

Environmental Protection Report

Red River Catchment River Water Quality Classification 1991

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Author: B L Milford
Water Quality Planner



NRA

National Rivers Authority

South West Region

C V M Davies
Environmental Protection Manager

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

Further enquiries regarding the content of these reports should be addressed to:

Freshwater Officer,
National Rivers Authority,
Manley House,
Kestrel Way,
EXETER,
Devon EX2 7LQ



RIVER WATER QUALITY IN THE RED RIVER CATCHMENT

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**National Rivers Authority
South West Region**



NRA

*National Rivers Authority
South West Region*

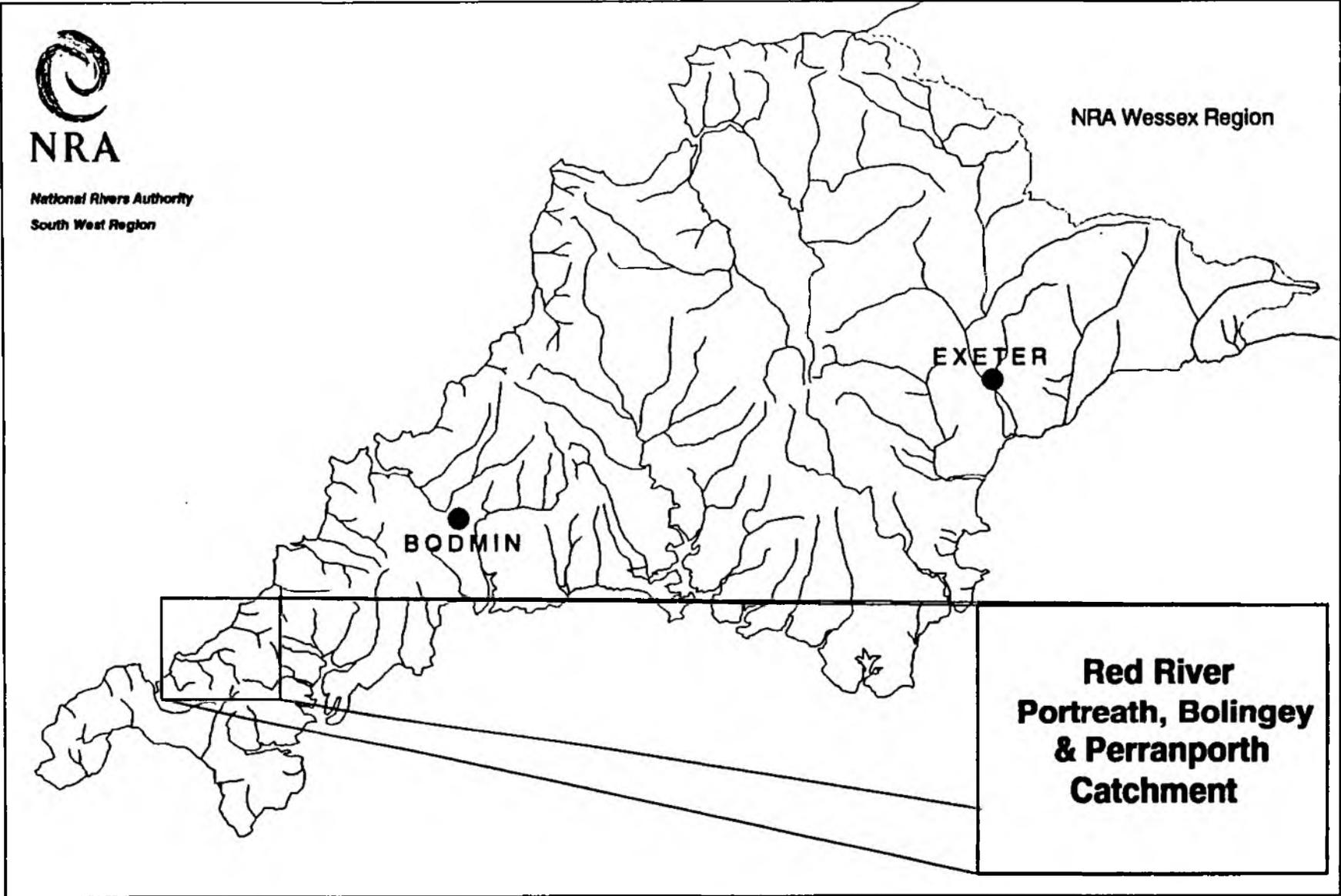
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**Red River
Portreath, Bolingey
& Perranporth
Catchment**

Red River, Portreath, Bolingey & Perranporth Catchment



1. INTRODUCTION

Monitoring to assess the quality of river waters is undertaken in thirty-four 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.

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), (7.1).

This report presents the river water quality classification for 1991 for monitored river reaches in the River Red River catchment.

2. RED RIVER, PORTREATH, BOLINGEY AND PERRANPORTH CATCHMENT

The Red River flows over a distance of 13.1 km from its source to the tidal limit, (Appendix 8.1). Water quality was monitored at five locations on the main river. Four of these sites were sampled at approximately monthly intervals and the site at Gwithian Towans, which is a National Water Quality monitoring site, was sampled fortnightly.

The Portreath Stream and the St. Agnes Stream flow over a distance of 8.4 km and 2.2 km respectively from their source to the tidal limit, (Appendix 8.1) and were each monitored at one site at approximately monthly intervals.

The Porthtowan Stream flows over a distance of 4.1 km from its source to the tidal limit, (Appendix 8.1) and was monitored at two sites at approximately monthly intervals.

Perranporth Stream flows over a distance of 7.5 km from its source to the tidal limit, (Appendix 8.1) and was monitored at three sites at approximately monthly intervals.

The Trevellas Stream and Porth Joke Stream flow over a distance of 4.6 km and 5.3 km respectively from their source to the tidal limits, (Appendix 8.1) and were both monitored at one site at approximately monthly intervals.

