

ENVIRONMENTAL PROTECTION



NRA

*National Rivers Authority
South West Region*

**River Seaton Catchment
River Water Quality
Classification 1990**

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

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RIVER WATER QUALITY IN THE RIVER SEATON CATCHMENT

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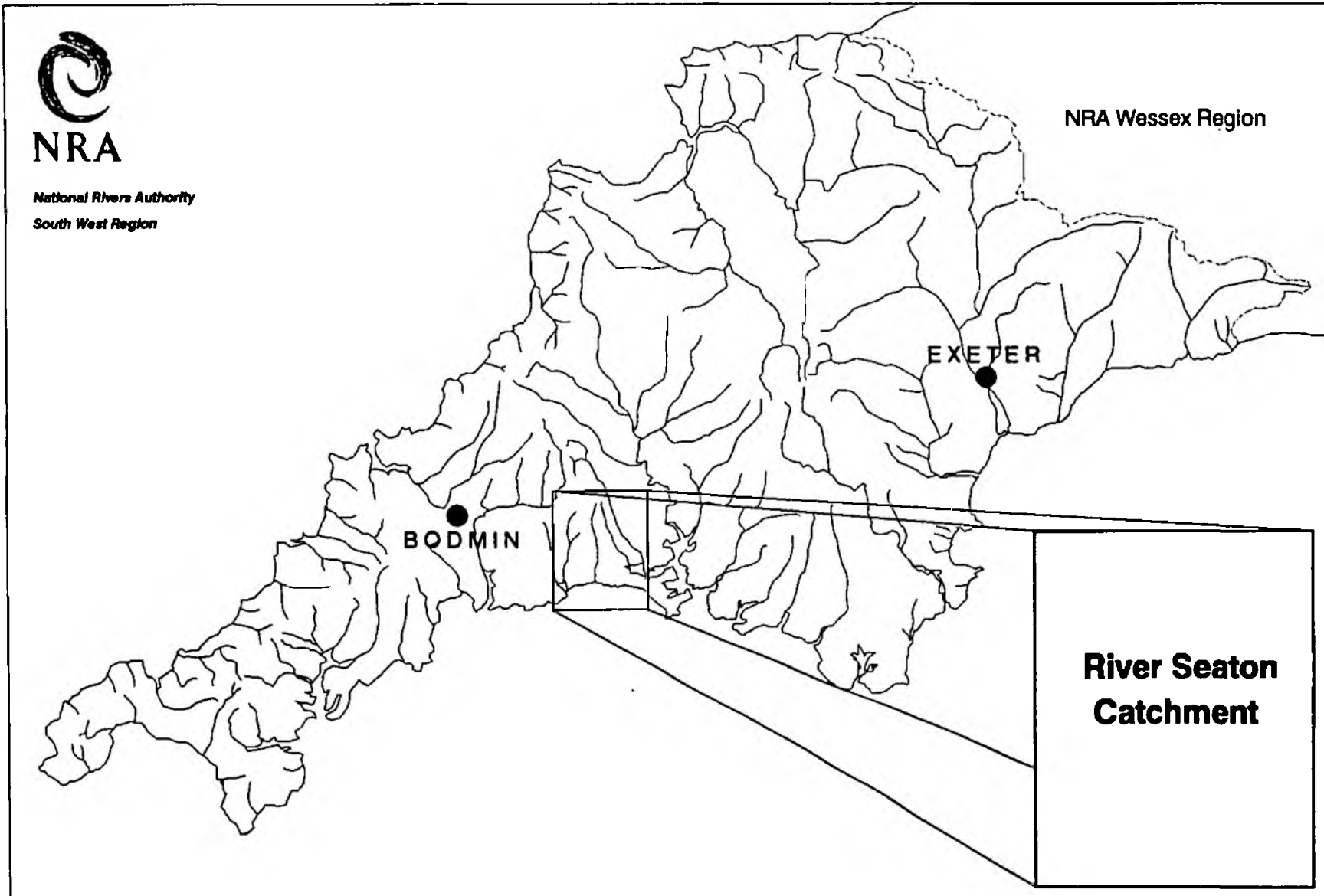
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**River Seaton
Catchment**

River Seaton 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 Seaton catchment.

