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## DEVON AREA INTERNAL REPORT

**AN INVESTIGATION INTO POSSIBLE  
CAUSES OF POOR WATER QUALITY AT  
NYMPHAYES BRIDGE (R30D009) ON THE  
GISSAGE LAKE**

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**Author: P ROSE  
INVESTIGATIONS TECHNICIAN**

*National Rivers Authority  
South Western Region*

**G R Bateman  
Area Manager (Devon)**

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# **AN INVESTIGATION INTO POSSIBLE CAUSES OF POOR WATER QUALITY AT NYMPHAYES BRIDGE (R30D009) ON THE GISSAGE LAKE.**

## **1. INTRODUCTION**

The Gissage Lake is a tributary of the Lapford Yeo which rises at Vennpark Moor, west of Zeal Monachorum. The river flows east then north east for approximately 5 km before its confluence with the Lapford Yeo in the region of Nymphayes.

There is one site on the Gissage Lake routinely chemically monitored. Nymphayes Bridge (R30D009 at NGR SS 7270 0508) has a current short term River Ecosystem Use (RE) Class target of 3 and a long term target of 2.

## **2. TERMS OF REFERENCE**

### **2.1 OBJECTIVES**

A request was received from Regional Quality Planning to briefly investigate the area above Nymphayes Bridge. Classification of the river based on the routine chemical monitoring programme would fail to reach the long term River Quality Objective (RQO) of RE class 2.

In this study, the area concerned has been investigated to identify possible cause of poor water quality of the watercourse.

### **2.3 PROJECT TEAM**

- T. Cronin (Project Leader)
- P. Rose (Project Manager, author)
- R. Pearson (Project Technician)

## **3. METHOD**

1. Analysis of routine water quality data to establish any trends and / or relationships between water quality and other factors such as rainfall and drought.
2. Talk to Water Quality Officers (WQO) to ascertain possible problem areas.
3. Carry out a catchment investigation using sewage fungus as a primary indicator to track down problem areas.
4. Inform the WQO for the area of any major inputs that are causing impact in the watercourse.



## 4. RESULTS

### 4.1 HISTORIC RESULTS

Analysis of routine water quality data taken at Nymphayes Bridge between the period of 01 January 1993 and 23 October 1995 (see APPENDIX I) show the following exceedances (using RE class 2 EQS's, see APPENDIX II):

BOD	8	(from 41 samples taken) EQS = 4.0 mg/l as 90 %-ile
Total ammonia	1	(from 41 samples taken) EQS = 0.60 mg/l as 95 %-ile

The majority of exceedances were associated with rainfall.

### 4.2 INVESTIGATION RESULTS

See proformas enclosed.

## 5. DISCUSSION

The land drain pipe at the Great Wooden area was the only discharge to be entering the water course at the time of the investigation (approximately 0.3 litres per second). Although the results from the water samples taken showed no chemical impact downstream of the pipe, there was an impact with regard to sewage fungus cover (approximately 10 % cover downstream and only a trace cover upstream). Sewage fungus cover within the pipe was 100% and was present in large established colonies.

It is possible that the drainage pipe could be connected in some way to a septic tank / waste water system of a near-by property hence the smell and sewage fungus present.

The cattle drinking area in the field south of Lower Crosspark Copse is probably a contributing factor to the exceedances although the field did not have cattle in the time of the investigation. The tributary has approximately 10 % cover of sewage fungus and the substrate was very muddy / silty.

The watercourse from the routine monitoring site up to the head-waters has a slight silty covering to the substrate. This is probably due to the nature of the soil in the area; the banks and some of the substrate has dense brown and grey clays present which are exposed throughout the length of the stream.

**6. CONCLUSION**

1. No inputs resulting in exceedance of WQS's downstream were identified at the time of the investigation
2. A land drainage pipe at Great Wooden maybe connected in some way to a septic tank or waste water system and may require remedial action / consenting,
3. A cattle drinking area is probably resulting in exceedances of EQS's downstream when being used during wet weather conditions.
4. A fine covering of silt on the substrate throughout the length of the water course at the time of investigation may be due to the natural podology of the area.

**7. RECOMMENDATIONS**

1. Field drainage pipe at Great Wooden to be visited by WQO.
2. Cattle drinking area to be visited by WQO.
3. Chemical survey to be carried out during wet weather conditions by Investigations Devon Area.



**SITE:** Land drain pipe, Great Wooden

**WATERCOURSE** Gissage Lake

**NGR** SS 7036 0372

**EVIDENCE OF WATER QUALITY PROBLEM**

Field land drain pipe with 100 % sewage fungus cover within mouth of the pipe. Approximately 10 % sewage fungus cover downstream of pipe, trace upstream. Discharge smelt like off-milk. Chemical samples indicated no EQS exceedance in receiving water.

