NRA

National Rivers Authority
South West Region

ENVIRONMENTAL PROTECTION

River Avon Catchment
River Water Quality
Classification 1990

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Suggestions for improvements that could be incorporated in the production of the next Classification report would be welcomed.

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RIVER WATER QUALITY IN THE RIVER AVON CATCHMENT

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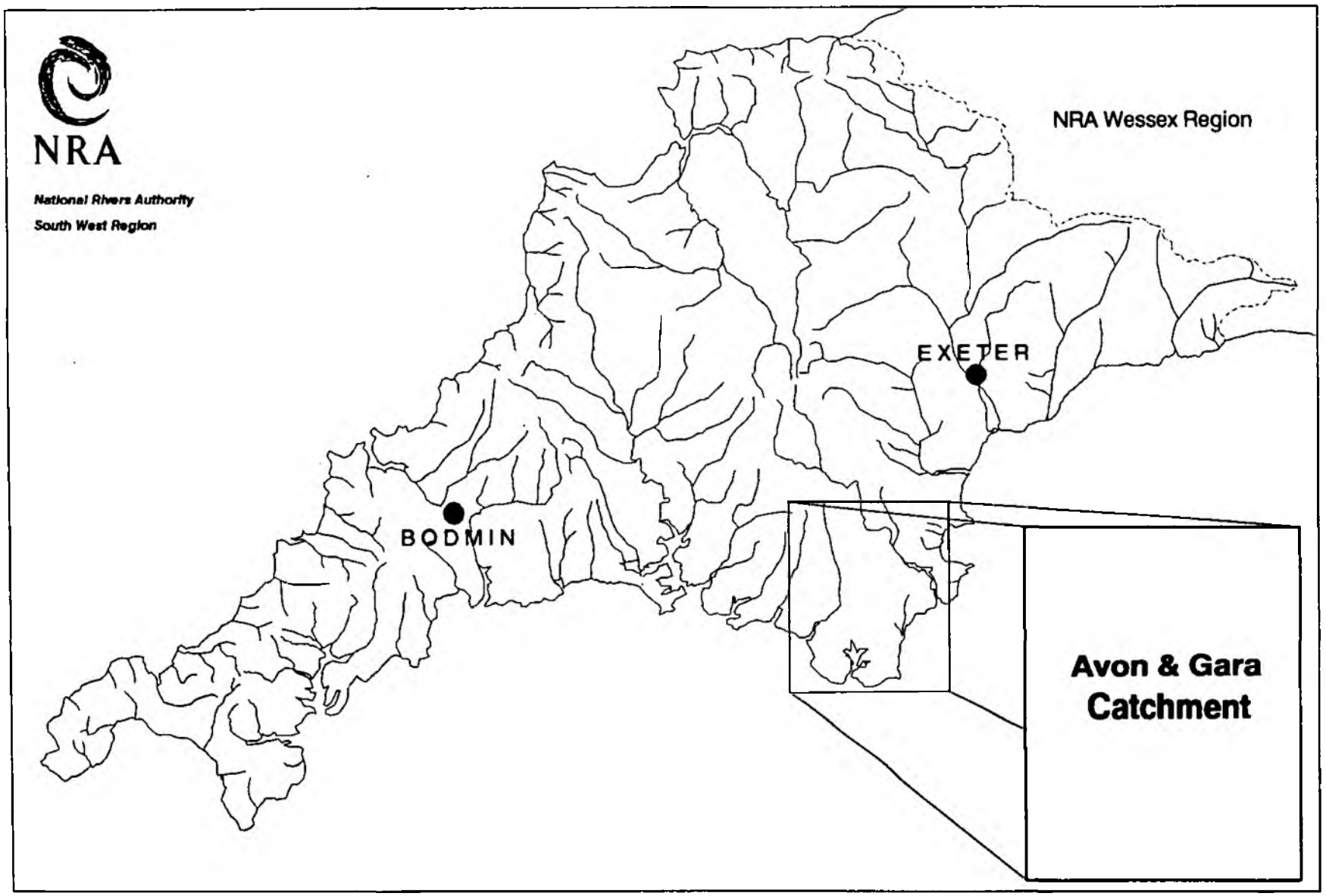
National Rivers Authority
South West Region



Avon & Gara 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 Avon catchment.

