ENVIRONMENTAL PROTECTION

NRA

National Rivers Authority
South West Region

River Yealm Catchment
River Water Quality
Classification 1990

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RIVER WATER QUALITY IN THE RIVER YEALM CATCHMENT

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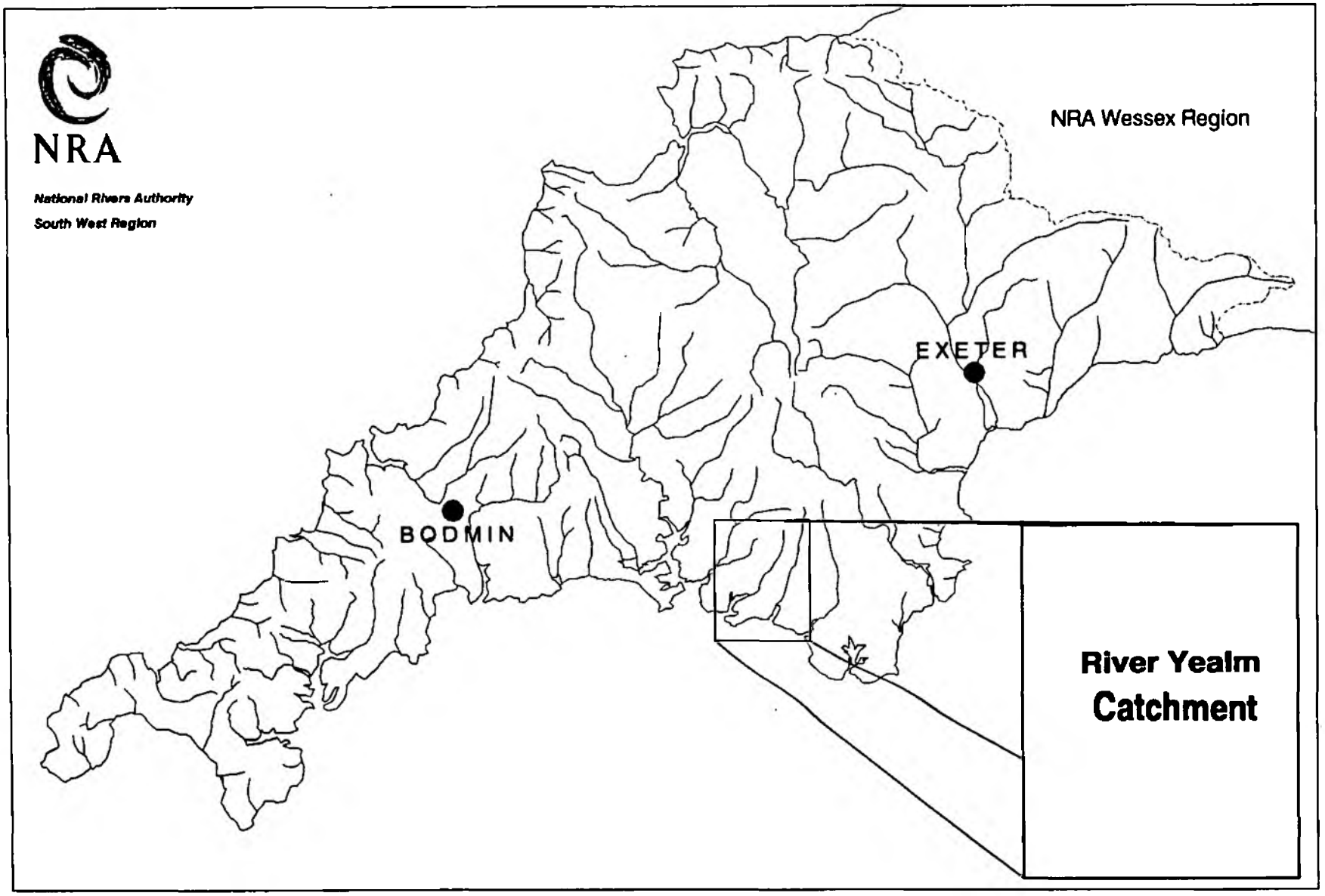
National Rivers Authority
South West Region



River Yealm Catchment

1. INTRODUCTION

Monitoring to assess the quality of river waters is undertaken in thirty-two catchments within the region. As part of this monitoring programme samples are collected routinely from selected monitoring points at a pre-determined frequency per year, usually twelve spaced at monthly intervals. Each monitoring point provides data for the water quality of a river reach (in kilometres) upstream of the monitoring point.

River lengths have been re-measured and variations exist over those recorded previously.

Each water sample collected from each monitoring point is analysed for a range of chemical and physical constituents or properties known as determinands. The analytical results for each sample are entered into a computer database called the Water Quality Archive.

Selected data are accessed from the Archive so that the quality of each river reach can be determined based on a River Classification System developed by the National Water Council (NWC), (9.1).

This report presents the river water quality classification for 1990 for monitored river reaches in the River Yealm catchment.

2. RIVER YEALM CATCHMENT

The River Yealm flows over a distance of 18.5 km from its source to the tidal limit, (Appendix 10.1). Water quality was monitored at seven locations on the main river; six of these sites were sampled at approximately monthly intervals. The site at Popple's Bridge was sampled on twenty occasions in 1990 because of no recent water quality data.

The Newton Stream flows over a distance of 5.8 km from its source to the tidal limit, (Appendix 10.1) and was sampled at one site on twenty occasions in 1990 because of no recent water quality data.

Silverbridge Lake flows over a distance of 7.7 km from its source to the tidal limit, (Appendix 10.1) and was monitored at four sites on twenty occasions each in 1990 because of no recent water quality data.