2. RIVER SEATON CATCHMENT

The River Seaton flows over a distance of 20.5 km from its source to the tidal limit, (Appendix 10.1). Water quality was monitored at seven locations on the main river. All sites were sampled on eighteen occasions during 1990 because of no recent water quality data.

Throughout the Seaton catchment two secondary tributaries of the River Seaton were sampled on eighteen occasions during 1990 because of no recent water quality data.

2.1 SECONDARY TRIBUTARIES

The River Tremar flows over a distance of 3 km from its source to the confluence with the River Seaton, (Appendix 10.1) and was monitored at one location. Monitoring points are all located in the lower reaches.

The Menheniot Stream flows over a distance of 3.1 km from its source to the confluence with the River Seaton, (Appendix 10.1) and was monitored at one location. Monitoring points are all located in the lower reaches.

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

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

3. NATIONAL WATER COUNCIL'S RIVER CLASSIFICATION SYSTEM

3.1 River Quality Objectives

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

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

The RQOs currently in use in the River Seaton 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

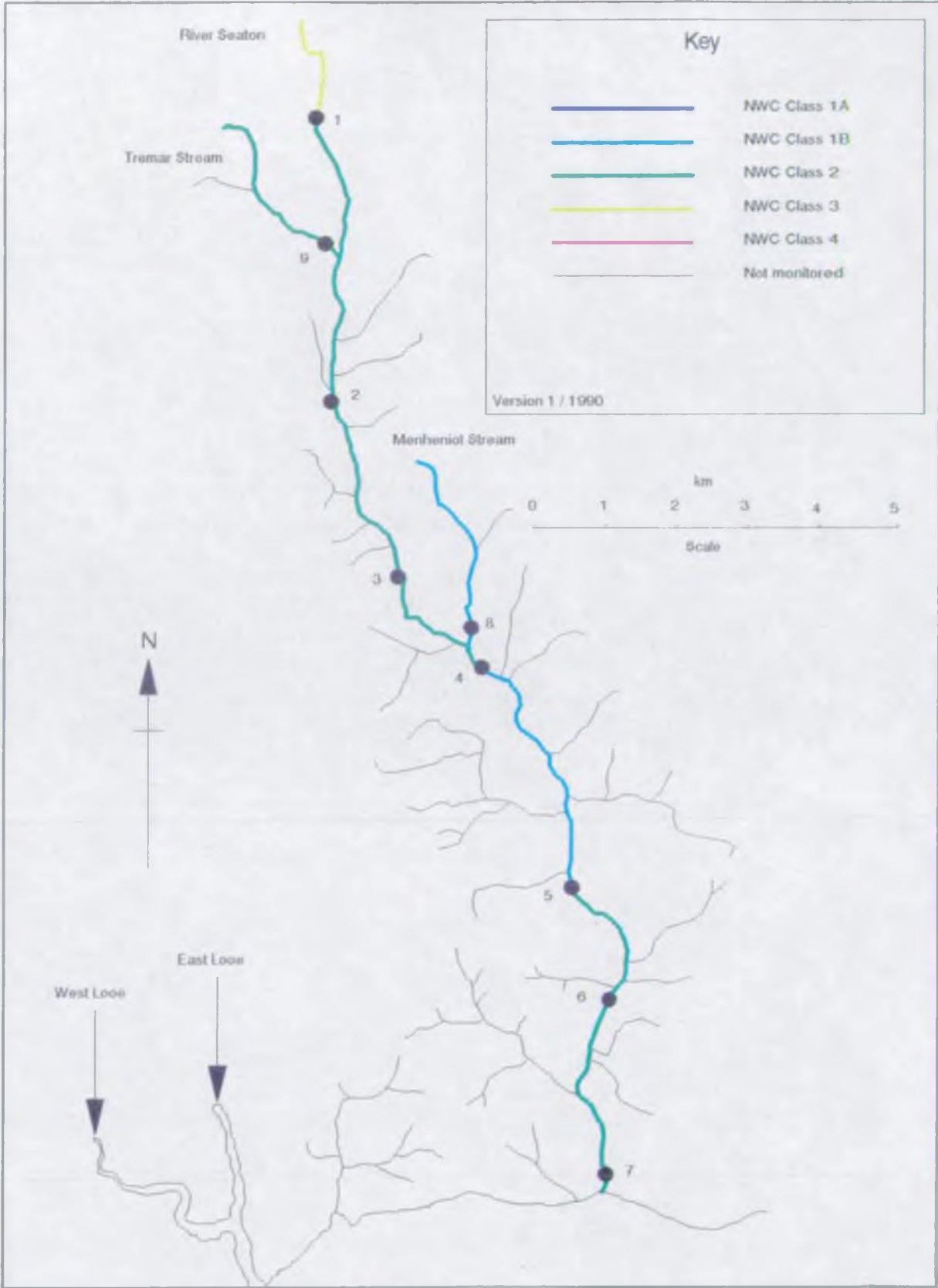
RIVER REACH	A segment of water, upstream from sampling point to the next sampling point.
RIVER LENGTH	River distance in kilometres.
RIVER QUALITY OBJECTIVE	That NWC class, which protects the most sensitive use of the water.
95 percentiles	Maximum limits, which must be met for at least 95% of the time.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

