

FISHERY SURVEY OF THE RIVER ISLE CATCHMENT

1. INTRODUCTION

- 1.1 This fishery survey of the River Isle catchment was started in May 1992 and concluded in August. The watercourses surveyed were the River Isle itself together with its tributaries, namely the Dowlish Brook, River Ding, and the Fivehead River.

2. TOPOGRAPHY AND GEOLOGY

- 2.1 The River Isle rises at Wadeford near Combe St Nicholas where a series of small springs emerge from chalk and greensand some 150 metres above sea level. The river falls progressively to Cocks Bridge below Ilminster where the gradient slackens. From here the river continues to run through a clearly defined flood plain and retains gravel runs throughout its length. At Midelnay the last kilometre of the Isle lies clearly within the Somerset Levels as the river divides West Moor from South Moor before it joins the River Parrett at Midelnay.
- 2.2 The Dowlish Brook is fed from several streams in an area of very varied geology near Windwhistle Hill: chalk, greensand and sandstone are all present in the catchment. Above Dowlish Wake five streams converge and several other tributaries join the main stream before it meets the Isle at Fuddles Hole.
- 2.3 The River Ding rises near Castle Neroche on the Blackdown Hills from small springs in the greensand some 250 metres above sea level. The river falls steeply in a narrow valley as far as Jordans. Here the stream divides into three separate channels which once served local milling and irrigation needs. Two of the channels reunite at Ilton before the river meets the Isle at South Bradon.
- 2.4 The Fivehead River, known locally as the River Rag, also originates on the Blackdowns from several small springs near Staple Fitzpaine. Many of the streams within this system dry up in the summer months. The River flows past Hatch Beauchamp and Beer Crocombe before it joins the Isle downstream of Isle Brewers.
- 2.5 The relationship between the various watercourses is also shown on the map (Appendix 1).
3. FLOW
- 3.1 There is one gauging station in this catchment, at Ashford Mills on the River Isle. Analysis of flow statistics and a comparison with the River Tone are shown in Table 1 and further details are included as Appendix 2.

APPENDIX 1

APPENDIX 2



Table 1

FLOW STATISTICS FOR THE R.ISLE AT ASHFORD MILLS COMPARED WITH THE R.BRUE AT LOVINGTON AND THE R.TONE AT BISHOPS HULL

	ISLE	BRUE	TONE
Period of years covered by record	29	27	30
Catchment area above gauging station (sq. kilometres)	90	135	202
Height of highest point of catchment above Ordnance Datum (metres)	274	260	409
Average daily flow in cumecs (a.d.f.)	1.30	1.85	3.03
95 per cent exceeded flow (m^3/s)	0.26	0.25	0.61
FLOW RANGE percentage of days per year:			
over 4 x a.d.f.	4	4	2.5
between 2 x a.d.f. and 4 x a.d.f.	7	9	9
between a.d.f. and 2 x a.d.f.	15	17	18.5
between 0.75 a.d.f. and a.d.f.	10	9	10
between 0.5 a.d.f. and 0.75 a.d.f.	16.5	14.5	17
between 0.25 a.d.f. and 0.5 a.d.f.	34.5	23.5	31
between 0.125 a.d.f. and 0.25 a.d.f.	12	20	11
below 0.125 a.d.f.	1	3	1

- 3.2 Table 1 indicates that the River Isle like the Brue and the Tone is a flashy river with a high percentage of days when flows are quite low and a significant period when flows are very high. The Isle and Tone differ from the Brue in having fewer days when flows are extremely low, under 0.125 of the average daily flow. The small amount of chalk and greensand aquifer in the headwaters of the Isle may be responsible for reducing the extreme low flows.

4. ABSTRACTION

- 4.1 There are only three abstraction licences from surface waters within the main River Isle catchment, one for spray irrigation and two for fish farming. The abstraction for spray irrigation represents 1 per cent of the 95 percentile flow at Ashford Mill. The fish farm abstractions are licences of entitlement which can take all of the flow of the river at the two sites. As with most fish farms there is almost full return of the water abstracted.
- 4.2 A major abstraction of water for industrial purposes which equated to nearly 25 per cent of the 95 percentile flow at Ashford Mill was revoked at the holders request in 1990.

- 4.3 There is one tiny licensed abstraction from the Fivehead River for agricultural purposes and there are no abstractions from surface waters in the catchments of the Dowlish Brook or the River Ding.
- 4.4 There is one licence, with a low flow condition, for spray irrigation from the Westport Canal.
- 4.5 On an unnamed tributary of the Isle at Whitelackington there are two licences to abstract for spray irrigation from two purpose built reservoirs.
- 4.6 There are several significant abstractions of groundwater for water supply within the catchment.

5. IMPOUNDMENTS

- 5.1 The most notable impoundment on the River Isle system is that which retains the waters of Chard Lake. This 50 acre lake on the outskirts of Chard was constructed in the 1840's to provide a supply of water for the Chard Canal which connected the town to the Bridgwater & Taunton Canal. It is now owned by the District Council though the fishing rights are held privately by the former owners.
- 5.2 There are numerous weirs on the River Isle associated with former mills. These are particularly numerous in the first two kilometres between Wadeford and Hornsbury. One former mill site at Puddleigh is now a fish farm. Hornsbury Mill is open to the public and is a popular tourist attraction.
- 5.3 Between Hornsbury and the confluence with the Dowlish Brook the Isle channel is divided as it feeds both an area of former water meadows and two mill systems: Bere Mills and Sea Mills.
- 5.4 At Ilminster and downstream there are several significant weir structures which divide the flow and prevent fish movement except in extreme flow conditions. These include Rose Mills, Hort Bridge, Eames Mill, Isle Brewers Mill, and Hambridge Mills.
- 5.5 At Cocks Bridge the new A303 crosses the River Isle flood plain on a raised embankment. The natural river channel is throttled at this point and high flows pass down a flood channel which is partially concreted. At the time of road construction it was only pressure from fisheries interests which resulted in the retention of the natural river channel.
- 5.6 The Dowlish Brook has two significant former mills at Moolham and Dowlish Ford.
- 5.7 Most of the weirs on the River Ding have collapsed but at Jordans the flow is split into three by a system of weirs some of which have recently been resited as a result of recent road works on the A358.

- 5.8 The Fivehead River has a number of old weir systems in and around Hatch Beauchamp.
- 5.9 On the Fivehead River and the River Ding the very low summer flow means that the smallest feature, including most riffles, probably restrict fish movement for much of the year.

6. WATER QUALITY

- 6.1 Chemical water quality is shown in Figure WQ1 for most of the River Isle, the Chard Lake tributary, the lower Ding and the Fivehead River. The upper reaches of the River Isle and the River Ding and the whole of the Dowlish Brook are unclassified. Most of the waters have the chemical quality one might expect though the middle Isle and lower Ding are Class 2 where class 1b should be the objective. FIGURE WQ1
- 6.2 Biological water quality is shown in Figure WQ2. The waters examined are generally the same as those included in the chemical classification, with the addition of the Dowlish Brook. The method of biological assessment checks the observed invertebrate score against that predicted from an analysis of the physical nature of the river at each site. As a result in the lower reaches of rivers the biological quality may be good even if the river is class 2 chemically. FIGURE WQ2
- 6.3 Interestingly the quality of the middle and lower Isle and Lower Ding is shown as all good in biological terms. The upper reaches which are shown as moderate only just fall outside the boundaries of "good".
- 6.4 The EEC Fishery Designation is shown in Figure WQ3. There are no designated salmonid waters within the catchment. The lower River Isle, Lower Ding and lower Fivehead River are designated as cyprinid waters. FIGURE WQ3
- 6.5 The most significant consented discharges within the catchment are probably those from the sewage treatment works which serve Chard and Ilminster. The works at Chard is due to be rebuilt soon at a new site. Current proposals mean that the effluent will still be discharged close to the present point. The storm sewage at Chard is discharged upstream of Chard Lake and this will continue though with improvements in quality.
- 6.6 There have been no significant water quality problems within the catchment in the last two years.
- 6.7 Very low dry weather flows mean that both the Fivehead River and River Ding are highly sensitive to any discharges for much of the year. This problem has been recognised so that for example the effluent from the Fivehead sewage treatment works is piped past the Fivehead River and discharged to the River Isle.