Bolingey Stream flows over a distance of 8.3 km from its source to the tidal limit, (Appendix 8.1) and was monitored at two sites at approximately monthly intervals.

The Holywell Stream flows over a distance of 9.2 km from its source to the tidal limit, (Appendix 8.1) and was monitored at two locations at approximately monthly intervals.

Throughout the Red River, Portreath, Bolingey and Perranporth catchment two secondary tributaries and two tertiary tributaries of the Red River, one secondary tributary of the Portreath Stream and one secondary tributary of the Porthtowan Stream were monitored. In addition Cargenwen No. 1 Reservoir was monitored at one site at approximately monthly intervals.

2.1 SECONDARY TRIBUTARIES

The Roseworthy Stream flows over a distance of 9.2 km from its source to the confluence with the Red River, (Appendix 8.1) and was monitored at three locations at approximately monthly intervals.

The Tehidy Stream flows over a distance of 7.1 km from its source to the confluence with the Red River, (Appendix 8.1) and was monitored at three locations at approximately monthly intervals.

The Redruth Stream flows over a distance of 5.5 km from its source to the confluence with the Portreath Stream, (Appendix 8.1) and was monitored at one site at approximately monthly intervals.

The Menagissey Stream flows over a distance of 2.3 km from its source to the confluence with Porthtowan Stream, (Appendix 8.1) and was monitored at one site at approximately monthly intervals.

2.2 TERTIARY TRIBUTARIES

The Praze River and Reen Stream flow over a distance of 6.7 km and 4.2 km respectively from their source to the confluence with the Roseworthy Stream, (Appendix 8.1). The Praze River was monitored at two locations, at approximately monthly intervals. Reen Stream was monitored at one site located in the lower reaches at approximately monthly intervals.

Each sample was analysed for a minimum number of determinands (Appendix 8.2) 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 Resources Act Register, (7.2).

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 Red River catchment are identified in Appendix 8.1.

3.2 River Quality Classification

River water quality is classified using the National Water Council's (NWC) River Classification System (see Appendix 8.3), 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

<u>Class</u>	<u>Description</u>
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 8.4 and 8.4.1.

The quality classification system incorporates some of the European Inland Fisheries Advisory Commission (EIFAC) criteria (Appendix 8.3) recommended for use by the NWC system.

4. 1991 RIVER WATER QUALITY CLASSIFICATION

Analytical data collected from monitoring during 1989, 1990 and 1991 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 8.5.

The quality class for 1991 can be compared against the appropriate River Quality Objective and previous annual quality classes (1985-1990) also based on three years combined data, for each river reach in Appendix 8.5.

The river water classification system used to classify each river length is identical to the system used both in 1985 and 1990 for the Department of the Environment's Quinquennial River Quality Surveys. The determinand classification criteria used to determine the annual quality classes in 1985, subsequent years and for 1991 are indicated in Appendices 8.4 and 8.4.1.

The river quality classes for 1991 of monitored river reaches in the catchment are shown in map form in Appendix 8.6.

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 8.7.

5. 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 8.8.

Appendix 8.9 indicates the number of samples analysed for each determinand over the period 1989 to 1991 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 the relevant quality standard (represented as a percentage), is indicated in Appendix 8.10.

6. GLOSSARY OF TERMS

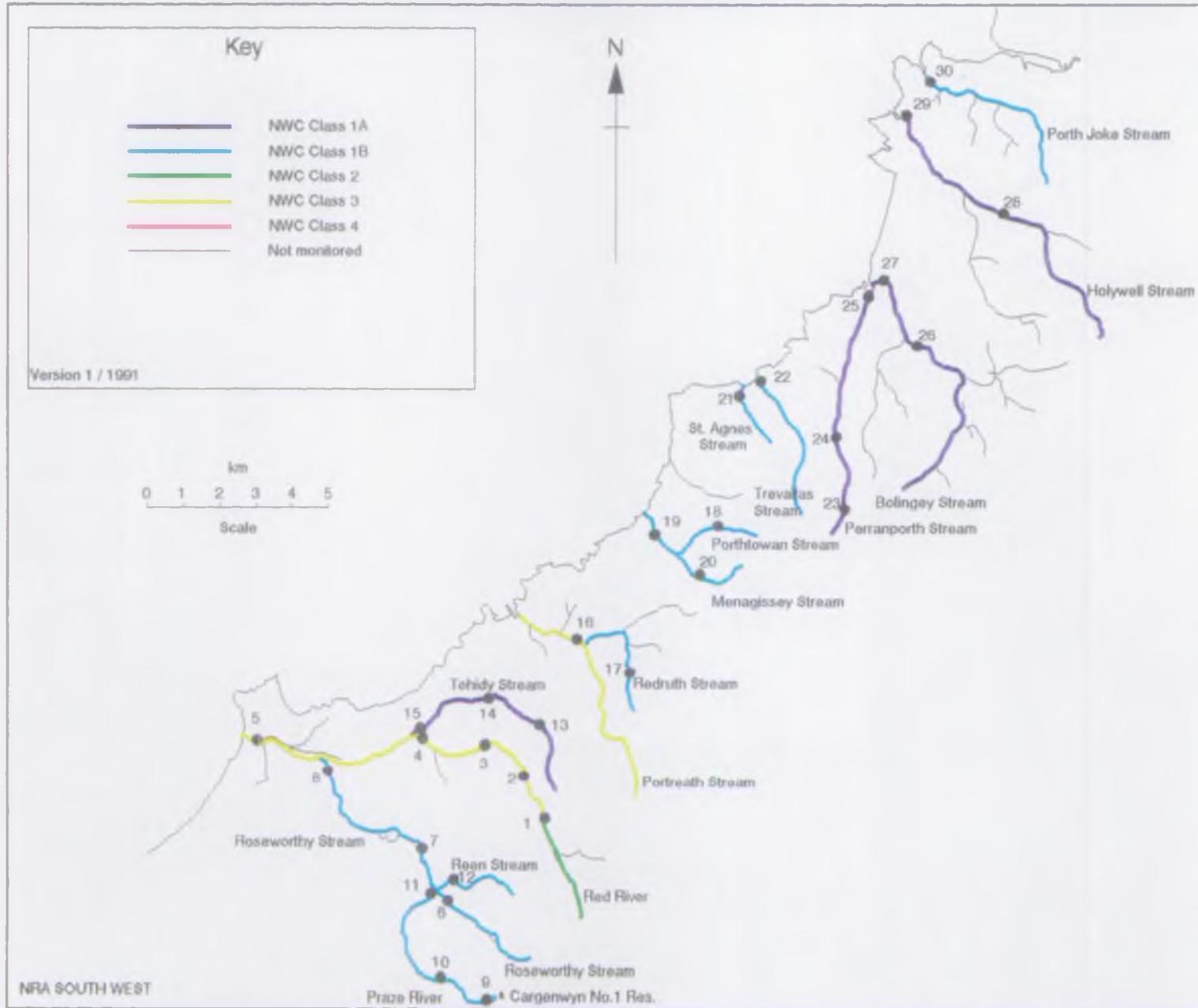
RIVER REACH	A segment of water, upstream from sampling point to the next sampling point.
RIVER LENGTH	River distance in kilometres.
RIVER QUALITY OBJECTIVE	That NWC class, which protects the most sensitive use of the water.
95 percentiles	Maximum limits, which must be met for at least 95% of the time.
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.

