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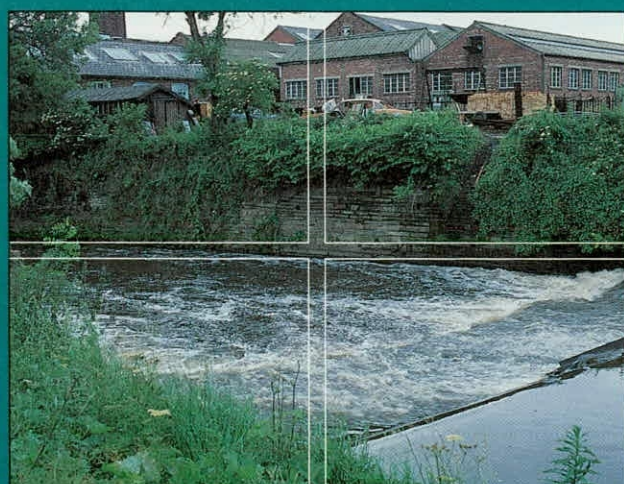
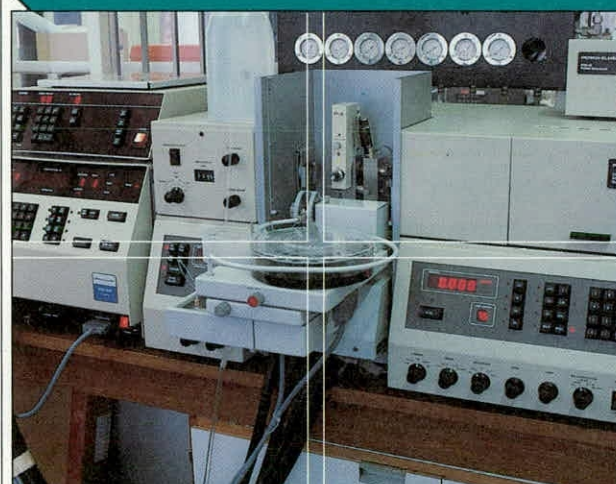
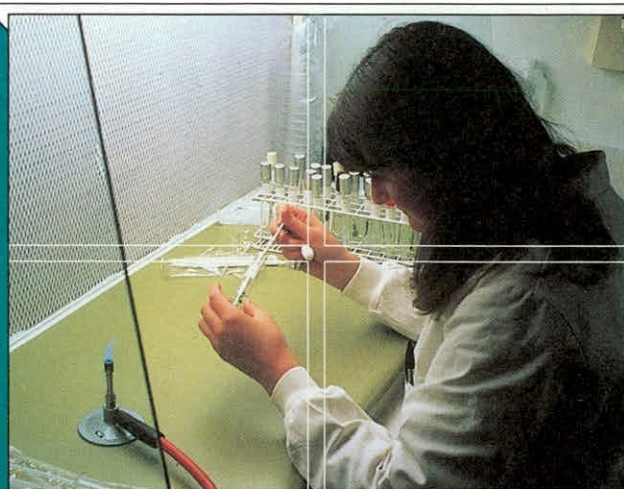
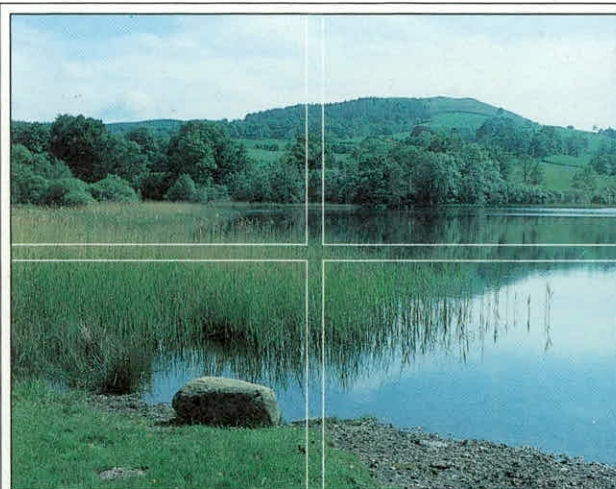
# **Quality audit of biological samples for the 1990 River Quality Survey North East River Purification Board**

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**Quality Audit of Biological Samples  
for the 1990 River Quality Survey  
North East River Purification Board**

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Project leader:	J.F. Wright
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## 1. INTRODUCTION

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

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

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

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

The IFE was contracted to undertake an audit of the sample sorting and identification performance of each NRA region, RPB and the DED. This report collates the results of 22 samples audited for North East RPB. The IFE was not required to perform any statistical analyses nor interpretation of the results of the audit.