- 6.8 There has been concern about the quality of some farm discharges in parts of the Fivehead River system. Problem areas have recently been targeted by NRA staff and improvement works begun at some farms are already resulting in improved water quality.

7. FISHERY SURVEY METHOD

- 7.1 Sample sites were chosen by dividing the various watercourses into two kilometre lengths within which a one hundred metre survey length was selected using random numbers. Table 2 lists the sample sites with their grid references; the location of all sample sites is shown on the maps which make up Appendix 1.

Table 2

SURVEY SITES

RIVER ISLE			
IS1A	Court Mill, Wadeford	ST313107	7/7/92
IS1B	Manor Farm, Knowle St Giles	ST335111	2/7/92
IS1C	Bere Mills	ST343121	26/6/92
IS1D	Donyatt	ST341143	25/6/92
IS1E	Upstream of Winterhay Lane	ST350157	19/6/92
IS1F	Cock's Bridge Copse	ST365166	18/6/92
IS1G	Below Ilford Bridges	ST370178	11/6/92
IS1H	Ashford Farm	ST357191	29/5/92
IS1I	Below Isle Brewers	ST363216	9/6/92
IS1J	Earnshill House	ST383223	19/5/92
IS1K	Hambridge	ST397221	8/6/92
IS1L	Below Westport Canal	ST405227	14/5/92
DOWLISH BROOK			
D01B	Chillington	ST384110	15/7/92
D01X	Dowlish Lane	ST382119	16/7/90
D01C	Below Dowlish Wake STW	ST372131	10/7/92
D01D	Dunpole Farm	ST345134	9/7/92
RIVER DING			
D11B	Silver Street	ST288145	30/7/92
D11C	Ding Drove	ST305150	29/7/92
D11D	Broadway	ST323153	23/7/92
D11E	Hortmead Lane	ST351163	22/7/92
D11F	Ilton	ST355171	16/7/92

FIVEHEAD RIVER			
FI1A	South Hill Farm	ST264168	5/8/92
FI1B	Bickenhall	ST281184	6/8/92
FI1C	Hatch Green	ST303195	7/8/92
FI1D	Below Elm Bridge	ST315197	13/8/92
FI1E	Upstream of Broad Bridge	ST324199	20/8/90
FI1F	Below Isle Abbots	ST354216	14/8/92
FI1G	Swell Drove	ST364222	21/8/90

- 7.2 All the sites were electric fished using pulsed DC fishing equipment operating at six hundred cycles per second. Both waded and boat sites were always fished upstream.
- 7.3 All sites were isolated using stop nets or large natural obstructions if these were present. Population estimates were obtained by three repeated fishings (runs) using a declining catch method at all sites except D01B and FI1F.
- 7.4 At the top of the Dowlish Brook site D01B was isolated by a very large downstream weir and contained no brown trout. One run was fished to estimate the population of fish species present. An additional site D01X was selected to provide information on the headwaters of this stream and fished with three runs.
- 7.5 On the Fivehead River thick weed growth prevented effective fishing at site FI1F. Two runs were fished and the results pooled to provide a minimum estimate. At site FI1G there were also weed problems and silt which hampered visibility.
- 7.6 The Habscore system, which attempts to relate habitat to trout population, was used at three sites D01X, DI1C and FI1A. All these sites were believed to be unpolluted and results were submitted to form part of a national database which is being compiled as part of an NRA research and development programme to widen the application of the Habscore technique.

8. RESULTS

- 8.1 All fish caught were measured and a large proportion were also weighed and had scales removed for age determination.
- 8.2 Figures 1 and 2 show respectively the biomass and population of all fish over 10 centimetres in length caught at each site on the River Isle. Figures 3 and 4 show the equivalent results from both the Dowlish Brook and River Ding. Figures 5 and 6 show the equivalent results from the Fivehead River.
- 8.3 All the figures showing biomass are drawn to the same scale to facilitate direct comparison. Each bar on Figures 1 to 6 is subdivided to indicate the species composition. Each

species is indicated by a consistent colour and shading style.

- 8.4 Growth rates have been derived for the major fish species on both the River Isle and Dowlish Brook and graphs will be tabled. There were insufficient fish caught on both the River Ding and Fivehead River to derive meaningful information on growth.

9. DISCUSSION

- 9.1 Both the Dowlish Brook and the River Ding have a gradient and habitat which means that all sites fished were typically dominated by trout or eels living in association with small species such as bullhead, stone loach and brook lamprey. On the River Isle and the Fivehead River there is a gradual change in gradient and habitat so that a brown trout regime changes to a cyprinid regime.
- 9.2 The upper reaches of the River Isle above Donyatt are exclusively salmonid waters. Downstream of Donyatt large cyprinid species become increasingly common and trout were not caught at any site below Ilford Bridges.
- 9.3 There was an indication during the survey that in the salmonid stretch of the river upstream of Donyatt, temperatures could approach 20 degrees C, the recommended maximum limit for salmonids. It was suspected that part of the problem arose from the effluent from Chard STW. Monitoring was initiated and proved inconclusive. The situation is aggravated by the history of water meadows on this part of the river. The watercourse often runs through the middle of fields and there are few trees to provide shade.
- 9.4 Chub are the dominant cyprinid species at most of the Isle sites below Donyatt. Dace were only present in significant numbers in the upper coarse fish reaches near Ilminster. It is interesting to note that roach achieve significance at sites below Ilford Bridges and unlike chub and dace do not overlap to any extent with brown trout.
- 9.5 Pike, although not present in large numbers, made a large contribution to biomass wherever they were caught.
- 9.6 The River Isle is characterised by its variety of flow types and instream features such as riffles, glides, runs and pools and the associated vegetation. For nearly all its length the substrate is excellent being mainly composed of flint of various sizes. Wherever possible this complexity has been conserved when routine river maintenance has been undertaken by NRA Flood Defence staff.
- 9.7 It was noted that at the time of the survey most of the cyprinids were caught from weedy runs and glides. The deep slack pools yielded few cyprinids and often produced only

pike and eels. Sites such as IS1D, IS1I, IS1K and IS1L were dominated by deep slack water. Sites such as IS1E, IS1H and IS1J were contrastingly dominated by glides and runs.

- 9.8 Consideration was given to the possibility that the deeper sites were more difficult to fish efficiently. An effective decline in catches in successive runs at these sites for most species suggests that this was not the case. Water in the one deep pool fished within site IS1E was sufficiently clear for the river bed to be visible and no fish were seen escaping whilst it was fished. There remains the possibility that eel numbers are underestimated from the deeper reaches.
- 9.9 In general the results from the River Isle are better than others achieved from Somerset rivers during recent years. This is demonstrated by Figure 7 which shows the fish biomass obtained from survey sites on the Rivers Isle, Sheppey, Axe and Cheddar Yeo.
- 9.10 The use of the high frequency electric fishing equipment has again resulted in significant catches of eels at all sites. On the river Isle eels were the dominant species at several sites both in terms of the numbers caught and in biomass.
- 9.11 An examination of the length frequency distribution of the total eel catch from all sites in the Isle catchment suggests a disturbing absence of young eels.
- 9.12 The results from the Dowlish Brook were most encouraging, as brown trout numbers here are the highest found in the Area outside West Somerset. The Brook did suffer two serious pollution incidents in 1985 and in 1988 but was restocked on both occasions in the year following the incidents. As this survey was undertaken three years since the last restocking in 1989, most of the trout caught will have been spawned in the Brook.
- 9.13 The District Council have indicated that they would like to provide a flood alleviation scheme for Dowlish Wake. It is important that the habitat features of this stream are protected in any such scheme.
- 9.14 Results from the River Ding appear to be poor by comparison with the Isle and Dowlish Brook. This watercourse is not believed to be polluted in any way and it may be that these results merely reflect the extreme low flows which appear to be a feature of this watercourse. Interpretation may well be helped by the use of the new Habscore system. At site DI1E flows on the Ding are divided and the habitat at this site would clearly not support fish over 10 centimetres in length.
- 9.15 Like the River Ding the results from the Fivehead River appear to be poor but again the very low base flows may be the problem. Water quality problems have been identified on a tributary which joins the main stream just below site FI1B.

