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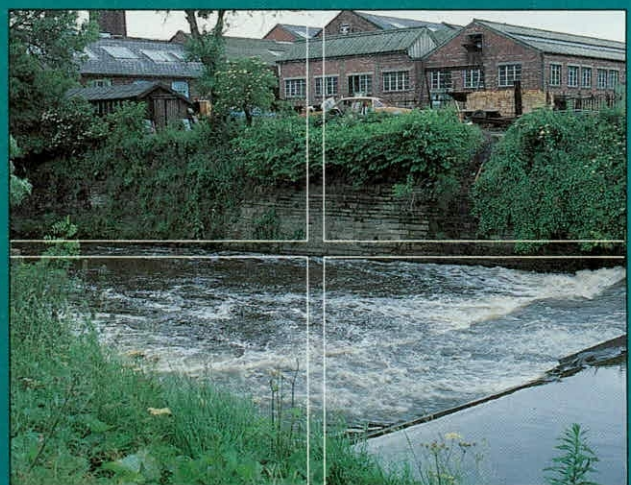
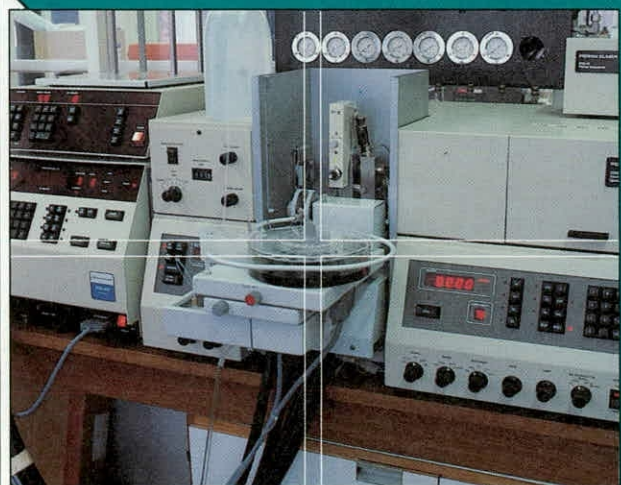
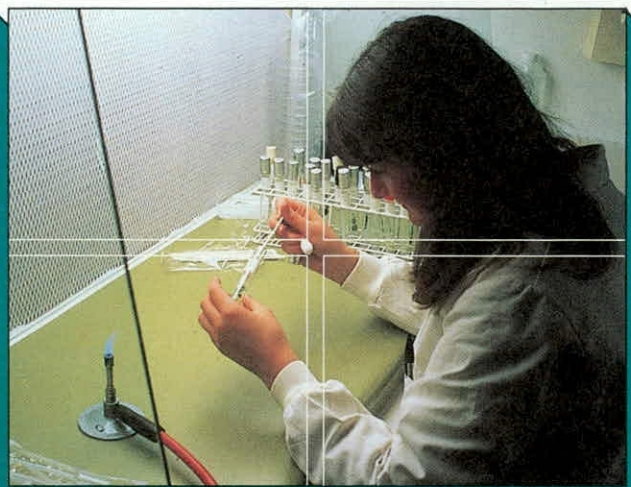
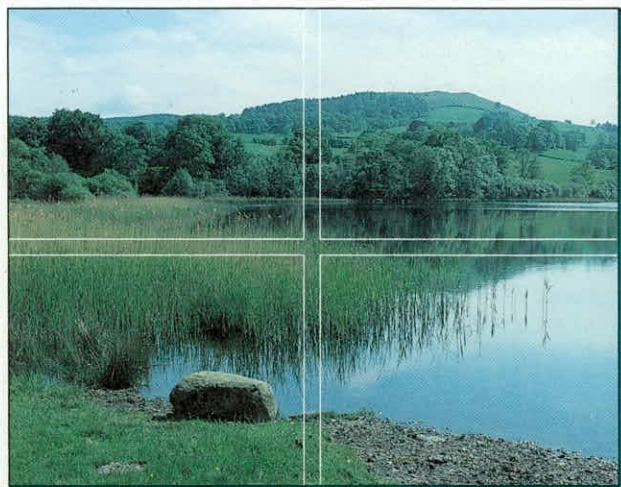
Quality audit of biological samples for the 1990 River Quality Survey Forth River Purification Board