2. RIVER AVON CATCHMENT

The River Avon flows over a distance of 33.5 km from its source to the tidal limit, (Appendix 10.1). Water quality was monitored at seven locations on the main river; three of these sites were sampled at approximately monthly intervals. The site at Hatch, which is a National Water Quality monitoring point, was sampled fortnightly. Three sites at Shipley Bridge, A38 Bridge and Loddiswell were sampled on twenty occasions during 1990 because of no recent water quality data.

The River Gara flows over a distance of 14.2 km from its source to the tidal limit, (Appendix 10.1) and was monitored at seven sites at approximately monthly intervals.

Small Brook and West Alvington Stream flow over a distance of 8.4 km and 1.3 km respectively from their source to the tidal limit, (Appendix 10.1) and were both monitored at one location on twenty occasions in 1990 because of no recent water quality data.

Throughout the Avon catchment three secondary tributaries of the River Avon and one secondary tributary of the River Gara were monitored. In addition the Avon reservoir was monitored at one site at approximately monthly intervals.

2.1 SECONDARY TRIBUTARIES

The Torr Brook, Glaze Brook and Bala Brook flow over a distance of 6.9 km, 6.1 km and 3.8 km respectively from their source to the confluence with the River Avon, (Appendix 10.1) and were monitored at one location each on twenty occasions in 1990 because of no recent water quality data.

The Slapton Stream flows over a distance of 6.1 km from its source to the confluence with the River Gara, (Appendix 10.1) and was monitored at one location on twenty occasions during 1990 because of no recent water quality data. Monitoring points are all 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 Avon 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 not have affected the classification of river reaches.