7. REFERENCES

Reference

- 7.1 National Water Council (1977). River Water Quality: The Next Stage. Review of Discharge Consent Conditions. London.
- 7.2 Water Resources Act 1991 Section 190.
- 7.3 Alabaster J. S. and Lloyd R. Water Quality Criteria for Freshwater Fish, 2nd edition, 1982. Butterworths.

Red River, Portreath, Bolingey & Perranporth Catchments 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

MWC RIVER QUALITY CLASSIFICATION SYSTEM

River Class	Quality criteria	Remarks	Current potential uses
Class limiting criteria (95 percentile)			
1A Good Quality	<ul style="list-style-type: none"> (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) 	<ul style="list-style-type: none"> (i) Average BOD probably not greater than 1.5 mg/l (ii) Visible evidence of pollution should be absent 	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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) 	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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) 	<ul style="list-style-type: none"> (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 	<ul style="list-style-type: none"> (i) Waters suitable for potable supply after advanced treatment (ii) Supporting reasonably good coarse fisheries (iii) Moderate amenity value

3 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

4 Bad
Quality

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

- 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 CaCO ₃	Statistic	Soluble Copper*	
		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 CaCO ₃	Statistic	Total Zinc		
		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
 1991 RIVER WATER QUALITY CLASSIFICATION
 CATCHMENT: RED

