

ENVIRONMENTAL PROTECTION



NRA

*National Rivers Authority
South West Region*

**River Tavy Catchment
River Water Quality
Classification 1990**

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RIVER WATER QUALITY IN THE RIVER TAVY CATCHMENT

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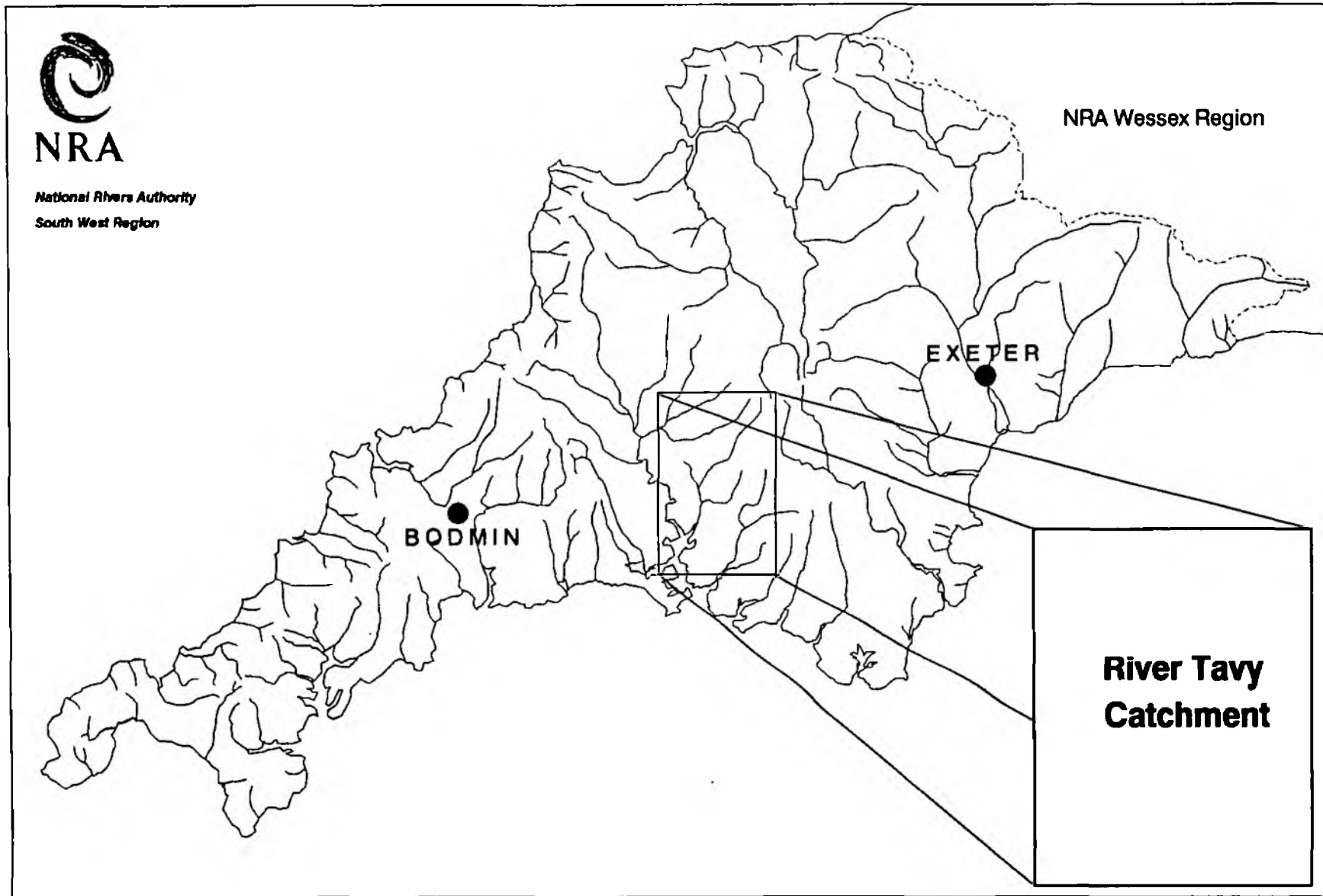
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National Rivers Authority South West Region



NRA

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River Tavy Catchment

**River Tavy
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 Tavy catchment.

2. RIVER TAVY CATCHMENT

The River Tavy flows over a distance of 35.2 km from its source to the tidal limit, (Appendix 10.1). Water quality was monitored at eight locations on the main river; five of these sites were sampled at approximately monthly intervals. The site at Denham Bridge, which is a National Water Quality monitoring point, was sampled fortnightly. The sites at Kelly School and downstream of Crowndale sewage treatment works were sampled on twenty occasions during 1990 because of no recent water quality data.

Throughout the Tavy catchment five secondary tributaries of the River Tavy were monitored at approximately monthly intervals and two secondary streams (Moortown Stream and Colly Brook) were sampled on twenty occasions during 1990 because of no recent water quality data.

2.1 SECONDARY TRIBUTARIES

The River Lumburn and River Walkham flow over a distance of 9.2 km and 22.1 km respectively from their source to the confluence with the River Tavy, (Appendix 10.1) and were both monitored at four locations.

Walla Brook (5.6 km), River Burn (9.3 km), Cholwell Brook (4.8 km), Moortown Stream (5km) and Colly Brook (4.8 km) were all monitored at one location. Monitoring points were all located in the lower reaches of these streams, (Appendix 10.1).

