

Environmental Protection Internal Report

**REGIONAL WATER QUALITY
MONITORING AND SURVEILLANCE
PROGRAMME FOR 1993**

**BIOLOGICAL IMPACT ASSESSMENT OF
DISCHARGES ON RECEIVING WATERS**

**November 1992
FWS/92/022**

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South West Region*

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INTERNAL REPORT FWS/92/022

SUMMARY

This report describes the routine biological discharge monitoring programme to be undertaken by NRA South West Region in 1993.

The complete monitoring programme covers all South West Water Service's sewage treatment works with descriptive consents (approximately 200) and all fish farms (approximately 100) in the region, together with about 30 trade effluent discharges. Consented farm discharges are no longer included in this programme. The trade discharges are listed in this report: sewage works and fish farms are listed in Monitoring programme and consent details for monitored discharges on the South West Region produced by Quality Regulations Section.

It is estimated that the programme will take five years to complete. This five-year rolling programme commenced in 1992. In 1992, samples were collected from approximately 70 discharges. It was estimated that about twice that many could have been surveyed if the information on the discharges and their location was more accurate. Checking the NRA's existing information on the location and nature of the discharges by field reconnaissance to improve its accuracy is an important secondary objective of the programme.

Each discharge is to be surveyed once, and samples are to be taken upstream and downstream from the discharges. Each year, selected catchments will be targeted. In 1992 the Torridge catchment was covered. The order of priority for 1993 is: Tamar, Tavy, Lynher, Plym, Axe, Sid, Otter, Lim, Exe, Taw.

The NRA's standard methods for biological river quality monitoring using invertebrates are to be used. Samples are to be taken between March and November.

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1. INTRODUCTION TO THE 1993 ROUTINE DISCHARGE MONITORING PROGRAMME

This report describes NRA South West Region's routine biological discharge monitoring programme for 1993. The programme was initiated in Autumn 1991, and work started in 1992.

1.1 Scope of the routine biological discharge monitoring programme

This monitoring programme is not aimed at all discharges, but at selected types:

- ♦ Sewage Treatment Works (STWs) owned by South West Water Services with descriptive consents. Descriptive consents do not specify a range of concentrations or loadings of chemical determinands that the discharge should comply with, but state that the discharge should have no detrimental effect on the water or ecological quality of the receiving water. The consents of STWs that are found to have a detrimental impact on the receiving water will be reviewed; they will be issued with numerical consents that specify concentrations or loadings of a number of chemical determinands with which the discharge must comply.
- ♦ Fish farm discharges. Consents for fish farms have only recently been issued. Their effects on the rivers in the South West Region have never been comprehensively assessed.
- ♦ Trade effluent discharges. A selected number of trade effluent discharges have been included in the programme, and are to be surveyed as a matter of urgency in 1992. This includes a number of discharges from agricultural processors, china-clay works, and a small number of discharges which, whilst complying with their numerical consents, are suspected of having a detrimental effect on their receiving waters.

Consented farm discharges are no longer included in this programme. Any consented farm discharges remaining after the major review of consents in 1992/93 will be monitored by pollution control staff.

This monitoring programme complements a similar, but more extensive chemical monitoring programme. There is a separate biological monitoring programme to assess the effectiveness of South West Water Services' sewage works capital improvement programme: this is to be undertaken by the Freshwater Investigations Team.

1.2 Aim of the routine biological discharge monitoring programme

The aim of the routine biological discharge monitoring programme is to monitor the ecological impacts of selected types of discharges in the South West Region on their receiving waters. It is to provide information to enable the effectiveness of existing consents for protecting water quality to be assessed, and to identify discharges where the consent conditions may need

to be revised.

Some of the information that the Quality Regulations Section have on these discharges may be inaccurate or erroneous. Although an attempt will be made to supply the Field Control biologists with the most accurate information available, some of the errors can only be corrected by a field visit. The correction of these errors is an important component of this programme, particularly as it represents the only monitoring of some discharges.

1.3 Objectives

- To provide an economical means of screening the impact of discharges not monitored in other discharge monitoring programmes.
- To complement a chemical monitoring programme of selected discharges to identify:
 - those that have a substantial impact on their receiving waters and which may be transgressing their consent conditions;
 - those that are not exceeding their consent conditions, but have an adverse impact on river quality, and which may require a review of their consent;
 - sewage works which should be added to the capital improvement scheme.
- To provide evidence when consent conditions have been infringed for:
 - legal proceedings;
 - identifying where special investigations may be required.
- To provide baseline data against which the effectiveness of improvements or remedial measures can be assessed.
- To provide an overview of the effect of certain categories of discharge on the water and ecological quality of rivers in the South West Region.
- To verify information that the NRA holds on discharges (for example its type, location, National Grid Reference, receiving watercourse) that is given on the consent document and Quality Regulation Section's schedules.

