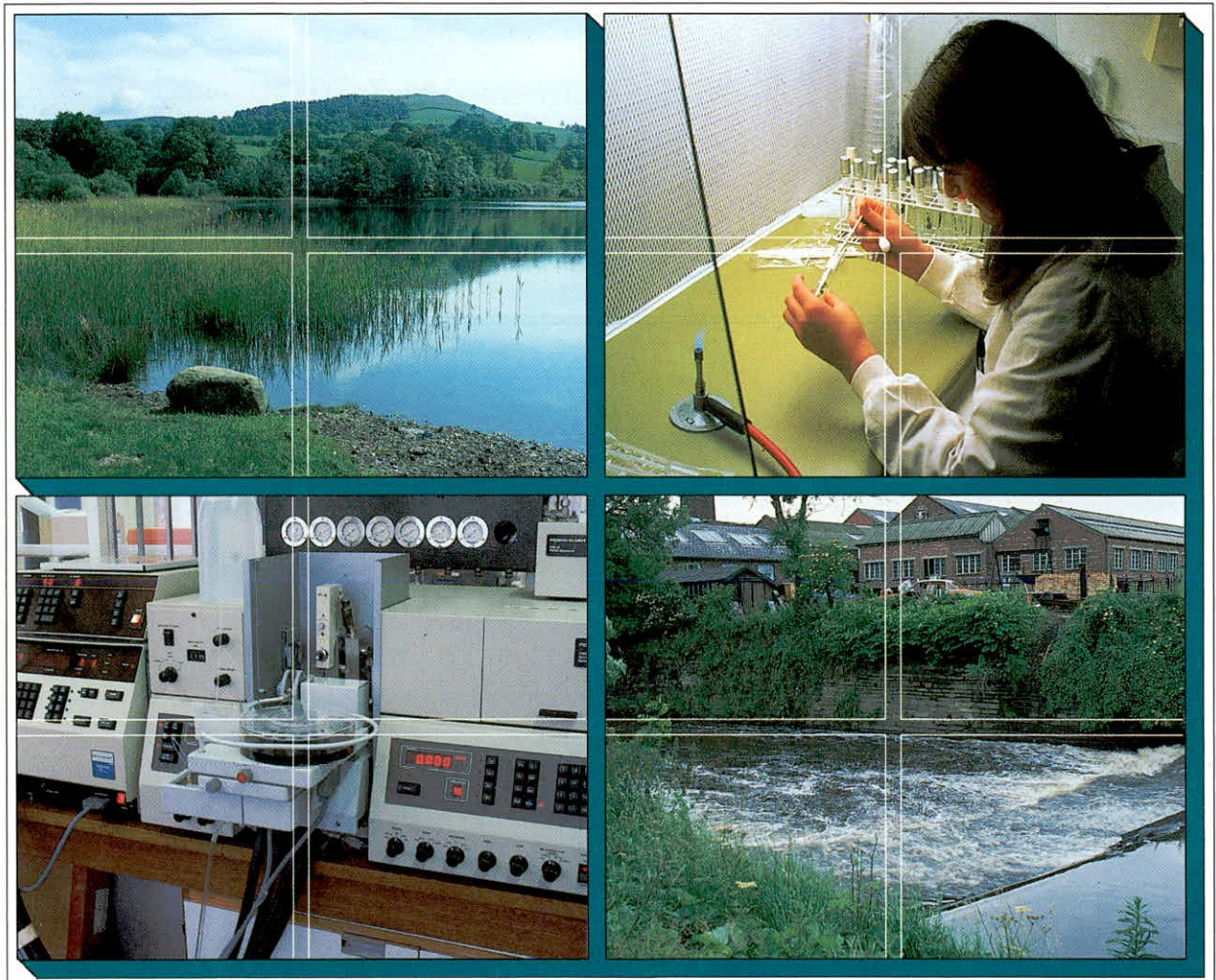




**Institute of
Freshwater
Ecology**

An audit of performance in the processing of macro-invertebrate samples in 1993. North East River Purification Board

**R.J.M Gunn, BA
J.M. Winder, PhD
N.J. Grieve, BSc
J.H. Blackburn, BSc
J.F. Wright, PhD
K.L. Symes, HNC**





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

Tel: 0929 462314

Fax: 0929 462180

**An audit of performance in the processing
of macro-invertebrate samples in 1993.
North East River Purification Board**

R.J.M. Gunn, J.M. Winder, N.J. Grieve,
J.H. Blackburn, J.F. Wright & K.L. Symes

Project leader:	R J M Gunn
Report date:	April 1994
Report to:	North East River Purification Board
IFE Report Ref:	RL/T04071e1/15
TFS Project No:	T04071e1

In accordance with our normal practice, this report is for the use only of the party to whom it is addressed, and no responsibility is accepted to any third party for the whole or any part of its contents. Neither the whole nor any part of this report or any reference thereto may be included in any published document, circular or statement, nor published or referred to in any way without our written approval of the form and context in which it may appear.

