHONIIDAE 3
Glossiphonia sp
Helobdella stagnalis
Theromyzon tessulatum

NERITIDAE 6
Theodoxus fluviatilis

VIVIPARIDAE 6
Viviparus fasciatus
Viviparus viviparus

VALVATIDAE 3
Valvata cristata
Valvata macrostoma
Valvata piscinalis

HYDROBIIDAE 3
Assiminea grayana
Bithynia leachi
Bithynia tentaculata
Hydrobia ulvae
Potamopyrgus jenkinsi

ANCYLIDAE 6
Acroloxus lacustris
Ancylus fluviatilis

PHYSIDAE 3
Physa fontinalis

LYNNAEIDAE 3
Lymnaea auricularia
Lymnaea palustris
Lymnaea peregra
Lymnaea stagnalis

PLANORBIDAE

Planorbis albus
Planorbis carinatus
Planorbis contortus
Planorbis cristata
Planorbis laevis
Planorbis leucostoma
Planorbis planorbis
Planorbis vortex
Segmentina complanata
Segmentina vitidae

UNIONIDAE 6
Anodonta anatina
Anodonta cygnea
Unio pictorum

SPHAERIIDAE 3
Pisidium sp
Sphaerium cornutum

ASELLIDAE 3
Asellus aquaticus
Asellus meridicanus

GAMMARIDAE 6
Crangonyx pseudogracilis
Gammarus duebeni
Gammarus pulex
Gammarus saddachi

COROPHIIDAE 6

ASTACIDAE 8

NEHOEURIDAE 7

CAPNIIDAE 10

CHLOROPERLIDAE 10

LEUCTRIDAE 10

BAETIDAE 4
Baetis sp
Centroptilum luteolum
Centroptilum pennulatum
Cloeon dipterum
Proclon pseudorufulum

CAENIDAE 7
Caenis sp

EPHEMERIDAE 10
Ephemera danica
Ephemera vulgata

EPHEMERELLIDAE	10	HYCROBITIDAE	5
Ephemerella ignita		ELMINTHIDAE ✓	5
HEPTAGENIIDAE	10	HALIPLIDAE	5
Ecdyonurus sp		HELODIDAE	5
Heptagenia sp		GYRINIDAE	8
LEPTOPHLEBIIDAE	10	AESHNIDAE	8
Habrophlebia fusca		LESTIDAE	8
Paraleptophlebia submarginata		COMPHIDAE	8
SIPHONURIDAE	10	CORDULEGASTERIDAE	8
RHYACOPHILIDAE	7	CORDULIIDAE	8
Agapetus fuscipes		LIBELLULIDAE	8
rhycophila sp		COENAGRIDAE	6
HYDROPSYCHIDAE	5 C	HYDRACHNELLIDAE (1) r	
POLYCENTROPIDAE	7	CERATOPOGONIDAE	
PSYCHOMYIIDAE	8	CLADOCERA	
PHRYGANEIDAE	10	OSTRACODA	
SERICOSTOMATIDAE	10	COPEPODA	
GOERIDAE	10		
MOLANNIDAE	10		
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNETHILIDAE	7		
SIALIDAE	4		
CHIRONOMIDAE	2 C		
SDMULIDAE	P 3		
TIPULDAE	r 3		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROHETRIDAE	5		
CORIXIDAE	9 3		
DYTISCIDAE	4 r 3		

RIVER

Deben

SITE

Ford. 37km DLS

DATE

16/5/84

CODE

NCR

TM 217607

D76h

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Mid	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTSMARGINAL/EMERGENT PLANTS% Cover =

Aplun nodiflorum

Berula erecta

Callitriche sp

Chara sp

Elodea canadensis

Filamentous algae

Fontinalis sp

Myriophyllum sp

Nuphar lutea

Nymphaea alba

Oenanthe fluviatilis

Potamogeton crispus

Potamogeton pectinatus

Ranunculus sp

Zannichellia palustris

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp

.....

.....

.....

.....

D = dominant

C = common

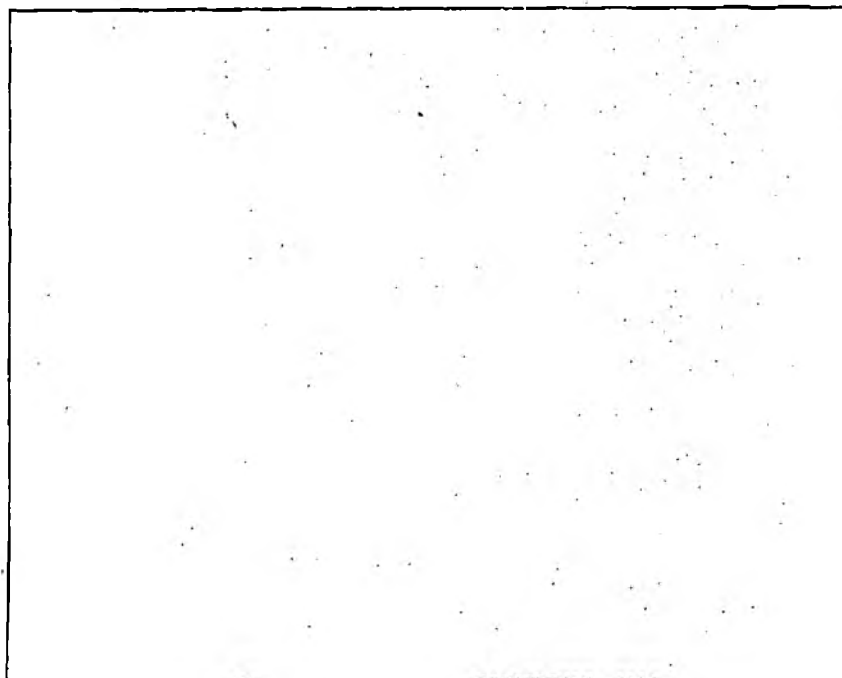
P = present

T = trace

Land Use

Wasteland	Width <u>6m</u>	Visible signs of affluent's impact on river
Urban	Depth <u>0.5m</u>	
Pastural	Temp	<u>Brown, dead</u> <u>algae</u>
Arable	Dissolved oxygen	
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Conif. wood .....		.....

Spate/Recent Spate/Low Flow



Number of snailles •

6

B.M.V.P. score •

19

DENDROCOELIDAE	5	PLANORBIDAE	3
Dendrocoelum lacteum		Planorbis albus	
Bellocephala		Planorbis carinatus	
PLANARIIDAE	✓	Planorbis contortus	
Polycelis sp		Planorbis cristatus	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroa		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
OLIGOCHAETA	1	Segmentina complanata	
Lumbricidae		Segmentina vitidae	
Lumbriculidae		UNIONIDAE	6
Naididae	✓p	Anodonta anatina	
Tubificidae		Anodonta cygnea	
FISCIOLIDAE	4	Unio pictorum	
Fiscicola geometra		SPHAERIIDAE	✓r
ERPOBDELLIDAE	Eod ✓p	Pisidium sp	
GLOSSIPHONIIDAE	3	Sphaerium corneum	
Glossiphonia sp		ASELLIDAE	3
Helobdella stagnalis		Aesellus aquaticus	
Theromyzon tessellatum		Aesellus meridianus	
NERITIDAE	6	CAMMARIDAE	6
Theodoxus fluviatilis		Crangonyx pseudogracilis	
VIVIPARIDAE	6	Cammarus duebeni	
Viviparus fasciatus		Cammarus pulex	
Viviparus viviparus		Cammarus saddachi	
VALVATIDAE	3	COROPHIIDAE	6
Valvata cristata		ASTACIDAE	8
Valvata macrostoma		NEMOURIDAE	7
Valvata piscinalis		CAPNIIDAE	10
HYDROBIIDAE	3	CHLOROPERLIDAE	10
Aeslinaea grayana		LEUCTRIDAE	10
Bithynia leachi		BAETIDAE	4
Bithynia tentaculata		Baetis sp	
Hydrobia ulvae		Centropilum luteolum	
Potamopyrgus jenkinsi		Centropilum pennulatum	
ANCYLIDAE	6	Cloeon dipterum	
Acroloxus lacustris		Procloeon pseudorufulum	
Ancylus fluviatilis		CAENIDAE	7
PHYSIDAE	3	Caenis sp	
Physa fontinalis		EPHEMERIDAE	10
LYMNAEIDAE	3	Ephemera danica	
Lymnaea auricularia		Ephemera vulgata	
Lymnaea palustris			
Lymnaea peregra			
Lymnaea stagnalis			

EPHEMERELLIDAE	10	HYGROBIIDAE	5
<i>Ephemerella ignita</i>		ELMINTHIDAE	5
HEPTAGENIIDAE	10	HALIPLIDAE	5
<i>Ecdyonurus</i> sp		HELODIDAE	5
<i>Heptagenia</i> sp		CYRINIDAE	8
LEPTOPHLEBIIDAE	10	AESHNIDAE	8
<i>Habrophlebia fusca</i>		LESTIDAE	8
<i>Paraleptophlebia submarginata</i>		GOMPHIDAE	8
SIPHONURIDAE	10	CORULECASTERIDAE	8
RHYACOPHILIDAE	7	CORDULIIDAE	8
<i>Agapetus fuscipes</i>		LISELLULIDAE	8
<i>Rhyacophila</i> sp		COENACRIIDAE	6
HYDROPSYCHIDAE	5	HYDRACHNELLIDAE	
POLYCENTROPIDAE	7	CERATOPOGONIDAE	
PSYCHOMYIIDAE	8	CLADOCERA	
PHRYCANEIDAE	10	OSTRACODA	
SERICOSTOMATIDAE	10	COPEPODA	
GOERIDAE	10		
MOLANNIDAE	10		
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LEMNEPHILIDAE	7		
SLALIDAE			
CHIRONOMIDAE	29		
SDULIDAE	5		
TIPULDAE	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

RIVER

Columbia River

SITE

Deben

DATE

21/8/84

CODE

NCR

T11217 607

FlowShadeSubstrate

Very fast	None	Boulders
Riffle	Low	Pebbles
Fast run	Med	Gravel
Slow run	Great	Sand
Pool		Silt
Slack		Detritus
		Marginal plants
		Submerged plants

SUBMERGED PLANTS% Cover =

Apium nodiflorum
 Berula erecta
 Callitriche sp
 Chara sp
 Elodea canadensis
 Filamentous algae
 Fontinalis sp
 Myriophyllum sp
 Nuphar lutea
 Nymphaea alba
 Oenanthe fluviatilis
 Potamogeton crispus
 Potamogeton pectinatus
 Ranunculus sp
 Zannichellia palustris

MARGINAL/EMERGENT PLANTS

One bank

Both banks

Sparse

Patchy

Abundant

Few species

Many species

Dominant spp.

D = dominant

C = common

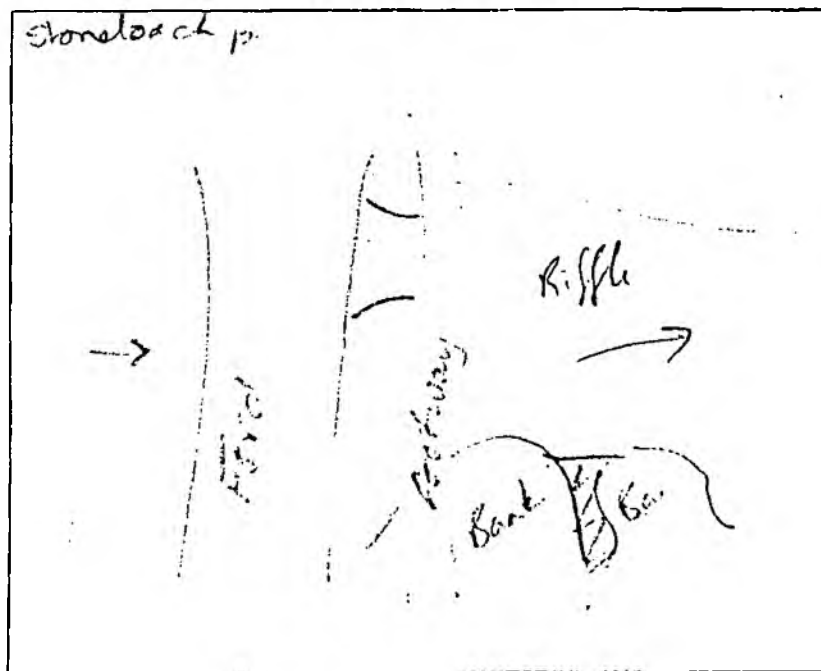
P = present

T = trace

Land Use

Wasteland	Width <u>3-5m</u>	Visible signs of effluent's impact on river
Urban	Depth <u>0.1-0.2m</u>	.....
Pastoral <u>/</u>	Temp .....	.....
Arable	Oxygen .....	.....
Heath	Representative of reach?	.....
Bog/marsh	Yes/No	.....
Decid. wood .....		.....
Cyrt. wood .....		.....

Spate/Recent Spate/Low Flood /



Number of families -

15.

B.S.M.P. score -

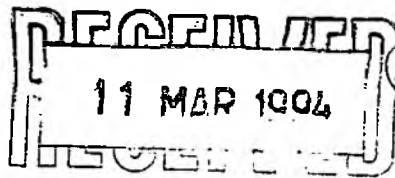
60.

DENDROCOELIDAE	✓ 1 P	PLANORBIIDAE	✓ 3 P
Dendrocoelum lacteum		Planorbis albus	
Bdellocephala		Planorbis carinatus	
PLANARIIDAE	✓ 3 P	Planorbis contortus	
Polycelis sp		Planorbis cristata	
Planaria torva		Planorbis laevis	
Dugesia lugubris		Planorbis leucostoma	
Dugesia polychroma		Planorbis planorbis	
Dugesia tigrina		Planorbis vortex	
		Segmentina complanata	
		Segmentina vitidae	
OLIGOCHAETA	1	UNIONIDAE	6
Lumbricidae		Anodonta anatina	
Lumbriculidae		Anodonta cygnea	
Naididae	✓ 1 C	Unio pictorum	
Tubificidae			
PISCICOLIDAE	4	SPHAERIIDAE	3
Piscicola geometra	✓ 3 P	Placidium sp	✓ 1 C
ERPODELLIDAE		Sphaerium corneum	
GLOSSIPHONIIDAE	3	ASELLIDAE	3
Glossiphonia sp	✓ 1 P	Asellus aquaticus	
Helobdella stagnalis	✓ 1 P	Asellus meridicanus	
Theromyzon tessellatum	✓ 1 P		
Hemiclepsis	✓ 1 P	GAMMARIDAE	6
NERITIDAE	6	Crangonyx pseudogracilis	
Theodoxus fluviatilis		Gammarus duebeni	✓ 1 C
		Gammarus pulex	
		Gammarus zaddachi	
VIVIPARIDAE	6	COROPHIDAE	6
Viviparus fasciatus		ASTACIDAE	8
Viviparus viviparus		NEMOURIDAE	7
VALVATIDAE	3	CAPNIIDAE	10
Valvata cristata		CHLOROPERLIDAE	10
Valvata macrostoma		LEUCTRIDAE	10
Valvata piscinalis		BAETIDAE	✓ 1 C
HYDROBIIDAE	3	Baetis sp	
Assiminea grayana		Centropilum luteolum	
Bithynia leachi		Centropilum pennulatum	
Bithynia tentaculata		Gloeon dipterum	
Hydrobia ulvae		Proclaeon pseudorufulum	
Potamopyrgus jenkinsi			
ANCYLIDAE	6	CAENIDAE	7
Acroloxus lacustris		Caenis sp	
Ancylus fluviatilis			
PHYSIDAE	3	EPHEMERIDAE	10
Physa fontinalis		Ephemera danica	
		Ephemera vulgata	
LYMNAEIDAE	3		
Lymnaea auricularia			
Lymnaea palustris			
Lymnaea peregra			
Lymnaea stagnalis			

EPHIMERELLIDAE	10	HYCROBIIDAE	5
<i>Ephemerella ignita</i>		ELMINTHIDAE	5
HEPTAGENIIDAE	10	HALIPLIDAE	5
<i>Ecdyonurus</i> sp		HELODIDAE	5
<i>Heptagenia</i> sp		GYRINIDAE	8
LEPTOPHLEBTIDAE	10	AESHNIDAE	8
<i>Nabrophlebia fusca</i>		LESTIDAE	8
<i>Paraleptophlebia submarginata</i>		COMPHIDAE	8
SIPHONURIDAE	10	CORDULEGASTERIDAE	8
RHYACOPHILIDAE	7	CORDULIIDAE	8
<i>Agapetus fuscipes</i>		LIBELLULIDAE	8
<i>Rhyacophila</i> sp		COENAGRIDAE	6
HYDROPSYCHIDAE	5	HYDRACINELLIDAE	
POLYCENTROPIDAE	7	CERATOPOGONIDAE	
PSYCHOMYIIDAE	8	CLADOCERA	
PHRYGANIIDAE	10	OSTRACODA	
SERICOSTOMATIDAE	10	COPEPODA	
GOERIDAE	10		
MOLANNIDAE	10		
LEPTOCERIDAE	10		
HYDROPTILIDAE	6		
LIMNephilidae	7		
SIALIDAE	4		
CHIRONOMIDAE	20		
SIMULIDAE	5		
TIPULIDAE	5		
<i>Tipula</i> sp	5		
NOTONECTIDAE	5		
PLEIDAE	5		
APHELOCHEIRIDAE	10		
NEPIDAE	5		
HYDROMETRIDAE	5		
CORIXIDAE	5		
DYTISCIDAE	5		

Mr Nathan Richardson

As promised, the rest of the
water quality data



WITH COMPLIMENTS



NRA

63002
DATE SENT 11/3/93
SOURCE ONE Anglian Region
SENT BY NW (Anglian)
VERIFIED SOURCE YES
YES
1000m Road
Ipswich
Suffolk
IP3 9JE
Tel: 0473 727712
Fax: 0473 724265

 ** EasyMap Database Search Summary **

 Printed on 01-03-94 at 12:53:05.
 EasyMap Version : 1.6w, Feb.1994.

Search details : from TM1248446729 to TM3408568233 (21.6 km x 21.5 km).
 No polygons were active - the entire search area was scanned.

Number of sites found = 22; searching for LIVE sites only.
 (the search was halted by the user.)

The list below is in Easting order, starting at the west of the map.

No.	CODE	SITE NAME	NAT GRID REF	CATCH	A	D	LIVE?	SOUR
1	R04LBGIP14515	CROWFIELD ROSE PH STW	TM1600058500		E	I	Y	NONA
2	S06PETTAUGDP1	PETTAUGH STW FINAL EFFLUENT	TM1663059800	35/06	E	I	Y	AWS
3	R04LFDEB003	ASPALL CYDER NR.DEBENHAM	TM1722065510	35/06	E	I	Y	NONA
4	R04LBDEB02315	HELMINGHAM CH STW <i>not converted</i>	TM1760056400		E	I	Y	NONA
5	S06DEBENHADP1	DEBENHAM FINAL SED.TANK EFFLUENT	TM1800062700	35/06	E	I	Y	AWS
6	R04LBENF8157	HELMINGHAM HALL STW DISCH.	TM1885057590		E	I	Y	NONA
7	S06HELMINGEAO	HELMINGHAM STW FE	TM1890058500	35/06	E	I	Y	AWS
8	S06KENTONXDP1	KENTON STW FINAL EFFLUENT	TM1920066500	35/06	E	I	Y	AWS
9	R04LB4NF865	FRAMSDEN PAYNESFIELD STW <i>hooked?</i>	TM1950059530		E	I	Y	NONA
10	S06MONKSSODV1	MONK SOHAM STW FINAL EFFLUENT	TM2060066490	35/06	E	I	Y	AWS
11	R04LBENF2263A	MONK SOHAM HALL STW F/E	TM2141065130		E	I	Y	NONA
12	S06EARLSOHEB0	EARL SOHAM TERTIARY TREATMENT EFFLUENT	TM2330062800	35/06	E	I	Y	AWS
13	R04LBDEB03215	BRANDESTON HALL SCHOOL STW	TM2450060200		E	I	Y	NONA
14	S06CHARSFIDP1	CHARSFIELD FINAL SED.TANK EFFLUENT	TM2660056000	35/06	E	I	Y	AWS
15	R04LB4NF134X	SUFFOLK HERITAGE 16 HOUSES DALLINGHOO	TM2680054800		E	I	Y	NONA
16	R04LB4NF916X	POUND CORNER HOUSE STW DALLINGHOO	TM2690054300		E	I	Y	NONA
17	S06EASTONXEB1	EASTON TERTIARY TREATMENT EFFLUENT	TM2840058400	35/06	E	I	Y	AWS
18	S06KIRTONXDP0	KIRTON FINAL SED.TANK EFFLUENT	TM2860039600	35/10	E	I	Y	AWS
19	S06WICKMKTDPO	WICKHAM MARKET FINAL SED.TANK EFFLUENT	TM3080055900	35/06	E	I	Y	AWS
20	R04JCENF12027	PETTISTREE WTW FILTER BACKWASH DISCH	TM3129054750		E	I	Y	NONA
21	R04LBDEB08010	RAF BENTWATERS STW <i>(Low Property)</i>	TM3230053600	35/06	E	I	Y	NONA
22	S06ALDERTODP1	ALDERTON FINAL SED.TANK EFFLUENT	TM3420041200	35/05	E	I	Y	AWS

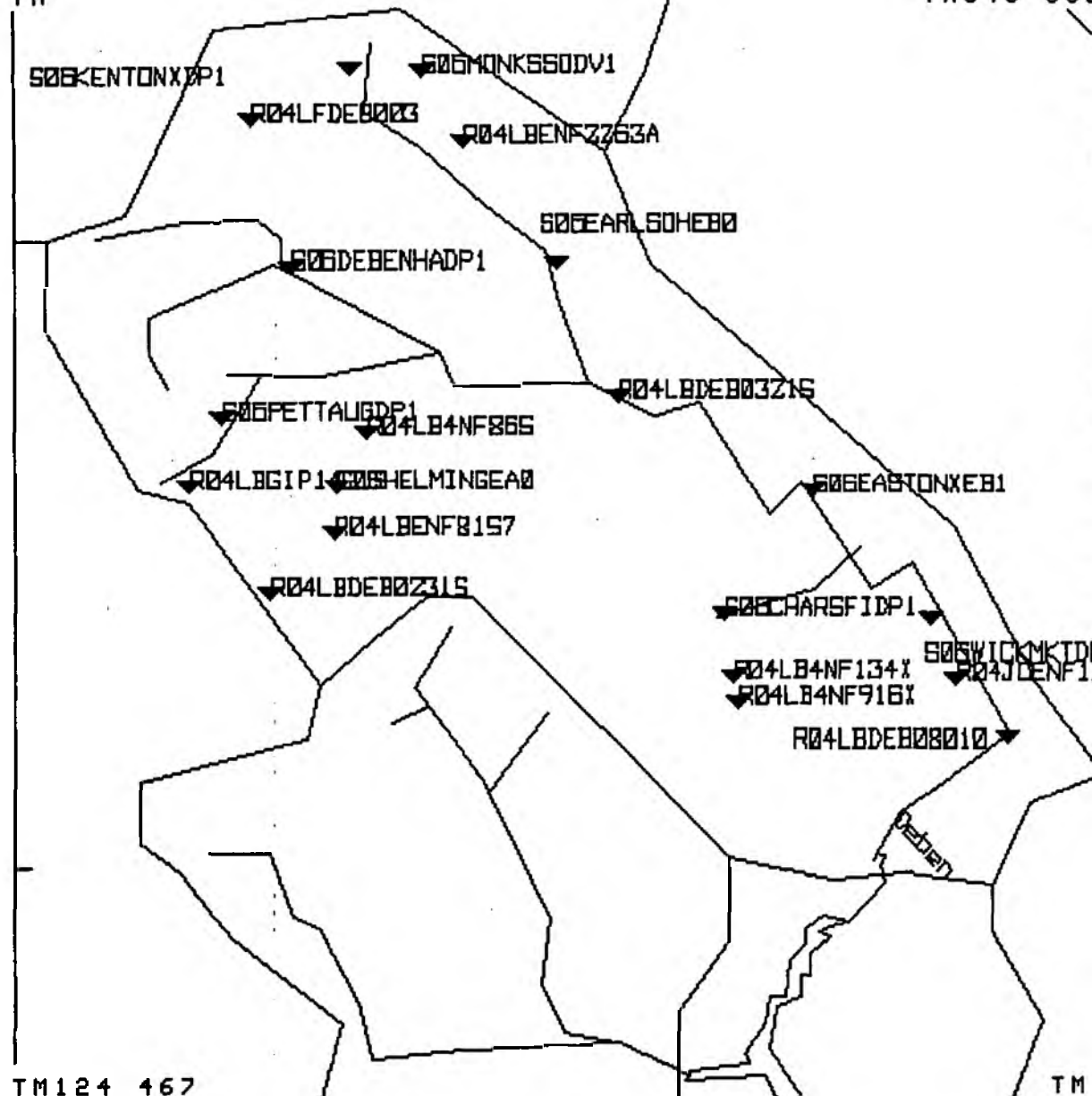
NRA Anglian Region - Water Quality Planning. PLB/PSS. 4-91, 7-93, 11-93.

DWF = dry weather flow
 DWF = Max daily flow.

Rendlesham Park A154NF/867X DWF 200 TM3230 5370
 Res. Dev. RAF Bentwaters PRENF/3318A MDF 210 TM3234 5369
 RAF Bentwaters, Tower Field PRENF/4586 MDF 210 TM3374 5373

TM

TM340 682



TM124 467

TM

EasyMap

NRA Anglian

MAIN MENU

OUTPUT OPTIONS

Sample Point Key

- ▲ Freshwater
- ▲ Saline Water
- ▲ Sediment
- ▲ Groundwater
- ▲ Biology
- ▼ AWS
- ▼ Non-AWS

No. of Sites=22
 Search Was Halted
 EasyMap Version
 1.6w, Feb.1994
 Press Any Key

4.3 km

NGR=TM38902 58761

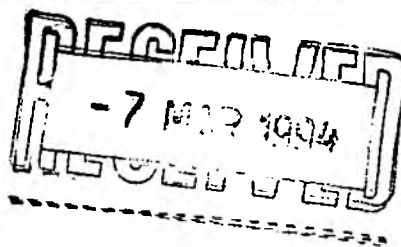
[illegible]

[illegible]

SITE	DATE	BMWP	ASPT	LQI	COMPLIANCE
RIVER LARK					
GREAT BEALINGS BR	24/05/90	80	4.7	5	PASS
BFFYN050	21/08/90	75	4	4	PASS
	24/10/90	92	4.4	5	PASS
	10/05/91	81	4.3	5	PASS
	08/08/91	85	4.3	5	PASS
	24/10/91	83	4.2	5	PASS
	13/05/92	63	4.2	4.5	PASS
	10/08/92	74	4.6	5	PASS
	24/06/93	91	4.6	5.5	PASS
	13/09/93	102	4.4	5.5	PASS
BUCKLESHAM MILL RIVER					
BRIGHTWELL BR	28/07/86	122	6.4	6.5	PASS
BFMIL020	09/07/87	110	5.2	5	PASS
	21/07/88	88	5.1	4.5	PASS
	19/04/90	104	5	4.5	PASS
	03/08/90	122	4.9	5	PASS
	24/10/90	104	4.7	4.5	PASS
	10/05/91	99	4.7	4.5	PASS
	24/07/91	105	5	4.5	PASS
	03/10/91	93	4.4	4	FAIL
	03/04/92	96	4.6	4	FAIL
	10/08/92	55	3.7	3	FAIL
	24/06/93	105	5	4.5	PASS
	13/09/93	100	4.8	4.5	PASS
IPSWICH INTAKE					
BFMIL030	19/04/90	84	4.4	5	PASS
	30/08/90	113	4.7	4.5	PASS
	24/10/90	114	4.4	5.5	PASS
	10/05/91	111	4.6	4.5	PASS
	24/07/91	99	4.5	4	FAIL
	03/10/91	86	4.3	5	PASS
	05/05/92	87	4.1	3.5	FAIL
	13/08/92	112	4.9	4.5	PASS
	24/06/93	120	4.8	4.5	PASS
	13/09/93	106	4.8	4.5	PASS
NEWBOURNE STREAM					
WATER INTAKE	19/04/90	71	5.1	5.5	PASS
BFMIL038	23/08/90	55	4.6	5	PASS
	24/10/90	60	4.6	5	PASS
	10/05/91	63	4.5	5	PASS
	24/07/91	71	4.7	5	PASS
	03/10/91	59	5.4	5.5	PASS
	03/04/92	78	4.9	5	PASS
	10/08/92	32	4	3.5	PASS
	24/06/93	64	4.3	4.5	PASS
	13/09/93	74	5.3	5.5	PASS

Our ref: PS/656/3/6; 859/83/00
Your ref:

Date: 4 March 1994



Dr Nathan Richardson
Southern Science
Premium House
Brighton Road
Worthing
West Sussex
BN11 2EN

Dear Nathan

RIVER DEBEN ALLEVIATION OF LOW FLOWS ENVIRONMENTAL APPRAISAL

It was most helpful to meet you on Wednesday and discuss progress on the Deben project.

