SWORDS WATER QUALITY STUDY - PHASE 1

WATER QUALITY OF THE THAMES

SWORDS WATER QUALITY STUDY - PHASE 1

WATER QUALITY OF THE THAMES

Introduction

This report aims to present a picture of the current water quality of the Thames and is part of the NRA's response to the south western Oxfordshire reservoir proposal (SWORDS). The report sets a 'baseline' with which to compare the quality of the Thames when the reservoir is operational. The Thames was studied from Farmoor (upstream of the reservoir) and downstream as far as Egham.

The data used was of two types. For July 1989 to June 1992 spot sample data for 17 sites (figure 1) have been analysed; and for July 1991 to June 1992 the data from 4 automatic monitors (AQM's) has been used. The AQM's record hourly sample results and since the volume of data for 3 years would've been too large only one year was used. Three of the AQM's are permanent and a mobile monitor was installed for August 1991 to July 1992 at Sutton Courtenay in the vicinity of the new reservoir. The three permanent monitors are at Northmoor (just upstream of the Farmoor abstraction), Cleeve (25 km downstream of the proposed reservoir); and Romney (just upstream of the intakes for the West London reservoirs.

River Quality

The water quality for the spot sample sites was analysed (Fig. 2-18) to give an idea of the present status. Only the 3 years to June 1992 were used since the purpose of this study was to present the present picture rather than analyse temporal trends in water quality.

There was seasonality observed at most of the sites studied. The nitrate (measured as total Oxidised nitrogen as mg/l of N) is higher in the Winter largely because of diffuse sources. Similarly at some sites the ammoniacal nitrogen also peaks in Winter possibly due to poor de-nitrification at the sewage treatment works (STW's) in cold weather (another possible cause of the seasonality may be increased ammonia decay in the sample bottles in the lab). The bio-chemical oxygen demand (BOD) was highest in spring/early summer at many of the sites and sometimes there was a corresponding peak in dissolved Oxygen (DO). The oxygen occasionally reached supersaturation levels suggesting that algae was influencing the BOD measurement.

The WRC's "Lapwing" computer program was used to analyse the spatial trends in water quality. This package detected differences in the mean water quality along the length of the Thames. The B.O.D. was found to be higher between Datchet and Egham than for the rest of the river (Fig.19). Similarly the oxygen increases between Boveney and Egham (Fig.20). This may be due to less pollutant load in the river or possibly due to algae.

The ammoniacal nitrogen and un-ionised ammonia decline in the upper reaches then remain constant, the variation being less clear than for BOD or oxygen (Figs.21 and 22). The concentrations are low and the variation is not significant as far as RQO standards are

concerned. There is a general increase in nitrate down the river (Fig.23) as the load from each catchment is added to the Thames.

Examination of the data from the AQM's showed the seasonality strongly for nitrate (and obviously temperature) and to a lesser extent for oxygen and ammoniacal nitrogen (Figs. 24-27). Temperature is clearly seasonal at all sites and nitrate similarly so with peaks in the winter and troughs in summer. Northmoor is not as strongly seasonal as the other AQM's as far as nitrate is concerned. The seasonality of oxygen is best seen at Romney, Cleeve and Sutton Courtenay with the spring peak clearly shown. The Romney AQM data (Fig. 27) suggests that a seasonal pattern exists for ammoniacal nitrogen. The winter readings are more variable and higher than those in the summer.

To consider the diel variation of water quality the hourly means of each determinand were examined (Figs 28-31). Temperature varies by about 1°C each day being lowest early in the morning and highest early evening. Of particular note was the diel pattern of nitrate at all stations. The permanent monitors seemed to drift by about $0.5mgl^{-1}$ over a 24 hour period, probably due to their calibration mechanism. The Sutton Courtenay temporary monitor however exhibits a definite diel cycle varying by about $0.3mgl^{-1}$ between midnight and midday. This pattern has been observed on the Wey and the Mole previously. Reasons for this variation are being explored. Ammoniacal nitrogen doesn't exhibit any diel variation at the sites in question probably because there are no influential STW effluents.

The relationship between flow and water quality was also investigated. At Sutton Courtenay the AQM data was compared with flow and at Days Weir the spot sample data was compared with flow (Fig. 32-33). The average flow and quality for each data set were also plotted. There was no clear relationship between flow and BOD, ammoniacal nitrogen and oxygen, but the high BOD's and ammonias occurred when the flow was low. Similarly the oxygen was most variable when flows were low. Nitrate was strongly positively correlated with flow at both sites and a flow - nitrate relationship was derived at each site using linear regression of logged data (Table 7).

River Quality Compliance

The quality of the Thames was assessed by analysing the spot sample results in three ways. Firstly using the "look-up" table method and then by calculating the 95th %-ile (5th %-ile in the case of oxygen) parametrically for all sites and non-parametrically using the Weibull method where there were more than 19 samples (Tables 1 and 2). For ammoniacal nitrogen and un-ionised ammonia the parametric method used was the method of moments which avoids bias sometimes introduced when using the usual parametric method because the figures involved are close to zero.

For the period July 1989 to June 1992 the Thames failed its RQO of 1B at four sites in its lower reaches (based on the "look-up" table method). There were nine further sites where the non-parametric %-iles failed to meet the standards (the method used in 1990 survey). In the 12 months ending June 1992 only one site failed its RQO, the Thames at Farmoor, using the "look-up" method and none using the parametric method. The non-parametric statistics could not be calculated for this time period since there were less than 20 samples.

For the five failures in the lower reaches of the Thames (1989-1992) B.O.D. was the

determinand failing its standard. The Thames supports a growth of algae especially in these lower reaches due to the high nutrient concentrations and slow velocity of the river. The B.O.D. test can be affected by this growth making the results artificially high thus leading to inaccurate river quality classification. B.O.D. results for these sites were in fact excluded in the 1990 survey. The nutrients that contribute to algae growth largely originate from sewage effluent though so these high values do indicate something about the water quality. Similarly the failure at Farmoor in 1991/92 was due to the failure of B.O.D.

The limited set of determinands recorded by the AQM's show that none of the sites failed their RQO's with respect to ammoniacal nitrogen and oxygen. This shows that for these sites the river quality in the so-called sampling window, i.e. 0930-1530, when the spot samples are taken, isn't different to all 24 hours of the day as far as RQO compliance is concerned. Since the monitors do not measure B.O.D. they don't give any further information about the RQO failures on the Thames.

The Thames is a designated E.C. cyprinid fishery from Eysey to Teddington i.e. for the whole of the study area. The river failed this directive for the rolling year ending June 1990 at Radley College Boathouse, due to high ammoniacal nitrogen. There were no other failures of this directive for the 12 months ending June 1991 and 1992. The "Dangerous Substances Directive" was passed in all of the three years ending June 1990,1991 and 1992. It is also worth noting that the Sutton Countenay monitor showed the nitrate concentrations to be failing the Surface Water Abstraction directive 95%-ile standard of 11.3 mgl^{-1} overall, due to high concentrations in the winter 1991/92. The daily mean nitrate peaked at around 14mgl^{-1} in January 1992 and remained mostly above the standard until March 1992. The monthly average flows recorded at Sutton Courtenay for this period are 28, 19 and 15 Cumecs for January, February and March respectively. These flows are just over half the average flows for these months, recorded at the Sutton Courtenay gauging station.

Conclusions

(1) The length of the Thames studied has an RQO of 1B apart from the 12.9km between the Cherwell and the Ock, which has an RQO of 2A. All of the length of the Thames studied meets its respective RQO. The length with an RQO of 2A generally meets a 1B, though with some methods of assessment it is class 2A suggesting that it does not meet class 1B reliably.

(2) The E.C. "Dangerous Substances" directive was met in the years ending June 1990,1001 and 1992 and similarly the "Fisheries Directive" (cyprinid) was met in the years ending June 1991 and June 1992. The fisheries directive was not met in the year ending June 1990 due to high ammoniacal nitrogen values at Radley College Boathouse. The "Surface Water Abstraction Directive" has a nitrate standard of 11.3 mgl^{-1} as N. It is of some concern that the Sutton Courtenay AQM showed the river not meeting this standard.

(3) Nitrate and temperature are strongly seasonal on the Thames. BOD peaks in spring or early summer probably due to algae.

(4) Diel variation was exhibited by temperature, nitrate and oxygen.

Kevin Farmer
920921
/pm...

TABLE 1 - RQO CLASSIFICATION OF THAMES USING SPOT SAMPLES

SITE NAME	RQO	7/1989 - 6/1992		7/1991 - 6/1992	
THAMES AT FARMOOR	1B	1B/2A/1A	(37)	2A/1/1B	(14)
THAMES AT GODSTOW	1B	1A/1B/1A	(36)	1A/-/1A	(14)
THAMES AT FOLLY BRIDGE	IB	1B/2A/1A	(32)	1B/-/1A	(12)
THAMES AT DONNINGTON BR	2A	1B/2A/1A	(34)	1B/-/1A	(14)
THAMES AT RADLEY COLLEGE	2A	1B/2A/1A	(32)	1A/-/1A	(11)
THAMES AT SUTTON BR	1B	1B/2A/3	(27)	1A/-/1B	(9)
THAMES AT DAYS LOCK	IB	1B/2A/1A	(34)	1B/-/1B	(10)
THAMES AT WALLINGFORD	1B	1B/2A/1A	(34)	1A/-/1A	(10)
THAMES AT GORING	1B	1B/1B/1A	(35)	1B/-/1B	(10)
THAMES AT CAVERSHAM	1B	1B/2A/1A	(43)	1B/-/1B	(11)
THAMES AT SONNING	1B	1B/2A/1A	(33)	1A/-/1B	(10)
THAMES AT HENLEY	1B	1B/2A/1A	(35)	1B/-/1B	(10)
THAMES AT COOKHAM	1B	2A/2A/1A	(34)	1B/-/1B	(10)
THAMES AT BOVENEY	1B	1B/2A/1A	(83)	1B/-/1B	(10)
THAMES AT DATCHET (3)	1B	2A/2A/1A	(41)	-/-/-	(0)
THAMES AT SUNNYMEADS	1B	2A/3/1B	(37)	1B/-/1B	(11)
THAMES AT EGHAM	1B	2A/2A/1A	(55)	1B-/1B	(12)

(1) Quality classification by three methods:-
LOOK-UP TABLES/NON-PARAMETRIC ASSESSMENT/PARAMETRIC ASSESSMENT

(2) Figures in parenthesis are number of samples used in assessment.

(3) Not sampled July 1991 to June 1992

TABLE 2 - RIVER QUALITY FOR JULY 1989 - JUNE 1992

	DISSOLVED OXYGEN (%SAT)		
	MEAN	NP %-ILE	PARAM %-ILE
THAMES AT WATER INTAKE, FARMOO	94.1550	80.1000	90.8726
THAMES AT TROUT INN, GODSTOW	94.0811	73.7000	90.3231
THAMES AT FOLLY BRIDGE, OXFORD	91.8529	72.2500	88.3013
THAMES AT DONNINGTON BRIDGE, O	92.2571	75.8000	88.3426
THAMES AT RADLEY COLLEGE BOATH	92.0938	66.6000	87.0871
THAMES AT SUTTON BRIDGE, CULHA	90.7600	76.6500	86.9528
THAMES AT DAYS LOCK	92.4611	69.5000	87.8503
THAMES AT WALLINGFORD BRIDGE	93.6722	76.5000	87.3051
THAMES JUST ABOVE GORING WEIR	90.3243	65.9000	86.0108
THAMES AT CAVERSHAM WEIR	92.7244	67.6000	88.2960
THAMES AT SONNING WEIR	90.7257	68.6000	86.4195
THAMES AT HENLEY BRIDGE	90.8432	70.7500	87.0990
THAMES AT COOKHAM BRIDGE	91.3250	67.8500	87.1700
THAMES AT BOVENEY WEIR	86.9430	67.7750	84.8124
THAMES AT MWD INTAKE, DATCHET	92.6341	60.8900	86.8220
THAMES AT THREE VALLEYS WATER	95.3068	73.0000	90.8711
THAMES ABOVE NSWC INTAKE, EGHA	97.6145	75.2000	94.4147

	AMMONIACAL NITROGEN (mg/l)		
	MEAN	NP %-ILE	PARAM %-ILE
THAMES AT WATER INTAKE, FARMOO	0.0849	0.4090	0.0779
THAMES AT TROUT INN, GODSTOW	0.0603	0.1410	0.0629
THAMES AT FOLLY BRIDGE, OXFORD	0.0682	0.1600	0.0710
THAMES AT DONNINGTON BRIDGE, O	0.0700	0.2160	0.0707
THAMES AT RADLEY COLLEGE BOATH	0.2524	0.9450	0.2103
THAMES AT SUTTON BRIDGE, CULHA	0.1534	0.3700	0.0926
THAMES AT DAYS LOCK	0.1556	0.5060	0.1472
THAMES AT WALLINGFORD BRIDGE	0.1592	0.6620	0.1241
THAMES JUST ABOVE GORING WEIR	0.1197	0.5120	0.1102
THAMES AT CAVERSHAM WEIR	0.0800	0.2860	0.0784
THAMES AT SONNING WEIR	0.0963	0.2660	0.0947
THAMES AT HENLEY BRIDGE	0.0957	0.2560	0.0949
THAMES AT COOKHAM BRIDGE	0.1208	0.2785	0.1188
THAMES AT BOVENEY WEIR	0.0902	0.2180	0.0852
THAMES AT MWD INTAKE, DATCHET	0.1076	0.2200	0.1096
THAMES AT THREE VALLEYS WATER	0.1063	0.2925	0.1004
THAMES ABOVE NSWC INTAKE, EGHA	0.1143	0.3280	0.1055

	B.O.D. (mg/l)		
	MEAN	NP %-ILE	PARAM %-ILE
THAMES AT WATER INTAKE, FARMOO	2.5487	7.3000	2.5527
THAMES AT TROUT INN, GODSTOW	2.0568	3.5800	2.1516
THAMES AT FOLLY BRIDGE, OXFORD	2.2152	6.1700	2.2960
THAMES AT DONNINGTON BRIDGE, O	2.2371	5.1800	2.3224
THAMES AT RADLEY COLLEGE BOATH	2.2788	6.3900	2.3670
THAMES AT SUTTON BRIDGE, CULHA	2.5185	6.2600	2.7034
THAMES AT DAYS LOCK	2.5088	7.3750	2.5477
THAMES AT WALLINGFORD BRIDGE	2.2528	7.7950	2.2761
THAMES JUST ABOVE GORING WEIR	2.4973	6.5700	2.4951
THAMES AT CAVERSHAM WEIR	2.3205	6.2750	2.3393
THAMES AT SONNING WEIR	2.3206	5.5500	2.4195
THAMES AT HENLEY BRIDGE	2.3686	5.4800	2.4365
THAMES AT COOKHAM BRIDGE	2.7657	8.1000	2.7647
THAMES AT BOVENEY WEIR	2.0607	6.6750	1.9550
THAMES AT MWD INTAKE, DATCHET	2.7071	9.1700	2.5364
THAMES AT THREE VALLEYS WATER	3.4229	9.7650	3.2487
THAMES ABOVE NSWC INTAKE, EGHA	2.8707	8.4400	2.7122

TABLE 2 - (continued)

	UN-IONISED AMMONIA (mg/l)		
	MEAN	NP %-ILE	PARAM %-ILE
THAMES AT WATER INTAKE, FARMOO	0.0015	0.0060	0.0015
THAMES AT TROUT INN, GODSTOW	0.0012	0.0021	0.0013
THAMES AT FOLLY BRIDGE, OXFORD	0.0014	0.0033	0.0014
THAMES AT DONNINGTON BRIDGE, O	0.0014	0.0042	0.0015
THAMES AT RADLEY COLLEGE BOATH	0.0044	0.0197	0.0035
THAMES AT SUTTON BRIDGE, CULHA	0.0027	0.0085	0.0026
THAMES AT DAYS LOCK	0.0030	0.0088	0.0029
THAMES AT WALLINGFORD BRIDGE	0.0027	0.0151	0.0021
THAMES JUST ABOVE GORING WEIR	0.0021	0.0071	0.0019
THAMES AT CAVERSHAM WEIR	0.0017	0.0038	0.0017
THAMES AT SONNING WEIR	0.0016	0.0032	0.0016
THAMES AT HENLEY BRIDGE	0.0017	0.0044	0.0018
THAMES AT COOKHAM BRIDGE	0.0021	0.0053	0.0022
THAMES AT BOVENEY WEIR	0.0016	0.0030	0.0015
THAMES AT MWD INTAKE, DATCHET	0.0022	0.0040	0.0023
THAMES AT THREE VALLEYS WATER	0.0017	0.0041	0.0018
THAMES ABOVE NSWC INTAKE, EGHA	0.0018	0.0045	0.0018

	NITRATE (mg/l)		
	MEAN	NP %-ILE	PARAM %-ILE
THAMES AT WATER INTAKE, FARMOO	8.5405	11.9200	8.9627
THAMES AT TROUT INN, GODSTOW	8.0861	12.0450	8.5545
THAMES AT FOLLY BRIDGE, OXFORD	7.7688	11.8350	8.2896
THAMES AT DONNINGTON BRIDGE, O	7.9500	13.4000	8.4232
THAMES AT RADLEY COLLEGE BOATH	7.8758	13.6300	8.3459
THAMES AT SUTTON BRIDGE, CULHA	7.9185	14.5400	8.5736
THAMES AT DAYS LOCK	8.4353	13.6500	8.9327
THAMES AT WALLINGFORD BRIDGE	8.6588	15.8500	9.1762
THAMES JUST ABOVE GORING WEIR	8.4314	13.2400	8.9308
THAMES AT CAVERSHAM WEIR	7.3591	12.7500	7.6702
THAMES AT SONNING WEIR	7.4970	12.3900	7.9467
THAMES AT HENLEY BRIDGE	7.4314	12.3600	7.8431
THAMES AT COOKHAM BRIDGE	7.7765	12.3500	8.2096
THAMES AT BOVENEY WEIR	6.2133	10.6200	6.3827
THAMES AT MWD INTAKE, DATCHET	6.3659	10.0900	6.6199
THAMES AT THREE VALLEYS WATER	7.4044	11.0000	7.7186
THAMES ABOVE NSWC INTAKE, EGHA	7.7133	12.6200	7.9605

TABLE 3

NORTHMOOR JULY 1991 - JUNE 1992

PERIOD	AMM. NIT. (mg/l) MEAN	95%	N	TEMPERATURE ('C) MEAN	95%	N	NITRATE (mg/l) MEAN	95%	N	OXYGEN (%SAT) MEAN	5%	N
OVERALL	0.2	0.2	7937	11.3	18.7	7937	7.4	9.9	7808	87.6	75.0	7594
7/91	0.2	0.2	693	17.6	19.2	693	5.7	6.3	693	84.2	71.1	662
8/91	0.2	0.2	673	18.2	19.0	673	5.7	6.3	673	87.6	76.0	644
9/91	0.2	0.2	573	15.7	18.0	573	5.4	6.4	573	85.0	73.0	545
10/91	0.2	0.2	502	9.7	12.2	502	5.6	7.0	409	81.8	71.0	480
11/91	0.2	0.2	653	7.4	9.7	653	8.1	11.2	653	83.9	76.0	626
12/91	0.2	0.2	734	5.5	8.4	734	8.4	9.3	734	85.8	80.0	703
1/92	0.2	0.2	673	5.7	8.0	673	9.2	10.9	673	88.9	85.0	644
2/92	0.2	0.2	680	6.0	7.3	680	9.1	9.7	680	92.0	87.0	651
3/92	0.2	0.2	686	8.2	9.8	686	8.1	8.7	686	87.1	75.0	656
4/92	0.2	0.2	698	9.9	12.2	698	8.5	9.9	698	88.6	70.5	670
5/92	0.2	0.2	711	15.2	18.8	711	7.2	8.3	675	95.2	76.0	680
6/92	0.2	0.2	661	17.1	19.4	661	6.4	7.0	661	88.7	73.0	633

TABLE 4

SUTTON COURTENAY AUGUST 1991 - JULY 1992

PERIOD	AMM. NIT. (mg/l) MEAN	95%	N	TEMPERATURE ('C) MEAN	95%	N	NITRATE (mg/l) MEAN	95%	N	OXYGEN (%SAT) MEAN	5%	N
OVERALL	0.3	0.4	5724	11.0	19.7	5695	8.1	12.3	5343	93.4	79.8	5695
7/91	****	****	0	****	****	0	****	****	0	*****	*****	0
8/91	0.2	0.2	682	14.7	16.4	516	6.4	7.2	516	96.8	90.4	516
9/91	0.2	0.3	613	12.4	15.1	613	5.9	7.4	613	91.8	83.7	613
10/91	0.3	0.4	680	7.8	9.8	680	6.4	7.9	536	81.3	71.6	680
11/91	0.3	0.6	206	6.5	7.8	231	7.4	10.0	207	87.9	83.9	231
12/91	****	****	0	4.5	4.7	66	****	****	0	102.1	101.2	66
1/92	0.4	0.4	312	3.0	4.4	358	12.6	14.5	335	91.6	88.6	358
2/92	0.4	0.4	637	4.2	5.5	637	11.7	12.7	590	94.0	90.0	637
3/92	0.3	0.4	682	6.0	7.5	682	10.0	11.4	636	92.6	88.1	682
4/92	0.2	0.2	55	5.3	5.9	55	10.6	11.8	55	92.5	90.2	55
5/92	0.2	0.3	515	15.3	20.8	515	7.3	8.8	513	111.1	95.6	515
6/92	0.2	0.3	660	17.9	21.7	660	7.4	8.0	660	99.5	90.1	660
7/92	0.3	0.6	682	18.3	20.1	682	6.9	7.5	682	87.6	81.3	682

TABLE 5

CLEEVE JULY 1991 - JUNE 1992

PERIOD	AMM. NIT. (mg/l) MEAN	95%	N	TEMPERATURE (°C) MEAN	95%	N	NITRATE (mg/l) MEAN	95%	N	OXYGEN (%SAT) MEAN	5%	N
OVERALL	0.2	0.2	7959	11.7	20.0	7959	8.6	12.9	7906	94.8	75.0	7550
7/91	0.2	0.2	694	19.3	21.0	694	5.2	5.9	694	79.2	64.0	596
8/91	0.2	0.2	714	19.6	20.6	714	5.1	6.1	714	90.1	77.0	684
9/91	0.2	0.2	534	17.0	19.5	534	6.2	7.2	488	88.5	75.0	510
10/91	0.2	0.2	458	10.8	13.4	458	6.9	7.9	455	80.4	71.0	438
11/91	0.2	0.2	692	7.8	10.9	692	8.9	13.9	692	86.1	83.0	663
12/91	0.2	0.2	734	5.5	8.8	734	10.0	11.5	734	87.1	78.0	703
1/92	0.2	0.2	719	5.2	7.8	719	11.5	14.9	719	95.9	80.0	688
2/92	0.2	0.2	656	5.6	7.1	656	11.7	13.4	656	91.1	72.4	628
3/92	0.2	0.2	724	7.9	9.7	724	10.7	12.2	724	100.3	93.0	693
4/92	0.3	0.2	691	9.6	12.0	691	10.2	13.2	691	101.6	85.0	661
5/92	0.2	0.2	704	15.7	19.9	704	8.4	10.2	704	133.8	84.7	673
6/92	0.2	0.5	639	17.6	20.1	639	6.8	7.9	635	95.0	76.0	613

TABLE 6

ROMNEY JULY 1991 - JUNE 1992

PERIOD	AMM. NIT. (mg/l) MEAN	95%	N	TEMPERATURE (°C) MEAN	95%	N	NITRATE (mg/l) MEAN	95%	N	OXYGEN (%SAT) MEAN	5%	N
OVERALL	0.2	0.3	7273	12.1	20.4	7273	8.7	12.4	7254	92.6	81.0	6921
7/91	0.2	0.2	692	19.3	20.9	692	6.7	7.2	692	85.2	79.0	663
8/91	0.2	0.2	708	19.9	20.8	708	6.3	6.9	708	84.2	77.0	678
9/91	0.2	0.2	489	17.7	20.0	489	7.0	7.7	489	86.3	80.0	466
10/91	0.2	0.2	568	12.1	13.9	568	7.2	8.1	568	88.2	85.0	543
11/91	0.2	0.2	399	7.1	8.4	399	10.4	13.7	380	90.7	85.0	382
12/91	0.4	0.4	707	5.6	8.6	707	9.9	11.4	707	88.1	81.0	639
1/92	0.2	0.4	690	5.2	7.8	690	11.7	15.3	690	93.4	91.0	659
2/92	0.2	0.3	672	5.7	7.1	672	10.6	11.3	672	94.9	91.0	643
3/92	0.2	0.2	712	8.5	10.0	712	9.5	11.2	712	103.4	95.0	681
4/92	0.2	0.2	615	10.1	12.5	615	9.8	11.7	615	103.3	95.0	587
5/92	0.2	0.4	373	17.9	20.5	373	6.9	8.6	373	109.1	74.0	357
6/92	0.2	0.3	648	18.5	20.3	648	7.9	10.0	648	89.4	78.0	623

TABLE 7 - REGRESSION OF NITRATE AS N ON FLOW

DAYS WEIR

LOG_e (Nitrate) = 1.51 + 0.27 LOG_e (flow)