The Institute of Freshwater Ecology is part of the Terrestrial and Freshwater Sciences Directorate of the Natural Environment Research Council.

1. INTRODUCTION

In 1993 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 North East 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 Table 2 which summarises 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 Valerie Palmer for typing the report.

TABLE 1. The IFE Report form

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

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		

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

NOTES:

NET LOSSES

NET GAINS

--

TABLE 2. The 7 spring samples audited for North East RPB

River	Site	Sorter	Losses	Gains	Omissions
Buckie Burn	Ladle d/s Inchgower	MBD	0	2	0
Little Water	B9005 Bridge	MAD	0	3	0
Truim	Cuaich	JP	0	1	0
Cromdale Burn	Old Railway Bridge	JP	0	7	0
Buckie Burn	Seatown	LC	0	4	0
Dee	Banchory	DH	0	1	0
Allt Amharcaidh	u/s Lagganlia	MA	1	1	0

TABLE 3. The 3 summer samples audited for North East RPB

River	Site	Sorter	Losses	Gains	Omissions
South Ugie	u/s Kitchen Burn	CR	0	1	0
Arkland Burn	d/s Aberchirder	CR	0	3	0
Bucks Burn	d/s Bankhead SWS	DH	0	6	1

TABLE 4. The 20 autumn samples audited for North East RPB

River	Site	Sorter	Losses	Gains	Omissions
Spey	Doune	MA	0	0	1
Blackdog Burn	d/s Potterton STW	LC	0	2	0
Livet	u/s Tamnavoulin	MA	0	0	0
Ebrie Burn	d/s Auchnagatt	DH	0	4	0
Concairn Burn	u/s Cornhill	JP	1	1	0
Byth Burn	d/s New Byth	JP	0	0	0
Deveron	Conniecleugh	JP	0	1	0
Trib. of Bervie	u/s Templehill	DH	0	1	0
Kings Burn	u/s Westertown	LC	0	5	0
Leeches Burn	A950 Bridge	DH	0	2	0
Achuochkie Burn	u/s Tormore	DH	0	3	1
Muick	d/s Loch Muick	DH	0	0	0
Gelly Burn	d/s Caravan site	JP	1	2	0
Keithfield Burn	u/s Woodlands Quarry	LC	0	4	0
Durris Burn	Durris Cottage	MA	0	0	0
Sheil Burn	u/s Knockdhu	JP	0	0	0
Gairn	Bridge of Gairn	MAD	0	2	0
Trib. of Eigie Burn	u/s Eventide Home	LC	0	4	1
Bervie	Inverbervie	LC	0	1	0
Linkwood Burn	Benriach	JP	0	1	0

APPENDIX
Results of individual sample audits

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION North East RPB

RIVER Buckie Burn

DATE 5.5.93

SITE Lade d/s Inchgower

SORTER MDB

SAMPLE CODE 20G

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 Hydropsychidae 2 Simuliidae

NET LOSSES

0

NET GAINS

2

NOTES:

1 Hydropsyche siltalai 1 only
2 Simulium ornatum group

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Little Water
DATE	29.4.93	SITE	B9005 Bridge
SORTER	MAD	SAMPLE CODE	C05

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 Caenidae 3 Odontoceridae

NET LOSSES

0

NET GAINS

3

NOTES:

1 Potamopyrgus jenkinsi 1 only
2 Caenis rivulorum
3 Odontocerum albicorne 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Truim
DATE	4.5.93	SITE	Cuaich
SORTER	JP	SAMPLE CODE	05P

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 Caenidae

NET LOSSES

0

NET GAINS

1

NOTES:

1 Caenis rivulorum

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Cromdale Burn
DATE	20.5.93	SITE	Old Railway Bridge
SORTER	JP	SAMPLE CODE	40T

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 Sphaeriidae 2 Glossiphoniidae 3 Leptophlebiidae 4 Caenidae 5 Chloroperlidae 6 Psychomyiidae 7 Leptoceridae

NET LOSSES ☐0☐NET GAINS ☐7☐

NOTES:

- 1 Pisidium sp. 1 only
- 2 Helobdella stagnalis 1 only
- 3 Paraleptophlebia submarginata/cincta (juveniles)
- 4 Caenis rivulorum
- 5 Chloroperla torrentium
- 6 Psychomyia pusilla
- 7 Athripsodes commutatus 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Buckie Burn
DATE	5.5.93	SITE	Seatown
SORTER	LC	SAMPLE CODE	20V

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 Planariidae 2 Caenidae 3 Dytiscidae 4 Rhyacophilidae

NET LOSSES NET GAINS

NOTES:

- 1 Polycelis felina 1 only
- 2 Caenis rivulorum
- 3 Oreodytes sanmarkii (adult) 1 only
- 4 Agapetus sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Dee
DATE	12.5.93	SITE	Banchory
SORTER	DH	SAMPLE CODE	A28

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 Planariidae

NET LOSSES NET GAINS

NOTES:

1 Polycelis felina

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Allt Amharcaidh
DATE	26.4.93	SITE	u/s Lagganlia
SORTER	MA	SAMPLE CODE	028

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 Oligochaeta	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 Polycentropodidae

NET LOSSES NET GAINS

NOTES:

2 Plectrocnemia geniculata 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	South Ugie
DATE	18.8.93	SITE	u/s Kitchen Burn
SORTER	CR	SAMPLE CODE	G04

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 Hydropsychidae

NET LOSSES NET GAINS

NOTES:

1 Hydropsyche sp. (pupa) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION North East RPB

RIVER Arkland Burn

DATE 20.7.93

SITE d/s Aberchirder

SORTER CR

SAMPLE CODE 65P

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 Planariidae 2 Sphaeriidae 3 Elmidae

NET LOSSES

0

NET GAINS

3

NOTES:

1 Polycelis felina
2 Pisidium sp.
3 Elmis aenea (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Bucks Burn
DATE	22.7.93	SITE	d/s Bankhead SWS
SORTER	DH	SAMPLE CODE	95W

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 Ephemerellidae*	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 Sphaeriidae 3 Glossiphoniidae 4 Ephemerellidae* 5 Dytiscidae 6 Hydrophilidae 7 Limnephilidae 8 Simuliidae

NET LOSSES NET GAINS

NOTES:

- 2 Pisidium sp.
- 3 Theromyzon tessulatum 1 only
- 4 Ephemerella ignita
- 5 Oreodytes sanmarkii (larva) 1 only
- 6 Hydraena gracilis (adult) 1 only
- 7 Potamophylax cingulatus
- 8 Simulium ornatum group 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Spey
DATE	7.9.93	SITE	Doune
SORTER	MA	SAMPLE CODE	A20

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 Simuliidae*	None

B	SAMPLE	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 is supplied with sample)	2 Simuliidae*

NET LOSSES NET GAINS

NOTES:

2 Simulium reptans var galeratum 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Blackdog Burn
DATE	4.11.93	SITE	d/s Potterton STW
SORTER	LC	SAMPLE CODE	V50

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 Lymnaeidae 2 Dytiscidae

NET LOSSES

0

NET GAINS

2

NOTES:

1 Lymnaea peregra 1 only
2 Agabus sp. (larvae)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Livet
DATE	27.10.93	SITE	u/s Tamnavoulin
SORTER	MA	SAMPLE CODE	C40

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 NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Ebrie Burn
DATE	13.9.93	SITE	d/s Auchnagatt
SORTER	DH	SAMPLE CODE	D10

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 Lymnaeidae 2 Glossiphoniidae 3 Dytiscidae 4 Simuliidae

NET LOSSES

0

NET GAINS

4

NOTES:

- 1 Lymnaea peregra
- 2 Glossiphonia complanata 1 only
- 3 Oreodytes sanmarkii (adult) 1 only
- 4 Simulium cryophilum group 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Concairn Burn
DATE	8.9.93	SITE	u/s Cornhill
SORTER	JP	SAMPLE CODE	80H

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 Sericostomatidae

NET LOSSES

1

NET GAINS

1

NOTES:

1 Terrestrial snail in vial
2 Sericostoma personatum 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Byth Burn
DATE	10.11.93	SITE	d/s New Byth
SORTER	JP	SAMPLE CODE	75G

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:

--

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Deveron
DATE	27.10.93	SITE	Conniecleugh
SORTER	JP	SAMPLE CODE	A20

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 Indet Polycentropodid (juvenile) 1 only