I enclose further data as promised at the meeting:

Spray Irrigation abstraction data
Daily Flow data for Ashfield Crossroads & Earl Soham Watercourse
STW Dry Weather Flow Consents
Outline Options list
SWKP scoring for Deben

An explanatory note is also enclosed, but if you have any queries about the data or file formats please give me a call.

The data are for use only in connection with the above study, and should be returned on completion of the study.

Yours sincerely

PAULINE SMITH
Water Resources Business Planner

JOB No.	63002
DATE RECD.	7/3/94
RECD BY:	NRA
SOURCE ORG:	Pauline Smith
SENT BY:	Pauline Smith
VERIFIED SOURCE?	NO
CHECKED BY:	SS1
YES	INIT DATE

DEBEN: ENVIRONMENTAL APPRAISAL

NOTES ON DATA PROVIDED BY P. SMITH 4.3.94

Disc contains files for:

Spray Irrigation (subdir SI) - various formats, CSV, Lotus 1-2-3 etc

Flow (Subdir FLOW) - at Earl Soham watercourse (035318)
at Ashfield Xroads (035319)

File formats are: .ADF = NRA flow processing format, monthly blocked
(998 = missing/no data)
.HYD = Hydata format, one mean daily flow per line
(m = missing data)

Flow & SI Data are to 1991; more up to date information from Ipswich Office

DWF consents - WordPerfect and DOS (ASCII) formats

Also attached are:

- 1 Printouts of SI data
- 2 Printout DWF data
- 3 List of Options so far identified
- 4 Scoring forms for SWKP ALF assessment as applied to Deben

Notes on SWKP Scoring

Please note that the methodology is being re-considered by an NRA working group. There are some reservations about the method and its application and changes may be made following the working group's recommendations (due this summer).

In respect of the Deben, an assumption was made to include both surface and groundwater hydrological indicator scores (H1 and H2). It could be argued that the Deben should be scored using the surface water score only, as it is not a very strongly baseflow fed river. This would result in an overall Severity Index of 0.6 instead of 0.4.

Pauline Smith 4 March 1994

NRA R&D Project 237 : Low Flow Conditions

CALCULATION OF OVERALL INDICATORS

page 1 of 1

NRA REGION: ANGLIAN

NAME OF STREAM: R. DEBEN

DATE: 21 OCT 1992

(see Note Chapters 6.1 to 6.6 for full explanation of methodology)

OVERALL SEVERITY INDEX (SI)

SI type	SI	Weight	Weighted SI
Hydrological SI	<u>0.5</u>	40.0%	<u>0.2</u>
Ecological SI	<u>0.33</u>	30.0%	<u>0.1</u>
Landscape and Amenity SI	<u>0.25</u>	20.0%	<u>0.05</u>
Public Perception SI	<u>0.48</u>	10.0%	<u>0.05</u>
Total SI (SII) =			<u>0.4</u>

(pencil figs =
if surface
water Hydrol.
score only i.e.
exclude g.w.)

OVERALL RELIABILITY INDEX (RI)

RI type	RI (orig.)	Weight	Weighted RI
Hydrological RI	<u>0.8</u>	40.0%	<u>0.32</u>
Ecological RI	<u>1.0</u>	35.0%	<u>0.35</u>
Landscape and Amenity RI	<u>0.3</u>	25.0%	<u>0.08</u>
Total RI =			<u>0.75</u>

* Use only a proportion of indicator weight if "judgemental scoring" has been carried out (see Note Chapter 6.2)

POSSIBLE ACTION

SI	RI	Action
High	High	Put in Capital Programme for Alleviation
High	Low	Further studies required
Low	High	No action unless strong public pressure, in which case mount public relations campaign
Low	Low	No action unless strong public pressure, in which case initiate minimum cost further studies and mount public relations campaign

ADJUSTMENT

Length of watercourse affected (L) = 34 km
 Catchment area to mid-point of length affected (CA) = 114 km²
 Adjusted Severity Index (SIIa) = SII x L^{1/2} x CA^{1/2} = 6.28

COST ADJUSTMENT

Benefit:
 Increase in low flow resulting from alleviation scheme = Ml/day
 Benefit (or Value) = (approx.) million
 Cost:
 Net Present Value of costs of alleviation scheme = million
 (discount rate = 6% over 100 years, or as recommended by the DoE)
 Benefit/Cost ratio =
 Adjusted Severity Index (SIIa) =
 Total Severity Index (TSI), taking account of Benefit/Cost ratio =

HYDROLOGICAL INDICATOR

page 1 of 2

NRA REGION: *Anglian*NAME OF STREAM: *River Deben*DATE: *Aug 1992*

(see Note Chapters 2.1 to 2.8 for full explanation of the methodology)

H1 GROUNDWATER BALANCE PARAMETER -

ANNUAL LICENSED ABSTRACTION
ANNUAL RECHARGE

Total Groundwater ALA = 332 900 m³/a (GWALA)
 Calculated AR (1 in 10 yr drought) = 6 307 200 m³/a (AR)
 Total Annual 'Licence-exempt' Abst. = m³/a (X) - ONLY enter if significant
 Total Surface Water ALA = m³/a (SWALA) } ONLY enter if H2 not used and
 Licensed Effluent Returns (annual) = m³/a (ER) } ALA is supported by spring flow

ALA/AR = (GWALA+X+SWALA-ER)/AR =

0.05

ALA/AR	Score
>1.0	4
0.7-1.0	3
0.4-0.7	2
0.2-0.4	1
<0.2	0

Assign score: H1 = 0

PRIMARY

H2 RIVERFLOW BALANCE PARAMETER -

DAILY MAXIMUM LICENSED ABSTRACTION
Q95 "NATURAL"or Q95 "NATURAL"
RES. COMP. FLOW

Total Surface Water DMLA = 11 250 m³/d (SWDMLA) - ONLY enter for non-res. catchments
 Reservoir Compensation Flow (mean daily) = m³/d (COMP) - ONLY enter for reservoir catchments
 Total downstream channel abstraction (daily) = m³/d (DMLCA) - ONLY enter for reservoir catchments
 Total 'Licence-exempt' abstraction (daily) = m³/d (X2) - ONLY enter if significant
 Q95(7) = 7 776 m³/d (QNF)
 Total Groundwater DMLA (with direct impact) = m³/d (GWDMLA) }
 Licensed Effluent Returns (daily) = m³/d (ERTWO) } ONLY enter if H1 not used

Non-reservoir catchments: Total DMLA/Q95 = (SWDMLA+X2+GWDMLA-ERTWO)/QNF =

1.45

Reservoir catchments: Q95/COMP = QNF/(COMP-DMLCA-X2-GWDMLA+ERTWO) =

DMLA/Q95 or Q95/COMP	Score
>1.0	4
0.7-1.0	3
0.4-0.7	2
0.2-0.4	1
<0.2	0

Assign score: H2 = 4

PRIMARY

H3 GROUNDWATER LEVEL PARAMETER

Mean Annual Decline in minimum groundwater levels = m (MAD)
 Mean Seasonal Range = m (MSR)

MAD/MSR =

MAD/MSR	Score
>0.5	4
0.3-0.5	3
0.1-0.3	2
<0.1	1
<0.1	0

* If MAD/MSR > 0.5, see Note Chapter 2.3 to assign score

Assign score: H3 =

SECONDARY

HYDROLOGICAL INDICATOR

page 2 of 2

A REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 2.1 to 2.8 for full explanation of the methodology)

STREAM MORPHOLOGY PARAMETER

Cross Section	Current XSA of flow (m2)	Normal XSA of flow (m2)	Current Normal
1			
2			
3			
4			
5			
Mean =			

Current/Normal	Score
<0.1	4
0.1-0.3	3
0.3-0.5	2
0.5-0.7	1
>0.7	0

Assign score: H4 =

SECONDARY

FLOW AND ECOLOGY RELATIONSHIP PARAMETER -

RESIDUAL FLOW

MINIMUM ECOLOGICALLY ACCEPTABLE FLOW

Q95(7) =

Total DMLA (see H2) =

Reservoir Compensation Flow (mean daily) =

Total downstream channel abstraction (daily) =

Total 'Licence-exempt' abstraction (daily) =

Licensed Effluent Returns (daily) =

Tributary Inflows (sum of Q95s) =

MEAF (critical month) =

	m3/d	(QNF)	} ONLY enter for non-res. catchments
	m3/d	(DMLA)	
	m3/d	(COMP)	}
	m3/d	(DMLCA)	
	m3/d	(X2)	} ONLY enter for reservoir catchments
	m3/d	(ERTWO)	
	m3/d	(TRIB)	}
	m3/d	(MEAF)	

(Note: MEAF is under development as part of NRA R&D Project B2.1 and is as yet undefined)

(Q95-DMLA)/MEAF or COMP/MEAF	Score
<0.6	4
0.6-0.8	3
0.8-1.0	2
1.0-1.2	1
>1.2	0

Non-res. catchments: (Q95-DMLA)/MEAF =

Res. catchments: (COMP-DMLCA-X2+ERTWO+TRIB)/MEAF =

Assign score: H5 =

PRIMARY

H6 MOVEMENT OF SPRINGHEAD PARAMETER

Total length of reaches changed from perennial to intermittent =

Total length of reaches changed from intermittent to ephemeral =

Sum =

	km
	km
	km

Sum of reaches (km)	Score
>8	4
4-8	3
2-4	2
0-2	1
0	0

Assign score: H6 =

SECONDARY

CALCULATION OF HYDROLOGICAL INDICATOR

Parameter	Param. weight	Weight of params. used	Score	Weight x Score
H1	0.5 } If H1 & H2 are BOTH used,	0.4	0	0
H2	0.5 } set both weights to 0.4	0.4	4	1.6
H3	0.1			
H4	0.1			
H5	0.9			
H6	0.1			
SUM1 =		0.8 (max.1)	SUM2 =	1.6
Hydrology Severity Index = SUM2/(SUM1x4) =		0.5		
Hydrology Reliability Index = SUM1 =		0.8		

ECOLOGICAL INDICATOR

page 1 of 2

NRA REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 3.1 to 3.9 for full explanation of methodology)

E1 INVERTEBRATE COMMUNITY PARAMETER

Generate potential ASPT:

Select multipliers:

SOURCE =
REACH =
CHAN.MODS. =
EFF.COMP. =

SOURCE: Upland = 1; Lowland = 0.8
REACH: Headstream = 1; Mid = 0.95; Lower = 0.9
CHANNEL MODIFICATIONS: Limited = 1; Moderate = 0.95; Extensive = 0.9
EFFLUENT COMPONENT: Low (NWC class 1) = 1; Moderate (NWC class 2) = 0.95; High (NWC class 3) = 0.9

Potential ASPT =

Measured ASPT =

Score	Potential ASPT					
	<4.5	4.5-5.0	5.1-5.5	5.6-6.0	6.1-6.5	>6.5
<4.5	0	1	2	3	4	4
4.5-5.0		0	1	2	3	4
Measured ASPT	5.1-5.5		0	1	2	3
	5.6-6.0			0	1	2
	6.1-6.5				0	1
	>6.5					0

Assign score: E1 =

E2 FISHERY PARAMETER

Non-Tidal Fisheries:

Score	Fish community under 'normal' flow conditions	Decline due to low flows							
		b)	c)	d)	e)	f)	g)	h)	i)
Game	Headstream								
	a) Trout, salmon	2	3	4	-	-	-	-	-
	b) Small trout only (+ loss of older year classes)	-	2	3	-	-	-	-	-
	c) Minor species only (loss of spawning habitat)	-	-	2	-	-	-	-	-
	d) Complete loss	-	-	-	-	-	-	-	-
Coarse	Lower reaches								
	e) Trout	2	3	4	-	1	2	3	4
	f) Barbel, chub, dace, perch, pike	-	3	4	-	-	1	2	3
	g) Small populations of species f) (+ loss of older year classes)	-	2	3	-	-	-	1	2
	h) Bream, perch, roach, tench	-	3	4	-	-	-	-	1
	i) Small populations of species h) (+ loss of older year classes)	-	2	3	-	-	-	-	-

Tidal Fisheries:

OR:

Access to migratory Fish:

	Decline due to low flows		
	a)	b)	c)
a) No reduction in Game or Coarse	-	2	4
b) Seasonal decline to euryhaline spp	-	-	2
c) Permanent decline to euryhaline sp	-	-	-

Description	Score
60% reduction in access	4
45% reduction in access	3
30% reduction in access	2
15% reduction in access	1
No evidence of reduction in access	0

OR:

Short-term impact parameter	Score
No fishing was possible during a season due to low flows	4
or any assessed score in-between	(2)
No evidence of short-term impact of low flows on angling	0

Assign score: E2 =

ECOLOGICAL INDICATOR

page 2 of 2

NRA REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 3.1 to 3.9 for full explanation of methodology)

E3 FISH STOCKS PARAMETER

Generate potential fish stock: Past fish stock (N) = Not available

Select multipliers: CHAN.MODS. = 0.4 CHANNEL MODIFICATIONS: Low = 1; Moderate = 0.9; High = 0.8
EFF.COMP. = 1.0 EFFLUENT COMPONENT: Decrease = 1; No Change = 1; Increase = 1

Potential fish stock (NP) = N x multipliers =
Present/Potential Fish Stock =

Measured present fish stock (NM) =

Present/Potential	Decline related to low flows	Score
<0.4	Serious decline	4
0.4-0.59	Large decline	3
0.6-0.79	Moderate decline	2
0.8-0.99	Slight decline	1
>1.0	None	0

Assign score: E3 = 1

E4 PLANT PARAMETER

Description of changes	Score
Bankside flora has changed or is changing due to a lower water table	4
Abnormal invasion of the river channel in summer by marginal terrestrial plants	2
No change, other than normal seasonal variation in channel or bankside flora	0

Assign score: E4 = 2

E5 CONSERVATION PARAMETER

Only use this parameter if there is direct evidence that low flows are a problem (i.e. from 2 of parameters H1, H2, H5, E1, E2, E3)

Formally designated sites:

Channel, riparian or other habitats depending on surface or groundwater for their character	
RAMSAR Sites, National Nature Reserves (NNRs), Marine Nature Reserves (MNRs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), Habitat of species protected by EC Directive or Wildlife and Countryside Act	5
Conservation sites of regional or county importance (eg Naturalist Trust Reserve, RSPB Reserve)	4
Local nature reserve (including Heritage sites, C-sites, and Sites of historic interest)	3
No formal designation	0

Sites within the river system:

Instream and riparian habitat	Score
High conservation value, eg a diverse, natural and typical habitat of a viable size and containing species sensitive to disturbance. NWC class 1 stretch	3
Moderate conservation value, eg a smaller or less diverse site; or a site with natural or typical habitat but no particularly threatened species. NWC class 2 stretch	2
Site of minor conservation value. NWC class 3 stretch	1
Site of no conservation value. NWC class 4 stretch	0

Add scores from both tables and divide by 2 to give final E5 score.

Assign score: E5 = 2.5

CALCULATION OF ECOLOGICAL INDICATOR

Parameter	Param.weight	Weight of params. used	Score	Weight x Score
E1	0.4	0.4	1	0.4
E2	0.2	0.2	2	0.4
E3	0.3	0.3	1	0.3
E4	0.1	0.1	2	0.2
E5	0.3	X	-	
SUM1 =		1.0 (max.1)	SUM2 =	1.3

Ecology Severity Index = SUM2/(SUM1x4) =

0.33

Ecology Reliability Index = SUM1 =

1.0

LANDSCAPE AND AMENITY INDICATOR

page 1 of 2

NRA REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 4.1 to 4.6 for full explanation of methodology)

Note: Do not use L1, L2, L4 or L5 unless there is other firm evidence of low flows from at least 2 of parameters H1, H2, H5, E1, E2, E3

L1 LANDSCAPE DESIGNATION AND RARITY PARAMETER

For Landscape Designation:

Description	Score
Important in a national context, ie National Parks and Areas of Outstanding Natural Beauty	2
Important in a local context, ie Areas defined as Country Parks/Special Value etc. within local or structure plan context	1
Landscape has no official designation	0
An additional score may be awarded as follows:	
Areas which are undergoing environmental improvements (either national or local) and where finance exists to support such improvements, ie landscapes within Development Corporation Areas, Local Initiative Areas	+1

Landscape Rarity:

Description	Score
Where river/river corridor landscape is "the only" or "one of the best examples of..." in the national context	2
Where river/river corridor landscape is "the only" or "one of the best examples of..." in the local context	1
The river has no rarity value	0

Add scores to a maximum of 4.

Assign score: L1 = 0

L2 IMPORTANCE OF THE RIVER AS A LANDSCAPE FEATURE AND ITS IMPACT ON ADJACENT LAND PARAMETER

For Importance:

Description	Score
High importance - dominant landscape feature, due to associated artifacts such as weirs, bridges etc.	3
Medium importance - only stretches of the river are visible, or the course is only noticeable because of bankside vegetation being visible	2
Low importance - the river is barely noticeable	1

For Impact:

Description	Score
Where an attractive adjacent land use (within 500m) is primarily as a result of man's impact on, or management of, the river	-1
Where a degraded or unsightly adjacent land use is primarily as a result of man's impact on, or management of, the river, which could be remedied if remedial action were taken to the river	+1

Add scores to a range of 0-4

Assign score: L2 = 2

L3 RECREATION PARAMETER

Description (do not include fishing/angling)	Score
When 3 or more water-contact recreational activities were unable to take place sometime in each year during a 5 year period	4
3 or more water-contact recreational activities were unable to take place at any time in any one 12 month period	3
1 or 2 water-contact recreational activities were unable to take place at any time in any 12 month period	2
Any water-contact recreational activity was affected by low flows within the last 5 years. This also includes a reduction in enjoyment of a sport, resulting from low river flows	1
No change has been noted	0
If historical evidence exists, an additional score may be awarded where:	
The river was able to support a water-contact recreational activity within the past 25 years, but this activity is no longer possible due to lower river flows	+1

Add scores to a maximum of 4.

Assign score: L3 = 1

LANDSCAPE AND AMENITY INDICATOR

page 2 of 2

NRA REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 4.1 to 4.6 for full explanation of methodology)

Note: Do not use L1,L2,L4 or L5 unless there is other firm evidence of low flows from at least 2 of parameters H1,H2,H5,E1,E2,E3

L4 AMENITY PARAMETER

For Odour:

Description	Score
Strong odour at channel edge, eg sludge, sewage, chemical or farmyard wastes and noticeable at a distance of > 10m from the channel	2
Noticeable odour at the channel edge	1
No noticeable odour	0

For Visual Impairment at the river channel:

(Elements include unnatural water colour, farm wastes, foam, sewage, fungus, crude sewage, visible solids, rotting vegetation, and also where refuse and litter are exposed or if no water is present)

Description	Score
3 or more of the above elements which persist over a period of several months, as result of low flows, or 3 or more of the above elements which occur intermittently	3
1 to 3 of the above elements which persist over a period of several months, as result of low flows	2
2 of the elements which occur intermittently, as a result of low flows	1
No visual problem	0

For Visual Impairment on the river bank and adjacent land:

Description	Score
Where planning designation encourages public use	+1

Add scores to a maximum of 4.

Assign score: L4 = 1

L5 HISTORICAL AND CULTURAL ASSOCIATIONS PARAMETER

Description	Score
Sites of national historical/archaeological interest, ie National Monuments, National Trust sites	4
Sites of regional historical/archaeological interest, generally within 500m	3
Sites which have national cultural associations such as paintings and literature	2
Sites of local historical/archaeological, cultural or literary interest, such as place names	1
No historical or cultural associations	0

Assign score: L5 = 1

CALCULATION OF LANDSCAPE AND AMENITY INDICATOR

Parameter	Param.weight	Weight of params.used	Score	Weight x Score
L1	0.2	X		
L2	0.3	X		
L3	0.3	0.3	1	0.3
L4	0.1	X		
L5	0.1	X		
SUM1 =		0.3		SUM2 = 0.3

Landscape and Amenity Severity Index = SUM2/(SUM1x4) =

Landscape and Amenity Reliability Index = SUM1 =

0.25
0.3

PUBLIC PERCEPTION INDICATOR

page 1 of 1

REGION:

NAME OF STREAM:

DATE:

(see Note Chapters 5.1 to 5.3 for full explanation of methodology)

P1 PROXIMITY OF RIVER TO CENTRES OF POPULATION PARAMETER

Description	Score
River flows through a large centre of population, ie a town	4
River flows through a small centre of population, ie a village	3
River flows within 1km of a town	2
River flows within 1km of a village	1

(If unsure of town/village distinction, use: Town = > 10,000 pop.)

Assign score: P1 = 4

P2 COMPLAINTS RECEIVED FROM THE PUBLIC PARAMETER

Description	Score
Written complaints received from national organisations (e.g. English Nature, CLA, CPRE, Salmon & Trout Assoc. etc.) in support of local pressure groups formed specifically to deal with problems affecting the river and it's environment	4
Press coverage or written complaints received from national organisations or local clubs or pressure groups	3
A moderate number (> 5/annum on average) of written complaints received from individuals about problems related to low river flows over a period of years	2
Up to 5/annum on average written complaints received from individuals about problems related to low river flows over a period of years	1
No complaints received about problems related to low river flows	0

Assign score: P2 = 1

CALCULATION OF PUBLIC PERCEPTION INDICATOR

Parameter	Param.weight	Weight of params.used	Score	Weight x Score
P1	0.3	0.3	4	1.2
P2	0.7	0.7	1	0.7
SUM1 =		1.0	SUM2 = 1.9	

Public Perception Severity Index = $SUM2/(SUM1 \times 4) =$

0.48

Public Perception Reliability Index = $SUM1 =$

1.0

NRA

OVER

OVER

POS

SIZE

COS

R.

RIVER DEBEN SI LICENCES
ACTUAL ABSTRACTIONS CUBIC METRES
1991

LIC NO	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	TCM
60	0	9084	4542	16397	18168	13626	61817	62
61	0	4271	5258	4198	2250	0	15977	16
62	0	15797	6622	7399	8580	7154	45552	46
* 66	0	6703	3217	7580	6641	5564	29705	30
TOTAL	0	35855 (29752)	19639 (16432)	35574 (27914)	35639 (23492)	26344 (20780)	153051	153
TCM	0	36	20	36	36	26	153	
TCMD AVE (MAY-SEP)	.0	1.2	.7	1.1	1.1	.9	1.0	

MAX DAILY RATE CUBIC METRES
1991

LIC NO	APR	MAY	JUN	JUL	AUG	SEP	
60		500	500	900	500	500	ESTIMATE
61		450	450	450	450	450	ACTUAL
62		908	908	908	454	454	ACTUAL
* 66		500	500	500	500	500	ESTIMATE
TOTAL		2358 (1872)	2358 (1852)	2758 (2452)	1904 (494)	1904 (1494)	
TCMD MAX DAILY RATE		2.4	2.4	2.8	1.9	1.9	

REMAINDER OF LICENCES NO ABSTRACTION IN 1991

* = dls Naunton Hall

Partial restriction 50%. From 9/8/92

RIVER DEBEN DATA FOR RESIDUAL FLOW DIAGRAM
 LOW FLOW CONDITIONS APPROX 95 %ILE AT NAUNTON HALL)
 JUNE 92 FLOWS, EFFLUENT DWF & LICENSED DAILY ABSTRACTION

LOCATION	DISTANCE KM	FLOW L/S 23.6.92 M DEBENHAM SURVEY	EFFLUENT DWF L/S	EFFLUENT CUMULATIVE L/S	MAX DAY RATE LIC L/S	MAX ABS CUMULATIVE(7/35/6/) L/S	LIC NO	BALANCE L/SEC
DEBENHAM	.0	.0	.0	.0		.0		.0
DEBENHAM STW	1.0	.0	3.9	3.9		.0		.0
ASHFIELD X ROAD	4.0	7.4		3.9		.0		7.4
O/S ASHFIELD	5.0	11.8		3.9		.0		11.8
CRETINGHAM	8.0	23.30		3.9	-4.7	-4.7	65	18.6
EARL SOHAM STW	8.0	23.3	.9	4.8		-4.7		18.6
BRANDESTON HALL	11.0	34.8		4.8		-4.7		30.1
KETTLEBURGH BR	13.5	38.8		4.8		-4.7		34.1
	14.0	41.6		4.8	-1.4	-6.2	67	35.4
	15.0	44.3		4.8	-1.6	-7.8	95	36.5
EASTON	16.0	49.8		4.8	-7.9	-15.6	64	34.2
CHARSFIELD W/C	20.0	71.8	.6	5.4		-15.6		56.2
GLEVERING	20.0	71.8		5.4	-1.1	-16.7	63	55.1
	21.0	77.3		5.4	-11.6	-28.3	60	49.0
WICKHAM MKT	22.5	85.4		5.4		-28.3		57.1
	22.5	85.4		5.4	-10.5	-38.8	62	46.6
STW	23.5	88.7	6.4	11.8		-38.8		49.9
CAMPSEY ASH	24.0	90.3		11.8	-13.2	-52.0	61	38.3
ASH ABBEY	25.0	93.6		11.8	-7.9	-59.9	43	33.7
RAF BENTWATERS STW	26.3	97.9	13.1	24.9		-59.9		38.0
NAUNTON HALL	26.5	98.5		24.9		-59.9		38.6
EYKE	28.0	103.5		24.9	-15.8	-75.6	68	27.9
UFFORD	30.0	111.0		24.9	-7.9	-83.5	66	27.5