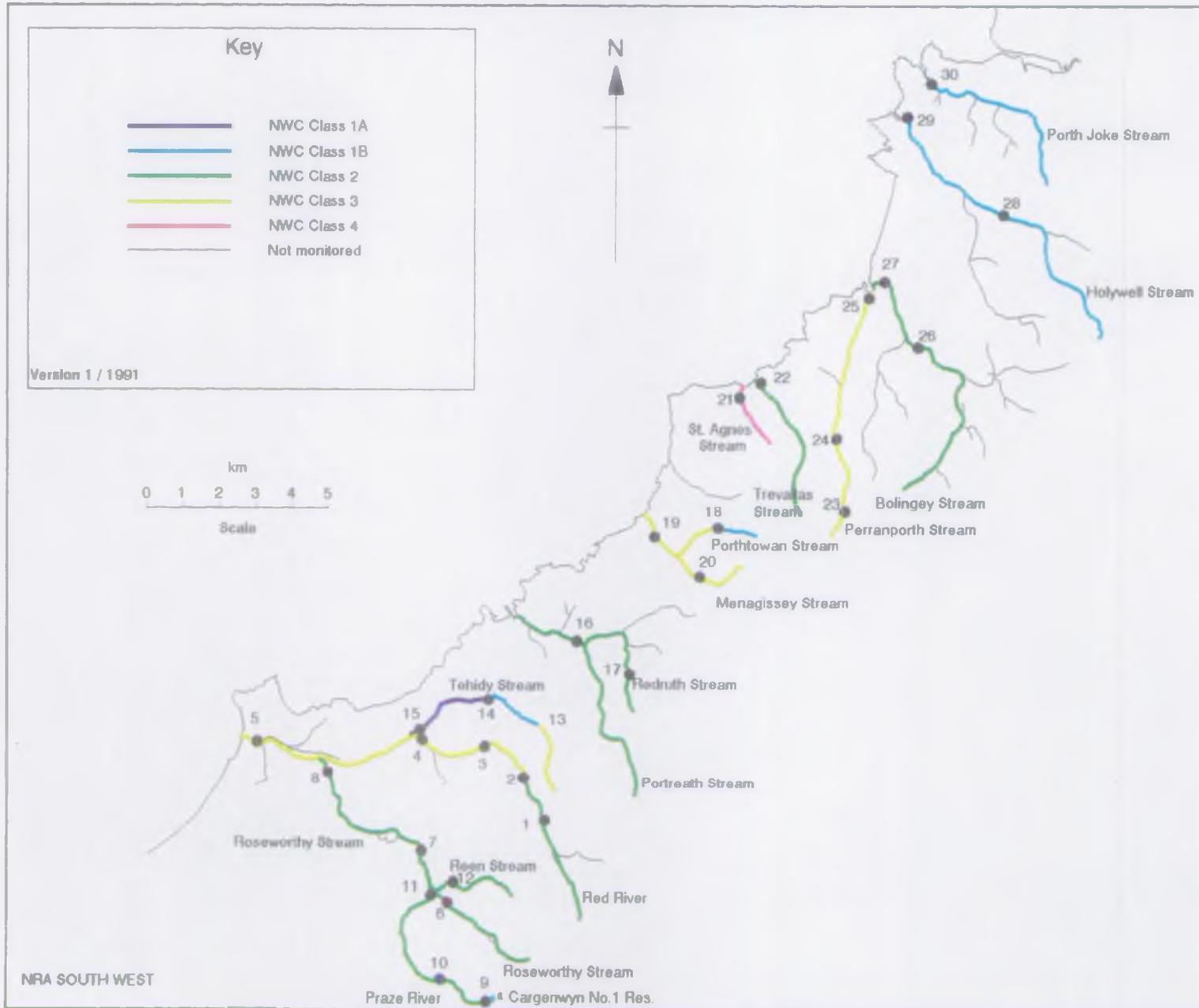
1991 Map Position Number	River	Reach upstream of	User Reference Number	National Grid Reference	Reach Length (km)	Distance from source (km)	River Quality Objective	85 NWC Class	86 NWC Class	87 NWC Class	88 NWC Class	89 NWC Class	90 NWC Class	91 NWC Class
1	RED RIVER	ABOVE BREA TIN WORKS	R23A001	SW 6690 3930	2.0	2.0	2	1B	1B	2	2	2	2	2
2	RED RIVER	ABOVE SOUTH CROFTY MINE	R23A002	SW 6613 4090	1.9	3.9	3	4	4	3	2	2	2	2
3	RED RIVER	ROSCROGGAN BRIDGE	R23A003	SW 6502 4201	1.7	5.6	3	4	4	3	2	3	3	3
4	RED RIVER	KIEVE BRIDGE	R23A005	SW 6293 4230	2.3	7.9	3	4	4	3	2	3	3	3
5	RED RIVER	GWITHIAN TOWNS	R23A006	SW 5825 4222	5.2	13.1	3	4	4	3	2	3	3	3
6	ROSEWORTHY STREAM	BOTETOE BRIDGE	R23A038	SW 6413 3774	3.0	3.0	1B	1A	2	2	2	2	2	2
7	ROSEWORTHY STREAM	PENPONDS	R23A008	SW 6302 3908	1.8	4.8	1B	1B	2	2	2	2	2	2
8	ROSEWORTHY STREAM	NANCEMELLIN	R23A009	SW 6062 4107	3.8	8.6	1B	1B	2	2	2	2	1A	2
	ROSEWORTHY STREAM	RED R. CONFLUENCE (INFERRED STRETCH)			0.6	9.2	1B	1B	2	2	2	2	1A	2
9	PRAZE RIVER	INFLOW, CARGENWYN RES. (UNMON. STRETCH)			0.4	0.4	1B	1B					U	U
	PRAZE RIVER	CARGENWYN NO.1 RESERVOIR	R23A050	SW 6508 3521	0.3	0.7	1B	1B					1B	1B
10	PRAZE RIVER	PRAZE	R23A045	SW 6400 3563	1.3	2.0	1B	1B					2	2
11	PRAZE RIVER	BARRIPPER	R23A037	SW 6330 3819	3.8	5.8	1B	1B					1B	2
	PRAZE RIVER	ROSEWORTHY STREAM CONFL. (INF. STRETCH)			0.9	6.7	1B	1B					1B	2
12	REEN STREAM	RAMSGATE	R23A007	SW 6416 3849	3.4	3.4	1B	2	2	2	2	2	2	2
	REEN STREAM	ROSEWORTHY STREAM CONFL. (INF. STRETCH)			0.8	4.2	1B	2	2	2	2	2	2	2
13	TEHIDY STREAM	TOLVADDON BRIDGE	R23A042	SW 6637 4217	2.8	2.8	1B	1B	1B	1B	1A	1A	3	3
14	TEHIDY STREAM	OLD MERROSE	R23A041	SW 6510 4327	1.8	4.6	1A	1B	1B	1B	1A	1A	1B	1B
15	TEHIDY STREAM	COOMBE	R23A017	SW 6299 4240	2.4	7.0	1A	1B	1B	1B	1A	1A	1A	1A
	TEHIDY STREAM	RED R. CONFLUENCE (INFERRED STRETCH)			0.1	7.1	1A	1B	1B	1B	1A	1A	1A	1A
16	PORTREATH STREAM	BRIDGE BELOW CAMBROSE	R23A015	SW 6739 4485	6.2	6.2	3	3	3	2	2	2	2	2
	PORTREATH STREAM	MEAN HIGH WATER (INFERRED STRETCH)			2.2	8.4	3	3	3	2	2	2	2	2
17	REDRUTH STREAM	NORTH COUNTRY BRIDGE	R23A014	SW 6896 4386	3.1	3.1	1B	3	3	2	2	3	3	2
	REDRUTH STREAM	PORTREATH STREAM CONFL. (INF. STRETCH)			2.4	5.5	1B	3	3	2	2	3	3	2
18	PORHTTOWAN STREAM	MOUNT HAWKE	R23A043	SW 7142 4795	0.8	0.8	1B	3	3			4	1B	1B
19	PORHTTOWAN STREAM	PORHTTOWAN BRIDGE	R23A013	SW 6950 4747	2.6	3.4	1B	3	3			4	3	3
	PORHTTOWAN STREAM	NORMAL TIDAL LIMIT (INFERRED STRETCH)			0.7	4.1	1B	3	3			4	3	3
20	MENAGISSEY STREAM	MENAGISSEY BRIDGE	R23A052	SW 7101 4626	1.0	1.0	1B						3	3
	MENAGISSEY STREAM	PORHTTOWAN STREAM CONFL. (INF. STRETCH)			1.3	2.3	1B						3	3
21	ST AGNES STREAM	PRIOR TO CULVERT ST AGNES	R23A016	SW 7217 5138	2.0	2.0	1B	1B	1B			1A	4	4
	ST AGNES STREAM	MEAN HIGH WATER (INFERRED STRETCH)			0.2	2.2	1B	1B	1B			1A	4	4
22	TREVELLAS STREAM	ABOVE TREVAUNANCE COVE	R23A051	SW 7280 5172	4.3	4.3	1B	3					2	2
	TREVELLAS STREAM	MEAN HIGH WATER (INFERRED STRETCH)			0.3	4.6	1B	3					2	2
23	PERRANPORTH STREAM	SILVERWELL	R23A046	SW 7473 4775	0.3	0.3	1A	1B	2	2	2	3	N	3