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 Tavy 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

| <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 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

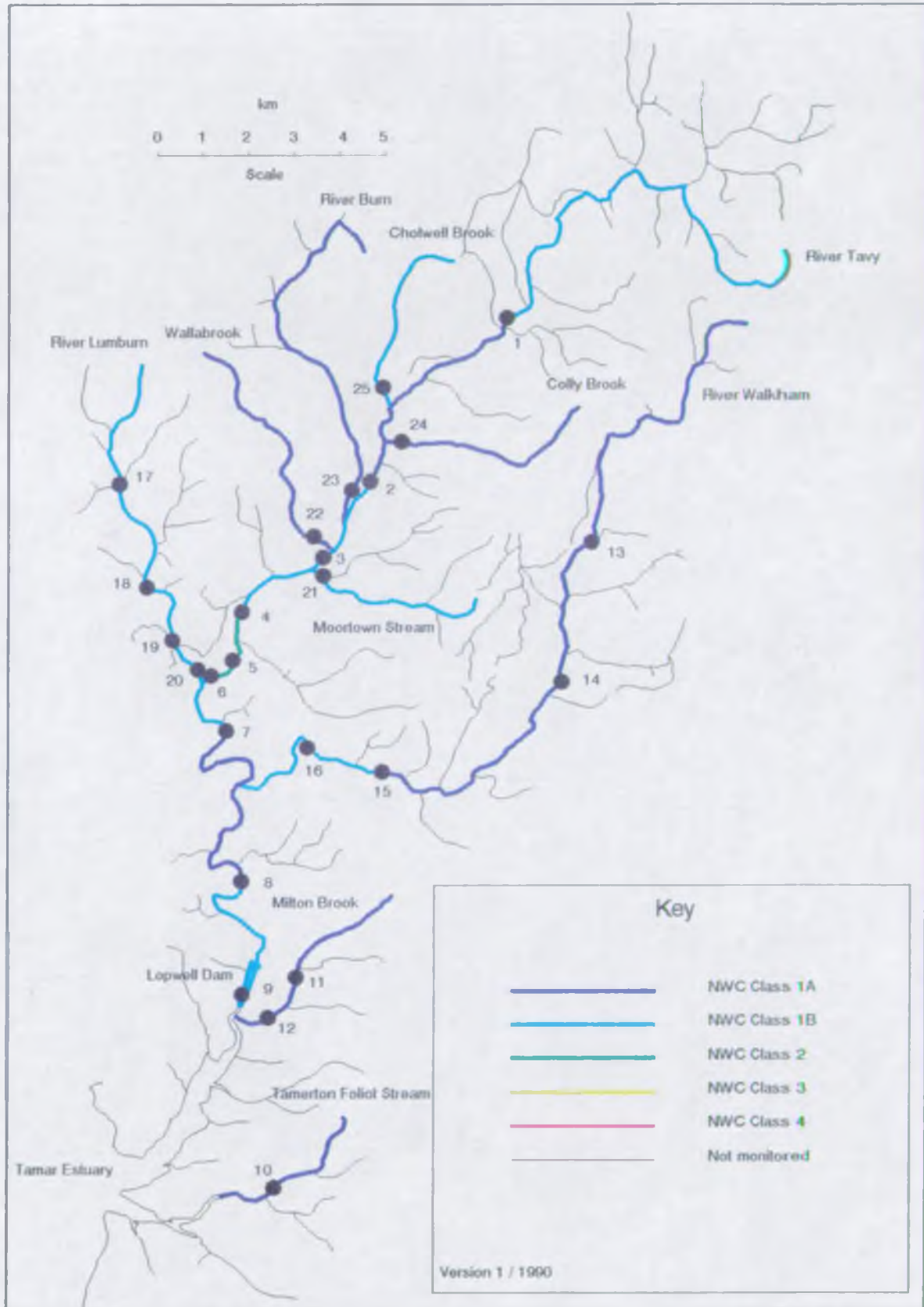
| | |
|---|--|
| RIVER REACH | A segment of water, upstream from sampling point to the next sampling point. |
| RIVER LENGTH | River distance in kilometres. |
| RIVER QUALITY OBJECTIVE | That NWC class, which protects the most sensitive use of the water. |
| 95 percentiles | Maximum limits, which must 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.

Tavy Catchment River Quality Objectives



BASIC DETERMINAND ANALYTICAL SUITE FOR ALL CLASSIFIED RIVER SITES

pH as pH Units
Conductivity at 20 C as $\mu\text{S}/\text{cm}$
Water temperature (Cel)
Oxygen dissolved & saturation
Oxygen dissolved as $\text{mg}/\text{l O}$
Biochemical oxygen demand (5 day total ATU) as $\text{mg}/\text{l O}$
Total organic carbon as $\text{mg}/\text{l C}$
Nitrogen ammoniacal as $\text{mg}/\text{l N}$
Ammonia un-ionised as $\text{mg}/\text{l N}$
Nitrate as $\text{mg}/\text{l N}$
Nitrite as $\text{mg}/\text{l N}$
Suspended solids at 105 C as mg/l
Total hardness as $\text{mg}/\text{l CaCO}_3$
Chloride as $\text{mg}/\text{l Cl}$
Orthophosphate (total) as $\text{mg}/\text{l P}$
Silicate reactive dissolved as $\text{mg}/\text{l SiO}_2$
Sulphate (dissolved) as $\text{mg}/\text{l SO}_4$
Sodium (total) as $\text{mg}/\text{l Na}$
Potassium (total) as $\text{mg}/\text{l K}$
Magnesium (total) as $\text{mg}/\text{l Mg}$
Calcium (total) as $\text{mg}/\text{l Ca}$
Alkalinity as pH 4.5 as $\text{mg}/\text{l CaCO}_3$

