

Environmental Protection Report

AN ASSESSMENT OF WATER QUALITY AT NANSMELLYN MARSH

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NRA

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South West Region

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1. INTRODUCTION.

An investigation was carried out on 26 August 1992 at Nansmellyn Marsh following concern by the NRA South West over a proposal from Cornwall Trust for Nature Conservation (CTNC) to manage the marsh and create open pools of water thereby changing the structure of the marsh.

The proposed change in marsh structure could affect the functional ability of the marsh to remove metals from the Budnic adit (identified in Figure 1) which discharges from the Budnic Consuls lead and tin mine. Ultimately, this could affect water quality in the Bolingey Stream.

Therefore, the purpose of the investigation was to ascertain whether Nansmellyn Marsh does, in fact, protect the Bolingey Stream from potential metal pollution.

2. RESULTS (see Table 1)

Five sites were sampled: the mine adit (site 1), two discharges from the marsh to the Bolingey Stream (sites 3 & 4) and the Bolingey Stream upstream and downstream of the marsh (sites 2 & 5).

Results from this single survey are compared with Environmental Quality Standards (EQS's) for the protection of salmonid fish, taken from the EC Dangerous Substances Directive.

The discharge from the mine adit was not particularly acidic (pH 6) but had high concentrations of dissolved Iron (Fe), Total Zinc (Zn) and Cadmium (Cd).

The marsh was very effective at removing metals, to concentrations that were generally less than those in the Bolingey Stream.

Zinc concentrations in the Bolingey Stream exceeded the EQS both upstream and downstream of Nansmellyn Marsh.

3. DISCUSSION

At the low flows observed on 26 August 1992, it is apparent that Nansmellyn Marsh was removing metals from the mine adit discharge and therefore protecting the Bolingey Stream from further metalliferous pollution.

The situation when the adit is discharging at higher volume may be considerably different.

4. RECOMMENDATIONS

- (i) It is recommended that the filtering capacity of the marsh is unaltered. The mine adit should not be allowed to discharge directly to open pools or the Bolingey Stream.

Action - Conservation Officer

ENVIRONMENT AGENCY



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(ii) The potential for proposing a water protection zone should be determined.

Action - Water Quality Planner

Figure 1. Location of sampling sites at Nansmellyn Marsh and Bolingey Stream on 26 August 1992.

