NRA

National Rivers Authority
South West Region

ENVIRONMENTAL PROTECTION

River Otter Catchment
River Water Quality
Classification 1990

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National Rivers Authority
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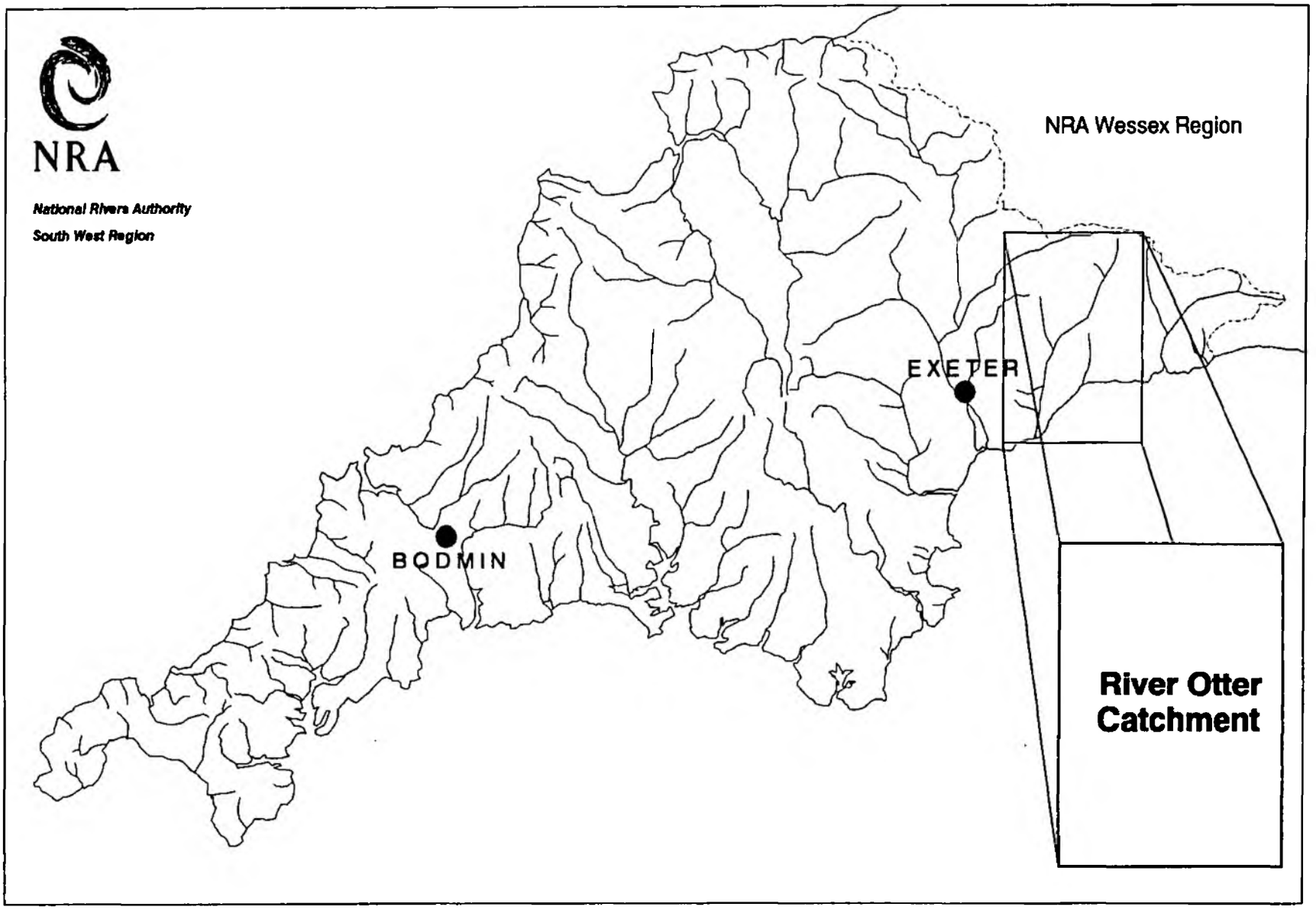

River Otter Catchment

RIVER WATER QUALITY IN THE RIVER OTTER CATCHMENT

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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 Otter catchment.

2. RIVER OTTER CATCHMENT

The River Otter flows over a distance of 43.8 km from its source to the tidal limit, (Appendix 10.1). Water quality was monitored at eleven locations on the main river; six of these sites were sampled on eighteen occasions during 1990. Sites at Rawridge, Monkton, Cottarson Farm and Fenny Bridges were sampled on twenty occasions during 1990 because of no recent water quality data. The site at Dotton Mill, which is a National Water Quality monitoring site, was sampled fortnightly.

Budleigh Brook flows over a distance of 4.7 km from its source to the tidal limit, (Appendix 10.1) and was monitored at one site on twenty occasions during 1990 because of no recent water quality data.

Throughout the Otter catchment thirteen secondary tributaries of the River Otter were monitored. In addition Squabmoor Reservoir (5.8 km) was monitored at one location at approximately monthly intervals.