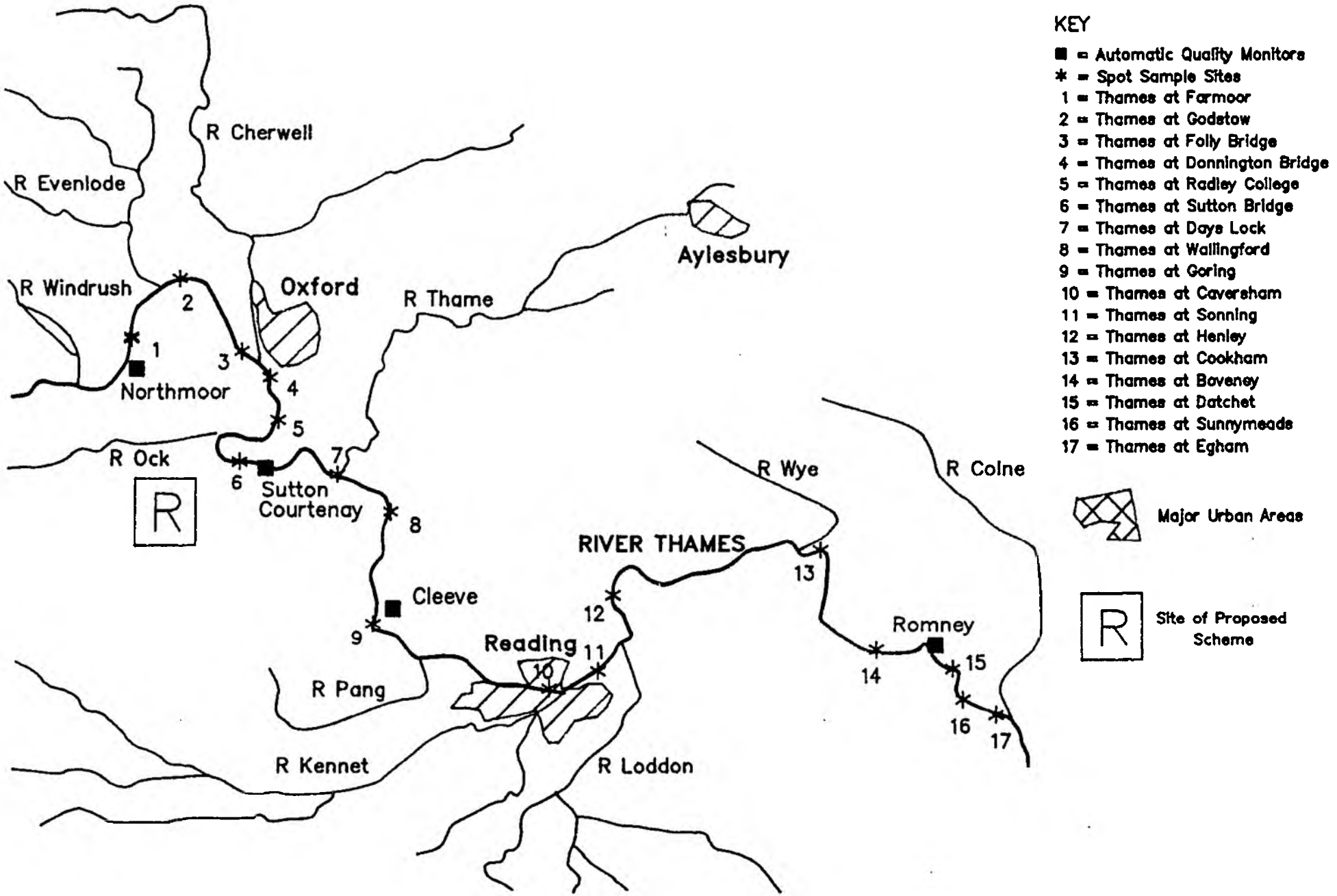
R^2 = 63%

SUTTON COURTENAY

LOG_e (Nitrate) = 1.53 + 0.25 LOG_e (flow)

R^2 = 56%

FIGURE 1 – SKETCH MAP OF THAMES IN AREA STUDIED



KEY

■ = Automatic Quality Monitors
* = Spot Sample Sites
1 = Thames at Farmoor
2 = Thames at Godstow
3 = Thames at Folly Bridge
4 = Thames at Donnington Bridge
5 = Thames at Radley College
6 = Thames at Sutton Bridge
7 = Thames at Days Lock
8 = Thames at Wallingford
9 = Thames at Goring
10 = Thames at Caversham
11 = Thames at Sonning
12 = Thames at Henley
13 = Thames at Cookham
14 = Thames at Boveney
15 = Thames at Datchet
16 = Thames at Sunnymeads
17 = Thames at Egham

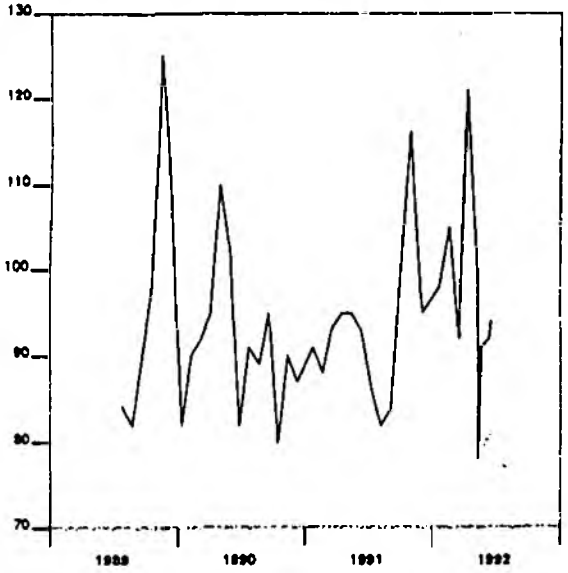
Major Urban Areas

R Site of Proposed Scheme

[redacted] against [redacted] (years)

Start time : 1st January 1989

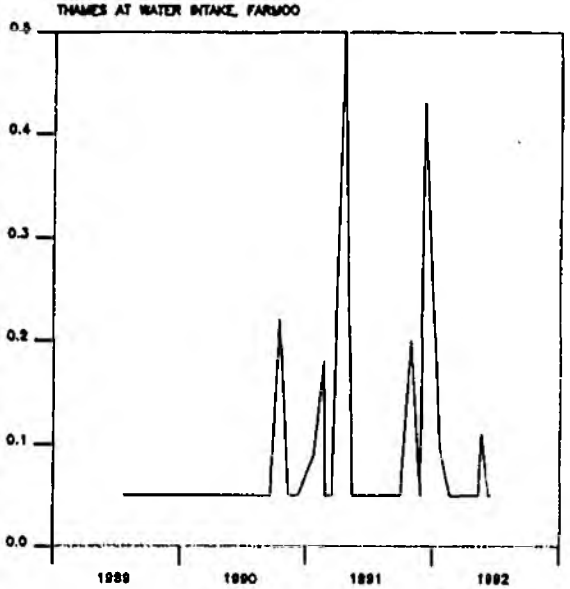
THAMES AT WATER INTAKE, FARMOO



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

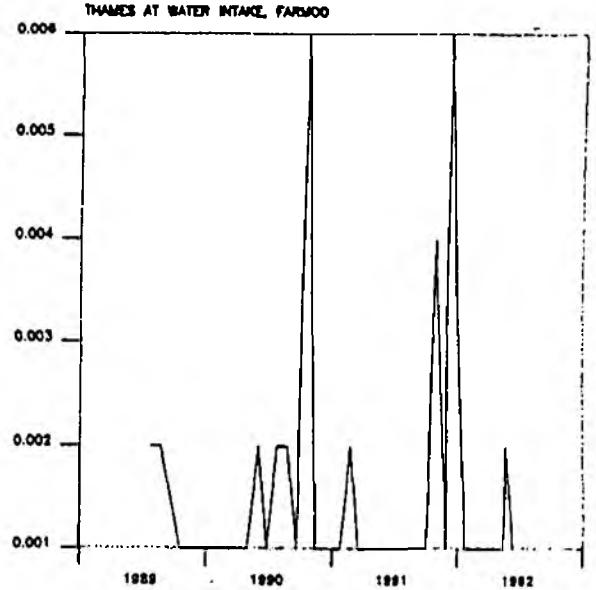
THAMES AT WATER INTAKE, FARMOO



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

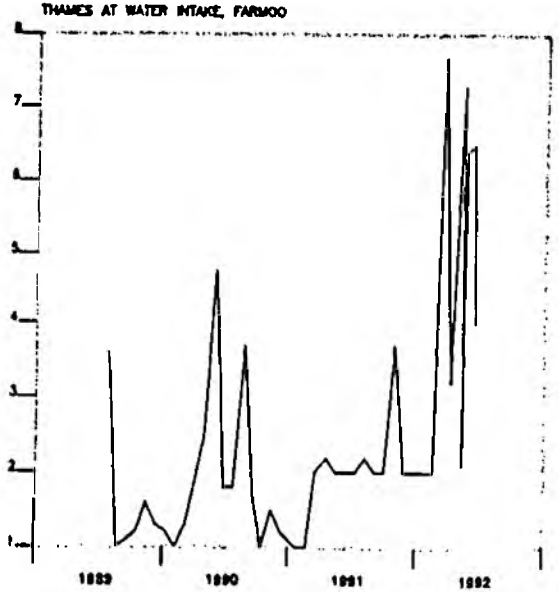
THAMES AT WATER INTAKE, FARMOO



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

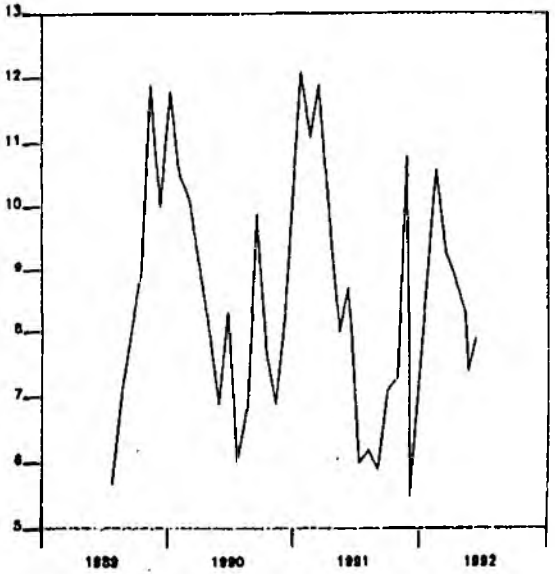
THAMES AT WATER INTAKE, FARMOO



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

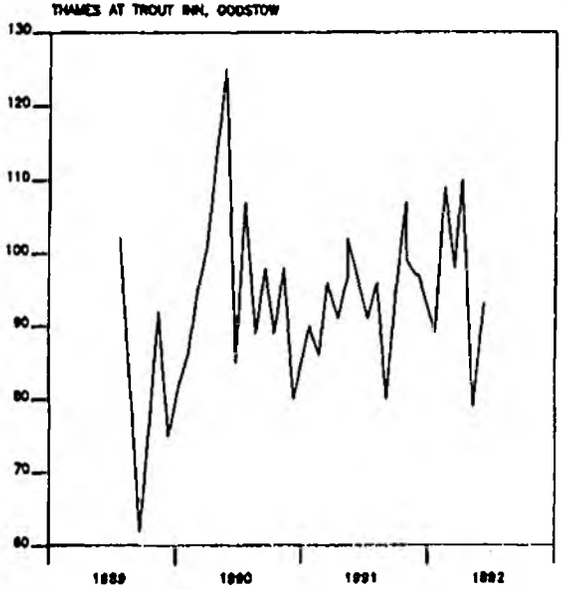
THAMES AT WATER INTAKE, FARMOO



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1988

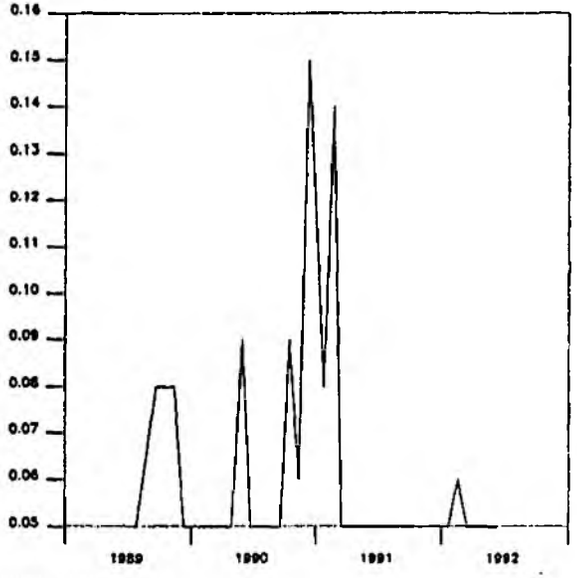
THAMES AT TROUT INN, GODSTOW



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1988

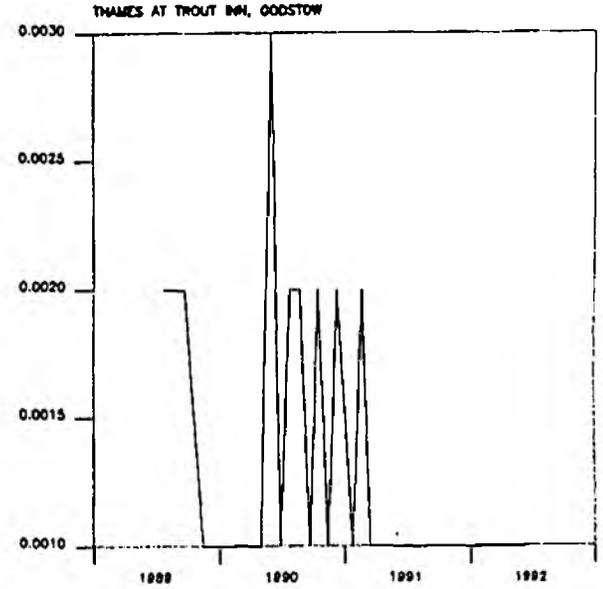
THAMES AT TROUT INN, GODSTOW



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1988

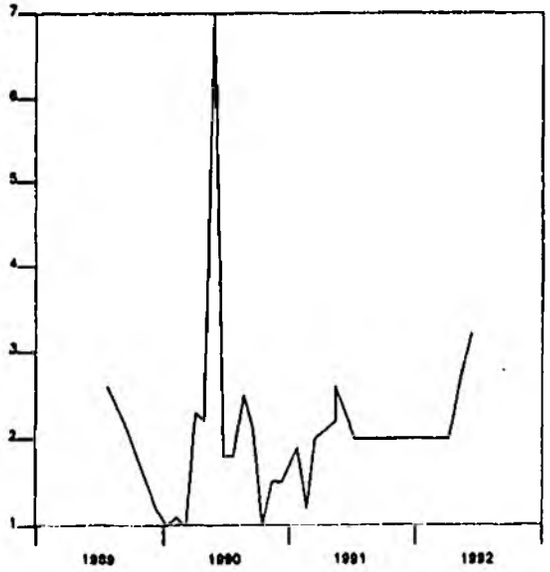
THAMES AT TROUT INN, GODSTOW



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1988

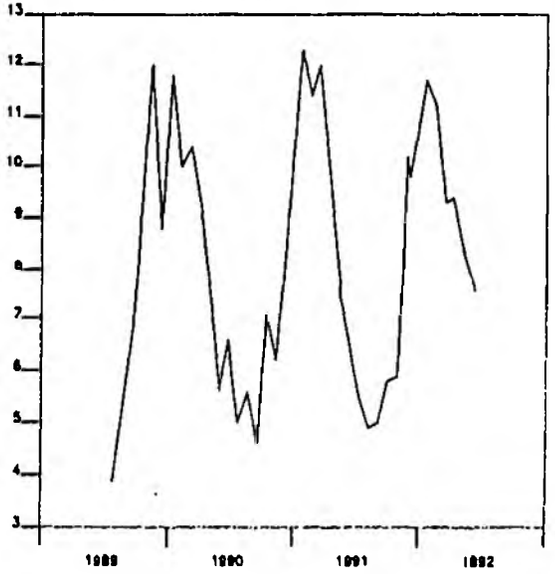
THAMES AT TROUT INN, GODSTOW



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1988

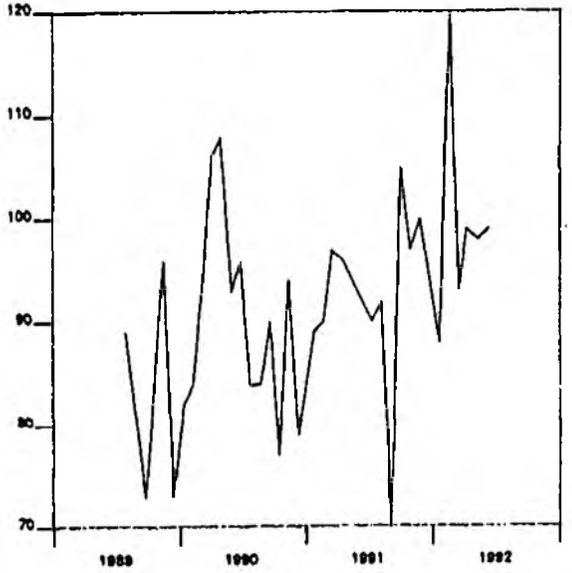
THAMES AT TROUT INN, GODSTOW



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

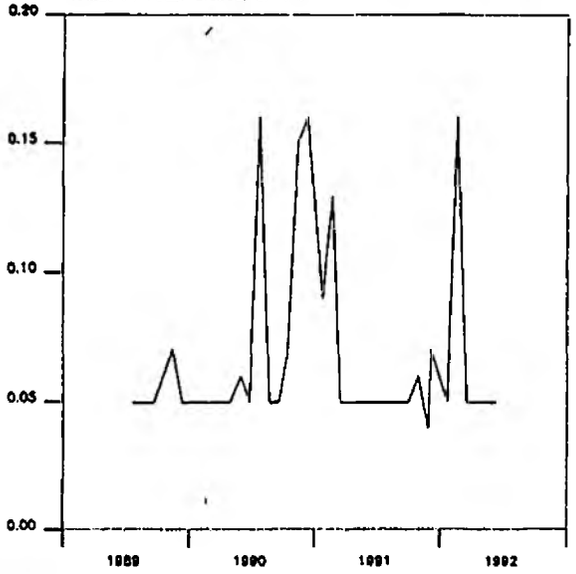
THAMES AT FOLLY BRIDGE, OXFORD



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

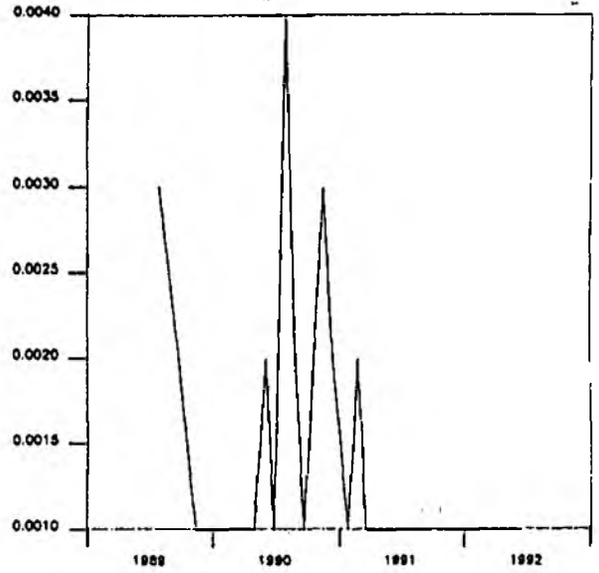
THAMES AT FOLLY BRIDGE, OXFORD



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

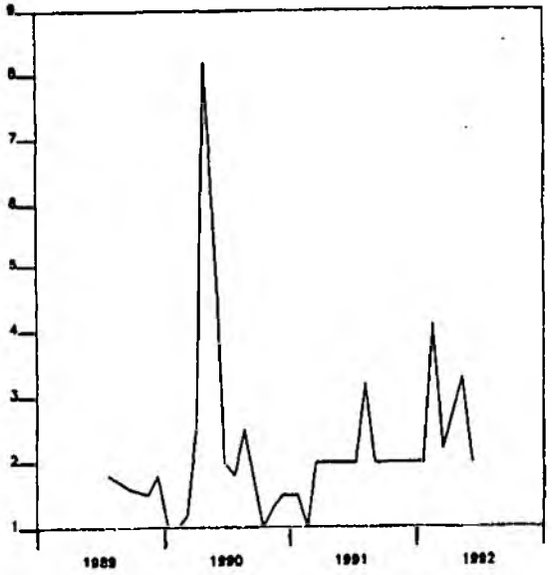
THAMES AT FOLLY BRIDGE, OXFORD



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

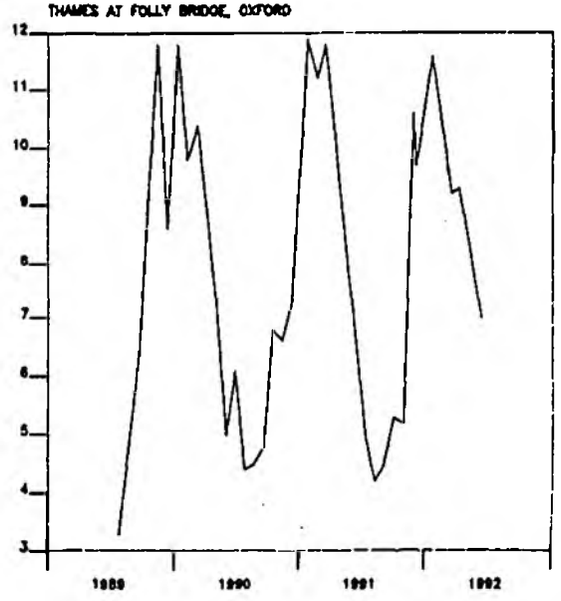
THAMES AT FOLLY BRIDGE, OXFORD



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

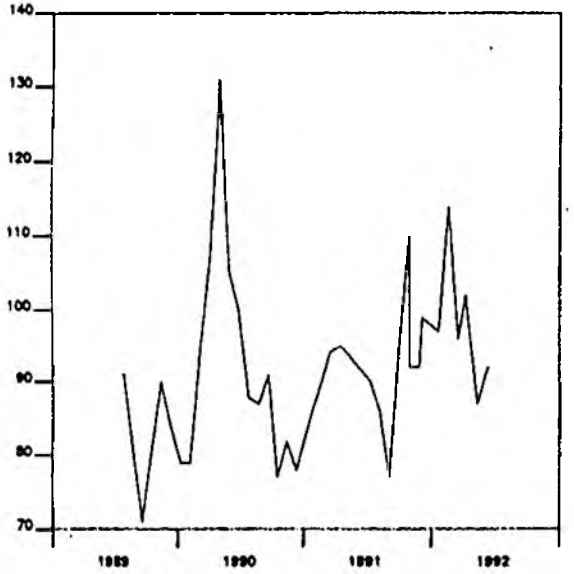
THAMES AT FOLLY BRIDGE, OXFORD



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

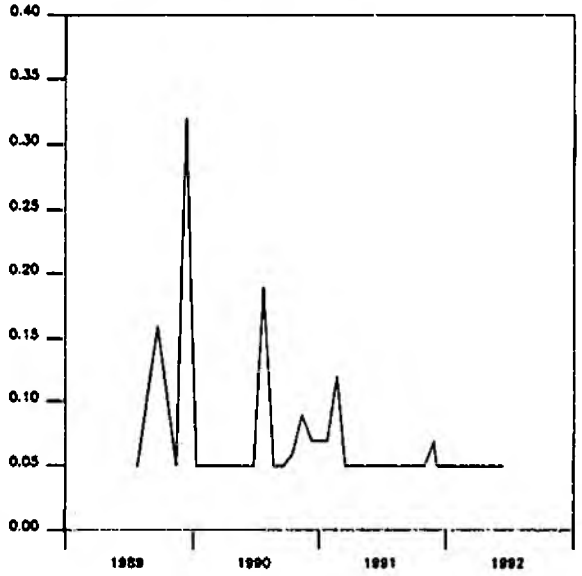
THAMES AT DONNINGTON BRIDGE, 0



Ammoniacal Nitrogen (mg/l) against Time (years)