MWC 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 |

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 ug/l Cu | 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 ug/l Zn | 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: TAVY (12)

| 1990 Map Position Number | River | Reach upstream of | User Reference Number | National Grid Reference | Reach Length (km) | Distance from source (km) | River Quality Objective | 85 NWC Class | 86 NWC Class | 87 NWC Class | 88 NWC Class | 89 NWC Class | 90 NWC Class |
|--------------------------------|------------------------|---------------------------------------|-----------------------------|-------------------------------|-------------------------|------------------------------------|-------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 1 | TAVY | HILL BRIDGE | R12C001 | SX 5321 8040 | 11.0 | 11.0 | 1B | 1B | 1A | 3 | 1A | 3 | 3 |
| 2 | TAVY | HARFORD BRIDGE | R12C002 | SX 5057 7678 | 5.2 | 16.2 | 1A | 1B | 1B | 1A | 1A | 2 | 2 |
| 3 | TAVY | KELLY SCHOOL | R12C015 | SX 4915 7500 | 2.6 | 18.8 | 1B | 1B | 1B | 1A | 1A | 2 | 1A |
| 4 | TAVY | WEST BRIDGE | R12C003 | SX 4768 7378 | 2.0 | 20.8 | 1B | 1B | 1B | 1A | 1A | 2 | 3 |
| 5 | TAVY | BELOW CROWDALE STW | R12C023 | SX 4702 7211 | 2.1 | 22.9 | 2 | 1B | 2 | 2 | 2 | 2 | 3 |
| 6 | TAVY | SHILLMILL ABOVE RIVER LUMBURN | R12C004 | SX 4675 7183 | 0.4 | 23.3 | 2 | 1B | 2 | 2 | 2 | 2 | 2 |
| 7 | TAVY | WASH FORD | R12C005 | SX 4700 7105 | 1.1 | 24.4 | 1B | 1B | 2 | 1B | 1B | 2 | 2 |
| 8 | TAVY | DENHAM BRIDGE | R12C006 | SX 4769 6776 | 6.2 | 30.6 | 1A | 1B | 1A | 1A | 1A | 2 | 1B |
| 9 | TAVY | LOPWELL DAM | R12C007 | SX 4750 6502 | 4.6 | 35.2 | 1B | 1B | 1B | 1A | 1B | 1A | 1B |
| 10 | TAMERTON FOLIOT STREAM | TAMERTON FOLIOT | R12B004 | SX 4718 6093 | 3.8 | 3.8 | 1A | | | | | | 1B |
| | TAMERTON FOLIOT STREAM | NORMAL TIDAL LIMIT (INFERRED STRETCH) | | | 0.5 | 4.3 | 1A | | | | | | 1B |
| 11 | MILTON BROOK | ABOVE MILTON COMBE | R12B002 | SX 4888 6597 | 2.9 | 2.9 | 1A | 1B | 1B | 1B | 1B | 2 | 1A |
| 12 | MILTON BROOK | BELOW MILTON COMBE | R12B001 | SX 4821 6475 | 1.5 | 4.4 | 1A | 1B | 1B | 1B | 1B | 2 | 2 |
| | MILTON BROOK | NORMAL TIDAL LIMIT (INFERRED STRETCH) | | | 0.9 | 5.3 | 1A | 1B | 1B | 1B | 1B | 2 | 2 |
| 13 | WALKHAM | MERRIVALE BRIDGE | R12D001 | SX 5500 7510 | 8.9 | 8.9 | 1A | 1A | 1B | 1A | 1A | 2 | 3 |
| 14 | WALKHAM | WARD BRIDGE | R12D002 | SX 5421 7203 | 3.6 | 12.5 | 1A | 1B | 2 | 1A | 1A | 2 | 2 |
| 15 | WALKHAM | MAGPIE BRIDGE | R12D003 | SX 5038 7035 | 5.7 | 18.2 | 1A | 1B | 1A | 1A | 1A | 2 | 2 |
| 16 | WALKHAM | GRENOPEN BRIDGE | R12D004 | SX 4900 7098 | 1.7 | 19.9 | 1B | 1A | 1A | 1B | 1B | 1B | 1B |
| | WALKHAM | TAVY CONFLUENCE (INFERRED STRETCH) | | | 2.2 | 22.1 | 1B | 1A | 1A | 1B | 1B | 1B | 1B |
| 17 | LUMBURN | RUSHFORD BRIDGE | R12C009 | SX 4496 7635 | 3.1 | 3.1 | 1B | 1B | 1B | 1B | 1A | 1A | 1A |
| 18 | LUMBURN | MILLHILL | R12C020 | SX 4544 7420 | 2.7 | 5.8 | 1B | 1B | 2 | 1B | 1B | 1B | 1B |
| 19 | LUMBURN | A390 BRIDGE AT LUMBURN | R12C018 | SX 4596 7307 | 1.8 | 7.6 | 1B | 1B | 2 | 1B | 1B | 1B | 1B |
| 20 | LUMBURN | SHILLMILL (PRIOR TO R.TAVY) | R12C010 | SX 4666 7193 | 1.4 | 9.0 | 1B | 1B | 2 | 1B | 1B | 1B | 1A |
| | LUMBURN | TAVY CONFLUENCE (INFERRED STRETCH) | | | 0.2 | 9.2 | 1B | 1B | 2 | 1B | 1B | 1B | 1A |
| 21 | MOORTOWN STREAM | MOUNT HOUSE SCHOOL | R12C021 | SX 4931 7470 | 4.7 | 4.7 | 1B | 1A | | | | | 1A |
| | MOORTOWN STREAM | TAVY CONFLUENCE (INFERRED STRETCH) | | | 0.3 | 5.0 | 1B | 1A | | | | | 1A |
| 22 | WALLABROOK | PRIOR TO RIVER TAVY | R12C011 | SX 4928 7545 | 5.6 | 5.6 | 1A | 1B | 1B | | | 1B | 1B |
| 23 | BURN | PRIOR TO RIVER TAVY | R12C008 | SX 4983 7618 | 9.0 | 9.0 | 1A | 1B | 2 | 1A | | 2 | 2 |
| | BURN | TAVY CONFLUENCE (INFERRED STRETCH) | | | 0.3 | 9.3 | 1A | 1B | 2 | 1A | | 2 | 2 |
| 24 | COLLY BROOK | PETER TAVY | R12C022 | SX 5140 7763 | 4.2 | 4.2 | 1A | 1A | | | | | 1A |
| | COLLY BROOK | TAVY CONFLUENCE (INFERRED STRETCH) | | | 0.6 | 4.8 | 1A | 1A | | | | | 1A |
| 25 | CHOLWELL BROOK | BROOK TAVY | R12C019 | SX 5088 7831 | 4.8 | 4.8 | 1B | 2 | | | | | 2 |

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

X

DO greater than 10% saturation

Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

Notes

- (a) Under extreme weather conditions (eg flood, drought, freeze-up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Class 1, 2, and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results.
- (b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4 . **
- (c) In most instances the chemical classification given above will be suitable. However, the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be down-graded on the basis of biota actually present, and the reasons stated.
- (d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95 percentile limits.

