

ENVIRONMENTAL PROTECTION



National Rivers Authority
South West Region

**MONITORING OF
ORGANO-CHLORINE PESTICIDES
IN COASTAL RIVERS
OF CORNWALL.**

**April 1990
FWI/90/014
Author: Dr. R.P. Smith**

**GORDON H BIELBY BSc
Regional General Manager**

**C V M Davies
Environmental Protection
Manager**

MONITORING OF ORGANO-CHLORINE PESTICIDES IN COASTAL RIVERS OF CORNWALL

FWI/90/014

Dr. R.P. Smith
Environmental Protection
Freshwater Investigations Team
NRA South West Region
Manley House
EXETER.

ENVIRONMENT AGENCY



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MONITORING OF ORGANO-CHLORINE PESTICIDES IN COASTAL RIVERS OF CORNWALL.

TECHNICAL REPORT No. FWI/90/014.

SUMMARY.

Eight catchments in West Cornwall were monitored for organo-chlorine pesticides in river water on a monthly basis between March 1989 and March 1990 at a total of 32 sites. This work followed the discovery of pesticide pollution from daffodil fields in the Newlyn River Catchment.

Low aldrin and dieldrin concentrations were detected at 53% of the monitored sites and occurred in 5 of the 8 monitored catchments. Aldrin and dieldrin occurred in up to 42% of samples collected within the catchments investigated. The Environmental Quality Standard (EQS=30 ng/l combined aldrin and dieldrin) was exceeded on one occasion at two sites in the River Hayle Catchment.

There was widespread occurrence of low concentrations of gamma-HCH, with between 10 and 58% of samples obtained from catchments showing positive results. All samples complied with the EQS of 100 ng/l.

Endrin and DDT isomers were not detected at any of the monitored sites.

Routine monitoring is likely to have missed periods of maximum aldrin and dieldrin contamination in river water. These occasions are infrequent and occur during rainfall when there is soil run-off from daffodil and potato fields.

It is recommended that the routine monitoring of pesticides is continued at the 32 river sites in West Cornwall assessed in the report. Bioaccumulation of pesticides in eels should be studied, and monitoring of pesticides in soils in conjunction with land-use surveys should be carried out to identify areas of high risk from pesticide contamination.

Dr. R.P. Smith.
Catchment Scientist.
April 1990.

MONITORING OF ORGANO-CHLORINE PESTICIDES IN COASTAL RIVERS OF CORNWALL.

1. INTRODUCTION.

During 1989 a programme was set up to monitor organo-chlorine pesticides in coastal rivers of Cornwall. This work followed the discovery of serious pesticide pollution in the Newlyn River associated with the bulb growing industry. Since bulb growing is widespread in west Cornwall it seemed possible that other rivers could be contaminated.

This report summarises results of organo-chlorine pesticide concentrations found in river water during 1989. Results for the Newlyn River survey have been reported elsewhere (Ref. 1).

2. METHODS.

Eight catchments were monitored for organo-chlorine pesticides in river water on a monthly basis between March 1989 and March 1990 at a total of 32 sites (see Fig. 1).

3. RESULTS (see Appendix).

Aldrin and Dieldrin.

Low concentrations of aldrin and dieldrin were detected at 53% of the monitored sites (17 of 32) and occurred in 5 of the 8 monitored catchments. Aldrin and dieldrin were not detected from any of the samples collected from the Porthleven Stream, the Leha/Lamorna Streams Catchment and the Trevaylor/Rosemorran Streams Catchment.

Aldrin was detected at low concentrations throughout the River Hayle Catchment (except the Nance Stream) and was found in 20% of samples (see Table 1). Dieldrin was not as widespread and only occurred in 7% of samples. Dieldrin was not found in any of the Hayle tributaries.

Other rivers where aldrin frequently occurred included the Penberth River, the Chyandour Brook and the Marazion River (see Table 1). Dieldrin was present in most of these rivers but occurred less frequently. The Larrigan River had low concentrations of dieldrin but not aldrin.

Combined concentrations of aldrin and dieldrin exceeded the Environmental Quality Standard (EQS = 30 ng/l) on 12 April 1989 in the Godolphin Stream and in the River Hayle immediately downstream of the Godolphin Stream confluence. This event was associated with heavy rainfall. Concentrations of aldrin and dieldrin collected from other rivers did not exceed the EQS.

Gamma-HCH.