Start time : 1st January 1989

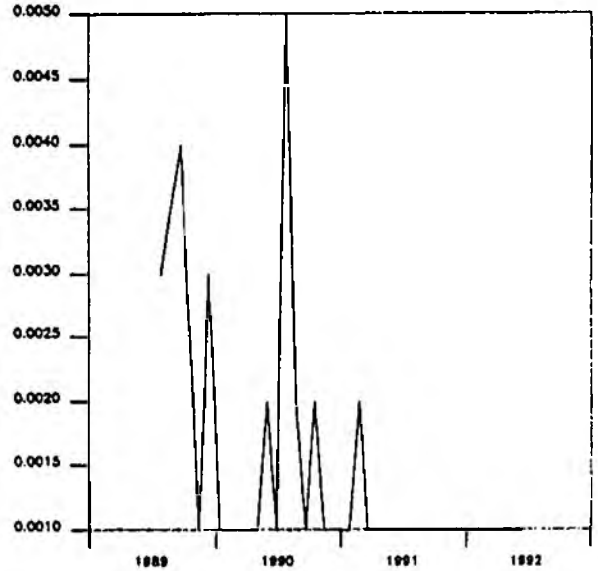
THAMES AT DONNINGTON BRIDGE, 0



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

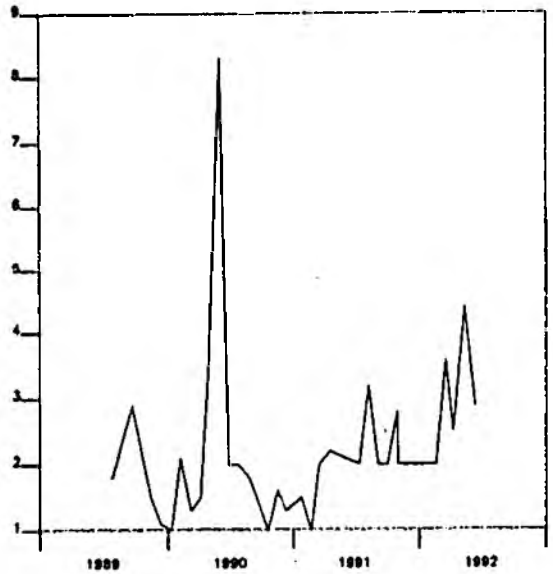
THAMES AT DONNINGTON BRIDGE, 0



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

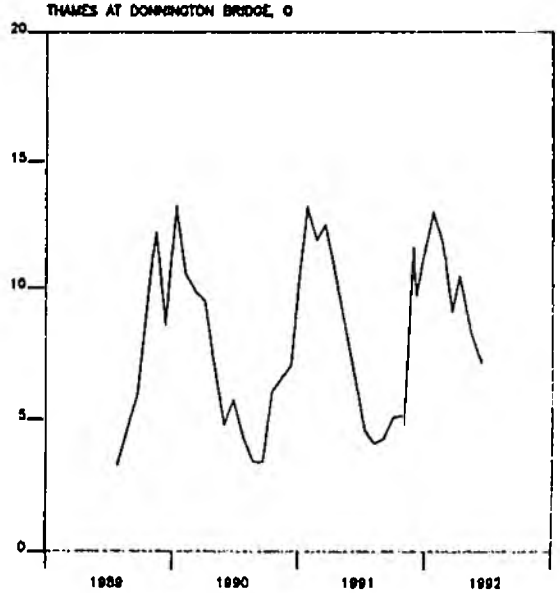
THAMES AT DONNINGTON BRIDGE, 0



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT DONNINGTON BRIDGE, 0

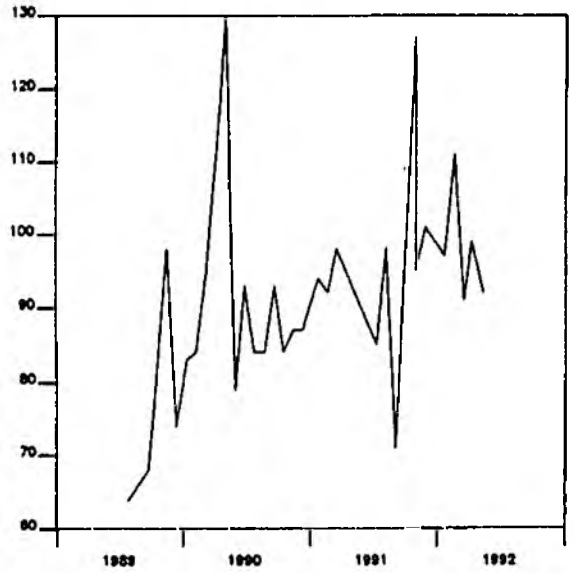


TT66

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

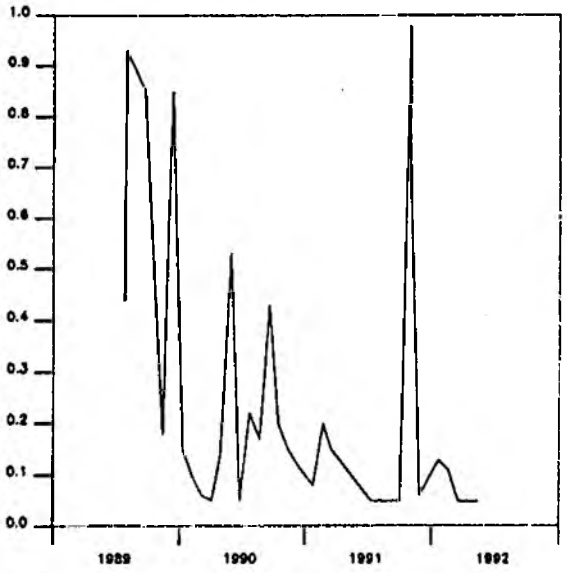
THAMES AT RADLEY COLLEGE BOATH



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

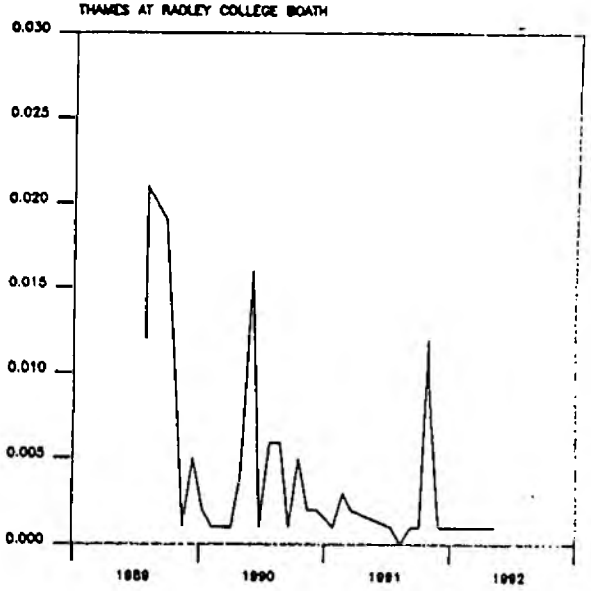
THAMES AT RADLEY COLLEGE BOATH



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

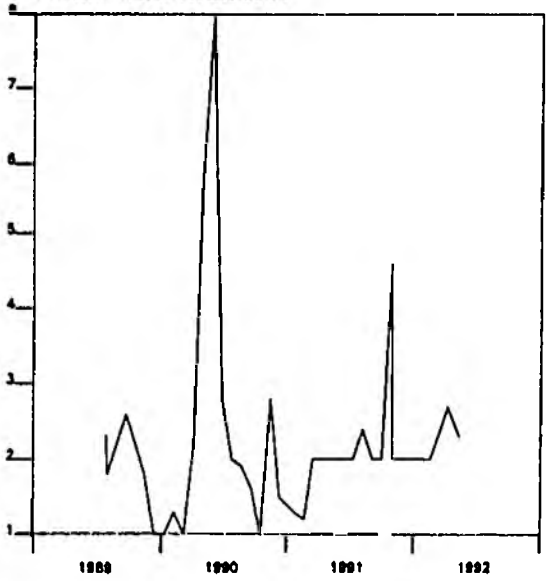
THAMES AT RADLEY COLLEGE BOATH



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT RADLEY COLLEGE BOATH



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT RADLEY COLLEGE BOATH

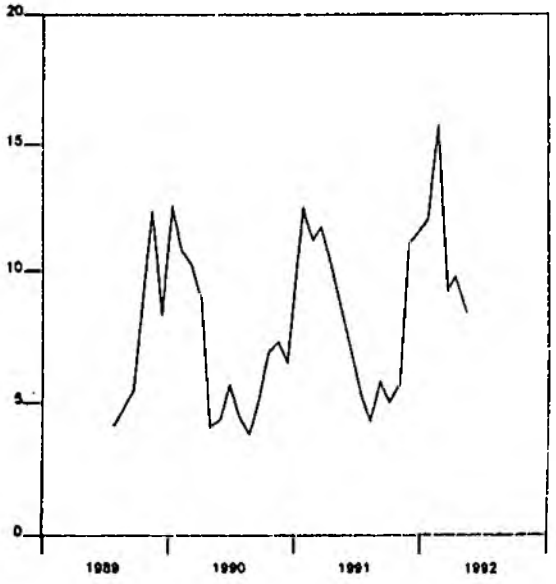
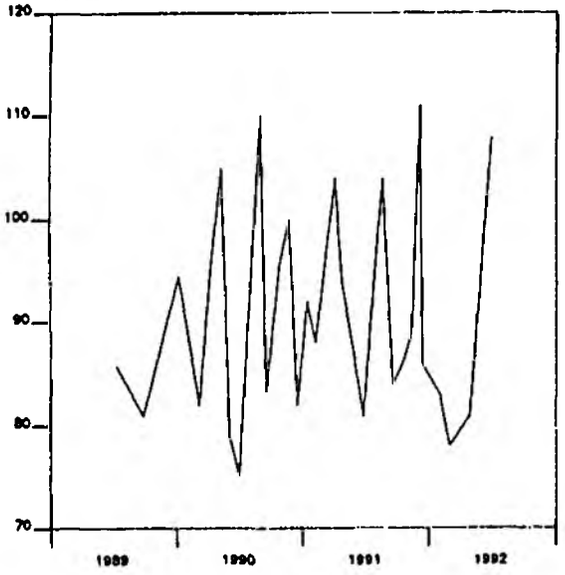


FIG 7

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1988

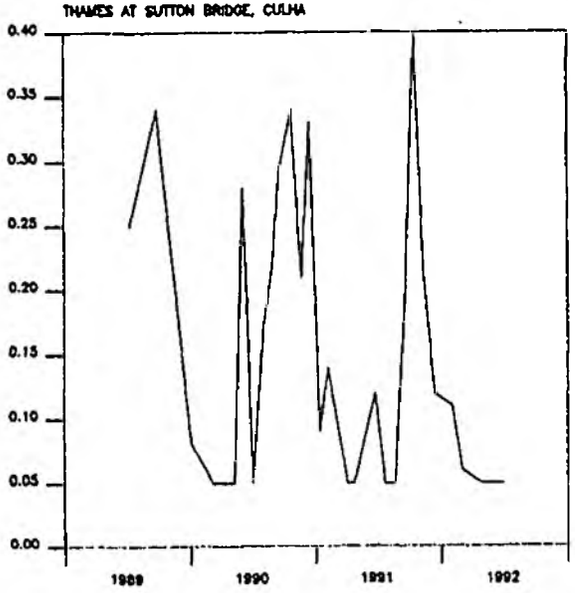
THAMES AT SUTTON BRIDGE, CULHA



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1988

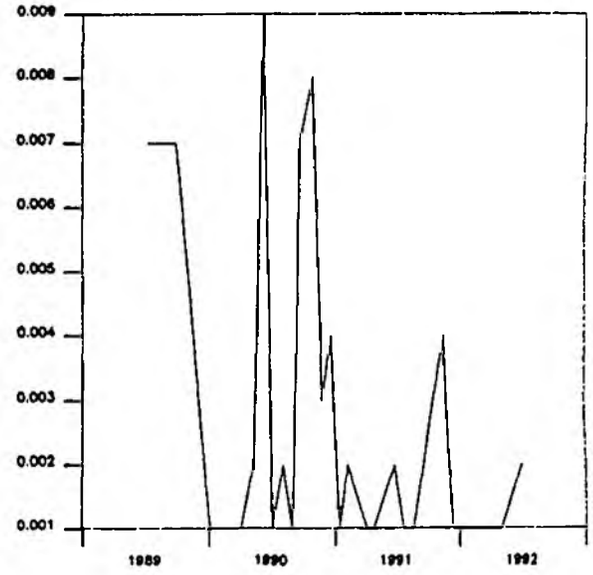
THAMES AT SUTTON BRIDGE, CULHA



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1988

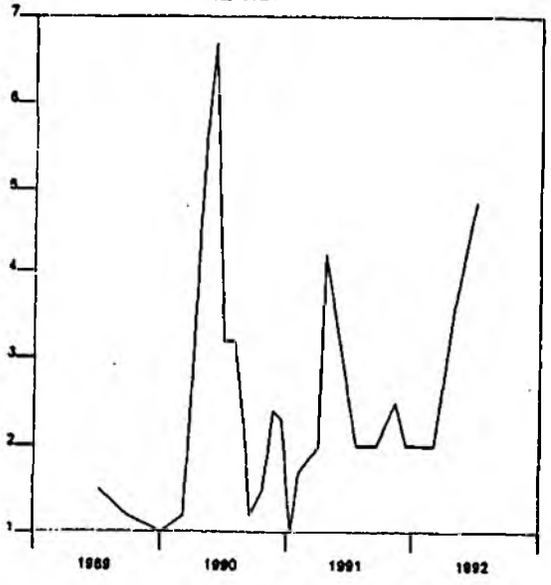
THAMES AT SUTTON BRIDGE, CULHA



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1988

THAMES AT SUTTON BRIDGE, CULHA



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1988

THAMES AT SUTTON BRIDGE, CULHA

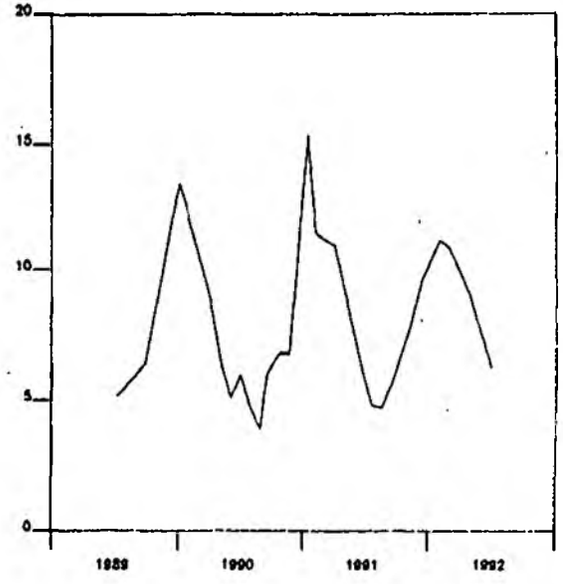
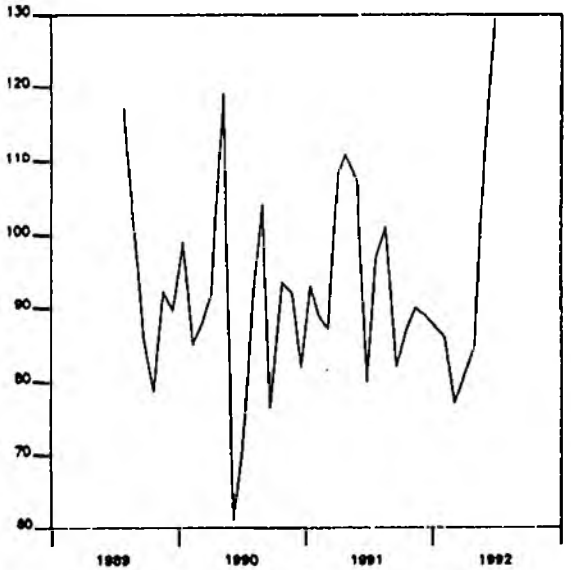


FIG 8

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

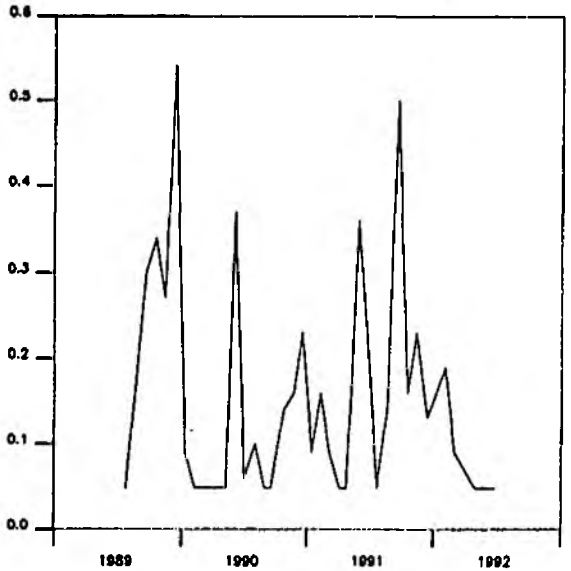
THAMES AT DAYS LOCK



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

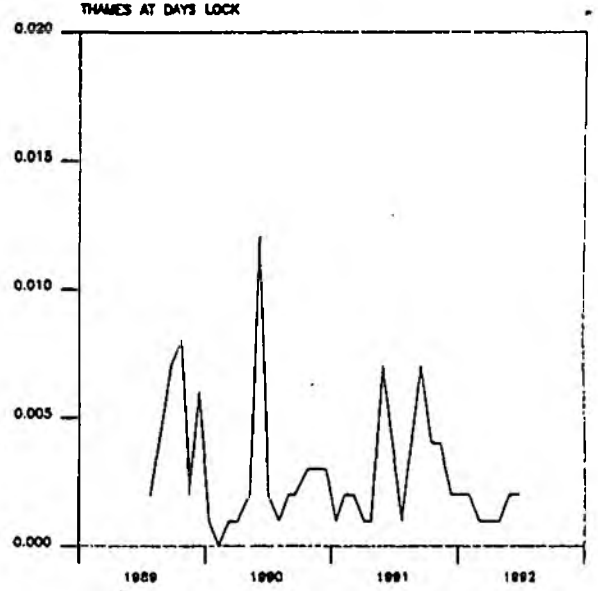
THAMES AT DAYS LOCK



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

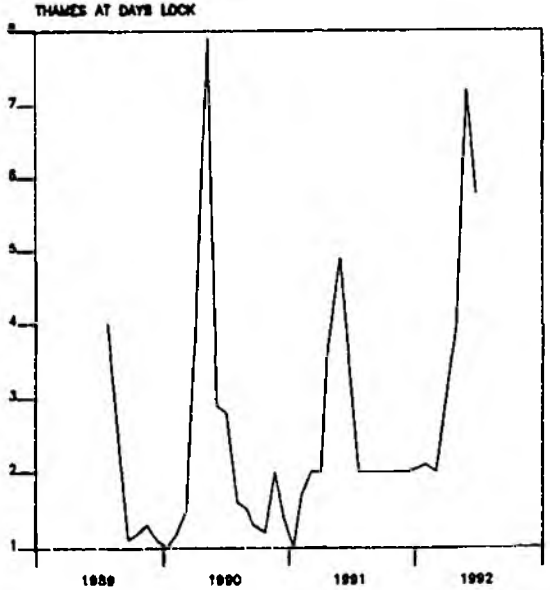
THAMES AT DAYS LOCK



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

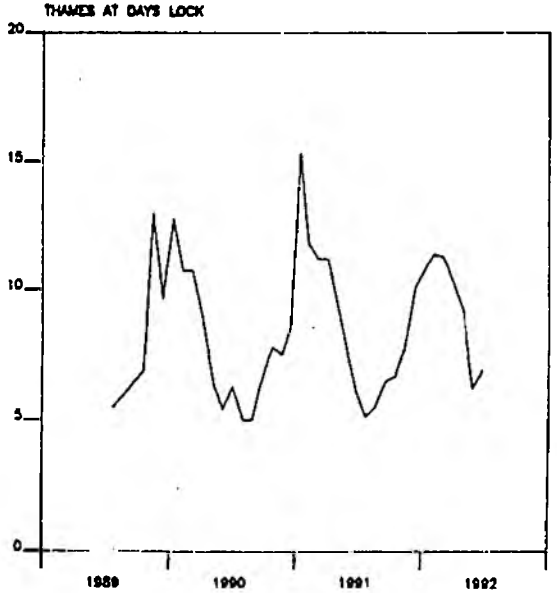
THAMES AT DAYS LOCK



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

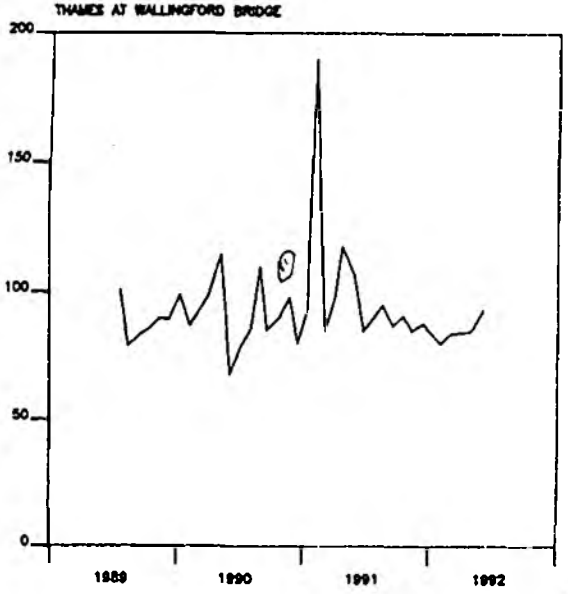
THAMES AT DAYS LOCK



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

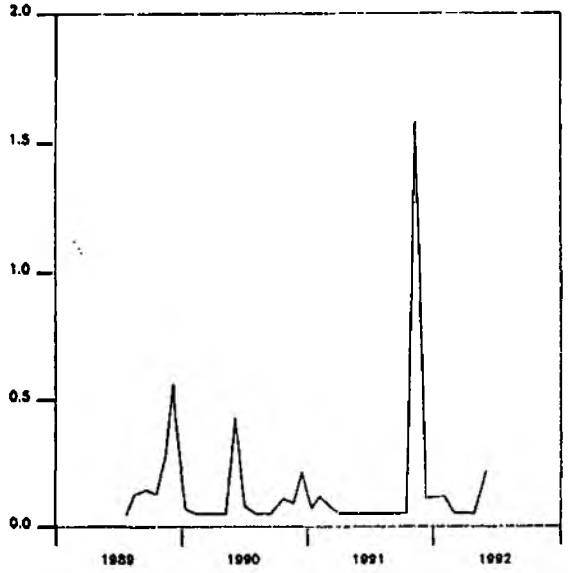
THAMES AT WALLINGFORD BRIDGE



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

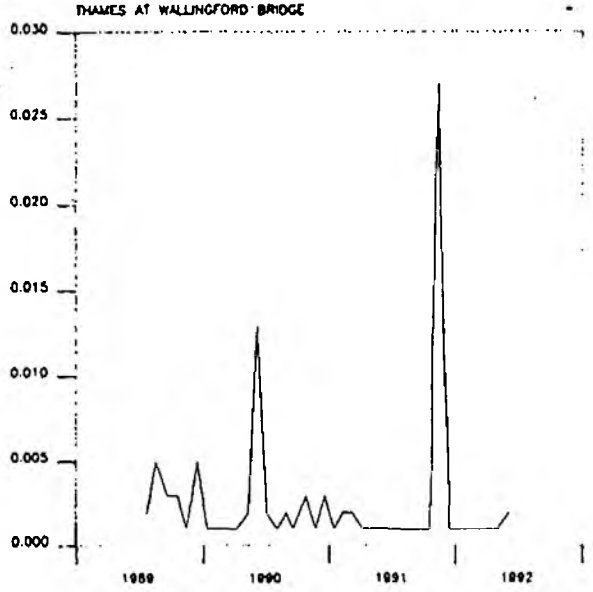
THAMES AT WALLINGFORD BRIDGE



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

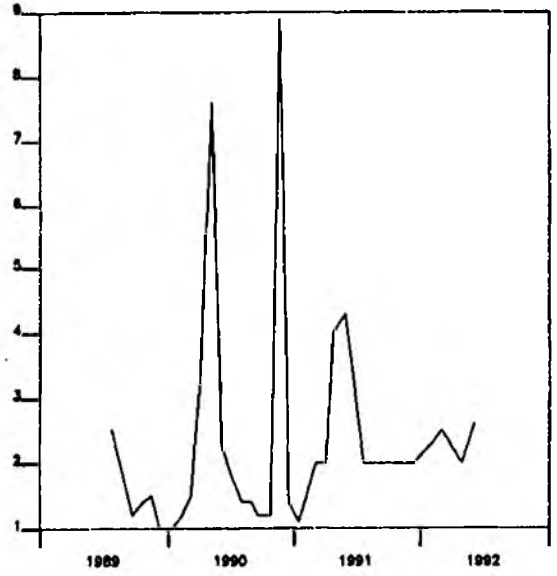
THAMES AT WALLINGFORD BRIDGE



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT WALLINGFORD BRIDGE



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT WALLINGFORD BRIDGE

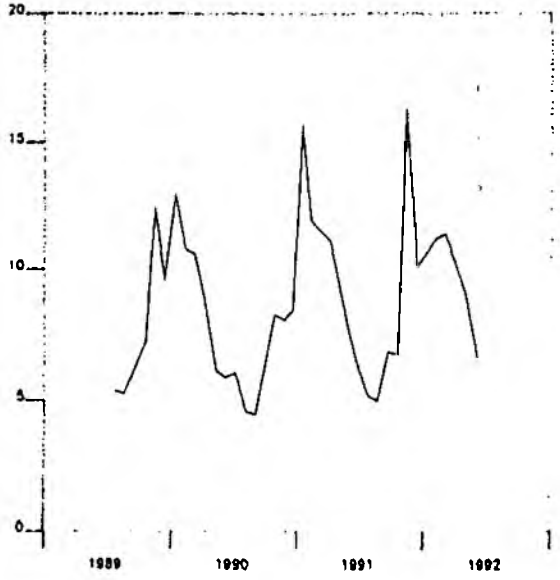
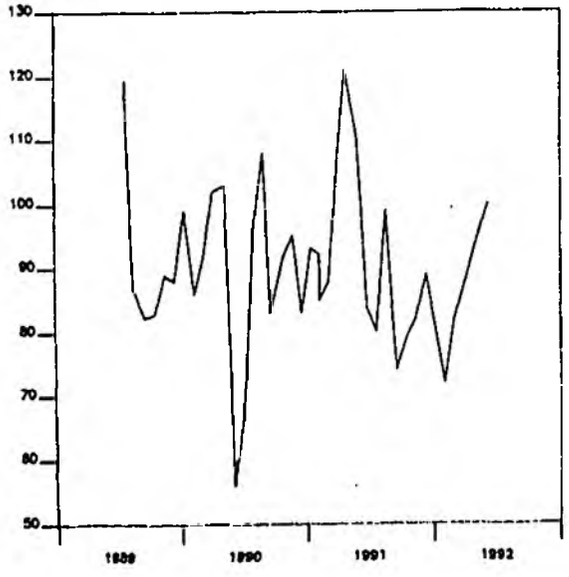