DEBEN DWF CONSENTS: FROM WATER QU

PTCODE	OWNER	TOT_PE	DWF_M3D	REC_WAT1	REC_WAT2
<u>35/06</u>					
S06PETTAUGDV1	AWS	50	0.0	TRIBUTARY	RIVER DEBEN NT
S06PETTAUGDP1	AWS	0	0.0		
S06DEBENHADP1	AWS	1491	340.0	RIVER DEBEN NT	
S06HELMINGEAO	AWS	11	0.0	TRIBUTARY	RIVER DEBEN NT
S06KENTONXDP1	AWS	25	0.0	TRIBUTARY	RIVER DEBEN NT
S06MONKSSODV1	AWS	20	4.0	RIVER DEBEN NT	
S06ASHFIELDP1	AWS	0	130.0	R.DEBEN	
S06EARLSOHEBO	AWS	279	80.0	RIVER DEBEN NT	
S06CHARSFIDP1	AWS	328	53.0	RIVER DEBEN	
S06EASTONXEB1	AWS	19	0.0	RIVER DEBEN NT	
S06WICKMKTDPO	AWS	2403	580.0	RIVER DEBEN NT	
S06RENDLESEBO	AWS	1054	300.0	RIVER DEBEN NT	
RO4LBDEB08010	PSA (CROWN)		1136.0	RIVER DEBEN NT	
PRENF3818	PSA (CROWN)		210.0	RIVER DEBEN NT	
RO4LFDEB003	CHEVALLIER GUILD		70.0	TRIB RIVER DEBEN	
S06TUDDENHDP0	AWS	1135	288.0	RIVER FYNN NT	
S06OTLEYXXDP1	AWS	442	159.0	RIVER LARK NT	
S06PLAYFORDP0	AWS	133	0.0	RIVER FYNN	RIVER DEBEN NT
S06LTBEALIDP1	AWS	141	0.0	RIVER FYNN NT	
S06GTBEALIDP1	AWS	128	0.0	TRIBUTARY	RIVER LARK NT
S06GRUNDISEB1	AWS	1309	200.0	RIVER LARK	RIVER DEBEN NT

TOTALS (Live sites)35/062703 m³d

reliable effluent = dwf x 0.75
 = 2773 x 0.75
 = 2079 m³d
 = 2.1 tcmd

35/07647 m³d

reliable effluent = dwf x 0.75
 = 647 x 0.75
 = 485 m³d
 = 0.5 tcmd

ALITY FEATURE FILES DATED 23/7/93

PTNAME	NGR	CATCH	AR	LIVE
NO LONGER REQUIRED DO NOT USE	TM1660059700	35/06	E	
PETTAUGH STW FINAL EFFLUENT	TM1663059800	35/06	E	Y
DEBENHAM FINAL SED.TANK EFFLUENT	TM1800062700	35/06	E	Y
HELMINGHAM STW FE	TM1890058500	35/06	E	Y
KENTON STW FINAL EFFLUENT	TM1920066500	35/06	E	Y
MONK SOHAM STW FINAL EFFLUENT	TM2060066490	35/06	E	Y
WORKS NO LONGER EXIST DO NOT USE	TM2100062900	35/06	E	
EARL SOHAM TERTIARY TREATMENT EFFLUENT	TM2330062800	35/06	E	Y
CHARSFIELD FINAL SED.TANK EFFLUENT	TM2660056000	35/06	E	Y
EASTON TERTIARY TREATMENT EFFLUENT	TM2840058400	35/06	E	Y
WICKHAM MARKET FINAL SED.TANK EFFLUENT	TM3080055900	35/06	E	Y
RENDLESHAM PARK TERTIARY TREATMENT	TM3460053100	35/06	E	Y
RAF BENTWATERS	TM3230053600	35/06	E	Y
RAF BENTWATERS (RESIDENTIAL DEVELOPMENT)	TM3234053670	35/06	E	Y
ASPALL	TM1722065510	35/06	E	Y
TUDDENHAM FINAL SED.TANK EFFLUENT	TM1970048000	35/07	E	Y
OTLEY FINAL SED.TANK EFFLUENT	TM2060054700	35/07	E	Y
PLAYFORD FINAL EFFLUENT	TM2180047900	35/07	E	Y
LT.BEALINGS FINAL EFFLUENT	TM2250047900	35/07	E	Y
GT.BEALINGS FINAL EFFLUENT	TM2270049100	35/07	E	Y
GRUNDISBURGH TERTIARY TREATMENT EFFLUENT	TM2320049800	35/07	E	Y

RIVER DEBEN: DISCHARGE CONSENTS

The following sites all discharge to the River Deben just upstream (within 200 m) of Naunton Hall gauging station:

Site	Consent no	Outfall	NGR	DWF m ³ /d	Date
RAF Bentwaters	PR4NF350X	TM 323	536 -	1136	1963
Rendlesham	PR4NF867X	TM 323	537	300	1980
RAF Bentwaters (res development)	PRENF3818	TM 3234	5367	210	1991

All relate to RAF Bentwaters site - which is due to close next year. - now private housing (Mar 94)

ps 16.9.92

RIVER DEBEN: 1:10 RECHARGE CALCULATION

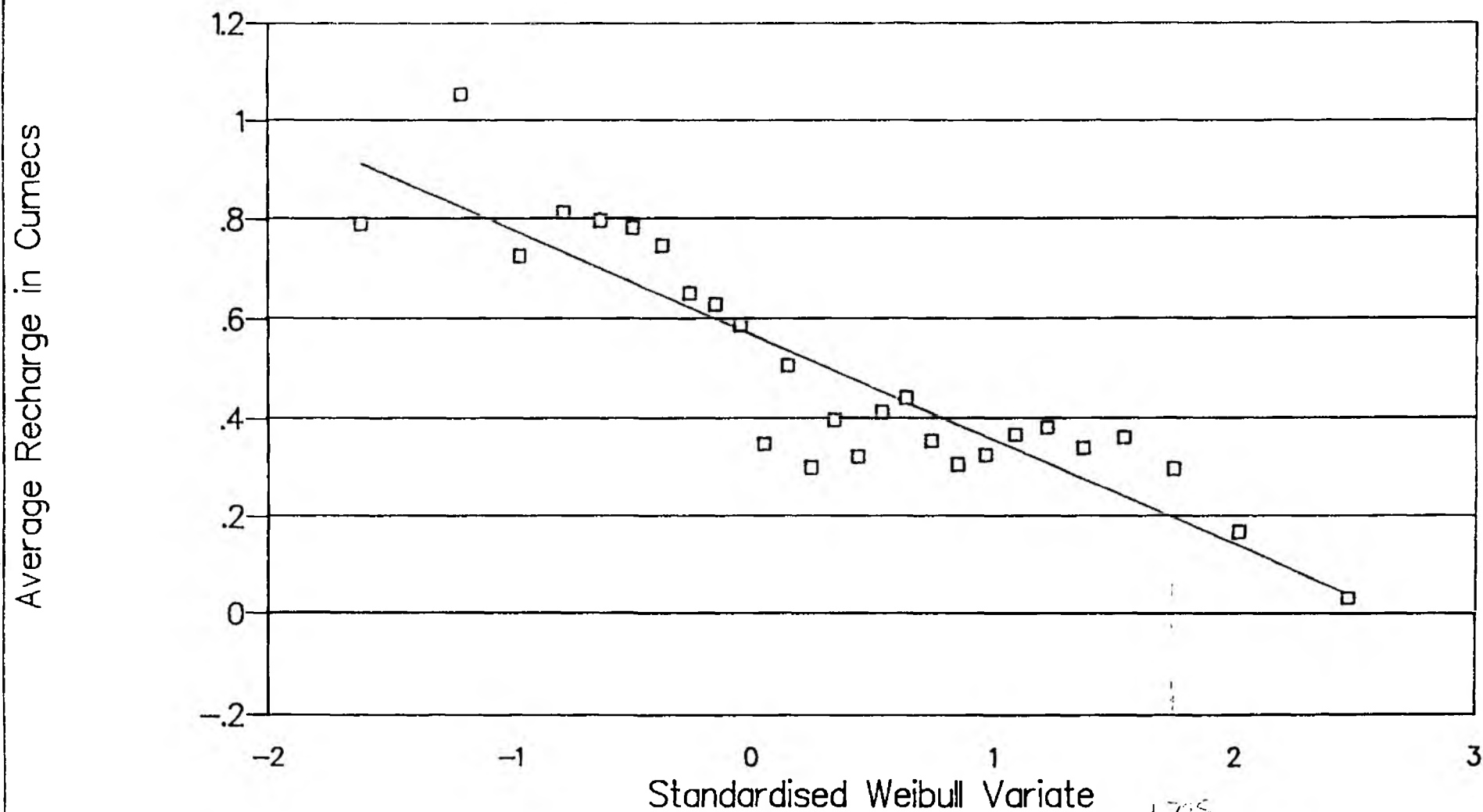
WEIBULL
CALCS

EP Morecs mm	EP Cumecs	YEAR	EP RANK i	ADF Cumecs	BFI	Base Flow Cumecs	Ave Runoff Cumecs	Avg Rech Cumecs	Avg Rech m3/d	Avg Rech m3/a	P	W	T
281.5	1.46	1987	1	1.75	.283	.263	.665	.791	68311.1	24,933,553	.021	-1.614	1.021
278.7	1.44	1974	2	1.06	.313	.176	.386	1.055	91167.0	33,275,955	.058	-1.200	1.061
215.3	1.11	1968	3	1.07	.319	.181	.387	.726	62754.2	22,905,285	.094	-.958	1.104
214.7	1.11	1982	4	.843	.334	.149	.298	.813	70232.1	25,634,706	.131	-.775	1.151
212.6	1.10	1976	5	.874	.346	.160	.303	.797	68852.8	25,131,264	.168	-.622	1.202
208.3	1.08	1969	6	.890	.375	.177	.295	.782	67605.5	24,676,010	.205	-.488	1.258
196.9	1.02	1965	7	.917	.441	.214	.272	.747	64518.6	23,549,294	.242	-.366	1.319
187.3	.97	1978	8	.935	.361	.179	.317	.652	56344.2	20,565,630	.279	-.252	1.387
180.9	.94	1966	9	.927	.376	.185	.306	.629	54361.2	19,841,855	.316	-.145	1.461
179.1	.93	1980	10	.972	.344	.177	.338	.588	50832.8	18,553,970	.353	-.042	1.544
150.3	.78	1986	11	1.13	.282	.169	.430	.348	30025.3	10,959,239	.389	.058	1.638
149.9	.76	1970	12	.750	.350	.139	.258	.507	43768.1	15,975,359	.426	.156	1.743
132.9	.69	1967	13	1.02	.285	.154	.387	.300	25917.5	9,459,896	.463	.253	1.863
125.7	.65	1971	14	.764	.375	.152	.253	.397	34316.7	12,525,582	.500	.350	2.000
125.3	.65	1984	15	.900	.315	.150	.327	.321	27776.5	10,138,414	.537	.448	2.159
122.5	.63	1977	16	.622	.332	.109	.220	.414	35734.1	13,042,960	.574	.547	2.346
118.2	.61	1979	17	.524	.389	.108	.170	.442	38169.0	13,931,676	.611	.648	2.568
111.8	.58	1983	18	.626	.323	.107	.225	.354	30559.2	11,154,122	.647	.752	2.837
105.9	.55	1985	19	.706	.354	.132	.242	.306	26448.3	9,653,624	.684	.861	3.168
102.1	.53	1981	20	.596	.355	.112	.204	.324	28020.9	10,227,629	.721	.976	3.587
88.3	.46	1964	21	.319	.466	.079	.090	.366	31661.4	11,556,424	.758	1.098	4.134
85.8	.44	1973	22	.247	.525	.069	.062	.382	32961.7	12,031,037	.795	1.232	4.878
80.3	.42	1990	23	.311	.537	.088	.076	.339	29299.6	10,694,338	.832	1.380	5.947
79.5	.41	1988	24	.194	.514	.053	.050	.361	31204.7	11,389,710	.869	1.550	7.618
68.4	.35	1989	25	.252	.576	.077	.057	.297	25670.6	9,369,786	.906	1.755	10.594
40.0	.21	1975	26	.137	.455	.033	.039	.167	14463.3	5,279,108	.942	2.027	17.385
13.4	.07	1972	27	.217	.697	.080	.035	.035	2981.8	1,088,370	.979	2.480	48.429

0.2 cumecs
10.21.1964

RIVER DEBEN RETURN PERIOD/EFFECTIVE PRECIPITATION

To Establish 1:10 Drought for Low Flow Assessment



1.725
1:10 Yr Drought Approximates to 1.725 Weibull.

RIVER DEBEN: ALLEVIATION OF LOW FLOWS

INITIAL COST ESTIMATES FOR OPTIONS

Warning: these are only based on general 'guide prices' to give an overview of likely costs, and assume previous estimates of flow needs are reasonable

Option		Capital Cost £k	Risks/other considerations	Recommended further action
1a	Do nothing		Continued low flows and associated costs to environment etc	Not a preferred option
1b	Do nothing, support ESA then revoke unused licences after 7 years		Continued low flows still a risk	Not a preferred option
2a	New augmentation borehole(s) plus Earl Soham with E.Soham at current capacity	£360k - £600k	Cost estimate is £600k if two new boreholes (each 5tcmd) needed	Obtain better cost estimate
2b	New augmentation borehole plus E.Soham increased capacity	£400k	Risk that uprating E. Soham is more complex and could add to costs (or fail)	Obtain better cost estimate
3	Revoke and compensate surface SI licences	£1600k	'Rule of thumb' cost of £1million per tcmd (ave) used: may be unrealistic	Obtain better cost estimate based on actual situation (by AJH)
4	Re-use of effluents	Several million pounds?	Costs of re-directing and treating effluent uncertain but high. Risk of causing new problems in river	Not a preferred option
5	Transfer water from Dove boreholes (Wetheringsett?)	£1000k (includes new bh to maintain capacity in Dove)	Cost for redirecting borehole output (5km, 20m head) uncertain. Other demands mean water may not be available from Dove unit	Not a preferred option
6	Replace surface SI licences with winter storage	£570k-£2280k	Very variable 'guide price' costs. Based on 'worst case' assumption that total storage is 570 tcm (full licenced entitlement). Availability of winter water could be constraint. Site/Construction feasibility unknown.	Investigate further: a) water availability b) actual storage needs c) construction feasibility d) costs
7	Replace surface SI licences with groundwater abstraction	£265k +?	May be additional costs for pipelines etc. Technical investigations may be complex/expensive. Risk that peak impacts not reduced enough if boreholes poorly sited	Investigate further: a) practical feasibility b) improved costs
8	Provide iron treatment at Debenham borehole	c. £500k	More expensive to guarantee success. Has significant operational & revenue cost implications.	Not a preferred option at present Ultimate fate of borehole to be decided
9	River channel management	??	To be considered in combination with other options. May both directly mitigate low flow impacts and reduce minimum flow needed to maintain environment.	More guidance on costs: from P. Barham/Engineering?

Nathan Richardson

Pauline Smith

17.5.94

DEBEN ENVIRONMENTAL APPRAISAL

Enclosed summary of Debenham Pump tests
+ Ashfield X Roads plot of flows for 1990 test
period. These are as available in the
office, will contact you if more can
be found in Ipswich. Please ring me if you
any queries.

WITH COMPLIMENTS

Regards,

Pauline Smith



JOB No. 6300
DATE RECEIVED 17/5/94
SOURCE OF INFO. National Rivers
SENT BY: Pauline Smith
VERIFIED SOURCE: YES
CHECKED BY: [Signature]
DATE: [Blank]
Kingfisher House
Goldhay Way
Orton Golding
Peterborough
PE2 5ZR
Tel: 0733 371811
Telefax: 0733 231840

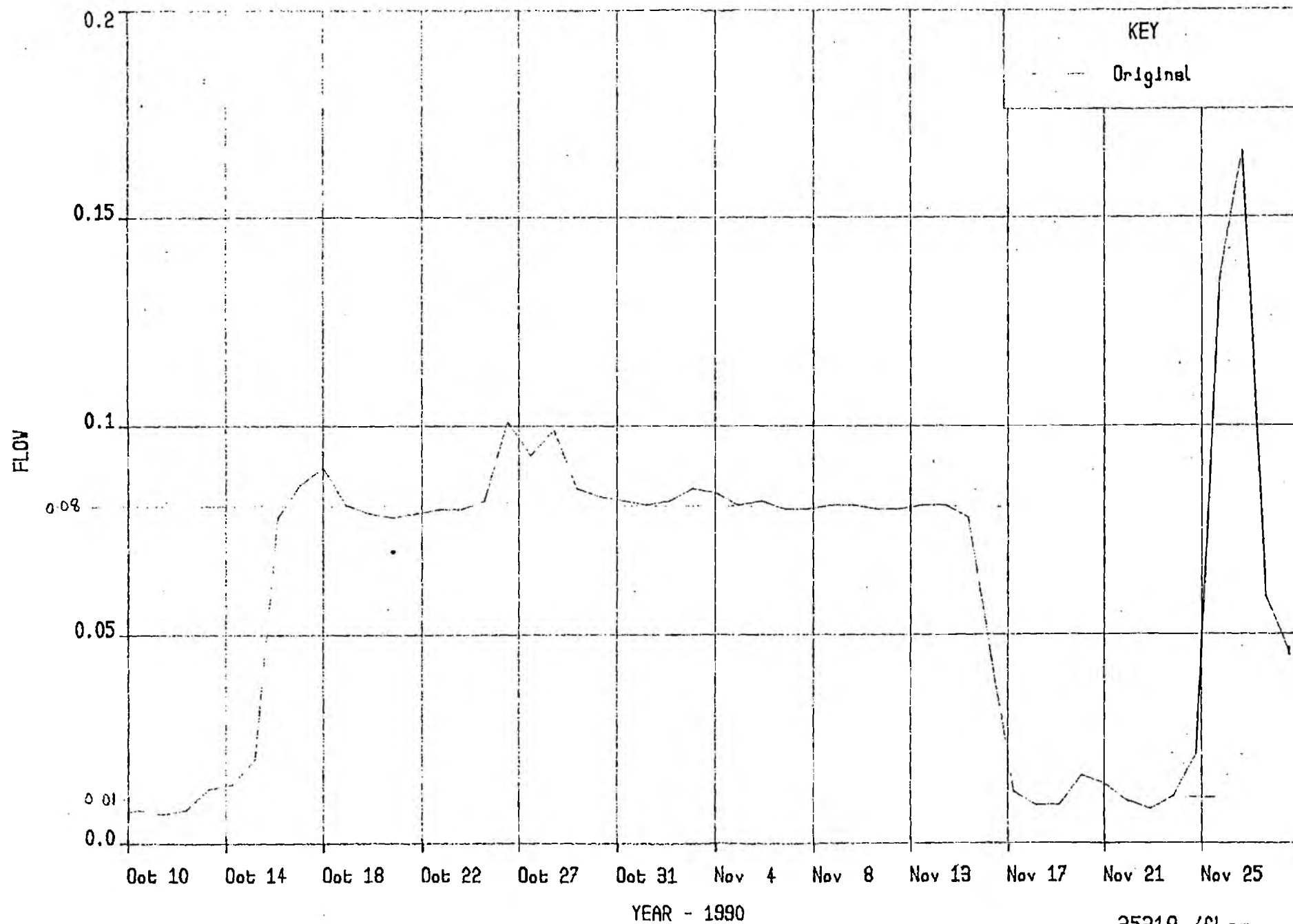
Summary of Pumping Test Discharges
to R. Deben from Augmentation Bores

Period	Source	Discharge (m^3/s)
12/7/76 to 20/9/76	Debenham STW Chalk bore [TM 179 626]	0.012, falling to 0.0075 in Sept.
23/6/76 to 20/9/76	E. Soham STW Chalk exploratory bore [TM 233 626]	0.018, falling to 0.012 in Sept.
28/3/77 to 4/4/77	E. Soham Chalk Production bore [TM 233 626]	0.087
14/8/78 to 15/11/78	- " -	0.048, falling to 0.037 in Nov.
2/8/81 to 25/8/81	Debenham Crag Borehole (exploratory) [TM 176 643]	0.024
6/6/82 to 7/6/82	Debenham Crag Production bore [TM 176 643]	0.107 (aborted due to high Fe.)
15/10/90 to 16/11/90	- " -	0.088

NB: Site at Aspell (TM 167 654)
was never developed]

D. Clarke.
17/5/94

R. DEBEN, Ashfield Crossroads



RIVER CORRIDOR SURVEY

RIVER DEBEN

Fen Street, Debenham downstream to the A1120

RIVER CORRIDOR SURVEY

RIVER DEBEN

Fen Street, Debenham downstream to the A1120

CONTENTS

Location Map

Raw Survey Data

Survey Summary

Summary of Fishery Interest

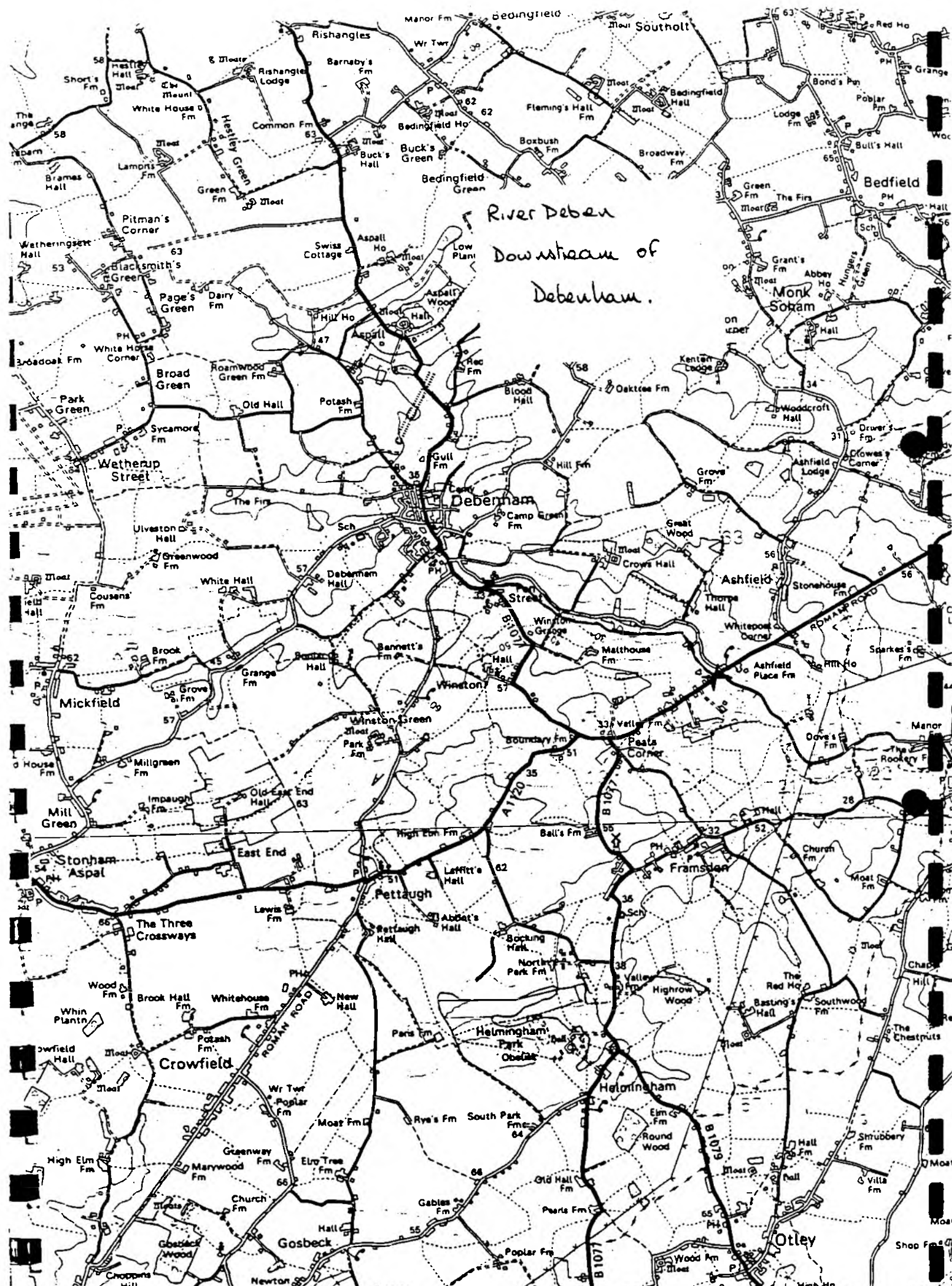
Dredging Recommendations

Dredging Map

Photographs

SURVEY : Angela Walker

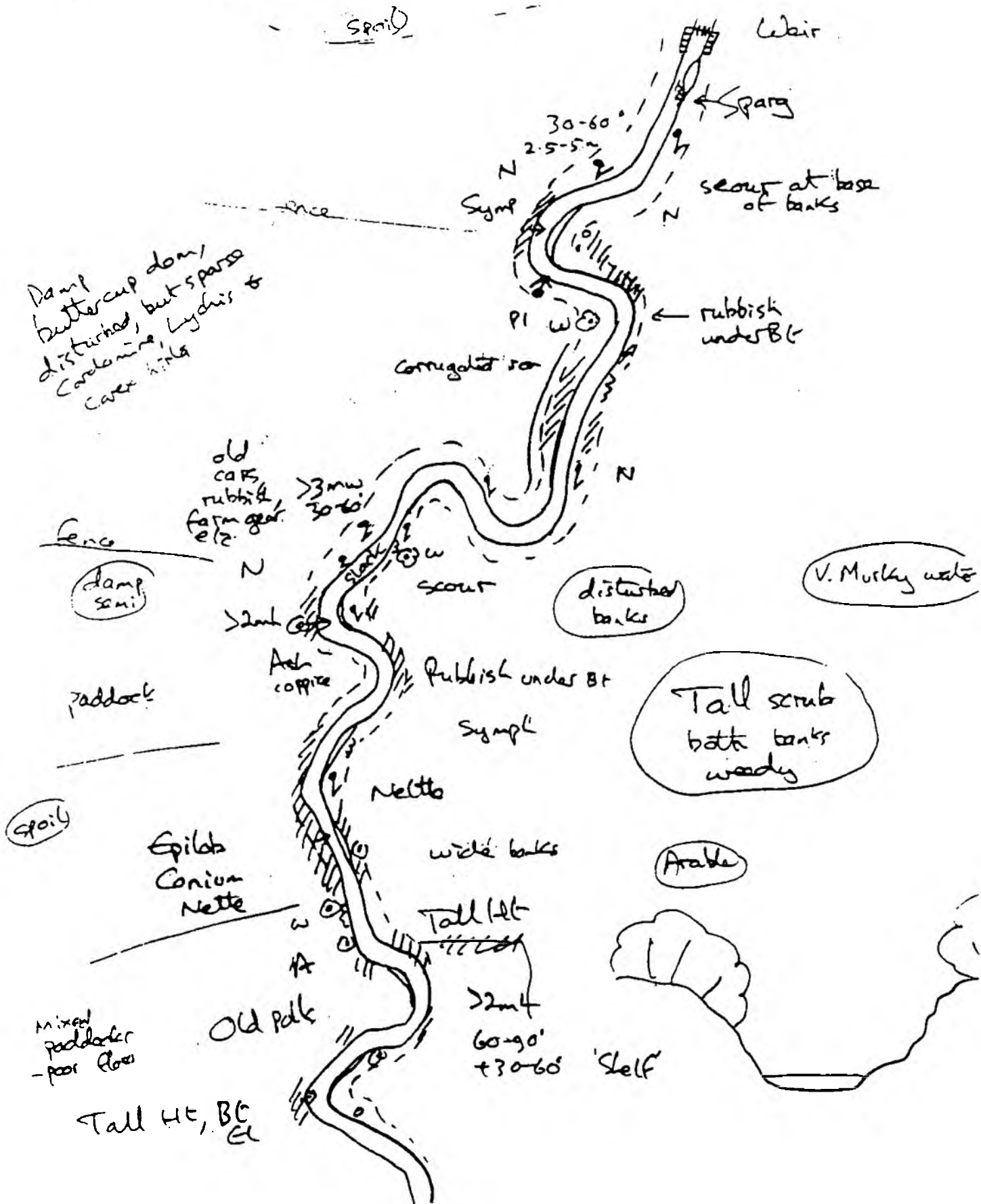
REPORT : Angela Walker



River Deben
Downstream of
Debenham.