**SOURCE OF PROBLEM:**

Land drain pipe, possibly connected to a septic tank / dirty water system of some kind. Discharge running at approximately 0.3 litres per second.



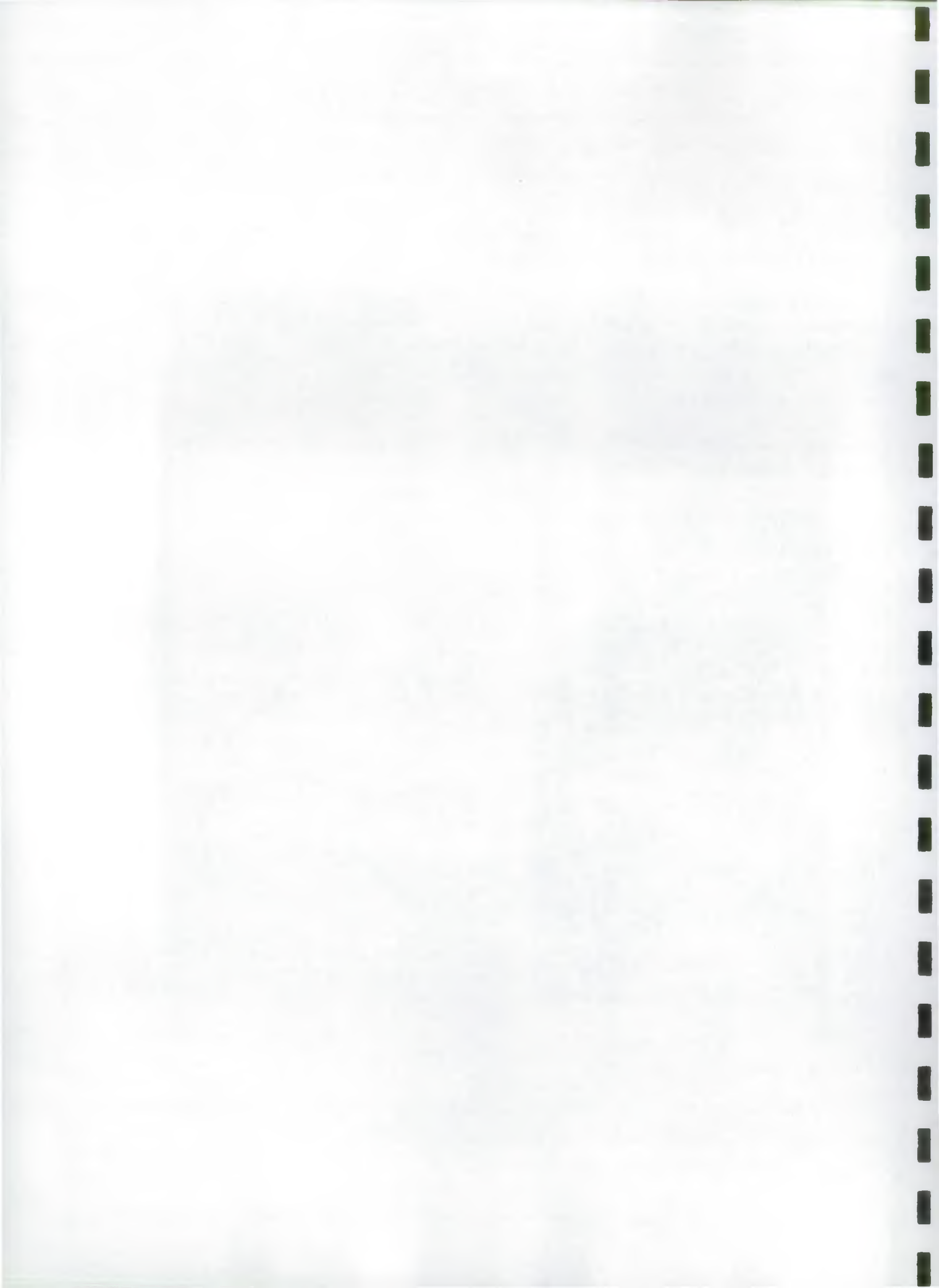
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**IMPLICATIONS:**

Although the samples taken did not exceed EQS's, origin of the contamination needs to be ascertained

**RECOMMENDATIONS:**

The Water Quality Officer to visit the site.



**SITE:** Cattle drinking area, Crosspark Copse

**WATERCOURSE** Tributary of Gissage Lake

**NGR** SS 7067 0347

**EVIDENCE OF WATER QUALITY PROBLEM**

A tributary entering Gissage Lake had 10 % sewage fungus cover. Impact on Gissage lake difficult to determine due to close upstream input (see Field drain Pipe). Tributary much more muddy / silty than rest of watercourse.

**SOURCE OF PROBLEM:**

Cattle drinking area in field. Stream entering drinking basin and overflowing to form very muddy area. Cattle will trample / defecate in this area whilst drinking. Problem will be exacerbated during wet weather.