2.1 SECONDARY TRIBUTARIES

The River Tale, River Wolf and Wick Stream flow over a distance of 14.2 km, 6.4 km and 8.3 km respectively from their source to the confluence with the River Otter, (Appendix 10.1) and were each monitored at two locations. One site on each of these watercourses was sampled on eighteen occasions and one site on each watercourse

was sampled on twenty occasions in 1990 because of no recent water quality data.

The Fair Oak Stream (3.3 km), Odle Brook (1.6 km), Combe Raleigh Stream (3.3 km), River Gissage (6 km), Gittisham Stream (3.6 km), Vine Water (5.2 km), West Hill Stream (3.4 km), Fluxton Stream (4.2 km), Metcombe Brook (3.3 km) and Colaton Raleigh Stream (8.2 km) were all monitored at one site between their source and confluence with the River Otter, (Appendix 10.1). Samples were taken on twenty occasions during 1990 because of no recent water quality data. All 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 Otter 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

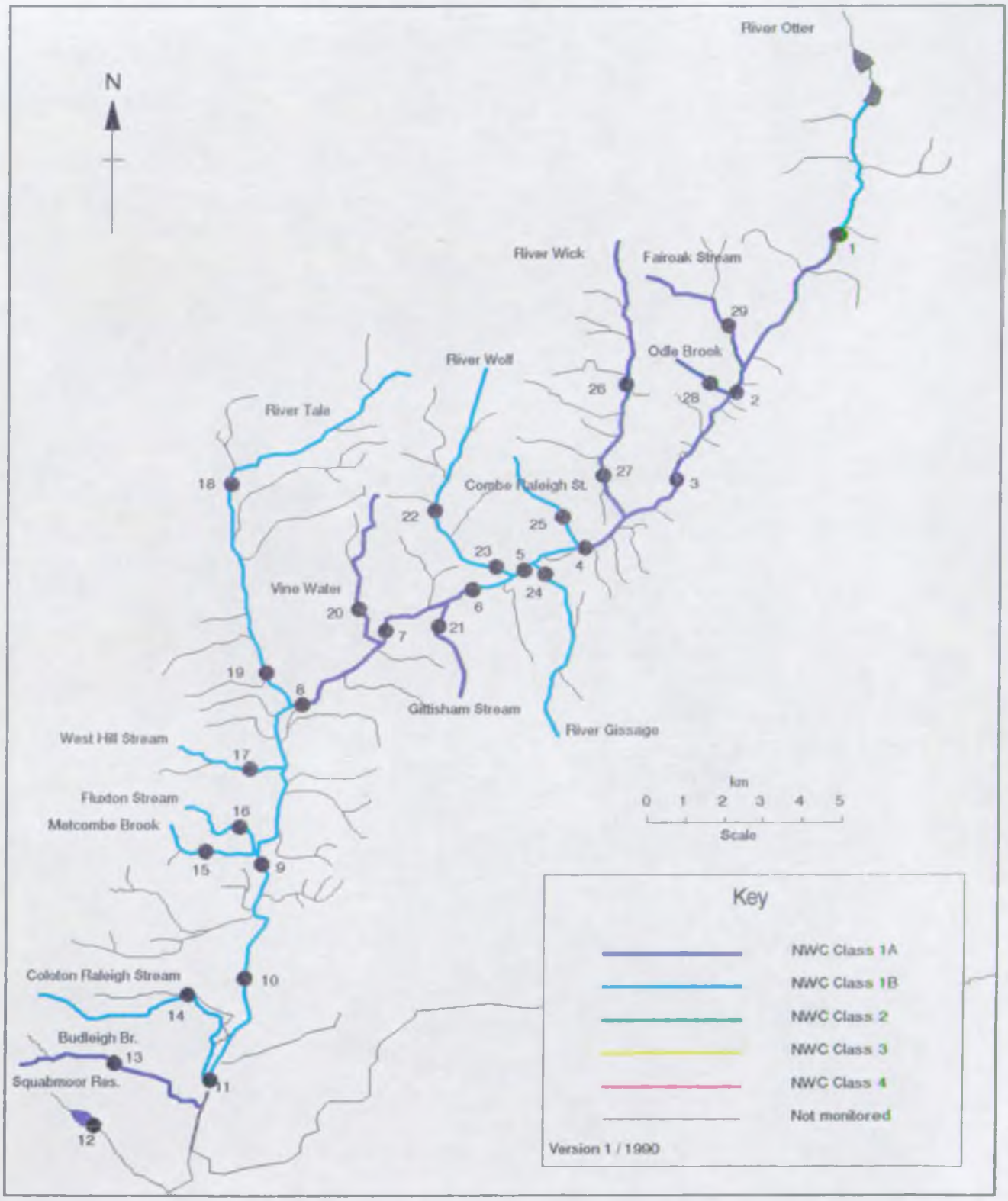
Reference

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.

Otter 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

oor lity	(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 lity		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
		DO greater than 10% saturation		Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

es (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.

