

~~EP/08/98~~

**DEVON AREA
INTERNAL REPORT**



**ENVIRONMENT
AGENCY**

**INVESTIGATION TO DETERMINE
IF THE SOAKAWAY FROM
STOWFORD FARM CARAVAN SITE
IS HAVING AN IMPACT ON THE
BIOLOGICAL COMMUNITY OF THE
COLAM STREAM**

**MARCH 1998
DEV/EP/08/98
(CATCHMENT 30A)**

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Area Manager (Devon)**

INVESTIGATION TO DETERMINE IF THE SOAKAWAY FROM STOWFORD FARM MEADOWS CARAVAN SITE IS HAVING AN IMPACT ON THE BIOLOGICAL COMMUNITY OF THE COLAM STREAM.

1. BACKGROUND

The Stowford Farm Meadows caravan site is situated on the Colam Stream in north Devon at NGR SS 5600 4265.

The owners of the site have recently placed an application with the Environment Agency in order to increase the total capacity of the septic tanks from 81 m³ to 82.5 m³. As such, the Discharge Consenting section have requested a biological survey to be carried out to determine if there is any impact from the soakaway on the Colam Stream at present (see APPENDIX I).

2. TERMS OF REFERENCE

2.1 OBJECTIVES

To determine if the soakaway from Stowford Farm Meadows caravan site is having an impact on the biological community of the Colam Stream.

2.2 PROJECT TEAM

T. Cronin (Project Leader)
P. Rose (Project Manager, author)

2.3 METHOD

The sites to be sampled were specified by the Discharge Consenting section (see Figure 1 and APPENDIX I). The collections were made from downstream up and consisted of a standard 3-minute kick and one minute search with bank-side identification of the macro invertebrates to family level. An assessment of the substrate to determine sewage fungus cover was also made.

3. RESULTS

See APPENDIX II and TABLE 1.

The collections made from the 4 sites on 18 March 1998 all included a wide range of macro invertebrates. Stoneflies, a group consisting of families that are particularly sensitive to organic pollution were well represented at each site. No sewage fungus was apparent at any of the 4 sites.

TABLE 1. The biotic scores for each site surveyed.

Site	BMWP* Score	ASPT** Score	No. of scoring taxa	No. of non scoring taxa	Total Taxa
1	154	7.00	22	1	23
2	155	6.74	23	0	23
3	161	6.71	24	0	24
4	165	6.88	25	1	26

* Biological Monitoring Working Party

** Average Score Per Taxon

All sites had comparable diversities and biotic scores indicating a very good water quality and no impact from the caravan site soakaway (see TABLE 1)

4. DISCUSSION

The results obtained from the biological collections show no impact at present on the macro invertebrate community in the stream resulting from the soakaway.

The BMWP and ASPT scores show the water quality to be very good at all sites. The ASPT scores in particular indicate a good proportion of the taxa identified to be pollution sensitive.

However, it must be noted that the caravan park is not open for the season as yet (mid March 1998). Once the season is fully under way and the septic tanks have been discharging to ground for a while and possibly the flows in the stream are less (high summer), any impact would be more apparent.

The fact that the substrate between the sites did not change radically, ie become more silty downstream from the drainage area, suggests there to have been historically little impact if any from the drainage area.

Each of the small tributaries coming into the Colam Stream between sites 1 - 4 (see Figure 1) were also quickly looked at (stones lifted, no quantitative data collected) to check that there were no indications of pollution; all of these sites had a range of stoneflies and caddis present and gave no cause for alarm.

5. CONCLUSIONS

1. At present (early spring 1998) no impact on the macro invertebrate community of the Colam Stream could be detected resulting from the Stowford Farm Meadows caravan site soakaway.
2. From the biological collections made, all 4 sites had comparable diversities and biotic scores indicating a very good water quality.

Figure 1. Map showing Stowford Farm Meadows caravan site, the septic tank soakaway area and the biological sample sites.

