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An audit of performance in the processing of macro-invertebrate samples in 1992. Clyde River Purification Board

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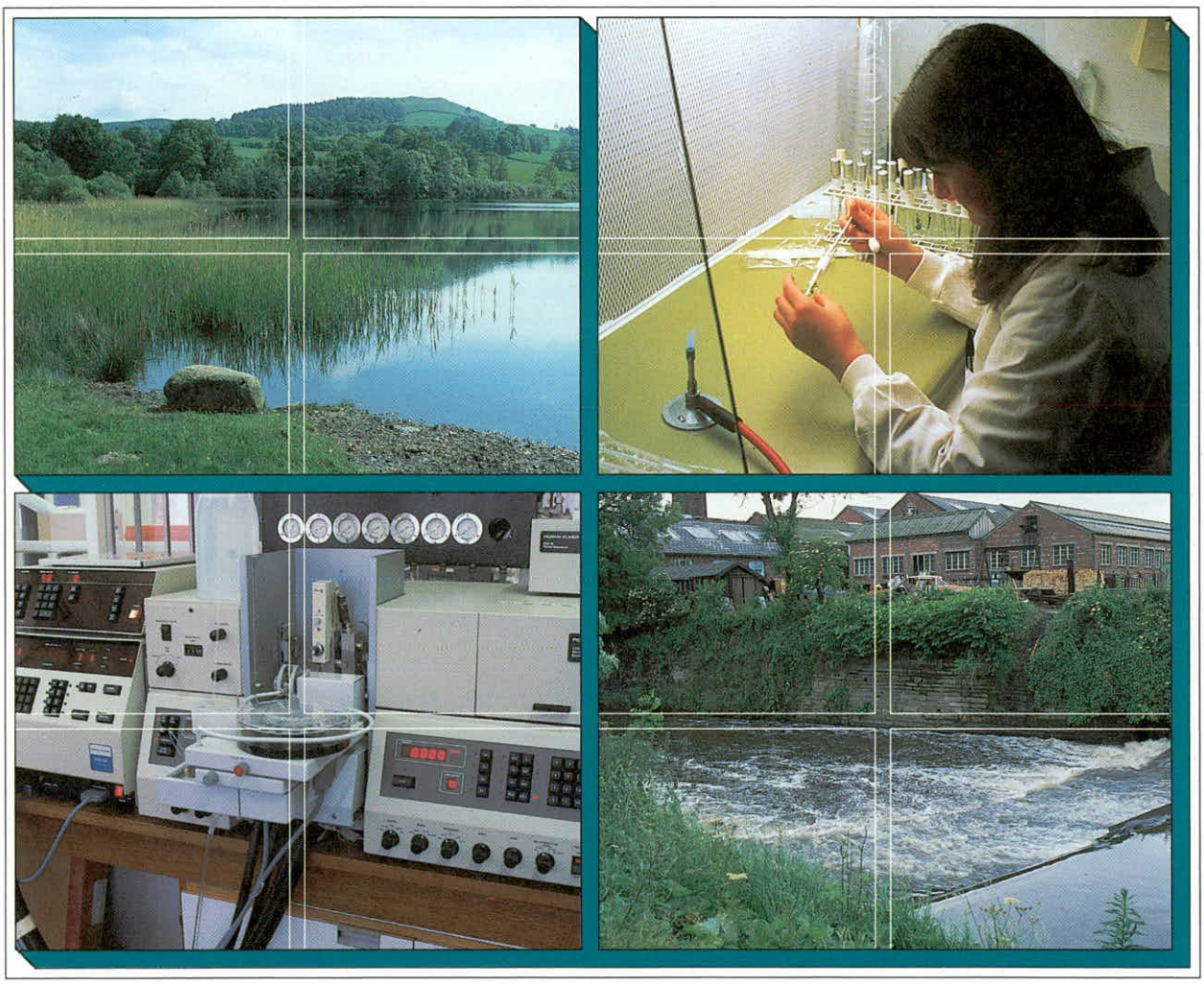

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An audit of performance in the processing of macro-invertebrate samples in 1992. Clyde River Purification Board

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1. INTRODUCTION

In 1992 the sampling of aquatic macro-invertebrates for the biological assessment of river quality continued throughout the United Kingdom. This task was undertaken by the National Rivers Authority (NRA) in England and Wales, the River Purification Boards (RPBs) in Scotland and the Industrial Research & Technology Unit (IRTU) in Northern Ireland.