Gamma-HCH was detected in all catchments assessed. Occurrence ranged between 10 and 58% of samples. Concentrations were generally low (less than 5 ng/l). Highest concentrations were found in the Chyandour Brook (max. 23 ng/l) and River Hayle (max. 35 ng/l). All sites complied with the EQS of 100 ng/l.

Endrin & DDT isomers.

Concentrations of endrin and DDT isomers were below the limit of detection on all occasions at each monitored site.

TABLE 1. Percentage occurrence of aldrin, dieldrin and gamma-HCH in samples collected from rivers of West Cornwall.

River	Aldrin	Dieldrin	Gamma-HCH
Hayle	20	7	33
Penberth	42	11	26
Leha/Lamorna	0	0	25
Lariggan	0	25	57
Chyandour	24	14	58
Trevaylor/Rosemorran	0	0	10
Marazion	9	0	29
Porthleven	0	0	17

4. DISCUSSION.

Aldrin and dieldrin are particularly persistent pesticides in the environment and are most likely to be present in soils where daffodils and potatoes have been grown.

Previous work on the Newlyn River (Ref. 2) has shown that aldrin and dieldrin enters watercourses during turbid run-off from fields at times of heavy rainfall. Since these run-off events are likely to be rapid and infrequent, routine sampling may not have coincided with the period of maximum contamination. Caution is therefore necessary when interpreting the results since they may have under-estimated the severity of pesticide pollution.

5. CONCLUSIONS.

1. Low concentrations of aldrin, dieldrin and gamma-HCH were found throughout rivers in West Cornwall.
2. It is considered that aldrin and dieldrin present in river water is a legacy of pest control in bulb and potato fields. Routine monitoring may miss periods of maximum contamination associated with soil run-off during rainfall.

6. RECOMMENDATIONS.

1. Routine monitoring of organo-chlorine pesticides at the 32 sites in coastal rivers of West Cornwall should be continued.

- Action Freshwater Scientist.
2. Bioaccumulation of pesticides in eels should be investigated in the following catchments:

* River Hayle Catchment.
* Penberth River Catchment.
* Lariggan River Catchment.
* Chyandour Brook Catchment.
* Trevaylor/Rosemorran Catchment.
* Marazion River Catchment.

- Action Catchment Scientist.
3. Areas of high risk from pesticide contamination should be identified in the West Cornwall Region. Work should determine pesticide concentrations in soils and should determine land use practises.

