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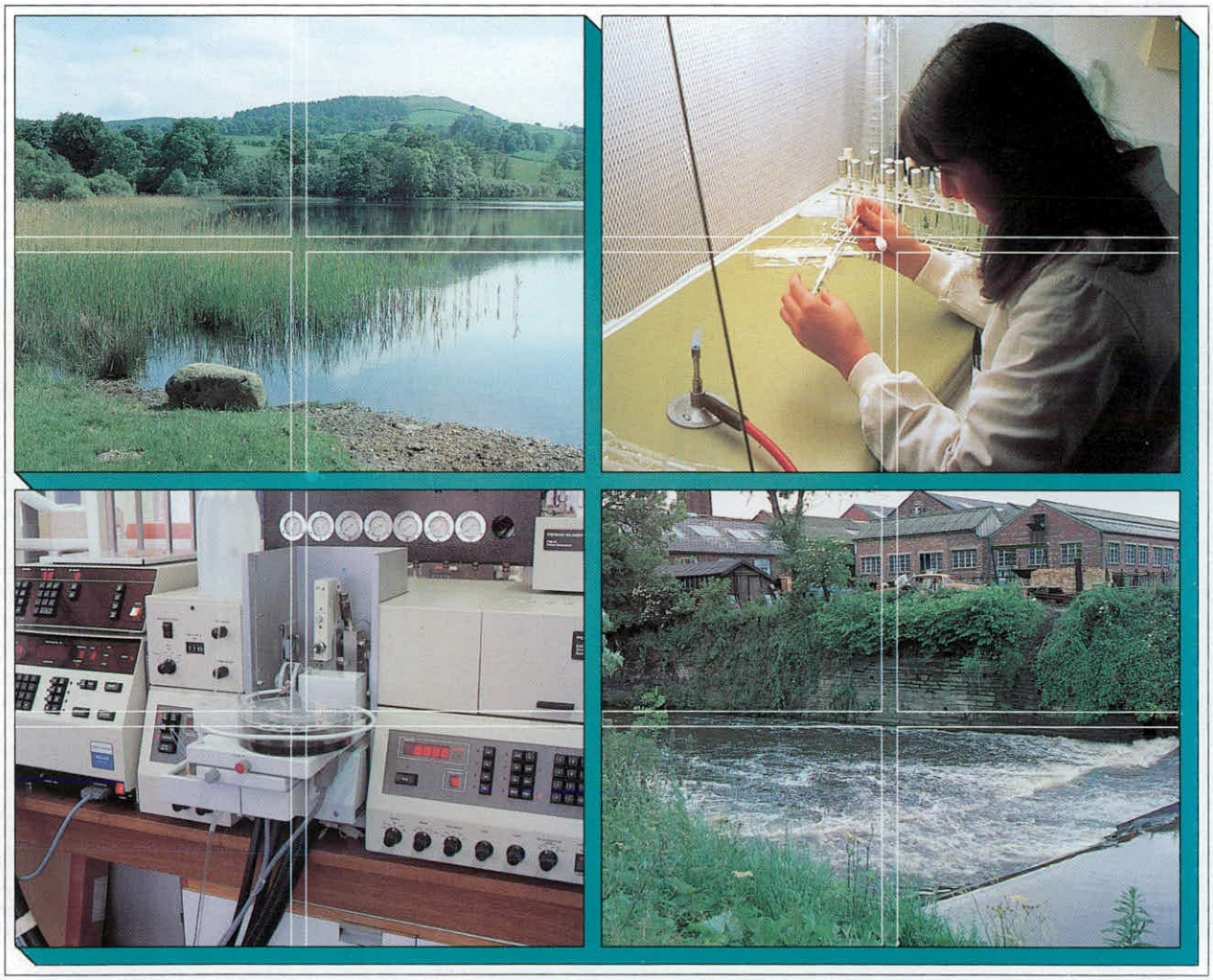
Institute of Freshwater Ecology

COLLECTION, PROCESSING AND SUPPLY OF BULK SAMPLES OF SEDIMENTS AND OVERLYING WATERS WITH DETAILS OF ASSOCIATED ENVIRONMENTAL MEASUREMENTS

Report on collection for Zeneca, Brixham Environmental Laboratory, on 28th October 1997

I.S. Farr Bsc. and **P. Henville**



Natural Environment Research Council

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Report on collection for Zeneca, Brixham Environmental Laboratory. 28th October 1997

I.S. Farr BSc & P. Henville

Project leader:	F. H. Dawson PhD. CBiol. MCIWEM
Report date:	30.10.97
Report to:	Zeneca, Brixham Environmental Laboratory, Brixham, Devon.
Order Number:	41005111
IFE Report Ref:	RL/T04073G7/6
Project No:	T04073 G7

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OBJECTIVES

Collect process and supply bulk samples of sediment and overlying water to Quality Assurance criteria and report on required associated environmental measurements.

CUSTOMER: Zeneca, Brixham Environmental Laboratory, Brixham
CUSTOMER ORDER NO: 41005111

REPORT

Sampling conditions:

Water levels in the Mill Stream (which supplies the Pond) were low. This was largely due to the low flow conditions in the River Frome which feeds the pond via the adjacent Mill Stream. Because of this, through-flow in the pond was low. Disturbed sediment was slow to clear from the sampling site and some particulate matter may have been included in the water sample taken. An attempt was made to increase the throughflow in the pond. Five days before sampling, the level in the pond was increased by about 1 cm by restricting the outflow. Before sampling began on 28th, outflow was increased by slightly opening a gap in a dam board at the pond outlet. Water level in the pond fell by about 1.5 cm during sampling due to this.