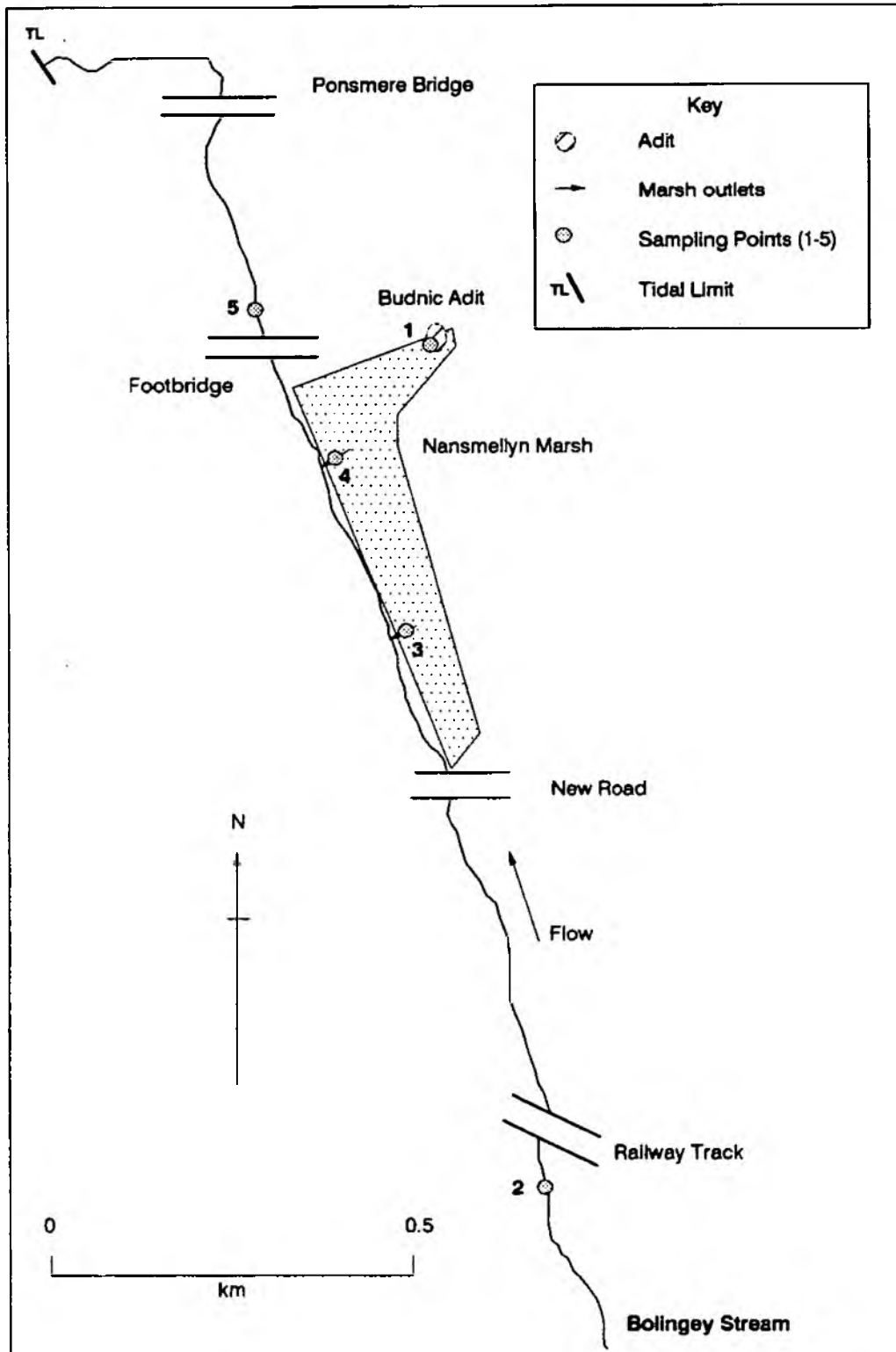


Table 1. Total and dissolved metal concentrations in the Bolingey Stream at Nansmellyn Marsh and mine adit on 26 August 1992

Site	pH	Cd (T) µg/l	Cd (D) µg/l	Cu (T) mg/l	Cu (D) mg/l	Zn (T) mg/l	Zn (D) mg/l	Al (T) mg/l	Al (D) mg/l	Pb (T) mg/l	Pb (D) mg/l	Se (T) mg/l
1. Adit	6.00	3.7	3.8	0.004	0.003	2.10	2.00	0.04	0.03	0.004	< 0.001	< 0.0002
2. Bolingey Stream U/S Nansmellyn Marsh	6.59	0.8	0.6	0.006	0.004	0.70	0.65	0.10	< 0.03	0.015	0.003	< 0.0002
3. 1st Discharge from Nansmellyn Marsh	6.73	0.2	< 0.2	<0.001	0.001	0.39	0.42	< 0.03	< 0.03	< 0.001	< 0.001	< 0.0002
4. 2nd Discharge from Nansmellyn Marsh	6.70	0.4	0.4	<0.001	0.001	0.45	0.44	< 0.03	< 0.03	< 0.001	< 0.001	< 0.0002
5. Bolingey Stream D/S Nansmellyn Marsh	6.53	0.8	0.5	0.006	0.003	0.59	0.60	0.06	< 0.03	0.009	0.002	< 0.0002
EQS	> 6.0 < 9.0	5.0			0.040	0.30					0.010	
Site	pH	Cr (T) mg/l	Cr (D) mg/l	Fe (T) mg/l	Fe (D) mg/l	Ni (T) mg/l	Ni (D) mg/l	As (T) µg/l	As (D) µg/l	Mg (T) mg/l	Ca (T) mg/l	
1. Adit	6.00	0.001	0.002	6.7	4.8	0.048	0.046	10.0	2.1	20.6	29.0	
2. Bolingey Stream U/S Nansmellyn Marsh	6.59	< 0.001	< 0.001	0.71	0.25	0.008	0.008	2.1	1.9	11.1	25.0	
3. 1st Discharge from Nansmellyn Marsh	6.73	0.001	< 0.001	0.58	0.37	0.009	0.008	0.2	0.2	17.7	42.0	
4. 2nd Discharge from Nansmellyn Marsh	6.70	< 0.001	< 0.001	0.20	0.12	0.009	0.009	1.3	1.1	18.6	31.0	
5. Bolingey Stream D/S Nansmellyn Marsh	6.53	< 0.001	< 0.001	0.47	0.18	0.007	0.006	1.8	2.0	11.8	28.0	
EQS	> 6.0 < 9.0		0.020		1.00		0.150		50.0			

TOTAL HARDNESS of Bolingey Stream = 100–150 as mg/l CaCO₃