Wembury Stream flows over a distance of 3.4 km and from its source to the tidal limit, (Appendix 10.1) and was monitored at one site on fifteen occasions.

Throughout the Yealm catchment one secondary tributary and one tertiary tributary of the River Yealm were monitored.

2.1 SECONDARY TRIBUTARY

The River Piall flows over a distance of 6.1 km from its source to the confluence with the River Yealm, (Appendix 10.1) and was monitored at two locations at approximately monthly intervals. Monitoring points are located in the lower reaches.

2.2 TERTIARY TRIBUTARY

The Cholwichton Stream flows over a distance of 1.3 km from its source to the confluence with the River Piall, (Appendix 10.1) and was monitored at one location at approximately monthly intervals. Monitoring points are located in the lower reaches.

Each sample was analysed for a minimum number of determinands (Appendix 10.2) plus additional determinands based on local knowledge of the catchment. In addition, at selected sites, certain metal analyses were carried out.

The analytical results from all of these samples have been entered into the Water Quality Archive and can be accessed through the Water Act Register, (9.2).

3. NATIONAL WATER COUNCIL'S RIVER CLASSIFICATION SYSTEM

3.1 River Quality Objectives

In 1978 river quality objectives (RQOs) were assigned to all river lengths that were part of the routine monitoring network and to those additional watercourses, which were not part of the routine network, but which received discharges of effluents.

For the majority of watercourses long term objectives were identified based on existing and assumed adequate quality for the long term protection of the watercourse. In a few instances short term objectives were identified but no timetable for the achievement of the associated long term objective was set.

The RQOs currently in use in the River Yealm catchment are identified in Appendix 10.1.

3.2 River Quality Classification

River water quality is classified using the National Water Council's (NWC) River Classification System (see Appendix 10.3), which identifies river water quality as being one of five quality classes as shown in Table 1 below:

Table 1 - National Water Council - River Classification System

Class	Description
1A	Good quality
1B	Lesser good quality
2	Fair quality
3	Poor quality
4	Bad quality

Using the NWC system, the classification of river water quality is based on the values of certain determinands as arithmetic means or as 95 percentiles (5 percentiles are used for pH and dissolved oxygen) as indicated in Appendices 10.4.1 and 10.4.2.

The quality classification system incorporates some of the European Inland Fisheries Advisory Commission (EIFAC) criteria (Appendix 10.3) recommended for use by the NWC system.

4. 1990 RIVER WATER QUALITY SURVEY

The 1990 regional classification of river water quality also includes the requirements of the Department of the Environment quinquennial national river quality survey. The objectives for the Department of the Environment 1990 River Quality Survey are given below:

1) To carry out a National Classification Survey based on procedures used in the 1985 National Classification Survey, including all regional differences.

2) To classify all rivers and canals included in the 1985 National Classification Survey.

3) To compare the 1990 Classification with those obtained in 1985.

In addition, those watercourses, which were not part of the 1985 Survey and have been monitored since that date, are included in the 1990 regional classification of river water quality.

5. 1990 RIVER WATER QUALITY CLASSIFICATION

Analytical data collected from monitoring during 1988, 1989 and 1990 were processed through a computerised river water quality classification programme. This resulted in a quality class being assigned to each monitored river reach as indicated in Appendix 10.5.

The quality class for 1990 can be compared against the appropriate River Quality Objective and previous annual quality classes (1985-1989) also based on three years combined data, for each river reach in Appendix 10.5.

The river water classification system used to classify each river length is identical to the system used in 1985 for the Department of the Environment's 1985 River Quality Survey. The determinand classification criteria used to determine the annual quality classes in 1985, subsequent years and for 1990 are indicated in Appendices 10.4 and 10.4.1.

Improvements to this classification system could have been made, particularly in the use of a different suspended solids standard for Class 2 waters. As the National Rivers Authority will be proposing new classification systems to the Secretary of State in the near future, it was decided to classify river lengths in 1990 with the classification used for the 1985-1989 classification period.

The adoption of the revised criteria for suspended solids in Class 2 waters would have affected the classification of the River Piall at Quick Bridge and Mark's Bridge.

The river quality classes for 1990 of monitored river reaches in the catchment are shown in map form in Appendix 10.6.

The calculated determinand statistics for pH, temperature, dissolved oxygen, biochemical oxygen demand (BOD), total ammonia, un-ionised ammonia, suspended solids, copper and zinc from which the quality class was determined for each river reach, are indicated in Appendix 10.7.

6. NON-COMPLIANCE WITH QUALITY OBJECTIVES

Those monitored river reaches within the catchment, which do not comply with their assigned (RQO), are shown in map form in Appendix 10.8.

Appendix 10.9 indicates the number of samples analysed for each determinand over the period 1988 to 1990 and the number of sample results per determinand, which exceed the determinand quality standard.

For those non-compliant river reaches in the catchment, the extent of exceedance of the calculated determinand statistic with relevant quality standard (represented as a percentage), is indicated in Appendix 10.10.

7. CAUSES OF NON-COMPLIANCE

For those river reaches, which did not comply with their assigned RQOs, the cause of non-compliance (where possible to identify) is indicated in Appendix 10.11.

8. GLOSSARY OF TERMS

RIVER REACH	A segment of water, upstream from sampling point to the next sampling point.
RIVER LENGTH	River distance in kilometres.
RIVER QUALITY OBJECTIVE	That NWC class,which protects the most sensitive use of the water.
95 percentiles	Maximum limits, which must be met for at least 95% of the time.
5 percentiles	Minimum limits, which must be met for at least 95% of the time.
BIOLOGICAL OXYGEN DEMAND (5 day carbonaceous ATU)	A standard test measuring the microbial uptake of oxygen - an estimate of organic pollution.
pH	A scale of acid to alkali.
UN-IONISED AMMONIA	Fraction of ammonia poisonous to fish, NH^3.
SUSPENDED SOLIDS	Solids removed by filtration or centrifuge under specific conditions.
USER REFERENCE NUMBER	Reference number allocated to a sampling point.
INFERRED STRETCH	Segment of water, which is not monitored and whose water quality classification is assigned from the monitored reach upstream.