**IMPLICATIONS:**

No samples were taken during the investigation as no cattle were in the field. During periods of wet weather when the cattle are in the field it is possible that there could be an impact in Gissage Lake.

**RECOMMENDATIONS:**

The Water Quality Officer to visit the site.  
Investigations Team Devon Area to carry out Wet Weather survey.

**APPENDIX I**



## ANALYTICAL SUMMARY OF:-

## GISSAGE LAKE AT NYMPHAYES BRIDGE

Date	Time	Type	Mat	BOD ATU MG/L	OXYGEN DISS % SATN	AMMON- IA MG/L N
240394	1210	SQMR	2F	2.0	97	0.06
250494	0930	SQMR	2F	1.2	101	0.02<
150694	1200	SQMR	2F	2.1	94	0.02<
150794	1410	SQMR	2F	1.2	89	0.02<
310894	1110	SQMR	2F	2.0	99	0.02
051094	1500	SQMR	2F	1.6	92	0.02<
191094	0945	SQMR	2F	4.2	109	0.02<
181194	1015	SQMR	2F	7.4	93	0.11
121294	1420	SQMR	2F	1.1	100	0.02
270195	1150	SQMR	2F	1.4	98	0.04
140295	0900	SQMR	2F	1.2	103	0.13

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## ANALYTICAL SUMMARY OF:-

## GISSAGE LAKE AT NYMPHAYES BRIDGE

Date	Time	Type	Mat	BOD ATU MG/L	OXYGEN DISS % SATN	AMMON- IA MG/L N
150895	1320	SQMR	2F	1.4	99	0.03<
040495	1225	SQMR	2F	1.2	96	0.03<
250495	1055	SQMR	2F	4.9	96	1.50
060695	1345	SQMR	2F	2.2	96	0.04
120795	1325	SQMR	2F	8.7	63	0.04
150995	1440	SQMR	2F	2.0<	80	0.17
091095	1120	SQMR	2F	1.3	74	0.03
231095	1240	SQMR	2F	1.2	75	0.03<

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TYPE ONLINE READY

## ANALYTICAL SUMMARY OF:-

## GISSAGE LAKE AT NYMPHAYES BRIDGE

Date	Time	Type	Purp	Mat	BOD ATU MG/L	OXYGEN DISS % SATN	AMMON- IA MG/L N
290193	1405	SQMR		2F	1.00	97	0.03
120293	1025	SQMR		2F	1.00	96	0.03
250293	1310	SQMR		2F	1.5	96	0.020
150393	1450	SQMR		2F	1.5	112	0.020
240393	1000	SQMR		2F	3.3	96	0.03
080493	1540	SQMR		2F	1.6	94	0.02
200493	1035	SQMR		2F	1.1	94	0.02
120593	1350	SQMR		2F	2.0	94	0.03

## ANALYTICAL SUMMARY OF:-

## GISSAGE LAKE AT NYMPHAYES BRIDGE

Date	Time	Type	Purp	Mat	BOD ATU MG/L	OXYGEN DISS % SATN	AMMON- IA MG/L N
290793	0955	SQMR		2F	1.1	103	0.020
080993	1055	SQMR		2F	6.4	85	0.20
071093	1640	SQMR		2F	1.2	87	0.020
221093	1110	SQMR		2F	2.2	98	0.020
031193	1340	SQMR		2F	2.7	87	0.020
111193	0930	SQMR		2F	5.5	81	0.07
241193	1045	SQMR		2F	1.5	96	0.04
061293	1030	SQMR		2F	1.7	93	0.02
120194	1035	SQMR		2F	1.3	95	0.11
070294	1215	SQMR		2F	1.2	93	0.05
250294	1150	SQMR		2F	1.00	96	0.07

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**APPENDIX II**

TABLE 1 : STANDARDS FOR THE FIVE RIVER ECOSYSTEM USE CLASSES

Use Class	DO % sat 10%ile	BOD (ATU) mg/l 90%ile	Total Ammonia mgN/l 95%ile	Un-ionised Ammonia mgN/l 95%ile	pH 5%ile & 95%ile	Hardness mg/l CaCO <sub>3</sub>	Dissolved Copper µg/l 95%ile	Total Zinc µg/l 95%ile	Class Description
1	80	2.5	0.25	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	30 200 300 500	Water of very good quality suitable for all fish species
2	70	4.0	0.6	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	30 200 300 500	Water of good quality suitable for all fish species
3	60	6.0	1.3	0.021	6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for high class coarse fish populations
4	50	8.0	2.5		6.0 - 9.0	≤ 10 > 10 and ≤ 50 > 50 and ≤ 100 > 100	5 22 40 112	300 700 1000 2000	Water of fair quality suitable for coarse fish populations
5	20	15.0	9.0						Water of poor quality which is likely to limit coarse fish populations