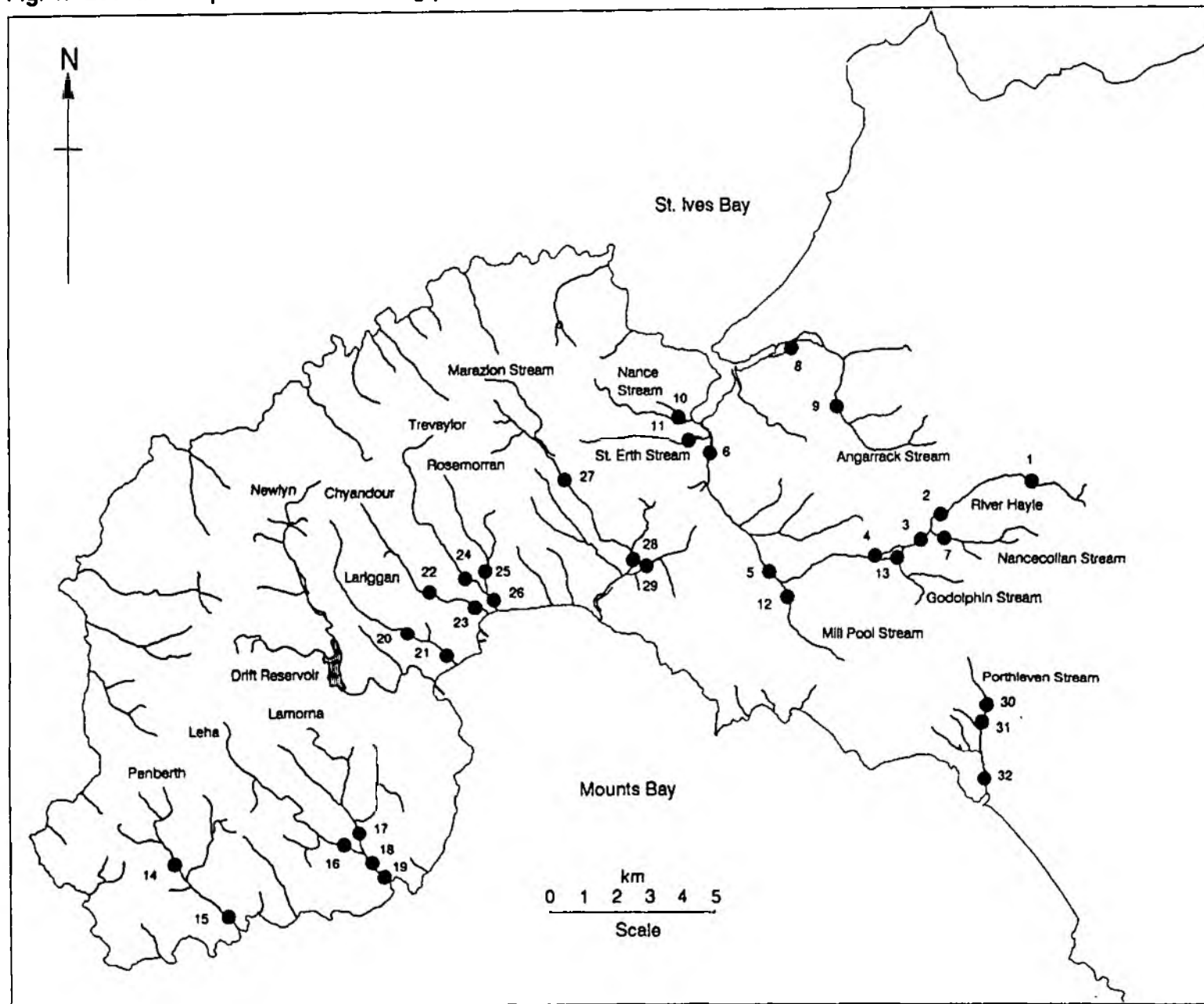
- Action Freshwater Officer.
4. Specific investigations should be carried out monitor pesticide movement at times of maximum contamination during heavy rainfall.

- Action Catchment Scientist.

7. REFERENCES.

1. SMITH, R.P. (1991). Reduction in aldrin and dieldrin concentrations in the Newlyn River. NRA South West Report, 17 pp (FWI/90/025).
2. HARROD, T.R. (1989). Pesticide pathways and land use practises in the Newlyn River Catchment, Cornwall. Report commissioned by the NRA South West Region.

Fig. 1. Location of pesticide monitoring points in coastal rivers of Cornwall.



Appendix 1. Sampling sites for organo-chlorine pesticides in coastal rivers of Cornwall

River Hayle Catchment

River Hayle

1. B3303 Bridge Crowan
2. Drym Farm
3. Binner Bridge
4. Godolphin Bridge
5. St. Erth Gauging Station

Nancecollan Stream

7. Trenwheal

Angarrack Stream

8. Nanpusker
9. Phillack - Copperhouse

Nance Stream

10. Lelant

St. Erth Stream

11. Treloweth

Millpool Stream

12. Millpool

Godolphin Stream

13. Gwedna

Penberth Stream

14. Bottoms
15. Treen

Leha/Lamorna Streams Catchment

Leha Stream

16. Trewoofe

Lamorna Stream

17. Trewoofe
18. Hotel Lamorna
19. Lamorna

Lariggan River

20. West Lodge
21. Wherry Town Bridge

Chyandour Brook

22. Heamoor
23. A30 Bridge at Chyandour

Trevaylor/Rosemorrnan Streams Catchment

Trevaylor Stream

24. Tryphogga

Rosemorrnan Stream

25. Kenegie Cottage
26. A30 Bridge at Chyandour

Marazion River Catchment

Marazion River

27. Cucurrian Mill
28. Truthwell Mill Bridge

Treglilowe Tributary

29. Chyveilan

Porthleven Stream

30. Penbro
31. Methleigh
32. U/S of Harbour

Key

SQMS and SMSS = Special spot sample
SQMR and SMRT = Routine spot sample
2F and 3B = River water
Units = ug/l.
L = Less than