Site	Name	NGR
1	30m D/S Collacott Bridge	SS 5561 4172
2	30 m D/S Stowford Farm Trib.	SS 5577 4205
3	10 m U/S Stowford Farm Trib.	SS 5573 4208
4	20 m U/S small trib.	SS 5548 4241

Key	
	Biological collection point
	Septic Tank
	Septic Soakaway



APPENDIX I

memo



ENVIRONMENT
AGENCY

To Trevor Cronin

Our ref 30A/STO

From Colin C Brown

Your ref

Ext Number 2228 6162

Date 15 October 1997

STOWFORD FARM MEADOWS

Further to our conversation of today's date please find attached location maps showing the sites on the Colam Stream where I would like a biological survey undertaken.

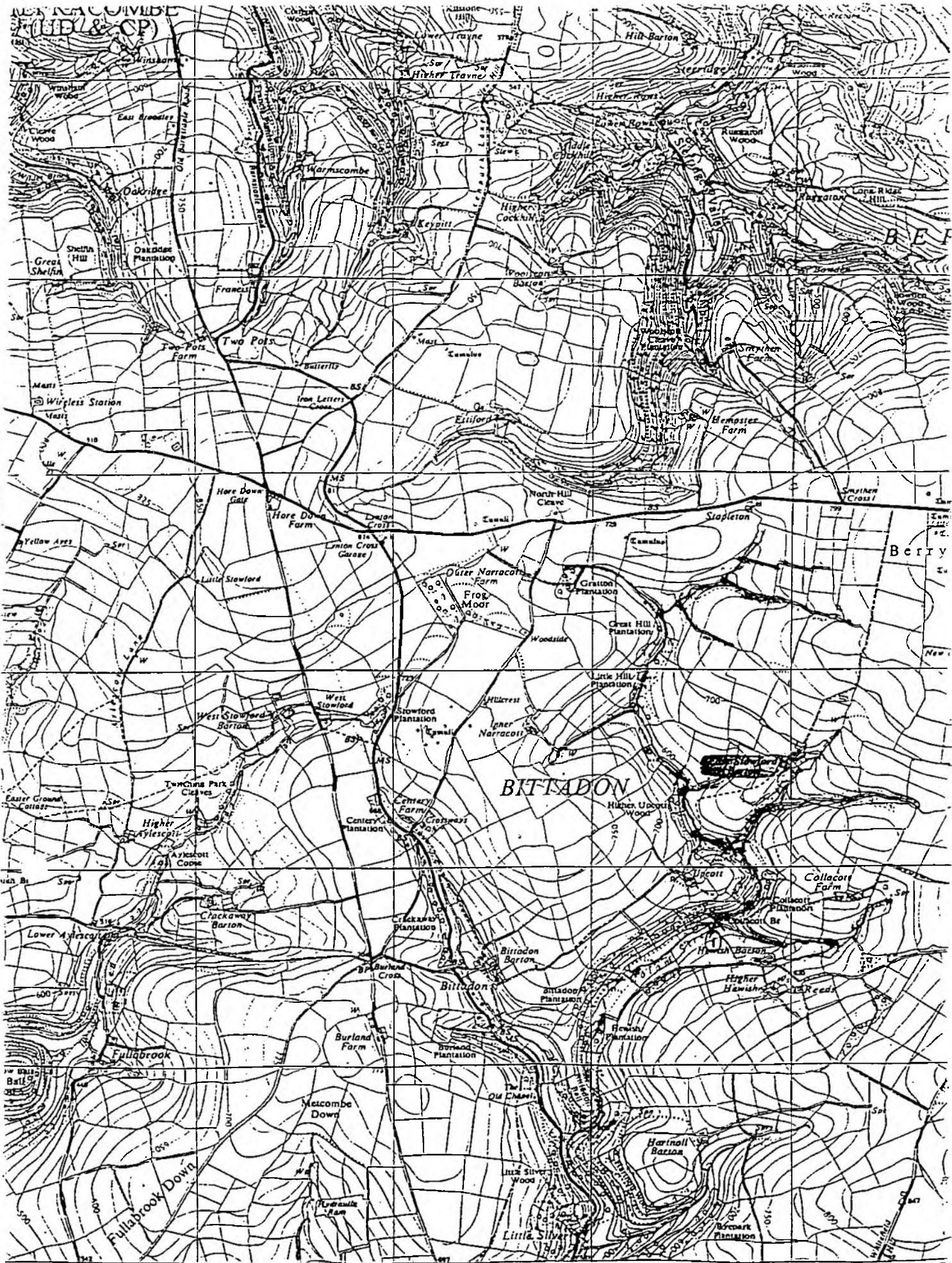
The owners of the camp-site are Redvers and Denzil Rice and they can be contacted for access on 01271 882476.

