FISHERY SURVEY OF THE CONGRESBURY YEO 1994

1. INTRODUCTION

1.1 This fishery survey of the River Yeo (Congresbury) was undertaken during July and August 1994.

1.2 The river was last surveyed in 1986 though on that occasion no work was done below Congresbury Bridge. Above Congresbury Weir most of the sites fished in 1986 were resurveyed in 1994. In this latest survey several new sites were added to represent the river from below Congresbury Weir to the tidal limit.

2. TOPOGRAPHY AND GEOLOGY

2.1 The upstream part of the Congresbury Yeo catchment is dominated by the steep Mendip escarpment on the south. On the north side are the lower hills above Wrington, Redhill, Butcombe and Nempnett Thrubwell. Downstream of Congresbury the river traverses a wide almost featureless plain on its way to the Bristol Channel.

2.2 The Mendip escarpment is up to 200 metres high and consists in the main of hard Carboniferous limestone. The high rainfall on the Mendip plateau, about 1100 mm per year, sinks into the limestone and reappears at large springs at Rickford and Langford.

2.3 The hills above Wrington and Redhill are also mainly limestone and their groundwater feeds springs between Lye Hole and Congresbury that provide valuable summer base flow to the river.

2.4 From Nempnett Thrubwell to Butcombe the hills are of Triassic reddish marl and mudstone (Mercia Mudstone) with local plateau-like caps of Lias limestone. The marls enclose a thick bed of sandstone, the Butcombe sandstone, which stores some water but otherwise these hills produce little water in a dry summer.

2.5 The low ground around Blagdon Reservoir also consists of the same relatively impermeable Triassic strata and these marls, mudstones and the Butcombe sandstone extend downstream to Perry Bridge. On the south side of the river they are concealed under wide spreads of Head (periglacial stony clay).

2.6 From Congresbury to the sea the level plain of estuarine clay deposited by repeated tidal flooding is only broken by the low hills around Yatton and Claverham.

3. FLOW AND ABSTRACTION

3.1 A gauging station at Iwood provides flow data for the River Yeo. Records indicate an average daily flow of 1.03 cumecs.

Further details on the available statistics are included as Appendix 3. **APPENDIX 3**

3.2 There have been no significant changes in abstraction since 1986. The most significant abstraction from the Yeo is that associated with the Blagdon Lake reservoir system which affects not only the Yeo but the major tributaries, the Rickford Stream and Langford Brook. The quantities involved and the implications for the watercourses were fully discussed in the 1986 report.

4. WATER QUALITY

4.1 Chemical water quality as shown in the 1993 General Quality Assessment is measured at five sampling points on the River Yeo. The upper site indicates that the water in that reach is in Class D "Fair" whilst the other sites are all Class B "Good". At the upper site dissolved oxygen is the class limiting criterion but both ammonia concentration and BOD are still only class C.

4.2 Biological water quality is assessed at two sites. The most recent available results are from 1992. At both sites biological quality was good and very close to that predicted from the physical habitat using the RIVPACS model.

4.3 The River Yeo is designated under the EEC Freshwater Fish Directive as "salmonid" from Perry Bridge to the Wrington Stream confluence and as "cyprinid" from that confluence to Tutshill Ear, the tidal limit.

4.4 There have been no significant water quality problems on the Congresbury Yeo in the last two years.

5. FISHERY SURVEY METHOD

5.1 New sample sites were chosen by dividing the watercourse into two kilometre lengths within each of which a one hundred metre length was selected using random numbers. Where survey sites existed in 1986 a sample site was selected to represent each two kilometre reach. On the Rickford Stream and Langford Brook all previous sites were fished. Appendix 2 lists the sample sites with their grid references. The location of all sample sites is shown on the map, Appendix 1. **APPENDIX 2** **APPENDIX 1**

5.2 Below Iwood all the sites were electric fished from a mini-boom boat using pulsed DC fishing equipment operating at six hundred cycles per second. Above Iwood all sites were waded using the same equipment. Sites were always fished upstream and were isolated using stop nets.

5.3 All fish over 10 centimetres and many under that size were measured and weighed. Samples of scales were also taken from many fish for future examination. Where there were large numbers of small fish they were sorted by species and counted and weighed in bulk. At the Congresbury Church site part of a large catch of eels was bulk weighed.

5.4 Population estimates of larger fish were obtained where possible by three repeated fishings (runs) using a declining catch method at all sites.

6. RESULTS

6.1 Figures 1 and 2 show respectively the biomass and population of all fish over 10 centimetres in length caught at each site. Each bar on Figures 1 and 2 is subdivided to indicate the species composition. Each species is indicated by a consistent colour and shading style. **FIGURES 1 & 2**

6.2 Figures 3 and 4 show respectively the biomass and population of all fish under 10 centimetres in length caught at each site including those that were counted and weighed in bulk. **FIGURES 3 & 4**

6.3 Figure 5 shows the length frequency of brown trout and compares the results from the main River Yeo with the results from the Rickford Stream and Langford Brook tributaries. Figure 5 can be compared in turn with Figure 6 which is an equivalent plot from the 1986 survey. **FIGURE 5** **FIGURE 6**

6.4 Actual results used to derive the figures are included within Appendix 2. **APPENDIX 2**

7. DISCUSSION

7.1 The poor water quality results at the uppermost site on the River Yeo are being investigated. A single very low reading of dissolved oxygen which put this site in Class D may be erroneous but there was clearly one poor sample in 1993 when both BOD and ammonia concentration were high and sufficient to put this site in Class C.

7.2 The low numbers of trout at Emley Lane, the uppermost site on the Yeo, lends some support to the possibility of a water quality problem. It is also possible that recruitment here is poor. The next Yeo site downstream at Perry Bridge, which had a high trout population, lies adjacent to the Rickford Stream which is clearly a good nursery area. On the Yeo trout are probably prevented from moving upstream from the Perry Bridge area to Emley Lane by a high weir situated just upstream of the Rickford Stream confluence.