This may explain the absence of brown trout from the next site downstream at FI1C.

- 9.16 Between sites FI1E and FI1F the river gradient shallows and the change to a coarse fishery is wholly expected. At the two lowest sites as already indicated there were sampling problems. It is clear nevertheless that the lower reaches of the Fivehead do constitute a reasonable coarse fishery. At certain times of year there is no doubt considerable exchange of fish with the River Isle and the Fivehead must be a valuable refuge and spawning area.
- 9.17 The weed problems on the Fivehead River appear to be closely correlated with the absence of trees in the lowest reaches. This area is also the length maintained by the Langport Internal Drainage Board.

10. CONCLUSIONS

- 10.1 In the light of the excellent results from the upper River Isle and the Dowlish Brook it would seem appropriate to extend the area embraced by the various water quality classifications.
- 10.2 Measures should be initiated to reduce the risk of high temperatures in parts of the upper River Isle. Discharges require monitoring and tree planting should be encouraged.
- 10.3 If the Habscore technique is recommended following current research, it should be used to examine whether the River Ding and Fivehead River trout populations are close to their potential.
- 10.4 The current NRA methods of routine maintenance are clearly sensitive to the rivers features and there are almost certainly benefits to the fishery as a result.
- 10.5 Every encouragement should be given to the local Internal Drainage Board to ensure that watercourses within its area of responsibility are managed according to the procedures now closely followed by the NRA.
- 10.6 The apparent shortage of young eels requires further study and investigation.

Figure WQ1

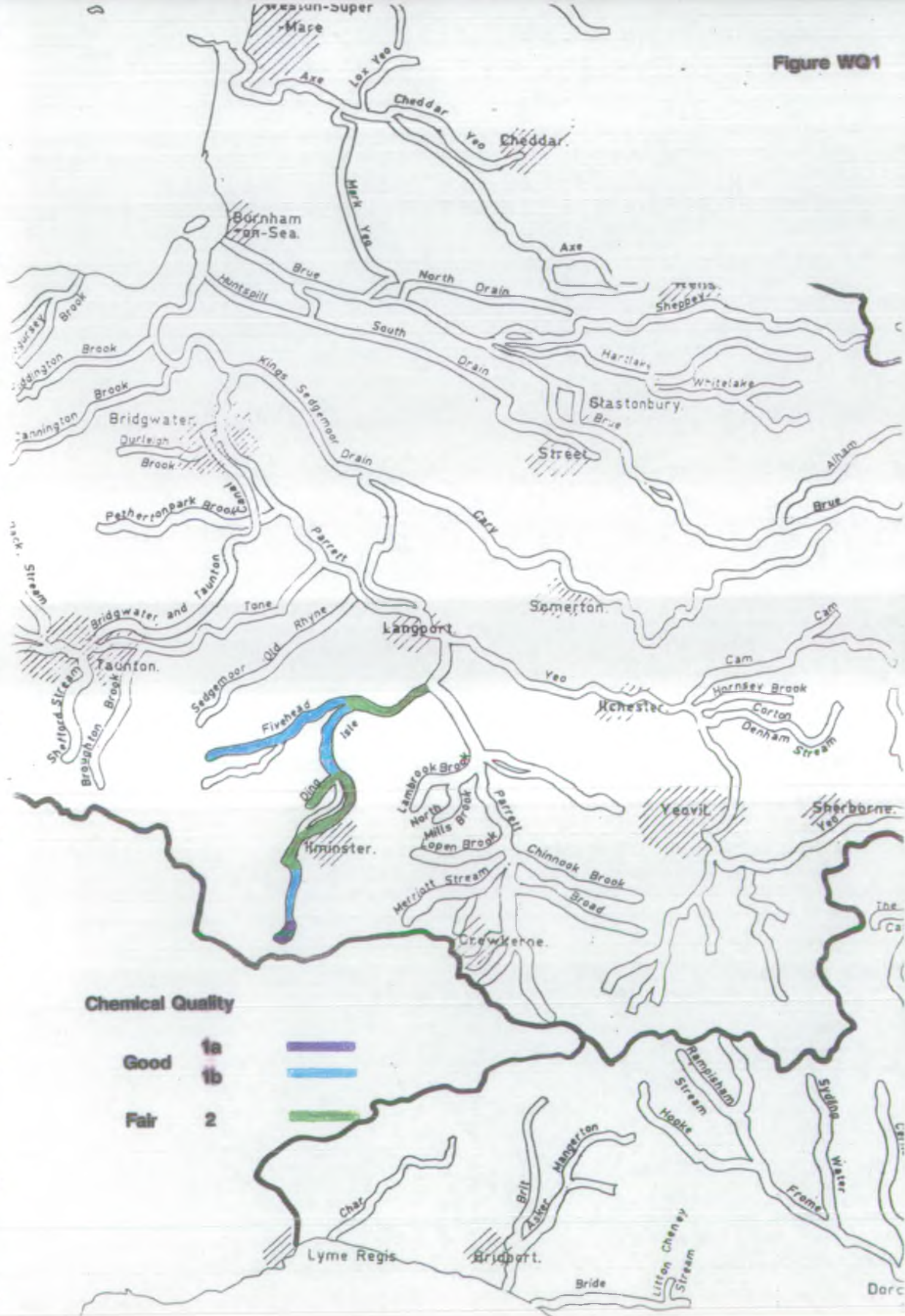
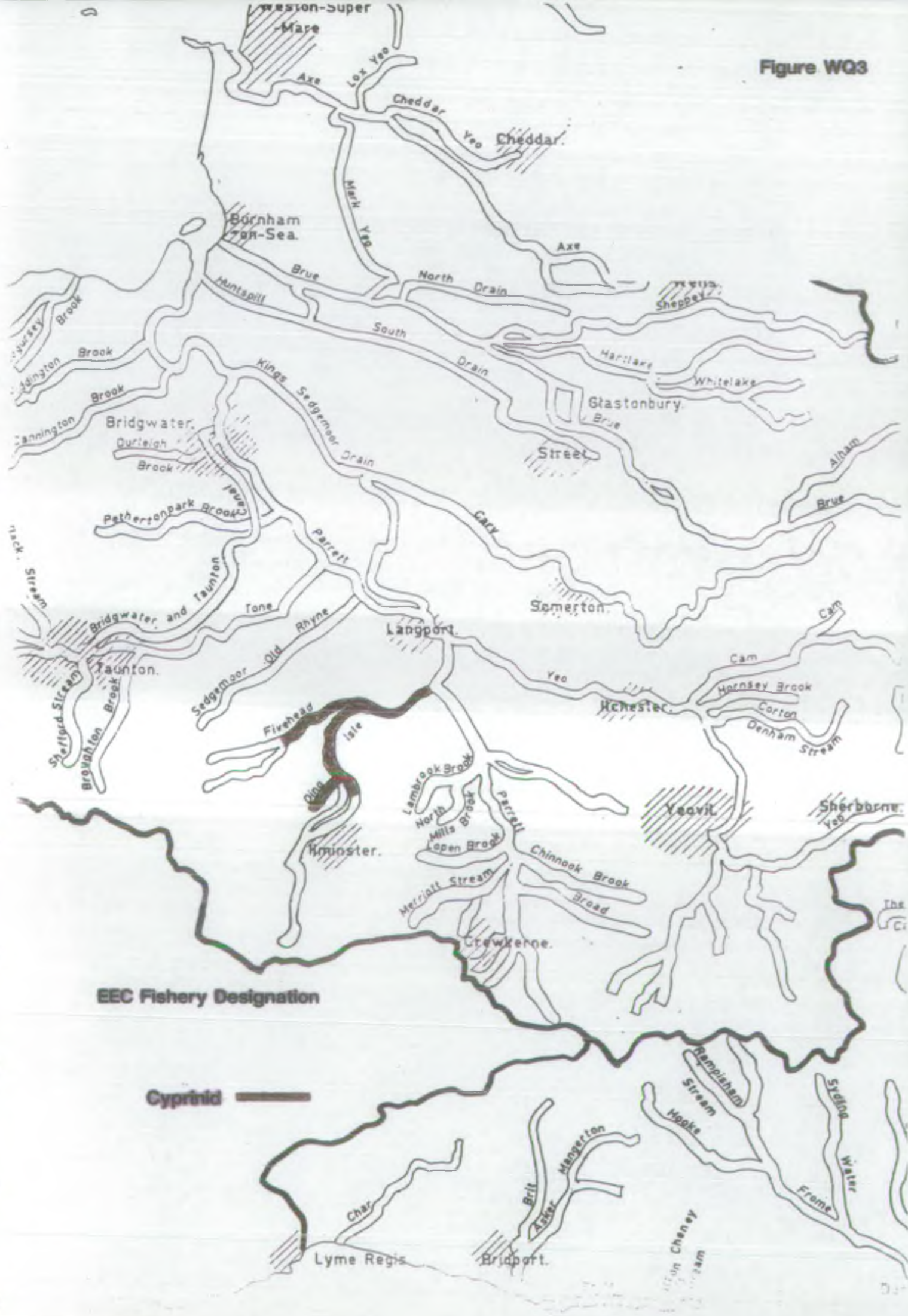