Raw Survey Data

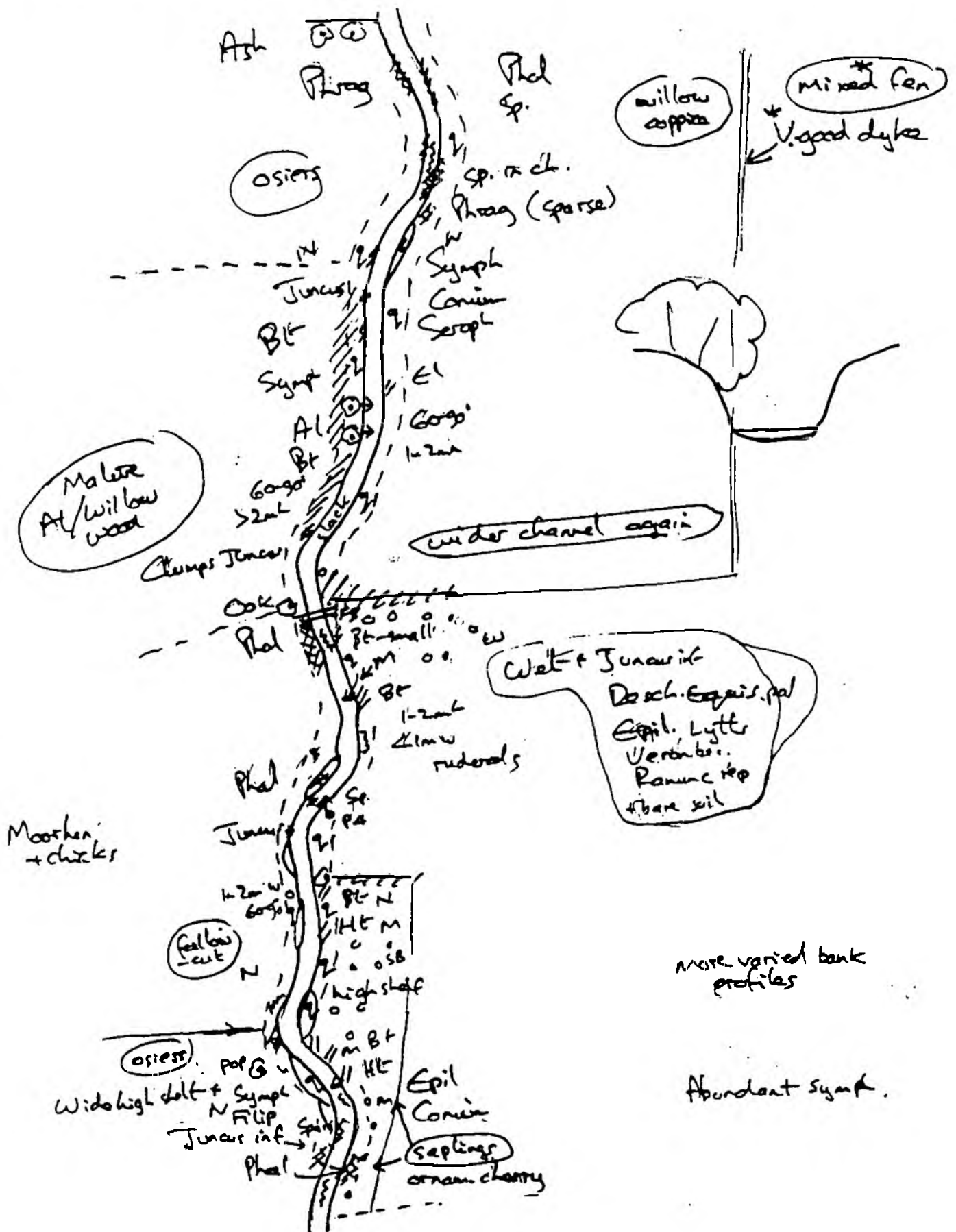
Deben @ Debenham ①



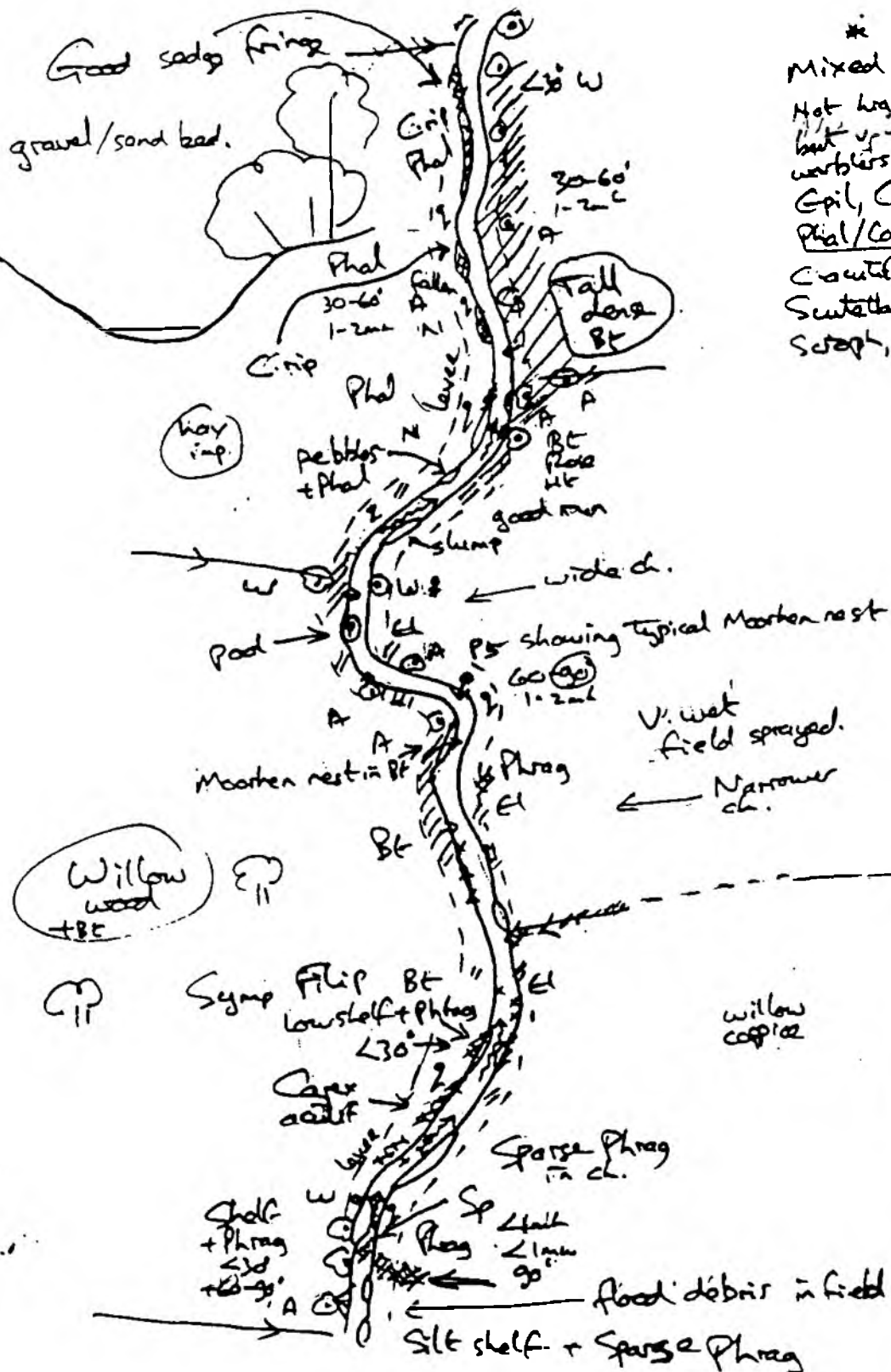
Daten @ Rebenham ②



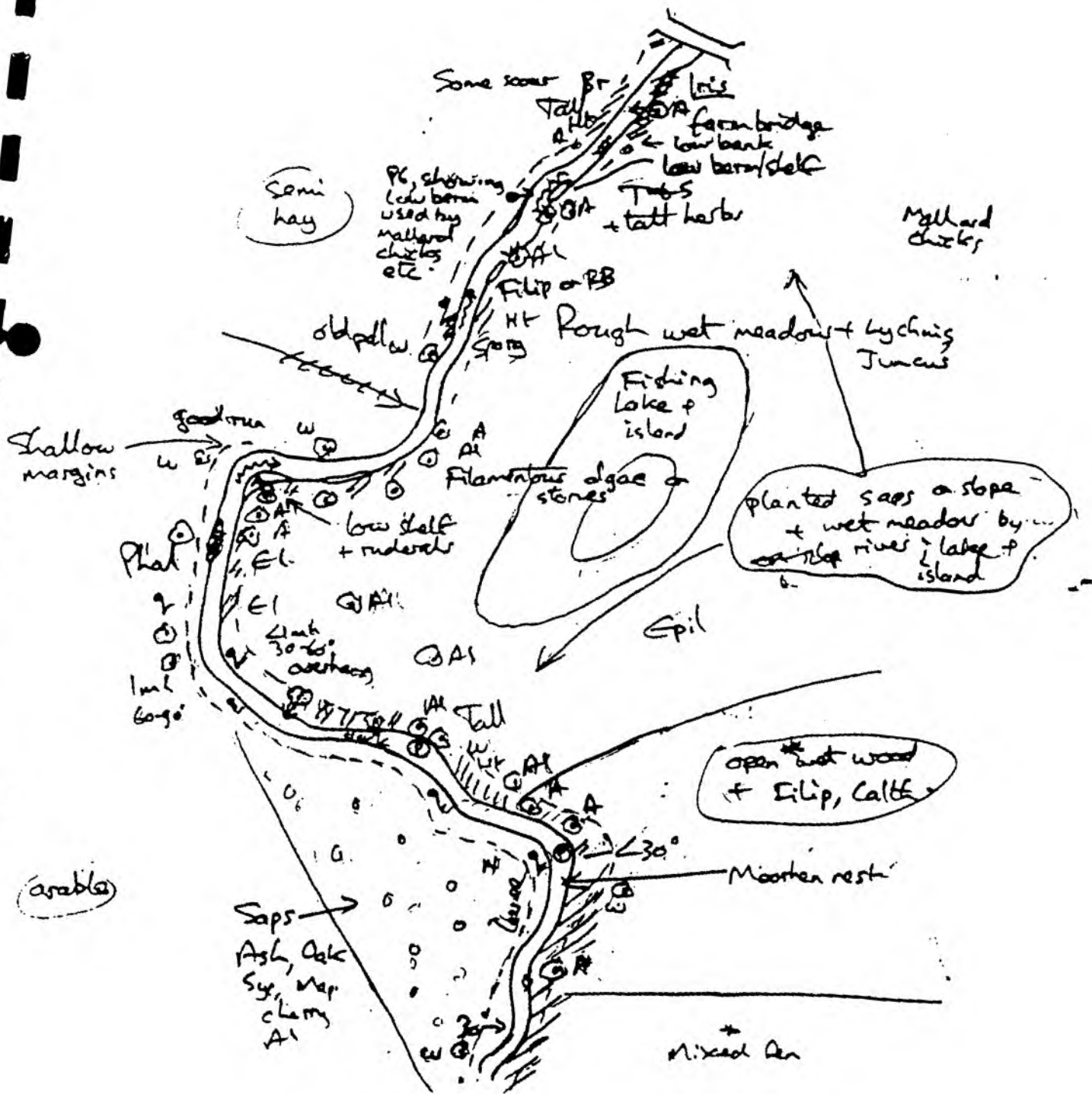
Deben @ Debenham ③



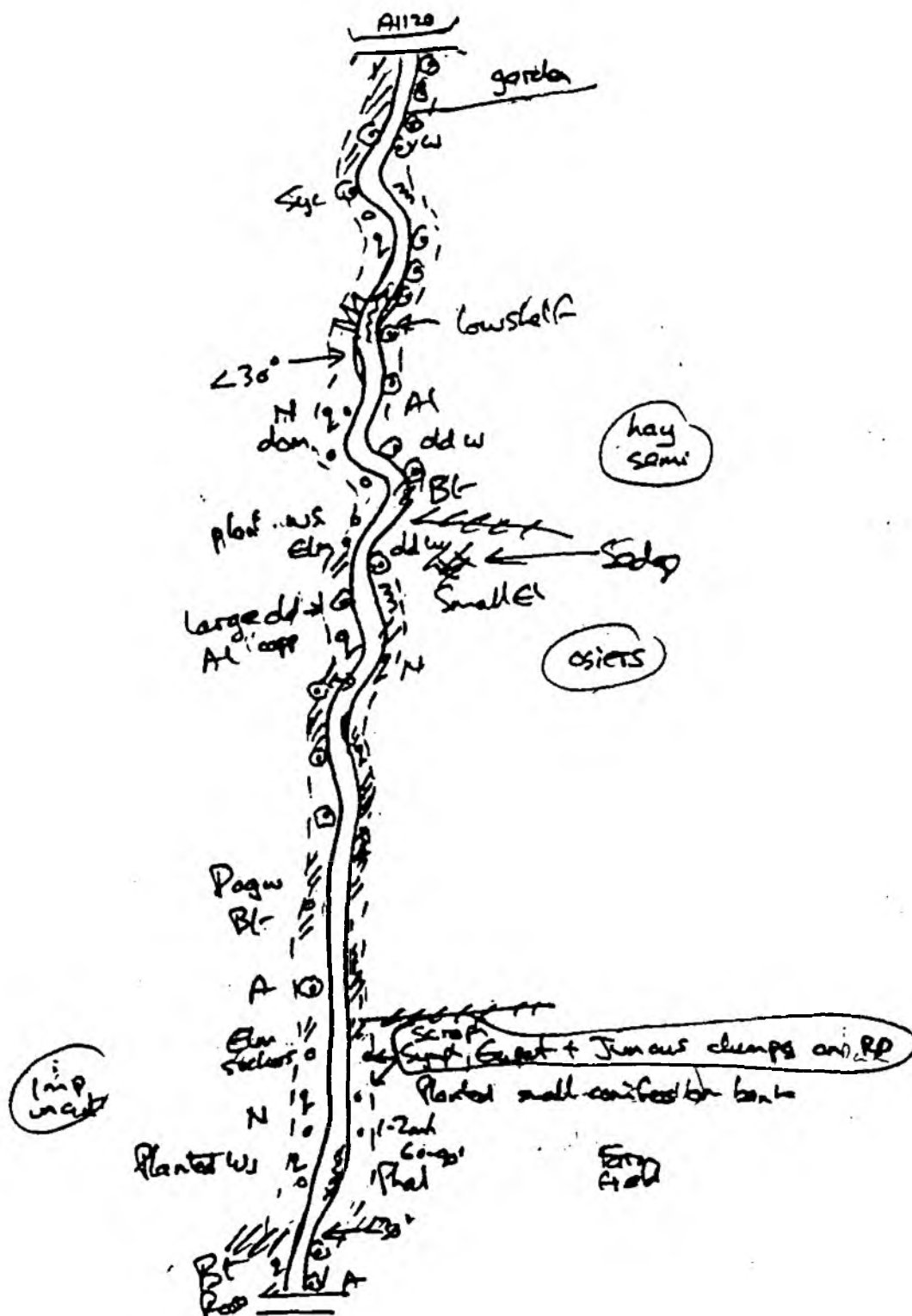
Leven @ Debenham ④



Daten @ Datenkom (5)



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RIVER DEBEN DOWNSTREAM OF DEBENHAM

Location A length of river from Fen Street, Debenham (TM 180625) to the A1120 road bridge, TM 203615.

Length Affected A 3 km. length flowing through farmland which is a mixture of pasture and hay/silage meadows, with a small acreage of arable and several working osier or willow coppices. There is some wet willow and alder woodland, one field of mixed fen adjacent to the river and an artificial lake.

Division and Personnel The Norwich Division; Paul Woodcock the RCO and Colin Beazley from the Woodbridge District Office.

Maintenance Requirements Shoal removal and some dredging using an hydraulic machine.

SURVEY SUMMARY

Adjacent Land-use The main features of wildlife interest along this section of the River Deben are the adjacent wet meadows, fen and woodland, rather than a high degree of interest in the river channel itself.

Most of the grassland is semi-improved or improved, with species such as Tufted Hair-grass (Deschampsia cespitosa) and Hairy Sedge (Carex hirta) indicative of damp soil conditions. Some areas had been recently sprayed with herbicide at the time of survey, presumably to extend the area planted with willows for coppicing. The most species-rich grassland remaining is around the fishing lake in length 5.

There are two fields with good, mixed fen vegetation. In length 3 the field also contains a reedbed and is separated from the river by a field of willow coppice and a dyke with a good flora. The fen in lengths 4/5 is adjacent to the river, separated only by a wide strip of blackthorn scrub along the bank. Species present include Water Figwort (Scrophularia auriculata), Skullcap (Scutellaria galericulata), Hard Rush (Juncus inflexus), Greater Bird's-foot Trefoil (Lotus uliginosus), Comfrey (Symphytum officinale), Great Willowherb (Epilobium hirsutum), abundant Meadowsweet (Filipendula ulmaria) and Marsh Marigold (Caltha palustris), and a dominant mixture of Greater Pond-sedge (Carex riparia) and Reed Canary-grass (Phalaris arundinacea).

On the left bank the most valuable habitat is the mature willow and alder woodland in lengths 3/4. This was not surveyed in detail but is most important as a reservoir for species which require mature timber. The waterlogged soils will provide suitable conditions for a variety of mosses, ferns and other specialist wetland plants and animals.

Banks The banks are variable in height, with the highest sections upstream of the weir (2-3m high) and greater variation from length 2 downstream. Short sections of low (<1m) or shallow (<30) bank occur. There is some scour at the base of the banks in lengths 1 and 2. The bank flora is poor overall and dominated by Nettle, Comfrey (Symphytum officinale), Great Willowherb and ruderals with sparse Common Reed and Meadowsweet. There are some small richer patches with Water Figwort, Greater Pond-sedge and Hemp-agrimony (Eupatorium cannabinum).

There are a number of shelves, some formed by slippage of steep sections of bank. Some of the shelves are low and wet and support a few species of riparian plants, mainly Reed Canary-grass and Meadowsweet. Damp, shallow banks and shelves are valuable as potential feeding areas for birds such as Snipe, and the shallow slopes are important as access points for waterbirds, particularly unfledged young.

There is extensive bankside tree and shrub cover throughout and much of the scrub is tall. A strip of dense blackthorn runs along

the right bank alongside the fen in lengths 4/5. Mature trees and shrubs provide shade over the water and low, overhanging branches suitable for nesting Moorhen and Coot. Two Moorhen nests with eggs have been noted on the field maps. The extent of tree and shrub cover is a key feature, both for the wildlife and the landscape value of the river corridor.

Margins Limited fringes of riparian vegetation are present. Reed Sweet-grass is most common, with occasional Hard Rush and Greater Pond-sedge and one clump of Yellow Iris (Iris pseudacorus). Small margins of gravel and sand are present in some of the meanders at the downstream end.

Channel The water was murky on the day of survey down to the end of length 4. This was probably the result of dredging work in progress in Debenham. No submerged vegetation was found, apart from some filamentous algae and a film of bacteria on the stones at the downstream end of the surveyed reach. There is some Branched Bur-reed (Sparganium erectum) and Common Reed in the channel in lengths 2, 3 and 4.

Upstream of the weir the river is slack, but downstream there is an alternation of small pools, slacks and several gravel riffles and runs.

SUMMARY OF FISHERY INTEREST

Downstream of the weir the river offers a variety of habitats for fish, with gravel riffles and runs and deeper slacks and small pools. Above the weir the river is slack in the surveyed section, with less variety of structure.

The limited development of marginal fringes and lack of aquatic vegetation will limit the potential of this stretch for fish. This may be due to poor water quality, influenced by the sewage outfall at the upstream end of the section. The short sections with emergent bur-reed and reed are important potential habitat for invertebrates and cover for fish fry.

Bankside reeds and herbs are important as a source of invertebrate food for fish and the overhanging trees provide and a source of food materials falling into the water.

DREDGING RECOMMENDATIONS

- 1) Both banks should ideally be left untouched throughout the section. Shallow banks and gentle slopes, where they occur, are particularly important.
- 2) Any fringes of reeds, rushes or sedges along the banks should be left untouched as these are a rare feature on this reach. In sections where emergent vegetation in the centre of the channel needs to be removed, leave a narrow fringe along one bank at least.
- 3) Vary the depth of dredging along the length of the channel as much as possible, retaining the marked pools by overdeepening and only shallowly dredging the runs and riffles, if at all, so that the gravels and fast flows are retained.
- 4) Trees and shrubs are a very valuable wildlife and landscape feature of this stretch and should be retained and worked around wherever possible. It may be necessary to cut some sections for access to the channel. This should be done so that the shade over the channel is retained, as illustrated on the summary diagram. Some low branches over the water should be retained as suitable nest sites for Coot and Moorhen. The two nests noted must be undisturbed until they are clearly no longer in use.
- 5) The preferred access bank for different sections is indicated on the summary map. This has been determined by the 'no access' areas described below. Elsewhere the preferred bank is less critical, apart from the need to retain as much as possible of established tree and shrub cover.
- 6) There are three areas of adjacent land of greater interest for wildlife; the wet woodland in lengths 3/4, the mixed fen in lengths 4/5 and the wet meadow with the fishing lake in length 5. There should be no access to or dumping of spoil in these areas, particularly the areas of fen and woodland. It is understood that the normal water-level will not be lowered and so there should be no drying out of these wetland habitats as a result of the dredging operation. The other area of fen in length 3 is set one field away from the river and therefore should not be affected.
- 7) There are two low shelves which should be retained intact if possible, or reduced in width as shown, to retain some of the value for wetland plants and waterbirds. The wide, high shelf in length 3 could be lowered to provide a further area of low shelf.

RIVER DEBEN, DOWNSTR. OF DEBENHAM. DREDGING RECOMMENDATIONS

Retain cliff

Retain shallow bank

Leave Iris on right bank

Leave shallow bank

Overdeepen pools

Leave sedge fringe untouched

Overdeepen pool

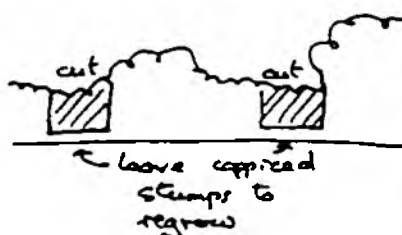
Leave low shelf + Reed

Leave sedge fringe

Wet woodland - leave untouched

Lower wide shelf

Cut gaps in scrub/trees for access, leaving variety of species & heights of bank cover



Retain richer flora on right bank

Retain shallow bank

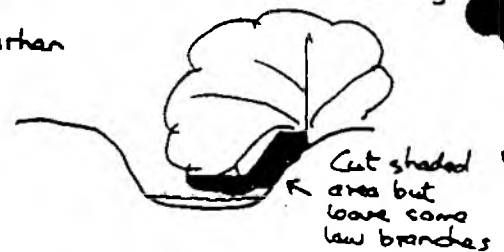
Leave half width of low shelves at least



Leave Moorten nests untouched until clearly unoccupied

Valuable wet meadows & Fen marked * - NO ACCESS OR DUMPING OF SPOIL

Cut low/obstructing branches where necessary but retain shade & some low branches for nesting Moorten



Coppice fish to rejuvenate

Overdeepen pool

Leave half width of shelf (as downstream)



RIVER DEBEN. LOUDHAM BRIDGE UPSTREAM TO WHITE BRIDGE WEIR

Location A length of river from White Bridge Weir, TM 315554, to the road bridge at TM 316545.

Length Affected A 1.5 km. length flowing through arable land, with some small blocks of wet woodland at the downstream end, much of which has suffered in the October 1987 hurricane.

Division and Personnel The Norwich Division; Paul Woodcock the RCO and Colin Beasley from the Woodbridge Office.

Maintenance Requirements Removal of silt and debris in the channel using an hydraulic machine.

DREDGING RECOMMENDATIONS

The work could be carried out from either bank in section 1 as far as the Anglian Water works. Downstream of here work should be carried out from the left bank, except for the short section upstream of the road bridge where the left bank is still well wooded. There should be NO ACCESS to the right bank and reedbed alongside the water works during the nesting season and NO ACCESS to the wet corner of the wood on the right bank in section 2.

There should be no dumping of spoil in wet hollows in the woodland, around the bases of trees, or on the reedbed in section 1.

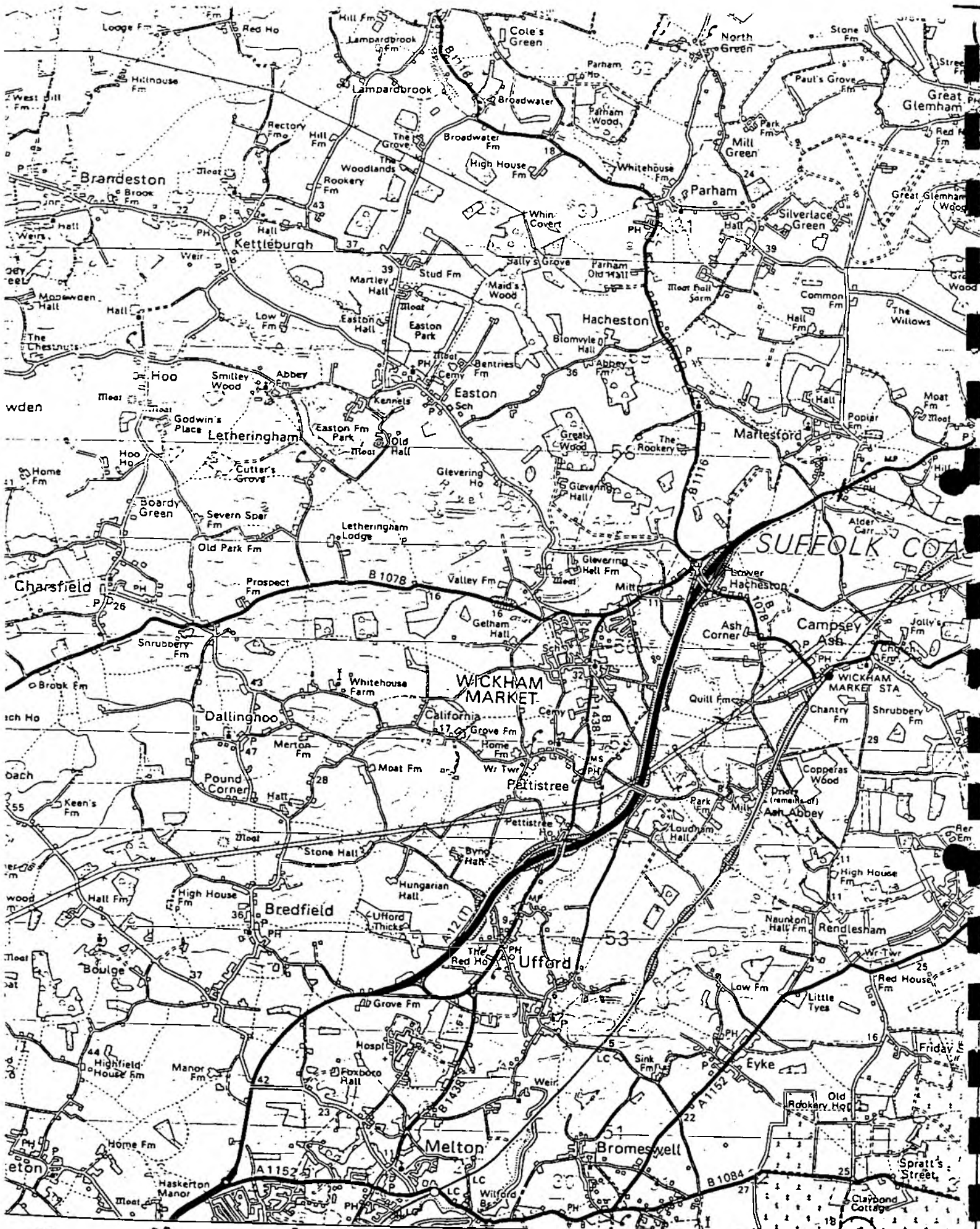
Avoid scraping or reprofiling the banks, particularly by the reedbed in section 1, except where shelf enhancements are recommended.