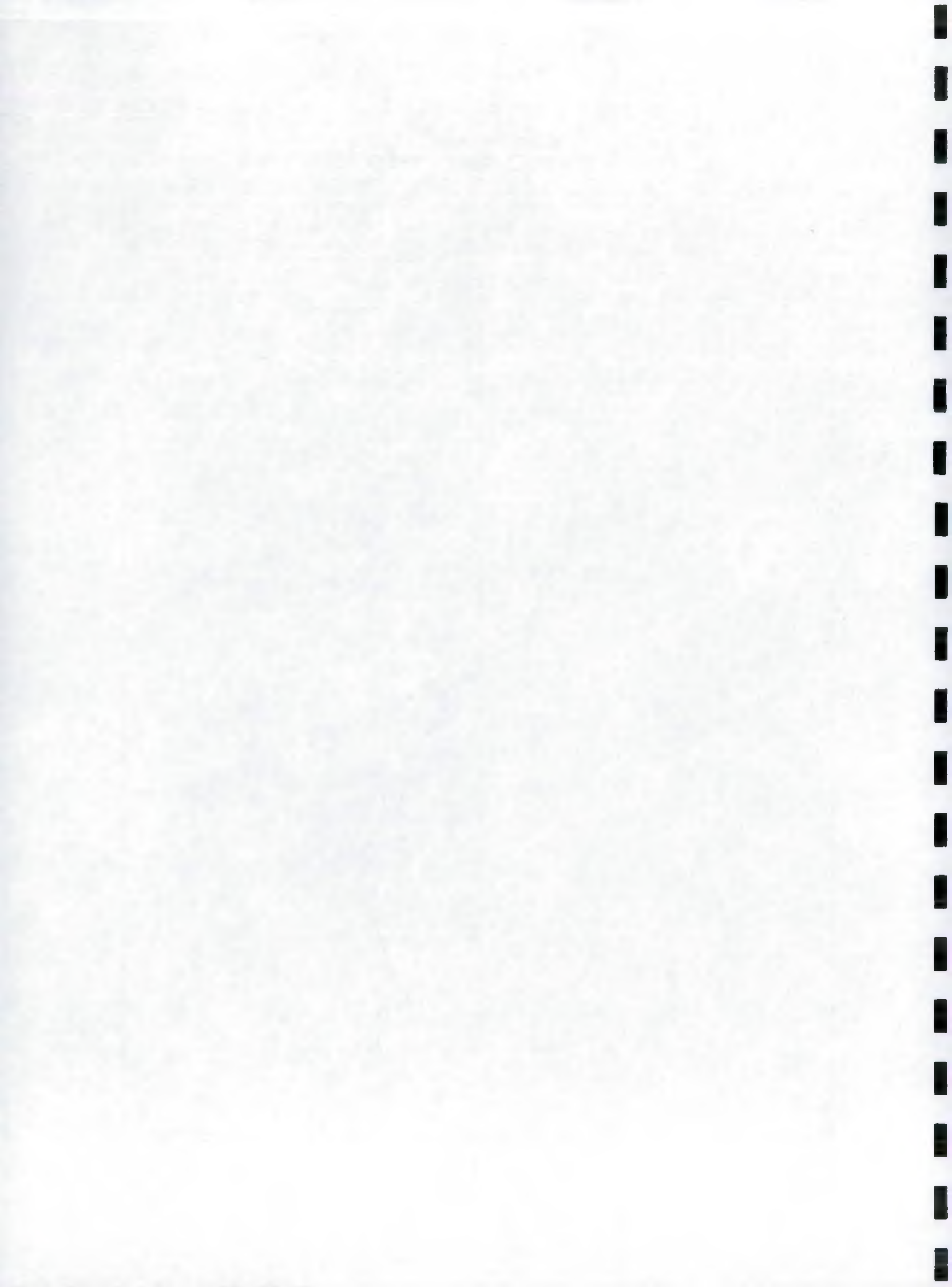
9. REFERENCES

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- 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.