Figure WQ3



River Isle 1992

Biomass of fish (gms per square metre)

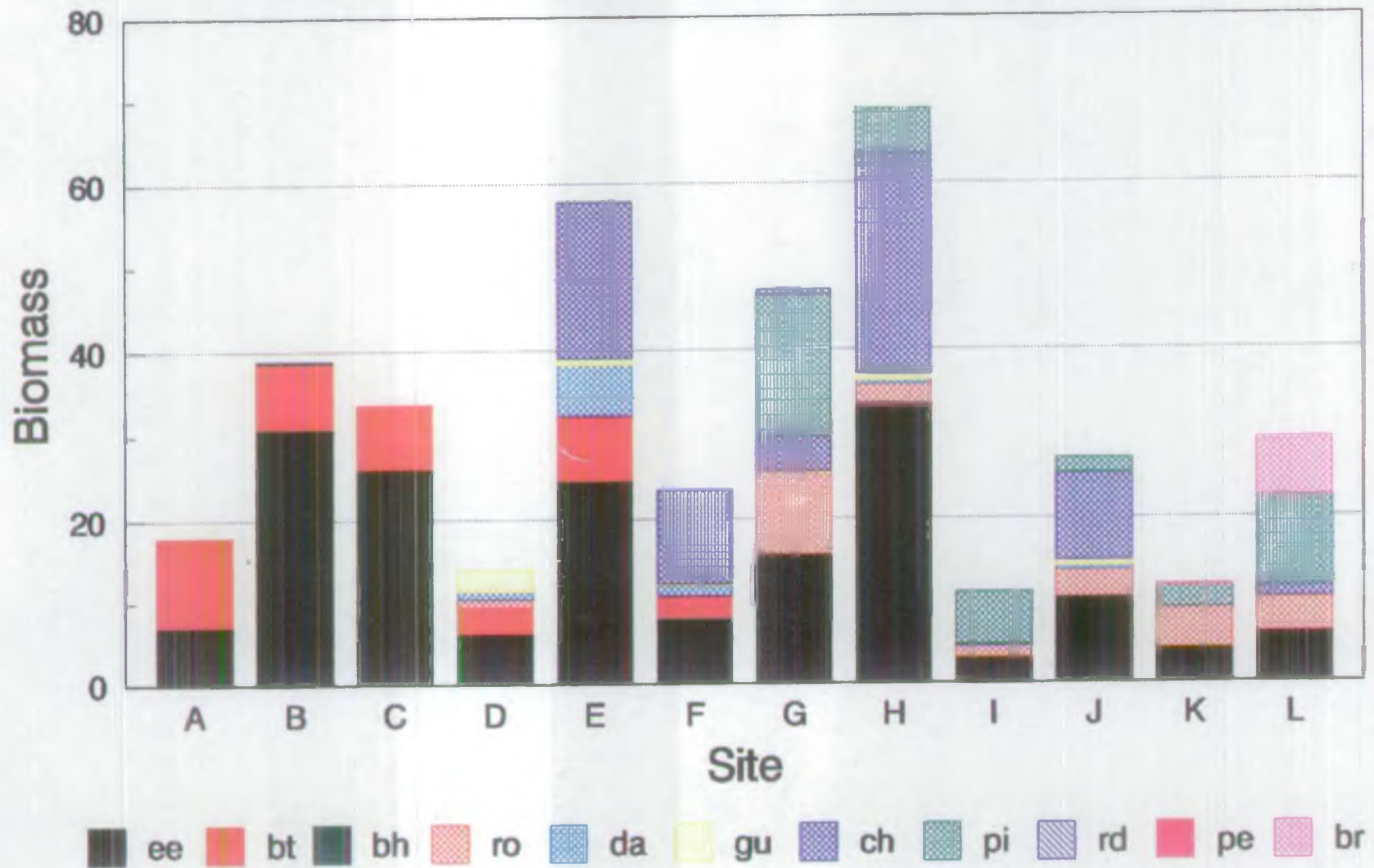


Figure 1

River Isle 1992

Population of fish caught (numbers)