9. REFERENCES

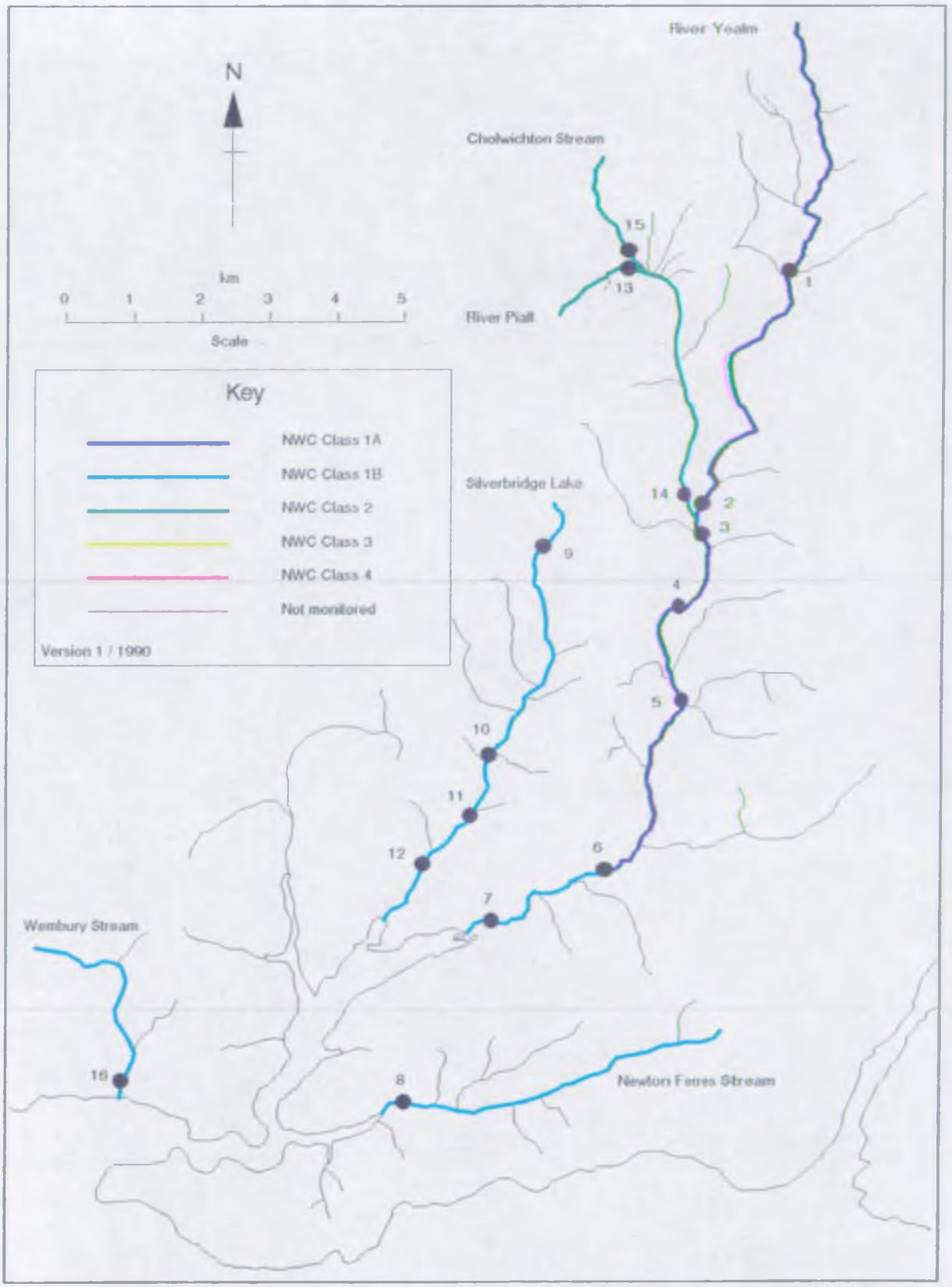
Reference

9.1 National Water Council (1977). River Water Quality: The Next Stage. Review of Discharge Consent Conditions. London.

9.2 Water Act 1989 Section 117

9.3 Alabaster J. S. and Lloyd R. Water Quality Criteria for Freshwater Fish, 2nd edition, 1982. Butterworths.

Yealm Catchment
River Quailty Objectives



BASIC DETERMINAND ANALYTICAL SUITE FOR ALL CLASSIFIED RIVER SITES

pH as pH Units

Conductivity at 20 C as uS/cm

Water temperature (Cel)