If you require any further information please let me know.

Regards

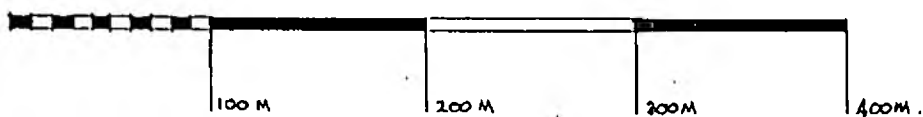
COLIN C BROWN
Tactical Planning Officer

Encs.





← AND BELOW NEXT TRIBS. CONFLUENCE - SEE 1: 25000 MAP



STOWFORD FARM MEADOWS

Touring Caravan and Camping Park

COMBE MARTIN
NORTH DEVON
EX34 0PW

APPENDIX II

BIOLOGICAL SURVEY SHEET - INVESTGATIONS

RIVER Colam		SITE DS Coloured Lodge		(30m DS)	
SITE REF NUMBER ①		NGR 255561, 472		SAMPLING OFFICER [Signature] DATE 16/2/13	
SAMPLING METHOD 3m x 1m		AVE WIDTH M 3.2		AVE DEPTH M 20cm	
SHADE % 60		FLOW M/SEC 1m ³		TURBIDITY clear	
COLOUR clear		MACROPHYTES PRESENT (% COVER)		ALGAE (% COVER)	
Oenanthe 5%				GREEN FILAMENTOUS	
				GREEN NON-FILAMENTOUS	
				DIATOMS 5	
				OTHER	
BRYOPHYTES (% COVER) 5		SEWAGE FUNGUS (TOTAL % COVER)			
OCHRE (% COVER)				☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
SUBSTRATE (% COVER)		ROCK PAVEMENT		BOULDERS (>256MM) 10	
COBBLES (64 - 256MM) 10		PEBBLES (16-64MM) 40		GRAVEL (2-16MM) 30	
SAND (0.0625 - 2MM) 10		SILT		CLAY	