7.3 At Iwood there is no evidence of successful trout spawning but the Yeo is now stocked successfully with brown and rainbow trout. Survey results here are dependent on the timing of stocking and fishing pressure. The fishing association would like the habitat here to be improved probably with the installation of current deflectors. The large brown trout caught below the M5 was probably an "escapee" from this stocked stretch.

7.4 Below Congresbury the fish population is dominated by eels and pike. There are small numbers of generally small roach and there were only a few fish over 10 cm in length caught.

7.5 As in 1986 the survey has revealed the importance of the Rickford Stream and Langford Brook as trout spawning and nursery areas (Figures 5 & 6). FIGURES 5 & 6

7.6 The biomass and density of fish is generally good in the River Yeo upstream of Iwood including the two tributaries. The amount of young trout in this latest survey shows a big increase over 1986. This is particularly marked on the Langford Brook but there is also an increase on the main River Yeo. The number of larger brown trout has declined but the overall population had a better structure in 1994 than it did in 1986.

7.7 The upper site on the Langford Brook had been polluted prior to the 1986 survey. In 1994 there were no known serious water quality problems and the site had also benefited from fencing which had prevented stock entering the stream and allowed herbaceous cover to develop. One peculiarity of the findings here was an absence of bullheads which may indicate an obscure problem at this site.

7.8 The lower site on the Langford Brook was realigned prior to the 1986 survey. The stream has recovered some habitat features but is still far short of the natural situation. A scheme for restoring a more meandering course has been drawn up and discussed with the landowner.

7.9 Results from both sites on the Rickford Stream are very comparable with 1986. This was expected as there were no obvious changes in habitat.

7.10 Below Congresbury the river appears to be dramatically over-widened. Although the water quality is apparently good the physical habit is very poor. The Congresbury Church site was very wide, shallow and extremely silty and it was no surprise that it produced huge numbers of eels. All the downstream sites were covered with filamentous algae especially Enteromorpha spp. prior to the survey. Electric fishing was only possible at most sites after a routine weed cut had been completed by NRA Flood Defences. Although this extreme plant cover was only present for a short period in 1994 it could have had an impact on water quality if it had not been cut.

8. CONCLUSIONS

8.1 Further investigation is needed to investigate the possibility of a water quality problem above Emley Lane. Ideally this should include an assessment of macroinvertebrate diversity.

8.2 The survey has again indicated the importance of the two main tributaries as a spawning and nursery area for brown trout. it is important that the habitat and flow of water in these tributaries is carefully protected. Any proposal to increase abstraction should be resisted.

8.3 There is a case for extending the range of waters in this catchment currently designated under the EEC Freshwater Fish

Directive. A mechanism also needs to be developed which would identify important streams for fisheries given that in many instances the EEC Freshwater Fish designation would introduce unrealistic demands for water sampling.

8.4 There is a strong case for habitat improvement in the lower reaches. Potential methods have already been worked out to improve the lower Langford brook and the Iwood reach of the Yeo. Below Congresbury improvement is likely to be more complex and expensive. A major scheme to improve both the fishery and the wider wildlife interest is needed. Fisheries and conservation staff need to work together with river engineers to develop some proposals.