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 1991 RIVER WATER QUALITY CLASSIFICATION
 CATCHMENT: RED

1991 Map Position Number	River	Reach upstream of	User Reference Number	National Grid Reference
24	PERRANPORTH STREAM	MITHIAN	R23A047	SW 7467 5060
25	PERRANPORTH STREAM PERRANPORTH STREAM	PLEASURE GARDENS PERRANPORTH NORMAL TIDAL LIMIT (INFERRED STRETCH)	R23A012	SW 7560 5407
26	BOLINGEY STREAM	PERRANWELL	R23A048	SW 7685 5286
27	BOLINGEY STREAM BOLINGEY STREAM	PONSMERE BRIDGE NORMAL TIDAL LIMIT (INFERRED STRETCH)	R23A011	SW 7602 5443
28	HOLYWELL STREAM	TRELASKE	R23A049	SW 7893 5681
29	HOLYWELL STREAM HOLYWELL STREAM	HOLYWELL BAY BRIDGE NORMAL TIDAL LIMIT (INFERRED STRETCH)	R23A010	SW 7673 5885
30	PORTH JOKE STREAM PORTH JOKE STREAM	PRIOR TO BEACH NORMAL TIDAL LIMIT (INFERRED STRETCH)	R23A061	SW 7736 6028

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	91 RWC Class
3.1	3.4	1A	1B	2	2	2	3	3	3
3.8	7.2	1A	1B	2	2	2	3	3	3
0.3	7.5	1A	1B	2	2	2	3	3	3
6.0	6.0	1A	2	2			2	2	2
1.9	7.9	1A	2	2			2	2	2
0.4	8.3	1A	2	2			2	2	2
5.5	5.5	1A	1B	1A	1B	1B	2	1B	1B
3.4	8.9	1A	1B	1A	1B	1B	2	1B	1B
0.3	9.2	1A	1B	1A	1B	1B	2	1B	1B
5.1	5.1	1B	1B					1B	1B
0.2	5.3	1B	1B					1B	1B

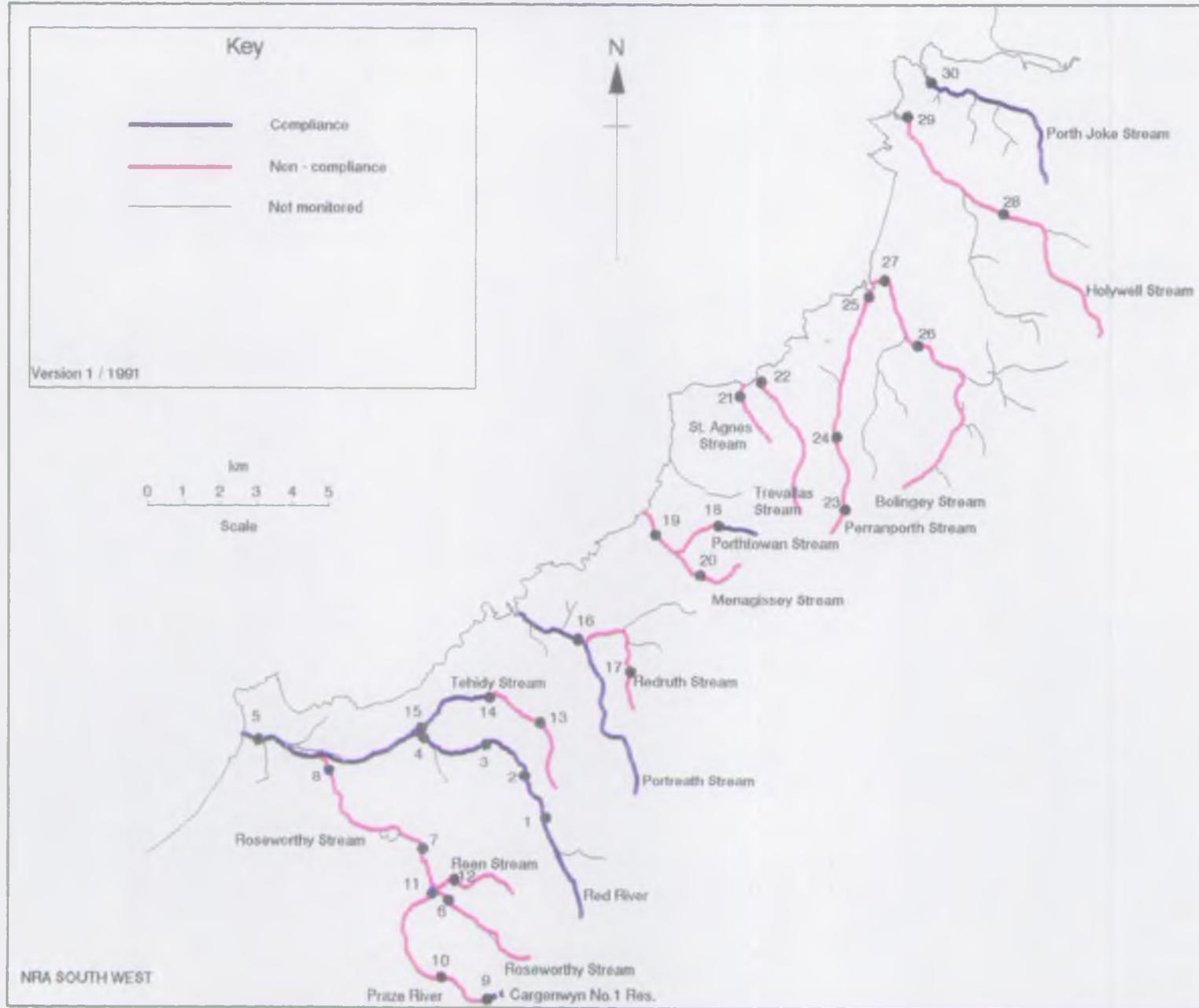
Red River, Portreath, Bolingey & Perranporth Catchments Water Quality - 1991