COMMENTS

5
Old Crown tract 3" - diff. to Sort due to shale -

			BMWP SCORE			BMWP SCORE			BMWP SCORE
EPHEMEROPTERA				LIMNephilIDAE	7	✓ A	CHELICERATA		
BAETIDAE	4	✓	C	MOLANNIDAE	10		ACARI		— A
CAENIDAE	7			ODONTocerIDAE	10	✓ A	MOLLUSCA		
EPHEMERELLIDAE	10			PHILOPOTAMIDAE	8	✓ A	ACROLOXIDAE	6	
EPHEMERIDAE	10			PHRYGANEIDAE	10		ANCYLIDAE	6	
HEPTAGENIIDAE	10	✓	B	POLYCENTROPODIDAE	7	✓ A	BITHNIDAE	3	
LEPTOPHLEBIIDAE	10			PSYCHOMYIDAE	8		OREISSENIDAE		
POTAMANTHIDAE	10			RHYACOPHILIDAE	7	✓ B	HYDROBIIDAE	3	
SIPHONURIDAE	10			SERICOSTOMATIDAE	10	✓ B	LYMNAEIDAE	3	
ODONATA				LEPIDOPTERA			NERITIDAE	6	
AESHNIDAE	8			PYRALIDAE			PHYSIDAE	3	
CALOPTERYGIIDAE	8			DIPTERA			PLANORBIDAE	3	
COENAGRIIDAE	6			ATHERICIDAE			SPHAERIIDAE	3	
CORDULEGASTERIDAE	8			CERATOPOGONIDAE			UNIONIDAE	6	
CORDULIDAE	8			CHAOBORIDAE			VALVATIDAE	3	
GOMPHIDAE	8			CHIRONOMIDAE	2	— A	VIVIPARIDAE	6	
LESTIDAE	8			CULICIDAE			BRYOZOA		
LIBELLULIDAE	8			DIXIDAE			OLIOCHEATA	1	✓ B
PLATYCNEMIDAE	6			EMPIDIDAE			HIRUDINEA		
PLECOPTERA				MUSCIDAE			ERPOBELLIDAE	3	
CAPNIIDAE	10			PSYCHODIDAE			GLOSSIPHONIIDAE	3	
CHLOROPERLIDAE	10	✓	A	PTYCHOPTERIDAE			HIRUDIDAE	3	
LEUCTRIDAE	10	✓	B	RHAGIONIDAE			PISCULIDAE	4	
NEMOURIDAE	7	✓	B	SIMULIIDAE	5	✓ A	NEMATOMORPHA		
PERLIDAE	10			STRATIOMYIDAE			NEMATODA		
PERLODIDAE	10	✓	B	SYRPHIDAE			PLATYHELMINTHES		
TAENIOPTERYGIDAE	10	✓	B	TABANIDAE			DENDROCOELIDAE	5	
HEMIPTERA				THAUMALEIDAE			DUGESIIDAE	5	
APHELICHERIDAE	10			TIPULIDAE	5	✓ H	PLANARIIDAE	5	
CORIXIDAE	5			COLEOPTERA			PORIFERA		
GERRIDAE	5			CHRYSEMELIDAE	5				
HYDROMETRIDAE	5			CURCLIONIDAE	5				
MESOVELIDAE	5			DRYOPIDAE	5				
NAUCORIDAE	5			DYTISCIDAE	5	✓ A	BMWP SCORE	154	
NEPIDAE	5			ELMIDAE	5	✓ A	ASPT SCORE	7	
NOTONECTIDAE	5			GYRINIDAE	5		NO. OF SCORING TAXA	22	
PLEIDAE	5			HALIPLIDAE	5		NO. OF NON-SCORING TAXA	1	
VELIIDAE	5			HYDRAENIDAE	5		TOTAL TAXA	23	
MEGALOPTERA				HYDROPHILIDAE	5				
SIALIDAE	4			HYGROBIIDAE	5				
NEUROPTERA				NOTERIDAE	5				
OSMYLIDAE				SCIRTIDAE	5				
SISYRIDAE				CRUSTACEA					
TRICHOPTERA				ASELLIDAE	3				
BERAIDAE	10			ASTACIDAE	8				
BRACHYCENTRIDAE	10			BRANCHIURA					
EDNOMIDAE	8			CLADOCERA					
GLOSSOSOMATIDAE	7			COPEPODA					
GOERIDAE	10	✓	C	COROPHIDAE	6				
HYDROPSYCHIDAE	5	✓	C	CRANIDAE	6				
HYDROPTILIDAE	6			CRANIDAE	6	✓ A			
LEPIDOSTOMATIDAE	10			OSTRACODA					
LEPTOCERIDAE	10								

ENVIRONMENT AGENCY - DEVON AREA
BIOLOGICAL SURVEY SHEET - INVESTIGATIONS

RIVER *Colam Stream* SITE *4 km x 20m W/S of Crib*
 SITE REF NUMBER *12* NGRSS *SS88 4241* SAMPLING OFFICER *PR* DATE *18/3/98*
 SAMPLING METHOD *3m kick + 1 min. reach* AVE WIDTH M *3* AVE DEPTH M *0.15*
 SHADE % *70%* FLOW M/SEC *1 m/s* TURBIDITY *Clear* COLOUR *Clear*
 MACROPHYTES PRESENT (% COVER) *Oenothera 5%* ALGAE (% COVER)
 GREEN FILAMENTOUS
 GREEN NON-FILAMENTOUS
 DIATOMS *1.0*
 OTHER
 BRYOPHYTES (% COVER) *10* SEWAGE FUNGUS (TOTAL % COVER)
 OCHRE (% COVER) *0 0 0 0 0 0 0 0 0 0 0 0*
 SUBSTRATE (% COVER) ROCK PAVEMENT BOULDERS (>256MM) *10*
 COBBLES (64 - 256MM) *30* PEBBLES (16-64MM) *30* GRAVEL (2-16MM) *10*
 SAND (0.0625 - 2MM) *5* SILT *5* CLAY