Retain a narrow fringe of emergent vegetation along one or both banks wherever possible. Retain marked stands of sedge, Water Plantain and Iris. Retain some water-lily and bur-reed in the channel to provide refuge for fish fry and recolonisation sources for the dredged channel.

Dredge shallows and run only shallowly and overdeepen pool in section 2 to retain variety of depth profile.

Work round the trees and shrubs along the banks wherever possible. Any low branches which are obstructing the channel should be cut so that shade over the channel is retained. Leave a proportion of low branches as nest sites for Moorhen and DO NOT remove the marked hawthorn branches (downstream end, left bank) unless the nest is clearly no longer in use. Pollard any old willows on the banks.

Carry out shelf enhancements as drawn to retain a proportion of the wet shelf habitat which exists, as this is very valuable for Mallard, Moorhen and other birds, invertebrates and small mammals.



SUFFOLK CO.

WICKHAM MARKET

WICKHAM MARKET STA

Melton

Bromeswell

Rendlesham

Woodbridge
2 km or 1 mile
A1210

Woodbridge
2 km or 1 mile
B1438

Woodbridge
2 km or 1 mile
B1084

De bar, loud han Bn ①

16.5.88

Good shallow banks to side of Road under
← Rangl ground + Nette, Road

Rough ground + Nett, Reed (spore)

Phrog → 100% in poll
Alien → 100% in poll

Alina del C (before 1900)

Sedge fringes $\rightarrow$ w/ $\rightarrow$ phal + sparse cane on fringe + sparse Phrag (Road)

pull back
P28 fringe &
ridge to down
at base back

At base → ~~Spruce~~ Fir in ch., shallow self-

Low back
Club

High
buses

Nuphar
(yellow water lily)

Numerous fallen
old willows
- pollard remains

Applicable
D. used

Maaf

At its channel

dry shales
+ fine mud/sand
to bed

БҮСЭ

Positive response

Sedge
+ debris
El + Rd
All
In diurnal

Scirpus (Clubmoss)

Sparta anserina
(unbracketed Burrod)

LB
Luna

both hawks go 1-2m h

Traps 57, 58, 59

Trim + lower PB shelf
remove 'island'

Reus + 'island' of
Phaloris
(Reed canopy-egress)

Arzabe

Plat: shelves - large.

Phal / Nupur /
+ Stagnant Rette /

Sandley, Geo
Kipfer

Philly

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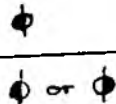
Nette dan

hanks

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RIVER DEBEN, LOUDHAM BRIDGE
DREDGING RECOMMENDATIONS ①

Retain sedge

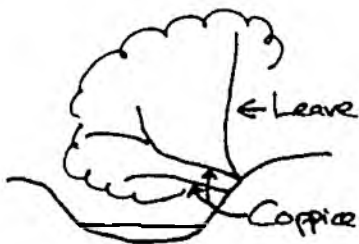


Trim low branches obstructing channel but leave some low overhanging branches wherever possible for nesting Moorhen

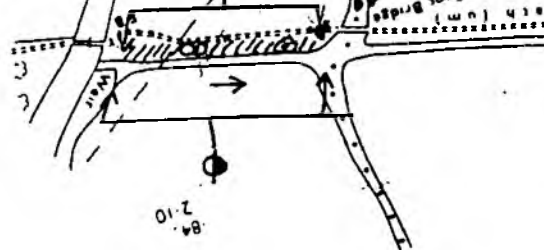
Polibird willows on right bank

Ease left bank

Coppice low overhanging willow to clear, but NB recommendation above; leave most upright stems to form standards



Leave scrub & trees untouched

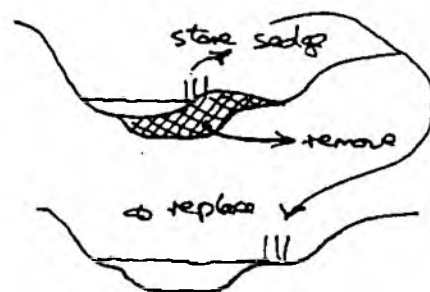


N

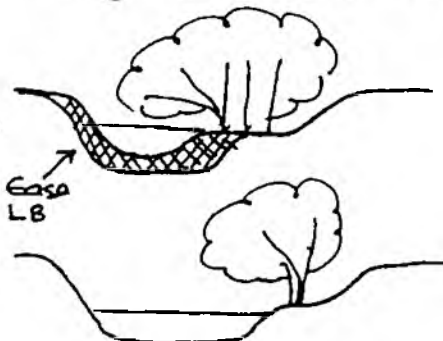
Leave right bank untouched
 Leave narrow fringe of reed along right bank.
 NO ACCESS to right bank in nesting season

Leave Water Plantain

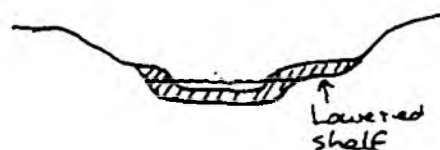
Recreate low shelf on right bank & dump sedge on new shelf



Remove outer stems of willow only & reduce shelf width

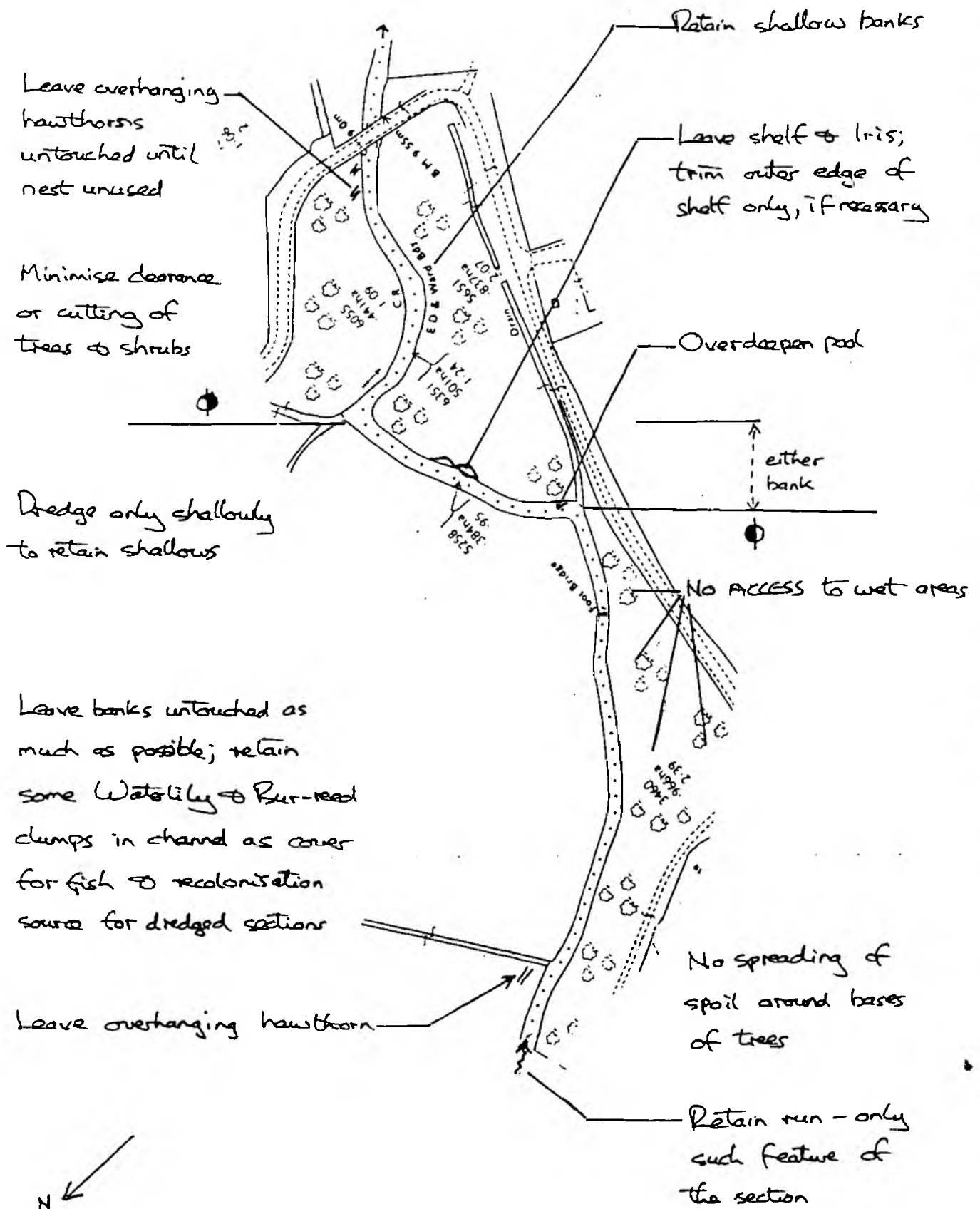


Trim shelf on left bank, trim & lower shelf on right bank & remove silt island. Dredge only shallowly downstream to retain shallows



RIVER DEBEN, LOUDHAM BRIDGE

DREDGING RECOMMENDATIONS (2)



Survey & Report : John Alder

January 1990

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Introduction
Location Map
Survey Summary
Recommendations
Photographs

RIVER CORRIDOR SURVEY

RIVER DEBEN

Debenham

RIVER DEBEN

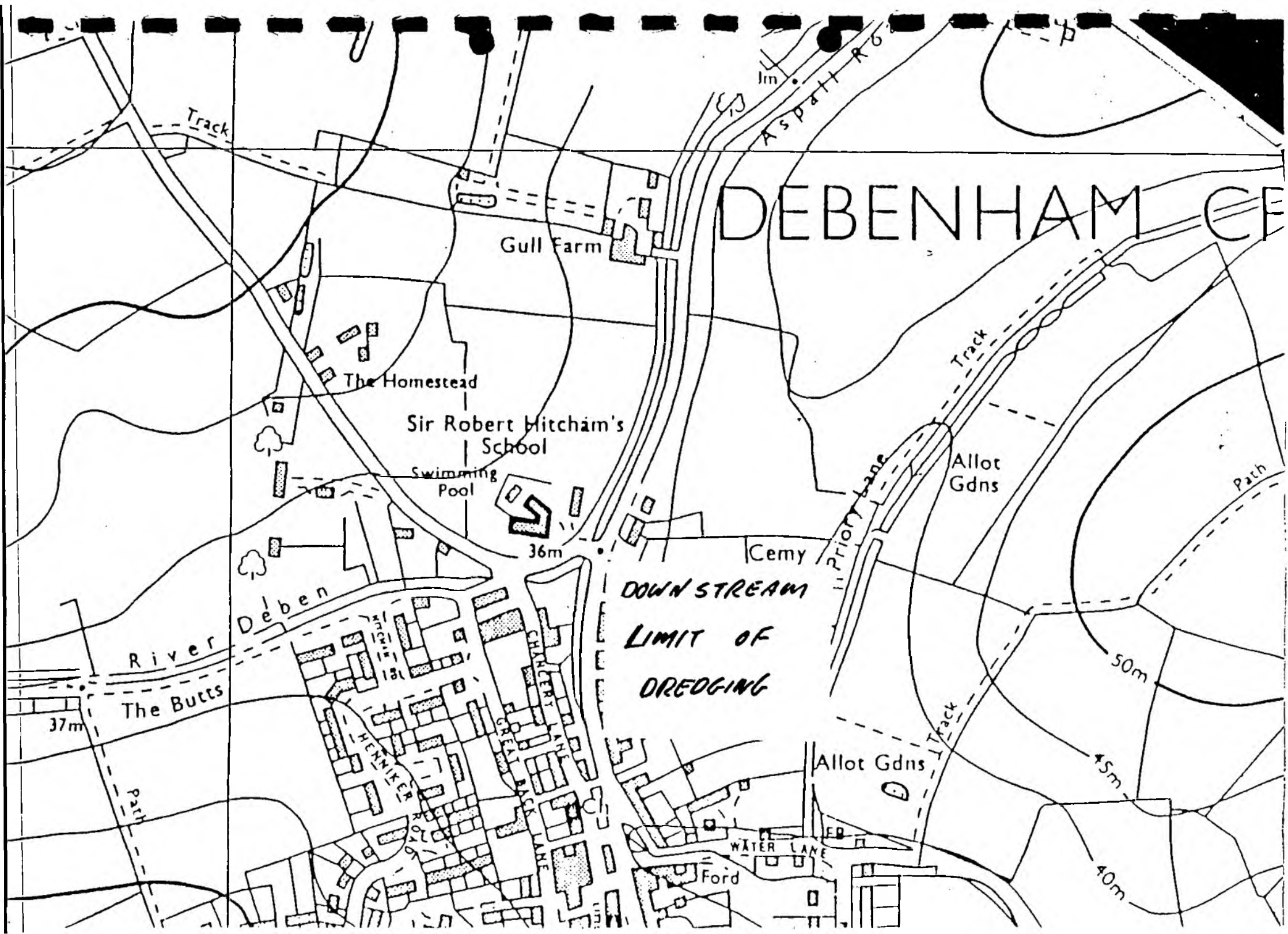
Location A 500m. length of small river at Debenham, grid reference TM 173537 to TM 174644.

Length affected The river flows alongside Aspall Road, with a playing field and arable land adjacent.

Personnel Jonathan Wortley, Fisheries and Conservation Officer, and Colin Beasley from the N.R.A. Suffolk District, Eastern Area.

Maintenance Maintenance dredging.

Survey date 22/8/89.



SURVEY SUMMARY

Adjacent Land-use The river flows alongside Aspoll Road, with a playing field and arable land adjacent.

Banks The banks are covered by tall ruderal vegetation, often dominated by Comfrey Symphytum officinale.

Margins There is no distinct marginal habitat; marginal plants included stands of Fool's Watercress Apium nodiflorum and Amphibious Bistort Polygonum amphibium.

Channel The channel was completely dry at the time of the survey, (see photographs), with some areas completely covered by Canary-grass Phalaris arundinacea.

RECOMMENDATIONS

This length of the river would be ideally suited to the creation of a two-stage channel; a narrowly dredged channel for normal flows would maintain itself relatively free of 'reed' growth, whilst the 'berm' would allow flood relief and provide a 'wetland' habitat for marginal plants.

The 'lagoons' at the end of the length upstream of the footbridge should be dredged out to reinstate them as 'pools' for periods of low flow.



River Deben. View upstream from bridge



River Deben. View downstream from bridge



River Deben. View upstream from footbridge



River Deben. View downstream from footbridge

RIVER DEBEN

Location Rural scene on the edge of a village location in an area of great landscape importance and conservation sensitivity.

Length affected Three separate stretches of the same river. The upper stretch is the 1.5km length of river upstream of the bridge and guaging station (to). The middle stretch is the 0.5km length upstream of where the old defunct section of the river begins and where the channel is diverted to Ufford Mill (from to). The lower section is the natural watercourse whic is effectively by-passed by the mill channel at present (to).

Division and Personnel Ken Jones the RCO and Colin Beasley of the Woodbridge area office of the Norwich Division.

Maintenance requirements All three stretches require dredging. However since each section has totally different problems each requires different degrees of management. For this reason each of the sections will be discussed separately.

Upper stretch

Maintenance requirements There is a general requirement to remove shoalling from within the channel as well as marginal encroachments and cattle trampled areas at the edge of the river which restrict flow. The severity of dredging will be related to the extent of restrictions to flow and work will be not restricted to exclusively one bank.

Survey summary

Adjacent land-use and river type This section of river is very different from the rest of the river surveyed. It flows through predominately arable land but upstream of the guaging station the banks are lower and improved grassland replaces arable cultivation. A small fragment of woodland still remains on the left bank but this has minimal nature conservation significance.

The river, despite its general slack nature for much of its length, has a gravelly substrate. It is productive and has a good mix of emergent, ²submergent and floating aquatic plants.

Banks The earth banks are generally sloping at 45-50 degrees and 1-2m high. However on passing downstream the banks become shallower and inclined at a shallower slope; shallow slopes also occur where the banks have slipped, been trampled, or where marginal gravels have accumulated. The banks are predominately open except in the upper half of the section where some trees and shrubs remain. The base of the majority of the banks are dominated by Reed Canary-grass (Phalaris arundinacea) and Reed Sweet-grass (Glyceria maxima) and the upper slopes are colonized by invasive tall herbs of little intimate association with the river. The most interesting and diverse communities occur on the wider, shallower, banks. In length 1 the Common Reed (Phragmites australis) is important on both banks; since this provides very important habitats for both birds and invertebrates it warrants special attention.

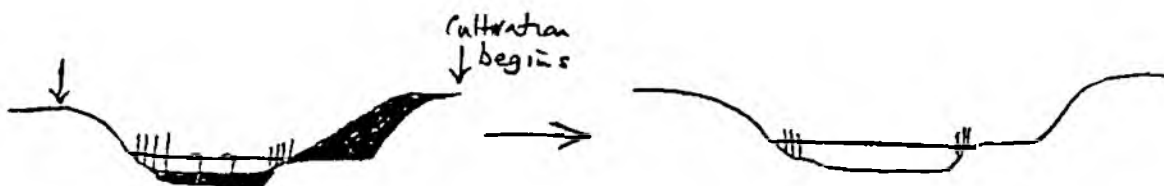
Margins These are a main feature of the conservation interest of the stretch (and engineering problem). Their interest and extent increase on passing downstream and some shelves are up to 5m wide. The wet margins are not exceptionally rich botanically but the floral stands do provide very important habitats for the fauna of the river.

Channel The channel exhibits good structural variety with the shoals and encroaching margins constricting the flow to create fast riffles between the areas of slack water. Slack water dominates the river in the lower reaches where there is a retained head at the guage. Because of this the lower length surveyed contrasts with the upper 2 lengths. In the slack lower length lilies (Nuphar lutea) dominate the flora whilst in the upper two lengths the flora is more diverse with emergent reeds and lilies in the slacker waters being interspersed with crowfoots (Ranunculus) and Starworts (Callitriche) in the riffles. At the left-bank inflow between lengths 2 and 3 there is a patch of Mare's-tail (Hippuris vulgaris).

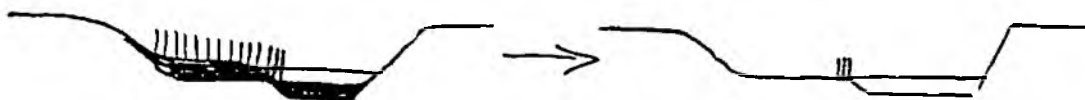
Summary of interest There are no habitats adjacent to the river which are important for nature conservation. There is limited tree and shrub cover along the banks and these decrease on passing downstream. Valuable marginal fringes have developed along long stretches of bank and there is good structural variety within the channel.

Optimum approach to dredging There is no restriction to dumping of spoil and the upper parts of the banks have little interest. Special sensitivity is thus required for the lower parts of the banks and the more physically diverse sections of river channel. Attention to the following, and skillful execution of the ideas by the machine operator, should ensure that the identified interests are retained or the right conditions created for their re-establishment.

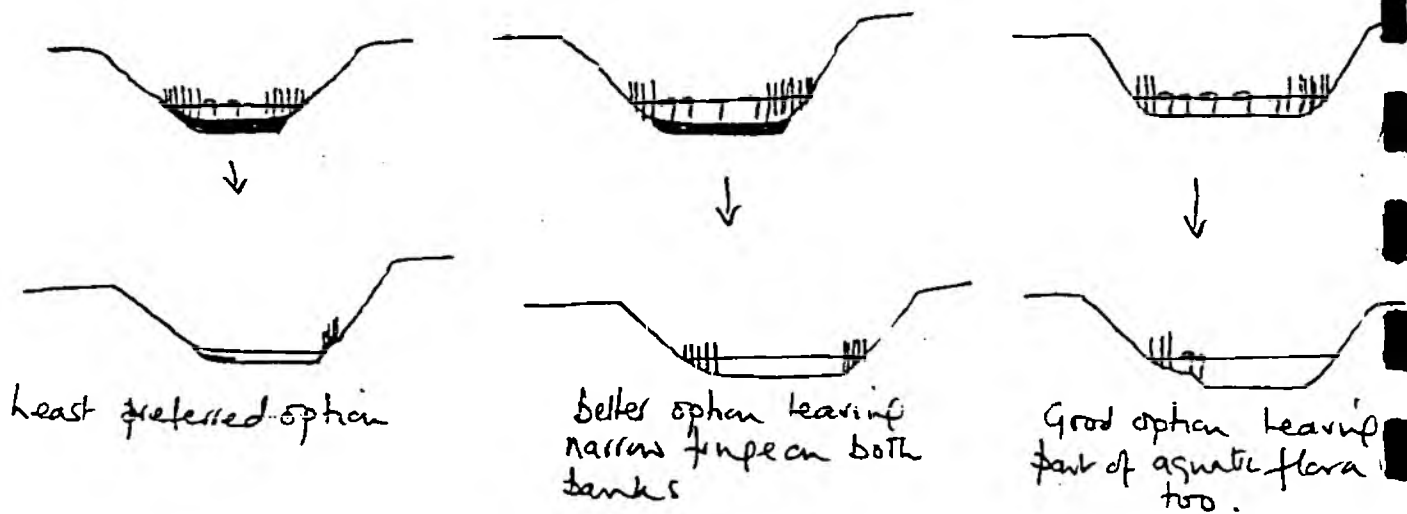
- 1) Alternate working banks to retain the existing shrubs and trees.
- 2) Retain the Common reed stands in their entirety on the banks where shown on the summary drawing.
- 3) Develop the nature conservation potential of the wide banks which are not under cultivation. Since much of the dredging will be aiming to remove the encroaching marginal fringes, these wide banks offer an opportunity to create similar habitats without conflict with either efficient drainage or land-use. The method of construction is shown below.



- 4) When removing the widest, and most constricting, marginal fringes there should be an opportunity to re-create a narrower and shallower edge to ^{the} river to enable plants to establish themselves after the dredging. The preferred bank profile is shown below.



- 5) Where the steep banks have not been poached by cattle and pushed into the river there are still often good, yet very narrow, marginal fringes which should be retained in part. It is suggested that the minimum requirement is the retention of a narrow fringe on one bank; however it would be preferable to retain the outer edge of both banks. An equally good approach is to have little regard for one bank and retain the majority of the opposite bank fringe together with elements of the inner aquatic flora. This latter method ensures that the submerged, as well as the fringing emergent, flora is retained. The possible options of operation are shown below.



6) There is a need to retain the riffle/slack sequence which at present exists in the river. It is recommended that their recreation is attempted where they at present occur. Recreation methods may adopt the use of either leaving localised constrictions to increase velocity or utilize over-deepening of slacks to ensure the riffles remain shallow. The following illustrate.

- ① Constriction on wide bank. ② h.s. showing variation in profile



Agreed approach

Evaluation of approach adopted

Cost and resource implications

Middle stretch

Maintenance requirement This stretch requires little attention. There is a need to remove soft silts from the lower parts of the stretch and gravel shoals from the upper parts. At the end of the stretch a new structure will be built to ensure the improved main river channel carries the majority of the water to release pressure on the mill channel.

Survey summary

Adjacent land-use and river type The river flows through semi-improved wet pasture which has been sprayed to encourage grasses but has remained poorly drained. The area is also traversed by a series of dykes. The adjacent land has limited botanical interest yet the damp pasture will be inevitably valuable for birds and invertebrates.

The river has a gravel structure which has been overlain by silts in the slack water areas influenced by back-up from the Mill. The flora expression is thus one related to an uncharacteristically sluggish nature and not one associated with a gravel bed.

Banks Trees occur commonly along the right bank and native alders dominante. Where the banks are not shaded they support a good reed flora with a considerable amount of this assemblage extending up the bank. An important ledge on the left bank and a bank of Common Reed on the right bank are noteworthy and these are shown on the length sketch.

Margins The margins of this section of river are less important than they are in many others because much of the interest which is normally confined to the edge of the river actually extends up the bank in this part of the Deben. The margins are thus usually an integral part of the lower bank flora.

Channel There are no notable features within the channel itself, the slack current velocity creating the ideal habitat for the Yellow Water-lily.

Summary of interest A good stretch of river with little of special note save the identified interests of the shallow margin, Common Reed stand and general floral richness of banks with its tree cover.

Optimum approach to dredging

Since a light dredge only is required there should be no reason why the identified interests should be threatened. By working from the left bank the trees, reeds and marginal fringes of the right bank will be left in their entirety. Providing the dredging of the channel only removes deposits of silts some rootstock of the plants found should be retained for future development. Overdeepening of the upstream gravels is not recommended and as much of this as possible should be left to develop its full riffle potential.

Special efforts should be made to retain the full extent of the Common Reed stand on the right bank.

It would be preferable to leave the left, working, bank undisturbed. If some reprofiling is needed it should be achieved by leaving the base of the marginal fringe intact. On the wide shallow shelf area the spoil needs to be thrown clear of the shelf and this wide and important habitat left undisturbed.

A summary of the desired method of executing the dredging operation is given on the sketch of the 0.5km length.

Considerable local disturbance is expected at the end of the stretch when building the new structure.

Agreed approach

Appraisal of approach adopted

Resource and cost implication

~~Willow~~ Lower
stretch

Maintenance requirement To considerably upgrade the capacity of length 5 and remove the encroaching and cattle-poached edges of lengths 6 and 7. Considerable excavation being required for the former whilst the latter involves considerable, but less drastic, re-instatement of the river's former carrying capacity.

Since length 5 is no more than a ditch (see drawing summarizing length features) and is required to be increased in size dramatically it will be dealt with separately.

Adjacent land-use and water-course characteristics Although main river, this is no more than a very shallow ditch with a few marginal trees and reeds in the channel. In no part of the watercourse is there a greater gap between trees than 2m. The ditch flows through semi-improved damp pasture with little botanical interest.

Optimum approach to dredging There is a need to cut a completely new watercourse following the general course of the present ditch. As many of the trees as possible should be left but unless there is some significant land take trees will have to be removed from one bank. Possible options are indicated on the summary drawing of the ditch.

Since there is a need for land-take and a totally new cut to be taken there is scope to create a channel profile which is in harmony with the outstanding landscape features of the valley here. There is a need to vary the depth characteristics to create pools, riffles and slacks as well as ensure bank profiles are not harsh and steep. When cutting branches from the old Willows some stakes (5-15m diam.) should be banged into one bank to create an attractive landscape, cover for animals, and a channel requiring less future management.

These ideas are summarized on the drawing of length 5.

Agreed approach

Appraisal of agreed approach

Resource and cost implications

Adjacent land-use and river type (lengths 6-7) The majority of the land is damp, semi-improved grassland but on the right bank at the end of the reach there is an overgrown wt woodland of nature conservation significance. The river is overgrown from the edges by encroaching reeds. This has been accentuated by years of cattle poaching.

Banks In length 6 the banks are open and totally dominated by reeds. Their very shallow nature and high water table enable Reed Sweet-grass (Glyceria maxima), Reed Canary-grass (Phalaris arundinacea) and Great Pond-sedge (Carex riparia) to thrive and encroach almost across the whole watercourse. Length 7 supports trees in addition to the choking reed growths and these are more common on the right bank. Despite the very shallow edges they do not support the richness of flora that is normally associated with such important habitats. This probably results from a combination of lack of competitiveness against the robust reeds and spraying.