RIVER HAYLE AT B3303 BRIDGE CROWAN

Date	Time	Type		ALDRIN	DIELD-	ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
		Purp	Mat	TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
				TOTAL		GAMMA							
120489	1050	SQMR	2F	0.002	0.003	0.003L	0.006	0.003L	0.005L	0.003L			
160589	1400	SQMR	2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	1000	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
190789	0936	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
300889	0915	SQMR	2F	0.001L	0.003L	0.003L	0.001						
200989	0933	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
241089	1315	SQMR	2F	0.001L	0.003L	0.003L	0.002						
221189	0905	SQMR	2F	0.001L	0.003L	0.003L	0.002						
131289	1232	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
220190	0946	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
130290	0926	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

RIVER HAYLE AT DRYM FARM

Date	Time	Type		ALDRIN	DIELD-	ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
		Purp	Mat	TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
				TOTAL		GAMMA							
120489	1100	SQMR	2F	0.001L	0.003L	0.003L	0.002	0.003L	0.005L	0.003L			
160589	1340	SQMR	2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	1030	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
190789	0956	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
300889	0931	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
200989	0946	SQMR	2F	0.001L	0.003L	0.003L	0.001						
241089	1237	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
221189	0935	SQMR	2F	0.001L	0.003L	0.003L	0.001						
131289	1207	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
220190	0926	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
130290	0956	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

BINNERTON BRIDGE RIVER HAYLE

Date	Time	Type		ALDRIN	DIELD-	ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
		Purp	Mat	TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
				TOTAL		GAMMA							
170389	0949	SQMS	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
120489	1145	SQMR	2F	0.006	0.003L	0.003L	0.003	0.003L	0.005L	0.003L			
160589	1240	SQMR	2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	1100	SQMR	2F	0.006	0.003	0.003L	0.001	0.003L	0.005L	0.003L			
190789	1046	SQMR	2F	0.008	0.003L	0.003L	0.001L						
300889	0954	SQMR	2F	0.008	0.003L	0.003L	0.001L						
200989	1021	SQMR	2F	0.004	0.003L	0.003L	0.001						
241089	1202	SQMR	2F	0.001L	0.003L	0.003L	0.002						
221189	1000	SQMR	2F	0.001L	0.003L	0.003L	0.003						
131289	1147	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
220190	1121	SQMR	2F	0.001L	0.003L	0.003L	0.001L						

ST ERTH GAUGING STATION RIVER HAYLE

Date	Time	Type	Purp	Mett	ALDRIN		ENDRIN		HCH		PP DDE		PP DDT		PP TDE	
					TOTAL	RIN	TOTAL	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL		
100289	0905	SMRT	3B		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
170389	1310	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
120489	1340	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
120589	1010	SGMR	2F		0.001L	0.003L	0.003L			0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
160589	1100	SGMR	2F		0.001L	0.003L	0.003L			0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
270689	1230	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
190789	1331	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
300889	1119	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
200989	1201	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
241089	1034	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
221189	1210	SGMR	2F		0.001L	0.003L	0.003L	0.001L	0.001L	0.003L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L

GODDOLPHIN BRIDGE

RIVER HAYLE

Date	Time	Type	Purp	Mat	ALDRIN DIELD-		ENDRIN		HCH (BHC) TOTAL		PP DDE		PP DDT		PP TDE	
					TOTAL	RIN	TOTAL	TOTAL	GAMMA	TOTAL	TOTAL	TOTAL	TOTAL			
120489	1220	SQMR	ZF		0.053	0.014	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
160589	1205	SQMR	ZF		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L					
270589	1130	SQMR	ZF		0.001	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L					
190789	1156	SQMR	ZF		0.002	0.003L	0.003L	0.001L								
300889	1021	SQMR	ZF		0.001	0.003L	0.003L	0.001L								
200989	1101	SQMR	ZF		0.001	0.003L	0.003L	0.001L								
241089	1137	SQMR	ZF		0.001L	0.003L	0.003L	0.002								
221189	1107	SQMR	ZF		0.001L	0.003L	0.003L	0.003								
131289	1117	SQMR	ZF		0.001L	0.003L	0.003L	0.001L								
220190	1221	SQMR	ZF		0.001L	0.003L	0.003L	0.001L								
130290	1006	SQMR	ZF		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L					