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

** Ammonia Conversion Factors

(mg NH_4 /l to mg N/l)

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

NWC RIVER CLASSIFICATION SYSTEM

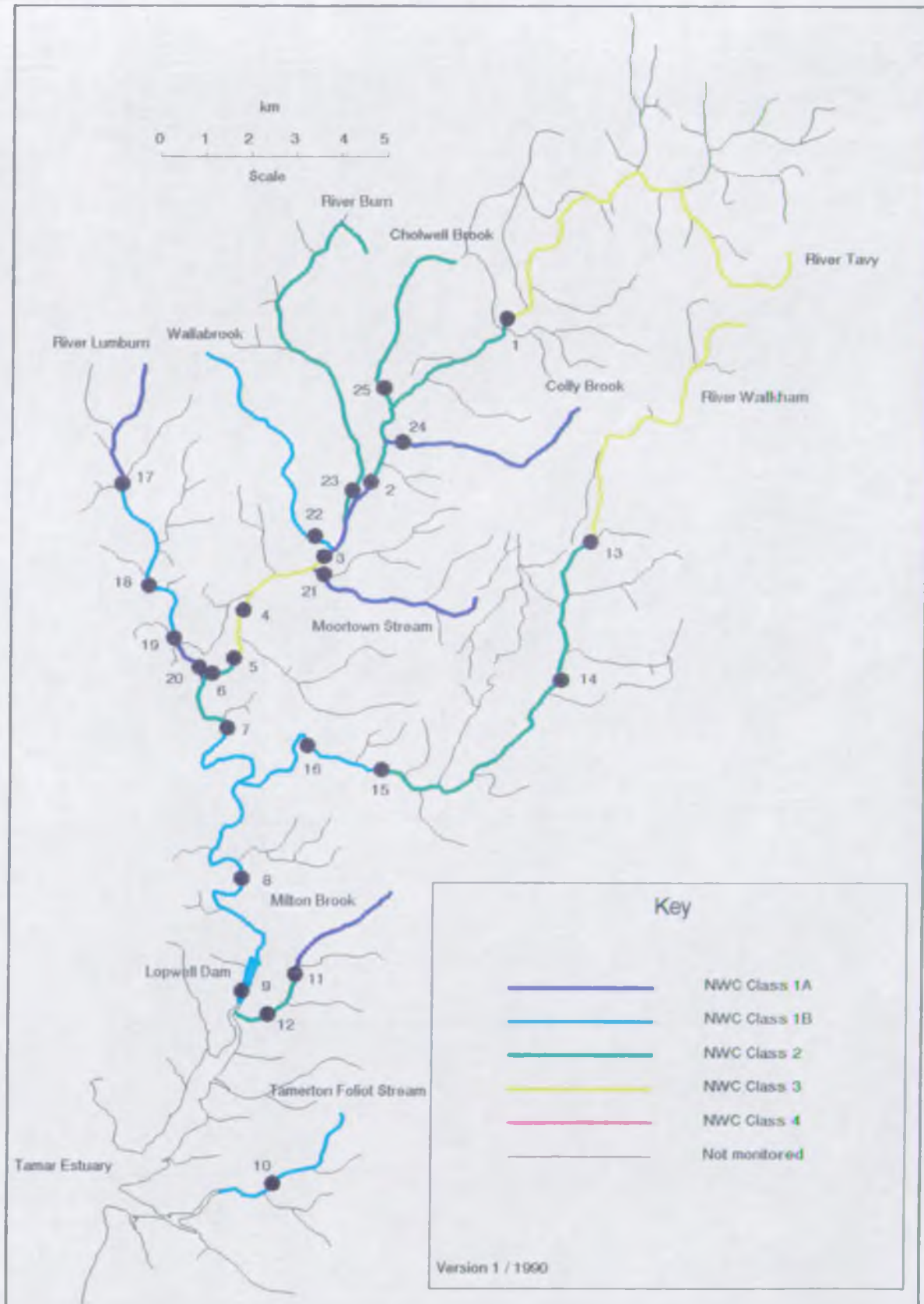
CRITERIA USED BY NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION FOR NON-METALLIC DETERMINANDS