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

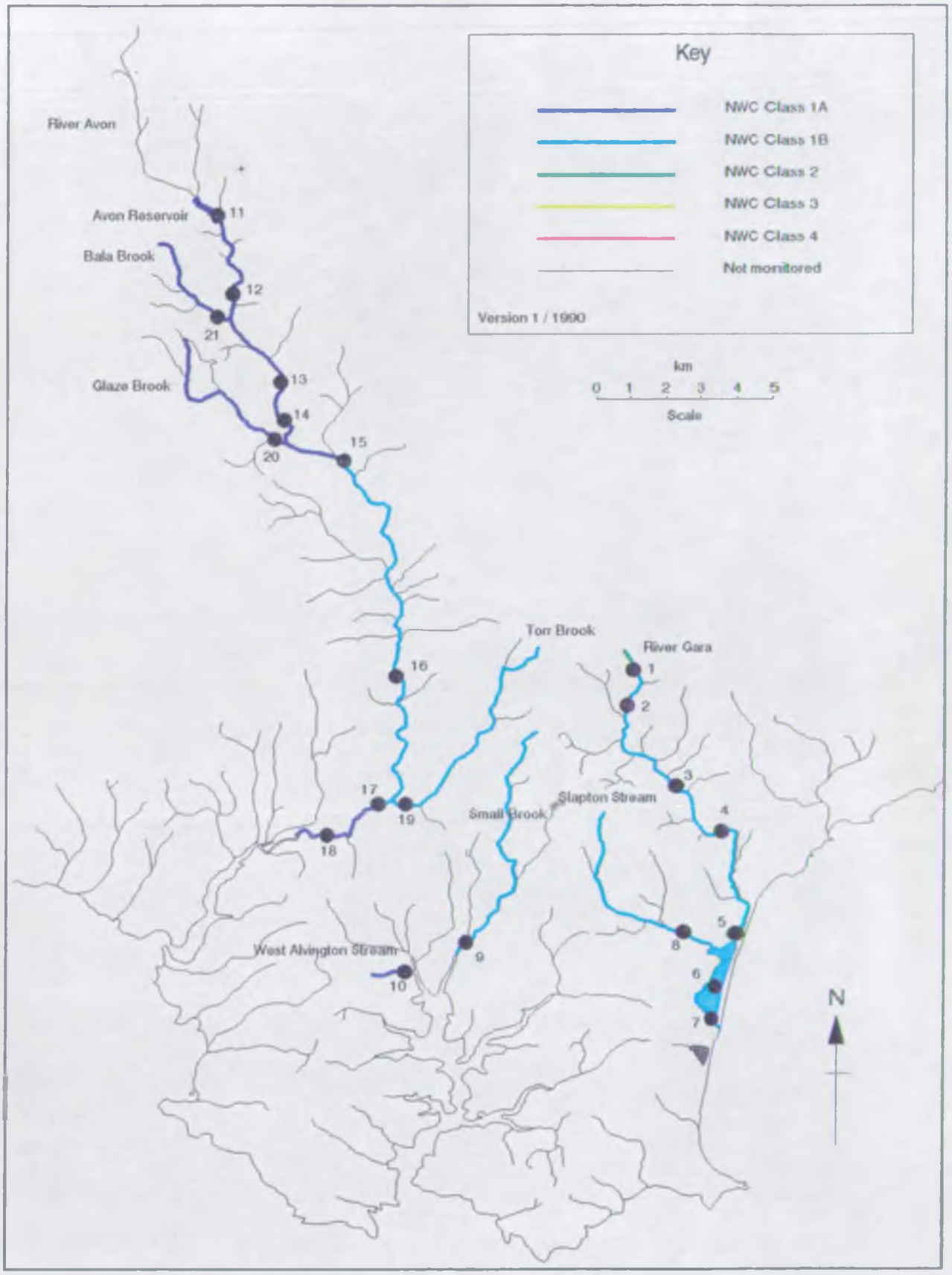
Reference

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.

Avon Catchment
River Quality 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 ality	(i) (ii) (iii)	DO greater than 10% saturation Not likely to be anaerobic 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
4 Bad ality		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

tes (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

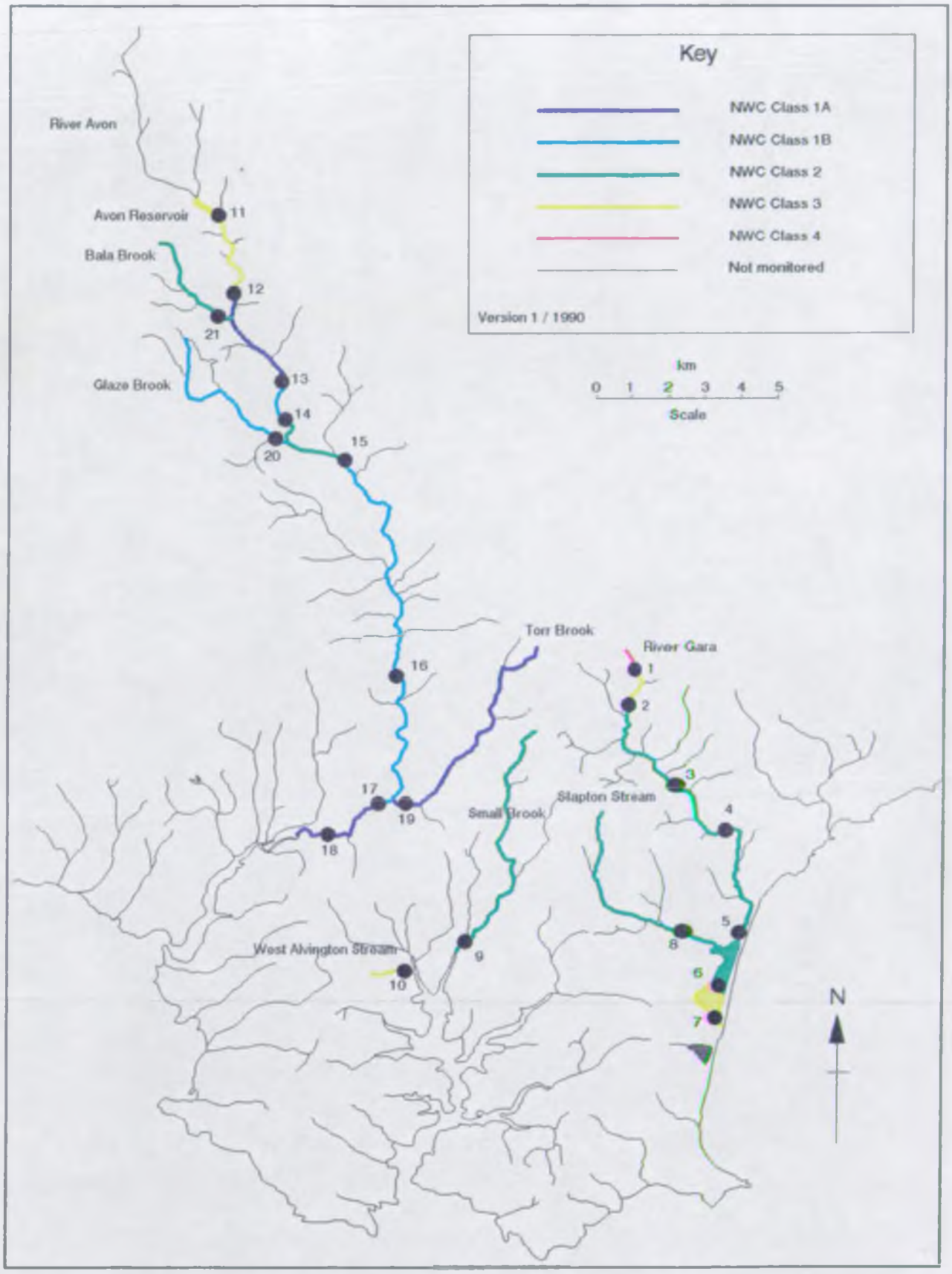
Total Hardness (mean) mg/l CaCO3	Statistic	Total Zinc ug/l Zn Class 1	Class 2	Class 3
0 - 10	95 percentile	< = 30	< = 300	> 300
10 - 50	95 percentile	< = 200	< = 700	> 700
50 - 100	95 percentile	< = 300	< = 1000	> 1000
100 - 300	95 percentile	< = 500	< = 2000	> 2000

