ENVIRONMENT AGENCY

ENVIRONMENT PROTECTION SECTION
CORNWALL AREA

FINAL DATA REPORT

Helford Estuary Gweek Quay Sediment Quality Data Report

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2001/53

Author: Anthony Heard
Investigations Officer

Geoff Boyd
Area Manager

Helford Estuary Gweek Quay Sediment Quality Data Report

1. INTRODUCTION

1.1. Objectives

To take surface sediment samples at Gweek Quay. Analysis of the sediment to be as broad as possible to enable the identification of any anomalies or elevated levels of materials of potential concern. The data will then be used to assess the impact of re-suspension dredging of the channel at Gweek Quay. This assessment does not form part of this work.

Data to be supplied to M. Robins, Customer Services.

2. METHODS

2.1. Sites were carefully selected to be representative of the sediments which would be mobilised in the proposed re-suspension dredging process.

2.2. Sediment samples were taken at 5 site along the proposed dredging area. The site positions were logged using a hand held Global Positioning System receiver.

2.3. A site specific risk assessment was undertaken due to the potential hazards of sampling from deep estuary muddy substrates.

3. RESULTS

Figure 1: Sampling sites

Figure 2: Data for all sites

Appendix: Risk assessment sheet

SUPLEMENTARY NOTE

Tributyltin (TBT) is a List II substance and is of particular concern in estuarine habitats. It has therefore been considered important to put the results of this survey into some context.

Little has been published on the toxicity of TBT in sediment. Some of what has been published* would suggest that benthic organisms are affected by TBT at or above the 100-300ug/kg range.

Recent collaborative work in which the EA has been involved has suggested that levels

in excess of 100ug/kg TBT should be considered potentially harmful.
The Fal estuary has been the subject of much TBT assessment and typically the 'cleaner' sites have recorded up to 100ug/kg with the more contaminated sites reaching levels in excess of 10 000ug/kg.
The concentrations recorded in this Helford estuary survey (10-26ug/kg) are some of the lowest levels of TBT in sediments recorded in the targeted sampling conducted by the EA and its predecessors.
Although there is still relatively little knowledge to support advice the EA might chose to give on the issue, the levels recorded at the sites in this survey would appear to be low.

References

Austen, M.C. and McEvoy, A.J. (1997). Experimental effects of tributyltin (TBT) contaminated sediment on a range of meiobenthic communities. Environmental Pollution, 96(3), 435-444, 1997

Langston, W.J., Bryan, G.W., Burt, G.R. and Gibbs, P.E. (1990). Assessing the impact of tin and TBT in estuaries and coastal regions. Functional Ecology, 4, 433-443

Langston, W.J. and Burt, G.R. (1991) Bioavailability and effects of sediment-bound TBT in deposit-feeding clams, *Scrobicularia plana*. Marine Environmental Research, 32, 61-77

Plymouth Marine Science Group (2002). Site Characterisation of the South West European Marine Sites: Fal & Helford cSAC.