The monitoring sites are to be photographed, and site location notes recorded (with sketch map and photographs) in the same manner as for routine biological monitoring sites in the river quality programme.

All sample processing must be done in the laboratory, other than the removal of large objects such as stones or weed (which must be washed in the sampling net to retain any animals) which may be done in the field. The invertebrate sample from the site downstream from the discharge will be processed first. If that sample indicates good biological quality, the discharge will be considered to have no significant detrimental impact on the biological quality of the receiving water, provided that sewage fungus, algal and macrophyte growth are also unaffected. In these cases, the sample taken ~~upstream from the discharge will not need to be processed.~~

2.3 Data analysis and reporting

Discharges that are clearly polluting will be reported to Pollution Control by field biologists immediately.

The results of the surveys will be transferred to the Freshwater Science Section for loading onto the biological database and for reporting, on a weekly basis. The results will be reported by the Freshwater Science Section to Quality Regulations Section on a weekly basis. The format of these reports has not been decided yet, but is likely to be similar to the weekly reports written for the biological river quality monitoring programme. The results of the whole survey will be also reported at the end of the year.

The evaluation of impact will be determined by the Field Control biologists with the help of the Freshwater Science Section. The severity of any detrimental impacts will be determined by comparing the biotas from the downstream sites with those from the corresponding upstream sites, and will be expressed as taxonomic deficits, and deficits in commonly used biotic indices such as BMWP-score and ASPT. Where feasible, the absolute impact of the discharges may be placed on a universal scale using Environmental Quality Indices (EQIs) based on comparisons with RIVPACS predictions.

Errors or inaccuracies in the Quality Regulation Section's schedules or on the consent documents will be reported, even if the discharge is unsuitable for biological monitoring in this programme. The correction of these errors by field reconnaissance is an important component of the programme. Sites that are unsuitable for biological monitoring because of other reasons will also be reported.

3 PROGRAMME INFORMATION

3.1 The Catchments given priority in 1993

Discharges are to be surveyed by catchment in the following order of priority:

- | | |
|------------------------------|-----------|
| 1. Torridge (completed 1992) | 8. Otter |
| 2. Tamar | 9. Lim |
| 3. Tavy | 10. Exe |
| 4. Lynher | 11. Taw |
| 5. Plym | 12. Camel |
| 6. Axe | 13. Erme |
| 7. Sid | |

This order is based on the need for a Tamar Catchment Management Plan (which includes the Plym), and Water Quality Management Plans for the introduction of Statutory Water Quality Objectives (SWQOs) in two catchment areas; the rest follow the Catchment Action Plans priority system. Currently, it is most likely that SWQOs will be introduced on the East Devon (incorporating the Lim, Axe, Sid, and Otter) and Exe catchments, it is possible however that they will be introduced on different catchments. It may be necessary therefore to change this order of priority, depending on the outcome of the Corporate Plan.

3.2 Discharges included in the programme

The discharges to be included in the programme are listed in the report Monitoring Programme and Consent Details for Monitored Discharges in the South West Region produced by Quality Regulations Section and updated quarterly. All STWs with descriptive consents and all fish farms are to be included in the monitoring programme. Trade effluents to be included are listed in Table 3.1. Note that in Quality Regulation's document, fish farms and trade wastes are incorporated in the tables entitled 'Non-plc Trade'.

In addition to the discharges mentioned above, two STWs with numerical consent conditions are also included in this programme. They were previously included in the routine biological river quality monitoring programme, and were surveyed in 1990, 1991, and 1992.

Table 3.1 STWs with numerical consents included in the routine biological discharge monitoring programme

Catchment	Works	Receiving watercourse	NGR
OTTER-4B	Talaton STW	Talaton Stream	SY 0765 9855
EXE-5D	Aylesbeare STW	Aylesbeare Stream	SY 0338 9186