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CATCHMENT : GARA & AVON (08)

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 RWC Class	86 RWC Class	87 RWC Class	88 RWC Class	89 RWC Class	90 RWC Class
1	THE GARA	COLLATON	R08A001	SX 7967 5265	0.1	0.1	2	1B	1B	1B	2	2	4
2	THE GARA	WOODFORD	R08A002	SX 7986 5103	1.9	2.0	1B	1B	1B	1B	1A	1A	3
3	THE GARA	FORDER	R08A003	SX 8110 4897	3.1	5.1	1B	1A	1A	1A	2	2	2
4	THE GARA	HIGHER NORTH MILL	R08A004	SX 8252 4765	2.4	7.5	1B	1B	1A	1A	2	1B	2
5	THE GARA	SLAPTON BRIDGE	R08A006	SX 8282 4435	4.1	11.6	1B	3	3	3	3	3	2
6	THE GARA	SLAPTON LEY	R08A011	SX 8230 4335	1.1	12.7	1B	2	3	3	3	3	2
7	THE GARA	TORCROSS	R08A007	SX 8222 4207	1.3	14.0	1B	2	3	3	3	3	3
	THE GARA	MEAN HIGH WATER (INFERRED STRETCH)			0.2	14.2	1B	2	3	3	3	3	3
8	SLAPTON STREAM	DEER BRIDGE	R08A012	SX 8131 4455	5.1	5.1	1B						2
	SLAPTON STREAM	GARA (SLAPTON LEY) CONFL. (INF. STRETCH)			1.0	6.1	1B						2
9	SMALL BROOK	BOWCOMBE	R08A013	SX 7503 4438	8.1	8.1	1B	1B					2
	SMALL BROOK	NORMAL TIDAL LIMIT (INFERRED STRETCH)			0.3	8.4	1B	1B					2
10	WEST ALVINGTON STREAM	TICKETWOOD	R08A014	SX 7342 4361	1.3	1.3	1A	1B					3
	AVON	INFLOW, AVON RES. (UNMONITORRED STRETCH)			5.5	5.5	1A	1A	1A	1A	1A	1A	
11	AVON	AVON RESERVOIR	R08B010	SX 6780 6540	1.1	6.6	1A	1A	1A	1A	1A	1A	3
12	AVON	SHIPLEY BRIDGE	R08B007	SX 6810 6290	2.9	9.5	1A	1A	1A	1A	1A	1A	3
13	AVON	LYDIA BRIDGE	R08B001	SX 6956 6070	3.0	12.5	1A	1A	1A	1A	1A	1A	1A
14	AVON	A38 BRIDGE, SOUTH BRENT	R08B008	SX 6978 5925	1.8	14.3	1A	1A	1B	1B	1B	1B	1B
15	AVON	HORSEBROOK	R08B002	SX 7126 5845	2.0	16.3	1A	1A	1B	1B	1B	1B	2
16	AVON	GARA BRIDGE	R08B003	SX 7290 5347	6.6	22.9	1B	1A	2	2	2	1B	1B
17	AVON	LODDISWELL	R08B004	SX 7272 4822	6.5	29.4	1B	1A	1A	1B	1B	1A	1B
18	AVON	HATCH	R08B005	SX 7145 4725	2.0	31.4	1A	1A	1A	1B	1B	1A	1A
	AVON	NORMAL TIDAL LIMIT (INFERRED STRETCH)			2.1	33.5	1A	1A	1A	1B	1B	1A	1A
19	TORR BROOK	LODDISWELL	R08A015	SX 7334 4832	6.5	6.5	1B						1A
	TORR BROOK	AVON CONFLUENCE (INFERRED STRETCH)			0.4	6.9	1B						1A
20	GLAZE BROOK	HIGHER TURTLEY	R08B009	SX 6979 5878	6.0	6.0	1A						1B
	GLAZE BROOK	AVON CONFLUENCE (INFERRED STRETCH)			0.1	6.1	1A						1B
21	BALA BROOK	ZEAL	R08B011	SX 6792 6244	3.6	3.6	1A	1A					2
	BALA BROOK	AVON CONFLUENCE (INFERRED STRETCH)			0.2	3.8	1A	1A					1A