Margins The shallowness of the banks makes these synonymous with the shallow banks and so they are not a distinct habitat.

Channel The channel is silted and at least half its area is occupied by marginal reeds which have even closed the channel in places. Habitat variety is thus limited.

Optimum approach to dredging Dredging will disfigure this stretch of river in the short term but there is no reason why a full and rapid recovery should not be made. The following are recommended.

- 1) Work from only one bank. In length 7 this must be the left bank. When working from the one bank lean across the river and remove all but the narrowest fringe from the far bank.
- 2) Work around all large trees on the working bank and where possible cut, and lean over, bushes so that they will regrow.
- 3) Produce as variable longitudinal profile as possible to create some riffles interspersed amongst the slacks. This will not only enhance nature conservation but also be good for water quality.
- 4) Retain as much of the stand of Common Reed as possible - the locality is indicated on the summary drawing.

5) Create the margin of the working bank as shallow as possible. A combination of a narrow under-water shelf together with a shallowly sloping water-logged soil margin would be ideal. Removal of all the reeds is desirable since this will create an open aspect which can be colonized by marshland species which at present cannot get a hold.

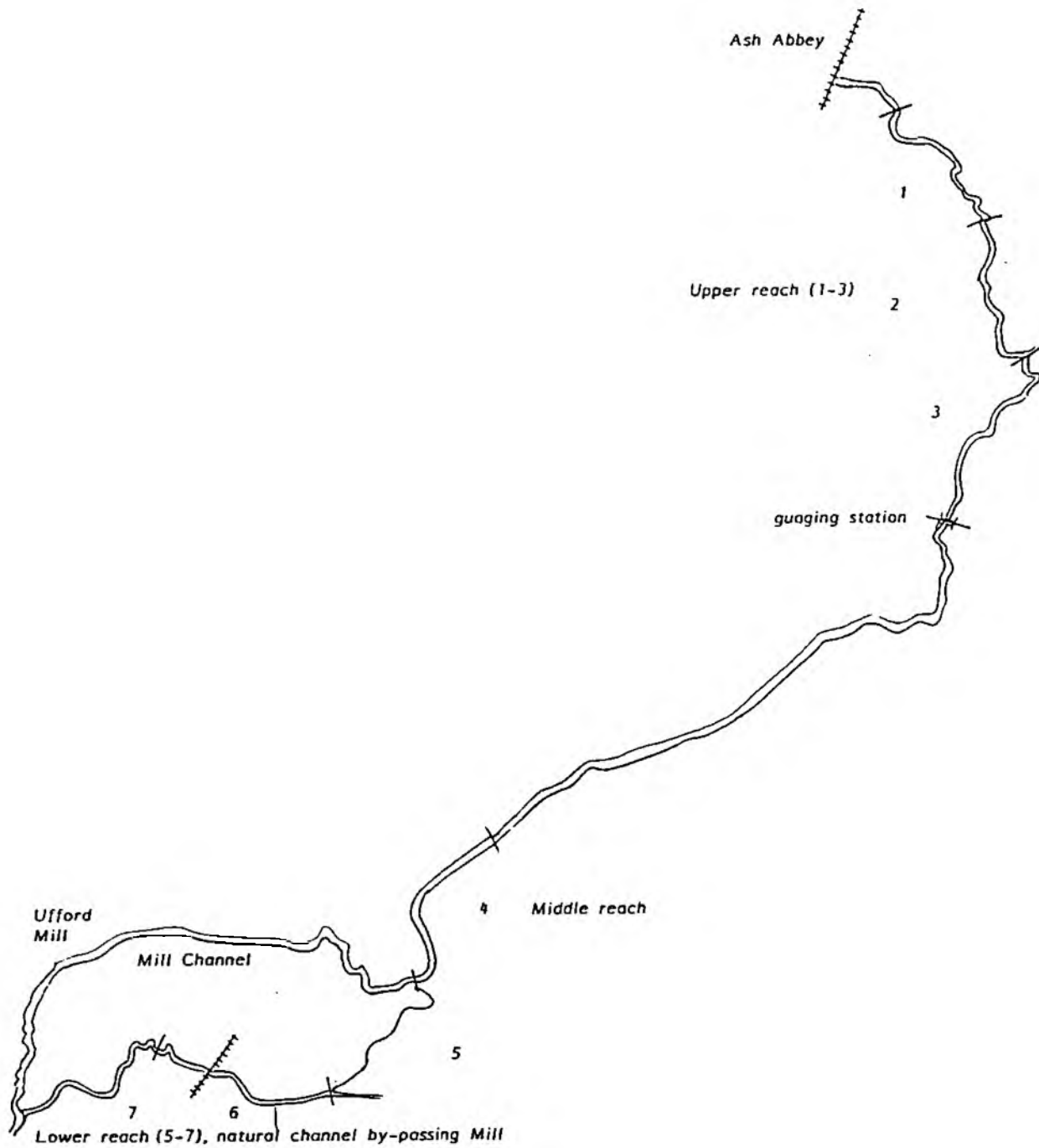
Some of these ideas are shown pictorially on the summary drawing.

Approach adopted

Appraisal of adopted approach

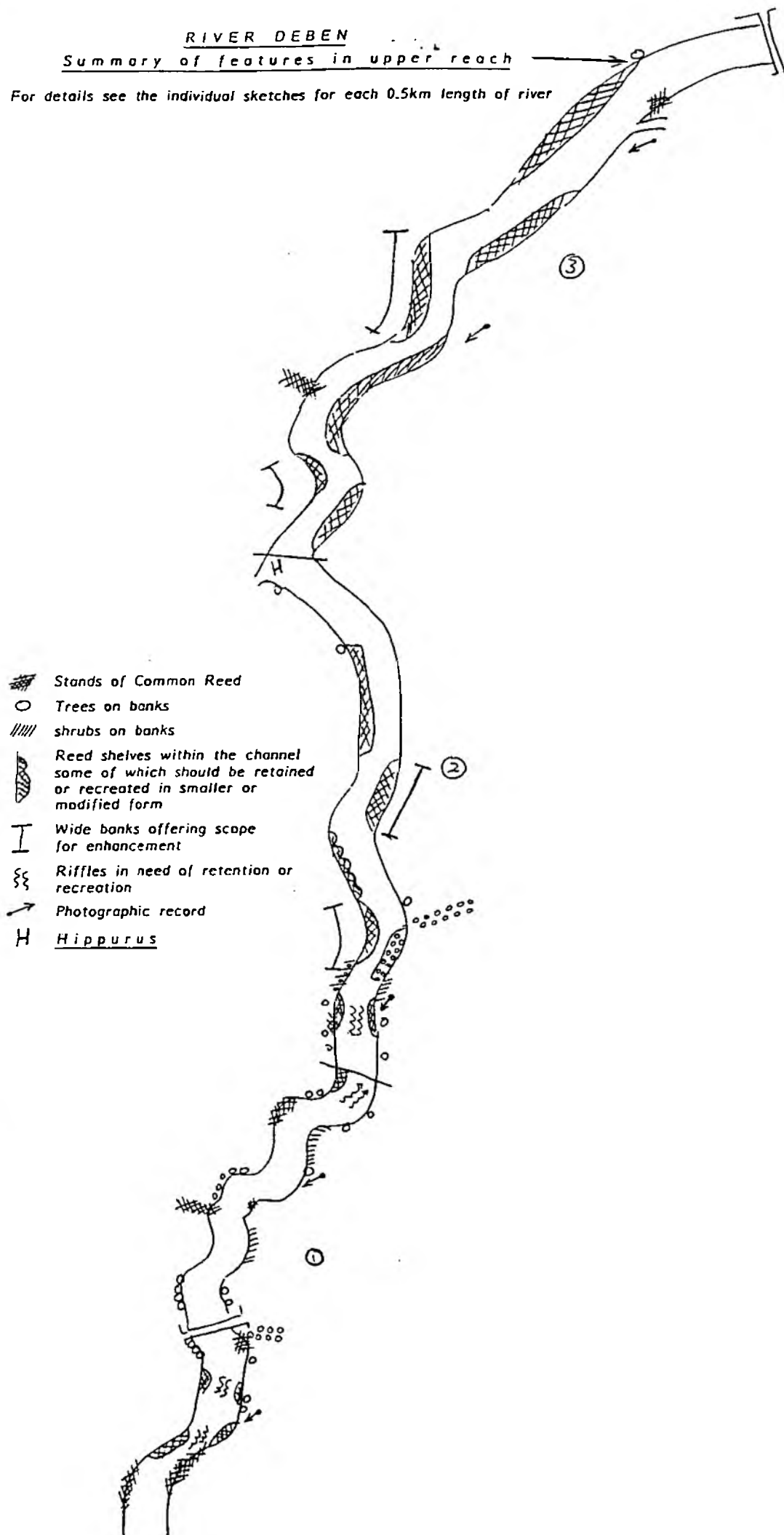
Resource and cost implications

RIVER DEBEN



RIVER DEBEN Summary of features in upper reach

For details see the individual sketches for each 0.5km length of river



A. WOODLAND & SCRUB

- | | |
|--------------------------------------|---|
| 1. Broad-leaved semi-nat. plantation | 5 |
| Coniferous semi-nat. plantation | 5 |
| Mixed semi-natural plantation | 5 |
| 2. Scrub - dense | 4 |
| scattered | 2 |
| Carr - alder-willow | 7 |
| 3. Parkland | - |
| 4. Recently felled wood | - |

B. GRASSLAND & MARSH

- | | |
|---------------------------|---|
| 1. Acidic unimproved | 5 |
| semi-improved | 2 |
| Neutral unimproved | 7 |
| semi-improved | 3 |
| Calcareous unimproved | 5 |
| semi-improved | 2 |
| 4. Improved/reseeded | - |
| 5. Marsh/marshy grassland | 7 |

C. TALL HERB & FERN

- | | |
|----------------------------|---|
| 1. Bracken | 3 |
| 2. Upland spp. rich veget. | 5 |
| 3. Other - tall ruderal | 3 |
| non ruderal | 3 |

D. HEATHLAND

- | | |
|--------------------------|---|
| 1. Dwarf scrub - dry | 3 |
| wet | 7 |
| 3. Lichen/bryophyte | 3 |
| 4. Montane | 3 |
| 5. Heath/grassland - dry | 3 |
| 6. wet | 7 |

E. MIRE, FLUSH AND SPRING

- | | |
|----------------|---|
| 1. Mires - bog | 7 |
| Fen - reed | 7 |
| sedge | 7 |
| sweet-grass | 7 |
| mixed | 7 |
| 2. Bog flushes | 5 |

F. SWAMP/INUNDATION

- | | |
|----------------------------|---|
| 1. Swamp - single sp. dom. | 7 |
| Tall mixed assemblage | 7 |

LEFT BANK

RIGHT BANK

RIVER

Km No.

Date

Surveyor

G. OPEN WATER

- | | |
|-------------------------------|----|
| 1. Standing - canal + canal = | 2 |
| ditch | - |
| dyke | 13 |
| pond, pool, cut-off | 13 |
| lake | 13 |
| gravel pit | 13 |
| reservoir | 1 |
| marina | - |
| 2. Running | |
| stream < 1m wide | 1 |
| 1.5m | 1 |
| 5-10m | 1 |
| > 10 | 1 |

I. ROCK

- | | |
|---------------------|---|
| 1. cliff | 1 |
| scree | 1 |
| limestone pavement | 1 |
| cave | 1 |
| other | 1 |
| 2. artificial waste | - |

J. MISCELLANEOUS

- | | |
|----------------------|---|
| arable | - |
| amenity grassland | - |
| ephemeral/short herb | - |
| hedge + | 2 |
| hedge = | 3 |
| fence on bank | - |
| fence set back | - |
| wall | - |
| building | - |
| caravans | - |
| fish farm | - |
| silage clamp | - |
| sewage works | - |
| garden | - |
| stick pile | 1 |
| flood debris | 1 |
| road | - |
| railway - disused | 2 |
| used | 1 |
| other | - |

LEFT BANK

RIGHT BANK

60

100 42

BANK FEATURES

	shelf	**5
	solid earth cliff	2
	soft earth cliff	*5
	rock cliff	2
	artificial	-
FB	flood bank adj.	-
FB	flood bank set back	-
	levee	-
Height	< 1m	**5
	1- < 2m	2
	> 2m	1
Width	< 1m	1
	1- < 2.5m	2
	2.5- < 5m	3
	> 5m	*4
Slope	< 30°	**5
	30- < 60°	1
	60- < 90°	1
	> 90°	(*)3

	mud	1
	sand	1
	bare shingle	1
	vegetated shingle	1
	earth	1
	natural cobbles	1
	natural boulders	1

BANK VEGETATION

	Conifer	1-5
	Oak, Ash, Sycamore	1-5
P	Willow - recent pollard	1-5
W	Willow old, not pollard	1-5
S	Standard willows	1-5
A	Alder	1-5
	Other trees	1-5
	Young trees	1-5
	Thick Scrub/shrubs	3
	Sparse Scrub/shrubs	2
	Reed/Sedge	*4
	Dense open	2
	Sparse open	1
	Reseeded or mown	-
	Exposed tree roots	3

ISLANDS

	Rocky, vegetated	2
	rocky, + bare	1
	shingle and rock	2
	shingle, rock + veg.	3
	earth - maturing	3
	earth - with trees	5
	developed	-

LEFT BANK

RIGHT BANK

RIVER HABITATS

	bridges/500m	-
	weirs/500m	-
	locks/500m	-
	inlet/500m	*3
Depth	< 25m	1
	25- < 5	1
	0.5- < 1.0	1
	> 1.0m	1

Width	< 1	1
	1- < 5	1
	5- < 10	1
	10- < 20	1
	> 20	1

Substrates

BR	bed rock	1
b	boulders	1
c	cobbles	1
p	pebbles	1
g	gravel	1
s	sand	1
+	silt/mud	1
	clay	1
	peat	1

Habitats and Flow

	pool	1
	slack	1
	riffle	1
	rapids	1
	run	1
	waterfall	1
	protruding rocks	1

Margins

	shingle ± bare	1
	shingle, vegetated	1
	mud	1
	sand	1

FLORA

	emergent veg < 1m wide	1
	emergent 1-2m wide	2
	emergent > 2m wide	3
	total veget. area	-
B	bryophytes	-
E	emergents	-
A	submerged	-
F	floating	-
	algae	-

RIVER

60
30
10

100

70
2020
60
2020
10
30
20
1040
30
20

A. WOODLAND & SCRUB		LEFT BANK	RIGHT BANK	RIVER		BANK FEATURE		RIVER HABITATS	
				RIVER	Km No.	BANK FEATURE		RIVER HABITATS	
1. Broad-leaved semi-nat. plantation	5			RIVER	DEBEN	shell	5	bridges/500m	
Coniferous semi-nat. plantation	2			Km No.	3	solid earth cliff	2	weirs/500m	
Mixed semi-natural plantation	5			Date	27.8.85	soft earth cliff	5	locks/500m	
Scrub - dense	4			Surveyor	N. Holmes	rock cliff	2	inlet/500m	3
Scrub - scattered	12					artificial		Depth < 25m	25
Can - alder	7					FB flood bank adj.		.25 < .5	45
Can - willow	7					FB flood bank set back		0.5 < 1.0	20
Parkland						levee		> 1.0m	10
Recently felled wood						Height < 1m	5	Width < 1	
						1 < 2m	2	1 < 5	
						> 2m	1	5 < 10	100
						Width < 1m	1	10 < 20	
						1 < 2.5m	2	> 20	
						2.5 < 5m	3		
						> 5m	4		
						Slope < 30°	5	Substrates	
						30 < 60°	1	BR bed rock	
						60 < 90°	1	b boulders	
						> 90°	3	c cobbles	
						mud	1	p pebbles	
						sand	1	g gravel	
						bare shingle	1	s sand	
						vegetated shingle	1	+ silt/mud	
						earth	1	clay	
						natural cobbles	1	peat	
						natural boulders	1	Habitats and Flow	
								pool	
								slack	
								rifle	
								rapids	
								run	
								waterfall	
								protruding rocks	
								Margins	
								shingle ± bare	
								shingle, vegetated	
								mud	
								sand	
								FLORA	
								emergent veg < 1m wide	30
								emergent 1-2m wide	20
								emergent > 2m wide	40
								total veget. area	
								bryophytes	
								emergents	
								submerged	
								floating	
								algae	

A. WOODLAND & SCRUB			LEFT BANK	RIGHT BANK	RIVER DEBIEN			LEFT BANK	RIGHT BANK
1.	Broad-leaved semi-nat. plantation	*5 2			Km No.	4			
	Coniferous semi-nat. plantation	*5 2			Date	27.8.85			
	Mixed semi-natural plantation	*5 1			Surveyor	N. Holmes			
2.	Scrub - dense	14							
	scattered	12							
	Carr - alder.	**7							
	willow	**7							
3.	Parkland	-							
4.	Recently felled wood	-							
B. GRASSLAND & MARSH					G. OPEN WATER			LEFT BANK	RIGHT BANK
1.	Acidic unimproved	*5			1.	Standing - canal +	2		
	semi-improved	2				canal =	3		
	Neutral unimproved	**7				ditch	-		
	semi-unproved	*3	60	80		dyke	13	12	1
	Calcareous unimproved	*5				pond, pool, cut-off	13		
	semi-improved	2				lake	13		
4.	Improved/reseeded	-				gravel pit	13		
5.	Marsh/marshy grassland	**7	25	5		reservoir	1		
						marina	-		
					2.	Running			
						stream < 1m wide	1	1	
						1.5m	1		
						5-10m	1		
						> 10	1		
C. TALL HERB & FERN					1. ROCK				
1.	Bracken	3			1.	cliff	1		
2.	Upland spp. rich veget.	*5				scree	1		
3.	Other - tall ruderal	3	5	15		limestone pavement	1		
	non ruderal	3				cave	1		
						other	1		
D. HEATHLAND					2.	artificial waste	-		
1.	Dwarf scrub - dry	*3			J. MISCELLANEOUS				
	wet	**7				arable	-		
3.	Lichen/bryophyte	*3				amenity grassland	-		
4.	Montane	*3				ephemeral/short herb	-		
5.	Heath/grassland - dry	*3				hedoe +	2		
6.	wet	*7				hedge =	*3		
E. MIRE, FLUSH AND SPRING						fence on bank	-		
1.	Mires - bog	**7				fence set back	-		
	Fen - reed	**7				wall	-		
	sedge	**7				building	-		
	sweet-grass	**7				caravans	-		
	mixed	**7				fish farm	-		
2.	Bog flushes	*5				silage clamp	-		
F. SWAMP/INUNDATION						sewage works	-		
1.	Swamp - single sp. dom.	**7				garden	-		
	Tall mixed assemblage	**7				stick pile	1		
						flood debris	1		
						road	-		
						railway - disused	2		
						used	1		
						other	-		

BANK FEATURES			RIVER HABITATS			RIVER
	shelf	**5		bridges/500m	-	
	solid earth cliff	2		weirs/500m	-	
	soft earth cliff	*5		locks/500m	-	
	rock cliff	2		inlet/500m	*3	10
	artificial	-	Depth	<.25m	1	40
FB	flood bank adj.	-	↓	.25-<.5	1	40
FB	flood bank set back	-		0.5-<1.0	1	40
	levee	-		>1.0m	1	10
Height	<1m	**5	40	10		
↑	1-<2m	2	60	90		
	>2m	1				
Width	<1m	1				
	1-<2.5m	2	20	40		
→	2.5-<5m	3	80	40		
	>5m	*4				
Slope	<30°	**5	30	5		
↗	30-<60°	1	60	95		
	60-<90°	1	10			
	>90°	(*)3	<			
	mud	1				
	sand	1				
	bare shingle	1				
	vegetated shingle	1	100	150		
	earth	1				
	natural cobbles	1				
	natural boulders	1				
BANK VEGETATION			Substrates			RIVER
	Conifer	1-5	BR	bed rock	1	
	Oak, Ash, Sycamore	1-5	b	boulders	1	
P	Willow - recent pollard	1-5	c	cobbles	1	10
W	Willow old, not pollard	1-5	p	pebbles	1	20
S	Standard willows	1-5	g	gravel	1	20
A	Alder	1-5	s	sand	1	30
	Other trees	1-5	+	silt/mud	1	
	Young trees	1-5	⊕	clay	1	
	Thick Scrub/shrubs	3	Y	peat	1	
	Sparse Scrub/shrubs	2				
	Reed/Sedge	*4				
	Dense open	2				
	Sparse open	1				
	Reseeded or mown	-				
	Exposed tree roots	3				
ISLANDS			Habitats and Flow			RIVER
	Rocky, vegetated	2	Ⓟ	pool	1	10
	rocky, + bare	1		slack	1	90
	shingle and rock	2	SS	rifle	1	
	shingle, rock + veg.	3	↑↑	rapids	1	
	earth - maturing	3	↑↑	run	1	
	earth - with trees	5	↑↑↑	waterfall	1	
	developed	-	ΔΔ	protruding rocks	1	
			Margins			RIVER
				shingle ± bare	1	
				shingle, vegetated	1	
				mud	1	
			SSS	sand	1	
			FLORA			RIVER
				emergent veg <1m wide	1	60
				emergent 1-2m wide	2	10
				emergent >2m wide	3	20
				total veget. area	-	10
			B	bryophytes	-	
			E	emergents	-	20
			A	submerged	-	20
			F	floating	-	30
				algae	-	

A. WOODLAND & SCRUB

- | | | |
|----|------------------------|-----|
| 1. | Broad-leaved semi-nat. | *5 |
| | plantation | 2 |
| | Coniferous semi-nat. | *5 |
| | plantation | 2 |
| | Mixed semi-natural | *5 |
| | plantation | 1 |
| 2. | Scrub - dense | 4 |
| | scattered | 12 |
| | Carr - alder- | **7 |
| | willow | **7 |
| 3. | Parkland | - |
| 4. | Recently felled wood | - |

B. GRASSLAND & MARSH

- | | | |
|----|------------------------|-----|
| 1. | Acidic unimproved | *5 |
| | semi-improved | 2 |
| | Neutral unimproved | **7 |
| | semi-improved | *3 |
| | Calcareous unimproved | *5 |
| | semi-improved | 2 |
| 4. | Improved/reseeded | - |
| 5. | Marsh/marshy grassland | **7 |

C. TALL HERB & FERN

- | | |
|----------------------------|---|
| 1. Bracken | 3 |
| 2. Upland spp. rich veget. | 5 |
| 3. Other - tall ruderal | 3 |
| non ruderal | 3 |

D. HEATLAND

- | | | |
|----|-----------------------|----|
| 1. | Dwarf scrub - dry | '3 |
| | wet | '7 |
| 3. | Lichen/bryophyte | '3 |
| 4. | Montane | '3 |
| 5. | Heath/grassland - dry | '3 |
| 6. | wet | '7 |

E. MIRE, FLUSH AND SPRING

- | | | |
|----|-------------|-----|
| 1. | Mires - bog | 0.7 |
| | Fen - reed | 0.7 |
| | sedge | 0.7 |
| | sweet-grass | 0.7 |
| | mixed | 0.7 |
| 2. | Bog flushes | 0.5 |

F. SWAMP/INUNDATION

1. Swamp - single sp. dom. **7
Tall mixed assemblage **7

**WEST
BANK**

RIGHT BANK

RIVER

DEBEN

Km No. 1

2

Date _____

27.8.85

Surveyor

N. Holmes

G. OPEN WATER

- | | | |
|----|---------------------|----|
| 1. | Standing ~ canal + | 2 |
| | canal = | 3 |
| | ditch | - |
| | dyke | 13 |
| | pond, pool, cut-off | 13 |
| | lake | 13 |
| | gravel pit | 13 |
| | reservoir | 1 |
| | marina | - |
| 2. | Running | |
| | stream < 1m wide | 1 |
| | 1.5m | 1 |
| | 5-10m | 1 |
| | > 10 | 1 |

1. ROCK

- | | | |
|----|--------------------|---|
| 1. | chiff | 1 |
| | scree | 1 |
| | limestone pavement | 1 |
| | cave | 1 |
| | other | 1 |
| 2. | artificial waste | - |

I. MISCELLANEOUS

- | | |
|----------------------|---|
| arable | - |
| amenity grassland | - |
| ephemeral/sicrt herb | - |
| hedge + | 2 |
| hedge = | 3 |
| fence on bank | - |
| fence set back | - |
| wall | - |
| building | - |
| caravans | - |
| fish farm | - |
| silage clamp | - |
| sewage works | - |
| garden | - |
| stick pile | 1 |
| flood debris | 1 |
| road | - |
| railway - disused | 2 |
| other | - |

		BANK FEATURES		LEFT BANK	RIGHT BANK	RIVER HABITATS	RIVER
		shelf	**5			bridges/500m	-
		solid earth cliff	2			weirs/500m	-
		soft earth cliff	*5			locks/500m	-
		rock cliff	2			inlet/500m	*3
		artificial	-			Depth <25m	100
		FB flood bank adj.	-			↑ ↓ 25- <5	1
		FB flood bank set back	-			↓ 0.5- <1.0	1
		levee	-			>1.0m	1
		Height <1m	**5	100	100	Width <1	1
		↑ 1- <2m	2			1- <5	100
		↑ >2m	1			↔ 5- <10	1
		Width <1m	1			10- <20	1
		→ 1- <2.5m	2	100	100	>20	1
		→ 2.5- <5m	3				
		→ >5m	*4			Substrates	
		Slope <30°	**5	100	100	BR bed rock	1
		↗ 30- <60°	1			b boulders	1
		↗ 60- <90°	1			c cobbles	1
		↗ >90°	(*)3			p pebbles	1
		mud	1			g gravel	1
		sand	1			s sand	1
		bare shingle	1			+ silt/mud	100
		vegetated shingle	1			⊕ clay	1
		earth	1	100	100	peat	1
		natural cobbles	1			Habitats and Flow	
		natural boulders	1			⊕ pool	1
						slack	1
		BANK VEGETATION				SS riffle	1
		Conifer	1-5			↑↑ rapids	1
		Oak, Ash, Sycamore	1-5			↑↑ run	1
		P Willow - recent pollard	1-5	2	2	mm waterfall	1
		W Willow old, not pollard	1-5	1	1	△△ protruding rocks	1
		S Standard willows	1-5	2	2		
		A Alder	1-5	1	1	Margins	
		Other trees	1-5			shingle ± bare	1
		Young trees	1-5			shingle, vegetated	1
		Thick Scrub/shrubs	3	1	1	mud	1
		Sparse Scrub/shrubs	2			SSS sand	1
		Reed/Sedge	*4	50	50		
		Dense open	2	50	50	FLORA	
		Sparse open	1			emergent veg <1m wide	1
		Reseeded or mown	-			emergent 1-2m wide	2
		Exposed tree roots	3			emergent >2m wide	3
		ISLANDS				total veget. area	-
		Rocky, vegetated	2			B bryophytes	-
		rocky, + bare	1			E emergents	-
		shingle and rock	2			A submerged	-
		shingle, rock + veg.	3			F floating	-
		earth - maturing	3			algae	-
		earth - with trees	5				50
		clipped					