R.J.M Gunn, BSc

J.F. Wright, PhD

J.H. Blackburn, BSc

M.T. Furse, BSc



INSTITUTE OF FRESHWATER ECOLOGY
River Laboratory, East Stoke, Wareham, Dorset BH20 6BB

Tel: 0929 462314

Fax: 0929 462180

Quality Audit of Biological Samples
for the 1990 River Quality Survey
Forth River Purification Board

R.J.M. Gunn, J.F. Wright, J.H. Blackburn & M.T. Furse

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1. INTRODUCTION

The 1990 River Quality Survey included the sampling of aquatic macro-invertebrates for biological assessment of river quality throughout the United Kingdom. In England and Wales the survey was undertaken by the National Rivers Authority (NRA), the River Purification Boards (RPBs) sampled in Scotland and the Department of Economic Development (DED) undertook the work in Northern Ireland.

Approximately 7750 sites were surveyed, the majority of which were sampled in spring, summer and autumn. Standard collection procedures were used and the sampling strategy was compatible with RIVPACS (River InVertebrate Prediction And Classification System), which has been developed by the Institute of Freshwater Ecology (IFE). Most of the remaining sites were sampled in a single season only, in order to extend the scope of the survey. For a variety of reasons, a few locations were sampled in just two seasons.

Samples were sorted for the families of macro-invertebrates included in the Biological Monitoring Working Party (BMWP) system. Taxa present were recorded on site data sheets. Sample processing and recording techniques varied from region to region.

In order to undertake this massive programme of fieldwork and sample processing, a large number of new staff were employed by the surveying agencies. In view of the number of staff involved and the variability of sample processing techniques, it was recognised that an independent quality control exercise was necessary to promote a consistently high level of reliability.

The IFE was contracted to undertake an audit of the sample sorting and identification performance of each NRA region, RPB and the DED. This report collates the results of 23 samples audited for Forth RPB. The IFE was not required to perform any statistical analyses nor interpretation of the results of the audit.

2. SAMPLE SELECTION

Nearly all samples from the 1990 River Quality Survey were sent to IFE for storage. They were catalogued on arrival and placed in crates, such that individual samples were readily accessible. A stratified random selection of samples for each sample processor was then made. Selection was undertaken by IFE staff and no selection was made before each sample had been received by IFE. Thus, sample processors had no means of knowing which of their samples would be audited.

The total number of sample processors employed nationally during the survey was considerably higher than that anticipated at the outset. As a consequence, the number of samples audited per processor was limited by the need to keep within the contracted overall total of 700 samples. A minimum of 4 samples was audited per processor, except where individuals processed very few samples or did not process material from each of the 3 seasons.

Sample selection was weighted towards spring samples in order to give early feedback on the blindspots of particular sorters and problems of identification.

3. SAMPLE PROCESSING

Biologists processing samples for the 1990 Survey were instructed to sort their samples, ideally within the laboratory, and select examples of each scoring taxon within the BMWP system. In most cases, the invertebrates were placed in a vial of preservative (4% formaldehyde solution or 70% industrial alcohol) and the BMWP taxa were listed on a data sheet. The vial of animals and the sorted material were then returned to the sample container and preservative added. Thus, each sample available to IFE for selection for audit should have included:

- i) a list of the BMWP FAMILIES FOUND IN THE SAMPLE
- ii) a vial containing representatives from each family
- iii) the preserved sample

When these three elements were present, the sequence of operations at IFE was as follows:

- a) The remainder of the sample was sorted and the BMWP families listed
- b) The families contained within the vial were identified and listed
- c) A comparison was made between the RPB listing of families and those identified from the vial by IFE
- d) A comparison was made between the RPB listing of families and those found in the sample by IFE
- e) "Losses" or "gains" from the RPB listing of families were noted. In the case of "gains", each additional family was identified, where possible, to species level, in order to clarify any specific repetitive errors.

For a number of different reasons, some samples did not include a vial containing representative examples of the families listed on the RPB data sheet. These samples were avoided for audit, where possible. When selection of such samples was unavoidable (eg where a particular sorter would otherwise have been excluded from the audit exercise), only operations a), d) and e) above were appropriate.

Several directives were issued to IFE relating to the treatment of BMWP taxa. Terrestrial representatives of BMWP scoring families, animals deemed to have been dead at the time of sampling, cast insect skins, pupal exuviae, empty mollusc shells and tail ends of "living" specimens were to be excluded from the listing of families present. Trichopteran pupae, although not routinely identified by many biologists, were to be included in the listing of families.