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

STATISTICS USED BY NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION

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

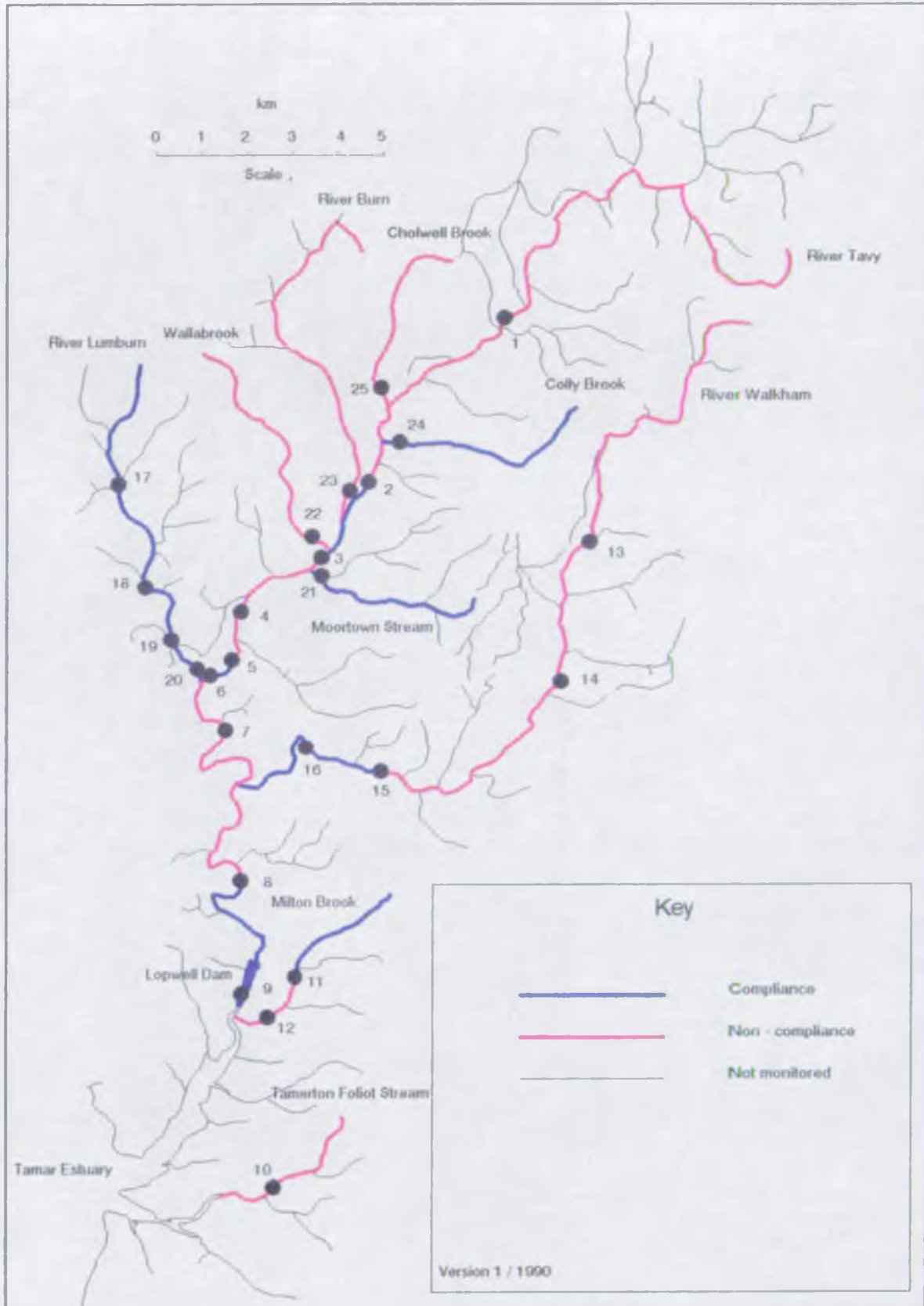
Tavy Catchment Water Quality - 1990



FEDERAL RIVERS AUTHORITY - SOUTH WEST REGION
 1990 RIVER WATER QUALITY CLASSIFICATION
 CALCULATED DETERMINED STATISTICS USED FOR QUALITY ASSESSMENT
 CRITERIA: TWY (12)