Seaton Catchment Water Quality - 1990

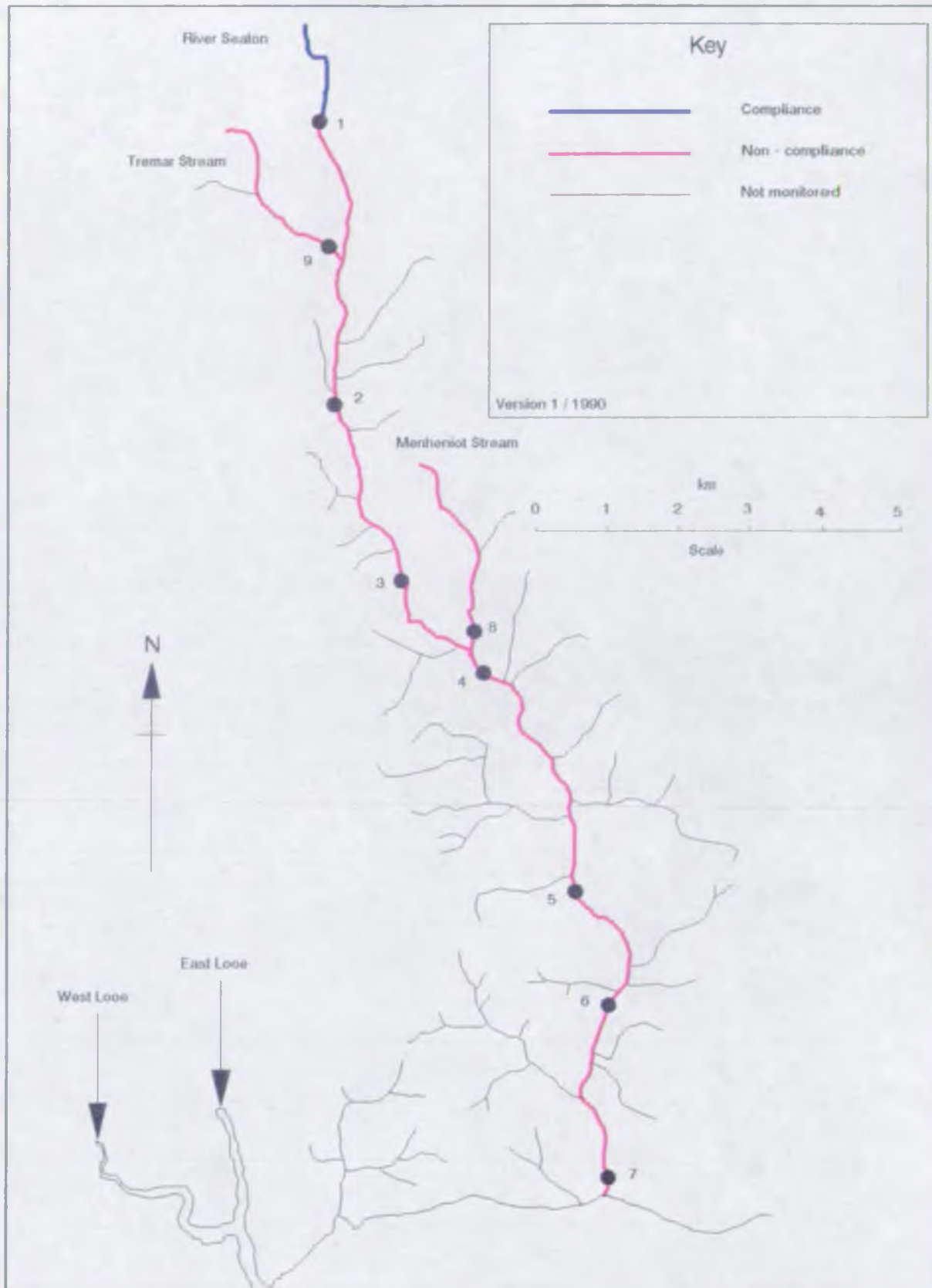




NL RIVERS AUTHORITY - SOUTH WEST REGION
 RIVER WATER QUALITY CLASSIFICATION
 FIELD DETERMINAND STATISTICS USED FOR QUALITY ASSESSMENT
 ENT: SECTION (15)

	Reach upstream of	User Ref. Number	90 %C Class	Calculated Determinand Statistics used for Quality Assessment																			
				pH Lower Class 5%ile		pH Upper Class 95%ile		Temperature Class 95%ile		DO (%) Class 5%ile		BOD (AU) Class 95%ile		Total Ammonia Class 95%ile		Union. Ammonia Class 95%ile		S.Solids Class Mean		Total Copper Class 95%ile		Total Zinc Class 95%ile	
	CROW'S NEST	[R13A001]	3	1A	5.8	1A	6.6	1A	14.9	1B	74.8	1A	2.0	1A	0.040	1A	0.010	1A	3.1	2	1209.0	3	835.9
	RENSDA BRIDGE	[R13A002]	2	1A	6.7	1A	7.5	1A	15.2	1B	78.0	1B	3.5	1A	0.280	1A	0.010	1A	15.3	2	212.0	1A	143.8