FIG 10

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

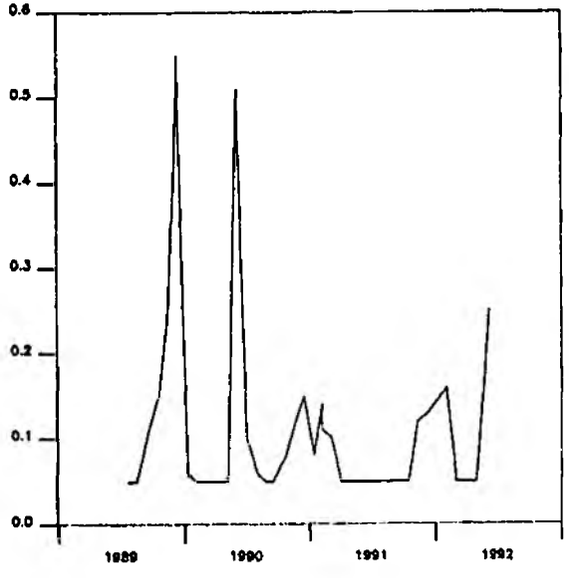
THAMES JUST ABOVE GORING WEIR



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

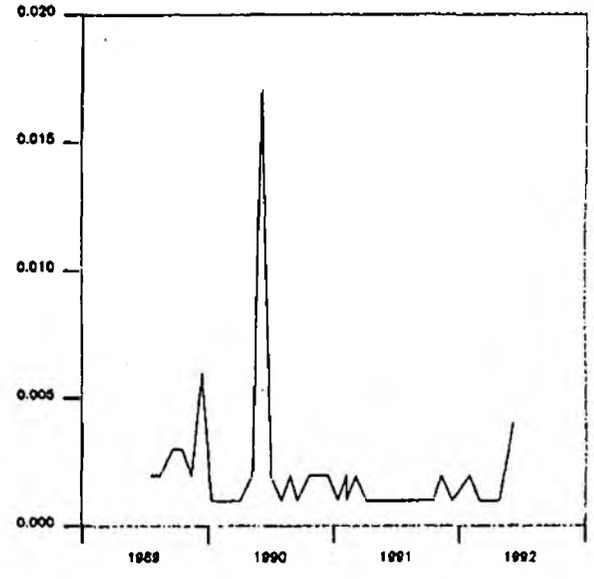
THAMES JUST ABOVE GORING WEIR



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

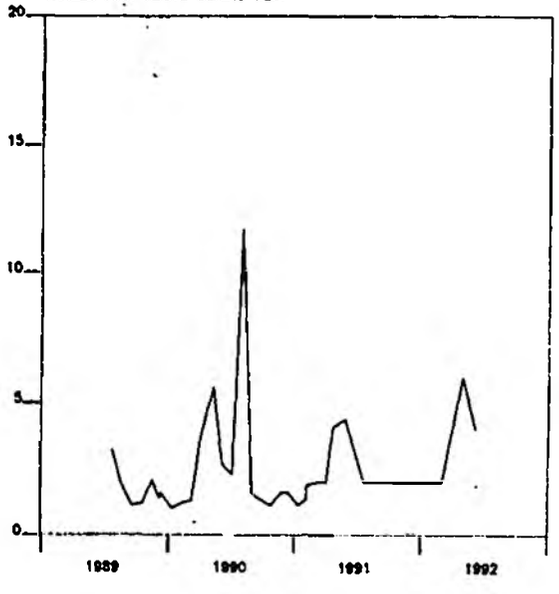
THAMES JUST ABOVE GORING WEIR



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

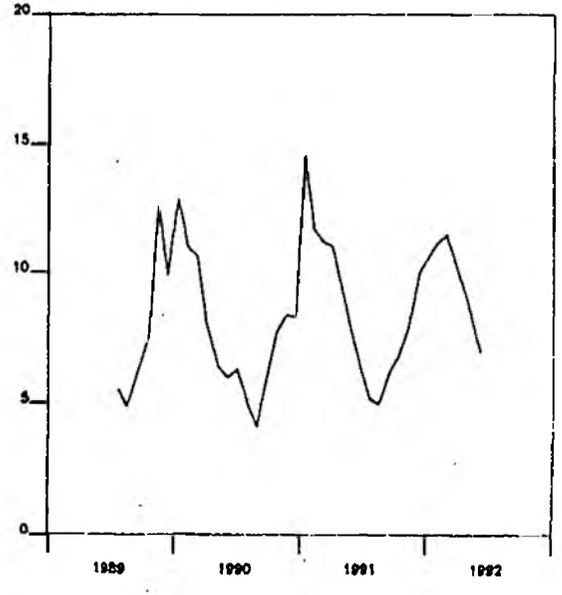
THAMES JUST ABOVE GORING WEIR



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES JUST ABOVE GORING WEIR

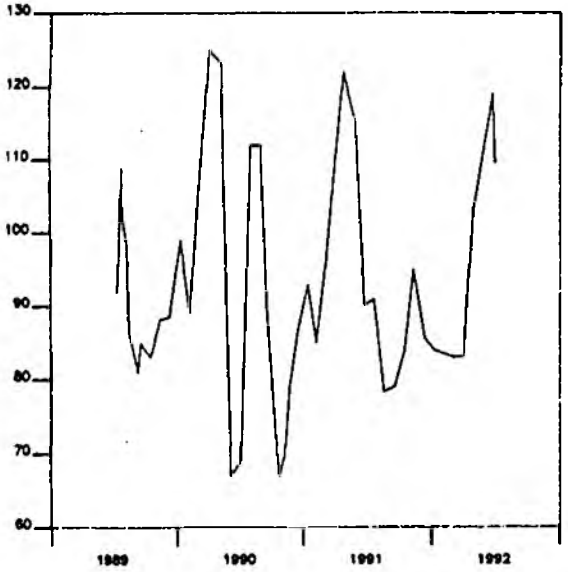


A2

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

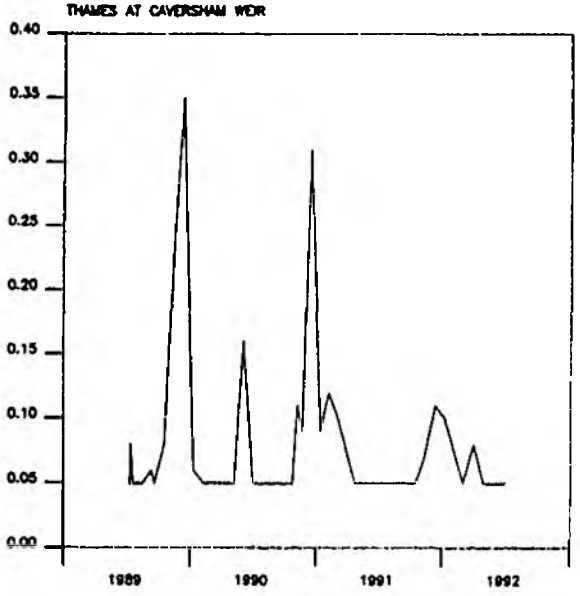
THAMES AT CAVERSHAM WEIR



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

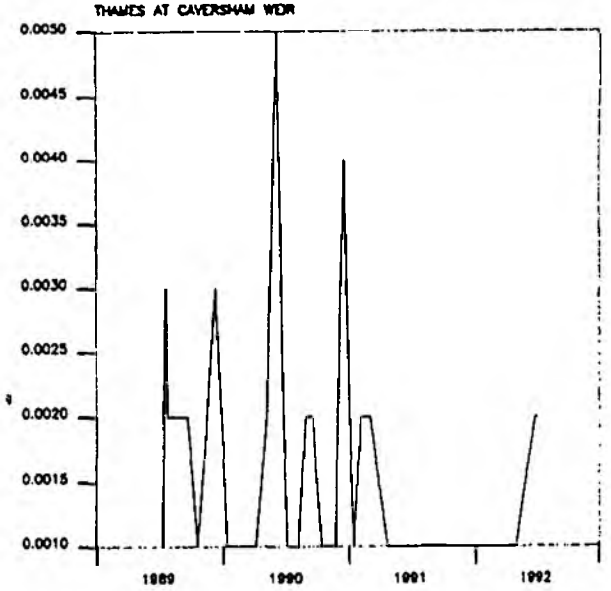
THAMES AT CAVERSHAM WEIR



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

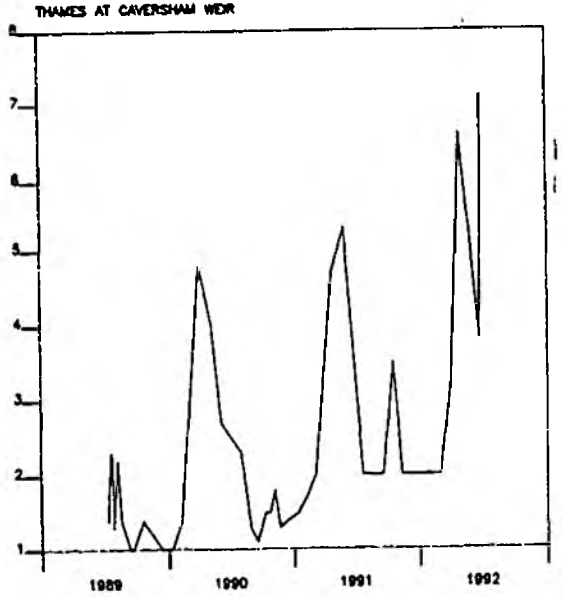
THAMES AT CAVERSHAM WEIR



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

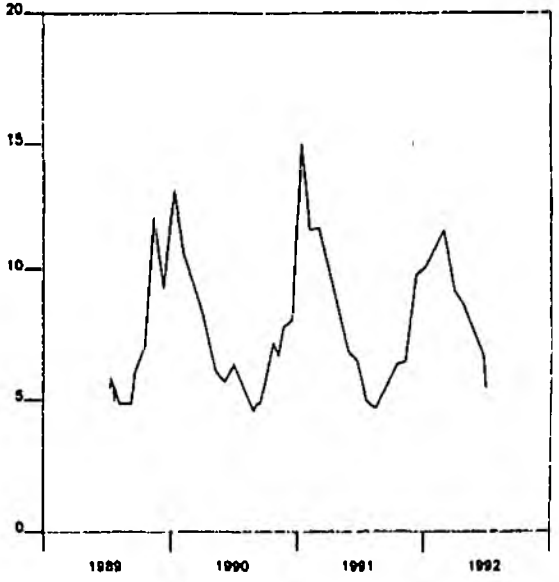
THAMES AT CAVERSHAM WEIR



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

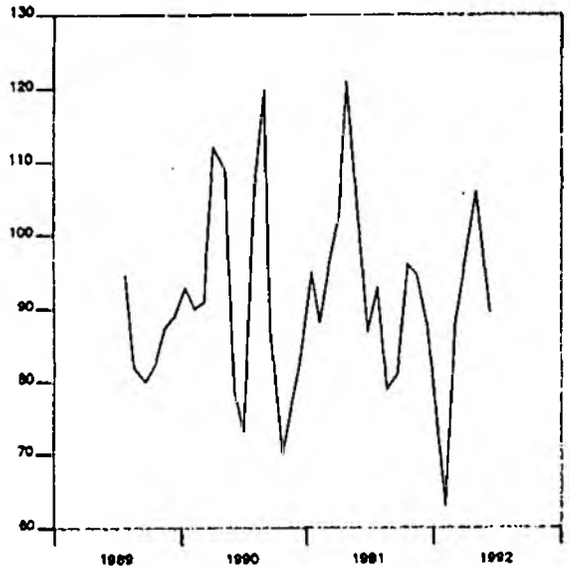
THAMES AT CAVERSHAM WEIR



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

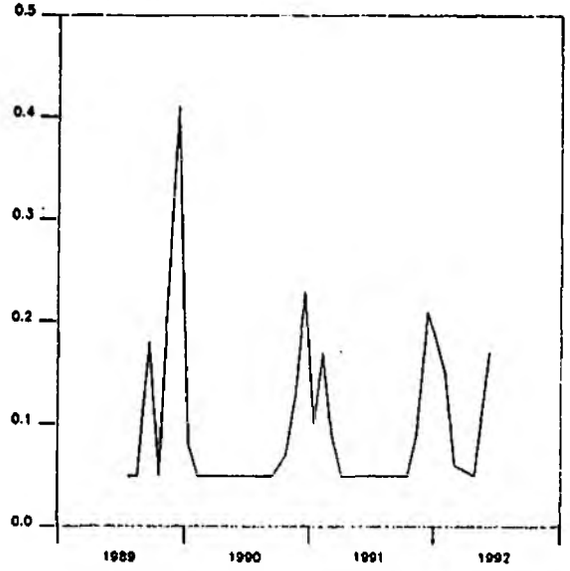
THAMES AT SONNING WEIR



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

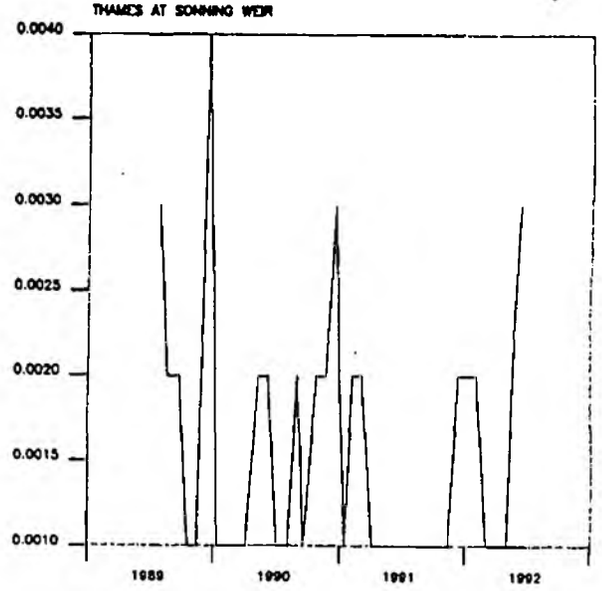
THAMES AT SONNING WEIR



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

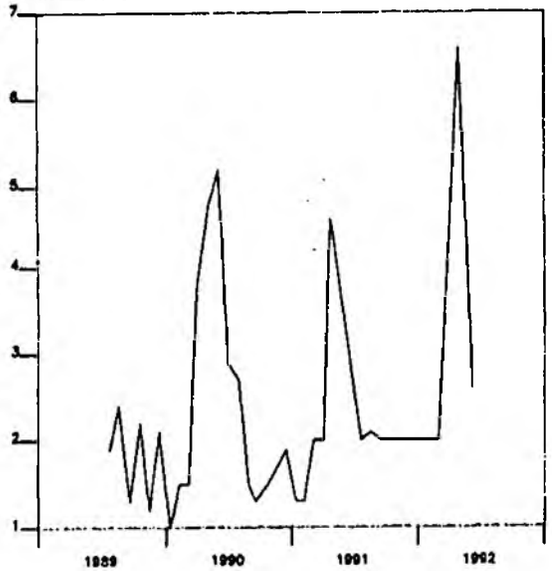
THAMES AT SONNING WEIR



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT SONNING WEIR



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT SONNING WEIR

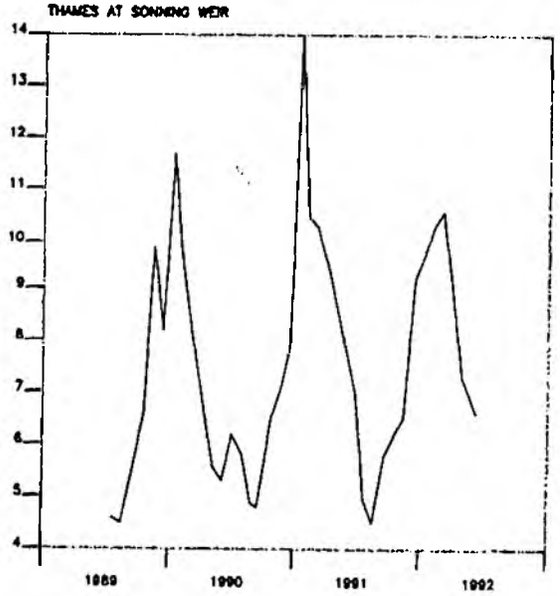
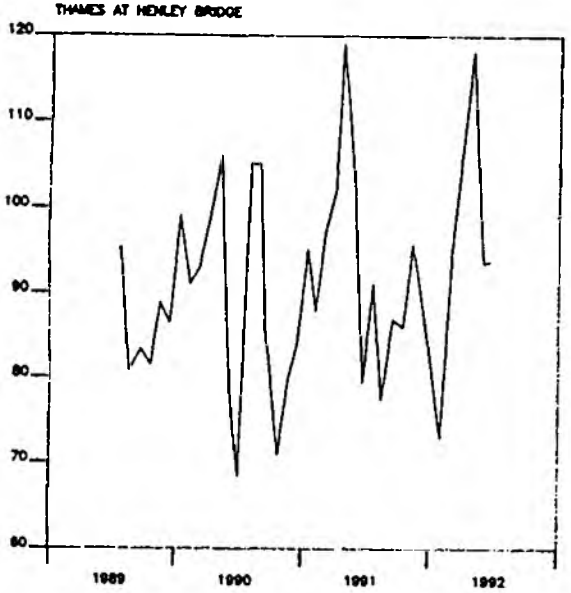


FIG 13

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

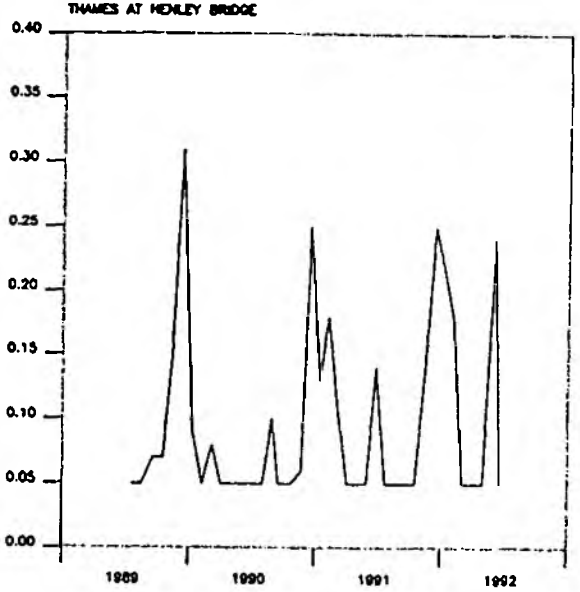
THAMES AT HENLEY BRIDGE



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

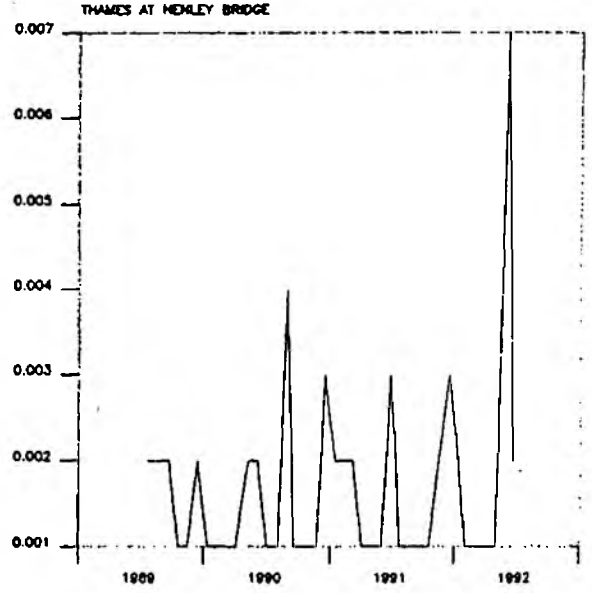
THAMES AT HENLEY BRIDGE



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

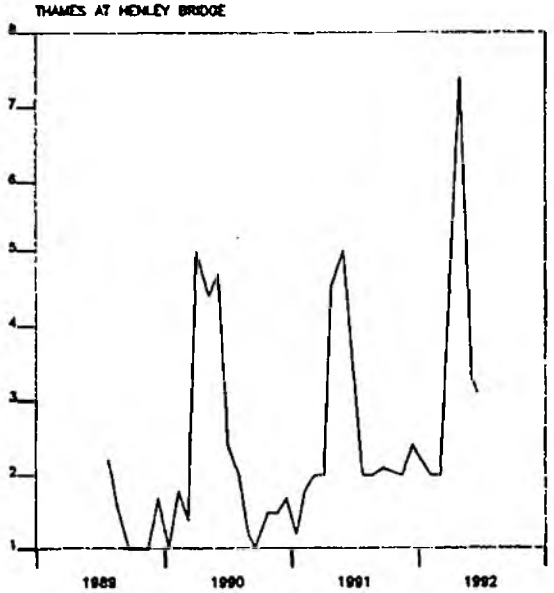
THAMES AT HENLEY BRIDGE



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

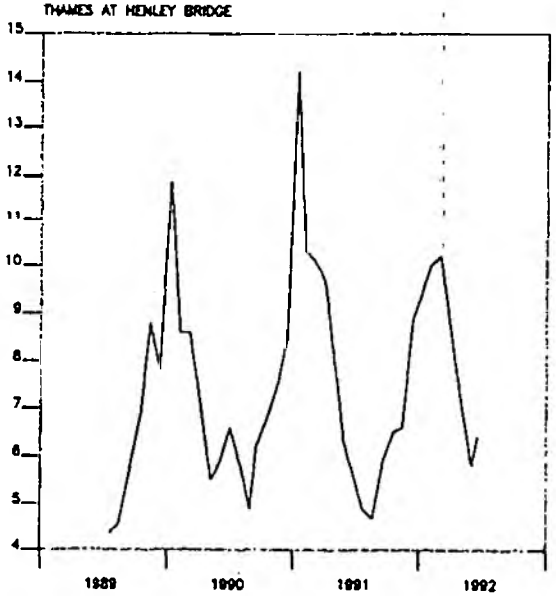
THAMES AT HENLEY BRIDGE



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

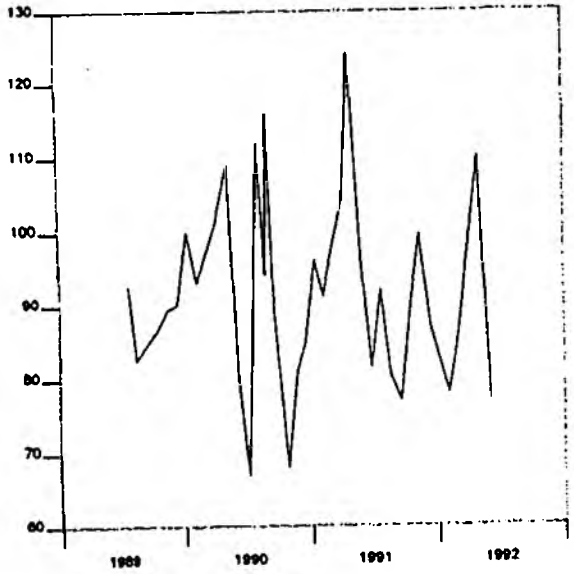
THAMES AT HENLEY BRIDGE



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

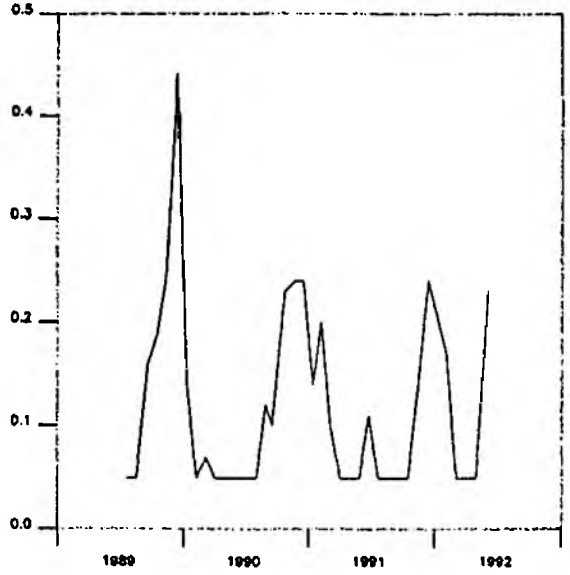
THAMES AT COOKHAM BRIDGE



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

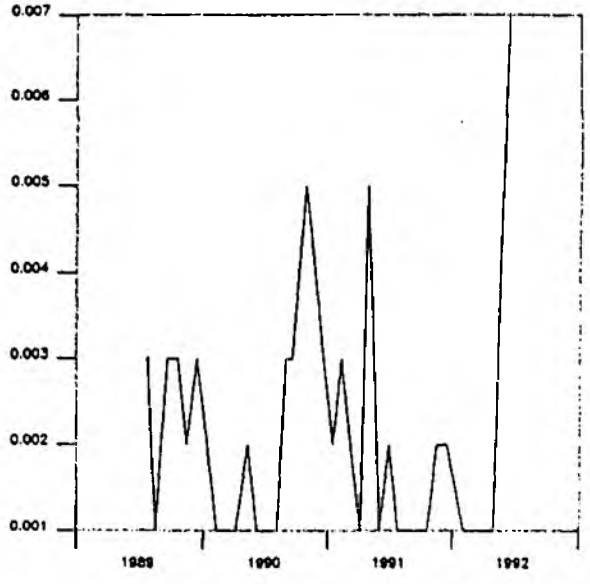
THAMES AT COOKHAM BRIDGE



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

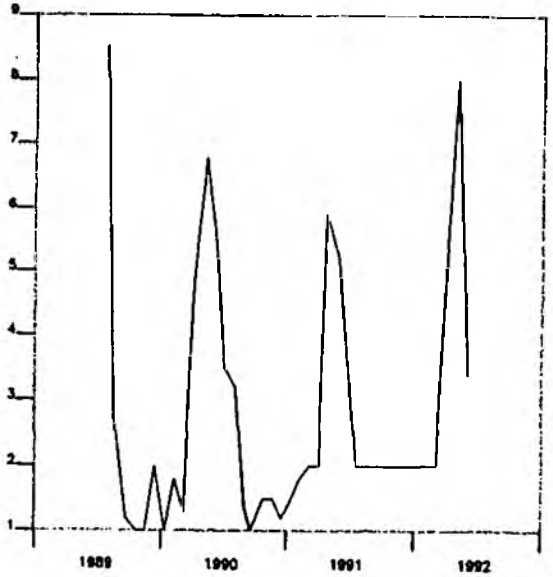
THAMES AT COOKHAM BRIDGE



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT COOKHAM BRIDGE



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT COOKHAM BRIDGE

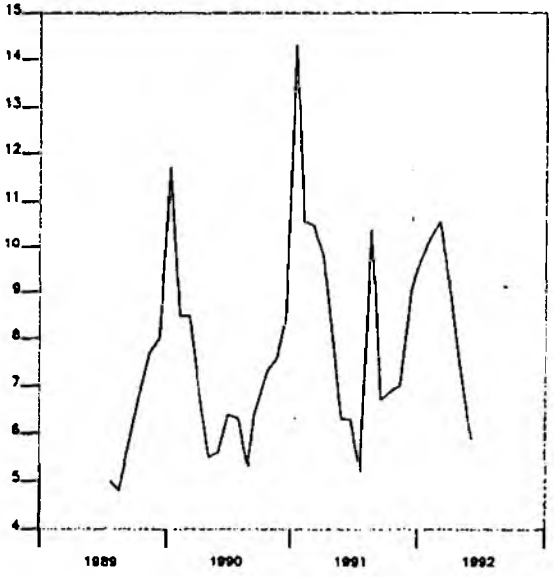
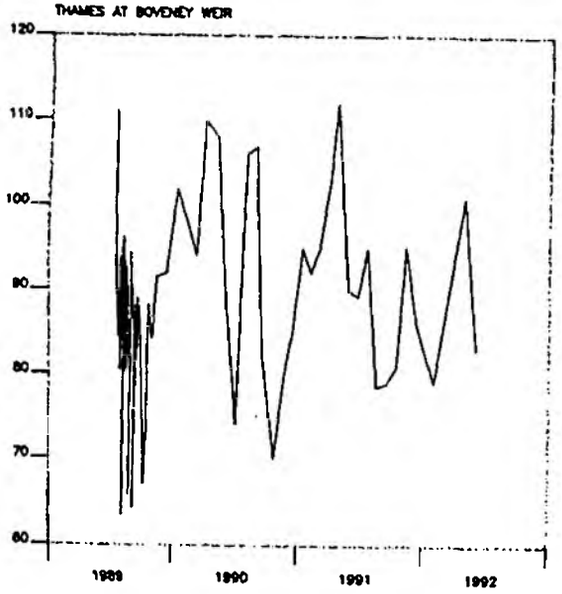