EC 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 : OTTER (04)

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
	OTTER	SOURCE TO OTTER LAKES (UNMON. STRETCH)			3.1	3.1	1B	1B	1B	1A	1B	1B	
1	OTTER	HOEMORE FARM	R04B001	ST 2210 1035	3.0	6.1	1B	1B	1B	1A	1B	1B	1B
2	OTTER	RAWRIDGE	R04B042	ST 1983 0625	5.1	11.2	1A	2	2	2	2	1B	1A
3	OTTER	MONKTON	R04B035	ST 1836 0306	4.1	15.3	1A	2	2	2	2	1B	1A
4	OTTER	CLAPPERLANE BRIDGE	R04B002	ST 1633 0120	3.1	18.4	1A	2	2	2	2	1B	1B
5	OTTER	COTTARSON FARM	R04B014	ST 1480 0075	2.2	20.6	1B	2	2	2	2	2	1B
6	OTTER	WESTON	R04B003	ST 1430 0009	1.2	21.8	1B	2	2	2	2	2	2
7	OTTER	PENNY BRIDGES	R04B019	SY 1148 9858	3.8	25.6	1A	2	2	2	2	2	1B
8	OTTER	B3176 BRIDGE OTTERY ST MARY	R04B004	SY 0935 9606	3.8	29.4	1A	2	2	2	2	2	2
9	OTTER	TIPTON ST JOHN	R04B005	SY 0901 9180	5.0	34.4	1B	2	2	2	2	1B	1B
10	OTTER	DOTTON MILL	R04B006	SY 0873 8853	4.2	38.6	1B	2	2	2	2	2	1B
11	OTTER	OTTERTON	R04B007	SY 0791 8529	3.9	42.5	1B	2	2	2	2	1B	1B
	OTTER	NORMAL TIDAL LIMIT (INFERRED STRETCH)			1.3	43.8	1B	2	2	2	2	1B	1B
	KNOWLE BROOK	SOURCE TO SQUABMOOR RES.(UNMON. STRETCH)			1.1	1.1	1A						
12	KNOWLE BROOK	SQUABMOOR RESERVOIR	R04B041	SY 0400 8385	0.4	1.5	1A						1A
	KNOWLE BROOK	NORMAL TIDAL LIMIT (UNMON. STRETCH)			4.3	5.8	1A						
13	BUDLEIGH BROOK	YETTINGTON	R04B034	SY 0538 8568	1.7	1.7	1A						1A
	BUDLEIGH BROOK	NORMAL TIDAL LIMIT (INFERRED STRETCH)			3.0	4.7	1A						1A
14	COLATON RALEIGH STREAM	POPHAYES	R04B032	SY 0723 8768	4.3	4.3	1B						2
	COLATON RALEIGH STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			3.9	8.2	1B						2
15	METCOMBE BROOK	METCOMBE	R04B028	SY 0818 9190	2.4	2.4	1B						1B
	METCOMBE BROOK	OTTER CONFLUENCE (INFERRED STRETCH)			0.9	3.3	1B						1B
16	FLUXTON STREAM	FLUXTON	R04B027	SY 0868 9283	3.0	3.0	1B						1B
	FLUXTON STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			1.2	4.2	1B						1B
17	WEST HILL STREAM	SALSTON BARTON	R04B026	SY 0885 9456	2.7	2.7	1B						3
	WEST HILL STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			0.7	3.4	1B						3
18	TALE	DANES MILL	R04B008	ST 0762 0329	6.0	6.0	1B	2	2	2	2	1B	1B
19	TALE	TALEFORD	R04B009	SY 0899 9688	6.9	12.9	1B	1B	2	2	1B	1B	1B
	TALE	OTTER CONFLUENCE (INFERRED STRETCH)			1.3	14.2	1B	1B	2	2	1B	1B	1B
20	VINE WATER	FENITON	R04B025	SY 1108 9914	4.0	4.0	1A						3
	VINE WATER	OTTER CONFLUENCE (INFERRED STRETCH)			1.2	5.2	1A						3
21	GITTISHAM STREAM	BELOW POMEREY	R04B024	SY 1343 9900	2.7	2.7	1A						2
	GITTISHAM STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			0.9	3.6	1A						2
22	WOLF	GODFORD	R04B037	ST 1302 0206	3.6	3.6	1B	2	2	2	2	1B	2
23	WOLF	WINNIFORD FARM	R04B011	ST 1433 0057	2.3	5.9	1B	2	2	2	2	1B	1B
	WOLF	OTTER CONFLUENCE (INFERRED STRETCH)			0.5	6.4	1B	2	2	2	2	1B	1B