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, several RPBs and the IRTU. This report presents the results of 30 samples audited for Clyde River Purification Board. The IFE was not required to perform any statistical analyses nor interpretation of the results of the audit.

Each organisation employed standard collection procedures, as used in the 1990 River Quality Survey, and the sampling strategy was therefore compatible with RIVPACS (River InVertebrate Prediction And Classification System), which has been developed by the Institute of Freshwater Ecology (IFE).

Samples were sorted by NRA, RPB and IRTU personnel 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.

2. SAMPLE SELECTION

Samples for audit were selected internally by each of the agencies being monitored. The biologists processing these samples had no prior knowledge of the samples to be audited.

The manner of sample selection, which biologists would be monitored and the number of audit samples from each season, were left to the discretion of the agency, within the limits of the total number of samples that IFE was contracted to audit.

3. SAMPLE PROCESSING

The normal protocol for NRA, RPB and IRTU biologists was to sort their samples within the laboratory and to 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 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 data sheet. Others arrived with the vial damaged in transit such that the representative examples were no longer separated. For these samples, 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 posterior ends of "living" specimens were to be excluded from the listing of families present. Chrysomelidae and Curculionidae, which appear in the BMWP list, were also to be excluded for the purposes of the audit. 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 Tables 2, 3 and 4 which summarise the results.

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 in which the vial of animals was damaged or missing, box A of the report form was not applicable (N/a). Families not on the list but present in the sample were entered in box B under "additional families" as before. Families recorded on the 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 sorter, entries in this box could include the sole representative of a family which was removed, a family seen at the site which escaped or was released (without mention being made on the data sheet), inaccurate identification, the wrong family box being ticked on the data sheet or the family being present in the sample but missed by IFE.

Results of the audits of individual samples are presented in the Appendix.

ACKNOWLEDGEMENTS

Thanks to Kay Symes for help with production of results and to Valerie Palmer for typing the manuscript.

TABLE 1. The IFE Report form

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION		RIVER	
DATE		SITE	
SORTER		SAMPLE CODE	

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

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	

NET LOSSES ☐ NET GAINS ☐

NOTES:

TABLE 2. The 10 spring samples audited for Clyde RPB.

River	Site	Sorter	Losses	Gains	Omissions
Black Cart Water	Milliken Park	MK	0	0	0
Black Cart Water	Linwood Bridge	DG	1	3	0
Douglas Water	A74 Bridge	DG	0	6	0
Garnock	Kilwinning	KA	0	1	0
Bothlin Burn	Bothlin Foot	SC	0	1	0
Saddell Water	B842 Bridge	SC	0	1	0
Lugton Water	A737 Bridge	MK	0	0	0
Myoch Burn	d/s Old Bridge	MT	0	2	0
Loin	Stronafyne	MT	0	2	1
Gryfe	Milton Bridge	KA	0	0	0

TABLE 2. The 10 summer samples audited for Clyde RPB.

River	Site	Sorter	Losses	Gains	Omissions
Clyde	Elvanfoot	MT	0	2	0
Eas a'Chais	u/s Fish Farm	KA	0	0	0
Clyde	Tidal Weir	SC	0	0	0
Barbreck	A816 Bridge	DG	0	2	0
Gala Lane	u/s Loch Doon	MK	0	0	0
Kelvin	Botanic Gardens	MT	0	0	0
Clyde	Dalmarnock Rail Bridge	DG	0	1	0
Kelvin	Kelvingrove	MK	0	1	0
Endrick Water	Drymen Bridge	KA	0	1	0
Clyde	Roberton	SC	0	0	0

TABLE 4. The 10 autumn samples audited for Clyde RPB.