CONGRESBURY YEO 1994

BIOMASS OF ALL FISH > 10 cm LENGTH

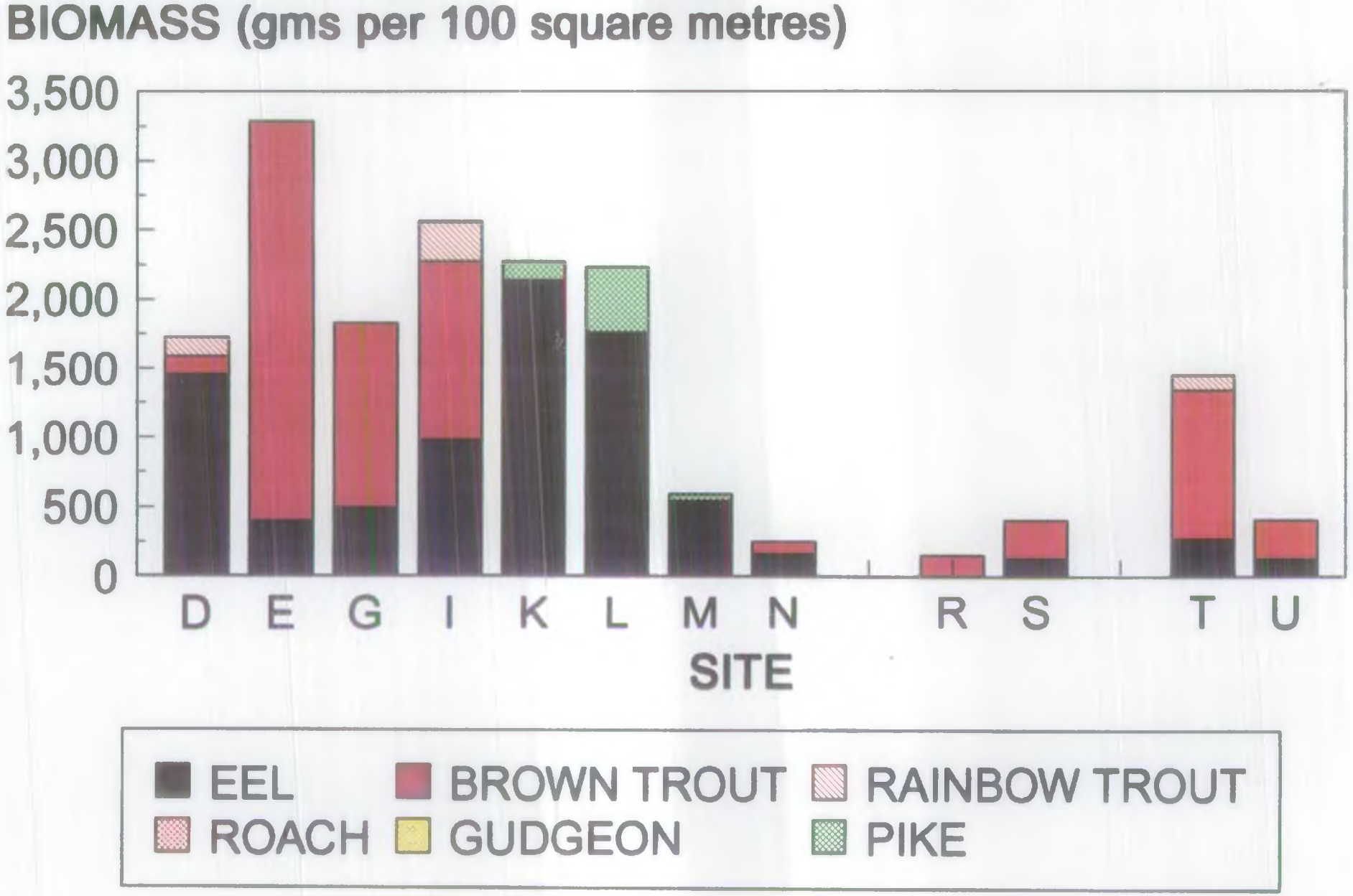


FIGURE 1

CONGRESBURY YEO 1994