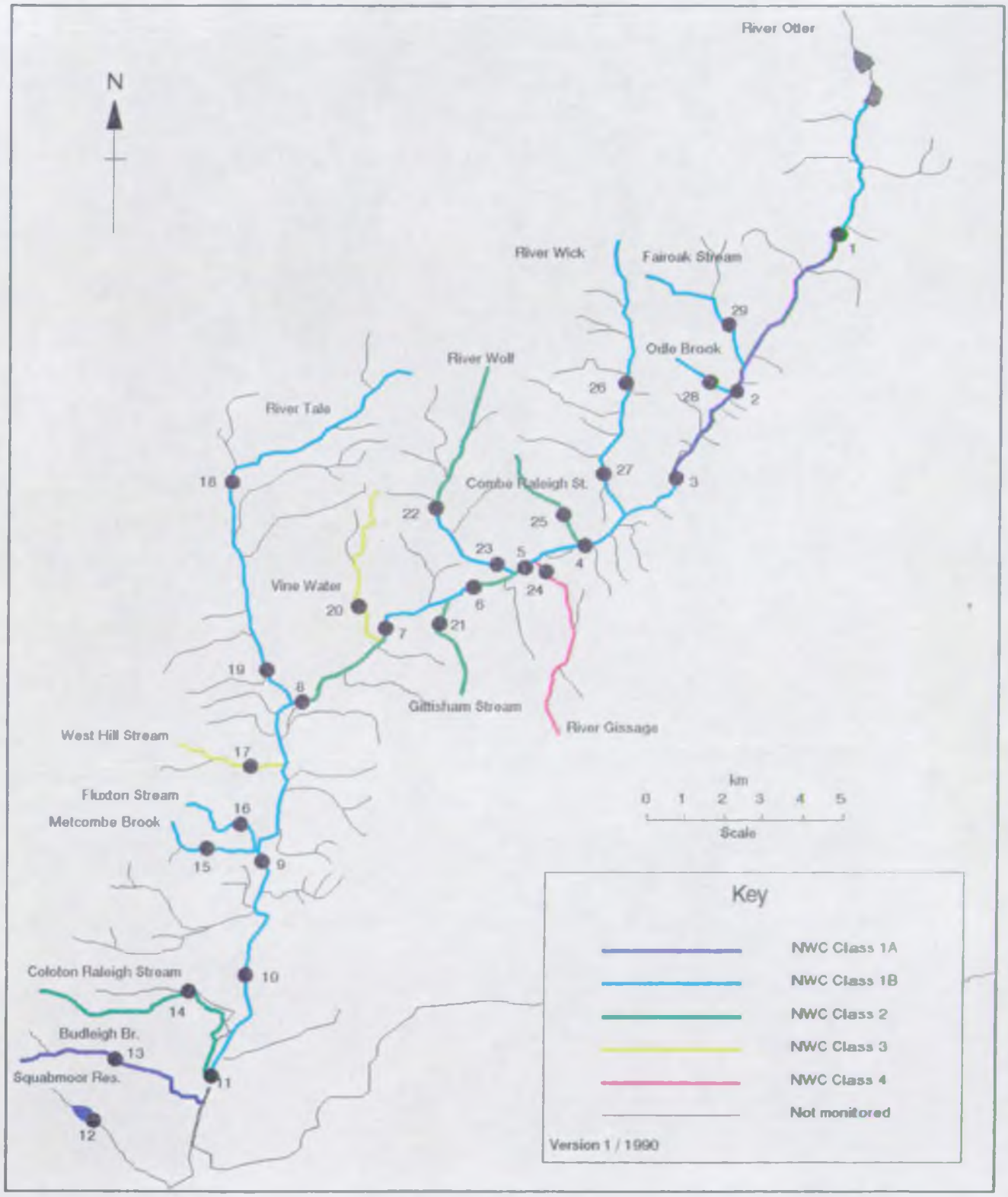
Appendix 10.5

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CATCHMENT : OTTER (04)

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
24	GISSAGE	PRIOR TO RIVER OTTER	R04B023	ST 1533 0115	5.9	5.9	1B	1B					4
	GISSAGE	OTTER CONFLUENCE (INFERRED STRETCH)			0.1	6.0	1B	1B					4
25	COMBE RALEIGH STREAM	LONGWOOD	R04B022	ST 1633 0173	2.7	2.7	1B						2
	COMBE RALEIGH STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			0.6	3.3	1B						2
26	WICK STREAM	BARN FARM	R04B036	ST 1705 0526	4.5	4.5	1A	1B	1B	1B	1B	1B	1B
27	WICK STREAM	MILL HOUSE NURSERY	R04B010	ST 1689 0288	2.7	7.2	1A	1B	1B	1B	1B	1B	1B
	WICK STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			1.1	8.3	1A	1B	1B	1B	1B	1B	1B
28	ODLE BROOK	SPURTHAM FARM	R04B021	ST 1946 0630	1.3	1.3	1A						1B
	ODLE BROOK	OTTER CONFLUENCE (INFERRED STRETCH)			0.3	1.6	1A						1B
29	FAIROAK STREAM	UPOTTERY	R04B020	ST 1994 0778	2.5	2.5	1A						1B
	FAIROAK STREAM	OTTER CONFLUENCE (INFERRED STRETCH)			0.8	3.3	1A						1B