RELUBBUS

RIVER HAYLE

Date	Time	Type	Purp	Mat	ALDRIN DIELD-		ENDRIN		HCH (BHC) TOTAL		PP DDE		PP DDT		PP TDE	
					TOTAL	RIN	TOTAL	TOTAL	GAMMA	TOTAL	TOTAL	TOTAL	TOTAL			
170389	1205	SQMS	ZF		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
120489	1300	SQMR	ZF		0.001	0.003L	0.003L	0.001	0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
020589	1340	SMSS	3B		0.001L	0.003	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
160589	1125	SQMR	ZF		0.001L	0.003L	0.003L		0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
270689	1205	SQMR	ZF		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L	0.003L	0.003L	0.003L	0.003L
190789	1246	SQMR	ZF		0.001L	0.003L	0.003L	0.003L	0.001L							
300889	1059	SQMR	ZF		0.001	0.003L	0.003L	0.003L	0.001L							
200989	1141	SQMR	ZF		0.001	0.003L	0.003L	0.003L	0.001L							
241089	1105	SQMR	ZF		0.001L	0.003L	0.003L	0.003L	0.001L							
221189	1115	SQMR	ZF		0.001L	0.003L	0.003L	0.003L	0.002							
131289	1042	SQMR	ZF		0.001L	0.003L	0.003L	0.003L	0.001L							

NANCEGOLLAN STREAM AT TRENMHEAL

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TOE TOTAL
120489	1125	SQMR	2F		0.001L	0.003L	0.003L	0.003	0.003L	0.005L	0.003L			
160589	1255	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	1040	SQMR	2F		0.006	0.003L	0.003L	0.002	0.003L	0.005L	0.003L			
190789	1021	SQMR	2F		0.013	0.003L	0.003L	0.001L						
300889	0941	SQMR	2F		0.017	0.003L	0.003L	0.001L						
200989	1005	SQMR	2F		0.006	0.003L	0.003L	0.002						
241089	1212	SQMR	2F		0.001L	0.003L	0.003L	0.002						
221189	0947	SQMR	2F		0.001L	0.003L	0.003L	0.002						
131289	1157	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
220190	1106	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
130290	1011	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

ANGARRICK STREAM - NANPUSKER

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TOE TOTAL
160589	0950	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	1350	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
190789	1446	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
300889	1400	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
200989	1353	SQMR	2F		0.001L	0.003L	0.003L	0.001						
241089	0850	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
221189	1400	SQMR	2F		0.001L	0.003L	0.003L	0.002						
131289	0902	SQMR	2F		0.001L	0.003L	0.003L	0.002						
220190	1511	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
130290	1411	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

PHILLACK - COPPERHOUSE

ANGARRACK STREAM (HAYLE)

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TOE TOTAL
120489	1440	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
160589	1005	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
270689	0001	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
190789	1431	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
300889	1339	SQMR	2F		0.001L	0.003L	0.003L	0.005						
200989	1311	SQMR	2F		0.001	0.003L	0.003L	0.001L						
241089	0910	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
221189	1337	SQMR	2F		0.001L	0.003L	0.003L	0.002						
131289	0922	SQMR	2F		0.001L	0.003L	0.003L	0.001						
220190	1501	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
130290	1401	SQMR	2F		0.001L	0.003L	0.003L	0.002	0.003L	0.005L	0.003L			

LALANT NANCE STREAM (HAYLE)

Date	Time	Type	Purp	Mat	ALDRIN DIELD-		ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
					TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL		
					TOTAL		GAMMA							
120489	1405	SQMR	2F		0.001L	0.003L	0.003L	0.002		0.003L	0.005L	0.003L		
160589	1020	SQMR	2F		0.001L	0.003L	0.003L			0.003L	0.005L	0.003L		
270689	1320	SQMR	2F		0.001L	0.003L	0.003L	0.008		0.003L	0.005L	0.003L		
190789	1411	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
300889	1323	SQMS	2F		0.001L	0.003L	0.003L	0.001L						
200989	1237	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
241089	1005	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
221189	1322	SQMR	2F		0.001L	0.003L	0.003L	0.003						
131289	0955	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
220190	1346	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
130290	1256	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

ST ESTH STREAM AT TRELOWETH

Date	Time	Type	Purp	Mat	ALDRIN DIELD-		ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
					TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL			
					TOTAL		GAMMA							
120489	1355	SQMR	2F		0.001L	0.003L	0.003L	0.001L		0.003L	0.005L	0.003L		
160589	1035	SQMR	2F		0.001L	0.003L	0.003L			0.003L	0.005L	0.003L		
270689	1310	SQMR	2F		0.001L	0.003L	0.003L	0.001L		0.003L	0.005L	0.003L		
190789	1346	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
300889	1130	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
200989	1231	SQMR	2F		0.001L	0.003L	0.003L	0.002						
241089	1025	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
221189	1222	SQMR	2F		0.001L	0.003L	0.003L	0.002						
131289	1012	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
220190	1336	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
130290	1031	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			