Appendix 10.5

Avon Catchment
Water Quality - 1990

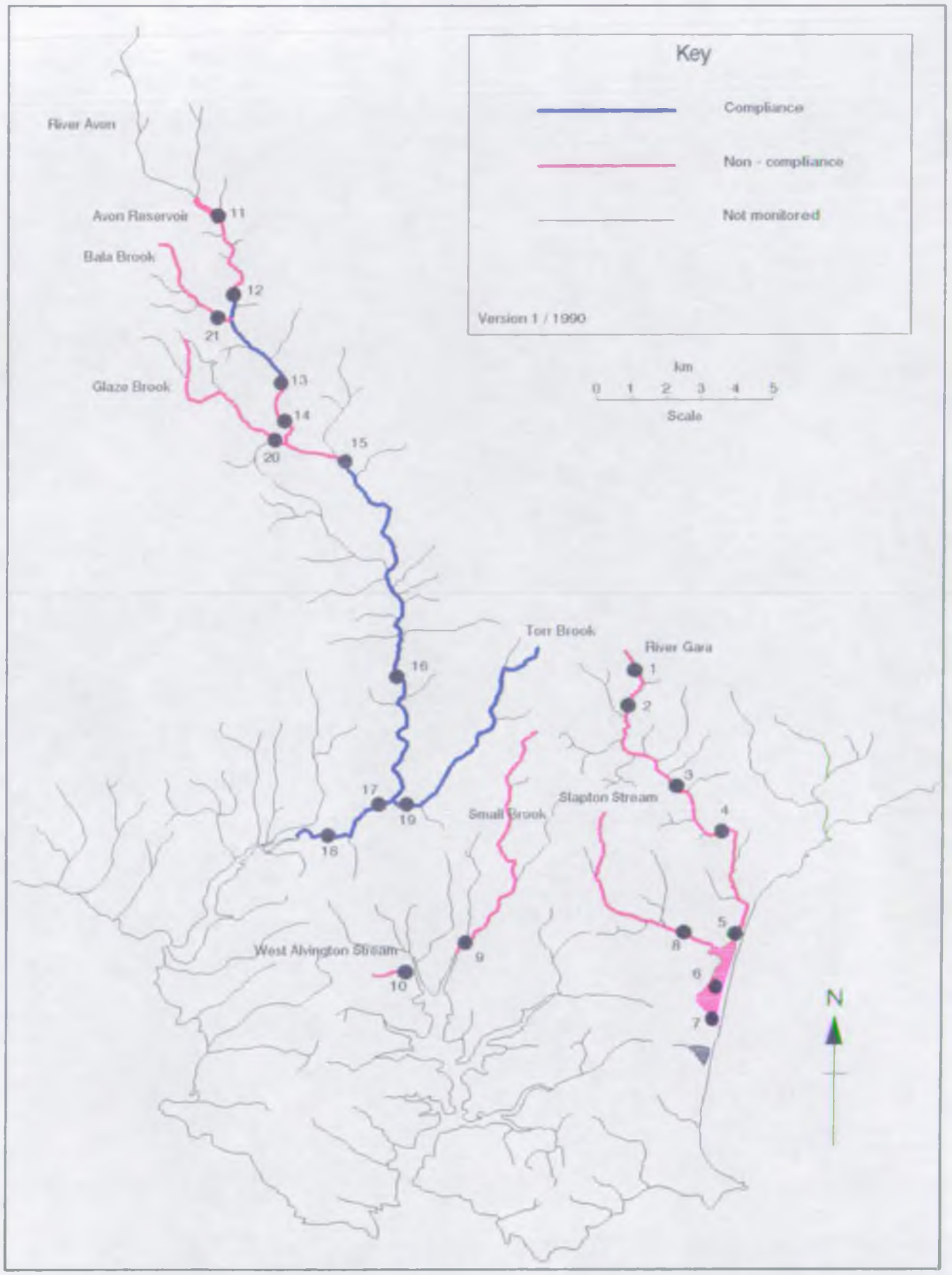


NATIONAL RIVERS AUTHORITY – SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CALCULATED DETERMINAND STATISTICS USED FOR QUALITY ASSESSMENT
CATCHMENT : GARA AND AVON (08)