## 2. SAMPLE SELECTION

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

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

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

### 3. SAMPLE PROCESSING

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

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

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

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

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

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

#### **4. REPORTING**

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

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

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

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

#### **ACKNOWLEDGEMENTS**

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

TABLE 1. The IFE Report form

## 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

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

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

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

NET LOSSES NET GAINS 

NOTES



TABLE 2. The 22 samples audited for North East RPB, with sample sorter initials and numbers of taxa 'lost', 'gained' and 'omitted'

River	Site	Sorter	Losses	Gains	Omissions
<b>SPRING</b>					
Lochter Burn	Balhalgardy	LMT	0	4	0
Spey	Kingussie	JCP	0	3	0
Burn of Muchalls	Br of Muchalls	LMT	1	5	0
Cowie	Stonehaven	LC	0	4	0
Isla	U/s Strathmill	JCP	0	3	0
Don	Kinkell Church	MAD	1	1	0
Catterline Burn	Catterline	LC	0	0	0
Black Burn	Kinaldie	MAD	0	2	0
Greenspeck Burn	Craigmaud Rd Br	MBD	0	2	0
Gonar Burn	Skelmanae Bridge	MBD	0	1	0
<b>SUMMER</b>					
Bronie Burn	U/s Cairnfechel	LMT	2	3	0
Little Water	B9005 Bridge	MAD	1	1	0
Tynet Burn	U/s Fish Farm	JCP	0	1	0
Gairn	Bridge of Gairn	LC	0	1	0
Truim	Crubenmore	MBD	0	0	0
Black Burn	Pittendriach	RO	0	3	1
<b>AUTUMN</b>					
Chabet Water	Ballcorach Bridge	RO	0	4	0
Cromdale Water	Old Railway Bridge	RO	0	1	0
Linkwood Burn	Whitewreath	JCP	0	3	0
Fordoun Burn	Fyvie Bridge	MAD	0	2	0
Deveron	Bridge of Alvah	LC	0	0	0
Auchreddie Burn	New Deer	MBD	0	0	0



**TABLE 3**  
**Results of individual sample audits**

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Lochter Burn**

SEASON **Spring**

SITE **Balhalgardy**

SORTER **LMT**

SAMPLE CODE **NRA12 0769**

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

B. IN SAMPLE **+**

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

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

NET LOSSES **0**

NET GAINS **4**

### NOTES

- 1 Pisidium sp.
- 2 Glossiphonia sp. 1 only
- 3 Caenis rivulorum 1 only
- 4 Amphinemura sulcicollis 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION	North East RPB	RIVER	Spey
SEASON	Spring	SITE	Kingussie
SORTER	JCP	SAMPLE CODE	NRA12 0625

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

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

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

NET LOSSES        NET GAINS   

NOTES

1 Pisidium sp.  
2 Chloroperla torrentium 1 only  
3 Hydroptila sp. (pupa) 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION North East

RIVER Burn of Muchalls

SEASON Spring

SITE Bridge of Muchalls

SORTER LMT

SAMPLE CODE NRA12 0808

AQC OF BMWP FAMILIES A. IN VIAL +

B. IN SAMPLE +

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

B	SAMPLE	
Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	(This box only completed when no vial supplied with sample)	2 Leptophlebiidae 3 Caenidae 4 Chloroperlidae 5 Hydrophilidae 6 Tipulidae

NET LOSSES 1

NET GAINS 5

### NOTES

2 Paraleptophlebia submarginata 1 only  
3 Caenis rivulorum 1 only  
4 Chloroperla torrentium 1 only  
5 Hydraena gracilis 1 only  
6 Dicranota sp. 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION North East RPB

RIVER Cowie

SEASON Spring

SITE Stonehaven

SORTER LC

SAMPLE CODE NRA12 0809

AQC OF BMWP FAMILIES    A. IN VIAL +

B. IN SAMPLE +

LOSSES		GAINS
A	VIAL	
	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	None	1 Perlidae
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 FOUND BY IFE
	(This box only completed when no vial supplied with sample)	2 Dytiscidae 3 Goeridae 4 Lepidostomatidae
Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE		