Anthony Heard
Investigations Officer

Figure 1: Sampling sites. Note also area of infill and sediment sump

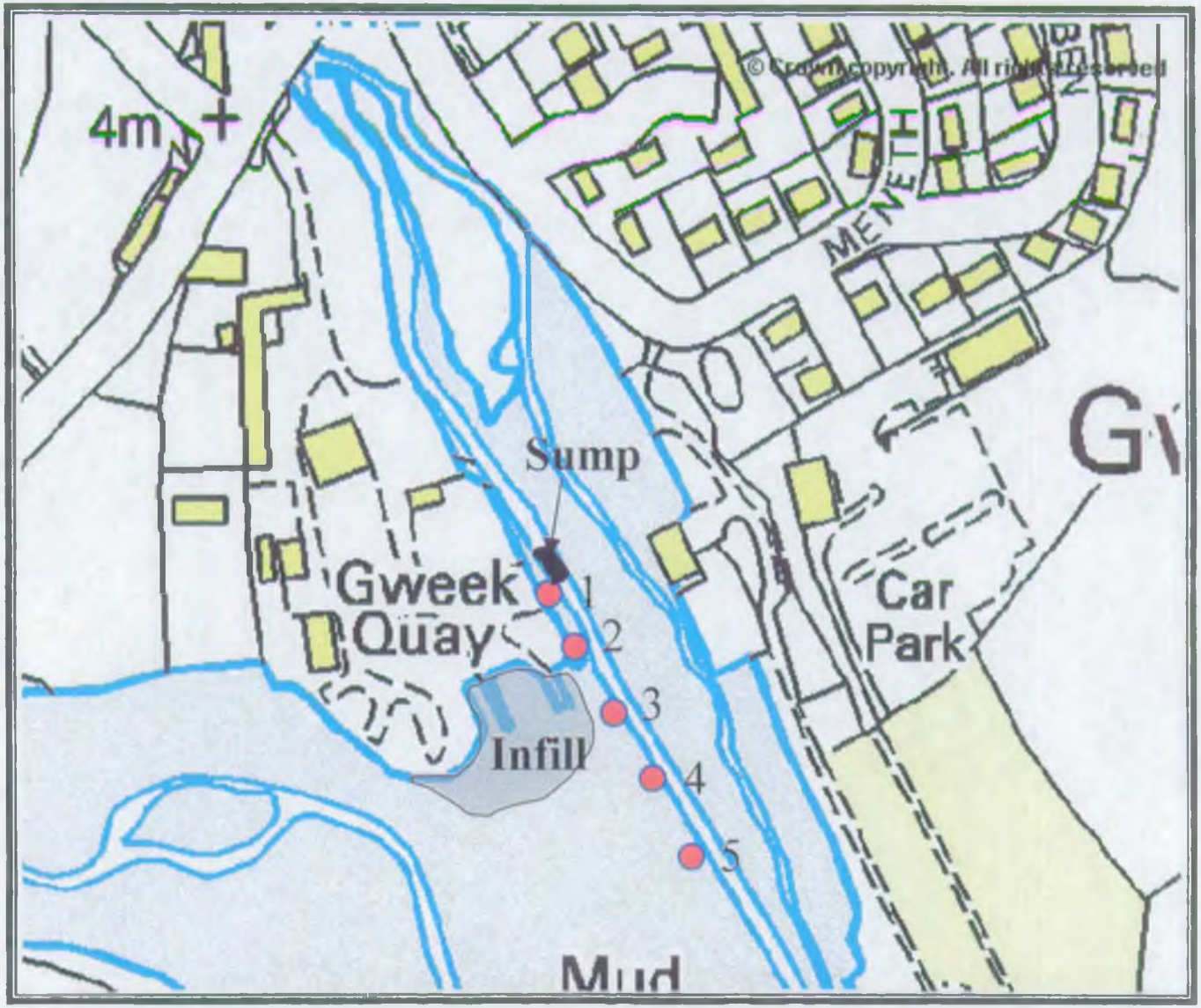

Figure 2: Analysis of Sediment Samples from Gweek Quay 01 February 2002

Det Code	Description	Site 1 NGR SW70738 26571	Site 2 NGR SW70736 26549	Site 3 NGR SW70754 26527	Site 4 NGR SW70773 26503	Site 5 NGR SW70789 26476
4061	TRIBUTYL TIN CATION DRY WEIGHT (µg/kg)	26.6	12.7	10.9	16.2	19.7
4017	GRAIN SIZE FRACTION 500 TO 999 MICRONS (%)	0.04	0.01	0.28	0.69	0.53
4018	GRAIN SIZE FRAC 1000-3999 MICRONS (%)	0	0	0	0	1.61
4019	GRAIN SIZE 4000-7999 MICRONS (%)	0	0	0	0	0
4020	GRAIN SIZE 8000-15999 MICRONS (%)	0	0	0	0	0
4021	GRAIN SIZE >16000 MICRONS (%)	0	0	0	0	0
5538	GRAIN SIZE FRACTION 39 TO 30.3 MICRONS (%)	7.65	8	7.1	6.85	7.03
5539	GRAIN SIZE FRACTION 64 TO 50 MICRONS (%)	8.28	8.6	8.63	7.93	7.79
5540	GRAIN SIZE FRACTION 84 TO 64 MICRONS (%)	7.69	7.77	8.17	7.28	7.04
5541	GRAIN SIZE FRACTION 112 TO 84 MICRONS (%)	7.19	6.89	7.62	6.74	6.38
5542	GRAIN SIZE FRACTION 160 TO 112 MICRONS (%)	6.88	6.11	7.32	6.82	6.25
5543	GRAIN SIZE FRACTION 261 TO 160 MICRONS (%)	4.5	3.55	5.19	5.52	5.06
5544	GRAIN SIZE FRACTION 564 TO 261 MICRONS (%)	0.73	0.54	1.68	1.94	1.69
5545	GRAIN SIZE FRACTION 2000 TO 500 (%)	0.02	0.01	0.15	0.46	2.13
5546	GRAIN SIZE FRACTION < 2000 MICRONS (%)	100	100	100	100	100
5547	GRAIN SIZE FRACTION > 2000 MICRONS (%)	0	0	0	0	0
5549	GRAIN SIZE 50.2 - 39.0 MICRONS (%)	8.5	8.91	8.49	8.03	8.03

Det Code	Description	Site 1	Site 2	Site 3	Site 4	Site 5
3106	MASS SPECTRUM (NRA REPORT)	Nothing unusual found	Nothing unusual found	Nothing unusual found	Nothing unusual found	Nothing unusual found
4084	VOLATILE ORGANICS SCAN -GCMS	No purgable volatile compounds found.	No purgable volatile compounds found.	No purgable volatile compounds found.	No purgable volatile compounds found.	No purgable volatile compounds found.