4. REPORTING

The results of each sample audit were recorded on a standard report form (Table 1). For audit samples where a vial of animals was included, the comparison between the RPB listing and the taxa found in the vial by IFE was shown in box A of the report form. Discrepancies could be due to carelessness, misidentifications or errors in completing the RPB data sheet. Families not on the RPB listing but found by IFE in the remainder of the sample were entered in box B of the report form under "additional families". When the families listed as "losses" in section A of the report form were compared with the full list of families recorded in the sample by IFE, some apparent losses from the vial were offset by the presence of those families in the remainder of the sample. These taxa were therefore listed in the "losses" box of section A and the "gains" box of section B and were neither a net loss nor a net gain. In these cases, the families were marked with an asterisk in both boxes. Such errors are noted as "omissions" in the table which summarises the results for each season (Table 2).

Species identifications, state of development (eg adult or larval coleopterans) and the presence of a single representative of a family within the remainder of the sample were recorded in the notes section of the report form. Where the RPB data sheet indicated that a family was noted and released at the site, this was recorded in the notes section but not included as a "loss", even though the family was not found in the vial.

For those samples which did not contain a vial of animals, box A of the report form was not applicable (N/a). Families not on the RPB list but present in the sample were listed in box B under "additional families" as before. Families recorded on the RPB list but not found by IFE were indicated on the left hand side of box B. If the vial of animals was retained by the RPB, entries in this box could include the sole representative of a family which was removed by the RPB, a family seen at the site which escaped or was released (without mention being made on the RPB data sheet), inaccurate identification, the wrong family box being ticked on the RPB data sheet or the family being present in the sample but missed by IFE.

Results of the audits of individual samples are presented in Table 3.

ACKNOWLEDGEMENTS

Thanks to Mrs Jessica Winder and Mrs Kay Symes for assistance with cataloguing and storage of samples and Mrs Valerie Palmer for typing the manuscript.

TABLE 1. The IFE Report form

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	<input type="text"/>	RIVER	<input type="text"/>
SEASON	<input type="text"/>	SITE	<input type="text"/>
SORTER	<input type="text"/>	SAMPLE CODE	<input type="text"/>
AQC OF BMWP FAMILIES A. IN VIAL <input type="checkbox"/> B. IN SAMPLE <input type="checkbox"/>			

		LOSSES	GAINS
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE		
B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	

NET LOSSES NET GAINS

NOTES

TABLE 2. The 23 samples audited for Forth RPB, with sample sorter initials and numbers of taxa 'lost', 'gained' and 'omitted'

River	Site	Sorter	Losses	Gains	Omissions
SPRING					
Dour Burn	U/s Harbour	IRF	0	5	1
Teith	D/s Loch Voil	IRF	0	0	0
Forth	Cobleland	MWM	0	2	0
Duchray Water	U/s Forth Confluence	MWM	0	1	0
Breich Water	Easter Breich	SdP	0	3	0
Peffer Burn West	Gauging Station	SdP	1	0	0
Barbauchlaw Burn	U/s Blackridge STW	HVH	0	0	0
Almond	Mid Calder d/s Linhouse	HVH	0	1	0
SUMMER					
Almond	Cowhill	HVH	0	3	0
South Esk	Newbattle	SdP	0	0	0
Devon	Vicars Bridge	MWM	0	3	0
Lochgelly Burn	D/s Cowdenbeath	IRF	0	0	0
Bog/Couston Water	Whiteside	BOK	0	1	0
Dalhousie Burn	Lothian Bridge	BOK	0	1	0
Killandean Burn	Confluence	BOK	0	0	0
AUTUMN					
Brox Burn	Milrig	BOK	0	0	0
North Middleton Burn	Borthwick	SdP	0	1	0
Tiel Burn	A92 Bridge	IRF	0	4	0
Murieston Water	B7008 Bridge	HVH	1	1	0
Ardoch Burn	Doune	MWM	0	3	0
Leven	Cabbagehall Lane	DH	1	0	0
Almond	Boathouse Bridge	DH	0	0	0
Tyne	Sandys Mill	DH	0	0	0