Appendix 10.5

Otter Catchment
Water Quality - 1990

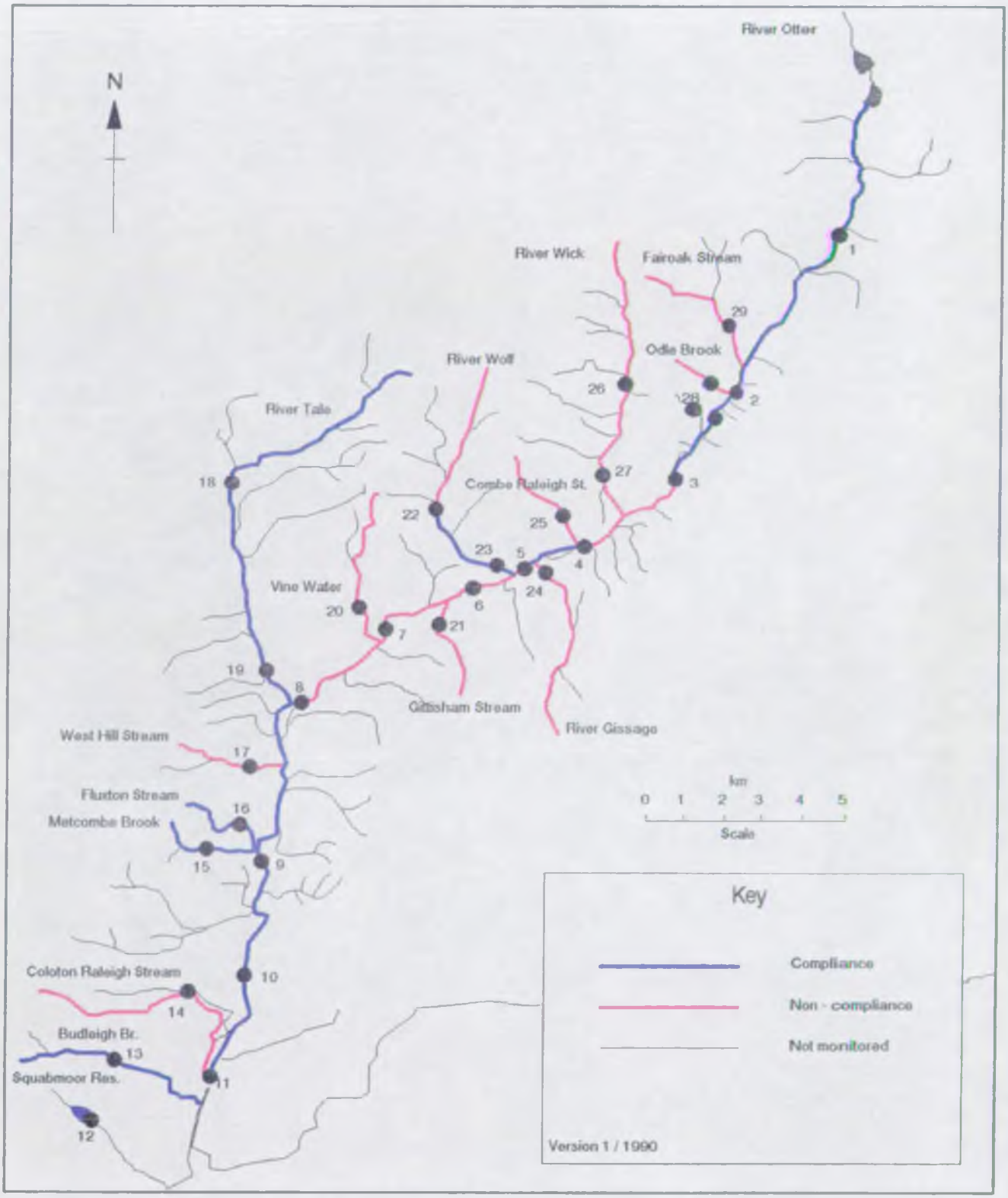


NATIONAL RIVERS AUTHORITY – SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
CALCULATED DETERMINAND STATISTICS USED FOR QUALITY ASSESSMENT
CATCHMENT : OTTER (04)