GODOLPHIN STREAM AT GWEDNA

Date	Time	Type	Purp	Mat	ALDRIN DIELD-		ENDRIN	HCH	PP	DDE	PP	DDT	PP	TOE
					TOTAL	RIN								
120489	1205	SQMR	ZF		0.100	0.039	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L		
160989	1220	SQMR	ZF		0.001	0.005	0.003L			0.003L	0.005L	0.003L		
270689	1120	SQMR	ZF		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L		
190789	1111	SQMR	ZF		0.001L	0.003L	0.003L	0.001L						
300889	1011	SQMR	ZF		0.001L	0.005	0.003L	0.001L						
200989	1046	SQMR	ZF		0.001L	0.005	0.003L	0.001L						
241089	1147	SQMR	ZF		0.001L	0.005	0.003L	0.002						
221189	1046	SQMR	ZF		0.001L	0.003L	0.003L	0.001						
131289	1132	SQMR	ZF		0.001L	0.003L	0.003L	0.001L						
220190	1211	SQMR	ZF		0.001L	0.003L	0.003L	0.001L						
130290	1046	SQMR	ZF		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.005L	0.003L		

BOTTOMS PENBERTH RIVER

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1605	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
280689	1146	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
030789	0715	SQMS	2F		0.001L	0.003L	0.003L	0.001L						
180789	1131	SQMR	2F		0.001L	0.004	0.003L	0.002						
310889	1351	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
190989	1330	SQMR	2F		0.001L	0.003L	0.003L	0.001						
251089	1201	SQMR	2F		0.009	0.003L	0.003L	0.001						
311189	1411	SQMR	2F		0.003	0.003L	0.003L	0.003						
121289	1416	SQMR	2F		0.002	0.003L	0.003L	0.001L						
160190	1228	SQMR	2F		0.001	0.003L	0.003L	0.001L						

PENBERTH STREAM AT TREEN

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1615	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
280689	1136	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
180789	1121	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
310889	1341	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
190989	1341	SQMR	2F		0.008	0.005	0.003L	0.001L						
251089	1211	SQMR	2F		0.002	0.003L	0.003L	0.001L						
211189	1401	SQMR	2F		0.002	0.003L	0.003L	0.001						
121289	1406	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
160190	1135	SQMR	2F		0.001	0.003L	0.003L	0.001L						

CARN EUNY STREAM - AT TREWOOFE

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1650	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	
170589	1441	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L	
280689	1216	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
180789	1031	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
190989	1431	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
251089	1228	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
211189	1331	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
121289	1331	SQMR	2F		0.001L	0.003L	0.003L	0.002L				
160190	1025	SQMR	2F		0.001L	0.003L	0.003L	0.001L				

LAMORNA STREAM TREWOOFE

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1700	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	
170589	1431	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L	
280689	1226	SQMR	2F		0.001L	0.003L	0.003L	0.002L				
180789	1041	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
190989	1356	SQMR	2F		0.001L	0.003L	0.003L	0.003L				
251089	1259	SQMR	2F		0.001L	0.003L	0.003L	0.005L				
211189	1341	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
121289	1341	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
160190	1035	SQMR	2F		0.001L	0.003L	0.003L	0.001L				

HOTEL LAMORNA

LAMORNA STREAM

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1640	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	
170589	0001	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L	
280689	1211	SQMR	2F		0.001L	0.003L	0.003L	0.003L				
180789	1051	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
310889	1321	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
190989	1420	SQMR	2F		0.001L	0.003L	0.003L	0.003L				
251089	1247	SQMR	2F		0.001L	0.003L	0.003L	0.003L				
211189	1346	SQMR	2F		0.001L	0.003L	0.003L	0.003L				
121289	1350	SQMR	2F		0.001L	0.003L	0.003L	0.002L				
160190	1007	SQMR	2F		0.001L	0.003L	0.003L	0.001L				

LAMORNA

LAMORNA STREAM

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH GAMMA	DOE PP')	DDT PP')	TDE PP')
					UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
170589	1516	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L