DENSITY OF ALL FISH > 10 cm LENGTH

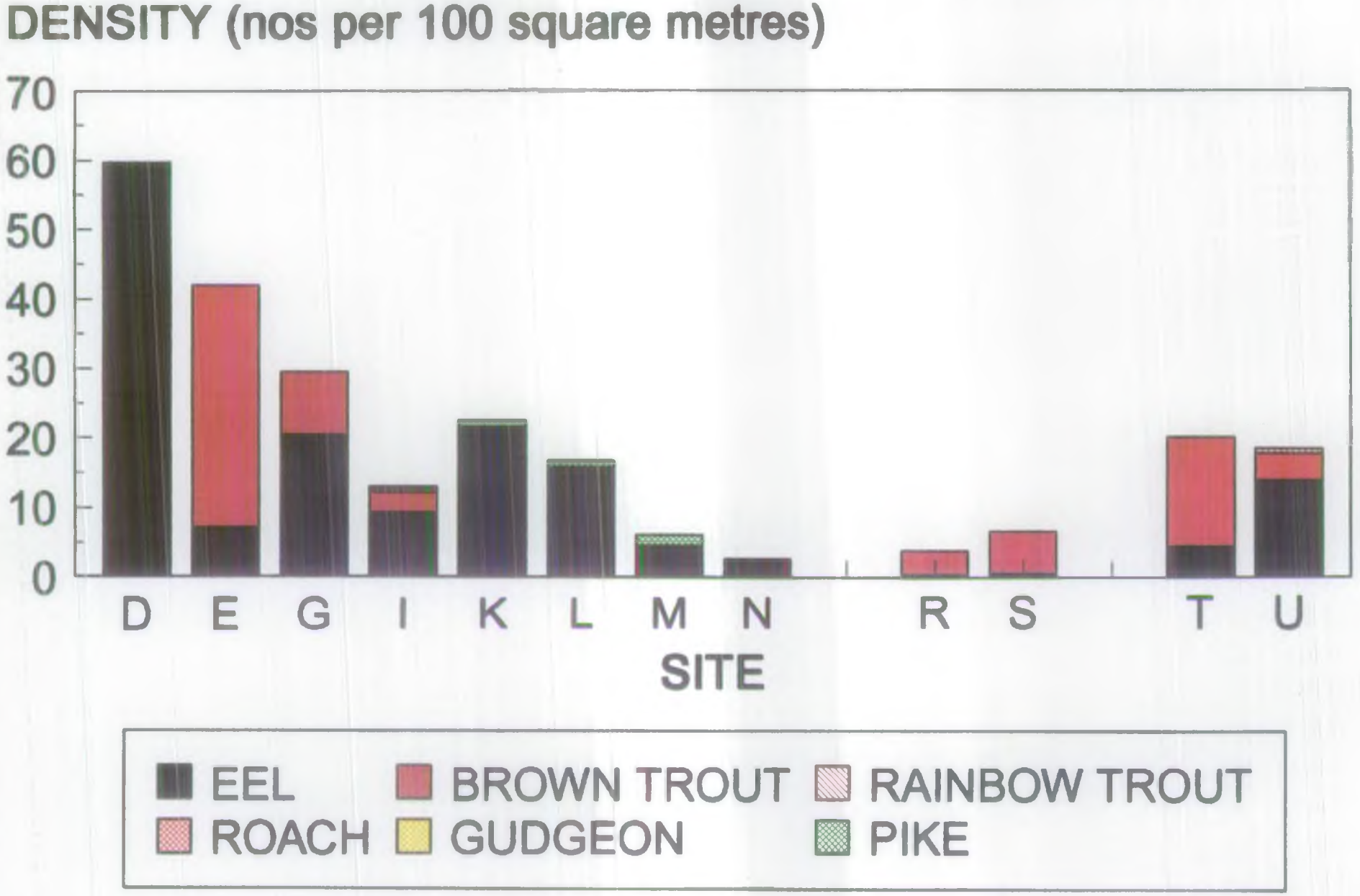


FIGURE 2

CONGRESBURY YEO 1994

BIOMASS OF ALL FISH < 10 cm LENGTH