Oxygen dissolved % saturation

Oxygen dissolved as mg/l O

Biochemical oxygen demand (5 day total ATU) as mg/l O

Total organic carbon as mg/l C

Nitrogen ammoniacal as mg/l N

Ammonia un-ionised as mg/l N

Nitrate as mg/l N

Nitrite as mg/l N

Suspended solids at 105 C as mg/l

Total hardness as mg/l CaCO3

Chloride as mg/l Cl

Orthophosphate (total) as mg/l P

Silicate reactive dissolved as mg/l SiO2

Sulphate (dissolved) as mg/l SO4

Sodium (total) as mg/l Na

Potassium (total) as mg/l K

Magnesium (total) as mg/l Mg

Calcium (total) as mg/l Ca

Alkalinity as pH 4.5 as mg/l CaCO3

NWC RIVER QUALITY CLASSIFICATION SYSTEM

River Class	Quality criteria	Remarks	Current potential uses
	Class limiting criteria (95 percentile)		
1A Good Quality	(i) Dissolved oxygen saturation greater than 80% (ii) Biochemical oxygen demand not greater than 3 mg/l (iii) Ammonia not greater than 0.4 mg/l (iv) Where the water is abstracted for drinking water, it complies with requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 1.5 mg/l (ii) Visible evidence of pollution should be absent	(i) Water of high quality suitable for potable supply abstractions and for all abstractions (ii) Game or other high class fisheries (iii) High amenity value
1B Good Quality	(i) DO greater than 60% saturation (ii) BOD not greater than 5 mg/l (iii) Ammonia not greater than 0.9 mg/l (iv) Where water is abstracted for drinking water, it complies with the requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 2 mg/l (ii) Average ammonia probably not greater than 0.5 mg/l (iii) Visible evidence of pollution should be absent (iv) Waters of high quality which cannot be placed in Class 1A because of the high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication (v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS)	Water of less high quality than Class 1A but usable for substantially the same purposes
2 Fair Quality	(i) DO greater than 40% saturation (ii) BOD not greater than 9 mg/l (iii) Where water is abstracted for drinking water it complies with the requirements for A3* water (iv) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 5 mg/l (ii) Similar to Class 2 of RPS (iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs	(i) Waters suitable for potable supply after advanced treatment (ii) Supporting reasonably good coarse fisheries (iii) Moderate amenity value

Poor Quality	(i) DO greater than 10% saturation (ii) Not likely to be anaerobic (iii) BOD not greater than 17 mg/l. This may not apply if there is a high degree of re-aeration		Similar to Class 3 of RPS	Waters which are polluted to an extent that fish are absent only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up
Bad uality	Waters which are inferior to Class 3 in terms of dissolved oxygen and likely to be anaerobic at times		Similar to Class 4 of RPS	Waters which are grossly polluted and are likely to cause nuisance
X	DO greater than 10% saturation			Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

Notes (a) Under extreme weather conditions (eg flood, drought, freeze-up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Class 1, 2, and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results.

(b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4. **

(c) In most instances the chemical classification given above will be suitable. However, the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be down-graded on the basis of biota actually present, and the reasons stated.

(d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95 percentile limits.

* EEC category A2 and A3 requirements are those specified in the EEC Council directive of 16 June 1975 concerning the Quality of Surface Water intended for Abstraction of Drinking Water in the Member State.

** Ammonia Conversion Factors

(mg NH_4/l to mg N/l)

Class 1A	0.4 mg NH_4/l = 0.31 mg N/l
Class 1B	0.9 mg NH_4/l = 0.70 mg N/l
	0.5 mg NH_4/l = 0.39 mg N/l

NWC RIVER CLASSIFICATION SYSTEM

CRITERIA USED BY NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION FOR NON-METALLIC DETERMINANDS

River Class	Quality Criteria
1A	Dissolved oxygen % saturation greater than 80% BOD (ATU) not greater than 3 mg/l O Total ammonia not greater than 0.31 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 21.5 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
1B	Dissolved oxygen % saturation greater than 60% BOD (ATU) not greater than 5 mg/l O Total ammonia not greater than 0.70 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 21.5 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
2	Dissolved oxygen & saturation greater than 40% BOD (ATU) not greater than 9 mg/l O Total ammonia not greater than 1.56 mg/l N Non-ionised ammonia not greater than 0.021 mg/l N Temperature not greater than 28 C pH greater than 5.0 and less than 9.0 Suspended solids not greater than 25 mg/l
3	Dissolved oxygen % saturation greater than 10% BOD (ATU) not greater than 17 mg/l O
4	Dissolved oxygen % saturation not greater than 10% BOD (ATU) greater than 17 mg/l O

STATISTICS USED BY NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

Determinand	Statistic
Dissolved oxygen	5 percentile
BOD (ATU)	95 percentile
Total ammonia	95 percentile
Non-ionised ammonia	95 percentile
Temperature	95 percentile
pH	5 percentile
	95 percentile
Suspended solids	arithmetic mean

NWC RIVER CLASSIFICATION SYSTEM

CRITERIA USED BY NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION FOR METALLIC DETERMINANDS

SOLUBLE COPPER

Total Hardness (mean) mg/l CaCO3	Statistic	Soluble Copper* ug/l Cu	
		Class 1	Class 2
0 - 10	95 percentile	< = 5	> 5
10 - 50	95 percentile	< = 22	> 22
50 - 100	95 percentile	< = 40	> 40
100 - 300	95 percentile	< = 112	> 112

* Total copper is used for classification until sufficient data on soluble copper can be obtained.