FEDERAL RIVERS AUTHORITY - SOUTH WEST REGION
 1991 RIVER WATER QUALITY CLASSIFICATION
 CALCULATED DETERMINAND STATISTICS USED FOR QUALITY ASSESSMENT
 CRITERION: RED

River	Reach upstream of	User Ref. Number	RQD	Calculated Determinand Statistics used for Quality Assessment																			
				pH Lower Class	pH Upper Class	Temperature Class	DO (%) Class	BOD (ATU) Class	Total Ammonia Class	Urdon. Ammonia Class	S.Solids Class	Total Copper Class	Total Zinc Class										
RED RIVER	ABOVE BREA TIN WORKS	R23A001	2	1A	5.8	1A	7.5	1A	17.1	1B	77.3	1A	3.0	1A	0.135	1A	0.010	1A	5.2	2	41.3	1A	75.5
RED RIVER	ABOVE SOUTH CHOFTY MINE	R23A002	3	1A	6.6	1A	7.6	1A	19.0	1A	81.2	1A	2.1	1A	0.080	1A	0.010	1A	4.6	2	182.2	1A	115.4
RED RIVER	ROSCROGAN BRIDGE	R23A003	3	1A	6.5	3	9.1	1A	21.0	1A	82.5	2	7.0	2	1.010	3	0.031	3	46.9	2	1527.0	3	11194.5
RED RIVER	KIEVE BRIDGE	R23A005	3	1A	6.9	1A	7.6	1A	18.7	1B	77.3	1A	2.1	1B	0.554	1A	0.010	1A	17.3	2	311.1	3	3387.5
RED RIVER	GNEITHAN TOWNS	R23A006	3	1A	6.7	1A	7.9	1A	17.7	1A	81.0	1A	2.3	1A	0.270	1A	0.010	1A	23.0	2	131.2	3	2268.0
ROSEBOROUGH STREAM	BODEICE BRIDGE	R23A038	1B	1A	6.5	1A	7.5	1A	16.3	2	59.5	1A	1.9	1A	0.042	1A	0.010	1A	3.8	2	99.0	2	348.0
ROSEBOROUGH STREAM	PENFONDS	R23A008	1B	1A	6.7	1A	7.8	1A	16.9	1B	77.5	1A	2.2	1A	0.195	1A	0.010	1A	9.7	2	101.7	1A	209.5
ROSEBOROUGH STREAM	NANCHELLIN	R23A009	1B	1A	6.8	1A	7.8	1A	16.4	1B	74.8	1A	1.9	1A	0.132	1A	0.010	1A	9.7	1A	48.3	2	1012.5
PRAZE RIVER	CARGENMEN NO.1 RESERVOIR	R23A050	1B	1A	6.8	1A	8.6	1A	20.6	1B	72.4	1A	2.8	1A	0.211	1A	0.010	1A	3.1	1A	21.5	1A	142.8
PRAZE RIVER	PRAZE	R23A045	1B	1A	6.3	1A	7.4	1A	16.8	1B	68.3	2	5.2	1B	0.363	1A	0.010	1A	7.6	1A	18.8	1A	48.0
PRAZE RIVER	BARROPPER	R23A037	1B	1A	6.5	1A	7.4	1A	16.7	1B	73.0	1A	2.8	1B	0.384	1A	0.010	1A	5.1	2	40.5	1A	186.3
REIN STREAM	RAMEGROE	R23A007	1B	1A	6.4	1A	7.6	1A	16.0	1B	76.2	1A	2.2	1A	0.078	1A	0.010	1A	2.3	2	80.7	1A	207.2
TEHILLY STREAM	TOLLATION BRIDGE	R23A042	1B	1A	7.0	1A	7.7	1A	17.3	1B	78.8	3	10.6	1B	0.413	1A	0.010	1A	10.7	2	51.0	1A	93.0
TEHILLY STREAM	OLD MERROSE	R23A041	1A	1A	6.9	1A	7.5	1A	17.4	1B	74.3	1A	2.6	1A	0.053	1A	0.010	1A	8.1	1A	49.0	1A	150.0
TEHILLY STREAM	COOME	R23A017	1A	1A	7.3	1A	7.9	1A	16.8	1A	83.3	1A	2.0	1A	0.153	1A	0.010	1A	4.5	1A	32.7	1A	67.8
FORTHBRUSH STREAM	BRIDGE BELOW CMBERGE	R23A015	3	1A	7.0	1A	7.7	1A	15.3	1A	81.3	1B	3.1	1A	0.254	1A	0.010	1A	9.5	2	328.8	2	674.0
FORTHBRUSH STREAM	NORTH COUNTRY BRIDGE	R23A014	1B	1A	6.6	1A	7.5	1A	14.2	1B	78.6	2	5.7	1A	0.108	1A	0.010	1A	7.5	2	380.2	2	832.0
FORTHDOWN STREAM	MOUNT HAWKE	R23A043	1B	1A	7.0	1A	7.8	1A	15.6	1A	85.0	1B	3.4	1B	0.430	1A	0.010	1A	12.0	1A	30.0	1A	374.0
FORTHDOWN STREAM	FORTHDOWN BRIDGE	R23A013	1B	1A	5.9	1A	7.3	1A	16.0	3	34.7	2	8.4	3	3.348	1A	0.010	1A	7.4	2	678.0	3	3372.0
FORTHGUISSEY STREAM	FORTHGUISSEY BRIDGE	R23A052	1B	1A	6.5	1A	7.7	1A	15.9	2	56.6	1A	2.9	1B	0.616	1A	0.010	1A	6.5	2	563.0	3	2600.0
ST AGNES STREAM	PRIOR TO CULVERT ST AGNES	R23A016	1B	1A	7.1	1A	8.3	1A	16.1	1A	82.5	4	24.3	2	0.885	1A	0.013	1A	16.2	1A	51.2	1A	256.4
TREVELLAS STREAM	ABOVE TREVALANCE COVE	R23A051	1B	1A	7.0	1A	7.9	1A	16.1	1B	77.3	1A	2.2	1A	0.133	1A	0.010	1A	3.5	2	42.6	2	736.0
FERRANFORDH STREAM	SILVERWELL	R23A046	1A	1A	6.5	1A	7.7	1A	14.0	2	51.0	3	15.0	1A	0.220	1A	0.010	3	38.3	2	90.0	1A	180.0
FERRANFORDH STREAM	MIDWAY	R23A047	1A	1A	6.7	1A	7.8	1A	15.4	1A	80.4	1B	4.8	1B	0.537	1A	0.010	1A	6.6	2	218.5	3	2490.0
FERRANFORDH STREAM	PLEASURE GARDENS FERRANFORDH	R23A012	1A	1A	7.2	3	9.5	1A	16.9	1B	76.3	1B	4.7	1A	0.288	1A	0.020	1A	15.0	1A	41.7	2	591.4
BOLINGEY STREAM	FERRANWELL	R23A048	1A	1A	6.7	1A	7.5	1A	15.1	2	52.3	1B	3.3	2	1.305	1A	0.010	1A	14.6	1A	45.3	2	1560.0
BOLINGEY STREAM	FOREMERE BRIDGE	R23A011	1A	1A	7.0	1A	7.6	1A	15.5	2	42.7	1B	3.6	2	0.717	1A	0.010	1A	12.2	1A	21.9	2	1126.0
HOLWELL STREAM	DELAGRE	R23A049	1A	1A	7.3	1A	7.9	1A	15.1	1B	78.4	1B	4.3	1B	0.580	1A	0.010	1A	15.7	1A	68.6	1A	476.0
HOLWELL STREAM	HOLWELL BAY BRIDGE	R23A010	1A	1A	7.4	1A	8.0	1A	14.6	1B	74.7	1B	3.7	1A	0.152	1A	0.010	1A	13.1	1A	11.7	1A	336.5
FORTH JONE STREAM	PRIOR TO BEACH	R23A061	1B	1A	7.9	1A	8.5	1A	15.8	1B	63.0	1A	2.4	1A	0.290	1A	0.010	1A	7.0	-	-	-	-