LARIGGAN RIVER AT WEST LODGE

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1540	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
170589	1310	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
280689	1056	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
180789	0921	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
190989	1251	SQMR	2F		0.001L	0.003L	0.003L	0.002						
251089	1125	SQMR	2F		0.001L	0.003L	0.003L	0.002						
211189	1226	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
121289	1246	SQMR	2F		0.001L	0.003L	0.003L	0.001L						

WHERRY TOWN BRIDGE LARIGGAN RIVER

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1530	SQMR	2F		0.001L	0.003	0.003L	0.001	0.003L	0.005L	0.003L			
170589	1326	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
280689	1241	SQMR	2F		0.001L	0.003	0.003L	0.001						
180789	1021	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
190989	1216	SQMR	2F		0.001L	0.004	0.003L	0.004						
251089	1332	SQMR	2F		0.001L	0.003	0.003L	0.003						
211189	1201	SQMR	2F		0.001L	0.003L	0.003L	0.005						
121289	1220	SQMR	2F		0.001L	0.003L	0.003L	0.002						

CYANDOUR BROOK AT HEAMDOOR

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1500	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			0.003L
170589	1301	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			0.003L
280689	1041	SQMR	2F		0.001L	0.003L	0.003L	0.008						
180789	0936	SQMR	2F		0.001L	0.003L	0.003L	0.023						
190989	1236	SQMR	2F		0.005	0.003	0.003L	0.018						
251089	1110	SQMR	2F		0.002	0.003L	0.003L	0.004						
211189	1216	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
121289	1236	SQMR	2F		0.002	0.003L	0.003L	0.002						
230190	1256	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
210290	1205	SQMR	2F		0.001L	0.003L	0.003L	0.001L						

A.30 BRIDGE AT CHYANDOUR CHYANDOUR STREAM

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1520	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			0.003L
170589	1251	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			0.003L
280689	1018	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
280689	1026	SQMR	2F		0.001L	0.003L	0.003L	0.010						
180789	1201	SQMR	2F		0.001L	0.003L	0.003L	0.020						
190989	1201	SQMR	2F		0.008	0.004	0.003L	0.023						
251089	1035	SQMR	2F		0.002	0.005	0.003L	0.006						
211189	1151	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
121289	1211	SQMR	2F		0.001L	0.003L	0.003L	0.004						
230190	1218	SQMR	2F		0.001L	0.003L	0.003L	0.004						
210290	1128	SQMR	2F		0.001L	0.003L	0.003L	0.001L						

TREVAYLOR STREAM AT TRYPHOGGA

Date	Time	Type	Purp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP TOTAL	DDT TOTAL	PP TOTAL	TDE TOTAL
110489	1450	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			0.003L
170589	1230	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			0.003L
280689	1006	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
180789	0951	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
310889	1041	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
190989	1126	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
261089	1055	SQMR	2F		0.001L	0.003L	0.003L	0.001						
211189	1113	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
121289	1141	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
230190	1140	SQMR	2F		0.001L	0.003L	0.003L	0.001L						
210290	1055	SQMR	2F		0.001L	0.003L	0.003L	0.001L						

ROSEMORRAN STREAM AT KENEGIE COTTAGE

Date	Time	Type	Furp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP DOT TOTAL	PP TDE TOTAL
110489	1435	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	
170589	1211	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L	
280689	0946	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
180789	0956	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
190989	1136	SQMR	2F		0.001L	0.003L	0.003L	0.002				
251089	1049	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
211189	1126	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
121289	1151	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
230190	1121	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
210290	1105	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
050390	1115	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	

A.30 BRIDGE AT CHYANDOUR ROSEMORRAN STREAM

Date	Time	Type	Furp	Mat	ALDRIN TOTAL	DIELD- RIN TOTAL	ENDRIN TOTAL	HCH (BHC) GAMMA	PP TOTAL	DDE TOTAL	PP DOT TOTAL	PP TDE TOTAL
110489	1510	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	
170589	1240	SQMR	2F		0.001L	0.003L	0.003L		0.003L	0.005L	0.003L	
180789	1211	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
190989	1150	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
251089	1025	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
211189	1136	SQMR	2F		0.001L	0.003L	0.003L	0.004				
121289	1201	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
230190	1210	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
210290	1120	SQMR	2F		0.001L	0.003L	0.003L	0.001L				
050390	1125	SQMR	2F		0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L	