	ROSELAND	[R13A006]	2	1A	6.9	1A	7.8	1A	14.3	1A	80.6	1A	2.7	1A	0.188	1A	0.010	1A	11.9	2	117.6	1A	82.0
	COURTNEY'S MILL BRIDGE	[R13A003]	2	1A	7.2	1A	7.8	1A	14.8	1B	79.2	1A	2.6	1A	0.156	1A	0.010	1A	10.6	2	90.6	1A	62.2
	TREBROOK BRIDGE	[R13A007]	1B	1A	7.1	1A	8.0	1A	15.0	1B	76.8	1A	2.8	1A	0.232	1A	0.010	1A	11.6	1A	81.0	1A	44.4
	HESSONFORD	[R13A004]	2	1A	7.2	1A	8.1	1A	15.0	1A	84.8	1A	2.4	1A	0.148	1A	0.010	1A	10.1	2	60.8	1A	36.4
	SEPTON BEACH	[R13A005]	2	1A	7.2	1A	7.8	1A	15.0	1B	71.8	1A	2.5	1A	0.190	1A	0.010	1A	9.2	2	62.3	1A	37.0
JOY STREAM	LAIT FACILITY	[R13A009]	1B	1A	7.3	1A	8.1	1A	15.2	1B	77.1	1A	2.5	1B	0.311	1A	0.010	1A	21.9	1A	70.5	1A	75.8
STREAM	ROSEHALL DOC	[R13A008]	2	1A	6.2	1A	7.4	1A	14.6	1B	68.9	1A	2.3	1A	0.281	1A	0.010	1A	9.4	2	442.6	2	274.6

Seaton 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)