A. WOODLAND & SCRUB			LEFT BANK	RIGHT BANK	RIVER DEBEN		
1.	Broad-leaved semi-nat. ?	*5			Km No.	7	
	plantation	2		100	Date	27.8.86	
	Coniferous semi-nat.	*5			Surveyor	N. Holmes	
	plantation	2					
	Mixed semi-natural	*5					
	plantation	1					
2.	Scrub - dense	14					
	scattered	12					
	Carr - alder	**7					
	willow	**7					
3.	Parkland	-					
4.	Recently felled wood	-					
B. GRASSLAND & MARSH			LEFT BANK	RIGHT BANK	G. OPEN WATER		
1.	Acidic unimproved	*5			1.	Standing - canal +	2
	semi-improved	2				canal =	3
	Neutral unimproved	**7				ditch	-
	semi-improved	*3	100			dyke	13
	Calcareous unimproved	*5				pond, pool, cut-off	13
	semi-improved	2				lake	13
4.	Improved/reseeded	-				gravel pit	13
5.	Marsh/marshy grassland	**7				reservoir	1
						marina	-
					2.	Running	
						stream < 1m wide	1
						1.5m	1
						5-10m	1
						> 10	1
C. TALL HERB & FERN			LEFT BANK	RIGHT BANK	1. ROCK		
1.	Bracken	3			1.	cliff	1
2.	Upland spp. rich veget.	*5				scree	1
3.	Other - tall ruderal	3				limestone pavement	1
	non ruderal	3				cave	1
						other	1
D. HEATHLAND			LEFT BANK	RIGHT BANK	2.	artificial waste	-
1.	Dwarf scrub - dry	*3			J. MISCELLANEOUS		
	wet	**7				arable	-
3.	Lichen/bryophyte	*3				amenity grassland	-
4.	Montane	*3				ephemeral/short herb	-
5.	Heath/grassland - dry	*3				hedge +	2
6.	wet	*7				hedge =	*3
E. MIRE, FLUSH AND SPRING			LEFT BANK	RIGHT BANK		fence on bank	-
1.	Mires - bog	**7				fence set back	-
	Fen - reed	**7				wall	-
	sedge	**7				building	-
	sweet-grass	**7				caravans	-
	mixed	**7				fish farm	-
2.	Bog flushes	*5				silage clamp	-
F. SWAMP/INUNDATION			LEFT BANK	RIGHT BANK		sewage works	-
1.	Swamp - single sp. dom.	**7				garden	-
	Tall mixed assemblage	**7				stick pile	1
						flood debris	1
						road	-
						railway - disused	2
						used	1
						other	-

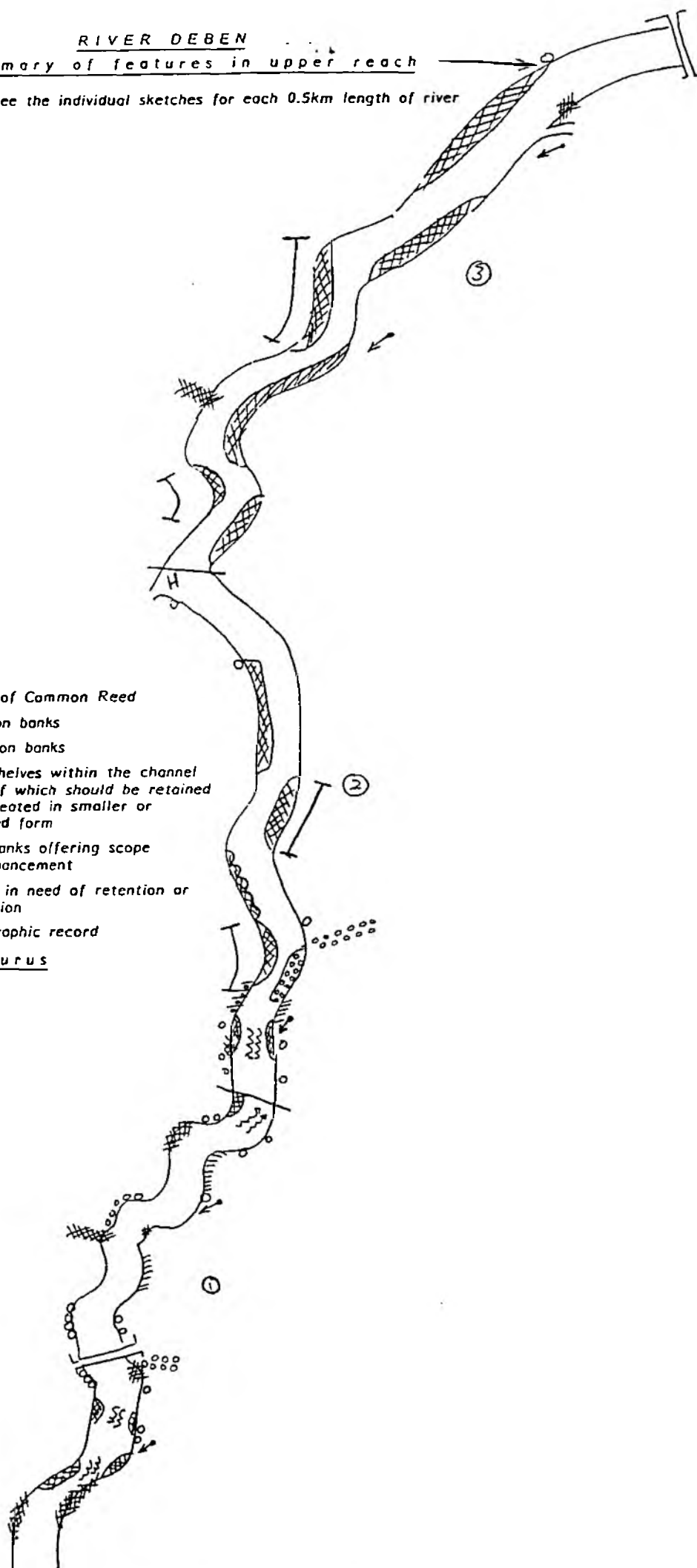
BANK FEATURES			LEFT BANK	RIGHT BANK	RIVER HABITATS	RIVER
	shelf	**5			 bridges/500m	-
	solid earth cliff	2			 weirs/500m	-
	soft earth cliff	*5			 locks/500m	-
	rock cliff	2			 inlet/500m	*3
	artificial	-			Depth	
FB	flood bank adj.	-			<.25m	1
FB	flood bank set back	-			.25-<.5	1
	levee	-			0.5-<1.0	1
		-			>1.0m	1
Height	<1m	**5	100	150	Width	<1
	1-<2m	2			1-<5	1
	>2m	1			5-<10	1
Width	<1m	1	60		10-<20	1
	1-<2.5m	2	40		>20	1
	2.5-<5m	3		150	Substrates	
	>5m	*4			BR	bed rock
Slope	<30°	**5	100	150	b	boulders
	30-<60°	1			c	cobbles
	60-<90°	1			p	pebbles
	>90°	(*)3			g	gravel
	mud	1			s	sand
	sand	1			+	silt/mud
	bare shingle	1			⊕	clay
	vegetated shingle	1	150	150		peat
	earth	1			Habitats and Flow	
	natural cobbles	1			⊙	pool
	natural boulders	1				slack
BANK VEGETATION					ss	riffle
	Conifer	1-5	1	1		rapids
	Oak, Ash, Sycamore	1-5				run
P	Willow - recent pollard	1-5		2		waterfall
W	Willow old, not pollard	1-5	1			protruding rocks
S	Standard willows	1-5		2	Margins	
A	Alder	1-5	1	1		shingle ± bare
	Other trees	1-5	1	1		shingle, vegetated
	Young trees	1-5				mud
	Thick Scrub/shrubs	3			sss	sand
	Sparse Scrub/shrubs	2	85	75	FLORA	
	Reed/Sedge	*4			emergent veg <1m wide	1
	Dense open	2			emergent 1-2m wide	2
	Sparse open	1			emergent >2m wide	3
	Reseeded or mown	-			total veget. area	-
	Exposed tree roots	3			B	bryophytes
ISLANDS					E	emergents
	Rocky, vegetated	2			A	submerged
	rocky, + bare	1			F	floating
	shingle and rock	2				algae
	shingle, rock + veg.	3				
	earth - maturing	3				
	earth - with trees	5				
	developed	-				

RIVER DEBEN

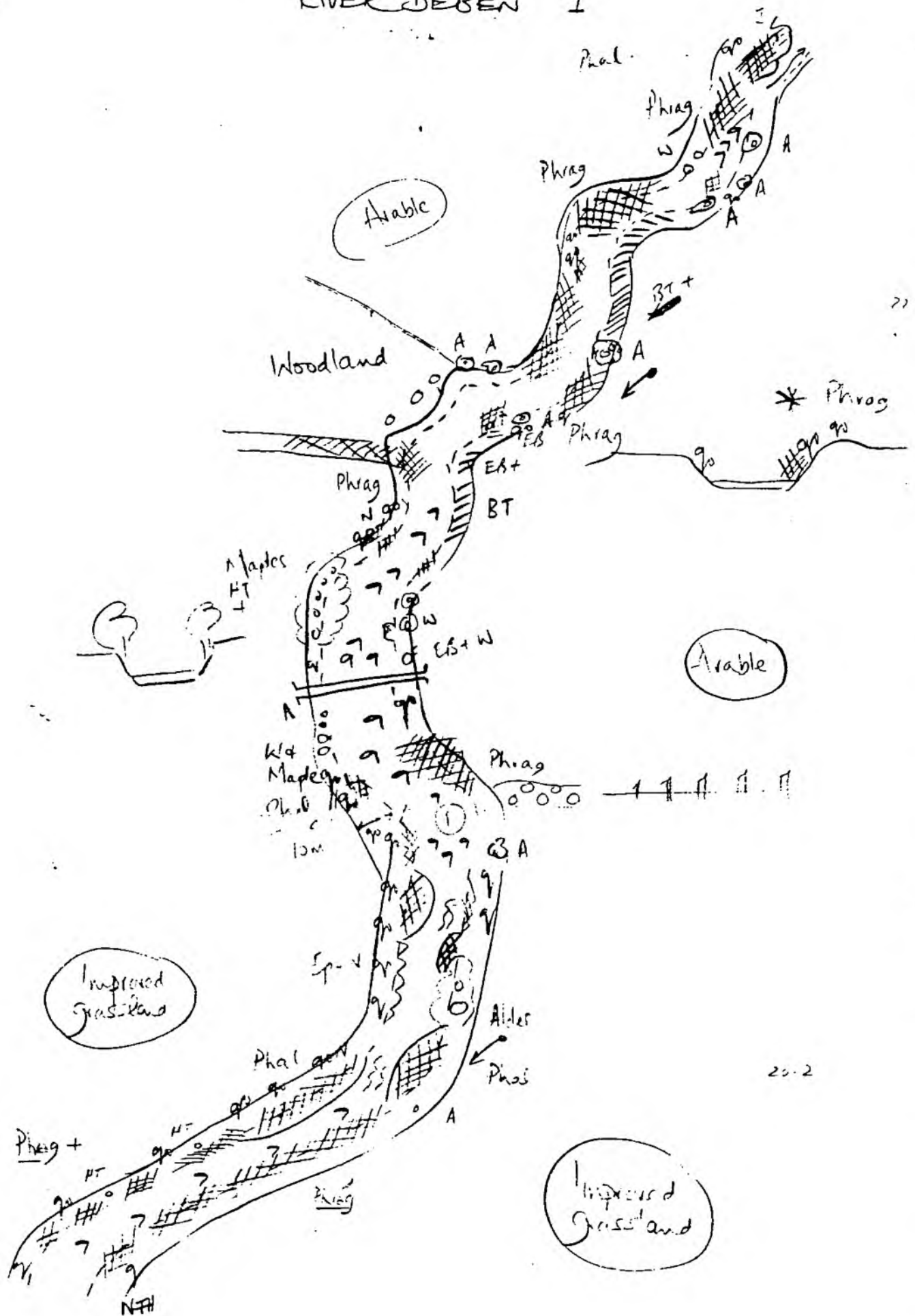
Summary of features in upper reach

For details see the individual sketches for each 0.5km length of river

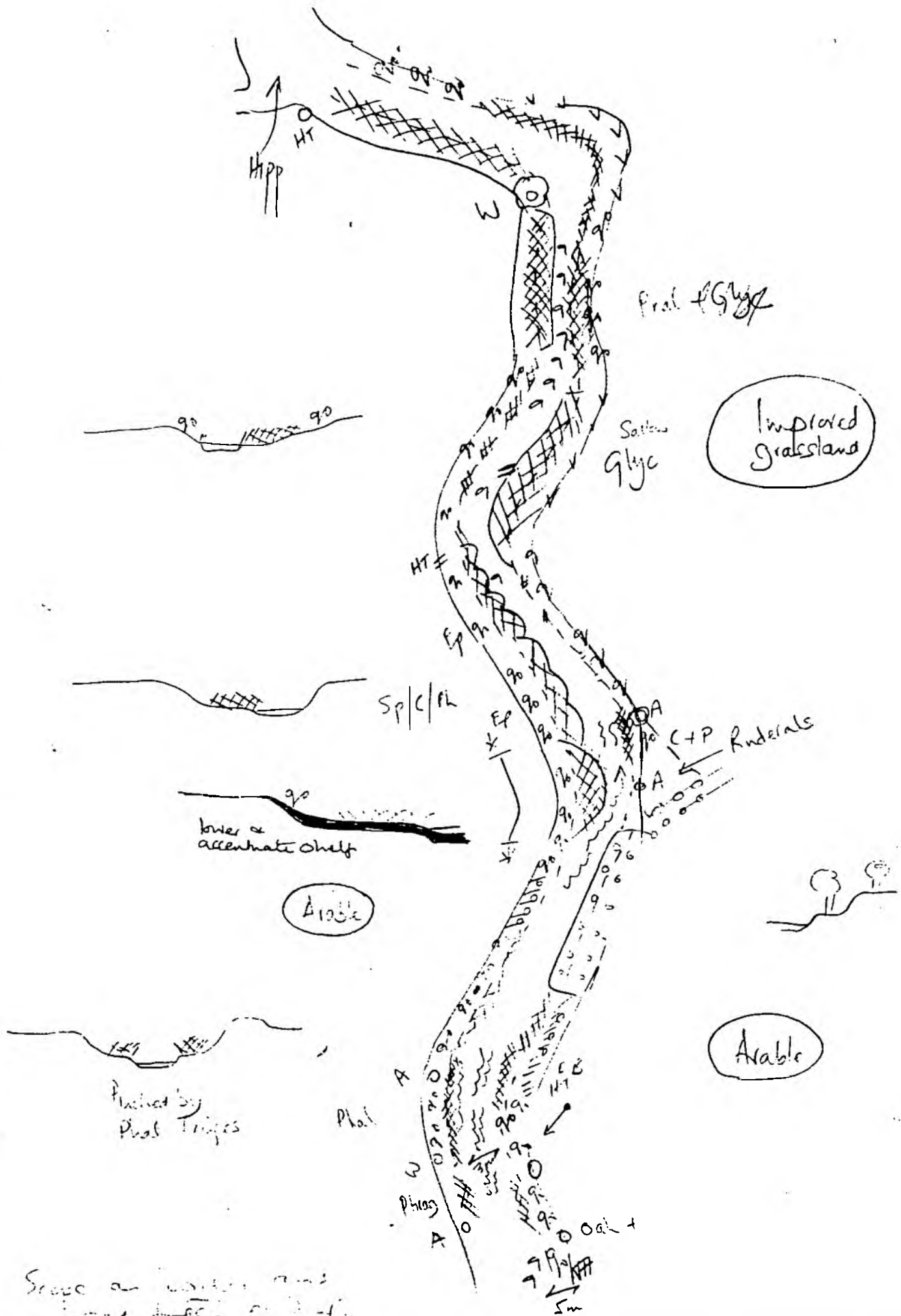
-  Stands of Common Reed
-  Trees on banks
-  shrubs on banks
-  Reed shelves within the channel
some of which should be retained
or recreated in smaller or
modified form
-  Wide banks offering scope
for enhancement
-  Riffles in need of retention or
recreation
-  Photographic record
-  Hippurus



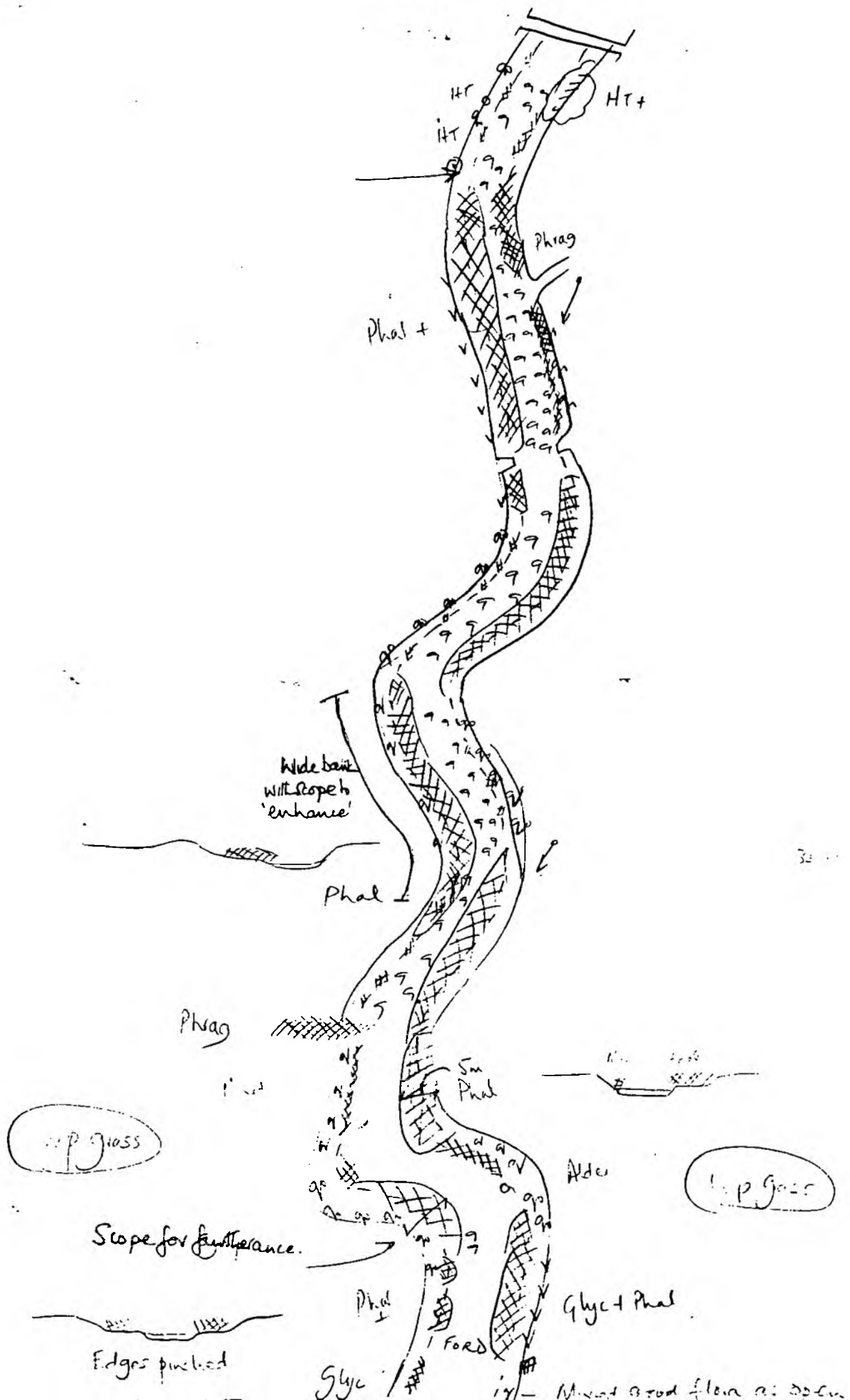
RIVER DEBEN 1



RIVER DEBEN 2

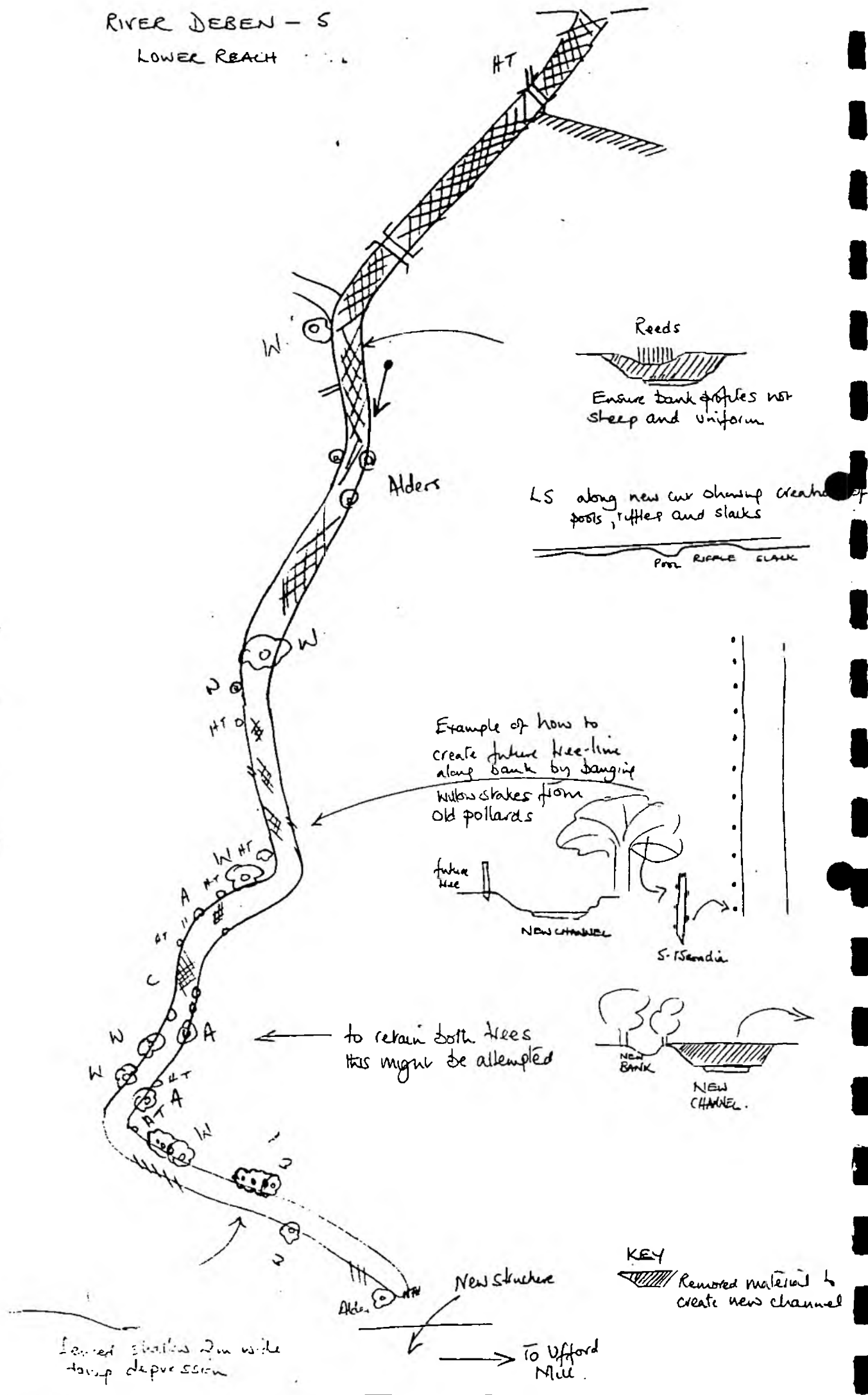


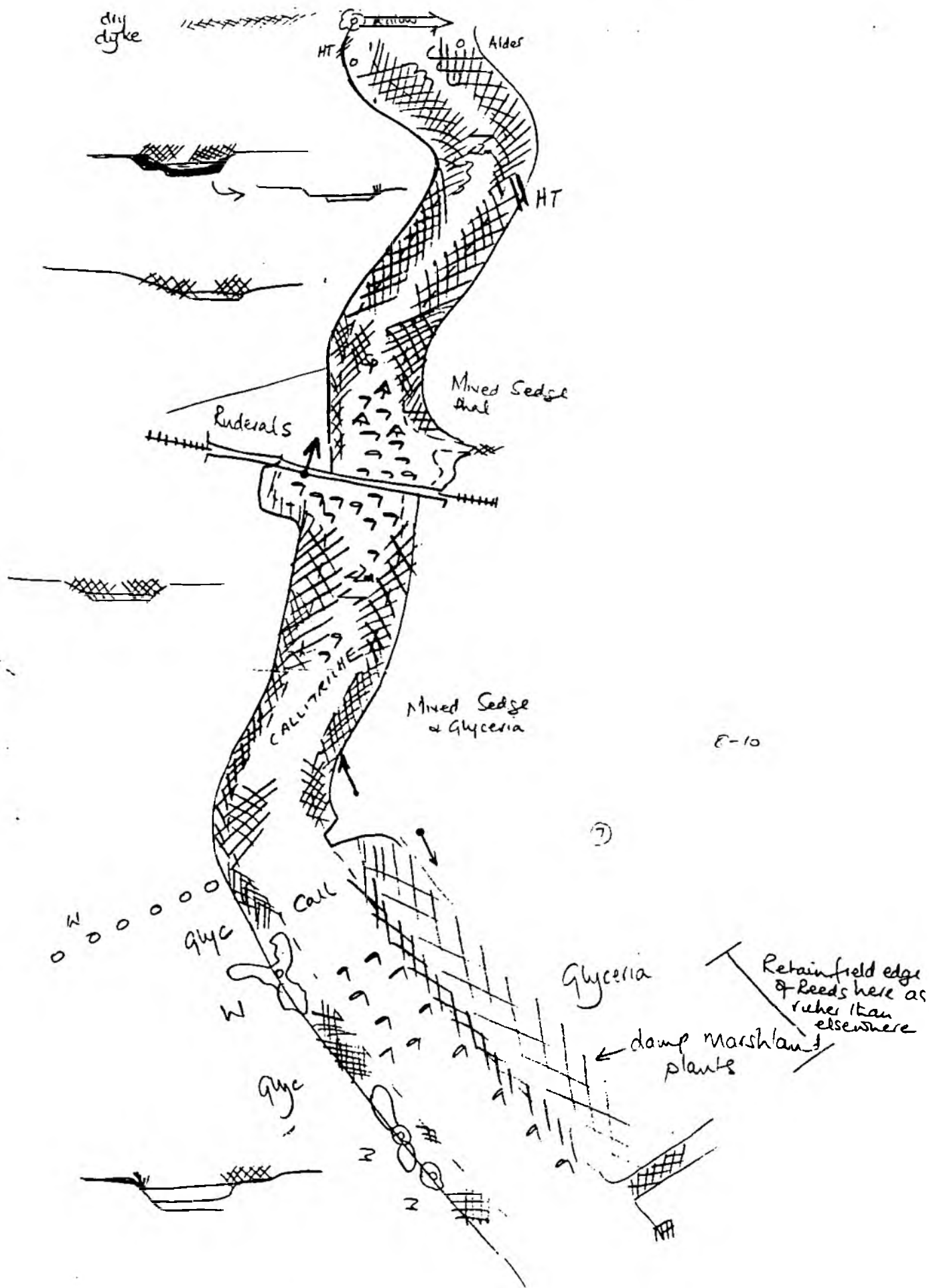
RIVER DEBEN 3



[illegible]

LOWER REACH





Mixed
Phal +

Iris +

A
Cores +

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Ash

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Phrag *

Retain as much of this
Reed as possible.

17-19

Work around
large trees
and cur back shrubs

Ideal approach to dredging

Glyc

Ash

G Rose

Ash

C + E

LS

Showing variation to create pool/riffle
sequence.