TABLE 3
Results of individual sample audits

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Dour Burn**

SEASON **Spring**

SITE **U/s Harbour**

SORTER **IRF**

SAMPLE CODE **NRA12 0165**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES		GAINS
A	<u>VIAL</u>	
		BMWP FAMILIES NOT FOUND BY IFE
		ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Tipulidae*
		None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	2 Hydrobiidae 3 Ancyliidae 4 Sphaeriidae 5 Gammaridae 6 Nemouridae 7 Tipulidae*

NET LOSSES **0**

NET GAINS **5**

NOTES

- 1 No tipulid in vial but dolichopodid found there.
- 2 Potamopyrgus jenkinsi 1 only
- 3 Ancylus fluviatilis 1 only
- 4 Pisidium sp.
- 6 Amphinemura sulcicollis 1 only
- 7 Tipula unca 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None
		ADDITIONAL FAMILIES FOUND BY IFE None

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)
		ADDITIONAL FAMILIES FOUND BY IFE None

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Forth**

SEASON **Spring**

SITE **Cobleland**

SORTER **MWM**

SAMPLE CODE **NRA12 0195**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES		GAINS
A	<u>VIAL</u>	
		</

B	<u>SAMPLE</u>		
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 1 Philopotamidae 2 Simuliidae

NET LOSSES **0**

NET GAINS **2**

NOTES

1 *Chimarra marginata* 1 only
 2 *Simulium argyreatum/variegatum* 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None
		ADDITIONAL FAMILIES FOUND BY IFE None

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)
		ADDITIONAL FAMILIES FOUND BY IFE 1 Dytiscidae

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Breich Water**

SEASON **Spring**

SITE **Easter Breich**

SORTER **SdP**

SAMPLE CODE **NRA12 0244**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	
	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	1 Hydrobiidae 2 Sphaeriidae 3 Asellidae

NET LOSSES

NET GAINS

NOTES

- 1 Potamopyrgus jenkinsi
- 2 Pisidium sp.
- 3 Asellus aquaticus 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydrophilidae	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES

NET GAINS

NOTES

1 Cercyon sp (terrestrial)

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

		LOSSES	GAINS
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None
B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	1 Caenidae

NET LOSSES

NET GAINS

NOTES

1 Caenis rivulorum

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**RIVER **Almond**SEASON **Summer**SITE **Cowhill**SORTER **HVH**SAMPLE CODE **NRA12 0235**AQC OF BMWP FAMILIES A. IN VIAL **+**B. IN SAMPLE **+**

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	1 Lymnaeidae

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	2 Leptophlebiidae 3 Elmidae

NET LOSSES **0**NET GAINS **3**

NOTES

1 Lymnaea sp. (juvenile) 1 only
 2 Indet Leptophlebiid (damaged specimen) 1 only
 3 Elmis aenea (larva) 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **South Esk**

SEASON **Summer**

SITE **Newbattle**

SORTER **SdP**

SAMPLE CODE **NRA12 0261**

AQC OF BMWP FAMILIES

A. IN VIAL

+

B. IN SAMPLE

+

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES

0

NET GAINS

0

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Devon**

SEASON **Summer**

SITE **Vicars Bridge**

SORTER **MWM**

SAMPLE CODE **NRA12 0173**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	1 Ancylidae 2 Caenidae 3 Odontoceridae

NET LOSSES **0**

NET GAINS **3**

NOTES
1 Ancylus fluviatilis
2 Caenis rivulorum 1 only
3 Odontocerum albicorne 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Lochgelly Burn**

SEASON **Summer**

SITE **D/s Cowdenbeath**

SORTER **IRF**

SAMPLE CODE **NRA12 0158**

AQC OF BMWP FAMILIES

A. IN VIAL

+

B. IN SAMPLE

+

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	<div>BMWP FAMILIES NOT FOUND BY IFE</div> <div>None</div> <div>ADDITIONAL FAMILIES FOUND BY IFE</div> <div>None</div>

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<div>BMWP FAMILIES NOT FOUND BY IFE</div> <div>(This box only completed when no vial supplied with sample)</div> <div>ADDITIONAL FAMILIES FOUND BY IFE</div> <div>None</div>

NET LOSSES **0**

NET GAINS **0**

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**RIVER **Bog/Couston Water**SEASON **Summer**SITE **Whiteside**SORTER **BO'K**SAMPLE CODE **NRA12 0227**AQC OF BMWP FAMILIES A. IN VIAL **+**B. IN SAMPLE **+**