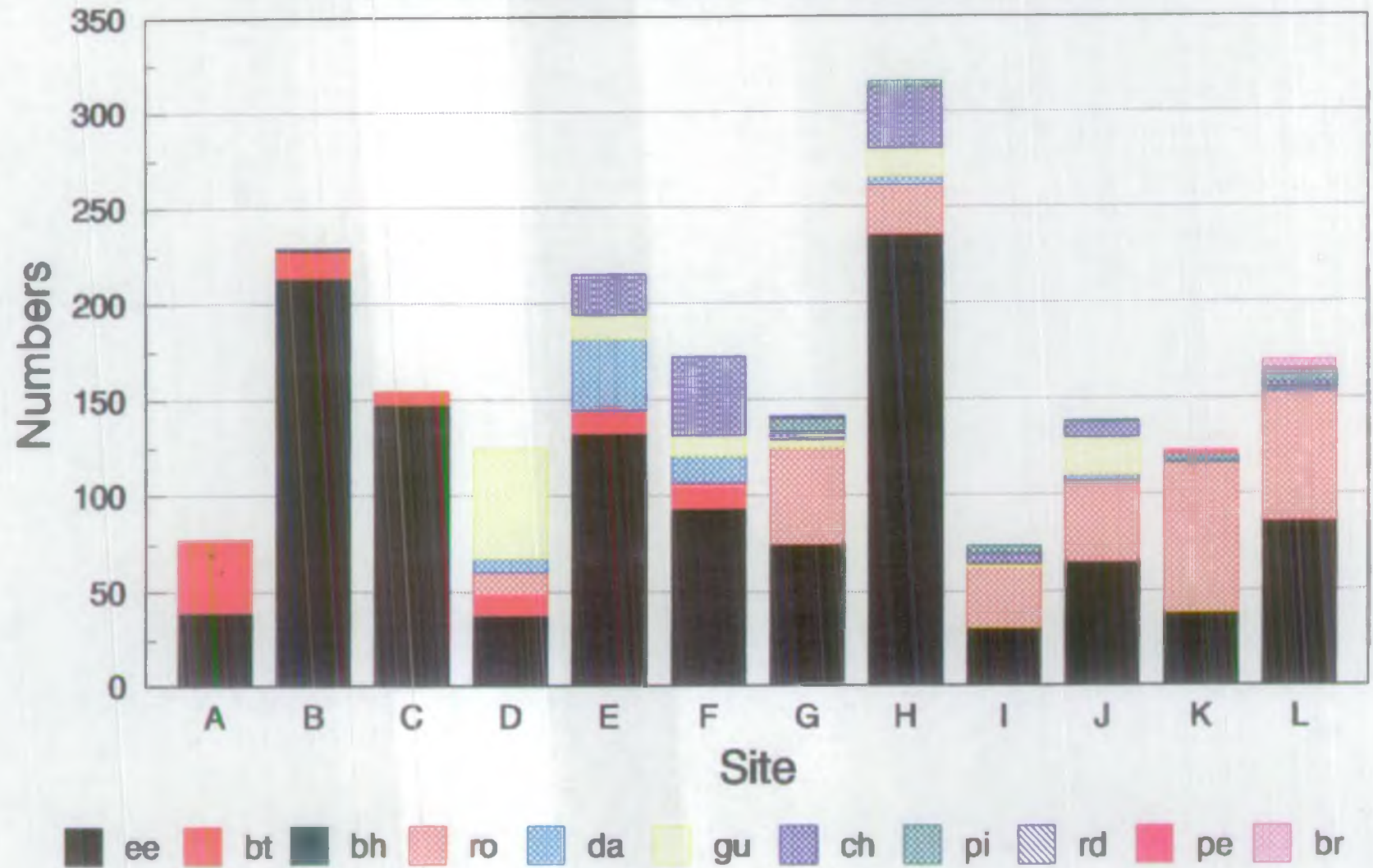


Figure 2

Dowlish Brook 1992

River Ding 1992

Biomass of fish (gms per square metre)

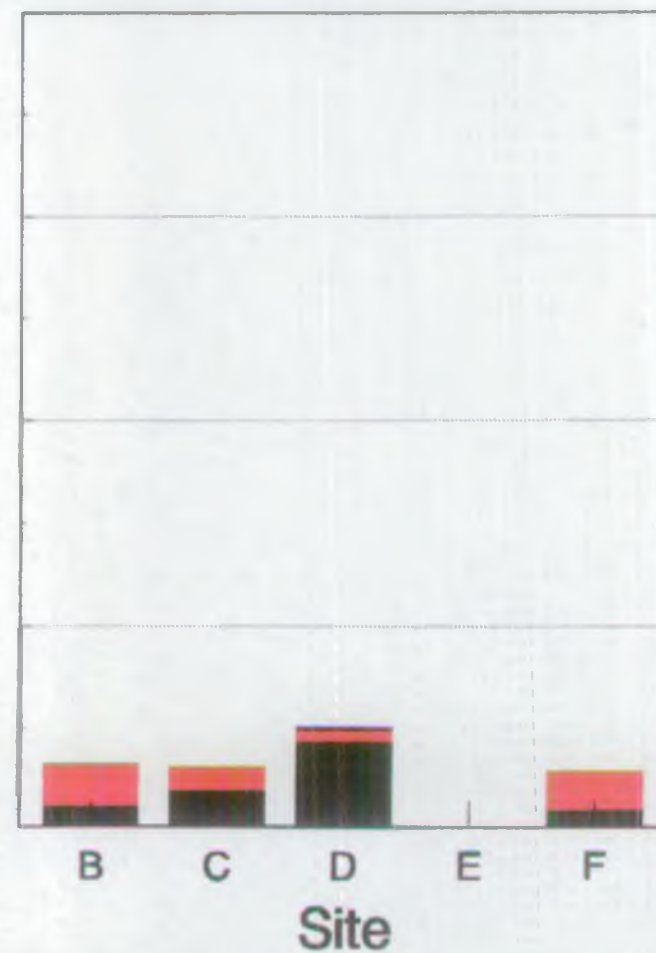
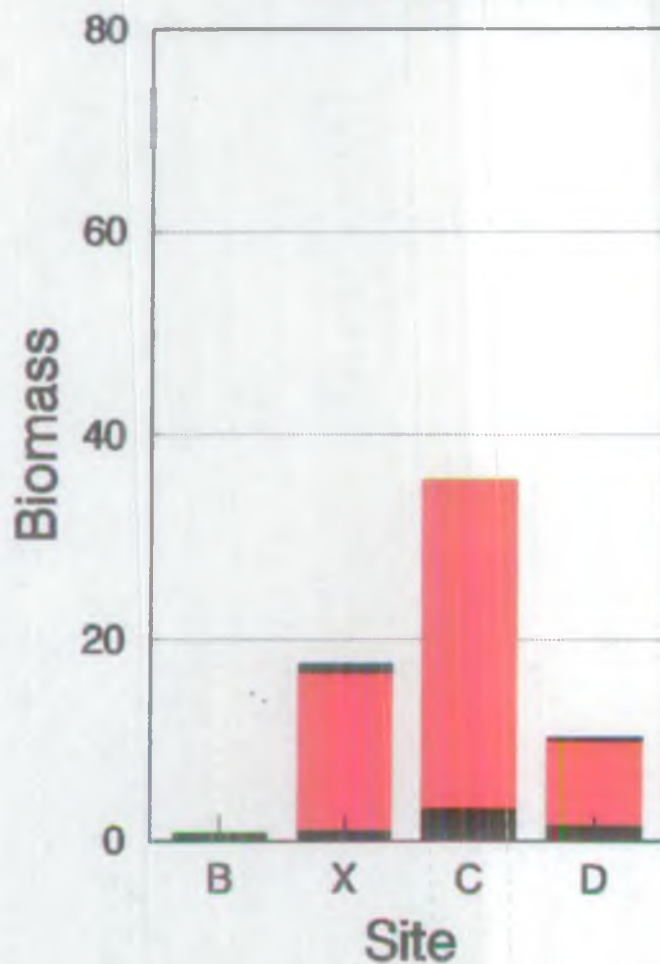


Figure 3

Dowlish Brook 1992

River Ding 1992

Population of fish caught (numbers)