River	Reach upstream of	User Ref. Number	90 %ile 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
OTTER	HOEMORE FARM	R04B001	1B	1A	7.3	1A	8.1	1A	16.2	1A	83.7	1B	3.2	1A	0.194	1A	0.010	1A	7.1	-	-	-	-
OTTER	RAWRIDGE	R04B042	1A	1A	7.3	1A	8.2	1A	18.0	1A	91.0	1A	2.4	1A	0.300	1A	0.010	1A	6.7	-	-	-	-
OTTER	MONKTON	R04B035	1A	1A	7.4	1A	8.3	1A	18.9	1A	83.3	1A	2.9	1A	0.186	1A	0.010	1A	9.5	-	-	-	-
OTTER	CLAPPERLANE BRIDGE	R04B002	1B	1A	7.5	1A	8.5	1A	20.0	1B	75.9	1B	4.8	1A	0.301	1A	0.010	1A	10.1	-	-	-	-
OTTER	COTTARSON FARM	R04B014	1B	1A	7.5	1A	8.2	1A	17.5	1B	68.4	1B	3.6	1B	0.408	1A	0.010	1A	9.4	1A	7.9	1A	18.6
OTTER	WESTON	R04B003	2	1A	7.4	1A	8.3	1A	19.1	1B	74.7	2	6.1	1B	0.343	1A	0.010	1A	12.2	1A	7.2	1A	18.3
OTTER	PENNY BRIDGES	R04B019	1B	1A	7.6	1A	8.4	1A	19.9	1A	81.1	1B	4.1	1A	0.275	1A	0.010	1A	8.3	-	-	-	-
OTTER	B3176 BRIDGE OTTERY ST MARY	R04B004	2	1A	7.5	1A	8.3	1A	18.7	1A	80.8	2	5.1	1A	0.291	1A	0.010	1A	10.5	-	-	-	-
OTTER	TIPTON ST JOHN	R04B005	1B	1A	7.5	1A	8.2	1A	18.1	1A	84.9	1B	4.9	1B	0.312	1A	0.010	1A	14.2	-	-	-	-
OTTER	DOTTON MILL	R04B006	1B	1A	7.6	1A	8.3	1A	18.6	1B	79.9	1B	4.8	1B	0.331	1A	0.010	1A	14.7	1A	12.1	1A	17.6
OTTER	OTTERTON	R04B007	1B	1A	7.5	1A	8.3	1A	19.0	1B	74.0	1B	4.5	1B	0.330	1A	0.010	1A	14.1	-	-	-	-
KNOWLE BROOK	SQUABMOOR RESERVOIR	R04B041	1A	1A	6.5	1A	7.0	1A	18.0	1A	85.0	1A	2.0	1A	0.040	-	0.000	1A	4.0	-	-	-	-
BUDLEIGH BROOK	YETTINGTON	R04B034	1A	1A	6.3	1A	6.9	1A	17.0	1A	87.1	1A	2.7	1A	0.109	1A	0.010	1A	10.8	-	-	-	-
COLATON RALEIGH STREAM	POPHAYES	R04B032	2	1A	7.0	1A	8.0	1A	16.0	1B	75.0	2	8.6	1B	0.340	1A	0.010	1A	17.7	-	-	-	-
METCOMBE BROOK	METCOMBE	R04B028	1B	1A	7.2	1A	8.0	1A	16.0	1B	79.3	1B	3.1	1A	0.088	1A	0.010	1A	6.9	-	-	-	-
FLUXTON STREAM	FLUXTON	R04B027	1B	1A	7.4	1A	7.9	1A	15.0	1A	84.1	1B	3.2	1B	0.443	1A	0.010	1A	12.4	-	-	-	-
WEST HILL STREAM	SALSTON BARTON	R04B026	3	1A	6.8	1A	7.4	1A	18.4	1A	83.2	1B	4.9	1A	0.300	1A	0.010	3	36.8	-	-	-	-
TALE	DANES MILL	R04B008	1B	1A	7.4	1A	8.1	1A	18.0	1B	79.9	1B	4.2	1A	0.300	1A	0.010	1A	9.8	-	-	-	-
TALE	TALEFORD	R04B009	1B	1A	7.4	1A	8.0	1A	18.2	1B	74.0	1B	3.4	1B	0.394	1A	0.010	1A	11.2	1A	7.0	1A	12.0
VINE WATER	FENITON	R04B025	3	1A	7.4	1A	8.0	1A	17.8	2	46.4	2	6.6	3	2.004	1A	0.020	1A	15.7	-	-	-	-
GITTISHAM STREAM	BELOW POMEREY	R04B024	2	1A	7.7	1A	8.2	1A	17.9	1B	64.1	2	7.2	1A	0.159	1A	0.010	1A	11.1	-	-	-	-
WOLF	GOLFORD	R04B037	2	1A	7.5	1A	8.1	1A	17.4	1B	79.3	2	7.4	2	0.919	1A	0.010	1A	9.6	-	-	-	-
WOLF	WINNIFORD FARM	R04B011	1B	1A	7.5	1A	8.2	1A	18.1	1B	71.9	1B	4.6	1B	0.441	1A	0.010	1A	11.7	1A	7.0	1A	21.1
GISSAGE	PRIOR TO RIVER OTTER	R04B023	4	1A	7.4	1A	8.3	1A	17.4	3	12.1	4	21.3	1A	0.130	1A	0.010	1A	17.8	-	-	-	-
COMBE RALEIGH STREAM	LONGWOOD	R04B022	2	1A	7.6	1A	8.4	1A	20.3	1A	82.0	1B	4.6	2	1.034	1A	0.010	1A	17.2	-	-	-	-
WICK STREAM	BARN FARM	R04B036	1B	1A	7.0	1A	8.0	1A	18.3	1B	60.1	1A	2.8	1B	0.531	1A	0.010	1A	6.8	-	-	-	-
WICK STREAM	MILL HOUSE NURSERY	R04B010	1B	1A	7.5	1A	8.1	1A	18.0	1B	78.0	1B	3.3	1A	0.214	1A	0.010	1A	10.0	1A	6.0	1A	16.4
COLE BROOK	SPURNHAM FARM	R04B021	1B	1A	6.6	1A	8.6	1A	20.8	1A	87.1	1B	3.7	1B	0.607	1A	0.010	1A	17.6	-	-	-	-
FAIROAK STREAM	UPOTTERY	R04B020	1B	1A	6.8	1A	7.7	1A	20.7	1A	96.2	1B	3.3	1B	0.675	1A	0.010	1A	3.8	-	-	-	-