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	1 Simuliidae

NET LOSSES **0**NET GAINS **1**

NOTES

1 Simulium ornatum group 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	Forth RPB	RIVER	Dalhousie Burn
SEASON	Summer	SITE	Lothian Bridge
SORTER	BO'K	SAMPLE CODE	NRA12 0264

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	1 Sialidae

NET LOSSES NET GAINS

NOTES

1 Sialis fuliginosa 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	Forth RPB	RIVER	Killandean Burn
SEASON	Summer	SITE	Confluence
SORTER	BO'K	SAMPLE CODE	NRA12 0242

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE
		ADDITIONAL FAMILIES FOUND BY IFE
		None

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE
		ADDITIONAL FAMILIES FOUND BY IFE
		(This box only completed when no vial supplied with sample)
		None

NET LOSSES NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Brox Burn**

SEASON **Autumn**

SITE **Milrig**

SORTER **BO'K**

SAMPLE CODE **NRA12 0239**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **North Middleton Burn**

SEASON **Autumn**

SITE **Borthwick**

SORTER **SdP**

SAMPLE CODE **NRA12 0266**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES		GAINS
A	VIAL	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None
		ADDITIONAL FAMILIES FOUND BY IFE None

B	SAMPLE	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)
		ADDITIONAL FAMILIES FOUND BY IFE 1 Goeridae

NET LOSSES **0**

NET GAINS **1**

NOTES **1 Silo sp. (juvenile) 1 only**

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Tiel Burn**

SEASON **Autumn**

SITE **A92 Bridge**

SORTER **IRF**

SAMPLE CODE **NRA12 0164**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	1 Odontoceridae

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	2 Planariidae 3 Leptophlebiidae 4 Ephemerellidae

NET LOSSES **0**

NET GAINS **4**

NOTES

- 1 Odontocerum albicorne (juvenile)**
- 2 Polycelis felina**
- 3 Indet Leptophlebiid (juvenile) 1 only**
- 4 Ephemerella ignita 1 only**

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**RIVER **Murleston Water**SEASON **Autumn**SITE **B7008 Bridge**SORTER **HVH**SAMPLE CODE **NRA12 0241**

AQC OF BMWP FAMILIES

A. IN VIAL

+

B. IN SAMPLE

+

LOSSES

GAINS

A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Chironomidae	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	2 Leuctridae

NET LOSSES

1

NET GAINS

1

NOTES

2 Leuctra sp. (juvenile) 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Ardoch Burn**

SEASON **Autumn**

SITE **Doune**

SORTER **MWM**

SAMPLE CODE **NRA12 0186**

AQC OF BMWP FAMILIES A. IN VIAL **+**

B. IN SAMPLE **+**

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None
		ADDITIONAL FAMILIES FOUND BY IFE None

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)
		ADDITIONAL FAMILIES FOUND BY IFE 1 Dytiscidae 2 Hydrophilidae 3 Lepidostomatidae

NET LOSSES **0**

NET GAINS **3**

NOTES

**1 Oreodytes septentrionalis (adult) 1 only
2 Hydraena gracilis (adult) 1 only
3 Lepidostoma hirtum**

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Leven**

SEASON **Autumn**

SITE **Cabbagehall Lane**

SORTER **DH**

SAMPLE CODE **NRA12 0152**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE 1 Lepidostomatidae
		ADDITIONAL FAMILIES FOUND BY IFE None

B	<u>SAMPLE</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)
		ADDITIONAL FAMILIES FOUND BY IFE None

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	Forth RPB	RIVER	Almond
SEASON	Autumn	SITE	Boathouse Bridge
SORTER	DH	SAMPLE CODE	NRA12 0229

AQC OF BMWP FAMILIES	A. IN VIAL	<input type="text" value="0"/>	B. IN SAMPLE	<input type="text" value="0"/>
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LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES	<input type="text" value="0"/>	NET GAINS	<input type="text" value="0"/>
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NOTES	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>
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1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION **Forth RPB**

RIVER **Tyne**

SEASON **Autumn**

SITE **Sandys Mill**

SORTER **DH**

SAMPLE CODE **NRA12 0275**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	None

NET LOSSES

NET GAINS

NOTES

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