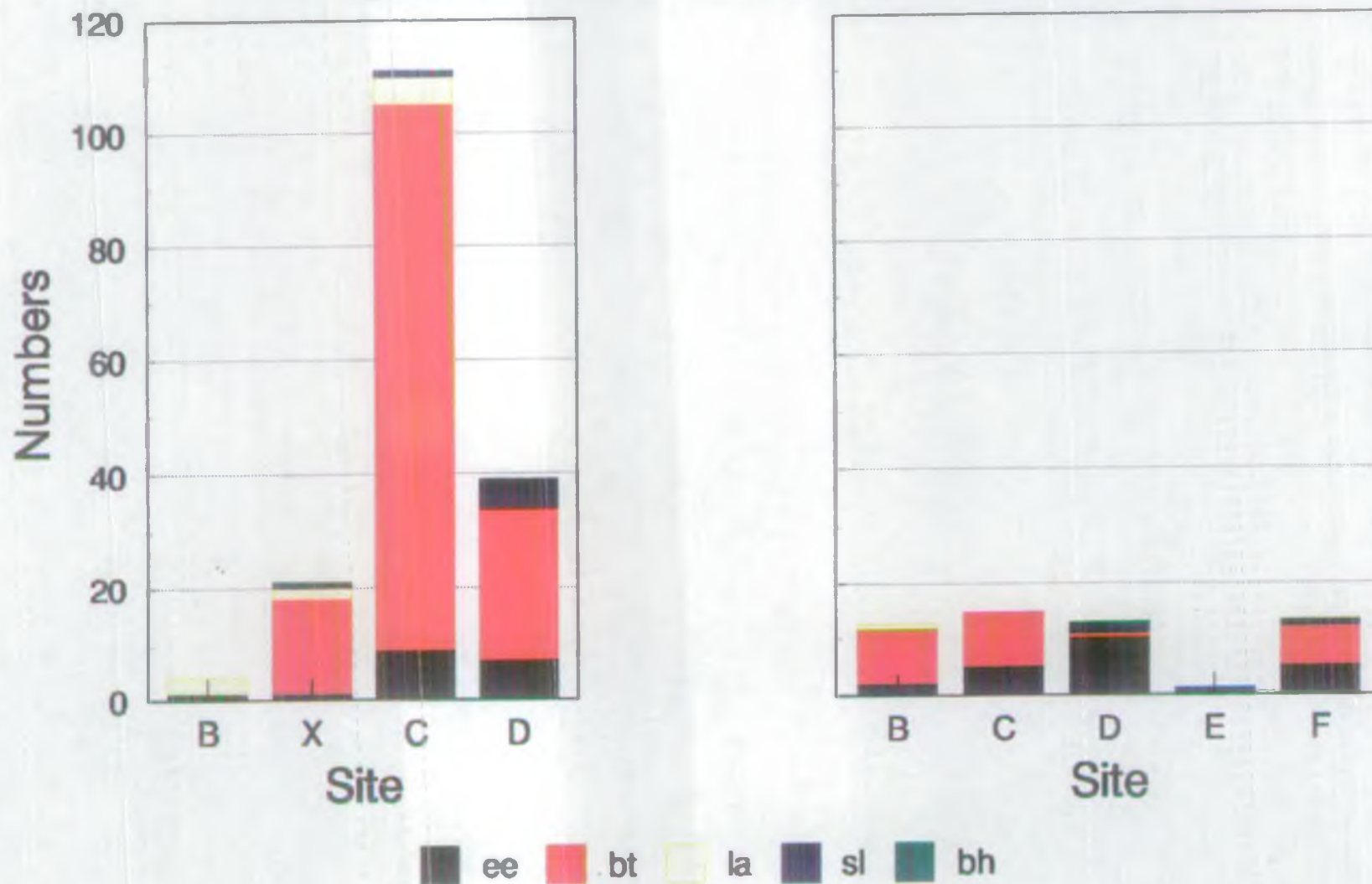
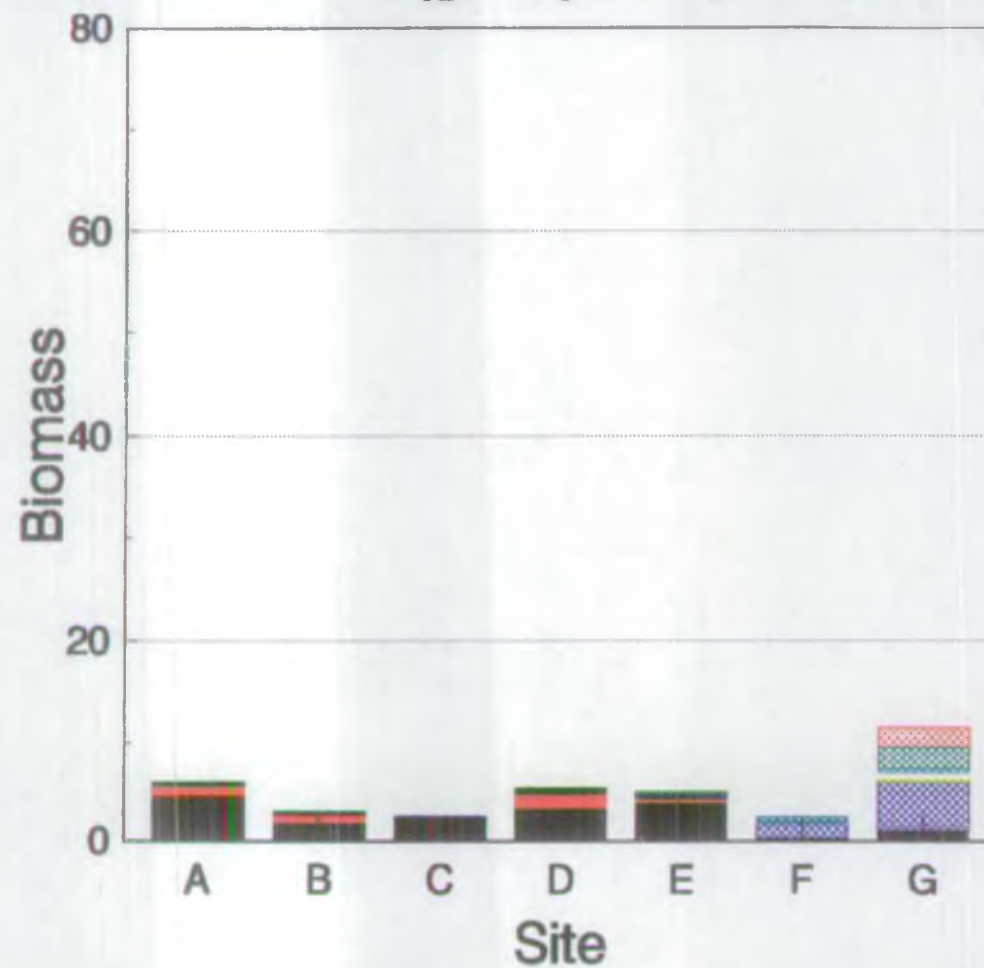


Figure 4

Fivehead River 1992

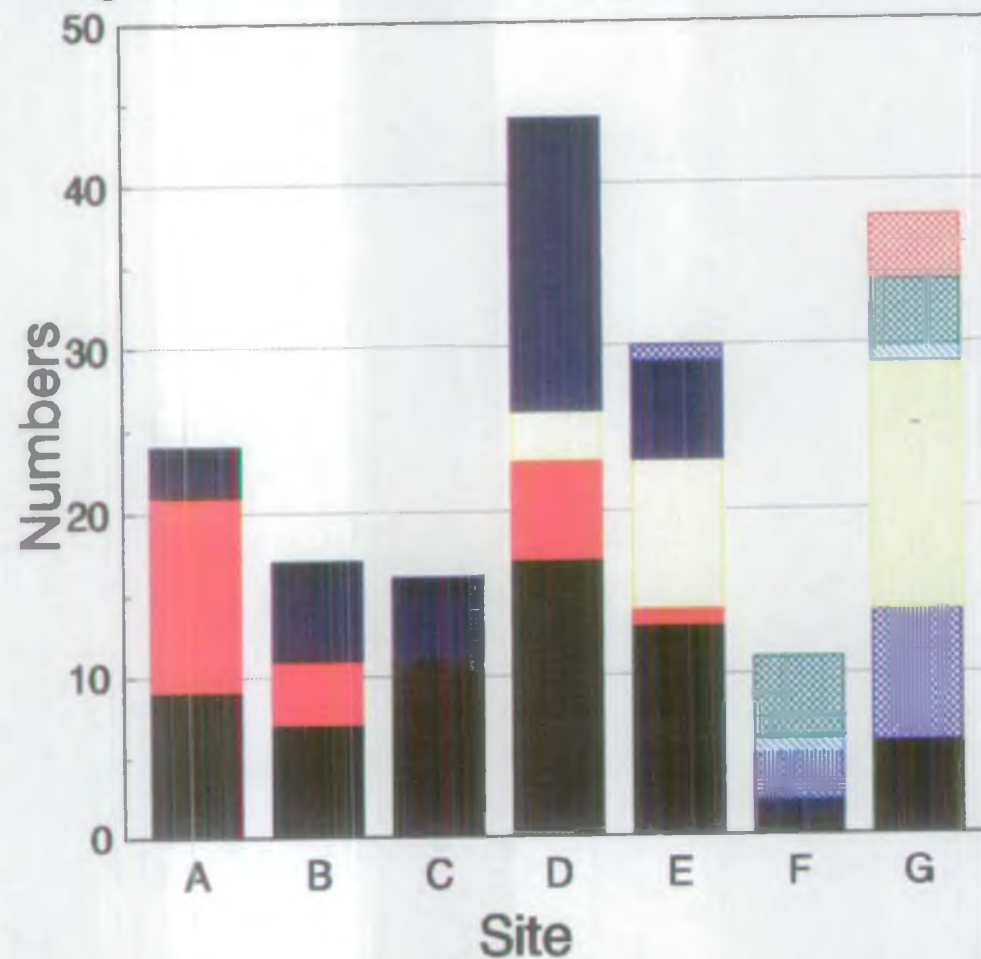
Biomass of fish (gms per square metre)