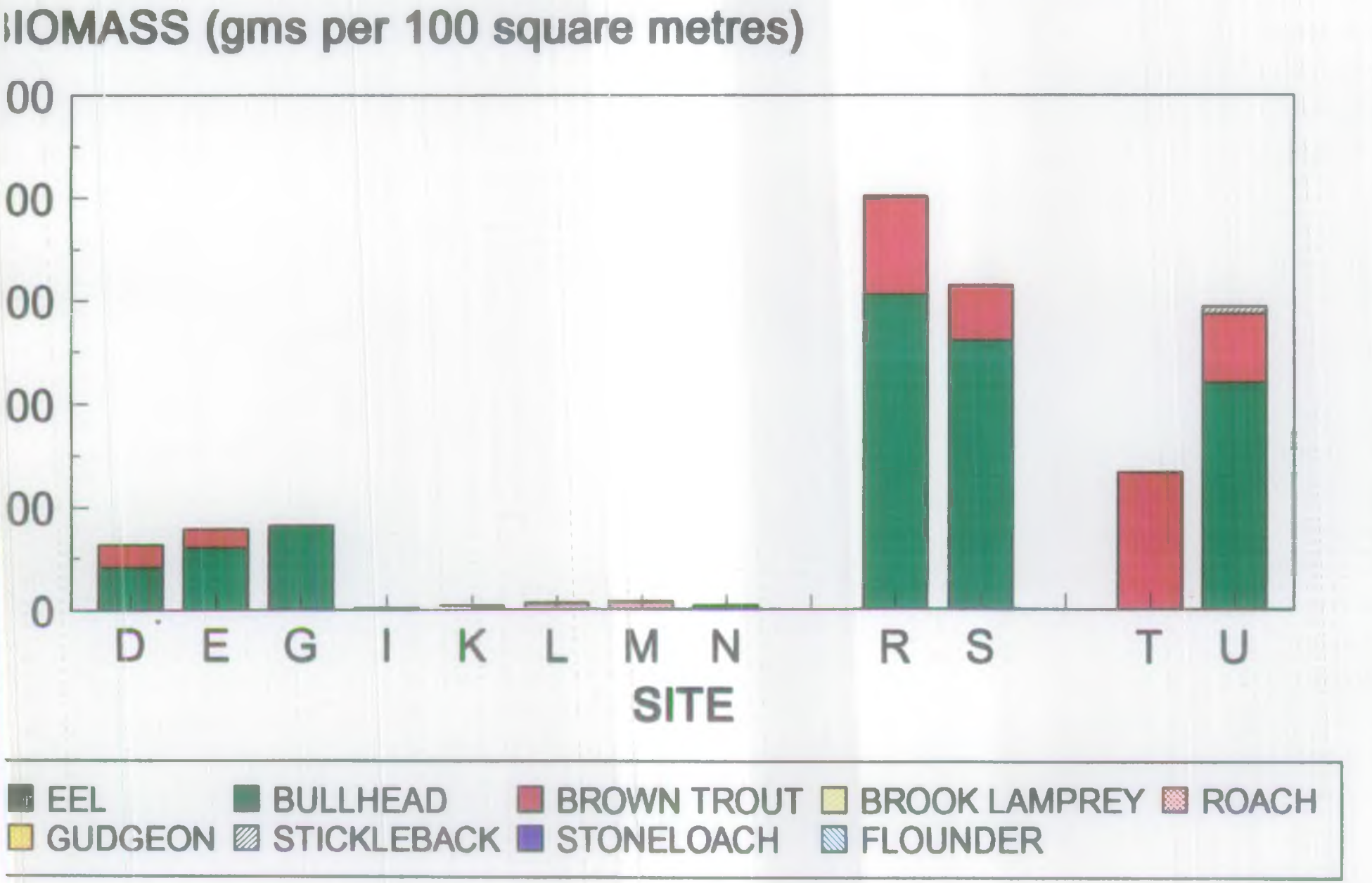


FIGURE 3

CONGRESBURY YEO 1994

DENSITY OF ALL FISH < 10 cm LENGTH

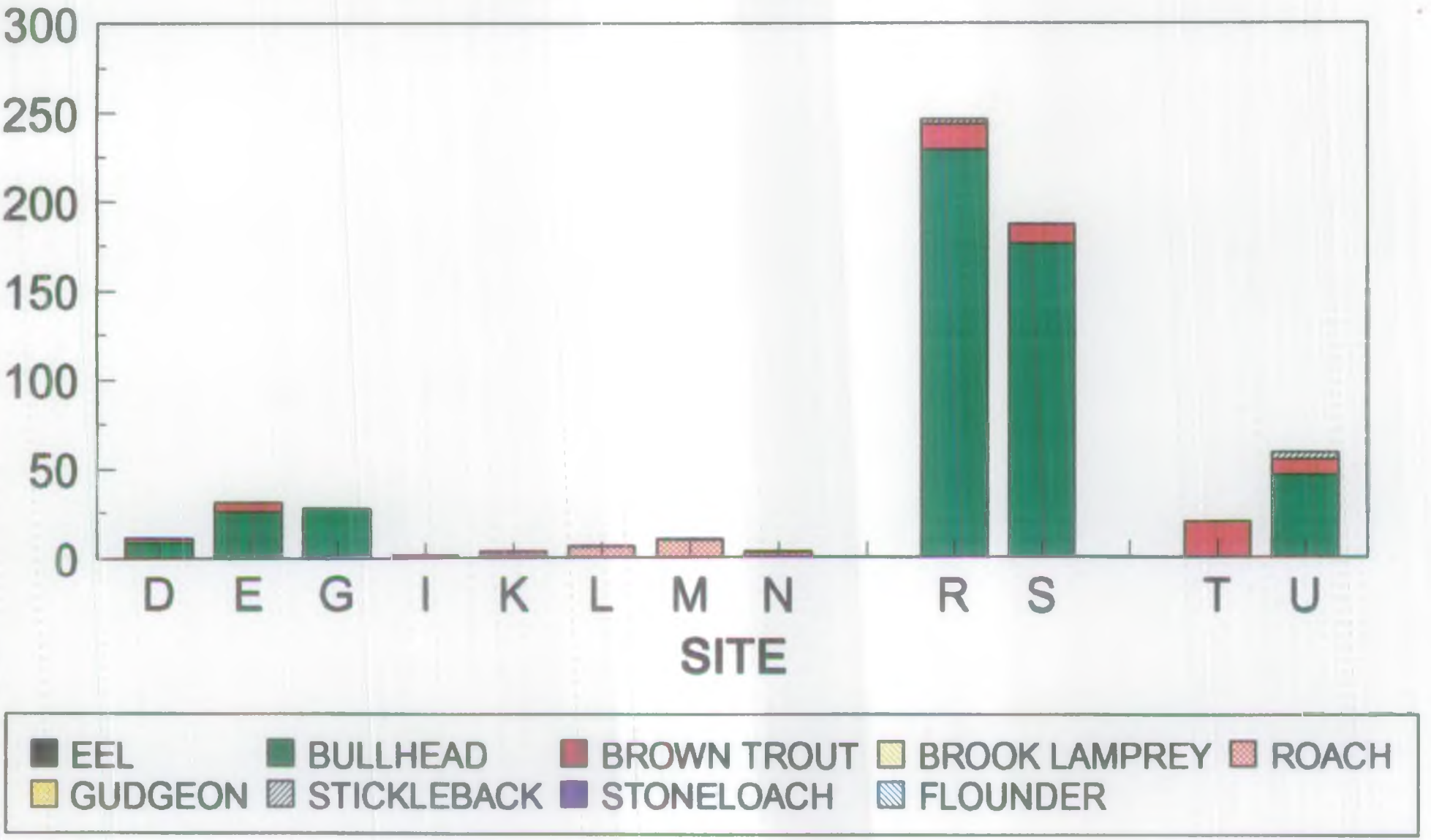


