



# **An audit of performance in the processing of macro-invertebrate samples in 1994. North East River Purification Board**

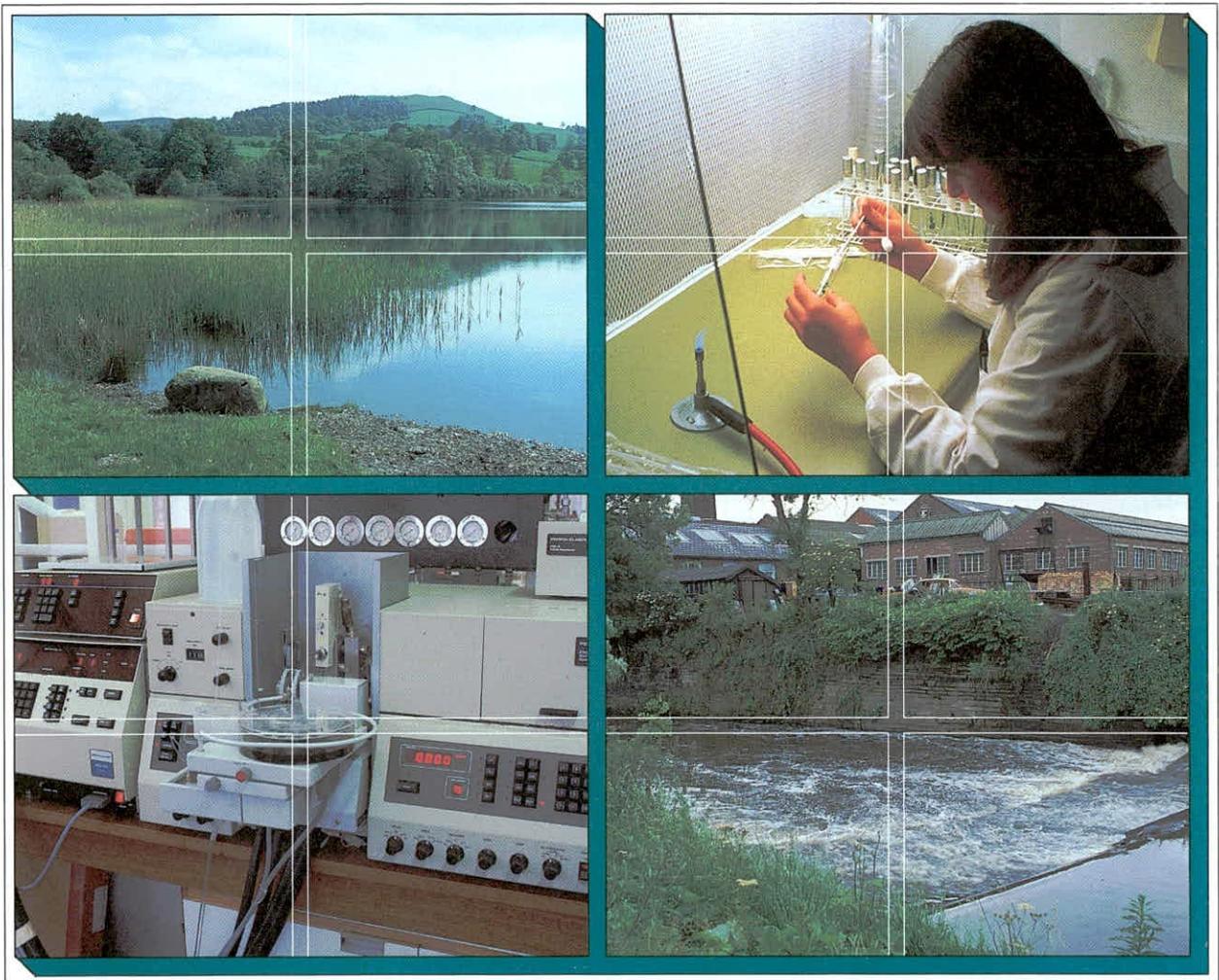
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Report To:  
IFE Report Ref. No:

North East River Purification Board  
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**An audit of performance in the  
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North East River Purification Board**

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Report Date:  
Report To:  
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R.J.M. Gunn  
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North East River Purification Board  
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## **1. INTRODUCTION**

In 1994 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 the Tables which summarise the results for each season (Tables 2, 3 and 4).

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.