CRUCHEMENT: SECTION (15)

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
SECTION	CROW'S NEST	RL3A001	31	-	31	-	30	-	30	-	31	-	31	-	22	-	31	-	30	-	30	-
SECTION	HENDRA BRIDGE	RL3A002	31	-	31	-	31	-	31	1	31	1	31	1	31	-	31	5	31	29	31	-
SECTION	ROSELAND	RL3A006	31	-	31	-	31	-	31	1	31	-	31	-	31	-	31	4	31	27	31	-
SECTION	COURNEY'S MILL BRIDGE	RL3A003	31	-	31	-	31	-	31	1	31	-	31	-	31	-	31	3	31	17	31	-
SECTION	TREHONNERIDGE	RL3A007	31	-	31	-	30	-	30	2	31	-	31	-	29	-	31	3	31	-	31	-
SECTION	HESSENFORD	RL3A004	31	-	31	-	30	-	30	-	31	-	31	-	29	-	31	4	31	4	31	-
SECTION	SECTION BEACH	RL3A005	40	-	40	-	38	-	38	-	40	-	40	-	37	-	40	2	33	3	33	-
MENENDOT STREAM	AT FACTORY	RL3A009	21	-	21	-	21	-	21	2	21	-	21	1	20	-	21	4	21	-	21	-
TREMPER STREAM	ROSECRADDO	RL3A008	21	-	21	-	21	-	21	1	21	-	21	-	21	-	21	1	21	14	21	7

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 1990 RIVER WATER QUALITY CLASSIFICATION
 PERCENTAGE EXCEEDENCE OF DETERMINAND STATISTICS FROM QUALITY STANDARDS
 CATCHMENT: SEATON (15)

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
SEATON	CROW'S NEST	R13A001	-	-	-	-	-	-	-	-	-	-
SEATON	HENDRA BRIDGE	R13A002	-	-	-	3	15	-	-	-	864	-
SEATON	ROSELAND	R13A006	-	-	-	-	-	-	-	-	194	-
SEATON	COURTNEY'S MILL BRIDGE	R13A003	-	-	-	1	-	-	-	-	127	-
SEATON	TREBROWN BRIDGE	R13A007	-	-	-	4	-	-	-	-	-	-
SEATON	HESSENFORD	R13A004	-	-	-	-	-	-	-	-	52	-
SEATON	SEATON BEACH	R13A005	-	-	-	-	-	-	-	-	56	-
MENHENIOT STREAM	AT FACTORY	R13A009	-	-	-	4	-	-	-	-	-	-
TREMAR STREAM	ROSECRADDOC	R13A008	-	-	-	14	-	-	-	-	1912	37

NATIONAL RIVERS AUTHORITY - SOUTH WEST REGION
 IDENTIFICATION OF POSSIBLE CAUSES OF NON-COMPLIANCE WITH RQO
 CATCHMENT: SEATON (15)

1990 Map Position Number	River	Reach upstream of	User Reference Number	Reach Length (km)	Possible causes of non-compliance
2	SEATON	HENDRA BRIDGE	R13A002	4.2	URBANISATION, STORM OVERFLOWS, MINING, CATCHMENT GEOLOGY, LAND RUN-OFF
3	SEATON	ROSELAND	R13A006	3.1	MINING, CATCHMENT GEOLOGY
4	SEATON	COURTNEY'S MILL BRIDGE	R13A003	2.6	MINING
5	SEATON	TREBROWNERIDGE	R13A007	2.6	LAND RUN-OFF, MINING
6	SEATON	HESSENFORD	R13A004	2.7	CANALISATION, SEWAGE TREATMENT WORKS, MINING, CATCHMENT GEOLOGY
7	SEATON	SEATON BEACH	R13A005	3.4	MINING, CATCHMENT GEOLOGY
8	MENHENTOT STREAM	AT FACTORY	R13A009	3.1	LAND RUN-OFF, SEWAGE TREATMENT WORKS
9	TREMAR STREAM	ROSECRADDOC	R13A008	2.8	CATCHMENT GEOLOGY, MINING