TOTAL ZINC

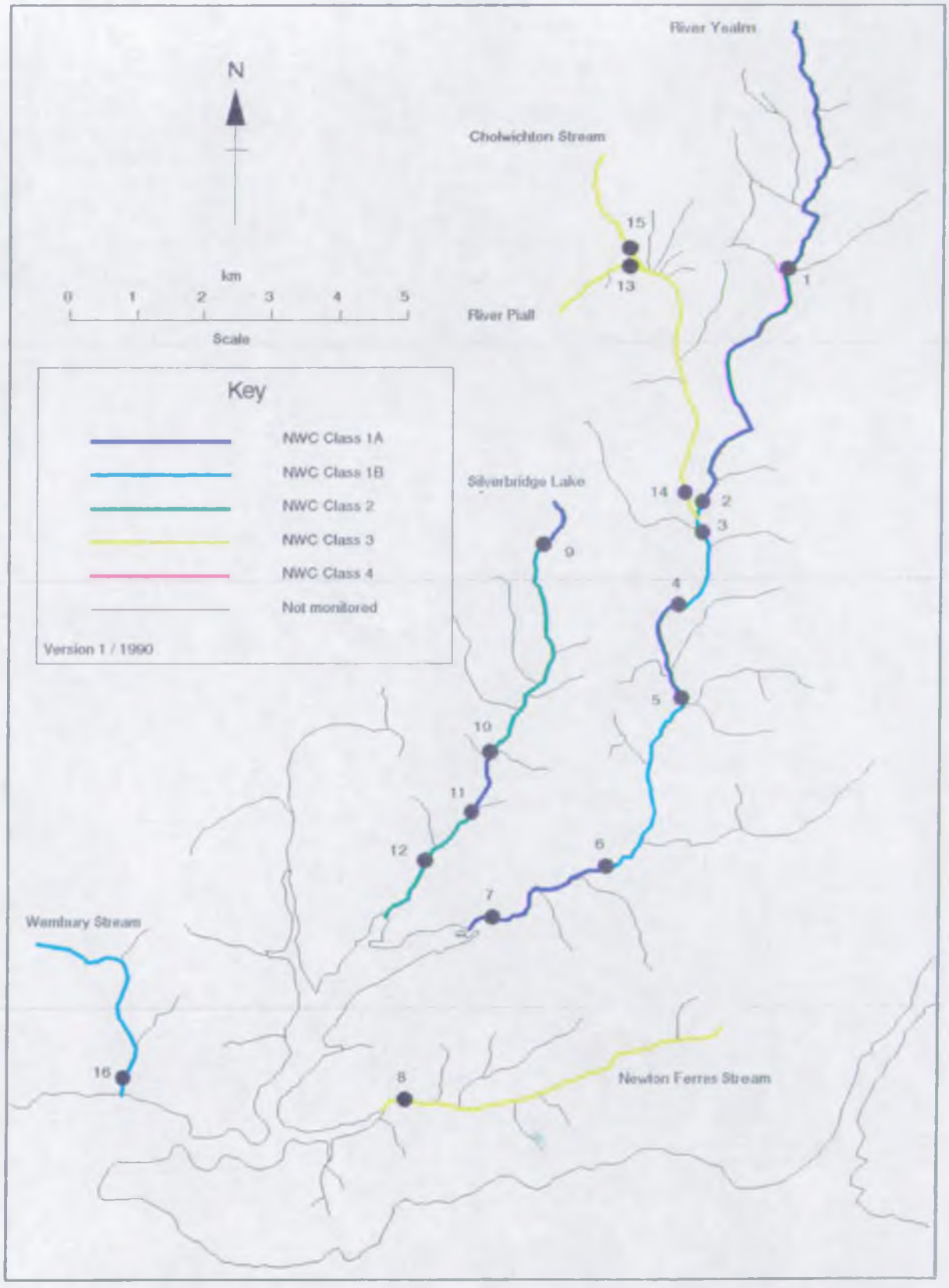
Total Hardness (mean) mg/l CaCO3	Statistic	Total Zinc ug/l Zn		
		Class 1	Class 2	Class 3
0 - 10	95 percentile	< = 30	< = 300	> 300
10 - 50	95 percentile	< = 200	< = 700	> 700
50 - 100	95 percentile	< = 300	< = 1000	> 1000
100 - 300	95 percentile	< = 500	< = 2000	> 2000

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CATCHMENT : YEALM (10)

1990 Map Position Number	River	Reach upstream of	User Reference Number	National Grid Reference	Reach Length (km)	Distance from source (km)	River Quality Objective	85 NWC Class	86 NWC Class	87 NWC Class	88 NWC Class	89 NWC Class	90 NWC Class
1	YEALM	HELE CROSS	R10B022	SX 6147 6088	4.4	4.4	1A	1A	1A	1A	1A	1A	1A
2	YEALM	FARDEL MILL FARM BRIDGE	R10B002	SX 6025 5720	4.7	9.1	1A	1A	1A	1A	1A	1A	1A
3	YEALM	BELOW R. PIALL AT MARK'S BRIDGE	R10B024	SX 6019 5702	0.2	9.3	1A	1A	1A	1A	1B	1B	1B
4	YEALM	LEE MILL BRIDGE	R10B003	SX 5997 5575	1.6	10.9	1A	1A	1A	1A	1B	1B	1B
5	YEALM	POPPLE'S BRIDGE	R10B021	SX 5985 5432	1.6	12.5	1A	1B	1B	1B	1B	1A	1A
6	YEALM	YEALM BRIDGE	R10B004	SX 5902 5199	2.8	15.3	1A	1B	1B	1B	1B	1A	1B
7	YEALM	PUSLINCH BRIDGE	R10B005	SX 5710 5100	2.6	17.9	1B	1B	1B	1B	1A	1A	1A
	YEALM	NORMAL TIDAL LIMIT (INFERRED STRETCH)			0.6	18.5	1B	1B	1B	1B	1A	1A	1A
8	NEWTON STREAM	AT BRIDGEEND	R10B015	SX 5558 4820	5.7	5.7	1B	1B					3
	NEWTON STREAM	NORMAL TIDAL LIMIT (INFERRED STRETCH)			0.1	5.8	1B	1B					3
9	SILVERBRIDGE LAKE	SPARKWELL	R10B020	SX 5797 5665	0.9	0.9	1B	1B					1A
10	SILVERBRIDGE LAKE	CHOKEFORD	R10B019	SX 5701 5352	3.6	4.5	1B	1B					2
11	SILVERBRIDGE LAKE	GORLOFEN	R10B016	SX 5680 5267	1.0	5.5	1B	1B					1A
12	SILVERBRIDGE LAKE	BRIXTON	R10B018	SX 5610 5201	1.0	6.5	1B	1B					2
	SILVERBRIDGE LAKE	NORMAL TIDAL LIMIT (INFERRED STRETCH)			1.2	7.7	1B	1B					2
13	PIALL	QUICK BRIDGE	R10B007	SX 5925 6083	1.6	1.6	2	2	3	2	3	3	3
14	PIALL	MARK'S BRIDGE	R10B008	SX 6013 5716	4.4	6.0	2	2	1A	1A	1A	1A	3
	PIALL	YEALM CONFLUENCE (INFERRED STRETCH)			0.1	6.1	2	2	1A	1A	1A	1A	3
15	CHOLWICHTOWN STREAM	PRIOR TO RIVER PIALL	R10B006	SX 5915 6088	1.2	1.2	2	2	1A	3	3	3	3
	CHOLWICHTOWN STREAM	PIALL CONFLUENCE (INFERRED STRETCH)			0.1	1.3	2	2	1A	3	3	3	3
16	WEMBURY STREAM	PRIOR TO BEACH	R10A001	SX 5175 4852	3.4	3.4	1B	1B					1B