Appendix 10.7

Otter 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 : OTTER (04)

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
OTTER	HOMORE FARM	R04B001	57	-	57	-	57	-	57	-	57	-	57	-	55	-	57	2	0	-	0	-
OTTER	RAWRIDGE	R04B042	18	-	18	-	18	-	18	-	18	-	18	-	18	-	18	-	1	-	1	-
OTTER	HONITON	R04B035	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	1	0	-	0	-
OTTER	CLAPPERLANE BRIDGE	R04B002	58	-	58	1	57	-	57	4	58	6	58	2	55	-	58	4	0	-	0	-
OTTER	COTTARSON FARM	R04B014	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	1	20	-	20	-
OTTER	WESTON	R04B003	58	-	58	-	58	-	57	-	58	4	58	-	58	-	58	4	58	-	58	-
OTTER	PENNY BRIDGES	R04B019	20	-	20	-	20	-	20	-	20	3	20	-	20	-	20	1	0	-	0	-
OTTER	A3176 BRIDGE OTTERY ST MARY	R04B004	57	-	57	-	57	-	57	2	56	8	57	1	52	-	57	6	0	-	0	-
OTTER	TIPTON ST JOHN	R04B005	56	-	56	-	56	-	56	-	56	1	56	-	56	-	56	5	0	-	0	-
OTTER	COTTON MILL	R04B006	78	-	78	-	77	1	77	1	78	2	78	-	72	-	78	7	78	-	78	-
OTTER	OTTERTON	R04B007	59	-	59	-	59	1	59	1	59	2	59	-	56	-	59	5	2	-	2	-
KNOWLE BROOK	SQUABMOOR RESERVOIR	R04B041	12	-	12	-	12	-	12	-	12	-	12	-	9	-	12	-	12	-	12	-
BUDLEIGH BROOK	YETTINGTON	R04B034	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	1	0	-	0	-
COLATON RALEIGH STREAM	FORWAYES	R04B032	19	-	19	-	19	-	19	-	19	1	19	-	19	-	19	2	0	-	0	-
METCOMBE BROOK	METCOMBE	R04B028	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	1	0	-	0	-
FLUXTON STREAM	FLUXTON	R04B027	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	1	0	-	0	-
WEST HILL STREAM	SALSTON FARTON	R04B026	20	-	20	-	20	-	20	-	20	-	20	-	20	-	20	4	0	-	0	-
TALE	DINES MILL	R04B008	59	-	59	-	59	-	59	-	59	-	59	-	57	-	59	5	0	-	0	-
TALE	TALEFORD	R04B009	57	-	57	-	56	-	56	1	57	-	57	1	56	-	57	5	57	-	57	-
VINE WATER	FENITON	R04B025	20	-	20	-	20	-	20	7	20	3	20	2	20	-	20	4	0	-	0	-
GITTISHAM STREAM	BELOW FOMEROY	R04B024	20	-	20	-	20	-	20	1	20	2	20	-	20	-	20	-	0	-	0	-
WOLF	GODFORD	R04B037	20	-	20	-	20	-	20	-	20	1	20	1	20	-	20	2	0	-	0	-
WOLF	MONKFORD FARM	R04B011	58	-	58	-	58	-	58	1	58	2	58	-	58	-	58	5	57	-	57	-
GISSAGE	PRIOR TO RIVER OTTER	R04B023	20	-	20	-	20	-	20	1	20	2	20	-	19	-	20	1	0	-	0	-
COMBE RALEIGH STREAM	LONGWOOD	R04B022	20	-	20	-	20	-	20	-	20	-	20	2	20	-	20	3	0	-	0	-
MICK STREAM	BARN FARM	R04B036	20	-	20	-	20	-	20	1	20	-	20	1	20	-	20	-	0	-	0	-
MICK STREAM	MILL HOUSE NURSERY	R04B010	58	-	58	-	58	-	58	5	58	3	58	1	57	-	58	3	58	-	58	-
COLE BROOK	SPURHAM FARM	R04B021	20	-	20	-	20	-	20	-	20	1	20	1	20	-	20	3	0	-	0	-
FAIRONK STREAM	UPOTTERY	R04B020	20	-	20	-	20	-	20	-	20	2	20	2	20	-	20	1	0	-	0	-

Appendix 10.9

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
1990 RIVER WATER QUALITY CLASSIFICATION
PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
CATCHMENT : OTTER (04)