River	Reach upstream of	User Ref. Number	90 NWC 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
THE GARA	COLLATON	R08A001	4	1A	6.3	1A	7.4	1A	17.4	3	39.3	4	49.3	3	6.597	1A	0.020	1A	13.3	-	-	-	-
THE GARA	WOODFORD	R08A002	3	1A	7.2	1A	7.9	1A	17.9	1B	73.5	3	12.2	1B	0.408	1A	0.010	1A	14.8	-	-	-	-
THE GARA	FORDER	R08A003	2	1A	7.3	1A	8.0	1A	17.7	1B	76.2	2	7.2	2	0.968	1A	0.010	1A	14.4	-	-	-	-
THE GARA	HIGHER NORTH MILL	R08A004	2	1A	7.6	1A	8.1	1A	17.7	1B	75.2	2	5.4	1A	0.164	1A	0.010	1A	10.9	1A	11.7	1A	118.9
THE GARA	SLAPTON BRIDGE	R08A006	2	1A	7.2	1A	8.0	1A	20.8	2	40.2	2	6.2	1A	0.075	1A	0.010	1A	2.8	-	-	-	-
THE GARA	SLAPTON LEY	R08A011	2	1A	7.0	1A	8.7	1A	16.5	2	51.0	2	7.9	1A	0.190	1A	0.010	1A	16.3	1A	14.0	1A	97.0
THE GARA	TORCROSS	R08A007	3	1A	7.6	3	9.4	1A	20.5	3	37.5	2	7.8	1B	0.590	3	0.022	1A	15.1	1A	10.0	1A	35.5
SLAPTON STREAM	DEER BRIDGE	R08A012	2	1A	7.2	1A	8.0	1A	16.0	1B	70.0	2	7.6	1A	0.058	1A	0.010	1A	9.7	-	-	-	-
SMALL BROOK	BOWCOMBE	R08A013	2	1A	7.5	1A	8.2	1A	19.8	2	57.2	2	8.9	1A	0.138	1A	0.010	1A	17.2	-	-	-	-
WEST ADVINGTON STREAM	TICKENWOOD	R08A014	3	1A	7.6	1A	8.1	1A	17.9	1B	70.4	3	10.6	1A	0.208	1A	0.010	3	30.2	-	-	-	-
AVON	AVON RESERVOIR	R08B010	3	3	4.6	1A	6.2	1A	17.5	1A	84.0	1A	1.9	1A	0.090	1A	0.010	1A	3.7	1A	5.0	1A	15.0
AVON	SHIPLEY BRIDGE	R08B007	3	3	4.7	1A	6.4	1A	17.0	1A	68.0	1A	1.8	1A	0.120	1A	0.010	1A	1.5	1A	5.0	1A	9.0
AVON	LYDIA BRIDGE	R08B001	1A	1A	6.2	1A	7.1	1A	16.0	1A	87.1	1A	1.9	1A	0.040	1A	0.010	1A	2.8	-	-	-	-
AVON	A38 BRIDGE, SOUTH BRENT	R08B008	1B	1A	6.3	1A	7.5	1A	16.9	1B	66.0	1A	2.3	1A	0.108	1A	0.010	1A	2.1	1A	6.0	1A	14.9
AVON	HORSEBROOK	R08B002	2	1A	6.8	1A	7.8	1A	16.2	2	48.0	1A	2.3	1A	0.054	1A	0.010	1A	3.6	1A	5.0	1A	24.0
AVON	GARA BRIDGE	R08B003	1B	1A	6.9	1A	7.9	1A	16.4	1B	76.5	1B	3.1	1A	0.087	1A	0.010	1A	4.6	1A	6.4	1A	15.6
AVON	LODDISWELL	R08B004	1B	1A	7.3	1A	7.8	1A	17.0	1B	70.0	1A	3.0	1A	0.070	1A	0.010	1A	4.4	-	-	-	-
AVON	HATCH	R08B005	1A	1A	7.2	1A	7.8	1A	17.0	1A	81.5	1A	3.0	1A	0.125	1A	0.010	1A	10.0	1A	5.5	1A	22.0
TOBR BROOK	LODDISWELL	R08A015	1A	1A	7.4	1A	8.1	1A	16.0	1A	87.0	1A	2.1	1A	0.110	1A	0.010	1A	11.6	1A	5.0	1A	9.0
GLAZE BROOK	HIGHER TURTLEY	R08B009	1B	1A	6.8	1A	7.5	1A	17.0	1A	83.0	1A	2.9	1B	0.510	1A	0.010	1A	2.2	1A	5.0	1A	9.0
BALA BROOK	ZEAL	R08B011	2	1A	5.1	1A	7.1	1A	16.0	1A	87.0	1A	1.5	1A	0.020	1A	0.010	1A	2.7	2	8.0	1A	13.0