CUCURRIAN MILL BRIDGE MARAZION RIVER

Date	Time	Type Pump	Mat	ALDRIN DIELD-		ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
				TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL		
110489	1410	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L			
170589	1151	SQMR	2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
280689	0926	SQMR	2F	0.003	0.003L	0.003L	0.001L						
180789	1231	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
310889	1021	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
190989	1106	SQMR	2F	0.001L	0.003L	0.003L	0.002						
251089	1013	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
211189	1101	SQMR	2F	0.001L	0.003L	0.003L	0.001						
121289	1126	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
230190	1046	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
210290	1015	SQMR	2F	0.001L	0.003L	0.003L	0.001L						

TRUTHWELL MILL BRIDGE MARAZION RIVER

Date	Time	Type Pump	Mat	ALDRIN DIELD-		ENDRIN	HCH	PP	DDE	PP	DDT	PP	TDE
				TOTAL	RIN	TOTAL	(BHC)	TOTAL	TOTAL	TOTAL	TOTAL		
110489	1400	SQMR	2F	0.001L	0.003L	0.003L	0.001	0.003L	0.005L	0.003L			
170589	1110	SQMR	2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L			
280689	0901	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
180789	1256	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
310889	1001	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
190989	1046	SQMR	2F	0.001L	0.003L	0.003L	0.001						
251089	0955	SQMR	2F	0.001L	0.003L	0.003L	0.003						
211189	1031	SQMR	2F	0.001L	0.003L	0.003L	0.001						
121289	1106	SQMR	2F	0.001L	0.003L	0.003L	0.004						
230190	0941	SQMR	2F	0.001L	0.003L	0.003L	0.001L						
210290	0940	SQMR	2F	0.001L	0.003L	0.003L	0.001L						

TREGILLIOWE TRIB AT CHYVELLAN

Date	Time	Type Pump	Mat	ALDRIN DIELD-		ENDRIN	HCH	DDE	DDT	TDE
				TOTAL	RIN	TT	TOTAL	GAMMA	PP'	PP'
110489	1345	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L
170589	1126	SQMR	2F	0.005	0.003L	0.003L		0.003L	0.005L	0.003L
280689	0911	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
180789	1231	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
310889	0951	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
190989	1036	SQMR	2F	0.002	0.003L	0.003L	0.002			
251089	0950	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
211189	1046	SQMR	2F	0.001L	0.003L	0.003L	0.002			
121289	1101	SQMR	2F	0.001L	0.003L	0.003L	0.003			
230190	0951	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
210290	0950	SQMR	2F	0.001L	0.003L	0.003L	0.001L			
250390	0920	SQMR	2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L

PENBRO PORTHLEVEN STREAM

Date	Time	Type Purp Mat	ALDRIN DIELD- ENDRIN			HCH PP ODE PP DDT PP TDE			
			TOTAL	RIN TOTAL	TOTAL	(BHC) GAMMA	TOTAL	TOTAL	TOTAL
110489	1250	SQMR 2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L
170589	1026	SQMR 2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L
280689	0831	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
180789	1351	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
310889	0901	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
190989	0951	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
251089	0912	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
211189	1456	SQMR 2F	0.001L	0.003L	0.003L	0.002			
121289	1016	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
240190	1050	SQMR 2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L

METHLEIGH PORTHLEVEN STREAM (MOUNTS BAY)

Date	Time	Type Purp Mat	ALDRIN DIELD- ENDRIN			HCH PP ODE PP DDT PP TDE			
			TOTAL	RIN TOTAL	TOTAL	(BHC) GAMMA	TOTAL	TOTAL	TOTAL
110489	1240	SQMR 2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L
170589	1041	SQMR 2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L
280689	0821	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
180789	1336	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
310889	0921	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
190989	1000	SQMR 2F	0.001L	0.003L	0.003L	0.003			
251089	0925	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
211189	1446	SQMR 2F	0.001L	0.003L	0.003L	0.003			
121289	1031	SQMR 2F	0.001L	0.003L	0.003L	0.001L			
240190	1023	SQMR 2F	0.001L	0.003L	0.003L	0.001L	0.003L	0.005L	0.003L

UPSTREAM OF HARBOUR PORTHLEVEN STREAM (MOUNTS BAY)

Date	Time	Type Purp Mat	ALDRIN DIELD- ENDRIN			HCH PP ODE PP DDT PP TDE			
			TOTAL	RIN TOTAL	TOTAL	(BHC) GAMMA	TOTAL	TOTAL	TOTAL
170589	1531	SQMR 2F	0.001L	0.003L	0.003L		0.003L	0.005L	0.003L