Note in sample pot that Caenidae were "lost". Caenis rivulorum found by IFE in sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Tributary of Bervie
DATE	19.10.93	SITE	u/s Templehill
SORTER	DH	SAMPLE CODE	G51

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 Rhyacophilidae

NET LOSSES

0

NET GAINS

1

NOTES:

1 Rhyacophila dorsalis 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Kings Burn
DATE	19.10.93	SITE	u/s Westertown
SORTER	LC	SAMPLE CODE	70E

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 Ancyliidae 2 Sphaeriidae 3 Hydrophilidae 4 Scirtidae 5 Limnephilidae

NET LOSSES NET GAINS

NOTES:

1 Ancylos fluviatilis 1 only
 2 Pisidium sp.
 3 Hydraena gracilis (adult) 1 only
 4 Elodes sp. (larva) 1 only
 5 Micropterna sequax

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Leeches Burn
DATE	7.12.93	SITE	A950 Bridge
SORTER	DH	SAMPLE CODE	M90

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 Scirtidae

NET LOSSES

0

NET GAINS

2

NOTES:

1 Potamopyrgus jenkinsi 1 only
2 Elodes sp. (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Achuochkie Burn
DATE	14.2.94	SITE	u/s Tormore
SORTER	DH	SAMPLE CODE	45L

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 Siphonuridae*	2 Simuliidae

B	SAMPLE	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 is supplied with sample)	3 Siphonuridae* 4 Hydrophilidae 5 Elmidae

NET LOSSES NET GAINS

NOTES:

2 Simulium cryophilum group in vial, S. argyreatum/variegatum and
Prosimulium sp. in sample
3 Ameletus inopinatus 1 only
4 Hydraena gracilis (adults)
5 Elmis aenea (adult) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Muick
DATE	25.10.93	SITE	d/s Loch Muick
SORTER	DH	SAMPLE CODE	089

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 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 is supplied with sample)	None

NET LOSSES

NET GAINS

NOTES:

--

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Gelly Burn
DATE	3.2.94	SITE	d/s Caravan Site
SORTER	JP	SAMPLE CODE	95N

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 Scirtidae	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 Lymnaeidae 3 Beraeidae

NET LOSSES

NET GAINS

NOTES:

1 Cast skin in vial
 2 Lymnaea peregra 1 only
 3 Beraea maurus 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Keithfield Burn
DATE	15.2.94	SITE	u/s Woodlands Quarry
SORTER	LC	SAMPLE CODE	P20

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 Planariidae 2 Sphaeriidae 3 Perlodidae 4 Dytiscidae

NET LOSSES NET GAINS

NOTES:

- 1 Polycelis felina
- 2 Pisidium sp. 1 only
- 3 Isoperla grammatica
- 4 Agapetus sp. (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Durris Burn
DATE	7.12.93	SITE	Durris Cottage
SORTER	MA	SAMPLE CODE	K20

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:

--

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Sheil Burn
DATE	3.2.94	SITE	u/s Knockdhu
SORTER	JP	SAMPLE CODE	55L

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 NET GAINS

NOTES:

--

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Gairn
DATE	2.2.94	SITE	Bridge of Gairn
SORTER	MAD	SAMPLE CODE	C05

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 Planariidae 2 Limnephilidae

NET LOSSES NET GAINS

NOTES:

1 Polycelis felina 1 only
2 Drusus annulatus/Ecclisopteryx guttulata (juvenile) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION North East RPB

RIVER Tr.Eigie Burn

DATE 3.2.94

SITE u/s Eventide Home

SORTER LC

SAMPLE CODE K30

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 Hydrobiidae*	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 Hydrobiidae* 3 Taeniopterygidae 4 Leuctridae 5 Perlodidae 6 Polycentropodidae

NET LOSSES 0

NET GAINS 4

NOTES:

1,2 Empty shell in vial, Potamopyrgus jenkinsi in sample
 3 Brachyptera risi 1 only
 4 Leuctra hippopus 1 only
 5 Isoperla grammatica
 6 Plectrocnemia conspersa 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Bervie
DATE	24.1.94	SITE	Inverbervie G.S.
SORTER	LC	SAMPLE CODE	G15

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 Planariidae

NET LOSSES NET GAINS

NOTES:

1 Crenobia alpina 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	North East RPB	RIVER	Linkwood Burn
DATE	1.12.93	SITE	Benriach
SORTER	JP	SAMPLE CODE	B30

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

NET LOSSES NET GAINS

NOTES:

1 Potamopyrgus jenkinsi