Appendix 10.5

Yealm Catchment
Water Quality - 1990

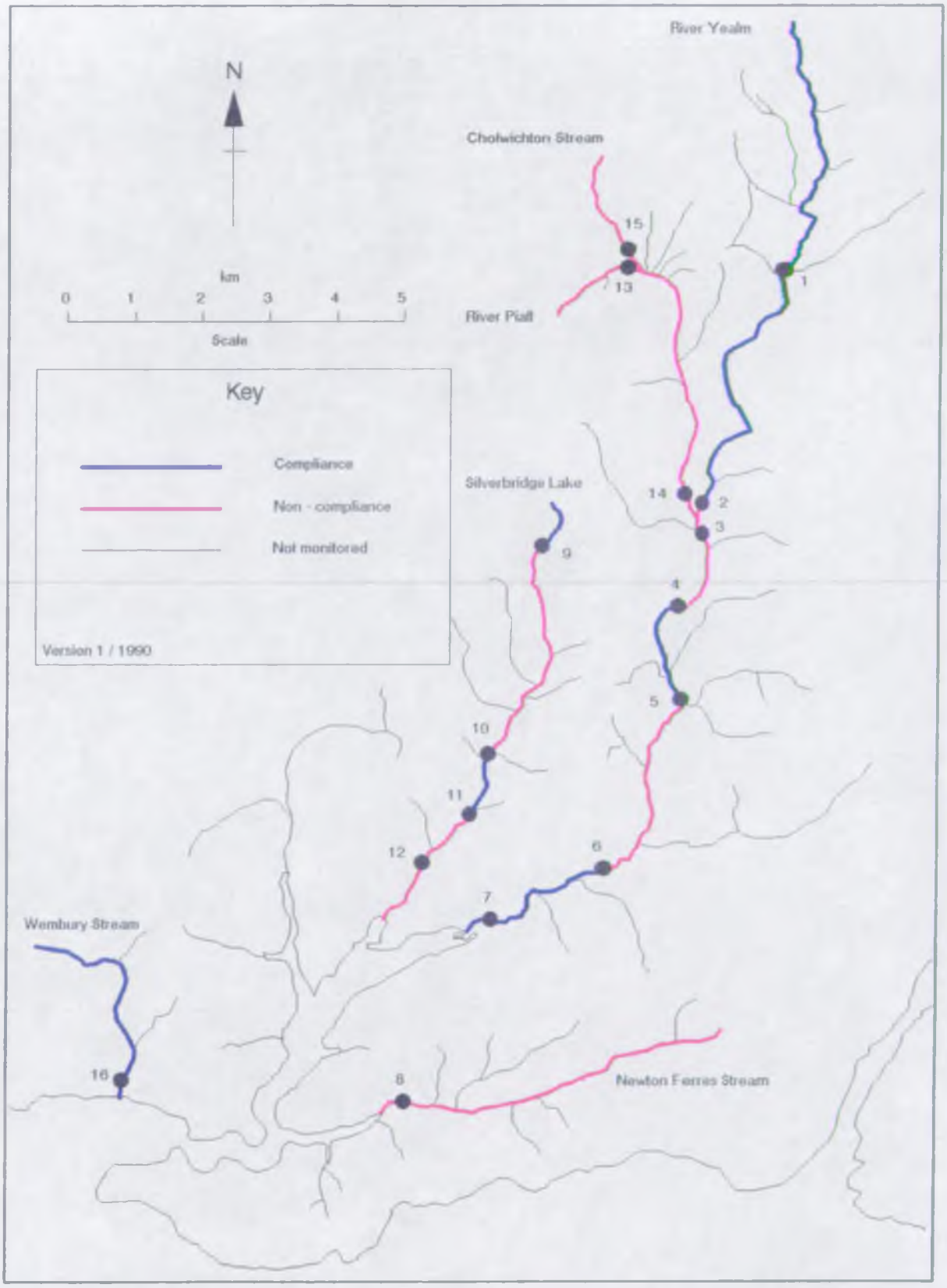


NATIONAL RIVERS AUTHORITY – SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CALCULATED DETERMINAND STATISTICS USED FOR QUALITY ASSESSMENT
CATCHMENT : YEALM (10)