Environmental measurements:

Conuctivity and water depth measurements were requested for this collection. Other work at the site on 28th required measurements of pH, Dissolved Oxygen and Redox. A summary of these data are included in this report for information.

Measurements were taken in bright light. Under low non-turbulent flow conditions this can result in supersaturation of dissolved oxygen with respect to equilibrium with the atmosphere and increased pH.

Instrument Calibrations and on-site Measurements:

All sensors calibrated successfully in the laboratory before field measurements. The redox meter connection to the sensor broke after the first reading in the water column. The sensor lead was repaired and all readings taken with the repaired equipment.

pH measurements: The field buffer checks were undertaken before the sensor was introduced into the sediment in case the sediment conditions affected the sensor. The sensor was unaffected by use in the sediment on this occassion.

All sensors retained their calibrations during field measurements.

Storage:

The site cold room was used for overnight storage of samples. Temperature range in this area was monitored with a max/min thermometer and was found to have varied between 2°C and 6°C.

Summary

Collection of :

Mill stream pond sediment and associated water

Our reference : Quotation	ZB281097/01
Your reference : Order no. :	41005111
Sample reference :	281097/1 (S_{500} & W)
Date of collection of the samples:	28th October 1997
Persons responsible :	

I.S. Farr BSc, P. Henville
Institute of Freshwater Ecology,
River Laboratory, Wareham, Dorset, BH20 6BB
Tel : 01929 462314

No pesticides have been directly applied to the millstream pond or stream over at least the last 10 years. No overspraying in the vicinity of the stream or pond has occurred in the last three years at least

Procedure for Sediment Sample Collection

1. A drag net of 25 cm cross-section and 100 mesh was used to collect surficial sediment. The net is to the design of the FBA (Freshwater Biological Association) pond net.

2. The depth of the water (d) was measured with a metre rule. A marker was placed on the frame of the net at a distance of d + 5 cm from the base. The net was drawn through the sediment with the marker at the water surface. Each drag was about 1 meter in length, running radially or parallel and within convenient reaching distance. Care was taken so that the drags did not cross. Each drag was approximately 25 cm in width.

3. The collected sediment was transferred to a large bin. Sediment was then sieved through a stainless steel 2 mm sieve into stainless steel trays before being transferred to two 10 litre capacity, wide necked polythene bottles (BDH 215/0451/03) for overnight storage at 2 to 6^0C.

4. The following morning the sieved sediment was homogenised with extra water from the sampling site and sieved by hand through a cleaned 500µm stainless steel sieve. The 500µm sieved slurry was transfered to three 10 litre plastic bottles and placed in the site cold room to allow settlement overnight.

5. Before dispatch, supernatant liquid above settled sediment was discarded. The contents of the bottles were emptied into a large container and thoroughly mixed before the bottle for dispatch was refilled.

6. Water was collected in a 1 litre capacity polythene bottle. Head space over the liquid was flushed with CO_2 (to prevent precipitation of dissolved solids in transit), The water sample was stored in the site cold room until dispatch.

Summary of Readings (for information)

Mill stream pond (high organic) sediment & associated water
Reference: 281097/1 s_{500} & w
Measurements on site:

In water:	Temperature:	(1) just below surface :	8.43 ± 0.12 °C
		(2) 5 cm above sediment :	8.6 ± 0.0 °C
	Conductivity:		541.0 ± 3.6 µS cm^{-1} at 25 °C
	pH of water:		8.11 ± 0.02
	Oxygen concentration:	(1) just below surface:	114.7 ± 1.2 %
		(2) 5 cm above sediment:	111.3 ± 2.5 %
	Redox potential in water:		+148.0 ± 1.0 mV (standard hydrogen scale)
	Mean water depth above sediment :		16.5 ± 3.3 cm
In sediment:	Redox potential in sediment:		- 25.3 ± 23.6 mV
	Temperature of sediment:		9.3 ± 0.0 °C
	pH of sediment		7.95 ± 0.20

pH sensor field buffer checks:

Buffer 1 (pH 7.0)	sensor reading: pH 7.12	@ 8.1 °C
Buffer 2 (pH 10.0)	sensor reading: pH 10.29	@ 8.0 °C

N.B. these buffer checks were undertaken after measurements in the water, but before measurements in sediment.

Initial Storage:

The water sample was placed in the site cold room by 12.40 hrs on 28.10.97, 2mm sieved sediment samples by 16.00 hrs. The 1 litre water samples were removed from the cold room at 16.10 hrs. to allow the head-space to be flushed with CO_2 gas before being returned for overnight storage.

Temperature during storage: 2°C to 6°C (max/min thermometer)

Preparations for dispatch:

After overnight storage, the sieved sediment was homogenised with extra water from the sampling site and sieved by hand through a cleaned 500µm stainless steel sieve starting at 12.00 hrs on 29th October. The 500µm sieved slurry was transfered to three 10 litre plastic bottles and replaced in the site cold room to allow settlement overnight.

After settling overnight in the cold room (16 hrs), supernatant water was siphoned off settled solids and the contents of the three containers poured and scraped into a clean stainless steel tray and thoroughly mixed. The container for dispatch were refilled with the mixed, sieved & settled sediment. Preparations were undertaken outside the storage room starting at 08.00 hrs on 30th October. After cleaning and weighing, the containers were returned to the cold room until dispatch.

Dispatch:

Samples were collected at 11.15 hrs 30.10.97 by carrier (Interlink Express). Consignment note No. 0366491323 for next day (overnight) delivery to Zeneca, Brixham Environmental Laboratory.

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