COMMENTS

Down trout approx 3" long + 1 unknown Salmonid Trich

		BMWP SCORE			BMWP SCORE			BMWP SCORE
EPHEMEROPTERA			LIMNephilidae	7	B	CHELICERATA		
BAETIDAE	4	B	MOLANNIDAE	10	A	ACARI		A
CAENIDAE	7		ODONTOCERIDAE	10	A	MOLLUSCA		
EPHEMERELLIDAE	10		PHILOPOTAMIDAE	8	A	ACROLOXIDAE	6	
EPHEMERIDAE	10		PHRYGANEIDAE	10	A	ANCYLIDAE	6	
HEPTAGENIDAE	10	B	POLYCENTROPODIDAE	7	A	BITHNIDAE	3	
LEPTOPHLEBIIDAE	10		PSYCHOMYIDAE	8		OREISSENIDAE		
POTAMANTHIDAE	10		RHYACOPHILIDAE	7	B	HYDROBIIDAE	3	
SIPHONURIDAE	10		SERICOSTOMATIDAE	10	B	LYMNAEIDAE	3	
ODONATA			LEPIDOPTERA			NERITIDAE	6	
AESHNIDAE	8		PYRALIDAE			PHYSIDAE	3	
CALOPTERYGIIDAE	8		DIPTERA			PLANORBIDAE	3	
COENAGRIDAE	6		ATHERICIDAE			SPHAERIIDAE	3	A
CORDULEGASTERIDAE	8		CERATOPOGONIDAE			UNIONIDAE	6	
CORDULIDAE	8		CHABORIDAE			VALVATIDAE	3	
GOMPHIDAE	8		CHIRONOMIDAE	2	A	VIVIPARIDAE	6	
LESTIDAE	8		CULICIDAE			BRYOZOA		
LIBELLULIDAE	8		DIXIDAE			OLIOCHEATA	1	B
PLATYCNEPIDIDAE	6		EMPIDIDAE			HIRUDINEA		
PLECOPTERA			MUSCIDAE			ERPOBDELLIDAE	3	
CAPNIIDAE	10		PSYCHODIDAE			GLOSSIPHONIIDAE	3	
CHLOROPERLIDAE	10	A	PTYCHOPTERIDAE			HIRUDIIDAE	3	
LEUCTRIDAE	10	B	RHAGIONIDAE			PISCIDIIDAE	4	
NEMOURIDAE	7	B	SIMULIIDAE	5		NEMATOMORPHA		
PERLIDAE	10		STRATIOMYIDAE			NEMATODA		
PERLODIDAE	10	B	SYRPHIDAE			PLATYHELMINTHES		
TAENIOPTERYGIDAE	10	B	TABANIDAE			DENDROCOELIDAE	5	
HEMIPTERA			THAUMALEIDAE			DUGESIIDAE	5	
APHELOCHIRIDAE	10		TIPULIDAE	5	A	PLANARIIDAE	5	B
CORIXIDAE	5		COLEOPTERA			PORIFERA		
GERRIDAE	5		CHRYSOMELIDAE	5				
HYDROMETRIDAE	5		CURCLIONIDAE	5				
MESOVELIDAE	5		DRYOPIDAE	5				
NAUCORIDAE	5		DYTISCIDAE	5	A	BMWP SCORE	165	
NEPIDAE	5		ELMIDAE	5	B	ASPT SCORE	6.88	
NOTONECTIDAE	5		GYRINIDAE	5	A	NO. OF SCORING TAXA	24	
PLEIDAE	5		HALIPLIDAE	5		NO. OF NON-SCORING TAXA	1	
VELIIDAE	5		HYDRAENIDAE	5		TOTAL TAXA	25	
MEGALOPTERA			HYDROPHILIDAE	5				
SIALIDAE	4		HYGROBIIDAE	5				
NEUROPTERA			NOTERIDAE	5				
OSMYLIDAE			SCIPTIDAE	5				
SISYRIDAE			CRUSTACEA					
TRICHOPTERA			ASELLIDAE	3				
BERAEIDAE	10		ASTACIDAE	8				
BRACHYCENTRIDAE	10		BRANCHIURA					
EDNOMIDAE	8		CLADOCERA					
GLOSSOSOMATIDAE	7		COPEPODA					
GOFRIDAE	10	A	COROPHIDAE	6				
HYDROPSYCHIDAE	5	B	CRANGONYCTIDAE	6				
HYDROPTILIDAE	6		GAMMARIDAE	6	B			
LEPIDOSTOMATIDAE	10		OSTRACODA					
LEPTOCERIDAE	10							