ICP-MS SEMIQUANTITATIVE SCREEN						
All results in mg/kg (+/-30% excluding digestion errors.)						
	Metal	Site 1	Site 2	Site 3	Site 4	Site 5
	Li	110	110	98	120	110
	B	74	80	61	89	80
	V	71	67	59	78	75
	Cr	68	68	58	76	74
	Mn	430	350	270	350	350
	Fe	36000	38000	31000	37000	37000
	Co	11	10	8.3	11	11
	Ni	47	50	37	53	52
	Cu	240	280	240	300	270
	Zn	430	570	550	620	520
	Ga	18	15	14	18	18
	As	56	55	41	58	55
	Rb	100	87	83	100	96
	Sr	110	110	84	110	110
	Zr	16	14	16	18	18
	Cd	1.1	1.1	1.1	1.4	1.2
	Sn	310	340	360	420	330
	Cs	18	16	14	18	16
	Ba	170	130	130	150	160
	La	27	27	23	28	26
	Ce	52	51	44	56	49
	Pr	8.3	8.3	7.5	8.6	7.9
	Nd	27	27	24	28	27
	Sm	4.9	4.8	4.1	4.9	4.7
	Gd	4	5.5	3.3	4	3.6
	W	4.1	5.3	4.9	6.3	4.8
	Pb	81	84	71	94	87
	Bi	16	16	15	17	15
	Th	12	12	11	13	13
	U	6.4	3.4	2.9	3.9	3.1

Note: Data to also be supplied electronically

Task risk assessment procedure

ENVIRONMENT AGENCY

MANAGEMENT OF HEALTH & SAFETY AT WORK REGULATIONS

PART 1. WORK ACTIVITY/TASK IDENTIFICATION SHEET

1.	REGION/AREA	South West/Cornwall
2.	TEAMS/JOB TITLES	Investigations
3.	TASK SUMMARY	Collection of sediment samples from Gweek Quay at low water. Access is by foot. Double manning is mandatory.
4.	TASK COMMENCES	Entrance to estuary from bank.
5.	TASK FINISHES	Exit estuary.
6.	TOOLS & EQUIPMENT	Dry suit, life jacket, wading pole, throwing line/rescue rope, adequate communications.
7.	LOCATIONS	Gweek Quay

8.	ASSESSORS	Anthony Heard
9.	DATE	14 March 2002
10.	REVIEW PERIOD	
11.	AUTHORISATION	CHECKED BY SIGNED DATE ……/……/……

Task risk assessment procedure

PART 2. RISK ASSESSMENT SHEET

→ STEP 1 →	STEP 2	STEP 3 →	STEP 4 →	STEP 5

1. NO	2. DESCRIPTION OF TASK ELEMENTS	3. IDENTIFICATION OF HAZARD, HARMFUL EFFECTS	4. IDENTIF ICATION OF PERSONS AFFECTED	5. INITIAL, RISK LEVEL H/M/L	6. EXISTING/ PLANNED RISK CONTROL MEASURES	7. LEVEL OF RISK H/M/L	8 RISK CONTROL MEASURES ADEQUATE YES/NO	9. OPTIONS FOR IMPROVED RISK CONTROL	10. PRIORITY OF ACTIONS REQUIRED H/M/L	11. ACTION PLAN REF. NO.
1	Access to estuary via ladder on quay	Slipping and falling -possible severe injury	All	M	Climb ladder using both hands and facing quay	L	yes			
2	Access to sampling point via streambed.	Deep water. - Drowning. Hidden/sharp objects. - cuts /bruises	All.	M	.Use wading pole to assess substrate/depth of water	L	yes			
3	Access to sampling point via mud.	Deep mud. - sinking, getting stuck Hidden/sharp objects. - cuts /bruises	Sampler.	M	Spread weight evenly over deep mud. Second sampler to stay in "safe" location off mud within throw line distance. Move slowly with care to avoid heavy impact with hidden objects.	L	yes			
4	Exit estuary prior to tidal flood reaching sample area.	- Stranding - Drowning.	All.	L	Start sampling on ebbing tide. Know tide times. Have route planned for exit to avoid being stranded. Exit estuary before tide returns to site.	L	yes			