TABLE 1. The IFE Report form

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	<input type="text"/>	RIVER	<input type="text"/>
DATE	<input type="text"/>	SITE	<input type="text"/>
SORTER	<input type="text"/>	CODE	<input type="text"/>

<b>A</b>	<b>VIAL</b>	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE		

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

TABLE 2. The 3 spring samples audited for North East RPB.

River	Site	Sorter	Losses	Gains	Omissions
Dinnet Burn	Mill of Dinnet	DH	0	5	1
Bronie Burn	A947 Bridge	LC	0	4	0
Bronie Burn	d/s Pitmedden	LC	0	2	0

TABLE 3 The 8 summer samples audited for North East RPB.

River	Site	Sorter	Losses	Gains	Omissions
Truim	d/s Dalwhinnie	JP	0	2	0
Deveron	Muiresk	MAD	0	3	0
Livet	Downan	LC	0	6	0
Cromdale Burn	Lethendry	JP	0	2	0
Doval Burn	d/s Dallas	KR	0	1	0
Kings Burn	u/s Westertown	KJR	0	4	0
Lhanbryde Burn	Woodpark	MAD	0	1	0
Knockando Burn	u/s Tamdhu Distillery	JP	0	0	0

TABLE 4 The 19 autumn samples audited for North East RPB.

River	Site	Sorter	Losses	Gains	Omissions
Lochter Burn	Fingask	MAD	0	2	0
Invernetie Burn	d/s Outlet C	LC	0	3	0
Arkland Burn	u/s Aberchirder	JP	0	1	0
Todlachie Burn	u/s Moneymusk STW	MAD	0	4	0
Youlie Burn	u/s Tarves STW	MAD	0	2	0
Fiddich	d/s Dufftown	LC	0	4	0
Scatter Burn	u/s Don confluence	MAD	0	1	0
Avon	Ballcorach	DH	0	5	0
Green Burn	A95 Bridge	DH	0	7	0
Rathven Burn	d/s Rathven PS	JP	0	3	0
Keithney Burn	Inverkeithney	JP	0	1	0
Dee	Banchory	MAD	0	1	1
Catterline Burn	Catterline	MAD	0	0	0
Eigie Burn	d/s Balmedie STW	DH	1	2	0
Black Burn	d/s Burnside	JP	0	0	0
Cardow Burn	d/s Cardhu Distillery	DH	2	1	0
Cairngall Burn	d/s Longside STW	LC	0	1	0
Keithfield Burn	u/s Woodlands Quarry	DH	0	5	0
Ugie	Inverugie	MAD	0	5	0

## **APPENDIX**

### **Results of individual sample audits**

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Dinnet Burn
DATE	26.5.94	SITE	Mill of Dinnet
SORTER	DH	CODE	E05/34

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	2 Hydrobiidae 3 Heptageniidae* 4 Cordulegasteridae 5 Dytiscidae 6 Odontoceridae 7 Chironomidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 2 Potamopyrgus jenkinsi
- 3 Ecdyonurus sp., Rhithrogena semicolorata/germanica
- 4 Cordulegaster boltoni 1 only
- 5 Oreodytes sanmarkii
- 6 Odontocerum albicorne
- 7 Tanypodinae, Chironomini, Tanytarsini

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Bronie Burn
DATE	30.5.94	SITE	A947 Bridge
SORTER	LC	CODE	E02/68

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	1 Heptageniidae 2 Chloroperlidae 3 Hydrophilidae 4 Tipulidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |   |
|---|
| 1 Rhithrogena semicolorata/germanica 1 only<br>2 Chloroperla torrentium<br>3 Indet Hydrophilid (larva) 1 only<br>4 Dicranota sp. 1 only |
|---|

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Bronie Burn
DATE	30.5.94	SITE	d/s Pitmedden
SORTER	LC	CODE	E15/72

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Potamopyrgus jenkinsi  
 2 Lymnaea peregra 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Truim
DATE	6.6.94	SITE	d/s Dalwhinnie
SORTER	JP	CODE	05J/115

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 is only completed when no vial is supplied with the sample)	1 Oligochaeta 2 Caenidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

<p>1 Nais sp. 1 only 2 Caenis rivulorum 1 only</p>
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EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Deveron
DATE	20.6.94	SITE	Muiresk
SORTER	MAD	CODE	A45/103

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 is only completed when no vial is supplied with the sample)	1 Lymnaeidae 2 Tipulidae 3 Simuliidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 1 Lymnaea peregra 1 only
- 2 Antocha vitripennis
- 3 Simulium ornatum group, S.cryophilum group