Appendix 10.7

Avon 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 : GINN & AVON (08)

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
THE GINN	COLLATON	R08A001	24	-	24	-	24	-	24	1	24	3	24	4	23	-	24	5	0	-	0	-
THE GINN	WOODFORD	R08A002	25	-	25	-	25	-	25	-	25	2	25	-	25	-	25	3	0	-	0	-
THE GINN	FORDER	R08A003	25	-	25	-	25	-	25	-	25	3	25	2	25	-	25	3	0	-	0	-
THE GINN	HIGHER NORTH MILL	R08A004	30	-	30	-	30	-	30	-	30	1	30	-	28	-	30	3	30	-	30	-
THE GINN	SLAPTON BRIDGE	R08A006	24	-	24	-	23	-	23	7	24	1	24	-	23	-	24	-	0	-	0	-
THE GINN	SLAPTON LEY	R08A011	12	-	12	-	11	-	11	1	12	3	12	-	11	-	12	2	12	-	12	-
THE GINN	TORCROSS	R08A007	29	-	29	2	29	-	29	2	29	7	29	-	27	1	29	5	29	-	29	-
SLAPTON STREAM	DEER BRIDGE	R08A012	21	-	21	-	19	-	19	-	21	1	21	-	18	-	21	2	1	-	1	-
SMALL BROOK	BOOKHAM	R08A013	20	-	20	-	20	-	20	1	20	1	20	-	19	-	20	2	1	-	1	-
WEST ALVINGTON STREAM	TUCKENWOOD	R08A014	20	-	20	-	20	-	20	2	20	1	20	-	19	-	20	4	0	-	0	-
AVON	AVON RESERVOIR	R08B010	12	4	12	-	12	-	12	-	12	-	12	-	11	-	12	-	12	-	12	-
AVON	SHIPLEY BRIDGE	R08B007	19	2	19	-	19	-	19	-	19	-	19	-	14	-	19	-	19	-	19	-
AVON	LYDIA BRIDGE	R08B001	26	-	26	-	26	-	26	-	26	-	26	-	23	-	26	-	0	-	0	-
AVON	A38 BRIDGE, SOUTH BRENT	R08B008	20	-	20	-	20	-	20	1	20	-	20	-	18	-	20	-	20	-	20	-
AVON	HORSEBROOK	R08B002	32	-	32	-	31	-	31	2	32	-	32	-	26	-	32	1	12	-	12	-
AVON	GINN BRIDGE	R08B003	25	-	25	-	25	-	25	-	25	-	25	-	24	-	25	-	25	-	25	-
AVON	LODDISWELL	R08B004	20	-	20	-	20	-	20	-	20	-	20	-	19	-	20	-	0	-	0	-
AVON	AVICH	R08B005	49	-	49	-	50	-	49	2	49	1	49	-	43	-	49	3	49	-	49	-
TOWN BROOK	LODDISWELL	R08A015	19	-	19	-	19	-	19	-	19	-	19	-	19	-	19	3	19	-	19	-
GLAZE BROOK	HIGHER TURTLEY	R08B009	19	-	19	-	19	-	19	-	19	-	19	1	15	-	19	-	19	-	19	-
BALA BROOK	ZEAL	R08B011	18	-	18	-	18	-	18	-	17	-	18	-	12	-	18	-	18	1	18	-

Appendix 10.9

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
CATCHMENT : GARA & AVON (08)