Fig 15

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

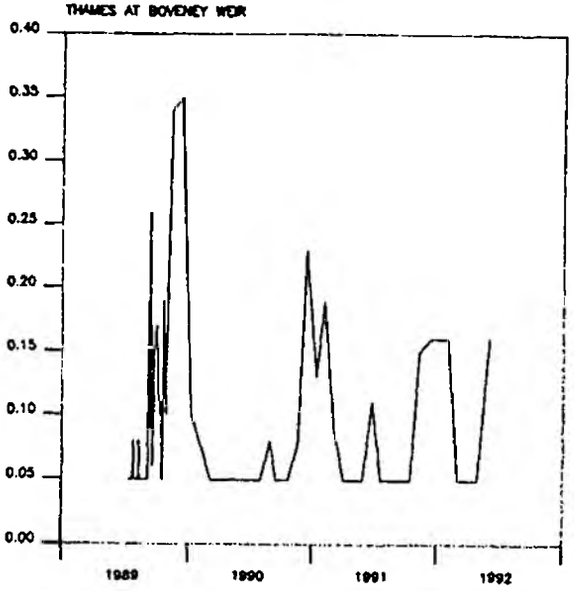
THAMES AT BOVENEY WEIR



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

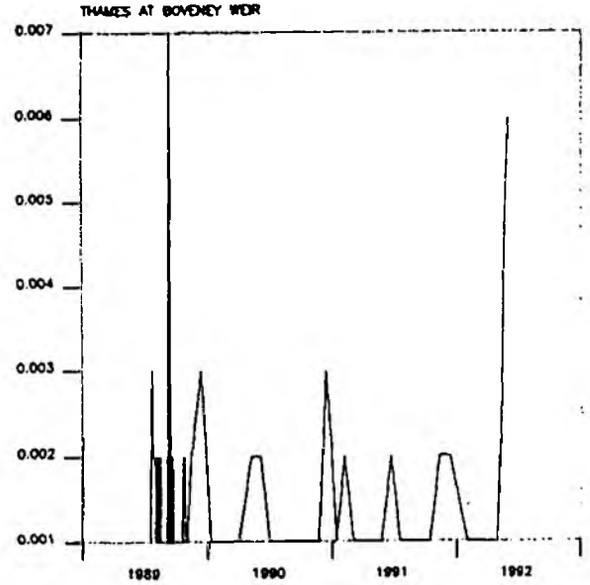
THAMES AT BOVENEY WEIR



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

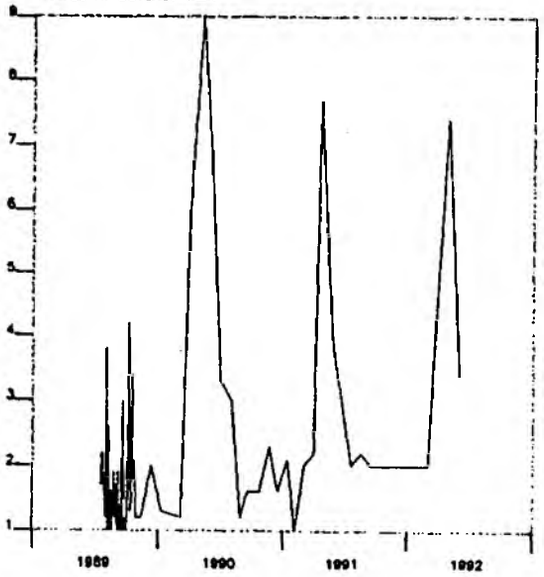
THAMES AT BOVENEY WEIR



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT BOVENEY WEIR



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT BOVENEY WEIR

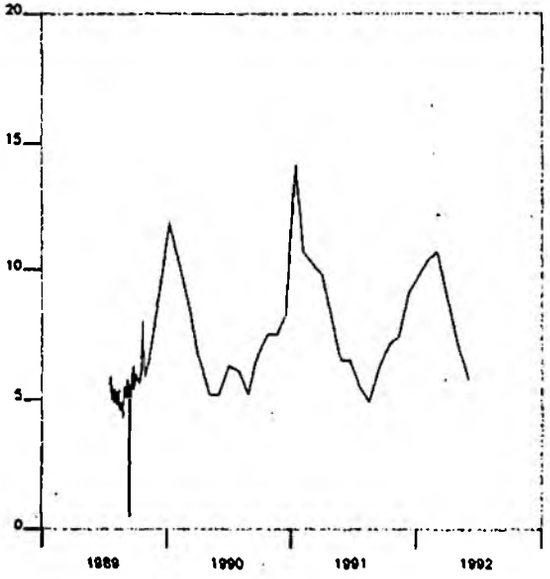
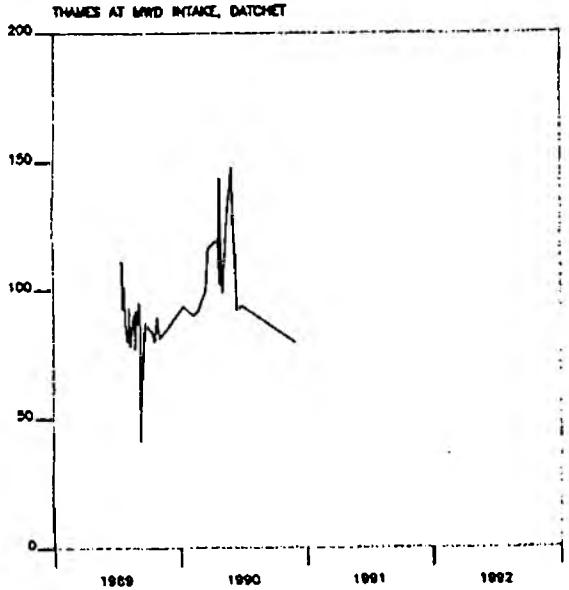


Fig 16

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

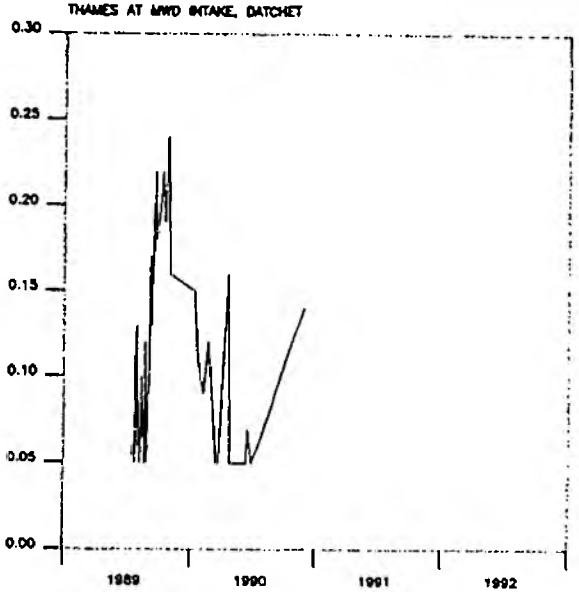
THAMES AT MWD INTAKE, DATCHET



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

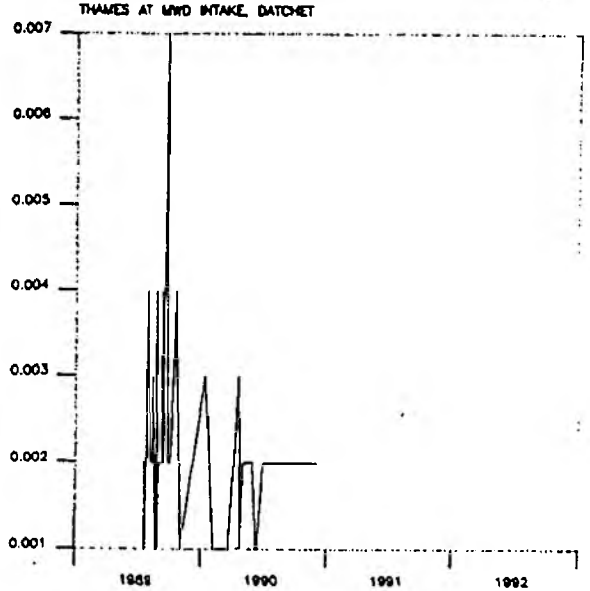
THAMES AT MWD INTAKE, DATCHET



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

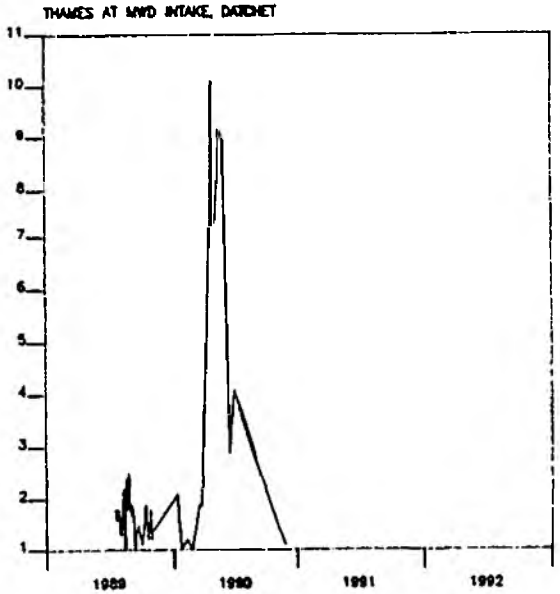
THAMES AT MWD INTAKE, DATCHET



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT MWD INTAKE, DATCHET



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES AT MWD INTAKE, DATCHET

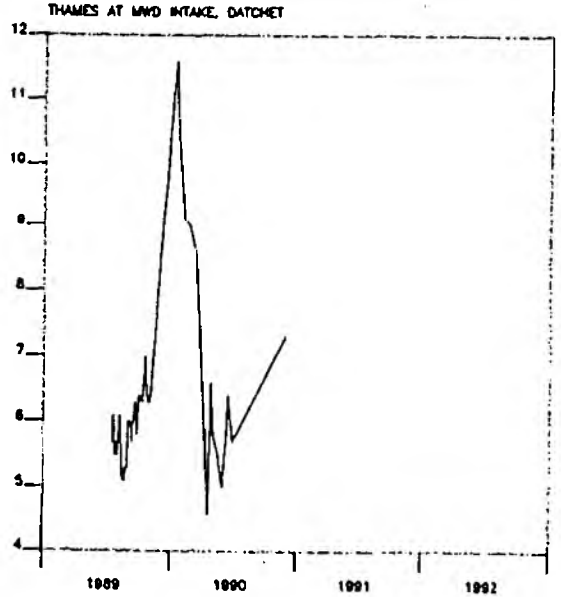
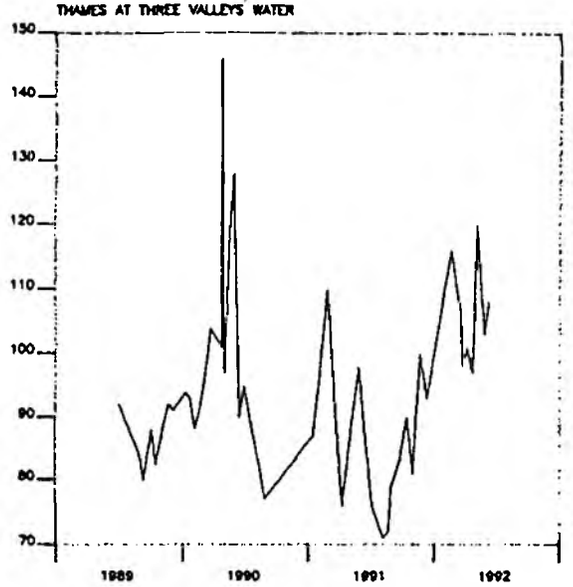


FIG 17

Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

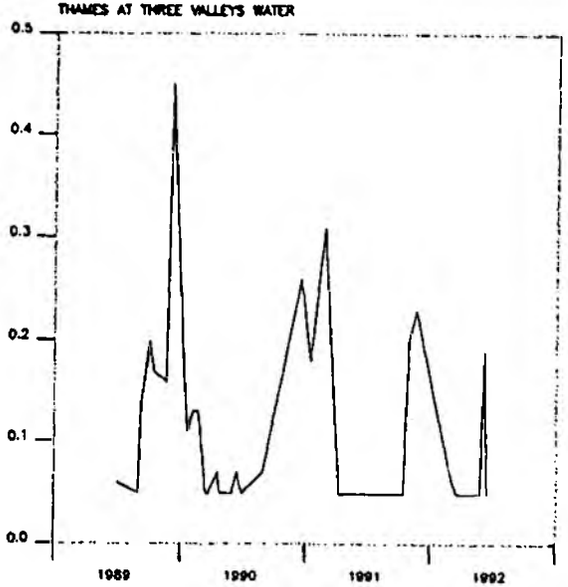
THAMES AT THREE VALLEYS WATER



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

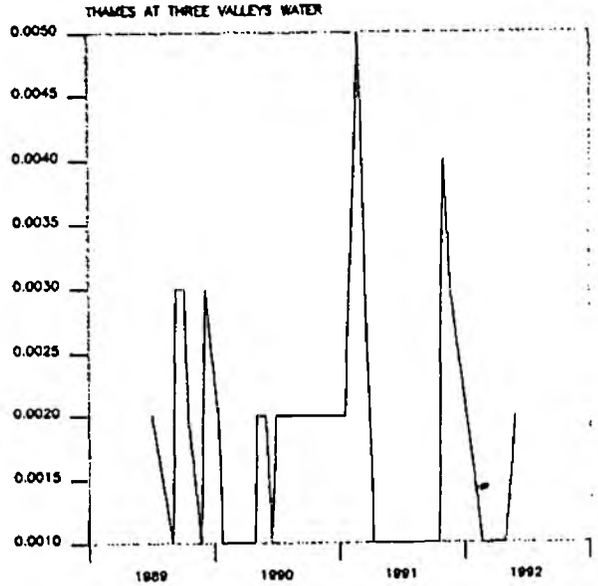
THAMES AT THREE VALLEYS WATER



Un-ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

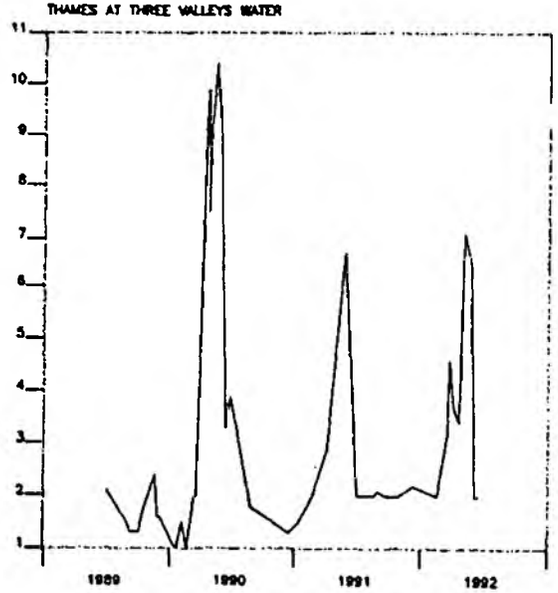
THAMES AT THREE VALLEYS WATER



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

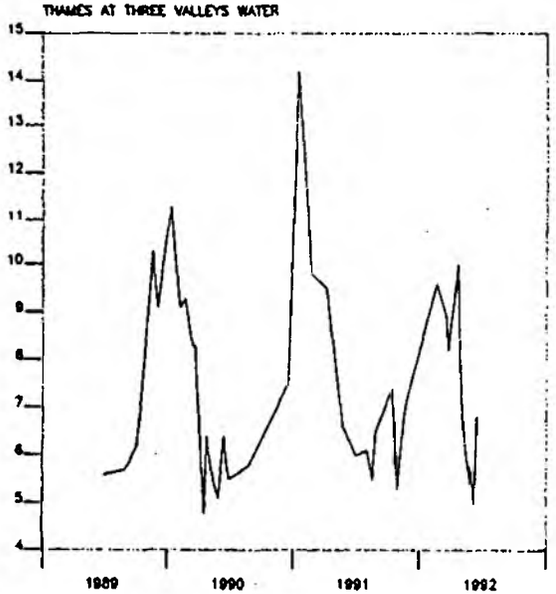
THAMES AT THREE VALLEYS WATER



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

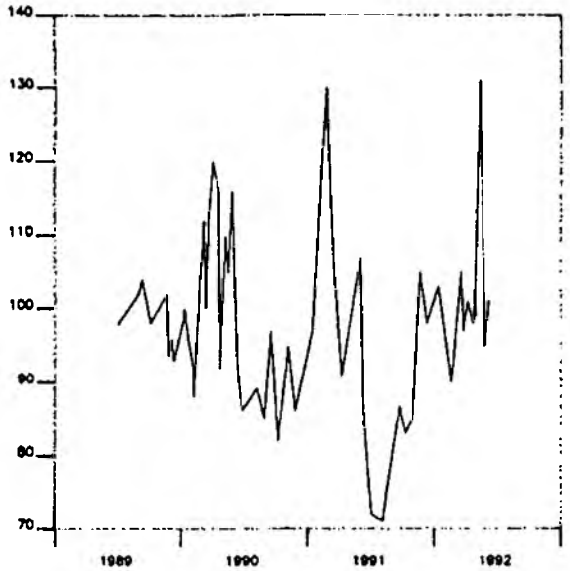
THAMES AT THREE VALLEYS WATER



Dissolved Oxygen, (%Sat) against Time (years)

Start time : 1st January 1989

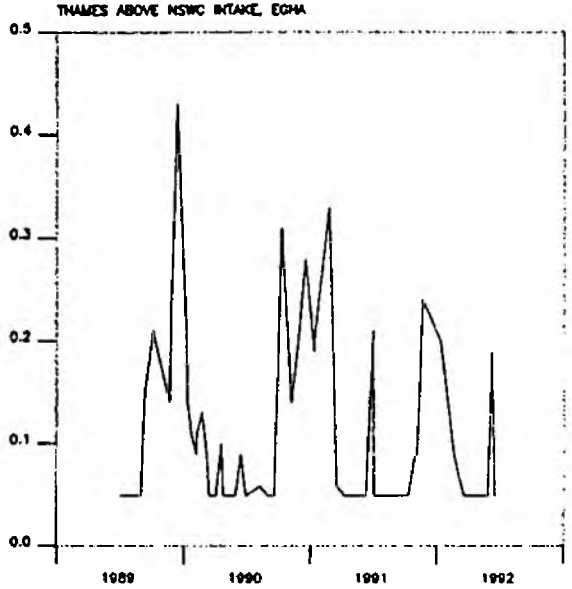
THAMES ABOVE NSWC INTAKE, EGHA



Ammoniacal Nitrogen, (mg/l) against Time (years)

Start time : 1st January 1989

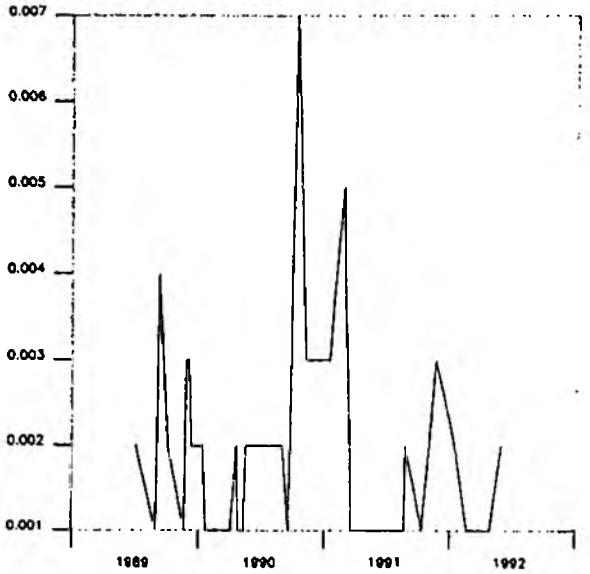
THAMES ABOVE NSWC INTAKE, EGHA



Un-Ionised Ammonia as N, (mg/l) against Time (years)

Start time : 1st January 1989

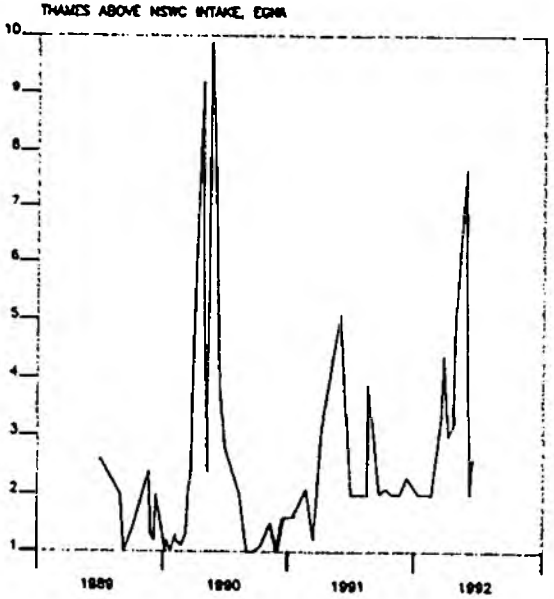
THAMES ABOVE NSWC INTAKE, EGHA



BOD (5 day using ATU), (mg/l) against Time (years)

Start time : 1st January 1989

THAMES ABOVE NSWC INTAKE, EGHA



Total Oxidised Nitrogen as N, (mg/l) against Time (years)

Start time : 1st January 1989

THAMES ABOVE NSWC INTAKE, EGHA

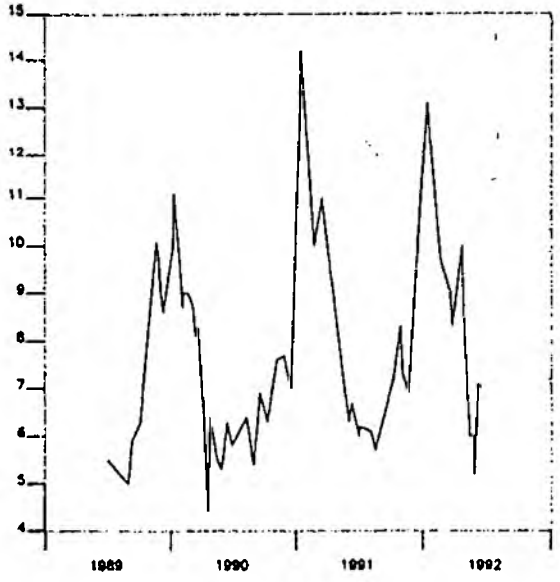
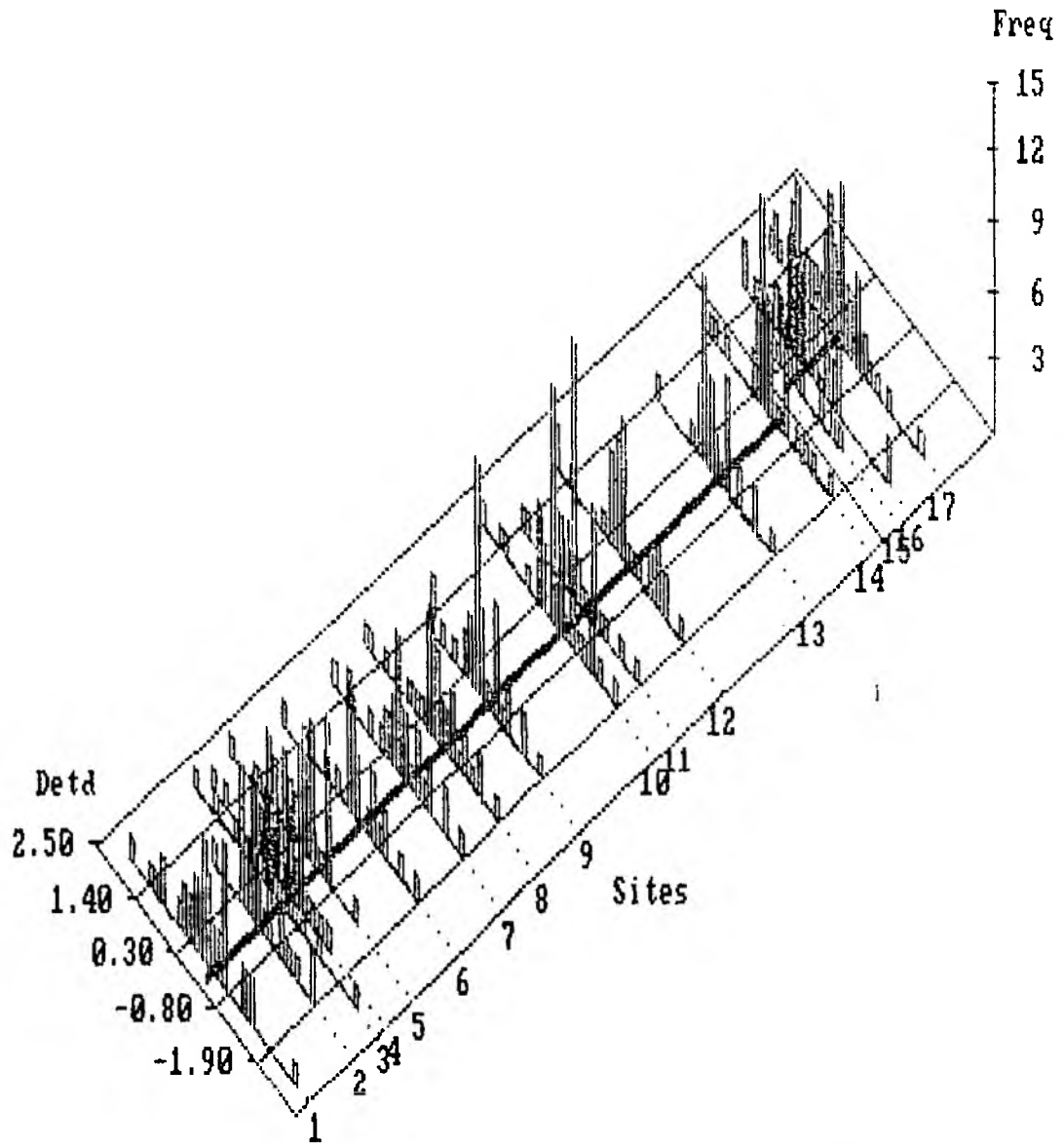