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
OTTER	HOEMORE FARM	R04B001	-	-	-	-	-	-	-	-	-	-
OTTER	RAWRIDGE	R04B042	-	-	-	-	-	-	-	-	-	-
OTTER	MONKTON	R04B035	-	-	-	-	-	-	-	-	-	-
OTTER	CLAPPERLANE BRIDGE	R04B002	-	-	-	5	60	-	-	-	-	-
OTTER	COTTARSON FARM	R04B014	-	-	-	-	-	-	-	-	-	-
OTTER	WESTON	R04B003	-	-	-	-	23	-	-	-	-	-
OTTER	FENNY BRIDGES	R04B019	-	-	-	-	36	-	-	-	-	-
OTTER	B3176 BRIDGE OTTERY ST MARY	R04B004	-	-	-	-	72	-	-	-	-	-
OTTER	TIPTON ST JOHN	R04B005	-	-	-	-	-	-	-	-	-	-
OTTER	DOTTON MILL	R04B006	-	-	-	-	-	-	-	-	-	-
OTTER	OTTERTON	R04B007	-	-	-	-	-	-	-	-	-	-
KNOWLE BROOK	SQUABMOOR RESERVOIR	R04B041	-	-	-	-	-	-	-	-	-	-
BUDLEIGH BROOK	YETTINGTON	R04B034	-	-	-	-	-	-	-	-	-	-
COLATON RALEIGH STREAM	POPHAYES	R04B032	-	-	-	-	72	-	-	-	-	-
METCOMBE BROOK	METCOMBE	R04B028	-	-	-	-	-	-	-	-	-	-
FLUXTON STREAM	FLUXTON	R04B027	-	-	-	-	-	-	-	-	-	-
WEST HILL STREAM	SALSTON BARTON	R04B026	-	-	-	-	-	-	-	47	-	-
TALE	DANES MILL	R04B008	-	-	-	-	-	-	-	-	-	-
TALE	TALEFORD	R04B009	-	-	-	-	-	-	-	-	-	-
VINE WATER	FENITON	R04B025	-	-	-	42	121	546	-	-	-	-
GITTISHAM STREAM	BELOW POMEREY	R04B024	-	-	-	20	140	-	-	-	-	-
WOLF	GODFORD	R04B037	-	-	-	-	49	31	-	-	-	-
WOLF	WINNIFORD FARM	R04B011	-	-	-	-	-	-	-	-	-	-
GISSAGE	PRIOR TO RIVER OTTER	R04B023	-	-	-	80	325	-	-	-	-	-
COMBE RALEIGH STREAM	LONGWOOD	R04B022	-	-	-	-	-	48	-	-	-	-
WICK STREAM	BARN FARM	R04B036	-	-	-	25	-	71	-	-	-	-
WICK STREAM	MILL HOUSE NURSERY	R04B010	-	-	-	3	11	-	-	-	-	-
ODLE BROOK	SPURTHAM FARM	R04B021	-	-	-	-	25	96	-	-	-	-
FAIROAK STREAM	UPOTTERY	R04B020	-	-	-	-	10	118	-	-	-	-

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
IDENTIFICATION OF POSSIBLE CAUSES OF NON-COMPLIANCE WITH RQO
CATCHMENT : OTTER (04)

* = WORK ALREADY IN HAND

1990 Map Position Number	River	Reach upstream of	User Reference Number
4	OTTER	CLAPPERLANE BRIDGE	R04B002
6	OTTER	WESTON	R04B003
7	OTTER	FENNY BRIDGES	R04B019
8	OTTER	B3176 BRIDGE OTTERY ST MARY	R04B004
14	COLATON RALEIGH STREAM	POPHAYES	R04B032
17	WEST HILL STREAM	SALSTON BARTON	R04B026
20	VINE WATER	FENITON	R04B025
21	GITTISHAM STREAM	BELOW POMEREY	R04B024
22	WOLF	GODFORD	R04B037
24	GISSAGE	PRIOR TO RIVER OTTER	R04B023
25	COMBE RALEIGH STREAM	LONGWOOD	R04B022
26	WICK STREAM	BARN FARM	R04B036
27	WICK STREAM	MILL HOUSE NURSERY	R04B010
28	ODLE BROOK	* SPURTHAM FARM	R04B021
29	FAIROAK STREAM	UPOTTERY	R04B020

Reach Length (km)	Possible causes of non-compliance
3.1	UP-STREAM ABSTRACTIONS, PAST ABBATOIR DISCHARGES
1.2	SEWAGE TREATMENT WORKS, INDUSTRIAL DISCHARGES, 2 POOR QUALITY UP-STREAM TRIBUTARIES
3.8	SEWAGE TREATMENT WORKS
3.8	UP-STREAM ABSTRACTIONS, FARMING ACTIVITIES
4.3	DROUGHT, FARMING ACTIVITIES
2.7	DROUGHT, QUARRYING
4.0	DROUGHT, SEWAGE TREATMENT WORKS, HISTORIC FARMING ACTIVITIES
2.7	SEWAGE TREATMENT WORKS
3.6	FARM DRAINAGE
5.9	CULVERTING, EUTROPHICATION
2.7	FARMING ACTIVITIES, SEWAGE TREATEMENT WORKS, SEPTIC TANKS
4.5	FARMING ACTIVITIES, SEPTIC TANKS
2.7	FARMING ACTIVITIES
1.3	DROUGHT, FARMING ACTIVITIES, EUTROPHICATION
2.5	FARMING ACTIVITIES