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
THE GARA	COLLATON	R08A001	-	-	-	2	448	323	-	-	-	-
THE GARA	WOODFORD	R08A002	-	-	-	-	144	-	-	-	-	-
THE GARA	FORDER	R08A003	-	-	-	-	44	38	-	-	-	-
THE GARA	HIGHER NORTH MILL	R08A004	-	-	-	-	8	-	-	-	-	-
THE GARA	SLAPTON BRIDGE	R08A006	-	-	-	33	23	-	-	-	-	-
THE GARA	SLAPTON LEY	R08A011	-	-	-	15	58	-	-	-	-	-
THE GARA	TORCROSS	R08A007	-	4	-	38	55	-	5	-	-	-
SLAPTON STREAM	DEER BRIDGE	R08A012	-	-	-	-	52	-	-	-	-	-
SMALL BROOK	BOWCOMBE	R08A013	-	-	-	5	77	-	-	-	-	-
WEST ALVINGTON STREAM	TICKETWOOD	R08A014	-	-	-	12	253	-	-	21	-	-
AVON	AVON RESERVOIR	R08B010	8	-	-	-	-	-	-	-	-	-
AVON	SHIPLEY BRIDGE	R08B007	6	-	-	-	-	-	-	-	-	-
AVON	LYDIA BRIDGE	R08B001	-	-	-	-	-	-	-	-	-	-
AVON	A38 BRIDGE, SOUTH BRENT	R08B008	-	-	-	18	-	-	-	-	-	-
AVON	HORSEBROOK	R08B002	-	-	-	40	-	-	-	-	-	-
AVON	GARA BRIDGE	R08B003	-	-	-	-	-	-	-	-	-	-
AVON	LODDISWELL	R08B004	-	-	-	-	-	-	-	-	-	-
AVON	HATCH	R08B005	-	-	-	-	-	-	-	-	-	-
TORR BROOK	LODDISWELL	R08A015	-	-	-	-	-	-	-	-	-	-
GLAZE BROOK	HIGHER TURTLEY	R08B009	-	-	-	-	-	65	-	-	-	-
BALA BROOK	ZEAL	R08B011	-	-	-	-	-	-	-	-	60	-

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
IDENTIFICATION OF POSSIBLE CAUSES OF NON-COMPLIANCE WITH RQO
CATCHMENT : GARA & AVON (08)

* = WORK ALREADY IN HAND

1990 Map Position Number	River	Reach upstream of	User Reference Number
1	THE GARA	COLLATON	R08A001
2	THE GARA	WOODFORD	R08A002
3	THE GARA	FORDER	R08A003
4	THE GARA	HIGHER NORTH MILL	R08A004
5	THE GARA	SLAPTON BRIDGE	R08A006
6	THE GARA	SLAPTON LEY	R08A011
7	THE GARA	TORCROSS	R08A007
8	SLAPTON STREAM	DEER BRIDGE	R08A012
9	SMALL BROOK	BOWCOMBE	R08A013
10	WEST ALVINGTON STREAM	TICKETWOOD	R08A014
11	AVON	AVON RESERVOIR	R08B010
12	AVON	SHIPLEY BRIDGE	R08B007
14	AVON	A38 BRIDGE, SOUTH BRENT	R08B008
15	AVON	HORSEBROOK	R08B002
20	GLAZE BROOK	HIGHER TURTLEY	R08B009
21	BALA BROOK	* ZEAL	R08B011

Reach Length (km)	Possible causes of non-compliance
0.1	FARMING ACTIVITIES, DROUGHT
1.9	DROUGHT, SPATES
3.1	FARMING ACTIVITIES, LAND RUN-OFF
2.4	DROUGHT, SPATES
4.1	DROUGHT, SPATES
1.1	EUTROPHICATION, BLUE-GREEN ALGAE
1.3	EUTROPHICATION, DROUGHT, SEWAGE TREATMENT WORKS, IMPOUNDMENT UP-STREAM
5.1	FARMING ACTIVITIES
8.1	FARMING ACTIVITIES, POOR SAMPLING POINTS, SEPTIC TANKS
1.3	URBANISATION, POOR SAMPLING POINT
1.1	MOORLAND ORIGINS, IMPOUNDMENT, CATCHMENT GEOLOGY
2.9	MOORLAND ORIGINS, CATCHMENT GEOLOGY
1.8	SEWAGE TREATMENT WORKS
2.0	FARMING, UNKNOWN POINT SOURCE, SPATES
6.0	SEPTIC TANK
3.6	MOORLAND, WATER TREATMENT WORKS, CATCHMENT GEOLOGY