FIG 19

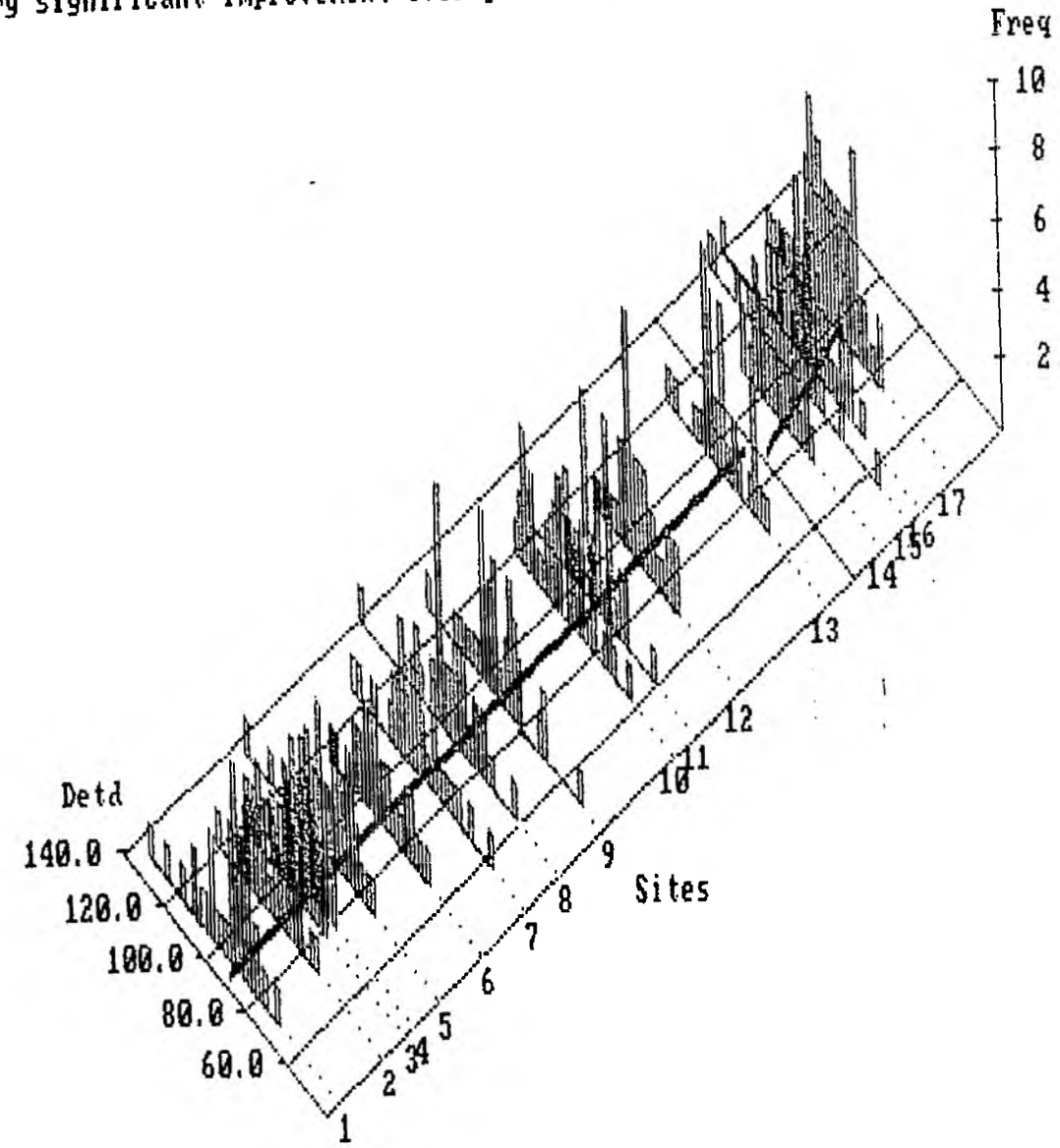
RIVER : RIVER THAMES - RESERVOIR STUDY 01/01/89 to 31/12/92
DETERMINAND : log B.O.D.
MODEL : Step(14); Step(3)
Proportion of between-site variation accounted for : 62.1%
Bonus improvement over preceding model



1 RIVER THAMES AT FARMOOR
2 RIVER THAMES AT GODSTOW
3 RIVER THAMES AT FOLLY BRIDGE
4 RIVER THAMES AT DONNINGTON BRIDGE
5 RIVER THAMES AT RADLEY COLLEGE
6 RIVER THAMES AT SUTTON BRIDGE
7 RIVER THAMES AT DAYS WEIR
8 RIVER THAMES AT WALLINGFORD BRIDGE
9 RIVER THAMES AT GORING WEIR
10 RIVER THAMES AT CAVERSHAM
11 RIVER THAMES AT SONNING
12 RIVER THAMES AT HENLEY
13 RIVER THAMES AT COOKHAM
14 RIVER THAMES AT BOVENEY WEIR
15 RIVER THAMES AT MWD DATCHET
16 RIVER THAMES AT 3 VALLEYS SUNNYMEADS
17 RIVER THAMES AT NSWC EGHAM

FIG 20

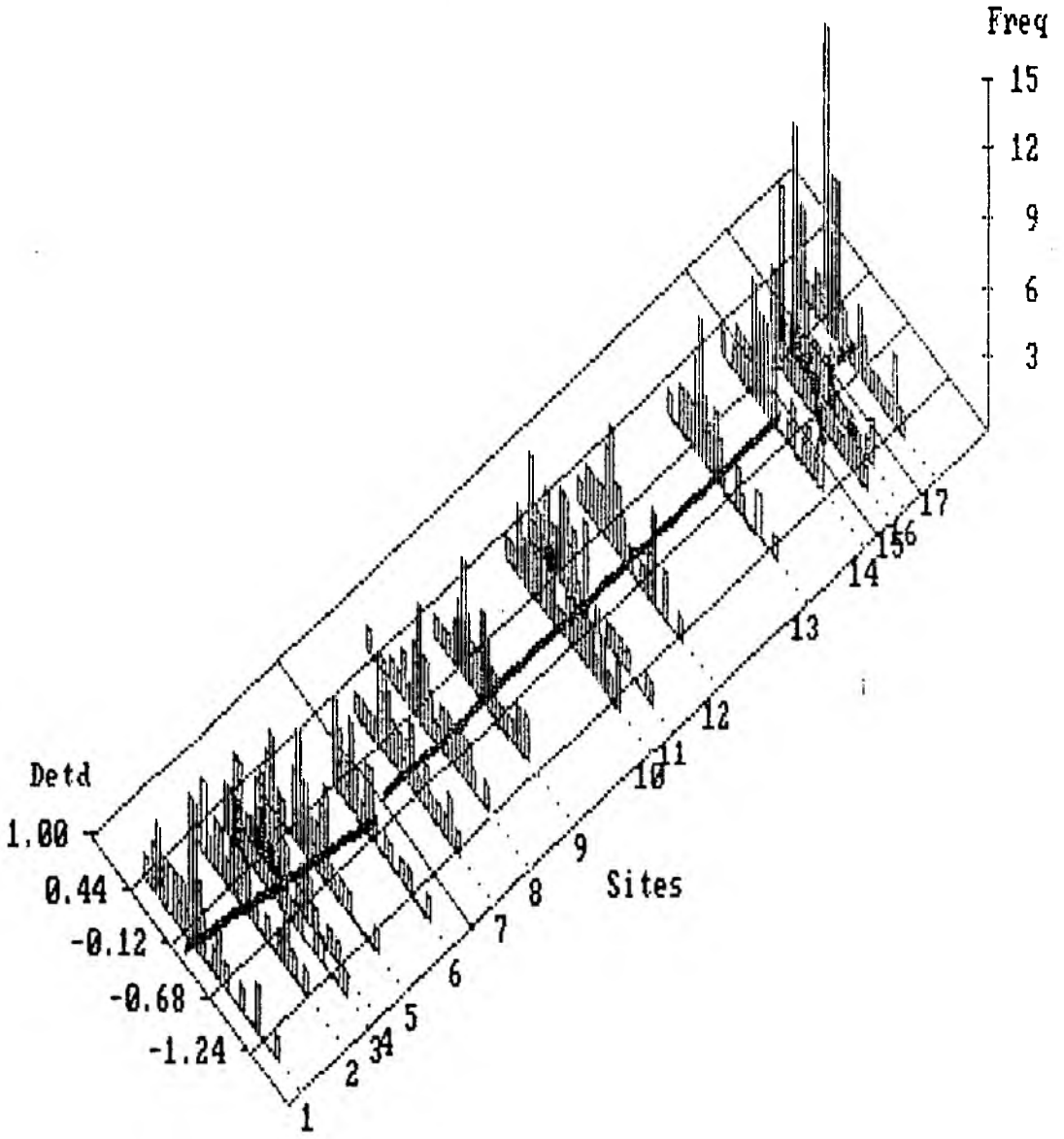
RIVER : RIVER THAMES - RESERVOIR STUDY 01/01/89 to 31/12/92
DETERMINAND : D.O. %SAT.
MODEL : Step(13); Lin(4)
Proportion of between-site variation accounted for : 71.4%
Very significant improvement over preceding model [P = 0.0027 (**)]



1 RIVER THAMES AT FARMOOR
2 RIVER THAMES AT GODSTOW
3 RIVER THAMES AT FOLLY BRIDGE
4 RIVER THAMES AT DONNINGTON BRIDGE
5 RIVER THAMES AT RADLEY COLLEGE
6 RIVER THAMES AT SUTTON BRIDGE
7 RIVER THAMES AT DAYS WEIR
8 RIVER THAMES AT WALLINGFORD BRIDGE
9 RIVER THAMES AT GORING WEIR
10 RIVER THAMES AT CAVERSHAM
11 RIVER THAMES AT SONNING
12 RIVER THAMES AT HENLEY
13 RIVER THAMES AT COOKHAM
14 RIVER THAMES AT BOVENEY WEIR
15 RIVER THAMES AT MWD DATCHET
16 RIVER THAMES AT 3 VALLEYS SUNNYMEADS
17 RIVER THAMES AT NSWC EGHAM

FIG 21

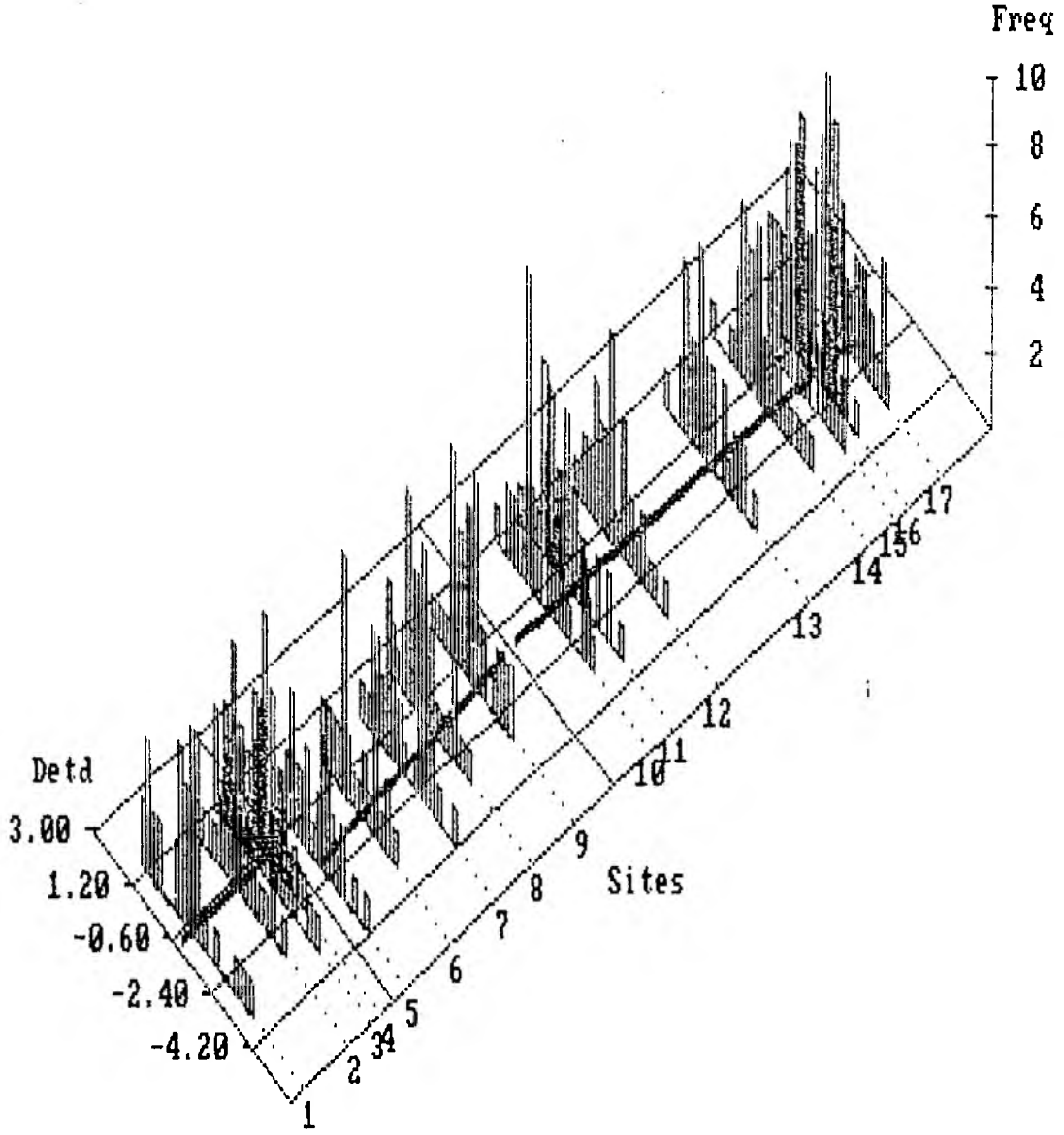
RIVER : RIVER THAMES - RESERVOIR STUDY 01/01/89 to 31/12/92
DETERMINAND : log AMM. NIT.
MODEL : Lin(6); Step(8); Lin(2); Step(1)
Proportion of between-site variation accounted for : 92.5%
Very significant improvement over preceding model [P = 0.0015 (**)]



1	RIVER THAMES AT FARMOOR
2	RIVER THAMES AT GODSTOW
3	RIVER THAMES AT FOLLY BRIDGE
4	RIVER THAMES AT DONNINGTON BRIDGE
5	RIVER THAMES AT RADLEY COLLEGE
6	RIVER THAMES AT SUTTON BRIDGE
7	RIVER THAMES AT DAYS WEIR
8	RIVER THAMES AT WALLINGFORD BRIDGE
9	RIVER THAMES AT GORING WEIR
10	RIVER THAMES AT CAVERSHAM
11	RIVER THAMES AT SONNING
12	RIVER THAMES AT HENLEY
13	RIVER THAMES AT COOKHAM
14	RIVER THAMES AT BOVENEY WEIR
15	RIVER THAMES AT MWD DATCHET
16	RIVER THAMES AT 3 VALLEYS SUNNYMEADS
17	RIVER THAMES AT NSWC EGHAM

FIG 22

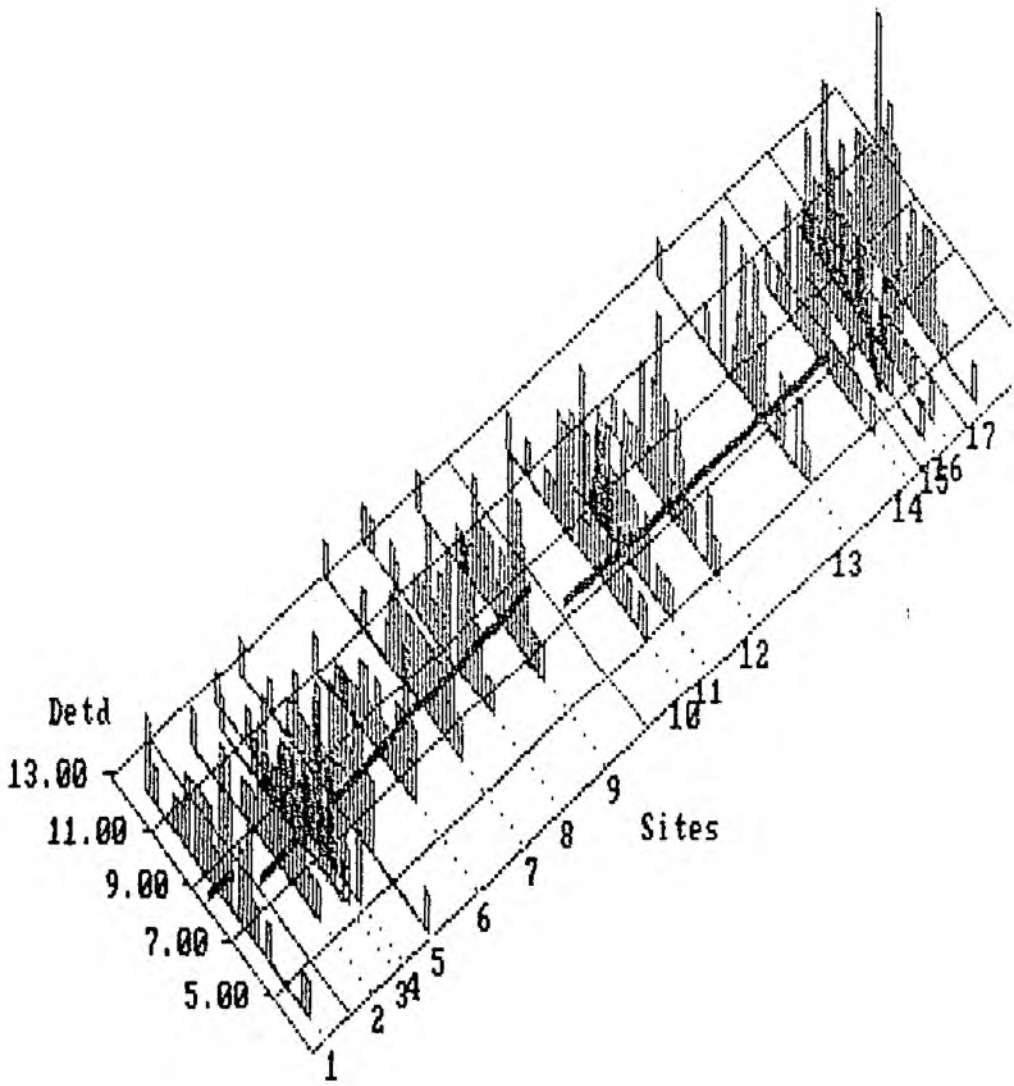
RIVER : RIVER THAMES - RESERVOIR STUDY 01/01/89 to 31/12/92
DETERMINAND : log UN-ION. AMM
MODEL : Step(4); Lin(5); Lin(8)
Proportion of between-site variation accounted for : 83.7%
Very significant improvement over preceding model [P = 0.0025 (**)]



1 RIVER THAMES AT FARMOOR
2 RIVER THAMES AT GODSTOW
3 RIVER THAMES AT FOLLY BRIDGE
4 RIVER THAMES AT DONNINGTON BRIDGE
5 RIVER THAMES AT RADLEY COLLEGE
6 RIVER THAMES AT SUTTON BRIDGE
7 RIVER THAMES AT DAYS WEIR
8 RIVER THAMES AT WALLINGFORD BRIDGE
9 RIVER THAMES AT GORING WEIR
10 RIVER THAMES AT CAVERSHAM
11 RIVER THAMES AT SONNING
12 RIVER THAMES AT HENLEY
13 RIVER THAMES AT COOKHAM
14 RIVER THAMES AT BOVENEY WEIR
15 RIVER THAMES AT MWD DATCHET
16 RIVER THAMES AT 3 VALLEYS SUNNYMEADS
17 RIVER THAMES AT NSWC EGHAM

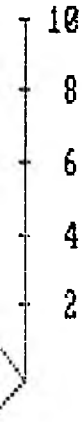
Fig 23

RIVER : RIVER THAMES - RESERVOIR STUDY 01/01/89
DETERMINAND : T.O.N.
MODEL : Step(1); Lin(8); Step(5); Lin(2); Step(1)
Proportion of between-site variation accounted for : 93.5%
Significant improvement over preceding model [P = 0.0170 (*)]



to 31/12/92

Freq

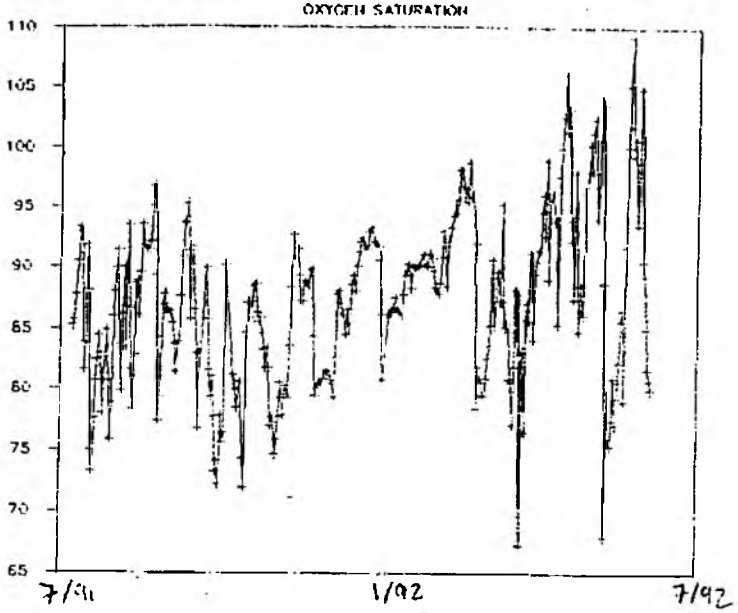


1	RIVER THAMES AT FARMOOR
2	RIVER THAMES AT GODSTOW
3	RIVER THAMES AT FOLLY BRIDGE
4	RIVER THAMES AT DONNINGTON BRIDGE
5	RIVER THAMES AT RADLEY COLLEGE
6	RIVER THAMES AT SUTTON BRIDGE
7	RIVER THAMES AT DAYS WEIR
8	RIVER THAMES AT WALLINGFORD BRIDGE
9	RIVER THAMES AT GORING WEIR
10	RIVER THAMES AT CAVERSHAM
11	RIVER THAMES AT SONNING
12	RIVER THAMES AT HENLEY
13	RIVER THAMES AT COOKHAM
14	RIVER THAMES AT BOVENEY WEIR
15	RIVER THAMES AT MWD DATCHET
16	RIVER THAMES AT 3 VALLEYS SUNNYMEADS
17	RIVER THAMES AT NSWC EGHAM

FIG 24

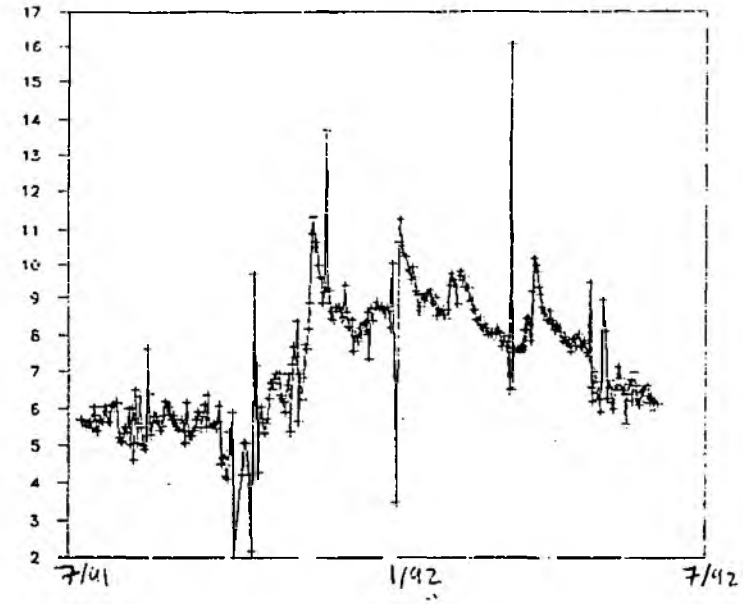
NORTHMOOR MONITOR - DAILY MEAN QUALITY

OXYGEN SATURATION

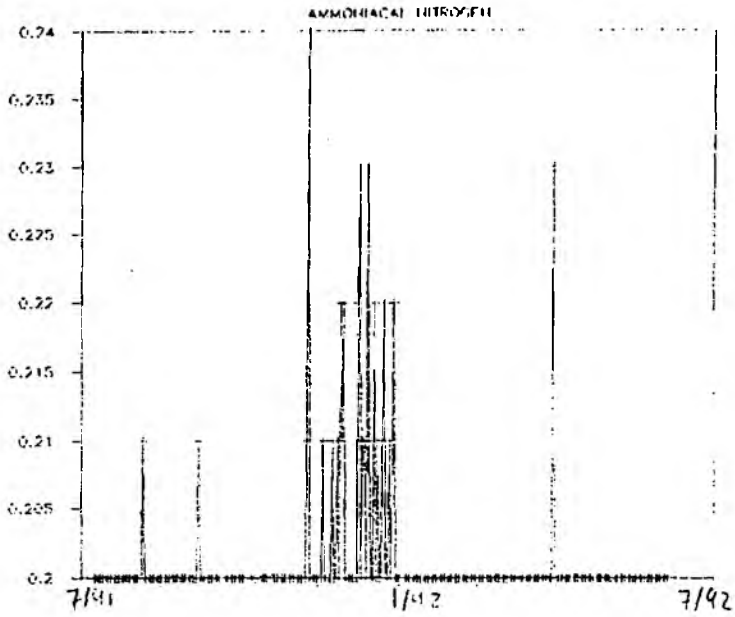


NORTHMOOR MONITOR - DAILY MEAN QUALITY

NITRATE



NORTHMOOR MONITOR - DAILY MEAN QUALITY



NORTHMOOR MONITOR - DAILY MEAN QUALITY

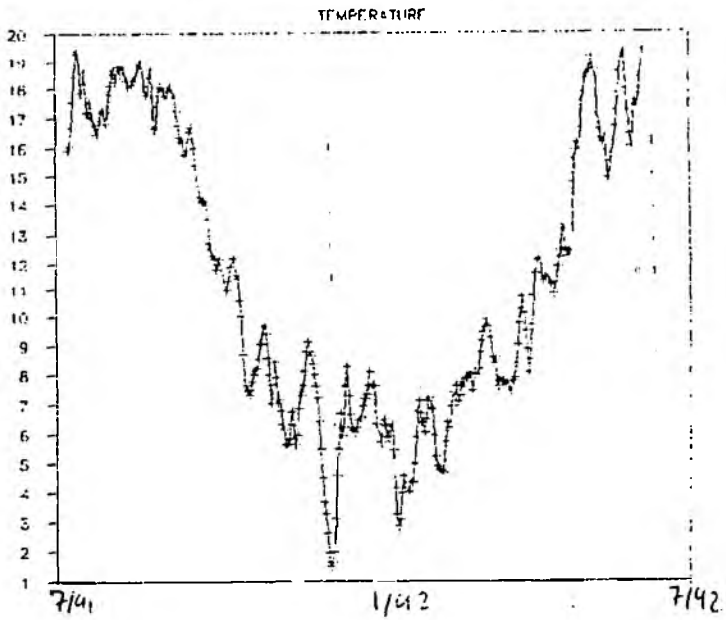
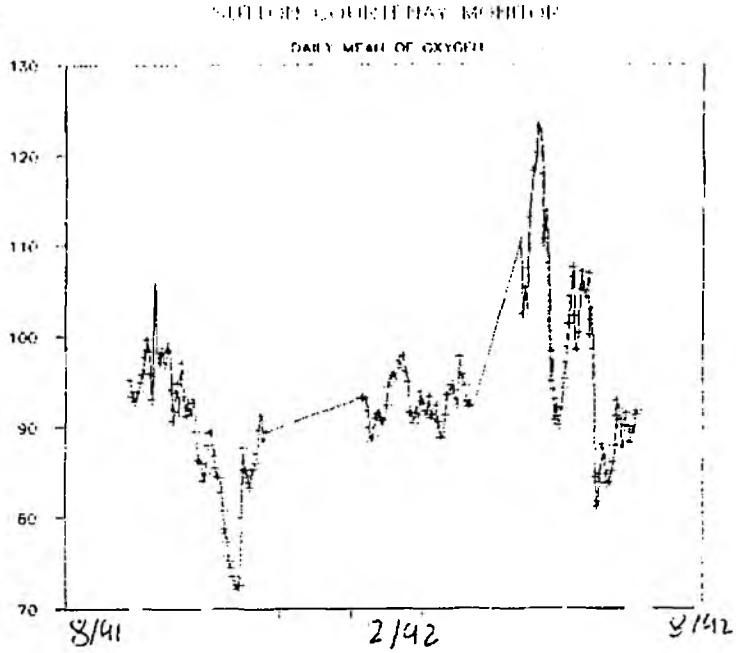
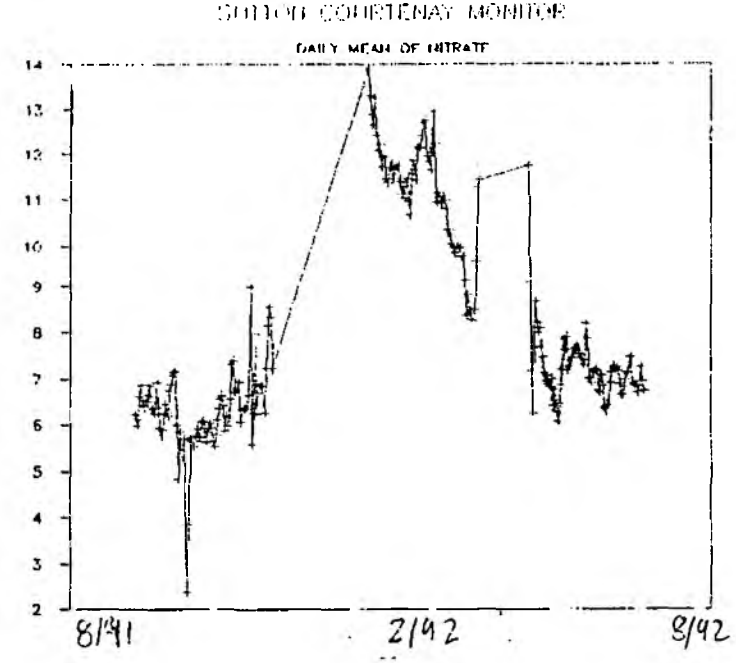