FIGURE 4

FIGURE 5

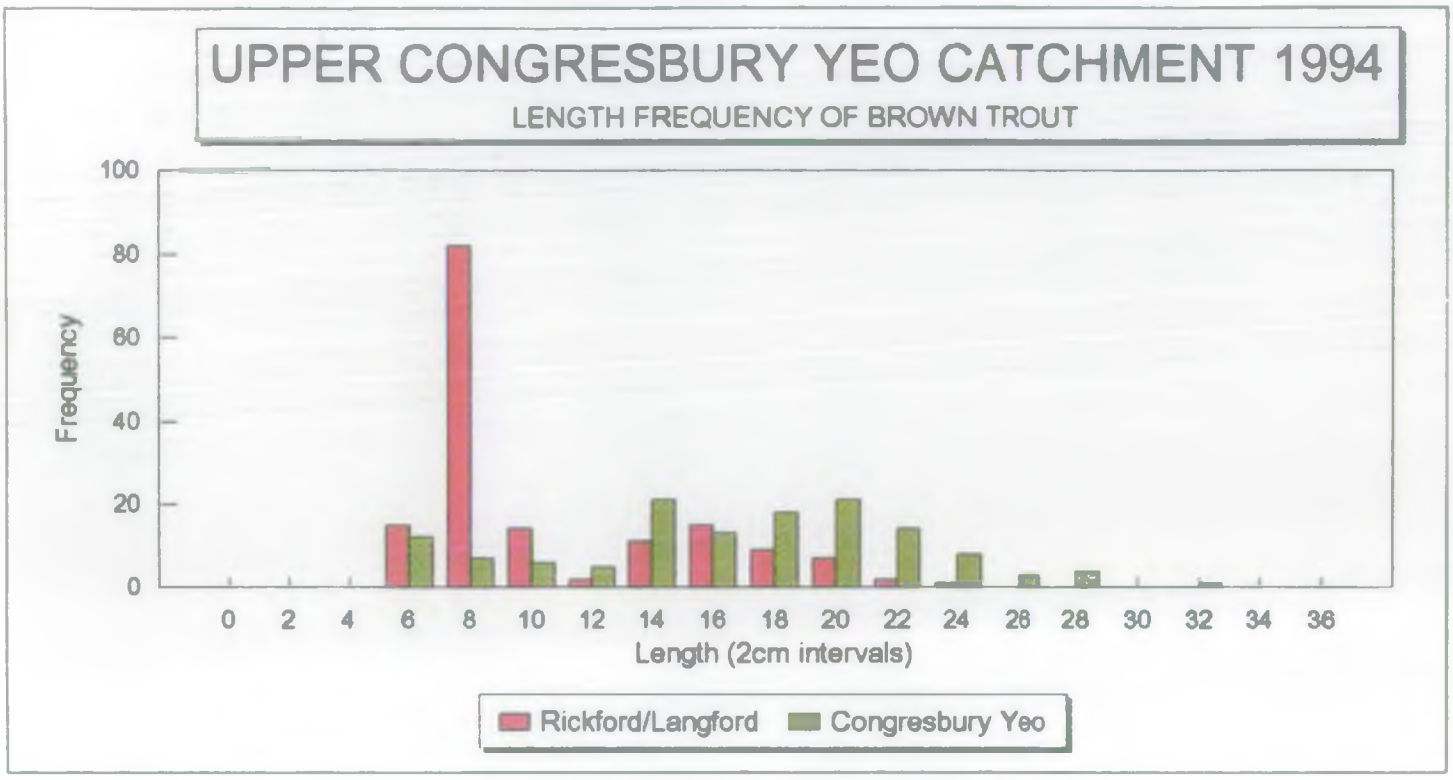
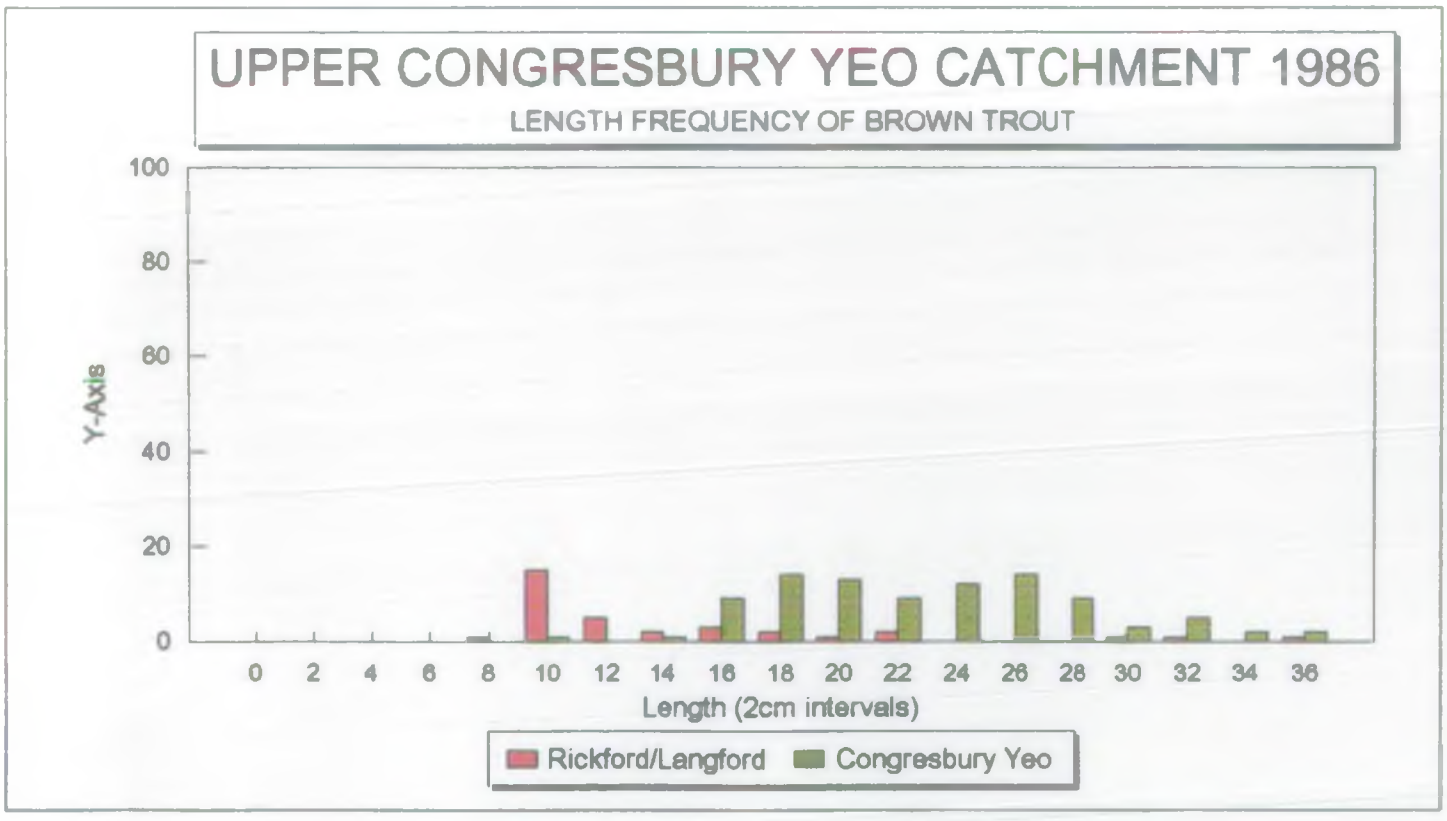
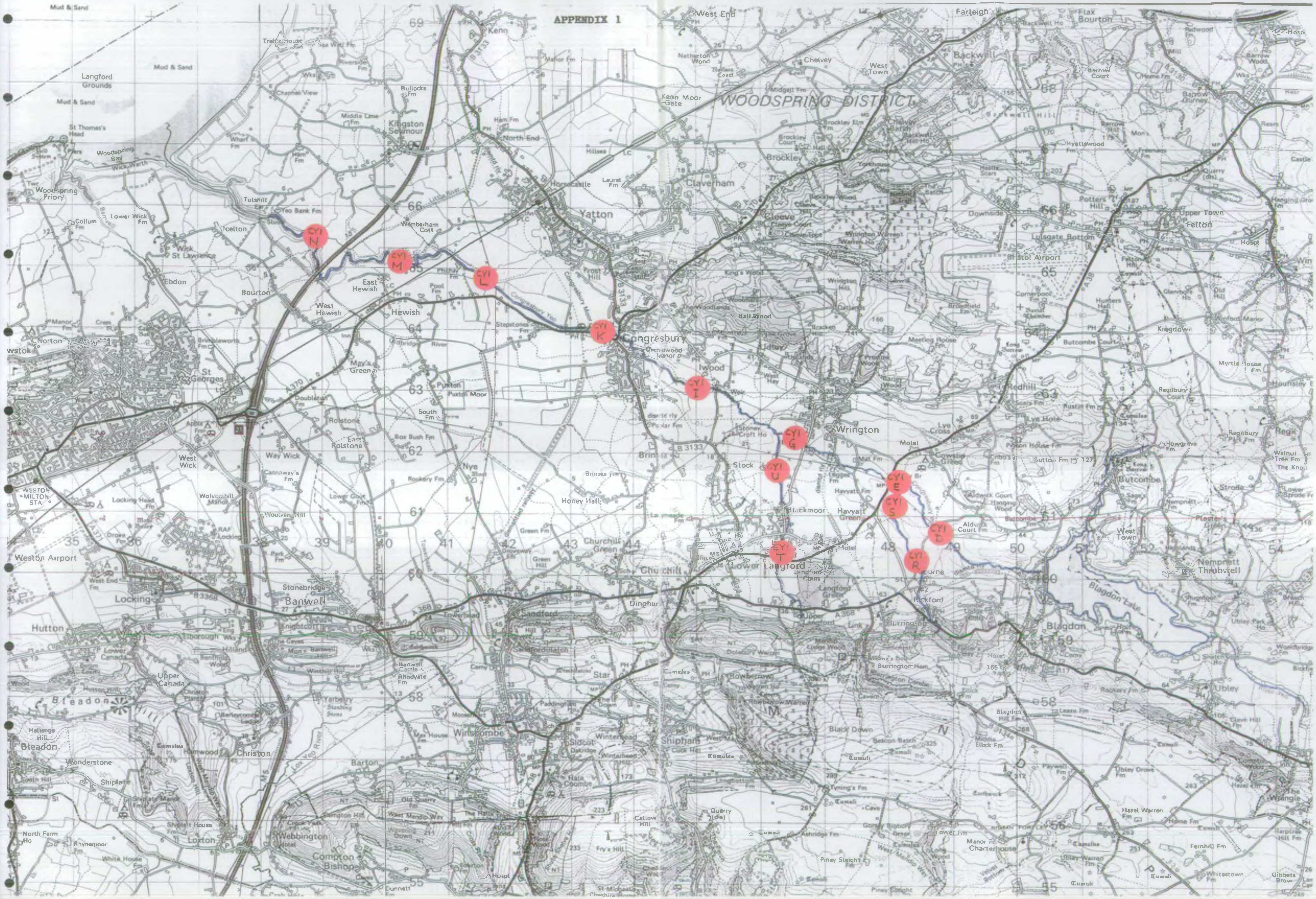