NET LOSSES 0

NET GAINS 4

### NOTES

- 1 Dinocras cephalotes
- 2 Oreodytes sanmarkii (adults)
- 3 Silo pallipes
- 4 Lepidostoma hirtum

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION

RIVER

SEASON

SITE

SORTER

SAMPLE CODE

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

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

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

NET LOSSES

NET GAINS

### NOTES

1 Caenis rivulorum 1 only  
2 Hydraena gracilis  
3 Hydropsyche siltalai 1 only



# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Don**

SEASON **Spring**

SITE **Kinkell Church**

SORTER **MAD**

SAMPLE CODE **NRA12 0750**

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

B. IN SAMPLE **+**

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWF families listed on sample data sheet and ii) BMWF families found in VIAL by IFE	BMWF FAMILIES NOT FOUND BY IFE  <b>1 Planorbidae</b>
		ADDITIONAL FAMILIES FOUND BY IFE  <b>2 Polycentropodidae</b>

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

NET LOSSES **1**

NET GAINS **1**

NOTES

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION North East

RIVER Catterline Burn

SEASON Spring

SITE Catterline

SORTER LC

SAMPLE CODE NRA12 0812

AQC OF BMWP FAMILIES

A. IN VIAL

+

B. IN SAMPLE

+

### LOSSES

### GAINS

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

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

NET LOSSES

0

NET GAINS

0

NOTES

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION North East RPB

RIVER Black Burn

SEASON Spring

SITE B979 Br, Kinaldie

SORTER MAD

SAMPLE CODE NRA12 0772

AQC OF BMWP FAMILIES A. IN VIAL +

B. IN SAMPLE +

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

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

NET LOSSES 0

NET GAINS 2

### NOTES

1 Beraea maurus 1 only  
2 Simulium cryophilum group 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION North East RPB

RIVER Greenspeck Burn

SEASON Spring

SITE Craigmaud Rd Br

SORTER MBD

SAMPLE CODE NRA12 0707

AQC OF BMWP FAMILIES A. IN VIAL +

B. IN SAMPLE +

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

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

NET LOSSES 0

NET GAINS 2

NOTES

1 Potamopyrgus jenkinsi  
2 Elmis aenea (adult) 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION

North East RPB

RIVER

Gonar Burn

SEASON

Spring

SITE

Skelmanae Bridge

SORTER

MBD

SAMPLE CODE

NRA12 0708

AQC OF BMWP FAMILIES

A. IN VIAL

+

B. IN SAMPLE

+

### LOSSES

### GAINS

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 Nemouridae

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 supplied with sample)	None

NET LOSSES

0

NET GAINS

1

NOTES

1 Nemoura cambrica/erratica

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Bronie Burn**

SEASON **Summer**

SITE **U/s Cairnfechel**

SORTER **LMT**

SAMPLE CODE **NRA12 0734**

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

B. IN SAMPLE **+**

LOSSES		GAINS	
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Nemouridae 2 Elmidae	None

B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial supplied with sample)	3 Ancyliidae 4 Siphonuridae 5 Hydrophilidae

NET LOSSES **2**

NET GAINS **3**

### NOTES

2 Terrestrial beetle in vial  
3 Ancylos fluviatilis  
4 Siphonurus sp. 1 only  
5 Helophorus brevipalpis, Anacaena globulus

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Little Water**

SEASON **Summer**

SITE **B9005 Bridge**

SORTER **MAD**

SAMPLE CODE **NRA12 0730**

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

B. IN SAMPLE **+**

LOSSES		GAINS
A	<u>VIAL</u>	
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE  1 Sphaeriidae  ADDITIONAL FAMILIES FOUND BY IFE  2 Ancyliidae