Red River, Portreath, Bolingey & Perranporth Catchments Compliance - 1991



NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

1991 RIVER WATER QUALITY CLASSIFICATION

NUMBER OF SAMPLES (N) AND NUMBER OF SAMPLES EXCEEDING QUALITY STANDARD (P)

CATCHMENT: RED

River	Reach upstream of	User Ref. Number	pH Lower		pH Upper		Temperature		DO (%)		BOD (RTU)		Total Ammonia		Union. Ammonia		S.Solids		Total Copper		Total Zinc	
			N	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P
RED RIVER	ABOVE BREA TIN WORKS	R23A001	34	-	34	-	34	-	34	-	34	-	34	-	34	-	34	1	34	-	34	-
RED RIVER	ABOVE SOUTH CROFTY MINE	R23A002	35	-	35	-	35	-	35	-	35	-	35	-	32	-	35	-	35	-	35	-
RED RIVER	ROZCOOLAN BRIDGE	R23A003	36	-	36	-	36	-	34	-	36	-	36	-	32	-	36	-	36	-	36	-
RED RIVER	KIEVE BRIDGE	R23A005	36	-	36	-	36	-	34	-	36	-	36	-	34	-	36	-	36	-	36	-
RED RIVER	GARDINER TOWNS	R23A006	68	-	68	-	69	-	65	-	68	1	69	-	10	-	69	-	67	-	67	-
ROSEMORBY STREAM	BOLEICE BRIDGE	R23A038	35	-	35	-	34	-	34	1	35	-	35	-	32	-	35	-	35	3	35	3
ROSEMORBY STREAM	PENFONDS	R23A008	37	-	37	-	37	-	37	-	37	-	37	-	37	-	37	2	36	7	36	1
ROSEMORBY STREAM	WANNOPPELLIN	R23A009	34	-	34	-	34	-	34	-	34	-	34	-	34	-	34	3	34	-	34	1
FRAZE RIVER	CORCENMEN NO.1 RESERVOIR	R23A050	25	-	25	-	25	-	25	-	25	-	25	-	23	-	25	-	24	1	24	-
FRAZE RIVER	FRAZE	R23A045	48	-	48	-	48	-	48	-	48	2	48	-	48	-	48	2	28	-	28	-
FRAZE RIVER	BRICKPIT	R23A037	31	-	31	-	31	-	31	-	31	-	31	-	31	-	31	-	24	1	24	-
REIN STREAM	RAMBRIDGE	R23A007	28	-	28	-	28	-	28	-	28	-	28	-	24	-	28	-	28	13	28	-
TEHIDY STREAM	TODDADIN BRIDGE	R23A042	54	-	54	-	54	-	54	-	54	10	54	2	49	-	54	8	36	4	36	-
TEHIDY STREAM	OLD MERRICE	R23A041	54	-	54	-	54	-	54	4	54	-	54	-	48	-	54	6	36	-	36	-
TEHIDY STREAM	COOMBE	R23A017	34	-	34	-	34	-	34	-	34	-	34	-	30	-	34	1	32	-	32	-
FORTHWITH STREAM	BRIDGE BELOW OMBROSE	R23A015	35	-	35	-	34	-	34	-	35	-	35	-	32	-	35	-	35	-	35	-
FORTHWITH STREAM	NORTH COUNTRY BRIDGE	R23A014	35	-	35	-	35	-	35	-	35	1	35	-	32	-	35	2	35	35	35	28
FORTHWITH STREAM	MOUNT HANE	R23A043	51	-	51	-	49	-	49	-	51	1	51	-	48	-	51	3	30	-	28	-
FORTHWITH STREAM	FORTHWITH BRIDGE	R23A013	33	-	33	-	33	-	33	4	33	1	33	7	32	-	33	2	32	30	31	28
MENGLISSEY STREAM	MENGLISSEY BRIDGE	R23A052	51	-	51	-	50	-	50	2	51	1	51	-	49	-	51	1	29	2	27	6
ST AGNES STREAM	PRIOR TO CLOVERT ST AGNES	R23A016	34	-	34	-	34	-	34	-	34	4	34	1	33	-	34	5	32	-	31	-
TREVELLAS STREAM	ABOVE TREVALLANCE COVE	R23A051	53	-	53	-	53	-	53	-	53	-	53	-	49	-	53	-	35	1	33	33
FERRANFORTH STREAM	SIDDERWELL	R23A046	15	-	15	-	15	-	15	3	15	1	15	-	13	-	15	2	14	1	13	-
FERRANFORTH STREAM	MITHIAN	R23A047	33	-	33	-	33	-	33	1	33	1	33	1	32	-	33	2	33	1	32	11
FERRANFORTH STREAM	PLEASURE GROUNDS FERRANFORTH	R23A012	35	-	35	6	34	-	34	2	35	8	35	1	33	-	35	6	33	-	32	1
HOLINGEY STREAM	FERRANWELL	R23A048	34	-	34	-	34	-	34	10	34	2	34	10	34	-	34	3	34	-	33	32
HOLINGEY STREAM	FOREBENE BRIDGE	R23A011	32	-	32	-	32	-	32	13	32	2	32	5	32	-	32	3	32	-	31	30
HOLYWELL STREAM	TRELAGE	R23A049	31	-	31	-	31	-	31	1	31	3	31	1	31	-	31	4	28	-	27	-
HOLYWELL STREAM	HOLYWELL BRY BRIDGE	R23A010	32	-	32	-	32	-	32	6	32	1	32	-	32	-	32	3	30	-	29	-
FORTH JORE STREAM	PRIOR TO BEACH	R23A061	18	-	18	-	18	-	18	-	18	-	18	-	15	-	18	2	0	-	0	-