ee bt la sl ch gu da pi ro

Fivehead River 1992

Population of fish caught (numbers)

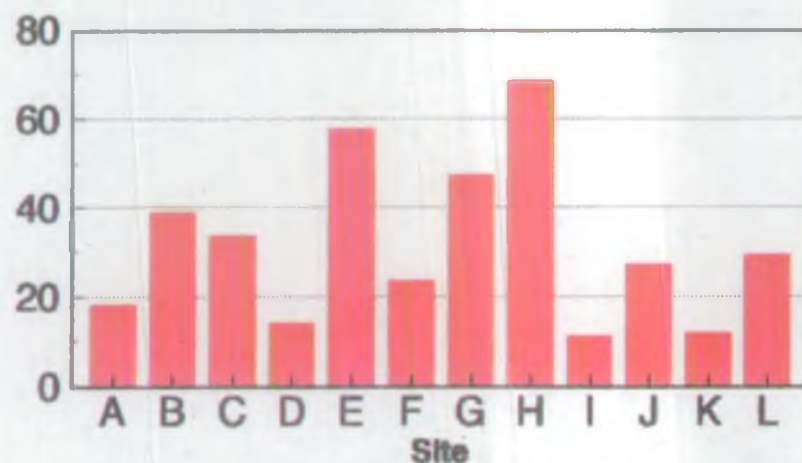


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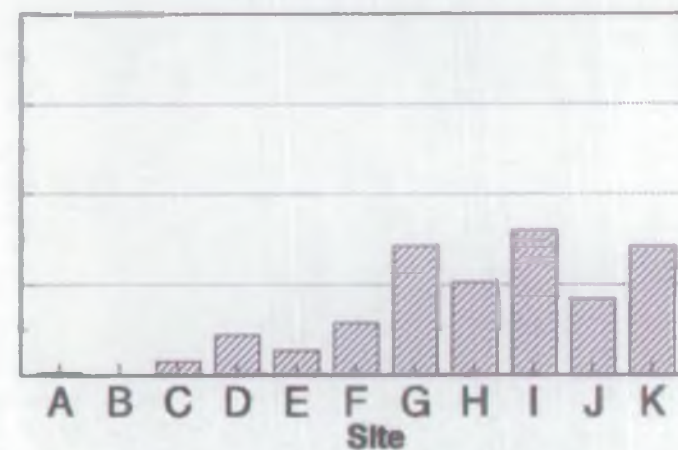
Figure 6