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

NET LOSSES **1**

NET GAINS **1**

NOTES **2 Ancyclus fluviatilis**

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Tynet Burn**

SEASON **Summer**

SITE **U/s Fish Farm**

SORTER **JCP**

SAMPLE CODE **NRA12 0686**

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

B. IN SAMPLE **+**

### LOSSES

### GAINS

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

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

NET LOSSES **0**

NET GAINS **1**

NOTES **1 Chloroperla torrentium 1 only**



# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Gairn**

SEASON **Summer**

SITE **Bridge of Gairn**

SORTER **LC**

SAMPLE CODE **NRA12 0789**

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

B. IN SAMPLE **+**

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

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

NET LOSSES **0**

NET GAINS **1**

NOTES **1 Ecclisopteryx guttulata 1 only**

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Truim**

SEASON **Summer**

SITE **Crubenmore**

SORTER **MBD**

SAMPLE CODE **NRA12 0640**

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

B. IN SAMPLE **+**

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

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

NET LOSSES **0**

NET GAINS **0**

NOTES

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION	North East RPB	RIVER	Black Burn
SEASON	Summer	SITE	Pittendriach
SORTER	RO	SAMPLE CODE	NRA12 0621

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

LOSSES		GAINS
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	ADDITIONAL FAMILIES FOUND BY IFE
		1 Rhyacophilidae*
		None
B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	ADDITIONAL FAMILIES FOUND BY IFE
		(This box only completed when no vial supplied with sample)
		2 Lymnaeidae 3 Planorbidae 4 Perlodidae 5 Rhyacophilidae*

NET LOSSES   

NET GAINS   

NOTES

- 2 Lymnaea peregra
- 3 Bathyomphalus contortus 1 only
- 4 Isoperla grammatica 1 only
- 5 Glossosoma sp. 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION	North East RPB	RIVER	Chabet Water
SEASON	Autumn	SITE	Ballcorach Bridge
SORTER	RO	SAMPLE CODE	NRA12 0647

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

LOSSES		GAINS
A	<u>VIAL</u>	BMWP FAMILIES NOT FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	ADDITIONAL FAMILIES FOUND BY IFE
	None	None
B	<u>SAMPLE</u>	BMWP FAMILIES NOT FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	ADDITIONAL FAMILIES FOUND BY IFE
	(This box only completed when no vial supplied with sample)	1 Sphaeriidae 2 Chloroperlidae 3 Dytiscidae 4 Hydrophilidae

NET LOSSES     NET GAINS

NOTES

- 1 Pisidium sp. 1 only
- 2 Chloroperla torrentium
- 3 Platambus maculatus (larva) 1 only
- 4 Hydraena gracilis (adult) 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION	<b>North East RPB</b>	RIVER	<b>Cromdale Water</b>
SEASON	<b>Autumn</b>	SITE	<b>Old Railway Bridge</b>
SORTER	<b>RO</b>	SAMPLE CODE	<b>NRA12 0644</b>

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

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

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

NET LOSSES

NET GAINS

NOTES    **1 Ancylus fluviatilis 1 only**

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Linkwood Burn**

SEASON **Autumn**

SITE **Whitewreath**

SORTER **JCP**

SAMPLE CODE **NRA12 0616**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

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

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

NET LOSSES

NET GAINS

NOTES  
1 Hydraena gracilis (adults)  
2 Sericostoma personatum 1 only  
3 Brillia modesta 1 only

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER

**Fordoun Burn**

SEASON

**Autumn**

SITE

**Fyvie Bridge**

SORTER

**MAD**

SAMPLE CODE

**NRA12 0729**

AQC OF BMWP FAMILIES

A. IN VIAL

**+**

B. IN SAMPLE

**+**

### LOSSES

### GAINS

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

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

NET LOSSES **0**

NET GAINS **2**

NOTES

**1 Caenis rivulorum 1 only**  
**2 Rhyacophila sp., Agapetus sp.**

# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION **North East RPB**

RIVER **Deveron**

SEASON **Autumn**

SITE **Bridge of Alvah**

SORTER **LC**

SAMPLE CODE **NRA12 0662**

AQC OF BMWP FAMILIES A. IN VIAL

B. IN SAMPLE

### LOSSES

### GAINS

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

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

NET LOSSES

NET GAINS

NOTES



# 1990 RIVER QUALITY SURVEY

## AQC - BIOLOGICAL SAMPLES

REGION	<b>North East RPB</b>	RIVER	<b>Auchreddie Burn</b>
SEASON	<b>Autumn</b>	SITE	<b>B9028 Bridge New Deer</b>
SORTER	<b>MBD</b>	SAMPLE CODE	<b>NRA12 0718</b>

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

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

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

NET LOSSES     NET GAINS

NOTES