FIGURE 6



APPENDIX 1



WOODSPRING DISTRICT
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Congresbury
Wrington
Backwell
Bristol Airport
Claverham
Cleeve
Brockley
Chelvey
West End
Farleigh
Flax Bourton
Felton
Kenn
Kingston Seymour
Woodspring Priory
Wick St Lawrence
Icelton
Bourton
West Hewish
East Hewish
Hewish
Puxton
St Georges
Weston Airport
Locking
Hutton
Banwell
Bleadon
Sandford
Churchill
Lower Langford
Langford Green
Blackmoor
Havyatt Green
Stock
Iwood
Redhill
Rickford
Burrington
Butcombe
Blagdon
Blagdon Lake
Nempnett Thrubwell
Ubley
Winscombe
Shipham
Sidcot
Star
Barton
Christon
Loxton
Webbington
Compton Bishop
Upper Canada
Shiplate

SPECIES	EST POPULATION >10 cms	BIOMASS>10 cms gms/100m2	DENSITY>10 cms per 100m2	POPULATION METHOD	PROBABILITY OF CAPTURE	BIOMASS<10 cms gms/100m2	DENSITY<10 cms per 100m2	MEAN WEIGHT (gms)	MEAN CONDITION FACTOR
CY1D	**EMLEY LANE, ST487607, 28/7/94**								
BULLHEAD	0	0	0	4	0	40.91	9.09		
BROWN TROUT	1	128.48	0.30	3	1.00	22.08	2.12		
EEL	195	1453.64	59.09	3	0.55	0	0	24.60	0.16
RAINBOW TROUT	1	140.61	0.30	3	1.00	0	0		
TOTALS		***1722.73***	***59.70***			***62.97***	***11.21***		
CY1E	**PERRY BRIDGE, ST481616, 17/8/94**								
BULLHEAD	0	0	0	4	0	60.56	25.31		
BROWN TROUT	111	2886.00	34.69	3	0.65	19.13	5.63	83.20	1.15
EEL	23	396.03	7.19	3	0.34	0	0	55.10	0.17
TOTALS		***3282.03***	***41.88***			***79.69***	***30.94***		
CY1G	**BEAM BRIDGE, ST465622, 27/7/94**								
BULLHEAD	0	0	0	4	0	81.94	26.36		
BROWN TROUT	30	1331.82	9.09	3	0.66	0	0	146.50	1.17
EEL	67	495.39	20.30	3	0.52	0.91	0.91	24.40	0.14
BROOK LAMPREY	0	0	0	4	0	0.30	0.30		
TOTALS		***1827.21***	***29.39***			***83.15***	***27.58***		
CY1I	**BELOW IWOOD, ST450631, 11/8/94**								
BROWN TROUT	17	1292.84	2.79	3	0.74	0	0	463.90	1.25
EEL	57	977.41	9.34	3	0.70	0	0	104.60	0.17
GUDGEON	2	6.72	0.33	3	0.50	1.15	0.33		
ROACH	0	0	0	4	0	0.33	0.33		
RAINBOW TROUT	3	289.03	0.49	3	1.00	0	0		
3 SP STICKLEBACK	0	0	0	4	0	1.15	1.15		
TOTALS		***2568.00***	***12.95***			***2.62***	***1.80***		
CY1K	**CONGRESBURY CHURCH, ST436639, 10/8/94**								
EEL	279	2126.46	21.30	4	0	0	0	102.90	0.18
PIKE	12	134.38	0.92	3	0.50	0	0	146.70	0.85
ROACH	2	11.68	0.15	3	0.50	3.82	3.82		
STONELOACH	0	0	0	4	0	1.44	0.23		
TOTALS		***2272.52***	***22.37***			***5.26***	***4.05***		
CY1L	**BELOW PILHAY FOOTBRIDGE, ST417648, 9/8/94**								
EEL	107	1757.63	15.74	3	0.58	0	0	111.70	0.18
PIKE	6	477.53	0.88	3	0.60	0	0	541.20	0.79
ROACH	0	0	0	4	0	7.29	6.77		
STONELOACH	0	0	0	4	0	0.29	0.29		
TOTALS		***2235.16***	***16.62***			***7.59***	***7.06***		

SPECIES	EST POPULATION >10 cms	BIOMASS>10 cms gms/100m2	DENSITY>10 cms per 100m2	POPULATION METHOD	PROBABILITY OF CAPTURE	BIOMASS<10 cms gms/100m2	DENSITY<10 cms per 100m2	MEAN WEIGHT (gms)	MEAN CONDITION FACTOR
CY1M	**EAST HEWISH, ST402651, 26/7/94**								
EEL	38	537.68	4.37	3	0.55	0	0	123.10	0.18
GUDGEON	0	0	0	4	0	0.69	0.12		
PIKE	14	51.66	1.61	3	0.52	0	0	32.10	0.91
ROACH	1	4.71	0.12	3	1.00	8.51	10.57		
STONELOACH	0	0	0	4	0	0.69	0.46		
TOTALS		*594.05*	*6.09*			*9.89*	*11.15*		
CY1N	**BELOW M5, ST389655, 21/7/94**								
BROWN TROUT	1	89.74	0.09	3	1.00	0	0		
EEL	27	161.05	2.37	3	0.38	0.09	0.09	68.00	0.18
FLOUNDER	0	0	0	4	0	0.96	0.44		
ROACH	0	0	0	4	0	2.81	2.81		
STONELOACH	0	0	0	4	0	0.18	0.18		
TOTALS		*250.79*	*2.46*			*4.04*	*3.51*		
CY1R	**RICKFORD STREAM, EMLEY LANE, ST484603, 23/8/94**								
BULLHEAD	0	0	0	4	0	306.30	228.89		
BROWN TROUT	9	144.67	3.33	3	0.90	93.89	14.44	43.40	1.22
EEL	1	3.33	0.37	3	0.50	0	0		
3 SP STICKLEBACK	0	0	0	4	0	1.85	2.96		
TOTALS		*148.00*	*3.70*			*402.04*	*246.30*		
CY1S	**RICKFORD STREAM, HAVYATT, ST481612, 23/8/94**								
BULLHEAD	0	0	0	4	0	261.53	176.47		
BROWN TROUT	10	275.88	5.88	3	0.77	54.00	10.59	46.90	1.21
EEL	1	127.65	0.59	3	1.00	0	0		
TOTALS		*403.53*	*6.47*			*315.53*	*187.06*		
CY1T	**LANGFORD BROOK, LANGFORD LOOP BRIDGE, ST463603, 19/8/94**								
BROWN TROUT	28	1064.00	15.56	3	0.74	135.11	21.11	68.40	1.35
EEL	8	268.89	4.44	3	0.67	0	0	60.50	0.16
RAINBOW TROUT	1	121.67	0.56	3	1.00	0	0		
TOTALS		*1454.56*	*20.56*			*135.11*	*21.11*		
CY1U	**LANGFORD BROOK, KITLAND LANE, ST462617, 24/8/94**								
BULLHEAD	0	0	0	4	0	220.92	46.92		
BROWN TROUT	5	274.23	3.85	3	0.83	66.00	8.46		
EEL	18	132.92	13.85	3	0.56	0	0	9.60	0.14
3 SP STICKLEBACK	0	0	0	4	0	7.69	3.85		
TOTALS		*407.15*	*17.69*			*294.62*	*59.23*		