River	Site	Sorter	Losses	Gains	Omissions
Cur	Bridgend	DG	0	3	0
Kelvin	Torrance	KA	0	0	0
Caplerig /Auldhouse Burn	Carnwadric	MK	0	0	0
Caplerig /Auldhouse Burn	u/s Mearns STW	MT	0	1	0
Kelvin	Twechar	SC	0	1	0
Rumbling Burn	B749 Bridge	KA	0	0	0
Dhish Water	Pinwherry Bridge	MT	0	1	0
Shellish	Glenbranter	MK	0	2	0
Croe Water	Ardgarten	SC	0	0	0
Carmel Water	u/s Kilmaurs	DG	0	3	0

APPENDIX

Results of individual sample audits

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Black Cart Water
DATE	15.5.92	SITE	Milliken Park
SORTER	MK	SAMPLE CODE	167

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Black Cart Water
DATE	15.5.92	SITE	Linwood Bridge
SORTER	DG	SAMPLE CODE	169

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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 Planorbidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	2 Dendrocoelidae 3 Valvatidae 4 Dytiscidae

NET LOSSES 1 NET GAINS 3

NOTES:

1 Empty shell in vial
2 Dendrocoelum lacteum 1 only
3 Valvata cristata 1 only
4 Oreodytes sanmarkii (adult) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Douglas Water
DATE	18.5.92	SITE	A74 Bridge
SORTER	DG	SAMPLE CODE	174

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Nemouridae 2 Chloroperlidae 3 Hydrophilidae 4 Sialidae 5 Odontoceridae 6 Leptoceridae

NET LOSSES 0 NET GAINS 6

NOTES:

1 Amphinemura sulcicollis
2 Chloroperla torrentium 1 only
3 Hydraena gracilis (adult) 1 only
4 Sialis lutaria 1 only
5 Odontocerum albicorne
6 Athripsodes bilineatus

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Garnock
DATE	14.5.92	SITE	Kilwinning
SORTER	KA	SAMPLE CODE	154

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Tipulidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Antocha vitripennis 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Bothlin Burn
DATE	4.6.92	SITE	Bothlin Foot
SORTER	SC	SAMPLE CODE	269

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Hydrophilidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Indet Hydrophilid (larva) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Saddell Water
DATE	20.5.92	SITE	B842 Bridge
SORTER	SC	SAMPLE CODE	194

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Simuliidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Simulium sp. (larva) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Lugton Water
DATE	14.5.92	SITE	A737 Bridge
SORTER	MK	SAMPLE CODE	158

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Myoch Burn
DATE	13.5.92	SITE	d/s Old Bridge
SORTER	MT	SAMPLE CODE	142

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Hydrobiidae 2 Hydrophilidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Potamopyrgus jenkinsi 1 only
2 Hydraena gracilis (adult) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Loin
DATE	5.5.92	SITE	Stronafyne
SORTER	MT	SAMPLE CODE	139

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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 Baetidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	2 Baetidae* 3 Taeniopterygidae 4 Goeridae

NET LOSSES 0 NET GAINS 2

NOTES:

2 Baetis rhodani, B.vernus
3 Brachyptera risi
4 Silo pallipes 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Gryfe
DATE	15.5.92	SITE	Milton Bridge
SORTER	KA	SAMPLE CODE	161

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Clyde
DATE	16.6.92	SITE	Elvanfoot
SORTER	MT	SAMPLE CODE	299

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Polycentropodidae 2 Psychomyiidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Polycentropus flavomaculatus 1 only
2 Psychomyia pusilla 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Eas a'Chais
DATE	26.6.92	SITE	u/s Fish Farm
SORTER	KA	SAMPLE CODE	340