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Livet
DATE	24.8.94	SITE	Downan
SORTER	LC	CODE	C70/166

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 is only completed when no vial is supplied with the sample)	1 Planariidae 2 Lymnaeidae 3 Caenidae 4 Dytiscidae 5 Hydrophilidae 6 Goeridae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 1 Polycelis felina 1 only
- 2 Lymnaea peregra
- 3 Caenis rivulorum 1 only
- 4 Oreodytes sanmarkii (adult) 1 only
- 5 Hydraena gracilis (adults)
- 6 Silo pallipes 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Cromdale Burn
DATE	4.7.94	SITE	Lethendry
SORTER	JP	CODE	40N/142

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 is only completed when no vial is supplied with the sample)	1 Leptoceridae 2 Lepidostomatidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Athripsodes albifrons/bilineatus 1 only  
2 Lepidostoma hirtum 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Doval Burn
DATE	16.8.94	SITE	d/s Dallas
SORTER	KR	CODE	10P/54

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 is only completed when no vial is supplied with the sample)	1 Sphaeriidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Pisidium sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Kings Burn
DATE	26.7.94	SITE	u/s Westertown
SORTER	KJR	CODE	70E/140

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	1 Ephemerellidae 2 Nemouridae 3 Elmidae 4 Rhyacophilidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |   |
|---|
| 1 Ephemerella ignita 1 only<br>2 Nemurella picteti<br>3 Elmis aenea 1 only<br>4 Rhyacophila dorsalis 1 only |
|---|

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Lhanbryde Burn
DATE	16.8.94	SITE	Woodpark
SORTER	MAD	CODE	60K/61

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 is only completed when no vial is supplied with the sample)	1. Dendrocoelidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Dendrocoelum lacteum 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Knockando Burn
DATE	30.8.94	SITE	u/s Tamdhu Distillery
SORTER	JP	CODE	50P

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 is only completed when no vial is supplied with the sample)	None

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Lochter Burn
DATE	25.10.94	SITE	Fingask
SORTER	MAD	CODE	K05

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

B	<p align="center">SAMPLE</p> <p>Differences between:                      i) BMWP families listed on sample data sheet and                      ii) BMWP families found in SAMPLE by IFE</p>	<p align="center">BMWP FAMILIES NOT FOUND BY IFE</p>	<p align="center">ADDITIONAL FAMILIES FOUND BY IFE</p>
		<p>(This box is only completed when no vial is supplied with the sample)</p>	1 Ephemerellidae 2 Hydrophilidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Ephemerella ignita 2 Hydraena gracilis (adults)
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EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Invernettie Burn
DATE	29.9.94	SITE	d/s Outlet C
SORTER	LC	CODE	112

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Potamopyrgus jenkinsi 2 Isoperla grammatica 1 only 3 Tipula montium group 1 only
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EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Arkland Burn
DATE	27.9.94	SITE	u/s Aberchirder
SORTER	JP	CODE	65L

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Rhyacophila dorsalis, Agapetus sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Todlachie Burn
DATE	3.10.94	SITE	u/s Monymusk STW
SORTER	MAD	CODE	50J

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 1 Nemoura avicularis, Protonemura meyeri
- 2 Polycelis felina 1 only
- 3 Taeniopteryx nebulosa
- 4 Hydraena gracilis (adult) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Youlie Burn
DATE	14.9.94	SITE	u/s Tarves STW
SORTER	MAD	CODE	G05

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Rhyacophila dorsalis 2 Silo pallipes 1 only
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EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Fiddich
DATE	13.10.94	SITE	d/s Dufftown
SORTER	LC	CODE	E50

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	1 Caenidae 2 Psychomyiidae 3 Goeridae 4 Lepidostomatidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |   |
|---|
| 1 <i>Caenis rivulorum</i> 1 only<br>2 <i>Psychomyia pusilla</i><br>3 <i>Silo pallipes</i> 1 only<br>4 <i>Lepidostoma hirtum</i> |
|---|

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Scatter Burn
DATE	7.11.94	SITE	u/s Don confluence
SORTER	MAD	CODE	97X

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 is only completed when no vial is supplied with the sample)	1 Physidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Physa acuta/heterostropha 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Avon
DATE	13.10.94	SITE	Ballcorach
SORTER	DH	CODE	B30