BIOLOGICAL SURVEY SHEET - INVESTIGATIONS

RIVER Colam Stream		SITE us d tree	
SITE REF NUMBER ③		NGR 55 55 73 4208	SAMPLING OFFICER PR
SAMPLING METHOD 2m K + 1 min Search		AVE WIDTH M 3	AVE DEPTH M 15cm
SHADE % 40	FLOW M/SEC 1m ³ /s	TURBIDITY clear	COLOUR clear
MACROPHYTES PRESENT (% COVER) Acanthaceae 5%		ALGAE (% COVER) GREEN FILAMENTOUS GREEN NON-FILAMENTOUS DIATOMS 5 OTHER	
BRYOPHYTES (% COVER) 2		SEWAGE FUNGUS (TOTAL % COVER)	
OCHRE (% COVER)		☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
SUBSTRATE (% COVER)		ROCK PAVEMENT	BOULDERS (>256MM) 15
COBBLES (64 - 256MM) 30		PEBBLES (16-64MM) 25	GRAVEL (2-16MM) 15
SAND (0.0625 - 2MM) 5		SILT	CLAY

COMMENTS

			BMWP SCORE			BMWP SCORE			BMWP SCORE
EPHEMEROPTERA				LIMNephilIDAE	7	A	CHELICERATA		
BAETIDAE	4	C		MOLANNIDAE	10		ACARI		
CAENIDAE	7			ODONTOCERIDAE	10	A	MOLLUSCA		
EPHEMERELLIDAE	10			PHILOPOTAMIDAE	8	A	ACROLOXIDAE	6	
EPHEMERIDAE	10			PHRYGANEIDAE	10		ANCYLIDAE	6	
HEPTAGENIIDAE	10	B		POLYCENTROPODIDAE	7	A	BITHNIIDAE	3	
LEPTOPHLEBIIDAE	10			PSYCHOMYIDAE	8		DREISSENIDAE		
POTAMANTHIDAE	10			RHYACOPHILIDAE	7	B	HYDROBIIDAE	3	
SIPHONURIDAE	10			SERICOSTOMATIDAE	10	B	LYMNAEIDAE	3	
ODONATA				LEPIDOPTERA			NERITIDAE	6	
AESHNIDAE	8			PYRALIDAE			PHYSIDAE	3	
CALOPTERYGIIDAE	8			DIPTERA			PLANORBIDAE	3	
COENAGRIIDAE	6			ATHERICIDAE			SPHAERIIDAE	3	A
CORULEGASTERIDAE	8			CERATOPOGONIDAE			UNIONIDAE	6	
CORULIDAE	8			CHAOBORIDAE			VALVATIDAE	3	
GOMPHIDAE	8			CHIRONOMIDAE	2	A	VIVIPARIDAE	6	
LESTIDAE	8			CULICIDAE			BRYOZOA		
LIBELLULIDAE	8			DIXIDAE			OLIOCHEATA	1	B
PLATYCNEMIDIDAE	6			EMPIDIDAE			HIRUDINEA		
PLECOPTERA				MUSICIDAE			ERPODELLIDAE	3	
CAPNIIDAE	10	A		PSYCHODIDAE			GLOSSIPHONIIDAE	3	
CHLOROPERLIDAE	10			PTYCHOPTERIDAE			HIRUDIDAE	3	
LEUCTRIDAE	10	B		RHAGIONIDAE			PISCICOLIDAE	4	
NEMOURIDAE	7			SIMULIIDAE	5	B	NEMATOMORPHA		
PERLIDAE	10			STRATIOMYIDAE			NEMATODA		
PERLODIDAE	10	B		SYRPHIDAE			PLATYHELMINTHES		