Comparison of Biomass (gms per square metre) of fish from four rivers

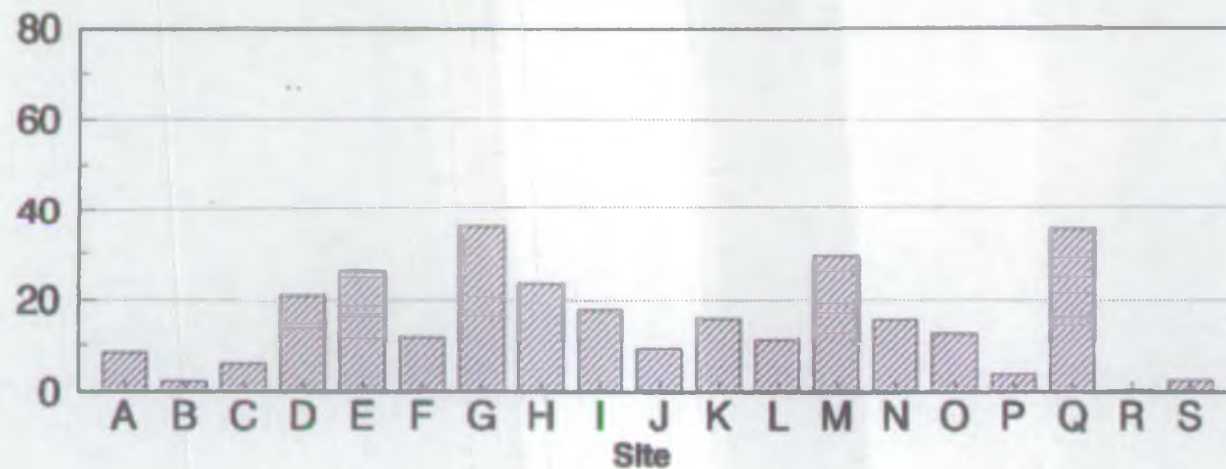
River Isle 1992



River Sheppey 1991



River Axe 1991



River Cheddar Yeo 1991

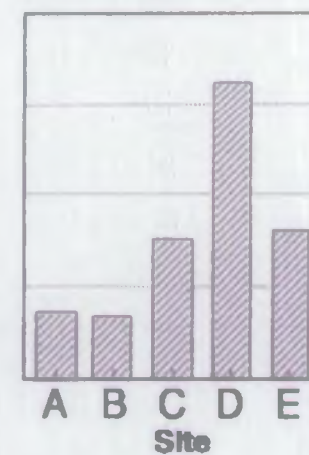
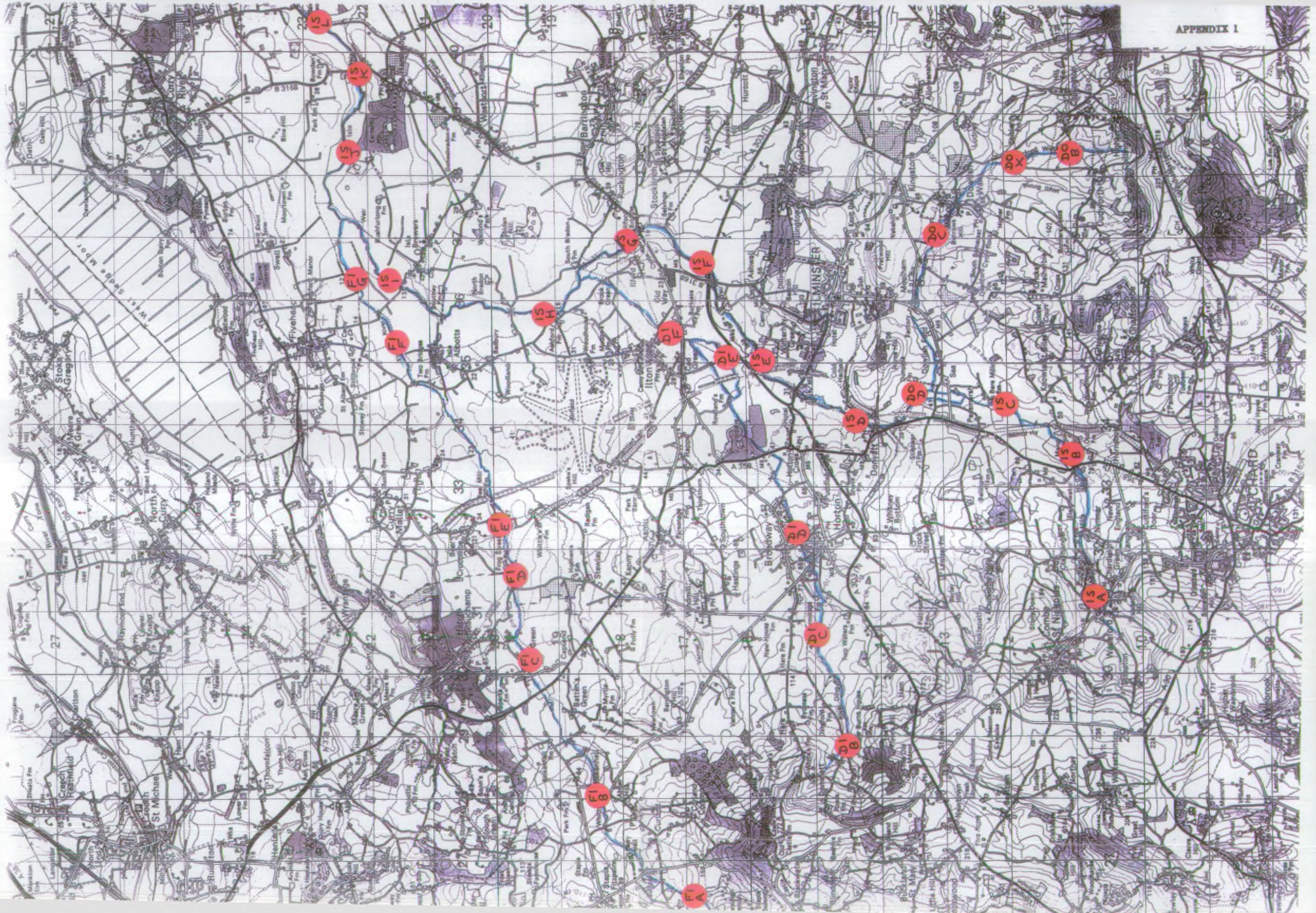


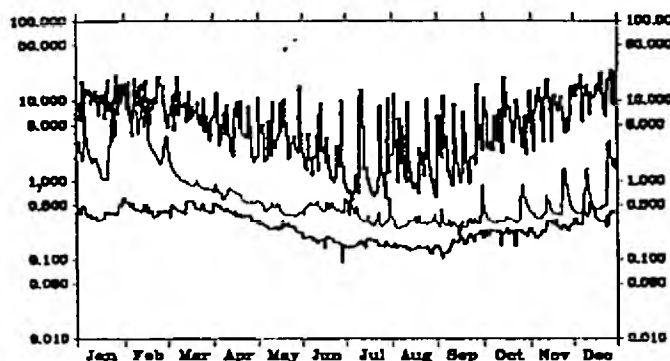
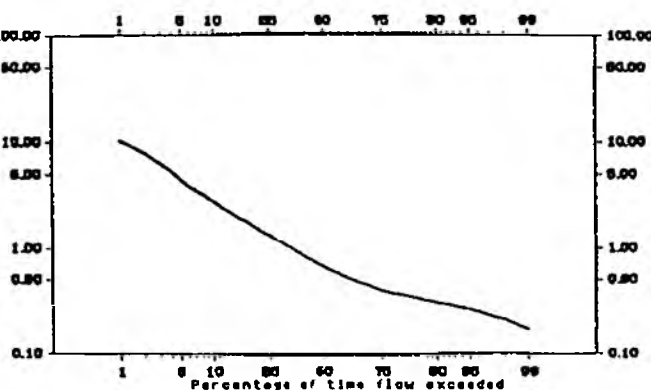
Figure 7



ISLE AT ASHFORD MILLStation Number
052004Gauged Flows
1962-1991

Measuring Authority: NRA - Wessex

Grid Reference: 31 (ST) 361 188

Daily Flow Hydrograph (m^3s^{-1})
Max. and min. daily mean flows from 1962 to 1991
excluding those for the featured year (1990)**Flow Duration Curve** (m^3s^{-1})Flow StatisticsUnits: m^3s^{-1} unless otherwise stated

Mean flow	1.30
Mean flow ($\text{ls}^{-1}/\text{km}^2$)	14.46
Mean flow ($10^6\text{m}^3/\text{yr}$)	41.1
Peak flow & date	28.8 20 Dec 1981
Highest daily mean & date	23.9 27 Dec 1979
Lowest daily mean & date	0.091 28 Jun 1964
10 day minimum & end date	0.134 29 Aug 1976
60 day minimum & end date	0.149 29 Aug 1976
10% exceedance	2.812
50% exceedance	0.672
95% exceedance	0.264
Mean annual flood	25.0
Bankfull flow	33.00

Catchment Characteristics

Catchment area (km^2)	90.1
Level stn. (mOD)	14.60
Max alt. (mOD)	274
IH Baseflow index	0.48
FSR slope (m/km)	5.10
1941-70 rainfall (mm)	943
FSR stream freq. (junctions/ km^2)	0.70
FSR percentage urban	0

Factors Affecting Flow Regime

- Flow influenced by groundwater abstraction and/or recharge.
- Augmentation from effluent returns.

Rainfall (mm)

(1962-1989)

Runoff (mm)

(1962-1991)

	Mean	Max/Yr	Min/Yr	Mean	Max/Yr	Min/Yr
Jan	108	221 1974	15 1964	74	153 1974	14 1976
Feb	73	143 1974	4 1965	46	160 1990	16 1965
Mar	81	145 1963	14 1973	55	180 1982	16 1973
Apr	52	127 1966	5 1964	33	67 1966	12 1976
May	46	137 1967	17 1989	24	69 1983	8 1976
Jun	58	148 1980	7 1976	17	39 1980	5 1976
Jul	53	149 1965	13 1976	14	44 1968	5 1976
Aug	65	127 1986	17 1983	14	39 1961	4 1976
Sep	69	172 1976	6 1971	15	70 1974	5 1964
Oct	88	246 1976	8 1970	28	145 1976	8 1964
Nov	87	174 1978	25 1980	44	109 1982	9 1964
Dec	163	193 1989	22 1980	68	143 1981	21 1962
Annual	667	1153 1974	583 1964	456	651 1974	176 1964

Station and Catchment Description

Crump profile weir for low flows, crest 6.71m broad. Modular limit of 0.6m. Velocity-area station for higher flows (downstream weed growth affects the stability of the stage-discharge relationship). Flood plain storage in catchment. Bankfull: 2.438m. Bypassing of station occurs at high flows. Minor groundwater abstractions in catchment.

Evidence of mill/factory discharges on charts.

Impermeable catchment - predominantly Lower Lias clays. Very responsive. Land use - rural.

Summary of Archived DataGauged Flows and Rainfall

Key:	All rain-fall	Some or no rain-fall	81234 56789
All daily, all peaks	A	a	1960s --eAA AAAAA
All daily, some peaks	B	b	1970s AAAAA AAAAA
All daily, no peaks	C	c	1980s AAAAA AAAAA
Some daily, all peaks	D	d	1990s ee
Some daily, some peaks	E	e	
Some daily, no peaks	F	f	
No gauged flow data	-	-	

Naturalised Flows

Key:	No naturalised flow data available.
All daily, all monthly	A
Some daily, all monthly	B
Some daily, some monthly	C
Some daily, no monthly	D
No daily, all monthly	E
No daily, some monthly	F
No naturalised flow data	-