River	Reach upstream of	User Ref. Number	90 %ile Class	Calculated Determinand Statistics used for Quality Assessment																			
				pH Lower		pH Upper		Temperature		DO (%)		BOD (ATU)		Total Ammonia		Union. Ammonia		S.Solids		Total Copper		Total Zinc	
				Class	5%ile	Class	95%ile	Class	95%ile	Class	5%ile	Class	95%ile	Class	95%ile	Class	95%ile	Class	Mean	Class	95%ile	Class	95%ile
YEALM	MILK CROSS	R10B022	1A	1A	5.5	1A	7.3	1A	14.9	1A	85.4	1A	2.5	1A	0.047	1A	0.010	1A	2.1	1A	6.0	1A	18.0
YEALM	PINSEL MILL FARM BRIDGE	R10B002	1A	1A	6.1	1A	7.2	1A	15.5	1A	83.3	1A	2.9	1A	0.142	1A	0.010	1A	4.0	1A	10.5	1A	22.5
YEALM	BELOW R. PIALL AT MARK'S BRIDGE	R10B024	1B	1A	6.5	1A	7.4	1A	17.2	1B	80.0	1A	2.0	1B	0.390	1A	0.010	1A	9.0	–	–	–	–
YEALM	LEE MILL BRIDGE	R10B003	1B	1A	6.6	1A	7.5	1A	14.8	1A	85.8	1B	3.6	1B	0.380	1A	0.010	1A	12.6	1A	8.0	1A	17.4
YEALM	POPPLE'S BRIDGE	R10B021	1A	1A	7.0	1A	7.7	1A	16.0	1A	87.1	1A	2.9	1A	0.179	1A	0.010	1A	13.7	–	–	–	–
YEALM	YEALM BRIDGE	R10B004	1B	1A	7.2	1A	7.9	1A	14.5	1A	89.9	1B	4.5	1A	0.167	1A	0.010	1A	14.3	1A	9.1	1A	23.5
YEALM	PUSLINCH BRIDGE	R10B005	1A	1A	7.2	1A	8.1	1A	15.4	1A	85.6	1A	3.0	1A	0.260	1A	0.010	1A	11.4	1A	8.0	1A	15.7
NEWTON STREAM	AT BRIDGEND	R10B015	3	1A	7.5	1A	8.2	1A	17.0	1A	83.5	2	9.0	2	1.053	3	0.030	3	31.1	1A	23.3	1A	37.9
SILVERBRIDGE LANE	SPANWELL	R10B020	1A	1A	7.1	1A	7.8	1A	17.0	1A	82.0	1A	2.4	1A	0.270	1A	0.010	1A	8.7	–	–	–	–
SILVERBRIDGE LANE	CHEREFORD	R10B019	2	1A	7.5	1A	8.1	1A	17.4	1A	81.1	2	5.4	1B	0.366	1A	0.010	1A	9.8	–	–	–	–
SILVERBRIDGE LANE	KORLOPEN	R10B016	1A	1A	7.6	1A	8.3	1A	15.8	1A	84.3	1A	2.9	1A	0.227	1A	0.010	1A	7.6	1A	14.6	1A	8.0
SILVERBRIDGE LANE	BRIDGEN	R10B018	2	1A	7.3	1A	8.2	1A	16.9	1B	79.4	1A	2.5	2	0.742	1A	0.010	1A	8.2	–	–	–	–
PIALL	QUICK BRIDGE	R10B007	3	1A	6.1	1A	7.1	1A	15.7	1A	83.4	1A	2.6	1A	0.176	1A	0.010	3	37.1	1A	5.6	1A	13.6
PIALL	MARK'S BRIDGE	R10B008	3	1A	6.4	1A	7.3	1A	14.6	1A	86.3	1A	2.7	1A	0.244	1A	0.010	3	25.8	1A	11.8	1A	16.0
CHOONICHOONI STREAM	PRIOR TO RIVER PIALL	R10B006	3	3	4.5	1A	7.0	1A	14.2	1B	73.6	1A	2.5	1A	0.070	1A	0.010	1A	15.6	1A	5.6	1A	13.0
MEMBURY STREAM	PRIOR TO BEACH	R10A001	1B	1A	6.7	1A	8.5	1A	17.2	1B	80.0	1B	4.0	1A	0.140	1A	0.010	1A	13.9	1A	6.0	1A	11.0

Appendix 10.7

Yealm Catchment
Compliance - 1990



NATIONAL RIVERS AUTHORITY – SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
NUMBER OF SAMPLES (N) AND NUMBER OF SAMPLES EXCEEDING QUALITY STANDARD (F)
CATCHMENT : YEALM (10)