TAENIOPTERYGIDAE	10	B		TABANIDAE			DENDROCOELIDAE	5	
HEMIPTERA				THAUMALEIDAE			OUGESIIDAE	5	
APHELOCHEIRIDAE	10			TIPULIDAE	5	A	PLANARIIDAE	5	
CORIXIDAE	5			COLEOPTERA			PORIFERA		
GERRIDAE	5			CHRYSOMELIDAE	5				
HYDROMETRIDAE	5			CURCLIONIDAE	5				
MESOVELIDAE	5			DRYOPIDAE	5				
NAUCORIDAE	5			DYTISCIDAE	5	B	BMWP SCORE	161	
NEPIDAE	5			ELMIDAE	5		ASPT SCORE	6-71	
NOTONECTIDAE	5			GYRINIDAE	5				
PLEIDAE	5			HALIPLIDAE	5		NO. OF SCORING TAXA	24	
VELIIDAE	5			HYDRAENIDAE	5		NO. OF NON-SCORING TAXA	0	
MEGALOPTERA				HYDROPHILIDAE	5		TOTAL TAXA	24	
SIALIDAE	4	A		HYGROBIIDAE	5				
NEUROPTERA				NOTERIDAE	5				
OSMYIIDAE				SCIPTIDAE	5				
SISYRIDAE				CRUSTACEA					
TRICHOPTERA				ASELLIDAE	3				
BERAEIDAE	10			ASTACIDAE	8				
BRACHYCENTRIDAE	10			BRANCHIURA					
EDNOMIDAE	8			CLADOCERA					
GLOSSOSOMATIDAE	7			COPEPODA					
GOERIDAE	10			COROPHIDAE	6				
HYDROPSYCHIDAE	5	A		CRANGONYCTIDAE	6				
HYDROPTILIDAE	6			GAMMARIDAE	6	B			
LEPIDOSTOMATIDAE	10			OSTRACODA					
LEPTOCERIDAE	10								

RIVER <i>Colan Stream</i>		SITE <i>DS 12m</i>		STANDARD SURVEY SHEET - INVESTIGATIONS	
SITE REF NUMBER <i>(2)</i>		NGR <i>SS 5577 4205</i>		SAMPLING OFFICER <i>PIC</i>	
SAMPLING METHOD <i>3m x 1m</i>		AVE WIDTH M <i>3m</i>		AVE DEPTH M <i>20cm</i>	
SHADE % <i>20</i>		FLOW M/SEC <i>1.5</i>		TURBIDITY <i>Clear</i>	
MACROPHYTES PRESENT (% COVER)		ALGAE (% COVER)		COLOUR <i>Clear</i>	
<i>Denudula 5%</i>		GREEN FILAMENTOUS <i>5%</i>			
<i>Glyceria 5%</i>		GREEN NON-FILAMENTOUS			
		DIATOMS <i>5%</i>			
		OTHER			
BRYOPHYTES (% COVER) <i>30%</i>		SEWAGE FUNGUS (TOTAL % COVER)			
OCHRE (% COVER)		☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐			
SUBSTRATE (% COVER)		ROCK PAVEMENT		BOULDERS (>256MM) <i>20</i>	
COBBLES (64 - 256MM) <i>30</i>		PEBBLES (16-64MM) <i>30</i>		GRAVEL (2-16MM) <i>15</i>	
SAND (0.0625 - 2MM) <i>5</i>		SILT		CLAY	

COMMENTS: Easier to sort than previous D/S sample.