A	<b>VIAL</b>  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	1 Perlidae

B	<b>SAMPLE</b>  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 is only completed when no vial is supplied with the sample)	2 Ancylidae 3 Hydrophilidae 4 Hydroptilidae 5 Limnephilidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |  |
|--|
| 1 <i>Perla bipunctata</i><br>2 <i>Ancylus fluviatilis</i> 1 only<br>3 <i>Hydraena gracilis</i> (adult) 1 only<br>4 <i>Hydroptila</i> sp. 1 only<br>5 <i>Ecclisopteryx guttulata</i> 1 only |
|--|

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Green Burn
DATE	1.9.94	SITE	A95 Bridge
SORTER	DH	CODE	60N

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	2 Ancyliidae 3 Sphaeriidae 4 Hydrophilidae 5 Scirtidae 6 Hydroptilidae 7 Goeridae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 1 Protonemura sp.
- 2 Ancyclus fluviatilis 1 only
- 3 Pisidium sp. 1 only
- 4 Helophorus brevipalpis (adult) 1 only
- 5 Elodes sp. (larva) 1 only
- 6 Hydroptila sp.
- 7 Silo pallipes 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Rathven Burn
DATE	12.12.94	SITE	d/s Rathven PS
SORTER	JP	CODE	30J

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 is only completed when no vial is supplied with the sample)	1 Hydrophilidae 2 Rhyacophilidae 3 Lepidostomatidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |  |
|--|
| <p>1 Indet Hydrophilid (larva) 1 only<br/>2 Glossosoma sp.<br/>3 Crunoecia irrorata 1 only</p> |
|--|

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Keithney Burn
DATE	20.10.94	SITE	Inverkeithney
SORTER	JP	CODE	70T

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 is only completed when no vial is supplied with the sample)	1 Hydrophilidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Hydraena gracilis (adult) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Dee
DATE	30.1.95	SITE	Banchory
SORTER	MAD	CODE	A28

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

2 Caenis rivulorum 1 only  
3 Tanypodinae, Orthoclaadiinae, Chironomini

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Catterline Burn
DATE	21.12.94	SITE	Catterline
SORTER	MAD	CODE	F15

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Eigie Burn
DATE	14.12.94	SITE	d/s Balmedie STW
SORTER	DH	CODE	K10

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 The number of scoring taxa recorded on the data sheet suggest that Hemiptera is included as a taxon. A terrestrial Hemipteran (Jassidae) was present in the vial  
 2 Lymnaea peregra  
 3 Elms aenea (adult + larva)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Black Burn
DATE	21.11.94	SITE	d/s Burnside
SORTER	JP	CODE	30F

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 is only completed when no vial is supplied with the sample)	None

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Cardow Burn
DATE	25.10.94	SITE	d/s Cardhu Distillery
SORTER	DH	CODE	50T

<b>A</b>	<b>VIAL</b>	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Scirtidae 2 Polycentropodidae	None

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

3 Lymnaea peregra 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Cairngall Burn
DATE	7.12.94	SITE	d/s Longside STW
SORTER	LC	CODE	L10

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

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

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

1 Taeniopteryx nebulosa

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Keithfield Burn
DATE	7.12.94	SITE	u/s Woodlands Quarry
SORTER	DH	CODE	P20

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	1 Lymnaeidae 2 Sphaeriidae 3 Perlodidae 4 Rhyacophilidae 5 Simuliidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- 1 Lymnaea peregra
- 2 Pisidium sp.
- 3 Isoperla grammatica 1 only
- 4 Agapetus sp. 1 only
- 5 Simulium cryophilum group, S.ornatum group

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1994

REGION	North East RPB	RIVER	Ugie
DATE	1.12.94	SITE	Inverugie
SORTER	MAD	CODE	U05

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

B	<b>SAMPLE</b>  Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	<b>BMWP FAMILIES NOT FOUND BY IFE</b>	<b>ADDITIONAL FAMILIES FOUND BY IFE</b>
		(This box is only completed when no vial is supplied with the sample)	1 Erpobdellidae 2 Caenidae 3 Dytiscidae 4 Hydroptilidae 5 Lepidostomatidae

\* Taxa recorded on data sheet but absent from vial and found by I.F.E. in sample (omissions)

NET LOSSES  NET GAINS  OMISSIONS

NOTES:

- |   |
|---|
| 1 Erpobdella octoculata<br>2 Caenis rivulorum 1 only<br>3 Oreodytes sanmarkii (adult) 1 only<br>4 Hydroptila sp.<br>5 Lepidostoma hirtum 1 only |
|---|