River	Reach upstream of	User Ref. Number	pH Lower		pH Upper		Temperature		DO (%)		BOD (ATU)		Total Ammonia		Union. Ammonia		S.Solids		Total Copper		Total Zinc	
			N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F
YEALM	HELE CROSS	R10B022	22	-	22	-	21	-	21	-	22	-	22	-	12	-	22	-	16	-	16	-
YEALM	PARDEL MILL FARM BRIDGE	R10B002	37	-	37	-	34	-	34	-	37	-	37	-	28	-	37	-	24	-	24	-
YEALM	BELOW R. PIALL AT MARK'S BRIDGE	R10B024	12	-	12	-	12	-	12	-	12	-	12	1	10	-	12	1	7	-	7	-
YEALM	LEE MILL BRIDGE	R10B003	38	-	38	-	37	-	37	-	39	3	39	2	32	-	39	2	27	-	27	-
YEALM	POPPLE'S BRIDGE	R10B021	21	-	21	-	20	-	20	-	21	-	21	-	18	-	21	2	7	-	7	-
YEALM	YEALM BRIDGE	R10B004	41	-	41	-	39	-	38	-	41	2	41	1	36	-	41	5	37	-	37	-
YEALM	PUSLINCH BRIDGE	R10B005	39	-	39	-	36	-	36	-	39	-	39	-	35	-	39	4	26	-	26	-
NEWTON STREAM	AT BRIDGEEND	R10B015	34	-	34	-	34	-	34	-	34	2	34	4	33	2	34	9	20	-	20	-
SILVERBRIDGE LAKE	STANWELL	R10B020	19	-	19	-	19	-	19	-	19	-	19	-	19	-	19	1	6	-	6	-
SILVERBRIDGE LAKE	CHICKENHO	R10B019	20	-	20	-	20	-	20	-	20	1	20	-	20	-	20	2	5	-	5	-
SILVERBRIDGE LAKE	LOCKOFFEN	R10B016	34	-	34	-	32	-	32	-	34	-	34	-	32	-	34	1	20	-	20	-
SILVERBRIDGE LAKE	BRIDGTON	R10B018	20	-	20	-	20	-	20	-	20	-	20	1	18	-	20	-	5	-	5	-
PIALL	QUICK BRIDGE	R10B007	40	-	40	-	38	-	37	-	40	-	40	-	37	-	40	21	28	-	28	-
PIALL	MARK'S BRIDGE	R10B008	40	-	40	-	37	-	36	-	40	-	40	-	36	-	40	6	27	-	27	-
CHOLWICHTOWN STREAM	PRIOR TO RIVER PIALL	R10B006	40	4	40	-	38	-	37	-	39	-	40	-	34	-	40	8	27	-	27	-
NEMBURY STREAM	PRIOR TO BEACH	R10A001	19	-	19	-	18	-	18	-	19	-	19	-	18	-	19	3	12	-	12	-

Appendix 10.9

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
CATCHMENT : YEALM (10)

River	Reach upstream of	User Ref. Number	PERCENTAGE EXCEEDENCE OF STATISTIC FROM QUALITY STANDARD									
			pH Lower	pH Upper	Temperature	DO (%)	BOD (ATU)	Total Ammonia	Un-ionised Ammonia	Suspended Solids	Total Copper	Total Zinc
YEALM	HELE CROSS	R10B022	-	-	-	-	-	-	-	-	-	-
YEALM	FARDEL MILL FARM BRIDGE	R10B002	-	-	-	-	-	-	-	-	-	-
YEALM	BELOW R. PIALL AT MARK'S BRIDGE	R10B024	-	-	-	-	-	26	-	-	-	-
YEALM	LEE MILL BRIDGE	R10B003	-	-	-	-	20	23	-	-	-	-
YEALM	POPPLE'S BRIDGE	R10B021	-	-	-	-	-	-	-	-	-	-
YEALM	YEALM BRIDGE	R10B004	-	-	-	-	51	-	-	-	-	-
YEALM	PUSLINCH BRIDGE	R10B005	-	-	-	-	-	-	-	-	-	-
NEWTON STREAM	AT BRIDGEEND	R10B015	-	-	-	-	79	50	43	24	-	-
SILVERBRIDGE LAKE	SPARKWELL	R10B020	-	-	-	-	-	-	-	-	-	-
SILVERBRIDGE LAKE	CHOKEFORD	R10B019	-	-	-	-	8	-	-	-	-	-
SILVERBRIDGE LAKE	GORLOFEN	R10B016	-	-	-	-	-	-	-	-	-	-
SILVERBRIDGE LAKE	BRIXTON	R10B018	-	-	-	-	-	6	-	-	-	-
PIALL	QUICK BRIDGE	R10B007	-	-	-	-	-	-	-	48	-	-
PIALL	MARK'S BRIDGE	R10B008	-	-	-	-	-	-	-	3	-	-
CHOLWICHTOWN STREAM	PRIOR TO RIVER PIALL	R10B006	10	-	-	-	-	-	-	-	-	-
WEMBURY STREAM	PRIOR TO BEACH	R10A001	-	-	-	-	-	-	-	-	-	-

Appendix 10.10

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
IDENTIFICATION OF POSSIBLE CAUSES OF NON-COMPLIANCE WITH RQO
CATCHMENT : YEALM (10)

* = WORK ALREADY IN HAND

1990 Map Position Number	River	Reach upstream of	User Reference Number
3	YEALM	BELOW R. PIALL AT MARK'S BRIDGE	R10B024
4	YEALM	LEE MILL BRIDGE	R10B003
6	YEALM	YEALM BRIDGE	R10B004
8	NEWTON STREAM	AT BRIDGE END	R10B015
10	SILVERBRIDGE LAKE	CHOKEFORD	R10B019
12	SILVERBRIDGE LAKE	BRIXTON	R10B018
13	PIALL	* QUICK BRIDGE	R10B007
14	PIALL	* MARK'S BRIDGE	R10B008
15	CHOLWICHTOWN STREAM	PRIOR TO RIVER PIALL	R10B006

Reach Length (km)	Possible causes of non-compliance
0.2	CHINA CLAY EFFLUENT, SEWAGE TREATMENT WORKS
1.6	LAND RUN-OFF, SEWAGE TREATMENT WORKS, SPATES
2.8	LAND RUN-OFF, STORM OVERFLOW, SPATES
5.7	LAND RUN-OFF, SEWAGE TREATMENT WORKS, CATCHMENT GEOLOGY, FARMING ACTIVITIES
3.6	LAND RUN-OFF, SEPTIC TANKS, SPATES
1.0	LAND RUN-OFF, SPATES
1.6	MINING, CHINA CLAY DISCHARGE
4.4	CHINA CLAY DISCHARGE
1.2	CHINA CLAY DISCHARGE, MOORLAND ORIGINS

Appendix 10.11