Remove and
create new shelf

Grassland

Wilderness
wetland

Inc. Phrag

HT

Phal

Ash

Glyc

Our ref: AWH/SH/35/6/GEN
Your ref:

Date: 7 April 1994

Southern Science Ltd
Premium House
Brighton Road
WORTHING
West Sussex
BN11 2EN

Attn: Miss K Munnery

Dear Miss Munnery

**RIVER DEBEN - ALLEVIATION OF LOW FLOWS
ENVIRONMENTAL APPRAISAL**

Thank you for your letter of 14 February 1994; as mentioned in our subsequent telephone conversation, I passed your queries regarding the dates of discharge consents to our Consents Officer, John Daniels, and he should be dealing directly with you over these.

In response to your queries relating to licence number 35/8/GS/152, I apologise for the delay in replying but can now confirm that the original licence was granted in March 1967 as a Licence of Right. I enclose for your information photocopies of annotated carbon copies of earlier licences (regrettably not adequately dated) which I believe were issued in 1967 and 1972; I have marked these accordingly.

Referring specifically to the Winston and Pettistree boreholes, I summarise below the abstraction rates pertaining to these sources:-

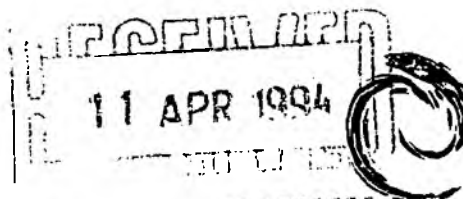
Licence of Right - March 1967

Winston - 2 Boreholes (sources 7 and 8) - daily rates 102,000 gpd and 144000 gpd.

Pettistree - 2 Boreholes (source 11) - daily rate 1,056,000 gpd.

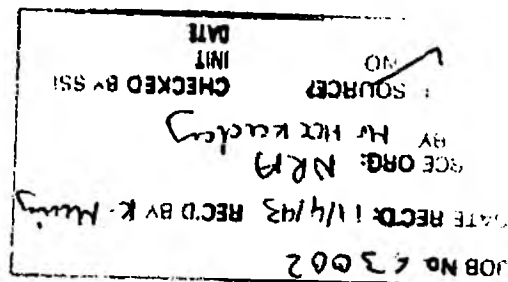
Annual Quantity aggregated with 14 other sources - 3,041,000,000 gallons/year.

Cont/d...



NRA

*National Rivers Authority
Anglian Region*





Licence Variation - February 1972

Winston - Source 7 - Daily Rate 450,000 gpd. 2,045 m³/d

Pettistree - Source 9 - Daily Rate 1,800,000 gpd. 8,183 m³/d

Increase in aggregate Annual Quantity (with 13 other sources) to 3,720,000,000 gallons per year but to revert to 3,355,000,000 gallons (licensed quantity at that time) on 1 January 1975.

Also limit of 1,070,000,000 gallons/year imposed on abstraction from Deben chalk (sources 7, 8, 9, 10 and 12 - Winston, Tuddenham St Martin (chalk bore), Pettistree, Woodbridge and Rushmere).

Licence Variation of October 1981

Winston - Daily Rate 2,700m³/d (increase from 2,045m³/d).

Pettistree - Daily Rate 8,183m³/d.

Aggregate annual abstraction increased from 15,251 tcma to 18,500 tcma for a period of 5 years only. Removal of aggregate limit of 4,864 tcma on Deben chalk abstraction.

It would appear that sometime between March 1967 and February 1972, the aggregate annual figure was increased from 3,041,000,000 gallons/year to 3,355,000,000 gallons/year but I regret I can find no precise record of this on any of the files.

I trust the above information is sufficient for your needs, however, please do not hesitate to contact me if you have any further queries.

Yours sincerely

A handwritten signature in cursive script, reading "A W Hockaday".

A W HOCKADAY
Area Licensing Officer

Encs

Please ask for: Tony Hockaday

ANGLIAN REGION

NRA P' BORO

LICENSING DATA ARCHIVE

RUN DATE 10 FEB 1994 AT: 2.64.

REQUEST FOR ONE-LINE INDEX IN NUMERIC ORDER

LICENSED ABSTRACTIONS - RIVER DEGEN CATCHMENT

KEY TO COLUMNS ON INDEX

COLUMN HEADING

DESCRIPTION AND NOTES

1 "USE

USE

USE

"COOLING-A1"	-	CONSUMPTIVE COOLING	COOLING-A1
"SPRAY IRR "	-	SPRAY IRRIGATION	SPRAY IRR
" "	-	MISC. CONSUMPTIVE	
"P.W.S. "	-	PUBLIC WATER SUPPLY	P.W.S.
"ANTI-FROST"	-	ANTI-FROST SPRAY IRRIGATION	ANTI FROST
" "	-	MISCELLANEOUS INDUSTRIAL	
"INDUSTRIAL"	-	INDUSTRIAL (OTHER THAN 1 OR 8)	INDUSTRIAL
"COOLING-C1"	-	NON CONSUMPTIVE COOLING	COOLING-C1
"S&G WASHG."	-	SAND & GRAVEL WASHING	S&G WASHG.
" "	-	MISC. NON CONSUMPTIVE	
"GEN. AGRIC"	-	AGRICULTURAL - NO CHARGE	GEN. AGRIC
"IMPOUNDING"	-	IMPOUNDING	IMPOUNDING
" "	-	MISCELLANEOUS - NO CHARGE	
"NRA-AN T/F"	-	NRA-ANGLIA INTERBASIN T/F	NRA-AN T/F
"AW-PLC T/F"	-	AW-PLC INTERBASIN T/F	AW-PLC T/F
"W.C.IB T/F"	-	WATER CO. INTERBASIN T/F	W.C.IB T/F
"IDB. T/F "	-	IDB ETC INTERBASIN T/F	IDB. T/F
"BWB T/F "	-	BWB INTERBASIN T/F	BWB T/F
"RECIRC/COM"	-	RECIRCULATION/COMPENSATION	RECIRC/COMP
"DOMESTIC "	-	DOMESTIC	DOMESTIC
"GENAG/DOM "	-	COMBINED GEN. AG & DOMESTIC	GENAG/DOM
"FISHERY "	-	FISHERY PURPOSES	FISHERY
"AMENITY. "	-	ORNAMENTAL OR RECREATIONAL LAKE	AMENITY.
"INIT. RES "	-	INITIAL RES. FILLING	INIT. RES
"P.W.U. "	-	PRIVATE WATER UNDERTAKING	P.W.U.
"SANITARY. "	-	SANITARY OR HYGIENE PURPOSES	SANITARY
"W.T. (R-R)"	-	WATER TRANSFER (RIVER-RIVER)	W.T. (R-R)
"W.T. (G-R)"	-	WATER TRANSFER (GROUNDWATER-RIVER)	W.T. (G-R)
"W.T. (R-G)"	-	WATER TRANSFER (RIVER-GROUNDWATER)	W.T. (R-G)
"CROWN PROP"	-	CROWN PROPERTY	CROWN PROP

LICENCE NO.	LICENCE HOLDER	SITE NAME	*USE	*TCMA	*GRID REF	*START DATE	*END DATE
7/35/06/*G/002	MR W R A A UTHWATT-BOUVERIE	BORE AT ASHFIELD PLACE, ASHF	LD*SPRAY. IRR	*	68.1	*TM20586168	*121965 *
7/35/06/*G/006	CDR. & MRS T D P HELPS	BORE NR GREAT WOOD, ASHFIELD	*GENAG/DOH	*	1.6	*TM19956292	*111965 *
7/35/06/*G/005	THE GOVERNORS	BORE AT BRANDESTON HALL, GRAND	*P.V.U.	*	9.0	*TM24726025	*111965 *
7/35/06/*G/005	MR P LAWSON	WHOLE LICENCE (LN)	*	*	5.800	*121965	*
		BORE AT LODGE FM, KETTLEBURGH	*GENAG/DOH	*	5.000	*TM25796234	*121965 *
		BORE NW OF RECTORY FM, KETTLE	*H*GENAG/DOH	*	0.800	*TM26486140	*
7/35/06/*G/007	MR S F. BLOOMFIELD	WHOLE LICENCE (LN)	*	*	2.8	*121965	*
		BORE AT CRETINGHAM LODGE, CRET	*GENAG/DOH	*	1.3	*TM22696224	*121965 *
		BORE AT SPARKES'S FM, CRETING	*H*GENAG/DOH	*	1.4	*TM22456178	*
7/35/06/*G/008	MR V FLEMING	WHOLE LICENCE (LN)	*	*	7.2	*031966	*
		BORE AT MILL END, EYKE	*GEN. AGRIC	*	2.700	*TM31465266	*031966 *
		WELL AT CHURCH FM, EYKE	*GEN. AGRIC	*	4.500	*TM31835185	*
7/35/06/*G/009	MRS V D FAVELL & CO	BORE AT GREENWOOD FM, HICKFIELD	*GENAG/DOH	*	1.4	*TM14616291	*121965 *
7/35/06/*G/011	P I MILES & SONS	WELL AT WOODCROFT HALL, M. SOHAM	*GENAG/DOH	*	2.2	*TM20956432	*121965 *
7/35/06/*G/012	MR B N & MRS H S HINTON	WELL NR SCHOOL AT EARL SOHAM	*GENAG/DOH	*	3.3	*TM23496329	*121965 *
7/35/06/*G/013	MICKFIELD HALL FARMS	BORE AT DISUSED AIRFIELD, WETH.	*GENAG/DOH	*	4.5	*TM13406355	*121965 *
7/35/06/*G/016	MR R & MRS P E DAVIES	BORE AT HILL FM, KETTLEBURGH	*GENAG/DOH	*	0.9	*TM27426122	*121965 *
7/35/06/*G/015	CDR. & MRS T D P HELPS	BORE NR THORPE HALL, ASHFIELD	*GENAG/DOH	*	3.4	*TM20216245	*121965 *
7/35/06/*G/015	MR D J BYE	WELL AT DECOY FM, MELTON	*GEN. AGRIC	*	3.3	*TM29335125	*121965 *
7/35/06/*G/017	MR S F RANDALL	WELL AT PROSPECT FM, CHARSFIELD	*GEN. AGRIC	*	3.3	*TM26755633	*121965 *
7/35/06/*G/019	MR V MARSDEN-JONES	WHOLE LICENCE (LN)	*	*	0.6	*121965	*
		BORE AT THE CHESTNUTS, EARL SOH	*GEN. AGRIC	*	0.4	*TM22886307	*121965 *
		BORE AT THE CHESTNUTS, EARL SOH	*GEN. AGRIC	*	0.1	*TM22226348	*
7/35/06/*G/021	MR C G WHITE	BORE AT BARN GROVE FM, ASHBOCK	*GEN. AGRIC	*	22.700	*TM18665524	*121965 *
7/35/06/*G/022	MR C E ROSE	WHOLE LICENCE (LN)	*	*	2.4	*121965	*
		BORE AT SUDDON HALL, KENTON	*GEN. AGRIC	*	1.6	*TM20016563	*121965 *
		BORE AT OAKTREE FM, KENTON	*GEN. AGRIC	*	0.8	*TM19296467	*

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7/35/06/*G/023	MR J HADDON	BORE AT BLOOD HALL, DEBENHAM	*GEN. AGRIC*	5.600	*TM18396472*	121965	*
7/35/06/*G/024	MRS M REID	BORE AT MONEWDON HALL, WOODBR.	*GEN. AGRIC*	4.1	*TM24625941*	121965	*
7/35/06/*G/028	MR B W WRIGHT	BORE AT HOO FM, HOO	*GEN. AGRIC*	1.6	*TM24575767*	121965	*
7/35/06/*G/029	MR B W WRIGHT	BORE AT IVY LODGE, HOO	*GEN. AGRIC*	0.4	*TM23965719*	121965	*
7/35/06/*G/030	FARM OFFICE	BORE AT EASTON PARK, EASTON	*GEN. AGRIC*	1.1	*TM28505890*	121965	*
7/35/06/*G/032	P I. MILES & SONS	BORE AT CHURCHYARD'S FM, E. SCH.	*GEN. AGRIC*	0.3	*TM24526321*	121965	*
7/35/06/*G/033	MR J RITCHIE	BORE AT POPLAR FM, DEBENHAM	*GEN. AGRIC*	3.3	*TM16386185*	121965	*
7/35/06/*G/038	MR R PATTERSON	BORE AT CHURCH FM, EARL SOHAM	*GEN. AGRIC*	1.6	*TM23796313*	011966	*
7/35/06/*G/041	MR J F HAAG	BORE AT HIGH HOUSE FM, FRAMSDEN	*GEN. AGRIC*	4.5	*TM21315932*	011966	*
7/35/06/*G/042	ALDRED & SONS	WELL AT SYCAMORE FM, WETHERING	*GEN. AGRIC*	0.8	*TM14496425*	011966	*
7/35/06/*G/043	MR R C STINNER	DECAY POND AT CAMPSEA ASH	*SPRAY IRR *	22.7	*TM318 547 *	021966	*
7/35/06/*G/044	G M ANDERSON & SON	BORE AT HALL FM, BOULGE	*SPRAY IRR *	5.7	*TM25265320*	021966	*
7/35/06/*G/045	MRS D E LE MAY	BORE NE OF IVY LODGE, HOO	*GEN. AGRIC*	0.8	*TM24115738*	021966	*
7/35/06/*G/046	J YOUNGMAN & SONS	BORE AT CHARSFIELD HALL	* ALL *	68.100	*TM24005640*	021966	*
			ANTI FROST	18.100	*TM24005640*		*
			*SPRAY IRR *	50.000	*TM24005640*		*
7/35/06/*G/047	HELMINGHAM ESTATE FARMS	BORE NR TOLLGATE CORNER, FRAMSDEN	*GEN. AGRIC*	2.2	*TM19215952*	041966	*
7/35/06/*G/049	TOLLEMACHE DISCRETIONARY	BORE AT RED HOUSE FM, FRAMSDEN	*GEN. AGRIC*	2.7	*TM20995802*	041966	*
7/35/06/*G/050	TOLLEMACHE DISCRETIONARY	BORE AT FRAMSDEN HALL FM, FRAMSDEN	*GEN. AGRIC*	2.7	*TM20996004*	041966	*
7/35/06/*G/051	MR A C SAMSON	BORE AT EASTON NURSERIES	*GEN. AGRIC*	1.8	*TM28055871*	041966	*
7/35/06/*G/052	MR A DOCKERTY	BORE AT ABBEY HOUSE FM, M. SOHAM	*GEN. AGRIC*	0.6	*TM21606552*	041966	*
7/35/06/*G/054	IVY FARMS (CODDENHAM) LTD	BORE AT WINDWHISTLE FM, E. SOHAM	*SPRAY IRR *	22.700	*TM22556337*	051966	*
7/35/06/*G/055	CHARLES LONG LTD	BORE AT SYCAMORE FM, KENTON	*GEN. AGRIC*	1.6	*TM19156621*	081966	*

DATE REC'D BY: 1.1.94	DATE REC'D BY: 1.1.94
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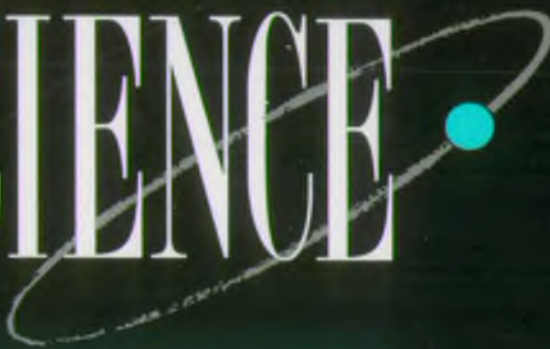
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LICENCE NO.	LICENCE HOLDER	SITE NAME	*USE	*TCMA	*GRID REF	*START DATE	*END DATE
7/35/06/*6/056	M E S FARMS (SUFFOLK) LTD	WELLPTS AT BENTREES FM, EASTON	*SPRAY IRR *	61.8	*TM28555830	*081966	*
7/35/06/**/058	C R TANNER	BORE AT KETTLBURGH HALL, KETT.	*GEN. AGRIC*	2.270	*TM27016030	*111966	*
7/35/06/**/060	H J HOLLAND & SON	WHOLE LICENCE (LN)	*	98.5	*	*011967	*
		R DEBEN N OF WICKHAM MARKET	*SPRAY IRR *	69.9	*TM30095668	*011967	*
		SEEP RES S OF FEN COTT, PETTIST	*SPRAY IRR *	28.6	*TM287 545	*	*
7/35/06/**/061	A HAYWARD & SON	WHOLE LICENCE (LN)	*	38.1	*	*011967	*
	LINKED B	MARSH DRAINS AT CAMPSEY, ASH	*SPRAY IRR *		*TM31615618	*	*
	LINKED B	MARSH DRAIN AT CAMPSEY, ASH	*SPRAY IRR *		*TM31635558	*	*
		SEEP RES N OF QUILL FM, CAM. ASH	*SPRAY IRR *	20.0	*TM317 556	*	*
7/35/06/*S/062	BRIDGE & IVY FARMS LTD.	MARSH DRAIN AT BRIDGE FM, HACH.	*SPRAY IRR *	150.0	*TM30775672	*011967	*
7/35/06/*S/063	MR M F HURLOCK	R DEBEN AT GLEVERING HALL FM	*SPRAY IRR *	7.2	*TM29505730	*011967	*
			*		*TM29605650	*	*
7/35/06/*S/064	K & J CLARKE	R DEBEN AT LETHERINGHAM HALL	*SPRAY IRR *	36.3	*TM27575789	*011967	*
			*		*TM28455754	*	*
7/35/06/**/065	MR J R WESTERN	WHOLE LICENCE (LN)	*	5.0	*	*011967	*
		R DEBEN AT BRIDGE FM, CRETINGHAM	*SPRAY IRR *	2.2	*TM23426045	*011967	*
			*		*TM24235996	*	*
		WELL AT BRIDGE FM, CRETINGHAM	*GEN. AGRIC*	2.7	*TM23606020	*	*
7/35/06/*S/066	H & J FOSKETT	EYKE COMMON WATERCOURSE, BROMES'L	*SPRAY IRR *	31.700	*TM304 549	*011967	*
7/35/06/**/067	WILLIAM KERR (FARMS) LTD	WHOLE LICENCE (LN)	*	125.0	*	*011967	*
		ALL SITES (USAGE -- 2)	*SPRAY IRR *		*	*	*
		BORE AT PARK FM, LETHERINGHAM	*GEN. AGRIC*	2.2	*TM27185763	*	*
		WELL AT MODEL FM, EASTON	*GEN. AGRIC*	4.5	*TM27685825	*	*
		BORE AT LETHERINGHAM ABBEY	*GEN. AGRIC*	4.5	*TM26825845	*	*
		R DEBEN D/S OF KETTLBURGH BR.	*SPRAY IRR *		*TM26465937	*	*
			*		*TM28145860	*	*
		RES S OF SANCTUARY BR, LETHER*	*SPRAY IRR *		*TM27245832	*	*
		RES SE OF LETHERINGHAM ABBEY	*SPRAY IRR *		*TM27275812	*	*
		RES SE OF LETHERINGHAM ABBEY	*SPRAY IRR *		*TM27285803	*	*
7/35/06/**/068	MAUNTON HALL FARMS	WHOLE LICENCE (LN)	*	113.6	*	*041967	*
		ALL SITES (USAGE -- 1)	*SPRAY IRR *		*	*	*
		19 WELLPTS AT HIGH HOUSE FM, R.	*ALL	113.6	*TM327 538	*	*
			*SPRAY IRR *		*TM327 538	*	*
			M.T. (G-R)		*TM327 538	*	*
		R DEBEN AT LOW FM, EYKE	*SPRAY IRR *	37.0	*TM312 526	*	*

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7/35/06/*G/069	MR J F WRIGHT	BORE AT CHINER'S FM, HOD	*GEN. AGRIC*	2.7	*TM24345743*	041967	*
7/35/06/*G/070	MR D J WILSON	WHOLE LICENCE (LN)	*	6.6	*	041967	*
		BORE AT DAIRY FM, CRETINGHAM	*GEN. AGRIC*	3.3	*TM22426083*	041967	*
		BORE AT DOVE'S FM, CRETINGHAM	*GEN. AGRIC*	3.3	*TM21626090*		*
7/35/06/*G/071	MR N D SHEFFIELD	WELL AT ROOKERY FM, EARL SOHAM	*GEN. AGRIC*	0.8	*TM23116295*	051967	*
7/35/06/*G/073	WRENTHAM FARMS LTD.	BORE AT HUNGARIAN HALL, PETTIST	*GEN. AGRIC*	4.1	*TM28175349*	061967	*
7/35/06/*G/074	ANGLIAN GILT PRODUCERS LTD	BORE AT OLD PARK FM, LETHERHAM	*GEN. AGRIC*	2.2	*TM26825701*	111967	*
7/35/06/*G/077	DOUGLAS GOLDSMITH LTD	BORE AT CROWN NURSERY, UFFORD	*SPRAY IRR *	9.000	*TM29405258*	081970	*
7/35/06/*G/078	NOTCUTTS NURSERIES LTD	BORE AT NOTCUTTS NURSERY, PETT.	*SPRAY IRR *	163.6	*TM30325450*	081971	*
7/35/06/*G/079	NOTCUTTS NURSERIES LTD	WHOLE LICENCE (LN)	*	124.130	*	051972	*101993
	LINKED D	BORE AT VALE FM, UFFORD	*SPRAY IRR *	23.000	*TM28965265*		*
	LINKED D	SAND & GRAVEL B/H NO 1 UFFORD	*SPRAY IRR *	78.400	*TM28835223*		*
		SAND & GRAVEL B/H NO 2 UFFORD	*SPRAY IRR *	78.400	*TM28845229*		*
		BORE AT UFFORD	*SPRAY IRR *	22.730	*TM28845227*		*
7/35/06/*G/080	WILLIAM KERR (FARMS) LTD	BORE AT MONEWDEN HALL FM, MONEW	*GEN. AGRIC*	6.5	*TM24545942*	011973	*
7/35/06/*G/081	MR D I. NEUTEBOOM	WHOLE LICENCE (LN)	*	45.4	*	031973	*
		ALL SITES (USAGE - 1)	*ANTI FROST*		*		*
		ALL SITES (USAGE - 2)	*SPRAY IRR *	40.9	*		*
		"FOX" BOREHOLE, STONHAM ASPAL	* ALL *		*TM15206044*		*
			ANTI FROST		*TM15206044*		*
			*SPRAY IRR *		*TM15206044*		*
		"FLINT" BOREHOLE, STONHAM ASPAL	* ALL *		*TM15626055*		*
			ANTI FROST		*TM15626055*		*
			*SPRAY IRR *		*TM15626055*		*
7/35/06/*G/082	MR B NORMAN	BORE AT CHESTNUT TREE FM, FR. ST.	*GEN. AGRIC*	3.3	*TM23985949*	121973	*
7/35/06/*G/083	MR J F WRIGHT	BORE AT WRIGHT'S FM, MONEWDEN	*SPRAY IRR *	9.0	*TM22835744*	031974	*
7/35/06/*G/085	MR D J. BYE	RESERVOIRS AT DECOY FM, MELTON	*SPRAY IRR *	24.0	*TM295 512*	091978	*
7/35/06/*G/086	M R. UTHWATT-BOUVERIE, ESQ	BORE AT BLUEBELL FM, FRAMSDEN	*GEN. AGRIC*	1.8	*TM19256135*	011979	*
7/35/06/*G/087	MR C N BACON	BORE AT BOUNDARY FM, FRAMSDEN	*GEN. AGRIC*	0.9	*TM18676078*	011979	*

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7/35/06/*G/088	MR R V ROBINSON	16 WELLPTS AT SINK FM EYKE	*SPRAY IRR *	72.7	*TM310 519	*061979	* Y
7/35/06/*G/089	WRENTHAM FARMS LTD	WHOLE LICENCE (SI)	*SPRAY IRR *	45.4	*	*041982	*
		SEEP RES NR BING BR, PETTISTREE	*SPRAY IRR *		*TM287 539	*	*
		SEEP RES NR BING HALL, PETTIST	*SPRAY IRR *		*TM290 538	*	*
7/35/06/*G/090	DOUGLAS GOLDSMITH LTD	4 WELLPTS NR METH. CHAP, UFFORD	*SPRAY IRR *	2.3	*TM294 532	*071983	*
7/35/06/*G/091	MR P W WARBURG	WELLPTS SE OF LOWDHAM HALL	*SPRAY IRR *	68.2	*TM315 532	*081984	*
7/35/06/*G/092	A HAYWARD & SON	30 WELLPTS AT FEN BARN, PETTIST	*SPRAY IRR *	23.0	*TM312 548	*081986	*101996
7/35/06/*G/093	WESTROPE PARK FARM	BORE SE OF GROVE FM, PETTISTREE	*SPRAY IRR *	90.7	*TM31705 23	*031987	*101996
7/35/06/*G/094	MR R J. HERRING	SEEP RES AT SANDPIT FM, UFFORD	*SPRAY IRR *	20.5	*TM305 525	*031987	*101996
7/35/06/*S/095	W. KERR (FARMS) LTD	WHOLE LICENCE (SI)	*SPRAY IRR *	45.500*		*121988	*
		R. DEBEN D/S OF KETTLEBURGH BR	*SPRAY IRR *	45.500*	*TM26405951*		*
					TM27265896		*
		MARSH DRAINS AT LOW FM, EASTON	*SPRAY IRR *	45.500*	*TM27205910*		*
7/35/06/*G/097	NOTCUTTS NURSERIES LIMITED	BORE AT UPPER BARN, UFFORD	*SPRAY IRR *	64.315	*TM29975333*	*061990	*101999
7/35/06/*G/098	UFFORD PARK LIMITED	WHOLE LICENCE (LN)	*	2.700*		*081990	*
		TRIB OF RIVER DEBEN-MELTON 1	*IMPOUNDING*		*TM29115156*	*081990	*
		TRIB OF RIVER DEBEN-MELTON 2	*IMPOUNDING*		*TM29185157*		*
		TRIB OF RIVER DEBEN-MELTON 3	*IMPOUNDING*		*TM29255158*		*
			*SPRAY IRR *	2.700*	*TM29255158*		*
		TRIB OF RIVER DEBEN-MELTON 4	*IMPOUNDING*		*TM29315158*		*
		TRIB OF RIVER DEBEN-MELTON 5	*IMPOUNDING*		*TM29395159*		*
		TRIB OF RIVER DEBEN-MELTON 6	*IMPOUNDING*		*TM29445158*		*
		TRIB OF RIVER DEBEN - MELTON 7	*IMPOUNDING*		*TM29345170*		*
		TRIB OF RIVER DEBEN - MELTON 8	*IMPOUNDING*		*TM29295175*		*
		WELL POINTS AT MELTON	*RECIRC/COM*	2.700*	*TM29225156*		*
7/35/06/*G/099	D H AND J F KNOWLAND	WHOLE LICENCE (LN)	*	1.100*		*011991	*
		BOREHOLE AT CROWS HALL	*P.W.U.	0.735*	*TM19196284*	*011991	*
		BOREHOLE AT HILL FARM	*P.W.U.	0.365*	*TM18606386*		*
7/35/06/*G/100	M A LLOYDS	BORE AT LEATHERINGHAM	*GEN. AGRIC*	7.320*	*TM26275721*	*031987	*
7/35/06/*G/101	ANGLIAN GILT PRODUCERS LTD	BORE OLD PARK FARM, LEATHERINGHAM	*GEN. AGRIC*	7.320*	*TM26845700*	*031987	*
7/35/06/*G/102	D NEUTEBOOM	BORE AT STONHAM ASPAL	*SPRAY IRR *	60.000*	*TM15306001*	*011992	*092001

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