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Clyde
DATE	16.6.92	SITE	Tidal Weir
SORTER	SC	SAMPLE CODE	311

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Barbreck
DATE	26.6.92	SITE	A816 Bridge
SORTER	DG	SAMPLE CODE	337

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Dytiscidae 2 Elmidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Oreodytes sanmarkii (adult) 1 only
2 Elmis aenea (adult) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Gala Lane
DATE	23.6.92	SITE	u/s Loch Doon
SORTER	MK	SAMPLE CODE	322

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Kelvin
DATE	12.6.92	SITE	Botanic Gardens
SORTER	MT	SAMPLE CODE	297

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Clyde
DATE	16.6.92	SITE	Dalmarnock Rail Bridge
SORTER	DG	SAMPLE CODE	310

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Corixidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Indet Corixid (nymph) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Kelvin
DATE	12.6.92	SITE	Kelvingrove
SORTER	MK	SAMPLE CODE	298

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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 Sphaeriidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 1

NOTES:

1 Sphaerium sp.

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Endrick Water
DATE	20.8.92	SITE	Drymen Bridge
SORTER	KA	SAMPLE CODE	398

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Glossiphoniidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Helobdella stagnalis 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Clyde
DATE	16.6.92	SITE	Roberton
SORTER	SC	SAMPLE CODE	300

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Cur
DATE	20.10.92	SITE	Bridgend
SORTER	DG	SAMPLE CODE	577

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Ephemerellidae 2 Taeniopterygidae 3 Limnephilidae

NET LOSSES 0 NET GAINS 3

NOTES:

1 Ephemerella ignita 1 only
2 Brachyptera risi
3 Indet Limnephilid (juvenile) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Kelvin
DATE	13.10.92	SITE	Torrance
SORTER	KA	SAMPLE CODE	528

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

Note on data sheet says "2 pots". Only 1 received by IFE.

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Caplerig/Auldhouse Burn
DATE	1.10.92	SITE	Carnwadric
SORTER	MK	SAMPLE CODE	468

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

Note on data sheet says "2 pots". Only 1 received by IFE.

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Caplerig/Auldhouse Burn
DATE	1.10.92	SITE	u/s Mearns STW
SORTER	MT	SAMPLE CODE	467

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Polycentropodidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Plectrocnemia sp. (juvenile) 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Kelvin
DATE	13.10.92	SITE	Twechar
SORTER	SC	SAMPLE CODE	525

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Planorbidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Gyraulus albus 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Rumbling Burn
DATE	7.10.92	SITE	B749 Bridge
SORTER	KA	SAMPLE CODE	501

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Dhish Water
DATE	29.9.92	SITE	Pinwherry Bridge
SORTER	MT	SAMPLE CODE	460

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Erpobdellidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Erpobdella octoculata 1 only

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Shellish
DATE	20.10.92	SITE	Glenbranter
SORTER	MK	SAMPLE CODE	576

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Asellidae 2 Taeniopterygidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Asellus aquaticus 1 only
2 Brachyptera risi

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Croe Water
DATE	20.10.92	SITE	Ardgarten
SORTER	SC	SAMPLE CODE	579

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

1992 RIVER QUALITY SURVEY AQC - BIOLOGICAL SAMPLES

REGION	Clyde RPB	RIVER	Carmel Water
DATE	7.10.92	SITE	u/s Kilmaurs
SORTER	DG	SAMPLE CODE	502

AQC OF BMWP FAMILIES A. IN VIAL [+] B. IN SAMPLE [+]

A	VIAL	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	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	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 is supplied with sample)	1 Ephemerellidae 2 Rhyacophilidae 3 Sericostomatidae

NET LOSSES 0 NET GAINS 3

NOTES:

1 Ephemerella ignita 1 only
2 Rhyacophila dorsalis (larva + pupae)
3 Sericostoma personatum 1 only


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