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ROUTINE BIOLOGICAL MONITORING OF DISCHARGES 1993 - TRADE DISCHARGES

DISCHARGE	U.R.N.
DAIRY CREST CHARD CREAMERY, CHARD JUNCTION	P02C/P/14
EXPRESS DAIRY CO LTD HONITON CREAMERY WASTES	P04B/P/21
ST REGIS(UK)CO LTD, HIGHER KINGS MILL, CULLOMPTON	P05C/P/33
ST REGIS(UK)CO LTD, SILVERTON MILL, HELE	P05C/P/34
STRONG RAWLE & STRONG WILLAND, TIVERTON JUNCTION	P05C/P/36
ST IVEL LTD, STATION ROAD, HEMYOCK	P05C/P/37
J BIBBEY & SONS - DEVON VALLEY MILL	P05C/P/38
LLOYD MAUNDER TIVERTON JUNCTION WILLAND	P05C/P/59
ASHLEY TIP, TIVERTON	P05E/P/35
JOHN HEATHCOAT & CO LTD, TIVERTON	P05E/P/36
HIGHER KILN (MONTHLY) 4 SITES	Catchment 5G
HIGHER KILN (BI-ANNUALLY) 8 SITES	Catchment 5G
HEATHFIELD TIP TREATMENT UNIT, KINGSTEIGNTON	P06B/P/41
WBB BALL CLAY - S.D.24	R06B041
WIGGINS TEAPE LTD, IVYBRIDGE	P09B/P/5
AMBROSIA CREAMERY S T W - EFFLUENT	P12F/P/7
DAIRY CREST CREAMERY, DAVIDSTOW	P12P/P/5
MERTON/MEETH COMBINED	R29B009
MERTON/MEETH COMBINED U/S GREATWOOD	R29B030
MERTON/MEETH COMBINED D/S GREATWOOD	R29B031
MELDON QUARRY, OKEHAMPTON	R29B018
MERETON (WATTS, BLAKE & BEARNE) U/S ND5	R29B015
MERETON (WATTS, BLAKE & BEARNE) ND5	R29B025
MERETON (WATTS, BLAKE & BEARNE) D/S ND6	R29B008
MERETON (WATTS, BLAKE & BEARNE) COURT MOOR	R29B016
MERETON (WATTS, BLAKE & BEARNE) ND6	R29B026
MEETH (ENGLISH CHINA CLAY) QUARRY U/S MEETH	R29B005
MEETH (ENGLISH CHINA CLAY) QUARRY MEETH ND1	R29B022
MEETH (ENGLISH CHINA CLAY) QUARRY WOOLADON ND2	R29B023
MEETH (ENGLISH CHINA CLAY) QUARRY D/S ND1	R29B011
MEETH (ENGLISH CHINA CLAY) QUARRY STOCKLEIGH ND7	R29B027
MEETH (ENGLISH CHINA CLAY) QUARRY D/S ND7	R29B012
MEETH (ENGLISH CHINA CLAY) QUARRY ND3	R29B029
MEETH (ENGLISH CHINA CLAY) QUARRY D/S ND3	R29B013
DEEP MOOR TIP, TORRINGTON EAST	R29B019
HATHERLEIGH ABATTOIR AND CATTLE MARKET A	P29C/P/10A
HATHERLEIGH ABATTOIR AND CATTLE MARKET B	P29C/P/10B
EXPRESS DAIRY FOODS LTD NORTH TAWTON - TREATED EFFLUENT	P30C/P/6

J MURRAY-BLIGH 25 November 1992
 biolischargeprogtrade.W20

Table 3.2
 Trade discharges included in the routine biological discharge
 monitoring programme

N.G.R.	DATE	FOLIO
ST 3380 0460	10/08/83	SWWA 283
ST 1500 0060	17/03/81	DRA 1067
ST 0310 0820	21/09/87	SWWA 884
SS 9760 0110	11/01/91	NRA-SWR-2494
ST 0310 1150	22/11/79	SWWA 116
ST 1400 1390	30/10/85	SWWA 615
SS 9930 0250	23/03/72	DRA 1548/1547
ST 0301 1141	03/08/90	NRA-SWR-1920
SS 9490 0950		
SS 9520 1280	11/12/79	SWWA 118
see Quality Regulations Section		
see Quality Regulations Section		
SX 8460 7630	26/08/81	SWWA 181
SX 8600 7270		
SX 6340 5660	08/11/90	NRA-SW-2322
SX 3970 8490	21/04/81	15/47/51/P/7
SX 1580 8690	15/10/87	3052/6/120
SS 5500 1285		
SS 5515 1290		
SS 5510 1305		
SX 5649 9294	01/04/91	NRA-SWR-2658
SS 5030 1325		
SS 5100 1270		
SS 5100 1235		
SS 5160 1180		
SS 5265 1135		
SS 5330 0840		
SS 5330 0840		
SS 5330 0840		
SS 5315 0885		
SS 5310 0890		
SS 5305 0950		
SS 5305 0906		
SS 5260 1115		
SS 5235 2082		
SS 5303 0474	08/02/74	DRA 1565
SS 5320 0501	"	"
SS 6550 0140	21/04/81	DRA 1544

Furse, M.T., Wright, J.F., Armitage, P.D. and Moss, D. (1986) A practical manual for the classification and prediction of macro-invertebrate communities in running water in Great Britain. Preliminary version. Wareham: Freshwater Biological Association.

National Rivers Authority (1990) RIVPACS field sampling. Video recording. Birmingham: Spectrum Communications.