| River | Reach upstream of | User Ref. Number | 90 RMC Class | Calculated Determined Statistics used for Quality Assessment | | | | | | | | | | | | | | | | | | | |
|------------------------|-------------------------------|------------------|--------------|--|-----|----------------------|-----|-------------------------|------|--------------------|------|-----------------------|------|---------------------------|-------|----------------------------|-------|---------------------|------|--------------------------|-------|------------------------|-------|
| | | | | pH Lower Class 95ile | | pH Upper Class 95ile | | Temperature Class 95ile | | DO (%) Class 95ile | | BOD (MBU) Class 95ile | | Total Ammonia Class 95ile | | Union. Ammonia Class 95ile | | S.Solids Class Mean | | Total Copper Class 95ile | | Total Zinc Class 95ile | |
| TWY | HILL BRIDGE | [R12C001] | 3 | 3 | 4.4 | 1A | 7.6 | 1A | 16.3 | 1A | 81.3 | 1B | 3.6 | 1A | 0.120 | 1A | 0.010 | 1A | 13.2 | 2 | 7.0 | 2 | 33.0 |
| TWY | HARFORD BRIDGE | [R12C002] | 2 | 1A | 5.5 | 1A | 7.6 | 1A | 17.4 | 1B | 73.0 | 1B | 4.7 | 1A | 0.085 | 1A | 0.010 | 1A | 12.0 | 2 | 30.0 | 1A | 171.0 |
| TWY | KELLY SCHOOL | [R12C015] | 1A | 1A | 5.9 | 1A | 7.6 | 1A | 16.5 | 1A | 83.0 | 1A | 2.4 | 1A | 0.070 | 1A | 0.010 | 1A | 5.8 | - | - | - | - |
| TWY | WEST BRIDGE | [R12C003] | 3 | 1A | 6.4 | 1A | 7.6 | 1A | 16.6 | 1A | 87.7 | 2 | 6.3 | 3 | 1.592 | 1A | 0.016 | 1A | 12.4 | 1A | 22.0 | 1A | 111.0 |
| TWY | BELOW CROMDALE SW | [R12C023] | 3 | 1A | 6.4 | 1A | 7.6 | 1A | 18.0 | 1B | 61.0 | 3 | 10.0 | 3 | 3.700 | 1A | 0.010 | 1A | 14.2 | - | - | - | - |
| TWY | SHILLAMILL ABOVE RIVER LUMLEN | [R12C004] | 2 | 1A | 6.4 | 1A | 7.5 | 1A | 16.9 | 1A | 80.4 | 2 | 7.4 | 2 | 0.974 | 1A | 0.010 | 1A | 18.9 | 2 | 46.0 | 1A | 195.0 |
| TWY | WASH FORD | [R12C005] | 2 | 1A | 6.7 | 1A | 7.8 | 1A | 16.5 | 1A | 82.3 | 2 | 6.3 | 1B | 0.344 | 1A | 0.010 | 1A | 17.7 | 2 | 43.0 | 1A | 135.0 |
| TWY | DENHAM BRIDGE | [R12C006] | 1B | 1A | 6.6 | 1A | 7.7 | 1A | 17.3 | 1A | 89.9 | 1B | 4.5 | 1A | 0.225 | 1A | 0.010 | 1A | 11.1 | 1A | 20.6 | 1A | 35.7 |
| TWY | LOEWELL DAM | [R12C007] | 1B | 1A | 6.6 | 1A | 8.5 | 1A | 20.0 | 1B | 80.0 | 1A | 3.0 | 1A | 0.156 | 1A | 0.010 | 1A | 5.5 | 1A | 11.0 | 1A | 24.0 |
| EMERSON FOLIOET STREAM | EMERSON FOLIOET | [R12B004] | 1B | 1A | 6.8 | 1A | 7.8 | 1A | 18.1 | 1B | 68.8 | 1A | 3.0 | 1A | 0.097 | 1A | 0.010 | 1A | 12.4 | 1A | 11.0 | 1A | 17.0 |
| MILION BROOK | ABOVE MILION COME | [R12B002] | 1A | 1A | 5.2 | 1A | 7.8 | 1A | 19.0 | 1A | 86.0 | 1A | 2.2 | 1A | 0.100 | 1A | 0.010 | 1A | 9.9 | - | - | - | - |
| MILION BROOK | BELOW MILION COME | [R12B001] | 2 | 1A | 6.9 | 1A | 7.8 | 1A | 16.6 | 1A | 80.8 | 1A | 2.9 | 2 | 0.774 | 1A | 0.010 | 1A | 9.9 | 1A | 17.0 | 1A | 16.0 |
| WALNHAM | MERRIVALE BRIDGE | [R12C001] | 3 | 3 | 4.6 | 1A | 7.2 | 1A | 15.2 | 1A | 86.8 | 1B | 3.5 | 1A | 0.051 | 1A | 0.010 | 1A | 2.2 | 2 | 6.9 | 2 | 34.4 |
| WALNHAM | MARD BRIDGE | [R12C002] | 2 | 1A | 5.2 | 1A | 7.2 | 1A | 15.0 | 1A | 87.5 | 1A | 2.6 | 1A | 0.035 | 1A | 0.010 | 1A | 3.5 | 2 | 5.9 | 1A | 13.9 |
| WALNHAM | MAGPIE BRIDGE | [R12C003] | 2 | 1A | 6.2 | 1A | 7.5 | 1A | 15.5 | 1A | 89.5 | 2 | 5.8 | 1A | 0.240 | 1A | 0.010 | 1A | 8.8 | 1A | 16.7 | 1A | 25.0 |
| WALNHAM | GREENOPEN BRIDGE | [R12C004] | 1B | 1A | 6.2 | 1A | 7.5 | 1A | 15.4 | 1A | 87.2 | 1B | 3.2 | 1A | 0.154 | 1A | 0.010 | 1A | 6.8 | 1A | 13.8 | 1A | 24.8 |
| LUMLEN | RUSHFORD BRIDGE | [R12C009] | 1A | 1A | 6.7 | 1A | 7.8 | 1A | 17.1 | 1A | 80.2 | 1A | 2.8 | 1A | 0.125 | 1A | 0.010 | 1A | 7.3 | 1A | 10.0 | 1A | 33.0 |
| LUMLEN | MILLHILL | [R12C020] | 1B | 1A | 7.2 | 1A | 8.0 | 1A | 16.0 | 1B | 78.0 | 1B | 4.0 | 1B | 0.382 | 1A | 0.010 | 1A | 8.1 | 1A | 10.0 | 1A | 33.0 |
| LUMLEN | A390 BRIDGE AT LUMLEN | [R12C018] | 1B | 1A | 7.1 | 1A | 7.9 | 1A | 16.9 | 1A | 84.3 | 1B | 4.3 | 1B | 0.694 | 1A | 0.010 | 1A | 11.1 | 1A | 24.0 | 1A | 41.0 |
| LUMLEN | SHILLAMILL (BELOW TO R. TWY) | [R12C010] | 1A | 1A | 6.7 | 1A | 7.7 | 1A | 15.8 | 1A | 81.2 | 1A | 2.9 | 1A | 0.297 | 1A | 0.010 | 1A | 8.8 | 1A | 36.5 | 1A | 245.5 |
| MCCORMICK STREAM | MOUNT HOUSE SCHOOL | [R12C021] | 1A | 1A | 6.9 | 1A | 8.1 | 1A | 16.9 | 1A | 83.2 | 1A | 2.9 | 1A | 0.224 | 1A | 0.010 | 1A | 8.5 | - | - | - | - |
| WALLABROOK | BELOW TO RIVER TWY | [R12C011] | 1B | 1A | 6.9 | 1A | 7.9 | 1A | 16.4 | 1B | 75.4 | 1A | 2.6 | 1A | 0.190 | 1A | 0.010 | 1A | 5.2 | 1A | 7.0 | 1A | 24.0 |
| BURN | BELOW TO RIVER TWY | [R12C008] | 2 | 1A | 6.6 | 1A | 7.6 | 1A | 16.1 | 1A | 84.9 | 1B | 4.7 | 1B | 0.528 | 1A | 0.010 | 1A | 6.5 | 2 | 31.9 | 1A | 86.7 |
| COLLY BROOK | PETER TWY | [R12C022] | 1A | 1A | 6.5 | 1A | 7.8 | 1A | 16.7 | 1A | 81.0 | 1A | 2.0 | 1A | 0.089 | 1A | 0.010 | 1A | 3.8 | - | - | - | - |
| CHODWELL BROOK | BROOK TWY | [R12C019] | 2 | 1A | 5.9 | 1A | 7.7 | 1A | 17.5 | 1A | 82.0 | 1B | 4.5 | 1B | 0.700 | 1A | 0.010 | 1A | 5.0 | 2 | 131.0 | 2 | 365.0 |