Gauging Station Summary

CONGRESBURY YEO AT IWOOD

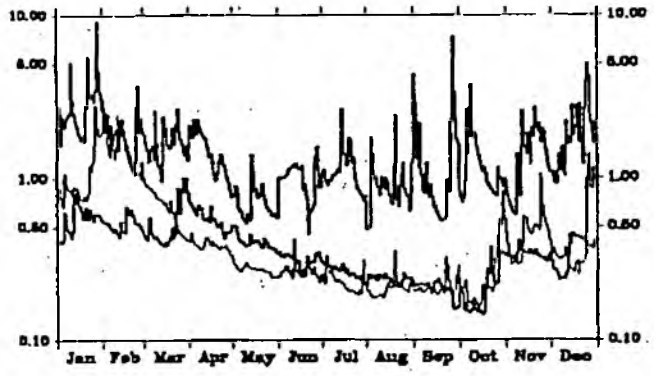
Station Number
052017

Gauged Flows
1973-1991

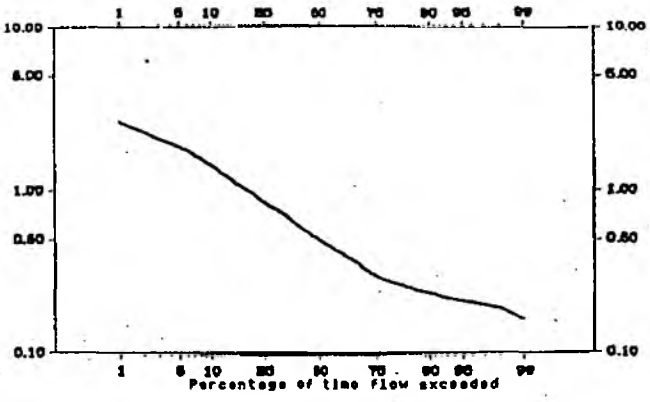
Measuring Authority: NRA - Wessex

Grid Reference: 31 (ST) 452 631

Daily Flow Hydrograph (m^3s^{-1})
Max. and min. daily mean flows from 1973 to 1991 excluding those for the featured year (1990)



Flow Duration Curve (m^3s^{-1})



Flow Statistics

Units: m^3s^{-1} unless otherwise stated

Mean flow	0.72	
Mean flow (ls^{-1}/km^2)	10.88	
Mean flow ($10^6m^3/yr$)	22.9	
Peak flow & date	15.4	28 Jan 1975
Highest daily mean & date	9.2	28 Jan 1975
Lowest daily mean & date	0.143	17 Oct 1989
10 day minimum & end date	0.151	17 Oct 1989
60 day minimum & end date	0.202	19 Oct 1989
10% exceedance	1.445	
50% exceedance	0.501	
95% exceedance	0.209	
Mean annual flood		
Bankfull flow		

Catchment Characteristics

Catchment area (km^2)	66.6
Level stn. (mOD)	7.40
Max alt. (mOD)	325
IH Baseflow index	0.59
FSR slope (m/km)	
1941-70 rainfall (mm)	838
FSR stream freq. (junctions/km^2)	
FSR percentage urban	

Rainfall and Runoff

	Rainfall (mm) (1973-1979) Mean	Max/Yr		Min/Yr		Runoff (mm) (1973-1991) Mean	Max/Yr		Min/Yr	
Jan	88	163	1974	19	1976	53	91	1986	25	1989
Feb	77	134	1974	19	1975	43	68	1988	31	1987
Mar	78	118	1979	15	1973	39	62	1989	22	1984
Apr	55	83	1979	4	1976	34	50	1987	15	1990
May	62	148	1979	24	1976	19	29	1986	11	1990
Jun	46	81	1974	7	1976	19	39	1973	10	1990
Jul	52	100	1978	10	1976	19	46	1973	9	1990
Aug	66	115	1974	29	1976	17	34	1985	8	1990
Sep	69	178	1976	16	1978	19	48	1974	8	1990
Oct	67	289	1976	9	1978	22	48	1988	9	1989
Nov	66	120	1974	39	1978	27	48	1986	13	1985
Dec	98	159	1978	23	1975	52	85	1984	19	1988
Annual	809	1833	1974	615	1975	543	391	1988	236	1990

Station and Catchment Description

Factors Affecting Flow Regime

Summary of Archived Data

Gauged Flows and Rainfall

Key:

	All rainfall	Some or no rainfall
All daily, all peaks	A	a
All daily, some peaks	B	b
All daily, no peaks	C	c
Some daily, all peaks	D	d
Some daily, some peaks	E	e
Some daily, no peaks	F	f
No gauged flow data	*	-

	01234	56789
1970s	---EE	E====
1980s	-----	eaaaa
1990s	ae	

Naturalised Flows

Key:

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	-

No naturalised flow data available.