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 1991 RIVER WATER QUALITY CLASSIFICATION
 PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
 CATCHMENT: RED

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
RED RIVER	ABOVE BREA TIN WORKS	R23A001	-	-	-	-	-	-	-	-	-	-
RED RIVER	ABOVE SOUTH CROFTY MINE	R23A002	-	-	-	-	-	-	-	-	-	-
RED RIVER	ROSCROGGAN BRIDGE	R23A003	-	-	-	-	-	-	-	-	-	-
RED RIVER	KIEVE BRIDGE	R23A005	-	-	-	-	-	-	-	-	-	-
RED RIVER	GWITHIAN TOMARS	R23A006	-	-	-	-	-	-	-	-	-	-
ROSEWORTHY STREAM	BOTETOE BRIDGE	R23A038	-	-	-	1	-	-	-	-	146	16
ROSEWORTHY STREAM	PENPONDS	R23A008	-	-	-	-	-	-	-	-	154	-
ROSEWORTHY STREAM	NANCEMELLIN	R23A009	-	-	-	-	-	-	-	-	-	103
PRAZE RIVER	CARGENWEN NO.1 RESERVOIR	R23A050	-	-	-	-	-	-	-	-	-	-
PRAZE RIVER	PRAZE	R23A045	-	-	-	-	3	-	-	-	-	-
PRAZE RIVER	BARRIPPER	R23A017	-	-	-	-	-	-	-	-	1	-
REEN STREAM	RAMSGATE	R23A007	-	-	-	-	-	-	-	-	102	-
TEHIDY STREAM	TOLVADDON BRIDGE	R23A042	-	-	-	-	-	112	-	-	28	-
TEHIDY STREAM	OLD MERROSE	R23A041	-	-	-	7	-	-	-	-	-	-
TEHIDY STREAM	COOMBE	R23A017	-	-	-	-	-	-	-	-	-	-
PORTREATH STREAM	BRIDGE BELOW CAMBROSE	R23A015	-	-	-	-	-	-	-	-	-	-
REDRUTH STREAM	NORTH COUNTRY BRIDGE	R23A014	-	-	-	-	-	14	-	-	851	177
PORHTOWAN STREAM	MOUNT HAWKE	R23A043	-	-	-	-	-	-	-	-	-	-
PORHTOWAN STREAM	PORHTOWAN BRIDGE	R23A013	-	-	-	42	68	378	-	-	1595	1024
MENAGISSEY STREAM	MENAGISSEY BRIDGE	R23A052	-	-	-	6	-	-	-	-	1280	767
ST AGNES STREAM	PRIOR TO CULVERT ST AGNES	R23A016	-	-	-	-	-	385	26	-	-	-
TREVELLAS STREAM	ABOVE TREVAUNANCE COVE	R23A051	-	-	-	-	-	-	-	-	7	145
PERRANPORTH STREAM	SILVERWELL	R23A046	-	-	-	36	400	-	-	53	125	-
PERRANPORTH STREAM	MITHIAN	R23A047	-	-	-	-	59	73	-	-	446	730
PERRANPORTH STREAM	PLEASURE GARDENS PERRANPORTH	R23A012	-	6	-	5	56	-	-	-	-	18
BOLINGEY STREAM	PERRANWELL	R23A048	-	-	-	35	11	321	-	-	-	212
BOLINGEY STREAM	PONSMERE BRIDGE	R23A011	-	-	-	47	21	131	-	-	-	125
HOLYWELL STREAM	TRELASKE	R23A049	-	-	-	2	45	87	-	-	-	-
HOLYWELL STREAM	HOLYWELL BAY BRIDGE	R23A010	-	-	-	7	23	-	-	-	-	-
PORTH JOKE STREAM	PRIOR TO BEACH	R23A061	-	-	-	-	-	-	-	-	-	-