Tavy 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: TWY (12)

| River | Reach upstream of | User Ref. Number | pH Lower | | pH Upper | | Temperature | | DO (%) | | BOD (AGU) | | 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 |
| TWY | HILL BRIDGE | RL2C001 | 28 | 4 | 28 | - | 28 | - | 28 | - | 28 | - | 28 | - | 23 | - | 28 | 3 | 15 | 2 | 15 | 1 |
| TWY | HANFORD BRIDGE | RL2C002 | 28 | - | 28 | - | 28 | - | 27 | 1 | 28 | 2 | 28 | - | 23 | - | 28 | 2 | 14 | 1 | 14 | - |
| TWY | KELLY SCHOOL | RL2C005 | 19 | - | 19 | - | 20 | - | 18 | - | 20 | - | 19 | - | 17 | - | 19 | 1 | 9 | - | 9 | - |
| TWY | WEST BRIDGE | RL2C003 | 27 | - | 27 | - | 27 | - | 26 | - | 27 | 1 | 27 | 1 | 26 | - | 27 | 2 | 14 | - | 14 | - |
| TWY | BELOW CRONDALE SW | RL2C0023 | 17 | - | 17 | - | 17 | - | 17 | - | 17 | 1 | 17 | 2 | 17 | - | 17 | 2 | 8 | - | 8 | - |
| TWY | SHILLMILL ABOVE RIVER LILBURN | RL2C004 | 28 | - | 28 | - | 28 | - | 28 | - | 28 | 1 | 28 | - | 28 | - | 28 | 3 | 15 | - | 15 | - |
| TWY | MASH FORD | RL2C005 | 30 | - | 30 | - | 30 | - | 30 | - | 30 | 1 | 30 | - | 30 | - | 30 | 3 | 18 | 1 | 19 | - |
| TWY | DENHAM BRIDGE | RL2C006 | 49 | - | 49 | - | 48 | - | 48 | - | 49 | 4 | 49 | 1 | 13 | - | 49 | 4 | 37 | 1 | 37 | - |
| TWY | LOPPELL DM | RL2C007 | 29 | - | 29 | 1 | 29 | - | 29 | - | 29 | - | 29 | - | 29 | - | 29 | - | 14 | - | 14 | - |
| EMERSON FOLIOT STREAM | EMERSON FOLIOT | RL2B004 | 25 | - | 25 | - | 24 | - | 24 | 1 | 25 | 1 | 25 | - | 21 | - | 25 | 1 | 14 | - | 14 | - |
| MILTON BROOK | ABOVE MILTON COMBE | RL2B002 | 14 | - | 14 | - | 14 | - | 14 | - | 14 | - | 14 | - | 12 | - | 14 | 1 | 7 | - | 7 | - |
| MILTON BROOK | BELOW MILTON COMBE | RL2B001 | 28 | - | 28 | - | 27 | - | 27 | 1 | 28 | 1 | 28 | 2 | 24 | - | 28 | 2 | 14 | - | 14 | - |
| MALNSHAM | MENINGVALE BRIDGE | RL2D001 | 28 | 4 | 28 | - | 28 | - | 27 | - | 28 | 1 | 28 | - | 13 | - | 28 | - | 22 | 2 | 22 | 1 |
| MALNSHAM | MARD BRIDGE | RL2D002 | 29 | - | 29 | - | 29 | - | 29 | - | 29 | - | 29 | - | 15 | - | 29 | 1 | 22 | 1 | 22 | - |
| MALNSHAM | MAGPIE BRIDGE | RL2D003 | 29 | - | 29 | - | 29 | - | 29 | - | 29 | 1 | 29 | - | 21 | - | 29 | 2 | 22 | - | 22 | - |
| MALNSHAM | GRENOFEN BRIDGE | RL2D004 | 31 | - | 31 | - | 31 | - | 31 | - | 31 | - | 31 | - | 30 | - | 31 | 3 | 24 | - | 24 | - |
| LILBURN | RUSHFORD BRIDGE | RL2C009 | 25 | - | 25 | - | 25 | - | 25 | - | 25 | - | 25 | - | 24 | - | 25 | 1 | 13 | - | 13 | - |
| LILBURN | MILLHILL | RL2C020 | 22 | - | 22 | - | 21 | - | 21 | - | 22 | - | 22 | - | 21 | - | 22 | 1 | 16 | - | 16 | - |
| LILBURN | JAISO BRIDGE AT LILBURN | RL2C018 | 23 | - | 23 | - | 21 | - | 21 | - | 23 | - | 23 | 1 | 21 | - | 23 | 3 | 17 | - | 17 | - |
| LILBURN | SHILLMILL (PRIOR TO R.TWY) | RL2C010 | 30 | - | 30 | - | 27 | - | 27 | - | 30 | - | 30 | - | 26 | - | 30 | 3 | 20 | - | 20 | - |
| MOORCOMB STREAM | MOUNT HOUSE SCHOOL | RL2C021 | 20 | - | 20 | - | 20 | - | 20 | - | 20 | - | 20 | - | 18 | - | 20 | 1 | 8 | - | 8 | - |
| MILLABROOK | PRIOR TO RIVER TWY | RL2C011 | 26 | - | 26 | - | 25 | - | 25 | 1 | 26 | - | 26 | - | 19 | - | 26 | - | 15 | - | 15 | - |
| BLUN | PRIOR TO RIVER TWY | RL2C008 | 28 | - | 28 | - | 28 | - | 28 | - | 28 | 1 | 28 | 2 | 27 | - | 28 | 1 | 22 | 1 | 22 | - |
| COLLY BROOK | PETER TWY | RL2C022 | 21 | - | 21 | - | 21 | - | 21 | - | 21 | - | 21 | - | 19 | - | 21 | - | 8 | - | 8 | - |
| CHICKWELL BROOK | BROOK TWY | RL2C019 | 19 | - | 19 | - | 18 | - | 18 | - | 19 | - | 19 | - | 15 | - | 19 | 1 | 13 | 8 | 13 | 11 |