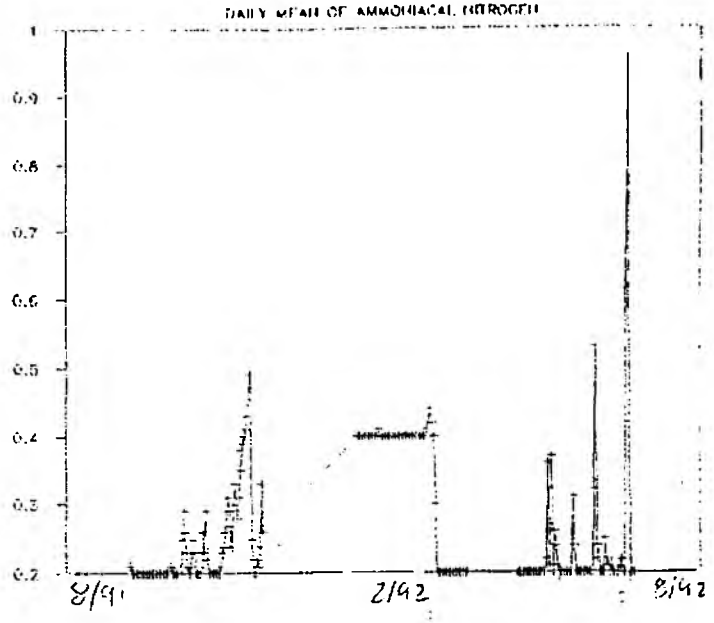
FIG 25


DAILY MEAN OF OXYGEN
130
120
110
100
90
80
70
8/91
2/92
8/92


DAILY MEAN OF NITRATE
14
13
12
11
10
9
8
7
6
5
4
3
2
8/91
2/92
8/92

SUTTON COURTENAY MONITOR

DAILY MEAN OF AMMONIACAL NITROGEN



SUTTON COURTENAY MONITOR

DAILY MEAN OF TEMPERATURE

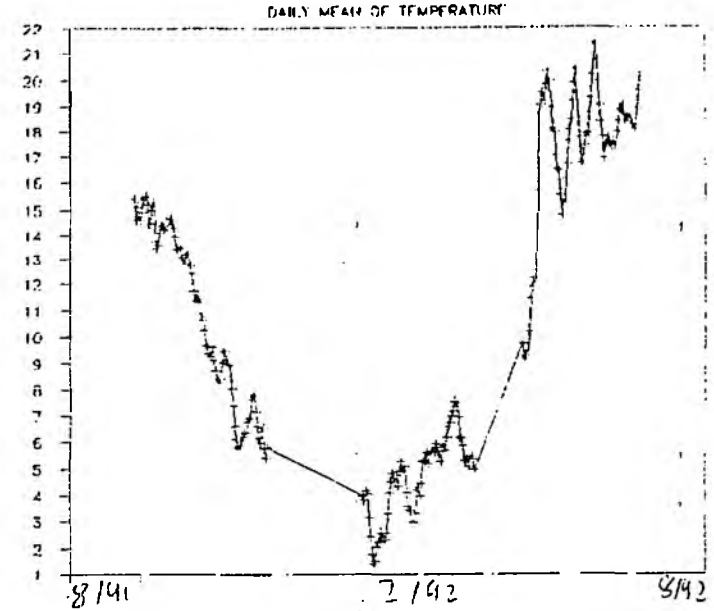
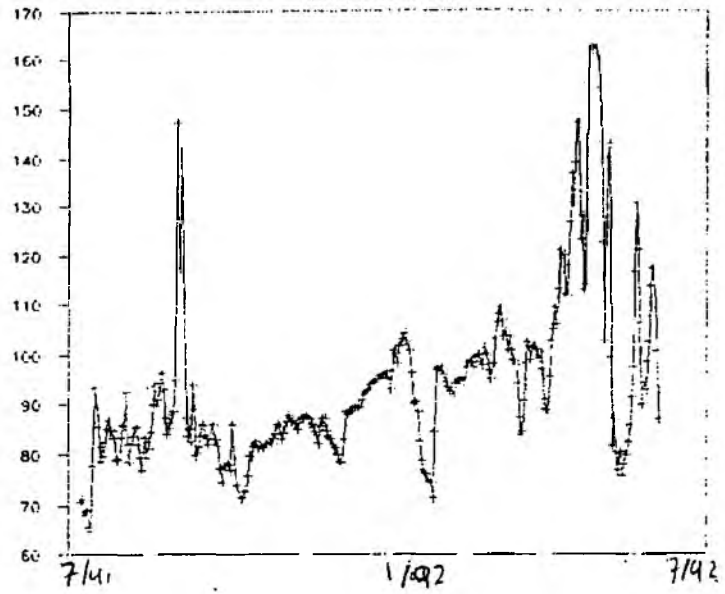


FIG 26

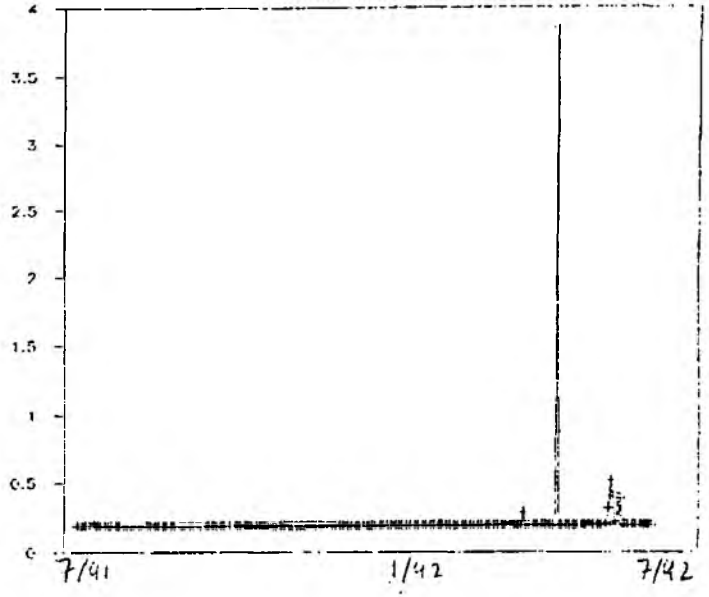
CLEEVE MONITOR — DAILY MEAN QUALITY

OXYGEN STAURATION



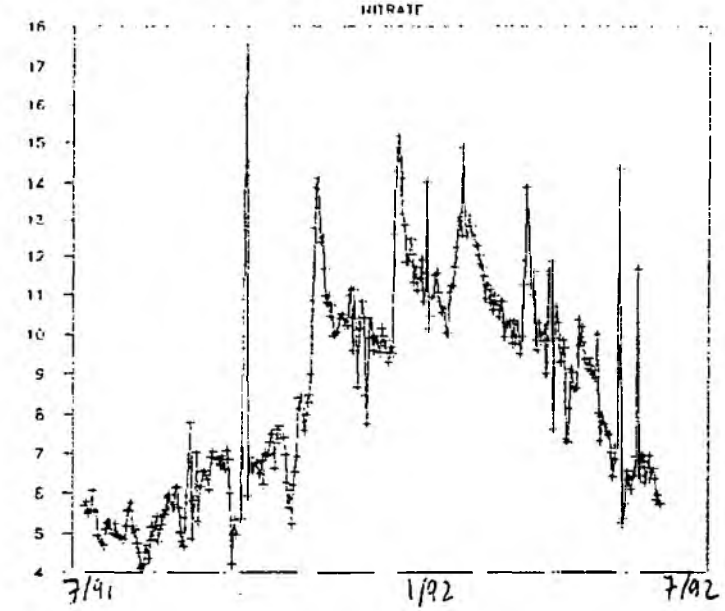
CLEEVE MONITOR — DAILY MEAN QUALITY

AMMONIACAL NITROGEN



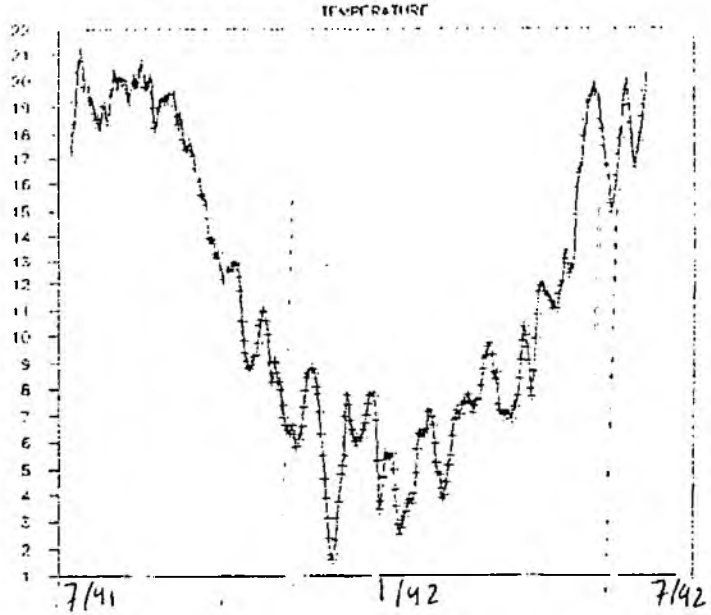
CLEEVE MONITOR — DAILY MEAN QUALITY

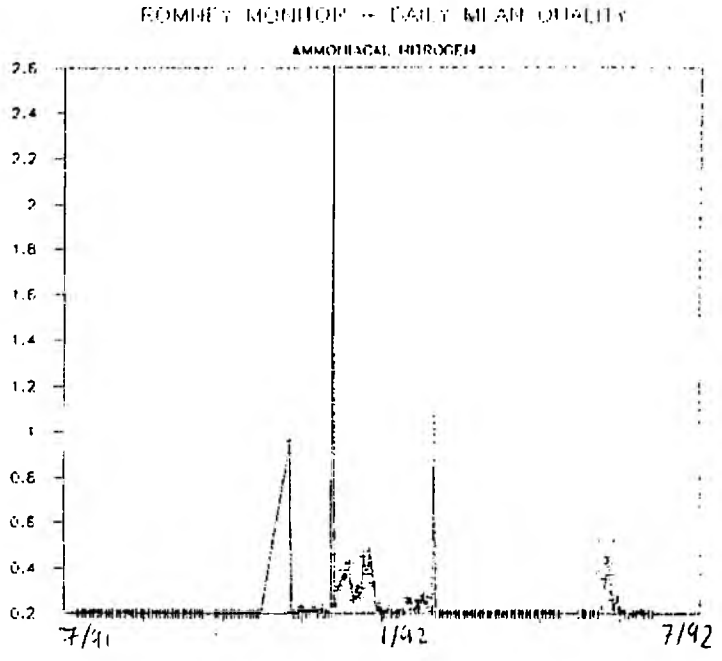
NITRATE



CLEEVE MONITOR — DAILY MEAN QUALITY

TEMPERATURE




POMEIS MONITOR -- DAILY MEAN QUALITY
AMMONIACAL NITROGEN
mg/l
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
7/91
1/92
7/92

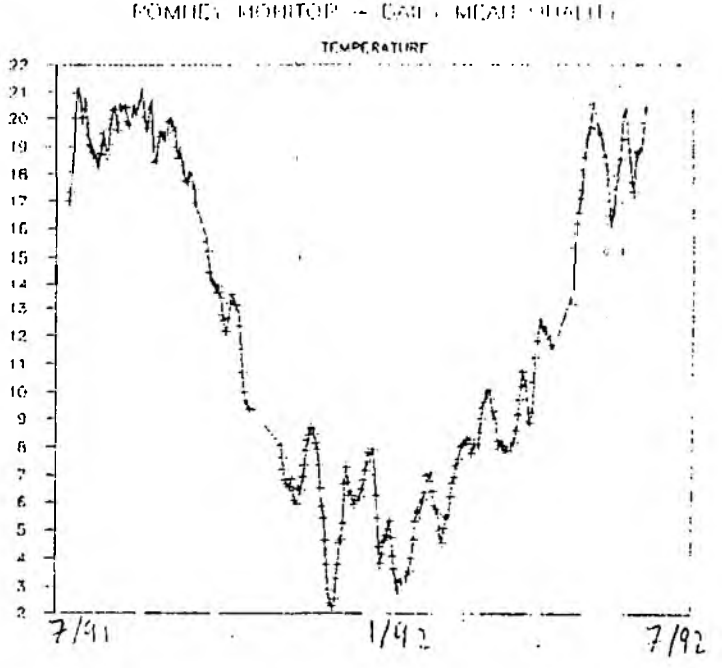
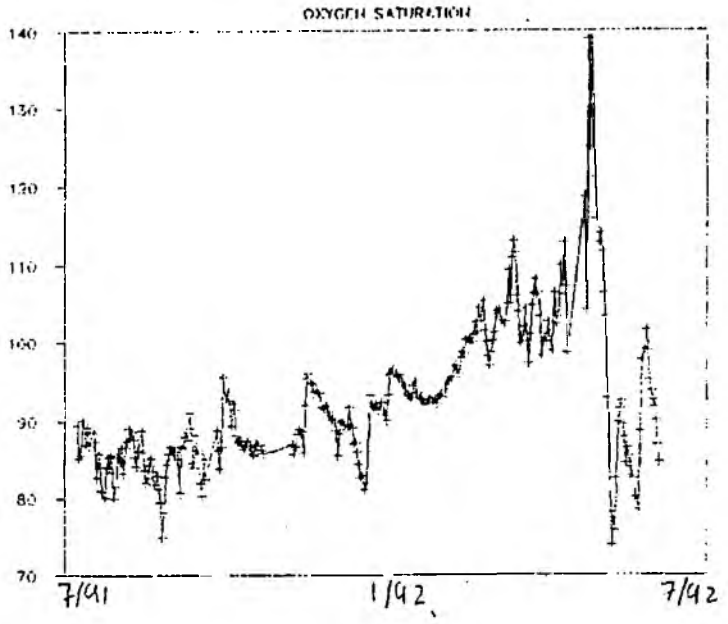

POMEIS MONITOR -- DAILY MEAN QUALITY
TEMPERATURE
C
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
7/91
1/92
7/92

FIG 27

POMLEY MONITOR -- DAILY MEAN QUALITY



POMNEY MONITOR – DAILY MEAN QUALITY

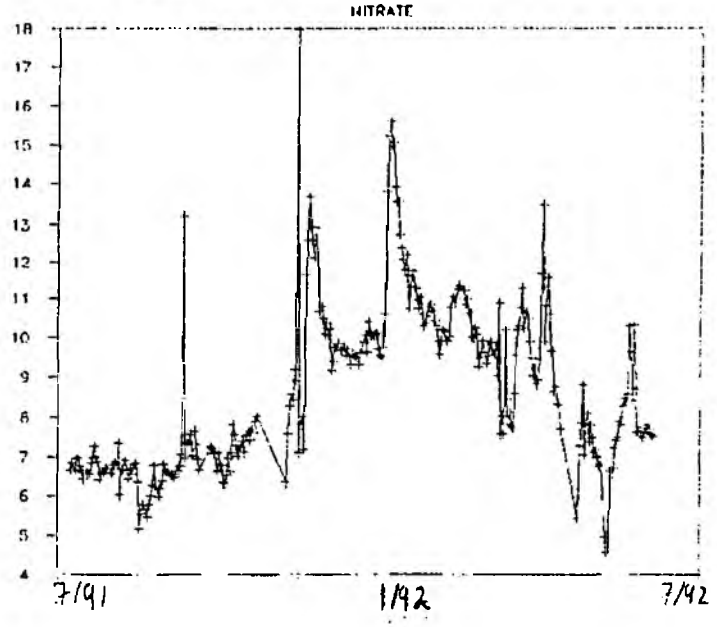
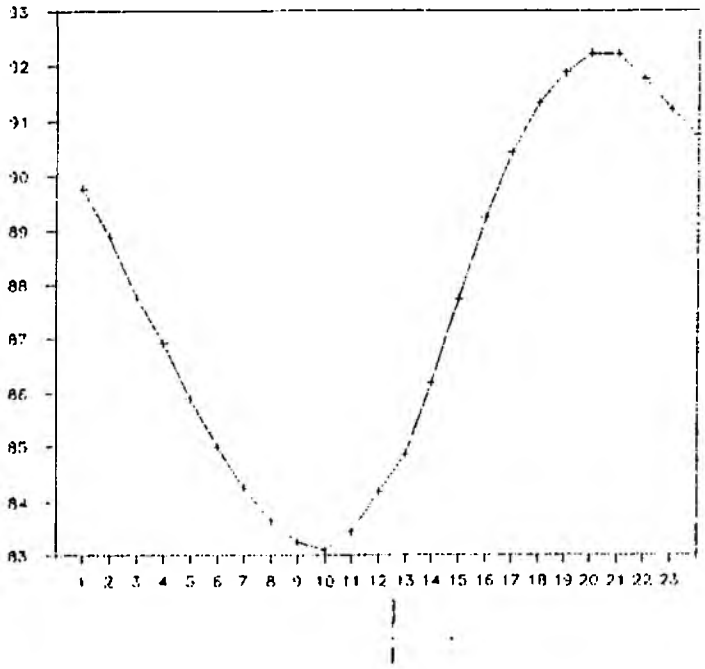


FIG 28

NORTHMOOR – HOURLY MEAN OF

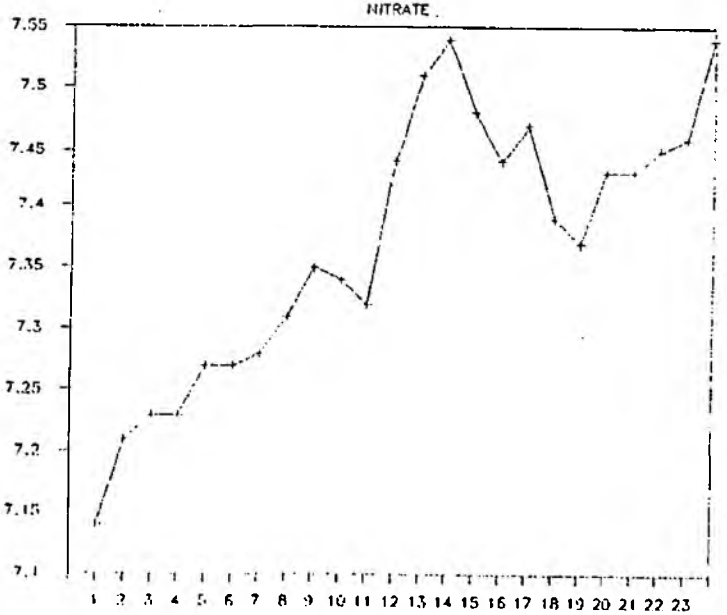
OXYGEN SATURATION



28

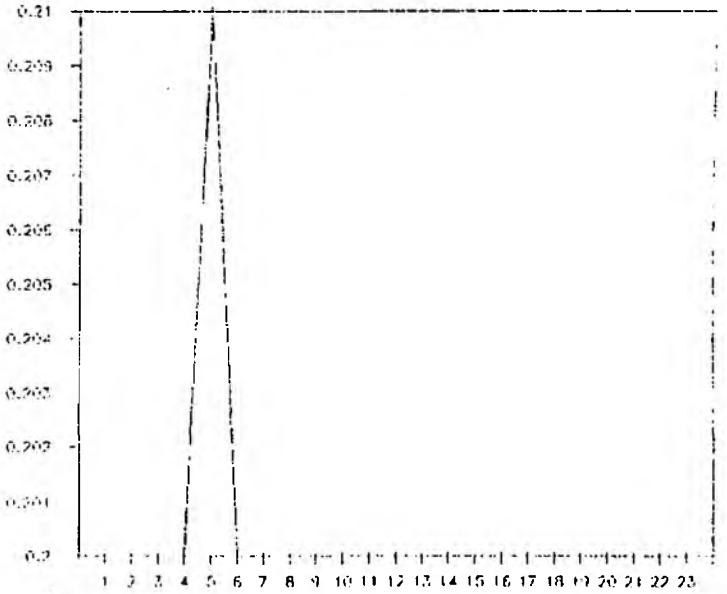
NORTHMOOR – HOURLY MEAN OF

NITRATE



NORTHMOOR – HOURLY MEAN OF

AMMONIACAL NITROGEN



NORTHMOOR – HOURLY MEAN OF

TEMPERATURE

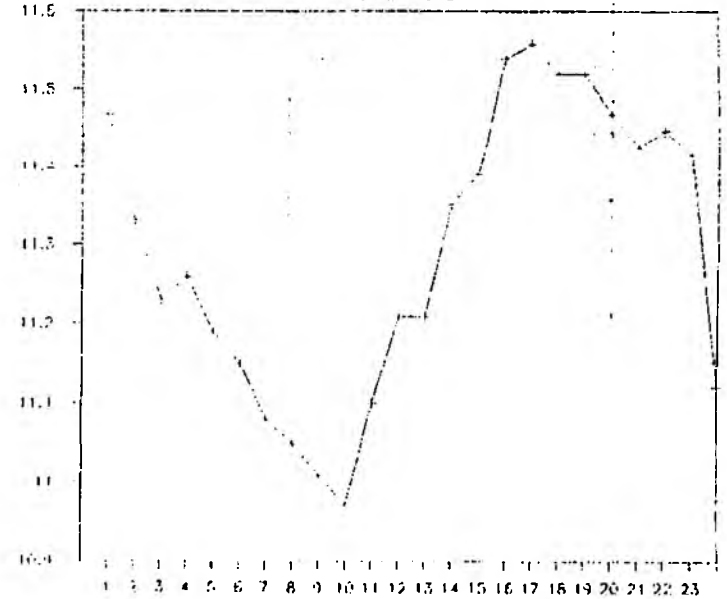
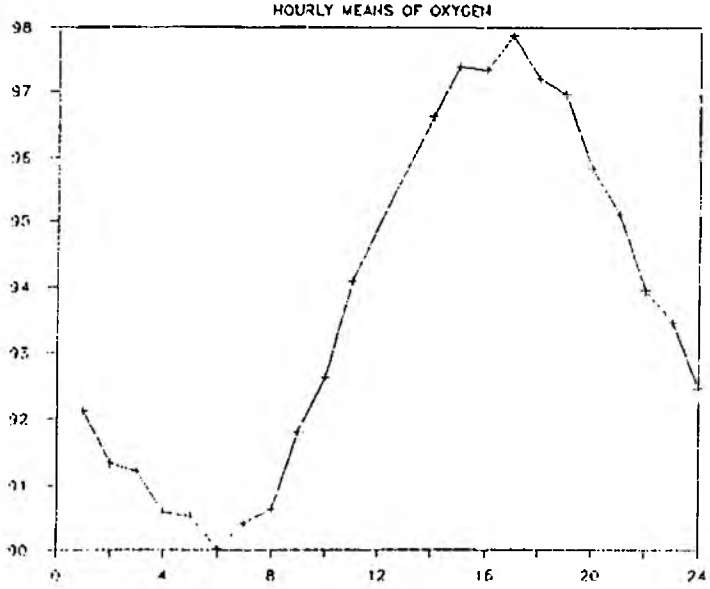