			BMWP SCORE			BMWP SCORE			BMWP SCORE
EPHEMEROPTERA				LIMNephilIDAE	7	A	CHELICERATA		
BAETIDAE	4	✓	C	MOLANNIDAE	10		ACARI		
CAENIDAE	7			ODONTOCERIDAE	10		MOLLUSCA		
EPHEMERELLIDAE	10			PHILOPOTAMIDAE	8	✓	ACROLOXIDAE	6	
EPHEMERIDAE	10			PHRYGANEIDAE	10		ANCYLIDAE	6	
HEPTAGENIIDAE	10	✓	C	POLYCENTROPODIDAE	7	✓	BITHNIDAE	3	
LEPTOPHEBIIDAE	10			PSYCHOMYIDAE	8		DREISSENIDAE		
POTAMANTHIDAE	10			RHYACOPHILIDAE	7	✓	HYDROBIIDAE	3	
SIPHONURIDAE	10			SERICOSTOMATIDAE	10	✓	LYMNAEIDAE	3	
ODONATA				LEPIDOPTERA			NERITIDAE	6	
AESHNIDAE	8			PYRALIDAE			PHYSIDAE	3	
CALOPTERYGIIDAE	8			DIPTERA			PLANORBIDAE	3	
COENAGRIIDAE	6			ATHERICIDAE			SPHAERIIDAE	3	✓
CORDULEGASTERIDAE	8	✓	A	CERATOPOGONIDAE			UNIONIDAE	6	
CORDULIDAE	8			CHAOBORIDAE			VALVATIDAE	3	
GOMPHIDAE	8			CHIRONOMIDAE	2	✓	VIVIPARIDAE	6	
LESTIDAE	8			CULICIDAE			BRYOZOA		
LIBELLULIDAE	8			DIXIDAE			OLIOCHEATA	1	✓
PLATYCNEMIDIDAE	6			EMPIDIDAE			HIRUDINEA		
PLECOPTERA				MUSICIDAE			ERPOBELLIDAE	3	
CAPNIIDAE	10			PSYCHODIDAE			GLOSSIPHONIIDAE	3	
CHLOROPERLIDAE	10	✓	A	PTYCHOPTERIDAE			HIRUDIDAE	3	
LEUCTRIDAE	10	✓	A	RHAGIONIDAE			PISCICOLIDAE	4	
NEMOURIDAE	7	✓	B	SIMULIIDAE	5	✓	NEMATOMORPHA		
PERLIDAE	10			STRATIOMYIDAE			NEMATODA		
PERLODIDAE	10	✓	B	SYRPHIDAE			PLATYHELMINTHES		
TAENIOPTERYGIDAE	10	✓	B	TABANIDAE			DENDROCOELIDAE	5	
HEMIPTERA				THAUMALEIDAE			DUGESIIDAE	5	
APHELOCHEIRIDAE	10			TIPULIDAE	5	✓	PLANARIIDAE	5	
CORIXIDAE	5			COLEOPTERA			PORIFERA		
GERRIDAE	5			CHRYSOMELIDAE	5				
HYDROMETRIDAE	5			CURCLIONIDAE	5				
MESOVELIDAE	5			DRYOPIDAE	5				
NAUCORIDAE	5			DYTISCIDAE	5				
NEPIDAE	5			ELMIDAE	5	✓			
NOTONECTIDAE	5			GYRINIDAE	5				
PLEIDAE	5			HALIPLIDAE	5				
VELIIDAE	5			HYDRAENIDAE	5				
MEGALOPTERA				HYDROPHILIDAE	5				
SIALIDAE	4			HYGROBIIDAE	5				
NEUROPTERA				NOTERIDAE	5				
OSMYIDAE				SCIRTIDAE	5	✓			
SISYRIDAE				CRUSTACEA					
TRICHOPTERA				ASELLIDAE	3				
BERAEIDAE	10			ASTACIDAE	8				
BRACHYCENTRIDAE	10			BRANCHIURA					
EDNOMIDAE	8			CLADOCERA					
GLOSSOSOMATIDAE	7			COPEPODA					
GOERIDAE	10	✓	B	COROPHIDAE	6				
HYDROPSYCHIDAE	5			CRANGONYCTIDAE	6				
HYDROPTILIDAE	6			GAMMARIDAE	6				
LEPIDOSTOMATIDAE	10			OSTRACODA					
LEPTOCERIDAE	10								