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 1990 RIVER WATER QUALITY CLASSIFICATION
 PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
 CATCHMENT: TAVY (12)

| 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 |
| TAVY | HILL BRIDGE | R12C001 | 11 | - | - | - | - | - | - | - | 40 | 10 |
| TAVY | HARFORD BRIDGE | R12C002 | - | - | - | 9 | 55 | - | - | - | 36 | - |
| TAVY | KELLY SCHOOL | R12C015 | - | - | - | - | - | - | - | - | - | - |
| TAVY | WEST BRIDGE | R12C003 | - | - | - | - | 27 | 127 | - | - | - | - |
| TAVY | BELOW CROWDALE STW | R12C023 | - | - | - | - | 11 | 137 | - | - | - | - |
| TAVY | SHILLAMILL ABOVE RIVER LUMBURN | R12C004 | - | - | - | - | - | - | - | - | - | - |
| TAVY | WASH FORD | R12C005 | - | - | - | - | 26 | - | - | - | 95 | - |
| TAVY | DENHAM BRIDGE | R12C006 | - | - | - | - | 48 | - | - | - | - | - |
| TAVY | LOPWELL DAM | R12C007 | - | - | - | - | - | - | - | - | - | - |
| TAMERTON FOLIOT STREAM | TAMERTON FOLIOT | R12B004 | - | - | - | 14 | - | - | - | - | - | - |
| MILTON BROOK | ABOVE MILTON COMBE | R12B002 | - | - | - | - | - | - | - | - | - | - |
| MILTON BROOK | BELOW MILTON COMBE | R12B001 | - | - | - | - | - | 150 | - | - | - | - |
| WALKHAM | MERRIVALE BRIDGE | R12D001 | 7 | - | - | - | 18 | - | - | - | 37 | 15 |
| WALKHAM | WARD BRIDGE | R12D002 | - | - | - | - | - | - | - | - | 17 | - |
| WALKHAM | MAGPIE BRIDGE | R12D003 | - | - | - | - | 92 | - | - | - | - | - |
| WALKHAM | GRENOPEN BRIDGE | R12D004 | - | - | - | - | - | - | - | - | - | - |
| LUMBURN | RUSHFORD BRIDGE | R12C009 | - | - | - | - | - | - | - | - | - | - |
| LUMBURN | MILLHILL | R12C020 | - | - | - | - | - | - | - | - | - | - |
| LUMBURN | A390 BRIDGE AT LUMBURN | R12C018 | - | - | - | - | - | - | - | - | - | - |
| LUMBURN | SHILLAMILL (PRIOR TO R. TAVY) | R12C010 | - | - | - | - | - | - | - | - | - | - |
| MOORTOWN STREAM | MOUNT HOUSE SCHOOL | R12C021 | - | - | - | - | - | - | - | - | - | - |
| WALLABROOK | PRIOR TO RIVER TAVY | R12C011 | - | - | - | 6 | - | - | - | - | - | - |
| BURN | PRIOR TO RIVER TAVY | R12C008 | - | - | - | - | 58 | 70 | - | - | 45 | - |
| COLLY BROOK | PETER TAVY | R12C022 | - | - | - | - | - | - | - | - | - | - |
| CHOLWELL BROOK | BROOK TAVY | R12C019 | - | - | - | - | - | - | - | - | 50 | 83 |

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 IDENTIFICATION OF POSSIBLE CAUSES OF NON-COMPLIANCE WITH RQO
 CATCHMENT: TAVY (12A)

| 1990 Map Position Number | River | Reach upstream of | User Reference Number | Reach Length (km) | Possible causes of non-compliance |
|--------------------------|------------------------|---------------------|-----------------------|-------------------|--|
| 1 | TAVY | HILL BRIDGE | R12C001 | 11.0 | MOORLAND ORIGINS, UP-STREAM ABSTRACTIONS |
| 2 | TAVY | HARFORD BRIDGE | R12C002 | 5.2 | WATER QUALITY UP-STREAM TRIB. POOR, UP-STREAM ABSTRACTIONS, SEWAGE TREAT. WORKS, SEPTIC TANK |
| 4 | TAVY | WEST BRIDGE | R12C003 | 2.0 | UP-STREAM ABSTRACTIONS, EUTROPHICATION, LAND RUN-OFF, URBANISATION, STORM OVERFLOW |
| 5 | TAVY | BELOW CROWDALE STW | R12C023 | 2.1 | LAND RUN-OFF, UP-STREAM ABSTRACTIONS, SEWAGE TREATMENT WORKS, SPATES |
| 7 | TAVY | WASH FORD | R12C005 | 1.1 | LAND RUN-OFF, INDUSTRIAL DISCHARGE, SPATES |
| 8 | TAVY | DENHAM BRIDGE | R12C006 | 6.2 | LAND RUN-OFF, UP-STREAM ABSTRACTIONS, INDUSTRIAL DISCHARGES, SEPTIC TANKS, SPATE |
| 10 | TAMERTON FOLIOT STREAM | TAMERTON FOLIOT | R12B004 | 3.8 | STORM OVERFLOW, LAND RUN-OFF |
| 12 | MILTON BROOK | BELOW MILTON COMBE | R12B001 | 1.5 | LAND RUN-OFF, SEWAGE TREATMENT WORKS |
| 13 | WALKHAM | MERRIVALE BRIDGE | R12D001 | 8.9 | MOORLAND ORIGINS |
| 14 | WALKHAM | WARD BRIDGE | R12D002 | 3.6 | MOORLAND ORIGINS |
| 15 | WALKHAM | MAGPIE BRIDGE | R12D003 | 5.7 | LAND RUN-OFF, STORM OVERFLOW, SPATES |
| 22 | WALLABROOK | PRIOR TO RIVER TAVY | R12C011 | 5.6 | FARMING ACTIVITIES |
| 23 | BURN | PRIOR TO RIVER TAVY | R12C008 | 9.0 | FARMING ACTIVITIES, CANALISATION, SEPTIC TANKS |
| 25 | CHOLWELL BROOK | BROOK TAVY | R12C019 | 4.8 | HISTORIC MINING (OLD SPOIL HEAP), CATCHMENT GEOLOGY, MOORLAND |