FIG29

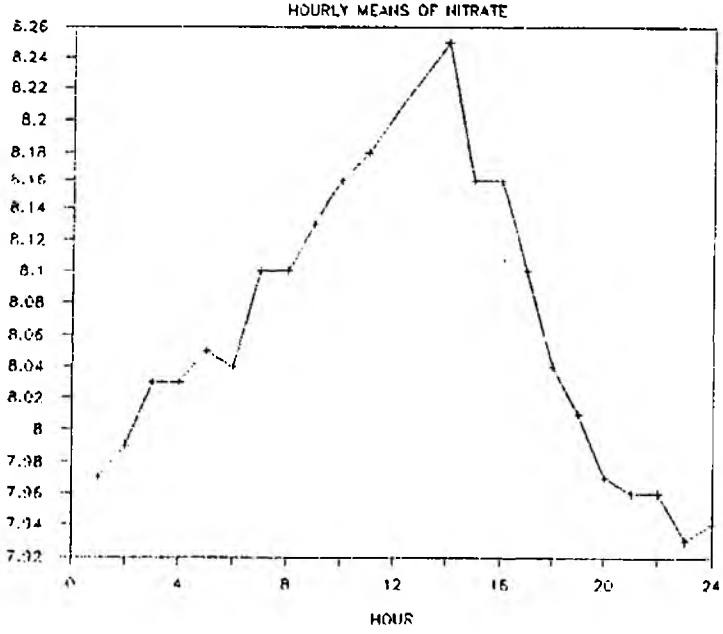
SUTTON COURTENAY MONITOR

HOURLY MEANS OF OXYGEN



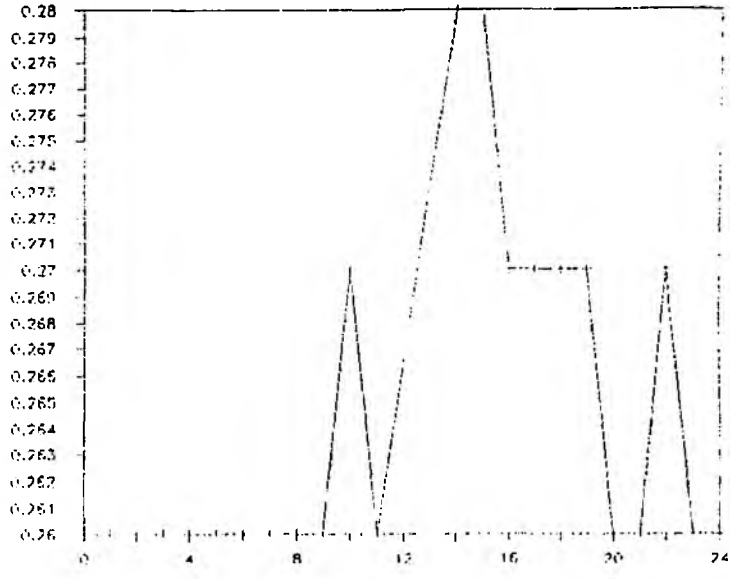
SUTTON COURTENAY MONITOR

HOURLY MEANS OF NITRATE



SUTTON COURTENAY MONITOR

HOURLY MEANS OF AMMONIACAL NITROGEN



SUTTON COURTENAY MONITOR

HOURLY MEANS OF TEMPERATURE

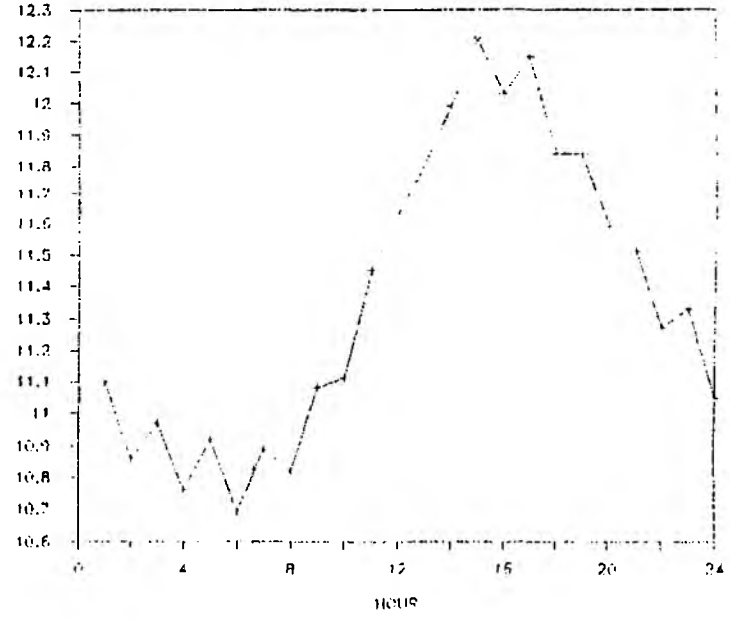
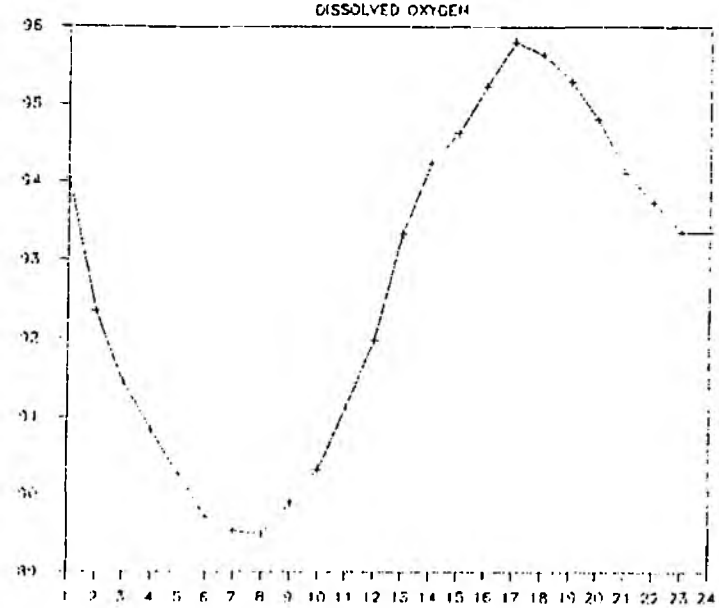


FIG 30

POMNEY – HOURLY MEAN OF

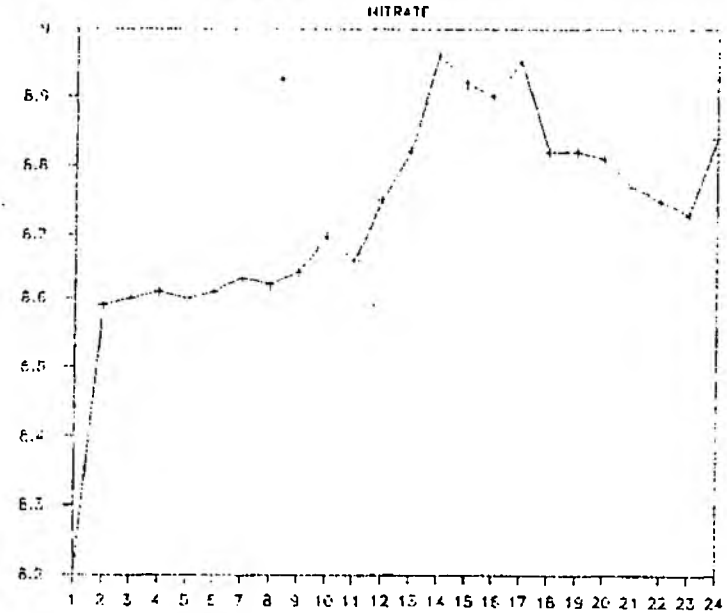
DISSOLVED OXYGEN



% SAT

POMNEY – HOURLY MEAN OF

NITRATE

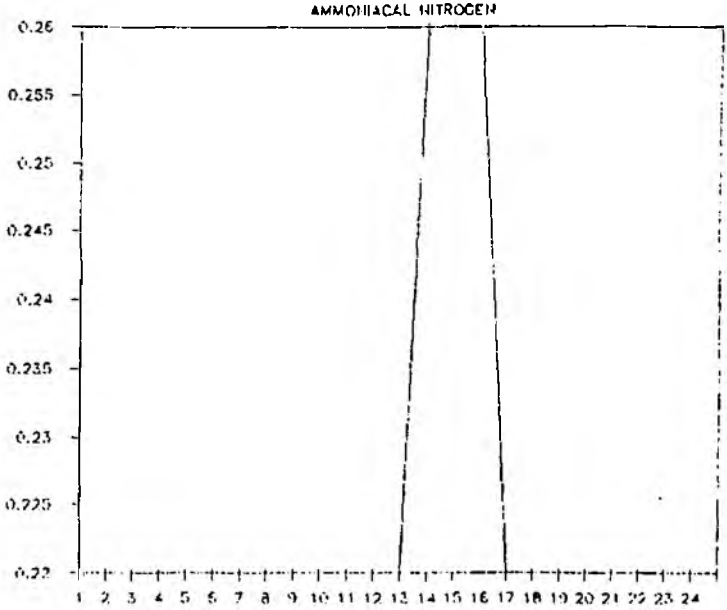


mg/l

40

ROMNEY – HOURLY MEAN OF

AMMONIACAL NITROGEN



ROMNEY – HOURLY MEAN OF

TEMPERATURE

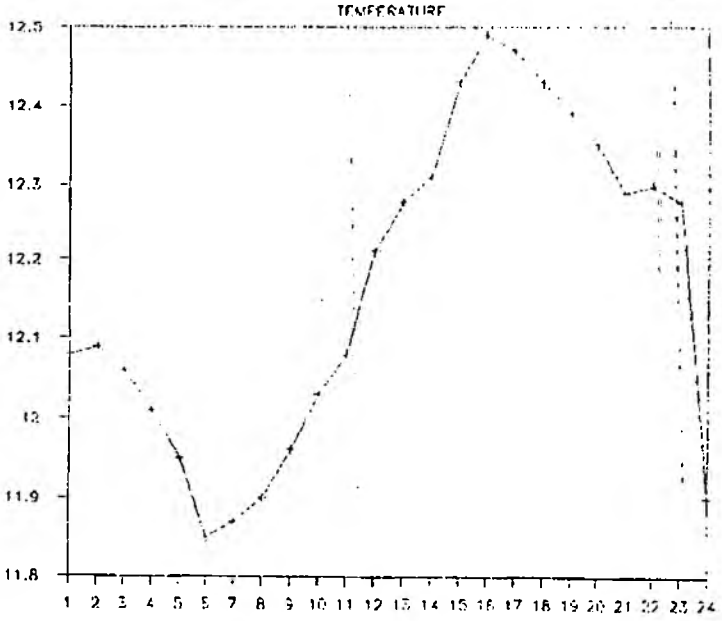
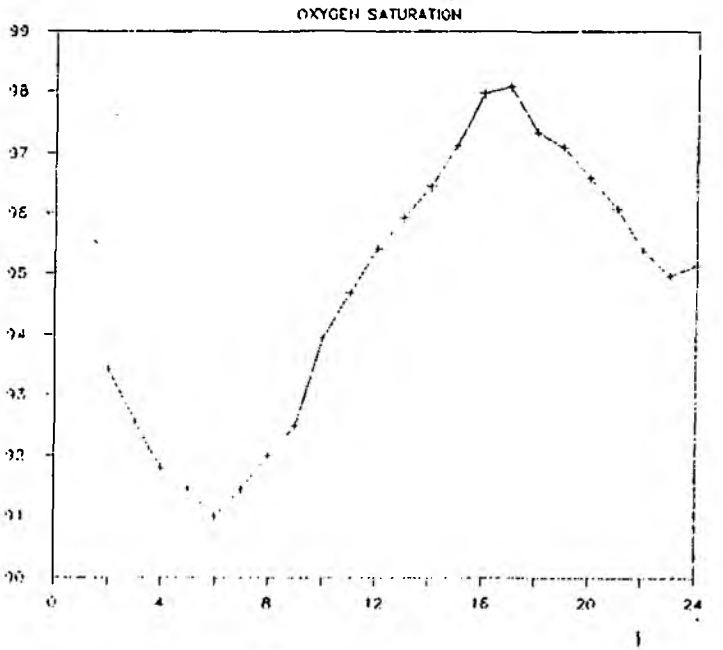
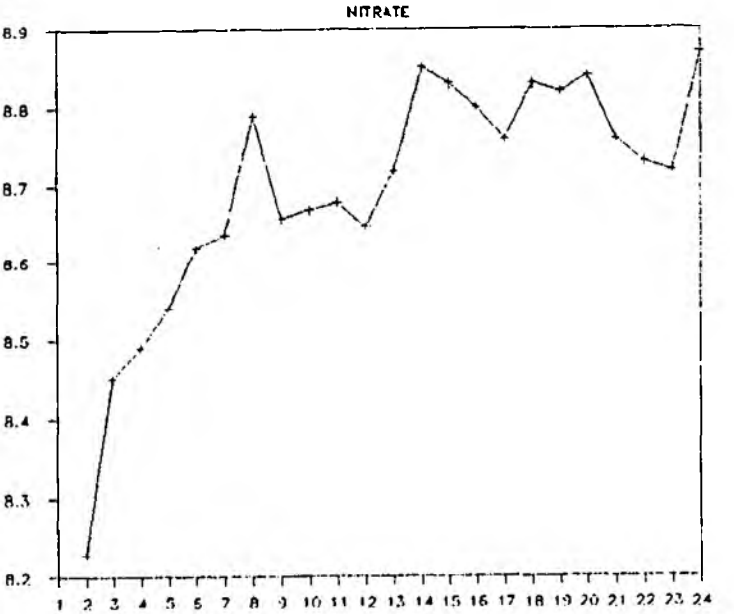


FIG 31

CLEEVE MONITOR – HOURLY MEAN QUALITY

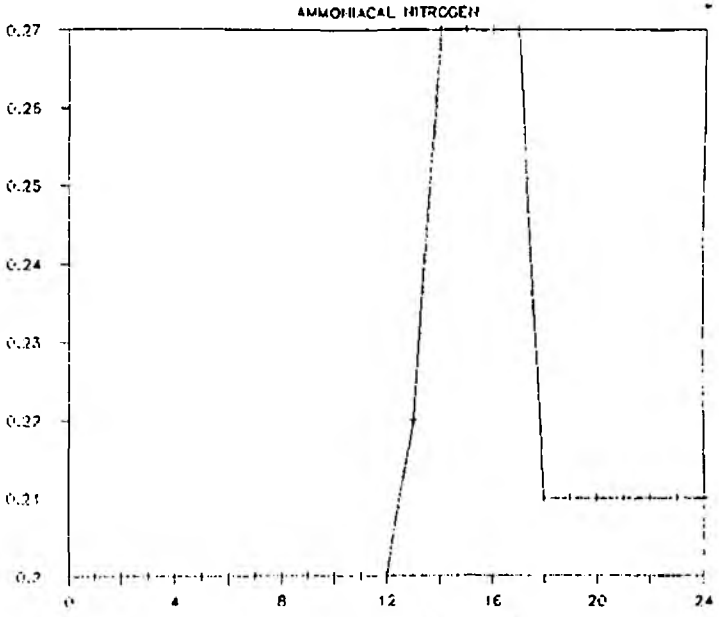


CLEEVE – HOURLY MEANS OF



CLEEVE MONITOR – HOURLY MEAN QUALITY

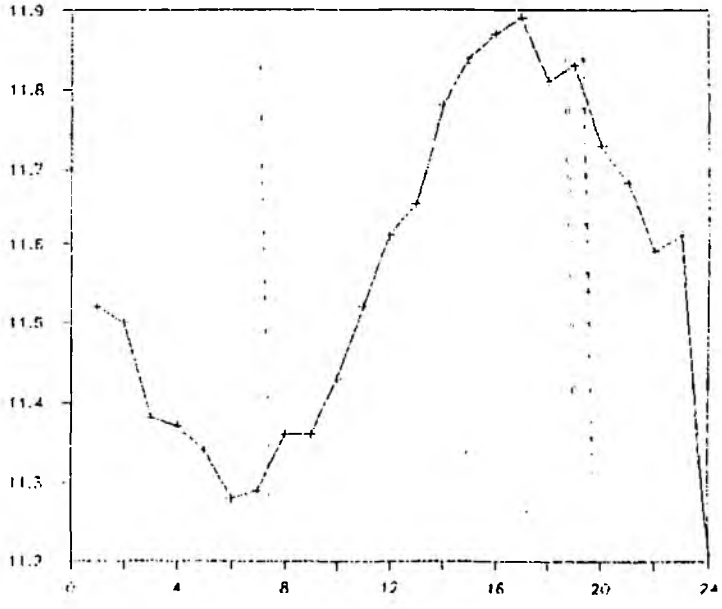
AMMONIACAL NITROGEN



mg/l

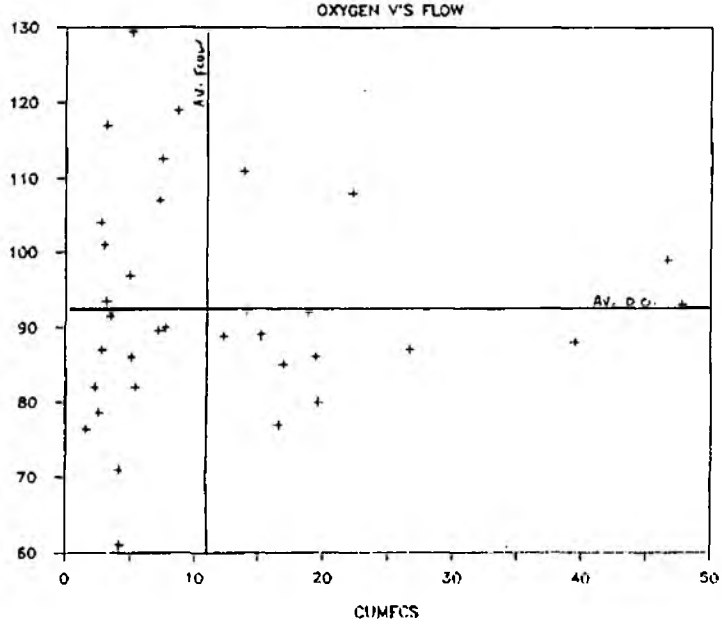
CLEEVE MONITOR – HOURLY MEAN QUALITY

TEMPERATURE



THAMES AT DAYS WEIR

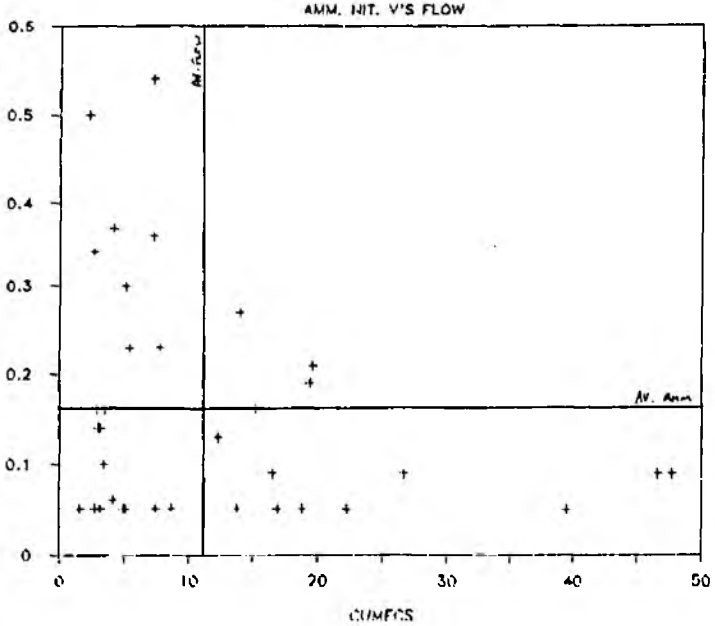
OXYGEN V'S FLOW

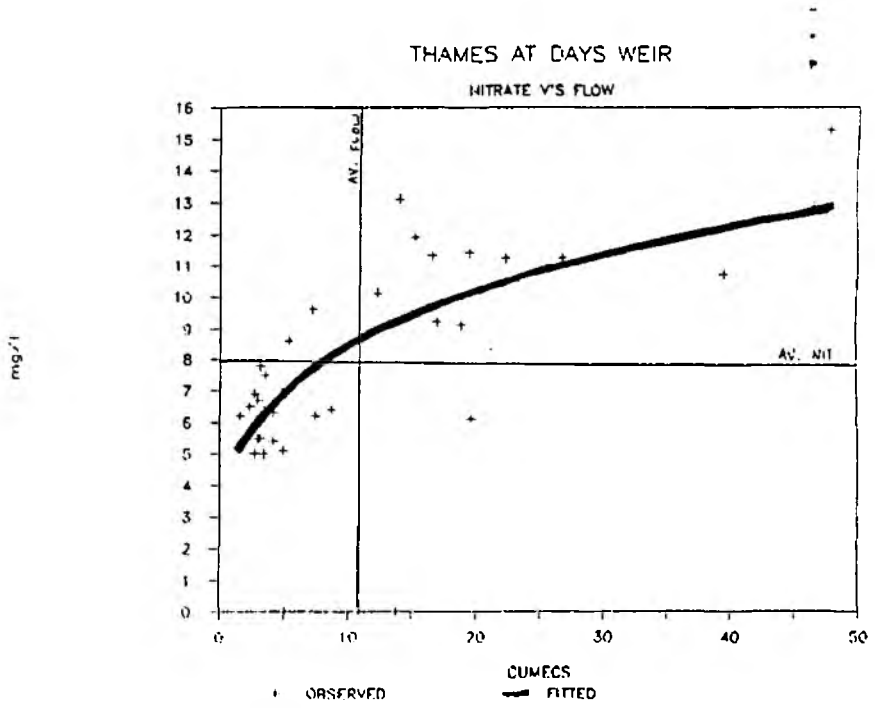


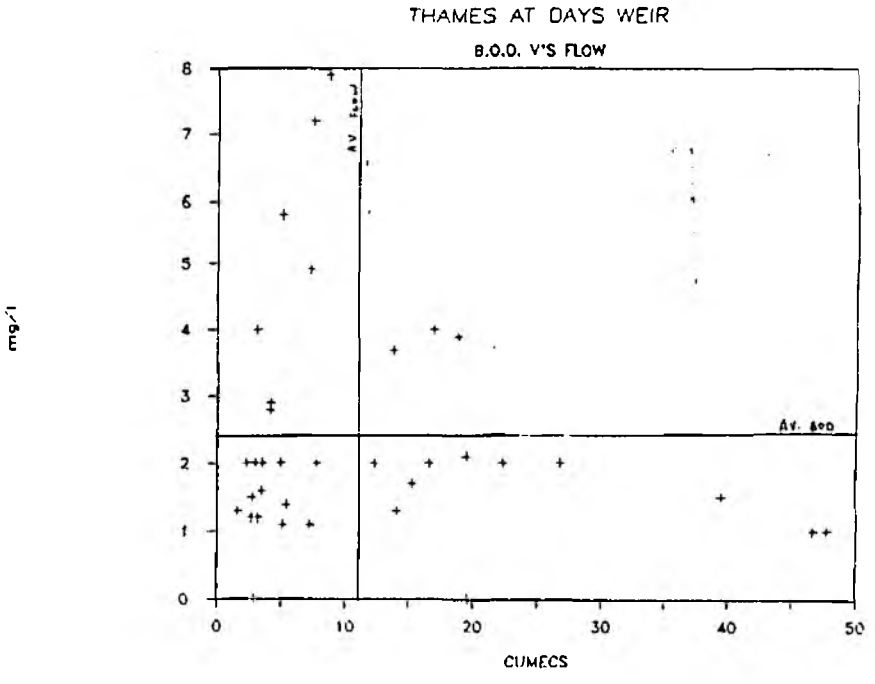
42

THAMES AT DAYS WEIR

AMM. NIT. V'S FLOW

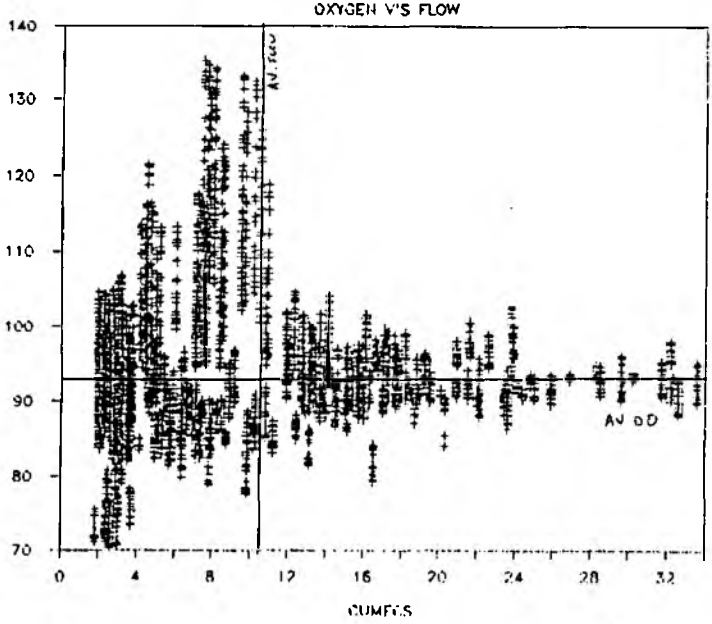



THAMES AT DAYS WEIR
NITRATE V'S FLOW
mg/l
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
AV. FLOW
AV. NIT
0
10
20
30
40
50
CUMECS
OBSERVED
FITTED

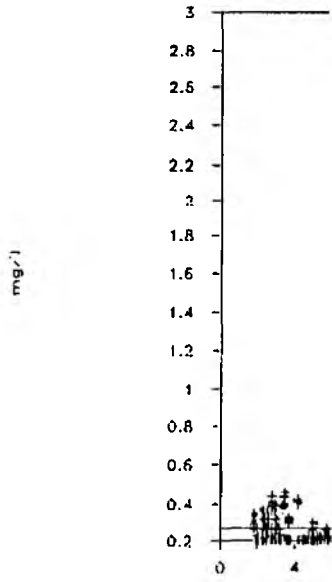

THAMES AT DAYS WEIR
B.O.D. V'S FLOW
mg/l
8
7
6
5
4
3
2
1
0
AV. FLOW
AV. BOD
0
10
20
30
40
50
CUMECS

THAMES AT SUTTON COURTENAY

OXYGEN V'S FLOW

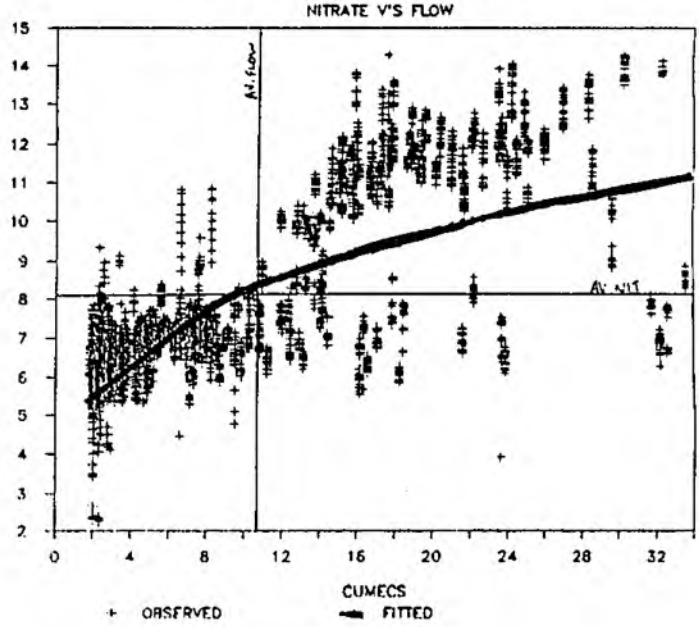


43



THAMES AT SUTTON COURTENAY

NITRATE V'S FLOW



THAMES AT SUTTON COURTENAY

AMM. NIT. V'S FLOW